CHAPTER IX

THE AUSTRALIAN ARMY DENTAL SERVICE

I

THE POSITION IN 1914

THE Army Dental Service of the A.I.F. was in a very high degree special and peculiar. This in a great measure was due to the fact that it was created *de novo,* and its organisation and methods—the strategy and tactics, as we may properly say, of its employment—were wholly independent of British Army or any other precedent. The Service reflected, indeed, not only the mettle and methods of Australian dentists and dentistry, but very exactly also the spirit of the A.I.F and in particular the outlook of the Medical Director, Surgeon-General Howse.

In these respects its experience contrasted sharply with that of the Medical Service of the A.I.F. in which policy and higher direction, except in matters of personnel, were almost exclusively British.

The different position in the dental service was due to the lack of policy, or indeed the negative policy, of the British Army and medical authorities in the sphere of dentistry.

In the Australian forces the impulse came from two directions—first, from the dental profession in Australia bringing its influence to bear on the Minister and the D.G.M.S. (General Fetherston). Second, from General Howse, who was a realist and sometimes in closer touch with the military needs than were his intimate associates—the Australian military commanders—themselves. General Fetherston, it is true, stubbornly opposed the initial reforms overseas, but in fairness to him it must be made clear that his opposition was due to a firm policy of adhering to British organisation in order to avoid, if possible, a confusing multiplicity of systems within the Empire's forces overseas. In each case he referred the question to the Director-

General of Army Medical Services at the War Office; and it was on receiving negative advice from there that he opposed the proposals.

The British policy was restrictive, not only in the number of dentists and dental units provided, and the status given to them, but, perhaps consequentially, in the extent and nature of work done. The consequence was that dominion dental units behind the Western Front were besieged by British troops and W.A.A.C's, for whom, especially in the base area, a great amount of work was done. Eventually, finding that Australian troops could not adequately be attended to and were being held back from duty because dentally unfit, the Australian authorities had to rule that only urgent operations were to be undertaken for other than members of the Australian troops serving with them.

At the beginning of the War of 1914-18 the only dental appliances in the Australian, as in the British Army, were a set of forceps carried by the Regimental Medical Officer and this officer was (as we must say) the only "dental practitioner" officially provided for the army in war. At its close a statement so characteristically provocative as that of Surgeon-General Howse—that as a factor in the achievement of victory, in a short war a dental service could less well be spared than a medical one—can scarcely be held outrageous. The reason for this extraordinary change lies deep in the whole scheme and circumstance of modern war and modern civilisation. Whether or not the chief factor in this amazing revolution is the modern scientific steel roller-mill or other sophistications in the production of modern diet, this much is certain—the "total" modern army can no more be made and kept efficient without an effective system of dentistry than can a modern nation. The new "Army Dental Service" is part of the technique of social life in our present civilisation.

Australia illustrates this as much, perhaps more than, any other nation. The word "nation" is used advisedly instead of "race". Evidence points towards social factors rather than genetic as still paramount in the pathogenesis of dental disease. But genetic evolution is based on socially determined selection.

The degenerative diseases of dental tissue seem largely to be confined to civilised man, and, in their present universality, it

would seem to ultra-modern civilisation.[1] They have this important feature in common with certain other chronic morbid processes, (for example, the allergic diatheses, chronic *otitis media,* certain chronic skin diseases, the "rheumatic" and "rheumatoid" states, and so forth, whose aetiology at the period of the war was obscure) that, in *themselves they are not directly fatal*; nor is their actual existence in an individual incompatible with health and efficiency. But in dental disease and deficiency this state of things is due in a great measure to the facilities and amenities at the command of a civil community in the matter of food and its preparation, and—especially—to the possibility of substituting artificial masticating apparatus as "dentures" which if inferior to the natural organ are reasonably adequate to the purpose. In civilised communities *the utter dependence of civilised man on his dentist* becomes evident only when certain ulterior effects of dental disease appear—chiefly in the form of local or systemic infection or when, as in war, circumstances compel a return to an environment in which sophistication of food is impracticable and the provision of artificial dentures difficult.

In all previous modern wars primitive conditions existed to a degree that induced military authorities to make decay or loss of teeth a definite bar to fitness for military service, both in peace and war. This was emphatically the case at the beginning of the war of 1914-18. Illogically enough, however, having thus recognised the importance of dental disease, the Army made no effective provision whatever for meeting its occurrence in soldiers after they had been accepted for service.

Reasons for military neglect

Probably the most important reason for the military neglect of dentistry lay in the historical despite of the art of dentistry by the "orthodox" medical profession, and to the subordinate position of dentistry among the medical sciences, and of the dental profession in the related social groups or occupations; a subordination, however, much less marked in Australia than in Great Britain.[2] In 1914 the subject of dental disease was still held to be outside

[1] It is pointed out by Plimmer (*Food, Health and Vitamins, p. 4*) that Wellington's men did not have dentists but were of the finest quality.

[2] In justice to the first Australian Director of Medical Services, Gen. W. D. C. Williams, it must be recorded that so early as 1906 he had urged on the military authorities the inclusion of some form of dental service in the Australian Military Forces. His recommendation was refused by the military authorities.

the interest of the orthodox medical profession. There was little co-operation between the dental specialty and general medicine in the study and prevention of its causes and effects.

An important cause of military neglect was undoubtedly the fact that caries was to all intents universal and that, moreover, in regard to prevention, the dental profession was hardly more conscious of any obligation to the community than was the medical profession. To most general practitioners in both professions *treatment* was still the end-all of responsibility, save for the repetition of current banalities on which the general public was often better informed than the professions. Like general medicine, dentistry was "disease-conscious" but not yet "health-conscious". The public was critical of this state of affairs but had not as yet been enlightened. Homage, it is true, was paid by both professions to the "preventive" idea but both still looked on "preventive medicine" as synonymous with "public health". The fact that prophylaxis in dental decay must precede even birth had hardly yet affected the attitude of either medicine or dentistry.

Dental science in 1914

But however much the dental and medical professions may have fallen short in their duty of showing forth the light that was in them, the most important element in the situation in respect of dentistry lay in the fact that *the light itself was faint,* and flickered with the frequent changes in the currents of dental and medical opinion regarding the aetiology of diseases of the teeth and gums. The cause of dental disease was at this time so imperfectly understood that effective socially applied measures of "prevention" were not possible. Dental prophylaxis was strictly a matter of *personal hygiene* since dental disease was generally held to be chiefly a local phenomenon, and due to extrinsic causes—chemical and infective.[3]

[3] It may be recalled that in 1914 the importance of the pre-eruptive stage of dental development and the susceptibility of the developing tooth to defects in structure, due to nutritional deficiencies in infancy and childhood, were but vaguely apprehended. It was (it is true) known that the "internal secretion" of the pituitary and other glands had an important influence on growth, development, and metabolism; that an effective supply of phosphorus and calcium to the developing organism was not entirely a matter of a fish diet and "chemical food"; that nutrition might be influenced by the presence or absence in adequate amounts of certain accessory food factors; and that dental development and "disease" might result from other than local factors affecting the fully erupted teeth. But all this was as yet only part of the "higher" science of dentistry, and the practical possibilities were discerned only by a few men of vision—among them, as the dental journals and the proceedings of scientific gatherings reveal, Australians. Even the funda-

As an art and craft dentistry appears to be almost co-eval with intelligent practice of medicine. The preface to the first written work on dentistry[4] gives as the reason for their early dissociation that

> The most celebrated surgeons, having abandoned this branch of surgery or having but little cultivated it, their negligence gave rise to a class of persons who without theoretic knowledge or experience, and without being qualified practised it at hazard, having neither principles nor system.

Origin of the dental profession

However this may be, one thing is certain—scientific dentistry began with John Hunter. Like surgery, dentistry was at first a craft of almost menial type. Of modern times it began indeed in the barber element of the barber-surgeon combination, and was left behind when surgery became scientific. There it remained, abandoned by surgeons and physicians alike, until this man arose who held nothing human alien to his interest. John Hunter's *Natural History of the Human Teeth* (1771) gave—as it may be said—to dentistry a foundation of "function" as well as of "structure".

> Hunter was the first to study the teeth in a scientific manner and the first to recommend complete removal of the pulp in filling them.[5]

Dentistry seems for a time to have been practised as a specialty of medicine. Thus in 1799 a dental surgeon was appointed to Guy's Hospital, London. But the rift between "orthodox" medicine and dentistry widened. An empirical practice of dentistry, especially in those operations that are almost wholly mechanical, had created a large body of dental artisans who, though often uneducated, developed a high degree of manipulative skill. There thus came to be two classes of practitioners the first regarding dentistry as a specialty of scientific medicine, the latter as a distinct and separate calling.

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mental importance of the enamel in the development of dental caries, the fact that once erupted the teeth must stand or fall by the enamel as laid down in the intra-alveolar stage of the teeth: and that the development of this stage is critically influenced by diet and other factors—these truths were only being deliberated in the scientific background of dental teaching. The use of the tooth brush, with antiseptic accessories was, for the great body of practitioners, the beginning and the end of dental prophylaxis.

[4] Pierre Fauchard's *Le Chirurgien Dentiste*, 1728 quoted from Garrison and *Encl. Brit., Vol. 8, p. 50.*

[5] Fielding H. Garrison, *An Introduction to the History of Medicine, p. 348.* (Philadelphia, W B Saunders Company, Fourth Edition, 1929)

Dentistry (says Sir D'arcy Power)[6] was soon lucrative and fashionable; but only became a profession based upon scientific principles when Rogers and the Tomes—father (1815-95) and son—placed it upon a broad foundation. They were helped by a body of enlightened men who insisted that there should be a preliminary training, both in theory and practice, which should be tested by subsequent examination. The Dental Society was founded in 1856 and a Dental Register was opened in 1879. . . .

Quite early in the 19th century the United States of America became the home of scientific dentistry.

"In November 1840" (says the *Encyclopaedia Britannica*) "was established the Baltimore College of Dental Surgery, the first college in the world for the systematic education of dentists." In Great Britain dentistry was for the reasons given above very late in obtaining social recognition. Most of the medical schools there refused to furnish the desired facilities for dental instruction. Students from all over the British Empire, including many Australians, went to Philadelphia University to graduate and thence sometimes to Edinburgh to practise tooth extraction.

Modern dentistry is so obviously a specialty of medicine that there is hardly need to argue the matter.[7] Its science, in so far as this is concerned with life is identical with that of medicine:[8] its art, where this deals with living tissues is directed by the same laws and principles as guide the general surgeon. The discoveries of Pasteur and of Lister are alike the foundation of surgery and of "dental surgery": and the observations and researches that have resulted in our present knowledge as to the part played by accessory food factors in nutrition, and as to the influence of the "internal secretions" in metabolism, were as revolutionary in their influence on dentistry as they were on internal medicine.

Whatever the cause—and the question cannot even yet be regarded as having been more than exactly stated—there is no question that in 1914 *dental disease was—as it still is—exceedingly widespread through the Australian people*.[9] Australians who were rejected for the A.I.F. on dental grounds numbered 15,773, the majority within the first eighteen months of the war. Infinitely the most common cause was caries. Pyorrhoea was

[6] *A Short History of Surgery, p 65.* (London: John Bale, Sons and Danielsson, Ltd., 1933)

[7] "This branch of medicine has now a foremost place among the medical specialties and especially as regards public health" (*Proceedings of the 5th International Congress in Military Medicine and Pharmacy, p. 356.*)

[8] For the most part indeed, it derives from within the Medical Profession.

[9] *See Vol. I, Graph No. 9, facing p. 466.*

not, so far as can be ascertained, a major element in dental practice in Australia. In particular Vincent's Disease was scarcely known there; its prevalence there since the war is probably largely due to its introduction by the troops, among whom, as "trench mouth", it was a major element in the disease picture of the front and army zone.

Before the war of 1914-18 dentistry in the six Australian States was still evolving its standards. Successive "Dental Acts" had made registration necessary, and were still tightening up—so far as vested interests and public ignorance would allow them—the qualifications, and the regulations under which dentistry might be practised. Even in New South Wales the old system of qualification by apprenticeship was still in force, side by side with that of university training. In settled areas on the coast the public generally demanded and obtained a very high average of dental skill and attention. In New South Wales and Victoria there were already faculties of Dental Science within the Universities; there were dental journals, associations and professional congresses. Large numbers of graduates were in practice. In the out-back portions of Western Australia and Queensland, where settlement was very scattered, little attention was paid by the inhabitants to their dental state and the dentists available were in many cases not highly trained. Nevertheless, on the whole, the dentist's status was higher than in Great Britain.

