CHAPTER 2

ON THE OUTBREAK OF WAR

WHEN Germany invaded Poland on 1st September 1939 there were still people who imagined peace might be preserved, but on the evening of Sunday 3rd September, Australian time, their hopes were dissipated. Great Britain was at war with Germany, and consequentially Australia was now involved in hostilities.

In the medical services the effects of immediate mobilisation were most striking in the navy, for naval reservists were needed at once for both sea-going and shore establishments. During the early weeks of this period the resources of the naval depots of the capital cities were strained to supply enough accommodation and medical officers to carry out the examination of the large number of reservists. In the army large numbers of militia medical officers were called up, chiefly on a part-time basis. Major-General Downes, the D.G.M.S., though hurriedly recalled from his tour of military establishments overseas, had not returned to Australia when war was declared. Meanwhile Colonel W. W. S. Johnston was acting in his stead with Major E. L. Cooper as his assistant.

The air force at once appreciated that great expansion must occur in this service, and that medical commitments would call for a vast increase in organisation. Never happy in its unwilling compliance with control by the D.G.M.S. of the Army, the R.A.A.F. medical services felt that the complex and individual technical nature of wartime duties demanded independence. The absence of Downes from Australia intensified their difficulty, and on 4th September 1939 the Air Member for Personnel took action, and requested the Chief of Air Staff to have the existing system of control of air force medical services reviewed.

RAISING AN EXPEDITIONARY FORCE

On 8th September the Australian Cabinet received word from the Dominion Office in London that the British Chiefs of Staff hoped that Australia might decide to send an expeditionary force overseas. Memories of the bitter controversy in 1917 over conscription were not yet dead, and the parliamentary Labour Opposition held strong views against the sending of a force out of Australia. It was claimed that this action would weaken the defence of Australia and lead the way to compulsory service again. New Zealand, less inhibited, decided at once to raise a special military force, and the Australian Government decided on 15th September to raise one division and auxiliary units up to a strength of 20,000 men for service at home or abroad. In addition two drafts of militia were to be formed each of 40,000 men. This was only 40 per cent of the full mobilisation strength of four infantry divisions, two cavalry divisions, and three independent infantry brigades. It was of course obvious that the obligations of the Royal Australian Navy might range over a wider field

than those of an expeditionary force. The need of aircrews for special service overseas was also recognised by the Government.

On 13th October, Sir Thomas Blamey was appointed as commander of the special force and promoted Lieut-General. Medical examination of recruits began early in October. On 3rd October General Downes arrived in Australia, having perforce curtailed his tour of the American continent to a few days. On resuming duty under the increasing pressure of urgent mobilisation requirements he was perturbed by a certain slowness of response of medical officers for duties in the new force. The reasons for this are of some importance, for a perceptible degree of cleavage was apparent between the militia and the special force, soon to be known as the 6th Division of the Second A.I.F. (Australian Imperial Force). The Cabinet had decided that preference was to be given to the militia for enlistment in the A.I.F., half the vacancies to go to the militia, a quarter to men who had had previous service, and a quarter to men from the country who had not had opportunity for training.

The 16th Brigade was recruited largely from New South Wales; after the first three days the flow of recruits slackened, and of 3,400 who had been accepted up to 13th October, only 1,200 had come from the militia. Only at the end of November was the 16th Brigade up to 96 per cent of full strength. The reasons for this were stated by Blamey to be a lack of inspiring lead by the Government, hesitation of militiamen to join a force which seemed unlikely to go overseas, and active or passive resistance to recruiting by militia commanders. The last reason was probably exaggerated, but there was no doubt some basis of fact behind it. It is only fair to add that the rates of pay for members of the expeditionary force were below those given the militia, an anomaly only corrected when the force went overseas. On 15th November compulsory training for home service was announced by Mr R. G. Menzies, the Prime Minister, and on 28th November the decision was made to send the division abroad early in 1940.

In this early period of indecision arose a feeling of separation between the militia and the A.I.F. which was to persist in diminishing degree throughout the war, and which was to some extent noticeable in the medical services. Though there was on the whole no difficulty in obtaining medical officers for the new division, some hesitation was discernible among the younger specialist groups, who perhaps not unnaturally waited to see what were the prospects of going overseas. There seemed more keenness in the southern than the northern States, perhaps because of the personal influence of the headquarters of the three medical services in Melbourne.

MEDICAL UNITS

The medical units raised with the Second A.I.F. were, like combatant units, given continuity with the original A.I.F. units by using the prefix "second", abbreviated as the 2/1st Field Ambulance *et cetera*.[1] Their

[1] In the beginning this prefix was not officially used for such units as general hospitals or for units which had not exact counterpart in the First A.I.F. As the term "second" was generally used for A.I.F. units later, no distinction based on chronology will be used.

colour patches also had a distinctive grey background, and their members carried a bronze badge "Australia" on each shoulder. The units raised with the 16th Brigade were the 2/1st Australian General Hospital, the 2/1st Field Ambulance, and the 2/1st Field Hygiene Section. The hospital unit was not completely assembled till near the time of embarkation, as the more senior officers, particularly the specialists were not then needed. Difficulty was found in recruiting privates for the Army Medical Corps, and in the last week or two there were men who marched in with a certain air of surprise to find themselves in a medical unit. Non-commissioned officers, when not technical specialists were in many instances experienced in militia work and invaluable for their knowledge of procedure.

