

1928.



THE PARLIAMENT OF THE COMMONWEALTH OF AUSTRALIA

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PARLIAMENTARY STANDING COMMITTEE
ON PUBLIC WORKS.

Chair of the Senate.
JUN 12 1928

REPORT

TOGETHER WITH

MINUTES OF EVIDENCE

RELATING TO THE PROPOSED

AUSTRALIAN WAR MEMORIAL,
CANBERRA.

By Authority:

H. J. GILES, GOVERNMENT PRINTER, CANBERRA.

MEMBERS OF THE PARLIAMENTARY STANDING COMMITTEE ON PUBLIC WORKS.

(Fifth Committee.)

GEORGE HUGH MACKAY, Esq., M.P., Chairman.

Senate.

Senator John Barnes.
Senator Patrick Joseph Lynch.*
Senator Herbert James Mockford Payne.†
Senator Matthew Reid.

House of Representatives.

Malcolm Duncan Cameron, Esq., M.P.
Robert Cook, Esq., M.P.
The Honorable Henry Gregory, M.P.
Andrew William Lacey, Esq., M.P.
David Charles McGrath, Esq., M.P.
Alfred Charles Seabrook, Esq., M.P.

* Resigned 30th June, 1926. † Appointed 1st July, 1925. ‡ Resigned 2nd March, 1927. § Appointed 24th March, 1927.

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5. PUBLIC WORKS COMMITTEE.—REFERENCE OF WORK.—AUSTRALIAN WAR MEMORIAL, CANBERRA.—Sir Neville Howse (Minister for Home and Territories) moved, pursuant to notice, That, in accordance with the provisions of the *Commonwealth Public Works Committee Act 1913-21*, the following proposed work be referred to the Parliamentary Standing Committee on Public Works for investigation and report thereon, viz.:—The Australian War Memorial, Canberra.

Sir Neville Howse having laid on the Table plans, &c., in connexion with the proposed work—
Debate ensued.

Question—put and passed.

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AUSTRALIAN WAR MEMORIAL.

REPORT.

THE PARLIAMENTARY STANDING COMMITTEE ON PUBLIC WORKS, to which the House of Representatives referred for investigation and report the question of the Australian War Memorial, Canberra, has the honour to report as follows:—

INTRODUCTORY.

1. The *Australian War Memorial Act 1925*, provides that—

“(1) There shall be a Commonwealth Memorial of the Australians who died in the war.

“(2) The Memorial shall be known as the Australian War Memorial and shall consist of the collection of the war relics of the Commonwealth and such building for the accommodation of those relics as is specified by the Governor-General in the *Gazette*.

“(3) The war relics of the Commonwealth shall include the relics, records, models, pictures, photographs and other articles which at the commencement of this Act comprise the Australian War Museum and any other such articles, having relation to the war, which are acquired in pursuance of this Act.”

2. The items to be housed in the building will include practically the whole of the documentary records of the Australian Forces which took part in the Great War, as well as the pictures, figures, models and material relics in which the story of those Australians is enshrined.

3. The documentary records include not only the complete history of every unit, but also of every man who served in the Australian Forces, showing his period of service, wounds, rank, promotion and decorations.

4. A roll of honour will show in a permanent and legible manner the names of all those who died as a result of war service.

5. The material relics consist of models of battlefields, war trophies, including captured guns and aeroplanes, weapons, uniforms, &c., and anything which will give a picture of the actual life of the Australian soldier at the front during war time.

6. The gathering of these relics at the front began early in 1917, and by 1918 had grown to considerable dimensions. In that year a suggestion was made from the front to the then Minister for Defence (Senator Pearce) that this collection, which was obviously of great value, should be housed in a building which would be a memorial to the Australian Forces after the war, and which would contain also a Roll of Honour showing the names of all those who fell in the service of Australia. Cabinet considered this suggestion, and in 1918 informed the Australian Headquarters overseas that the proposal had been agreed to in general terms. This fact was made known amongst the troops and the building up of the collection in memory of the fallen received the wholehearted support of all ranks.

7. Since the war the Governments of Great Britain, the sister Dominions, and the Allies have made valuable gifts. Great numbers of soldiers and of relatives bereaved through the war have also, as a tribute to their dead, presented records and relics most precious to them.

8. This great collection is said to be unique of its kind, in that it constitutes not a war museum portraying—much less glorifying—war, but a memorial conceived, founded, and from first to last worked for by Australian sailors and soldiers themselves in honour of their fallen comrades.

PROPOSAL SUBMITTED.

9. The proposal now submitted for investigation by the Committee is for the erection on the lower slope of Mount Ainslie, on the axial line from Capitol Hill passing through the centre of Parliament House to Mount Ainslie, of a building to house the War Memorial collection and perpetuate and honour the names of the fallen.

DESCRIPTION OF THE BUILDING.

10. The design may be briefly described as a central sunlit garden court having on each side a Roll of Honour sheltered by arched cloisters which lead to a domed Hall of Memory. Surrounding the court of honour are grouped the lower flanking wings of the galleries containing the memorial collection.

11. The building at its greatest dimensions is approximately 400 feet long by 107 feet wide, and from the terrace in front to the apex of the dome is 104 feet high. It will consist of—

A lower ground floor containing a hall, 208 feet long by 40 feet wide, in which will be housed war relics; a strong room having a floor space of 17,000 square feet, intended for the storage of books and documents, and a reading room having a floor space of 1,000 square feet. The height of the walls in this portion will be 11 feet. In this section also provision is made for offices, staff luncheon room, photographic room, lavatories and caretaker's quarters.

A ground floor which has on each side of the central court of honour a hall 190 feet long by 40 feet wide, opening through a 12-ft. entrance to a gallery 135 feet long and varying from 30 to 34 feet wide in width. In these galleries are to be placed large models occupying twelve recesses 15 feet deep. In the centre under the Hall of Memory is a further museum space containing an area of 3,600 square feet, certain light areas, lavatories, &c. At the end of the building is an aeroplane court which contains 9,000 square feet of space, the greatest length being 130 feet and the greatest width 87 feet. The walls of this floor will be 12 feet high.

A first floor on which are two cloisters, one on each side of and standing about 12 feet above the central court of honour. These cloisters in which will be recorded the names of the fallen, are intended to be 9 feet wide and 15 feet high with arched openings to the central court of honour. The cloisters lead to the

Hall of Memory which is to be in the form of a Greek cross, the central portion of which is 40 feet square, and each of the four arms of the cross about 10 feet deep. The arm of the cross facing the entrance is intended to hold a choice piece of statuary. The four arches will be 33 feet high. The height up to the main cornice will be 46 feet and to the top of the dome 77 feet. The lighting of the Hall of Memory will be provided by four large semi-circular windows with ornamental glass which will admit a subdued light tending to create the requisite feeling of reverence. It is intended that the Hall of Memory will have a marble floor and a marble plinth 2 feet up the wall. The remainder will be treated with mural decorations and paintings depicting various subjects connected with the great war.

The central court of honour will be an open sunlit court approximately 212 feet long and 35 feet wide containing ornamental trees, flowers and sweet-smelling shrubs, and a central mirror pool 75 feet long, 15 feet wide and about 1 foot deep.

TYPE OF CONSTRUCTION.

12. The floors and certain structural portions of the building such as the dome and supporting piers are to be of reinforced concrete. The walls generally, including the backing of the stone facings will be of brick in cement. The roofs of the galleries will be in the nature of a light fireproof ceiling of concrete with a pitched roof of tiles externally. The dome will be covered with golden terra cotta tiles. It is intended that the whole of the external walls, including the piers and arches of the internal cloisters shall be faced with sandstone.

ESTIMATE OF COST.

13. The estimated cost of the building as submitted to the Committee is set down at £253,079, and the time fixed for completion two years from date of commencement.

COMMITTEE'S INVESTIGATIONS.

14. The Committee inspected the site suggested for the proposed building, carefully examined the plans of the structure which were explained in detail by the designers, and took evidence from representatives of the War Memorial Board and of the Returned Soldiers' Associations, architects, town planners, sculptors, builders and others in an endeavour to inform itself fully on the whole proposal.

SITE.

15. Situated on the southern slope of Mount Ainslie, it is proposed that the building shall be located on the axial line from Capitol Hill to Mount Ainslie within a reserve of approximately 30 acres.

16. The main approach to the building from Anzac place is to be 50 feet wide, gently rising to the lower terrace which is shown at the 1,925 feet level. This terrace is intended to extend laterally beyond the sides of the building and will be 550 feet long and 100 feet wide. This terrace will connect to Gallipoli avenue and Flanders avenue by means of secondary approaches 25 feet wide. A broad flight of steps in three stages will connect the upper and lower terraces opposite the main portal. These steps are to be flanked on either side by a pedestal on which it is suggested that suitable statuary of heroic size will be placed at some future date.

17. It is proposed that the two main terraces with their approaches be paved with a suitable material such as concrete used in conjunction with brick, in which case some interesting patterns may be introduced. It is suggested and shown on the plan that a space round the whole building should be cleared and graded evenly, where garden plots with ornamental shrubs and flowers could be introduced. The remainder of the area at the back will be planted thickly with trees to form a suitable dark background for the lighter coloured building.

18. The investigations made by the Committee satisfied it that the site offered no disabilities from the building point of view, and could be properly drained without great expense; while witnesses were unanimous that the position is pre-eminently the most suitable that could be suggested for a building of the nature contemplated, and with this opinion the Committee agrees.

19. The Committee therefore recommends that the erection of the building on the site selected be proceeded with at the earliest practicable opportunity.

BUILDING.

20. The size of this building is determined mainly by the space required by the War Memorial Board for the display of their exhibits and by the necessity of recording the names of those who died as the result of war service. The design of the building is governed by the fact that the Government stipulated that the cost of the structure should not exceed £250,000.

21. Competitive designs were invited for this building and, although some 70 designs were submitted the adjudicators reported that in their opinion only one could possibly be built within the stipulated amount and it was disqualified for other reasons. Subsequently, two of the competitors, Messrs. E. L. Sodersteen and J. Crust, were invited to collaborate and submit a new design, with the result now under consideration.

22. The Committee has been informed by the Chairman and other representatives of the War Memorial Board that the building suggested will provide all the space and would comply with all their requirements, while eminent architects, including the President of the Federal Council of the Australian Institutes of Architects, the President of the Institute of Architects of New South Wales, and the President of the Royal Victorian Institute of Architects were unanimous in their praise of the design as being appropriate, dignified and impressive, and architecturally worthy of the Commonwealth and of the purposes it is intended to serve.

23. Some doubt was expressed as to whether the building could be constructed for the stipulated amount, and considerable evidence was taken in regard to this aspect of the matter. The estimate supplied was calculated on a system of cubing, and it is recognized that this system can be regarded as only approximate and dependent to a large extent on previous experience of similar construction; so that with a unique building of this description there is an element of uncertainty. To obtain a more accurate estimate it would have been necessary to prepare working drawings and take out quantities, a procedure involving a considerable expenditure of time and money, and one at this juncture deemed inadvisable.

24. As supporting the estimate it was pointed out that a firm offer had been received for the stone facing of the building, and excluding that item, the building, with the exception of the dome, was not of an expensive or ornate character. Figures were obtained of the cost per cubic foot of certain buildings erected in Canberra, and of larger and more elaborate structures erected in Sydney, and after allowing for an advance of 15 per cent., which is given as the cost of buildings in Canberra as against Sydney, the Committee is satisfied from the evidence received that 2s. 6d. per cubic foot may be regarded as a fairly approximate estimate, and the weight of evidence supported the view that, were tenders invited for the work as now designed, there is a reasonable prospect that the sum desired to be expended may be found to be sufficient.

25. The Committee was assured that the building as designed will result in the production of a monument of appealing interest and beauty, and this being so, members are satisfied that Messrs. Sodersteen and Crust have successfully solved the problem with which they were faced of designing a suitable memorial building that could be erected for £250,000.

ENGINEERING SERVICES.

26. *Lighting.*—The scheme of lighting arranged for by the Federal Capital Commission aimed at the complete lighting of the building, including a system of flood lighting the dome, at an estimated cost of £5,700. After hearing the views of various witnesses the Committee is of opinion that it is unlikely that there will ever be any necessity to keep this building open at night time, so that the system of lighting may reasonably be restricted to the necessities of the office and cleaning staff. In this way the estimated expenditure might be reduced to £4,500.

27. *Flood Lighting.*—Special attention was given to the question of whether provision should be made for the flood lighting of this building by night. It was explained in evidence that difficulty and expense might be expected if the whole of the building were to be provided for, by reason of its size and design, and attention was then given to the advisability of flood-lighting the dome only. Views on this subject varied considerably. It was suggested, for example, that on a moonlight night the silent majesty of the structure, if light in colour, would be most impressive, but at the same time it was realized that flood-lighting would be probably the most effective method of ornamenting the building on special occasions. It was also suggested that from a sentimental point of view arrangements might be made to use in the flood lighting the searchlights from the Australian warships used in the war—not for use as searchlights, but merely that the projector should be adapted if possible for use with the ordinary lamps generally employed for that purpose. Inquiries made as to the cost of flood-lighting the dome elicited the information that the necessary installation would amount to approximately £550, and that the energy, depending on the frequency of use, and allowing for current at 7d. per unit, would cost 7s. per hour. So that the illumination for three hours each night, would cost approximately £382 per annum.

28. While not agreeing that the dome should be flood-lighted every night, the Committee, after much discussion, eventually agreed to recommend the expenditure on the necessary installation, leaving it for the Government to determine when the building is to be illuminated.

29. The decision arrived at by the Committee in connexion with this matter is shown by the following extract from its minutes of proceedings:—

Mr. Seabrook moved that no provision be made for flood-lighting the structure at the present time.

Seconded by Mr. Lacey.

Senator Reid moved as an amendment that the necessary installation be made to permit of the lighting of the dome on special occasions as required.

Seconded by Mr. Cook.

The Committee divided on the amendment.

Ayes (4).

Senator Reid.
Mr. Cameron,
Mr. Cook,
Mr. Mackay.

Noes (4).

Senator Barnes.
Mr. Lacey,
Mr. McGrath,
Mr. Seabrook.

and the Chairman having given his casting vote in favour of the amendment, it was declared carried.

30. *Water Supply.*—It was ascertained in evidence that a 6-in. water main is already laid on Gallipoli-avenue, from which an adequate supply of water can be obtained for the building and for keeping full the ornamental mirror pool in the Court of Honour.

31. *Sewerage.*—For the sewerage of the building it is intended to install a 6-in. sewer of glazed stoneware joined in cement. It will be laid on a grade of 1 in 60 through the ground, and would be sufficient to cater for the staff and 8,000 visitors. This sewer will discharge into the existing subdivisional reticulation of Reid. The provision of this sewer is estimated to cost £925, of which it is claimed that £650 should be chargeable to the building, the remainder to be borne by the Federal Capital Commission.

32. *Fire Protection.*—It is proposed to take a 6-in. main from the existing main to circuit the building and provide four fire hydrants. The distance between hydrants will be 300 feet and their distance from the building 100 feet. The estimated cost is set down at £1,975. The architects' specification indicates that provision has been made also for a system of fire hydrants throughout the building.

33. Careful consideration was given to the question of whether a system of fire sprinklers should be installed within the building at a cost of £5,000. While realizing the value of the contents of the building and the irreplaceable nature of some of the exhibits, members were faced with the objection that in certain sections water would probably do more damage than fire in a given time. Moreover, inquiries made showed that the water pressure at the site of the Memorial is low and that actually the static pressure would not be sufficient to properly operate sprinklers. If they were installed, therefore, it would be necessary to provide an automatic booster pump or a tank in the roof. The cost of a booster pump would be small, but it might not be absolutely reliable, while a tank, though reliable, might present some difficulties in its installation in the building without affecting the design.

34. After giving the matter much thought, the Committee, in view of the fire-resisting nature of the building and the fact that, while open, the museum will be constantly under supervision, unanimously decided that the installation of a fire sprinkler system was unnecessary.

35. *Heating.*—Although in the instructions issued to the architects it was stated that no heating was required, some consideration has been given to this matter, as, in addition to making the building more comfortable to the public and the staff in winter, it is probable that some of the exhibits as well as the records would benefit by a certain degree of warmth and dryness. Inquiries were made on the question of cost and it was ascertained that a suitable hot-water heating system using oil-burning boilers would cost about £14,000, while a heating and ventilation system could be installed for £18,000. The cost of maintenance of the heating system only would amount to approximately £9 per week and of the heating and ventilation system probably £14 a week. Some portions of the building, like the cloisters could not, of course, be adequately heated and taking into consideration that most visitors will be moving about during the course of their inspection, the Committee unanimously decided that a central heating system was not necessary. It is recognized that it would be essential to heat the permanently occupied portions such as the caretaker's quarters, offices, reading room, &c., but it is thought this could be adequately provided for by a system of electrical heating apparatus at a cost of approximately £200.

36. *Vacuum Cleaning.*—Consideration was given to the question of the installation of a complete vacuum cleaning system. In view of the size and design of the building, however, it was thought that such a system would be difficult and costly of installation. It was decided, therefore, that the needs of the establishment might be met by the use of portable machines as required, the power points for which are included in the architects' estimate of the building.

37. *Storm-water Drainage.*—There is a natural depression to the west of the building site, and it is proposed to take up the discharge of the catchment area by a concrete pipe line of storm-water pipes laid through the depression. These pipes will pick up the pipes from Peronne-crescent and from Gallipoli-avenue, and a connexion may be made to the roof-water drains from the building. The invert of the drain is below the basement level of the building. In Peronne-crescent and Flanders-avenue it will be necessary to deal with the storm-waters brought down by the Mount Ainslie storm-water drain and to construct two culverts. The total estimated cost of storm-water drains is set down at £3,600, of which it is suggested that £700 be charged against the building.

38. *Formation of Ground.*—The instructions issued to the architects provided that "The cost of preparing the site, including the laying out of the surrounding grounds and constructing such walls, terraces, steps, roads, &c., as may be incidental thereto, will be additional to the sum above mentioned, and the execution of these works will be arranged for by the Commonwealth independently." The 30 acres on which the building is to be situated will be bordered by Gallipoli-avenue, Peronne-crescent, Flanders-avenue and Anzac-place. In the architects' plans, terraces are provided at reduced levels of 1,933, 1,925, and 1,923 feet. They are horizontal, and it was pointed out in evidence that a person standing on the roadway at Anzac-place would have his view of the base of the building obstructed by a portion of the terrace at the 1,933 feet level. To overcome this difficulty, it is suggested that the terrace be sloped away from the building at a grade of 1 in 40, and, in addition, be given a longitudinal slope of 1 in 300 from the centre line, which will provide for the effective drainage of the pathways. Inquiries made by the Committee indicated that the cost of the formation of the ground, including excavation on the site of the building, was estimated to cost £15,650, of which it was claimed £7,925 should be charged, against the building.

39. *Plantations in Grounds.*—It is proposed to plant certain areas to the east and west of the building with Australian trees of selected types and of suitable heights to balance up the undulations of the area, and also to use a number of specimen trees. The varieties suggested

include eucalypts, kurrajongs, casuarinas and callitras. The areas immediately around the building will be sown with grass and specimen dwarf evergreen shrubs, which will be clipped to shape and kept low. There will be an edging or border planted with upright pyramidal conifers. Elsewhere will be planted cupressus of various types, dwarf flowering shrubs and berried shrubs with autumn foliage. Australian trees will greatly predominate, although it has been suggested that a sentimental interest might be created by having in some places types of trees typical of some of the war areas with which the Australian troops were identified. It is estimated that the cost of the plantations in the grounds and beautification generally will cost approximately £3,385, and that the upkeep will be £2,000 for the first year and £1,200 per annum for the second and succeeding years.

40. In order that the best features of the plan may be preserved, and the treatment of the site developed in harmony therewith, it is recommended that the treatment of the area surrounding the Memorial be carried out only after consultation and collaboration with the architects.

41. To avoid detracting from the appearance of the Memorial it is recommended that telephone and telegraph wires, and all electric cables in the vicinity be kept underground.

ADDITIONAL WORKS.

42. The above items were not included in the architects' estimate for the building, but are services of which it is claimed at least a proportion of the cost should be charged against the building. In addition certain expenditure will be necessary to develop the area in the vicinity of the Memorial. This development, although portion of the ultimate city development, would not be proceeded with in the ordinary programme for some years. The particulars obtained by the Committee in respect of these are:—

Parking Area.

43. It is proposed to form in Anzac-place a parking area to provide accommodation for 150 cars. It is suggested that ultimately Anzac-place will be sown with grass, but to save maintenance costs this might be left for a few years and shrubs planted in the meantime. The parking areas will be between the trees.

The estimated cost of this is—

Roads, kerbing and guttering	£3,500
Planting	675
	<hr/> £4,175

Roads.

44. The grading of the roads to be constructed around the site comprising Gallipoli-avenue, Peronne-crescent, Anzac-place and Flanders-avenue are to be carried out according to the principles adopted in connexion with the Parliament House gardens and other areas where the appearance of the streets is an important consideration. Due attention has been given to the importance of keeping the view of the building unobstructed from all angles.

45. *Gallipoli-avenue*.—It is proposed to construct this avenue to its full width of 200 feet, and to grade and form the central and side plantations and footpaths. There will be two side margins each 20 feet wide, each roadway will be 30 feet and the central plantation 100 feet in width. This is in accordance with the original plans of Mr. Griffin. This avenue will be 1,007 feet long and the estimated cost of it is set down at £5,150.

46. *Peronne-crescent* is proposed to be constructed to its full width of 100 feet. This includes two margins each 35 feet wide carrying footpaths and plantations, and a carriage way 30 feet wide. This crescent will be 2,652 feet long and is estimated to cost £8,200.

47. *Flanders-avenue*.—It is proposed to form and gravel the northern roadway—that is, the one adjacent to the site of the proposed building. The width of the construction will be 20 feet for footpath and plantation and 30 feet for the roadway. The length will be 2,100 feet and the approximate cost £6,025.

48. *Anzac-place*.—It is proposed to construct roadways 30 feet in width surrounding Anzac-place, which is a circular feature according to Mr. Griffin's plan. Also the northern, eastern and western roadways round Anzac Park. The total estimated cost of this work is £5,145, making the estimated total cost of constructing all necessary roads, pathways and plantations according to the lay-out of the city, including kerbing and guttering, £23,120.

49. The work above-mentioned covers almost the complete development of this locality. In the opinion of the Committee, however, provided suitable and convenient access to the Memorial be provided, the full programme for the development of the streets and footpaths may be spread over some years.

Sculpture.

50. During the course of the Committee's investigations it was ascertained that the designers of the Memorial intended that a suitable group of statuary should be placed at the back of the Hall of Memory facing the entrance; a group on each of the pedestals at the entrance, and a sculptured panel over the entrance; but no provision for the cost thereof was included in the estimate. It was stated that the cost of the sculpture indicated might be expected to amount to £40,000, but some criticism was offered to the effect that the placing of the sculpture as indicated was disadvantageous from the point of view of the most effective lighting, so that much of the decorative effect might be lost and full value not secured for the expenditure. It is, therefore, recommended that before contracting for the supply of any sculpture expert advice should be obtained as to the size and location of the proposed pieces.

51. While recognizing that the addition of sculptured groups or panels would add considerably to the appearance of the building, the structure would not look unfinished without it, and as the cost is great these additions might with advantage be deferred for a period of years.

52. The Committee is anxious that anything obtained should be of a high order of merit and, being a national Memorial, is unanimously of opinion that all sculpture in the building should be the work of Australians. It was stated in evidence that the highest class of sculptural casting is not carried out in Australia, and if this be so, the Committee thinks the work might reasonably be done in any of the allied countries where the material and workmanship can be depended upon to be of the best.

Recording of Names.

53. Besides a complete list of names of all who enlisted, with particulars as to service, wounds, promotion, decorations, &c., which will be kept in the records, it is intended to record in the Memorial the names, with no indication of rank, of all who died as a result of war service. It is expected that the number of names to be so recorded will approximate 80,000. The original intention of incising these names on the interior walls of the Hall of Memory proved to be a most expensive process, and the Committee was impressed with the ingenious idea suggested by Mr. Crust of recording the names by bronze letters cast in synthetic marble and placed in panels on the walls of the cloisters. This system will, in the opinion of the Committee, prove attractive and permanent, and besides meeting with the general approval of all witnesses examined, will result in a saving on the original method suggested of approximately £20,000.

54. Evidence was taken as to the method of classifying the names to be recorded, as it is desired that this be done in a manner which will provide for the easiest reference by visitors who desire to see those names in which they will be particularly interested.

Careful attention was given to suggestions made that names should be recorded under the units with which the men served, be the areas or actions in which they were killed, or the localities with which they were connected in Australia.

The classification by units offers disadvantages in that many men served in various units at different times and that surviving relatives are not fully informed of the unit with which they were serving at the time of their death.

The classification by States has the disadvantage of emphasizing existing subdivisions of Australia and of placing large groups of names under some headings and smaller lists under others. It is possible also that in the centuries to come State names or boundaries may be altered.

55. After due consideration, therefore, the Committee unanimously agreed to recommend the system suggested by the War Memorial Board, namely, that names should be recorded alphabetically in an alphabetical arrangement of the names of the towns with which they were connected, disregarding States excepting in such cases where towns of similar names occur in two States, when the distinction will be indicated.

LIBRARY.

56. The Committee was informed in evidence that the scope of the War Memorial Library as outlined by the War Memorial Board and approved by the Prime Minister in 1920 was that it should be limited to—

- (a) written records dealing with the war;
- (b) trench, transport, and unit papers and magazines; and
- (c) publications and books having a special value by reason of their historical connexion with and reference to, the Australian Naval and Military Forces, and providing and compiling data for the compilation or study of Australian war records.

57. The Committee made inquiries as to whether there was likely to be any duplication of purchases by the War Memorial Board and the National Library, and was informed that in regard to books, while there was a probability of some duplication, it would not be great. It was mentioned that the value of the books acquired by the War Memorial Board and which would also be acquired by the National Library is at present about £36 annually, and that this figure would decrease as the publication of war books of historic value dwindled.

In the case of both books and other items the Committee feels that any duplication of purchase should not extend beyond what is absolutely necessary. It is of opinion that it would be desirable to have some definite delineation and definition of the scope of the War Museum so as to avoid any conflict with the work of other libraries and institutions of the Commonwealth.

58. In regard to the lay-out of the Library, the Committee approves of the use of steel shelving as proposed, and suggests that the stacks be placed 3 feet 6 inches apart in the ordinary passages and 4 feet 6 inches in the main passages with subdivision of the central stacks to permit of ready access.

59. For the better preservation of the books and documents to be kept therein, and for the comfort of the staff, it is recommended that steps be taken to provide adequate natural ventilation, although the Committee is not prepared to recommend that a special air-conditioning plant be installed.

60. It is also suggested that the position of the proposed reading room be altered to bring it closer to the offices, and permit of better supervision of persons entering or working in the reading room.

61. An effort was made to arrive at the probable cost of maintenance of the building, and to ascertain if any revenue was likely to be derived from it. It was stated in evidence that the salaries of the staff required would amount to approximately £2,380 per annum, and contingencies to £650 per annum. As admission will be free, revenue from the establishment is likely to be small, but it was stated that during the last twelve months a profit was made from the War Museum in Sydney of approximately £242 from the sale of guide books, reproductions of pictures, photographs, &c.

FACING MATERIAL.

62. In the conditions of the competition it was stipulated that the building should be faced with a material not inferior to sandstone, and in the design prepared by Messrs. Sodersteen and Crust, Waverley sandstone is specified. It was stated in evidence that a firm offer had been received to supply and fix on the building a sandstone facing 6 inches thick at a cost of £48,430.

63. During the course of the Committee's investigations several witnesses claimed that sandstone could not be regarded as a permanent material, and instances were mentioned of the deterioration of that stone in buildings which had been erected for about 100 years.

64. Mention was made of synthetic granite and the Committee examined samples of this preparation and visited the factory where it was being manufactured. As this product is comparatively new, it was felt that its durability was not proved, and by some witnesses it was felt that the use of an artificial composition of this nature in a Memorial building might be regarded as an offence to sentiment. In like manner the use of specially prepared concrete was not regarded favourably.

65. All architectural witnesses were emphatic that the most appropriate and enduring material that could be used for the facing of this Memorial would be light-coloured granite, but Mr. Sodersteen had stated that the price quoted to him for the use of granite was £144,377, which put such material out of the question. During the course of the Committee's investigations, however, a visit was made to an establishment where granite was being worked, and evidence obtained from a witness representing a granite company and the three largest stone yards in Sydney. He intimated that he was authorized by his company and the three yards mentioned, to state definitely that if the offer to supply and fix on the building a facing of sandstone for £48,000 were correct they would be prepared to do the work with a veneer of 3 to 4 inches of granite for the sum of £65,000. If the price quoted for free-stone were incorrect it was added that the difference between free-stone and granite, fixed on the building, would not be more than 4s. per super foot.

66. This information, elicited by the Committee, puts a different complexion on the matter, and in view of the general wish that this splendid Memorial should be constructed of the most enduring material obtainable, the Committee is unanimously of opinion that granite would form a more suitable and durable facing than sandstone, and recommends the adoption of a light-coloured axed granite.

SEPARATE CONTRACTS.

67. In the erection of a structure of the magnitude contemplated, if the contract be let for the building as a whole it is probable that the contractor will sublet contracts for certain sections of the work, and reap a percentage of profit over the whole. As it is desirable that every economy possible be exercised in connexion with the erection of this building, it is recommended, that tenders be called for each of such sections separately, thereby saving the profit which the general contractor would otherwise make.

PREPARATION OF QUANTITIES.

68. The preparation of quantities is usually arranged for by the architect and a fee allowed the quantity surveyor at the rate of 1 per cent. of the cost of the building. To save this expense, estimated in this instance at £2,700, it is recommended that the preparation of quantities be entrusted as part of their usual duties to the qualified quantity surveyors of the Department of Works and Railways.

TOTAL COMPLETED COST.

69. With a view to informing Parliament fully in the matter the Committee endeavoured to ascertain the total liability involved in the erection of this Memorial, and from evidence obtained has prepared the following figures :—

	Chargeable to Building.	To be provided by Federal Capital Commission.
	£	£
Estimated cost of the building as submitted by designers	253,079	..
Extra cost of granite facing	17,000	..
Architects' fees	16,200	..
Sculpture	40,000	..
Sewerage	650	275
Water supply and fire-hydrants	1,975	..
Electric supply .. .. .	..	2,852
Lighting the building, not including flood-lighting	5,150	..
Flood-lighting of dome	550	..
Formation of grounds, including excavation on site of building	7,825	7,825
Concrete paving of terrace at 1933 feet level	2,444	..
Concrete paving of terrace at 1925 feet level	6,722	..
Concrete paving of side entrance	1,375	..
Concrete paving of main entrance	684	..
Brick paving of paths and terraces	1,650	..
Terrace wall	4,400	..
Front steps between 1925 feet level terrace and 1933 feet level terrace	4,400	..
Storm water drainings	700	2,900
Plantations in grounds and beautification generally	3,385	..
Surrounding roads, including kerbing and guttering—		
Gallipoli-avenue	128	5,022
Peronne-crescent	300	5,900
Flanders-avenue	128	0,497
Anzac-place	48	2,672
Road north of Anzac Park .. .. .	..	1,075
Western roadway Anzac Park .. .. .	..	570
Eastern roadway Anzac Park .. .. .	..	780
Formation of parking area, including kerbing and guttering Anzac-place .. .. .	..	3,500
Plantations and beautification of parking area, Anzac-place .. .. .	..	675
Plantations and beautification of surrounding grounds .. .. .	..	738
Concrete footpaths in Gallipoli-avenue, Flanders-avenue, and Peronne-crescent	1,178	1,178
Concrete footpaths in parking area, Anzac-place .. .. .	..	560
	£369,971	£43,019
Making a total of	£412,990	

70. In addition there will be an annual expenditure in respect of the following items :—

Upkeep of gardens, £2,000 for the first year and £1,200 per annum for the second and succeeding years.

Salaries of staff, £2,380 per annum.

Contingencies, Maintenance, &c., £650 per annum.

Flood-lighting of dome varying in accordance with the number of nights and duration of illumination.

IMMEDIATE COST.

71. Eliminating the following items which are not chargeable to the building and those which in the opinion of the Committee may be deferred or spread over a period of years, viz.:-

Sculpture	£
Architects' fees	40,000
Formation of ground	18,200
Storm-water drainage	7,825
Plantations	700
Roads	3,385
Concrete footpaths	604
	1,178
	£69,892

The estimated immediate cost of the building and essential services may be stated at £300,079.

SUMMARY OF RECOMMENDATIONS.

72. Briefly summarized the recommendations of the Committee are as follow:—

- (a) That the erection of the building on the site selected be proceeded with at the earliest practicable opportunity, paragraph 19.
- (b) That the system of lighting be restricted to the necessities of the office and cleaning staff, paragraph 26.
- (c) That provision be made for flood-lighting the dome as required, paragraph 28.
- (d) That the installation of a fire sprinkler system is unnecessary, paragraph 34.
- (e) That a central heating system and air-conditioning plant is unnecessary, paragraph 35.
- (f) That vacuum cleaning be carried out by portable machines, paragraph 36.
- (g) That the terrace at the 1,933 feet level be sloped to give an unobstructed view of the base of the building from Anzac place, paragraph 38.
- (h) That the treatment of the area surrounding the Memorial be carried out in collaboration with the architects, paragraph 40.
- (i) That telephone, telegraph and electric cables in the vicinity be kept underground, paragraph 41.
- (j) That provided suitable and convenient access to the Memorial be provided, the full programme of development of the streets and footpaths could be spread over some years, paragraph 49.
- (k) That expert advice be obtained in the matter of placing sculpture, paragraph 50.
- (l) That the provision of sculpture be deferred for a period of years, paragraph 51.
- (m) That all sculptural work on the building should be done by Australians, paragraph 52.
- (n) That sculptural casting be carried out in any of the allied countries where the material and workmanship would be of the best, paragraph 52.
- (o) That the system of recording the names of the fallen as suggested by the War Memorial Board be adopted, paragraph 55.
- (p) That the scope of the War Memorial Library be definitely defined to avoid any conflict with the work of any other libraries or institutions of the Commonwealth, paragraph 57.
- (q) That steps be taken to provide adequate natural ventilation in the record room, paragraph 59.
- (r) That the position of the reading room be altered to permit of better supervision, paragraph 60.
- (s) That the building be faced with light-coloured axed granite, paragraph 66.
- (t) That separate tenders be let for certain sections of the building, paragraph 67.
- (u) That the preparation of quantities be entrusted to the qualified quantity surveyors of the Department of Works and Railways, paragraph 68.

SAVINGS EFFECTED BY THE COMMITTEE.

73. If the recommendations of the Committee be adopted, it is anticipated that the following savings will be effected:—

	£
Alteration of lighting system	1,200
Elimination of fire sprinkler system	5,000
Elimination of automatic fire doors	600
Modification of central heating and artificial ventilation	17,800 and £364 per annum
Profit on separate contracts—say	7,000
Preparation of quantities	2,700
	34,360
Less increased expenditure if granite facing is adopted	17,000
Leaving a net saving of	17,360 and £364 per annum

G. H. Mackay
G. H. MACKAY,
Chairman.

Office of the Parliamentary Standing Committee on Public Works,
Parliament House, Canberra.
25th May, 1928.

MINUTES OF EVIDENCE.

(Taken at Canberra.)

THURSDAY 22ND MARCH, 1928.

Present:

Mr. MAOKAY, Chairman;

Senator Payne	Mr. Lacey
Senator Reid	Mr. McGrath
Mr. M. Cameron	Mr. Seabrook.

Sir Neville Reginald Howse, V.C., K.C.B., K.O.M.G., Minister for Home and Territories, Minister for Health, Minister in charge of Repatriation, and Chairman of the Board of Management of the Australian War Memorial, sworn and examined.

1. *To the Chairman.*—The proposal that has been referred to the committee for investigation is the War Memorial building which is to be erected at Canberra. By an Act of Parliament (No. 18 of 1925) the War Memorial will consist of the Commonwealth collection of war relics, given by sailors and soldiers and their relatives, together with the building in which they are housed. An important feature of the building will be the Hall of Memory, in which will be inscribed, in a permanent and legible manner, the names of Australians who died as the result of war service, irrespective of the date of their deaths. In inscribing their names therein, no mention whatever will be made of distinction. In the memorial will also be kept a record of all units and of every individual man from the time he joined to when he left the service. The Government is anxious to carry out this policy, which is a universal one of honoring the achievements of the nation in the war and the sacrifices of the fallen, not for the aggrandizement of the soldiers or their relatives, but for the purposes of giving an educational incentive to the nation. It is being done with the object of commemorating the great sacrifice that these men made when their country was in peril. The great collection of war relics is unique of its kind, in that it constitutes not a general museum portraying—much less glorifying—war, but a memorial conceived, founded and from first to last worked for by Australian sailors and soldiers themselves in honour of their fallen comrades. The collection has in part been displayed to the public, first in Melbourne where in the course of two years it was seen by 800,000 visitors and afterwards in Sydney, where the attendances to date total 1,250,000. The Government has announced that the cost of the building shall not exceed £250,000. That amount would not include the cost of the preparation of the site, gardening, and terracing, the extension of water, sewerage and electricity mains to the site, road-making, remuneration of architects, overhead charges and interest on capital during course of construction. The general instructions with which the architects were required to comply were included in the data relating to the project referred to the Committee. Concerning the constructing authority, I would point out that by Act 18 of 1925, which provides for the establishment of the Australian War Memorial, the appointment of a board of management with certain prescribed functions and powers was authorized. The board is subject to the Minister for Home and Territories, and the Minister, advised by the board, is re-

sponsible for bringing about the establishment of the war memorial. This includes the responsibility for the design, the reference of the project to the Public Works Committee for investigation and report, and the obtaining from Parliament of the funds required for the construction of the building. Under the *Seat of Government (Administration) Act* (No. 8 of 1924), the Federal Capital Commission is granted the following power—

Subject to the approval of the Minister, the construction of all works and buildings required by the Commonwealth in the Territory, except works exempted by order in Council from the operations of this paragraph.

While the procedure to be followed in connexion with the construction of the war memorial building has not yet been determined, it is probable that upon the acceptance of a design and the provision of funds by Parliament, the Federal Capital Commission will be requested by the Government to arrange for the construction of the memorial. It is, therefore, not definite but probable that the commission will be empowered on behalf of the Government to make the necessary arrangements with the architects and the builders for the erection of the building. With reference to the architectural competition, I would point out that the conditions governing the competition provided that a design should be excluded if the adjudicators determined that the probable cost would exceed the stipulated sum of £250,000. This was emphasized in a statement circulated to registered competitors. They could, therefore, have been under no misapprehension regarding the mandatory nature of this clause. When the adjudicators met, it quickly became apparent from the elaborate nature of the designs submitted that compliance with this clause relating to cost would be a decisive factor. After careful investigation, the adjudicators were forced to the conclusion that with perhaps one exception, none of the designs could be carried out for the sum allowed. The one exception was unacceptable on other grounds. The adjudicators were, therefore, unable to select any design for transmission to London for final adjudication. This prevented the making of any award and the competition was brought to an end. It was only after this that the Government agreed to a suggestion that, to avoid the delay entailed in holding another competition, two architects who had taken part in the competition, should be invited to collaborate in preparing a fresh design satisfying the Government's requirements. In the opinion of the adjudicators the two architects selected had, by their work in the competition, established a superior claim to be chosen for this purpose—one by his skilful and economical planning; the other by the beauty of his design. The Government did pay to twelve competitors because of the work that they had done, and purely as an act of grace, an amount of 100 guineas each. From the evidence before me I am satisfied that there has been no breach of trust on the part of the Government in respect of the original competitors for the design. Officially, I have heard of no dissatisfaction with the manner in which the competition was concluded, but I have heard rumours among my own friends that the Government should be prepared to erect a more elaborate building and that money should not stand in the way of such a commemoration. Certain persons have pointed out that New Zealand, a smaller

country than Australia was erecting memorials at Auckland and Wellington at a cost of £200,000 each. That point was also raised by the Soldiers' and Sailors' Association, to which I belong, and I pointed out that it was a question not merely of money but of obtaining a structure suitable for a model city in which war relics could be housed. The erection of the building is really a matter of urgency because these relics are priceless and if destroyed by fire, could not be replaced. They are of great educational value to the nation, and are really a trust in the hands of the Government. They have been collected by the soldiers and their relatives. At present they are housed in buildings which are not of fire-resisting construction. It is estimated that the Roll of Honour to be placed in the Hall of Memory will include 80,000 names. The number of deaths to date due to war service is about 69,000, and deaths are continually occurring. For instance, last week a man died clearly as a result of war service. He was mentally unsound and committed suicide. His name will be included in the roll, because his mental condition and therefore his death were brought about by his war service. His wife and children have become pensioners. The names are to be set in the cloisters which form part of the Hall of Memory. The architects will be able to advise the committee on that point. After investigation of different methods, they found that a quite suitable and also the cheapest method is to have cast a large number of letters of the required size. With these letters the number of names to appear in one panel will be assembled, and synthetic marble then poured over them. When the marble is set, the panel will be removed from the form, and the face polished. It will then have the effect of bronze letters set in marble. You ask me what I think of the opinion which is occasionally expressed that a national memorial should take a utilitarian form. Where this is urged it will frequently be found that utility is the object and that the memorial is merely a pretence. Where this is not the case, the plea for a utilitarian memorial arises from a confusion of values. It is based upon the idea that the country should get some practical return for its expenditure—that money is wasted that is devoted to a statue or monument. There could be no greater misconception of the purpose of a national memorial. The Cenotaph in Whitehall yields no interest upon the capital invested, but who shall estimate the return in consolation and inspiration which it has given the British nation? Spiritual as well as material values must weigh with a people. In a utilitarian memorial, after a time only the useful element remains. A utilitarian memorial would be particularly inappropriate as a national memorial, where the utility provided can benefit only the small section of the population in its neighbourhood who are able to enjoy the advantages it offers. The committee formed to establish the South Australian War Memorial which was representative of both parties in the State Parliament, subsequently supplemented by a number of non-parliamentary members, expressly laid down that the memorial should not take a utilitarian form. At a public meeting held in the Melbourne Town Hall on the 4th August, 1923, to discuss the establishment of a Victorian War Memorial, it was decided it must be a monument. This decision was endorsed later by a meeting of mayors and mayoresses. The State Government agreed to contribute, on condition that the memorial should be of a non-utilitarian character. These facts indicate the views held elsewhere opposed to utilitarian memorials. I do not think that we should ask the States to contribute to the cost of the building, but I do think—and I am speaking as a soldier—that had we asked the soldiers when they returned from the war to contribute they

would have been prepared to pay a great deal of the expenses in connection with the building of the memorial and the storage of war relics. The Government asked the War Memorial Board (or committee as it was then called) to select a site for the building and it selected one at the foot of Mount Ainslie, facing Parliament House. The board consists of the Minister for Home and Territories as chairman, Sir George Pearce, Sir William Glasgow, Major Mair, Admiral Napier, Sir Harry Chauvel, Sir John Monash, Sir Brudenell White, Colonel Donald Cameron, Mr. H. S. Gullett, Mr. Justice Ferguson and Mr. C. E. W. Bean.

