

products. Co-ordinating these was an organisation which crystallised factory experience and laboratory knowledge into specification form, and through its inspection staff secured manufacture in accordance with its specifications.

The policy stood the severest of tests, and, in conjunction with a policy of scientific protection, is adaptable under Australian conditions. If steadily followed, it will enable our industrial resources to function in war and be a support to the fighting forces on which the existence of our nation finally depends.

All I need add to the foregoing is that the policy summarised in the penultimate paragraph above was consistently followed by the Munitions Supply Board, under the Chairmanship of Mr. Leighton, throughout the period between the two Wars, and that it was the fulfilment of such policy before the outbreak of World War II which enabled this country to slide smoothly, without fuss or tribulation, almost unnoticed by Parliament or people, into the enormous production effort of 1940.

Early in 1921, the preparation of the Financial Estimates for 1921-1922 afforded the Department an opportunity of testing the intentions of the Government and of Parliament in regard to Mr. Leighton's proposals of May 1919; he had been successful in securing a Parliamentary Vote on the Estimates of 1919-1920 for a commencement with the Research Laboratories, and now he asked for Votes for a commencement with the following -

Machine-Gun manufacture at the Small-Arms Factory,  
Lithgow.  
Inspection buildings and testing equipment at  
Lithgow and Maribyrnong.  
T.N.T. production at Cordite Factory, Maribyrnong.  
Experimental Fuze production at Maribyrnong,  
Gun factory and Gun ammunition production

and token amounts were included also for a Gun factory and for Gun-Ammunition production with a view to construction works commencing in the financial year following.

Establishment of Munitions Supply Board

I 473/18/36

Agendum  
159

On 21st March, 1921, Mr. Leighton submitted a proposal "to establish a Munitions Supply Branch, Defence Department". He said -

A scheme for the defence of Australia must include, as a necessary part, proposals for the organisation of general supply and for securing self-containment in essential munitions and stores.

In pointing out that the scheme of a Munitions Supply Branch had been subjected to authoritative investigation and had been favourably received, he said -

Its primary object is to bring within one organisation all those separate sections of the Defence Department that are devoted at present to questions of supply so that the administrative experience and constructive effort of the past are combined and brought to bear on the problem presented by the need for self-containment.

.... the policy of the Munitions Supply Branch would be to develop the existing factories along natural lines so that eventually a nucleus of Government shops would be established to serve as the source of peace demands for all natures of war materiel and as a college for the instruction of masters and men of outside industries. It is by following such a course that full use can be made of the industrial resources of Australia in time of war. A further feature of the policy is the co-ordination of the work of all sections now dealing with industrial and contract questions so that eventually the Department would possess a Branch capable of dealing with every phase of the problem of supply.

In thus expressing himself, Mr. Leighton had in mind the inclusion of the Defence Contract and Supply Board and staff within the Munitions Supply Branch, and he pointed out that in time of war there would be formed probably a Ministry of Munitions and that it would be desirable in peacetime to form an organisation which could be lifted out of the Defence Department as an administrative unit; exactly what happened in 1939 when the Department of Supply and Development was created. He also asked for a direction as to the establishment of new factories.

The Government accepted Mr. Leighton's recommendations, and they were carried into effect on 13th August, 1921, when the Munitions Supply Board was constituted a statutory body under the Defence Act; the members consisting of the same personnel as that forming the "Board of Factory Administration", with myself as Secretary. The functions prescribed for the Board by statutory law were -

- (a) Provision of such armament, arms, ammunition, equipment, supplies and stores of all kinds, as may be demanded by the responsible authorities and approved by the Minister.
- (b) Research and design;
- (c) Inspection and examination of supplies obtained in Australia, other than food, forage and fuel supplies, up to the point of issue to the Service;
- (d) Administration of manufacturing establishments established or to be established under section 63 of the Defence Act, and placed under the control of the Minister of State for Defence.

The Board had statutory authority to incur expenditure on -

- (a) Purchase of raw materials, fuel and maintenance stores of all kinds within the limit of available funds;
- (b) Replacement of and repairs to existing Government Factory works, buildings, plant, machinery, furniture and fittings within the limit of available funds.
- (c) New works and buildings, machinery, plant, furniture and fittings not exceeding £2,000 in any one Factory at any one time.

and further stated its objects to be -

- (a) to manufacture those articles of equipment, arms and ammunition, etc. which are not procurable from trade sources during time of peace.
- (b) To make possible the local production of service supplies.
- (c) To keep systematic records of British Service specifications.
- (d) To provide facilities for scientific research

The Board went on further to explain that as a corollary to the fact that the Munitions Supply Branch must be regarded as the medium through which methods of manufacture can be tried out and technical knowledge for the production of war materiel obtained by factories, the following became its duties -

- (e) The designing of factories, machines and tools for production in time of war.
- (f) The making and checking of gauges for trade manufacture.
- (g) Research and experiment.
- (h) The training of men in the manufacture of war material for distribution as instructors and inspectors to the civil factories in time of war.

The following establishments and services were placed under the administration of the Board -

Contract and Supply Board, all capital cities.  
Research Laboratories, Maribyrnong, Victoria.  
Inspection Branch stations in N.S.W. and Victoria.  
Acetate of Lime Factory, Brisbane, Queensland.  
Clothing Factory, South Melbourne, Victoria.  
Cordite Factory, Maribyrnong, Victoria.  
Harness Factory, Clifton Hill, Victoria.  
Small Arms Factory, Lithgow, New South Wales.  
Small Arms Ammunition Factory, Footscray, Victoria.  
Woollen Cloth Factory, North Geelong, Victoria.

