CHAPTER XIV

EVACUATION EXPEDITIONARY BASE. THE GENERAL HOSPITALS

THE disabled soldier whose wound, injury, or sickness was of such a nature or degree of severity as to make his retention in Army area undesirable—in view either of his own interests or the military situation—was transferred to the Lines of Communication, where he came under the control of the Inspector-General of Communications, and became the responsibility of the Director of Medical Services, L. of C. We visualise, then, a stream of casualties, sick and wounded, drawn from the vast system of treatment stations, major and minor, along the 100 odd miles of the British front passing by innumerable transport routes to converge, now chiefly by rail,[1] to some half-dozen centres of treatment and *triage* on the lines of communication and at the Expeditionary Force Bases. Here for a moment the casualty comes to rest in medical units—"General" and "Stationary"[2] Hospitals—not unlike those of civil life and under conditions not wholly alien from those.

BRITISH L OF C.—MEDICAL ADMINISTRATION

The British Lines of Communication in France comprised a "two-way" traffic system by rail and sea, between the "Army" area and the Expeditionary Force Bases together with various subsidiary supply depots and medical centres behind the front. This was one of the most important spheres of medical activity, though at the beginning of the war the system was astonishingly vague.

The *British Official Medical History of the War* shows[3] that by October, 1914, confusion had become so confounded that the Director

[1] Though by far the greater number reached the Base Hospitals by rail, during 1917-18 31,563 were carried by barge and 52,841 by motor ambulance convoy.

[2] The rôle of the "Stationary" Hospital at the Base was even less defined than at the Front.

[3] *General, Vol II p 4.*

of Medical Services of the Expeditionary Force (Surgeon-General T. P. Woodhouse) "was represented in an administrative capacity both at G.H.Q. and on the headquarters of the L. of C., while he himself and his office were attached to neither"; the administration of the medical services at G.H.Q. was "practically in the hands of the Adjutant-General, assisted by a deputy director and deputy assistant director of medical services." "The situation" as Sir William Macpherson dryly comments "was not one which was conducive to smooth administration." At the beginning of January, 1915, a complete reorganisation of the administrative medical services was effected with a D.G.M.S. (Sir A. Sloggett) "as the responsible head at G.H Q." and a Director of Medical Services (Surgeon-General Woodhouse) at the headquarters of the I.G.C. at Abbeville. The medical control of the several bases was placed under deputy directors.

With changes incidental to the development of the B.E.F. this arrangement persisted throughout the war.

The staff of the D.M.S., L. of C., included a D.A D M.S. for ambulance trains; after 1915 he was graded as an A.D.M.S and had a small expert staff. Working in close conjunction with the Director of Transportation at G.H.Q., this officer controlled the movement of all the ambulance trains on the British front. The diagram on the next page indicates the channels whereby this stupendous task was carried out with unimpeachable efficiency and smoothness. An Ambulance Train Advisory Committee in France, with sub-committee at home, advised G.H.Q. and War Office respectively on the ambulance train requirements and problems associated therewith. A special inspectoral staff was also appointed in France.

Ambulance trains—their control

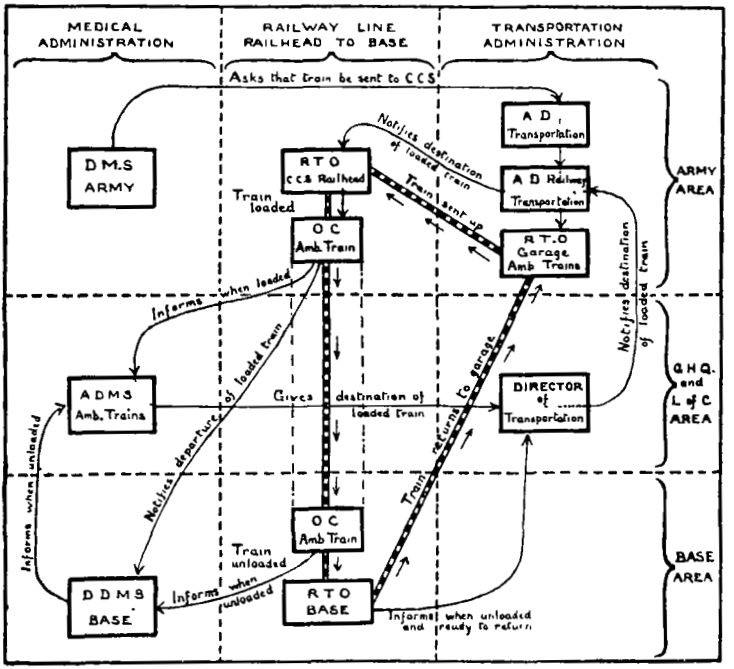
The casualty clearing stations, at railhead, were linked to the system of General Hospitals by the ambulance trains.[4] The merging of Dominion with other British and Imperial casualties which began at the C.C.S.[5] was here complete since the service was supplied entirely by the War Office (or through it by private benevolence) and

The Trains

[4] *See pp 28, 269.* Railhead on the Western Front (it may be recalled) corresponded with the port of Mudros in the Gallipoli Campaign as a centre for classification and treatment, and the "black" ships and hospital ships corresponded to the ambulance train For the student of military medical tactics and strategy no better exercise could be imagined than a comparative study of the transport and treatment problems of the L. of C. in the two campaigns

[5] One feature of the arrangements on the ambulance trains went against Australian feelings, namely the unduly great difference in the matter of the comfort provided for the "commissioned" officer and for the rank and file. This "class" distinction between the wounded was strongly marked throughout the British Army medical system—*e.g.* in the provision for "Rest Hospitals" for officers at the Front, at the Base in France, and in Britain. The difference between British and Australian ideas is further seen in the activities of the British Red Cross Society and the Australian Branch respectively. It is fair to note that repugnance to these distinctions was not confined to the A I.F. The following statement of opinion is that of an R.M.O. of the Guards. "The difference in our Army between the comforts and honours obtained and the hardships that have to be endured by the rank and file, and the easier lot of their officers, would be grotesque even if we were not all of the same race." (*Unwilling Passenger, p 17,* by Lieut.-Col. Arthur Osburn).

the trains were staffed entirely by personnel of the R.A.M.C. and Q.A.I.M.N.S.[6] But to complete the picture of the evacuation of sick and wounded from front line to base a short account is given of the ambulance train system and service in France.[7]



Scheme of method of running an Ambulance Train (From British Official Medical History)

The British Ambulance Train in the Great War evolved in three stages: (*a*) The haphazard use of open trucks. (*b*) Adaptation of coaches to take stretchers. (*c*) The construction and working of special ambulance (hospital) trains.

[6] Or by Dominion personnel lent to those services. In this way some members of the A.A.M.C. and A A N S did terms of duty on these trains The experience of an Australian Medical Officer-in-charge of one is given in the narrative of March, 1918, *see pp. 623-4*

[7] This is taken chiefly from the *British Official Medical History* and from the article by Surgeon-General Sir George Makins which deals with, *inter alia*, "Hospital Trains and Motor Ambulances" in *British Medicine in the War 1914-17*, published by the British Medical Association, 1917 (a reprint of articles in the *B M J*, *April to Oct., 1917*)

(*a*) *The Open Truck.* The method of evacuation of wounded to the Base by open "supply" truck "returning empty" was perforce employed in the first week of the 1914 fighting. The plight of the seriously wounded evacuated thus seems to have created as painful an impression as that of the "black ships" from the Landing.[8]

(*b*) *"Improvised" and "Temporary Ambulance Trains."* In England at the outbreak of war there was one military ambulance train, constructed during the South African War.

"A small difference in gauge in the French and English lines prevented the prompt shifting of English hospital carriages across the Channel." Great difficulties were experienced in the initial stages of the campaign. "It seems as if both France and Germany had relied for the railway transport of the wounded on the same means which served the purpose in the war of 1870-71. In fact with the exception of the addition of frames for carrying stretchers placed on the floors of merchandise waggons, no special arrangements appear to have been made. [These trains] were provided with no permanent arrangements for cooking food, no sanitary conveniences, no provision for the carriage of water, and, in fact, consisted of a mere string of trucks, with no means of intercommunication."[9]

Even after the introduction of specially designed and constructed ambulance trains, the adaptation of passenger coaches to take stretchers was carried out, and after 1916 huge numbers of walking wounded were evacuated by the "temporary ambulance trains." At the end of the war the technique for adaptation had been standardised, and doubtless the methods adopted are embodied in "mobilisation standing orders" of all scientifically equipped nations. The Australian engineers had some experience in the "Somme winter" of 1916 in connection with evacuation from the Flers front by the broad-gauge train constructed by the I Anzac Corps.[10]

(*c*) *The Special "Ambulance" or "Hospital" Trains.* At the end of the war there had been specially constructed for the evacuation of British casualties between 40 and 50 ambulance trains, of which the larger number were working on the Western Front. At the end of 1917 the general organisation of a standard train was as follows:—[11] Each was composed of 16 bogie coaches varying from 58 to 61 feet in length. They were vestibuled throughout and heated by steam from the engine, and were fitted with electric light and fans. No. 1 coach was a brake van and lying infectious ward (18 patients); No. 2 a staff car with lavatories, dining and sleeping rooms for sisters and medical officers; and No. 3 a kitchen and "sitting sick officers' car." The following 8 coaches were "ward cars" with 36 beds in each (three tiers of twelve beds) with a lavatory and washing-up sink at the end. The remaining five coaches were, pharmacy and treatment car, sitting infectious car,

[8] *Vol. I, p. 179.* As late as May, 1915 (Battle of Neuve Chapelle) the D.M.S. First Army (Surgeon-General W. G. Macpherson) organised a special system for equipping and using empty supply trains for evacuation of wounded. *Brit. Off. Med. History, General, Vol. II, Appendix B*

[9] Sir George Makins, *loc cit., p. 58*

[10] *See pp 83n, 87-8*

[11] *Brit. Off Med History Vol IV, Chapter xxiii (pp 560-665).* This chapter gives a detailed and informative statement of the various means of ambulance transport used in the British Army during the Great War. It is of interest that the aeroplane is not included.

kitchen and personnel mess car, personnel car (other ranks), brake van and store car.