2. To Senator Reid.—The committee recommended a site and the Government agreed to it. It is not yet definitely settled, but it is probable that the Federal Capital Commission will be asked to arrange with the architects and builders for the construction of the building. I think that the soldiers themselves will be satisfied with the form of the war memorial. Of course, it would be impossible to satisfy all the soldiers or all sections of the community, but as far as I can find out from the Association—I am a member of the Orange Branch—the members appear to agree entirely with the action of the Government. In order to conform with the views of the returned soldiers the Government formed the War Memorial Committee consisting principally of returned soldiers.

3. To Mr. McGrath.—I see no reason why the Federal Capital Commission should not supervise the erection of the building. The whole of the work will be done by contract and I presume that the architects will be responsible for the supervision. The war relics will be housed in the Exhibition Buildings at Melbourne and Sydney. In either case they are safe from fire, and I think that it will be agreed that however simple they may be they are priceless because of their associations. The record in the Hall of Memory will be of those who died from war injuries, and I am totally opposed to exhibiting the names of the living. No distinctions will be made. Rank will not be recorded because every man made an equal sacrifice. A full record of their service and distinctions will be kept in the library, which is part of the memorial. I hope to arrange for the laying of the foundation stone of the building on next Armistice Day, and it is anticipated that building operations will commence early next year. I do not know whether the expenditure will be met out of revenue or loan, but I think we would be perfectly justified in paying for it out of loan money because it will last for a much longer period than 50 years. I am advised that the estimated cost of maintenance of the memorial will be about £3,000 a year. Staffs are maintained at both Sydney and Melbourne, and when the relics are housed at Canberra, the staffs will be reduced and co-ordinated. Of course if a change of Government took place there would be nothing to prevent the new government from changing the personnel of the War Memorial Board by amending Section 5 of the Australian War Memorial Act, which reads:—

(1) For the purpose of this Act there shall be a board of management, consisting of not more than twelve members appointed by the Governor-General and, on the happening of any vacancy in the office of member of the board, the Governor-General may appoint a person to the vacant office.

(2) Members of the board shall hold office for a term of four years but shall, upon the expiration of that term, be eligible for re-appointment.

(3) In case of illness or absence of any member of the board, the Governor-General may appoint a person to act as the deputy of the member during his illness or absence, and the deputy shall, while so acting, have all the powers and perform all the duties of a member.

The late State Government of Victoria decided that the war memorial for that State should not be of a

utilitarian character, and I have no knowledge of a change of opinion on the part of the present Government.

4. To Mr. Lacey.—If the building were erected by contract and supervised by the architects, of course the Federal Capital Commission would, in a way, be responsible for the work, but the contract would have to be carried out under the advice of the architects. The commission would certainly be responsible for checking that the architects were efficiently supervising the construction of the building, using the correct materials and observing time specifications. The material and observing time specifications of the Capital city would impose certain restrictions upon the selection of a site for war memorial purposes. As far as I am concerned, I should select the site that has already been chosen or one in its vicinity as suitable for the purpose. I should think that under section 5 of the Act the Government would make the appointments to the War Memorial Board. I do not know who would make the recommendations to the Government.

5. To Senator Payne.—The war relics are stored in the Exhibition Buildings at Melbourne and Sydney. Every protection possible is given to them, and the advice of the representatives of the fire boards was sought. A night watchman is on duty in each building, but although everything possible has been done to preserve them they are still very unsafe, because the buildings in which we have been obliged to place them are not of fire-resisting construction. In saying that I consider the site selected to be the most suitable, I should like to point out that I am guided entirely by the opinion of architects, because I have no knowledge of the contours and therefore cannot express an expert opinion in regard to elevation and idealism. I am sure that if I were asked to construct a model city, the result would be rather a disgrace.

6. To the Chairman.—I feel certain that if this committee decided on a site which it considered was more suitable for the war memorial building, the Government would not hesitate, if it thought fit, to accept the committee's recommendation.

7. To Senator Payne.—It would be much preferable to remove the war relics to Canberra as soon as possible rather than to leave them in Melbourne and Sydney, with the risk of destruction by fire.

8. To Mr. Cameron.—The illustrations that the members of the committee have before them show the design that has been accepted for the memorial.

9. To Mr. Seabrook.—The Government has agreed to provide £250,000 for the erection of the memorial. If the tenders are higher than that amount the only thing to do will be to curtail the design or else ask the Government to provide the extra sum required. As far as possible, we are making that amount the limit for the actual cost of the building. The overhead charges will be in addition. Tenders will be called in all the States. The names of all soldiers will be recorded in the library in book form, and the names of the fallen soldiers will appear on tablets in bronze letters.

10. To the Chairman.—With reference to the stone to be used in the building the War Memorial Board says:—

It is regrettable that the memorial cannot, for economic reasons, be expressed in a more enduring material than sand and stone, but after all that material is used in most of the great monuments of the world.

11. To Mr. Cameron.—If the tenders are more than £250,000, I should say that as the competition designs were disqualified because it was believed they could not be carried out for the sum allowed, we should be more emphatic in this case in keeping the cost of the building

within this sum. If the tenders do not come within £250,000, it will mean the curtailment of some portion of the building.

12. To Senator Reid.—The present design has been submitted by the two architects that were selected. They conferred with the War Memorial Board, the Federal Capital Commission, and the adjudicators, consisting of the President of the Federal Council of the Australian Institutes of Architects, the Professor of Architecture at the University of Sydney, and the Commonwealth Director-General of Works. These three gentlemen, although not now the adjudicators, are really acting in an advisory capacity.

(Taken at Canberra.)

FRIDAY, 23RD MARCH, 1928.

Present:

Mr. MACRAE, Chairman;

Senator Payne
Senator Reid
Mr. Cameron
Mr. Cook

Mr. Lacey
Mr. McGrath
Mr. Seabrook.

Charles Edwin Woodrow Bean, Official Historian of the A.I.F., sworn and examined.

13. To the Chairman.—At the present time I am writing, and editing for the Australian Government a history of the operations of the A.I.F. during the war. I am aware that the Government has asked this committee to investigate and report on the establishment of a war memorial at Canberra, and I am familiar with the discussions which have culminated in the present proposal. The proposal for the war memorial really goes back to the period of the war itself. According to the King's regulations it is necessary that all records in the shape of war diaries and reports be sent to the rear, and these, in the first place, were committed to the custody of the British War Office. After the evacuation of Gallipoli in 1916, when I was in London, Mr. H. C. Smart of the High Commissioner's Office and I ascertained that these records were being sent to England where they were being kept with the records of the British Army. Sir Max Aitken, who was responsible for writing an account of the war for the Canadian Government, informed us that the Canadians were taking steps to have their diaries and records removed to the custody of their own people. Mr. Smart and I thought that the same course should be followed with respect to the Australian records. We therefore made this request supported by Sir Max Aitken, afterwards Lord Beaverbrook, Minister for Information. The British War Office willingly acquiesced in our suggestion, and it was arranged that the diaries, &c., should be removed, and placed in the custody of some Australian authority, in consideration of our giving the War Office a copy of each Australian war diary. In return they promised to furnish us with any of theirs which we might require. Early in 1917 the necessary authority for the reception of these documents was set up. Lieutenant Treloar was chosen to organize the collection, and afterwards it was transferred to Australia. We also obtained the right from the British War Office to take our own photographs. This was a right which had previously been jealously guarded by General Headquarters, who recognized the danger of such photographs falling into enemy hands. The first arrangement was that we should use the British War Office photographers, on the understanding that they should take photographs of anything we desired, and that

these photographs should become our property. It was found, however, that this arrangement would not work. The British photographers were kept, news men, imported from the British agencies, and in their keenness for news value, if the material for a photograph was not present they made it up. We considered that this was a very dangerous practice if the photographs were to serve as official records. We therefore asked that we should be allowed to employ our own photographers, men who could be relied upon to take only actual scenes. I do not wish to say anything against the British photographers, but it is a fact that it was quite an easy matter to fake war pictures. For instance, by putting a plug of gelignite under a corner of a house and blowing it up, a very fine representation of a shell burst could be obtained. Our first photographer was appointed in 1916, and some very valuable photographic records began to flow in from that time. I was myself present, as far as possible, during each engagement, and the photographs made a point of being always present, and though, of course, it was seldom possible to obtain photographs of any actual feet of arms, as soon as we could learn of it afterwards we took pictures of the scene of the fighting, showing, perhaps some broken bomb spot or captured trench. Such records are immensely valuable for incorporation in a history in order to add cumulative proofs of the truth of the story. Early in 1917, when Major Treloar started to organize the Australian records section, these two kinds of data, written and pictorial, were forwarded to him. Shortly after this it was suggested that, as the British and Canadians were sending official artists to the front to paint war pictures, it might be advisable if we were to do the same, and it was arranged that two artists should be sent over for this purpose. Here, again, our policy was different from theirs. The Canadians sent over artists who were, I have no doubt, very able men, but who were almost all of the new schools. I do not know enough about art to know whether they were virtuosos or fakes. Some of them who could paint normal pictures did produce very effective work, but others turned out pictures which, I thought, would be almost insulting to the relatives of those fighting at the front. They put together a very valuable collection of paintings which were exhibited in London in 1917, but, to my mind, it was more an exhibition of freak art than a record of the war. When the Canadian pictures were sent back to Canada they were very shortly relegated to obscurity for that reason. We chose Australian artists who were working in London at the time, such as Lambert, Leist, Power, Streeton, and others. Will Dyson was the first to go over. He was not commissioned by any one, and went over without any remuneration. He was devoted to the A.I.F., lived the life of an infantryman at the front, and was twice wounded. He has left on record a series of drawings which, as far as I am aware, are the only pictures which adequately depict the utter verities, misery, and distress of the men at the front during the winters of 1916 and 1917. I remember he said once that no picture he ever drew would go towards the glorification of war, and render more likely another war in the future, and indeed there is no quality in them other than that which portrays the strain and toil of war. We have 200 of these drawings which we propose to keep together as a unique collection. For this work he received no remuneration, and put himself into financial straits to do it. Both in the British and other armies it was the practice to collect war trophies, things covered by military regulations which contain provisions for sending captured guns to the rear to be allocated to different authorities. Australian units in each battle were showing considerable interest in the capture of guns as exemplifying the progress of the unit. It was recognized that it was desirable to collect these trophies into some kind of a

museum where they could be displayed, and where war records might also be kept. In 1918 a suggestion was made from the front to Senator Pearce that this collection, which was growing to considerable dimensions, and which was obviously of great value, should be housed in a building which would be a memorial of the Australian forces after the war, and which would contain, also, a Roll of Honor showing the names of all those who fell in the service of Australia. Cabinet considered this suggestion, and in 1918 informed the Australian headquarters overseas that the proposal had been agreed to in general terms. This fact was made known amongst the troops by the Australian War Records Section, through its officers. Mr. H. S. Gullett, myself and others, visited all the large units we could in France and Palestine, explaining to the officers and men that this collection was to be made in honour of their fallen comrades. The War Records Section by that time had a small depot organized in France to receive any relics brought in. It was run by enthusiastic men who had been incapacitated for further fighting, but who were able to carry on such work as this. From that time on the inflow of material to our depot was so great, and of such a character, that it excited the attention of the British war authorities, and the question was raised as to whether we were not collecting too much material. For instance, the 3rd Battalion, near Messines, removed one of the artificial trees which had been erected in a wood for artillery observation purposes. It was taken down during the night, and carried off some miles to the depot, a considerable amount of transport being used in the process. The British authorities informed Major Treloar that they could not understand how it was that more material was being collected by the comparatively small Australian forces than by all the other divisions of the British Army. The reason, of course, was that the proposal had been well published amongst the Australians, and the troops were enthusiastic. The depot was first started under Corporal Bailey, a West Australian, who had been incapacitated, and to his work, to a great extent, the success of the early collectors was due. He unfortunately met his death while trying to clean out some of the shells which were sent to the depot. On one occasion, the collection was almost overrun by the Germans in their big advance of 1918. The German shells were already falling in the town where it was housed, but the officers managed to find some Australian transport, and a number of men volunteered to remove the collection, even though the Germans were almost upon them. In the summer of 1918 the proposal was made that a series of models should be constructed of interesting points on the battlefield. The genesis of the idea was as follows:—After the German thrust against Amiens had been stopped in 1918, a number of war correspondents, artists, and photographers, including Captain Wilkins, had their temporary headquarters just behind the Australian front, where the 6th Infantry Brigade was also quartered. One evening a discussion arose as to what would be the most interesting type of exhibit that proposed war memorial could contain. It was the wish of all those connected with the scheme that there should be set up in Australia an institution which would be metropolitan in the sense that it would be the best of its kind anywhere. We planned that, just as one had to go to Florence or Dresden to see the finest picture galleries, so people would have to come to Australia to see the finest war memorial. I thought that probably the most interesting exhibits in such a memorial would be a section of old duckboards which had lain in the bottom of a trench, and were worn by the feet of hundreds of thousands of men; or perhaps a row of the battered old trees which had looked down upon the vicissitudes of the battle of Pozieres. Will Dyson said that he himself had been tremendously impressed with some models of a battlefield, and his friend, Derwent Wood, the English

sculptor, had been struck with the same idea, and had asked if it were not possible for us to adopt it. There was a general agreement on the point, and the suggestion was put to General Birdwood. While the committee always gave the scheme their support, that a sculptor and artist should be sent to the front in order to perpetuate in the form of models some of the typical scenes along the Australian line. The suggestion was adopted, and the result is a unique collection of models, some of which may now be seen in the Australian war memorial in Sydney, while the complete set will be finished in about three years from now. Those who have seen the war memorial in Sydney will realize that a model such as that showing the winter conditions on the Somme is capable of conveying an impression far more real than any written description, or any picture that might be painted. There was one model made of Price trench, showing the mud and desolation, the scene looking more like the upheaved bed of a sea than anything else, and it was here that Australian soldiers had to live. I had previously tried to describe that trench myself, but after seeing the model I realized that nothing could possibly give as true an impression of it as did the model. Web Gilchrist, the Australian sculptor, was the first man chosen for the work. He, with L. McCubbin, an A.I.F. artist, was sent over to France, and produced the first of the models which may now be seen in Melbourne. The figures in that model representing the taking of Mont St. Quentin are masterly. Gilbert did before he was able to complete his work, and it was taken up by Messrs. Anderson and Bowles. The relics and records were taken from the depot to Boulogne and brought to England. From there they were shipped to Australia, and housed in the Exhibition Buildings in Melbourne and in Sydney. The Melbourne collection has been seen by 800,000 people during the past two years, and the Sydney collection by 1,250,000 people. The collections have been cared for as well as possible. It is not always easy, however, to give the exhibits the necessary attention in a temporary museum. A great deal of skill and judgment is required in order to find the best means of preserving the different articles. For instance, one of the exhibits is the uniform of a soldier, exactly as he came out of the Somme battle. It has been dressed on a model, so that people may see for all time how Australian soldiers appeared in battle. The uniform is caked with mud, and shows the knees torn with the barbed wire of the German entanglements. It is obvious that unless special precautions are taken the mud will in time fall from the uniform, and insects will attack the cloth. We have been endeavoring to get information from those who are engaged in preserving the relics found in the tomb of Tutankhamen, as to the best means to be employed in such work. The war memorial committee is agreed that the best place to erect such a national memorial is at Canberra. All the opinions I have heard on the subject have favored the idea of the war memorial being of a non-utilitarian character. It must be remembered, however, that such a memorial would serve very definite purpose, and it might not be strictly correct to call it non-utilitarian. For one thing, there is this priceless collection to be housed, and some place has to be found for it. Again, there will be preserved in it the historical records of the A.I.F., without which the official history could not be written. It has been my duty to visit other countries since the war, and I was impressed with the great reputation enjoyed by the Australians. Our reputation in American circles solely on the performances of our fighting forces during the war. The history of those forces cannot be written unless the documents are carefully preserved, and worked upon in such an institution as that which we are now proposing. Otherwise, it would not command the confidence of historians abroad, and unless we did command that confidence we should find the performances

of our soldiers in some of these battles being questioned. The tendency to do that is already observable. Both in America and elsewhere the Australian claims will be challenged unless we can establish them by close-reasoned proof. Historians in time will say, "What was there, after all, in this fighting reputation of the A.I.F.?" From the time this was first thought of as a practical proposition, it was intended to house the war collection in the memorial. Personally, I have not heard of any suggestion to the effect that the memorial should take some strictly utilitarian form. I have myself taken a part in the collection of articles for inclusion in the museum. I think that the display of these articles as proposed by the architect is by far the best of any that we have considered. The architects have been working in conjunction with Major Treloar and myself, and while the display which was originally suggested was a good one, it was not so good as that which is now before the committee. It will be seen that in this design there is a simple scheme for keeping the public circulating through the memorial. It has been so designed that the public follow an easy and natural circuit, so that they take in the different exhibits in their logical order. A person entering the building first comes into what is called the museum room, in which it is proposed that there shall be displayed documents and maps of any special interest. For instance, we have the maps with which von Sanders, on the Turkish side, fought the Gallipoli campaign. There are also messages of an interesting, and sometimes of a pathetic nature. There is one from a young signaler saying that the troops had pinned their objective, and then the message suddenly ends. There is a note at the foot saying that the man was shot before he was able to finish it. There is also a letter from a famous German flying ace in Palestine, saying what his fellows thought our airmen were. He was a very fine sport himself, but he was unfortunately killed just after the war. Then there is a relics room where there will be seen such articles as General Birdwood's old uniform at Gallipoli, and Senator Elliott's old boots, showing the bullet hole through one of them where he was wounded. The visitor then gets to the naval relics, including mines blown up on our own coast. After that there is the Palestine section, where will be exhibited those things dealing with the Palestine campaign. Close by we have the models from France, and then we get to the French coast. On the way one passes a passage leading to the aeroplane corps, in which it is proposed to exhibit nine aeroplanes, including the Ross-Smith plane, and the one in which Paver and McIntosh came to Australia. Speaking of their plane, Allan Cobham told me that he considered it would form the most interesting exhibit in the section. There are also several German planes brought down by our men in France. Next we come to the exhibits dealing with France in 1918, 1917 and 1916 in that order. Whether this should be 1916, 1917 and 1918 is a matter of detail which the architect will decide later. The arrangement is such that there is a clear roof over the different rooms, and from a subdued light the spectator is looking into the brightly lighted models. Such a scheme has not been provided in any other design put forward. In another section there are two doors, in one of which there will be a model of a room in a shell-wrecked cottage at Villers-Bretonneux, when that place constituted the Australian front line. The floor of the room was strewn with broken tiles, bricks and plaster, and in a corner of the room is the place where Australian soldiers had been sleeping. The materials of which the room was made were carefully taken away, and the place will be reconstructed in the museum so that people will be able to see the actual conditions under which our soldiers lived and slept just behind the front line. On the opposite side an open bivouac will be erected, showing how men can live in such comfort

as is obtainable in war-time under all kinds of conditions. A little further on we come to the room which will contain the Dyson pictures. The outer walls have only slits in them, but no windows, so as to get the light focused properly on the picture. The light comes from above, striking obliquely on the walls and thence on to the floor. Thus the spectator stands in a cone of shade, and sees no reflection in the glazed pictures.

It is proposed that a record of those who were killed in the service of their country shall be inscribed around the walls of the cloister on the first floor. Much consideration was given to the question as to what names should be included, and how they should be displayed and classified. The names of all those who enlisted will be recorded elsewhere in the building. The staff will be responsible for the collection of a complete, indexed list of all who enlisted, showing their promotions, service, and what became of them. The lists that are already in existence show a great deal too much—including, as they do, punishments and diseases. Such things have to be most carefully preserved from public view, a course which is only just to the men themselves. From the existing records there will be compiled a complete list showing all the details which may suitably be shown in public. I think the most complete list of those who enlisted is now kept at Base Records, and it is necessary to refer to Melbourne for information, and it is thought that eventually those in charge of such records will begin to look upon them as so much lumber, and will be anxious to dispose of them. They might then find a place in the National War Memorial Museum. There are at present three lists, of which we have one; we have been promised another, and we shall probably be the ultimate recipients of the third. There exists at present no record of the A.I.F. as a collection of units. It is proposed that all enlistments shall be recorded in book form, or rather in a series of books, so that they may be looked up as one would look up a reference book in the library. I do not think that it would be necessary to have the names recorded on such a material as vellum. If they are printed in good type on rag paper, the record will be practically everlasting. There might, of course, be other copies which could be thumbed by the public. The question of the Honor Roll is a separate one altogether. The policy is that where it can fairly be claimed for any man that he lost his life in the service of his country his name should be included. It is proposed to refer, first, to the Repatriation Act, for the definition of those who were members of the service, and also to the decision of the Repatriation authorities as to those whose deaths were due to war service. Secondly, it is proposed to include all members of the merchant service who met their death through the war. Thirdly, it is proposed to make provision for cases not recognized by the Repatriation authorities, for example, those men who served with Allied forces. The board will consider any individual cases of Australians, and provided they met with their deaths through the war, they will be included in the Honor Roll. It was suggested from the very first that no ranks should be shown. It was thought that that would be altogether in line with the Australian attitude during the war, and my own opinion is that, far from such a course detracting from the honor of such men as General Bridges and General Holmes, the fact that their names are recorded simply in the same way as those of men with whom they fought, will add to the honor in which they are held. There remains the question as to how the names should be classified, and three suggestions were put forward, by units, by time, or by locality, i.e., the place in Australia with which they were connected. Classification by units would be interesting to returned soldiers because, during the lifetime of the present members of the forces, it would be possible for them to see under

the name of their old unit, the names of those who had fallen. However, anyone who has been connected with war records realizes that, outside of those intimately connected with the soldiers concerned, there is much doubt as to the proper unit of each man. Furthermore, some men belonged to four or five units in succession. Many people find it very difficult to distinguish between brigades of infantry and of artillery, and so on, and even at this date many close relatives cannot say for certain to what unit some soldier who was killed belonged. Such a classification would make it practically impossible, after the present generation, to find the name of any one on the list. Then there is the proposed classification according to time, which has this very interesting quality: It would be possible to look at the list for April of 1915—as representing the landing at Gallipoli, or July of 1916, for the battle of Pozieres. From looking at those lists it would be possible to see in a graphic way what the cost of those actions was to Australia. People would be able to gauge in that way the price which the country paid for each of its victories or defeats. That method of classification, however, would make it difficult to identify any particular man, nor would it be certain that a man who, for instance, died in July of 1916, died at Pozieres. That throws us back on the third method of classification, by the locality or town in Australia with which the dead soldier or sailor was connected. That offers many advantages, and furnishes comparatively small lists of names. It makes it possible for any one who knew a man in that town or district to find his name at any time, while after the death of those now alive, it will be possible for people in their home towns to find the names of relatives and ancestors. Even after the lapse of three or four hundred years, families connected with a place would be able to go to the museum and look up names. It is felt very strongly by the returned soldiers that this is the only way to preserve local tradition based on the sacrifices made by the A.I.F. Therefore, that method of classification has been adopted. Great centres like Sydney and Melbourne might, of course, have enormous lists classified under their names. It is proposed therefore to subdivide them as far as possible. Sydney, for instance, will be subdivided into 53 municipalities, and Melbourne will be treated in the same way. It is proposed always to find the actual town from which a man came, and inquiries have been made for this purpose. We have already received 46,000 replies out of the 60,000 who are qualified to be on the Roll of Honor, and replies are still being received in response to the circulars sent out. We are still working on the matter, and it is hoped still further to reduce the number of those whose home towns have not yet been definitely established. In the case of those people who came from England or other places, it has been recommended that they be classified under the town in Australia with which they are connected. If no other source of information were available we at least know from their attestation forms the district in which they enlisted. A strong room will be provided for the safe keeping of the records and documents. These include the official records, together with a number of diaries and letters sent in by the relatives of men who have died. These latter are particularly valuable, as they supplement the frigid records of the diaries with the warm, personal narratives of the men actually engaged in the fighting. Very often these letters actually correct the material included in the diaries. Such personal records are naturally very precious to the people in whose possession they are, and frequently they are unwilling to part with them. Some have been copied and the originals returned, but in other cases people have bequeathed the documents to the museum. In addition to this, war records have been received from the British Government, which has allowed us to go through its documents

and take out what we want, whether from secret despatches or others. The Canadian and New Zealand Governments have done the same, while the German and Turkish Governments have also placed material at our disposal. The German Government, in particular, has been very frank in opening its records to us. Under the usual safeguards, these records will be available to the public. For the purpose of storing these records, I think that 30,000 feet of shelving will be ample, and the 1,000 square feet of floor space for the library will provide sufficient room for students. The library will consist of all books throwing important light on Australia's part in the war, or at least such of those books as can be purchased. The library will be added to from time to time, but the rate of addition will naturally slow down, and it is not likely that much more space will be required even in ten or twenty years' time. The war is an incident which happened, and is finished with. The number of war relics is limited, and not many over and above those already in our possession are likely to be acquired. The committee is already limiting its programme of pictures in accordance with space, and while war books will still be published, I think that a sufficient margin is provided for in the estimate. The annual expenditure will be a decreasing quantity, though for some time to come it will be necessary to continue the classification of records. Headquarters and departments have turned over to the War Memorial Committee vast masses of documents which are absolutely useless until they are classified, and the expenditure on this work will have to go on until the job is finished. The present staff, consisting of two or three persons, has sufficient work to keep it occupied for nearly four years. An estimate has been made of the entire staff which will be required, but Major Treloar will be in a better position to inform the committee on that point. I do not think that the inclusion of the museum and the library will detract from the purely memorial character of the building. It will have the effect of inducing people to view the place with reverence, and will curb any tendency to glorify war. I consider that ample provision has been made for the public, and the building is so designed that it can be attended to by a very small staff. I have kept myself in touch with many of the war memorials, which have been erected in other parts of the world, and while I do not know of any in which the memorial is a collection solely of war relics, something of the kind has been done with Les Invalides, in Paris, and also at General Grant's tomb in America, which contains a number of relics.

14. To Mr. Cook.—I think that the plan we are now considering for this building is better than any which we have previously had before us. It is the final result of thirteen consecutive arrangements suggested by the architects in consultation with others, including Major Treloar, and myself. We do not want a very extensive display. It is thought that it would be better to have a small museum, but one very good of its kind, rather than a large, rambling one. All the demands of the war memorial committee have been met. I have seen several memorials in other parts of the world, and some of these have been taken into consideration in designing this. In the case of the Invalides in Paris, the special feature there, as in this memorial, is that there is a centre in which the reverence of the visiting public focuses itself. There we have the catalogue of Napoleon, which is below the level of the spectators. There is a marble gallery surrounding it, and around this gallery are hung foreign flags which Napoleon captured, including many British flags. The artist who designed it said that one reason for his design was that everybody who looked at the tomb must bow his head. The purpose in our design is to provide that centre of reverence which does not exist elsewhere in Australia, a place, for example, where floral or other tributes may be offered to the memory of the dead. It is proposed

that in the centre there should be some figure such as that of a recumbent soldier, which will form the focal point for commemorations. Some suitable relief will also be placed there, such as the signed speech of the Archbishop of Amiens, in which he expressed the sentiment of the French in general, and of the people of Amiens in particular, towards the Australian soldiers. These things would be indicative, as it were, of the world's tribute to the men of the Australian forces. The committee has collected information, as far as possible, concerning the memorials which have been erected by other countries to their soldiers. A list of these, with such particulars as can be obtained, is as follows:—

Great Britain.—Centoph in Whitehall; Unknown Warrior in Westminster Abbey.

Scotland.—Hall of Memory in Edinburgh Castle.

Canada.—Gothic Tower at Canadian House of Parliament, which contains a Memorial Chamber to Canadian soldiers. Cost 1,000,000 dollars (£200,000).

Australia.—

New South Wales.—Proposed Anzac Memorial Hall. On hand, or promised, land worth £70,000 and £75,000 cash. Centoph costing about £10,000 also erected.

Victoria.—Monumental Memorial to cost £200,000.

Queensland.—Anzac Square to cost about £25,000.

South Australia.—Monumental Memorial to cost £25,000.

Western Australia.—Granite obelisk costing about £4,000.

Tasmania.—Column costing about £6,000.

New Zealand.—

Wellington.—Proposed combined Museum, art gallery, carillon tower and memorial hall to cost not less than £300,000.

Auckland.—Memorial (general) museum (with a gallery for war relics)—£200,000.

Christchurch.—Bridge of Remembrance—cost unknown.

Dunedin.—Memorial column—£10,000.

Newfoundland.—Monumental memorial, cost 50,000 dollars (£10,000).

United States.—Unknown warrior buried in Arlington Cemetery. Also many very costly memorials in the various States.

France.—Unknown warrior buried beneath the Arc de Triumphant. National War Memorial at Verdun.

Italy.—Unknown warrior buried in a stately tomb in Rome. Elaborate memorials at five or six points on battle front.

Belgium.—Unknown warrior at foot of Column of Congress.

Czecho-Slovakia.—Memorial on Vitkov Hill costing £75,000.

Those are the memorials of which we have received particulars. If it had been possible to construct this building of marble, we should have preferred to do so, but we were informed by the architect that the expense would be too great. As a matter of fact the question of expense has placed limitations on all the great memorials of the world. It is only in America that they can do what they like in this respect.

15. To Mr. McGrath.—We propose to have just a sufficient number of the captured guns at the memorial to show the type of weapons used by ourselves and our

19. To Mr. Seabrook.—It is not proposed to put in the memorial all the guns and aeroplanes now kept in Melbourne. It is provided that all the tanks, relics, &c. except such as might be damaged by the weather, will be put in the grounds, where a courtyard has been provided for them. This big gun now at Esslake will be to be separately housed. The committee's idea is that it will either be in the park in front of the memorial, or else in some square in Canberra itself. It is not generally known that this gun is not merely a great war trophy. As a matter of fact, the committee has turned its face against trophies as such, because their tendency is to glorify war. This, however, is the actual gun which caused most of the damage in Antwerp, and gun which caused most of the damage in France delivered it is the gun from which the Australians on the 32d October, 1918, the people when they advanced on the German forces over was then that date when the Australian forces over ran it. It was captured by a combined attack of British cavalry and our infantry, and was allotted to our forces.

In cases in which soldiers have been posted as missing, and nothing more heard of them, the War Graves Commission has allotted a space in each cemetery to record the names of those soldiers whose remains have not been identified, but who died in that area.

20. To Senator Reid.—Personally I approve of the general appearance of the proposed building. The architect's first idea is that the building should have the general appearance of Santa Sophia, at Constantinople, that is, it should be a building which mounts up to a central dome. I think this design will help to commemorate the dead, as well as to guard, in proper manner, the relics within it. The architect has told me that as the building would be so far from the centre of Canberra, and would be standing more or less alone, among trees, it would be necessary to construct a design calculated to harmonize with other buildings. The design of a semi-circular court, with bright, open beds and decorative lawns, will bring it into a typically Australian atmosphere, which will combat any depressing effect which the memorial might otherwise suggest. The Canberra Commission was inclined to think that this memorial would have cost not less than £250,000; otherwise, I think Sir John Gorton would have approved of it, except that he would have also liked to see it built in marble.

21. To the Hon. Mr. McEwen.—Mr. McEwen is of opinion that this building should be erected as soon as possible, to provide for the safety of the relics. As regards the Exhibition Building in Melbourne, they were done, as far as we could learn, to people throwing down cigarette butts.

21. To the Chairman.—I think that, people, even in 100 years' time, will still be interested in this museum. There is always a human interest in these matters. There is a human appeal in the sufferings, bravery, and cruelty of men which makes the memory of them last. From the first the object of those who collected for this museum was to make it as human as possible. It contains the atmosphere, the spirit and the relief of the A.T.F., and I think that we should do a great deal if we separated those things from the memorial. The fact that there is no such memorial elsewhere rather adds to the value of this proposal. The committee has realized that it is necessary to have two or three gardeners, but if that work were not done by the memorial committee it would have to be done by someone else, and the cost to the country would be the same. The architects have laid out a plan of the grounds in a very simple manner, and so that it can be elaborated later, but it is not thought that the total cost will be more than £23,000 in the first instance.

Mr. M. Cameron, architect, sworn and examined:

Walter Burley Griffin, architect, sworn and examined:

Q. To the Chairman.—I am aware that the Committee is inquiring into the erection of an Australian War Memorial at Canberra. In the limited time at my disposal I have not the opportunity of inspecting the plans of the proposed structure, and up to the present have seen only newspaper cuttings showing the recommended design of the memorial. I understand that it is proposed to erect a monumental structure approximately 400 feet long by 180 feet wide, rising at its highest point to 100 feet. I understand that it is intended to erect it on the southern slope of Mount Ainslie, which I consider is a suitable position. In the original description of the plans this suitability of such a site is mentioned.

original plan for a Memorial Building was not to be underground and there it is proposed to place the memorial on a reserve of 30 acres and that it is intended to terrrace the land. I should like to study the exact location of the site before expressing a definite opinion on the point of whether the erection of a memorial in the position indicated would have a detrimental effect upon the plan of the city. I am not sure whether the site selected is on the most suitable level, I may say that provision was made in the original plans for a short avenue named Vista Avenue, and apparently that is the site that has been selected. An appropriate level can be identified by that avenue. There is here a long level slope, the main axis of the city on the

[illegible]

building of this type which is plain in design it would be comparatively free from projections that encourage fretting. I suggest that the structure should be light in colour in conformity with the colouring of other buildings in Canberra. It is to be built where the sunshine is particularly brilliant, and where the shadows have a very important function in connexion with the architecture. In these circumstances I think

[illegible][illegible]

24. *To Senator Reid*.—I do not think I would recommend a concrete facing on such a building having in view the nature of the other buildings at Canberra. There is a certain amount of artificiality about concrete which does not obtain with native stone. There is variety and interest in natural textures which is not to be found in artificial material. I should prefer stone to any artificial material, particularly as there is a certain amount of sentiment associated with the material to be used, and stone will always have the appeal of the ages behind it.

24A. To Senator Payne.—I have had an opportunity of judging the life of good quality stone used in other parts of the world. Sandstone has been used in many countries in monumental buildings, but I cannot for the moment recall any monumental building of great age.

which has been constructed of sandstone; most of those which I have in mind have been built of limestone. I understand that some monumental buildings have been standing for 800 or 700 years, and in considering whether sandstone would have such a long life I would have to take into consideration the climate. For instance, the life of sandstone may be comparatively short in a climate where the winters are wet and the frosts heavy and severe; and also where there is a variation in the humidity. I consider that the climate of Canberra would be suitable for a building of sandstone. The aesthetic sense of the people should be considered in connection with the materials to be used; that is an important consideration and I believe that a sandstone building would contribute more to that end than one of concrete.

25. To Mr. Cook.—I understand that the building is to be constructed for the specific purpose of providing a war memorial and housing a collection of war relics. I have seen the collection, and I presume that sufficient space has been provided for what is required. That is a matter which the War Memorial authorities will have to decide. As to whether the general design of the memorial is in keeping with the architecture of the capital city I may say that it is not unsuitable. Naturally, as a rationalist architect, I have different ideas from many other architects, and in expressing a considered opinion on a design like this I should have to bear in mind what other alternatives there are. If, however, the architectural standards of the whole city are kept up to the standard of the proposed structure, it would be a very handsome city. As to whether the financial aspect should have prior consideration to the use of the best material I may say that in the use of marble, granite and sandstone or limestone there is quite a legitimate field in which to consider suitable material without overlooking the economic aspects. It is to be a large building, and to use the highest class of material might involve unnecessarily heavy expenditure. I have had a good deal of experience in the use of Australian stone. I know a marble obtained in South Australia from Angaston or Kapunda, which is crystalline in texture, is very beautiful and is eminently suitable for a monumental building. I do not think any architect would favour the use of synthetic granite for a rock facing.

26. To Mr. Lacey.—If frosts are combined with excessive moisture in the atmosphere, the use of sandstone should not be considered. That would apply to most sandstones. In the sense in which I am speaking the frosts at Canberra are not severe. I am comparing with the countries where, during periods of moisture, the temperature drops to 20° or 30° below zero. In those than it would ever be at Canberra where the cold is of short duration, and does not penetrate sufficiently into the stone to be detrimental. In the countries I had in mind sandstone absorbs the moisture, which during periods of cold freezes, and causes portions of the stone to break off.

27. To the Chairman.—I think a combination of the War Memorial and the War Museum is desirable as it will ensure a more lasting interest in both features.

The witness withdrew.

Leslie Wilkinson, Professor of Architecture, University of Sydney, sworn and examined.

28. To the Chairman.—I understand that the committee is inquiring into the proposal to erect a War Memorial at Canberra. As the committee is doubtful as to whether the competition for suitable designs. All the original designs were rejected because the estimated costs

exceeded £250,000, which was the maximum amount stipulated in the conditions under which the competition was held. As the members of the committee are aware, it was mandatory upon the assessors to reject any design which in their opinion could not be carried out for £250,000. The design which could not be considered can, I understand, be completed for that figure. I think it is completely satisfactory and well designed. I have conferred with Messrs. Sodersteen and Crust, the successful competitors, and have also seen drawings, models and photographs of the proposed structure. One of its great merits is that it cannot be labelled as belonging to any particular style of architecture. I hope we have passed the time when the people and the press will refer to particular styles of architecture. It employs a type of architecture which should be associated with a memorial of this sort. I have not had anything to do with the selection of the site which, however, I regard as satisfactory. Of course I regard Canberra as a scattered place, but I think the site is a suitable one. I do not wish to express any opinion concerning the most suitable treatment of the area on which the building is to be situated, as that is more a matter for the architects whose duty it is to design a proper setting. The levels render it unsuitable for an extensive formal setting. The immediate surroundings of the building should be so treated, whilst the remainder should be more or less in its natural state, with trees planted up to the mountain behind. Although sandstone is not the most suitable material for monumental work, I think it will be satisfactory for this purpose. I think we will all agree that granite would be better. It is an unanswerable question whether a building erected 2,000 feet above the sea level, where the frosts are somewhat severe, should be faced with sandstone. That can be determined only by experience. I know that tests have been made with Hawkesbury sandstone, which have shown very satisfactory results, better in fact than sandstone obtained from anywhere else. The architects have considered the use of granite, but the cost would be much greater than if sandstone were used. I believe that the successful competitors obtained quotations for both granite and sandstone. If the size of the building were to be reduced in order to face it with a more expensive material it would probably mean abandoning the whole museum scheme. I do not see how the collection could be permanently housed in a building of smaller dimensions. It is not a large building, as the members of the committee can easily realize. From the drawings some persons would imagine that it is much larger than it really is. I believe that a building of sandstone would harmonize with the colour scheme already erected at Canberra. I understand the sandstone which the architects suggest is not that which is ginger in colour, but cream as has been used in some of the big buildings recently erected in Sydney. I do not know the Fairy Meadow limestone. I am satisfied with the site and general design of the building which I think is an able solution of the difficulty which faced the competitors. As one of the assessors I am sorry that this design was not submitted in the first place as a good deal of controversy would have been avoided. If it had not been for our strict instructions as to cost, I think the assessors would have been unanimous in recommending the acceptance of Mr. Sodersteen's original design. It differed materially from that now under consideration, but the general character of it was much the same. The present design has been produced by Mr. Sodersteen and Mr. Crust. As the separate designs submitted by these gentlemen contained certain desirable features, it was suggested that these two architects should collaborate. The design under consideration which contains the best features of both is the result. If more

money were available the only alteration that I would expect to see would be a larger building. There is always a certain amount of dissatisfaction in connection with competitions of this kind, and I think the government understood that the competition has been rendered null and void by the application of a strict provision with which all the competitors had to comply. There has been no suggestion of unfairness, but some competitors thought that premiums had been awarded and that the whole competition should be held again. They also said that as a large number of competitors failed to provide the necessary accommodation within the expenditure mentioned it proved that it was impossible to do so. I think that this design provides the answer. From my knowledge of the plan I think the building could be constructed for £250,000. The treatment of the museum walls should be simple as the attention of the public should be concentrated upon the exhibits rather than upon an attractive architectural interior.

29. To Mr. Lacey.—I favour the use of sandstone for facing the buildings, but if a light coloured granite could be afforded I think it would provide a more lasting monument. If I had to choose between granite and sandstone, irrespective of cost, I would select the former. Speaking in a fairly rational way I do not think the difference in cost would make the slightest difference to the present generation, or to two or three generations to come. I do not know the Angaston marble, but I believe it has been used for a War Memorial in Adelaide. I think the assessors who were asked to examine the amended design were somewhat surprised at the low price of the firm tender obtained for Hawkesbury sandstone which made the difference in the price between sandstone and light coloured granite greater. So far as I can understand the price for Hawkesbury sandstone was a firm one for a certain period. If any time should elapse the suppliers of course have the right to amend their quotation. The price was obtained from a well-known firm which has its own quarries and which is known to do good work at low prices.