The Board also emphasised the fact that it was a function of the Service concerned to determine its requirements; that the responsibility of the Munitions Supply Board was limited to making arrangements for purchase or manufacture of such supplies after the demand had been approved by the Minister or other competent authority. Another important step taken in August 1921, necessary because the action of setting up a Munitions Supply Board superseded the Arsenal project of 1915, was the abandonment of Mr. A.E. Leighton's title as General Manager of the Arsenal. As from 25th July, 1921, he was appointed by the Executive Council to be Controller-General of Munitions Supply

with the intention that the holder of that office should be Chairman of the Munitions Supply Board, and that his duties would include technical direction of the Government factories and establishments set up under the authority conferred by Section 63 of the Defence Act.

In the carrying on of public administration, it seems to be almost a custom that if some step is taken of a constructional nature, a period of quiescence will follow whereby the parties sink into passivity, appearing to pause for a rest upon their laurels, so to speak. Or is it that expediency suggests: "victory having been achieved, a period of seclusion is now to be advised; it can be usefully employed in study of the next forward move?" Whatever the cause, there was little other than the foregoing of historical interest to be recorded in 1921 except that the ammunition works of the Colonial Ammunition Company were leased by the Commonwealth as from 1st January, 1921. Orders upon the Government Factories were reduced as a consequence of the end of the war, with the result that immediate outcry arose in regard to terminations of employment, particularly with regard to returned soldiers, and then authority followed for acceptance of "outside orders" for the Government Factories, and both of these matters will be dealt with in the records of the respective Factories. There was also an enquiry from the Navy Department, hitherto somewhat aloof, as to whether Naval Armament Stores could be manufactured in Australia, <sup>its</sup> being added that "the Admiralty in a recent memorandum observed that great importance is attached to manufacture of Munitions in Australia", and a reply was despatched advising importation of the stores under reference because of a lack in this country of the drawings and

specifications necessary for manufacture of the Naval stores described, but explanation was given of the arrangements being organised in that connection. There was also the incident that I returned from abroad in September 1921 and took up my appointment as Secretary of the Munitions Supply Board soon afterwards.

When I resumed duty at Victoria Barracks, Melbourne, after an absence of three years, the scene was vastly changed; quietness now in place of the intense activity and hurly-burly of the height of the war. When I left the Germans appeared to be in the ascendancy, but now they were negligible. We were victors in what we were told was "the war to end wars". This was reflected in the local atmosphere. The country was demanding economies in the public expenditure, and during the latter months of 1921 a discussion in Parliament forced a heavy reduction in the Defence Estimates. The outlook was most discouraging for the Munitions staff so laboriously and devotedly trained abroad with a view to Australia's profiting from the experience of the war. Some of them sought positions elsewhere, but fortunately their work and the time expended were not lost entirely to the community. Wherever they served they attained distinction, and took a full part in World War II; Before it ended some of them were holding executive positions once again in the Munitions administration. Those of us determined to carry on with our leader, Mr. A.E. Leighton, were at least a little heartened by the gradual development of the first step in Mr. Leighton's plan: the Research and Inspection centres at Maribyrnong were rising brick by brick. Most of the plant had arrived from England, and never again would Australia be lacking in the means of scientific control of the precision necessary

in the manufacture of munitions, whatever form of chemistry or engineering or physics might be involved; whatever the United Kingdom or the United States could do in that way we could do at Maribyrnong. Our standards of measurement were interchangeable with their standards, and our men had professional status comparable with that of their people. No <sup>other</sup> country south of the Equator was so well equipped. The Inspection Branch also could be similarly classed to the extent that it would be called upon to operate at this time, but obviously its development would be gradual. It was dependent upon the products being manufactured at any given date.

#### The Development Programme of 1922

Senator Walter Massy Greene was appointed to be Minister for Defence during the re-organisation period following upon the drastic reduction of the Parliamentary Votes for the Defence Services, and the current viewpoint in the Department at the time of his advent there can be expressed succinctly by repetition of a saying current amongst the staff: "Senator Massy Greene has come here armed with a meat-axe!" But in the result, to the extent that the Munitions Supply Branch was affected, our fears were absolutely groundless. 27 years later, at a farewell dinner to myself by the Business Men of Melbourne, on my retirement, I had the pleasure of telling those present, amongst them Sir George Pearce and Sir Walter Massy Greene, that of the Ministers I had served under during the past 50 years, Sir George Pearce took first place and Sir Walter Massy Greene took second place, and this opinion, I can say, has been founded upon the personal ability displayed by the two Ministers whilst in office, and their contributions of a positively constructive nature to the development of the Australian Defence

system. Furthermore, I hold this opinion relative to Sir Walter Massy Greene despite the fact that I had occasion twice during World War II to find myself strongly at variance with him on matters of Defence Policy. As to the merits generally of former Defence Ministers, although the question is not apropos here, I may as well complete the story by recording that my opinion that the Right Hon. J.B. Chifley takes third place in my assessment, and that Sir Thomas Ewing would come next with fourth place, in the succession from the Hon. Donald Melville, Minister for Defence when I joined the Victorian Defence Department in June 1900. I suppose, too, that I should not overlook Sir Frederick Sargood, one of the first Senators. He was Minister for Defence in the Victorian Governments of 1883, 1890 and 1894 and certainly established an effective Defence organisation in Victoria during 1883-1884. Because of that he must be regarded as the founder of Australian Defence seeing that the Commonwealth Defence Department was practically the successor of the Victorian organisation when it was federated on 1st March, 1901. On this, I should say that Sir Frederick also was a great Minister for Defence, but I cannot classify him out of personal knowledge. I only came on the scene six years after he vacated his last term of office, but even in 1900 he was regarded in the Department as a powerful force in Defence matters.

