

CHAPTER XXVI.

DEFENCE.

§ 1. Department of Defence.

1. **Introduction.**—At the outbreak of the 1939–45 War, the Department of Defence comprised the three Fighting Services. In November, 1939 separate Departments, each with its own Minister, were created for the control and administration of the Navy, Army and Air Force. The Defence Department as then reconstituted retained responsibility for over-all defence policy and for the conduct during the war of the business of the War Cabinet and the Advisory War Council.

2. **Post-war Functions and Organization.**—(i) *The Cabinet and the Council of Defence.* The determination of defence policy is the responsibility of Cabinet. It is assisted in this by the Council of Defence, which is a statutory body created under Section 28 of the Defence Act, its functions being to consider and advise upon any questions of defence policy or organization which are referred to it by the Prime Minister or the Minister for Defence. The Council consists of the Prime Minister and those Ministers most concerned in defence, the three Chiefs of Staff and the Secretary, Department of Defence.

(ii) *Functions of Department of Defence.* Subject to the authority of Cabinet and the Council of Defence, the Minister and Department of Defence are responsible for:—

- (1) The formulation and general application of a unified defence policy relating to the Defence Forces and their requirements, including:—(a) co-operation in British Commonwealth defence and the defence aspect of the Charter of the United Nations; (b) the supply aspect of defence policy, including the review of production programmes and capacity; (c) the scientific aspect of defence policy; and (d) the financial requirements of defence policy, and the allocation of funds made available.
- (2) The defence aspect of Armistice and Peace Terms, Control Commissions, and Forces of Occupation.
- (3) Matters of policy or principle and important questions having a joint service or inter-departmental defence aspect.
- (4) The higher defence machinery, the control of the joint service machinery, and the Secretariat of the Council of Defence.
- (5) The defence aspect of questions relating to the organization and machinery for:—(a) co-operation in British Commonwealth defence; (b) co-operation in regional security, including obligations under the United Nations Charter; (c) higher direction in war; and (d) higher direction of the Services.
- (6) The Commonwealth War Book, which is a summary of national plans for an emergency as developed in Departmental War Books.
- (7) The administration of inter-service organizations, such as the joint intelligence machinery.
- (8) The defence aspect of:—the strength and organization of the Forces, higher appointments in the Services, Honours and Awards, and civil defence policy.

(iii) *Joint Service and Inter-Departmental Machinery.* The joint service and inter-departmental advisory machinery of the Department consists of various committees headed by the Defence Committee, the Chiefs of Staff Committee and the Joint War Production Committee. The Defence Committee is a statutory body consisting of the Secretary, Department of Defence, who is Chairman, and the Chiefs of Staff of the three Services. In general, its function is to advise on defence policy as a whole, and on matters of policy or principle and important questions having a joint service or inter-departmental defence aspect. The main responsibility of the Chiefs of Staff Committee is the preparation of strategic appreciations and military plans. The function of the Joint War Production Committee is, briefly, to examine the relation between strategical plans and their requirements to ensure that the war potential for them exists. The major committees subordinate to the Defence Committee and/or the Chiefs of Staff Committee comprise the principal Administrative Officers Committee (Maintenance and

Materials), the Principal Administrative Officers Committee (Personnel), the Defence Research and Development Policy Committee, the Joint Planning Committee, the Joint Intelligence Committee and the Joint Administrative Planning Committee.

3. Post-war Defence Policy.—(i) *Basis of Australia's Post-war Defence Policy.* The basis of Australia's post-war defence policy is stated in the following terms in the Government's announcement of 4th June, 1947:—

“The Forces to be placed at the disposal of the United Nations for the maintenance of international peace and security, including regional arrangements in the Pacific;

The Forces to be maintained under arrangements for co-operation in British Commonwealth Defence; and

The Forces to be maintained to provide for the inherent right of individual self-defence”.

(ii) *Post-war Defence Programme.* The approved post-war defence programme extending over a period of five years from 1947–48 to 1951–52 originally provided for the expenditure of £250,000,000 during the period, and this has subsequently been increased to £295,000,000. The post-war defence programme is designed to secure a balanced scheme of defence providing for the Navy, Army and Air Force, Defence Research and Development, and Munitions and Supply, in proper proportions within the limits of the available resources that can be devoted to defence. The roles of the three Services are blended and inter-related and their strength and organization have been determined on the basis of the fulfilment of the objectives of policy stated above.

(iii) *Defence Research and Development.* The whole question of post-war policy is affected by the impact of scientific development on the types of weapons and armament for the various Services, and the results of these developments will be under constant notice. High priority is therefore given in the programme to defence research and development, for which an amount of £33,500,000 is being provided under the five-year programme. The main individual item is the Long Range Weapons Project which is a joint United Kingdom-Australian undertaking. It is the first important step in the widening of Australia's responsibility in defence research and development in accordance with the policy of the strategic development and distribution of the resources of the British Commonwealth. The Department of Defence is responsible for questions of policy in this field, and the Department of Supply and Development is the responsible authority for executive action in respect of approved policy decisions.

(iv) *National Planning for an Emergency.* To achieve a balanced defence policy, it is necessary to ensure proper co-ordination of the Navy, Army and Air Forces, the supply organization and the civil economy which supports the direct military effort. The Government's policy provides for the co-ordination of these as integral parts of the national defence policy. The basis of planning for these matters and also for the civil defence measures necessary to protect the community against attack by modern weapons is the Commonwealth War Book and Departmental War Books. These are now being revised in the light of wartime policy and likely contingencies. There has been established a Standing Committee for the Co-ordination of Departmental Action to Meet an Emergency and sub-committees of the Standing Committee have been set up for detailed planning as required.

(v) *Flexibility of Post-war Policy.* It is important that the future developments in weapons and methods of war should be borne in mind when considering national defence, the shape and size of post-war forces, and the new problems of organization and training which they will create.

Australian policy, like that of the United Kingdom, will be kept flexible. At the same time, while the completion of the objectives laid down will be vigorously pursued according to the planned schedule of the programme, a continuous review will be maintained in regard to progress and the need for any variations that may arise.

4. Co-operation in British Commonwealth Defence.—The defence programme gives practical and substantial effect to the acceptance by Australia of a larger contribution towards the defence of the British Commonwealth in the Pacific, and the relief in corresponding degree of the burden for so long carried by the United Kingdom. The need for improved machinery for co-operation in British Commonwealth defence has been

recognized and advocated by the Australian Government for some time and now that proposals by it to achieve that objective, with particular reference to the Pacific Area, have been agreed to by the Governments of the United Kingdom and New Zealand, planning is actively proceeding between those Governments on mutual defence.

5. **Australian Participation in the Occupation of Japan.**—An account of Australia's part in the organization and activities of the British Commonwealth Occupation Force in Japan up to the end of 1947 will be found in Official Year Book No. 37, page 1144. During 1948 the United Kingdom and New Zealand contingents were withdrawn except for a handful of administrative personnel. On 30th June, 1949 the strength of the Australian contingent was 2,630.

§ 2. Military Defence.

1. **State Systems.**—A detailed historical account of the Australian defence forces prior to Federation will be found in Official Year Book No. 2, pp. 1075–1080. See also Official Year Book No. 12, p. 999.

The strength of the military forces of the States on 31st December, 1900 (the eve of Federation) was :—New South Wales, 9,338; Victoria, 6,335; Queensland, 4,028; South Australia, 2,932; Western Australia, 2,696; Tasmania, 2,024; total for Australia, 27,353. This total is exclusive of cadets, reservists and rifle club members.

2. **Commonwealth Systems.**—(i) *General.* Under the terms of the Constitution Act 1900, the Commonwealth took over control of defence matters in March, 1901. The growth of the Commonwealth Military Forces may be considered to have taken place in fifteen phases. For particulars of the phases which cover the period from the welding together of the military forces of the States into one homogeneous army in 1902 up to the decision to increase the training strength of the militia to 70,000 in the year before the 1939–45 War (phases 1–7), see Official Year Book No. 36 and earlier issues.

The eighth phase was initiated by the Government on 2nd September, 1939, when the Governor-General issued a proclamation of the existence of war or of a danger thereof and for the calling out of the Citizen Forces for war service. The ninth phase was initiated on 13th October, 1939, when the organization of the Australian Military Forces into Commands came into operation. The objects of the Command Organization are as follows :—(a) to bring peace organization into line with war organization; (b) to provide for the personal and whole-time guidance and supervision, by a higher commander, of divisional and other formation commanders, on questions of training and general preparedness for war; and (c) to reduce the number of lower formations under the direct control of Army Head-quarters.

The tenth phase was initiated on 30th November, 1939, when a proclamation was issued under the Defence Act calling upon certain personnel to enlist and serve in the Defence Forces.

The eleventh phase: Owing to a considerable expansion in the administrative functions which the three main commands were called upon to perform, it was decided to relieve the G.O.s.C. of these commands and their staffs of much of their administrative responsibilities in order that they might concentrate on operational matters. In January, 1942, therefore, Northern, Eastern and Southern Commands were divided into separate command and base head-quarters—the command head-quarters to handle operational, and base head-quarters administrative, matters.

The twelfth phase: As a result of the expansion in supply and other administrative installations in Australia, it was found necessary to revise the machinery for command administration of lines of communication areas and to decentralize control. A division into lines of communication areas was therefore made, and these areas corresponded with Northern, Eastern, Southern and Western Commands and 7th and 8th Military Districts. Command and general administrative control of the lines of communication areas were placed under the respective base head-quarters and 7th and 8th Military Districts, and came directly under Army Head-quarters.