30. To Mr. Seabrook.—I understand that the £250,000 is the contract price, and do not think it was to cover certain necessary overhead charges. It would not include the architects' fees. In competitions of this kind, when the cost of building is stated and nothing is said to the contrary, it is assumed to be the amount which the contractor would be paid for his work. The contract price for a house would not include architects' fees. If I were asked by a client to submit sketch plans and estimates, I should be very careful to say that the cost of building was so much, and also to remind him that he must make provision for architects' fees. It is usually a matter of arrangement between the architect and the client. It was not generally understood that sandstone was to be used in construction; the only conditions stated were that the building was to consist of monumental materials. Personally, I think that brick would be cheaper than concrete for this type of walling. I presume this building will be faced with sandstone, and will have a brick backing. I have not seen the specifications, and therefore cannot say of what material the roof is to consist. Some of the top lighting needs careful study, as skylights in the roof must be avoided owing to the heat. I understand the light is to be admitted vertically. Messrs. Sodersteen and Crust have gone very carefully into the cost with quantity surveyors, and I think we can safely say that a building in accordance with the plans under consideration could be erected within the stipulated amount. In the original competition the cost of Mr. Sodersteen's design was under-estimated, and that is why it was not awarded first place. This

is a smaller building in every way, but it is difficult to say what the cost will be, as it may be found that the tenders when called will vary to the extent of 100 per cent. I do not think any of the competitors have a grievance. They all accepted the assessors' decision that, with one possible exception, the work could not be done for the money. Their principal grievance was that they were asked to do the impossible. If they had written in and said it was an impossibility, the whole matter would have received further consideration by the authorities. I am pleased, however, to see such a problem was one which could be solved. I have seen the estimates, and in my opinion the work can be done within the stipulated amount. Tenders were received for both stone and granite, and the total cost of the stone, which is one of the biggest items in this building, appeared to me to be very low.

31. To the Chairman.—They were definite tenders.

32. To Senator Reid.—The convenience of the public has been considered. I have not considered the layout of the structure in great detail, but I believe that it will prove satisfactory from a public point of view. I presume that a certain number of emergency exits will be provided for use when the building is crowded, or in the event of fire, which is most unlikely. I believe that the proposed design will fulfil all that is desired. It is a difficult problem, and at the moment I am not quite certain as to the wisdom of endeavouring to combine a monumental structure with a building to accommodate a large collection of exhibits. That, however, has been decided upon, and I think this is the best solution that it is possible to get. A good deal of the difficulty was occasioned by the line of expenditure allowed. Owing to the heat of the summer at Canberra there should be overhanging eaves and vertical lighting to the roof lights. I regard Hawkesbury sandstone as a suitable material to use in a building of this character. A large number of cathedrals of a monumental character are built of sandstone, and although the frosts in some of the countries which I have in mind are more severe than they are at Canberra, I do not think that these buildings have deteriorated to any extent in consequence. As compared with Great Britain, I should say the life of sandstone would be greater at Canberra.

32a. To Senator Payne.—From my knowledge and observation I should say that the life of a sandstone building would be in the vicinity of 700 or 800 years. If the memorial was constructed of sandstone facing, I do not think it would be likely to fret unduly. The whole lighting scheme has been carefully considered in view of the fact that pictures will be hung on the walls and exhibits displayed on the floors.

33. To Mr. Cook.—I have seen similar competitions to that with which I have just been associated carried through. I understand that the accommodation provided meets the requirements of Captain Bean and Major Trelour. I have visited some of the great museums in other parts of the world. This is a museum of an unusual type, inasmuch as it has been designed to house a collection which will not increase. Every other museum is built with a view to extension, but in this instance that will not be necessary, and in this lasting material, burnt brick, which will outlast a marble veneer, but for a memorial building we cannot consider the use of such material. I should think that sandstone facing was in keeping with the structure to be erected.

34. To Mr. Cameron.—A building faced with sandstone and of the type under consideration should

36. To Mr. Cameron.—I do not think any work of this nature has been undertaken in the British Empire. In Auckland the people are spending a similar amount on a building which is not only to be a war museum, but a general museum. Large sums have been spent on memorials in such places as Winchester,

In all our endeavours we have kept in mind the essentials of the problem which we recognize to be as follows:—

1. To design a building which will provide a suitable and permanent home for the unique collection of exhibits which

than anticipated, and a good foundation can only be laid

be used, a drawing showing the actual size of the letters proposed is submitted. Whilst having the appearance of stone, the names can be recorded in this way very economically.

Estimated Cost of Names.—The slabs containing the names will be of synthetic marble similar to the sample submitted. The price quoted by the manufacturer for this, works out at 1s. 6d. per name. This includes the slab and the labour of arranging the letters only. We have obtained quotations from two firms for the manufacturing of the metal letters. The price for these letters, including names of towns, &c., should not exceed 2s. per name. On the basis of these figures we can confidently estimate the cost of recording the names at 3s. 6d. per name. For 60,000 names this would amount to £2,000, which is only a fraction of what would be the cost of inscribing the names in stone or on bronze slabs.

Hall of Memory.—Externally the Hall of Memory would be faced with stone in keeping with the rest of the building, the dome being covered with golden terra cotta tiles.

Interior.—As it is proposed at a later date to introduce a treatment of mural paintings of appropriate subjects in the Hall of Memory—a plaster finish over a large portion is all that is required. Marble would be used for the floor and plinth.

Heating.—Although in our general directions it was stated that no heating was required, we think the matter might be more comfortable for the public and the staff in winter, it is probable that some of the exhibits as well as the records have gone in to the question of cost and estimate that suitable hot water heating system, using oil burning boilers could be installed for a sum of £14,000. Of course this would be an additional cost and not part of the original sum allowed.

Fire Services.—While the building will be fire resisting construction throughout, there is the possibility of a fire occurring amongst some of the exhibits. As a precaution against this possibility we have allowed for a system of fire hydrants throughout, which would cost £875. Should a cost would be—

(a) Automatic Fire Sprinklers, 1,400 points	£3,825
(b) Automatic Fire Doors	£600

Electric Light.—If it is necessary to suppose that the exhibits must all be capable of proper inspection at night, by artificial light, a fairly extensive system will need to be arranged. For ordinary purposes of cleaning, &c., quite a modest system will suffice. For lighting points and power points for vacuum cleaners, &c., we estimate that £500 will suffice, which amount is included in our estimate.

The following statement shows the method employed of arriving at the cubic contents of the building:—

Basement taken at 10 feet high over full area of ground floor	50,143 x 10 = 501,430
Ground floor taken at 20 feet high over full area	50,143 x 20 = 1,002,860
Picture model square taken at 8 feet additional height	13,490 x 8 = 107,920
Aeroplane hall taken 10 feet additional	7,000 x 10 = 70,000
Cloisters at 11 feet additional heights	4,246 x 11 = 46,706
Entrance block at 10 feet additional	1,830 x 10 = 18,300
Hall of Memory, lower portion taken	5,000 x 37 = 185,000
37 feet additional to picture models	3,000 x 20 = 60,000
37 feet centre and dome 20 feet over last item	1,000 x 10 = 10,000
Rear of Aeroplane Hall	2,024,632

2,024,632 feet at 2s. 6d. = £263,070.

Estimated cost of building, £263,070, of which sum £48,430 10s. represents the cost of the sandstone facing.

Various Estimates for Facing Materials.

Main building in sandstone with a granite base, extra cost, £11,707 10s.

If the whole building is executed in granite, extra cost, £95,947.

Probably a suitable material for facing the building would be Fairy Meadow limestone, but in the absence of any information on the point we are unable to supply an estimate of the extra cost which would be involved should this material be used.

Following is a report on the layout of the grounds:—

The accompanying plan which is submitted shows what we consider the minimum amount of work necessary to provide a fitting setting for the National War Memorial. The main approach to the building from Prospect-place is 50 feet wide, gently rising to the lower terrace, which is shown at the 1925 level. This terrace extends laterally beyond the sides of the building, and is 600 feet long and 100 feet wide. This means of secondary approaches 35 feet wide. A broad flight of steps in three stages connects the upper and lower terraces opposite the main portal. These steps are flanked on either side by two pedestals, on which it is hoped that suitable statuary of heroic size will be placed at some future date. It is proposed that these two main terraces with their approaches shall be paved with a suitable material such as concrete used in conjunction with brick, in which case some interesting patterns could be introduced. It is suggested and shown on the plan that a space round the whole building should be cleared and graded evenly where garden plants with ornamental shrubs and flowers could be introduced. No plantations on the outer areas of the site, as this work will probably be laid out by the Federal Capital Commission.

The following is an estimate of cost for layout of grounds:—

Excavate and fill 5,000 cubic yards	£2,000
Excavate and fill terrace, 2,300 cubic yards	1,100
Main entrance to lower terrace, 112 feet x 50 feet	1,020
Lower terrace; concrete	6,111
Paths; concrete	1,250
Upper terrace; concrete	2,222
Surfacing	1,600
Terrace wall in sandstone	4,000
Steps, granite	4,000
	£23,303

Total estimate for layout of grounds, £23,305.

A summary of the levels is as under:—

Road at boundary, Prospect-place (assumed)	1,020
Camber-avenue entrance (assumed)	1,000
Lower terrace	1,025
Ground level	1,935

The building at its greatest dimensions is approximately 400 feet long by 107 feet wide, and from the terrace in front to the apex of the dome is 104 feet. I do not think the building could be completed in less than two years from the date on which construction was commenced. The working drawings could be completed in six months, so that it would take about two years and six months from the time when the working drawings were commenced until the structure was completed. The estimated cost of the building is £263,070, and the cost of laying out the ground is £23,305. Our general instructions stated that the cost of laying out the grounds was not to be included in the total amount allotted for the work. No allowance has been made for the provision of roads and other services to the site. Our lay-out plan shows what we consider the minimum amount of work necessary on the site. It would improve the setting of the building if more money than suggested were expended. What we have provided for would give a satisfactory setting for the building; it would make ample approaches. In Sydney I have supervised buildings of similar construction which have cost up to 1s. 9d. a cubic foot, and allowing for the extra costs at Canberra I think that 2s. 6d. a cubic foot is ample. A contractor has undertaken to supply sandstone at the price I have mentioned. I do not know whether this price can be guaranteed for an indefinite period. The time stipulated was for delivery within twelve months, but I suppose an extension materially. We also obtained an estimate from Turner Brothers of Goulburn for granite which would, on their figures, increase the price by £95,947. I have not seen a sample of the Fairy Meadow limestone, but from conversations I had with Mr. Murdoch I am safe in saying that he is of the opinion that it would be a satisfactory material for facing purposes. The proximity of the deposit to Canberra would be in its favour, which consists largely of sandstone facings, has been in use for over 120 years. The Court House and Macquarie's time, are also faced in Governor Macquarie's time, are also faced in sandstone, and have been in position for over 100 years. There is also a sandstone monument in Macquarie-street which has been erected for over 100 years, and has not been affected by erosion. Most sandstone buildings are affected more or less by the organic matter in the dust, and the discoloration of sandstone in Sydney buildings is due largely, I think, to the fumes from the harbour and city. At Windsor the sandstone has retained its colour, as it is far removed from factory smoke. Under similar conditions the colour of sandstone should last well at Canberra. If there were no limit placed upon the cost of the proposed structure I would suggest granite, which would be the most satisfactory. I should like to have an opportunity of ascertaining the suitability of the Fairy Meadow stone. After quotations were taken out for the supply and fixing of granite and allowance made for freight, it was ascertained that granite would cost £35,947 extra, or nearly three times as much as sandstone. Before I could express an opinion on the Fairy Meadow stone I should have to visit the deposit or arrange for tests of it to be made at the Technological Museum in Sydney. As I have not seen the quarry I could not say what development work would be necessary there before the deposit could be operated; it depends upon the amount of over-burden to be removed. I am not particularly enthusiastic concerning the use of sandstone facing; I would prefer to use granite, which is more lasting and a more dignified monument as it is possible to make it. There is no doubt that after 100 years sandstone becomes affected. The only suggestion I could make to improve the structure would be in connexion with the facing material block of synthetic granite which the facing material to be used. If the Fairy Meadow stone were found to be suitable and increased the cost of the building by 30 per cent, I would feel inclined to recommend its use. The limestone is admirably suited for treatment in either limestone or granite. I am suggesting the use of synthetic granite only for the steps and the paving in the Court of Honour. I would prefer to use granite for such work, as it would be more lasting, sandstone; whilst granite would be three times more expensive. If the paving and the steps of the Court of Honour were of granite, the extra cost would be about £8,000. It was originally intended that the names should be engraved on the walls of the cloisters. I now submit for the information of the committee a block of synthetic marble in which the letters have been set by a special process. It is quite satisfactory, whilst not as good as if the names were actually described. The cost would be much higher if the work were done otherwise than in accordance with the sample submitted. The sample block is composed of white cement and marble dust. The letters are made separately and fixed on to a bar and placed face downwards. The composition is then poured on top, and when this has set, the face, including the letters, can be polished. It is now estimated that there will be 80,000 names. I submit a plan showing the size and spacing of the lettering of the names. These will start 8 ft. 2 in. from the floor, and extend for 4 ft. 9 in., so that the highest names will not be more than 7 feet from the floor. It is proposed that the slabs containing these names shall be fixed on the walls of the cloisters. I understand that Professor Wilkinson has suggested that the names should be recorded in a book, and that thousands of stars or some such symbol should be

arranged in the dome to give an impression of the number of fallen men. That would effect a considerable saving on the cost of the names themselves; but apart from that, I think the suggestion has much to commend it. Originally we were counting on the names extending 9 feet high without any break between them; but as the result of various consultations with the museum authorities we have modified the scheme until it has reached the present state, which consists of small tablets being placed in position in panels 10 feet long by 4 ft. 9½ in. high. Such panels would be divided into three subsidiary panels, each containing four columns of names. I approve Professor Wilkinson's suggestion, and believe that a rich blue glass mosaic affixed to the dome with cut glass to represent stars, upon which there would be a reflected light, would be most effective. Such an arrangement would, I think, be more impressive than a large number of names upon the wall, which, I think, would tend to become monotonous. Our original estimate provided for 60,000, but the number has since been increased to over 80,000 names. These additional names can be included. If Professor Wilkinson's suggestion were adopted the cloisters could still remain, a fitting setting to the Hall of Memory. I think Professor Wilkinson mentioned his scheme at an interview at which Mr. Murdoch was present, but the observation was quite casual. In my original competition drawing I had provided some decorations in colour, and had stars to represent battles rather than individuals. I think it would be possible to provide a star or symbol for each fallen man. They would, however, diminish in size towards the top. I am favorably disposed to that idea. I have not seen synthetic marble used on any buildings in Sydney, but I have just completed a building in Phillip-street in which synthetic sandstone is used, but that has been done only on the score of cost, and that has been done the difference between the two. Synthetic marble can be polished to look equal to marble. The Hall of Memory will not need artificial lighting, and all the galleries will have ample natural light. In a reinforced concrete building the risk of fire from the short circuiting of electrical wires would be very small. We have allowed for hydrants, but our estimate does not cover the cost of fire sprinklers. If electric lighting was not required an expenditure of £1,000 would be necessary to provide wire for supplying energy for a vacuum cleaning plant. As to whether the Federal Capital Commission would have any responsibility in connexion with the construction of this building, I may state that the original conditions of the competition set out that the successful architect would be employed to carry out the work on the scale of charges adopted by the Federal Institute of Architects of Australia. The usual fee is 6 per cent. on the total cost of the building, and if it were decided not to proceed with the building at present the responsibility of the Government up to date would be 14 per cent. on the estimated cost of the building. Whether the building is proceeded with or not, the cost of preparations and plans, &c., would amount to 3 per cent. of the total cost. That would be additional to the total estimated cost of the building. Mr. Crust and myself would be solely responsible for the supervision of the building during erection. I understand that the architects for the administrative block at Canberra, and not the Commission, are calling tenders. If the Commission called for tenders it would have the responsibility of accepting or declining them. The architects would take the usual responsibility until the building was handed over. I should like to stress the point concerning fire sprinklers. We have allowed for hydrants, but the extra cost of sprinklers would be £3,825, and of fire doors £600. There would be no risk whatever of fire if sprinklers and fire doors were provided. The diameter of the

dome in the Hall of Memory is 40 feet and its apex is 77 feet above the floor. Of course the whole of the dome externally will be faced similar to the rest of the building, and we suggest that it should be covered with golden terra cotta tiles placed in such a way that they will catch the sunlight and have a striking effect from a distance, especially against the dark background of Mount Ainslie. We suggest that the floor should be of Uram marble from Queensland, and the plinth to a height of 2 feet should consist of New South Wales marble. For the interior of the hall itself, we have allowed for a stone dressing, but most of the hall will be covered with plaster, as we understand that at a later date the museum authorities intend to provide suitable mural decoration. Statuary will also be provided for. Four -latory windows have been provided in the dome, it is our intention to avoid direct lighting. We should dispense with strong lighting effects, and intend rather to introduce a subdued light, which will gradually diminish as it reaches the top of the dome. The most effective way of treating the dome would be in glass mosaic, which would be more expensive. If the suggestion for the provision of stars were adopted the cost of the Hall of Memory would be increased. The stars would be more costly, and if the dome were treated in this most satisfactory manner the additional cost would be approximately £6,000. The tiles on the dome externally will be fish-tail in shape, and will be semi-glazed. The largest will be about 18 inches overall, and they will gradually diminish in size towards the apex of the dome. They will be about 12 inches thick. The facing on the Government Savings Bank in Sydney is not the usual architectural terra cotta, but is more in the nature of a faience. Those blocks have a concrete backing, whereas the proposed roof of the dome will be of terra cotta tiles 12 inches thick, and wired and cemented to the dome. I have seen the soldiers' memorial at Albury, which is illuminated at night by a flood light. That would be an excellent idea, and one which I had in mind for using on the dome of this building. To provide the necessary equipment for such a system of lighting to the dome would cost approximately £500, and the estimated cost of lighting would be £200 a year.

38. *To Mr. Lacey.*—Quantities have been taken out and prices submitted by two reputable firms for the supply of sandstone. The lowest was under £50,000 for sandstone for the building, but if Hawkesbury sandstone were used it would cost £10,000 above the cost which I have submitted. The Hawkesbury stone in my opinion wears as well as the Sydney sandstone, but is of a lighter colour. The new stores of David Jones Limited and Farmers', in Sydney, are both faced with Hawkesbury sandstone. I should say the lasting qualities of Sydney and Hawkesbury sandstone would be the same.

39. *To Mr. Cameron.*—The proposal is to face the whole of the building with sandstone, but if a granite base is provided, the extra cost would be over £11,000. I consider that limestone or granite would provide the most lasting facing for the building. Ninety per cent. of the inner walls of the Hall of Memory will be of plaster. If stars are provided in the dome, they should be on a background of coloured glass mosaic—a series of very small glass tiles. The stars would be of cut glass so that they would catch the rays of reflected light; they should project perhaps 2½ inches.

40. *To Mr. Seabrook.*—The contour plans were supplied to us by the Federal Capital Commission. We have estimated that the foundations will be taken out to a depth of 10 feet from the ground floor over the whole site. The basement occupies one side of the building. I have not inspected the foundations, but Mr. Crust has been to Canberra, and reports that hard

shale foundation is available as disclosed in a trial hole at a depth of about 5 feet from the surface. The building regulations of the Sydney City Council provide for a maximum load of from 5 to 10 tons per square foot for hard shale. It would not be necessary to go deeper as our land is comparatively light, except under the Hall of Memory, where four piers support the dome. Any extra depth would involve additional cost. A series of agricultural drains under the floors will connect with the storm water drains. It is assumed that sewer and other services will be available on the site. There is a 6 foot fall in the roof of the aeroplane court. That roof will not be tiled and the light in the aeroplane court is different from the other lighting, inasmuch as it is clerestory lighting. The aeroplane court roof will have a copper roof with rolls. The usual cost for work of this type in Sydney would be 1s. 9d. a cubic foot, and in view of the fact that we obtained a price of under £50,000 for sandstone facings, I think that 2s. 6d. a cubic foot is ample. The bricks would be obtained locally and the brickwork would be 14 inches thick. In front of the building, provision has been made for a terrace 550 feet long by 100 feet wide, which runs across the building; there is a subsidiary pathway connecting Canberra Avenue and Monaro Avenue. We have counted on using filling for these terraces. We prefer to have the building as light in colour as possible. Owing to its distance from other groups, it is not of great importance if it is faced with a different material. I think granite would be ideal and light enough in colour. I do not think a concrete building with a plaster finish would be very satisfactory. It is difficult to plaster such large areas, and cracks would develop owing to the different compositions of material, and their shrinkage. I cannot recall a monumental building on which plaster has been used externally. A concrete backing would stand as well as a brick backing, but it would probably cost more. Brick with a stone veneer would be more satisfactory. The Hawkesbury and Sydney sandstones are similar in composition, but different in colour. If stars were used in the dome they would provide more of a starry effect than that of a number of individual stars. Stars 5 inches in diameter should be sufficient and should be visible 77 feet from the floor. The cornice is only 7 inches and would not obstruct the view. I have not had personal experience with Uram marble, but from my observations it is the only satisfactory white marble we have in Australia at present on the market. The Uram marble has not the vein usually found in other marbles. It is more of a crystalline texture. The entrance steps to the building would be of granite and the steps in the Court of Honour of synthetic granite.

41. *To Mr. Cook.*—Building costs are about 5 per cent. higher than they were two years ago and there is a tendency for costs to rise. Bricks are dearer and sandstone is now costing more owing to the higher tariff duties recently imposed. The concrete forms would be of Oregon. The labour market at present is fairly stable, but over the last two years building costs have gone up 15 per cent., but they have since declined by about 10 per cent. They remained stationary until two months ago when the price of bricks and Oregon increased. There is a general tendency, I think, for building costs to rise again in the near future. We have been in close touch with the War Memorial authorities in preparing the design, and I understand that they have reported in favour of it. They consider that sufficient space has been provided. The base will extend to just above the small window shown on the plan. If the expenditure could be incurred, I would recommend a granite base because sandstone, when close to the ground, is liable to erosion. I have noticed that there is erosion near the ground in some

sandstone buildings in Sydney; but I could not say what the effect would be at Canberra. I am satisfied with the foundations provided. It is my intention to supply the committee with a report on the Fairy Meadow limestone. From what I have heard of it I think it would be more suitable for facing than sandstone as the building is particularly adaptable to limestone or granite facings. The colour would need to be light. I could not give an opinion on the difference in price because the quarry has not been opened up and it is difficult to say what the cost of winning the stone might be. It would be easier to work than granite and in this structure there is very little detail work. The wall spaces are treated in a broad way and I think it would be cheaper than granite. From the viewpoint of the Museum authorities the planning could not be very well improved. We received a schedule of the exhibits to be housed, each of which have a distinctive mark which is shown on the plan. Space has been provided for placing further names.

42. *To Senator Reid.*—Consideration was first given to sandstone because of the price. We had a difficult problem at the outset as we were limited to an expenditure of £350,000, and sandstone was the only facing we could consider at that figure. The price we obtained was for Waverley sandstone; the Hawkesbury sandstone would cost £10,000 more. All our sandstones are similar with the exception of the Hawkesbury stone, which is lighter in colour. I prefer the Hawkesbury stone because of its colour. I would favour the use of that stone as against a darker one for Canberra, because of the dark natural background where the wooded slopes of Ainslie will provide the backing for the building. I think that the rock formation if any would be somewhat deep, but we can build on shale as no heavy concentrated loads occur except under the dome. There is an outcrop of rock at the foot of the site which leads me to suppose that the strata may run right through the site. The size of the symbols or stars would be governed by the contrasting background. The movement of a large number of names can be overcome by breaking them up into panels. If these panels were not used for this purpose they could be employed for depicting battle scenes in either bronze or marble reliefs. If the building were not lighted internally at night, the saving would be equivalent to approximately £2,000. The British Museum, I understand, has not an electric light installation, the absence of an illuminant is to ensure against fire risk. This building could be used at a reasonable hour and the cleaning done prior to darkness or in the morning. If the electric light wiring were omitted and points only provided for a vacuum cleaning plant, the saving would be about £2,000. The dome externally could be illuminated by flood light and there would be a certain amount of reflected light on to the wings.

43. *To Senator Payne.*—We received a quotation for the supply of Hawkesbury sandstone. I doubt whether the cost in other directions could be reduced to enable that stone to be used, as it was a difficult problem for us to provide the desired accommodation at the figure. If the electric lighting and wiring system was dispensed with entirely the additional cost in using Hawkesbury sandstone would then be reduced to £7,000. I cannot see any way in which the building can be altered in order to save that amount. Synthetic sandstone is approximately 25 per cent. cheaper than Sydney sandstone. Synthetic sandstone which I have used has never been tested as to its wearing qualities; I do not think it would last more than 50 years without showing signs of decay, and for a memorial building this would be of the question. A dull light grey colour would be most suitable and the Hawkesbury sandstone is a pale greyish colour. Fairy Meadow limestone would last much longer than sandstone. I have heard that

some types of sandstone have lasted 600 or 700 years in England, but I cannot vouch for the accuracy of such an assertion. In some countries sandstone develops a protective coating, and would reach its full life in a building in which there are no angles and corners. The lettering on the sample block which I have submitted is larger than that which it is proposed to use. Personally, I think it preferable to have a number of symbols representing the fallen, which might create a better conception of the number than would be the case with names; but of course there are many relatives of fallen men who would prefer to see the names engraved on the walls of the building. I think that is why the War Memorial authorities wish to adhere to the original idea. If fire sprinklers were installed they would each cover an area of 10 feet by 10 feet, and would be installed only in the museum area. The cost would be additional.

44. *To Mr. McGrath.*—Although I have stated that I have not seen the Fairy Meadow stone, I could obtain definite information as to its lasting qualities by having tests made at the Technological Museum. The proposal of Professor Wilkinson, which I think is a good one, is that the names shall not be engraved on the walls but shall be recorded in a book which would be regarded as a Roll of Honor, and which would be kept for reference, if necessary, in the Hall of Memory. I do not know if such a proposal would meet with the approval of the War Memorial Committee; I do not think it would. It was one of the competitors in the original competition in which most of the designs were rejected because the estimated cost was more than the £250,000 stipulated. The design now under consideration is similar to the one I originally submitted, but a modification has been made particularly in connexion with the earth works which, under the original proposal would have cost three times as much. The laying out of the site was considered by the adjudicators as having a bearing upon the adjudication of the designs. There is no comparison between sandstone and granite for use in a memorial building which should last for thousands of years. There are deposits of limestone in the Blue Mountains, but I do not think the quantity available is sufficient to justify the consideration of its use.

45. *To the Chairman.*—Our present intention is that the facing in the cloisters shall be of sandstone of a thickness of 12 inches where double faced with a 6-inch veneer for walls where backed with brick. Around the concrete beams it would probably be reduced to 4 inches. The extra cost for a granite base would be over £11,000. A granite facing over the whole building would cost £144,377, or £93,947 extra. Our total estimate of £253,000 does not include anything for heating or for laying the water and sewerage services to the site. It does not cover architects' fees or the cost of providing fire sprinklers. For the paving of the cloisters I think synthetic stone would be quite satisfactory, but it would not be as suitable as granite. If the building were constructed with a sandstone facing this would not affect the paving of synthetic stone. Sandstone paving cannot be regarded as satisfactory, and synthetic stone will also effect the life of the paving. I stated in my original report that in designing this building we decided to depart from architectural tradition as far as it was possible, and produce something purely Australian. We could do better by substituting granite for sandstone, but that would mean an expenditure of another £95,947. Although I have not seen the Fairy Meadow limestone, I have spoken favorably concerning its use because we have had some discussion on its suitability with Mr. Murdoch.

46. *To Mr. Seabrook.*—I do not think through stones are necessary; the veneer would be tied back with gun-metal ties.

46. To Mr. Cook.—Our estimate is based on the wages at present ruling in Sydney with a marginal allowance of 9d. a cubic foot to meet the higher costs of Canberra. I shall supply the committee with the extra cost of delivering stone to Canberra as compared with Sydney.

47. To Mr. Lacey.—I have discussed this matter with some who took part in the original competition, some of whom thought that the amount stipulated was too low for the nature of the work to be undertaken. We have since been able to give the matter more attention and time than was possible when preparing our designs for the competition, as the time was then limited.

48. To Mr. Seabrook.—We cannot tell absolutely exactly what the cost will be until working drawings are prepared and tenders are called. Our estimate is based on our experience in Sydney, and if the accommodation to be provided had to be reduced, that would be a responsibility of the museum authorities.

The witness withdrew.

John Crust, Architect, Sydney, sworn and examined.

49. To the Chairman.—I am an architect in the Department of Works and Railways. I am aware that the committee is considering the proposal to erect a national war memorial at Canberra. In collaboration with Mr. Soderstrom, I have prepared the design which is now before the committee. During the last week-end I visited the site on which the proposed national war memorial is to be erected, and found that a shaft had been sunk in the centre of the site to a depth of 15 feet. The first 5 feet in this shaft consists of clay, below which shale is encountered. The clay portion of the sides of the shaft have shrunk and cracked owing to exposure to the atmosphere, but below a depth of 4 feet 6 inches are visible. If we sank to a depth of 4 feet 6 inches on to the shale we would get a satisfactory foundation. I do not know by whom the hole was sunk. I suppose the work was done by the Commission as a trial hole. I interviewed the secretary and other officers of the Commission, but was unable to learn the history of the shaft referred to. I regard an inspection of that hole as a satisfactory test of the material likely to be encountered in sinking for the foundation, as I do not think there will be much variation. When preparing the working drawings further test holes would have to be sunk to ascertain the quantities required for the foundations. The greater portion of the structure will be of one storey, and in these circumstances, I do not think there will be any difficulty in connection with the foundation. Two tons to the foot would be approximately the greatest load which the foundation Memory. I understand that at present no regulations have been issued by the Commission. The regulations in Sydney provide that on a rock foundation 20 tons to the square foot is permissible, for shale rock, 3 tons for hard clay or a compact shale 4 tons, and for confined shale 2 tons. I should describe the material likely to be encountered at Canberra as hard clay, and the stress under the Hall of Memory would not exceed 5 tons to the square foot. I do not anticipate any difficulty in connexion with the foundations. The basement floor would be on a level of 1,923 feet, and the ground floor on a 1,935 foot level or 12 feet between the floors. In order to briefly describe the general layout and dimensions of the proposed structure, I may say that the building is entered on the ground floor level through a gateway 10 feet wide. We do not propose to provide solid doors at this point, but open-work gates, so that even when the museum is closed, visitors will be able to

view the Court of Honour. Through this gateway one enters a covered loggia that leads to the open garden, from which there is a clear view up the steps of the Hall of Memory. Turning to the left from the loggia, the visitor enters the museum proper by a doorway 6 feet wide, giving access to a hall 100 feet by 40 feet, containing posters, personal relics, naval and Gallipoli exhibits. From there, one passes through a 12-foot entrance to a gallery 80 feet wide. The hall on the side is 135 feet long, and varies from 30 feet to 34 feet in width. Large models will occupy the recesses, which are 15 feet deep, and of which there are twelve. From these one passes into the Aeroplane Court, which has a floor space of 9,000 square feet, the greatest length of which is 120 feet, and the greatest width 87 feet. The semi-circular end of the court has been provided for architectural effects. The portion marked "future" is to be used for future exhibits. The other side of the building is an exact duplicate of that which I have just described and is devoted to the exhibits connected with the campaigns in France and Flanders, and also to the collection of Dyson's drawings. The centre portion of the ground floor is described as second class space, over which the Hall of Memory is situated, and consequently the lighting is not so good. The height of the wall in this space is 12 feet, and the floor area 3,600 square feet. Its greatest width is 60 feet, and its length about 87 feet. On the ground floor provision is made for lavatories, &c., which is not included in the 3,600 feet. There are three W.C.s, and two urinals for men, and three W.C.s for women. There will also be lavatory accommodation in the basement for the staff. Three alternative ways of reaching the Hall of Memory are provided. In entering the building most patrons will be attracted to the garden, and passing the pool will arrive by the main staircase, which rises in five flights to the Hall of Memory. The distance from the front entrance to the Hall of Memory is 220 feet, and the width of the garden, including that of the two cloisters, is 70 feet. The names of the fallen will be recorded on the walls of the cloisters which surround the Court of Honour. These cloisters are 12 feet above the Court of Honour, 9 feet wide, and 15 feet high. The arched openings will be closed to a height of about 2 feet with dwarf walls or flower boxes. Although during wet weather, the rain may be able to beat in, I do not think that can be regarded as a disadvantage. That portion of the building has been specially designed for the inscription of the names. The floor of the cloisters would have a slight fall outwards. For those who do not wish to enter through the garden, there are two other staircases, by using which patrons can remain under cover the whole way, and turn in one of the gates and walk along the cloisters and reach the Hall of Memory in that way. Seating accommodation has not been provided in the cloisters. The Hall of Memory, which has been described in our report, is in the form of a Greek cross, the central portion of which is 40 feet square, and each of the four arms of the cross about 16 feet deep. The arm of the cross facing the entrance is intended to hold a choice piece of statuary. The four arches will be 33 feet high. The height up to the main cornice is 46 feet, and to the top of the dome 77 feet. The principal lighting comes from four large semi-circular windows. The lighting in the Hall of Memory will be provided by these windows, which will consist of ornamental glass, and which will admit a subdued light which will tend to create the requisite feeling of reverence. Provision is made for access from the ground floor to the first floor in three ways. There is a broad external staircase, and also two internal staircases. The floor of the cloisters will be of reinforced concrete, finished with synthetic granite. The Hall of Memory will have a marble floor, also a marble plinth 2 feet up the wall.

The dome is of reinforced concrete, and is not ornamental to the extent of being elaborate. There is not any danger of the plaster cracking. The basement is entered from the entrance loggia by a staircase which leads into a room, 208 feet long by 40 feet wide. This is devoted entirely to the housing of war relics, and forms a part of the museum. From this room there is a corridor 8 feet wide leading to the reading room, which has 1,000 feet of floor area, and in which the walls are 11 feet high. There is also a strong room in which all documents will be stored, and which has a floor area of 17,000 feet. Included in this area are four small strong rooms, which were not asked for, but which enable us to utilize to advantage the space occupied by the foundation walls of the Hall of Memory. Fireproof doors are all that is necessary to provide safe storage for documents which would be stored there. Thirty thousand feet of steel shelving has been provided in rows seven shelves high. This will probably cost £2,000, and is included in the lump sum estimate of 5s. 6d. per cubic foot. The only entrance to the basement from outside is to the caretaker's quarters, which are at the north-west corner of the basement and consist of living room, three bedrooms, kitchen, bathroom, &c. We do not think it is an advantage to have another entrance to the museum in this part of the building, as we think the authorities would prefer the public to enter and leave at the one point. We have also provided a yard for the caretaker, the dimensions of which are 30 feet by 50 feet, around which there will be a wall. A dark room for photographic purposes has been provided, and also a changing room for the staff. A plain luncheon room, 25 feet by 11 feet, to accommodate a staff of seven or eight, has also been shown provided. The light for the basement is obtained from windows, which are provided only on one side. We do not propose to provide natural lighting in the strong rooms. The caretaker's quarters are considered satisfactory from a health point of view, as plenty of light and ventilation are available. I regard the lighting in all parts of the building as satisfactory. The pool in the Court of Honour will be to 75 feet long by 15 feet wide, and constructed of concrete. The depth of the water will be 9 inches to 1 foot, and if the pool is filled to a depth of 9 inches it will hold 5,000 gallons, which is not excessive. The water will be obtained from the ordinary water supply through a 2-inch or 3-inch pipe, and we shall be able to satisfactorily drain this water off when necessary by gravitation to the lower ground levels. The paving in the Court of Honour will form a margin round the pool. The waste water may possibly be utilized for irrigating the gardens on the lower slopes. Some of the larger relics not requiring protection will be placed in the area enclosed by a wall on the western side of the basement. If necessary an entrance could be provided from the outside. I think that 500 persons could be accommodated in the building without overcrowding, as we have a space occupied by 50,000 square feet, which includes the room for entering and leaving the building. No special exits have been provided, but this could be done if necessary. Provision has been made for the disposal of storm waters, and the sewerage system will be connected up with the Commission's sewers. Our price includes connexion inside the building, but we would expect the Commission to bring the sewer to the site. Although the original conditions of competition specified that the names were to be engraved on the walls of the Hall of Memory, I do not think it need be taken quite literally. By the method of recording the names in the stone would be 5s., and under our proposal only 3s. for each name. The cloisters were chosen for recording the names partly because it was

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regarded as more economical. The original conditions provided for 60,000 names to be recorded in the Hall of Memory, and when this was considered by me to be impracticable, I suggested the alternative, which I think has the support of the adjudicators. I suggest using bronze metal for the letters, which I think would be more legible than any system of engraving. I have heard Professor Wilkinson's suggestion regarding a number of symbols to represent the fallen, and I believe the objection to such a scheme would come from the relatives of the men, who would wish to see the names of their sons or fathers prominently displayed. If the names were recorded in a book there would be congestion when it was being inspected, but I do not think that would be the case if the names are shown in the cloisters, as the public would be distributed over different sections. We would not have sufficient space in the dome to place 60,000 stars or symbols. The idea is a beautiful one, but I do not know whether it is one which should be adopted in preference to that which we suggest. Unless some special arrangements are made it will be our responsibility to see that the contractors carry out the work in every detail. I should say that the Federal Capital Commission would have only the same right as a client in making suggestions during construction. A private client leaves the whole job to the architect; but I do not know what the exact position of the Commission would be in this case. I suppose we would take instructions from them, but at the same time they would have to leave the work largely in our hands. We have arrived at our estimate on a basis of so much per cubic foot, but without working drawings and investigation in greater detail we cannot say definitely if the work can be carried out for £250,000. Even when drawings and specifications are prepared and tenders are received it may possibly be found that there is a big variation in the tenders. We shall not know how close our estimate is to the actual cost until tenders are received, but I believe the work can be done for the stipulated amount. In order to ascertain if our estimate is reasonable we have investigated the cost of other buildings, but this structure cannot be compared with a city building, any 10 stories high, as it is totally different in design. It is cheaper than many other buildings, because the rooms are large and the general structure plain. Mr. Murdoch is conversant with the details, and I think he would regard 2s. 6d. per cubic foot as a reasonable price for a building of this kind. We have obtained a definite price for the sandstone, which represents one of the greatest items in the cost, and if we deduct that from £250,000 there would still be £200,000 left for the remainder of the work. We have every right to feel confident that the building can be constructed within the limits specified. Apart from the stone facing, the Hall of Memory and the cloisters, the structure could be compared almost to a building of the warehouse type.

50. To Mr. Cameron.—Further test holes will be sunk on the site in order to ascertain the nature of the ground.

51. To Mr. Seabrook.—In the absence of rock, marble can be regarded as a satisfactory foundation. If necessary, piers and concrete girders will be used if we have to go below the 3 foot level. Although it may be said that the nature of the ground in Canberra varies, I have noticed that on the site for the Administrative Block, which is nearly two miles away, the same type of subsoil is being encountered. In a building of this nature, consisting of long unbroken walls, a pressure of 2 tons to the square foot is satisfactory. There is bound to be a certain amount of settlement, but it is general there will not be any damage. The bottom would have to be tested before we commenced building. If, as you say, only 30,000 stars could be provided in

the dome it would be necessary to utilize the space below the cornices which would not be desirable, as those in that position would be seen from only one side of the building.

52. To Senator Reid.—The space provided for entrances and exits could perhaps receive further consideration. Most of our time has been devoted to providing sufficient space for the exhibits. I do not think that the building is likely to be overcrowded after it has been open a few days. It would take some figuring to ascertain the actual space available to the public, as the exhibits take up only a small portion of the floor area. I should say that hard stone such as granite is more suitable for monumental purposes than sandstone, but at the same time I must say that sandstone is good. The British Museum and many of the public buildings in England are built of that material. I do not think that good quality sandstone would be affected by frost. They have severe frosts in England, but they do not hesitate to use sandstone, although they take great care that the material is obtained from the right quarries.

53. To Mr. Cameron.—There would not be any danger of the names in metal being disfigured by oxidation.

(Taken at Canberra.)

WEDNESDAY, 28th MARCH, 1928.

Present:

Mr. MACKAY, Chairman.

Senator Reid	Mr. Lacey
Senator Payne	Mr. McGrath
Mr. M. Cameron	Mr. Seabrook
Mr. Cook	

William Elmhirst Potts, M.B.E., M.C., B.E., A.M. Inst. C.E., A.M.I.E., Aust., Acting Chief Engineer, Federal Capital Commission, sworn and examined.