II

1915—THE SERVICE EVOLVES

In the organisation of the Australian Army Medical Services which took place after the Boer War of 1899, no provision was made at the outbreak for any form of dental service; nor, although Surgeon-General Williams recommended it in 1906, was this arranged for when the Australian Military Forces were again reorganised with the introduction of Universal Military Training in 1911. General Williams' suggestion had been rejected by the military authorities as "not required". A great opportunity was then lost to Australia of being in the forefront in an advance which was recognised by many medical men, military and otherwise, as inevitable.

When war broke out in 1914 many dental practitioners from

all parts of Australia volunteered for service as dentists, both in connection with the partial mobilisation of the Australian Military Forces for home service, and in training camps in Australia, and also for service overseas with the Australian Imperial Force. This desire on the part of the dental profession to serve as such was backed by a very general feeling in the medical profession that the formation of a military dental service was inevitable.

In New South Wales at the outbreak of war there was no arrangement for giving the troops dental attention. Men were rejected by the medical officer and instructed to have the work done by private dental practitioners. A few weeks later a number of dentists practising in and around Sydney offered their services free for a specified time each week. The Board of Management of the United Dental Hospital of Sydney made a part of the hospital available for the work. A roster of attendance of the dentists was drawn up which provided for a half-day attendance each per week. As much conservative work as possible was accomplished, all necessary extractions done and a certain number of dentures made by the hospital mechanics: the cost of materials was paid for out of hospital funds. For a few months this plan worked fairly well until the conditions proved that it was impossible to cope with the vast amount of work presenting.

In Victoria at the outbreak of war also no provision was made. Volunteers for the first contingents requiring dentures, or having bad teeth, were rejected. As the number was great the dental profession took the matter up, and, through the Council of the Melbourne Dental Hospital, made an offer to the Defence Department to carry out without cost the dental requirements of the first A.I.F. contingents leaving Victoria. This offer was accepted by the Minister for Defence. The Dental Hospital was placed at the disposal of the profession, donations of dental equipment and supplies were received from some of the supply houses, and the troops were paraded in batches of 300 to 500 daily. In addition, work was done gratuitously for the A.I.F. by members of the profession in their own rooms, and a number of fourth year dental students performed a great many of the minor operations for the men in camp.

Thus, as the result of the comparatively high standard in

connection with the examination of recruits, and of the public-spirited action by dentists in each State, the first Australian expeditionary force sailed from Australia in a fairly satisfactory condition as regards dental fitness.

The force sails

Even before it reached Egypt, however, medical officers realised that the problem of dental treatment was destined to be important and difficult. Even before leaving Australia some Regimental Medical Officers had made their own arrangements. Further, a few dentists enlisting both in field ambulances and in the infantry had foreseen the need and taken steps to enable themselves to carry out the more urgent work. Arrangements were made to purchase, through regimental funds and otherwise, dental equipment. In several cases also, considerable sums were provided by the Australian Branch of the Red Cross Society. In some instances the men employed in this emergency were those with experience but without registered qualifications.

Representations by the Regimental Medical Officers to the A.D.M.S. and to the combatant commanders became more and more urgent. A memorandum by Lieut.-Colonel Frank Marshall, afterwards Staff Officer, Australian Dental Service, says:

Early experience in Egypt

> The dentists working with units were absolutely unable to do more than touch the fringe of what was demanded of them, though a considerable amount of work was accomplished. One Regimental Medical Officer *e.g.*, states that at the latter part of the Mena period, seven dentures per day were turned out in his battalion, in addition to surgical dental work.

The A.D.M.S. 1st Australian Division (Colonel Howse) took up the matter with the A.I.F. Commander, General Bridges, who permitted dental work to be done at Mena House (No. 2 A.G.H.), Regimental and Red Cross funds being used. But most of the work was done by civil practitioners in Cairo whose work was very uneven.

Before the 1st Division left for the Dardanelles Colonel Howse, on March 16th, prevailed upon General Bridges to cable to the Defence Department for leave to promote to commissioned rank a dental surgeon, Private McIntosh, who had done good work in the 1st Battalion. The application was refused by the D.G.M.S. (Colonel Fetherston) in Australia, even when it was repeated by General Bridges "in the interests of the troops",

and pressure was also being applied by the Dental Board of Victoria.[10]

Finally on 18th May 1915, the D.G.M.S. agreed that dentists might be appointed in Australia and Egypt, with rank of lieutenant.

An additional reason for Colonel Fetherston's reluctance to allow the commissioning of dentists from among the troops overseas was that he had repeatedly informed the dental profession in Australia, which by then had wrung from the Department the appointment of dental officers in Australia, that "dentists would not be sent with commissioned rank in the A.I.F." The change in Australia had followed on an increasing realisation of the unsatisfactory nature of a system by which what was obviously a vital and normal responsibility of the Defence Department was thrown upon the public spirit and voluntary effort of a civil profession. The objects both of the military authorities and of the dental profession were being defeated by it.

Dental Reserve in Australia

On 6th January 1915, therefore, approval was given for the formation of an Australian Army Medical Corps Reserve (Dental), comprising:

Military District.	Captains.	Lieutenants.	Total.
1st	1	7	8
2nd	1	13	14
3rd	1	13	14
4th	1	7	8
5th	1	5	6
6th	1	5	6
	6	50	56

All ranks were "honorary", but this was the first recognition in Australia[11] of the principle of granting commissioned rank to members of the dental profession as such, and was the first step in the formation of an Australian Army Dental Service. The first appointments under the new establishment were not, how-

[10] This time the War Office was consulted by the D G M.S It replied that dentists were occasionally commissioned when asked for by the D.M S. but were not included in medical units unless they were fully qualified medical practitioners.

[11] In the New Zealand Expeditionary Force dentists with commissioned rank sailed with the first convoy in 1914.

ever, made till March 1915, and the officers appointed were not utilised in any definite way, nor was there any precise definition of their duties and responsibilities.[12] Not till late in 1915, when the dental standard for Australian recruits had been lowered,[13] and the Australian camps were overflowing through the great recruiting drives, was definite provision made for using this Dental Reserve in connection with the camps.

On 19th October 1915, the establishment was increased to provide for 158 officers including 6 captains and 2 majors. Next day a principal Dental Officer was allotted to the staff of the D.G.M.S. in Melbourne and a "Senior Dental Officer" appointed both in New South Wales and in Victoria—as they were also later in the other States. Some of the officers were detailed to serve for periods in the training camps and certain *full time* officers were allocated permanently in the most important of them.

In the 2nd Military District, for example, (Colonel Marshall reports) between 30 and 40 dental officers were detailed for duty half day per week. Later it increased to a full day per week. The whole of the Dental Hospital, including equipment and staff, were now placed at the disposal of the military authorities, who formed it into a Base Hospital for the dental treatment of the soldiers in camp. 20 staff-sergeant mechanics with one warrant officer and orderly and four lady attendants, were appointed full time. Dental officers were also appointed to the following camps—Liverpool, Marrickville, Showgrounds, Cootamundra, Bathurst, Goulburn, and Newcastle. The cost of material, etc., was now paid from military funds and several donations from the Walter Hall Trust. The chief trouble which had to be contended with at the Dental Hospital was the difficulty of getting the men paraded, the result being that many were sent away without their dentures.

Early in 1916 the establishment was increased to provide for

[12] The officers of the dental reserve in the 2nd Military District were sent out for training in stretcher drill—and claimed to have achieved no little proficiency in this branch of medical work.

[13] In June, 1915, the following amendment was made of standing orders as to the dental fitness necessary for enlistment in the A.I.F.:

"The acceptance or rejection of a recruit on account of loss or decay of teeth will depend on the *consideration of the relative position of the sound teeth* and the physical condition of the recruit; thus, the loss of many teeth in a man of indifferent constitution would point to rejection, whilst a robust recruit who had lost an equal number might be accepted. (*Too much attention cannot be paid to this latter point*)"

Men might be admitted if they had serviceable incisors and any opposing molars, or serviceable incisors and opposing canines and bicuspids on the same side; or serviceable incisors and canines in both jaws, and well fitting permanent sets of false teeth (*upper and lower*); or complete upper set with serviceable lower natural teeth.

"Recruits otherwise fit but whose teeth are not up to standard may be passed *if they can by dental treatment be made fit* The necessary dental treatment will be provided by the Department after enlistment".

168 officers,[14] 5 warrant officers and 163 staff-sergeants and by May it provided 4 majors, 54 captains, 116 lieutenants, 7 warrant officers, 170 staff-sergeants, 8 corporals (clerks) and 170 privates. Major T. F. W. Hall was Staff Officer for Dental Services on the staff of the D.G.M.S. in Melbourne and was later made a lieutenant-colonel. The Senior Dental Officers were on those of the P.M.O's in each military district. Lieut.-Colonel Marshall writing in 1918 says:

> Lieut.-Colonel Hall computes that, on a conservative estimate, 75 per cent. of the men who enlist require dental treatment. It is seldom that a recruit has a perfect set of teeth, while the great majority have teeth missing or are affected by some wasting disease like pyorrhoea. Recruits are divided into three classes: the first requiring no treatment; the second, modified treatment; and the third, extensive treatment. In this third class are men who, while dentally unfit for war service, are capable of being made fit. Earlier in the war period men without a certain number of teeth were not accepted for service, but now complete sets of false teeth are often supplied to the troops. The number of those men who, in the twelve months ended 30th June 1917, were made dentally fit, but would otherwise have been unfit for service is 22,592. There were 55,497 fillings, 127,280 extractions, 26,475 plates supplied, 3,398 plates repaired, 39,485 treatments, including those for pyorrhoea, while no fewer than 183,987 artificial teeth were used.
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> The growth of the Army Dental Services in Australia has assisted to foster several industries within the Commonwealth Among these industries are the manufacture of dental chairs, lathes, vulcanisers, amalgam, and other articles for every-day use.

At Anzac

To return to the troops overseas. At the date of the Landing no provision had been made for a dental service for the A.I.F., but a number of officers and others who had been dentists in civil life were serving in various units. Owing to the lack of recognition very little work could be done. Even in the 1st Battalion, where a kit for Private McIntosh had been purchased with £20 from regimental funds, most of it had to be left on board the transport.[15]

One artillery N.C.O. had enough equipment to undertake extractions in a dugout. A New Zealand dental officer, Captain B. S. Finn, worked with the 4th Australian Field Ambulance at Anzac Beach till the Suvla Bay landing; owing to the limited equipment no work other than extractions, fillings and gum

[14] The number of majors and captains was still the same.

[15] Instructions were given that it was to be sent ashore with the third echelon of the landing force. These stores however were never landed and the kit was eventually forwarded to Australian Base Medical Stores in Heliopolis.

treatments was attempted. Sergeant H. D. Ferguson, 12th Light Horse Regiment, another sergeant of the 1st A.C.C.S., and a few men in other units carried on. A number of extractions, and cement and temporary fillings were done.

In the 1st Field Ambulance, between August 29th and September 14th, two brothers, stretcher-bearers, treated 199 cases, doing 122 extractions, 29 amalgam fillings, 6 dressings, 30 minor operations, 2 partial upper dentures, 2 partial lower dentures, and 19 repairs. At a New Zealand depot a limited number of dentures were undertaken, but most men in urgent need of them or of other extensive treatment were sent on to either Lemnos or Egypt, whence, in some cases, after being transferred from place to place, even including Malta, they were sent back months later to Anzac with their teeth still unattended to.

The difficulties of dentistry at Anzac may be judged from the fact that a dental chair consisted of the side of a dugout with a pack as headrest; the "dental surgery" itself was sometimes only a few yards behind the front line.[16] Most operations were carried out in the operator's so-called "leisure" moments when off duty in the front line, or on fatigue work.

The small dental equipment of the 1st A.C.C.S. had been left at Lemnos, and extractions were done without either local or general anaesthetic. Eventually, when the kit did arrive, quite an amount of conservative work was put through. On one occasion when the dentist there was carrying out an extraction, a shrapnel bullet struck him on the knee.

Even in August when the 2nd Australian Division arrived, no establishment had been made for dental officers to accompany any units, and any dental work was carried out by men in the ranks, in the same manner. The 5th Australian Field Ambulance had three men who were registered dentists in Australia, and had obtained (with £30 from the Red Cross) an outfit sufficient for all kinds of dental work. As soon as news of this spread men in extreme need flocked to its position at Waldron's Point, on the extreme left flank of the Australian position. Owing to the conditions, especially scarcity of water, urgent fillings and

[16] For example, about June, Cpl. W. C Mitchell of the 7th Light Horse Regiment utilised a dugout made from biscuit tins, facing Shell Green; here he did practically all classes of work until material gave out. In July, McIntosh was sent to Egypt in search of his dental equipment but owing to difficulties in procuring a movement order for return, he could not return to Anzac until October.

extractions only were undertaken. After two weeks the ambulance moved to Rest Gully at Anzac, where conditions were much better; dental quarters were in a corner of a sandbagged shelter. The unit's carpenter built a dental chair. Dental operations were confined to hours not occupied by stretcher-bearing. Patients were drawn from all ranks.