The thirteenth phase: In August, 1941 War Cabinet approved of Lieutenant-General Sir Iven Mackay as G.O.C.-in-C. Home Forces commanding the forces in Northern, Eastern and Southern Commands. The G.O.C.-in-C. was made superior to the G.Os.C. Commands for the direction of operations, but subordinate to the Military Board, which remained the body advising the Minister for the Army, and through him, War Cabinet.

The fourteenth phase: Shortly after the outbreak of war with Japan, a number of units of the United States Forces were routed to Australia. Subsequently additional forces arrived. By agreement among the Governments of the United States, the United Kingdom, the Netherlands and Australia in April, 1942, General Douglas MacArthur was appointed Commander-in-Chief, South-west Pacific Area. General Sir Thomas Blamey was assigned to the command of the Allied Land Forces in the South-west Pacific Area by General Head-quarters, South-west Pacific Area. With the appointment of General Sir Thomas Blamey as Commander-in-Chief Australian Military Forces, the Military Board ceased to function and Army Head-quarters became Allied Land Forces Head-quarters, Australia. As from 9th April, 1942, the system of commands and bases was abolished and replaced by the field army and lines of communication areas which were established in each of the six States on the mainland plus Northern Territory and New Guinea. Field formations were formed as follows:—

First Australian Army—from Northern and Eastern Commands.

Second Australian Army—from Southern Command.

Third Australian Corps—from Western Command.

Northern Territory Force—from 7th Military District.

New Guinea Force—from 8th Military District.

In March, 1943 First and Second Armies took over from Queensland, New South Wales and Victoria Lines of Communication Areas the command of all coast and static anti-aircraft artillery defences and training establishments. On 16th June, 1944 Western Command was re-established and took over the combined responsibilities of Third Australian Corps and Western Australia Line of Communication Area.

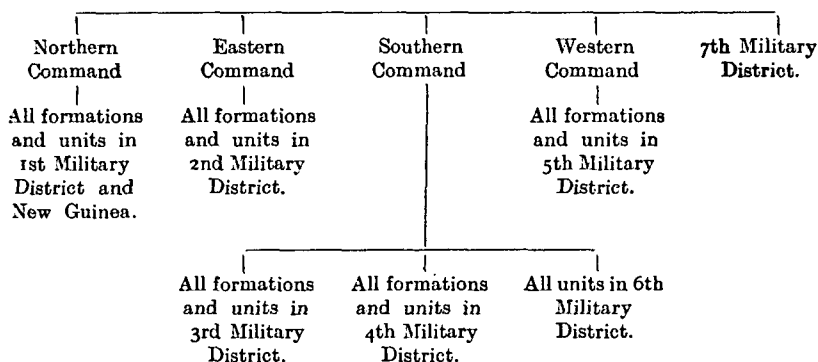
The fifteenth phase: In March, 1946 the Military Board and the organization of commands and military districts were re-introduced.

(ii) *Population of Military Age, Census, 1947.* The following particulars show the numbers of males of military age in the population of Australia as at the Census of 30th June, 1947. The total number of cadet age, 12 and over, and under 18, was 333,373; at citizen soldier age, 18 and over, and under 26, 495,859; and 26 and over, and under 35, 532,210; making a total of 1,028,069, 18 and over, and under 35, which is considered the best period for military service. In addition to the above-mentioned, there were 1,186,141 males 35 and over, and under 60, in Australia at the 1947 Census.

(iii) *Allotment of Units.* Under the Command Organization (see above) units are raised on a territorial basis, each State supplying its proportion of the personnel required for the fighting services, the organization at 30th June, 1949 being as follows:—

COMMAND ORGANIZATION.

Army Head-quarters.



Military Districts conform generally to State or Territory areas, as follows :—1st Military District, Queensland; 2nd, New South Wales; 3rd, Victoria; 4th, South Australia; 5th, Western Australia; 6th, Tasmania; 7th, Northern Territory. Third Military District includes a considerable portion of Southern New South Wales, and 4th includes Broken Hill.

(iv) *Strength of Military Forces.* There was little alteration in the numbers serving in the Australian military forces from the institution of the Commonwealth to the year of the introduction of the compulsory training system. From 1913 to 1918, however, the annual increase was considerable. As a result of the International Conference which met at Washington on 11th November, 1921, it was decided to continue the universal training law, but its operation was restricted to the more populous centres and to certain quotas only. From 1st July, 1922 to 30th June, 1925, training in the Senior Cadets was limited to two quotas instead of four, and in the Citizen Forces to two quotas instead of seven. On 1st July, 1925 Senior Cadet training was reduced to one quota only, while Citizen Force training was increased to three quotas. These conditions remained in force until 1st November, 1929, when the constitution of the forces on a voluntary basis was adopted. During the period last mentioned Senior Cadet training commenced on 1st July of the year in which Senior Cadets reached the age of 17 years, and on 1st July of the following year they were allotted to the Citizen Forces, in which training continued until 30th June of the year in which they attained the age of 21 years. Notwithstanding the reduction in training, all males residing within 5 miles of a training centre were required to register during the months of January or February of the year in which they reached the age of 14 years. Junior Cadet training of boys of the ages of 12 and 13 years, which was in abeyance during the years 1922–23 and 1923–24, was also supervised by the Defence Department during the period 1st July, 1925 to 31st October, 1929.

Under the voluntary enlistment system, personnel might enlist for a first period of three years, and on its completion the member concerned might be re-engaged for successive periods of two or three years until he reached the age for retirement.

In 1947, to provide a basis for the establishment of the post-war Army, the Commonwealth Government approved a programme extending over a period of five years to 1952. This programme provides for a Regular Army of a total strength of 20,000 all ranks, and a Citizen Force of a total strength of 50,000 all ranks. The strength of the Australian Military Forces (Australian Regular Army and Citizen Military Forces not including Cadets) at the 30th June, 1949 was 30,801. Enlistment in the Australian Military Forces is restricted to British subjects resident in Australia with a minimum age of 18 years.

The Australian Cadet Corps is a voluntary organization comprised of Senior Cadet units raised at educational establishments in all States of the Commonwealth. It serves as a training ground to provide, to some extent, the future officers and non-commissioned officers of the Australian Military Forces, and, as such, occupies a foremost position in the scheme of national defence. The minimum age for enrolment in school units is the year in which the applicant reaches the age of 14 years, and cadets, who in the large majority of schools receive a free issue of A.M.F. pattern uniform, may remain in the Cadet Corps until they cease to be pupils of the educational establishments concerned. A few units retain their own pattern school uniform and are not issued with A.M.F. pattern uniforms. Provision is made for the appointment of officers, warrant and non-commissioned officers on an authorized establishment scale from within school units. School cadets' units are not affiliated with Citizen Military Force units. The establishment for the whole Corps is 35,000 all ranks, and by December, 1948 the number of cadet units raised was 224 with a total strength of 20,535.

Approval has recently been given for the raising of Regimental Cadet units in close collaboration with Citizen Military Force units. These units are manned by the enrolment of boys who have either left school or are students at schools where no unit of the Cadet Corps is raised. Regimental Cadets wear the same uniform as their parent Citizen Military Force unit with the addition of the word "Cadets" directly under the unit title.

(v) *The Australian Staff College.* Until 1938 the training of staff officers was carried out in the various Military Districts throughout Australia, except in cases where officers were selected from time to time to attend courses abroad. In 1938 an Australian Command and Staff School, located in the original Officers' Mess at Victoria Barracks, Sydney, was established.

Between 1939 and 1945 the training of staff officers was carried out under varying conditions by different schools in accordance with the changing needs of the war.

Early in 1946 the Staff School (Australia) was established at Seymour in Victoria and re-designated the Australian Staff College in conformity with other Empire training establishments for training officers for command and staff appointments. The College was later moved to Queenscliff in Victoria, where it is at present situated.

The courses are of one year's duration and are held from February to December each year. The normal intake is 30 students and, on successfully completing the course, an officer is awarded the symbol "psc". The course is designed to train Grade II. Staff Officers, and students may be nominated by the Royal Australian Navy, the Royal Australian Air Force and the Commonwealth Public Service. Each course includes among the students Army representatives of the other Dominions.

In order to ensure common standards in tactical doctrine and staff and command training throughout the Empire, liaison is maintained with other Staff Colleges; and to this end there is also a reciprocal exchange of instructors. To this extent it may be said that the Australian Staff College is imperial in character.

(vi) *Royal Military College.* The Royal Military College was established in 1911 at Duntroon in the Australian Capital Territory for the purpose of providing trained officers for the Army. The conditions of entry are laid down in the Royal Military College Regulations and provide for admission by "normal", "service" and "special" entries. The length of the normal course is four years; "service" entry cadets attend for three years.

While at the College, cadets receive pay and allowances of 7s. per day in their first year, rising to 11s. per day in their fourth. Uniform maintenance allowance of 1s. per day is additional. The course of instruction is organized into military and civil departments and the instructional staff comprises officers of the army and civilian professors and lecturers. On graduation, cadets are appointed lieutenants in the Australian Regular Army. The College also trains New Zealand cadets for commissions in the New Zealand Permanent Forces under an agreement made with the Government of that Dominion.

(vii) *Rifle Clubs.* The Australian Rifle Club movement, which had its origin in 1888, is provided for in the Defence Act and comprises an Australian Council of State Rifle Associations (which functions in an advisory capacity to the Minister and in the promotion of inter-empire and interstate rifle competitions), State Rifle Associations, District Rifle Club Unions and Rifle Clubs. Prior to 1931 the administration of the organization was the responsibility of the Secretary for Defence. From that year its control passed to the Military Board. This organization continued until the outbreak of the recent war. In 1941 rifle clubs were placed in recess and, with the exception of annual miniature rifle competitions, remained inactive until August, 1946, when approval was given for the re-establishment of the movement on a civilian basis under the control of the Secretary, Department of the Army. When placed in recess, the efficient strength of the rifle club movement was 1,018 clubs and 36,478 members. Approximately 20 per cent. of this number served overseas and a further 60 per cent. performed home service duties during the recent war. Rifle shooting activities were resumed in 1946 and the strength position of the movement as at 30th June, 1949 was 1,037 clubs and 48,155 members.