73/18/329

On 19th January, 1922, Senator Massy Greene discussed the position of the Munitions Supply Branch with Mr. Leighton in his capacity as Chairman of the Munitions Supply Board. The Minister was advised that the Board had been considering the possibilities in the light of the Parliamentary debate and had agreed that the financial conditions, and the aspect of foreign relations, had changed greatly since the submission of the



report of 27th May, 1919, that it was no longer possible, or perhaps necessary, to plan for completion of the Munitions Supply scheme within three years. This had contemplated an expenditure for the financial year 1921-1922 of £1,100,000 for Munitions Supply, of which £400,000 would be for new works and £700,000 for .303-inch rifles and ammunition, but it appeared now to the Board that for the early future it would not be practicable for the Department to set aside more than £500,000 for munitions supply purposes. The general opinion was summarised in a Board Minute dated 13th December, 1921 -

There appears to be little justification, when funds are limited, to continue spending so large a proportion of our grants on small-arm ammunition and rifles when so many other essentials are lacking. It will be wiser for the Department to concentrate attention on developing factories towards making essential articles that cannot be made at present rather than to continue to spend large sums on building up reserves that at the best leave us in an unbalanced position.

The Military Board was consulted on this and endorsed it as the basis of preparation of the Estimates for 1922-1923. The Minister's ideas were found to be running on similar lines and he asked for a report which Mr. Leighton expressed to me in the form of a Memorandum as follows -

Secretary, Munitions Supply Board,  
from Controller-General, Munitions Supply.

During the course of an interview with the Minister this morning (19th January, 1922) he told me that he required a concise statement covering the following -

1. The capital value of each existing Muniton factory and establishment, excluding the commercial factories, i.e. Woollen Cloth, Clothing and Harness Factories, but including the Small-Arms Ammunition Factory.

Sub-divide Land  
Buildings  
Plant and Machinery

73/18/329

2. The average annual amount expended by the Department on the purchase of products from each factory during the last 3 years. Name and number of the product.
3. The estimated total cost of each of the new establishments and factories projected under the Munitions Supply Scheme.
4. The expenditure incurred up to December 1921 on the items dealt with in paragraph 3.
5. The expenditure still to be incurred on completing the scheme dealt with in paragraph 3.
6. On the assumption that the remaining expenditure determined on paragraph 5 is spread over six years, assess expenditure for each year.
7. Determine the annual expenditure that will be required to keep the factories and establishments under paragraphs 1 and 3 in "nucleus" trim, i.e. with such modified outturn and staff as will ensure the factory being readily brought to normal outturn should occasion arise.

In preparing the Report, I called for the assistance of the leaders of the technical groups of which there were five. I asked each one to prepare a six-year development plan, the total cost of which in no circumstances would exceed £900,000. I fixed the total arbitrarily. I knew my masters - that intangible entity known as "Government", which in my mind does not mean so much the Cabinet of Ministers, but comprehends the Cabinet and its departmental advisers - and their revulsion from anything looking like a million pounds (that is during the years following World War I), and £900,000 obviously was well below that. I knew that in fixing the figure we must jettison some of the ideas we had about a complete job; that absolute essentials must come first; and that the frills could come up later. My colleagues did not give way on this without protest, and we had much argument about details, but a good plan was built up although, as was pointed out, not nearly adequate for

war requirements. Nevertheless the moderate production planned would afford opportunities of some preparation for war in that there would be facilities available for staff and employees being trained in the technique of manufacture according to local conditions, and the Factories would be handy as models for expansion and duplication on the call of emergency, as well as acting so to speak as technical schools for commercial establishments should conversion of the latter be necessary for production of war demands.

Unfortunately, aeroplane manufacture was one objective which had to be discarded, but I felt that in any circumstances that was an isolated matter. Future design was not yet certain, and finance was unlikely to be a difficulty once policy had been decided. I use the expression "unfortunately" because in later years I have thought that, if perhaps in 1922 the Munitions Supply Board had been able to do something about a commencement with aeroplane manufacture, the industry might have advanced much further in Australia by 1939. When ultimately it was placed upon a practical basis, in 1936, it should be acknowledged I think, that although nominally the commercial interests concerned acceded to a request by Government, tribute is due really to their patriotism in financing what never could be a profitable investment in Australia. I had also to exclude the proposal in the plan of 1919 to include an Iron Foundry in the Munitions Production programme. The reason was that, however desirable an iron foundry may have been in ordinary conditions, it was not absolutely essential as long as there were commercial foundries to draw upon, and in fact it never became necessary at any time to think of one in a Government Factory. It came

first-class iron castings were not freely available, but in later years the quality of production from commercial foundries had very much improved. Another item dropped from the 1919 plan was a large central toolroom which at all times was only thought of as a necessity in time of war, and in fact had only become an absolute requirement in 1939-40, but of course in the intervening years adequate toolrooms had been set up in all the parent Government factories. I am mentioning these points as illustration of the fact that it was never the policy of the Munitions Supply Board to instal production plant as long as there was assurance of there being an acceptable quality of manufactured supplies being obtainable from the ordinary resources of commercial industry.