54. To the Chairman.—I understand the committee is inquiring into the erection of an Australian War Memorial at Canberra. I was not aware that the cost of preparing the site and constructing terraces, roads, &c., was to be undertaken at the cost of the Commission. Neither was I aware that it was the intention of the Government to ask the Commission to take charge of such constructional work; but if that should be decided upon, the Commission has the necessary staff of workmen to do it. I have, in the limited time at my disposal, given consideration to the various works and services which would have to be provided. I am aware of the levels suggested by the architect, and although they will not necessitate any unusual amount of earthworks, a large quantity will be involved. I am familiar with the site and am conversant with the levels. I could readily form some idea of the quantity of earthwork required adjacent to the building, and for the formation of the terraces as provided by the architect. I should say that the site is an excellent one, as it is on the main axis of the city. I produce plan C493 which shows in colours the proposed lay-out of the roads to be constructed around the site. These embrace Gallipoli-avenue, Peronne-crescent, Anzac-place and Flanders-avenue. The grading has been carried out according to the principles adopted in connexion with Parliament House gardens and other areas where the appearance of the streets is a most important consideration. Due attention has been given to the importance of keeping the view of the building unobstructed from all angles. The streets it is proposed to construct, together with their estimated cost,

embraces the following. It is proposed to construct Gallipoli-avenue to its full width and to grade and form the central and side plantations and footpaths. The full width of the avenue will be 200 feet. There will be two side margins, each of which will be 20 feet wide. Each roadway will be 30 feet, and the central plantation 100 feet in width. That is in accordance with the cross section for such avenues which has been adopted in Canberra, and in accordance with the original plans of Mr. Griffin. The central strip will be planted in a suitable manner and plantations provided on the two side margins. The details of the estimated cost of Gallipoli-avenue are: for the western footpath, for plantation, formation and gravelling, £600. The cost of widening the western roadway, which is already partially constructed, is estimated to be £400. The cost of forming the central plantation is set down at £1,200. For forming, bulleeting and gravelling the eastern road, the cost is estimated at £1,200. For the formation of the eastern footpath, plantation and gravelling the path, the cost is estimated at £750. The cost of kerbing and guttering both roadways is set down at £1,100. This makes the estimated cost in connexion with Gallipoli-avenue £5,150. This avenue is 1,007 feet long and 200 feet wide over all. In connexion with Peronne-crescent, I would point out that the old Yass-road crosses the area reserved for the War Memorial and in my opinion this road will have to be deviated, as must eventually be done, on to the city plan. It is proposed to construct Peronne-crescent to its full width of 100 feet, which includes plantations and footpaths. There are two margins each 35 feet wide carrying footpaths and plantations as well as a carriage-way 30 feet wide and approximately 2,552 feet long. The cost of constructing this crescent is estimated at £5,000 and the kerbing and guttering at £1,200, making a total of £6,200. On Flanders-avenue it is proposed to form and gravel the northern roadway—that is the one adjacent to the site of the proposed building. The natural surface on the centre line of the roadway slopes at the rate of one foot in eleven. The road level near Peronne-crescent is fixed by the Ainslie catchwater drain which runs across the north-eastern corner of the site, and can be deviated only by tunnelling. It is possible, however, to get a grade of 1 in 14 by fairly deep filling up to a maximum of nearly 8 feet near the intersection of Xpress-street. It is proposed to grade the footpath as near as possible to the natural surface. It is also proposed to extend Peronne-crescent beyond the north-eastern boundary line of the building site to its intersection with the old Yass-road. It will then replace the old road and become the main thoroughfare in that portion of the city. The estimated cost of this portion of the work is £1,600. The width of the construction will be 20 feet for footpath and plantation, and 30 feet for the roadway, the length of which will be approximately 2,100 feet. The old Yass-road has a grade of 1 in 12. It is usual in the city to get a ruling grade of 1 in 20, but in my opinion that is quite impracticable here. In some cases in the city the ruling grade is 1 in 16. The actual grade adopted for Flanders-avenue is about 1 in 14. It is proposed to construct the roadways surrounding Anzac-place which is a circular feature on the axis according to Mr. Griffin's plan. The total cost of the roads surrounding Anzac-place will be £5,145, which is for roads 30 feet wide. The total estimated cost of constructing all the necessary roads, footpaths and plantations according to the lay-out of the city, is £21,945, which includes the cost of kerbing and guttering. For the present it is proposed that the surface of these roads and footpaths will consist of gravel. The estimate of £21,975 does not include anything for trees planting. When once the formation is completed, tree planting is a comparatively inexpensive work. I am

suggesting that, if necessary, a parking area will be provided in Anzac-place although I have not worked out a scheme in detail. The whole space would be treated similarly to parking areas in the vicinity of Parliament House, but it would involve additional cost. Anzac-place is sufficiently near to the proposed building for the purpose. The ground in Anzac-place is comparatively level. I shall prepare an estimate of forming, gravelling and draining that area. The 30 acres on which the building is to be situated will be bordered by Gallipoli-avenue, Peronne-crescent, Flanders-avenue and Anzac-place. In the architects' plans terraces at reduced levels 1923, 1925, and 1928 are provided. The terraces are horizontal and as shown on the accompanying sections, the terraces at the 1923 feet level will obstruct the view of the base of the building. A glimpse of plan CP251 which I produce shows that a person standing on the roadway at Anzac-place will have his view of a part of the base of the building obstructed by a portion of the terrace. To overcome that difficulty, I suggest that the terrace be sloped away from the building at a grade of 1 in 40, and in addition be given a longitudinal slope of 1 in 300 from the centre line. This will provide for an effective drainage of the pathways. I do not think that this alteration will materially affect the architect's estimated cost of forming the terrace. A person standing at Anzac-place would have a line of vision as shown by the green line on the plan. The black line represents the terrace levels as designed by the architect. It will be seen that if the levels suggested by the architects are adopted, the view will be obstructed. The same result will follow if the building is viewed from a point marked "AA" on the plan. I suggest that the architects could get the same effect whilst preserving the line of sight by sloping the terrace and continuing it as shown in red on the plan. The same difficulty arose in connexion with the construction of Parliament House, as looking from a point on Commonwealth-avenue it is impossible to see the base of the building. Personally, I think that the view of such an important building as this should not be obstructed even to the smallest degree. This is the first occasion on which I have mentioned this matter; I have had no opportunity of discussing it with the architects. I understood that the cost of developing within the area was included in the building estimates. I have made no estimate of the cost of forming terraces and planting gardens, &c., within the area. I have considered only the engineering services to be provided up to the site. The question of the amount to be expended on the land surrounding the building has not been mentioned to me. I presume the architects will arrange for the lay-out of that area in connexion with which they will possibly seek my advice. I know that nothing has been done beyond the actual terracing shown on the plans produced to the committee. I have no knowledge of any action being taken in the direction of doing the work mentioned in paragraph 13 of the conditions submitted to the architects who submitted competitive designs. I have only been interested in the provision of essential services up to the building. I produce two other plans numbered M24, and CP163, which show the grades of the proposed roads. By situating Anzac-place to the south of the building and altering the boundary so that Gallipoli-avenue will junction with Flanders-avenue through Anzac-place, the cost of construction would be lessened. On plan G12, produced, the proposed storm waters scheme is shown. There is a natural depression to the west of the building, and it is proposed to take up the discharge of the catchment area by a concrete pipe line of storm water pipes laid through the depression. These pipes will pick up the water from Peronne-crescent and from Gallipoli-avenue, and connexion may be made to the roof water

drains from the building as tentatively shown on the plan. The invert of the drain is below the basement level of the building. The estimated cost of the drain is £1,400. In Peronne-crescent and Flanders-avenue it will be necessary to deal with the storm waters brought down by the Mount Ainslie storm water drain and to construct two culverts. The estimated cost, in addition to the £1,400, would be £2,300. The total cost of storm water drains would be £3,600.

In connexion with the water supply and fire protection, I may explain that a 6-inch water main is already laid on Gallipoli-avenue, and is fed from the Russell Reservoir through a 9-inch pipe along the Sydney-Emden Road, thence through a 6-inch main alongside Anzac Parkway to Gallipoli-avenue. It is proposed to take a 6-inch main off the existing main, to circuit the building, and to provide four fire hydrants as shown on Plan SC 96W. The distance between the hydrants will be 300 feet, and their distance from the building 100 feet. The estimated cost is £1,975. The water supply for the building can also be obtained from that main by ordinary tapping and the use of smaller pipes. That is exclusively a building service, which would be provided by the contractor, and which, I think, you will find is included in the cost of the building. It is essential to note that the pressure at this point is somewhat low. The Russell reservoir levels are—Top, 2,086.5; bottom, 2,070.70. The level at the highest point for hydrants at the memorial site is 1,933. The level of the Red Hill reservoir floor is 2,394.46. If two hydrants are in use at the same time the discharge through the fire hose nozzle is estimated at 320 gallons a minute. The static head at this point is 137 feet when the reservoir is nearly empty. With 200 feet of 2½-inch canvas hose the loss in head would be approximately 36 feet, therefore the nozzle pressure would be 44 lb. per square inch. On that information I calculate that the distance of a horizontal jet throw would be 58 feet, and a vertical jet throw 68 feet, and the quantity discharged through one nozzle would be 160 gallons a minute. The architects' specification indicates that provision has been made for a system of fire hydrants throughout the building. I think they have also stated that if necessary fire sprinklers could be installed. In my opinion fire hydrants should not be installed inside the building, but a sprinkler system should be. I understand that a sprinkler system would cost £3,825. I regard hydrants as unnecessary and undesirable in the building, where there are valuable exhibits in the form of documents and records. A good deal of damage could result from carelessness or the action of vandals or irresponsible if the fire hydrants were available. Further, a fire could be well alight, and prevent the hydrants being brought into operation. A sprinkler installation would have complete connexion with the 6-inch main. Actually the static pressure will not be sufficient to properly operate the sprinklers, and if they were installed it would be necessary to provide an automatic booster pump or a tank in the roof. I think the latter proposal preferable, because a tank is more reliable. The cost of a booster pump would be small, but it could not be absolutely relied upon at all times. A tank is absolutely reliable. I have not gone into the details to the extent of determining the number of points. An ordinary 1-inch or 2-inch house service would be sufficient for supplying the ornamental pool in the centre of the building. An additional fire safeguard is that by the operation of certain valves the full pressure of the Red Hill reservoir could be brought into the 6-inch main, but, of course, in the event of fire there might be some delay in doing that. I am estimating for complete protection against fire with the pressure that is available in the locality. It

60. *To Mr. Seabrook.*—According to the trial shaft which has been sunk, suitable foundations can be obtained at a depth of 5 feet, but I cannot say definitely whether such foundations can be obtained at that depth all over the site. I do not think there is much variation, and I believe it will be found that at a depth of 5 feet over the whole area decomposed rock will be encountered, which will give an excellent foundation for the pressure mentioned. The authority of the Commission with the architects would be a matter of arrangement. The architects for the Administrative block are Robertson and Marks, and the contractors Hutcherson Brothers. If the lay-out of the ground was to be undertaken by the Commission, doubtless tenders would be called for the work.

61. *To Mr. Cook.*—The lowest approximate amount for which tenders would be called would depend upon the circumstances. I have based the estimates for road work on a cost per mile. Before the work is commenced, I would ascertain the exact quantities of the materials to be used. The lay-out of the roads is in accordance with the plans, but I have made suggestions as to how the work should be done. In most essentials the Griffin plan must be carried out, but there are some minor instances in connection with subdivisional work where that is impracticable. The turns in the road in the locality under consideration are not as sharp as they are in other parts of the Territory. The usual width of a road in New South Wales is 66 feet, on which two 12-foot footpaths are provided, which leaves a carriageway of 42 feet.

62. *To the Chairman.*—I will submit details of the estimated cost per yard of the roads, and shall also provide a summary of the detailed costs.

(Taken at Canberra.)

THURSDAY, 29th MARCH, 1928.

Present:

Mr. MAORAY, Chairman;

Senator Payne
Senator Reid
Mr. M. Cameron
Mr. Cook
Mr. Lacey
Mr. McGrath
Mr. Seabrook.

ROY ROWE, President of the Federal Capital Territory branch of the R.S.S.I.L.A. and Furniture Officer, Federal Capital Commission, residing at Canberra, sworn and examined.

63. *To the Chairman.*—We, in Canberra, have the equivalent of State rights. The status of our branch is similar to that of the States, although we suffer minor disadvantages. We have direct access to the Federal executive. The question of an Australian war memorial was considered at the congress of our branch which was held recently. At our request the Minister for Home and Territories permitted the Director of the Memorial and War Records section to explain the proposal to the congress. I should like to thank this committee for permitting me to express the view of ex-service men in the Federal Capital Territory regarding it. The establishment of the Federal Capital has brought to Canberra men from all parts of Australia.

The Federal Capital Territory branch of the Returned Soldiers' League is, therefore, particularly representative of the Navy and the Australian Imperial Forces. There is probably not a battalion or regiment of the Australian Imperial Forces that is not represented among our members. At our annual congress, held recently, the question of the War Memorial

was on our agenda. Many of our members serving in Palestine and France during the latter half of the war contributed to the collection of records and relics for the War Memorial Museum. Rivalry existed among the units to send in the best and most unique articles. Many exhibits were sent in with the names of mates who had fallen, as we felt that the recording of their names with the articles, which exhibited, would help to perpetuate their memory. The branch executive was anxious to have the Government's proposals explained to our congress, and, therefore, asked the Minister for Home and Territories to arrange for this to be done. He kindly instructed the Director of the War Memorial to attend the congress and address delegates on the subject. The proposals were strongly supported by delegates representing all sub-branches. Unanimous approval was expressed of the site selected, it being considered that for location and elevation it was the best available. The following resolutions were carried unanimously—

That this congress hereby records its warm appreciation of the Government's proposals and particularly of the Hall of Memory which, with its clustered record of the names of the fallen, delegates feel, will make a strong appeal to public sentiment. Delegates are aware that the memorial in the form proposed was conceived in 1917, and has been made possible chiefly by the whole-hearted co-operation of the members of the Australian Forces, and their relatives who, heartily approving of the proposal, gave their most precious relics and records in order that the achievements of these Forces and of the fallen might be perpetuated in the National War Memorial. Further, the delegates are unanimously of the opinion that no more effective memorial than that proposed by the Government could be conceived.

That congress notes with satisfaction the statement by the Prime Minister, published in the press of 10th February, 1928, that the Government intend to proceed with the building as soon as the necessary preliminary work has been finished. The delegates, believing that the early completion of the National War Memorial is the wish of Australians in general, and of returned men in particular, are of the opinion that the Government will arrange for the construction of the building to be commenced during the current year and completed as quickly as possible. Further, they desire to respectfully assure the Government of the support of the members of the Federal Capital Territory branch in bringing the project to a successful conclusion.

That congress is of the opinion, having noted the public suggestion in favour of building a war memorial in the form of a pillar of light on Mount Ainslie, deprecates strongly any movements which might detract from the supreme importance of a building fully worthy of housing the Australian War Museum, and considers that until this has been accomplished other movements for a local memorial should be deferred.

I think those resolutions accurately express the view of returned sailors and soldiers in the Federal Capital Territory, who heartily approve of the form the memorial is to take. The design of the building satisfies the desire for a monument. The Hall of Memory, with its record of the fallen, imparts a fitting atmosphere of solemnity. The collection of pictures, relics, records and models will convey a true idea of what Australia's effort in the war was, what the sailors and soldiers endured, the sacrifices made, and what they achieved. The memorial should be a source of inspiration to future generations. The returned men in the Federal Capital Territory are interested, both as ex-soldiers and as citizens of Canberra. As diggers, we are anxious that the paying of this final tribute to our fallen comrades should not be delayed. As citizens, we believe the memorial will be a worthy ornament to the Federal Capital. It will attract to Canberra ex-service men and citizens from all parts of the Commonwealth, especially the relatives of the fallen, who will have a natural desire to make a pilgrimage to Canberra to see the memorial and pay their homage to the memory of the fallen. The memorial would be a fitting place for the national celebration of Anzac Day and Armistice Day at the Seat of Government of the Commonwealth. There is another aspect which appeals to us. Many diggers have come to Canberra

and made their homes here. They can only remain as long as there is work for them. We feel that the construction of a building, such as the memorial, will provide employment for a large number of men for three or four years. The best journeymen in the Commonwealth can be supplied from among ex-service men resident in Canberra, and the returned men may be relied upon to take a special interest in the building of a memorial to their fallen comrades. We note with satisfaction the statement of the Minister for Home and Territories that it is hoped to lay the foundation stone on Armistice Day, 1928, and we earnestly hope the work will be sufficiently advanced to enable this to be accomplished. I have heard that it is suggested that no expenditure should be incurred except on a utilitarian memorial for the relief of distress existing among ex-service men. I am opposed to a utilitarian memorial, because I believe that the greater degree of utility practised in relation to such a memorial, the less will be the memorial value. I think that my views are shared by returned men in Canberra, and that Australians would oppose the vision of necessity and benefits for the living at the expense of a memorial for the fallen. From the angle of cost I think we should not hesitate to spend £250,000 upon a memorial to the memory of the dead, when we remember that millions of pounds have already been expended in repatriating the living. It is the opinion of my branch that the proposed building will fully meet its ideas in commemorating the sacrifice of their fallen comrades. So far as I am aware, it is the unanimous wish of returned soldiers that a permanent and lasting record of the fallen should be established, and that that would be achieved by recording their names in permanent lettering on the walls in preference to their being recorded in any book. There are many aspects that might be referred to, but that which appeals to us most is the recording of the names in such a way that they will be handed down to future generations in a permanent form. If the suggestion to have a large number of stars in the dome of the building and the names of the fallen recorded in a book were followed, it would destroy to a great extent the same atmosphere and would not have anything like the same attraction or honour the dead to the same extent in the eyes of relatives who would visit the memorial from all parts of the Commonwealth. The question of having the museum and the memorial in the one building was discussed fully and the delegates representing all our sub-branches, gave it their unanimous approval. To have a granite facing, I understand, would entail a substantially increased expenditure. Anything which is of a permanent nature would naturally appeal to returned soldiers and have their support; but we are unanimously of the opinion that the time has arrived when a suitable memorial should be built, and we should not agree to its being delayed on account of the fact that an additional £100,000 would have to be provided for a granite facing. We prefer that the building should be faced with sandstone rather than that it should be delayed in the hope of getting a granite facing. Personally, I consider that the site which has been chosen for the memorial is conspicuous, convenient, and accessible to public. Some of the delegates who have been here for years consider that it is the most suitable site in Canberra. My branch considers that the expenditure of £250,000 on the memorial will be a sufficient recognition of the sacrifice of our fallen comrades. We do not regard it as too little. When we considered the matter we knew that that was the estimated cost, and it was unanimously endorsed.

64. *To Mr. Cameron.*—I believe that the lettering is to be in bronze on synthetic marble. That will be quite satisfactory. It will be a permanent record.

There appears to be no reason why that system should not be adopted. We are emphatically of the opinion that it is the best system.

65. *To Mr. Seabrook.*—I have seen the plan of the proposed memorial. When we discussed the matter, the whole of the plans that are now available were not in our possession as they were more or less confidential. But the plans which we then had conveyed fairly fully the nature of the scheme, and they were unanimously supported. We consider that if the names were recorded in a book it would not be a permanent record. Either it would have to be a valuable book worthy of the inscriptions, which might become damaged or lost and on that account could not be made as public as would be advisable; or there would be a cheaper book that would be unworthy of the function it served. It would not be anything like as convenient for the general public as the recording of the names on the wall. Only one or two persons would be able to consult it at a time, whereas as many people as could get into the Hall of Memory would be able to view comfortably the whole of the names recorded on the cloisters. I am not particularly impressed with the idea of having stars, because they would not convey the personal touch and the correct number could not be provided. We are very strongly of the opinion that it would be better to record the names on the wall.

66. *To Senator Reid.*—The returned soldiers are quite satisfied with the proposed memorial. The scheme was explained with the permission of the Minister and was heartily endorsed by all the delegates who attended the congress. They also approved of the idea of housing the museum in this building because it has many association with the life of the Australian Imperial Forces that should be preserved. Another point which appealed to them was that in addition to being a history of the Australian Imperial Forces, it would satisfy their desire for a monument in the Hall of Memory. We are emphatic in our preference for the permanent listing of the names of the fallen. I am quite sure that the idea of having a book would not be entertained. I believe that the memorial will have a strong appeal, particularly to the relatives of returned men. They will have a keen desire to see this tribute to their dear ones. I believe it will be the desire of all near relatives to visit Canberra to see this national tribute.

67. *To Mr. Cook.*—Our branch is very strongly of the opinion that any memorial which is erected should be in the form of a shrine and have an association with the Australian Imperial Forces. The only real opportunity that presents itself for obtaining the views of our members is our annual congress. This matter was definitely listed for discussion at our last congress and circulated among our members prior to that gathering, and a definite opinion was obtained upon it. That is the most representative opinion that we can secure in our organization.

68. *To Mr. McGrath.*—Our congress was representative of the sub-branches in the Federal Capital Territory. As a branch, we have not considered whether the names should be grouped according to locality or battalions. The locality idea is quite a good one. The difficulty I foresee in recording the names in regimental form is that regiments were enlisted from all parts of the Commonwealth and the regimental interest would thus be widely distributed among the various States. The locality appeal would probably be stronger than the battalion appeal. I understand that many other memorial buildings have been faced with sandstone. Although, unquestionably, the returned men would favour a material of a more permanent nature, at the same time they would not like to see the building of this memorial delayed because

of any difficulty that might be experienced in raising the necessary money to face it with granite. If there were no such delay we should naturally favour a granite facing.

69. *To Mr. Lacey.*—It should be made as easy as possible to pick out the names of the fallen. Relatives of a deceased soldier would be better acquainted with the town in which he enlisted than the battalion to which he was attached. There were no representatives at our congress from any other branches in Australia. The opinions I have expressed this morning have not been given on behalf of any other State. I point out, however, that we claim to be more representative than any State branch because we have members who have come from every branch in the Commonwealth and represent every unit in the Australian Imperial Force, and the navy.

70. *To Senator Payne.*—The recording of the names in battalion form would be somewhat difficult because a number of men enlisted in certain battalions which were afterwards split up, when they were drafted into other battalions. It would be a question as to which battalion they should be assigned. I cite as an instance some men in the first and second division battalions who were drafted into the fourth and fifth division battalions. These men served for a few months on Gallipoli in the battalions in which they enlisted, and afterwards served for years in the other battalions to which they were drafted. If the names were grouped according to the towns in which the men enlisted, it would be made easier for the relatives to pick them out. Our branch has not considered whether the memorial should be so lighted as to be observed by both day and night. Personally I consider that it would be a desirable thing but whether the cost would be prohibitive is another matter. It would add to the value of the memorial if it were distinguishable at any hour of the day or night.

71. *To the Chairman.*—The membership of our branch numbers 500. Our members are drawn from public servants, commission employees, staff men, industrial men, tradesmen, men engaged in all branches of commerce, and quite a number of Parliamentarians. It would be appropriate if the building were erected as far as possible by returned soldiers. They could be relied upon to take a special pride in any work connected with a memorial to the men who fell. I do not think there would be any difficulty in obtaining plenty of skilled and unskilled labour.

72. *To Mr. McGrath.*—I shall ask our branch to consider the advisability of having associated the names of men who fought side by side in battalions grouped in that order.

73. *To Mr. Seabrook.*—I favour the locality method because it would not allow of any misunderstanding. It would also take from the board the decision of establishing to which unit a man belonged.

(Taken at Melbourne.)

MONDAY, 2ND APRIL, 1928.

Present:

Mr. MACKAY, Chairman;

Senator Barnes	Mr. Cook
Senator Payne	Mr. Lacey
Senator Reid	Mr. McGrath
Mr. M. Cameron	Mr. Seabrook

Edward John Diddin, General Secretary, Returned Sailors and Soldiers' Imperial League, Melbourne, sworn and examined.

74. *To the Chairman.*—I am aware that the Commonwealth Government has referred to the Public

Works Committee a proposal to erect a war memorial at Canberra, and that the Government has restricted the expenditure on the building to £250,000. The proposal has been considered by my executive, and I am here to express the opinion of the returned sailors and soldiers throughout Australia. I am also aware that it is proposed to house war relics, and records in the building. I think that it is advisable to have the war museum connected with the memorial. We do not like utility being combined with the memorial. On receipt of a request from the committee to attend here to give evidence to-day, the State branches were communicated with asking for their opinions, and in each case they endorsed the government's proposals. I am aware of the manner in which it is proposed to record the names of the fallen soldiers. I believe they are to be recorded in lasting metal or material. That would be a fitting manner in which to form a permanent record. The names should be grouped under municipalities in alphabetical order, and not under the heading of States. In that way we think we would give an Australian significance to the memorial. For instance, the names of the fallen men from Hobart would be recorded under the municipality or shire of Hobart. If the names were grouped under States, New South Wales and Victoria would show the vast majority of fallen soldiers, and the small States would be tucked away in a corner, and perhaps in a few years regarded as of minor importance. We like the Australian idea. I do not think that there would be any difficulty in arranging the names under localities, except that there may be a little extra work in compilation. By this means the relatives of fallen soldiers would find the names without difficulty. This subject has been thoroughly discussed by my executive. We are advocating the alphabetical grouping of the municipalities or shires. Where there are two municipalities of the same name the State would be shown, such as "Tas." for Tasmania and "Q." for Queensland.

75. *To Senator Reid.*—We think that our suggestion of grouping the names under municipalities would simplify identification. It was because of Professor Wilkinson's suggestion to cover with stars the interior of the dome of the Hall of Memory that my executive came to consider the grouping of names. We do not agree with Professor Wilkinson's proposal. We prefer a permanent record of names set in lasting material on the walls of the cloisters.

76. *To the Chairman.*—Regarding the proposal to build the war memorial of concrete covered with sandstone, I understand that most of the monuments throughout the Empire are constructed of sandstone, and we feel that the Australian monument could be well set up in that stone. The question of cost should not enter into the question of a memorial at all. Whether it is to be constructed with a granite or sandstone facing is a matter for the government's determination, but we feel that we should like it to be in keeping with other memorials. If granite is recommended, of course it would be necessary to curtail the expenditure in other parts of the building, the alternative being to appeal to the public. I think that sandstone facing would be satisfactory, particularly in view of the fact that many memorials are constructed of the same material. Every little town throughout Australia has a war memorial of some kind, and I think that the people of Australia have subscribed liberally and sufficiently. I understand that the expenditure of £250,000 is for the building only, and not for grounds or approaches. A war memorial as proposed would be worthy of Australia. It is an excellent memorial and admirably suited for the purpose.

77. *To Mr. Seabrook.*—My committee has seen the photographs of the memorial, and some of us have also examined the plans. A representative from each

State has actually been on the site, and looked along what is known as Prospect Parkway to Parliament House. The committee is hardly competent to know whether the building is large enough to contain all the war exhibits. We do not know the number of exhibits and what is actually proposed to be placed within the hall. We, of course, know that the exhibits are now housed in the exhibition halls of Melbourne and Sydney. I think that the building would be sufficiently large for housing war relics, but it is difficult to give any definite information without the advice of an architect. I should think that the life of a sandstone building would be sufficient for the purposes of a war memorial, because repairs could be effected from time to time, as is done in connexion with churches and other memorials. I am definitely of the opinion that the names should be recorded on the walls of the cloisters. We do not like the idea of having stars on the interior of the dome. We do not think that stars would have a war significance, and in any case we doubt whether there is room on the dome for 80,000 stars. If the names were recorded in a book kept in the dome, we feel that in 50 years' time it would be lost, stolen, or destroyed by handling. It is obvious that the continual handling of the book would soon destroy it. It would certainly be preferable to have the names recorded in bronze, as is now proposed.

78. *To Senator Payne.*—I have seen the site of the war memorial, and I approve of the locality. It will certainly give due prominence to the memorial. Every facility should be given to the public to visit the memorial and to see the names of fallen soldiers with whom they are concerned. We feel that senators with whom opinion that the public was unsuitably placed to see the names set in metal on the walls of the cloisters. It is now proposed, rather than wide museum, should be in close association with the memorial. Whether the building should have sandstone or granite facing is a question for the government's determination. Memorials now being erected in many parts of the world are being built of sandstone. I have noticed sandstone buildings on the other side of the world, including churches at Rouen and in England, and they are all in good repair. Many old sandstone buildings at Oxford have been standing for centuries. I would not say that sandstone is a more suitable facing for the building than granite, because that is a question for the government's decision. The war relics and exhibits should be housed in absolute security. Every day that they remain in Melbourne or Sydney adds to the risk of destruction by fire.

79. *To Senator Reid.*—Some members of my executive have seen the plans. Considering the amount of money available, we feel that the proposal will meet the wishes of the people of Australia. My executive is definitely in favour of the names being permanently inscribed on the walls of the cloisters. I should like my grandchild, say in 50 years' time, to be able to visit the war memorial and to say, "There's my grandfather's name." I prefer that proposal to placing pictures on the walls depicting the principal battles of the war. A picture can only show one aspect of battles such as those of Villiers-Bretonneux and Ypres. I think that the future generations will be only too eager to see the names of the fallen soldiers, especially if they are placed under localities. I do not think that the memorial hall will ever be crowded, but it will be continually visited by people from the various parts of Australia. In May last representatives of each State inspected the site, and since then we have been continually in touch with Major Trelor, the secretary of the War Memorial Committee. We have made suggestions from time to time to that committee. One suggestion related to the names of the towns approaching the memorial, and the names of the roads approaching the memorial, and the place of the name "Prospect Parkway" to "Anzac Place." We are also, to some extent, responsible for

the placing of 80,000 names on the walls of the cloisters. It was originally intended to have 60,000 names, representing only those persons killed overseas, but upon our representations the names of those persons who have died since as a result of war injuries are to be included. The committee has adopted a very friendly attitude towards us, and has invited us to make suggestions. The cost of the memorial has not been discussed by my executive. We discussed Professor Wilkinson's proposal to place stars on the interior of the dome. We have received very definite protests against that proposal, particularly from New South Wales.

80. *To Mr. Lacey.*—We think that the cloisters should be so designed as to permit the names to be seen as easily as possible by near relatives. I admit that there may be some difficulty in grouping names under localities, particularly in view of the fact that some district councils are known to the public by one name and officially by another name, but it is seldom that persons living in a municipality do not know its correct appellation. My committee is definitely of the opinion that the names should be grouped under municipalities, but I shall place the position fully before it, with a view to reconsidering its decision. I would not alter my opinion in regard to grouping names under municipalities until I had fully discussed the question with my executive.

81. *To Mr. McGrath.*—My committee discussed the question of grouping the names under battalions or brigades, but we were not in favour of it. It was also suggested that the names should be shown in accordance with the battles at which the soldiers had been killed, such as Gallipoli, Pozieres, and Villiers-Bretonneux, but we found that that entailed many difficulties. Men who had been badly wounded at Gallipoli may have been later killed in France, and it would be difficult to associate them with the Gallipoli casualties. My committee has not discussed the question of whether the expenditure on the war memorial should be met out of loan money or revenue.

82. *To Mr. M. Cameron.*—The names of the fallen soldiers should be grouped under the municipality in which they lived prior to the war, and generally the last place of residence would be the place of enlistment.

83. *To the Chairman.*—My committee arrived at an expression of opinion as to the suitability of the war memorial, first by an exchange of telegrams, and secondly by a meeting of representatives in Melbourne. We have members of the League in Melbourne who are representing the different States. They have been brought together to discuss the views that have been expressed by the States by telegram or letter. The method of recording the names was fully discussed. We also discussed the battalion scheme, the alphabetical scheme, and the battle casualty scheme, but at the time we considered the municipality scheme the most suitable. The delegates were unanimous in their decision. In the circumstances, we consider it to be the most suitable method of recording the names, but in view of the facts that have been placed before me this afternoon I am prepared to place the matter before my executive with a view to further discussing the subject. In giving evidence to-day I am representing the president of the League. He very much regrets that he was unable to be present.

84. *To the Chairman.*—My committee will reconsider the question of grouping the names under municipalities. We do not like the idea of grouping the names under States. We want an Australian sentiment. We did not discuss with the War Memorial Committee the method of recording names. In fact, we did not take the matter seriously until Professor Wilkinson's suggestion came under our notice. We

consider that it would be appropriate if returned soldiers only were employed on the construction of the building. It would be a sentiment that would be appreciated by the public.

85. *To Mr. Seabrook*.—It should be a condition of tendering that returned soldiers only should be employed on the work. That is already a condition of tender in railway construction. It is unfortunate that at times all returned soldiers are judged on the basis of one who gives bad service.

(Taken at Melbourne.)

TUESDAY, 3RD APRIL, 1928.

Present:

Mr. MACKAY, Chairman;

Senator Barnes	Mr. Cook
Senator Payne	Mr. Lacey
Senator Reid	Mr. Seabrook
Mr. M. Cameron	

William Arthur Mordey Blackett, President of the Royal Victorian Institute of Architects, sworn and examined.

89. *By the Chairman*.—I am aware that this committee is investigating a proposal for the erection of a war memorial at Canberra, and that the stipulated cost of the building is £250,000. I have not had an opportunity of inspecting the plans, although I have seen illustrations of the model in the press. Without studying the plans I can form a pretty good idea of the proposal. It is a fine and dignified plan, and what struck me most about it was the Byzantine influence on its design of architecture. That is most appropriate, because the first contact of the Australian soldiers with the enemy was at Gallipoli. The Byzantine style of architecture originated in the eastern Roman Empire, and the influence of its great buildings affected the style adopted by the Turkish Empire. Another striking feature of the plan is the cruciform nature of the building. I admire very much the idea of the central court with the mirror pool. Without having had an opportunity to make a close study of the proposal, it appeals to me as being one of the most important monuments that will be erected in the world in memory of the war. Its quietness and non-assertion of military force are very fine attributes. It is a monument of memory rather than of war, and lacks the bombastic effect which is seen in the memorials erected by the late German Empire in commemoration of the Franco-Prussian war, the architectural construction of which is designed to perpetuate the glorification of the dynasty and the subjugation of the enemy. That effect has not been aimed at in British monuments, and I think that this proposal is quite in harmony with our racial thought. I am acquainted with the site of the proposed building. I have been on the site, and I consider the aspect pleasing. This building will certainly be in harmony with other buildings in Canberra of major importance. The Institute of Architects has discussed the proposal, but the actual plans have not been considered. One well-known architect of Melbourne told me that he considered that the design had great possibilities of being a really fine monumental structure. I think that the building should be of a non-utilitarian character, especially in a monument of this magnitude, because a utilitarian structure soon ceases to function as a memorial. For instance, a hospital that is erected for memorial purposes soon functions only on utilitarian lines. It is a most excellent idea to include the war museum within the building, because the material side

of the history of the great war will then be exposed to future generations, and this is something to understand the great sacrifices that were made during the war. I agree that the building should be of light colour; to harmonize with the other buildings of Canberra and with the landscape. I also think that the building should be flood-lighted externally. We have an instance of that at Albury, and also at Brighton. These memorials, although comparatively small, are permanently flood-lighted, and the effect is singularly effective. They create a response in one's imagination. This memorial, with Mount Ainslie in the background, will be a wonderful sight, and I suppose that there will hardly be a monument in the world with such a background except, of course, the monument at Edinburgh, which is unique. Whether the whole building should be flood-lighted is a matter which could be easily ascertained before permanent provision is made for lighting. With respect to the proposal to have a building of sandstone, of course the Macquarie buildings in Sydney go back only to the beginning of last century. Some of these are showing signs of decay. In choosing the stone to be used in the construction of this memorial we must consider its lasting qualities, and not its cost. I should prefer granite to be used. The established aim of the Commonwealth government should be to have a memorial that will last for thousands of years. The deterioration of sandstone is due, to a certain extent, to frost. We have no very old sandstone buildings in Australia. A great mistake was made in building Parliament House at Westminster, London, of sandstone, and the decay of that building is causing considerable concern to the Imperial Parliament. There is a church in Derbyshire built of sandstone which is 1,200 years old, and it has stood the test of the time well. This church was taken as an example in choosing the same stone in building the Houses of Parliament at Westminster. The repair of the British Parliament House has been very expensive, and it will cost much more. I could not give an estimate of the life of sandstone. That would require the services of a geologist. Of course, the climatic conditions, as far as sandstone is concerned, are better here than in Sydney. This is a dry climate, and not so humid as that of Sydney, and I think that sandstone should last much longer in Canberra than in Melbourne or Sydney. Canberra is not likely to become an industrial centre, and that will certainly be to the benefit of the building. Another advantage is that the building is to be of plain design. If it were a Gothic building with a great many pinnacles, entailing elaborate carving work, the weather would have a greater detrimental effect. If the sandstone deteriorated, it would be a simple matter to replace it in a building with a sandstone finish in a modern method of constructional veneer. The cost of Sydney sandstone is about 30s. a cubic foot, delivered in Melbourne. Stawell stone delivered in Melbourne is 37s. 6d. a cubic foot, as compared with 28s a cubic foot for granite. I should have no objection to building with a sandstone facing which, say, in 100 or 200 years could, if necessary, be replaced. There is to be, I understand, no carving in the building, and the sculpture, I assume, will be in bronze. The use of synthetic marble is to me a horrible idea, but I should not like to give a hasty opinion about the proposal to use that material for the slabs to take the names of fallen soldiers on the walls of the cloisters. I should first like to see a sample of the work. I have used synthetic stone slabs, but I cannot say how long they will last. Much would depend upon the mixing of the ingredients. I would have no objection to the use of this material, so long as it was sufficiently hardened. Of course, synthetic marble has a tendency to look poor. I estimate that the cost of this building will be about 2s. 6d. per cubic foot. It is not a building of elaboration, and there are large spaces in it. In calling for tenders I think it

would be wise to give alternative specifications. I have used Hawkesbury sandstone a little. It tends to become very grey, but it would be pleasantly in harmony with the colour of the other buildings at Canberra. The colour is not white. The old Sydney stone is better than the Hawkesbury stone, but before giving an opinion as to the suitability of sandstone for this building I should like to have the advice of geologists, and also of stonemasons. I believe that Sir John Harrison showed me some samples of Fairy Meadow limestone, but I should not care to pass an opinion as to its lasting qualities; there appear to be considerable variations in its natural structure. If possible it would be a sound idea to build this memorial of stone taken from the Federal Capital Territory. I do not think that it would be necessary to provide heating appliances within the building if it is not intended that assemblies should take place there. I should not think that the building would be used at night, and if that is so it would need to be lighted only for the purpose of enabling the night watchman to make his rounds. Cleaning will be necessary to preserve the exhibits. I am inclined to think that the reticulation necessary for a vacuum cleaning system would be a large expense, and hardly warranted. The building, I suppose, would be cleaned in series, one section being closed at a time, and there is no reason why a small staff should not clean the building with portable apparatus. I favour the use of sprinklers for protection from fire. The fire risk must be reduced to a minimum, as many of the exhibits are of incalculable value. It would be a loss to Australia if any of the exhibits were destroyed, and a watchman should be on the premises at all times.

87. *To Senator Reid*.—It would be costly to flood-light the whole building, but that question could be decided when the building is erected. Of course the maintenance cost has to be considered. If there were a hydro-electric scheme at Canberra the cost of lighting would be practically nothing. The memorial might look too big with floodlights. The difficulty is to light it in proper proportion, and that is really a matter for experiment. I like the lay-out of the relics as shown on the plan. It may be that it is intended to install a system for keeping paper records, and in that respect I might state that the records office in London is developing a new system. It has made many experiments respecting the preservation of documents, because the tendency of modern paper is to disappear after a few years. Respecting the effect of frost on sandstone, I do not know that there are heavier frosts in Canberra than in Melbourne or Sydney. That is a question for the Government meteorologist to decide. Another advantage is that there are no sandstorms in Canberra. A sandstone building in Canberra would probably last three times as long as one in either Melbourne or Sydney. The Pyrmont stone, of which the English, Scottish and Australian Bank in Melbourne is built, seems to be of a better quality than other sandstone, but the colour would not be suitable for Canberra. I should prefer a stone that was not too grey. I should not like to express an opinion as to whether the sum stipulated for the building will enable it to be carried out as shown on the plan, but the estimate seems to be reasonable.

88. *To Senator Payne*.—The permanency of the building is the essential factor. Sandstone is probably as good a stone as we have in Australia, but for a national monument I should prefer granite. Of course a building with a sandstone facing when decaying could always be gradually restored. It is important that the stone should be properly bedded. The use of acid when washing down sandstone causes a sort of cleavage in the stone. There was an instance of that at the Melbourne exhibition. The iron standards of the fence were bedded in a bluestone base, and these

for purposes of economy were set in a combination of sulphur and something else. It proved to be false economy on the part of the State Government. I am familiar with Hawkesbury river sandstone, Pyrmont sandstone, Waverley sandstone and other types of stone which are not really known by name. The Waverley stone seems to me to be quite sound. It is of a whitish-grey colour. I like the Stawell stone. It is an amazingly good stone but very expensive and heavy for working. The Hawkesbury stone is not so grey as the Waverley stone. The system of natural interior lighting as is proposed in this building is excellent, and in the Hall of Memory is similar to that used in the Byzantine buildings of Constantinople. The old direct skylight is an abomination. It is imperative to get rid of reflection on the glass of pictures that are hung on the walls, and I think that under the proposed system of natural lighting there is a good chance of doing that.

89. *To Mr. Cook*.—I have had very little experience of granite, because its use is so expensive. My Institute was not consulted about the estimate of the cost of the building, but it must have been based on some data. It is not a great amount to allow for a building of this class, and is really on the low side. The competitors for the design had that opinion, because few of the designs came within the stipulated figure. I do not think that the people of Australia would object if the expenditure on the memorial were increased. Respecting the materials to be used in the building, of course no one knows for certain how long reinforced concrete will last. It is a recognized method of construction and the only thing to do is to adopt the best methods of construction known to us to-day. I approve of the facing of the building being in stone. There is little difference in the wearing of stone in New South Wales and Victoria. The humidity may be greater in Sydney, but the heat is greater in Melbourne. The wearing effect in Canberra would be purely climatic. There are no sulphur fumes or root deposits in the Federal Capital Territory such as there are in Melbourne. Another advantage is that Canberra stone does not develop moss. I do not think that the Hall of Memory would be used for public ceremonial. It is designed really for inspection by visitors. I approve of the names of fallen soldiers being recorded on the walls of the cloisters. The star treatment of the inside of the dome if in mosaic with a blue ground, would be very beautiful. Of course, that need not be done at once; St. Paul's Cathedral, London, has been done in mosaic only during the last 30 or 40 years, and the work is still incomplete. No great national monument need be completed immediately. There is nothing to prevent that class of work being done as we can afford it. The lay-out of the relics follows the course of the war historically and geographically. If the museum authorities are satisfied, I should not attempt to offer any opinion. It would be difficult to extend a building that is designed with a definite object such as a memorial, but it will be quite possible to add wings to the building if that were absolutely desired, but I think that the museum authorities should be consulted on that matter. The design generally has not been discussed by my Institute, but my opinion is that it will have a very fine effect. It is derivative, just as we are derivative of Great Britain, and its forms are well arranged.

90. *To Mr. Lacey*.—Flood lighting would be a costly permanent charge, but still provision could be made for floodlighting the building only on national occasions. I should prefer a permanent monumental structure rather than the curtailment of the building just to meet a heavy recurrent charge for lighting. Sandstone would last longer in Canberra than in Melbourne or Sydney.

91. To Senator Barnes.—There is a French method of testing stone by which stone is soaked in oil. Stone could be tested at the laboratory of the Melbourne University. I think that the geological museum in Melbourne contains stone and data from all parts of the world. St. Paul's Cathedral, London, is built of Portland stone, and it has stood wonderfully well in regard to the facework.

92. To Mr. McGrath.—Sandstone is a beautiful material, and in some ways has a little more warmth than granite. Granite tends to look cold. Bronze and granite are monumental materials; but I think sandstone could be made to look beautiful. The Pantheon in Paris is built of sandstone, and does not lose any impressiveness on that account. St. Peter's, of Rome, is built of sandstone, and, as we know, many churches are great national monuments. In Melbourne, Stawell stone costs about 7s. 6d. a cubic foot more than Sydney stone. Stawell stone is to be used on the extension of Parliament House. It should be the Government's aim to erect the best monument possible. It should not be of a utilitarian character.