(viii) *The Australian Battles Nomenclature Committee.* The Minister for the Army gave approval on the 25th July, 1947 for the formation of the Australian Battles Nomenclature Committee and for its terms of reference to be as follows :—

- (a) to tabulate those operations fought in the Pacific Zones in the 1939–45 War which involved the Australian Military Forces ;
- (b) to classify these operations in accordance with a definite system of nomenclature which will denote their relative importance ;
- (c) to define the geographical and chronological limits of each operation ;
- (d) to advise the United Kingdom Battles Nomenclature Committee regarding operations in zones other than the Pacific Zone in which the Australian Military Forces participated.

The inaugural meeting of this Committee was held at Victoria Barracks, Melbourne on 16th December, 1947, under the chairmanship of General Sir Thomas Blamey. At this meeting sub-committees were appointed to study the various campaigns in order to classify the operations into battles, actions and engagements.

3. *1939–45 War.*—(i) *General.* For a detailed account of the part played by the Australian Military Forces in the 1939–45 War, together with a chronological list of important events, see Official Year Book No. 36, pages 1016 to 1022.

(ii) *Gross Enlistments.* For particulars of the gross enlistments in the Australian Military Forces during the 1939–45 War, see Official Year Book No. 37, page 1150.

(iii) *Disbandments.* The Australian Imperial Force was disbanded on the 30th June, 1947, and replaced by the Interim Army. The Australian Women's Army Service, which had been formed on the 29th September, 1941 with the object of enlisting women for the replacement of men in rear areas, was also disbanded on the same date.

(iv) *Casualties.* Particulars of casualties will be found in § 6. following.

(v) *Decorations and Awards.* A list of the numbers of the various decorations and awards conferred appears in § 7. following.

§ 3. Naval Defence.

1. *State Systems.*—Information regarding naval defence systems prior to 1901 will be found in Official Year Book No. 2, p. 1084.

2. *The Present System.*—(i) *General.* (a) *Royal Australian Navy up to end of 1939–45 War.* An outline of the development of Australian Naval policy was given in Official Year Book No. 3, p. 1060 and No. 12, p. 1012. Some account of the building of the Australian Navy, the proposed and modified cost thereof, the compact with the Imperial Government, etc., appears in Official Year Book No. 15, pp. 921 *et seq.* An account of the growth and activities of the Royal Australian Navy during the 1939–45 War is given in Official Year Book No. 36, pp. 1023 *et seq.*

(b) *Post-war Programme.* In June, 1947 the post-war defence policy of the Commonwealth Government was announced by the Minister for Defence. A sum of £250,000,000 was to be expended over a period of five years in the carrying out of an approved programme (see § 1. 3 (ii) above). Of this amount, the Navy was to receive £75,000,000 allotted at the rate of £15,000,000 annually. In June, 1949 the Government allotted a further £45,000,000 to the defence programme. The Navy will receive portion of this sum, part of which will be utilized to finance a resumption of reserve training in 1950.

The following is a summary of the naval programme :—

(1) Ships in Commission—

Fleet: It is proposed that by the end of the programme, the Fleet should consist of :—2 Light Fleet Carriers, 2 Cruisers, 6 Destroyers.

Escort Forces : 3 Frigates.

Surveying Duties : 3 Survey ships and their tenders.

Training Ships : 1 Frigate, 2 Australian Minesweeping Vessels, 3 Air/Sea Rescue Vessels.

Auxiliary Vessels : 1 Ocean-going Tug, 1 Ammunition Carrier, 2 Boom Defence Vessels.

(2) Ships to be retained in Reserve and maintained in good condition against any future emergency—

One Cruiser, 2 Destroyers, 6 Frigates, 1 Sloop, 30 Australian Minesweepers, 39 Miscellaneous Vessels.

(3) Change in Status—On 1st January, 1949 the Royal Australian Navy ceased to be a squadron and assumed the status of a fleet, a fleet being an organization consisting of various types of ships and naval aircraft, capable of undertaking major operations.

(4) Personnel—Recruiting is in progress to raise the strength of the Royal Australian Navy to a total of 14,753, inclusive of air personnel, by 1951–52. This number will comprise 6,756 sea-going forces and 7,997 for shore establishments and pools.

(5) Reserve Training—Training will be resumed as from 1st January, 1950 and will be carried out in each of the capital cities. Training will be voluntary, and members will be asked to undergo 15 days' night and/or Saturday training in their home establishments plus 13 days' continuous training each year in H.M.A. ships or training establishments, including specialist Schools. In addition, payment will be made for further voluntary home training up to a maximum of 12 days. Selected members may undergo special courses up to a limit of six months during the whole of their service in the Reserve, whilst up to 12 months' training or service may be performed in an H.M.A. ship or establishment with similar qualifications. Engagements are for three years. Rates of pay have not been finalized. Provision has been made for the training of 450 officers and 3,550 ratings in the first year.

(6) Naval Aviation—The first stage of the Royal Australian Navy's naval aviation plans has been reached with the commissioning and arrival in Australian waters in May, 1949 of H.M.A.S. *Sydney*, the first of two projected light fleet carriers. An Air Station (H.M.A.S. *Albatross*), where training is proceeding, was opened in August, 1948. Finance provided in the current five-year programme totals £11,976,000 for capital expenditure and £11,432,000 for maintenance.

(7) Ship Construction and Repair—Provision is made for the maintenance in Australia of a nucleus ship construction and repair industry capable of rapid expansion in war. An average sum of £2,500,000 is proposed to be expended annually on the completion of the present destroyer programme for four ships under construction and two to be laid down.

(8) Shore Establishments—There will be shore establishments essential for basing commissioned ships and to provide administrative storing, repair and training facilities. A new base now being established at Manus Island (Admiralties) will replace the present New Guinea Base at Dreger Harbour, New Guinea.

(c) *The Relation of New Weapons.* Careful consideration has been given to the implications of new weapons, and the decisions in regard to the Navy are based on the broad conclusions of great naval powers that these weapons should be introduced by the normal process of evolution, first into existing ships, and later perhaps into an entirely new form of fighting ship. The same authoritative opinion is of the view that there will be no rapid development which will render vessels such as carriers, cruisers and destroyers obsolete within the near future.

(ii) *Naval Board.* The Australian Navy is administered by a Board consisting of the Minister for the Navy with four Naval Members, including a member for Naval Aviation, one Finance Member and the Secretary, Department of the Navy (ex-officio); the seat of administration is at Melbourne.

(iii) *Naval College.* Twenty-eight Cadet Midshipmen entered the Naval College for training in the year commenced January, 1949. In addition, there were seven seventeen-year-old youths enrolled, five for the Supply and Secretariat Branch and two for executive training.

(iv) *Training Establishments.* Flinders Naval Depot, Victoria remains the principal training establishment for ratings in the permanent forces, while several advanced training schools are established in Port Jackson, New South Wales. Air training has begun at Nowra, New South Wales.

(v) *System of Payment.* Since the close of hostilities in August, 1945, the entire pay code of the R.A.N. has been revised and a new code is now operative. A voluntary superannuation scheme became operative during 1948-49, an alternative to the still existent system of accumulating deferred pay.

(vi) *The Australia Naval Station.* Defined limits of the Australia Station will be found in Official Year Book No. 37, page 1152.

(vii) *BCOF.* On 1st October, 1948 the R.A.N. assumed responsibility for British Commonwealth Naval representation in Japan. H.M.A.S. *Commonwealth* is the base establishment at Kure and the R.A.N. maintains one destroyer or one frigate on the Station.

3. *Ships of the Royal Australian Navy.*—The following ships were in commission or in reserve in October, 1949 :—

SHIPS OF THE ROYAL AUSTRALIAN NAVY, OCTOBER, 1949.

Vessel.	Description.	Displacement.
In Commission—		Tons.
<i>Sydney</i>	Aircraft Carrier	14,000
<i>Australia</i>	Cruiser	9,870
<i>Bataan</i>	Destroyer	1,870
<i>Arunta</i>	"	1,870
<i>Warramunga</i>	"	1,870
<i>Quiberon</i>	"	1,760
<i>Quickmatch</i>	"	1,760
<i>Shoalhaven</i>	Frigate	1,544
<i>Barcoo</i> (Surveying Ship)	"	1,544
<i>Condamine</i>	"	1,420
<i>Culgoa</i>	"	1,420
<i>Murchison</i>	"	1,544
<i>Warrego</i> (Surveying Ship)	Sloop	1,060
<i>Latrobe</i>	Australian Mine Sweeper	650
<i>Gladstone</i>	" " "	650
<i>Tarakan</i>	Landing Ship (Tank)	1,625
<i>Labuan</i>	" " "	1,625
Miscellaneous—Sixteen	" " "	"
<i>Lachlan</i> (Surveying Ship), frigate, 1,420 tons, on loan to the New Zealand Navy	" " "	"

SHIPS OF THE ROYAL AUSTRALIAN NAVY, OCTOBER, 1949—continued.