In fact, as the *British Medical History* states,[12] "the ambulance trains were mobile hospitals complete not only in medical equipment but in medical personnel, stretchers, supplies and stores for use on the trains and to meet the emergency demands of D's.M.S. during active operations. They were used not only to evacuate the cases from the front area, but also to permit of treatment of the wounded during the journey."

Each train had a carrying capacity of 306 lying and from 56 to 64 sitting, and 36 to 39 personnel.

Most of the sitting cases were evacuated by the "temporary ambulance trains" ("TA.T.") which had a capacity of 1,008 in third class carriages. The staff of the "T.A.T's" consisted of 1 Medical Officer, 1 N.C.O., and 8 privates of the R.A.M.C. from the regular ambulance train service. That for the ambulance train consisted of 3 medical officers, 4 nursing sisters and from 45 to 55 other ranks, R.A.M.C. After 1915 they were not marked with the Red Cross since this emblem provided an aiming point for bombing the railway track.

The Bases

The British Expeditionary Bases in France comprised the ports of Calais, Boulogne, Rouen, Le Havre, Dieppe, and Marseilles; together with supply and reinforcement depots, chiefly at Etaples and Le Havre, and the "Third Echelon" of G.H.Q., B.E.F.—its records department—at Rouen.[13]

The medical organisation at the bases comprised:—

(*i*) Groups of General and Stationary Hospitals

(*ii*) Associated "Convalescent" Hospitals, Camps, or Depots[14]

(*iii*) Venereal, Dermatological, Infectious and other Special Hospitals

(*iv*) Ports of embarkation.

As with the medical stations at the previous levels of evacuation, the purpose of these at the Expeditionary Base was treatment, evacuation, and return to duty; but there was found here in addition exact and deliberate provision for research. The

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[12] *Loc. cit., pp. 629-30*

[13] Marseilles was the port for Indian Transports. Each port had its special function—meat, bread, oils and fats, etc. each passing through particular ports. After 1916 Australian reinforcements came chiefly through Le Havre. The homeward bound traffic passed—casualties via Calais, Boulogne, or Le Havre, men on leave mainly through Boulogne

[14] The slovenliness of military-medical terminology noted in *Vol. I* was found also in France. No one knew what distinction was implied in Convalescent Hospital, Camp or Depot. The proper distinction, which should have been founded on the degree to which they were medical or military (and therefore protected or not by the Geneva Convention), was not observed.

deputy directors at the great ports—under the D.M.S., L. of C., and subject to the policy laid down by the Director-General—were responsible for the treatment and evacuation or return to duty of all casualties arriving by ambulance train or occurring within their area.[15] In most of this wide responsibility Australians had no part, but there was one important function in which the Australian Medical Service was directly concerned.

The Consultants

Reference has been made in various places to the work of the Consulting Surgeons and Physicians. Among these were three members of the Australian Service, Colonel Sir Alexander MacCormick and Lieut.-Colonel T. P. Dunhill, Consulting Surgeons, and Lieut.-Colonel E. W Fairfax, Consulting Physician. The idea of these appointments originated at the Base and was brought about by the difficulty experienced in (*i*) securing continuity of action for the individual casualty throughout the stations on the line of evacuation and (*ii*) diffusing the results of observation and experiment throughout the medical service. This was a difficulty inherent in the organisation of services behind the front in strata or levels, each isolated from the one in advance or in rear of it. The appointment of Consultants was designed to overcome this isolation, and their work was entirely devoted to that end. The methods adopted are admirably set out in the following memorandum by the Consulting Surgeon to Rouen Base Lieut.-Colonel Dunhill, the Surgeon Specialist to No. 2 A.G.H.

Duties—supervise work

"It was our duty to advise the D.D.M.S. on all questions relating to the surgical work of the area; to visit all hospitals and medical units regularly, and to spend much time there; to see that suitable men were placed in the positions of surgeons in charge of divisions and surgical specialists. A consultant must make himself familiar with the work of each of the officers working in his area. It is his duty to recommend changes or promotions. Men who are not deemed capable of filling the positions they occupy are shifted on his recommendation.

"On visiting a hospital, he calls on the O.C. first, as a matter of courtesy. Then he is met by the officer-in-charge of the surgical division. In times of rush, he does not allow this officer to be brought away from his work, but finds him at his work. He sees cases in consultation with the surgical officers. He watches carefully and notes

[15] Boulogne, Rouen and Abbeville, where Australian hospitals were sited, were bombed at various times At Etaples a general hospital close to the railway junction sustained very heavy casualties

the treatment and general management of cases. He helps and advises. If necessary he interferes to alter treatment or methods generally.

"When cases come down the line badly treated, he writes to the consulting surgeon of the area from which the case has come, unofficially. The work of the surgeon responsible for the incident is thus watched without any fuss, and a word in season prevents repetitions.

"In rush times it is quite impossible to see in consultation all the cases for whom it would be advisable; but in quieter times plans of work are discussed for the different types of battle injury, and as much individual work as possible is given.

"The consulting surgeon visits other areas and makes himself familiar with methods of treatment which are being carried out there, both at front and base. He meets, and discusses methods with, the consulting surgeons of these areas, and together they plan for continuity of treatment He finds out the best and he distributes the knowledge acquired to the officers under his control. When there is time he encourages the officers under him to visit other hospitals in the district, or even to travel further afield to see special hospitals or men. In this way a high standard of efficiency is obtained, and a spirit of healthy rivalry induced. He sees that clinical research is kept going, *e.g.* delayed primary suture, methods of wound disinfection, bacteriological problems, etc.—anything that will result in a *saving of man-power for the army.*

To spread knowledge and promote research

"He advises the D.G re the segregation of certain types of injury. Thus the segregation of fractured femur cases, of head injuries, chest injuries, etc., has immensely improved the methods of treatment in these types and the results obtained.

and advises as to system

"Thus the consulting surgeon, if he does his work conscientiously and sympathetically, ensures smooth and efficient surgical treatment from front line to home base."

The General Hospital System of the B.E.F.

The Hospital Centres. The ultimate disposition of the general and stationary hospitals[16] and convalescent "depots" and "camps" of the B.E.F. was the result of numerous factors—of stirring events in the early months of the war; of the desire of the French authorities that casualties should so far as possible be evacuated to England; of the situation of military camps and "dumps"; of port and railroad facilities; and of the German submarine onslaught on hospital ships in 1917.

In August, 1918, of the 48 General Hospitals and 19 Stationary Hospitals of the B.E.F., 19 General and 8 Stationary Hospitals were

[16] The British Historian is emphatic that the function of "General" and "Stationary" Hospitals, as such, cannot be defined, being in both cases dependent on their distance from the front

at Boulogne and Etaples; 15 General and 5 Stationary at Le Tréport and Rouen; and the remainder at fifteen other centres. In addition there were 7 Voluntary Hospitals and a number of Native Labour Contingent Hospitals.[17]

The great hospital centres at Trouville and Deauville were formed in the spring of 1917. Thereafter little change occurred.

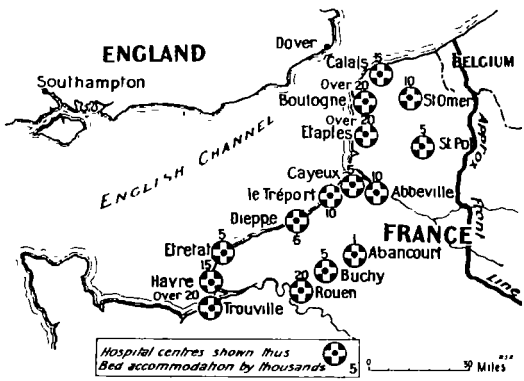
Bed accommodation of General Hospitals

Hospital bed accommodation for the B.E.F. was provided by a system known as "crisis expansion" to meet emergencies. The total accommodation in its various classes of hospitals behind the Western Front varied from some 10,000 beds in 1914 to between 80,000 and 90,000 in 1917-18, and 95,000 at the time of the Armistice. The figures represent the capacity of the hospitals when expanded. The procedure of expansion was provided for by recognising four stages, as follows:—

"(1) The normal bed accommodation permanently established.

"(2) Expansion 'A,' or the number of fully equipped hospital beds, which could be added to each hospital by taking over more buildings or by increasing the number of tents or huts. This expansion was of a semi-permanent character.

"(3) Expansion 'B,' or the number of beds which could be added in an emergency by placing more beds in the wards and reducing the space normally allowed to each bed.



HOSPITAL CENTRES INCLUDING CONVALESCENT DEPOTS IN FRANCE MARCH, 1918, SHOWING ACCOMMODATION (*The numbers given are the maxima. Another centre was at Marseilles, for 5,000 beds; and there were nine others, each with less than 1,000 beds—at Bourg, Aire, Frévent, Doullens, Amens, Cérisy, Cherbourg, Paris, and Cap Martin.*)

"(4) Expansion 'C' The amount of additional accommodation available in an emergency by appropriating the huts for personnel, dining rooms and other accessory buildings and placing trestle cots and mattresses in them instead of hospital beds."

[17] The stationary hospitals in the forward area are not included in these figures

At the end of 1916 the total thus provided was—"Normal beds 40,719; Expansion 'A' 7,947; Expansion 'B' 13,310; Expansion 'C' 9,048."[18]

In 1917 group "A" "were included in the normal permanent accommodation of the hospitals" and "B" and "C" became officially known as "crisis expansion."

Structure of a General Hospital

When full to maximum capacity, including beds added by "expansion," a General Hospital at the seat of war might comprise a community of 3,000-4,000 or even more persons, and its intake and output of patients —its basic metabolism so to speak—might be as high as 800 a day. The most obvious general feature indeed of the series of medical units embraced in the scheme of evacuation will be seen in the increase in their size and complexity at each stage rearward from the front. From the Regimental Medical Establishment of 1 officer and 23 other ranks, through the Field Ambulance, 10 officers, 182 other ranks, and C.C.S., 8 officers, 7 nurses, 78 other ranks, we have now reached the General Hospital, an immense unit which, with the normal complement of 1,040 beds, comprised 34 officers, 73 nurses, 203 other ranks of the medical service. The professional staff is now exactly discriminated as "surgical" and "medical." A place is found for the "specialties" of civil life—eye, ear, nose and throat, skin. A pathological department is an integral part of each unit. In such respects, as well (as will presently be seen) in their method of working, these great units were as closely linked with the hospitals of civil life as with the military stations whose work has been reviewed in the preceding chapters.