> After a weary day's duty of stretcher-bearing and fatigues (writes one of the dentists) one would limp back to one's dugout and endeavour to scrape together a meal from such items as bully-beef, bacon fat, and biscuits. No sooner would an indigestible pancake be half-cooked, than a call from the depths of the gully would drag you from the interesting occupation, in order to attend to the wants of a number of men in need of dental treatment.

During November and December 60 repairs to dentures, 180 fillings, and 327 extractions were done.

Ulcerative gingivitis (or trench mouth) appeared on the Peninsula at an early date, but no specific means of combating it were available—the only drugs procurable were tincture of iodine, potassium permanganate and hydrogen peroxide. In most cases, tincture of iodine was employed, but this did no more than perhaps check the progress of the disease. Severe cases led to greatly diminished powers of resistance on the part of the persons attacked.

Undoubtedly on the Peninsula a vast amount of dental work could have been carried out had it not been for the ever-present unsurmountable difficulty of obtaining dental stores. Indents for fresh supplies were forwarded to Lemnos and Egypt, but no stores arrived until a few days before the evacuation in December.

The diet at Anzac was undoubtedly such as to test a man's dental equipment to the utmost. The army biscuit was found by many to be a hard nut to crack. But above all, the circumstances at Anzac were peculiar in that it was essential that every man able in any degree to take his place in the firing line was required there; and that this need existed over a long period; and that facilities for evacuation were limited; and finally, that even when he was evacuated there was no provision of any adequate kind at the base for dental attention to enable him to be returned within a reasonable time.

The official records of Colonel Howse, then A.D.M.S. of the

1st Australian Division, show that Australian medical officers well recognised the urgent need. A memorandum from Colonel Howse in June says:

> About 50 cases have been cleared on account of broken dentures and after an absence of 4 or 5 weeks in Mudros or Alexandria some of these have been returned to duty without having received any dental treatment. They have been much improved by dietary but on return to the ordinary (war diet) again become unfit for duty.

In Egypt the situation was that reinforcements arriving from Australia were in many cases found dentally unfit, and could not be included in the drafts to Anzac, where they were urgently needed. The allotment of two New Zealand dental officers and a few men to the Australian hospitals in Cairo was totally inadequate to cope with more than a very small amount of the work required. Dental unfits among men evacuated from Anzac, either from dental unfitness, or, more commonly, from other diseases, were accumulating in larger and larger numbers. Many of these men were so anxious to get back to Anzac that they spent large sums of money for often inefficient work by civil practitioners. Others used the plea, justified or otherwise, of dental unfitness to excuse an unjustifiable reluctance to return to their duty. At Lemnos as yet (and also at Malta where an increasing number of convalescents and dental unfits were accumulating) no dental work worth speaking of was done.

The report of Lieut.-Colonel L. S. Dudgeon, member of the British medical advisory committee, who visited Anzac and Lemnos in the last stage of the campaign, says:[17]

> The general opinion of all acquainted with the health of the Australian troops is that the condition of their teeth is unsatisfactory. This opinion is confirmed in each Australian Division which I visited—in fact there is very considerable dental work required in the whole of the Anzac Area with the exception of the Indian Brigade. The examination of the teeth and gums of a portion of the first Australian Division who were resting at Sarpi Camp, Mudros at the end of September showed that a very large number of the men required urgent attention, while others of the same division with a total strength of 437 were also resting at the same camp at the end of September. The M.O., Captain Wentworth Thompson, informs me that he examined 378, of which a very large proportion had broken dentures, decayed stumps, oral sepsis, and teeth which otherwise required attention. I examined 35 from the trenches and

[17] This was dated 24 November 1915, signed by Wm Hunter, Col A.M.S., G. S. Buchanan, Lt.-Col R.A.M.C., and Leonard S. Dudgeon, Lt.-Col. R.A.M.C., and after the suggestion at the end was minuted: "This policy will be carefully considered."

firing line in the Australian Divisions taken at random, of which 19 had either broken plates or decayed stumps or other defective and septic conditions of the mouth. At the present moment there are four dentists and four mechanics employed at Anzac, who are unable to meet the demands required of them. It is proposed to have four more dentists and mechanics, but it is worthy of consideration whether a sufficient number of dentists and mechanics could not be attached to the A.D M.S. of each division. These facts are of importance, as it is obviously impossible to maintain the health of the troops when such septic conditions of the mouth exist, while treatment in the division or area to which the man is attached has much to recommend it.

Only when Colonel Howse's urgent appeals through Surgeon-General Babtie caused the War Office itself to take up the matter with the Defence Department had the authorities in Australia set about the rectification of the position overseas.

A.I.F. Service formed

Towards the end of June 1915, demands both in Egypt and Anzac for proper provision became so urgent that action by Australia could no longer be deferred. On July 6th the Government authorised the appointment of 14 dental officers, 12 mechanics and 13 privates for service in the A.I.F. overseas. Six of the officers and a proportion of the other ranks were to be appointed from troops already in Egypt. These dentists were to be employed in units (officer, mechanic and private) attached to General Hospitals. The equipment provided for these units was a fairly complete one, though it was on no definite scale, and was not, as a matter of fact, distributed until work commenced in Egypt.[18] The Dental Service was definitely initiated as a part of the Army Medical Service. This principle, Colonel Marshall states,

has remained, and been recognised, throughout, and has undoubtedly been a source of strength and of mutual benefit to both services.

Major Down, one of the first six officers selected in Australia contributed in 1917 an interesting account of the building up of the original service.

During the second week of July 1915, a meeting was held in the office of the D.G.M S., Melbourne, to discuss what equipment was necessary and its immediate supply. The hopeless want of previous consideration that had been bestowed upon the venture, was very apparent at this meeting, and was a very real index to the obstacles that lay in front of

[18] The uncertainty as to the exact status of the Service was shown by the fact that the personnel were in some States equipped as mounted, in others, for dismounted service.

the six elected officers, before they could hope to place the Service they had entered on a footing sufficiently sound to enable them to carry out the work they had undertaken to do. An equipment was at last secured and six officers, one from each State, with the rank of honorary lieutenant, with six staff-sergeants and six orderlies, sailed for Egypt on or about July 17th 1915. A surgery was opened on the transport conveying the dental personnel and a fair amount of useful work was carried out before reaching Suez. On arrival at Suez the unit and equipment was handed over to the S.M.O., A.I.F., then Colonel Ramsay Smith, who through his deputy Lieut.-Colonel Barrett disposed of the units in the following manner:

Lieut. Marshall was ordered to report to No. 3 A.G.H., Lemnos.
Lieuts Molle and Terry were attached to No. 1 A.G.H., Heliopolis Palace Hotel.
Lieut. Day was posted to Mena House.
Lieut Down was posted to No. 1 Auxiliary Hospital, Luna Park, Heliopolis.
Lieut. Douglass was posted to Zeitoun Camp.

There were then four additional officers appointed in Egypt, who were posted as follows

Lieut. Wright to No. 3 Auxiliary Hospital.
Lieut. Pascoe to No. 2 A.G.H., Gezireh Palace.
Lieut. Blogg to Helouan Convalescent Hospital.
Lieut. Vernon was ordered to proceed to England to be attached for duty to Harefield Park Convalescent Hospital, then being established.

It was found that the amount of work to be done was stupendous and within a week of the arrival of the Corps in Egypt, all the units were toiling against impossible odds to cope with the more urgent cases that paraded to them for treatment At this period there was no organisation of any description and although the dental officers, both individually and collectively placed their views before the Staff Officer for Medical Services, no attempt was made to reduce the state of chaos, then reigning, on to a definitely organised basis.

Egypt

Before the end of 1915 Surgeon-General Fetherston visited Egypt to investigate all matters pertaining to medical services, and in an interview with Lieut Down certain propositions in regard to dental services were placed before him, the main features being—

(*a*) A necessity for immediately increasing the number of dental units.
(*b*) The urgent necessity for the appointment of a responsible head of the department.
(*c*) The necessity for the appointment of an officer, especially qualified to act in the capacity of quartermaster.

The first of these suggestions was given consideration, and ten more officers were appointed. The third suggestion was immediately taken up and Lieut. Unsworth arrived in Egypt in December 1915 as Quartermaster Dental Services, and immediately took over duties of purchasing supplies and issuing as required to dental officers. This appointment marked the first step in respect of the proper organisation of the dental services.

The second and most important suggestion was resolutely turned down, with the result that the dental services continued to be administered by a medical officer to the end of the period in which the A.I.F. remained in Egypt. There is reason to believe, however, that the question of the formation of a Dental Corps under separate administration was discussed by General Fetherston, when in London, but the D.G.M.S. Surgeon-General Sir Alfred Keogh did not look upon the proposition as placed before him with favour.

The strenuous nature of the work and the severity of the climate soon made inroads on the limited personnel with the result that before the end of 1915 two officers had been invalided back to Australia—Lieuts. Molle and Terry. The work at No. 1 A.G.H. then devolved on Lieut. Down, and the O.C. of the hospital, Lieut.-Colonel Newmarch, personally sought the appointment of more dental officers. He was informed however by Intermediate Base, Cairo, that an establishment had been laid down and could not be exceeded, and no more officers could be appointed until the sick officers referred to had been permanently invalided out of the Service. Thus again was the inelasticity of our organisation made manifest. Colonel Newmarch however was convinced of the necessity for the appointment of more dental officers, and interviewed Surgeon-General Ford, D.M.S., Egypt, on the subject. Mainly as a result of this interview several additions were made to commissioned rank in the Dental Corps.

It was frequently pointed out to the medical authorities that the bulk of the work being executed in Egypt was for troops then undergoing training, and should be attended to by posting dental officers to the various training units, instead of concentrating the work in the General Hospitals, thus taking up room more urgently required for casualties arriving from Gallipoli.

Up to the end of 1915, there was no possibility of dental officers making a serious attempt to save teeth by conservative treatment, as the small amount of work that could have been encompassed by the then few operators would not have in any way alleviated the congestion. A definite attempt was made however to extract all seriously decayed teeth and to supply suitable dentures to take their place.

Of the work in Egypt one of the dental officers, who succeeded a New Zealand officer and a light horseman previously working at No. 1 A.G.H., says:

> From the beginning, nothing but trouble seemed to overtake our efforts, due to lack of organisation and sympathy from all concerned. Our equipment was inadequate, our supplies irregular and at times impossible to secure; our staff was too small to cope with the number of troops who were streaming in for treatment. No one at the head of affairs would take any responsibility for our maintenance and future provision.

The equipment brought from Australia was hurriedly put together without any sealed pattern for a guide and though it proved sufficiently complete for the rather radical treatment meted out to A.I.F. units in Egypt it fell far short of the care-

fully thought out and skilfully packed field equipment later issued from British ordnance stores. A dental parade of some 200 patients reported daily at No. 1 General Hospital.

On the work done at that hospital between September and the end of 1915 Lieutenant Down reported:

> By far the greater number of patients are from camps outside and hospital patients and staff requiring attention are delayed in consequence. . . . Patients are blocking up the passages all day and causing a great amount of dirt and untidiness that should not exist in a General Hospital.
>
> There are now 3 dental officers attached to the hospital. The time of one officer is nearly fully taken up with ward work and administrative duties, and another is mostly employed supervising the prosthetic branch of the work. This leaves practically only one officer to attend to the ever-increasing parade.
>
> In the laboratory there are now 4 staff-sergeant dental mechanics and 5 orderlies and with the restricted accommodation available the laboratory becomes almost unbearable for the greater part of the day.
>
> There has been a great deal of sickness in the section brought about chiefly through overtaxing themselves. . . . During part of the period recorded the work was being carried out by one officer.
>
> The task can be judged from the appended figures.

Summary of dental work at No. 1 Australian General Hospital, Heliopolis, 11 Sept. to 31 Dec., 1915.

Extractions	4,866	Dressings	824
Amalgam fillings	635	Crowns	23
Cement fillings	107	Dentures	487
Root fillings	280	Repairs	301

Cases treated, 7,473.

It soon became evident that the establishment of mechanics in each dental section was insufficient to cope with the possibilities of the work of one dental officer. This was rectified later on.

The great number of extractions was due not to any lack of recognition of the vital importance of conservative dentistry, but to the impossibility of keeping pace with the work. It is undoubtedly true that many thousands of teeth were removed with the greatest reluctance by the dental officers, through nothing more than sheer inability to find the time to do what they knew was the correct procedure.

In the A.I.F. ulcerative gingivitis was noticed at No. 1 General Hospital, Heliopolis, but it is safe to state that the dental officers though interested in a rather rare disease little thought of the important rôle this disease was later to play.