Vessel.	Description.	Displacement.
In Reserve—		Tons.
<i>Shropshire</i>	Cruiser	9,870
<i>Hobart</i>	"	7,100
<i>Quadrant</i>	Destroyer	1,760
<i>Quality</i>	"	1,760
<i>Queenborough</i>	"	1,760
<i>Barvon</i>	Frigate	1,420
<i>Burdekin</i>	"	1,420
<i>Diamantina</i>	"	1,420
<i>Gascoyne</i>	"	1,420
<i>Hawkesbury</i>	"	1,420
<i>Macquarie</i>	"	1,420
<i>Swan</i>	Sloop	1,060
<i>Ararat</i>	Australian Mine Sweeper	650
<i>Bunbury</i>	" " "	650
<i>Bowen</i>	" " "	650
<i>Bundaberg</i>	" " "	650
<i>Benalla</i>	" " "	650
<i>Cootamundra</i>	" " "	650
<i>Cowra</i>	" " "	650
<i>Colac</i>	" " "	650
<i>Castlemaine</i>	" " "	650
<i>Deloraine</i>	" " "	650
<i>Dubbo</i>	" " "	650
<i>Echuca</i>	" " "	650
<i>Fremantle</i>	" " "	650
<i>Glennelg</i>	" " "	650
<i>Gympie</i>	" " "	650
<i>Horsham</i>	" " "	650
<i>Inverell</i>	" " "	650
<i>Juinee</i>	" " "	650
<i>Kiama</i>	" " "	650
<i>Katoomba</i>	" " "	650
<i>Kapunda</i>	" " "	650
<i>Lithgow</i>	" " "	650
<i>Mildura</i>	" " "	650
<i>Parkes</i>	" " "	650
<i>Rockhampton</i>	" " "	650
<i>Strahan</i>	" " "	650
<i>Shepparton</i>	" " "	650
<i>Stawell</i>	" " "	650
<i>Townsville</i>	" " "	650
<i>Wagga</i>	" " "	650
<i>Lae</i>	Landing Ship (Tank)	1,625
LST 3014	" " "	1,625
<i>Platypus</i>	Depot Ship	3,455
Miscellaneous—Twenty-eight	.. .. .	..

4. **Strength of Royal Australian Navy.**—The serving strength of the Royal Australian Naval forces, both permanent and reserves, at 30th June, 1949 is shown below :—

STRENGTH OF ROYAL AUSTRALIAN NAVAL FORCES (PERMANENT AND RESERVES), 30th JUNE, 1949.

Particulars.	Numbers Borne.		
	In Training.	Officers.	Men.
Royal Australian Navy—Sea-going	667	9,247
Emergency List	34	..
Retired	13	..
Royal Australian Naval Auxiliary Services	9	32
Cadet Midshipmen undergoing training at R.A.N. College	88	..	..
Royal Australian Naval Reserve (Sea-going)	25	..
Royal Australian Fleet Reserve	7
Royal Australian Naval Reserve	13	8
Royal Australian Naval Volunteer Reserve	41	4
Total	88	802	9,298

5. **Casualties, 1939–45 War.**—Particulars of casualties will be found in § 6. following.

6. **Decorations and Awards, 1939–45 War.**—Particulars of decorations and awards appear in § 7. following.

§ 4. Air Defence.

1. **General.**—A statement respecting the preliminary steps taken in connexion with the development of air defence will be found in Official Year Book No. 18, p. 610, and one on the expansion and development, and zones and operations of the Royal Australian Air Force during the 1939–45 War appears in Official Year Book No. 36, p. 1027.

2. **Administration and Organization.**—The Department of Air is responsible for policy for organization and control of the Royal Australian Air Force. The Air Board is responsible, subject to approved policy, for the control and administration of the Royal Australian Air Force, and is constituted as follows :—Chief of the Air Staff, Air Member for Personnel, Air Member for Engineering and Maintenance, Air Member for Supply and Equipment, and Finance Member. The Secretary, Department of Air, is ex-officio a member of the Air Board.

Head-quarters of the Royal Australian Air Force is located at Melbourne. An Overseas Head-quarters is located at London and an Air Attaché at Washington, U.S.A.

With the exception of certain technical units which are allotted to the direct command of a Maintenance Group, the units of the Royal Australian Air Force are organized in five geographical areas throughout Australia.

The geographical areas of command are—

Southern Area—Head-quarters Southern Area controls Air Force units in Victoria, Tasmania and South Australia.

Eastern Area—Head-quarters Eastern Area controls Air Force units in New South Wales and Southern Queensland.

North-Eastern Area—Head-quarters North-Eastern Area controls Air Force units in northern Queensland, New Guinea and adjacent islands.

North-Western Area—Head-quarters North-Western Area controls Air Force units in Northern Territory.

Western Area—Head-quarters Western Area controls Air Force units in Western Australia.

The organization of the Royal Australian Air Force includes the following types of units :—

- (a) R.A.A.F. Stations ;
- (b) Bomber, Fighter, Transport, Tactical Reconnaissance, Survey, Target Towing, Communication and Search and Rescue Squadrons ;
- (c) Aircraft Depots ;
- (d) Stores Depots ;
- (e) Flying Training, Ground Training, Navigation, Radio and Air Armament Schools ;
- (f) Royal Australian Air Force College ;
- (g) Telecommunication Units ;
- (h) Royal Australian Air Force Staff College.

3. **Aircraft.**—Some of the aircraft which are at present being used in the Royal Australian Air Force are : Bomber Squadrons—Lincolns ; Fighter Squadrons—Mustangs and Vampires ; Transport Squadrons—Dakotas ; General Reconnaissance Squadrons—Catalinas and Lincolns ; Army Co-operation—Mustangs and Lincolns ; Training—Tiger Moths, Wirraways, Oxfords, Dakotas, Lincolns, Ansons and Beaufighters.

4. **Establishment.**—The Royal Australian Air Force establishment, as proposed, will comprise—(a) a Home Defence Organization, (b) Task Force elements and (c) a Training Organization consisting in all of approximately 12,000 personnel.

5. **Casualties, 1939-45 War.**—For particulars of casualties incurred by R.A.A.F. personnel during the 1939-45 War see § 6. following.

6. **Decorations and Awards, 1939-45 War.**—The numbers of decorations and awards won by members of the R.A.A.F. during the 1939-45 War are shown in § 7. following.

§ 5. Enlistments in the Australian Services, 1939-45 War.

For particulars of enlistments in the Australian Services during the 1939-45 War, see Official Year Book No. 37, pp. 1155-6.

§ 6. Casualties : Australian Services, 1939-45 War.

Official Year Book No. 37, pp. 1156-1160, contains information in considerable detail on casualties to members of each of the Australian Fighting Services during the 1939-45 War.

This information is dissected into nature of casualty, theatre of war and zone of operations, but is not repeated in this issue because of the limitations of space.

The following table, which is a brief summary of all casualties to members of the Fighting Services during the 1939-45 War, contains revisions in respect of the Navy which have been received since the previous issue. The figures for the other services are unaltered.

ALL CASUALTIES : AUSTRALIAN SERVICES, 1939-45 WAR.(a)

Particulars.	Royal Australian Navy.	Australian Military Forces.	Royal Australian Air Force.	All Services.
Killed, died of wounds, injuries, etc. . .	2,031	21,558	10,264	33,853
Prisoners-of-war escaped, recovered or repatriated	263	20,920	1,876	23,059
Wounded, injured, etc. (cases)	579	177,049	3,236	180,864
Total	2,873	219,527	15,376	237,776

(a) Excludes deaths and illnesses from natural causes.

The revisions to the Navy figures, which relate to persons killed, died of wounds, injuries, etc., only, comprise the following changes :—Battle Casualties—War against Germany, from 876 to 903 ; War against Japan, from 953 to 951 ; all theatres, from 1,829 to 1,854. Non-battle Casualties—War against Germany, from 40 to 42 ; War against Japan, from 45 to 57 ; all theatres, from 85 to 99. Non-operational Casualties—Australia, from 64 to 58 ; Overseas, from 26 to 20 ; Total, from 90 to 78. Grand total, from 2,004 to 2,031.

§ 7. Decorations and Awards : Australian Services, 1939-45 War.

The numbers of the various decorations and awards conferred on members of each of the fighting forces for gallantry or other meritorious service during the 1939-45 War were shown in detail on page 1161 of Official Year Book No. 37. The totals, which include some minor revisions since last issue, are as follows :—

DECORATIONS AND AWARDS : AUSTRALIAN SERVICES, 1939-45 WAR.

Decoration or Award.	Royal Aus- tralian Navy.	Aus- tralian Military Forces.	Royal Aus- tralian Air Force.	All Services.
British	1,094	10,343	5,222	16,659
Foreign	65	145	174	384
Total	(a) 1,159	(b) 10,488	(c) 5,396	17,043

(a) In addition, 45 decorations or awards were made to British personnel in Australian Services, and one to a civilian with the Australian Services. (b) In addition, 18 decorations or awards were made to British or Allied personnel on loan to A.M.F., 41 to civilians with A.M.F., and 363 to natives with A.M.F.

(c) Excludes decorations and awards to R.A.F. personnel on loan to R.A.A.F. and to members of R.A.F. who were Australian by birth—particulars are not available.

Foreign awards include those of the United States of America, Russia, Greece, Poland, France, Holland, Belgium and Lebanon.

§ 8. Australian Troops, 1914-18 War.

Particulars of the enlistments, casualties, honours and decorations won, and engagements of the Australian Imperial Force during the 1914-18 War are given in Official Year Book No. 16, pp. 628 *et seq.*

§ 9. Expenditure on Defence.

Details of expenditure on Defence, War (1939-45) Services and Post-war Charges will be found in Chapter XVII.—“Public Finance,” A.—Commonwealth Finance, § 7, pp. 794-6.

§ 10. War Gratuities.