It follows that, though full of professional interest, the details of the internal structure and activities of these units are not so alien from civil experience as to call for detailed study here.[19] An account of some aspects of their work, however, based chiefly upon the experience of the Australian hospitals, will serve to indicate the nature of the particular problems of these units.

Their *structure,* like that of all military units, included three

[18] Quotations are from the *Brit Off Med. History, General, Vol. II, p 67*

[19] In its general features the work of a military general hospital in the Great War has been described, and illustrated by instance, in *Vol I.*

elements: (*i*) personnel, (*ii*) housing accommodation, and (*iii*) equipment.[20]

Establishment. The establishment of medical officers and other ranks R.A.M.C. or A.A.M.C. of the "General" Hospital was subject to much change in the course of the war to meet special needs or the changing conditions of the war itself. Beginning with 520-bed hospitals staffed by 21 officers, 43 female nurses and 143 other ranks, in the last year of the war hospitals reached a normal bed-state up to 2,500 and a staff of 41 officers, 125 nurses, 138 other ranks and 124 women (domestics). In 1918 a sliding scale for staff and beds was introduced, the latter rising by accretions of 100 up to 2,500.

Housing and Lay-out. The General Hospitals in France were housed in tents or huts. In No. 1 A.G.H. in June, 1918, the hutting accommodation was as follows:—

Patients. 360 beds, Dining Hall, Cook-house.
Sisters. Quarters, Mess, Bath-house, Cook-house.
Officers. Quarters, Mess, Bath-house, Cook-house.
Other Ranks. Quarters, Recreation and Mess room, Cook-house.

Huts were also provided for one Bath-house for personnel (other ranks) and walking patients; Operation theatres; X-ray room; Pathological laboratory; Dispensary; Matron's office; Post office; and Quartermaster's office and Pack store.

The remainder were in tents.

For the planning and construction of General Hospitals the Engineers were responsible. Of three sites occupied by Australian units, the plan of No. 3 A.G.H. is selected for illustration, since it was designed without regard for exigencies of space and so forth. No. 1 at Rouen and No 2 at Boulogne were not so exactly laid out.[21]

Kitchen. The importance of this feature in a General Hospital of 2,500 beds need not be stressed. An illustration of the kitchen at No. 3 Australian is given at *p. 428.*

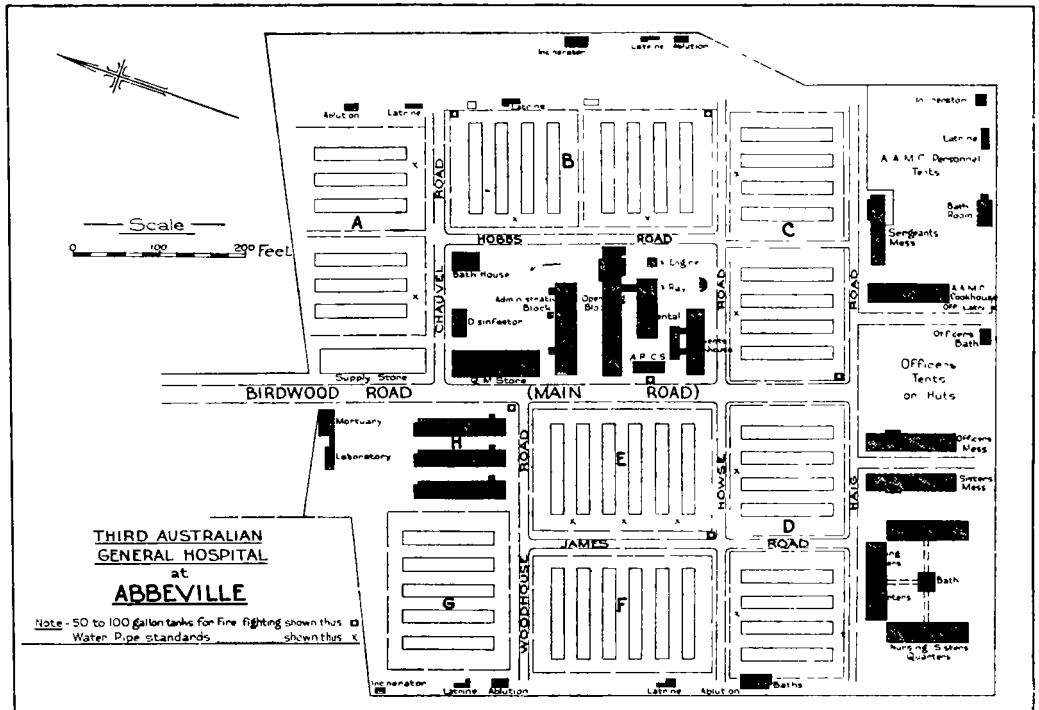
Sanitation. "Sanitation" in these vast tent and hutted towns was a most formidable problem, especially in the winter. The system of

[20] That the question whether the first, or the second and third, of these constituted a "hospital," and which element was the more important, is by no means a purely academic one, was shown by Australian experience in the war. At no time was Australia able to provide, from her own resources, General Hospitals adequate to the requirements of her force in the field Personnel was available, but much of the equipment—particularly tentage—must be obtained overseas. And it may be added that the most difficult problem for Australia to-day would still be the material rather than the human one In this connection see *Vol. I, p. 89*

[21] The following is taken from *The Work of the Royal Engineers in the European War 1914-18, Work Under the Director of Works (p 158)* published for the Institution of Royal Engineers, Chatham. (This history may be commended for many useful specifications of medical constructive works)

"Sites and Lay-out—Generally speaking, sites for hospitals or groups of hospitals were selected as far as possible in proximity to railway stations, where special sidings could be laid to receive hospital trains, and whence there was good road access to the hospitals. . . As a type, the plan of a general hospital of 1,500 beds, constructed at Abbeville, is given, as the site imposed no special conditions in the lay-out"

The plan reproduced in the abovenamed history is that of No 3 Australian General An exact model of this hospital made by German prisoners of war employed there, was on view for some time at Australia House and is now in the Australian War Memorial at Canberra.



PLAN OF NO. 3 AUSTRALIAN GENERAL HOSPITAL

From an Engineer plan which shows the layout and accommodation at the beginning of 1918. Tents are shown unshaded. At a later date, in Blocks E, F, and G, huts of the hospital Nissen type were substituted for the brigaded hospital marquee tents. The first hut in Block H was used for reception and discharge by convoy.

conservancy was designed by the engineers, but was usually carried out by the unit personnel. Faecal disposal was commonly by incineration in destructors.

Equipment. The General Hospitals were equipped on a scale that permitted exact surgical and medical attention in the critical stage of the most serious types of case. The X-ray apparatus was adapted to all the refinements of localisation. In the Australian hospitals the official surgical equipment was greatly supplemented by the "Red Cross" and by special gifts.

Y.M.C.A. Hut and Red Cross Store. The "Y.M.C.A. Hall" was a structural feature whose importance in promoting functional efficiency may properly be stressed. In the Australian units a hut was provided for the representative of the Australian Red Cross Society.

Functions of a General Hospital

One feature of the working of these huge technical units which is not represented in that of the civil hospital calls for special note.

The "Convoy." The casualties arriving by ambulance train from the front reached the hospitals through the medium of a "convoy" of motor ambulances. These as will be recalled were provided at each base to link the ambulance train to the hospital and the latter with the hospital ship.

The arrival and departure of the convoy was the great event in the hospital day. The rotation of duty was much as in the C.C.S. groups and the frequency of convoys was in direct proportion to the pressure of casualties. From the office of the D.D.M.S., the hospital was notified by telephone of an impending "convoy," first when the incoming train was a few hours distant, again when it was about an hour away, and again when it was arriving at the station. The message noted the approximate number and nature of the casualties and their distribution; the hospital was informed if a loading party was required from it, in which case cars were sent to fetch the men, who, after loading, returned with the ambulances. The unloading of a hospital train in the later years of the war was a matter of minutes.

Admission. At the reception room of the hospital the routine of admission, classification, and distribution (*"triage"*) was organised with equal exactitude. As carried out at No. 2 A.G.H., the procedure was laid down as follows:—

"Every patient must be admitted through the Admission Tent, where the Admitting Officer will be in attendance with clerks. The Admitting Officer will fill up the Index Cards (and in time of stress, if the patient is one for classification, will complete the card by classifying him A. B. C. or D.) The classification letter should be written in the bottom right hand corner of the Tally Cards with red pencil. One clerk will fill up the Tally Cards, if classification is made by the Admitting Medical Officer. Another clerk will enter up the particulars in a Rough Admission Book. The patient will take with him to the ward to which he is allotted the Index Card, and, if classi-

fied, the duplicate Tally Cards. On admission to the ward, all cards with the patient will be fixed on to the chart board attached to his bed."

The duties of the staff may be illustrated by the instance of No. 3 A.G.H. in the last half of 1918.

Commissioned Officers. Of these this hospital had 28, as follows: The Colonel commanding; two Lieutenant-Colonels (Surgeon specialist and second-in-command); 12 Majors; 11 Captains, and 2 Lieutenants.

These officers were distributed for duty as follows:—Command (2), Registrar (1), Surgeon specialist (1), Operating surgeon (1), Anaesthetist (1), Surgical wards (8), Physician in charge of Medical section (1), Medical wards (2), Pathologist (1), Radiographer (1), Quartermasters (2), Dispenser (1), employed "on external duties" in the command under the D.M.S. Abbeville (6).

Attached. Dental officer (1), Chaplains (3). Two Surgical teams were also attached for administration and included 1 Operating surgeon and 1 Anaesthetist in each. The surgeons of the Surgical teams while at the hospital were employed in the general surgical work.

In addition a few officers were usually attached for "refresher" work in medicine and surgery.