Early in November, as the result of General Fetherston's visit, six more dental units were formed, in Egypt and Australia. and the appointment of Lieutenant Unsworth, the Quartermaster, had good results in view of the extreme difficulty of securing sufficient and suitable stores.

As there had been no previous dental service Unsworth had little to guide him in the matter of supplies. All useful stocks in Cairo and Alexandria were requisitioned. The shortages, such as chairs, cabinets, flasks, plaster, had to be manufactured in Cairo. Plaster of Paris gave considerable trouble. A local firm was consulted about manufacturing the article. Gypsum was known to be deposited about 80 miles out in the desert A sample, burnt, ground, and tested, answered the purpose to within about 10 per cent. It was very hard to obtain as the marauding desert tribes scared the camel-men. Eventually a fair supply was obtained, burnt and ground in a brickyard at Wadi Halfa, and after packing in kerosene and petrol tins was brought down the Nile in feluccas to Cairo. This compared very favourably upon analysis with third grade English plaster.[19]

Lemnos

Lemnos, 60 miles from Gallipoli and used as a base, was an ideal spot for opening up a dental clinic to attend to the troops passing through and stationed on the island. In the earlier half of the campaign some dental work was being done by a member[20] of the staff of No. 1 Stationary Hospital in East Mudros. But no serious amount of work was undertaken until the 3rd Australian General Hospital landed in August 1915.

When this hospital was in England (to which it had gone direct from Australia) a dental unit had been formed in it in response to a cable from Australia, which was now establishing the dental units. Three members of the hospital personnel were selected, one promoted honorary lieutenant, one staff-sergeant (dental mechanic), and one attached as orderly. In England two complete equipments were purchased with Red Cross funds. They were complete including two pump chairs and large cabinets. At Lemnos a weatherboard hut was built, subdivided

[19] Even the buying up of all dental supplies in Egypt did not relieve the shortage, and supplies sent from Australia and England did not arrive until most of the dental units, with the exception of the Light Horse units, left Egypt in 1916.

[20] Sgt H. S Marshall Visiting the hospital in June, Sir Ian Hamilton was greatly impressed by the importance of this work and issued instructions that such assistance as was possible should be given by the base depot in the provision of dental supplies.

3RD AUSTRALIAN GENERAL HOSPITAL, LEMNOS

1915.	Patients.	Extractions.	Treatments.	Scalings.	Amalgam.	Cement	Temporary.	Synthetic.	Root.	Dentures.	Repairs.	Crowns	General Anaesthetics.	Gutta Percha.
September .	82	8	37	7	25	3	19	6	—	1	1	—	—	1
October ..	129	12	27	5	28	21	28	9	—	4	—	—	—	—
November .	161	38	89	8	46	11	37	16	12	1	2	—	—	—
December .	201	21	108	13	65	21	45	20	10	9	8	2	—	—
Total ..	573	79	251	33	164	56	129	51	22	15	11	2	—	1
AUSTRALIAN IMPERIAL FORCE														
September .	670	459	215	5	156	101	110	22	—	17	39	3	58	1
October ..	987	520	140	16	386	240	108	33	—	46	79	1	5	—
November .	511	392	201	6	75	60	71	27	22	6	16	—	1	—
December .	1,299	740	453	29	267	221	256	31	35	49	33	10	1	—
Total ..	3,467	2,111	1,009	56	884	622	545	113	57	118	167	14	65	1
NEW ZEALAND EXPEDITIONARY FORCE														
September .	96	58	27	2	28	7	26	8	—	3	6	1	—	—
October ..	355	227	49	2	123	60	28	11	—	9	35	10	—	—
November .	98	69	31	2	17	16	5	5	1	5	12	—	—	—
December .	23	3	10	2	3	1	3	—	1	3	1	—	—	—
Total ..	552	357	117	8	171	84	62	24	2	20	54	11	—	—
IMPERIAL FORCES														
September .	545	629	155	7	105	62	55	21	—	18	18	1	38	—
October ..	380	324	58	8	52	43	23	27	—	22	27	3	6	—
November .	436	380	102	17	45	26	42	14	10	12	10	2	6	—
December .	330	196	107	13	47	31	40	16	15	9	13	5	2	—
Total ..	1,691	1,529	422	45	249	162	160	78	25	61	68	11	52	—
Grand Total ..	6,283	4,076	1,799	142	1,468	924	896	266	106	214	300	38	117	2

into two surgeries, 10 ft. x 8 ft. and a workroom, 20 ft. x 16 ft., the passage between being used as a waiting room. The floors were concrete. Water was supplied. Glass was unprocurable but white calico kept out rain, dust and flies. Pending the completion of the dental hut, urgent operations were carried out in the hospital dispensary with the aid of a small travelling equipment.

Towards the end of August, another dental unit arrived for the hospital. As its officer (Lieutenant F. Marshall) had brought a complete equipment from Australia, three outfits were now available and were put into use.

From September 4th, when the hut was opened, the dental staff was besieged by patients from the hospital, and from the many naval and military units around Lemnos, as well as Egyptian, Greek and Maltese Labour Corps and Turkish prisoners of war. At the end of October the two dental officers were admitted to hospital with paratyphoid, and one of them was evacuated to England. No reinforcements had arrived except one staff-sergeant, but the staff-sergeants, who were qualified practitioners, carried on. The work done at Lemnos in this hospital is shown in the figures appended.[21]

England

From Gallipoli men were also evacuated sick and wounded to England. There an Australian civil practitioner (who was afterwards commissioned in the Australian Army Dental Service) worked at first at the Australian Convalescent Hospital at Harefield. In August 1915. two honorary lieutenants were appointed in Australia and Egypt to be attached to that hospital and other appointments were later made to the Auxiliary Hospital at Abbey Wood. One of these officers says:

> The dental condition at this time was deplorable; the majority had not had an opportunity of receiving any dental treatment for many months, mainly owing to lack of attention to oral conditions during their stay in English hospitals. Pyorrhoea and ulcerative gingivitis were much in evidence; and I venture to say that 70 per cent. of the patients passing through our hands for the period October 1915-March 1916 suffered from such. In addition there was a considerable amount of fracture and restoration work; . . . it was not unusual for men to present ununited fractures of some months standing, for which no mechanical appliances had been adjusted.

[21] No jaw surgery was seen Cases of ulcerative gingivitis were soon noticed. Canadian hospitals there also had dentists, but their equipment was late in arriving. A table of the 1st Division at Sarpi Camp at the end of September showed that 607 men urgently needed dental attention, including 409 "bad cases".

About September 1915, arrangements were made for dental work to be carried out also at the Australian and New Zealand Base Depot, Weymouth, by a sergeant and several attached men from infantry units.

Reconstruction in Egypt

In December 1915 and January 1916, the Australian troops returned to Egypt from Gallipoli. The appointment of a largely independent D.M.S., A.I.F. in the person of Surgeon-General Howse in November 1915, allowed the centralisation of the administration, and the establishment of responsible authority, for co-ordinating the work of the dental service with that of the rest of the A.A.M.S. It was the lack of this that had hitherto proved the greatest bar to an adequate provision for the dental needs of the troops. The reorganisation of the A.I.F., under General Birdwood, and the increase from two and a half infantry divisions to five, which presently served on the Western Front, and the Light Horse, which served in Palestine, has been described many times in these pages, and only the effects on the dental service need here be referred to.

At this juncture there was carried out a thorough overhaul of all Australian troops as regards physical condition. Each Regimental Medical Officer held parades of his whole unit, now at full strength, and submitted lists, sometimes of hundreds of men, requiring dental treatment. The dental sections were distributed among dental hospitals and in the training camps, and under the new conditions of personal administration and of rapidly improving organisation, the work was carried out along lines infinitely more satisfactory than hitherto.

The dental reforms were largely based on a report made for the D.M.S., by the quartermaster. Among other things he pointed out that:

> No standard of work is now observed. Some sections are carrying out the treatment most suited to conditions, whilst others are going in for high class, conservative dentistry.
>
> There is a large number of dentists now serving with the Australian Imperial Force in Egypt, who are not on the strength of the Dental Corps. Also, there are dentists with various field hospitals and field ambulances. These details should be investigated, and where possible, the men transferred to this corps.

Lieutenant Unsworth added that

the sections were overworked and that there were no field dental sections, and it was most desirable that there should be.

Accordingly fourteen more dental units were created in Egypt, the officers and other ranks being obtained from other arms of the service. In February and March 1916, four more were formed, and other units arrived from Australia, bringing the total number of dental officers in Egypt to 39, including the quartermaster with an equivalent number of other ranks. This number was never exceeded in Egypt.

The first 36 dental units were complete and equipped and, by 14th April 1916, had been allotted as follows: General Hospitals—three; Auxiliary Hospitals—four; Dermatological Hospital—one; Convalescent Depots—two; Stationary Hospitals—two; Casualty Clearing Hospitals (*sic*)—one; Field Ambulances—twelve; Light Horse Field Ambulances—three; Training Bases—eight. The base depot of medical and dental stores was at Heliopolis.

In March, after a tussle with the British officers controlling the transport to France, who had no authority to allow dental units to accompany field ambulances, General Howse managed to get his dental units shipped with their divisions for the Western Front. *This was the first time on record that any dental unit was allowed by the British authorities to go to France as a recognised part of a field ambulance personnel.*

Every dentist who left Egypt with the A.I.F. was supplied with a complete field equipment and sufficient supplies of materials to carry him over six weeks or two months.[22]

The chief reforms and procedures initiated and officially recognised by March 1916, may be epitomised as follows:

(1) Dentists A.I.F. all to hold commissioned rank as dental officers.
(2) Only registered dentists to be dental officers.
(3) Base hospital dental kits and field equipments standardised.
(4) Expendable materials standardised.
(5) Dentists attached to general hospitals, field ambulances, stationary hospitals and casualty clearing stations as part of their personnel.

[22] About March, 1916, also Gen. Howse proposed to Australia that the organisation of a dental unit should consist of one officer, two staff-sergeant mechanics, and one dental orderly, but it was not for some time that this was approved.

(6) Dental stores with quartermaster established from which stores were issued. This department was made a separate and distinct accounting unit, for both purchase and issue of dental supplies.
(7) Personnel of dental units fixed at one officer, two staff-sergeant mechanics and one orderly.
(8) Weekly return forms of work done instituted.
(9) Forms for recording work done were prescribed and issued to units in book form for surgical and mechanical work.
(10) 39 dental units fully equipped in the field.

III

THE WESTERN FRONT

As to the provision of dental service for the British troops on the Western Front the *British Official Medical History* says[23] that, during the Battle of the Aisne, in

The British Dental Service

September, 1914, it so happened that Sir Douglas Haig, in command of the First Army, suffered severely from toothache at a time when all his energies were required for the battle. The immediate needs were met by bringing a civilian dentist from Paris to Fere-en-Tardenois. He remained there for three days and treated several cases. In consequence of this incident a telegram was sent to the War Office asking for the provision of dental officers, and dentists began to arrive and were attached to casualty clearing stations before the British troops had left the Aisne.

When the Australians reached France in April 1916 the only British dentists in Army areas were still those thus attached, one to each casualty clearing station. For artificial teeth and all mechanical dental work men had to be sent to the base. Many commanders at the front had, however, arranged that the dentists at the casualty clearing stations should on certain days of each week visit the divisional areas with an ambulance car. In May 1916 the Army was offered through the Red Cross a motor dental laboratory, presented by private subscription. This proved a model for four others—one being presented for each Army. These brought some mechanical dentistry into the forward areas.[24] An advance upon this—the formation of a centre round each laboratory—was suggested by the medical directorate in March 1918, but was rejected by the Adjutant General. But the provision for dental attention in the British Army was still in what was regarded by the oversea staffs as almost a

[23] *General, Volume II, p 308*

[24] Small dental centres eventually grew up around them. The First and Second Armies had also their own dental centre at St. Omer.

"hopeless" position when the war ended. The *British Official Medical History* itself says:

> Dentistry with Dominion and American troops was in a much more advanced state and on a more extensive scale than with the troops from the United Kingdom. Thus the war establishments of a Canadian division provided for a dental surgeon with each field ambulance, with each artillery and infantry brigade and with divisional headquarters, in addition to two with headquarters of a mounted brigade. The U.S.A. troops had a dentist and dental equipment with each infantry battalion. This extensive organisation for dental work had a definite influence on the British formations.