93. To Mr. M. Cameron.—This memorial is not for the glorification of war. It is non-assertive and is in the true sense a memorial. Strangely enough, it has a religious significance in its architecture. The development of the Byzantine dome was due to the necessity to create a great void in the early Eastern churches. I should not care for the use of red granite in this building. I remember seeing red granite buildings in Egypt, but there they have a somewhat different landscape, and the buildings harmonize with the desert. I do not know of any building constructed entirely of red granite. I have heard that there are deposits of red granite near Casterton, Victoria; but I have not seen them. Granite is used because it has distinctive features, and it would be very suitable for a war memorial at Canberra owing to its permanent nature. I would not say that it would be a mistake to erect a monumental building of sandstone.

94. To Mr. Sedgwick.—I was not one of the competitors for the design of the building. The feeling among the architectural profession is that the cost factor should be carefully considered before competitions for designs are launched. About 70 designs were sent in, and the actual expense of preparing each one was about £200. The architect has to prepare his design mostly at night, quite apart from his usual work. We feel that great care should be taken in preparing the programmes for competitions. I am informed that there was a feeling among the competitors that the war memorial would cost more than £250,000; but they waived that, in view of the fact that the design was for a national memorial. Some of the designs submitted would cost nearly £1,000,000 to carry out. I saw the designs when they were exhibited in Melbourne. Our institute asked for this exhibition of the designs to be held in Melbourne, and the Government arranged it. It was of great interest, not only to the architectural profession, but also to the public. Brick backing in a building is heavier than concrete backing, and gives a thicker wall. Brick backing is quite satisfactory. The system of building bricks in steel frames is now being adopted sometimes in preference to building with concrete. In modern construction, the bricklayer is coming into his own again. A concrete building for monumental purposes would not have a first-class appearance. Concrete is an interesting material, if properly treated. David Jones's building in Sydney is of Hawkesbury River sandstone, and the new National Bank in Melbourne is another fine example. When taking stone out of a quarry there should be a man present to mark every stone, and another man on the job to show the exact position of every stone. The colour of stone varies even in an old quarry. I do not mind a variation of colour in a

building, so long as it is not too marked. I should not like an extreme variation. The colours must harmonize with one another. I think that the Fairy Meadow quarry might be prospected, or at any rate a bore driven in. I should not favour the use of terra-cotta facing on this building. I would not mind the courtyard paving being in terra-cotta, but that would be too expensive. Salt air has an effect on most varieties of stone other than the densest types; the salt has a hygroscopic action, and attracts or assists absorption of moisture. The oldest stone buildings in Sydney would not be much more than 100 years old. St. Mary's Cathedral was built in 1817, but few buildings were erected before 1800.

95. To Senator Payne.—I think that the use of Canberra bricks as backing in the proposed memorial building will be quite satisfactory. I do not think that the bricks should be burned more. They have been used in many of the bigger buildings, and are better in colour than Melbourne bricks of the usual type. I prefer the dome to be of Byzantine style. I should say that this building would be original, just as much as a piece of music is original. Certain notes and forms are common to music, but still it has a new air. The building is derivative, and we ourselves are derivative from Great Britain and Europe.

(Taken at Melbourne.)

THURSDAY, 6TH APRIL, 1928.

Present:

Mr. MACKAY, Chairman;

Senator Barnes	Mr. Cook
Senator Payne	Mr. Leacey
Mr. M. Cameron	Mr. Scarbrook.

Paul Raphael Montford, Sculptor, Melbourne, sworn and examined.

96. To the Chairman.—I am aware that this committee has had referred to it the proposal to erect a national war memorial at Canberra. I really feel that this inquiry would not be complete without some reference to sculpture, and no one in Melbourne having had my sculptural experience, I thought it would be well to place this experience at the disposal of the committee. I have seen the plans. The relationship of sculpture and architecture is little understood, merely through want of practice, and this is evident from the position in which the architect has placed the sculpture at the entrance. The sculpture on the facade is facing south, and the result will be that for practically all day the sun will be behind the panels which will be against the sky. This will have the effect of making the sculpture look poor. It is a bad place in which to put sculpture, from the point of view of light. The desired decorative effect is lost, when there is neither sunlight on the work nor a suitable background. There is no silhouette. The proximity of Mount Ainslie may help, but generally speaking, I feel that anything in the way of a silhouette if it could be provided would be much more effective. Sculpture depends a great deal on silhouette. Of course in a relief like this, much depends on lighting, and the lighting in this case I feel will be a disappointment. It may be that in the summer time the sun will not be always behind the sculpture, but a side-light on sculpture is not so effective as a top-light. The present position may be all right as a decorative place in the architecture, but nevertheless I feel that when erected the sculpture will be a disappointment, and that some colour perhaps will be necessary to relieve the figures from the background. The groups at the

entrance will also be under a disadvantage in that there is no proper frontage. To get a front view one would have to view them off the steps from their own level. With these great blocks of stone in front, the dignity of the sculpture would be entirely lost. The position would be much more dignified if the groups had been shifted to the side steps where one could look at them straight on, and where they would not be hidden by the blocks of stone in front. To make the best use of the sculpture the most important side of a group should offer both a near and distant view. It is evident that a group "X" gun" in action would become a rare spectacle of limbs seen end on, and to be properly seen from the direction of Parliament House, the group must run with the facade. A big square base cannot be used for sculpture. The base as shown on the plan would be about 18 feet across and 12 feet deep. A suitable base would have to be added and take some architectural form and the sculpture would be placed on it. A suitable base might have a depth of about 3 feet. To cover a base 12 x 12 would give a terrible aspect to the sculpture. I should think that 9 feet figures would be sufficient for the sculpture. A bigger scale than that would mean dwarfing the building. Probably 8 feet figures would be sufficient. It is easy to make a building look puny purely by making the sculpture too large in scale. The memorial to be erected in Victoria was originally designed to have a figure 15 feet high. The work is still to be of that height, but it is so built up that the figure is actually only 8 feet high. There should be a relation between the figure and the building at the back, as if the building were a sort of house in which the figure lived and walked. It is desirable to have a relationship between the building and sculpture, as there is between an ordinary house and its occupants. The figures comprising the group could be 8 feet figures. It is the architect's business to design the base of the figure. The sculptor may design a pedestal, but the architect must be guided entirely by his own art as to what this pedestal should be, and what place it should occupy. It has been suggested that sculpture should be placed in the courtyard, and that is a very suitable place for it. The effect that the galleries on each side would have upon the mirror pool may cause difficulties. Sculpture to look well should not be below the eye. Perhaps it would be as well to raise the figures on pedestals somewhat resembling columns, so as to enable them to look well from the galleries. What strikes me about the group at the back of the hall of memory is that there is no effective light upon it. Any amount of work may be put into it, but it will be more or less wasted for the lack of light. There will be a light at the back of the sculpture which, of course, will not light it. There is no top light at all. There are two lights at the side, but owing to the angles of the building inside it seems to me that the sculpture would be mostly cut off from those lights. No sculpture could look well with equal light on both sides of it. A lot of money may be expended on it, but owing to the lack of light it will be a disappointment. It is doubtful whether the present light from the front window will be effective. I feel that some sculpture must be placed in the hall of memory if possible, and its position should be out from the sides where it can be distinctly lighted on one side, or better still from above. I think that the position of the sculpture should be settled before the building is completed. Bronze figures could be cast in Australia. We have produced some fairly good work, but if the company were given work additional to what it has now in hand to carry it over the next five years, it would engage an expert from overseas. The trouble is with imported bronze that too much brass is used. The metal that we have been casting in Australia is absolutely of bronze. The work can be done here quite well. Owing to the

additional cost of wages in Australia, the casting here would probably cost half as much again as in England. In addition the company here is not quite used to the work. There are two methods of casting, one in sand and the other by the waste-wax process. Most of the work is done here in waste-wax. A man would have to be imported to do sand work, and also to cast big groups in waste-wax. I can see the possibilities of using sculpture in the war memorial, and I estimate that suitable groups and figures would cost about £40,000. From an architectural point of view the placing of the figures on the plan may be very nice, but I feel that the lighting would kill the sculpture. That could be overcome to some extent by colouring the background to give a decorative effect. Granite is very difficult to carve, and I suppose it would cost almost twice as much as sandstone. I feel that the work of designing and modelling the sculpture should be done here, because it is better done in the surroundings in which it is to be placed. Work done in England for use in Australia is always liable to be a misfit, and that is counteracted by carrying out the work in Australia. I am sorry to say that besides myself there are no sculptors who have carried out such work as this in either Sydney or Melbourne. I have tried to get the Government to assist me to run a school to encourage young men who have a desire for sculpture, so that they may carry on my work when I leave it, but I have received no help from the Federal Government, because they class it as education, which is purely a State matter. If we could guarantee efficient work, I feel sure that we could induce a sculptor to come from abroad to carry out these groups if necessary.

97. To Senator Payne.—The architect when making the drawings and arranging for the sculpture evidently had in view the massiveness of the building. I suggest that the groups might be placed to the sides of the entrance, on pedestals. Sculpture cannot be placed at one end of a base. The whole of the base must be occupied by the sculpture, and if there is too much surface on the base it is necessary to build up a sub-base, suitable for the sculpture. I suggest that the bases might be turned to either side, or that they might be brought to the front of the steps instead of at the back. Regarding the reliefs on the facade of the Hall of Memory, a person looking at it from the front would view it on the skyline. It would be hidden from the sun for the greater part of the year. It would be only now and again that the sculpture would look at its best.

98. To Mr. Cook.—I have carried out any amount of sculpture work at home. I like the design of the building immensely. It is really beautiful. I do not think that the expenditure on it should be limited. When an artist gets on the job, he puts the question of cost on one side, with the result that he usually reaches or exceeds the allotted expenditure. I think that the limited cost has affected the general design of the building, but the architects have overcome the difficulty extremely well and given us a very fine building, which is quite fitted for sculpture. Any suggestion regarding extra lighting is the prerogative of the architect.

99. To Mr. McGrath.—I am to do the sculpture work for the Shrine of Remembrance. I have been given four and a half years in which to do it. I shall be more or less fully occupied with that work. There is no one to assist me. The work would be done more quickly if an assistant were brought from abroad. The architects of the memorial have not provided for over much sculpture work. The two groups at the front I estimate will cost about £7,000 each. The carving on the facade is worth an additional £2,000 or £3,000. When estimating the time required, we must differentiate to some extent between the work carved on the building itself and the work placed

on the building. The work placed on the building can be done practically at any time, perhaps two or three years after the structure is completed. The amount of carving work as now proposed would not warrant bringing a man from overseas.

100. To Mr. M. Cameron.—I believe that the sculpture on the Shrine of Remembrance is to be of the same material as the building. An estimate of £240,000 for granite would be low. If stone is used, considerably less than that sum will be expended. In any case the sculpture on the Shrine will not be of bronze. There are carvers here quite capable of doing the work. The outside groups at the entrance to the memorial should be of bronze. Marble does not stand well out of doors. If these groups are made of stone they will soon be a disappointment. The imported bronze is not good enough. The statue of the King at Canberra, and I think it is not of Admiralty bronze, which is real bronze. It is a metal that runs more easily than bronze. In Australia, of course, we get what we want. I have always insisted on having a pure metal bronze. It is doubtful whether we could up to now have carried out in Australia a statue similar to that of the King. We might do it, but we would not be sure of the result. If a competent man were imported from abroad a demand for casting work would soon be created.

101. To the Chairman.—Any inside statuary could well be of marble and would look very well. The marble we get in Queensland is not very good for carving, even when especially picked for the purpose. Marble certainly gives a good effect. When using sculpture as a decoration there is no need to keep to a centre line, but sculpture enables one to get away from an absolute balance. A value can be given to architectural work purely by giving freedom to the decoration.

102. To Mr. M. Cameron.—Respecting the method of inscribing the names of the fallen soldiers on the walls of the cloisters, carving in marble would be a terrible job. It seems to me that the names should be cast, which would give a better result than carving. If synthetic marble is to be used, it seems to me that there would be difficulty in quite permanently attaching the synthetic marble to the frame work prior to running the metal letters to the metal letters. I think that letters could be incised by making a metal model in reverse, placing them face up, casting the synthetic marble, and then removing the models. The letters could be stuck down with a little wax before the marble is run over them. About 500 metal letters might be needed. I think that the cost should be about 1s. a word. Bronze will always go black in time. It might be suggested to the architect that he could in this way have the letters incised in the synthetic marble, and they could then be coloured or treated as desired.

(Taken at Sydney.)

WEDNESDAY, 11TH APRIL 1928.

(SECTIONAL COMMITTEE.)

Present:

Mr. Mackay, Chairman;
Senator Reid
Mr. Camorero
Mr. Cook.

Sir Charles Rosenthal, Architect, President of the Federal Council of the Australian Institutes of Architects, Fellow of the Royal Institute of British Architects, Member of the War Memorial Adjudication Committee, sworn and examined.

103. To the Chairman.—I am aware of the proposal to erect a war memorial at Canberra. I was an adjudicator of the original competition, and with Mr.

Murdoch and Professor Wilkinson submitted a report on the design submitted. I am satisfied that the accepted design is architecturally worthy of the Commonwealth. I am acquainted with the site on which it is proposed to erect the memorial. I do not know who selected the site, but I consider it a suitable one. From the point of view of drainage, it is quite satisfactory. I have not seen the trial holes, and, therefore, cannot speak as to the foundations; but, from what I have seen of the locality, I have no fear in that respect. The nature of the country is disclosed along the main Yass-road to Queanbeyan, nearby. In any case, only the centre portion of the building will be in any way heavy. I am aware that the expenditure in connexion with the memorial is limited to £250,000, and that that sum does not include many interior fittings, overhead expenses, &c. I do not know what is proposed in connexion with the lay-out of the grounds surrounding the memorial. The heating of the building will be fairly expensive, but the installation of lighting and sewerage will be comparatively simple. I should not like to give an estimate of the cost of these services without careful thought. I am satisfied that the building can be erected for £250,000. The amended plans have been carefully examined in order to check designers' estimates. We had before us the architects' skeleton bill of quantities, together with a definite tender for the Sydney freestone which it was proposed to use to face the building. The quantities were carefully checked by an independent officer of the Public Works Department. His figures substantially agreed with those of the architects. That matter is referred to in the report which the adjudicators sent to the Minister. In my opinion, the method of cubing gives a fairly close approximate cost, especially when we have the experience of other works as a basis of comparison. In this case we have not only applied the cubing method, but we also had the quantities checked. The architects' estimate of 2s. 6d. a cubic foot should be ample; the Commonwealth Bank, Sydney, did not cost more than that amount. The difference between building costs in Sydney and Canberra is from 15 per cent. to 20 per cent. It is difficult to say definitely how prices compare, because sometimes Sydney contractors, in order to keep their men together, will submit a tender on a low basis. I should say, however, that a 15 per cent. margin would be sufficient. Sydney contractors now understand conditions of Canberra fairly well. I do not think that there will be any difficulty in getting the building erected for £250,000 if Sydney freestone is used for facing it. I am satisfied with the general layout of the building, and I understand that the War Memorial Committee is satisfied that ample accommodation for the exhibits is provided. I am strongly of the opinion that the memorial and the museum should be in the one building. To separate them would, in my opinion, kill the whole project. The conception now is such that a casual visitor who has no particular interest in the names which will be recorded there, but will visit the building to see the museum exhibits, will feel that the Hall of Memory is a fitting culmination to the museum portion. The value of the memorial will be enhanced by the museum. It is probable that the exhibits will be added to from time to time, but not by the addition of large exhibits. Many of the returned men have personal relics which they will ultimately hand to the museum authorities. There will be ample accommodation for them. I have seen the war memorial at Albany, and am of the opinion that the Canberra memorial also could be effectively flood-lighted at night. In my opinion the flooding of the dome alone would not be satisfactory. Probably experiments could be made with a view to arriving at the most effective method of lighting the building at night. Granite would probably be the most lasting material for the

memorial; but sandstone has been used throughout the world for memorials, with satisfactory results. From that point of view sandstone should be quite satisfactory. In United States of America careful tests are made of different stones with a view to arriving at their suitability for various purposes. Should sandstone not be considered sufficiently durable, artificial granite could be used. The cost would be about one-third more than that of freestone. Artificial granite has been in use in America for a number of years. It is just as lasting. This material is now being manufactured in Sydney, and is being used to face the new Sun newspaper building. Artificial granite is a composition of ground marble mixed with steel tailings. The discolouration of freestone buildings in Sydney is largely due to the overhanging cornices and projections, which gather dust from coal smoke which is washed over the surface by rain. In buildings where there are large cornices it is usual to spray the upper surfaces towards the back so that the water will run away from the face of the building. Late, discoloured freestone has been cleaned by a steam process, with satisfactory results. That has been done with the A.B.C. Bank building in Sydney. I should not anticipate serious discolouration in Canberra, because there the atmosphere is wonderfully clear and there should not be the smoke and dust inseparable from a large manufacturing area. The life of freestone in Canberra will probably be greater than in Sydney. On the other hand, severe frosts might cause lamination of the stone. In Geelong buildings constructed with stone from Warrne Ponds have frayed away. That stone is inferior to Sydney freestone. The life of sandstone at Canberra is largely a matter of conjecture. There are freestone buildings in Sydney which have been erected for 30 years, and are still in sound condition. The Union Bank building is apparently as sound to-day as it was when quite new and made 50 years ago. The use of natural granite would make the cost of the building prohibitive, whereas artificial granite, similar to the sample I now submit to the committee, would cost only one-third more than sandstone. This material has not the disadvantage of terra cotta, in connexion with which considerable losses are likely to occur in the burning process. Artificial granite is made in moulds of any size. If necessary, slabs 20 or 30 feet long by 5 or 6 feet wide could be made, and, where desired, it could be reinforced. I am acquainted with Fairy Meadow limestone. In my opinion it is too dark; the heavy veins make it unsuitable for outside work. I think that the war memorial should have a plain surface. I do not know the proposed lay-out of the grounds and roads around the building, and therefore cannot say whether the estimate of £50,000 supplied by Mr. Potts, of the Federal Capital Commission, is reasonable. I suggest that Sydney sandstone should be used to face the building, but that, if thought desirable by the Government, alternative tenders for sandstone and artificial granite should be invited. If the Government would agree to the additional cost, I should prefer artificial granite to Sydney sandstone. I have had no personal experience of synthetic marble or granite, but I have a theoretical knowledge of it. I consider that the method of recording the names of the soldiers by embedding the letters in artificial granite would be both permanent and satisfactory. I prefer the plan of having the names arranged alphabetically according to States rather than alphabetically in localities. The division of the names into States would make it easier to find any names of individual soldiers. I do not agree with the secretary of the Returned Soldiers' and Sailors' Imperial League, that there should be no recognition of the

States. Artificial granite would be quite satisfactory for the floor of the cloister. I do not think that the use of natural granite would be justified when we can produce chemically a material the same as granite, and infinitely cheaper. I do not know whether the architects considered this aspect, but I presume they did. The estimates of this stone were prepared by Beal Bros., quarry masters, of Waverley, who have excellent quarries of their own. They are quite reliable, and carry out big works in the city. They have given a firm price for this stone, and I presume they would be prepared to stand by it. If it could be shown that conditions have changed from the time the quotation was given, it would probably be necessary to revise the estimate. In New South Wales we have had more experience of Waverley stone than of Hawkesbury stone. Hawkesbury stone is whiter and looks very well, but probably the freight on it would be more. I do not think that it matters much from the point of view of the building itself which stone is used. I think it would be desirable to provide for the electric lighting of the buildings. It has to be remembered that visitors to Canberra at the present time have very little to do with their evenings, and they might, therefore, like to see the memorial at night. It would be a grave mistake not to provide for a lighting system. Even at an estimated cost of £3,000 more, it must be remembered that certain of the exhibits need to be artificially lighted even in the daytime. I do not think that it is necessary to install any provision for heating. We know that Canberra can be very cold, but visitors to the memorial will be moving about all the time, so that heating provision will not be required. The most important part of the building will be that on which the names are recorded, and that will be in the open where a heating installation would be useless. The aim should be to reduce the maintenance of such a building to the minimum, and for that reason I think that the installation of a vacuum cleaning apparatus would be advisable. There would have to be an electric installation right through it would save the wages of two or three people to have fire precaution, I am not sure that a good system of hydrants would not be as satisfactory as any sprinkling system. On the other hand, the cost of installing an adequate fire prevention system is so small in comparison with that of the whole building that it might be unwise to omit anything that would make for the safety of the building and exhibits. In regard to laying out the land surrounding the building, care should be taken to plant an adequate number of both deciduous and native trees. This would enable an attractive effect to be provided during all times of the year. Where only deciduous trees are growing, there are three or four months of the year when the grounds present a very bare appearance. On the other hand by a careful blending of the two types of trees, it would be possible to ensure a very attractive effect throughout the whole twelve months. There should be a large expanse of sward broken by suitable clumps of shrubs and trees. A study of the grounds surrounding some of the old French chateaux gives one a good idea of what should be sought. In these grounds there are wide expanses of sward with carefully situated groups of timber, the effect of which is to give pleasing vistas in every direction. I think that the entire responsibility for the building and lay-out should rest with the architects. No outside body should have control over the laying out of the garden without the approval and co-operation of the architects. After all the whole object of laying out the grounds is to

enhance the setting of the building, and it is absolutely essential that there should be the closest collaboration between those who lay out the grounds and those who design the building. It would be an extraordinary situation, for instance, if the architects who are entrusted with this building could have their decisions vetoed by any member of the staff of the Federal Capital Commission. I would not go to the extent of saying that only returned soldiers should be employed in the construction of the building. Keen as I am to give preference to returned soldiers with the proper qualifications I think that it would be the height of absurdity to insist that only returned men should be employed on this work. Give preference by all means to men who can show that they know the work, but otherwise such a policy would be suicidal. Take, for example, the design and construction of stair cases. It is questionable whether it would be possible to find a dozen returned men in Sydney who could design and set out a stair case. Generally those who are capable of doing this work are Scotchmen, who came out here years ago. They are in the employ of different firms, and when they finish one job they are lent to other firms doing similar work. The suggestion that the names of all members of the Australian Imperial Forces should be permanently recorded on the walls of the memorial is I think unreasonable. I agree with the returned men that the names of all men who died after they returned to Australia should be recorded, because they gave their lives in the service of their country just as effectively as if they had died overseas. All those who gave their lives in this way should have their names recorded on the walls of the memorial, but those who came back fit and well should have their names recorded only in book form.

104. *To Mr. Cameron.*—There is no doubt that synthetic marble will give as good service as sandstone. I have no knowledge of the fretting of sandstone in old buildings in Sydney. The Sydney stone is close grained, and resists fretting very well. Practically every quarry employs qualified men for stone cutting, so that it may be taken for granted that the stone will be properly cut and laid on its bed. With regard to the provision of sculpture for the building, I am inclined to favour the use of bronze. My own Second Division in France was responsible for a notable victory, and we were of opinion that the site was a suitable one for a memorial. I arranged a design for the base and foundation, and Web Gilbert, who was attached to my head-quarters at the time, made a plasticine model of a proposed bronze group. There was a good deal of delay in getting the work finished, but about eighteen months ago the figures were cast, and the monument completed at Mont St. Quentin. Many Australians who have since visited it have assured me that it is the finest monument of its kind in Europe. The figures were cast out of bullion bronze, with a proper alloy of brass and copper. Marble lends itself quite well for use in statuary, but I do not think that anything is so effective as bronze. All outside work should be done in bronze, and I would almost go so far as to say that inside work should be carried out in this material also. As I said before, it is very desirable that the grounds surrounding the building should be laid out in keeping with the design of the building itself. It is possible that in the design of the architect some particular corner or aspect of the building is intended to appear prominently to the gaze, but if trees are planted haphazardly they might, in 20 or 30 years' time, completely block out what is really the essential view. Then, either that view must be lost, or trees have to be sacrificed which have taken 20 or 30 years to grow. With regard to the method of recording the names it has to be remembered that the number to be recorded from each State varies very considerably, New South Wales

and Victoria, for instance, having by far the largest number. In deciding whether the names should be recorded merely under their different States, or according to their towns as well, it has to be remembered that they must be grouped, so as to make a balanced and artistic display on the walls. I cannot see much point in putting in the individual town as well as the State from which the soldier came. Frequently a man's town of enlistment might be Goulburn or Wangaratta, but actually his birthplace is somewhere outside the State altogether. On the whole, I am inclined to favour recording only the name of the State. I should not be much concerned if even the States were left out, but I recognize that their inclusion would help visitors to find homes. It should be our endeavour to facilitate, as far as possible, the finding of names, provided a system to do this could be adopted without increasing the cost too much.

105. *To Senator Reid.*—I do not think that a man was asked when he was enlisting what district he came from. If he enlisted in, say, Glen Innes, Ballarat, or Bendigo, the town of enlistment was taken, as the place with which his name was associated. Of course the man had to give the address of his next of kin. If the names are recorded under the different States I do not think there will be much difficulty in identifying them. In the Australian Imperial Forces we had New South Wales, Victoria, and other States united, and they are still known by those names. This name Australian Imperial Forces is the great binding link, after all. I do not think it necessary to give the name of the locality from which the man came, because the number of cases in which the names and initials will be duplicated will be very small, and where such instances occur the difficulty can easily be overcome by adding the particular locality to the name. I think the situation would be adequately met by arranging the names alphabetically according to the different States, with the provision I have indicated for dealing with duplicate names. I do not think there is anything in the contention that no artificial materials should be used in the construction of this memorial. Those who protest against the use of synthetic materials for such a purpose are generally satisfied to have concrete used, which, after all, is synthetic also. Our best buildings in Sydney are constructed of reinforced concrete with a thin veneer of stone. If it were possible to get back to the Middle Ages, with the rate of wages and labour conditions which then prevailed, we could achieve the ideal, and erect a building of solid dressed stone throughout, but that would cost \$5,000,000 instead of \$250,000. I would prefer the facing to be made of synthetic, rather than of freestone. It would be more lasting, and the colour would be better. My first consideration is colour. If sandstone would stay the same colour as when quarried it would be suitable, but taking into consideration the conditions at Canberra I think that the synthetic stone would be preferable. I do not think that the frosts at Canberra would be sufficient to destroy freestone, and possibly at Canberra conditions would be such that sandstone would last for hundreds of years. The absence of corrosive chemicals in the air due to the smoke from factories would be a factor of a longer life for sandstone. I think that the height of the building is sufficient to make it imposing. The internal arrangement I consider to be especially good. It provides for one-way traffic, which is practically an ideal arrangement. A visitor may miss a section of the museum if he so desires. The proposed arrangement will make easy the control of visitors. I believe in the policy of preference to soldiers so long as they have the necessary qualifications. If it were possible to get the whole of the work done by returned soldiers, that would be a fine ideal, but in my opinion cost and workmanship should be the first consideration.

My experience of buildings constructed for the Government, or in fact by the Government, has granted a subsidy, such as hospital buildings, is that the architect entrusted with the work has given the control of it. The Government has only sent an inspector to inspect the buildings on their completion. In the case of this memorial, the project having been submitted to a competition and an adjudication having been made, the Government should satisfy itself that the successful architects are capable of carrying out the work, and should not then interfere with them. The Federal Capital Commission would be justified in making periodical inspections, but not in interfering with the work of the constructors. I have never heard of a Government appointing an inspector to supervise work which has been entrusted to a reputable firm of architects. The Government should make sure that the work is given to a qualified firm of architects, after which it should be satisfied to let them do their job.

106. *To Mr. Cook.*—I should have been better satisfied if the cost of the work had not been limited to \$250,000, but the accepted design is so worthy that there is no need to spend any more money. The collaboration between the two architects has given a result better than I expected. The extra cost of building at Canberra is largely due to freight on material and extra payments to tradesmen. In addition to the ordinary standard wage, good tradesmen are generally paid an allowance towards the cost of their keep when away from home. I do not think it unreasonable for tradesmen to expect concessions over and above their wages even when guaranteed twelve months work. The successful tenderers will probably be a firm with a staff of trusted men whose home would be in or around Sydney. They would require something to attract them from the city. Recently I carried out some work at Mittagong. The work was performed by one of Sydney's best contractors, who paid the best prices and lodgings for his men for a period of seven months. Possibly he could have obtained local men to do the work; but rather than run the risk of getting inefficient workmen he decided to send his own trusted and experienced men. It is possible that a contractor already established at Canberra would be able to submit a lower tender than would be possible for a Sydney firm to submit. In my opinion no advantage would be gained by delaying this work. Even though work at present in progress at Canberra might then be approaching completion, there is no guarantee that by waiting the work would be done for a smaller amount. I understand that the only big contract at present in progress at Canberra is that for the foundation of the permanent administration buildings. I have no doubt that tenders will be submitted for this work by some of the best contractors of the Commonwealth. There should be at least a dozen reputable firms in Sydney who would tender for it, and probably the same number from Melbourne. It is not likely that many tenders will be received from contractors in the other States. The building should be completed within twelve months. If given a free hand, I would have the building faced with artificial granite rather than with Sydney freestone. I certainly recommend that tenders be invited for a facing of either freestone or artificial granite. To construct separate buildings for the museum and the museum would be more costly than to have only one building. Moreover, the combined building would be preferable from many points of view. If necessary, it would be an easy matter to add to the proposed building, but I cannot conceive of such a necessity arising. The only possible additions to the museum will be small articles. Already the returned soldiers who may possess articles suitable for the museum have been asked to present them to the museum, in the nation's interest. I do not anticipate danger from fire

in the proposed building; but, having in view the unique character of the contents and that they could not possibly be replaced, I am of the opinion that the extra cost of installing sprinklers is justified. I do not endorse the views of Professor Wilkinson regarding stars in the Hall of Memory. I agree with the architects' idea of a little good sculptural work, rather than more of an inferior quality. The small amount of sculptural work accentuates the simplicity of the building, and enhances its beauty. There is in Australia a sculptor quite capable of doing all that it is required. He has already been selected to do the sculptural work of the South Australian war memorial. If the groups are to be cast in bronze, the work will probably be done best and cheapest in Paris. The moulds would be prepared in Australia, and then sent in sections to Paris for the casting to be made there. In this matter I should not be guided entirely by cost, but also by the fact that the French founders are experts in this class of work, and, therefore, would probably do a much better job. Even if the work of making the castings were carried out in France, I do not think there would be any great indignation on the part of Australians generally. I have in mind that Mont St. Quentin monument, which was designed in Melbourne by Mr. Web Gilbert and cast in France. No complaint was made on that occasion. We cannot afford to have a second-rate piece of sculpture in this job. I have seen a number of monuments in other countries, and am of the opinion that the proposed memorial compares favourably with them. It is a unique design. Any one seeing it for the first time would immediately recognize it as a memorial. I think that it compares more than favourably with memorials in other countries. The conception is worthy of the men whom it proposes to honour. I am not acquainted with all the details of the building, but, apart from the castings, I do not think it would be necessary to import anything in connexion with it. I have had experience with Harcourt, Gabo, Uralla and Goulburn granite. I could not say whether Mr. Montford's estimate of \$50,000 for sculptural work is excessive, because I do not know what is proposed. The amount, however, does not appear to be unduly large. The amount of \$100,000 for road services appears to be heavy, but, again, I do not know what is proposed. It appears to me, however, that the cost of the roads surrounding the memorial should not be debited to the memorial. In my opinion the only legitimate charges against the memorial should be for work done on the land itself, such as the layout of the grounds and the provision of the necessary services, such as water, sewerage, lighting, and so on. The design of the building itself has my unqualified approval.

107. *To Mr. Cameron.*—If artificial granite is used for the building I should prefer it to be axed dressed; or the base could be treated in that manner with a polished surface for the rest of the building. I do not think that at Canberra the axed surface would collect any considerable quantity of dust.

107A. *To the Chairman.*—I should like to make it clear that I have no pecuniary interest in the artificial granite, of which I have submitted samples. As an Australian industry, I am, however, greatly interested in it. During my 25 years' experience as an architect I have consistently used Australian materials wherever possible.

108. *To Mr. Cook.*—A building faced with artificial granite should not be much more costly than a building constructed wholly of stone some years ago. By using reinforced concrete it is possible to get the same strength with thinner walls.

(Taken at Sydney.)

THURSDAY, 19th APRIL, 1928.

Present:

Mr. MAOKAY, Chairman;

Senator Reid. Mr. Lacey
Mr. Cameron. Mr. McGrath
Mr. Cook

Herbert Ernest Ross, Architect and Civil Engineer, sworn and examined.

109. To the Chairman.—As a member of the Advisory Committee appointed to draw up the various principles for the establishment of the City at Canberra, I acted with my colleagues in the selection of a site for the War Memorial, and the essential features of this site were—

- A considerable distance from the focus point Capitol Hill.
- On a line with one of the main radial axes from that point.
- Considerable open park lands or reservations in the intervening distance, giving complete display for the structure.
- A background constituted by a plantation of dark timber with the dark mass of Mt. Ainslie forming as it were the final drop scene at the back of the whole setting.

The Advisory Committee had, therefore, visions to give the War Memorial a splendid setting, and Cabinet having approved of the site it becomes almost an axiom that the distance and the background demand most distinctly a building light in colour, whatever may be the design. Any building of a brown shade will lose most of its vigour on a background which, during the major intervals, will be itself brown as to the grass and fields and that proportion of brown which is a constituent in the colour of Australian forest timber. To secure a fine spiritual effect, distance would favour light shades of a cold colour not darker than a bluish-grey, although a pure white would give a more vivid effect, and yet would be sufficiently toned by the distance. I am of the opinion, nevertheless, that a suitable shade of light-grey, almost white, would be the ideal colour for the structure. Having been trained originally in the sciences of mineralogy and lithology, I claim to have special knowledge fortified by architectural and constructional experience of building stones and their characteristics. Observation shows that Sydney sandstone though of vast extent is only found in the best quality in very few places. I hold the view that the best deposits are worked out, and though beautiful stone is being produced from other quarries, I regard it as inferior to some extent to that originally quarried from what were known as Hell Hole and Purgatory Beds at Pyrmont, but even the best of this stone after from 50 to 80 years of use shows weathering and decay where the conditions are destructive, such as on the underside of cornices and in the base courses subject to intermittent damp. I also think that the best conditions at Canberra would be an additional source of decay. White sandstones are being quarried, but structurally they are, in my opinion, by no means so sound as the yellow and brown sandstone above referred to. I regard glazed terra cotta, properly prepared, as having in all probability a greater permanence than any natural rock, as the impervious glaze offers permanent resistance to destructive action. With terra cotta also the whole chromatic scale is available in respect of any effect desired. The cost of this material is the only objection to an ideal material. I consider that in Canberra a city which obviously from its near relation to the Burrenjack and other sources of ample electrical energy will never be a smoky city,

therefore the absence of sulphurous acid so destructive to marble and limestones generally will allow of these as suitable for Canberra. The only stone of this character I would recommend is the Queensland marble, the cost of which would be considerably below that of granite, and would be one of the two possible materials in my opinion to be used. The dark marbles of Fairy Meadow would be entirely unsuitable, producing a gloomy effect most undesirable. I have considerable knowledge of Portland cement and its behaviour, having been associated with this industry almost from its inception in this country, and have formed the opinion that synthetic stones which are compounded of Portland cement and suitable aggregates constitute a material which will stand the weather and retain its texture as well as any natural stone. If the aggregates be marble then the compound will be more durable in the general sense than marble itself, as should the grains weather in the course of a century or so the skin of Portland cement forms, when this stage is reached, a barrier against further decay. I regard synthetic stone as being cheaper than any other material possible for the structure short of, of course, plain stucco, against which any objection must be purely sentimental, as properly applied it is not only the cheapest, but the most durable of all. The synthetic stone gives a possibility of a wide range of colour, and its use would greatly simplify construction. I regard the use of solid masonry of any kind as obsolete and unnecessary, as casings only associated preferably with reinforced concrete will afford structure of greater durability than any other known method, and at a greatly reduced cost. A factor in the decision must be labour and mason labour during the past four years has been scarce, my own works having been delayed seriously from this cause. It will be observed that I have put the question of colour first because this building is essentially the demonstration of a particular sentiment. It is a war memorial, and should, therefore, be designed to bring out its full value. In regard to the use of materials, our experience in Sydney has been to the effect that sandstone is not permanent, and cases of fretting are noticeable in many buildings. In connexion with the use of terra cotta as a building material it may be remarked that the oldest example of this material is to be found in the heads which have been discovered in Egypt, and which are over 5,000 years old. These glazed heads have been lost for thousands of years, during which time they have been alternatively buried and exposed, and yet they are in an almost perfect state of preservation at the present time. Then there is the case of Persian tiles which are possibly 4,000 years old, and which are still in place upon some buildings. There is no natural stone which has retained its texture as terra cotta has done. Those materials have endured the ravages of time and wars for thousands of years, and they are just as good now as the day they were made. I am familiar with the Fairy Meadow stone at Canberra, and I am of the opinion that if you wish to obtain a building which is entirely depressing in its effect you should build it of that particular stone. It is almost black, and if polished it is a very dark grey. I am of the opinion that synthetic stone will stand the weather and retain its texture as well as any natural stone, and therefore the aggregate is a natural stone itself, and therefore no better or worse than any other natural stone. It has been demonstrated by experience, however, that cement will stand weathering better than any natural stone. On the sea wall where the action of the weather is more rapid than in an ordinary atmosphere, you will find the cement at the trowel joints sticking out two or three inches, while the stone around it has weathered away. That is under the very worst conditions. If you have a natural stone held together with Portland cement the mass is more durable than natural stone

itself. In the course of a few hundred years, such a synthetic stone might be pitted as a result of weathering, but it would not lose its strength. Stucco is one of the most enduring of building materials because it is composed largely of silica, one of the most permanent of all stones. It is, however, used for most cheap kinds of building, and is regarded by architects as a very improper material for the construction of memorials. That is, however, a matter of sentiment. In considering the construction of buildings out of free stone it must be remembered that during the last few years masons have been very difficult to obtain. The work on the Government Savings Bank in Sydney has been seriously delayed owing to the shortage of masons. There are, of course, sufficient masons in the country to carry on the average amount of work, but at the present time Dr. Bradfield is constructing the pylons of the harbour bridge out of granite, and until that work is finished the shortage of masons is likely to persist. I have seen the plans of the proposed building, and am aware that the Government has limited the cost to £250,000. In regard to the general suitability and impressiveness of the structure, I say most definitely that the main aspect of the building—when in the greatest exposure to visibility—should be at right angles to the axis. For a given expenditure of money you should strive to get the effect of showing as much as possible of what you have spent your money on. From that point of view, the building is designed the wrong way round. The main facade of the structure should face the viewpoint, but instead of that it is end on. This, in my opinion, is a vital mistake in the design. In other words, the building is not balanced. Take for instance St. Peter's Cathedral in Rome. There you have a main central dome which is flanked with halls of colonnades going each way. I am not suggesting that the design of the memorial should be like that, but that is the principle that should be observed. Obviously, the main part of the building should be across the line of vision instead of with it. If the building is 400 feet by 200, the 400 feet expanse should be exposed to the viewpoint instead of the 200 feet one. The stretch of country between Capitol Hill and Ainslie has been kept open by means of reserves, and that it is the natural viewpoint for the memorial. Aesthetically, there is no objection to the building from the point of view of the layout or the situation. The beauty of the structure is not effected by the fact that it is on the side of a hill, as the building can be so designed to meet that situation. My next objection to the building is that it is not at all elevating in a spiritual sense. It is a very squat arrangement which, when placed a mile from the viewpoint, will have a heavy and unimpressive effect. There is nothing about it which is graceful. In saying this I wish it to be understood that neither I nor any of my friends have had anything to do with the competition for the design of this building. I was one of the men who got out the conditions for the competition, and what I had in mind when the conditions were drawn up has not been realized in this design. I have not seen all the designs which were submitted. I have seen some of them, but I would not feel justified in criticising them. I will say, however, that some of these I have seen more nearly approach the conception of what I thought such a memorial should be. To be quite frank, I consider that a building of this design, seen from the natural viewpoint, would be a failure. From my own knowledge of the architectural ability available in this continent, I am sure that it would be possible to get 50 better designs. However good the two designs might have been from which the present one was formed, it must be remembered that the conjunction of two such designs produces a hybrid. It is necessary, in

order to unite two designs, to make a compromise between the different features of each. It would be hopeless for the Government to attempt to face this building with terra cotta, and keep the expense down to £250,000. I have had no experience myself in the use of synthetic granite. That material is composed of any material which may be selected and compounded, with Portland cement into a solid block. Experience would indicate that such a material should be as permanent as any natural stone. There could be no objection to the covering of such a building as this with what might be called a "make-up." When a cathedral is built, the dome is covered with copper which is itself a manufactured product. It would be carrying sentiment a long way to object to the use of synthetic granite simply because it was synthetic. I should prefer something of a somewhat lighter colour, but in any case it is infinitely preferable than sandstone. It is necessary to have a sufficient thickness of stone to secure it to the body of the structure. The synthetic granite would be attached to the skeleton of the building by means of clamps of small pieces of bronze set into the stone, and built into the concrete. Then the back is grouted in with cement. I should think that the cost of synthetic stone should be less than that of sandstone, but I have no figures on that point. This synthetic stone is manufactured here in Sydney. I know the method of manufacture, and I know what the ingredients are, and if it costs more than Sydney sandstone the manufacturers are making an undue profit. I should say that this memorial could not be built for less than 3s. 3d. per cubic foot if it is faced with sandstone. There would be a difference of 15 per cent. in favour of Sydney if the building were to be erected here. If synthetic stone is used in place of sandstone the price ought to be about the same. When costs were considerably below what they are now it took 3s. 6d. per cubic foot to build the Commonwealth Bank building. It would certainly tend to make the building cheaper to have, as is provided in the design, a series of straight lines with very few dividing walls, but then it has to be remembered that the dome is an expensive item. It would depend on the experience of the architect whether his estimate should be taken as reliable. Not every architect has had the experience to qualify him to give an accurate estimate. A man like Mr. Hennessey, who has just recently designed the Roman Catholic Cathedral at Brisbane, which is to cost £800,000, might be able to give a good estimate for such a work as this. Seeing that the paving for the court need not be more than one and a half inches thick, I think that proper material for the purpose would be Queensland marble. The marble can be easily sawn, and for slabs of that thickness the cost would not be greater than for synthetic stone. The fact that it would be exposed to the weather would not, I think, make any difference. Marble pavements have been used for most of the beautiful buildings in the world, and especially in Italy. If it is proposed to persevere with sandstone facings for the building, we have to consider the relative merits of Hawkesbury and Waverley stone. The Hawkesbury stone is not so strong as the other, but it is whiter, and does not turn brown. It is also a very new stone, and we have had no extended experience of its use. I should be rather cautious of Hawkesbury stone on the ground of its durability. I have studied the Fairy Meadow limestone. It is a dark dove-grey, would make a very gloomy building, and would be particularly unsuitable for such a building as we are now considering. It would be quite suitable for some buildings in Canberra, but for this building its use would be an utter mistake. Canberra is one of the few places in which limestone can be used with permanent effect. From

the point of view of the strength of the structure I think it would be quite satisfactory. I have no objection to the method suggested for recording the names—that is, by embedding the bronze letters in synthetic marble—so long as they are not exposed to the weather. If, however, they are exposed to the rain, the water will run down the face of the letters, and turn the marble green. The letters should not be polished once they are put up. Regarding the suggestion that sculpture should be used to adorn the building, I consider that if synthetic stone is used in its construction there is no reason why the bulk of the stuary could not be composed of that material. The sum of £50,000 should go a long way towards providing what is suggested in the plan. It would, I think, be ample. As to whether the statues should be of bronze or marble, it is true that bronze, with a background of white or light coloured building, would be very effective, and would, I think, be preferable. Care should be taken, however, not simply to place an order for a certain amount of stuary, and pay whatever price the sculptor puts upon it. Any stuary work should be subject to the submission of small-scale models or cartoons, by the sculptor, with a fixed idea of the cost. If there is one thing in this world concerning which prices seem to be absolutely at large it is the cost of stuary. The purchaser is usually entirely at the mercy of the artist's idea of his value, and he being a temperamental individual, may probably do very little work and charge a great deal for it. Personally, I am in favour of flood-lighting the whole of the building. A very beautiful effect can be produced by flood-lighting, but it will be an expensive matter from the point of view of current, and possibly of installation. You are fortunately situated as far as the site is concerned, inasmuch as you can place the projectors at considerable distance from the building. The installation should be what is known as the semi-distant type where the reflectors are two or three hundred yards away from the building. There should be incorporated in the design suitable supports for the flood-lighting, such as obelisks forming part of the general scheme of garden effects. I agree that golden-coloured tiles for the dome would look very effective, but they would cost 20s. per square foot. I do not consider that it is necessary to install any heating devices for this building. Visitors will be moving through it continuously, and will not be stationary for any length of time. Furthermore, the building is well sheltered from the prevailing winds. It will be a simple matter to provide sufficient heating for the purpose of the officials who will be in the building. In regard to fire protection, it must be remembered that if the floors are of stone or marble, and there is a sufficient staff in charge, it would be impossible to get anything like a general conflagration. It is possible that some particular exhibit might be burnt, but that would be burnt out in any case before a sprinkler system could be started. If there is a proper guard I should say that no further fire protection is needed than an efficient alarm system, and an ample supply of hydrants and hoses. Some watchmen would probably be necessary in any case. The wages of watchmen would not amount to the interest which would have to be paid on the cost of installing a sprinkler system. I think that the proposed site of this memorial is absolutely ideal from all points of view. Moreover, I do not think that there should be any trouble on the question of foundations.