Nursing Staff. The Principal Matron, the Head Sister, 20 Sisters, and 60 Staff Nurses; the total numbers varied at different times between 70 and 90.[22]

Other Ranks Department	Personnel N C O's	Ptes	Attached (Under-age, "P.B.," etc)	Total average
General Duties (a)	4	13	12	29
Ward Duties (b)	9	85	9	103
Q.M. Dept.[23] (c)	13	25	15	53
Clerical Dept. (d)	5	6	3	14
Messes (inc. Batmen) (e)	—	14	3	17
Sundry (f)	7	10	—	17
	38	153	42	233

(a) Includes R.S.M., Orderly Sgt., Orderly Corporal, General duties, Sanitary, Messenger, Picquet, Bugler,
(b) Includes Chief Ward-master, Assistant Ward-master, Blockmasters, Wards, Theatre, Dressing hut, Masseur, Operating team.
(c) Includes R.Q.M.S., "Chief Steward," "Q M. Department," Cooks, Pack store, Carpenter, Bootmaker, Painter, Plumber, Fumigator, Tailor, Boilerman, Barber, Sailmaker, Gardener.
(d) Includes Clerical, Pay clerk, Postal.
(e) Includes Officers' Mess, Sisters' Mess, Sergeants' Mess, Patients' Mess.

[22] One V A.D was employed—Miss Nancy Birdwood, daughter of the G O C A.I F.

[23] The hospital diary suggests that some of the cooks might with advantage have been females specially trained.

(f) Includes Dispensing Dept., Pathological Dept., X-ray Dept., on command, at Schools, and Dental attached.

Under-age boys were employed in the following duties:—Batmen, Wards, Bugler, Sanitary, General duty, Q.M., Cooks, Sisters' mess, Officers' mess, Sergeants' mess, Clerk.[24]

"P. B." men were employed in the following duties:—General, Cooks, Sailmakers, Carpenters, Officers' mess, Sisters' mess, Q.M., Batmen, Wards.[25]

Extra-unit Personnel. Convalescent patients were employed on many light duties in the wards and patients' mess tent and kitchen. In October, 1918, 63 were thus occupied at No. 3 A.G.H. During this month an average of 52 pioneers were at work under the Engineers in construction—chiefly of bomb-proof dugouts and revetments—and in the replacement of tents by huts. German prisoners of war were very freely employed in this unit, chiefly under the Quartermaster, in the repair of tents, maintenance of the grounds and so forth, and particularly in the construction of revetments.

Evacuation. The procedure, as laid down for this at No. 2 A.G.H. at Boulogne was:—

When orders from the Registrar are sent to a ward to evacuate so many "A" "B" "C" and "D" patients, the sisters will write up on the Tally Cards of the patients being evacuated the name of the ship and destination, and the Evacuating Medical Officer or the Medical Officer in charge of the case must sign these Tally Cards. The Index Cards, which take the place of History Sheets, must be signed by the Medical Officer in charge of case, and will be collected by the Sergeant supervising the loading of patients. (N.B. The classification "A" "B" "C" or "D" is only to be used for patients who are to be evacuated to England.)

Disposal.[26] The methods of disposal may be illustrated by a synopsis of those practised at No. 2 A.G.H.:—

SYNOPSIS OF DISPOSAL OF CASES AND CLASSIFICATION

1. To be retained in hospital.

Patients classified as ready for discharge under 7 days.	For disposal in France.
Ready for discharge under 14 days.	
" " " " 21 "	
Cases of fractured femur.	Till fit to evacuate to U.K.
Patients too ill to move.	

[24] A note in the hospital diary says that these boys "were an unmitigated nuisance" with "some brilliant exceptions."

[25] The hospital diary notes that it would have been better if these men had been "definitely A A M.C."

[26] The scheme of No. 2 A.G.H. set forth above was drawn up in 1916 and varied somewhat in details at different times. The arrangements also differed in some respect from those at Rouen, from which patients embarked at Le Havre, but it adumbrates accurately the work of a Base Hospital.

2. Evacuate to U.K.

All General Medical and General Surgical cases except as above.
Jaw and Face to Queen's Hospital, Sidcup.
Neurological (organic) to No. 4 London General
Nephritis to St. Bartholomew's.
Organic diseases of or injury to Cerebro-Spinal system to King George's etc.
Rectal cases to St. Mark's.
Selected cases, Arterial Injury to No. 5 London General.
Gas shell cases (not mustard except with complications).
Men domiciled in Ireland (by Irish Convoy)
Orthopaedic cases (to be marked "Military Orthopaedic").
Internal derangements of Knee.

To be classified as
"A"—Stretcher cases needing special treatment on voyage.
"B"—Other stretcher cases.
"C"—Sitting cases.
"D"—Walking cases.

3. Evacuate locally.

To *Details Camp.*—Men fit for duty—for medical boarding.
To *No. 12 Con. Camp*—Cases ready for duty in 4 or 5 days.
To *No 1 Con. Camp.*—Cases requiring treatment and convalescence for over 4 or 5 days.
Clean operation cases awaiting transport to No. 25 General
D.A.H. and V.D.H.
To *No 7 Con. Camp.*—V.D (G) and V.D.(S).
To *No 25 General.*—Chronic skin cases. Scabies.
Cases (other than A.I.F. and N Z) requiring clean operation, Hernia, etc.
To *No. 8 Stationary.*—Mental cases. Fractured femurs
To *No. 14 Stationary*—Infectious cases
To *Nos 54 or 55 General.*—N.Y.D. Nervous. (On no account to be disposed of otherwise.)

Disposal : Return to duty

From the wards in the "General" and "Stationary" Hospitals at the Base the casualty went, usually as a sitting case by ambulance convoy, to a British Convalescent "Camp" or "Depot" in France, and thence when discharged from convalescence through "Base Depot" back to the line; if not, he went by hospital ship to Britain, for further treatment.

In the "Convalescent" and "Base" Depot system in France we make touch again[27] with the system of convalescence under combined medical and military control, which, as organised for the Australian force, is described in a later section of this chapter.

[27] In its early crude beginnings it is seen in *Vol I*, in operation in the Convalescent Depot systems at Zeitoun, at Lemnos, at Moascar, and in the Command Depot at Weymouth *See also Chapter xvi*

Treatment at the Bases

Regarded as a treatment station on the route of evacuation, the Base Hospital in France was not an end-point for wounded cases, save for the slighter ones and for a few special types—in particular femurs—to which further reference will be made. At this stage of evacuation treatment was not yet entirely an end in itself, but was intended also to promote removal for a further stage—this time the final one. But treatment at each stage was accompanied with the proviso—"return to duty" when possible; and the circumstances of the Base permitted the opportunity for effecting a useful short circuit in the case of men with slight wounds, whose treatment was often completed here, allowing their return to the front without going further. The conditions also allowed considerably greater scope than at the front in the selection of more serious cases for the benefit of continued treatment; the types of case for which treatment at the Base was favoured were those with fractures of the femur, penetrating wounds of the knee, "abdomens," "heads," and "chests," together with amputations, patients with retained foreign bodies, multiple or penetrating severe wounds, and the more urgent types of septic infection. For "disease" the Base was again a sorting house. Types of disease in which an end-point and complete cure might be reached without undue delay were held, treated, and returned to the front through the Convalescent Camps and Base Depots; the residue was cleared across the Channel to the hospitals in Britain.

Notes on Surgery in the Base Hospitals. The nature of the surgery done in the General Hospitals at the overseas base was determined in part by the conditions outlined above, but chiefly through the fact that, in ordinary circumstances, the wounded man would not reach these hospitals in less than 24 hours, commonly—even in 1918—48 hours or more after wounding;[28] and that, on the other hand, to reach the next stage he would have to face another 24 hours and the Channel crossing.

[28] In the early fighting of 1914 ambulance trains are said to have taken at times 56 to 72 hours on the trip. On the other hand No. 3 A G.H., in the advanced general hospital centre at Abbeville, received in 1918 wounded men direct from the line, and even at Boulogne and Rouen the first operation was often at the General Hospital

Venue for Operation in Rushes. Throughout the whole extent of the Lines of Communication from the R.A.P. to England, the work done in the treatment stations was in some measure at least determined by the mechanical factor of mass—of the size of the human wave passing at any one time over the transport routes into the widening reaches of the Lines of Communication. As has been seen, the number of casualties on whom operations could be done at the C.C.S. varied directly with the number of wounded men presenting. In lightly wounded men the question of the proper stage for operation had often to be determined by military rather than medical necessity; and it was a matter for debate whether or not they should be passed on for surgery at the Base. In this the French and British and American services tended to adopt different policies. A note, dated 1st January, 1918, from a senior operating surgeon of the A.I.F.[29] to the D.M.S., A.I.F. is here placed beside a statement in the *American Official Medical History*.

"So far as my observations go, the 'lying wounded' are promptly and efficiently treated [at the C.C.S.], so that contaminated wounds do not, in many instances, become grossly septic. The 'walking wounded' except in times of great slackness, do not receive the same prompt and efficient treatment. Very many 'walking wounded' with slight but contaminated wounds are dressed without any attempt to remove or treat the contaminated tissues, and these arrive at the Base in a more or less infected condition. Sepsis, thus established, greatly delays the return of the soldier to the firing line or to useful civil employment. In a military sense it is the slightly wounded man whom it pays to treat efficiently for he can then be returned in the shortest possible time to the firing line where the need for men is greatest.

"The French have done something to deal with this problem. Wounds of the soft parts are skilfully excised at what correspond to our Casualty Clearing Stations. In a very large percentage, 70 to 80 per cent. of cases, the wounds heal by primary union. . . .

"Our medical service did not accept the tenet of our Allies that the more lightly wounded should receive preferential attention in the zone of the armies because of the greater probability of their return to active service, and also because a greater number could thus be cared for in a given period. Increased knowledge of surgery proved that removal of devitalised tissue and foreign bodies from slight wounds could be accomplished successfully back of the zone of the armies. . . . No one questions the necessity for very prompt action in serious wounds, but it had also been believed that return to the colours would be expedited if the slightly wounded as well as the seriously wounded could be operated on within 12-hour limit of time. Later observations showed that practically the same results were obtained in the slightly wounded without foreign bodies, if operation were delayed 24 hours or even longer. Upon this knowledge was based the American policy of sending such cases farther to the rear for operation, if pressure was such that their numbers would overtax an evacuation hospital of approximately 1,000-bed capacity at the front.