A.A.D.S. 1916

When the Australian Imperial Force, reorganised after the Gallipoli Campaign became divided in two separate forces, a dental service effectively organised and equipped accompanied each of its three parts—the Light Horse in Egypt, the infantry units and formations in France, and the reinforcement and details personnel assembled in the Command Depots of the United Kingdom. The service was now recognised as an important element not only in the medical service but in the Australian Imperial Force itself. The policy had been laid down by the D.M.S., A.I.F. and accepted by the General Officer Commanding that the Australian soldier should be made and kept "dentally fit" and that this duty should be as much a responsibility of the Director of Medical Services as any other element in the problem of the effective. To the achievement of this purpose there had been created an organisation unique in the history of medical service: in addition to a complete organisation at the Australian Base in England whereby all recruits (or returned wounded) should be made dentally fit, this service was to be continued throughout the whole course of his movements to the front. The most important innovation undoubtedly was the attachment of a "dental section", organised on an exact establishment and with prescribed equipment, to each field ambulance.

The dental history of the A.I.F. during 1916-18 is a record of increasing exactness in the implementing of this campaign and the principle was extended to include a vigorous campaign of administrative pressure to ensure that recruits left Australia in a reasonable condition of dental fitness. The year 1916 was indeed one of experiment and trial and error, in which mistakes

and inefficiency dominated the picture. When the Australian infantry formations went to France, and the Administrative Headquarters to England, the dental service was not represented on the staff of the Director of Medical Services by a dental officer but was controlled by an A.D.M.S. Not only the dental officers themselves but the A.D.M.S. responsible for the control of the depots found that the dental problems were such as could only be solved with the assistance and advice of a dental officer.

During this year dental officers at the depots in England and elsewhere could see that the object—of ensuring that none but fit men reached the front—was not being attained but because the organisation was still rudimentary they could not prevent it; and General Howse, having no dental officer on his own staff, also was slow in grasping the opportunity to stop this leakage. The A.I.F. was now fairly well supplied with dental units. By the end of August there were in France 16 units, (three for each of the four Australian infantry divisions then there, two at the casualty clearing stations, one at No. 2 A.G.H., and one at the Base Depot at Etaples); 48 in England, mainly at the training and convalescent (or "Command") depots; and 6 in Egypt (three with Light Horse field ambulances, and one each at No. 14 A.G.H., No. 2 A.S.H., and the training depot). The dental units in England were relied upon to ensure that no dentally unfit man reached France.

They were not, however, given the power to do so. An order of 28th August 1916, for example, laid down that:

> Officers and men for dental treatment will in the first instance see the medical officer of their *unit*. Dental treatment will *not* be given except on recommendation of the medical officer.

The dental officer had no right to determine which men did and which did not require treatment; he could not order troops to parade for dental examination. Further, through lack of dental staff to formulate and control policy, there was no recognised standard of dental fitness, nor any general system of recording the dental condition of the troops.

As almost always happened, it was through military urgency that the necessary changes were brought about. The immense losses at Pozières in July and August 1916 caused a most pressing demand for reinforcements, but sufficient reinforcements

were not forthcoming. The A.I.F. leaders and War Office made demands on Australia; the Defence Department in Melbourne on the other hand pointed out that there were apparently very large numbers of troops in the training depots or elsewhere overseas. In the pressure more dentally unfit men were rushed from Australia to England. There General Howse and the staff at the Base adopted every means they could devise to make the convalescents and the new drafts fit for sending to France.

It had been noted very early in the campaign in France that many soldiers were being evacuated from the line because they had not sufficient teeth with which to maintain nutrition on the limited diet obtainable in the forward areas. On July 4th the Australian dental officer, Captain Down, at the base depot at Etaples pointed out to the British D.D.M.S. there that great numbers of men were held up there as temporarily unfit awaiting dentures. After conference with the D.D.M.S., Down reported on August 16th that 500 Australians of the 1st Division alone were thus held up, and presumably an equal number of the 2nd, 4th and 5th. As the British dental clinic there had also over 1,000 men waiting, it could give no help. He accordingly recommended that 5 Australian dental officers and 10 mechanics should be sent at once to the Australian Depot; and further that the system of recording in force at the British dental clinic should be adopted.

The scheme was approved and General Howse at once sent the five units asked for. But the fact that the Australian soldiers in the Etaples depots, most of whom were drafts from England on their way to the front, were held up for dental unfitness, argued that the system of dental control at the depots in England was far from efficient. Actually the trouble largely lay in the fact that the military and medical officers at the depots at this time were especially concerned with their duty of getting the men there forwarded to the front at the earliest possible moment, and as they, and not the dental officers, determined what men should be dentally inspected and who was fit for service, numbers of dentally unfit men were passed, only to be held up at Etaples, where men convalescent from hospitals in France also were received.

In England, some of the suggestions put forward by dental officers to remedy these defects were, at this stage, adopted. In

September a weekly report was required in certain forms from all dental units, and in November the second sergeant-mechanic, authorised about a year before, was at last appointed to each unit. On November 11th an order was issued that all troops arriving at the Australian depots in England from Australia or from anywhere else—

> will be paraded at the medical inspection room for inspection by the medical and dental officers during the first day in camp.
>
> The C.O. will furnish the R.M.O. with a nominal roll of these men . . . and will be responsible that all are paraded for inspection.
>
> On inspection the R.M.O. will make entries on the roll indicating which men are completely inoculated and vaccinated, dentally fit and otherwise fit for general service. For others, vaccination and inoculation, and dental treatment will be instituted forthwith.
>
> The dates of completion of these measures and of fitness will be subsequently entered by the R.M.O. and initialled when the soldier becomes fit for general service.
>
> This nominal roll will be preserved by the R.M.O. as the record of fitness or otherwise of the men of the unit.
>
> No man will be sent overseas unless his record shows that he is complete medically and dentally.

The dental officer had to record on the nominal roll each man's dental condition. But in spite of this great improvement the order still left in the hands of the R.M.O. the decision whether a man was dentally unfit. Colonel Marshall comments:

> The weak points of the scheme were three:
>
> (1) No provision was made for a final inspection and certification by a dental officer.
>
> (2) The R.M.O. alone still held the power to strike a man off draft.
>
> (3) No standard of dental unfitness was laid down.
>
> Under this scheme the dental officer kept a nominal roll of all men in the battalion and as each man received the attention necessary he was marked as dentally fit. The M.O. on the final draft inspection would use the roll as his guide to dental fitness. It often came about that men became dentally unfit after having been made fit; in some cases a broken denture would render a man ineligible for draft even although he had been completed only a few days beforehand; such a thing as an alveolar abscess would be quite sufficient to make a man a casualty, and the only way to overcome the trouble was to parade the troops before a dental officer prior to marching out.

At this time the only authority in the nature of a dental staff officer was the quartermaster, Lieutenant Unsworth, who had been ordered to inspect the dental units in England from time to time, and who was thus able to draw General Howse's atten-

tion to the disadvantages under which they were working. But Lieutenant Unsworth, though he had been associated with the dental profession for many years, was not himself a member of it. He realised that he was not qualified to advise on matters other than those of organisation, and himself urged General Howse to appoint a dental officer as his adviser. Not only was supervision required but the dental officers had little confidence in purely medical advisers to the D.M.S., and their contentment was in itself an object worth while. On 13th December 1916 the D.M.S. took this step, appointing as his adviser the senior officer in the service, Captain Marshall, with the rank of major.

Marshall was then working with No. 3 A.G.H. at Brighton, England, out of touch with the rest of the service and its problems. He took quick steps to remedy this defect, obtaining authority for the immediate appointment of a dental staff officer to supervise, under himself, the Australian dental units in France, while he himself, to gain close personal touch with the work in England, moved first to A.I.F. Administrative Headquarters at Horseferry Road and then to Tidworth, headquarters of the depots on and around Salisbury Plain. The officer selected for France, and promoted for the task, was Major L. B. Day.

Major Day afterwards wrote:

> Armed with a private letter of introduction to the M.O. of the 2nd Australian Division Base Depot, and with verbal instructions to put some organisation into the Australian Dental Services in France, one set to work in a leaky tent on a snow covered hill at Etaples. I had no knowledge of what was required or what was desired, not even knowing how to write an official memo, possessing no explicit directions, in fact I had nothing but personal kit.

But his endeavour to work from Etaples was checkmated by the fact that the British authorities controlling transport in France knew little or nothing about him or his position. He was unable to get to the units, as he was intended to do, until in April 1917 he managed to get approval for his attachment to General Birdwood's headquarters at I Anzac Corps. His instructions were simply "to do all in his power to help the dental units along and to act as a liaison officer between dental officers and the D.D.M.S. of the Corps". Marshall says:

> The routine that was evolved out of the then existing disorganisation

became a tower of strength to the units in France and so thorough was the work carried out by S.O., A.D.S., France, that the S.O., A.D.S., A.I.F., London was relieved of a vast amount of detail that was safely left in the hands of the S.O., A.D.S., France.

At the depots in England the system was still defective in that even those men who were marked as dentally unfit were not compelled to parade for treatment. It is true that their medical officer was empowered, and indeed had (since December 20th) been required, to parade them for treatment and to ensure that no man "medically or dentally incomplete" should be listed for draft to the front. But the dental officers who were supposed to render the troops dentally fit had no power to call them up for treatment. Major Marshall was now able to bring about steps that transformed the position. The chief one was the issue on 28th February 1917 of an order—*G.R.O. 2232*—giving dental officers at the depots the power to ask for men to be paraded and requiring the unit commanders, on receiving a day's notice, to parade any man named by their dental officer, and to ensure that no other duty prevented the man's attendance.

G.R.O. 2232 (says Marshall) was the most effective instrument ever placed in the hands of the dental officer. . . . After the promulgation of this order dental officers could demand the compulsory parading of all troops in the Battalion. By working in close co-operation with O's.C. and adjutants the dental officer was enabled to so order his parades that no hindrance to the course of training resulted. The musketry course was one that presented some difficulty as any breach in its continuity necessitated a fresh start. It was usually arranged that men undergoing this course were not called up for treatment until they had completed it, provided that all necessary extractions were completed beforehand. No such arrangement was necessary with the other courses, men for treatment being called up at times suitable to the dental officer.

Marshall's second task was the setting up of a standard of dental fitness. From the medical side came some criticism, reflected in the following letter written at the beginning of 1917 by Captain J. P. Fogarty, senior medical officer at Codford.

Dental officers have a tendency to confound what I would term "socially unfit" with "militarily unfit", a tendency to brand every man as unfit who requires dental attention, without due regard as to whether his dental insufficiency amounts to depreciation of the man as a soldier. Men are thus branded unfit who for years in civil life have been carrying on with their mouths in the same state and have enjoyed the best of health and are in good physical condition. I think this misinterpretation of "dentally unfit" is likely to exist not only in England but also in France,

as so few dental officers have had opportunity to become familiar with the dental requirements of the line. If one is not at present in operation, could not some definite standard or standards be drawn up that dental officers could look for and in their work aim at attaining? The days of the hard army biscuit as a diet for the soldier to any extent are past, and it is only on very rare occasions that he is called upon to exhibit greater masticatory powers than he would in civil life.

The standard eventually established (according to Marshall) was:

No man was to be allowed to proceed overseas unless his mouth was free from caries or any pathological condition of the gums, or an insufficiency of teeth for adequate mastication.

A further important reform for the improvement of control was the appointment at each Command Depot (*i.e.* convalescent depot) and at each group of training battalions (reinforcements from Australia) of a Senior Dental Officer, to supervise the work of the dental units leaving the staff officer (Major Marshall) free to devote himself to larger matters of policy. Such a step was necessary if there was to be any chance of these innovations in policy and method being quickly adopted and strictly adhered to in the numerous scattered units. Eventually a dental staff officer (Major Down) was appointed to the depots at Salisbury Plain, and Marshall (then a lieutenant-colonel) returned to his proper position on General Howse's staff in London. A dental staff officer (Major Douglass) also was appointed for the A.I.F. in Egypt. Major K. Valentine Blogg was S.D.O. at the Base Depot in France. On 27th November 1917 the staff of the dental services of the A.I.F. under the D.M.S. comprised[25]

Staff officer,	A.A.D.S.	Admin. H.Q.	1 lt-col.
do.	do.	France	1 major
do.	do.	A.I.F. Depots in U.K.	1 major
do.	do.	Egypt	1 major
S.D.O.	do.	Base Depots, France	1 major
do.	do.	1 Command Depot, Eng.	1 major
do.	do.	3 Command Depot, Eng. and 2 Tng. Bde.	1 major
do.	do.	4 Command Depot, Eng.	1 major
do.	do.	1 Training Bde.	1 major
do.	do.	3 Training Bde.	1 major

[25] There were at this period 118 dental units in existence, of which 66 were in England, 35 in France, and 17 in Egypt.

"From the observations and suggestions of the S.D.O's," says Marshall, "was evolved the ultimate routine of the A.A.M.C. Dental Service."