Agendum  
1922/381

The revised plan was submitted by the Munitions Supply Board to the Minister on 28th February, 1922. It was built up upon an estimated capital expenditure of £900,000 to be spread over six years as follows -

	<u>Buildings and Works</u> £	<u>Plant</u> £	<u>Gauges &amp; Tools</u> £	<u>Total</u> £
Ordnance and Shell production	115,000	95,000	30,000	240,000
Gun Ammunition except Shell	86,800	40,600	12,600	140,000
Explosives and filling	132,100	52,900	-	185,000
Machine-gun and pistol	88,750	104,250	97,000	290,000
Laboratory and Inspection	25,000	20,000	-	45,000
	<u>447,650</u>	<u>312,750</u>	<u>139,600</u>	<u>900,000</u>

It was explained that as the bulk of the equipment required to be imported had already been received in the country, little of the £900,000 would be spent abroad. It was also mentioned that expenditure on the plan had already been incurred to the extent

of £355,940 so that the total cost of the plan would be £1,255,940. Of the expenditure already incurred, £72,540 was in connection with the Laboratories and Inspection centres for Buildings and Equipment, and some £282,000 on plant for the Munitions factories, that being mostly the British Munitions plant but including some local purchases. The production contemplated under this plan was prescribed by the Military Board in 1918, but it was also available for requirements of the Navy and Air Force. It was to be capable of manufacturing annually, in a single shift of 48-hours weekly, the following -

Rifles	35,000
Machine Guns	250
Pistols	1,000
Guns and Carriages up to 4.5" calibre	38
Gun Ammunition up to 6"	50,000 rounds
Small-Arms Ammunition	40,000,000 rounds

Explosives production obviously was included, and also the filling of the explosives into the ammunition components, but the designed capacity had to be 160,000 rounds of gun-ammunition because a smaller unit was not practicable. It was also understood in this connection that, while the gun-manufacturing plant was balanced for 38 gun equipments annually, a considerable amount of the gun manufacturing plant had machining capacity for a greater output per machine, and also many of the machines could handle larger types of guns; it was because these extra machining facilities were available that in later years the factory was able to undertake the much longer anti-craft guns without its being necessary to purchase and house complete new plants, but of course a moderate number of additional machines had to be installed for each different type of gun. A matter which should be mentioned here, in connection with the foregoing statement of production, is that at this time the Small-Arms Ammunition Factory, located at Footscray, Victoria, was not

owned by the Government, it was being leased merely from the Colonial Ammunition Company Limited, an English Company which built the Factory in 1888 and operated it until 1921 when it was leased by the Government, at the Company's request, for £20,000 annually. In 1927 however, it was purchased by the Government for annual payment of £19,153 for 10 years, and consequently from 1921 it formed part of the Munitions Supply organisation within the Government Ammunition Factories group. It will be recollected that £500,000 had been set in discussion with the Minister as the annual expenditure for at least six years, and in the plan prepared at his request this expenditure was worked out thus and then to continue approximately as shown in 1926-1927 -

	<u>1922-23</u>	<u>1923-24</u>	<u>1924-25</u>	<u>1925-26</u>	<u>1926-27</u>
	£	£	£	£	£
Non-recurring Capital Expenditure	150,000	150,000	200,000	200,000	100,000
Upkeep Central Administration	37,000	37,000	38,500	38,500	40,000
Maintenance of existing factories, including Labs. & inspection	192,200	192,200	192,200	192,200	192,200
Proposed maintenance of new factories	100,000	100,000	90,000	90,000	120,000
<u>TOTALS:</u>	<u>479,200</u>	<u>479,200</u>	<u>520,700</u>	<u>520,700</u>	<u>452,200</u>

At a later date we shall see how these estimates worked out, but I can say here that we suggested the plan of £500,000 annually in good faith, we felt that it was constructive and of real value to the country, and were gratified when it was approved by the Government. We were watchful consequently throughout that the plan should be adhered to as closely as

possible, in expenditure as well as in production results. With regard to the latter, it was pointed out in our plan that if capacity production was required by the Army from the completed factories the annual expenditure would be £273,100, and that the £160,000 noted in the above statement was designed for maintenance upon a nucleus basis..

On 13th May, 1922, the Minister telegraphed that action was to be taken at once to give effect to the Policy contained in a statement\* being issued publicly by the Prime Minister, an extract from which read thus -

#### MUNITIONS

Never in the history of mankind so far as we know have 5½ millions of people been called upon to defend a Continent. We all earnestly hope that Peace may reign for ever on earth, or if that unhappily War comes, it may find us with our numbers greatly ~~reduced.~~ *increased.*

Yet, if War came tomorrow, our great need would not be men but material. Modern warfare is largely a question of material: of guns and of munitions. Lacking guns, the valour of our splendid Anzacs would avail little: and guns without munitions are useless.

The problem of defending Australia can only reach an acute stage if our sea communications are threatened, supplies from overseas partially or entirely cut off. Munitions in abundance then will be a question literally of life and death, and a scheme of defence which does not as far as possible ensure due provision for meeting the requirements of Navy, Army and Air stands condemned as fundamentally unsound.

Provision must therefore be made for the manufacture of Munitions within Australia. This has been the policy of the Commonwealth for a number of years and the Government now possesses or controls several factories in which certain classes of munitions are made. Of the classes manufactured at these factories there are at present reserves approximating very closely to requirements. Continued production in

\* A complete copy of the Prime Minister's statement is filed with the supporting papers for Chapter 8.

excess of requirements is unjustifiable and unnecessary and it is therefore proposed to reduce the output of these factories to the lowest point consistent with their retention as nucleus organisations with a small skilled staff upon which should the need arise it will be possible to build rapidly and secure a maximum output.