[29] Colonel H. S Newland in a personal memorandum dated 1 Jan., 1918. The quotation from the *American Medical History* is from *Vol XI. Surgery Part I, pp. 112-3.*

mary union after 'delayed primary suture' and never become septic. Valuable men, valuable time and valuable dressings, etc, are thus saved."

The belief that early operation was essential in all cases (caused) the British and French to locate many large relatively immobile hospitals close to the front"[30]

Be this as it may, throughout the war, even in the British Service and as late as March-April, 1918, large numbers of less severely wounded came to operation first in the General Hospitals.[31]

Provision for Regional Surgery at the Base. While particular reference to regional surgery must again be excluded, it is desirable to note that at the Base many of the particular problems that derived from the anatomical or physiological features of the region or organ involved reached a climax so as to make some special provision necessary.

Femurs, Injury of the Eyes, Face and Jaws; Knee Joints, etc. The first move in this direction was induced by the terrible mortality in cases of fractured femurs in the hospitals in Britain. In 1917 provision was made to concentrate these in special hospitals in each centre in France. This was followed by arrangements for "specialist" treatment for some other regional wounds—such as injury of the eyes, face and jaws, and of penetrating wounds of the head, chest, knee joint, as well as for special methods of treatment, such as the "Carrel-Dakin."[32]

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[30] The following statement by Médecin Inspecteur Général A Mignon (*Le Service de Santé Pendant la Guerre, 1914-1918 Tome IV, p. 549*) has useful figures bearing on the above

"Les délais d'opportunité de la suture ont augmenté avec l'expérience. Après avoir déclaré qu'une suture devait être pratiquée dans les six heures qui suivent la blessure, on l'a tentée et réussie le cinquième, sixième, huitième et jusqu'au onzième jour après la blessure. (*Bull. Soc. Chir., 1918, p. 657*). Sans aller jusqu'aux extrêmes, retenons que Delbet a obtenu de bons résultats dans son service de Paris, de la vingt-deuxième à la quarante-huitième heure; et Sencert, au Val de-Grâce, de la vingt-quatrième à la soixante-sixième heure. (*Bull. Soc. Chir, 1918, p. 772*). La suture primitive a même été appliquée avec succès sur des plaies ayant été enflammées et dont tout symptôme inflammatoire avait disparu. (*Bull. Soc Chir, 1918, p. 7*)."

[31] *See pp* 621-22 The demand made on the surgeons in a great offensive is illustrated by the following note from the private diary of Lieut.-Col. D A Cameron, A A M C, describing work at No. 2 A G.H at the time of the Arras operations

April 8th, 1917. Large numbers of wounded arriving. Push at front evidently started. *10th.* Great numbers of Canadians . . . men arrive in helmets and with kit. *11th* Very busy. *12th.* O.C. gave me a little theatre of my own at 6 p m — did 10 operations that night. . . . *13th.* Did 37 operations in the day—very busy— over 800 cases admitted during the night. . . . *14th, 15th, 16th* Operations all day, *18th, 19th, 20th.* Very busy, though work lessening. *25th.* Very busy *26th* 28 operations in the day. *30th.* 28 operations. *May 1st* During last month 8,091 admissions to No. 2 A.G.H.

[32] The history of "Carrel-Dakin" at the Base is worth a particular note. At a meeting of Consulting Surgeons at the office of the D.G., G.H.Q., 30 Nov, 1916, it was decided that every endeavour should be made to carry out the Carrel treatment of wounds. This advice was given effect to by an order of Dec, 1916, laying down procedures to be followed at "Clearing Stations," "on the Trains," and "at the Base." At each base "Carrel" cases from the front were to be concentrated

Operation to Rectify Deformities. A certain amount of regional surgery was also undertaken in the Base Hospitals in the "radical cure" of hernia, hydrocele, varicocele, varicose veins, haemorrhoids[33] and the like. These were found chiefly in men who, having been passed as "fit," developed the deformity—or, as was far more frequent, developed the "disability" from a pre-existing deformity—while on service. In this list we may include also the operation for appendicitis.[34]

General Surgery of Wounds at the Base. But, except for such developments in regional surgery, it was inevitable that the quest for asepsis, and the endeavour to break through the 12-36 hour time-limit that in most cases determined the onset of anaerobic infection, should result in the surgery of the Base becoming accessory to that of the front. I came to be concerned with the treatment of declared sepsis, and with measures for its limitation rather than its prevention; with antisepsis rather than asepsis except so far as, by "delayed primary suture" it completed the good work done at the front. Furthermore, in point of the actual *amount* of work, the Base remained the chief surgical centre, and the surgery done there was of profound importance to the welfare of millions of wounded men.

The bête noir of the Base—"true sepsis." It has been stated in short that surgery at the Base was concerned, above all, with the problem of the pyogenic cocci—in particular of the streptococcus, and that its great objective was to prevent re-infection,[35]

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in special hospitals. The following is the experience of an Australian nurse who was for a time attached to one of these hospitals—No 14 British General, at Wimereux, Boulogne.

"Early in 1917 we got on to the Carrel-Dakin method I had a ward of 34 beds, every man had his bacterial chart as well as his temperature chart. The pathologist did the films and sent back a report on which we marked the chart up. When we got three negatives the wound was stitched up. The results were splendid. We had a great staff in the Carrel Ward, bigger than in most of the wards, as it was a show place, and the charting etc. took a lot of time." In the later months of 1917, though the hospital had increased in size, "the full Carrel treatment was ceased, as it kept patients too long and we couldn't manage the rushes." (From a memorandum written for the Australian War Memorial by Sister Leila Smith, A.A.N.S.)

[33] In the A.I.F. in France cases suitable for operation were operated on under supervision of the surgical specialist at each hospital. Unsuitable cases were sent to England, or returned to the front after boarding.

[34] 782 men were invalided to Australia during the war from this disease.

[35] Sir Anthony Bowlby (*Brit. Off. Med. History, Surgery, Vol. I, p. 246*) states that "while only about 10 per cent. of all open wounds were infected with streptococci on arrival from the front, within a week over 90 per cent. had become infected." A committee for the investigation of how this infection occurred was sitting at the time of the Armistice, and it had been already found that many of the nurses and orderlies were "carriers" of streptococci in their throats.

and to this end to achieve the early closure of all wounds. The discovery of a "royal road" to the goal of "prevention" through early closure may be recalled to give the proper setting to the picture of surgery at the Bases.

In this mental impression it should be recalled that for fully three years of the war the surgeon at the Base lived and moved and faced his task in a setting of sepsis. Three years of "trial and error" on the human guinea-pigs of the war passed before the wheel had turned in full cycle, and "immediate suture," the "big bad wolf" of 1914-15, had in 1918, as "primary suture" and "delayed primary suture" after excision, come to serve as the trusted watch-dog against secondary infection.[36]

Medicine at the Base. The numbers of battle and non-battle casualties admitted to medical units in the B.E.F. were: battle, 1,988,969, non-battle, 3,528,486—a total of 5,517,455; the number of these evacuated to Britain was 1,245,535 wounded, and 1,034,160 sick or injured. The corresponding totals in the A.I.F. were 142,206 battle and 207,978 non-battle casualties; of whom 130,960 and 147,294 respectively reached the Base. The nosological composition of this mass of "sickness," analysed for the A.I.F. so far as is possible in terms of pathogenesis, is given elsewhere.[37]

"Battle" or "Non-battle"? But, in addition to the officially "sick" by the time the Base was reached certain types of "battle-casualty" were becoming frankly "disease."

Chemical Trauma. In particular, gassed men were now in the stage of bronchitis or pneumonia, their condition differing little in its clinical features from that caused directly by infection. *Physio-psychic trauma.* In "shell shock" any possible "commotional" element had by now subsided, and the psychic or "emotional" element in the complex was dominant, and the disorder obviously now becoming fixed as a "functional" and frankly mental "dis-ease." *Physical trauma.* Types of non-battle casualty other than disease whose causation was less crudely physical than physical violence—for example trench foot and bronchial catarrh due to cold, and intestinal irritation due to food and dirt—came also into the medical wards.

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[36] Humanity has been advised, above all things, to know itself. Of the moral "lessons of the war" none perhaps is more searching than this that in the matter of judgment man must be always aware of his emotions, reactions, prejudices.

The initial reaction of surgeons to the two great methods for treating contaminated or infected wounds, the Carrel-Dakin system of antiseptic lavage and secondary suture, and the method of aseptic excision with primary or delayed primary suture, reveal that not yet are the actions of man guided by reason alone but chiefly by prejudice. An Australian surgeon esteemed alike for his sound philosophy and his surgical judgment remarked to the writer anent this very thing that the trouble in the first few years of the war was that too few of the old men had young minds

[37] *In Chapter xvii and Vol. III.*

Battle Wounds. Even wounds became at times the joint concern of physician and surgeon. The following note is from the records of No. 3. A.G.H.

"*Chest Wounds.* Penetrating chest wounds were treated in the *acute medical ward,* and from September, 1917, there were always a few of these cases in hospital. From the end of March, 1918, to October, 1918, this ward was continuously occupied by such patients, and for a short time they filled also two other wards. Most of these cases, if they reached the base, recovered; but there were a few deaths. In some, death was due to the severity of the wound, but in most it was due to *infection.*

"The following is a brief summary of the method of treatment employed. (1) Mild cases with small sterile haemothorax—rest in bed. (2) Cases with large sterile haemothorax—aspiration repeated as often as necessary. (3) Infected haemothorax—resection of rib and drainage: wash out.

"Except when the military situation required, all these cases were retained for three weeks after date of wounding."

In a not inconsiderable proportion of the sick reaching the Base, the morbific agent or influence—which in the great majority of cases was microbial—was well on the way to defeat by natural resistance, and the patients required only rest and food to reach "convalescence."