1. 1914-18 War.—Reference is made in earlier issues of the Official Year Book (*see* No. 15, p. 930) to the bonus payable in accordance with the War Gratuity Acts of 1920 as a war service gratuity to soldiers and sailors who served in the 1914-18 War. Owing to limitations of space this information cannot be repeated, but it may be noted that the gratuity was paid in Treasury Bonds, maturing not later than 31st May, 1924, and bearing interest at 5½ per cent. In necessitous cases payment was made in cash when desired by the person entitled. The first gratuities were made available about the beginning of June, 1920. The total amount paid to 30th June, 1949 was £27,515,036 and bonds amounting to £11,780 had not been redeemed at that date.

2. 1939-45 War.—Briefly, the War Gratuity Act 1945-1947 provides for payment to members of the Forces of war gratuity (a) at the rate of £3 15s. per month of overseas service, subject to a qualifying period of 90 days continuous or 180 days in the aggregate in twelve months, and of certain subsequent periods in Australia, and (b) at the rate of 15s. per month of Australian service after 6th December, 1941, subject to a qualifying period of six months' service, other than that for which payment at the overseas rate is made. All members who perform overseas qualifying service will be paid a minimum of twelve months' gratuity at the overseas rate, irrespective of whether the full twelve months period had been completed or not.

In cases of death due to war service either overseas or in Australia, where members of the family were totally dependent on the deceased member, a minimum payment equivalent to three years' gratuity calculated at the overseas gratuity rate may be made. In respect of all other cases of death, overseas and in Australia, due to war service, gratuity at the rate accruing to the member at the date of notification of his death will be continued for a further seven months.

The period of entitlement to gratuity terminated at the date of discharge or on 30th June, 1947, whichever was the earlier. Payment will be made on 3rd March, 1951, or at earlier dates in certain circumstances, and will include compound interest at the rate of 3.25 per cent. per annum on the yearly credit balances. For greater detail on the provisions of the Act *see* Official Year Book No. 36, pp. 1073-4.

A Registrar of War Gratuities controls the register in which are kept the accounts of all persons entitled to war gratuity. The total liability on account of war gratuity is estimated to be about £80,000,000. Provision is made for financing the Act by appropriation from Consolidated Revenue Fund and by borrowing. The War Gratuity Appropriation Act 1948 created a trust account for the payment of gratuities and, from credits of the Import Procurement Suspense, Marine War Risks Insurance, Overseas Shipping and War Damage Fund Trust Accounts, amounts totalling £17,000,000 were made available for that purpose during 1948-49. Total receipts of the War Gratuity Trust Fund during 1948-49 amounted to £33,249,036. Expenditure amounted to £3,197,633 and the balance carried forward amounted to £30,051,403.

§ 11. The Department of Supply and Development.

1. **General.**—On 6th April, 1948 the Department of Munitions (with which the Department of Aircraft Production was amalgamated on the 1st November, 1946) and Department of Supply and Shipping were amalgamated under the name Department of Supply and Development, although certain functions of the Department of Supply and Shipping were taken over by the newly constituted Department of Shipping and Fuel. Records covering munitions production prior to the 1939-45 War appear in earlier issues of this publication (see No. 18, pp. 612-616, and No. 32, p. 241). A statement of the main development in the organization and output of the Department of Munitions during the 1939-45 War, and including the period up to 30th June, 1947, will be found in Official Year Book No. 36 (pp. 1037-1068) and No. 37 (pp. 79, 654-5, 1162-1171). Accounts of aircraft production activities during the 1939-45 War and up to 30th June, 1947 appeared in Official Year Book No. 36 (pp. 1068-1073) and No. 37 (pp. 1167-1170).

2. **Functions of the Department and Acts Administered.**—The functions of the Department of Supply and Development include (a) research, design and development in relation to war *matériel*; (b) the provision or supply of war *matériel*; (c) the manufacture or assembly of aircraft or parts thereof; (d) arrangements for the establishment or extension of industries for purposes of defence; (e) the acquisition, maintenance and disposal of stocks of goods in connexion with defence; and (f) the arrangement or co-ordination of—(i) surveys of Australian industrial capacity and the preparation of plans to ensure the effective operation of industry in time of war, including plans for the decentralization of secondary industries and particularly those relating to defence; and (ii) the investigation and development of Australian sources of supply of goods necessary for the economic security of the Commonwealth in time of war, and, in particular, the investigation and development of additional oil and strategic mineral resources, the production of power alcohol from sugar or other vegetable crops, and the production of oil from coal or shale.

The Acts administered by the Department are as follows:—Aluminium Industry Act 1944; Atomic Energy (Control of Materials) Act 1946; Defence (Transitional Provisions) Act 1946-1948 insofar as it relates to the following National Security Regulations and Orders:—Regulations—Disposal of Commonwealth Property (repealed 5th August, 1949), Minerals (repealed 15th September, 1949), Munitions (repealed 15th September, 1949), Shipbuilding (repealed 15th September, 1949), Supplementary Regulations No. 142, Tinplate Control (repealed 31st December, 1949); Orders—Control of Tinplate Order (repealed 27th October, 1949), Cordage and Fibre Order; Development and Migration Act 1926-1930; Geophysical Survey Act 1928; Northern Australia Survey Act 1934; Petroleum Oil Search Act 1936; Petroleum Oil Search Act 1936 (No. 2); Petroleum Oil Search Act 1940; Petroleum Oil Search Act 1941; Petroleum Prospecting Act 1926-1927; Petroleum Prospecting Act 1928; Supply and Development Act 1939-1948.

3. **Capital Valuations of Government Factories, Laboratories and Establishments.**—The capital valuations of Government factories, laboratories and establishments are shown in the following table.

**GOVERNMENT FACTORIES AND ESTABLISHMENTS: CAPITAL VALUATIONS,
30th JUNE, 1949.**

(£.)

Establishment.	Land.	Buildings and Works.	Plant and Equipment.	Total.
<i>Ammunition Factories—</i>				
Footscray, Victoria	16,986	835,267	2,370,832	3,223,085
Finsbury, South Australia ..	22,654	243,886	270,280	536,820
<i>Ordnance Factories—</i>				
Maribyrnong, Victoria	5,456	1,209,477	3,767,435	4,982,368
Echuca, Victoria	2,001	143,412	349,495	494,908
Bendigo, Victoria	19,187	663,921	1,844,386	2,527,494
<i>Drawing Office—</i>				
Maribyrnong, Victoria	930	52,640	23,170	76,740
<i>Explosives Factories—</i>				
Maribyrnong, Victoria	69,172	2,221,016	1,901,231	4,191,419
Mulwala, New South Wales ..	2,238	1,744,637	1,587,706	3,334,581
<i>Small Arms Factory—</i>				
Lithgow, New South Wales ..	6,874	853,523	3,330,211	4,190,608
<i>Marine Engine Works—</i>				
Port Melbourne, Victoria ..	31,983	108,626	128,212	268,821
Rocklea, Queensland	16,683	61,186	121,378	199,247
<i>Clothing Factory—</i>				
South Melbourne, Victoria ..	1,981	17,061	41,962	61,004
<i>Aircraft Factories—</i>				
Fishermen's Bend, Victoria ..	161,571	876,316	1,488,447	2,526,334
Parafield/Northfield, South Australia	374	106,178	90,707	197,259
Total	358,090	9,137,146	17,315,452	26,810,688
<i>Stores and Transport Depots—</i>				
Maribyrnong, Victoria	39,372	1,019,844	489,259	1,548,475
Sydney, New South Wales ..	13,226	541,207	297,605	852,038
Brisbane, Queensland .. ..	..	52,877	66,718	119,595
Finsbury North, South Australia	33,631	631,264	163,112	828,007
Perth, Western Australia ..	4,238	30,342	53,783	88,363
Hobart, Tasmania .. ..	..	..	14,654	14,654
Oaklands, New South Wales ..	2,704	427,597	83,644	513,945
Total	93,171	2,703,131	1,168,775	3,965,077
Grand Total.. ..	451,261	11,840,277	18,484,227	30,775,765

NOTE.—These figures do not take into account the capital valuations of Research and Development Branch Establishments, including the Long Range Weapons Base Establishment, Salisbury, the Long Range Weapons Establishment Air Component, Mallala, the Long Range Weapons Establishment Range, Woomera, Defence Research Laboratories, Maribyrnong, and the Aeronautical Research Laboratory, Fishermen's Bend.

4. *Value of Output of Departmental Factories.*—The following table showing the value of output for the years 1946–47 to 1948–49 provides a picture of the peace-time production of the Departmental factories. Figures for previous years are given in Year Book No. 37, pp. 1163–64.

DEPARTMENTAL FACTORIES : VALUE OF OUTPUT.
(£.)

Year.	Aircraft Production.	Ammunition.	Clothing.	Explosives.	Ordnance.	Small Arms.	Total.
1946–47 ..	3,601,745	847,181	337,592	499,272	1,213,998	739,179	7,238,967
1947–48 ..	4,118,319	924,036	347,979	486,646	1,283,689	755,651	7,916,320
1948–49 ..	4,026,354	961,034	451,679	601,749	1,636,053	750,523	8,427,392

5. *Aircraft Production.*—(i) *General.* All Commonwealth Government functions in regard to the manufacture of fighter, bomber and trainer aircraft and of aero engines and of other aircraft components required for Royal Australian Air Force purposes are administered by the Division of Aircraft Production of the Department of Supply and Development. Aircraft repair and overhaul activities carried out for the R.A.A.F. in civilian establishments, as distinct from the Service workshops conducted by the R.A.A.F., are also a function of the Division of Aircraft Production, together with the responsibility of supplying aircraft and engine spare parts.