110. To Senator Reid.—A building with a stucco finish would not necessarily have the same appearance as the present Parliament House at Canberra. Parliament House has had an external colouring; but there are now available white cements which do not require any further colouring. Modern stucco has no limits as to texture and colour, but unless the workmanship is good there is a tendency for small cracks to develop.

Where stucco is badly cracked, the fault is due to bad workmanship. Next to terra cotta, stucco is the most durable material to use. I should not hesitate to recommend stucco in preference to terra cotta for the memorial, although I should not receive much support from the architectural profession for so doing. We must, however, consider public sentiment in connexion with this memorial. In my opinion the proposed building will look loop-sided except from Kurrajong Hill and Parliament House. Whereas the memorial should be in aesthetic repose from all angles. The simplest type of monument is that of the old Egyptian pyramids which are in repose from every viewpoint. I have not considered the suitability of the design from the point of view of the visiting public who wish to view the relics. There would be no difficulty in designing a building which would be satisfactory both from the public and the aesthetic point of view. The proposed memorial only wants some alteration to the windows and doors to make it resemble a Mohammedan mosque surrounded by some fortifications. I do not think that a satisfactory design could be evolved which would cost less than £250,000 to construct. That has been clearly revealed by the competition. Most of the designs submitted were for buildings which would cost more than £350,000. It would have been better if the Government had agreed to spend an additional £100,000 than to spend £350,000 on a building which will not be worth while. For the additional expenditure a design worthy of the nation could have been obtained. In the high country of New South Wales heavy frosts have a bad effect on sandstone, but I do not press that disadvantage against sandstone in the case of buildings erected at Canberra. My main objection to sandstone is on the ground of colour. The proposed building will appear as one long white mass without relief. From a distance it will not look different from a long stretch of white calico with a dome in the centre. In my opinion the water pressure at Canberra is sufficient to make it unnecessary to install sprinklers. I recommend, however, the installation of fire extinguishers and an automatic alarm system.

111. To Mr. Cook.—I think that the Government was right in imposing a limit of £250,000 when inviting designs; but having failed to get a satisfactory design with that limitation, it would have been better to have invited fresh designs with a limit of £350,000. I was not a competitor in the designs; but I consider that the result of the competition was entirely unsatisfactory. The accepted design was not a competitive design at all. Moreover, it bears no resemblance to a competitive design. Once the designs submitted were rejected, the whole competition should have been thrown open again.

112. To the Chairman.—It is true that all the competitors knew the restriction as to price; but experience has shown that no acceptable design at cost less than £250,000 could be prepared. In my opinion it was a mistake to allow the two designers whose designs came within the cost limit to collaborate with a view to evolving a further design. Cost, not quality, was made the governing factor. If another design to cost say £10,000 less had been submitted, it is conceivable that the architects submitting it would have been awarded the competition even though the design was inferior. I agree that the restrictions had a big influence on reducing the cost. Nevertheless, I am of the opinion that the competition was abortive. I am not aware of any general dissatisfaction among the competitors regarding the result of the competition. In any case, seeing that their designs exceeded the cost limit, they have no grounds for complaint.

113. To Mr. Cook.—In my opinion, the difficulty could be met in one of three ways—fresh designs could

be called for; or separate designs should be invited for the memorial and the war museum; or the two successful designers should be asked to prepare a number of fresh designs for submission to adjudicators appointed by the Federal Government. As an architect, I hesitate to criticize a design submitted by another architect; but as a citizen of the Commonwealth, desirous of seeing a worthy memorial erected, I feel that the accepted design should not be proceeded with. Even with a limit of £250,000, it should be possible to produce a design very different from the one which has been accepted. I do not think that a building to the accepted design can be built for £250,000. Without a careful examination I am unable to say whether the present design could be amended without spoiling its effect. In any case I should not care to do that. I have no direct evidence of the lasting qualities of synthetic stone. The use of this material, known as torazzo, has not extended beyond a period of 50 years. It could not have been in use before Portland cement was first used—about 80 years ago. During that period, however, Portland cement has shown its weather resisting properties. Artificial granite may possibly have no granite whatever in it. It can be made of a number of constituents, such as felspar, silica, granite, or hornblende crystals. The probability is that it is constructed of broken limestone or marble, mixed with cement, in which case it would be as lasting as solid granite. A building of solid granite would probably cost £30,000 more than one of sandstone. I have never been able to explain satisfactorily why work in the country costs so much more than it does in the city. Of course, freight is a considerable item, and it is usual to make some concession to workmen who have to leave their homes and board in the country. My firm does a lot of work in the country, and we find that the additional cost ranges from 10 to 25 per cent. over the cost of similar buildings in the metropolitan area. Where a contractor has a team of reliable men it is worth his while, even at additional cost, to retain them. I have not considered whether the proposed building will be large enough to accommodate the exhibits. I take it that the War Memorial committee has considered that aspect. I am in favour of separate buildings on different sites for the memorial and the war museum. There is no reason why they should be together. Future generations will view them both quite differently from the present generation. The sentiment which now attaches to the exhibits will disappear, and future generations will regard them merely as curios. For £100,000 a memorial aesthetically beautiful could be constructed. Had the architects been untrammelled by utilitarian considerations associated with the war relics, I feel certain that a much more beautiful memorial would have resulted. For a war memorial alone a limit of £100,000 should be sufficient. So far as the museum is concerned building of great beauty is not necessary, so long as it provides the necessary accommodation. The war museum could be grouped with other museums which Canberra will have in time to come. There is no necessity for it to be in the same locality as the memorial. It is almost impossible to get for the money a beautiful building which will be both a memorial and a store house. We have in Australia men capable of doing the sculptural work proposed. There is no need to send to France or elsewhere for any casting. I believe that in Australia we can do all that is necessary. All that is required is sufficient grit to make the initial effort.

114. To Mr. Lacey.—I have not known Hawkebury sandstone long enough to speak of its durability. Other white sandstone with which I am acquainted is not durable. No difficulty would be encountered in attaching the facing material to the main structure, nor would there be any danger of the facing becoming

crushed; it would get its support from the main structure. Artificial granite has a high crushing strength. I do not think that the climate of Canberra would affect artificial granite, but the smoke factories might do so. The use of artificial granite would be in the nature of an experiment, but there should not be much risk seeing that it is composed of materials about which a good deal is known. The enduring qualities of concrete have been proved over a period of 80 years. I should have no hesitation in recommending a building of concrete faced with artificial granite. I should not be in favour of flood-lighting the building every night. It should be sufficient to illuminate it, say on Sunday evenings. There should not be much depreciation in a building of the character proposed. I consider that if the same amount of money were spent on two buildings the position would be met much more happily than it will be met by the proposed building.

115. To Mr. Cameron.—When I said that had there been no limitation as to cost, fifty better designs would have been obtained, I was thinking of a building which would be both a memorial and a museum. I am definitely of the opinion that the proposed building is not suitable as a memorial. Its total height is not much greater than that of the gum trees which will surround it. It is too squat and flat, and does not convey the right sentiment. The aggregate in the sample of artificial granite submitted is broken limestone. The black portion is probably copper slag, the remainder being cement. Instead of using broken limestone, felspar trachyte or any other mineral which can be broken up and mixed with cement could be used. It would be possible to make the material of different colours. The sample submitted will probably be less durable than one containing trachyte. The characteristic of most memorials is their elevation. They are more vertical than the building proposed. Viewed from Capitol Hill the memorial will resemble a long white palisade with a dome in the centre. In my opinion the design is elementary. Moreover, it would not improve on closer approach because there is no amount of detail to be seen at close quarters. I think the internal arrangement of the Hall of Memory is excellent.

(Taken at Sydney.)

FRIDAY, 13TH APRIL, 1928.

Present:

Mr. MACKAY, Chairman;	
Senator Reid	Mr. Lacey
Mr. Cameron	Mr. McGrath.
Mr. Cook	

Alfred Samuel Hook, Associate Professor of Architecture of the University of Sydney, President of the Institute of Architects of New South Wales, sworn and examined.

116. To the Chairman.—I am aware that the Federal Parliament has instructed the Committee of Public Works to investigate the proposal for the construction of a National War Memorial at Canberra and that the Government has stipulated that the cost of the building should not exceed £250,000. I saw the plans when they were published, and have had an opportunity of looking at them since. I am familiar with the general design. The design has not been considered officially by my Institute. There was considerable discussion in the Institute following on the competition when it was proposed to combine the two designs, and the general, but not unanimous, opinion was that the right thing had been done. I should prefer the committee to regard any opinion which I might express on this

and for the memorial to be tucked away where nobody would see it, but the idea does not appeal to me, to say nothing of the fact that we would thereby lose the effect of a really fine building by splitting it into two. I regard sandstone facings for the building as quite permanent. The life of such stone in the Canberra atmosphere should be absolutely indefinite. The exposure of granite to such a climate as geologists will tell you for millions of years that it is still standing. It is true that there is a certain amount of ex-foliation in sandstone in Sydney buildings, but that is always to be seen in cities where the stone is subject to chemical action from smoke and fumes. The same will not apply to Canberra. In regard to colour, a special light coloured, almost white note has been struck at Canberra and for that reason I think the Hawkesbury sandstone would be more suitable for the memorial. It will harmonize better with the surrounding landscape. Granite would be more permanent, but when we speak of permanence in relation to such materials we are speaking of something that will only vary by centuries. In any case I am not sure that I would favour the use of granite. It is a delightful material to work with, of course, but the colour would differ materially from anything else that is to be seen at Canberra.

It is a very beautiful design, but I obtain some idea of harmony; a city should be designed in these days, and not just thrown together. I agree with the opinion that has been expressed that granite would cost practically three times as much as sandstone. I have seen samples of the "Benedict" stone that has been manufactured in Sydney, and I regard it as a most interesting product. One would be quite satisfied to see a memorial of this type faced with such material, but after all, we are not touching upon the permanence of such material. If granite is used in the construction of this stone, it should possess the elements of permanence. I am not seeing some suitable tests I should not like to commit myself to an opinion upon the permanence of an aggregate in which marble is used. We have yet to determine whether Australian marble, when exposed to the weather, will stand the test of time. Sandstone is just as permanent in a cold climate as in a hot one. It is not so permanent as either granite or sandstone, and it is not so much good for outside work, except in Mediterranean half way between the granite and sandstone. A great deal depends on the constituents of the marble. Some of these are much more affected by weather than others. When considering the permanence of marble, what has to be considered is, what kind of marble is it, and where is it to be used?

I certainly like the appearance of this synthetic stone. I am not going to admit that deep down within me, I have an objection to admit that synthetic stones for a memorial of this kind. I feel that there was no imitation about the war, or about the men who fought in it. As a professional man, however, if it were proved to me that this synthetic stone were absolutely durable, I should not like to say that it ought not to be used, even in such a building as this. It is a very good imitation that I very much doubt whether anyone would know that it is not real stone. I think however, that what is to be done is to imitate some material, and to give up trying to imitate some other material. We should set out to produce a beautiful material with a beautiful surface, in the same way as we strive to obtain the proper texture for concrete. It remains true, nevertheless, that this synthetic stone is a genuine sandstone employed for the purpose of imitating granite. I am not sure that it is true that sandstone does not slightly from exposure to weather, but everybody with an eye for nature appreciates the disappearance of that crude, raw note so associated with an absolutely new building. I recognize that for a considerable part of the year.

Canberra, is not green, but brown, and this synthetic stone, which will probably change its colour hardly at all, would stand out well in contrast. Nevertheless, I think that sandstone would be quite satisfactory. I would not object to the use of synthetic marble and granite on the pathways and in the courts. If they do not prove permanent they can be taken up and renewed. As a matter of fact they will probably wear better than most stone and, in fact, they will be more durable than most stone and, in fact, they will be more durable than most stone. I have named the proposed building the name, in bronze in synthetic marble is a brilliant solution of the problem of recording these names. Thus synthetic marble will be protected from the weather inside the cloisters. The name will, if anything, be more readable in this form than if incised in the stone. After a time the brownish tone of the bronze will disappear, and it will turn a deep olive green colour, which is regarded as one of the principal charms of bronze. It is the natural weathered colour of this metal, and it is what a fashionable man tries to get. It is difficult to say whether a £50,000 should be considered as sufficient to provide statuary for this memorial. Sculptors have sometimes wild ideas of what their services are worth. The Government should see that it is well advised on this subject by competent men. There are men in Australia who can do remarkably good sculpturing work, and who would probably not dream of asking a tithe of what some of the artists overseas would ask. These men in Australia are good artists, but they are not well known, and therefore could not open their shops at the rate of £40,000, £50,000, or £60,000 a week, but I would be just as good as the work obtained overseas. I should like here to pay a tribute to the work of Mr. Raynor Hopper, who is in the technical school here. I think he is really a brilliant man, but he is rather lost in Australia. In treating with overseas artists we have to remember that a man, when in his prime, may turn out wonderful work, and be able to demand a great figure for it. Ultimately however, his hand may lose its cunning, but he still obtains a great reputation for his work simply because he has up to now a reputation. A man comes away from a quarter of Australia may know now to be a little very prime, but because he is unknown he receives little notice, and little remuneration. I think that for the sum of £40,000 or £50,000 it would be possible to obtain sufficient good statuary. If it is proposed to have flood-lighting effects at all, I should favour the lighting of the whole building. The architect who designed it, designed a complete entity, so why should we emphasize merely the floodlighting. I am not sure that I would like to have floodlighting. This building is in a different category from the Albury memorial. If the building is used at night I am inclined to think that flood-lighting would be very annoying to the people in the building, as the lights would be glaring through the windows. I do not think that Canberra is so bitterly cold that it would be necessary to heat this building, nor do I think that it would be necessary to have the building heated internally. It would be the custom to see these pictures and museums in other parts of the world about 5 o'clock in the evening. With regard to cleaning provision, I prefer the vacuum cleaning principle always. The ideal scheme would be to have a number of electric points throughout the building, and to use portable vacuum cleaners. Personally, I have no time for the ordinary system of fire sprinklers, because they are apt to do much more damage than the fire. There may be a small fire in one corner, but the sprinklers would get to work over a large area, and they would destroy a large quantity of the pictures. If the sprinkler could be limited to a limited area it might be satisfactory. Nevertheless, I think that the alarm system would meet the situation fairly well. Any fire that

I am inclined to think that this building can be erected in Canberra for 2s. 6d. per cubic foot. We know that costs there are somewhat higher than in Sydney, but in any place 2s. 6d. a cubic foot is a reasonable figure for an average type of building. It would not be an excessive figure for a building of this sort faced with masonry, and with reinforced concrete walls and floors. It would be very much internally, but much of this building consists of what we describe as voids. There is no more in them than in an open verandah. Therefore, as compared with a commercial building of this size, this building, with its straight walls and open corridors, might be built for 2s. 6d. per cubic foot, while a similar commercial building would cost 4s. per cubic foot. I am sure that from the point of view it will be admitted that even 5s. a cubic foot ought to be sufficient for any kind of building in Canberra. I feel fairly confident that this building, being of the type it is, can be erected for 2s. 6d. a cubic foot. Even that I think is a liberal estimate. I am of the opinion that the designer of the building should be in the position to estimate its cost, and to produce a bill of materials, which would be interesting to know what the estimated cost per cubic foot is of the new administrative buildings at Canberra. The alternative to estimating the cost by cubing is to take out the quantities used. You must either cube, which is an approximation, or you must take out the actual amount of material. We know of no other way. I take the idea of the bill of materials from the same source as the bill of materials of the Taj Mahal, which is the only bill of materials of which I have any knowledge. The principle is something the same as in the Taj Mahal, only on a smaller scale. In regard to the treatment of the 30 acres surrounding the building, it must be remembered that this is an ultra-formal structure, and the grounds should, to some extent, be formal also. However beautiful they may be, they must be, also, well laid out, and they must be surrounded with a few irregularly placed gums. I do not think that there should be any trouble in securing proper foundations for the building.

117. To Mr. Cook.—I am of the opinion that sandstone is practically everlasting. I am aware that eminent architects differ very considerably from me on this point. But we have to consider whether they are talking of sandstone used in a place like Sydney, or whether it is used only in the country. One can see that the sandstone used in the country is of a very bad quality. It is made millions of years ago, and it is there still. How can one say in face of that that the stone is not permanent? It is true that many of the old buildings are showing signs of flaking. This is partly due to the fact that the wrong kind of stone has been used, and partly because the stone has been placed in the wrong position. The sandstone used in the country is the Great Oolite. It is laid. They are made by a process of depositing small particles. They are in layers. Any sedimentary rock placed properly in a building will remain there fairly permanently. Should a block which should be laid horizontally be placed vertically in the building it will begin to peel. The reason for this is that the bedding is not laid properly in position, sandstone is very durable. A skilled architect knows how the material should be used. The bed of every stone should be so marked before it leaves the quarry, so that the mason will know how to lay it. There is no excuse for exfoliation. The principle of laying the stones applies to sedimentary rocks, and to all the rocks of the same origin. It contains a number of materials which have been melted together and allowed to cool. Granite, or trachyte may be pressed to any

designers of the memorial. They should at least be consulted in the matter. The building will be as essentially formal that the approaches should also be formal. The layout of the grounds should be designed architecturally. An atmosphere of reverence should permeate the whole of the memorial and its surroundings. I have no definite opinion to offer regarding the sunken pool in the approach to the hall of memory. I rather like the idea of the major portion of the building being reflected in the pool.

130. To Mr. McGray.—The nation is now committed to the Federal Capital at Canberra, and in my opinion that is the proper place for this memorial. Sandstone will not be greatly affected by frost if it is properly laid; but if wrongly laid it will be ruined. The great trouble is that many buildings constructed of sandstone in districts subject to heavy frosts. Limestone, however, is a sedimentary rock which is subject to the same drawbacks as is sandstone. Practically all the great buildings in the old country which are not built of granite are made of sandstone. The most important buildings have been erected in districts subject to heavy frosts. In this matter we must be guided by the experience of other countries. At North and South Heads, Sydney, we have examples of sandstone subjected to all the evidence that the opening is getting any wider. Apart from the question of cost I should prefer granite to sandstone. Granite is so hard and so expensive to work that granite buildings are necessarily severe in design. It is suitable only to a few styles of architecture, and it is not so easily weathered, if a structure were to be erected regardless of cost, I should recommend granite.

118. *To Mr. Cameron.* I prefer Hawkesbury sandstone for the memorial because it would harmonise in colour with the existing buildings there. They are white in colour, and in my opinion it would be a mistake to depart from what appears to be a definite colour scheme. I do not agree with the witness who stated that the proposed memorial will resemble a Mohammedan mosque. In the first place, there are no minarets. It is true that it has a flat dome, but that is the only possible resemblance. The dome is not a flat dome, as it resembles a dome that would not necessarily detract from its dignity. The Santa Sophia mosque in Constantinople is one of the most beautiful buildings in the world. I consider that the lay-out of the grounds surrounding the memorial should be entrusted to the

ordinary room. Waverley stone would stand out well against the background, but stone similar to that used in Farnham House, George-street, Sydney, which is known as marble, appeals to me more. There is no difference in appearance between artificial granite and natural granite. There is only the feeling that a sham material should not be used for a memorial. My objection to artificial granite is purely sentimental. The only logical objection to the artificiality of it is that there is no direct evidence of its durability. I believe, however, that the memorial will last. 99 per cent. of the people who visit the memorial will not know the difference between artificial and natural granite. I should not be in favour of a concrete building covered with stucco, but I should not object to a building of concrete made with an aggregate of fine stone, such as broken granite, brought to the face, cleaned off and polished. I do not like concrete covered with stucco. So far as danger from fire is concerned, I think that sufficient precautions can be taken, such as the use of automatic fire extinguishers with an automatic fire alarm, would give ample protection. I take it that caretakers for the building will be provided. Very few of the relics will be inflammable. There should be no danger of fire from the fusing of the electric wires.

TUESDAY, 17TH APRIL, 1928.

Mr. MACKAY, Chairman;

Sir John Sulman, consulting architect and town planner, sworn and examined.

122. To the Chairman.—I was chairman of the Federal Capital Advisory Committee from 1921 to 1925 inclusive. In 1923 I was in touch with the War Memorials Museum Committee and prepared a set of conditions of competition for the proposed building on the site selected by the Federal Capital Advisory Committee and approved by the Museum Committee. The requirements of the committee were so extensive that I made a rough plan of a building to suit their needs and found that it could not possibly be erected for the sum allowed by the Government, viz., £250,000, and told them they would have to increase their wants. The reply to me was that they would not do so, and that I must reply to the Government to increase the amount allowed. This I tried to do, but was met by a flat refusal. By this time I was leaving for Europe and when I returned just before the advisory committee was superseded, I found no further progress had been made. The matter was revived by the commissioners under the new Government, and the conditions were modified conditions with new adjudicators, and the result is well known. A feature of the original scheme was a large central hall, which would have been a very costly addition, and this alone would have been a very costly addition. It has been superseded in the design under consideration by colonnades, which will answer the purpose equally well, while being much cheaper. The idea of a long central court (rising by steps to the Hall of Memory) which the arcades enclose, is considered an excellent one; especially as it is embellished with water basin and trees, and provides a very pleasing, airy and colour intense background for the building. It leads up to the Hall of Memory, a dignified domed structure, from which, so far as the plans show, has no specific object except to house a group of sculpture at the end of the vista. This is too insignificant in size to give a reason for the hall, which should, I think, have its

centre dignified by some fine and inspiring memorial fulfilling the two artistic function as the altar does in the choir or cathedral, to wit St. Peter's at Rome. Externally I consider the design an excellent one, quiet, dignified and expressive of its purpose, the dome forming the culminating feature. The whole composition will look well either from the ground level or the heights of Mt. Ainslie. In colour it should, I think, be white, or nearly so, to harmonize with the general character of the city, and also to show up against the wooded slopes of the mountain. I do not know whether the materials for the structure have yet been selected but if not, I would strongly urge that they should be of the most durable, strong and homogeneous, granite, and that the material right through and not faced. Granite would be ideal if of a light colour, but is prohibitive on account of cost. Freestone can be obtained from a distance, probably from Sydney, but is not as durable as it ought to be, and the cost thereof would also be too great if the walls are of stone all through. Moreover, sandstone shrinks. Brick is out of the question on account of colour. I therefore come to the conclusion that concrete is the most suitable. It is homogeneous, very durable, cheap, and if treated with a fine granite or marble aggregate on the external surface used by the Americans, it would be suitable in colour and texture. On the whole I give *vincere* particulars. There are, of course, a few little details of the design that might be improved, and I give a list of them hereunder. But "by and large" I consider the design a fine one, a credit to its authors and worthy of its object.

1. The internal dome is too high and would cause reverberation.
2. No light in parts of the staircases of 'the Hall of Memory.'
3. The conveniences are badly lighted and ventilated.
4. Natural ventilation of the different sections of the museum is, I think, insufficient.

The natural lighting shown also requires consideration.

5. Artificial ventilation will be required in the basement. If so, would it not be well to consider it as supplementary to natural ventilation all through, especially in winter, when some kind of warming will be required.
7. There is a dark passage in the basement near the caretaker's quarters.
8. The caretaker's living room is badly lit.
9. The arcades flanking the central look very bare, and would be much improved by a simple flat band as a cap, and a set off as a base to each pier.

As I have said, my first objection to the plan is that the internal dome is too high, being 77 feet to the apex. The dome is what is called stilted. It has vertical sides before the curve begins, and for this reason does not look well, and being a large cavity would cause sound reverberation. There are two coverings, the internal and external, and in most of the big domes constructed in the world, notably in St. Paul's in London, the external dome is a considerable distance from the internal one and looks well. At Santa Sophia at Constantinople there is only one dome as a covering which intercepts the light and gives the whole building a gloomy and damp appearance. This is not recognized, from the time of the Renaissance, that to get a good effect in buildings of this kind there must be two domes, an internal and an external one. I suggest that the internal dome should spring from the cornice. This would have the effect of reducing the height, which would make it look much

better, and would do largely away with sound reverberation. It is not the height outside with which I find fault, but the internal height. The outside is admirable. The appearance would be better if it were done, because, otherwise, it would have the effect from the inside of looking up into a deep well. This is not a very big building, and it is not possible to get very far away from the dome. Therefore, for artistic reasons, if it proposed to decorate the dome, it is better that it should not be too deep. The extra cost involved in making a double dome would not be worth considering. I am still president of the Public Memorials Advisory Board to the State Government of New South Wales, and I have had to do the passing, improving, and sometimes the re-designing of a number of war memorials. There is always a difficulty in getting good materials used. I designed one memorial which I had hoped would have been completed by now, and would have furnished an example on the method of construction which I have recommended. The principle, however, was a little too new for the folks here. They wanted something of the ordinary standard type. I refer to the proposed memorial arch over Botany-road at the bridge. For ordinary casing in concrete work timber, as you know, is used, but for good work steel plates are employed. These plates are of a standard size, and can be used over and over again. They give better service, and in the end are cheaper. Specially made concrete, with good ingredients, is the cheapest building material we have. The method of construction employed in America is to put a steel plate down between the rough material which you are putting into the middle of the wall, and the fine material which is to form the surface. This fine material is made of crushed granite mixed with white or ordinary cement. It can be of any coarseness or fineness desired. This finishing material is filled in around the outside, and as soon as it is finished the plates between it and the rough interior filling are withdrawn, and both concretes being wet immediately join together and become homogeneous. You would then obtain a surface of a certain granulated texture. I would suggest that the pieces of granite should be broken up to the size of pens. When the outside casing is taken away, and the concrete is set, it can then be gone over with a wire brush or with a little acid to clean off any cement that remains on the outside adhering to the little nodules of granite. By this means it is possible to get a very attractive surface. Further, you will have a homogeneous structure with no metal in it, and it is a material that will last for ages. It is infinitely cheaper than making the same stuff into blocks, because in that case you have to pay for masons' labour, and that is very costly. I am familiar with Tharwa granite, but I do not think that it would be suitable for this work, because it is too dark in colour. It is not likely that by this method of construction any ridge will appear where the different sections of a wall are joined. If there is a slight ridge it can be easily chiselled off. In order to deal with the horizontal joints, I would suggest that the ends of the plates be bent slightly inward so as to make an actual groove in the concrete, which will be something like a joint in masonry. This would add to the appearance of the building. I am not familiar with the Fairy Meadows limestone. I have seen samples of it, but it was so long ago that I have almost forgotten it. From my general knowledge of stones, I would rather use crushed granite for this purpose, as it is certainly more durable than limestone. The cost would be less than anything that has yet been suggested. I am quite certain that this material which I suggest would be found to be satisfactory. The great difficulty in connexion with most kinds of work is in obtaining skilled labour in the Territory. It is much more difficult to obtain such

labour there than in Sydney, for instance. Good masons can get plenty of employment here, and they will not go to the Territory except for increased pay. The method of construction which I suggest can be carried out almost entirely by unskilled labour. I have not previously heard that it was proposed to construct this building by erecting piers of concrete and walls of brick, these to be covered with sandstone, but having heard it, I totally disagree with the proposal. Such a method of construction would be satisfactory for a building that was designed to last only 100 years or so. Our Sydney sandstone shrinks. When I came out here 43 years ago I bought a partnership with a leading architect, and then had an opportunity of studying the use of sandstone in buildings. I found that a 4 feet length of stone shrank about a quarter of an inch. Such a length of stone would be about 18 inches deep, and it was learned that the joints opened by not less than a quarter of an inch. The shrinkage depends upon the amount of what is called quarry sap in the stone. Sandstone should be well seasoned for a year before it is put into a building. It is true that we do not usually use such large blocks as I have described for building. Possibly the stone now being used does not shrink so much. Sydney sandstone has a certain amount of clay in it, and is, therefore, not durable. If you look under the corners of any building here more than twenty years old, you will find evidence of the stone fretting away. In buildings 40 years old and more this fretting is most marked. In Canberra it would be better, no doubt, where there is not so much moisture, and where there are not so many fumes in the atmosphere. For the A.M.P. building in Melbourne they took sandstone from Sydney down to Melbourne just for the sake of its appearance, and from that point of view it has much to recommend it. Nevertheless, I contend that it is not a really durable material. I am confident that the Government is insistent that the cost of this memorial should not exceed £250,000. I am trying to help the committee, and to help the architects by suggesting a method of construction which, I am sure, will be cheaper than building in brick and facing it with stone, besides being far more durable. It would amount to a saving of possibly £10,000 on the building. As to the durability of this method of construction, it is only necessary to consider the old Roman concrete. They did not have such good cement as we have; they made it by mixing volcanic ash with lime mortar, yet, as we know, it lasted extremely well. I am a little sceptical about infusing concrete piers, as if any damp gets to the reinforcement metal it is likely to weaken the pier, and then the strength of the building is reduced. I am not prepared to hazard any opinion as to the life of sandstone at Canberra. I know that Sydney buildings of 40 years of age are fretting badly under the cornice where the sun does not reach the stone. Professor Wilkinson and I are acting as adjudicators of the competitive designs for the Anglican Cathedral at Canberra. The committee was very anxious that we should give them an idea of the cost, and we decided that building at Canberra was 25 per cent. dearer than in Sydney or Melbourne. For one thing there is the extra carriage on material. If it is proposed to use stone from Sydney, the carriage on this item alone will be very heavy. The main reason for increased costs, however, is that labour at Canberra is more expensive than it is here. It is difficult to get first-class men to go to the Federal Territory, and I perceive there than it is here. What the exact extra cost is I cannot say at the present time. Perhaps Sir John Butters or Colonel Owen would be able to give the committee information on that point. I regard my suggestions as to building in concrete to be the most

important piece of advice which I can give the committee. I wish also to call attention to the fact that there is no provision for lighting shown in the plan for certain of the staircases. There should be an opening—even if only a small one—on each landing. That of power. I suggest that the committee also call the attention of the architects to the lighting and ventilation of the conveniences. I have not had any experience of the use of synthetic concrete. If it is a facing similar to a stone facing on brick, I should have the same objection to it that I have to other material of the kind. It is costly, and it is not so durable. When a wall is constructed of concrete it is homogenous right through, instead of being built up of two separate materials, and is therefore undoubtedly more durable. For instance, in the old Roman buildings the concrete core is still standing, while the facings have been stripped off. I should have no objection to the use of this synthetic material for paths, and for paving the courtyard, provided the cost is approximately the same. The process of cubing is only a very rough guide to the cost of a building. If you wish to obtain accurate results you must take out the quantities of the actual material to be used. It is possible that there may be a big variation between the results arrived at by the two methods of computation. Cubing is only a guess based upon the average of your experience. It is based upon what similar types of buildings have cost, but it must be remembered that no building of this kind has previously been erected in Australia. Suppose the extra cost of building at Canberra is only 20 per cent. above Sydney costs, instead of 25 per cent. If the cost of building at Canberra is assessed at 2s. 6d. a cubic foot, a 20 per cent. reduction for Sydney would be 6d. off that, which would be equivalent to 2s. a cubic foot in Sydney. I do not think that it would be possible to erect this building in Sydney for 2s. a cubic foot. I would rule sandstone entirely out as a material for erecting this memorial, even Hawkesbury sandstone. I do not think that it is durable enough for a building of this character. The original idea was to place the building at right angles to its present axis, but that would involve a totally different kind of plan. The dome would not then centralise with the rest of the plan, and the whole building would look lopsided and out of balance. The building which I roughly plotted at first was one with a central feature. That is the kind of design which it is necessary to have if you propose to turn the flank of the building towards Parliament House. It would look more imposing, perhaps, if the spectator saw the length of the building instead of just the end. I do not think that sculptural embellishments are necessary in a building of this kind. If it were proposed to have any such I should concentrate most of the expenditure on some imposing memorial in the centre of the Hall of Memory. In St. Peter's in Rome, for instance, there is a great central shrine which is the keynote of the whole building. There ought to be a central feature in the Hall of Memory; otherwise the building loses its significance. If it is decided to have sculptural effects, it might be possible to do the work for £50,000, although that would depend on the artist who was employed. For that sum it would be possible to have built a kind of architectural shrine which would be very effective, but not necessarily a sculptural monument. We need a central feature in the Hall of Memory, but it might well be an architectural feature, rather than a sculptural one. I do not think that I have any suggestions to offer regarding the treatment of the 30 acres of land surrounding the building. I certainly favour the idea that the architects should be consulted in laying out the grounds in order that they may harmonize with the building. I should not leave it entirely to gardeners, who very often make a mess of such things. They

have no idea of vistas. I consider that expenditure on such things as storm water drainage should be regarded as capital expenditure on the development of the capital, and should not be charged against the cost of the building. I have understood all along that the Government was prepared to allow £250,000 for the building alone. I consider that the method suggested for recording the names, that is, embedding bronze letters in synthetic marble, is as good as anything that could be adopted. When I was designing memorials for other places I used to allow 10s. a name for cutting them in granite. It must be remembered that these names will be recorded on alabs which cannot be put into a solid portion of the building, but which will have to be attached to the wall. The same, of course, would apply to bronze plates. We hope that we shall escape revolutions in this country, but it is a fact that during revolutions in other countries the bronze memorials were torn down and put to military use. I recommend that the building should be heated, as it is very cold in Canberra in the winter. In view of the fact that a proper heating installation is estimated to cost £14,000, it might possibly be cut out for the time being, but provision should be made for installing it later. I certainly think that fire protection appliances should be provided, though I do not favour the installation of ceiling-fire sprinklers. I think that hoses here and there would be quite enough to subdue any local conflagration which might occur. This, I hope, is going to be an absolutely fireproof building with no wood in it, and practically the only danger of fire would come from the furniture installed. I agree that it might be desirable to install floodlighting apparatus.

123. To Mr. Cameron.—As far as I know none of this concrete work, with special facing which I have recommended, has been done in Australia. There would be no difficulty in getting men to do the work. If a few experts were required they could be obtained from America. I have seen the work carried out in it to the point of view of a dignified memorial. The only thing which would be better would be solid granite, which has a sentiment attaching to it from the time of the Pharaohs, but it would not be possible to carry it out in that material for less than £500,000. I have nothing in my mind that I could suggest for a central figure or memorial in the Hall of Memory. I only suggest that something should be chosen which would make a vital appeal. It might be possible to prepare a record of the circumstances of the individuals connected with the war, and this might be kept in a shrine, just as the bones of saints were kept in shrines in the old European cathedrals.

124. To Mr. Seabrook.—I should not like to go as far as to say that this building should not be carried out according to the design, and with the materials suggested, for £250,000. It has been so much reduced in size from the original competition drawings that I should not like to make a definite statement of that kind. I could not give an estimate of the cost per cubic foot of this building if carried out in concrete as I suggest. As a matter of fact, it would only affect the total cost of the building by a small percentage. A would not need to be as thick as a corresponding wall built of brick and faced with stone, but I should not recommend skinning a building of this kind down to the finest possible point. The plan of this building shows the proposed brick and stone faced wall to be only 14 inches thick, which I think is too thin. I observe also that it is proposed to have a wooden support for part of the roof. I should prefer this to be of concrete, and to have no wood whatever in the building so as to reduce fire risk to the absolute minimum. Taking a 14-inch wall of brick with stone facings,

and a 14-inch concrete wall, I should say that the concrete wall would be 60 per cent. stronger. However, before giving a definite opinion as to whether these walls as set out in the plan are thick enough, I should like to go into it more carefully, and to learn what lateral supports are provided. No plastering or facing on the concrete will be necessary.

125. To Senator Reid.—I am not aware of any examples of this work in Australia. It would be cheaper for the contractor for this building to obtain new plant. It would be made in standard sizes, and could be used again for almost any kind of building other than one containing large projections. This system would be cheaper than any other construction. I do not regard it as artificial; instead of solid granite, crushed granite is used. I do not think the public would object to it on the ground that it is artificial. The public generally knows very little about technical matters. The absence of vertical joints emphasizes the solidity and improves the appearance of the building. I consider the design to be so admirable that I should be sorry to see the sculptural work at the entrance cut out. I do not advocate that the design be altered. The few suggestions that I have made are purely technical in character. The great thing in the interior is to prevent reflections. If there is a greater amount of light on the observer than on the wall, there will be reflections. The idea of the architects is along right lines, but the method of carrying it out will require very careful consideration. It is a question of minute details. In New Zealand I saw a building lighted in the manner proposed, and it looked very gloomy.

126. To Mr. Lacey.—I am aware that this granite-faced concrete has been used in the United States of America for some years. The only reason I can advance for its not having been used previously in Australia is that we are probably not sufficiently progressive. I do not think that the proposal to use this material in Australia has ever been adopted. In one instance, I suggested it in connection with a memorial bridge, but the people concerned selected another design. So far as I am aware, buildings of this material have not been attempted in Australia.

127. To Mr. Cook.—I endeavoured to get the Government to agree to a greater expenditure on the memorial, but evidently it knows best how much it can afford. I favour a combined structure for the memorial and the museum. The exhibits and the memorial are both associated with hallowed memories, and the great museum as well as the memorial. I do not regard the memorial as utilitarian; everything in the building will combine to make one complete memorial. I do not favour any alteration of the elevation of the building; its simplicity is its charm. The broad flanks emphasize the special features at the entrance, and the dome. Subject to the limitation of cost imposed, I regard the memorial as worthy of the purpose it will serve. I am satisfied with the design.

128. To Mr. McGrath.—I do not agree with the witness who condemned the design on the ground that it was too flat. The general idea of the buildings in Canberra is that they should be low and broad. There has been no attempt to go in for lofty buildings there. The provisional Parliament House is an example of a low broad building. The permanent Parliament House which was originally contemplated, would also have been low and long. I think the proposed memorial will be in harmony with the buildings already erected, and those which have been suggested. If there had been no limitation as to cost, I should favour a building constructed of granite. Without details of the quantities and the cost of granite, I could not give an estimate of the cost of erecting the building with granite. I prefer granite to sandstone. I do not like compound walls. If we study the old Roman monuments we find that the

facings have disappeared, leaving the concrete interior. The alteration I have suggested in the concrete is only a matter of detail. Contractors accustomed to concrete work could easily make the modifications I have suggested.

129. To Mr. Seabrook.—There should be no necessity to re-inforce the building if constructed with concrete. The designers have not proposed any reinforcements in a building of brick with a stone facing, and concrete would be stronger. It might be advisable to re-inforce the dome. It is all a matter of thrust and stress. The dome is the only place where reinforcements might be necessary.

130. To Mr. Cook.—If the building is to be faced with either sandstone or granite, I should prefer granite. I should not care to say whether the monument can be erected for £250,000 without first having details of the quantities.

(Taken at Sydney).

WEDNESDAY, 18th APRIL, 1928.