There are, however, a number of branches of munition production which have not been undertaken in this country up to the present which it is essential in the interests of the country's defence should be put in hand as soon as possible. A definite programme has been drawn up allotting an expenditure of approximately £500,000 a year for which sum it is hoped that it will be found possible to maintain existing munition factories on a nucleus basis, provide for the systematic erection of other factories and their maintenance on a nucleus basis as they are completed so that when the full building programme is finished all the factories can be conducted as nucleus organisations for a similar annual expenditure.

It is proposed, therefore, to proceed with the erection of these factories and the necessary experimental and investigational work which munition problems present. Much of the necessary machines for these factories is already in hand. It is not proposed as these factories are completed to run them at their full capacity. The intention is - and the programme is laid down accordingly - that they shall be retained as a nucleus organisation with a small highly-trained technical and mechanical staff upon which we can build rapidly should the need arise. This entails a high unit cost for such reduced output turned out from the munition factories, but despite this the Government is satisfied that this policy will provide the maximum national insurance at the minimum cost.

The nature of the work to be undertaken at these factories is such that no private firm would be prepared to lay down the requisite plant or train the necessary technical and mechanical staff, let alone carry out the indispensable amount of experimental work inseparable from munition programmes in a country where the spade work with local supplies yet remains to be done.

In time of war these factories could not meet the demand, but what they will be able to supply is such things as gauges and tools and technical knowledge and information, the lack of which threw Australia hopelessly out of the race during the late war when it came to the question of supplying a vast part of our munition requirements.



As the scheme develops steps will be taken to secure the co-operation of existing private works throughout Australia that are suitable for munition making, and in consultation with them determine how far their plant can be used in the special processes of munition manufacture to the best advantage. As the technical problems are worked out and the difficulties surmounted it may be found possible to give classes of instruction to certain of the employees of these factories that are considered most suitable to supplement the Government factories in time of war and whose co-operation may be obtained.

On this, the Minister added an instruction, dated 22nd May,

1922 -

Existing Munition Factories are to be reduced to a nucleus basis, and steps taken within the limits of the financial provision for the establishment of other factories and their maintenance also on a nucleus basis.

and thus was launched the first Munitions Developmental Programme - to be known as the 1922 Programme. We had been striving for several years to do something effective in the way of self-containment, and four months previously, when Senator Massy Greene had appeared amongst us, we had feared that it was the end of five years of hard work in study and planning, whereas it was a complete reversal of everything. A six-year programme of useful employment had been approved and finance was more or less guaranteed, and we hoped inwardly also that in the result, although fundamentally our objective was preparation for war, it could be shown that our work would contribute materially in the development of the chemical and engineering industries, and promote also a greater utilisation of science in industry. Incidentally, the instructions resulted in a reduction of employees in the existing Government factories by 889 persons, leaving 475 still employed there; an action regrettable of itself, but nevertheless inevitable as a matter of political economy having regard to the waste of public money and the futility of manufacturing goods for which there

was no use apparent and which could only deteriorate lying in store unused. Another important executive act which became necessary at this time was the question of exemption of the Munitions works from examination and report by the Parliamentary Public Works Committee. It was raised by Mr. Leighton on 11th May, 1922, and submitted to Cabinet by Mr. Massy Greene on 2nd June, 1922. Briefly, the Commonwealth Public Works Committee Act of 1913 provided that all Public Works estimated to cost more than £25,000 must be examined by a Parliamentary Committee and reported upon to Parliament, except that "works for the Naval or Military defence of the Commonwealth" could be exempted by the Governor-General in Council. Obviously this could only be done if approved beforehand by Cabinet for exemption. The idea behind this provision in the Act <sup>was</sup> that there may be reasons of a special nature for exemption of Defence works, examples being security and urgency, ~~and~~ As Parliament generally is jealous of any limitations or restrictions upon its fundamental authority, it was always accepted that proposals for exemption must be soundly based and limited to the utmost. Even in this case the Minister for Works and Railways protested to his colleague, the Minister for Defence, against the exemption. The Cabinet decision on Mr. Leighton's submission read -

The question of submission of any particular work to the Public Works Committee to be determined from time to time as the question arises.

This decision meant that a general exemption for the 1922 programme was refused, and that a separate exemption would have to be obtained for each item of the programme estimated to cost more than £25,000.

B.419/5/161  
B.419/11/140

gendum  
922/443

ee also  
gendum  
929/204

B.419/12/22

The first twelve months under the new programme was largely taken up with preparatory work, but in reporting upon the state of the planning the Board re-affirmed its objective on a broader scale -

- (a) The establishment of scientific and technical staffs, with the necessary laboratory equipment, for the investigation, from the Munitions standpoint, of the resources of Australia in the way of materials.

The laboratories will also study and develop manufacturing processes so that in time of war there will be a centre from which such information can be rapidly distributed.

- (b) The erection of factories for the production of articles of Munitions either not obtainable from commercial sources or required in peace time in such small quantities as to render the encouragement of private enterprise uneconomical or undesirable.

The factories contemplated will not be nearly adequate to meet war requirements but nevertheless, with their moderate turnover, they will afford an opportunity of preparing for war by training staff and employees in the technique of manufacture according to local conditions, and providing models for expansion and duplication when emergency calls as well as acting as the technical schools for commercial establishments when the latter are being converted to produce war demands.

- (c) The preparation of a Scheme for the Organisation of the whole Industry of the country in time of war.