No difficulty whatever was found in recruiting nurses for the hospital. Owing to scarcity of accommodation, which was in most camps used by the Second A.I.F. in these early stages, occupied by militia troops, the assembly of these units was hurried into the last few weeks before embarkation. Clothing and equipment which had been lamentably short in supply began to come to hand, and at the end of the year most of the preliminary preparations for departure were well in hand.

ADVANCE PARTY OF THE A.I.F. GOES OVERSEAS

On 15th December an advance party of the Second A.I.F. left for an overseas base. This party included Colonel H. C. Disher, who like most of the senior medical officers volunteering for the special force, had served in the 1914-1918 war: he was to be the Assistant Director of Medical Services of the Overseas Base, and his deputy was Major N. H. W. Saxby, who had field training with the militia. The destination of the force was officially undisclosed but by the end of the year it was generally known or assumed that the division was bound for the Middle East, as a training ground for operations in Western Europe. The demands for medical services in Australia grew rapidly: the militia camps had to be served, the coastal defences had their medical problems, medical examination of recruits needed many doctors, and administrative duties called for many more in headquarters and in medical units.

Full powers were not as yet available to the Central and State Coordination Committees for the control of medical personnel, accommodation and equipment, but as yet there was no urgent need for more authority, as the State committees could render any necessary help in consultation or action.

D.G.M.S. RETURNS

A month after the declaration of war Downes arrived from his overseas trip with much useful information. During his tour he had conferred with the administrative heads of the armed forces in Britain and in India, and had facilities for studying methods and material, the most efficient forms of treatment in the field, the handling of casualties and medical aspects of passive air defence. He made investigations into ordnance stores such as tentage and uniforms, and into hygiene in the field. Two visits to the French army proved valuable. In spite of the urgent stress of work in

all services help was freely given by all concerned. The declaration of war forced Downes to compress into six days visits to Ottawa, New York, Washington and Chicago, but he recommended that a detailed study of the United States Army equipment and book-keeping method would be most useful. In Europe he gathered valuable information concerning motor ambulances, particularly of the Indian type, methods of water carriage and purification, disinfestation, details of field medical and hygiene equipment, types of suitable containers for these, preventive inoculation, technical training and air transport of casualties. He noted particularly the value of adequate secretarial staff. Recalling the previous discussions about the relationship of the Director-General of Medical Services with the Adjutant-General and the Military Board, Downes also investigated this question overseas, and concluded that it was not desirable that the director should be a member of the controlling body, but that it was essential that he be consulted and have ready access to it. It is interesting that he found a considerable divergence of opinion concerning the surgical functions of a field ambulance. It will be seen later that combat experience called forth similar discussions in the field and at headquarters. British medical equipment was found to be of great interest to Australia; the desirability of a degree of standardisation was evident, and also the need for alternative sources of supply to be open to Australia for items which were not made there. Some useful details of dental equipment were obtained and information relating to dental establishments and administration.

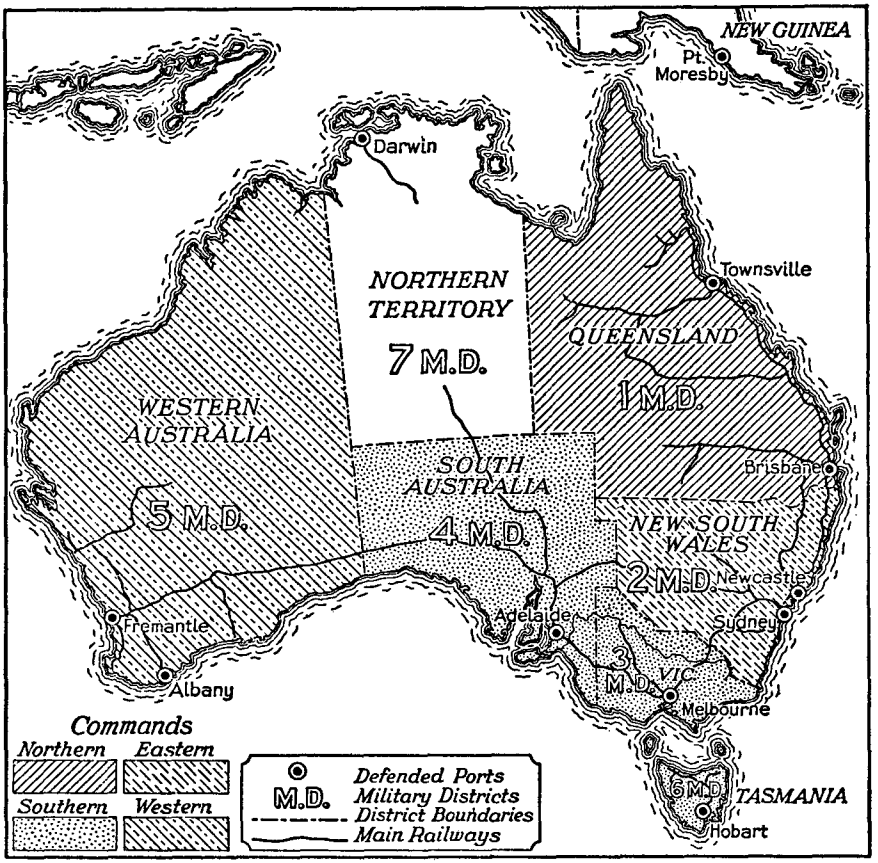
Downes was impressed by the rapid expansion of aviation medicine in Britain, which called for a closer liaison between the R.A.F. and the R.A.A.F. The Director of the Medical Services of the R.A.F. strongly urged that the attachment of a medical officer of the R.A.A.F. to the R.A.F. medical branch which had been most successfully effected with one Australian officer, Wing Commander E. A. Daley, should be continued year by year.