Reinforcements

At this time, by order from Australia, any additions found necessary to the personnel of the dental service had to be raised from men already on active service. Colonel Marshall says:

> This direction from the Department of Defence was adhered to in England, France and Egypt. It was not until the A.I.F. had become exhausted of any likely candidate for the dental service, that reinforcements were despatched from Australia. This ruling of the Defence Department was unknown to many members of the dental service who had been retained for service with the home forces for many months even though they had enlisted for active service.

In July, 1918, arrangements were made for regular monthly reinforcements from Australia—2 dental officers and 2 mechanics for England and one of each for Egypt. Of the mechanics received during the war from Australia, Colonel Marshall notes:

> They were not always first class operators and mechanics; in certain instances, personnel had been despatched from Australia with no qualifications whatsoever. Why such men were ever permitted to join the dental service it is hard to conjecture.

Promotion

Except for the quartermaster, commissioned rank in the Service was given to none but dentists; but three warrant officers were employed at the depots to supervise mechanical work. Authority was given by the Australian Government to promote dental officers after one year to the rank of honorary captain, but it was long before it was acted upon, and it was not until 6th April 1917, that the honorary rank of all officers then in the Service was made "substantive". Clerks (mostly corporals) and orderlies were chosen from all branches of the A.I.F. but as a rule "B" class men had to be selected—not always a satisfactory system.

The conditions that at first confronted the Staff Officer for Dental Services at the depots are thus described by him:

> *The rolls.* Though officers had been instructed to keep all records according to a definite scheme, it was found that dental rolls were in a deplorable state; in many instances they were entered upon scraps of paper and many were missing.
>
> No fixed system had been adopted to cope with the dental unfits who were increasing in numbers through both a shortage of dental officers

and lack of experience on the part of dental officers. These two points were investigated by the S.D.O's and recommendations forwarded.

Training battalions. The S O.A.D.S. attached a unit to each training battalion, and also saw that a *pro rata* distribution was made for the Command Depots.

Nominal rolls. All dental officers were instructed to enter the nominal rolls in a book after having made certain that this original roll was correct in every particular. The dental officer was then able to keep track of every man in the battalion provided that he was supplied with rolls of all men marching into and out of the unit. At the initial inspection, either on the medical parade or by a separate dental parade, particulars as to dental fitness would be made by the dental officer on his roll. When a man marched out of the unit his name would be crossed off this roll.

As men were held in these formations at least 14 weeks, dental officers could, by adopting a definite scheme of work, make sure that men would be dentally fit at the end of their training period. Naturally if all extractions were completed during the first week of a man's stay in the battalion, he would be in a fit condition for a denture at the expiration of his training. All other treatment could be given during this period.

Command Depots. Reorganisation of a Command Depot was a more difficult undertaking, especially in keeping a check upon all men in the depot. The population of a Command Depot was an ever-changing one; men were retained perhaps only 24 hours in the depot and then transferred to some other location; at other times a man was liable to be retained in the depot six months before proceeding overseas. Under such conditions the system originally adopted, which was identical with that of a training battalion, was found too cumbersome for the limited clerical staff employed by the S.D.O. No difficulty was experienced after the inauguration of the card system.

Under the system thus instituted it was possible for the S.D.O. at the Base Depot in France (which in June, 1917, moved from Etaples to Havre) to keep a check on the effectiveness of the dental work done in England. When any member of a draft arrived in France dentally unfit a detailed report was made of this and an explanation was sought from the dental officer who should have seen that he was fit before he left England.

The highwater mark—1918

The end of 1917 as we have seen[26] found the Allied Armies facing a supreme crisis. The war of attrition had ground down both sides. But Russia having collapsed, a great German offensive was expected and the Americans were not yet ready.

The Australian force had its own urgent problems of maintenance. Third Ypres had taken toll of its divisions to the

[26] *Vol. II, Chap. x.*

extent of some 38,000 battle casualties,[27] recruiting in Australia was failing, conscription was again rejected, a drastic curtailment of the striking strength of the force was threatened. At the same time, General Howse was inexorable in his refusal to relax the "standard of fitness" of the replacements sent to France from the training battalions and Command Depots in England.

The outcome of this situation has been fully told in *Volume II*. The Australian Divisions were *not* disbanded, nor even weakened. On the contrary they were brought fully to strength in time to meet the German offensive—and that, with an augmented rather than diminished efficiency and morale; and throughout 1918 they were maintained at a strength sufficient to keep the Australian force (reinforced in the end by Americans) as the spearhead of the Fourth Army's advance throughout the terrific strain of the "last 100 days".

The part played in this achievement by the dental service has an interest beyond the service itself. The organisation and efficiency of dental work in the depots in the United Kingdom reached highwater mark in time to meet the crisis. On 22nd April 1918, the following letter was sent by the D.M.S., A.I.F. to General Birdwood, its commander.

> I have the honour to bring to the notice of the General Commanding the following report on the work accomplished for the week ending 30.3.18. by the dental units attached to the 1st, 2nd, and 3rd Training Brigades:
>
> During the week there was a demand for every man up to 10th week of training for draft; this demand necessitated the completion of dental work for some hundreds of men. On being advised of the urgency of the work the dental personnel affected gave a very ready response, and worked solidly through Easter, with the gratifying result that all men required were rendered dentally fit with the exception of about 5. These latter men were found to be suffering from some acute condition such as post extraction inflammation. Some idea of the effort put forward may be gauged from the fact that 1,862 fillings, 289 dentures, and 148 repairs, were inserted and 1,084 men were made dentally fit in the week.
>
> N. R. Howse,
> Surgeon-General, D.M.S., A.I.F.

Records show that the work achieved by the dental sections working with the Command Depots was in no way behind this

[27] The figure given in *Vol. II, p. 245* (34,342) includes only casualties suffered between Sept. 16 and Nov. 10.

record. At the front during the same period the dental units in the field and at the Base played an important part in maintaining the field strength. A statement rendered by the S.O.A.D.S. there (Major Day) for the month ending 29th December 1917, is epitomised below: 16,812 men were treated comprising 15,016 members of the A.I.F., 1,607 British, 12 French soldiers, 28 prisoners of war, and 149 civilians.

DENTAL REPORT FROM NOV. 25TH TO DEC. 29TH, 1917.

Teeth extracted	4,206	Scaling cases	429	Dentures:	
Anaesthetics:		Dressings	2,181	Full upper	184
Local	2,834	Minor operations	1,968	Full lower	31
General	15	Ulcerative gingivitis	1,151	Partial upper	913
Fillings:		Pyorrhoea	44	Partial lower	567
Amalgam	2,249	Crowns	76	Repairs	1,820
Cement	1,778	Fractured jaw cases	23	Dentally unfit: Awaiting dentures	673
Root	700			Others dentally unfit	574
Temporary	1,095				

By the date of the Armistice with Germany in November 1918 there were 130 dental officers serving with the A.I.F. abroad, of whom 119 were engaged in operative work and 11 in administrative capacities. This was the highest figure ever reached in the Service.

The routine finally observed at the Command Depots is described by Colonel Marshall as follows:

Routine at Command Depots. All men marching into Command Depots were paraded for dental inspection within 24 hours. Complete nominal rolls of all such men were supplied by depot orderly room to the S.D.O. either in duplicate or triplicate. The state of dental fitness was marked on these rolls as follows:

x:—extractions required.
y:—fillings required.
s:—scaling and gum treatment required.
r:—repairs to dentures required.
d:—dentures required.
g:—waiting for dentures after extractions. (A number after "g" indicated the number of weeks to elapse before the impression for denture can be taken.)

All dentures *in situ* were noted on page 17 of the Army pay book. If the pay books were not available the dental officer forwarded a copy of the required entry to the officer commanding the unit, who was responsible that it was copied into it when it became available. Entries

DENTAL SERVICES, A.I.F.

ADS Form 8.

(Form to be used as supplement to ADS Form I by Dental Units attached to Training Units in A.I.F. Depots in U.K.)

Return for Week Ending Midnight, Saturday,

Dental Unit No.

Location

13562—1,000—11/18

REINFORCEMENTS FROM AUSTRALIA.

No of men examined..... on..... ex Transport.....

" " " Dentally Fit .....

" " " " Unfit.... .

" " " Requiring "Y"..... No. of "Y" Required ..... .

" " " " "D"..... " " "D" " ... .

" " " " "R"..... " " "R" " ..... .

" " " " "X".. .. " " "X" " .....

" " " " "S".....

REMARKS —

No. of men examined in Overseas Draft.....

No. of men struck off draft.....

No.	Rank	Name.	Date Struck off Draft	Reason of unfitness.	Has S.D.O. SEEN and concurred.

DENTAL UNFITS AVAILABLE FOR TREATMENT IN WEEKS OF TRAINING

Requiring	Prior to 7th week.	7th week.	8th week.	9th week	10th week.	Perm. Cadre.	Marched in.
X							
Y							
S							
D							
R							
TOTAL ..							

REMARKS:—

No. of Pin Teeth used .....

No. of Diatoric Teeth used.....

Dental Officer in Charge.

19

in pay books were made in ink in neat handwriting, and stated whether a denture was upper or lower, using the following abbreviations to denote the various dentures:

F.U. Full upper. F.L. Full lower. P.U. Partial upper. P.L. Partial lower.

When a soldier refused to undergo any necessary treatment, or to have a denture, a statement to that effect was entered in his pay book. The supply of men for dental parades was arranged for by this routine:

Supposing there were four companies in the depot, four separate rolls would be forwarded to the depot orderly room where they were checked and despatched to the respective companies. The day following each company's roll would accompany its men parading and on it would be noted the reason for any absentee. At the close of each day's work, nominal rolls of all men having been made dentally fit would be forwarded to the depot orderly room and S.M.O. Whilst the men were waiting for their turn for treatment they were handed over to the physical training instructors who put them through various exercises. Treatment was confined mainly to high category men as in most cases these men automatically became "A" class when dental treatment was completed. Men medically fit for "A" class but dentally unfit were put in a separate category *viz.* "B.1.a.4."; this category was the same in all depots.

As soon as a man became "A" class he was available for draft; no men other than "A" class were allowed to proceed overseas. Officers were not removed from overseas drafts on account of dental unfitness.

Extractions were carried out as soon as the men had been examined, so as to ensure that their mouths would be in a fit condition at an early date for a denture.

Prior to a draft of fit men marching out of a Command Depot an inspection was made by a dental officer who had to certify

> "I have examined all the men in the above nominal roll and they are dentally fit and all dentures *in situ* or supplied have been entered in pay books."

Finally no man was permitted to refuse such treatment as would render him dentally fit.

The drafts of fit men from the Command Depots were sent to the overseas training brigade prior to being sent overseas. Here they were again examined and if any unfit man was discovered in the draft he was struck off the roll and an explanation was asked for from the dental officer in the Command Depot who permitted the dental unfit to be included in the depot draft.

The following returns were sent weekly through the S.D.O.

1. Return of dental unfits made up from the particulars given by the card system. This enabled the S.O.A.D.S. to keep a check upon all dental unfits.
2. Nominal rolls of officers and other ranks dental service, and other ranks temporarily attached.
3. Nominal roll of officers and other ranks marching in or out of depot.
4. Weekly dental report.

Both Command Depots and training battalion drew all supplies from the Q.M. Dental Supplies at 12 Great Smith Street, London. Indents were sent monthly on the dates shown below:

Group 1. *1st of each month.*
Units at—Parkhouse,
Bulford,
Weymouth,
Longmoor.

Group 2. *8th of each month.*
Units at—Codford,
Hurdcott,
Fovant.

Group 3. *15th of each month.*
Units at—Sutton Veny,
Longbridge Deverill,
Heylesbury.

Group 4. *22nd of each month.*
Units at—Clifton,
Brightlingsea,
Grantham.

Dental equipment was standardised in June 1917.

A charge of £1 was made for the renewal or replacement of a denture previously supplied at public expense unless it could be shown that the loss was not due to the fault of the officer or man concerned

In France and Belgium eventually there were 35 units and two administrative officers. The units were posted as follows:

France.

Ambulances	15
Field Artillery	5
Army Artillery	1
Casualty Clearing Stations	3
Hospitals	3
Corps Headquarters	1
Corps School	1
Railway Operating Coy.	1
Base, Havre	5
Total	35[28]

Base Depots, Havre

At the Base Depots in France the five units under their S.D.O., Major Blogg, carried out an immense task—easily the most important dental service of the A.I.F. in France. Suitable arrangements as to discipline and attendance were made with the military authorities. The S.D.O. had to furnish the following returns:

[28] Later, in 1919, units were attached to Divisional Headquarters.

Weekly return of work done

Dental unfits, classified.
Troops treated.
Gingivitis cases.
Admissions to hospital.
Transfers.
Evacuations.
Personnel.
Leave.