The morbid states which chiefly occupied the attention of physicians in the base hospitals in France are indicated by the following percentages of total B.E.F. admissions:—[38]

Influenza	7·04 per cent.	Trench fever	3·51 per cent.
Accidental injuries	6·57 per cent.	Scabies	3·11 per cent.
Coryza, acute bronchitis, tonsillitis, and laryngitis	6·40 per cent.	Trench feet	2·95 per cent.
		Fibrositis	2·67 per cent.
		Debility	2·57 per cent.
I.C.T.	5·69 per cent.	N.Y.D.N.	2·13 per cent.
P.U.O.	4·62 per cent.		

The Medical Wards. The following notes of work in the medical division at No. 3 A.G.H. at Abbeville during 1917 and 1918 compiled by Major F. Blois Lawton[39] will help to give form and life to these hospital returns. During 1918, 29,061 medical cases passed through this hospital.

Abbeville 1917-18. "From the time of the reception of our first patients in France the medical wards were usually busy, though at times for a few days they became slack. When there were few medical cases coming by 'convoy,' we were usually receiving local sick. When convoys of wounded were frequent, medical cases were few; sometimes the medical wards were full of surgical patients and *vice versa.*

[38] Venereal disease (18·79 per cent.) was treated in special hospitals.

[39] Major Lawton served with the unit from its inception to its disbandment.

"*Trench Fever.* The first patients admitted were 'light cases' transferred from the neighbouring hospitals. It was found that a number of these had 'trench fever,' and eventually they were evacuated to England. Trench fever varied much in its severity. Often enough the men did not appear very sick and had little or no rise of temperature, but complained of pain and undoubtedly had tenderness. Such patients were liable to be treated as mild and allowed out of bed, and some sent to convalescent camps, whence they returned to hospital with a recrudescence of their trench fever or presenting that syndrome known as D.A.H, and were lost to the Army for a long time. Trench fever disabled men for long periods, and must have been the most serious disease of the war in France. There were always cases of trench fever in the wards, but much less during the last year, though during this period many cases of trench fever were undoubtedly called 'influenza.'

"When the Hospital opened in France 'trench fever' was not a notifiable disease, but later it was notifiable. Many cases were sent on, however, with a diagnosis of P.U.O. or myalgia. This was due, partly to the fact that the signs and symptoms of the disease were not fully appreciated by many officers in General Hospitals, and partly to the necessity of filling up that cumbersome form A.F.W. 3110.[40]

"*Gas.* From the beginning we were receiving cases of gas poisoning, but in January, 1918, we were made a gas centre, and took all cases coming to this area as well as those sent down as 'N.Y.D. Gas poisoning.' Later in the year the gas centre was changed to one of the other hospitals, and we received no more. The worst cases of gas poisoning were received during the Cambrai offensive and just afterwards. At that time there were many deaths.

"*Respiratory.* At all times of the year there were usually a few cases of pneumonia, and sometimes there were large numbers. In the late winter of 1918 we saw a fair number of cases of broncho-pneumonia, presenting signs and symptoms which became only too common later in the year [in connection with the epidemic of "pneumonic" influenza].

"At all times there was 'influenza,' usually mild but often accompanied by laryngitis and tracheitis which persisted for some time. These patients required a long rest before they were restored to health.

"*Nephritis.* Always there were cases of nephritis in Hospital. These became more prevalent as the weather became colder. There were often severe cases, but there were few deaths. In February, 1918, there were several deaths. In the men who died it was found that there had been a chronic nephritis. Convulsions were uncommon, though other uraemic symptoms were encountered often enough.

"*Other Infections—Dysentery—Enterica—Meningitis.* In the summer of 1918 there was an outbreak of dysentery, and this hospital was made the dysentery centre for the area. Sixty beds were set apart and isolated for the patients and were sufficient for a time, but later another 30 were added. There were few acute cases, and all of them responded to treatment. All were examined pathologically, and all giving the necessary number of negative (3 in 3 days) results were sent to Con. Camp for further examination. The severe cases were

[40] A F W 3110 was the form for notification of infectious disease The danger of complexity in the notification form—i *e* neglect to notify—is not unknown in civil life. Major Lawton suggests, without doubt rightly, that a much simpler form would have served as well for an enquiry of this kind. See in this connection *pp. 546-50*

evacuated. Nearly all those giving positive results had bacillary dysentery, but occasionally patients who had been in Egypt had amoebic dysentery. Apart from the epidemic, cases of dysentery were seen from time to time.

"Cases of meningitis came in occasionally, but there was never an epidemic. Occasionally cases of other infectious diseases were seen. Cases of Enterica were rare."

Pathology in the Base Hospitals

The pathology department was an important element in the routine work of the base hospitals as well as in the campaign of research. The Australian units were equipped for every type of work and were staffed by men of distinguished ability.

Research at the Base

It would hardly be possible to exaggerate the importance in the Great War of scientific research, clinical and laboratory, into the war's medical problems. But, though the carnage of the war has often been referred to in these pages as a vast process of vivisection, the analogy with civil experiment cannot be pushed too far; for, from the millions of experiments made in the war on the reaction of the human body against infected wounds, in a minute fraction only were the results of the incision or of subsequent rational intervention by the surgeon and pathologist accurately observed and recorded. The same may be said, though perhaps less emphatically, of disease. The remarkable results in both were due rather to the vast resources, material and human, that were tapped, and to the urgent demand for "results."

Laboratory Experiment and Clinical Observation. After a war, from which came so little positive good, any constructive result has been seized on with pathetic avidity. And one result that was really worth much sacrifice was the re-discovery after fifty years of obscurity imposed by the over-powering success of Pasteur's analytical experiment, of the practical value even in exact "scientific" research, of the clinical outlook and synthetic method—the "general view" of medicine supported by Sir William Gull and the British tradition and drawn from Hippocrates through Sydenham, Linacre, Hunter; and which, sponsored by Sir Thomas Lewis since the war, has achieved a name and a professorial chair as "Clinical Science."



46. "NISSEN BOW" HOSPITAL HUTS AT No 1 A G H, ROUEN

The huts are sandbagged for protection against fragments of aerial bombs

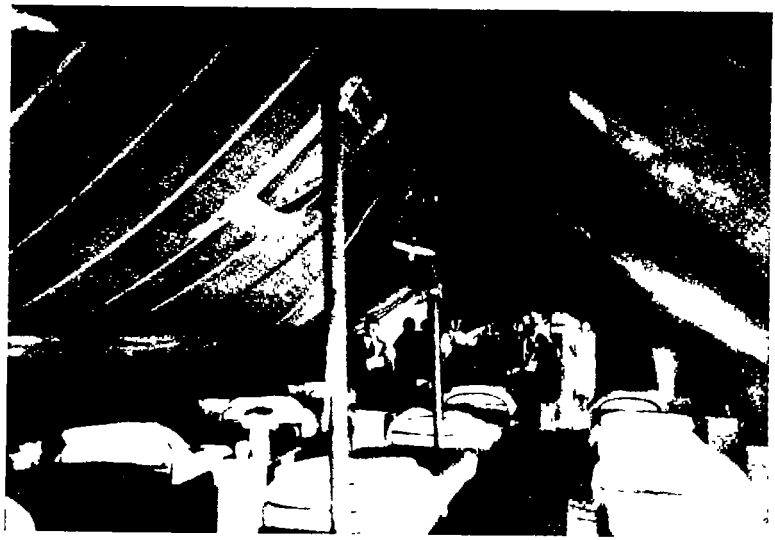
Aust War Memorial Official Photo No E3423
Taken on 23 Sept 1918



47. PART OF THE TENT LINES OF No 3 A G H, ABBEVILLE

Lent by Major F D H B Laxton, A A M C
Aust War Memorial Collection No C4539

To face p 412



48. A TENT WARD AT No 3 A.G.H., ABBEVILLE

The marquees are "brigaded" to form an extended ward

Aust War Memorial Official Photo No E2612
Taken on 23 June 1918



49. A HUT WARD AT No 1 A.G.H., ROUEN

The wooden frames are for extension in cases of fractured femur

Aust War Memorial Official Photo No E3442
Taken on 23 Sept 1918

In the previous volume an account was given of the work done at No. 3 A.G.H. at Lemnos under the direction of Lieut.-Colonel C. J. Martin, in which, as was there suggested, was seen the collaboration of clinical and experimental experts to a degree uncommon in civil experience. The same feature characterised some of the most fruitful episodes of investigation in France into both medical and surgical problems.[41]

Research in Problems of Wounds. In the early years of the war, research at the Base was directed almost entirely against the problems of wounding. It took two forms—first, the ultra-analytical, typified by the work of Wright; second, that of deliberate clinical research into methods of wound treatment. This, in the B.E.F., found its most exact exposition in the team work—pathologist plus surgeon—carried out in the clinical "research unit" established at No. 26 General Hospital at Etaples.[42] It was used to investigate the problems of wound healing, in particular the application of the Carrel-Dakin system, and subsequently of other antiseptic forms of treatment. Wright's work has already been described. His physiological experiments merged in the last year of the war with the search for an anti-serum against gas gangrene.

As with surgical technique the centre of gravity in organised research moved up, though much less decisively, to the zone of the field armies.