In conveying this to the new Minister, Hon. E.K. Bowden, M.P., the Board said - 20th March, 1923 - that the Research Laboratories had been built at Maribyrnong and that equipment was nearly complete; that a scientific staff had been appointed and a commencement made with study of the numerous problems confronting munitions production in Australia. It was also stated that an Inspection staff had been appointed of all classes of Munitions during manufacture so that their suitability for the Services would be ensured. The Minister was also informed that

preparation of a scheme for the Organisation of Industry was being undertaken, but as the whole foundation of this depended upon the completion of the programme outlined under (a) and (b) above, the Board was concentrating upon getting the new factories commenced and into working order, and the investigation of the raw materials necessary for those factories.

Good progress had been made with the 1922 Programme when I reported upon it to the Munitions Supply Board on 28th September, 1923. Mr. Leighton at the time <sup>was</sup> being in England in consultation with the authorities as to advances in types of Munitions and in manufacturing methods, and he was also available as adviser to the Prime Minister (Hon. S.M. Bruce, M.P.), who was attending the Imperial Conference, on matters related to Munitions production. I informed the Board - Colonel T.J. Thomas being Acting Chairman - that during the past eighteen months the activities had been concentrated mostly upon design and in drafting plans and specifications of buildings and works for the various factories, and that requisitions for these to the value of £126,000 had been sent forward to the Department of Works and Railways. Various items of equipment to the value of £109,000 had also been ordered, as well as a large quantity of the raw materials and supplies necessary for the new programme. On the other hand, in the light of information received from England, it had been necessary to revise some of the items of capital expenditure mainly in relation to the T.N.T. factory, with the result that the £900,000 of the six-year programme had been increased by £55,000 to <sup>£955,000.</sup> ~~£995,000.~~ In the first place this arose out of a decision to increase the originally proposed output capacity of 50-tons annually to be 100-tons annually, but a substantial amount of the increase was

due also to post-war methods of manufacture of T.N.T. and to a more exacting provision for the health of the employees engaged upon manufacture of T.N.T., there being a definite liability to grave deterioration of health unless stringent precautions are taken.

No doubt, it will have been understood by readers that the drastic reductions of Defence expenditure instituted under the direction of Senator Massy Greene in 1922 were applied to all the Services and that they must have fallen most heavily upon the Army. The Military Board, of course, had the same opportunities as the Munitions Supply Board of advising the Minister as to the best means, from the Army standpoint, of meeting the situation, and it came to my ears that the Royal Australian Field Artillery training depot adjoining the Cordite Factory at Maribyrnong was likely to be vacated. The area of this was some one-hundred-and-three acres and upon it were standing large barracks, stores, stables, gun parks, amenities blocks, etc., some of them two-storey, and all in brick construction. When I heard this it immediately flashed into my mind that here was an ideal and ready-made site for the 18-pdr. gun and shell factory, far superior in my opinion to the two sites at Maribyrnong which had been discussed previously, and which also contained buildings of large floorspace which could be immediately and usefully occupied. Discreet enquiries amongst my Army friends confirmed the information but it was made clear that, if we sought transfer of the property, a quid pro quo would be expected to the amount expended upon it by the Army about £45,000. This proviso had no difficulties for me. At once I suggested that our allocation for capital expenditure under the six-year programme of £900,000 should be reduced by

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£48,000 at the rate of £8,000 annually for six years, and that the Army Vote for Works expenditure under their six-year programme should be increased accordingly. Consideration of this was promised and next I had to persuade my superiors, the members of the Munitions Supply Board, that the change should be made. Actually there was a considerable amount of hesitation I could never understand why. It was all so obvious to me. But finally, after study of the previous plans and a personal inspection of the land and buildings, not overlooking the seven or eight fine residences on the property, two months had elapsed in all this consideration and in discussion with the Army. Mr. Leighton recommended the scheme to the Munitions Supply Board and it was approved by the Minister on 25th September, 1922. Inwardly, I regard this transaction as one of my greatest achievements. It advanced our plans by several years and was of immeasurable value in the extensions necessary after the outbreak of World War II. In fact it would have been impossible to carry on the Ordnance Factory group during World War II if it had been placed in 1922 on the site then contemplated. As to the financial arrangement, I must admit that by the time two years had elapsed it had broken down and as the Army had not said anything about it we also said nothing. The facts were that, by the time we were working under the Estimates 1924<sup>3</sup>-24, the total expenditure contemplated by the Munitions Supply Branch for that year had become £582,505; that is £90,000 more than had been estimated in 1923. This increased Vote had developed out of additions to the programme as well as the excess costs of works, and as every care was being taken that the expenditures incurred conformed strictly with the intentions of the 1922 Programme, they could not be challenged.

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It was possible, we thought, that the Army was having similar experiences, and so the originally designed maximum Vote at £492,000 annually simply dropped from our consideration.

For the first three years of the 1922 Programme there was little calling for report except that the Bruce-Page Government endorsed continuance of the Munitions Production Programme as it was approved by the previous Hughes Government. But the Work Authorities had been somewhat delayed in commencing with the Buildings and Works and, consequently, substantial amounts of the finance appropriated by Parliament had lapsed at the close of the respective fiscal years. Efforts were made to have the lapsed amounts re-voted in subsequent years, but there was the customary Treasury reluctance to the totals of Defence Estimates at any time being permitted to exceed those of preceding years despite any more or less accidental savings which may have developed. However, the issue by the Government of a policy statement, on 23rd September, 1925, contained encouraging assurances of continuance with the programmes. In fact, as it was drafted by myself, I can say that it was satisfactory. As it is a record of the Departmental thought obtaining in 1925, it is probably worth inclusion here -

#### MUNITIONS SUPPLY IN TIME OF WAR

Statement by the Hon. Sir Neville Howse,  
V.C., K.C.B., K.C.M.G.,  
Minister of State for Defence - 29th September, 1925.