(ii) *Aircraft, Engine and Other Production.* At 1st July, 1947 the major aircraft manufacturing organizations in Australia were engaged in the production of aircraft and aero engines for military purposes in accordance with a programme which continued unchanged throughout the period 1st July, 1947 to 30th June, 1949, inclusive. Lincoln heavy bombers and Tudor military transport were on order at Government Aircraft Factories, Mosquito fighter-bombers and Vampire jet-fighters at De Havilland Aircraft Pty. Ltd., and Mustang fighters, Rolls Royce Merlin engines and Rolls Royce Nene turbo-jet engines at Commonwealth Aircraft Corporation.

Production of Lincoln and Mustang aircraft continued during 1947–48 and 1948–49 at a nominal rate. The last of the Australian Mosquito aircraft was delivered to the R.A.A.F. by De Havilland Aircraft Pty. Ltd. during July, 1948.

Difficulties experienced with the development of Tudors in the United Kingdom made it undesirable to proceed with the manufacture of this type in Australia, and the Tudor project was abandoned in 1948 before the assembly of the first prototype of the aircraft had been undertaken. Deliveries of Rolls Royce Merlin engines to be used for installation in Lincoln heavy bomber aircraft continued from the Engine Factory during the period. The first of the Rolls Royce Nene turbo-jet engines manufactured in Australia were delivered by the Commonwealth Aircraft Corporation during December, 1948 to De Havilland Aircraft Pty. Ltd. for installation in Vampire airframes. The first Australian Vampire—the first Australian jet-propelled aircraft of any type—was flown successfully during June, 1949, but had not been handed over to the R.A.A.F. at 30th June, 1949.

Aircraft annexes established during the war for the manufacture of propellers, retractable undercarriages and heavy forgings in light alloy metals continued to function during the two-year period. The Propeller Annexe made propellers for Lincoln and Mustang aircraft, as well as manufacturing spare parts for propellers in service and carrying out an extensive repair and overhaul programme for both service type and commercial aircraft propellers. Undercarriages for Lincoln and Vampire aircraft were in production at the Undercarriage Annexe.

(iii) *New Aircraft Projects.* During 1948 consideration was given by the R.A.A.F. to the selection of new types of bomber and fighter aircraft to follow the Lincoln and the Mustang projects respectively in the aircraft factories. From the point of view of operational performances, all types of jet-propelled aircraft currently in production for

the R.A.F. and Royal Navy were examined by R.A.A.F. officers and aircraft engineers, the object being to ensure that any selections made could be manufactured successfully in Australia. Recommendations of the Joint Mission were still being made as at 30th June, 1949. Another venture well in hand at the same date was the production of an elementary trainer aircraft as an original design project. This work was allotted to the Commonwealth Aircraft Corporation in April, 1949, a specification covering R.A.A.F. requirements having been prepared.

(iv) *Repair and Overhaul.* The R.A.A.F. has as far as practicable returned aircraft and aero engines requiring major overhaul and the incorporation of modifications to the aircraft and engine manufacturers establishments in which they were produced. This work, together with the production of maintenance spare parts, assists the factory managements to retain a reasonably balanced nucleus of experienced aircraft tradesmen by supplementing the restricted programmes of new aircraft and engine manufacture. In the same way, repair and overhaul of twin-row Wasp engines for the R.A.A.F. continued to be handled concurrently by the Commonwealth Aircraft Corporation. At the Aero Engine Factory, in addition to the production of Rolls Royce Merlin engines for Lincoln aircraft, the Company undertook the repair and overhaul of Merlin engines for the R.A.A.F. and the conversion of surplus Merlin engines from Spitfire aircraft to enable them to be used for installation in Mustang aircraft in preference to procuring new engines for the purpose.

(v) *Naval Aviation.* In anticipation of the arrival in Australia of the aircraft carrier *Sydney* in May, 1949, as an addition to the Royal Australian Naval Establishment, arrangements were made by the Division of Aircraft Production to provide the facilities necessary for the repair and overhaul by civilian contractors of the carrier-based aircraft, engines, propellers and accessories. To this end, it was arranged that the repair and overhaul of airframes of the Fairey "Firefly" and Hawker "Sea Fury" aircraft with which the aircraft carrier is equipped would be undertaken by the Fairey Clyde Aviation Co. Ltd., a combination of the interests of the Fairey Aviation Company of England and the Clyde Engineering Company of Sydney. Engines from the two types of aircraft—Rolls Royce "Griffon" and Bristol "Centaurus"—will be allotted to the Engine Factory for attention, and propellers, which are of the Rotol type for both types of aircraft, will be handled by De Havilland Aircraft Pty. Ltd.

6. *Research and Development.*—(i) *General.* The Research and Development Branch under the Chief Scientist is responsible for defence research and development projects in Australia, and will be divided into two sections as follows, each under a controller:—(a) the Long Range Weapons Project, and (b) Defence Research and Development.

Projects undertaken require approval of the Defence Department from the policy aspect, but executive work follows in the appropriate establishment which operates in close consultation with the armed forces.

The projects and establishments which come under the control of the Branch are dealt with hereunder.

(ii) *Joint United Kingdom-Australian Long Range Weapons Project.* (a) *General.* The Joint United Kingdom-Australian Long Range Weapons Project represents an undertaking shared between the United Kingdom Government and the Commonwealth of Australia, in connexion with the provision of facilities necessary to develop and test long range weapons.

The plan is based on the provision of ranges with the necessary instrumentation, and provides not only for such research and development in the long range weapons field as may be requisite (e.g. instrumentation), but it is also a potential for experiments in other defence research weapons.

The Long Range Weapons Organization under the direction of the Chief Scientist, Department of Supply and Development, consists of three units, all situated in South Australia, and working as a single entity under the Chief Superintendent. Reference to each of these establishments follows.

(b) *The Long Range Weapons Establishment, Salisbury.* The primary purpose of this establishment is to undertake research and development work connected with trials, assessment of results, and with the provision and improvement of equipment used on the range. As facilities at Salisbury grow it is possible that additional lines of research and development will be undertaken.

(c) *Long Range Weapons Establishment Air Component, Mallala.* The Long Range Weapons Establishment Air Component is charged with the two functions of transport (No. 34 Communications Squadron R.A.A.F.) and experimental flight operations (Detachment from Aero Research and Development Unit R.A.A.F.). The transport work so far has entailed over 1,600 hours flying. Several hundred hours had been flown on experimental work.

(d) *Long Range Weapons Establishment Range, Woomera.* The Long Range Weapons Establishment Range has been planned to provide all services and facilities necessary to carry out large scale experiments as required. Facilities being provided at Woomera may be divided into two divisions:—(i) *Administrative Facilities*, and (ii) *Technical Facilities*. *Administrative Facilities*—These include a village to house 2,000 persons with amenities such as a school, hotel, tennis courts, a swimming pool, games oval, golf course, shops, sewerage, etc. Buildings will be mainly in permanent brick construction, but in order to provide immediate living quarters much of the work done so far has been in temporary (i.e. timber) construction. *Water Supply*—July, 1949, saw the completion of the 107 mile pipe-line from Port Augusta, so that water from the Murray River is now available at Woomera. Total distance from the Murray is 283 miles. *Technical Facilities*—The Technical Area of the Range is in permanent construction and most of the buildings will be air-conditioned. The Administration building is almost ready for occupation, and others are approaching completion. The range operating personnel will shortly be accommodated in more adequate workshops and offices. *Air Field*—Good progress is being made in airfield constructions with runways, hangar accommodation and all facilities for both experimental work and aircraft servicing. *Main Missile Range*—The Main Missile Range is located at a distance from the technical establishment and Woomera village. It is here that the various missiles and test vehicles are fired, flown or dropped, the term used depending on whether the missile or test vehicle partakes of the nature of a rocket projectile or of other types of missiles. The Long Range Weapons Establishment Range is in reality a group of ranges each designed to satisfy not only the requirements of the moment, but capable of extension by adding equipment to meet future requirements. *Contribution of the Services*—The range operating personnel is provided largely by the R.A.N., the Army and the R.A.A.F., with the Army assuming the chief administrative responsibility. There are a number of civilian personnel, both scientific and administrative. Although major construction work is being carried out by the Department of Works and Housing, the armed services are also contributing. No. 1 Line Construction Project Squadron, Royal Australian Corps of Signals, No. 1 Field Squadron, Royal Australian Engineers, and No. 2 Air Field Construction Squadron R.A.A.F. are actively engaged.

(iii) *Defence Research Laboratories.* Pending clarification of the part to be played by the Defence Research Laboratories, Maribyrnong, Victoria, in the Australian programme of research and development for defence, the work of the establishment is, in the main, on the lines determined at the end of the 1939–45 War. The greater part of the work has comprised testing (in its broad sense, i.e., including the calibration of instruments) and investigational work of a short-term nature directed to meeting the needs of Service and other Government departments and secondary industry at large. There has been an appreciable volume of longer term research and developmental work. This has been concerned either with specific defence projects, notably in the case of the Explosives and Ammunition Section, or with subjects of more general interest and application, such as the improvement of materials and articles produced in industry, the formulation of standards and rationalization of specifications, and the development of laboratory techniques of measurement and evaluation.

The General Superintendent, in his report for the year ended 30th June, 1949, remarks that it has been clear that, to enable industry to develop along the lines essential to defence, the frontiers of the work of the Defence Research Laboratories will have to be extended both by the entering of new fields and the enlargement of existing ones. Plans for such extensions are, however, being integrated with broader departmental plans for defence research and development.