Research into the Aetiology of Disease. From the end of 1916 investigations were made into the causal factors in diseases prevalent in the Armies. In these, members of the Australian Army Medical Service played important parts. Of the historic studies of C. J. Martin and F. E. Williams into the aetiology of dysentery and the investigation of epidemic influenza at No. 3 A.G.H. a short account will be given in *Vol. III.*

The Australian General Hospitals in France, 1916-17[43]

Like the Casualty Clearing Stations, Australian General Hospitals were offered, accepted, and used by the Commander-in-Chief in France as "Imperial" units. The arrangement whereby, when possible, Australian soldiers should be sent to Australian units had been suggested by Australia in no parochial spirit. The advantages of "local" feeling had been recognised at the outset of the war by General Bridges and deliberately exploited in raising the field units of the A.I.F. It was believed

[41] As instance, Carrel's research at Compiegne, the investigation of wound shock on the British front, and the resolution of the clinical fog of P U O in the rickettsial infection trench fever

[42] In June, 1917, a small observation unit was provided here by the Joint War Committee (B R C S and Order of St John). The moving spirit in this adventure in research was Major Sydney Rowland, whose death from C S F, while working here, was a tragic loss to British medicine

[43] A full list of the Commanding Officers of these units will be given in *Vol III.*

that apart from "sentiment" this instinct might be exploited to advantage of the common cause in the treatment of sick and wounded Australians overseas. There is proof that the British authorities were not unfavourable and that endeavour was indeed made by some administrative officers to implement it.[44] But in practice at the Base it was found impossible to carry out this policy to any considerable extent. Of the total admissions to Australian General Hospitals in the war 11·2 per cent. were Australians; and of all Australian wounded on the Western Front 6·5 per cent. were treated in the Australian General Hospitals. The matter was summed up in 1917 in a memorandum by Colonel C. T. C. de Crespigny, who commanded No. 1 A.G.H. in France:—

"No Australian General Hospital or Casualty Clearing Station in France is exclusively devoted to the treatment of Australians. Such selection and segregation would be difficult and inadvisable. We admit sick and wounded in precisely the same way that our British and American neighbours do, so that in the same ward one may see English, Scots, Irish, Canadians, Australians, New Zealanders, South Africans, Newfoundlanders, British West Indians and members of other overseas units. It is a most striking example of the Empire's 'far flung battle line.' The intimate contact that exists between hospital patients offers an admirable opportunity for men of various dominions and the mother country to know and understand each other."[45]

The D.M.S., A.I.F. and the Australian Hospitals. The control exercised by Surgeon-General Howse over these units was similar in every respect to that which, as already shown, he exercised over the casualty clearing stations. It was almost entirely concerned with establishment, promotions and posting,

[44] In some commands, however, more could perhaps have been done in this direction. Thus at Abbeville in 1918 many Australians were sent to the wards of the British Stationary Hospital half a mile from No. 3 A G H —to the considerable inconvenience, for one thing, of the representative of the A.R.C S.

[45] Colonel de Crespigny adds:

"The patience and stoicism of the wounded is remarkable. The quiet and restfulness of a hospital far from the battle line, with good nursing, cleanliness and considerable comfort appears to them so great a relief as often to counter-balance the pain and discomfort of their wounds.

"As an Australian addressing Australians there is no need for me to speak particularly of our own splendid men. We all know them. But I feel that I must add a word about the British soldier after more than two years' acquaintance with him. Remember that my impression of him is based upon observation of the man as a patient, when the heat of battle has passed and he has no regimental tradition to live up to and he is harassed with pain or sickness or both And the longer one knows him the more one is struck by his pluck, endurance and ineradicable vein of quiet humour, which makes light of his own sufferings and helps his comrade in the next bed to bear his own. In hospital one sees him suffering bravely terrible and mutilating wounds and looking forward undaunted to a future which only too often must be a sad one in which both his capacity for earning his livelihood or enjoying his leisure will be permanently lessened or destroyed"

though with a "watching brief" for their general interests, in particular, that they should be given opportunity for effective employment. In the matter of their establishment some departure was made from British precedent, which opens up questions of some general interest.

Establishment of Australian General Hospitals. The establishment of the General Hospital was subject to some change in the course of the war, to meet special needs or the changing conditions of the war itself. That of the Australian hospitals, though based on British War Establishments, was never permitted by the D M S, A.I.F. to "cramp his style" or interfere with the distribution of his available personnel. He saw the problem of the Australian Imperial Force as a whole, and he would not hesitate to rob Peter at the Base to pay Paul at the Front. To this end the staff proper to an Australian General Hospital was never exactly defined, and was subject to a nice balancing by the Australian Director between four factors—the needs of the Base and the Front, the reinforcements coming forward to supply wastage in the medical service and, it should be added, the needs of the British Director General.[46] In one important respect also the staff of the Australian Hospitals differed from that of the British, namely in the more extensive substitution of members of the A.A.N S. for male nursing orderlies, a difference which was reflected in the working of the wards. In the Australian Service it was found that the British establishment of medical officers might be reduced without detriment to efficiency.[47]

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[46] An illustration of the attitude of General Howse on this matter of Imperial co-operation will be found in *Chapter xxvi, (pp 821-3) and Appendix No 2.*

[47] In 1916 the D M S, A I.F was sent by Sir Alfred Keogh a copy of a letter received by him from Sir Arthur Sloggett and was asked to comment on the following —

"Twenty Australian doctors were asked for to complete the required establishment for the two Australian General Hospitals as now expanded

"No 1 with 750 beds has 20 M.Os. but requires 27—7
No 2 „ 1,040 „ „ 19 „ „ „ 32—13
20

"The Australian units are in a similar position to the Canadians who have been asked for 28 officers to complete.

"I hope the Colonies concerned will be able, not only to meet our present requirements but to maintain the establishment, otherwise our calls for R A M C will be correspondingly increased"

General Howse replied—"I found by experience in Egypt over a period of many months, that 25 officers were able to run a 1,040 bed General Hospital very easily Australian M Os have been accustomed to very arduous work in the practice of their profession in civil life, and consequently find no difficulty in running a General Hospital with a smaller staff than that laid down in *Part I II—New Armies, 1915*"

He added that "No 1 A G.H, equipped for 750, had sufficient officers to run 1,000 beds if necessary . . . The O C. No. 2 informs me that at no time has the staff been fully employed"

In fairness, the comment must be made that at times, especially in France, the whole staff might be at full stretch to cope with the work Much depended on the type of casualties—in particular, on the proportion of wounded. But the considered opinion of the officer commanding No. 14 A G H. (Col Walter Summons) on experience in General Hospitals throughout the war was that "the establishment laid down by the War Office for 1,040 bed hospital might with advantage be modified The provision made for 30 medical officers in addition to O C, Q M, and Registrar is in excess of requirements At no time did the requirements of this unit demand more than 20" (*War Diary, March, 1918*).

With these provisos the Australian units complied with War Office establishment laid down in *Part VII New Armies* and modified at the end of 1916 by a sliding scale relating the staff to any convenient number of beds up to 2,500—the method adopted by the Australian Director-General in 1915 (*See Volume I, p. 406*). A table of establishments for the several medical units will be found as *Appendix No 8*

No. 1. A.G.H.

The prominent and even dramatic part played by No. 1 Australian General Hospital in the Gallipoli Campaign will be recalled. In April, 1916, under the command of Lieut.-Colonel de Crespigny, the staff arrived at Marseilles; the unit's establishment was that for a 520-bed hospital with expanding limit to 1,000.[48]

On April 17th the unit took over the huts and tents occupied by No 12 British Stationary on the Racecourse at Rouen, and on the 29th reported the hospital as ready to receive patients Here, somewhat cramped as to space, it worked through three strenuous years, passing through its wards in that time more than 90,000 casualties.

Its most difficult time was in the winter of 1916-17. The site was an exposed one. "The winter of 1916-17," an officer relates, "will long be remembered as one of the most severe on record, and it was surprising how well most of the medical cases got on although they were nursed in tents This was in a great measure due to the devotion of the nursing staff, many of whom suffered from minor degrees of frost-bite during the first three months of 1917. The cold interfered with the water supply, and the use of fuel was restricted owing to the shortage of coal For weeks the temperature showed several degrees of frost and on occasion the thermometer registered 4° Fahrenheit."

A large proportion of the casualties from the Somme Battles passed through Rouen, and in the winter wounded were replaced by trench foot, pneumonias, nephritis, and trench fever cases, the latter chiefly sent in as "P.U.O."

The work done in the unit is shown in tabular form on *page 780*. Its experiences during 1918 belong to a later chapter

The personnel, officers, nurses, and other ranks, alike took part in the social life of this peculiarly interesting town and the hospital Rugby XV (it is recorded) "succeeded in winning a local competition."

No. 2. A.G.H.

In Egypt, as will be recalled, No. 2 Australian General Hospital was over-shadowed, on the military side of its work, by No. 1. But it had maintained throughout a very high professional and scientific standard—its clinical records were unsurpassed in the Australian service.[49] This objective was maintained also throughout its

[48] In 1917 No. 1 and No 2 were expanded to 1,040 and 1,500 bed hospitals respectively

[49] The card record system of this unit was taken over by the Repatriation Department, and was found of great value in deciding difficult problems of attribution

service in France. Here the unit found itself so placed in relation to the stream of casualties as to be in a position to mould its own destiny.

Arriving at Marseilles on April 1st, established and equipped to form a 750-bed hospital, No. 2 was at once pressed into a service which gave it a place in the history of the B.E.F., in that, at a time of importance, it served as a sieve against the introduction of infectious disease from Egypt. An account of this important work is given elsewhere.[50]

Leaving behind a section thus engaged, the remainder of the unit took over a partly completed hospital site at Wimereux 2½ miles outside Boulogne. Here, at the most important base port of the B.E.F., and on the direct route of casualties from the Salient, the hospital maintained its tradition and built up a reputation for professional work which, even by the exacting standard of this base, was a high one. In particular a special study was made of fractures, especially of fractured femurs, and of perforating wounds of the joints.

The pathological department established a close *liaison* with that controlled by Lieut.-Colonel T. R. Elliott, the purpose of which was the study of surgical pathology of wounds and dissemination of results through museum specimens.[51] Figures illustrating the work of the unit will be found in the table on *page 780.*

No. 3. A.G.H.

Left behind in Egypt when the A.I.F moved to the Western seat of war, No. 3 Australian General Hospital had the job of clearing up after the Gallipoli Campaign, and for a time also served as the General Hospital for Australian casualties from the fighting of the Light Horse. The circumstances under which it was brought to England and its initial work at the Kitchener Hospital Brighton are recorded elsewhere

At the beginning of 1917 the submarine attacks on hospital ships and the urgent need to prevent wastage from the force in France brought about a general expansion of the B.E.F. Lines of Communication, and as a part of this the unit was sent to France.

Under the command of Colonel B. J. Newmarch with the establishment for a 1,500-bed hospital, the staff arrived at Abbeville on April 16th. Here under the immediate eye of the D.M.S., L of C., Surgeon-General Woodhouse, it took over a hospital site which enabled it ultimately to accommodate more than 2,000 patients at one time; and, with the South African General Hospital and No. 2 British Stationary, it formed an advanced centre—almost an outpost—of general hospital work. Casualties were cleared through Rouen or Boulogne, and convalescents to the

[50] *Chapter* VII (*pp.* 542-6)

[51] A considerable number of the preparations made in Australian units were included by Professor Arthur Keith in the museum of the Royal College of Surgeons in London The Australian collection will be described in *Vol III.*

great centre at Trouville. The unit served also, especially in the last phase of the war, a very large local population of moving and resting troops.