Present:

Mr. MACRAE, Chairman;

Senator Reid	Mr. Lacey
Mr. Cameron	Mr. McGrath
Mr. Cook	Mr. Seabrook

George Fulton Copeland, company manager, representing the Benedict Stone Company, Limited, sworn and examined:—

131. To the Chairman.—My company is associated with the Benedict Stone Corporation of New York, which for about twenty years has been manufacturing artificial stone. The parent company has made available to us its formulas, and our manager is experienced in the manufacture of artificial stone. We are therefore not experimenting. Already we have obtained an order from the directors of the Sun Newspaper, Sydney, for 25,000 feet of artificial granite. Almost all of the materials used in the manufacture of this stone is obtained in Australia. About 1 per cent. of it is imported. Various aggregates mixed with Portland cement go to make up the stone. The samples submitted previously by my company contain marble as the principle aggregate. That marble was obtained from Bathurst and Marulan. Most Australian marbles are suitable in texture so long as they are white enough. The material which we import does not affect the durability of the stone; it is used chiefly to get stones of good appearance. We have attempted to get this material in Australia, but so far we have not succeeded. The marble aggregate is not merely on the surface of the stone, the mixture is consistent throughout. The biggest block we have made so far weighed 45 tons. The material was the same throughout. We base our claim as to the durability of this material, on the fact that it is free from lamination and is less porous than natural stone. Moreover, it is reinforced with steel. Buildings of our stone which have been erected for seventeen years, show no signs of disintegration. The stone has the additional advantage that even in the way in which it retains its colour in dirt laden atmospheres may be seen in Pittsburgh, United States of America. Goodlet and Smith, a well known Sydney firm, have obtained from the American Company full particulars of the process of manufacture. The Australian works have been in operation only since January of this year. Our contract with the Sun Newspapers represents about £23,000. The whole of their building above the natural granite comprising the lower

doors will be faced with artificial granite. The building has not yet been advanced sufficiently far for the facing to be put on. The granite slabs will be from 4½ to 6½ inches in thickness. The specifications and drawings were prepared from a sandstone facing. We are working to the same specification. Into each block we cast ties. Copper ties specified by the architect are being used. My company would be able to supply artificial stone for the proposed memorial. No difficulty would be encountered in tying the facing to walls of brick. Some architects prefer copper ties, while others specify ties of tie the architects specify. The American company favours the particular class of tie but works to the architect's specifications. Synthetic granite is generally from 5 to 10 per cent more costly than sandstone; but where there is a good deal of repetition work, we can compete easily with natural stone. In the case of the proposed memorial we should be able to quote a lower price than for sandstone because there is a good deal of repetition work. Should alternative tenders for sandstone or granite be invited my company will submit a tender.

132. To Mr. McGrath.—I have no fears as to the durability of this material. The durability of the aggregate is unquestioned, while Portland cement is recognized as a very durable material. Our raw materials have been tested in Sydney by Mr. A. W. Dye. We use Kandas cement which is of good quality. My company is a large shareholder in the Kandas Company.

133. To Mr. Cameron.—Synthetic granite can be produced in almost any colour. I submit samples of some of the colours in which it is made. The whole of the material for one building would be the same colour. We have made artificial granite for the Federal Capital Commission out of Tharwa granite and Fairy Meadow limestone. Although the quality was satisfactory, the appearance was not good. It did not look different from ordinary concrete. We can carry out work to any design. In fact we like special designs, especially where there is a quantity of repetition work. I submit a photograph of the Park-avenue Synagogue, New York, which is faced with Benedict stone. The photograph shows how special designs can be prepared in this material.

133A. To Mr. Seabrook.—My company's works have been in operation only since January of this year, so that we have no finished building in Australia to which we can point as being faced with our stone. Some of the samples I have submitted this morning were made in America, but all those of light colour were made in Australia. The Sun people required a guarantee that the stone would stand a compression of 3,000 lbs. to the square inch. We gave a guarantee to that effect for a period of fifteen years. I have had no personal experience of this stone outside Australia. My company is in constant touch with the American Company. Our plant costing about £25,000 was ordered and supplied by the American company. The ties are cast with the stone. We are prepared to make them of any material specified by the architect. If concrete is used behind the facing it can be poured on to the back of our stone—the material itself can be used as a form. The manager of the company, who is present this morning, has been with the Benedict Company in America since it was formed in 1910. He understands building and is experienced in the manufacture of this material. We should experience no difficulty in connection with the dome of the proposed memorial. The Benedict Company specialises in domes and cornices. If given the opportunity, my company will submit an estimate for the whole of the facing of the proposed building and would be prepared to guarantee its work.

134. To Senator Reid.—We should be prepared to face the building with granite of the same thickness as is proposed in the case of sandstone, but if desired we could provide a facing 4½ inches in thickness. I think our tender would compare favourably with any tender for Waverley stone. I make that statement on the basis of our experience in connection with the Sun building. Wherever there is much repetition work we can easily compete with natural stone. There would be no difficulty in supplying sufficient artificial granite of light colour to face the proposed memorial although in that case it might be necessary to import a little more than 1 per cent. of the material required. The light sample submitted does not contain much Portland cement. If we can obtain in Australia a satisfactory light coloured cement, it will not be necessary for us to import any of the material. Some of the samples submitted have been coloured. The colouring does not interfere with the durability of the stone. They are all mineral colours. In my opinion artificial stone will last longer than natural stone; it is less porous and has no laminations. We have had analysts to examine our materials, both separately and together, and they are satisfied as to the durability of our products. The external face of the stone is generally polished; sometimes it is wrought.

135. To Mr. Cameron.—In order to satisfy the directors of Sun newspapers, samples of our stone were submitted to tests by the University authorities. The stone was submitted to a pressure of 2,000 lb. to a square inch and showed no signs of injury. That was the standard required by the Sun people. In about two weeks' time I hope to be able to supply a copy of a certificate from the University authorities.

136. To Mr. Cook.—The purchaser of our material has no means of satisfying himself as to the quality of the mixture other than his belief in the integrity of the firm. He could, of course, submit sample stones for testing from time to time. Ten years ago the American company had only one establishment; today it has six. My company has one factory already established in Sydney. Another factory will soon be started in Queensland, and I anticipate that within six months operations will commence in Victoria. My company is concentrating on New South Wales and the Federal Capital Territory. Artificial stone is to a large extent taking the place of Indiana limestone in America, although the cost is a little greater. The work we have done for the Federal Capital Commission has been purely experimental. We obtained some samples of Tharwa granite and Fairy Meadow limestone. The limestone was not mixed with other stone. The appearance was not satisfactory. For the Sun building we are using marble from Cow Flat, near Bathurst, and from the Caloola quarry. We have had some difficulty in getting marble of good quality, and have consequently had to pay high prices for it.

137. To Mr. Cameron.—The manager of our company assisted in the erection of the Park-avenue Synagogue, New York.

The witness withdrew.

Malcolm Shore Stanley, M.C., A.M.I.E. (Australia), Consulting Engineer, sworn and examined.

138. To the Chairman.—The type of concrete construction which I advocate for the war memorial at Canberra was developed in Australia about twenty years ago. The first building constructed was Wills' tobacco factory in Melbourne. Since that time the method has been improved, and it is now possible to construct floors and ceilings which have no projecting girders. Our construction involves the use of hollow blocks made of gypsum or coke breeze concrete. The use of these materials, while reducing the dead weight

of the floor and increasing its strength, also reduces its cost. The proposed memorial contains a long room about 200 ft. by 45 ft. If constructed in the ordinary way, the ceiling will be broken by a number of girders each of which will absorb some light and prevent the proper display of the articles. In New South Wales, Queensland, Victoria, South Australia and New Zealand we have constructed about 2,000,000 square feet of our flooring during recent years, all giving complete satisfaction. Buildings containing projecting girders reduce the head room of each storey by from 18 inches to 2 feet. Moreover, ordinary concrete construction involving the use of steel girders that each panel isolates. That affects the rigidity of the building. Our floors and ceilings are monolithic, and present an absolutely smooth surface. I submit a photograph of the interior of Small's chocolate factory near Sydney, showing a girderless ceiling. Although the span between the columns is 33 ft. 6 in., that ceiling sustains the weight of a machine weighing over 15 tons. Flat ceilings cheapen the cost of electric light and sprinkler installation. I submit a list of companies and firms for whom we have constructed buildings during the past three years. These buildings, which are in or near Sydney, may be inspected at almost any time. I am consulting engineer to the Innes-Bell Hollow Block Company. My evidence this morning is given on behalf of that company as well as in my capacity as a returned soldier interested in the memorial. I have supervised work for the company in Australia. For about twenty years the company has supplied hollow blocks, but the more recent development providing for girderless buildings has taken place within the last five years. Floors are constructed by first laying the hollow blocks on the forms. The blocks themselves are about 2 feet square and about 10 inches thick. Their thickness is determined by the nature of the job and the stresses which they will have to bear. When the blocks have been laid on the forms, steel rods are placed between them. The dimensions of the steel rods are determined mathematically. The concrete is then poured in. The hollow blocks are constructed with a slight taper so that when the concrete is poured in they are dovetailed into position. When the concrete matures, the concrete blocks and the poured concrete are monolithic. By adopting our method, the proposed war memorial could be constructed without projecting girders. Spans of from 35 feet to 40 feet may be constructed to carry heavy loads. The floor details would be determined mathematically. A building constructed with columns 33 ft. 6 in. apart contains approximately 1,150 square feet between the columns. In one such building in Sydney 230 tons of sand was carried in that space. In commercial construction the pillars are given an overhang of 2 feet at the top. That would give a bearing surface of about 9 feet square. We have buildings in Sydney where no such caps are used at all. I have seen the plans of the proposed war memorial, and I think this system of block construction could be used in a building of that type. With the elimination of girders there is obtained, not only a reduction in the actual cost, but an improvement in lighting, ventilation, and interior appearance. As a result of our experience in Sydney, I should anticipate that it would be 17 per cent. cheaper to use the material I suggest than to use steel columns and steel girders. Our works for making these hollow blocks are at Rosebery. We are using coke and waste products from the gas works in their construction. In New Zealand and South Australia we are using gypsum. The difference in the cost of the blocks, as compared with Canberra and Sydney, would be infinitesimal. As a matter of fact, our price in Canberra would be the same as in Sydney, because we would manufacture

on the spot. Two weeks ago I returned from New Zealand where I had been engaged in work in connexion with Aulsebrook's factory at Christchurch. They had called tenders for a building of a similar design to this with concrete and steel girders and concrete floors. I went over and designed for them a girderless floor, and a pure concrete job. Tenders were obtained on the old design and on the new, and the tenders submitted to my design were much below others. We did not submit the tenders; they were obtained from the contractors on the spot. We do not do concrete work; we do the designing. I wish now to submit particulars of a factory building which we designed for a firm in Petersham, on the Parramatta-road. Originally, it was designed with steel joists, steel columns and concrete slabs. The tender received for that style of construction was £73,892. Then I submitted a design for carrying out the interior work with hollow concrete blocks, and the work was done under my supervision for £52,000, a saving of over £20,000. I claim that our system of construction means reduced reinforcement, and a simpler form of work. It is the first endeavour I know of to standardize in concrete work. If there are girders across a building it is necessary to put in a system of moulds to carry the slabs, and special timber work for every girder. In this system which I recommend, the timber centring stands on one wall, and goes right through to the other without any cutting. The plastering and finishing costs are reduced to a minimum. Instead of having to deal with every girder with their re-entering angles, there is only a plain surface. There is a smaller area to plaster, because of the unbroken surface. It produces the maximum of strength and rigidity in a building. I submit here a photograph of a floor which was designed for loads of 240 lb. a square foot. The load it was carrying at the moment this photograph was taken was 495 lb. a square foot, or twice the load it was designed for. If it is decided to attach some form of ceiling treatment, such as fibrous plaster, it is put on very simply. In some instances we have thousands of feet of mould attached to the ceiling. There is generally a plug in the concrete ready for the ceiling attachments. Any ceiling attachments suitable for use on an ordinary concrete floor can be attached to this style of floor without extra cost. Such a floor would have greater resistance to temperature stresses than would other kinds. If you have a concrete slab running through a building, and you split it up by means of RSJs as in ordinary construction, you get a thin slab running into a very rigid girder line. We know that in an iron casting with a thin web running into a heavy web it generally cracks at the joint between the various sections. With the type of floor I recommend there is a uniform thickness throughout. This system of block flooring has been especially designed to meet Australian conditions. Architects and builders are recognizing this fact as is shown by the number of contracts we have received. We are doing the interior work for the Metropole Hotel, and for the new Haymarket post office. In Queensland we are now doing a fair sized building for Cummins and Campbell, at Townsville. In South Australia we are doing six jobs at the present time, including the News building. In these cases the work was obtained in competition with other systems of building. We have had no complaints in regard to any of the buildings which have been constructed. I believe my system will be useful for the suspended floors in the memorial. We are engineers and designers, and our object in coming before the committee is to endeavour to improve the internal structure of the building, which is an aspect about which the committee has probably heard little or nothing from other witnesses.

139. To Mr. Cook.—None of our floors has given any trouble. The usual cracks that appear in concrete floors are absent from these. Hollow concrete blocks were used in Melbourne twenty years ago, and James Bell and Company have been interested in them ever since. Similar constructions exist throughout the world, particularly in America. Their use would effect a saving of 17 per cent., not on the cost of the whole building, but on those parts of the building in which they are used. Engineers, like other people, are often very conservative, and professional jealousy has sometimes prevented the use of this type of flooring when buildings are being designed.

140. To Mr. Seabrook.—The blocks are standardized, being 2 feet by 2 feet, while the depth varies according to the span. For a 30 feet span the depth would be 14 inches, while for a 15 feet span it would be reduced to 7 inches. There is a thickness of 1½ inches of material around the hollow in the centre of the block. The blocks are slightly tapered, so that when the concrete is run around them the taper is sufficient to prevent displacement of any kind. The blocks have no function once the concrete has hardened except to take the plaster. They do not contribute in any way towards the strength of the floor. In the plan of this memorial provision is made for a considerable amount of shelving, and our columns would facilitate the placing of these. I do not know of a single instance in which our prices have been higher than other tenders. I remember a case in which the architect's estimate for a building was £76,000, but the lowest tender was £150,000. The firm came into contact with us, and we were able to design a building which cost only £32,000. In many cases we are engaged by architects as engineers for the work, and we receive our fees in the usual way.

141. To Senator Reid.—Our floors serve to bind the walls together in the same way as beams do, only more effectively. The girders bind the walls only at given points, and reinforcement runs in the opposite direction, usually consisting of ½-inch rods. With our system of construction we tie the walls in two directions with steel rods running criss-cross from wall to wall. This enables the floors more effectually to withstand temperature stresses. In the old form of flooring there is resistance to the deformation due to temperature in only one direction, as the reinforcements run only one way, but with our method of construction we are resisting temperature stresses by reinforcements running in two directions. This spreads resistance over the whole mass. Moreover, our system tends to deaden noises as between one floor and another, this being caused partly by the hollow blocks, and partly by the use of two materials which vibrate at different periods. These floorings are much used to-day in flats, because of their sound-deadening properties. Our system of reinforcement follows the ordinary established principles. There is nothing Bolshevik about it. Usually it is necessary to support the floor for about three weeks, after the concrete is laid, but with the new quick-hardening cement now being made in Australia, this period can be reduced to one week. To my mind that would still further cheapen the job. For dividing a ceiling into panels we sometimes attach the enrichments direct to the blocks. In other instances a hole is drilled, and something put in to fasten the enrichments to. Usually we can attach them just as we do in the case of an ordinary concrete floor.

Sidney Frank Marsh, General Manager of the Uralia Granite Company Limited, sworn and examined.

142. To the Chairman.—I also represent the hardstone trade of Sydney, comprising Loveridge and Hudson Limited, Anselm Odling and Sons, and D.B. Acton

and Company. I am aware of the proposal to construct a National War Memorial at Canberra. In my opinion granite would be a more permanent material than sandstone with which to face the building. Granite is the only material stone which will last for centuries. A satisfactory light coloured granite can be obtained in New South Wales. I submit one sample which comprises the closest grain and the whitest granite procurable in Australia. It is also the easiest to work as well as the cheapest granite in New South Wales. My object in appearing before the committee to-day is to correct the impression that granite is a material too costly to be used in the National War Memorial. First of all, I would like to state that granite is not an expensive material by any means, for certain classes of work. It would seem that a comparison is being made between the cost of freestone and granite for this memorial on the basis that freestone will cost approximately £48,000 and granite £130,000. The firms which I represent comprise the three largest stoneyards in Sydney, which are the three largest in Australia. After consultation with them I am authorized to say that nobody with any authority to do so has given an estimate for this job to be done in granite, either to the architect or to any one else. We—my company, and the three yards in Sydney referred to—have not been given any opportunity of ascertaining the quantities or of viewing any working drawings of the memorial on which a quotation or an estimate could be given. We can only give an estimate based on £48,000 for freestone. We, however, do know the class of work to be done and the finish desired, also the character and simple construction of the building under notice, and, if the estimate of £48,000 for freestone is correct, I am authorized to state that we are all prepared to tender for the erection of this granite veneer in a thickness of 3 to 4 inches, according to requirements, at a price closely approximating £65,000. If the estimate of £48,000 for freestone is incorrect, we wish to point out that in this particular job a difference between the price of freestone and granite would not be more than 4s. per super foot fixed on the building. While on the question of certain classes of granite being supplied at a low figure, I would like to point out that twelve months ago the granite and hardstone industry was not in nearly so good a position as it is to-day. Two years ago if one wanted granite in large quantities there was nobody in a large way of business who could execute the order satisfactorily; the architects had no faith in the supply of such material. We have now three large and wealthy companies actively engaged in quarrying granite, with the result that whereas two years ago it cost from 9s. to 10s. a cubic foot to quarry this material, to-day my company alone is doing it for 2s. 6d. and paying good dividends. This is due to the fact that several thousands of pounds have been spent in establishing a modern quarry, equipped with the latest machinery and methods. A further reduction in the price of the finished material has been brought about by the re-organization of the Sydney end of the business, many increases in plant, and machinery being added to the three large yards handling this material. Haulage and handling charges have been cut down considerably, and more modern methods of working stone with new machines have been instituted. For instance, the largest yard in Sydney has been removed from the city to a suburban position on the railway line, and where, twelve months ago, this yard with the assistance of 60 men found difficulty in handling 250 cubic feet of stone per week, to-day 1,000 cubic feet are handled by the same staff with the greatest ease. This particular yard is at present engaged in the construction of Uralia granite of the Bank of New South Wales' Head Office, Sydney, where a very large quantity of stone in the rough and in various stages

of manufacture is on view. With a view to your committee getting greater confidence in the ability of the hardstone trade of Sydney to handle future business at Canberra, I suggest that an inspection of this modern yard be made. I think that the speed with which the material is handled would be a revelation to the committee. Expensive moulds which two years ago were done by hand, entailing hand labour for days, are now done by modern machines in a few hours, and, in some cases, minutes. This has tended to reduce the cost of the finished article to a price not dreamt of by either the trade or the buyers of granite and hard stone a few years ago. My company is now supplying the granite required for the Bank of New South Wales' head office, Sydney, amounting to 30,000 cubic feet, and when I point out that this is one of the most expensive granite buildings ever erected in Sydney, every stone being polished and extensively moulded, elaborate sills and cornices, etc., being used, and the whole of the stone being of not less thickness than 14 inches, in some cases 3 feet, it will probably astonish you to know that the job is costing \$45,000 fixed and in position. Were this a simple sawn faced veneer job similar to the National War Memorial, twice the quantity of stone, namely, 73,000 feet super could have been provided and fixed at the same cost. In the case of the new Roman Catholic Cathedral in Brisbane, for which my company holds the contract to supply the necessary stone for the foundations, steps, and entrances, amounting to some thousands of feet, I would point out that in this case 6-inch stone worked on two faces is being brought to Sydney, worked, taken back to Brisbane and placed in position for 13s. a foot super. These facts should give the committee confidence that the figures that I have named for the National War Memorial can be substantiated. My estimate is based on freestone 9 inches in thickness. In my opinion, there is no necessity for a granite facing 9 inches thick. Granite 3 inches or 4 inches in thickness should be sufficient. My estimate is for granite less than 9 inches in thickness. If it is proposed to face the building with 6-inch freestone, costing \$49,000, it could be faced with granite 4 inches thick for \$35,000. There would be no delay if the building was erected of granite. One of the largest yards now slack. Sixty or 70 men could be made available at once. We have 160 men in employment. The contract for the proposed memorial would not overtax the capacity of the hard stone yards. We can quarry more granite than two yards can absorb. Every week we could supply 4,000 super. feet of granite 3 inches in thickness, or 3,000 feet of granite 4 inches thick. The hardstone firms have discussed the question of delivery. If an order for granite is placed with them there will be no delay in delivery. At the present time 50 or 60 stonemasons are out of employment in Sydney. The secretary of the union informs me that twelve or fourteen men in Adelaide and Melbourne would come to Sydney if their services were required. I have no intimate knowledge of synthetic granite. Some directions it has advantages over natural granite. Where time is the essence of the contract, synthetic granite can be manufactured four times as quickly as natural granite can be worked. That enables a building to be erected more quickly. No one knows definitely the durability of synthetic granite. If quantities and plans are made available to us, the firms I represent will submit a firm offer in seven days. We are emphatic that the price I have quoted is well within the limit. In saying that, I am relying on the estimate of \$48,000 for freestone. We have not yet had an opportunity of ascertaining the quantities. In any case, granite would not cost more than 4s. a super. foot above the cost of freestone. The quotation is for coarse axed granite, which is less expensive than polished

granite, the difference being about 7s. a super. foot. If axed granite costs 13s. a super. foot, polished granite would cost about 21s.

143. *To Mr. Seabrook.*—The sample of granite I have submitted is the lightest coloured granite in Australia. In the sunlight it is a brilliant white. The mould on the stone is done with carborundum and water. The prices I have given is for the material fixed in position in the building at Canberra. The granite is fastened with steel fastenings into the concrete, and grouted with cement. Each block is fastened to its neighbour and to the wall behind it. Any gaps are filled with cement. There would be no headers in the wall unless specially specified. The material has to bear only its own weight. By a superficial foot, I mean a block 1 foot by 1 foot and 4 inches thick. We can supply the material in lengths up to 14 feet. For the Sun office we have supplied slabs up to 13 feet long. We supply it in the largest sizes possible so that the machines, and not the quarries, do the work. The price of cornices and mouldings is regulated according to the number of angles and curves. The usual charge is about 7s. 6d. a running foot. In order to give a definite quote, we should require a schedule of quantities, the number and class of openings, the design of the cornices and ornamentations. We could then make a definite offer for the whole building within seven days.

144. *To Senator Reid.*—The firms I represent would be prepared to do the work themselves, or to supply the material to the general contractor for the building. The price I have given is for the completed work in the building. So far, we have had no difficulty in getting suitable men. At present there are plenty of men available. We make a flat rate charge for stone of all sizes. At one time there was a limit of 10 feet, but now we quote a flat rate for the whole of the stone. With modern machinery, the bigger the stone the more money we make. Crushed metal of any kind is, in my opinion, not so strong as the natural stone, because after passing through the crusher it has not reached its final breaking stage; it will still go to pieces. In our quarry near Bathurst, we have large quantities of natural disintegrated granite with which we have carried out experiments. Our experience has shown that it is not suitable for concrete. Crushed granite or marble is liable to further disintegration. The trade term is "sting." A block apparently sound may break at any time without warning. Any material which has passed through a crusher is subject to "sting." Stone is crushed, not by pressure, but by shock; and after crushing, the particles are liable to further disintegration. I think that difficulty would arise in connexion with artificial granite. For four or five years we have been experimenting with artificial granite, but until the quality of Australian cement improves we have abandoned further experiments. In the United States of America the manufacture of cement has reached such a stage that a cement road can be used for traffic the day after it is laid. That cannot be done in Australia with Australian cement. High-grade cement is not made in Australia. Scientists do not know whether the Bathurst granite has reached the stage where it is disintegrating, or whether it is still in course of formation. Any stone which has passed through a crusher is no longer sound.

145. *To Mr. Lacey.*—We can supply granite 2 inches in thickness if required. That is done in small jobs. Architects are satisfied as to the durability of granite. Where cost is not a consideration, they specify granite. At present three large buildings of granite are being erected in Sydney. For some years previously, no granite buildings have been erected. Granite 2 inches thick has been used in R. S. Lamb and Company's building in Jamieson-street. The National building, Pitt-street is faced with granite 2½ inches thick, as is

also the Bank of Australasia building, Castlereagh-street, opposite David Jones'. In some cases the main building is of brick, and in others of concrete. Granite or travertine, which are similar in texture, although of different colours, will never leave a building. I do not know what firms other than those I represent could meet the building of granite is ridiculous. Evidently those who have suggested that figure based their estimate on methods which were used ten years ago. I have never previously given evidence before this committee. It was only when the hardstone trade of Sydney read the evidence about the supposed excessive cost of granite that they decided to be represented before the committee. From a slab 1 foot thick, we can cut three slabs 4 inches thick or five slabs 2 inches thick. By using 3-inch granite, the reduction in cost would be about 20 per cent. I do not think, however, that my association would undertake to face the proposed memorial with 3-inch material. I recommend that it should be 3 inches thick. There is no need to make it more than 3 inches. The architect might stipulate 4-inch granite in places, but where 3 inches is ample it would be a waste of money to specify 4 inches. The four firms I represent have a capital of about £250,000. They are emphatic that if freestone can be supplied for £48,000, granite can be supplied for £65,000. Any variation in the price of freestone would affect our price pro rata.

146. *To Mr. Cook.*—The difference between Sydney and Canberra prices is probably 2s. 8d. a cubic foot. The price I have quoted is for the material fixed on the building in Canberra. I do not know the percentage of stone in the sample of synthetic granite before me. It appears to contain marble, which is not a suitable material for outside work. Architects have hesitated to specify granite not only because of its greater cost, but also for the reason that in the past they could not be sure of prompt delivery. That position has now been remedied. The firms I represent are prepared to guarantee delivery.

147. *To Mr. McGrath.*—I do not think there would be any doubt that the architects would be prepared to accept 4-inch granite in preference to 6-inch sandstone for the memorial.

148. *To Mr. Cameron.*—Granite similar to the sample submitted has been submitted to a stress of 102 tons on a 3-inch cube. It will stand a greater pressure than that. There is practically no expansion or contraction in granite.

149. *To Mr. Seabrook.*—The firms I represent are at present working at about half capacity. Within seven days of receiving details from the architects, 500 cubic feet of granite could reach Sydney. About 6,000 cubic feet of ashlar is now available. That means about 34,000 square feet 3 inches thick, or 20,000 square feet 4 inches thick. Most of that could be made available forthwith.

150. *To the Chairman.*—The deposit we are working consists of granite builders. We estimate that there are five million cubic feet of granite in an area of two acres. Some of the builders are 200 feet long, 60 feet wide and 30 feet thick. For about 9 or 10 feet from the outside, the stone is dry. Where stone is to be polished, we use only sappy stone, but for axed work, any stone may be used. Sappy stone polishes quicker. For ordinary work it does not matter whether dry or sappy stone is used. Our estimate has been based on the drawings we have seen, and providing for a plain building containing very little ornamental work. In the absence of detailed working drawings, I cannot give a definite quotation. From what I know of the design of the building, there will not be much detail in it, so that a flat rate estimate should not be far out.

F.591-5

151. *To Mr. Cameron.*—From a distance of, say, half a mile, a building faced with granite like the sample herewith would look white. I submit photographs showing the white appearance of the stone in the quarry. Dust and dirt would certainly lie on it, but rain would wash it off. At Canberra there is not much dust. The Urala quarries are about one mile west of Urala, near Armidale.

(Taken at Sydney.)

FRIDAY, 20th APRIL, 1928.

Present:

Mr. Mackay, Chairman;	Mr. Lacey
Senator Reid	Mr. McGrath
Mr. M. Cameron	Mr. Seabrook.
Mr. Cook	

John Smith Murdoch, Director-General of Works and Chief Commonwealth Architect, sworn and examined

152. *To the Chairman.*—I was one of the adjudicators of the War Memorial competition. The adjudicators recommended that the matter be referred to this committee for inquiry. I know the site of the proposed memorial well, and regard it as suitable for the purpose. I was not concerned in its selection. It was selected by the War Memorial Committee. I do not think that the treatment of the site has yet been exhaustively considered. It would be better to wait until the memorial has been completed. The works necessary for beautifying the site are not to be included in the contract price for the building. The competition specifically mentioned that the works necessary to beautify the surroundings of the building were a matter for the Government, apart from the building itself. The competition designs were limited to buildings estimated to cost not more than £250,000, exclusive of the cost of the grounds. All embellishments of the site, such as road-making, gardening, steps and statuary, were to be regarded as extras. All works inside the building should be included in the cost of the building. In my opinion the architects should be consulted as to the lay-out of the grounds, although they need not necessarily supervise the work. In my opinion the sum of £250,000 is inadequate to provide a memorial worthy of the purpose for which it is to be erected. In response to the call for designs for a memorial to cost not more than £250,000, 60 designs were submitted. The adjudicators—Sir Charles Rosenthal (president of the Federated Council of the Institutes of Architects), Professor Wilkinson (of the University of Sydney), and myself—approached a task of some magnitude when we began the examination of the designs. As the work proceeded, it became clear that, with one possible exception, none of the designs complied with the terms of the competition, as regards the cost of the building. The Government and the War Memorial Committee were inflexible in the view that the amount should not be exceeded. Some of the designs were for buildings of great magnitude and beauty, which would have cost in my opinion as much as £800,000. One of the conditions of the competition was that the adjudicators must set aside any design which, in their opinion, could not be erected for £250,000. The adjudicators obtained separate estimates from experienced quantity surveyors in respect of about 30 of the designs, in order to justify their view that the designs did not come within the price limit. We also consulted first-class building firms operating on a large scale in Sydney to verify our opinion. They agreed that the designs could not be erected for the price. One design, much more

modest than the others, appeared to meet the requirements of the competition fairly satisfactorily, except that, in the opinion of the adjudicators, the conditions were violated in that the design proposed to place the names of the soldiers, not on the walls of the Hall of Memory, as provided in the competition, but in open cloisters on the roof of the museum. The proposal appealed as a clever means of overcoming the economic position; but it did not strictly comply with the conditions of the competition. The adjudicators took no risk in the matter; they advised the authorities that, in their opinion, with one possible exception, buildings to any of the designs submitted could not be constructed for £250,000. They pointed out that the one exception did not strictly comply with the terms of the competition. Realising the desire of the Government to make some progress with the memorial, the adjudicators recommended that the authors of two of the designs should collaborate in the preparation of a design which would come within the price limit. Up to this time the adjudicators did not know who the designers were. When this was disclosed it was found that the design which could possibly be built for the price stipulated was submitted by Mr. Crust, and that the other design, which showed great beauty, was the work of Mr. Soderstrom. The plans now before the committee are the result of the combined efforts of those two men. There is a reasonable hope that a building to their design can be erected within the price limit. So far the design is only in sketch form. If these two men are commissioned to prepare full working drawings, there will necessarily be a number of alterations in detail. The sketch design, however, suggests that the memorial will be a striking and beautiful monument. It is full of original ideas, particularly in the direction of introducing the garden and sunlight into the memorial in the great court. In my opinion the names of the soldiers engraved there among the flowers, the sunlight and the garden, will make a wonderful appeal. The idea is in principle similar to that in Mr. Crust's original design. I understand from Mr. Bean and Major Treloar, who have been in consultation with the architects, that the accommodation provided by the design will meet requirements. I have also been in touch with the architects and am of the opinion that the design might well be adopted by Australia. I have not taken out the quantities, but I know the estimated cost of the stone work. I have based my estimate on Canberra costs being 17 per cent. more than in Sydney. Two shillings and sixpence a cubic foot is a tight estimate for the work, but considering the simplicity of the design, I think that the work possibly might be done for that price. In the preparation of the working drawings, care will have to be taken to avoid extravagance. If it is found that no tender under £250,000 is received, it may be necessary to reopen the whole position. A margin of, say, £5,000 might be permitted; but I do not think any greater variation should be allowed. The hollow block system of concrete construction is quite satisfactory. The architects, in their own interests, will have to get the most economical floor, consistent with quality. Hollow concrete floor blocks have been used in low buildings erected by the Government, and have given satisfaction; but where the buildings are high, and floors of greater thickness are required, they take up a good deal of space. That disadvantage would not apply to the proposed memorial. Synthetic granite might be satisfactory for the steps and paving. The conditions of the competition made it clear that no material inferior to sandstone would be admissible as a facing. If sandstone is not used, we must turn to granite, marble, or terra cotta. I have seen numbers of buildings in America and Australia, in which synthetic stone has been used. My personal feeling is that for this

memorial we should adhere to natural stone. In such a building synthetic stone is an offence to sentiment. In twenty years' time there will probably not be the same sentimental objection to chemically prepared material. I, however, have a sentimental objection to synthetic stone for memorial purposes, although not for ordinary buildings. Urethane granite would be suitable for the memorial. That the building could be faced with granite 4 inches thick for £65,000 compared with £48,000 for sandstone, is pleasant news. Personally, I should feel disposed to advise the Government to find the additional money in order to get granite. Granite 3 inches in thickness would be sufficient. There would be no difficulty in affixing it to the building. I suggest that alternative tenders be invited for sandstone and granite facing. The architects should not be expected to call for tenders in the expectation that a granite building could be erected for £250,000. Stone properly selected will last for several generations in Canberra; granite will last much longer. The sketch drawings do not permit of an exact estimate of cost being made. I suggest that tenders be invited for Hawkesbury sandstone and for granite, and that the Government should then decide whether it will agree to the additional expenditure necessary to obtain granite. I should also invite alternative tenders for the rough building in either brick or concrete or for facing it. There is plenty of material at Canberra from which to make concrete. Concrete construction does not require the same highly skilled labour as does brick work. For that reason concrete would probably be cheaper. If one contract is let for the whole job, the general contractor would want a percentage of profit over the whole, whereas if the work is let in sections that additional cost would be avoided. I would suggest that a contract be let for the construction of the rough walls of the building including plastering and plumbing work, &c., and that contract for facing the building either with stone or granite be a separate one altogether. Let alternative tenders be called, and if the Government thinks it worth while to give £10,000 or £15,000 more to have the building faced with granite instead of stone it will be in a position to consider the matter. The point to be emphasized is that if the work with a sandstone facing comes within the £250,000, the position of the architects will be vindicated, because it is already recognized that a building faced with sandstone would be acceptable. If I were in the councils of the Government and if the difference between facing with granite and sandstone were only a matter of £15,000, I should certainly make an effort to have it faced with granite. I do not know that it matters whether the dome, because of its height, would result in sound reverberation as suggested by Sir John Sulman. Much speaking in the hall under the dome will, I think, be unlikely. The committee will realize from the design that it is desirable to get some elevation in the dome, and acoustics possibly are not a matter of very much concern. In the Roman Catholic Cathedral at Westminster its chief beauty lies in domes of enormous height, the effect being to inspire a feeling of awe and reverence in the beholder. The design is simplicity itself and it is only through its scale of height that it produces the effect I have described. I do not favour the construction of a double dome. I do not see the object of creating a high dome outside and then not taking advantage of that height from the inside. This dome is only 76 feet high, while the Cathedral at Westminster must be twice that height. I should give the architects the benefit of Sir John Sulman's criticisms, for which I have great respect, and ask them to study the matter thoroughly. If I were a rich man I should donate to the Government enough money to line this hall with

Queensland marble. At present all that can be done with the money available is to plaster the walls with the hope that, perhaps in time to come, they will be decorated murally. If it were lined with marble up to the beginning of the great arch, and after that painted with mural subjects, it would be a beautiful thing. I certainly favour placing some shrine or piece of statuary in the middle of the Hall of Memory. It is desirable that there should be some *pièce de résistance* in this space. I would aim to have some great statue symbolizing the effect of war on civilization, or some other subject of a similar kind. As to the so-called squatness of this design, that is a form of criticism which is frequently flung at buildings, but so long as a building is suitable for its purpose I do not agree that it should be called squat. The function of architecture, in my opinion, is to meet its purpose, and because a building is low, that is not to say that it is ugly. In order to overcome this squatness one must simply add more stories, but in this case we do not want them. We want a museum all on one floor. In New York one can see a building of 50 stories, and alongside is Morgan's new bank two stories high. Who is going to say that Morgan's bank is too low, or is ugly? As a matter of fact, it is very beautiful, and it answers the purpose for which it was designed. Especially does this apply in a place like Canberra where the prevailing idea is low architecture with garden effects. I should have been better pleased, I think, if the long side of this memorial had been presented to the view of the governmental area instead of the narrow side being visible. To do that, however, would cost thousands of pounds more on account of meeting the difficulty in the levels. On the north and south line the site is practically level, but from east to west there is a slope, and the cutting of the foundations would be a very expensive operation. After all, it is rather doubtful whether more people will see the building from the governmental area than from the east or west. I never contemplated the installation of any heating apparatus in the building beyond, perhaps, a radiator or stove in the rooms occupied by the secretary. However, I should welcome the provision of a vacuum cleaning plant as it would save staff. I should have a portable machine instead of installing pipes. Though it is hard to imagine how the building or contents could be damaged by fire, still, in view of the great value of the collection which will be housed, it might be a good thing to have sprinklers installed as a means of fire protection. I favour flood-lighting the dome only, rather than the whole building, but I would not be disappointed by the entire omission of this. Personally, I do not think that £50,000 would be required for sculpture work. The group in front of the steps should not be regarded as coming within the cost of the building. It is really part of the ground decoration. The sculpturing on the building itself could be done at any time, the stone being left rough for that purpose, but the cost should be included in that of the building. I refer to the sculptured figures over the entrance to the building. A sum of £50,000 would probably meet the cost of this work. I would not favour having the figures done in bronze, but rather in the material of which the building is constructed. If the building is finished with granite, I should have the figures sculptured in granite, although it is a hard material to sculpt. If the building is finished in stone I should have the figures sculptured in stone. If granite were adopted it would have to be used. I agree that the only possible method of getting the names recorded with in the estimated cost is to have the letters cast in bronze, and then embedded in synthetic marble as in the example now before you. The cost of incising the names in marble or producing them in bronze casting was what

made many of the designs submitted in the competition so costly. This system, which is now proposed, will be quite satisfactory and furnishes another example of the economic sense of the designers.

153. *To Senator Reid.*—I regard it as essential that the building should be erected for £250,000, in view of the fact that other competitors were cut out on account of the price which they submitted. I do not think, however, that it would be unfair if a further £15,000 or £10,000 were advanced so that granite might be used. The conditions of the competition stipulated that the use of freestone would be admissible. If they can produce a freestone design for the money, their instructions will be fulfilled. The Government is then at liberty if it likes to erect the building in a more expensive material. Even if the makers of synthetic granite sent in a tender that was equal to freestone, my objection to the synthetic material in this particular building would still remain. I do not think anybody can say with any certainty that synthetic granite placed in a building now would still be there at a remote future date; but from what we have seen in Egypt and elsewhere it is reasonable to suppose that the true granite would still be there. As to the durable qualities of concrete, it has to be remembered that Portland concrete in the form as now used is only some 50 years old. No one knows how long it will last, or what condition concrete will be in after it has stood for a century. Even admitting that concrete possesses many virtues, I should not advise its outward use in a building of this kind. If it were for a building such as a bank, or some other commercial structure, I should have no objection; but in this particular building we are venerating our dead, and therefore let the thing be expressed by something which comes out of old Mother Earth. It is possible that synthetic granite would last, but there is no certainty of it. It is something made by the hand of man in imitation of something made by the hand of God, and for this particular purpose I should take what was made by God's hand. I am satisfied that I should be able to tell the difference between synthetic granite and the real stone. Where synthetic granite is used in America, they generally build the wall up of real granite to above the height of the eyes, and then use synthetic granite for the rest. Even then the difference between the two materials was always apparent to me, although I admit that to an untrained eye it might not be apparent. I think Waverley stone is a good material, but the quarries vary from year to year. I would not attempt to flood-light the whole building, but if at all only the dome. I would not have light projectors about the grounds. I am satisfied that 3 inches is sufficiently thick for the granite facing on the walls if it is sound granite.