For supplies indents were submitted to the Base Depots Medical Stores, Havre. No trouble was experienced as the stores were near the Base Depots.

France—forward areas

Though the Service in the forward (or Army) areas was understaffed and overworked, conditions were easier than in England[29] in that dental parades were voluntary and the aim of the dental officer was to alleviate any pain or discomfort rather than to render men dentally fit: this last course was not within the realms of possibility as the distribution of dental units was as follows:

1916, 1917	..	..	..	..	..	1	dental	unit	per	7,000	men
1918	..	..	..	..	..	1	„	„	„	5,250	„
1918, 1919	..	..	..	..	..	1	„	„	„	4,250	„

Artillery

Authority had been given for the attachment of a dental unit to each artillery brigade, but this was not done until 1918, men of the artillery in need of dental service being instead told to report to the nearest field ambulance. It was not, however, always easy or even possible for the men to do this and accordingly in 1917, the opinion of artillery commanders being taken, it was found that they were all of opinion "that the services of a dental unit were urgently required", and they undertook to find transport for the equipment.

Apparently, however, the D.D.M.S. of Corps took no action until the matter was again brought forward in March 1918, when it was approved. The proposal for an extra unit per division to attend to "divisional units" was not approved until after the Armistice.

The experience and routine of Australian dental units in

[29] In the United Kingdom owing to the limited number of units available in 1916 dental units were constantly moving from one formation to another in order to cope with the arrears of work



15. SURGERY OF NO 34 AUSTRALIAN DENTAL SECTION, NEAR BUSSY, FRANCE, JUNE 1918

This section was attached to 5th Divisional Ammunition Column

Aust War Memorial Official Photo No E2372

To face p 472



16. THE MECHANICS' WORKSHOP, No 34 AUSTRALIAN DENTAL SECTION

Aust War Memorial Official Photo No E2374.

To face p 473

Experience in Army areas

"Army" areas in France and Belgium are described in the following extracts from reports of the Dental Staff Officer for the A.I.F. in France (Major Day) and from the comments of Colonel Marshall:

Dental units are attached to all the field ambulances—15 in number—and to the casualty clearing stations.

Casualty clearing stations. The outfit supplied was a standard one, but more supplies could be retained as these stations were practically of a non-mobile variety. All classes of work were carried out, the patients being drawn from any unit that happened to be in the vicinity Australians were naturally in the minority as an Australian casualty clearing station treated whatever troops came their way.

Ambulances The equipment provided was limited, owing to the difficulty of obtaining transport. No standard kit was carried until 1918, when equipment was cut down to 300 lb This was sufficient for all practical purposes When trench warfare was in existence the divisional ambulances with attached dental units were usually distributed as follows:

(1) Advanced dressing station.
(2) Main dressing station.
(3) Divisional rest stations.

The dental officer at the advanced dressing station treated cases coming from an area between the ambulance and the front line and from units close to the A.D.S. No man was retained overnight at the A.D S for dental treatment, and should any man require urgent treatment whilst doing duty in the front line, he had to produce a dental report bearing the signature of his R.M.O or a responsible officer By this means no man could absent himself from the line on the plea that he left his post for dental reasons.

At the main dressing station as well as at the Divisional Rest Station, cases that required extensive dental treatment were admitted should the circumstances warrant it. Cases were seldom retained longer than fourteen days, the usual period being from seven to ten.

Supplies in France

The initial system in vogue in France for obtaining dental stores was very unsatisfactory. Indents in triplicate were forwarded through the recognised channels (dental officer—C.O. Field Ambulances—A.D.M.S.) to Advanced Depot Medical Stores, from which perhaps certain articles could be supplied. Usually, however, the whole indent could only be filled by the Base Depot Medical Stores. Seeing that the War Office made no provision for the supply of dental stores, it usually came about that, upon receipt of an indent, a despatch would be forwarded to England for these stores. In some cases, months elapsed before these long overdue stores could be collected.

Dental stores were usually too bulky. The personnel of an advanced or Base Depot Medical Store had not the slightest knowledge of dental requirements

The first reform was the standardisation of all dental equipment and supplies. S.O.A.D.S. France (Major Day) drew up a schedule of

what was considered a reasonable outfit, neither bulky nor weighty. The S.O.A.D.S. kept a reserve stock to meet any emergency or to cover breakage. (These supplies had been taken over from the Advanced Depot Medical Stores 4th Army, as this depot was moving to an area in which no British dental officers were employed.) Later a revision of dental equipment was carried out from the experience gained.

By keeping to this list no trouble was experienced with regard to later requisition, except for articles of equipment not in everyday use. In June 1917 Major Day wrote that now "I was able to have the requisitions for dental supplies for the month in advance, filled and delivered at the dental units within *nine days* from receiving the monthly requisitions. Previous to my being posted to 1st Anzac the time occupied in obtaining these same stores and supplies averaged *six weeks*. Dental units in II Anzac Corps and those attached to the 1st and 2nd A.C.C.S. have no difficulty in obtaining dental supplies as there is an Advanced Depot Medical Supplies at Bailleul in their area, and this store carries dental supplies. Thus the difficulty encountered by the units in 1st Anzac Corps in obtaining supplies does not exist for these units."

March 1918

No change took place in the equipment list until March 1918, when the Australians were despatched from the northern sector to the Somme area to stop the German thrust to Amiens.

Ambulances were ordered to cut down their transportable stores and equipment to a minimum. The question of transportation became very acute. Officers who had endeavoured to work with a minimum of equipment were gladly assisted by the O's.C. Ambulance. The only exception was found in the 3rd Division where the A.D.M.S. ruled that all dental equipment and personnel were to be transferred to No. 3 A.G.H. Abbeville. Had the dental equipment of the 3rd Divisional units been kept to a minimum, in all probability this would not have occurred. Though some dental stores belonging to dental units in the other divisions were also forwarded to No. 3 A.G.H., yet dental officers were able to undertake all urgent operations. The S.O.A.D.S. personally supervised the transport of these stores, which would have otherwise been dumped. As a state of mobile warfare was likely to be in operation from now onwards, a revision of the dental equipment became imperative. All surplus stores were ordered to be deposited temporarily at No. 3 A.G.H.

A new schedule was drawn up making provision for all classes of work with any equipment not exceeding 300 lb. Surplus stores at No. 3 A.G.H. were sent to the office of the S.O.A.D.S. who utilised them to supply units lacking any article on the revised list. The D.D.M.S. Australian Corps then directed O's.C. Ambulances and dental officers that transport would be provided for 300 lbs. weight of dental equipment.

On 30th March 1918 the staff of the S.O.A.D.S. France was increased by the addition of one staff-sergeant to supervise the requisitioning and supplying of dental stores. As a reserve stock of stores was held by S.O.A.D.S. the time occupied in completing the indents was usually very small, but officers were instructed to forward their indents at least three weeks before they expected to be in need of fresh supplies. No excuse in future was to be regarded as valid, if officers were held up owing to

shortages, unless it could be proved that indents for the articles in question had been submitted at least three weeks previously. Thus even though conditions meant many hasty moves, dental officers were seldom held up for lack of material.

All reports and returns from dental officers in France were forwarded to the S.O.A.D.S. France, those from units at the Base coming to him through the S.D.O. there. These were then forwarded to the Staff Officer for Dental Services at Administrative Headquarters, London, and by him were included in his monthly report, for transmission to Australia. The following were required from the field:

France—returns

1. Weekly return of work done.
2. Weekly return of troops evacuated for dental reasons.
3. „ „ „ troops admitted to hospital for dental reasons.
4. „ „ „ personnel temporarily attached and authority for same.
5. „ „ „ personnel transferred.
6. „ „ „ Teeth—Pin teeth in stock.
   Diatoric do.
   Pin teeth used.
   Diatoric do.
7. Troops treated—A.I.F., B.E.F., other troops, prisoners of war, civilians.
8. Troops reporting with ulcerative gingivitis.

EGYPT—GENERAL SURVEY

The A.I.F. in Egypt was administered from Headquarters in Cairo and to all intents and purposes was considered a separate organisation to the A.I.F. in the United Kingdom and France. Until the appointment of Major Douglass as S.O.A.D S. Egypt, all dental administration was vested in the A.D.M.S. Seeing that a medical officer was in charge of the dental services it was not to be expected that the S.O.A.D.S. (A.I.F.) would be fully informed of the wants and disabilities of the dental service then existent in Egypt. As soon as Major Douglass took charge in Egypt—17.12.17—the inadequacy of the units then in operation was reported to Headquarters, London, whereupon steps were taken to increase the establishment of dental units for A.I.F. mounted division. The following is a statement of the dental strength of the A.I.F. in Egypt at various periods:

Jan.	1918	8
Feb.	„	10
Apr.	„	13
May	„	15
Sept.	„	17

which last figure represents the greatest number reached in that country.

Egypt

In Egypt there were 17 dental units distributed as follows under the S.O.A.D.S. Egypt (Major Douglass).

Light Horse F. Ambs.	5
Base, Moascar	6
Desert Mounted Column	2
Headquarters, Cairo	1
14 A.G.H.	1
2 A.S.H.	1
No. 1 Sqdn. A.F.C.	1
Total	17

Here transport was always a difficult matter for the dental units in the field, owing to the great distances covered by the Light Horse, who naturally travelled with the minimum of impedimenta. Ambulance commanders gave the dental officers every assistance that lay in their power, but the limited means at their disposal frequently resulted in dental units being dumped until transport could be spared. All men sent into the field from the Base were as far as possible made dentally fit before being sent. Major Douglass writes:[30]

Each man was charted and when he marched out of the training depot the chart was forwarded to the nearest dental officer who would arrange for the completion of the necessary treatment. This dental chart was returned to the Senior Dental Officer, Moascar.

Special dental treatment was available for all members of the A.I.F. at A I F. Headquarters and at No 14 A.G.H., Abbassia. The class of work executed by many of the civil dental practitioners in Egypt was of the lowest quality yet substantial fees were always demanded from the troops; many complaints from members of the A I F. led to the creation of a "Dental Trust Account" by means of which extra equipment and material necessary for this special dental work could be purchased. Gold fillings and crown and bridge work were supplied to all ranks on payment of the actual cost of materials used;[31] appointments could be arranged by telegram. The results fully justified the formation of these special dental clinics, the class of work being of the best and involving the minimum of cost to the soldier.

The general procedure adopted in Egypt for dental parades, etc., was parallel to that in existence in England. Provision was made for a thorough inspection of all troops passing through the Base at Moascar in order to eliminate all dental unfits from the drafts.

[30] His account is here epitomised.

[31] Written consent of the S O A.D.S. had to be obtained before gold work was done.

Before the arrival of Major Douglass and the issue of routine orders the Australian Service here had suffered by the absence of a recognised administrator. The enthusiasm of all ranks had been considerably dampened by the lack of recognition afforded them for the seemingly never-to-be-completed task which they so conscientiously tackled. Through the tardy inauguration of the dental service so many dental unfits had accumulated that no matter how hard a dental unit might strive to clear up these arrears no appreciable difference was noted. Every proposition put forward by members of the dental service met with opposition through lack of knowledge. When Major Douglass reported for duty at Headquarters, Cairo he found that such opposition had not entirely disappeared though time and a closer liaison had effected great changes.

DENTAL POLICY AND TECHNIQUE

Of the general policy of the Service Colonel Marshall says:

"The object in view of all dental units was to render a man dentally fit as rapidly as possible, taking into consideration the value of conservative treatment. In the United Kingdom dental officers undertook all the conservative work, the taking of impressions, the fitting of dentures, and all the prophylactic measures adopted to combat the pathological conditions of the mouth. Overseas the dental officer—perforce—relegated the taking of impressions and the fitting of dentures mainly to the staff-sergeants; this had been brought about by the preponderance of operative work that was ever before the dental officer. Certain policies were laid down for the guidance of dental officers as follows:

"*Conservation of teeth.* No teeth should be extracted which can be saved.[32] By close adherence to this policy many a tooth was saved which, if extracted, would have necessitated the fitting of a denture, and, as is well known, a soldier with dentures was far more likely to become a casualty than one depending upon his natural supply of teeth. Great attention was paid to oral hygiene[33] as the troops were very susceptible to ulcerative gingivitis. The order quoted above said: 'Efforts will be concentrated upon cleansing the mouth and preserving useful teeth.

"In the United Kingdom and at the Bases in France and Egypt men were called up for dental treatment by the dental officers; in the field dental parades were purely voluntary. The first operations to be attempted were the cleansing of the mouth and the completion of whatever extractions were necessary. If a denture was indicated, and the condition of the man's mouth such that no delay was necessary, the dentures were undertaken without any waste of time. Fillings

[32] *A A M C Order No 103 of 4 Apr. 1917*

[33] For example, between Apr 1918 and the troops' return to Australia, 1,336 dozen tubes of tooth paste were issued free from the Australian Base Depot of Medical Stores alone.

took up most of the dental officers' time however; owing to the high standard of efficiency in existence, practically every cavity had to be filled."