A visit to the medical establishments of the German army and air force had been arranged, together with interviews with Goering and Ribbentrop, but the German authorities abruptly cancelled these at the beginning of August. Two other subjects in which Downes was particularly interested were preventive inoculation of troops and radiographic examination of recruits. The results of these enquiries were most useful on his return, particularly as important advances in the latter had been made in Australia during his absence.

MILITARY ORGANISATION IN AUSTRALIA

Many urgent problems awaited the D.G.M.S. on his return, and it was a pity that the delays in obtaining approval and finance for this tour considerably reduced its value. The change from peacetime establishments to the needs of war involved many adjustments and changes. In August 1939 provision was made for the medical requirements of two cavalry divisions, five infantry divisions and fortress defence troops. On a militia

part-time basis there was the skeleton staff for six cavalry field ambulances, fifteen field ambulances, seven field hygiene sections, eight fortress companies (A.A.M.C.) and, a recent addition obtained against opposition, two casualty clearing stations. Establishments provided for regimental medical officers and orderlies. The latter had previously not been members of the medical services, but this curious anomaly was remedied. These units were distributed among the six military districts, whose boundaries corresponded approximately to those of the States; a seventh military district embraced the Northern Territory. Early in October the Military Board introduced the command organisation in lieu of the previous system. Northern and Eastern Commands now replaced the 1st and 2nd Military



Commands and Military Districts.

Districts (Queensland and New South Wales) Southern Command absorbed the 3rd, 4th and 6th Military Districts of Victoria, South Australia and Tasmania, and the 5th District became Western Command. Downes made a last minute protest against this change, fearing that it

might now be possible for technical recommendations to reach the Military Board without the D.D.M.S. of a command being consulted, but this seemed to be very unlikely.

Under the militia establishments no provision was made for units such as hospitals, convalescent depots and training depots; these were now required, calling for more staff and equipment, in addition to the requirements of the existing field medical units. The special force of one division needed 104 medical officers, including three colonels, two to command hospitals and one as A.D.M.S. Preliminary arrangements had been made for the supply of medical staff for the defence forces and the special force, but following the practice of 1914, all decisions about appointments were left to the D.G.M.S. There was little time left for the completion of arrangements for the 16th Brigade which was due to embark early in the new year. The medical tasks to be carried out involved special decisions and arrangements. Physical standards for the special force conformed closely with those current on the outbreak of war, but details needed confirmation, and the question of radiological examination had to be settled at once and steps taken to select and supply apparatus, and to adopt methods of procedure and review. The details of immunisation were also decided and standards laid down. Finally, though major questions of equipment were still to be settled for the medical units, especially the large ones, casualty clearing stations and hospitals, there were a 600 bed hospital and a convalescent depot to be equipped by the new year, as well as a field hygiene section and a field ambulance, and the regimental medical officers.

In these matters the preparatory work done before the declaration of war proved most useful, and the principles laid down in Standing Orders for Mobilisation, and the Army Headquarters Instruction for War proved adequate guides for procedures.

At the outbreak of war the staff of the Army Medical Directorate included three permanent officers, the D.G.M.S. and two non-medical staff officers, Major Christie and Lieutenant F. C. Barnet, a civilian clerk, and several militia officers who were available for part-time duty, nominally up to sixteen days *per annum*. These included two assistants to the D.G.M.S. (Colonel W. W. S. Johnston and Major E. L. Cooper), a Director of Hygiene (Lieut-Colonel C. H. Kellaway), a Director of Dental Services (Lieut-Colonel J. E. Down), a staff officer of Pharmaceutical Services (Major C. Tonkin), and a Matron-in-Chief (Miss Grace Wilson). The A.D.G.M.S. and his deputy and the Matron-in-Chief at once came on full-time duty. Expansion of the organisation began along the lines of the British War Office Directorate, in which separate sub-directorates are responsible for personnel; medical standards, accommodation, and treatment; equipment; nursing; hygiene and pathology; organisation, and medical and surgical treatment. The developments at the medical headquarters will be detailed later.