It was proved during the Great War that success cannot be expected unless the industrial resources of a country are organised to supply the fighting forces with munitions which, broadly, means everything required by the soldier.

In Australia our industrial resources are limited and it is obvious that their productive capacity will be strained to the utmost in time of war to supply military needs. The Government has therefore taken steps to stimulate establishment of new

industries and to initiate action whereby full advantage will be taken, should necessity require it, of the industrial resources of the country.

The establishment of new industries is a matter in which the Customs Department is concerned mostly but wherever necessary reference is made to the Defence Department for advice regarding the bearing an industry may have upon munitions production.

There are some industries exclusively connected with munitions such as gun ammunition, which would not be profitable for private enterprise and must be taken up by the Government itself and factories designed to produce a moderate amount of output are being erected for such purposes. These places will be inadequate in time of war but they will serve as places where supervising staff can be trained and as centres from which manufacturing details will be circulated to the commercial industries should it ever be necessary to convert such factories from their ordinary peacetime activities. In the meantime the Government factories are being utilised for production of the ordinary training requirements of the forces.

In time of war, therefore, it is the manufacturers of the country who must produce the munitions required by the Forces, and to ensure that this will be done efficiently there has been set up in the Department of Defence a Munitions Supply Branch which will co-ordinate these efforts. It is not much use, for instance, for some manufacturers to produce large quantities of shell if there <sup>are</sup> no High-Explosives to put in it, and it will be the duty of the Munitions Supply Branch to attend to such matters.

The Munitions Supply Branch is modelled largely upon the Ministry of Munitions in England and most of its officers were sent to England during the war to gain first-hand information of the best methods of organisation. The officer-in-charge occupied a high position in the Ministry of Munitions during the war and he and his officers are now engaged in erection of new factories, establishment of laboratories for scientific research and development generally of arrangements for local manufacture of all types of munitions.

In an organisation for munitions production the first step is tabulation of all the requirements of the Army. After that the process of manufacture must be determined and then you ascertain what raw materials are required and where they can be obtained. At this stage it is found that many raw materials are usually imported not always because they cannot be produced here but often because the local demand is too small to warrant production. If investigation shows that local production is impossible for any reason then



recourse is made to the Research Laboratories to ascertain whether a locally-produced substitute can be found. Enquiries of this nature often reveal astonishing facts, one recent instance being in connection with a component of artillery ammunition manufactured for the first time in Australia, which was found to require no less than 40 different materials in the make up.

After all this information is collected, and it is a task of great magnitude because many thousands of manufactured articles are required by the Navy and Army and Air Force, we propose to invite the manufacturing industries of the country to help by furnishing particulars of the scope of their works, their output capacity and other useful information. I have no doubt that their help will be forthcoming when it is requested and in the meantime they are doing practical work by their readiness to meet the ordinary peace requirements of the Department even though quantities and monetary values are small. It may be added in passing that Departmental standards of quality are high but manufacturers are usually able to meet them.

Of late years many articles formerly imported are being made locally and as the small demands make for high costs I have given directions that substantial preference may be given if necessary.

This brief outline of the steps we have taken in regard to munitions production will show that the Government is alive to the importance of building up an efficient organisation to direct it and it will be extended gradually as the financial resources of the country will permit.

For the next two years steady progress continued to be made in the implementation of the 1922 Programme. Occasionally a peremptory demand would descend upon us - a resounding alarm so to speak - for the expenditure programme to be reduced by so many pounds as our share of a Departmental reduction ordered by the Treasury. But I could generally produce some item or other on our programme to be deferred until the following year, or even promise that the saving would be made, with an unspoken hope in mind that the necessity would be forgotten by the end of the financial year, so that actually there was no real halt in attainment of the objective we had set ourselves. On 16th January 1928 the Prime Minister (Right Hon. S.M. Bruce, M.P.)

summoned a meeting of the Council of Defence to consider the financial condition of the three Services in respect of their five-year plan (which had been launched two years after the Munitions six-year plan) and the Munitions plan, and the Reports presented showed that there was no possibility of the respective plans being completed on the due dates, and the Treasurer stated for his part that there could be no increase of the total of the Defence Estimates for 1928-29 over the total for 1927-28. To do so, the Treasurer stated, "would mean increased taxation which was particularly inadvisable at the present time of financial stress". Of course, he did not know then that the financial conditions he had in mind were the darkening clouds of the Depression which was soon to shake the credit structure of the whole world. The Prime Minister expressed the opinion that <sup>the</sup> international situation at the time did not call for anything drastic in the way of special taxation for Defence purposes, and suggested there should be examination of items which should be preferred over others on the respective plans so that some at least could be carried through to completion on the funds available. Another meeting was therefore arranged for April, and this was convened on the 13th of that month. The reports presented by the Munitions Supply Board for the two meetings showed that five-sixths of the six-year programme would be completed by 30th June, 1928, and so it was only a year behind the original intention to be finished in 1928. For 1927-28, £466,000 had been voted, and it was asked that the amount for 1928-29 should be £500,000 but the final decision was that the amount to be placed in the Estimates <sup>is</sup> ~~should be~~ £425,000, would still enable completion of the Factory extensions because the savings ordered could be made up by

deferring production expenditure in the new factories. Certain works also were to be deferred, particularly the Artillery Proof Range, but as this was not wanted in any case until there had been some actual production from the new factories, this was not urgent and the other deferred works were by way of adding to the scope of the factories or improving their efficiency when in full production.