Every dental unit whether at a Base or in the field, gave first consideration to troops in need of immediate relief, all other necessary operations being undertaken in order of urgency. It was the usual practice to devote the first part of the day's routine to extractions. In certain Command Depots in the United Kingdom and at the Base in France it was the practice to group the work, one officer supervising all the prosthetic work, another the extractions, whilst the remainder would concentrate upon fillings.

In the field, should the circumstances demand it, cases were admitted to a field ambulance after having extensive extractions done, in order that light diet could be supplied.

As to technique, Colonel Marshall states:

Mechanical work. With the exception of the units attached to A.I.F. Headquarters at London and Cairo, Queen's Hospital, Sidcup, and Australian Corps Headquarters, France, mechanical work was limited to the construction and repair of vulcanite dentures. The addition of the apparatus necessary for metal work would have made dental equipment elsewhere too heavy for transport.

Dentures were supplied if a soldier had not sufficient teeth to masticate the army ration. Very rarely were dentures provided for a restoration of less than four teeth, the majority of dentures making good a deficiency of five or more teeth. With the introduction of the small box respirator (S.B.R.) it was found that the loss of perhaps two or three incisors prevented the soldier from gripping the mouth-piece in the approved fashion. In all cases where men stated that this difficulty had been experienced a denture was provided.

Most dentures supplied were partial uppers. It was found that in many cases the soldier would wear the upper denture but carry the lower in his pocket. Accordingly, where the dental officer considered that a lower denture would ultimately be discarded by the soldier, an upper denture would be inserted and if the patient expressed satisfaction and was prepared to carry on without a lower plate he was considered as dentally fit.

Impressions were usually taken with modelling compound.

Teeth. Both diatoric and pin teeth were used; platinum pin teeth were at first supplied but later, owing to the scarcity of that metal, composition metal pin teeth were substituted giving entire satisfaction.

Rubber. Three varieties were supplied—brown, gum pink, and repairing.

Crown and bridge work were carried out at A.I.F. Headquarters, Horseferry Road, but no fresh bridge work was attempted, repairs only being undertaken. Crowns were supplied where the extraction of the tooth would result in hardship for the soldier concerned. The cost of gold used was defrayed by entry in pay book and acquittance roll. The S.O.A.D.S. France carried the apparatus for such work and any officer desiring to carry out urgent gold work could use it. In Egypt all

varieties of conservative and prosthetic work were done at A.I.F. Headquarters, Cairo.

In the field synthetic cement was used as a substitute for a broken facing until the patient could gain proper attention. Cases were noted in which the cement still held even after a period of nine months. A limited number of Davis crowns were obtainable in the field.

Fillings. In the field and the depots in England and Egypt amalgam and cement fillings were inserted. Dental officers were instructed to employ amalgam wherever time and circumstances permitted; in the field, where less root treatment could be given, oxyphosphate of copper cement was particularly valuable in extensive excavation, the cement acting as an efficient obtrudent as well as an excellent medium to arrest further caries. Synthetic cement was seldom used, most cavities in the incisors being filled with either white copper cement or amalgam. Copper amalgam was employed extensively in cavities involving the gingival margin and in extensive caries of all molars. Many dental officers employed a lining of copper cement underneath the amalgam, such a combination giving excellent result.

Root treatment. A great number of root treatments were carried out as every endeavour was made to conserve every useful tooth. The drug employed in all cases of decomposition of the nerve was Trikresol and Formalin which rendered excellent results. Root fillings in these cases were usually made up of oxpara and gutta-percha points.

Increase of fillings

Colonel Marshall points out that as the number of dental units was increased the numbers of dentally unfit were gradually reduced. However, the sequel to any active fighting in France was an almost immediate increase of dental unfits in the Command Depots, due to the discharge from hospital of men who had been sent from France dentally unfit. Even with this handicap the number of extractions steadily diminished and fillings proportionately increased. The returns show an increase of 63 per cent. in fillings with a corresponding decrease of 45 per cent. in extractions.

Facial restoration

At Queen's Hospital, Sidcup, where plastic work was undertaken on members of the A.I.F. in need of this, a dental unit under Major Kenneth Russell was attached, as all wounds of the jaw required dental, in addition to medical, attention.

The dental unit was concerned in the construction of splints of all descriptions; owing to the variety of conditions existent, each case was carefully studied and a special appliance made to meet its requirements.

The apparatus evolved was the result of suggestions from

medical and dental officers and the staff-sergeant mechanics, considerable technical skill and ingenuity being required in the construction of the mechanical appliances for all jaw cases.

Ulcerative gingivitis

The pathological condition of the gums known as "Vincent's Disease", "ulcerative stomatitis", or "trench mouth", though noticed in the A.I.F. at No. 1 General Hospital, Heliopolis, did not obtain an alarming hold until in 1917 troops wounded in France started drifting into the training areas from various Command Depots and hospitals. At that time so great were the numbers of troops infected that liquor arsenicalis was ordered by the gallon and dental officers were especially detailed to treat this disease alone. Though it was probably less prevalent among Australian than among British troops it would be safe to say that at no time in 1917 were there less than 500 Australians invalided from training duties and isolated from contact with other troops because of attack by this rather repulsive dental disease. Between 1st September and 1st December 1917, there were 3,532 cases among Australian troops.

Careful prophylaxis by cleaning of mess utensils, etc., and, in every case, scaling were urged. A circular described the disease as follows:

> Ulcerative gingivitis is a form of oral infection which of late has attracted considerable attention It is an aggressive ulceration of the gums and neighbouring tissues. The lesion starts with a cushion-like red swelling on the gums near a tooth As the gum swells it separates from the tooth and later becomes discoloured with a yellowish purulent exudate within the superficial layers of the mucous membrane. Beneath this exudate the tissues become necrotic, and in a short time the infiltrated area has been replaced by an ulcer. As the ulcer extends the tooth may become loose in its socket and lost. A yellowish-brown or dirty-grey exudate adheres to the floor of the ulcer, and if detached there is free haemorrhage. The palate is not often involved, but it may extend to the tonsils.
>
> The disease is caused by infection with a mixture of spirochaetes, bacillus fusiformis, and pyogenic cocci, and is identical, as regards causation, with the old hospital gangrene It is probable that the spirochaete like many other organisms only becomes pathogenic under certain favourable conditions. "Vincent's angina" and "ulcerative gingivitis" are identical in their aetiology. It can be transmitted by the use of drinking utensils, etc.

In consultation with Colonel C. J. Martin a dentifrice, in the form of a small cake of soap containing liquor arsenicalis,

was issued from the Australian Base Depot of Medical Stores to dental officers for distribution to men who were apparently cured of the disease. This proved a material assistance in preventing recurrence.

Statistics

The following are statistics of the operations performed by the Australian Army Dental Service in England, on the Western Front, and in Egypt between August 1915 and 30th June 1919.

	1915-1916	1917.	1918	1919 to 30 June.	Grand Totals.
Cases treated.					
U.K. Depots ..	82,363*	254,002	351,607	50,505	
U.K. Hospitals ..	—	15,940	24,332	11,048	
France	—	157,538	153,258	36,260	
Egypt	—	30,789	33,681	10,134	1,211,457
Teeth extracted.					
U.K. Depots ..	40,804*	95,184	31,453	3,026	
U.K. Hospitals ..	—	4,136	3,220	733	
France	—	57,880	44,820	9,436	
Egypt	—	10,354	9,445	1,816	312,307
Local anaesthetic.					
U.K. Depots ..	No record.	46,560	17,785	2,466	
U.K. Hospitals ..		1,581	1,865	487	
France		36,004	27,105	6,201	
Egypt		7,191	6,278	1,203	154,726
General anaesthetic.					
U.K. Depots ..	No record.	86	9	—	
U.K. Hospitals ..		33	99	11	
France		257	199	25	
Egypt		8	34	3	764
Amalgam fillings.					
U.K. Depots ..	18,737*	68,718	135,154	4,550	
U.K. Hospitals ..	—	2,316	5,160	1,769	
France	—	22,163	29,632	6,322	
Egypt	—	8,159	17,049	4,042	323,771
Cement fillings.					
U.K. Depots ..	8,843*	34,912	34,835	3,047	
U.K. Hospitals ..	—	1,153	2,337	1,307	
France	—	17,110	18,098	4,130	
Egypt	—	1,442	3,768	1,618	132,600

	1915-1916	1917.	1918.	1919 to 30 June.	Grand Totals.
Root fillings.					
U.K. Depots ..	3,681*	10,723	13,042	1,612	
U.K. Hospitals ..	—	500	1,168	558	
France	—	7,116	8,500	1,814	
Egypt	—	1,733	4,357	1,229	56,033
Temporary fillings.					
U.K. Depots ..	—	9,284	12,255	2,828	
U.K. Hospitals ..	—	1,197	1,540	1,077	
France	—	8,941	8,155	1,859	
Egypt	—	1,262	4,865	2,650	55,886
Scaling cases.					
U.K. Depots ..	—	10,793	26,178	2,897	
U.K. Hospitals ..	—	785	2,008	838	
France	—	4,162	8,004	2,388	
Egypt	—	769	1,374	500	60,696
Dressings.					
U.K. Depots ..	10,170*	22,199	27,203	4,268	
U.K. Hospitals ..	—	1,621	2,478	1,834	
France	—	16,323	23,403	4,262	
Egypt	—	4,328	9,705	3,490	131,284
Minor operations.					
U.K. Depots ..	19,058*	49,612	48,905	5,747	
U.K. Hospitals ..	—	1,954	4,591	1,552	
France	—	24,225	17,964	4,169	
Egypt	—	4,892	4,274	2,560	189,503
Ulcerative gingivitis.					
U.K. Depots ..	—	21,603	52,526	19,523	
U.K. Hospitals ..	—	618	2,556	2,220	
France	—	8,826	15,792	5,743	
Egypt	—	1,907	1,711	1,394	134,419
Pyorrhoea.					
U.K. Depots ..	—	4,418	11,396	949	
U.K. Hospitals ..	—	438	295	75	
France	—	1,548	1,117	95	
Egypt	—	244	613	221	21,409
Crowns.					
U.K. Depots ..	500*	550	473	34	
U.K. Hospitals ..	—	64	141	78	
France	—	695	365	64	
Egypt	—	42	104	81	3,191

	1915-1916	1917	1918	1919 to 30 June	Grand Totals
Fractured jaw cases.					
U.K. Depots ..	—	26	128	—	
U.K. Hospitals ..	—	77	338	41	
France	—	94	92	7	
Egypt	—	4	38	4	849
Dentures:					
Full upper.	929*				
U.K. Depots ..	—	2,924	2,264	364	
U.K. Hospitals ..	—	213	314	122	
France	—	1,647	1,878	362	
Egypt	—	298	386	101	11,802
Full lower.					
U.K. Depots ..	226*	853	531	96	
U.K. Hospitals ..	—	65	95	39	
France	—	728	299	70	
Egypt	—	82	81	24	3,189
Partial upper.					
U.K. Depots ..	3,781*	21,846	17,001	1,841	
U.K. Hospitals ..	—	1,257	1,375	513	
France	—	10,566	9,524	2,109	
Egypt	—	1,600	2,119	651	74,183
Partial lower.					
U.K. Depots ..	2,219*	19,688	16,857	976	
U.K. Hospitals ..	—	829	985	259	
France	—	7,016	5,549	948	
Egypt	—	978	1,304	255	57,863
Repairs.					
U.K. Depots ..	4,315*	11,220	11,633	3,811	
U.K. Hospitals ..	—	763	1,319	725	
France	—	14,504	16,746	4,534	
Egypt	—	1,774	3,932	1,695	76,971

* These figures are incomplete owing to a number of units not keeping records during the period 1915-16.

STATISTICS (FROM RECORDS AVAILABLE) OF TROOPS TREATED BY THE AUSTRALIAN ARMY DENTAL SERVICES IN FRANCE AND LEMNOS.

	Australian Troops.	British Troops	New Zealand Troops	French and Belgian Troops.	Canadian Troops.	American Troops.	South African Troops	Chinese, Portuguese and Indian	French and Belgian Civilians	Prisoners of War.	Other than A.I.F. or B.E.F.
3rd A.G.H., Lemnos, Aug. to Dec. 1915	4,040	1,691	552								
1916	(No records).										
France, 1917	142,443	13,300	97	211	177	—	4	22	617	90	577
„ 1918	131,595	18,593	67	597	132	115	18	32	1,750	85	129
	278,078	33,584	716	808	309	115	22	54	2,367	175	706