The work of this unit during 1917 was of a routine—not to say humdrum—type; but with the German push-through in 1918 it took a dramatic turn, so that, indeed, this centre held the limelight till almost the end of the war. The account of this is given later.[52] A matter which calls for record here is the formation of a pathological research laboratory, which was designed and organised under the immediate direction of the Adviser in Pathology of the Australian Imperial Force, Lieut.-Colonel C. J. Martin, whose work is recorded elsewhere. But researches carried out there belong to the later history of the service.[53]

Return to Duty—The Base Depots

The setting up of four "Australian Divisional Base Depots" at Etaples has already been mentioned in recording the move of the A.I.F. to France, of which that incident formed part.[54] Throughout 1916 these formations remained there as an integral part of the British depot system. An Australian instructional staff, drawn from each of the Divisions, was pooled with the British, though each divisional depot had a small administrative staff of its own and a medical establishment on regimental lines. In June, 1916, the latter was augmented by an Australian dental unit—a quite dramatically successful move.[55] But the general working of the depots and in particular the system for dealing with convalescents, was only less crude and unsatisfactory than it had been in Egypt. The situation at the end of 1916 is disclosed in a report to the G.O.C., A.I.F.[56]

"According to returns furnished by the Base Depot, out of 1,275 in the 1st Divisional Base Depot 328 were sick, over 19 per cent. Enquiry into this appalling sick rate disclosed that it was due to the wrong classification of convalescents and casualties as sick. There are about 400 men not recovered from wounds or sickness, but who have been discharged from convalescent camps, hospitals, etc. to the depot. These men are useless for ordinary work in the depot, and should still be in convalescent camp. On the day of my visit there were 400 men awaiting dental treatment, many of these have never been to the front, many others had to be evacuated as dentally unfit shortly after their arrival. I am most strongly of opinion that more than half these should never have left England, or indeed Australia, in their present dental condition."

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[52] *See pp. 778-81, 800 f.*

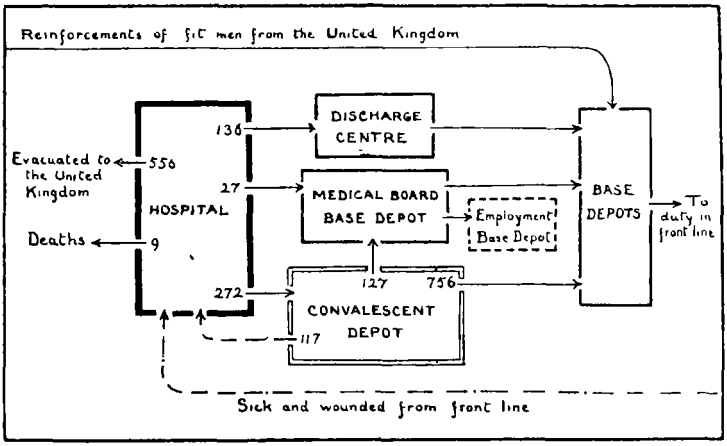
[53] *See p. 560 and Vol. III.*

[54] *See p. 34.* A depot for the 3rd Australian Division was formed in Nov., 1916.

[55] *See also p. 655.*

[56] By the A.A. & Q.M.G., 1st Australian Division, Colonel C. H. Foott.

Many of these men, it was found, "do not become fit as early as desired"—hardly a matter for surprise! The terrific experience of the Somme, initiating, as it did, for the B.E.F. the procedure of attrition, compelled in France as in England a drastic reorganisation of the whole system of numerical maintenance.



Disposal of sick and wounded received into hospitals and convalescent depots on the Lines of Communication in France. The numbers indicate the proportion per 1,000 admissions into hospitals and convalescent depots in 1917. (From British Official Medical History.)

The Base Depots in France had not only to ensure that reinforcements received from Great Britain were up to the standard of hardness and efficiency required by the Commander-in-Chief; they had also to receive men discharged from convalescent camps in France and to give them some hardening similar to that given in the depots in England. As part of a wide reconstruction in the B.E.F., in June, 1917, the Australian Base Depots were transferred from Etaples to Le Havre, reorganised as members of a single "*Australian General Base Depot*," Lieut.-Colonel Burston, A.A.M.C., being appointed S.M.O. Shortly afterwards the function of putting reinforcements through a second training in drill was abandoned as unnecessary except in a few items and they were sent on to their divisional reinforce-

ment camps close behind the front. But the hardening of convalescents in France was still necessary, and, though being designed for a simpler type of case it was less elaborate than that of the Command Depots in England, it nevertheless had some points of special interest.

When the Australian depots moved to Le Havre, reinforcements and convalescents still mingled with no exact procedure for insuring "fitness." It was not until 1918, long after the similar machinery of the Command Depots in England had been perfected, that the urgent call for effectives, brought about by the German offensive and by the diminished supply of recruits from overseas, compelled a more exact system.

Australian Convalescent Depot

The necessary reform was achieved by giving effect to the principle that few men discharged from *medical* convalescent camp or depot were fit to resume at once their place in the ranks, and that, in the promotion of their fitness and the selection of those who should be held fit for duty, the medical service must be given the controlling decision. In April, 1918, an *Australian Convalescent Depot* was formed as part of the Australian depot system at Le Havre, and the duties of Colonel Burston were extended to include command of this convalescent depot in addition to his position as "S.M.O." of the whole depot system.

"Hardening" in France. The Convalescent Depot accommodated 2,000 men in two separate camps or "divisions," each under the full command of a medical officer. Each "division" was sub-divided into four companies, each one of which again was under a medical officer, who had the full disciplinary powers of a company commander, and was responsible for the interior economy of his company, and for the treatment, training, and classification of each man in his command.

Classification. Men marching in from "Con. Camp," if fit, were classed "A" and transferred at once to the Base Depots; otherwise they were classified "D," unfit for any duty; "C," fit for light fatigue and physical training, or "B," fit for physical training and route marching. Men were reclassified weekly, and if thought "unlikely to be fit within two months" went to the General Base Depot for medical boarding and appropriate action.

System of Training. This took the form chiefly of "physical training," and of games. The latter were organised on lines designed to "foster the spirit of healthy rivalry between companies in regard to both military duties and sport, and to ensure the active participation so far as desirable of every man." Inter-company competitions in boxing, wrestling, and most forms of sport were organised, and to a great extent replaced routine "physical jerks." The men were promised a fair deal and a reasonable spell in the depot, and that success in sports and competitions would not in itself involve early discharge as "fit."

Infectious Disease. For the depot a very effective sanitary organisa-

tion was provided and an exact system built up for detection and isolation of infectious disease and treatment of scabies. Fine baths and laundries were built, and controlled by the Corps and a particularly effective delousing system organised. The chief problem of the general depot work was to ensure that drafts to the front should be free from infectious disease deriving either from drafts from Britain or from local cases. From both sources in 1916 came outbreaks of mumps and measles sufficiently serious to interfere with military activities.[57]

During the last year of the war, by a rigidly enforced system of inspection and isolation, these cases of disease were effectively excluded from the front.

Statistics. The following table shows the work done in the Australian Convalescent Depot at Havre during its brief existence.

STATISTICS OF NO. 1 AUSTRALIAN CONVALESCENT DEPOT HAVRE

	ADMISSIONS FROM					DISCHARGES				
1918	Front	Expedy Base Hospls.	Brit Con Depots France	Base Depots in France	Total	"A" Class	Med Board	To Hospl.	Died	Total
Apl.					1,157					
May					2,023	2,870	275	361		1,399
June					2,063					2,085
July		850	660	54	1,564	1,479	277	102		1,858
Aug.		1,800	822	137	2,759	1,620	268	73		1,901
Sept.		762	196	48	1,006	1,597	142	67		1,806
Oct.	31	966	1,057	41	2,095	1,826	223	178		2,227
Nov.		1,051	77	20	1,148	1,258	67	60	1	1,386
Dec.		328	454	73	855	661	136	97	1	895
1919										
Jan.		56			56	614	83	34		731
Feb.		8			8	424				424
TOTALS					14,734[58]	12,349	1,411	972	2	14,734

Diminished by the moiety thus returned to duty, the overflow from the front passed through the Base for the most part

[57] The ultimate source of these outbreaks was the camps in Australia These were followed by outbreaks on the transports, and these by others in the training battalions in England, from which cases reached the Base Depots in France *See pp 555-6*

[58] Representing 38 per cent of wounded and 62 per cent of sick and injured

Embarkation

rapidly; some without stay, others after partial treatment, some few again saved by prolonged care after the more desperate type of regional wound—femurs, abdomens, knee-joints, jaws, and so forth. These all went by special ambulance convoys or by ambulance train to embark on hospital ship for the British ports, Southampton and Dover.

SYNOPSIS OF CHAPTER XV

EVACUATION: LAST STAGE, DISTRIBUTION

THE CHANNEL CROSSING:

Embarkation.
Disembarkation Distribution.

THE HOSPITAL SYSTEM IN BRITAIN:

Australian Patients and British Hospitals
The Australian "Red Cross."
No. 3 A.G.H.

TREATMENT IN BRITISH PRIMARY HOSPITALS:

Secondary treatment of wounds and disease.
Prophylaxis in reparative surgery.
The treatment of diseases in British Hospitals.

THE NATIONAL ISSUES.

Reparative treatment.
Reparative surgery.
  Types requiring reparative treatment.
Reparative Medicine.
  The technical problem.

THE SPECIAL HOSPITALS

The Australian Auxiliary Hospitals (Harefield, Southall, Dartford)
Work in the Auxiliaries.
  For potential "effectives"
  For "invalids"

THE PARTING OF WAYS—FINAL DISPOSAL OF AUSTRALIAN CASUALTIES·

The Medical Boards.
A poignant decision.
National wreckage and Army salvage.