Meanwhile a medical administrator for the 6th Division, Colonel S. R. Burston, was selected as A.D.M.S., an officer with an excellent record in

the 1914-1918 war when he had held senior appointments, and with an unbroken sequence of militia experience in South Australia. Downes had made preliminary arrangements while in London to select consultants for an expeditionary force, should the need arise; as a result, this foresight secured the services of Sir Thomas Dunhill as Consulting Surgeon and Dr N. Hamilton Fairley as Consulting Physician. These distinguished Australians rendered valuable services in London as technical advisers in the early stages of the war, and their choice was a fortunate one for Australian medicine. A medical liaison officer was also appointed in London, Major H. M. Trethowan, who took up duty as the A.A.M.C. representative at Australia House. He reported all new developments and helped to place orders for equipment in England, and was able to visit the British Expeditionary Force in France and investigate matters of interest to the A.A.M.C. His reports covered such topics as equipment, establishments, technical details of blood banks and the supply of serum and plasma, details of medical embarkations, hospital ships and ambulance trains, records, and special subjects like X-ray apparatus and prophylaxis and treatment of venereal disease.

MEDICAL EXAMINATION OF RECRUITS

Criticism of medical examinations for the militia had been voiced in the Federal Parliament in 1936, when the whole system was also criticised. The Military Board agreed with the adverse comments on the system as carried out at that time, but had no option but to continue as before. No relaxation of medical standards had been authorised, but it was believed that medical officers interpreted the standards more leniently. As a "screening" test the average examination for militia men was very rough indeed. The circumstances were against greater accuracy, as examinations were often perforce carried out by busy practitioners under the handicap of poor facilities and numbers too great to be examined in the time available.

In 1938 the subject was reawakened. The annual Anne Mackenzie oration delivered by Major-General Downes in March 1938 at Canberra contained apposite references to health standards in connection with military service, and in April further references were made in the Melbourne Press to Australian physical standards. The generally low standard of dental fitness was the subject of special comment; for instance it was pointed out that nearly 15 per cent of the applicants for the permanent forces were dentally below standard. The value of physical exercise for youths was also mentioned, particularly in the form of games with recreational appeal. It was pointed out on behalf of the armed forces that the high standard required for entrants to the permanent Services caused the rejection of many men who did not satisfy these standards though they were in all other respects physically fit. The rejection figures for the permanent forces were then given as navy 45 per cent, army 55 per cent and air force 43 per cent, whereas less than 4 per cent of volunteers for the militia were rejected.

In June 1938 fresh interest was aroused by General Sir Harry Chauvel who expressed disappointment in the physique of some of the men taking part in the march on the occasion of the King's parade. Some discussion was evoked and contrary opinions were expressed on behalf of the militia and the air force. It was pointed out that many of these were youths whose physique was as yet immature though sound, and that slenderness was no indication of capacity.

In 1939 these questions of standards of development and physique became pressing when applied to a volunteer force likely to serve overseas, a successor to the still famous A.I.F. of the previous generation. The compulsory calling-up of the militia emphasised the importance of the physical examination and selection of men for the armed Services. The number of rejections for militia services was greater under a compulsory system, but this was due not so much to a more exacting standard of examination as to the inclusion of numbers of defectives who were automatically included in the yearly quota called up for examination for the militia. In general, it is fair criticism to state that the primary recruiting medical examinations were carried out under very unfavourable conditions, in pursuance of a policy that was penny wise and pound foolish. It is interesting that a letter from a layman describing conditions in at least one recruiting medical examination room as "revolting" was published in *The Medical Journal of Australia* on 30th August 1941. Though it was evident that accommodation was poor and restricted in the early days, it was futile to expect the medical services to carry out such an important function without proper facilities. Good accommodation, reasonably free from noise, where men could be examined deliberately and with adequate equipment, was essential. Competent senior practitioners appointed to organise and oversee the work were needed in greater numbers: later, some of the best work was done by men of the semi-retired class. More will be said later of the defects responsible for the breaking down of recruits under training. Certainly there were examples of hurried work, lacking in thoroughness, but not a little of this was primarily due to unreasonable expectation that good work can be done with poor facilities.

In 1939 and the early part of 1940 great numbers of recruit examinations were carried out by part-time medical officers in such time as could be spared from the demands of general practice. This examination was only preliminary, and a second examination was carried out in the larger centres by a board which had important functions. Such a recruiting board could work quickly by sub-dividing the work; it had an opportunity of disclosing defects not previously obvious to a single examiner, and it could make decisions in doubtful cases. This board of review was later reinforced by the greater use of consultants, in such branches as orthopaedics, skin and the special senses. Re-examination also helped to unmask impersonations. That impersonation took place seems certain. Later, when the check examinations were better arranged, and when X-ray examination of the chest was done at the time there was little chance of this deplorable

practice succeeding. Eventually a photograph was taken of all members of the forces, but in the early period of war most of the troops had embarked for oversea service before their photographs could be taken. If this could be done at the time of the second board all problems of identification would be solved. Finger printing has been suggested and would seem to be practicable and desirable.