On 30th June, 1929, the extension programme was practically completed, at cost of about £1,400,000 against the £1,255,940 originally estimated, the total investment now in the Government Munitions factories being £2,100,000. I have said that, when the programme was initiated, the factories could make only .303-inch rifles and their ammunition, but now the manufactures could include field guns and their ammunition, which included new types of cordite and trinitrotoluol (high explosive); brass cartridges, fuzes and primers; shells and bombs; depth-charges and smoke-floats, and machine-guns. There were also workshops for manufacture of tools and gauges for munitions production and a workshop was built at Lithgow for manufacture of lathes and other machine-tools should these be needed in emergency. Research Laboratories and experimental grounds had been built and equipped with the most modern appliances, including standards of measurement; ranges for testing guns and artillery ammunition were constructed, and laboratories were equipped for testing the methods of defence against chemical warfare. The details at the new Ordnance Factory included a large Forging shop equipped with the largest Hydraulic Forging Press in Australia with the necessary furnaces so that now it was possible to forge large gun bodies in this country, and also there were Carriage and Gun

machining shops, a steel-plate fabrication shop and a wood-working shop. At the Ammunition Factory, Footscray, in addition to the various machining shops for Fuzes and Cartridge Cases, etc., there <sup>were</sup> ~~was~~ installed Brass Rolling-Mills, and in all there were now available manufacturing plants which although designed for a comparatively small output were complete and capable of undertaking a wide range of products. The technique could now be studied, and they only needed extensions to assure a large production of any of the standard types of munitions. It has been mentioned earlier that the supervisory technical officers had already been trained abroad, and foremen and leading tradesmen had been engaged from time to time as sections were completed and these were now undergoing training on experimental orders.

In the estimates of 1929-30 an attempt was made to obtain some money for commencement with a new developmental programme, but it was a forlorn hope and even the expenditures of the then departing financial year were severely pruned. The promise of £492,000 per annum for all purposes had gone overboard. The Depression was upon us; But the Treasurer did announce in his Budget statement -

The construction of buildings and works and the purchase of machinery and plant necessary for the approved Munitions Supply scheme are practically completed but there are certain "rounding off" projects in hand and money for these is to be provided from the Loan Fund. In general, it may be taken that the programme of developmental work on Factories and establishments for the Munitions Supply Board will not be affected detrimentally.

Meanwhile, we received assistance from the Naval Board in the effort to widen our scope within the framework of a new developmental programme. On 23rd February, 1929, the Navy Office forwarded specifications for Naval Cordite and asked to be

advised of the facilities for manufacture of such Cordite in Australia. The Navy Office said that a new type of Cordite was being manufactured in England for the Royal Navy; it was known as "Solventless Centralite Cordite" ("Cordite S.C.") but finality had not yet been reached in respect of the specification. The Naval Board was advised in reply of the current position and asked to consider whether the S.C. Cordite, or M.D. Cordite (the present local product) should be adopted for Naval use in Australian waters. On 8th April, the Naval Board was also advised of the possibilities of manufacture of certain types of shell and fuzes, and particularly its attention was drawn to the difficulties associated with proofs of Naval shell filled with the high-explosive Lyddite, as against the P.N.T. being manufactured in Australia for Army gun-ammunition. It was recalled that 3½ years had elapsed since there had been an examination of the possibilities of manufacture of Naval Munitions in Australia and it was suggested that there should be a re-survey. Following upon the advent of the Scullin Government, a deputation of Departmental employees waited upon the new Minister for Defence (Hon. A.E. Green, M.P.) on 9th December, 1929, and discussed matters of employment and retrenchment in the Government Factories, of which one item was the importation of cordite from England for the Navy. This was discussed afterwards in the Department and both Naval and Munitions Supply Boards were agreed that -

to give precedence to shell manufacture is calculated to serve best at this time the policy of munition production in Australia and to provide employment at a point in our organisation where it is most needed.

Next came a letter from the Naval Board (10th May) transmitting an Admiralty communication wherein the advantages of S.C. Cordite were expounded and the opinion expressed that if the

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Australian Navy did not adopt Cordite S.C. then another Naval type: Cordite M.C. would be preferred for Naval purposes over the Cordite M.D. being manufactured already in Australia. This Admiralty resistance to the use of Cordite M.D. for Naval purposes implied, of course, that in any case a new type of Cordite would have to be made for Naval requirements, particularly as the Admiralty strongly advised that there should be no decision until an Australian chemist had visited England and examined the position there. The Naval Board endorsed the Admiralty proposals and in conjunction with that discussed again the problems of proof and suggested that for the time being the production to be considered should be confined to charges of Cordite for 6-inch guns and under. The Munitions Supply Board again expressed agreement with the ideas of the Admiralty and the Naval Board, and at the end of May 1930 Mr. Leighton brought it to the notice of the Minister, as a new project, but pointed out that the cost was a problem: £25,000 for factory purposes and £30,000 for the facilities for proof. The alternative to the latter <sup>was</sup> being to send the Naval Cordite to England for proof. However, Mr. Green directed that the preliminary investigations and work regarding Naval Cordite were to proceed and receive continuous attention. The Manager of the Explosives Factory was advised accordingly and instructed to take up an investigation of the manufacture of nitro-benzene, that substance being the starting point for carbamite and tetryl, the first a basic constituent in the manufacture of S.C. Cordite, and the other used in the exploders for firing shell. He was asked to report as to the plant requirements and advised that there would be no necessity for importation of an aniline plant, but some special items would

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