The work of each section of the Laboratories is outlined below:—*General Chemistry*—Paints and allied materials; textiles and mycology; lubricants, corrosion preventives and packaging; organic chemistry; production of gratitudes; miscellaneous service stores. *Chemical Defence*—Gas absorption at activated surfaces; generation of aerosols; atmospheric pollution and air filtration; detection and estimation of gases, vapours and dust in air; protection from, and elimination of, toxic industrial hazards; applied infra-red spectrometry; respirators and other protective equipment; physical and chemical investigations and advice on chemical warfare problems; peace-time uses of chemical warfare materials. *Explosives and Ammunition*—Service explosives and ammunition—problems relating to their design, manufacture, testing, uses and storage. *Metallurgy "A"*—Physical metallurgy; corrosion and metal protection; electroplating; spectrographic analysis; chemical analysis of metals and alloys. *Metallurgy "B"*—Foundry metallurgy; welding metallurgy; industrial radiography; non-destructive testing; photography; pyrometry. *Engineering*—Investigation of fatigue of metals; calibration of load and pressure measuring instruments and testing machines; mechanical testing of metals, rubber, plastics, cordage and other materials; photoelastic methods; design and construction of laboratory equipment. *Metrology*—Maintenance of standards of mass, length and time; design and examination of gauges; testing of measuring instruments, gears and gear-cutting tools, machine tools, balances, weights, volumetric glassware, barometers and time-measuring apparatus; mathematical analysis. *Physics, Optics*—Design of optical systems, including reflecting and microscope objectives; phase-contrast microscopy; interferometry; spectrophotometry; goniometry, infra-red investigations; heat and thermometry; general physics; glass-working, mechanical workshops. *Electricity*—Electronics, including design and construction of special equipment for high voltage low-power supplies, measurement of very short time intervals; high vacua; linear accelerator; dielectric studies; electrical calibrations; magnetism; fine instruments workshop. *Crystal Physics Group*—X-ray diffraction; electron diffraction and electron microscopy and their application to problems in chemistry, physics and metallurgy. *Technical Information Section*—This has a large library of books, periodicals and other publications and unpublished documents on pure and applied physics and chemistry, metallurgy, electrical and mechanical engineering. In collaboration with the laboratory sections it supplies an information service to government departments and industry. A publications unit edits official publications of the laboratories including reports and circulars and, in collaboration with the General Chemistry Section, the monthly periodical *Paint Notes*. *New South Wales Division*—This has a metallurgical laboratory at Lidcombe and a chemical one at Villawood, but these are being consolidated in new head-quarters at Alexandria. Its range of laboratory, advisory and technical information work covers physical metallurgy, industrial radiography, corrosion and metal protection, metallurgical analysis, general chemical analysis and testing, including paint technology. The bulk of the laboratory work has been concerned with solving the day-to-day problems of production. *South Australia Branch*—This branch was opened at Finsbury in 1947 and has since expanded steadily. It has sections for work on physical metallurgy, industrial radiography, chemical metallurgy and pyrometry. Recent developments include a widening variety of chemical work and the calibration and adjustment of electrical instruments, with an increasing amount of advisory and technical information service to industry.

(iv) *Aeronautical Research Laboratories*. The Aeronautical Research Laboratories were established by the Council for Scientific and Industrial Research in 1937, and the first buildings, at Fishermen's Bend, Melbourne, were occupied early in 1940. Fundamental research in aeronautical science, as well as industry, was carried out for the

R.A.A.F. and for civil aviation. In February, 1949 the laboratories became part of the Research and Development Branch of the Department of Supply and Development. Work requested by other organizations is arranged for either at the laboratories or elsewhere. Giving more emphasis to defence research aspects, the work, with appropriate experimental facilities, is organized under the following sections: *Gasdynamics*—The fundamental aspects of aerodynamics are investigated, e.g., high speed flow and turbulence. The section is equipped with a variable pressure high speed subsonic wind tunnel, and two special low turbulence tunnels. *Applied Aerodynamics*—This section deals with the problems of the design of the aeroplane such as control, stability and boundary layer flow. It includes a flight research group working in conjunction with the R.A.A.F. The main item of equipment is an atmospheric pressure wind tunnel. *Structures and Materials*—Characteristics of the load carrying structure are investigated both from the point of view of the efficiency of the structure and of its life under operating conditions. A very large range of mechanical testing equipment is available, including a structural test bay 120 feet by 80 feet for testing wings and large aircraft components, a 600,000 lb. universal testing machine and a tyre and undercarriage testing machine. *Physical Metallurgy*—The materials of aircraft and aero engine construction are studied, particular attention being paid to fatigue, to high temperature materials, to corrosion and to ageing phenomena. *Engines and Fuels*—The power plant, its installation and associated problems are investigated, gas turbines receiving particular attention. A very well equipped combustion laboratory is included in the wide range of engine testing equipment available. *Instrumentation and Electronics*—The main work of this section is the development and construction of special instrumentation required by the other sections for research purposes.

7. **Liquidations.**—Overall realizations on surplus property for the three years ended 30th June, 1949 totalled £19,869,896. For 1946–47 the total was £10,908,825 (liquidations £5,871,924, Division of Aircraft Production £875,799 and machine tools £4,161,102); for 1947–48 £6,756,676 (liquidations £4,914,584, Division of Aircraft Production £661,790, and machine tools £1,180,302); and for 1948–49 £2,204,395 (liquidations £1,933,784, Division of Aircraft Production £152,030 and machine tools £118,581).

8. **Directorate of Supply.**—(a) *General.* The Directorate of Supply was established under the Supply and Development (Administrative) Regulations in 1943 for the purpose of purchasing supplies or arranging services for War Departments. Provision has been made in the amended Supply and Development Act 1939–1948 for the Directorate to continue these functions. Under the latter Regulations the Directorate also assumes the additional responsibility of arranging for the sale or disposal, on behalf of the Department of Supply and Development, the Department of the Navy, the Department of the Army, and the Department of Air, of all surplus or unserviceable property, war matériel, goods and services approved for disposal.

(b) *Disposals.* The Directorate continues, broadly, the policy developed by the Commonwealth Disposals Commission, which was designed mainly to ensure an orderly disposal of surplus war goods at fair market prices.

(c) *Purchases.* The policy of the Directorate is to purchase supplies and foodstuffs for the Naval, Military and Air Forces as far as possible by public tender, as provided by Treasury Regulations.

(d) *Administrative Organization.* The Directorate is situated in Melbourne, and the approving authority for the arranging of contracts is the Contract Board, comprising representatives of the Department of Supply and Development, the Department of the Navy, the Department of the Army and the Department of Air. The Directorate is represented in States other than Victoria by a district organization which also operates in conjunction with a District Contract Board as the approving authority.

9. **Commonwealth Disposals Commission.**—The constitution and function of the Commonwealth Disposals Commission, its policy and procedure and an outline of its activities are recorded in Official Year Book No. 37 (see pp. 1194–6). The Commission comprised two industrialists, two members of the Commonwealth Public Service, and a representative of the Trade Union movement.

The basic principles and methods of disposal adopted by the Commission provided for meeting the needs of Commonwealth and State Departments. Special consideration was given to the requirements of overseas relief organizations, the Red Cross and Australian hospitals and bodies engaged in educational, charitable, health and general

community activities. A wide range of equipment, particularly tools of trade required for rehabilitation purposes, was sold to ex-servicemen who were sponsored by the Repatriation authorities. After the requirements of these priorities were met, the main avenue of disposal was through trade channels and by public tender and auction.

During the five years of its existence, over 124,000 motor vehicles were placed on the roads, of which 70 per cent. found their way to rural areas; thousands of Army tractors and armoured fighting vehicles are to-day in use by municipal authorities, land-owners and industry generally; whole camps and thousands of hutments have been diverted to ease the housing problem; millions of yards of textiles and countless items of clothing have found their way into the economy, including free issues of 670,000 garments and blankets to 260 different charitable institutions; numerous war factories and warehouses have been sold for post-war purposes; thousands of machine tools are being used by industry to make good the lag in production for civilian purposes and by Technical Colleges to train ex-servicemen in peace-time pursuits; aviation authorities are using large numbers of surplus aircraft for passenger and goods traffic; a great variety of ships and small craft have been put back into service to make good the shortage of shipping and to aid the fishing industry.

After five years, during which it disposed of surplus war-time assets to a total value of more than £130,000,000, the Commission ceased to function as from 31st July, 1949. Its remaining duties were taken over by the Disposals Division of the Directorate of Supply, Department of Supply and Development. About 70 per cent. of Australian production in the final stages of the 1939-45 War was being devoted to defence needs, and soon after the war ended much of the stock-pile of materials and equipment owned by the Government, and by many of the factories which had produced it, became surplus to requirements. These assets, in huge quantities, were scattered over the whole of the Commonwealth, in New Guinea and across the northern islands from the Solomons to Borneo. In the following table the total realizations of the Commission over the period of its existence, namely from 4th September, 1944 to 31st July, 1949, are classified according to (a) commodities and (b) holding department or authority.

COMMONWEALTH DISPOSALS COMMISSION : REALIZATIONS FROM SEPTEMBER, 1944 TO JULY, 1949, CLASSIFIED ACCORDING TO COMMODITIES AND HOLDING DEPARTMENT OR AUTHORITY.
(£'000.)