The AAF D1, the important document which records the result of medical tests of every recruit, contains a *questionnaire* designed to cover his past medical history. This was soon found to be inadequate and questions were added relating to head injuries and digestive disorders, in view of the frequency of the appearance of men on sick parade complaining of symptoms due to these conditions, though they had previously denied them on enlistment. This part of the D1 was too often filled out by a non-experienced lay clerk, instead of by the medical examiner, and the recruit was not always made to appreciate the seriousness of the offence of mis-statement. It seems a pity that action was not taken under the *Defence Act* against some of the offenders. Many medical examiners look tolerantly on the misguided patriotism which urges recruits to understate their age, or even to omit important items in their history, but the principle is wrong. Ample time for the taking of a history should be allowed in these examinations; part of this time would be usefully spent in forming at least some partial mental or psychiatric estimate of the man's suitability. The question of special psychological and psychiatric examination of men and women enlisting for various types of service in time of war will be dealt with later. The effect of the induction of unsuitables in an army needs no detailed description; it lowers general morale, increases sick wastage and adds to useless national expense in medical care and pensions.

The standards at first laid down for the Second A.I.F. were as follows:

Two classes of fit men were accepted. Class I included two categories (a) those fit for duty in the special force, (b) those fit for duty in field formations. Class II included those (a) fit for specified duties in any unit in which the disability is no bar, and (b) fit for duty other than with field formations.

Age: between 20 and 35 years, the upper limit being extended to 40 years for potential warrant and non-commissioned officers. The age limits for officers were lieutenant 30 years, captain 35, major 40 and lieut-colonel 45 years. Height: 5 feet 6 inches as an ideal, 5 feet 5 inches to be admissible in special cases. Recruits of 5 feet 4 inches in height could be listed for consideration; 5 feet 2 inches with chest measurement of 32 inches would qualify for class II.

Chest measurement: 35 inches maximum was accepted.

Eyesight: Class I (a) 6/18 both eyes; (b) 6/12 one eye, 6/36 the other. Class II (a) 6/24 both eyes; (b) 6/18 one eye, 6/60 the other.

Hearing: Whispered speech heard at 20 feet was required; a lower standard in one ear could qualify for certain service. Ordinary speech

heard at 20 feet in one or both ears was sufficient for the class II categories (a) and (b) respectively.

There was no fixed standard of dental fitness. Provided a recruit had jaws which lent themselves to the fitting of effective dentures he was not rejected for dental deficiency. Men with dentures were accepted. Any recruit rejected for dental reasons was rejected only by advice of a dental officer, who certified his reasons on the AAF D1. For the purposes of the preliminary examination a recruit could be accepted with a few teeth in good occlusion.

These standards were exacting in respect of the minima of height, chest measurement, eyesight and hearing. Inevitably changes were made in the direction of relaxing these criteria. The second examination revealed that numbers of men were accepted on the preliminary test who were too short to comply with the standard. Directions were circulated among medical officers setting out the standards required, and giving details of conditions calling for special care and judgment, but the interpretation of these varied considerably.

Skeletal deformities needed specific and careful examination. The feet demanded special attention, but stress was chiefly laid on functional capacity. Hernia and varicose veins were also important. Exercise tolerance tests were not used as a routine, but where the efficiency of the heart was questioned some form of this method was advised.

Early in 1940 an amended schedule of the procedure adopted in recruiting examination was published. Some of this may be quoted here, as the advice given therein applied equally to the original routines. Attention was directed particularly to the detection of any of the following abnormalities, which were recorded in detail if discovered:

Defects of the heart, lungs, or circulation; insufficient muscular development; postural deformities of chest and spine; deformities of limbs—especially of hands and feet (bunions, hammer toes, *pes cavus,* flat feet and missing digits); corns on toes; limitation of movement of joints; mental deficiency; hernia; defects of speech or hearing; haemorrhoids; varicose veins of appreciable degree; goitre; adiposity; renal disease; diabetes; infectious skin disease; trachoma; peptic ulcer; apparently above age limit for enlistment.

Certain conditions were found likely to raise doubts in the examiner's mind, and the following advice was given as a guide to a decision:

(a) Absence of fingers.—Loss of one finger or portions of two (except of index and middle right fingers) will not unfit a recruit for class I, if other hand movements be normal.

(b) Undescended testis.—Not to be regarded as disqualifying.

(c) Hernia.—Disqualifies for class I and IIB. Not disqualifying for class IIA unless large or causing pain.

(d) Hydrocele.—A large hydrocele should cause temporary rejection until treated by operation.

(e) Varicocele.—Not to be regarded as disqualifying unless associated with pain.

(f) Kyphosis.—The postural type does not disqualify but if the angulation is acute, the recruit must be rejected.

(g) Scoliosis.—Slight degree (especially of "postural type") not to disqualify.

(h) Flat feet.—Only disqualifying in severe and undoubted cases. If the arch, while not apparent on standing flat, appears on standing on tiptoes, the candidate is acceptable. If it does not appear and if the feet are free of marked deformity or tenderness, he may be accepted for class II.

(i) *Pes Cavus.*—Excludes for class I. If present to a moderate degree the candidate is acceptable for class IIA and B.

(j) *Hallux valgus* (or bunion).—Will disqualify if associated with other deformities of the feet or with painful or disabling corns.

(k) Hammer toes.—If associated with corns will disqualify for class I; not to disqualify for class II unless corns are inflamed.

(l) Blood pressure.—A systolic blood pressure above 160 mm. mercury or a diastolic blood pressure above 100 mm. mercury renders a recruit unfit for classes I and II. A diastolic blood pressure over 90 mm. mercury is sufficient to exclude a recruit under 40 years of age for class I. An applicant over 45 years of age with a diastolic blood pressure between 95 mm. and 100 mm. mercury should be accepted only if the urine is free of albumin. Low blood pressure alone does not exclude.

(m) Cardiac murmurs.—Care is to be taken that systolic murmurs unaccompanied by symptoms or signs of cardiac disease, and so of no clinical significance, are not regarded as disqualifying. A definite history of coronary occlusion excludes for all other duties except those of a sedentary nature on home service.

(n) Tachycardia.—Is not necessarily evidence of heart disease, but a consistently rapid pulse at successive examinations should be viewed with suspicion.

(o) Cardiac irregularities.—Are of no significance unless they persist when pulse rate rises as a result of exercise.

(p) Asthma.—Recruits with a history of asthma should be rejected if they have had attacks in the immediately preceding five (5) years.

(q) Pulmonary tuberculosis.—A definite diagnosis of tuberculosis past or present, or pleural effusion (unless definitely non-tubercular) will disqualify.

(r) Glycosuria.—Will disqualify unless a sugar tolerance curve within normal limits is obtained.

(s) Albuminuria.—Albuminuria in a youth is of no pathological significance unless it is associated with other evidence of disease. If the presence of albumin be detected by the test of boiling with dilute acetic acid, further examinations should be made after an hour's rest in the recumbent position, or at different times of the day. If the urine be then clear, the candidate is to be considered fit. When an appreciable amount of albumin is present in the specimen passed after lying down, the candidate will only be accepted if in addition to the above conditions microscopic examination fails to show red or white corpuscles.

(t) Peptic ulcer.—A definite history of peptic ulcer will disqualify for the A.I.F. A recruit may be accepted as class II for home service only provided he has been free of symptoms for two years.

(u) A history of certifiable mental derangement will disqualify.

Particular care was enjoined in the carrying out of tests of sight and hearing, which were the personal responsibility of the medical officer.

Difficulty arose sometimes in deciding the significance of glycosuria. The instruction allowed acceptance provided the sugar tolerance curve of the blood was within normal limits. The difficulty lay in determining what constituted a normal curve. At first anyone with sugar in the urine was rejected, but later the resources of laboratories were used to have blood tests made. Later still the development of military laboratories and availability of more pathologists and biochemists permitted routine

examination of these men. Some of the curves obtained showed higher swings of sugar content than are usually accepted as normal, and when the need for men became great and these men were accepted, serial examination usually failed to reveal evidence of diabetes, or even of abnormal blood analyses. Suspicion was at one time entertained that some interference was being practised with the normal mechanism of sugar absorption and excretion by men seeking to avoid military duty, but experience dispelled such ideas. A special investigation in Melbourne showed that occasional glycosuria with slightly aberrant tolerance curves were found among as many recruits for the A.I.F. as among those called up for the militia. It seemed likely that the common factor was neurogenic, and due to psychological causes. Observations in Sydney and elsewhere yielded similar results.

An occasional cause of confusion was in the examination of the heart. Some medical examiners, especially when working under the spur of haste and in noisy uncomfortable surroundings, rejected young men as suffering from mitral stenosis. In a number of these there was only a cardio-respiratory murmur associated with overaction of the heart under excitement, and with an apical impulse deceptively forceful and diffuse. On the whole, however, the bar to accurate examination was not one of knowledge or judgment, but lack of time and facilities for carrying out a methodical and deliberate examination in which all necessary observations of structure and function were made.

For medical officers the limits of age were often exceeded. At that stage it might have been difficult to staff a general hospital had age limits been strictly observed. For the positions of senior specialists considerable experience was desirable, especially at a time when standards in military medicine had to be established, and with this in view the more senior age groups were drawn upon freely. At this time too, volunteers for medical service contained rather a disproportionate number of senior men and especially medical officers who had served in the 1914-1918 war.