Particulars.	Realiza- tions.	Particulars.	Realiza- tions.
Commodities—		Holding Department or Authority— <i>continued.</i>	
Crude Materials	864	Army— <i>continued</i>	
Basic Materials and Pro- duction	35,658	Sales Nauru—Ocean Is- land	29
End Products	80,068	Sales Borneo—Morotai ..	6,735
Unclassified Sales	18,599	Salvage	1,051
Total Realizations	135,189	Air—	
		Sales Borneo—Morotai ..	795
		Aircraft	1,228
		General	5,454
		Navy—General	1,557
		Property, Land and Buildings (a)	11,507
		Ships and Smallcraft	2,793
		Other Departments	8,958
		Auctions (unclassified items)(b)	11,040
		Total Realizations	135,189
Holding Department or Authority—			
Supply and Development—			
Liquidations	20,976		
Machine Tools	9,217		
Aircraft Production	3,467		
Works and Housing	3,834		
Army Mechanical Trans- port	13,978		
Army—			
General	32,570		

(a) Includes auction sales.

(b) Excludes real property sales by auction.

10. **Tinplate Control.**—Throughout the 1939-45 War assured supplies of tinplate were essential to the packaging of foods for Australian and Allied troops. With this objective the Commonwealth Government established a Commonwealth Tinplate Board, comprising representatives of the industrial and Departmental interests concerned in the availability of adequate supplies, not only for the canning of foodstuffs, but also for more direct war purposes. This Board was replaced on 31st December, 1946 by the Commonwealth Tinplate Advisory Committee and at the same time a Controller of Tinplate was appointed.

Over the eight years ended 30th June, 1949 Australian consumption of tinplate averaged 110,000 tons per annum. Upwards of 85 per cent. is used for the canning of foodstuffs. Most canning factories run at peak capacity in the fruit-picking season, and keep their key personnel in employment during other months of the year in handling such packs as jam from fruit pulp, soup, vegetables, meat and spaghetti.

Australia's tinplate supplies are drawn from the United Kingdom and the United States of America, but during 1949 plans for the establishment of a tinplate mill at Port Kembla were further advanced. Tinplate is rolled to rigid specifications many months in advance of its permanent use in the form of cans.

Control over the use of tinplate in Australia was abolished on 12th October, 1949, but the services of the Committee are being retained by the Commonwealth for advice in the matter of overseas supplies.

11. **Bureau of Mineral Resources, Geology and Geophysics.**—An account of this section was given in the Official Year Book No. 37, pp. 849-50. This matter is further revised and extended in this edition of the Year Book, p. 889.

12. **Stores and Transport Branch.**—This Branch now functions as the central authority, which is responsible for providing all storage and transport facilities necessary to meet the official requirements of Commonwealth Departments and authorities. It has branches in all States and agents in Canberra and Townsville, Queensland.

At the 30th June, 1949 it had under its control land, buildings, plant and machinery, valued at over £4,000,000, and 4,000,000 square feet of storage space, of which 3,600,000 was Government-owned and the balance held under tenancy.

13. **Employment.**—Employment in administrative sections of the Department of Supply and Development and at Government Factories and Establishments at the 30th June, 1939, 1943 (the peak of war-time employment) and 1945 to 1949 was as follows. The table illustrates the rise during the war period, and the subsequent decline, of female employment in the factories.

ADMINISTRATIVE OFFICES AND GOVERNMENT FACTORIES AND ESTABLISHMENTS : EMPLOYMENT.

30th June—	Administrative Offices.			Government Factories and Establishments.			Total.		
	Males.	Females.	Persons.	Males.	Females.	Persons.	Males.	Females.	Persons.
1939(a) ..	12	6	18	4,481	574	5,055	4,493	580	5,073
1943(a) ..	3,118	3,115	6,233	32,210	22,548	54,758	35,328	25,663	60,991
1945(a) ..	2,252	2,403	4,655	16,087	7,656	23,743	18,339	10,059	28,398
1946(a) ..	1,698	1,146	2,844	8,549	1,020	9,569	10,247	2,166	12,413
1947(b) ..	1,629	1,021	2,650	11,266	1,348	12,614	12,895	2,369	15,264
1948(c) ..	1,893	1,045	2,938	11,385	1,477	12,862	13,278	2,522	15,800
1949(c) ..	1,315	662	1,977	11,449	1,765	13,214	12,764	2,427	15,191

(a) Munitions only. (b) Includes Aircraft Production in addition to Munitions. (c) Includes Aircraft Production and Supply and Mineral Resources in addition to Munitions.

14. **Finance and Accounts.**—(i) *General.* The expenditure during the years 1944-45 to 1948-49 is shown in the tables which follow. The first table shows the total expenditure, while the second shows details of expenditure under the various trust funds. Apart from Defence Research Laboratories, Research and Development is not included in these figures.

(ii) *Total Expenditure.* The table following shows the total expenditure incurred on account of the Department during the years 1944-45 to 1948-49 inclusive.

SUPPLY AND DEVELOPMENT : TOTAL EXPENDITURE.

(£'000.)

Particulars.	1944-45. (a)(b)	1945-46. (a)(b)	1946-47. (b)	1947-48. (c)	1948-49. (d)
Parliamentary Appropriations ..	25,620	23,656	7,120	7,890	10,031
Trust Fund Accounts ..	83,083	46,059	20,266	19,132	17,159
Department of Supply and Development and for other Administration ..	2,851	3,924	4,549	910	897

(a) Includes Lend-Lease and Reciprocal Lend-Lease. (b) Department of Munitions.
(c) Former Departments of Munitions and Aircraft Production. (d) Former Departments of
Munitions, Aircraft Production and Supply and Shipping.

(iii) *Trust Fund Expenditure.* The table hereunder shows the comparison between expenditure from the various Trust Accounts during the years 1944-45 to 1948-49.

SUPPLY AND DEVELOPMENT : TRUST FUND EXPENDITURE.

(£'000.)

Fund.	1944-45.	1945-46.	1946-47.	1947-48.	1948-49.
Government Munitions Factories and Establishments ..	20,501	14,245	9,431	8,709	11,311
Manufacture of Munitions ..	53,831	27,064	8,730	5,396	1,581
Machine Tools ..	2,675	1,019	308	181	16
Materials ..	6,074	3,708	1,737	411	155
Aluminium Production ..	2	23	60	49	152
Beaufort Homes ..	..	(a)	(a)	300	1
Aircraft ..	(a)	(a)	(a)	4,086	3,862
Minerals Production ..	(b)	(b)	(b)	(b)	81
Total ..	83,083	46,059	20,266	19,132	17,159

(a) Department of Aircraft Production.

(b) Department of Supply and Shipping.

15. **Australian Shipbuilding Board.**—(i) *General.* The functions of the Board were described in issue No. 37 of this publication (p. 1170). The Shipping Act 1949 provided for replacement by Australian-built vessels of all ships 24 years and over trading on the Australian coast. In order to bring the costs of such replacement vessels within parity of the United Kingdom costs, subsidy of no more than 25 per cent. was granted. The head office of the Board is in Sydney.

(ii) *Construction Programme.* The programme, which underwent many changes to conform with altered requirements, now consists of 13 "A" Class, 9,000 D.W.T. freighters; 14 "B" Class, 6,000 D.W.T. freighters; 10 "D" Class, 3,000 D.W.T. freighters; 2 "D/A" Class, 3,000 D.W.T. freighters; 5 "E" Class, 700 D.W.T. freighters; 2 Union S.S. Coy. of N.Z., 3,000 D.W.T. freighters; 24 Wooden vessels, 300 D.W.T. freighters; and one 1,000 ton Floating Dock.

Important additions are the two vessels for the Union Steamship Coy. Ltd. of New Zealand and two "B" Class, 6,000 D.W.T. vessels for Huddart Parker Ltd. and the Adelaide S.S. Pty. Ltd. respectively.

AUSTRALIAN SHIPBUILDING BOARD : SUMMARY OF CONSTRUCTION AS AT 30th JUNE, 1949.

Class.	Completed.	Under Construction.	Not yet commenced.	Total.
"A"	13	.. ..	.. ..	13
"B"	2	4 { 2 B.H.P. 2 Evans Deakin	8 { 4 Mort's 4 Evans Deakin	14
"C" .. ..	..	.. ..	21	21
"D"	8	2 (State Dockyard)	.. ..	10
"D/A" .. ..	..	.. ..	2 (Evans Deakin) ..	2
"E"	4	1 (Walkers Ltd.) ..	.. ..	5
Union S.S. Coy of N.Z. 300-ton Wooden Vessels	24	.. ..	2 (State Dockyard)	2
	24	.. ..	.. ..	24
Total ..	51	7	33	91

In addition to the foregoing the 1,000 ton floating dock has been completed for the Department of the Navy.

(iii) *Ship Repair Facilities.* War-time control of ship repair ceased in 1946. Repair facilities, however, are still fully employed with reconversions and general repairs.

16. Australian Aluminium Production Commission.—Basic plans for the manufacture of aluminium ingot in Australia were approved by the Commonwealth Government in April, 1941 as a defence measure designed to make this country independent of overseas supplies. In April, 1944 an agreement was made between the Commonwealth and Tasmanian Governments for the establishment of the industry in Tasmania. The Australian Aluminium Production Commission, consisting of two representatives and two deputies acting for the Commonwealth and an equal number of representatives and deputies for Tasmania, was constituted on 1st May, 1945. Finance for the undertaking is provided by a fund of £3,000,000 to which contributions on a £1 for £1 basis are made by the Commonwealth and Tasmanian Governments.

Workable deposits of bauxite (aluminium ore) have been proved in New South Wales, Victoria and Tasmania, the largest deposits being located in the Inverell district of northern New South Wales, where reserves exceeding 8 million tons have been brought under Commission control. A combined alumina and reduction plant is being erected at Bell Bay, northern Tasmania, to which power will be transmitted from a generating station at Trevallyn, near Launceston. Large quantities of plant and equipment have been purchased, and construction work is proceeding with the object of completing the project in 1951. The works will have an output of 13,000 tons of ingot annually.