General Downes in March 1940 expressed the opinion to the Adjutant-General that it was a mistake to send men of class II away overseas, as many of them broke down. But the breakdowns were not only coming from class II men but also from class I. Inspectors of recruit examiners had been appointed in each State, lectures were given setting forth the requirements of a correct and full examination routine, and instructions sent out to all concerned. Later Lieut-Colonel H. H. Turnbull acting as inspector on behalf of Army Medical Headquarters investigated the not infrequent complaints of inefficient examinations. In spite of the impersonations and deceit which had been the cause of some errors, there was no doubt some foundation for complaint. As has been previously pointed out, omissions and false statements in the AAF D1 still accounted for many errors and it was considered that the fault lay with the medical examiners in less than half the cases. Some gross errors occurred in examination of the eyes and the employment of an oculist was recommended. It was also found desirable that an aurist should be available to

assess men who had old perforations of the ear drums. Though numbers of men of class II type (later known as B class) complained of symptoms from minor disabilities which had originally placed them in the lower category and eventually were returned from overseas, there were others in class I who managed to carry disabilities past several medical examiners. There can be little doubt that the second medical board was of the greatest value, especially when it was well organised, with the duties divided between the two members of the board according to their special interests and knowledge. A suggestion was made at this time that the original medical examination should simply grade recruits into two classes fit or unfit for military service, and that the grading be done by the second board, but this was not adopted.

RADIOGRAPHIC EXAMINATION OF THE CHEST

The most important innovation in the methods of selection of recruits for the A.I.F. in 1939 was the adoption of radiography of the chest. The actual method used was that of miniature fluorography, in which a photograph of the image on a bright fluoroscopic screen is taken on a 35 millimetre film. Dr H. W. Wunderly suggested in April 1939 the possible value of this method for large scale surveys. Successful X-ray examinations were made of the 16th Brigade Group before embarkation in January 1940. Though the recommendation from the D.G.M.S. was only approved by the Minister for Defence in November 1939, and it was the 24th December before the apparatus could be built and tested, even an accident to it *en route* did not prevent its rapid replacement, and the radiographic examination of 6,775 men was accomplished by 9th January. Cost was greatly reduced by this method. In the first two months of the application of micro-fluorography 22,000 men were examined at a cost of about fourpence per man. Even when allowance was made later for costs of travel, maintenance and depreciation the cost did not exceed tenpence per individual. It is hard to understand why permission to apply this method to men called up for the militia was withheld till 1942. The reason appears to have been financial, but against cost must be put the much greater cost of treatment and after care of men who could claim that an early pulmonary lesion had been exacerbated by military service.

Some radiologists hesitated to give the method their unqualified approval, but criticism was due largely to false assumptions. The difficulty in assessing the significance of apparently abnormal shadows in a miniature film were admitted, even when a board of two radiologists and a physician skilled in thoracic medicine examined the films enlarged on a screen. Care was taken that no board worked too long, to obviate fatigue. Their decision was merely "accept" or "for large film", and where any doubt existed a 17″ x 14″ film was taken and reviewed. If shadows suspicious of a pulmonary lesion were then seen the verdict was "reject". No recruit was rejected on the evidence of a miniature film alone. Experience showed that with safeguards the method was both accurate and rapid, and opposition on technical grounds disappeared. The use of

micro-fluorography quickly spread to the navy and air force and the women's services. Eventually a film was also taken of the chest of every man and woman entering and being demobilised from the Services. The changes brought by the introduction of mass surveys for tuberculosis have been notable. Indeed the problem of the handling of sufferers from early pulmonary tuberculosis has since the war become one of practical politics. Before the war, calculations of hospital and clinical accommodation were based to some extent upon the mortality figures or those for gross morbidity. Since the war, rates of incidence have become all important as the result of comprehensive surveys. There can be no doubt that the significance of tuberculosis in a community emphasised for so long by the medical profession, though largely in vain, has now been made evident to the people and their political leaders largely through the application of this specialised technique to military hygiene.

BLOOD GROUPING

Another important innovation was the introduction of blood grouping tests on every recruit. On the advice of the experts in blood transfusion Downes recommended its adoption to the Military Board. There was never any question of the wisdom of this measure, but some hesitation was felt at first in making it compulsory, on the curious ground that some men might object to having blood taken. Naturally this argument did not prevail. With the help of pathologists in civil hospitals in the capital cities the work was done with admirable despatch and accuracy. Later routine checks overseas and experience in medical units proved that reliance could be placed on this important item in a recruit's official record. Cross typing was always done if possible, but where this could not be done in emergency no complications occurred due to inaccurate typing. Each soldier's blood group was recorded in his paybook and stamped on his identity disc, though in the rush of departure not all discs were stamped in the units of the 16th Brigade.

PREVENTIVE INOCULATION

The whole question of preventive inoculation had been in the mind of the D.G.M.S. for some time before the outbreak of war. He realised that not only the question of immunity was involved, but also that of reactions following injections of vaccines or toxoids. The administration of repeated injections to troops was not only to some degree unpleasant, but consumed considerable time, and interfered with training, especially when uncomfortable side effects occurred. During his trip abroad Downes had investigated the possibility of using "cocktail" vaccines containing antigens of the enteric group and tetanus toxoid. On his return to Australia his advisers, Colonel Kellaway and Dr Morgan and his staff at the Commonwealth Serum Laboratories warned that investigation and trial were necessary before using a compound inoculation owing to the risk of severe reactions. Sharp reactions were known to follow "T.A.B." vaccine, which protected against typhoid and the A and B varieties of paratyphoid

fever. Investigations were carried out later on volunteers, but these did not encourage the use of combined vaccines and toxoid, as some excessive reactions were encountered. The advisability of building up immunity to tetanus was undoubted, and a formalinised toxoid was chosen for this inoculation. Even if Australian soldiers were not to be exposed again to the risk of highly contaminated soil, as in some of the intensively tilled areas of Western Europe, the serious nature of the disease called for protection. The advisability of adding dysentery and cholera antigens to the enteric vaccine was also considered, but it was thought better to consider inoculation against other alimentary tract infections when such a need appeared.

The routines adopted then were the administration of "T.A.B." vaccine at weekly intervals in three doses of 0.25 c.cm., 0.5 c.cm. and 0.5 c.cm., and of tetanus toxoid in a dose of 1 c.cm., repeated in six weeks. In order to avoid undue local and general reactions and to obviate the prejudice existing against these injections and their side effects, the usual full dose of the vaccine was halved. It was clearly realised at the time that there was no certainty that a solid immunity would be conferred by these doses, and after the first convoy had sailed experiments were carried out to ascertain what concentration of antibodies in the blood could be produced by the smaller doses. When compared with the results of British workers on the effects of the vaccine used by the British Army (Maclean and Holt, *Lancet,* 9th November 1940) the results were not very satisfactory. Even so, reactions occurred not infrequently, though it was found sufficient to free men from physical exertion till the following day. As told elsewhere completely new arrangements for preparation of a strongly antigenic but relatively non-toxic vaccine were made later. It was planned to give a routine *injection de rapelle* every year to every member of the forces. Men in the militia were also inoculated against the enteric diseases, as successive occupation of camp areas by unprotected men constituted a hazard. The D.G.M.S. held that this compulsory inoculation was necessary for militia, University trainees and garrison battalions in camp.

Tetanus toxoid usually produced no reaction following intramuscular injection, but in some series, such as those seen in the 2/2nd Field Ambulance at Puckapunyal in January 1940, up to 25 per cent of the men had some anaphylactic manifestation such as swelling of the face, urticaria, flushing and sweating after the second injection. A few men had vomiting and diarrhoea. Officers of the 2/1st Field Ambulance at Ingleburn in January out of an experience of 1,000 inoculations reported two cases of severe shock with abdominal pain and passing of blood. Recovery followed administration of adrenaline. Similar transient but alarming manifestations were seen in other parts of the world in a very small percentage of inoculated men. The material used was thoroughly examined, and it was concluded that a very small amount of peptone in the inoculum had sensitised susceptible persons. Precautions taken to exclude any such extraneous allergen eliminated the trouble.

In addition to these inoculations all men going overseas were vaccinated against smallpox. Since the majority of Australians are unvaccinated and therefore non-immune, this was necessary, but care was taken to keep within proper limits the amount of virus introduced, so as to minimise local and general reactions and to lower the risk, small though it is, of complications. In mass vaccination the requirements are speed, asepsis and safety. Instructions to medical officers laid down that a single site should be used for insertion of the lymph, strict aseptic precautions be employed in sterilising the applicator (such as a flamed wire loop) and conveying the lymph to the sterilised skin. The area covered by the lymph was not to exceed 3 millimetres. Scarification was forbidden; instead, the skin was repeatedly pressed by the edges of a triangular surgical needle through the drop of lymph. No troubles arose from this method. One interesting observation was made in New South Wales. Local reactions following vaccination occurred less frequently and were less severe when nurses cleansed the men's arms instead of orderlies. This was surely due to the greater thoroughness and experience of those trained in aseptic methods, all the more important here, since no antiseptics could be used, only a neutral detergent such as ether.

THE FIRST CONVOY SAILS

The final preparations for the 16th Brigade Group were more or less completed by the 9th January 1940 when the first units to embark marched on to the waiting transports. Anchoring in Sydney Harbour these ships awaited the remaining ships of the imposing convoy, which under the escort of *Ramillies,* a battleship of the Royal Navy, and the Australian cruisers *Sydney* and *Canberra,* stood out to sea on the early afternoon of 10th January. Arrangements were made to ensure that a relatively senior medical officer was included on the medical staff on each ship, and as far as possible each medical unit sailed together. This permitted intensive training to begin at once, and regular courses in appropriate military and medical subjects were arranged, laying stress on the preventive aspects.