154. *To Mr. Lacey.*—From the distance of Parliament House, and with the sun shining on it, the building, if erected with the granite facing of which we have a sample here, would look practically white. Granite will retain its original colour, while sandstone will become darker, especially in wet weather. In wet weather granite will become whiter in colour, because the rain will wash the dust off it. There will be less expansion and contraction due to temperature in granite than in sandstone. By using the hollow block system of flooring, it might be possible to save some expense in that direction, but it would probably cost more in the extra height of the building. I would have no objection to tenders being called for sandstone, granite, and synthetic facing. For a monumental building with granite over freestone, I should willingly give £20,000 more to have the building faced with granite. It is possible that an appropriate piece of sculpture in the centre of the Hall of Memory would cost anything up to £15,000; but that should not be put on the cost of the building. I hope

men recommended the erection of a concrete building with a granite plaster. I have such a great respect for Sir John Sulman and his long experience in building that I am not going to say such a building might not be satisfactory. I do not know enough about such methods of construction. My experience of concrete walls is that you can never save what you will be presented with when you take away the form with all the care in the world, you will have to go to work with the combing which will be treated with a trowel or some expediting process. The thickness of the long walls shown in this plan is 16 or 18 inches. It is possible that a long wall like this might require piers on the inside. That, however, is only an elementary part of construction, and the architects will see that it is satisfactory in that respect. They are not going to put up a wall that will not stand. Cubing is only a ready means of arriving at an estimate from drawings which have been brought to the stage of the architect. At the drawings are not yet in the form of a building. At the buildings of this kind with all over the world comparisons of cost. I should say that something about 2s. 6d. a cubic foot may approximately be sufficient for this work, although it is rather a tight estimate. Canberra is on a falling market, however, and the rush being over we may expect to get a little more value in building than we have been getting in the past. I think that 9d. a cubic foot extra as a margin for building in Sydney and Canberra is not much to allow for Canberra. The auditors based our estimates on a building costing 17 per cent. more in Canberra than here, or about one-sixth. If a building in Sydney cost 2s. a cubic foot, an increase of 1-6th, would bring it up to 2s. 4d. The buildings going up around Sydney now are costing from 1s. 9d. to 2s. 3d. a foot, depending upon the style of finish. An increase of 17 per cent. on that would bring the cost for building in Canberra close to the estimate. The fittings which Sydney contains have been taken into consideration in the Memorial. On the other hand, on this building we have four fronts in stone, whereas the majority of buildings in Sydney have only one, or at most two fronts. Taking it by

1857. To the Chairman.—I have never used synthetic granite, but I have used synthetic sandstone on a commercial building, with the idea of reducing costs. I have had no experience of synthetic granite, and I should not favour using it in a memorial building of this nature. Its lasting qualities have not been proved in this country, and there is no method of proving them except by time. Natural stone has been proved, and we have had experience in its use, as a result of which we have been able to form a judgment as to its permanence. Synthetic granite is not a material of high quality, and it is not used in its manufacture, is similar to the Terrazzo used in floors. It is composed of cement and marble dust, with a proportion of marbles, limestone or diinker particles. Our experience has been that Terrazzo wears from constant use, and becomes pitted. The same thing may happen with synthetic granite. Synthetic granite should cost less than sandstone. For this building I would suggest that 6-inch blocks of sandstone be used. We obtained a firm tender of £45,450 for the supply of sandstone, and there would be expense for freight over and above that. I should not recommend the use of the blocks below 6 inches. The blocks than that might be used for granite, but not for sandstone. If granite cannot be used on account of the expense, I should advise the use of sandstone. I obtained a price from Turner Brothers, of Goulburn, for the supply of granite, and this figure they quoted was £144,377 10s. 9d. I have never seen their quarries or works, but I was recommended to obtain a quote from them. I do not know whether Turner Brothers have an up-to-date plant, but their quote would have an influence on the price. The question is really one of plans, and it is not usual to get quantities taken off on the sketch plans. The cost of facing is the vital factor in the cost of the building, and that was why we obtained a price for it. We had intended to make further inquiries from other quarries before finalising the matter. I take it that tenders will be publicly called for everything on the job. It is only recently that up-to-date machinery has been available for the working of granite. I do not think that such machinery was available in Sydney even two or three years ago. Granite was quarried in the large extent of hills on the Sydney Harbour bridge, and I understand a special plant was put in for working it there. Turner Brothers informed me of their intention to put in a special plant to do this work if they

obtained the tender. I do not think that this was taken into consideration when quoting the price. I think the offer of Mr. Marsh, of \$25,000 for supplying and fixing the granite facing on the buildings is a very low one. When giving evidence previously I think I was asked whether the building could be improved in any way, and my reply was to suggest granite as a facing material instead of sandstone. It is the most permanent building material known, and our best world granite is one of the hardest stones in the world. Allowing for the difference in the use of granite, I should by all stone, synthetic stone, or the use of granite if the necessary money could be obtained. In working out the plans of the building, we had before us a list of conditions with which we had to comply. The only way in which it would be possible to cut down the cost of the building would be to reduce the size of the collection which would be housed in it. If the collection is reduced, it would as it stands at present, the cost of the building could not be cut down. In our estimate we made no provision for sculptural embellishment, except those portions such as string courses in low relief on the fronts of the building. The ornaments, such as the bands of carving and the niches round the dome would be provided for, but statutory would not be included in the price. I have never used the Innes Bell hollow block form of floor and concrete construction, but I have had it recommended to me. On one job I obtained tenders for the beams—the Bell system, and the ordinary form of beams—the other. I do not see how the Bell system can give increased head room. In the ordinary construction we use 8 or 6-in. reinforced slabs with a beam. The only difference with the hollow block system is that the beams do not project below the level of the floor, and consequently there is a level surface. One disadvantage of the hollow block system is that it is very difficult to install conduits, pipes in the floors. The system has advantages in certain types of construction, but it is really in factories where there are large, unbroken spaces. If the building were a public hall, and functions were to be held there, I should have suggested flattening the dome; but this is purely a shrine, and I do not think that the suggestion for a double dome is worth considering. A dome like this looks more impressive, and for the number of people who will be in the building, I am sure there will be no reverberation. St. Paul's, in London, and St. Peter's, in Rome, both have high, attilted domes similar to the one under consideration. The stairs to the dome in the plan are only for access to the dome for use in repair work, &c., and the small windows provided will afford ample lighting. These windows will have splayed backs, which will give ample light. The stairs are not for public use at all, unless some sightseers wish to go up to the top and look out from the dome. The two light areas provided for the lavatories. Each area is approximately 32 feet by 8 feet, and they extend for only one story there should be ample light and air. It must be remembered that the people light and air. We have given the matter of ventilation full consideration, and this is covered in the detailed drawing. Cows will be provided at about 10-ft. centres throughout the whole building, and the ceiling is so shaped that the foul air will rise to the top and escape. These plans are made to show the general lay-out of the building. Matters such as light and ventilation worked out as a matter of course when the working drawings are being prepared. As regards heating, it is true, I suppose, that people viewing the museum will be moving about the whole time, and with this in view, a heating system might be dispensed with. If it were an office building some heating

provision would, of course, be necessary. The floors will be covered with linoleum with a cork base, which is an effective insulation, both against heat and sound. For cleaning I should favour the installation of a vacuum system, with power points and portable machines, rather than having pipes throughout the building. I do not think that fire sprinklers will be necessary. The war museum authorities are concerned about the possibility of a local fire breaking out amongst the exhibits. An efficient fire brigade, watchmen, together with the ordinary fire hydrants, in my opinion will be all that is necessary. I think the sculptural and metallurgical collections should be added after the completion of the building, although, of course, I should like to see them completed with the building itself, if possible. As to flood lighting, I think it would be better to have only the dome lighted by means of concealed lights. I think the most effective way would be to conceal the lights on the entrance porch. I have a sample of Fairy Meadow limestone. I had previously seen a sample at the Federal Capital Commission. If this is office, which was much lighter, I consider it to be a fair sample of the stone, and I consider it to be too dark for this building, especially against a dark background. In this particular sample the seams are running across it is a defect. If it were subjected to any stress or strain, it would be liable to crack across that seam. As a result of my investigations into Fairy Meadow limestone, I do not approve of it as a facing for this building. I have a sample of Queensland marble, which we propose to use in the floor of the Hall of Memory, and in the vestibule. I suggest that tenders be called for the supply of stone for the facing of the building. The figure of £250,000 must be adhered to, we must call tenders for sandstone from different sources, we should suggest calling tenders both for granite and sandstone, and it might be advisable to obtain tenders for the supply of synthetic stone as well. We could carry out some tests on synthetic stone in the meantime. A detailed set of quantities will be supplied to each contractor. Items will be taken out for every different trade in the whole building, and contractors can have a copy of these on which to base their estimates. I still think that the building as designed can be carried out at a cost of 2s. 6d. per cubic foot. If granite is chosen as a facing it might be fire proofed. The architects should be consulted. Mr. Cullen and myself are equally interested in and responsible for the carrying out of the work.

168. To Mr. Lacey—I think that 3 to 4 inches would be thick enough for facing the building in granite. In fact, 3 inches would be, I think, quite satisfactory. In the past the main disadvantage about specifying a veneer of that thickness was the lack of machinery to make the veneers. I think enough economically. With modern plant, I think it could be making of this kind would be much more permanent and dignified than six inches of sandstone, and would be more in keeping with the memorial character of the building. The price of approximately \$144,000 for granite quoted by Messrs. Brothers, was for a thickness of 3 inches. If a saving of three or four of a thickness of 3 inches could be effected by using the Luns Bell hollow blocks, I should recommend their use; my experience however in connexion with a building for which I called tenders, was that the hollow block system was about 10 per cent. higher than the ordinary flat slabs, which we now propose to use here. I think that, in judging from my past experience, that there would be any saving as a result of using the hollow block system. I did not allow for heating in the estimate of \$280,000, and it was stated in the general conditions with which

we were supplied before starting to design the building, that heating was not required. It is our intention, if instructed, to call tenders for 6-inch sandstone and 3-inch granite.

150. *To Mr. Cook.*—From my past experience I think that 2s. 6d. a cubic foot is ample to carry out the construction of this building. The use of granite as against sandstone resolves itself into a matter of cost. I am very much in favour of granite, and if it would only cost £20,000 more I should strongly recommend its use. Sandstone facings on buildings in Sydney of 120 years of age already show signs of decay. I admit, however, that in England where sandstone has been used in the construction of some of the Gothic buildings, it has been standing for 600 or 700 years. Where sandstone is used in buildings, it sometimes becomes affected by erosion under the cornices, and down near the ground. In the building we are considering there are comparatively few projecting mouldings or cornices. Perhaps it would not be affected by weathering so much as the Sydney buildings have been.

160. *To Mr. Seabrook.*—Where we are using a brick backing for the facing, it will be necessary to build up the face with the backing. The long, outside walls shown in the plans are about 20 inches thick, which is quite thick enough. There will be a reinforced concrete ceiling over portion of it, and there will be also a reinforced floor. That would stiffen the walls, and there would be no need for piers. The use of piers would detract from the merits of the building from the museum point of view because they would restrict the placing of the pictures. A plain wall surface is much more satisfactory for the interior of the museum. As for the girders underneath, I suggest steel erected in concrete, with a reinforced slab. The hollow tile floors are suitable for bays of practically any size, and can be designed to carry almost any load. The amount of steel and concrete is usually increased with the load and sometimes a deeper tile is used. These hollow tile floors are used a lot in warehouse construction. There are two forms of hollow tile block construction. From my own experience I would recommend the beam and slab system construction.

161. *To Senator Reid.*—The walls on the ground floor are 20 feet high, and their loading is negligible. The wall which is 20 feet high is on the ground floor. The basement wall is 24 inches thick in some places. The hollow tiles if used would be on the ground floor of the building; this would be the ceiling of the basement. The only reason why I should consider using them would be on account of the cost, but personally I do not think they would be cheaper. The floors here are broken up to a large extent, and this is not favorable to the use of these tiles. The longest span of any of the basement floors will be 36 feet, which is quite a normal one. The large relics will be housed on this floor, including such things as the heavy guns. It is worth while considering whether it might not be advisable to avoid the use of pillars in this basement so as not to interfere with the handling of the large exhibits. It will be necessary to obtain a list of the relics to be housed, and we can then work out our space accordingly. If it is found that the pillars are in the way, we shall have to give further consideration to the matter. There is an external wall supported on these pillars, and a floor with hollow tiles would not carry that external wall without a beam. It would be necessary to have a beam there in any case. I should not recommend the use of any facing material darker than the granite specimen on view here.

162. *To Mr. Seabrook.*—I think that one of the disadvantages of the face concrete system of construction is that you have not got perfect control over the material

while it is being placed. My experience has been that it is very difficult to get the joints properly made or to get two days' concrete work absolutely level. I think that if the system suggested were used, there would be a series of marks on the outside of the building where the one day's concrete joined up with the next. In the construction of an ordinary house this difficulty would not arise because there you have only small wall surfaces broken up with windows. In a building like this, however, where it would take a week or so to pour a wall, I am sure that there would be marks where the concrete formed on different days joined up. I should not recommend the use of this material at all, nor would I call tenders for it. You have no control over the facing of fine concrete in this method of construction. It is in a very narrow form, and there is a serious risk that the surface might be uneven in texture. The aggregate might all work together in one place and the cement in another as a result of the concrete not being properly agitated in the form. My experience in the construction of concrete in Sydney has been that I have never seen a truly vertical reinforced column. In some of them there has been a variation of as much as 4 inches over a series of floors. If it is not possible to get a vertical column, I do not think it would be possible to construct satisfactorily a long wall like this. We can rule the concrete system of facing out altogether. I would not favour any decoration of the plain walls, and any sculpture should be on the front of the building. The plain walls would then form the contrast to the sculptural effects. The freight for hauling the sandstone for this building from Sydney to Canberra would be £5,500, this was allowed for in the price of the stone. Whether the building is faced with granite or sandstone, the freight charge would be included in the tender. The building has been criticized on the ground that it looks squat, and it has been further criticized on the ground that it faces the wrong way. I think the idea was to turn the building around on to the axis of Prospect Place. If that were done, it would certainly have the effect of making the building appear squat. If you take two buildings, both the same height, and both having domes, a narrow building will always look much higher than another building with wide spreading flanks. The narrow building is bunched together and grouped, and from an architectural point of view, you get practically a perfect composition. Even apart from the grade of the site, it would not be satisfactory to place this building flank on. It is one of the first principles of architectural design to get this pyramidal effect, especially in a monumental building. Before deciding on this particular plan, I think we did 20 different types of plans for the building. The whole process was a matter of elimination and simplification. We took the best features from each of the designs and incorporated them, and I am sure that if the building is erected in granite to this design, we shall have one of the finest memorials in the world.

(Taken at Canberra.)

MONDAY, 23rd APRIL, 1928.

Present:

Mr. MACKEY, Chairman.

Senator Reid Mr. Lacey

Mr. M. Cameron Mr. McGrath

Mr. Cook Mr. Seabrook.

William Elmhirst Potts, M.B.E., M.C., B.E., A.M. Inst. C.E., A.M.I.E. (Aus.), Acting Chief Engineer, Federal Capital Commission, recalled and further examined.

163. *To the Chairman.*—The estimated cost of forming the grounds, including terraces, and excavating the

site of the building for the war memorial is £15,650. The quantity of earthwork is estimated at 38,500 square yards. The estimated cost per cubic yard is 7s. The estimate of £15,650 includes interest and overhead charges. The architectural estimate allowed only £3,600 for the cost of earthworks, &c., at the rate of 10s. per cubic yard. I produce plan No. G12, which shows the nature of the earthworks required and the be done. To the east and north of the building there will be cutting and to the west filling. There will also be cutting to the south. The surplus soil will be placed towards the eastern corner of the site, in order to build up against the road embankment where about 8 feet of filling will be required to get the grade of 1 in 14. The amount of excavating to be done will provide almost exactly the amount of filling required. I mentioned when giving evidence before the committee previously that instead of having the terraces level, as designed by the architect, it would be better to give them a slope to get a line of sight to the basement of the building from Anzac-place. That matter has since been discussed with the architects, and they are agreeable. The quantities I gave a few minutes ago are for terraces sloped away from the building. I point out that on the line of sight from the intersection of Flanders-avenue and Perrone-crescent there is a bump in the ground. This will slightly restrict the line of sight, but I have not allowed for anything to be done, as it would mean taking the top of a ridge off, and that would be expensive. I did not consider that the expense would be justified. The estimated cost of forming and constructing the driveways and the kerbing and guttering for the provision of the Anzac-place parking area is £3,500. This also includes overhead and interest charges. The details of the cost of forming the roads, &c., and also the details of the cost of the stormwater drainage system in connection with the memorial, are as follows:—

EARTHWORK ON SITE OF WAR MEMORIAL SITE.

Description.	Quantity.	Rate Material.	Total.
		s. d.	£ s. d.
Cutting, cubic yards ..	38,500	7 0	13,475 0 0
Contingencies, 5 per cent. ..	..	..	673 15 0
Overhead, 9 per cent. ..	..	..	1,273 5 0
Interest, six months at 3 per cent. per annum ..	..	..	231 0 0
			15,653 0 0

Say, £15,650.

FORMATION, BALLASTING AND GRAVELLING IN ROADS OF PARKING AREA, ANZAC-PLACE.

Description.	Quantity.	Rate Material.	Total.
		s. d.	£ s. d.
Earthwork ..	2,400	8 0	960 0 0
Ballast, 4 inches ..	1,250	15 0	945 0 0
Gravel, 2 inches ..	760	15 0	670 0 0
Kerb and gutter ..	2,060 ft.	4 0	412 0 0
Contingencies, 10 per cent. ..	..	..	238 15 0
Overhead, 9 per cent. ..	..	..	285 15 0
Interest, 4 months, 3 per cent. per annum ..	..	..	34 10 0
			3,496 0 0

Say, £3,496.

PLANTATION, PARKING AREA, ANZAC-PLACE.

Description.	Quantity.	Rate Material.	Total.
		£ s. d.	£ s. d.
Large trees ..	52	1 0 0	52 0 0
Small trees ..	52	0 10 0	26 0 0
Shrubs ..	153	5 0	765 0 0
Lawn and Garden in centre ..	5,900 sq. yds.	0 1 6	442 10 0
Contingencies, 10 per cent. ..	..	..	86 0 0
Overhead, 9 per cent. ..	..	..	55 0 0
Interest, 4 months at 3 per cent. per annum ..	..	..	6 15 0
			676 15 0

Say, £675.

FORMATION OF PLANTATIONS, WIDENING WESTERN ROADWAY, GALLATOPOLI-AVENUE, BALLASTING AND GRAVELLING, EASTERN ROADWAY.

Description.	Quantity.	Rate Material.	Total.
		s. d.	£ s. d.
Earthwork ..	2,400	8 0	2,160 0 0
Ballast ..	1,000	15 0	750 0 0
Gravel ..	450	15 0	337 10 0
Metal ..	100	30 0	150 0 0
Kerb and gutter ..	4,000 ft.	4 3	850 0 0
Contingencies ..	10%	..	424 15 0
Overhead ..	9%	..	420 5 0
Interest, 4 months at 3 per cent. per annum ..	..	..	51 0 0
			5,143 10 0

Say, £5,160.

BALLASTING AND GRAVELLING OF PERRONE-CRESCENT AND FORMATION OF PLANTATIONS.

Description.	Quantity.	Rate Material.	Total.
		s. d.	£ s. d.
Earthwork ..	5,600	8 0	2,200 0 0
Ballast ..	1,700	15 0	1,275 0 0
Gravel ..	850	15 0	637 10 0
Kerb and Gutter ..	5,000 ft.	4 0	1,000 0 0
Contingencies ..	10%	..	511 5 0
Overhead ..	9%	..	506 5 0
Interest, 3 per cent. for 4 months ..	..	..	51 5 0
			6,190 5

Say, £6,200.

FORMATION, BALLASTING AND GRAVELLING OF THE NORTHERN ROADWAY OF FLANDERS-AVENUE.

Description.	Quantity.	Rate Material.	Total.
		s. d.	£ s. d.
Earthworks (rocky) ..	5,600	10 0	2,750 0 0
Ballast ..	2,000	15 0	1,500 0 0
Gravel ..	1,000	15 0	750 0 0
Kerb and Gutter ..	2,000 ft.	4 3	425 0 0
Contingencies ..	10%	..	547 0 0
Overhead ..	9%	..	541 10 0
Interest, 4 months at 3 per cent. per annum ..	..	..	65 10 0
			6,624 0 0

Say, £6,625.

BALLASTING AND GRAVELLING OF ANZAC PLACE AND FORMATION OF PLANTATIONS.

Description.	Quantity.	Rate Material.	Total.
Earthworks	cubic yds. 8 0	£ s. d.	£ s. d.
Ballast	1,600 15 0	8 0	720 0 0
Gravel	500 15 0	15 0	750 0 0
Kerb and Gutter	2,000 ft. 4 0	30 0	400 0 0
Contingencies	10%	22 5 0	22 5 0
Overhead	9%	22 5 0	22 5 0
Interest, 4 months at 3 per cent. .. ..	.. ..	.. ..	22 10 0
Say, £2,720.			

BALLASTING AND GRAVELLING OF ROAD NORTH OF ANZAC PARK AND FORMATION OF PLANTATIONS.

Description.	Quantity.	Rate Material.	Total.
Earthworks	cubic yds. 8 0	£ s. d.	£ s. d.
Ballast	475 8 0	100 0 0	190 0 0
Gravel	500 15 0	375 0 0	375 0 0
Kerb and Gutter	700 ft. 4 0	187 10 0	187 10 0
Contingencies, 10 per cent. .. ..	.. ..	89 5 0	89 5 0
Overhead, 9 per cent. .. ..	.. ..	89 5 0	89 5 0
Interest, 4 months at 3 per cent. per annum .. ..	.. ..	10 15 0	10 15 0
Say, £1,074.			

WIDENING OF WESTERN ROADWAY, ANZAC PARK AND FORMATION OF PLANTATIONS.

Description.	Quantity.	Rate Material.	Total.
Earthworks	cubic yds. 8 0	£ s. d.	£ s. d.
Ballast	100 15 0	75 0 0	75 0 0
Gravel	50 30 0	75 0 0	75 0 0
Kerb and Gutter	500 ft. 4 0	21 0 0	21 0 0
Contingencies	10%	47 0 0	47 0 0
Overhead	9%	47 0 0	47 0 0
Interest, 1 month at 3 per cent. per annum .. ..	.. ..	1 10 0	1 10 0
Say, £270.			

BALLASTING AND GRAVELLING OF EASTERN ROADWAY, ANZAC PARK AND FORMATION OF PLANTATIONS.

Description.	Quantity.	Rate Material.	Total.
Earthworks	cubic yds. 8 0	£ s. d.	£ s. d.
Ballast	475 8 0	190 0 0	190 0 0
Gravel	100 15 0	240 0 0	240 0 0
Kerb and Gutter	500 15 0	120 0 0	120 0 0
Contingencies	10%	65 0 0	65 0 0
Overhead	9%	64 10 0	64 10 0
Interest, 1 month at 3 per cent. per annum .. ..	.. ..	2 0 0	2 0 0
Say, £780.			

I wish to point out that I have had to increase slightly the estimate for the work in Flanders-avenue. When giving evidence before I estimated the cost at

£4,850. A more careful estimate gives the figure at £6,625. A summary of the cost of the engineering services required for the memorial is as follows:—

1. Sewerage—(a) Mains	£ 905
(b) House drainage and plumbing	1,110
2. Water supply and fire hydrants	1,975
3. Electrical supply, underground	2,352
4. Lighting of building, including flood lighting	5,700
5. Heating system	14,000
6. Sprinkler system	5,000
7. Formation of grounds, including excavation on site of building	15,500
8. Concrete paving of terrace at 1,023 level	2,444
9. Concrete paving of terrace at 1,925 level	6,722
10. Concrete paving of side entrances	1,372
11. Concrete paving of entrance	684
12. Brick paving of paths and terraces	1,650
13. Terrace wall	4,400
14. Steps	4,400
15. Plantation in grounds	3,385
16. Plantations in roads surrounding grounds	738
17. Parking area—roads and kerbing and guttering	3,300
18. Parking area—planting	875
19. Stormwater drainage	3,600
20. Roads, including kerbing and guttering	5,100
21. Gallipoli-avenue	1,000
22. Peronne-avenue	1,000
23. Flanders-avenue	6,025
24. Anzac-place	2,720
25. Road north of Anzac Park	1,075
26. Western roadway, Anzac Park	370
27. Eastern roadway, Anzac Park	789
Total	£103,905

* Estimates by architects plus overhead costs only.

of which the following items in my opinion are chargeable against the building and accessory services:—

1. (a) Sewerage (proportion)	£ 950
(b) House drainage and plumbing	1,110
2. Water supply and fire hydrants	1,975
3. Lighting of building, including flood lighting	5,700
4. Heating system	14,000
5. Sprinkler system	5,000
6. Formation of ground, including excavation on site of building	15,500
7. Concrete paving of terrace at 1023 level	2,444
8. Concrete paving of terrace at 1935 level	7,722
9. Concrete paving of side entrances	1,372
10. Concrete paving at main entrance	684
11. Brick paving of paths and terraces	1,650
12. Terrace wall	4,400
13. Steps	4,400
14. Plantations in grounds	3,385
15. Storm water drainage (proportion)	700
Total	£69,845

* Estimates by architects plus overhead costs only.

together with the half cost of kerbing and guttering the roads. The remaining £34,000, less the half cost of kerbing and guttering the roads, should, in my opinion, be charged against other votes. I wish to make it quite clear that these are my own estimates and proposals; they have not been submitted to or approved by the Federal Capital Commission, although they have been developed in accordance with the usual standards of the Commission. They were not submitted for approval, because I had not time to submit them. My preparation for this morning's evidence was completed only an hour before I came here. The notice that I had that my attendance was required was too short to allow me to submit these matters for the approval of the Commission. All the services that I have mentioned are more or less essential, though it might not be necessary to proceed with all of them at once. Some could be left for a considerable period. I do not suggest that the Commission will not approve of these proposals. I have not given very much thought to the proposals that have been made for heating the building; but, speaking without mature

consideration, I should say that it would be necessary to heat only the permanently occupied quarters, such as the offices, the caretaker's quarters, &c. It might be thought desirable to provide electric heating apparatus rather than an oil or coke-heated water system. If the heating could be carried out by means of a system of power points, it would reduce the estimate considerably. In consideration of that being done, I estimate that the amount required for heating could be reduced from £14,000 to £200. In my experience the cost of carrying-out engineering works of the character we have had under notice is not any higher in Canberra than in the other capital cities of the Commonwealth. For the same class of work, I am of the opinion that the architects should be consulted in the preparation of plans for the lay-out of the grounds, and also while the actual work is in progress. The plans produced give particulars of the electric lighting which it is proposed to provide. A few power points have been included, but chiefly for the purpose of vacuum cleaning, and so on. In the accommodation for the caretaker, office staff and attendants, provision is also made for power points. The lighting proposed is as follows:—

Lower Ground Floor.
Strong room for documents, &c.—General lighting is provided by vitreous enamel steel fittings, and in addition light plugs for wandering leads with hand-lamps for inspection of shelving.

General and Technical Relief.—General lighting by means of enclosed dust-proof type of diffusing unit similar to "Sol Lux."

Offices, Reading Rooms and Living Quarters.—The usual modern practice for lighting such rooms will be followed.

First Floor.
Cloisters.—Illumination of name tablets by flood light from concealed trough units within the colonnade. These will be brilliantly lit, sufficient light being available by reflection from the polished floor of the garden.
Hall of Memory.—Illumination of ceiling of dome will be from concealed units located at the base of the dome, while lighting of the walls and floor of the Hall of Memory will be from ornate units suspended from below the gallery surrounding the dome. The effect aimed at is to secure a softly diffused light within this portion of the structure.

Stairways and Internal Staircases.—Where desirable ornate brackets type of fitting is included.

Outdoor Terraces.—Lanterns on standards are included to the number of 30. No provision has been made for lighting the approaches.

Flood-lighting Exterior of Hall of Memory.—It is proposed to flood-light the exterior of the Hall of Memory from six banks of flood-lighting projectors, making 24 projectors.

Ground Floor.
Museums.—General lighting with units similar to "Sol Lux" type.

Recesses for Models.—Lighting of each of these will be by concealed lights arranged with a fitting similar to "Geocray" as used for illumination of shop windows.

Aeroplana Court and General and Technical.—General lighting with units similar to "Sol Lux" type.

Garden Court of Honour.—Lighting of lower level will be through archways of cloisters. Provision is made for the illumination only of the steps at the end of the Court by means of ornate units.

Entrance Portals.—Ornate type of lanterns.

The estimated cost of the lighting which I have outlined is £5,700. The scheme of lighting was arranged by one of my officers in consultation with the architects. It was intended to light the building completely. If the Memorial is not to be open for inspection at night, I estimate that the amount required for lighting could be reduced from £5,700 to £4,500. I produce a plan showing the proposed lay-out of the 30 acres of ground on which the building will be erected. It is proposed to plant those areas to the east and west of the building marked "A" on the plan with Australian trees of selected types and of suitable height to balance up the undulations of the area, and

also to use a number of specimen trees. The varieties it is intended to use for this purpose are eucalypts, kurrajongs, casuarinas, and callitrites. The areas marked "B" on the plan immediately to the east, west, north, and south of the building, will be sown with grass, and specimen dwarf evergreen shrubs, which will be clipped to shape and kept low. This will be an area of intense culture. The areas marked "B1" will comprise an edging or border to the previous areas mentioned, and will be planted with upright pyramidal conifers. Cupressus of various types and other suitable varieties will be planted. The areas marked "C1," "C2," "C3," and "C4" will be planted with dwarf flowering plants or bedded shrubs with autumn foliage. The area marked "D" will be planted with dwarf evergreen shrubs clipped to shape. The area marked "E," immediately adjacent to the building on the east and west sides, will be sown with grass. I think this will be a very effective treatment of the whole site. Australian trees will greatly predominate. The upkeep of the grass areas will be fairly costly; the pyramidal conifers will require to be trimmed annually, and that also applies to the dwarf shrubs. I estimate that the annual cost of upkeep of the area will be £2,000 for the first year and £1,200 per annum for the second and succeeding years. The surrounds to the parking areas will be planted with Australian trees, such as kurrajongs, eucalypts, and acacias. The plan marked "C043d" which I put in, shows the proposed treatment of the parking area. If Flanders-avenue and Gallipoli-avenue were brought to an intersection at Anzac-place as has been mentioned, about 50 per cent. of the parking area would have to be sacrificed. Such a rearrangement would effect a decrease in the construction costs, and would give a slightly better grade to Flanders-avenue. The plan as it is now drawn provides accommodation in Anzac-place for about 150 cars. If it were re-arranged as suggested, there would be accommodation for about 60 cars, and it would be necessary to find a parking area somewhere else in the neighbourhood. I regard the provision of Anzac-place as a fine feature of the whole scheme. It is proposed ultimately to sow Anzac-place with grass, but perhaps to save maintenance costs the planting of grass could be left for a few years and shrubs could be planted in the meantime. The parking areas will be between the rows of trees. The design is on similar lines to that which has been provided in Parliament House grounds. Nine entrances or exits have been provided for the parking area, spaced evenly around the circumference. In my opinion, adequate room has been allowed for the parking of the cars. They would be backed on to the kerb on each side, and there would be plenty of room for other cars to be driven between the two rows and for the cars in the parking area to be manoeuvred. It is not proposed to proceed with this whole scheme immediately, but the treatment that I have outlined is what is suggested for the site eventually. As to how quickly the area could be developed along these lines, I cannot say. It would really depend on the rate of the general development of Canberra. Certain of the engineering services that I have mentioned, such as sewerage, water supply for fire protection and otherwise, and electrical supply, would need to be put in hand immediately. The total cost of these is estimated at £103,905.

164. To Mr. Cook.—The sewerage, water supply for fire protection and otherwise, and certain provisions for electric light and heating would be necessary in the early stages. The sprinkler system would also perhaps be necessary. Of course, the earthworks and excavations would need to be done. I could not say without giving further consideration to the matter, exactly just how much of the work would need to be put in hand at first. All the estimates have been carefully made,

and I believe that they are as accurate as possible. The internal roads on which the cars will be parked will be 55 feet wide. In my opinion, that provides ample room. I think that the flood-lighting of the dome will be a feature of the city, but I am not prepared at the moment to say that I consider it necessary. I do not think it could be considered as urgent. The sprinkler system is that which is generally adopted for fire protection, and it is a good one. As to whether it is or is not necessary to install it in this building, I cannot say; it depends on the amount of risk which the authorities are prepared to take.

165. *To Mr. Lacey.*—I estimate that the annual cost of flood-lighting the dome will be £637. The question involves a consideration of the frequency with which the dome is lighted. If it is lighted only on special occasions, the cost would be much less than if it is lighted permanently. I have formed my estimate of the cost of lighting as follows:—Illumination for five hours during each night of the week employing twenty-four 600-watt projectors. Supply price for energy 7d. per unit. It is true that there is not likely to be anything inflammable stored in the building, and it might be thought desirable to provide hydrants and distribute a number of hand fire extinguishers instead of to install the sprinkler system. That depends on the amount of risk which the authorities are prepared to take. The sprinkler system is the most certain in its action, and, so far as I know, has been found to be very effective. A good many of the accessory services which I have mentioned would need to be carried out almost at once. The provision of the parking areas might be left to a later date, and so might some of the other work. That is a matter which would have to be determined by some other authorities.

166. *To Mr. M. Cameron.*—There should not be very much risk of fire in the building. The risk would occur through the carelessness of visitors. I should not like to say that sprinklers are not necessary. If adequate fire protection is desired, I think they should be installed. If the floor of the building is fireproof, the danger from fire should be remote. The suggestion that you make that the lay-out of the grounds should be agreed upon after collaboration between the architects and a recognized landscape artist would involve some slight extra expense, but that would, in my opinion be warranted even if only to obtain endorsement of the plan that has been suggested. Work of this kind is carried out at present by Mr. A. E. Bruce, the Superintendent of Parks and Gardens.

167. *To Mr. Seabrook.*—The deepest cutting that would be necessary on the site would be 15 feet. A good deal of the work could be done by steam shovels. I do not consider 7s. per cubic yard a high price for this work, taking into consideration the hard character of portion of the material, for it includes the cost of excavating, including blasting, cartage, filling into the other site, and trimming. A small steam shovel would shift about 200 yards a day in average material, and 150 cubic yards per day in harder material. The cost of operating one is about £11 a day. In preparing my estimates for the earthworks, I did not take into consideration whether the work would be done by day labour or contract. I anticipate that if the plan is approved tenders will be called for the work. I suppose that if a contractor desired to hire any of the Commission's plant to do work of this character, and the plant is not being otherwise employed, the Commission would be quite prepared to hire it. So far we have kept our plant fully employed, except small sections of it, which are required for special work only. The capital cost of flood-lighting is estimated at £550. Tourists often come to Canberra for a few days at a time. I do not know whether it would be necessary to keep the memorial building open at night for the benefit of

tourists. For sentimental reasons it might be a good idea to plant around the memorial building trees from all States of Australia.

168. *To Senator Reid.*—It would not be necessary to spend so much money on the lighting of the building if it were not to be used at night. If the authorities are prepared to take risks in connection with the memorial, it might not be necessary to install sprinklers. The idea of planting around the memorial trees from the countries of our allies, appeals to me. The memorial could be made a most representative one by adopting plans of that nature.

169. *To the Chairman.*—Provision could be made when the building is being erected for installing extra lighting and heating equipment at a later date. That would not involve very much expense, nor would it need structural alterations of any importance. I wish to repeat that my evidence has not been considered by the Federal Capital Commission, nor have my estimates been approved by it. Had I been appointed by the Commission to give evidence I should certainly have given the evidence I have given. I would not accept responsibility for any alterations that are made in the estimates which I have placed before the committee.

170. *To Mr. Cook.*—We have very full information in the Commission offices as to the trees and plants which will flourish in Canberra. We have been making experiments in this regard for a number of years.

(Taken at Canberra.)

MONDAY, 24TH APRIL, 1928.

Present:

Mr. MACKAY, Chairman;

Senator Reid	Mr. Lacey
Mr. M. Cameron	Mr. McGrath
Mr. Cook	Mr. Seabrook

Dr. James Frederick Watson, sworn and examined.

171. *To the Chairman.*—I have had the plans of the Australian War Memorial described to me, and have seen them reproduced in the newspapers. I am aware that the memorial is to house certain war records and manuscripts, and it would be advisable to regard the preservation of those papers from four standpoints, as broadly speaking, four sections of the public will visit the national war memorial to inspect the papers. The first section will be merely visitors, taking a casual glance at the exhibits. The second will be those applying for student tickets, actuated by a desire to handle one or two of the most important documents, with the object of discussing them later. The third section will be genuine students desirous of studying one or other section of the war, possibly with the intention of writing articles upon the subject. The fourth section will be the descendants of those who served at the war. I suggest that, for the sake of convenience, the papers should be classified accordingly. Those who wish to peruse the war service records of their relatives and friends will be few in number, so that such records could be placed in the basement and produced for inspection as desired. Accommodation for that type of visitor could be provided in the general room. Students studying sections of the war would require access to all papers, also occasional access to individual records. As it is unlikely that there will be many such visitors at a time, it would be convenient to have those papers accessible in a small room. An officer sitting in the room could afford the necessary supervision. In order to prevent undue handling of the records by the casual second section, the practice of the British Museum could be adopted of placing the papers in

glass show-cases and periodically notifying the public that certain papers of interest would be on show on certain dates. I suggest that, to prevent the war memorial library conflicting with the national library, the former should be restricted to books and newspapers published during the period of the war. The national library could handle subsequent publications. If some such limitation were not imposed it would be practically impossible for the war memorial library to handle future accessions. The restriction would be for the period commencing 1914 to, say, six months after the Armistice. It might be advisable to add to that period a 5 or 10 per cent. margin. Captain Bean, in evidence before this committee, intimated that the library of the war memorial will consist "of all books throwing any relevant light on Australia's part in the war, or at least such of those books as can be purchased. The library will be added to from time to time, but the rate of addition will naturally slow down, and it is not likely that much more space will be required even in ten or twenty years time. This is excellent; but, apparently, the question of duplication between the national library and the war memorial museum was not considered. An enormous quantity of literature will come in from time to time, all relevant to the war, and there would be a considerable redundancy if both libraries collected the same matter. Rather than use the war memorial vote to purchase current literature relevant to the war, it would be preferable to allow that vote to accumulate so that when a rare item was offered for sale at some future date it might be purchased. It would be advisable to embrace literature in all languages. Of course, any restrictive date would necessarily be an arbitrary one. Naturally, the whole of Captain Bean's history would be included in the war memorial collection, but that account will be elaborated in the future when censoring restrictions are lifted. The introduction of photographic lithography will enable the war memorial museum to obtain copies of records which are housed in other collections, which will be of inestimable value to students who would otherwise have to visit different countries to inspect such records. It would be necessary to index and cross index all records with a suitable card system. The proposed 1,000 square feet of floor space for the library should be sufficient, as there will be a gallery, and probably bays. The objection to bays is that students inspecting records in them are not under the observation of an attendant. Every facility should be afforded to the public to inspect the records, though in the initial stages certain censored papers will not be available. Writing and working facilities should also be provided. The staff required for indexing the manuscripts would depend upon the time in which it was desired to complete the work. After the indexing was completed a librarian and an assistant should be sufficient staff. The original plan by Walter Burley Griffin provided an ideal grouping of buildings in the recreation section. If that plan were adhered to one could, when standing on the steps in front of Parliament House, have a glorious vista up the parkway leading to the National War Memorial, with a grouping on each side of theatre, gallery, and museum. There could not be a more magnificent plan, and it would be a tragedy to alter it. Unfortunately, there appears to be a desire to alter that grouping. If the Griffin plan was to be regarded merely as a lay-out of streets that alteration might be legal, but I believe that the interpretation by Parliament was that the original plan and proposed zoning and grouping of buildings was to be adhered to, so that the proposed action is illegal. The Seat of Government Administration Act of 1924-26 provides—

"The Minister may at any time, by writing under his hand, modify or vary the plan so published, but no such modification

or variation shall be made until after the expiration of thirty days after notice of intention, published in the Gazette, so to modify or vary the plan has been given. A copy of the instrument by which any modification or variation of the plan has been made shall be laid before both Houses of the Parliament within fifteen days of the making thereof if the Parliament is then sitting, or, if not, then within fifteen days of the next meeting of the Parliament.

If either House of the Parliament passes a resolution, of which notice has been given at any time within fifteen sitting days after the instrument has been laid before it, disallowing the modification or variation made by the instrument, the modification or variation shall cease to have effect.

The alteration has been made contrary to those provisions of the act.

It appears to be the intention of the Federal Capital Commission to depart from the Griffin plan and permit the erection of a Roman Catholic Cathedral on the north-western side of the original recreation group. That will make the vista from Parliament House to the War Memorial lopsided and will spoil the aesthetic effect. It is proposed to move the national museum of natural history to that which was originally the university area. It would not matter so much if that museum were to house only the Macleay collection, but it is practically certain that additional wings will be added to the museum to accommodate collections that may be acquired from time to time in the future. If that is so the museum will be located in the wrong place and, as the design of the war memorial appears to be a masterpiece it would be a tragedy to spoil the symmetry of such an ideal grouping. Sir Bertram Mackennal and other distinguished people have declared that it will be a tragedy if anybody interferes with the original plan. If the Roman Catholic Cathedral is erected instead of the natural history museum the vista will certainly be wrecked. If prompt action is taken that can be obviated.

I favour the establishment of a building to house the Commonwealth archives. It is most important to proceed with that proposal before all public departments are removed permanently to Canberra. Each department requires space for records, but it is useless to maintain space for departmental records that have no current value. Some departments use their records actively for two years, others perhaps for three or five years. I suggest the establishment of an archives department on the outskirts of Canberra, each department to fix a period at which its records become of non-current value. On the 31st December of each year the papers from departments in which the fixed period has expired should be sent to the archives department, where they would be indexed and cross referenced. They would be available to departments at any time. Such a plan would allow the archives department to complete files which are at present incomplete. Under the prevailing practice blank cover minutes are sent from department to department and the original letter ultimately lodges in the file which last receives it, so leaving other files incomplete. It would be a great advantage if that fault were rectified. It should be easy to define the functions of the archives department, the national library and the war memorial museum so as to prevent overlapping. The war memorial museum could be restricted to the collection of literature and original documents during the period previously suggested by me. In the event of something unique dealing with the war period coming on the market at any time the war memorial museum should have first preference. The national library would have preference for subsequent periods. The archives department would merely be a collateral department. As an instance of how incomplete some of our collections are I may mention that the Commonwealth Government began issuing its own notes in 1910. Yet there is

not a complete set of Commonwealth notes in existence. A complete set of the notes exists only from the year 1917 on. Recently a 1910 £5 note brought 110 guineas at a recent sale in London.

173. *To Mr. McGrath.*—I consider that the Federal Capital Commission is to be blamed for any alteration of the original Griffin plan. About twelve months ago I wrote to the present Attorney-General drawing his attention to breaches of the *Seat of Government Administration Act 1924-26*. It would be necessary for Parliament to take action against the persons responsible for those breaches. A theatre and opera house may not be necessary for ten or twenty years, but that is a small period in the life of a city, and we have to consider posterity.

173. *To Mr. M. Cameron.*—The site dedicated to the Roman Catholic Cathedral was allocated to the natural history museum in the original Griffin plan. For at least two years a notice has been in existence indicating that the zoological museum is to be located on another site from that originally chosen. I am unable to express an opinion as to whether the proposed war memorial will be satisfactory for the material preservation of records, as to being damp proof, for instance.

173A. *To Mr. Seabrook.*—I believe that the suggested size for the library will be sufficient, provided that future accessions are restricted as I have previously suggested.

174. *To Senator Reid.*—I do not think the original site for the war memorial could be more perfect. The grouping in front of that memorial is important. If the access to the memorial is poor it will detract from the aesthetic beauty of the scheme. The buildings of the recreation and the proposed university group are in a different category as the civic administration group comes between the other two groups, so making it comparatively immaterial as to what style of architecture is chosen for the university. I think that the Federal Capital Commission has acted contrary to the spirit of the *Seat of Government Administration Act*.

175. *To Mr. Cook.*—My remarks have applied principally to official records. Personal records could be better housed in the national library.

(Taken at Canberra.)

THURSDAY, 30th APRIL, 1928.

Present:

Mr. MacKAY, Chairman.

Senator Barnes	Mr. Lacey
Senator Reid	Mr. McGrath
Mr. M. Cameron	Mr. Seabrook
Mr. Cook	

Sir John Henry Butters, M. Inst. C.E., M. Am. Soc. C.E., M.I.E. Aust., Chief Commissioner, Federal Capital Commission, sworn and examined.

176. *To the Chairman.*—I am aware that Parliament has asked the Public Works Committee to investigate a report on a proposal to erect an Australian war memorial at Canberra. Following upon the inconclusive architectural competition in 1926, the Commission endorsed the recommendation of the adjudicators of the war memorial competition, that two of the architects who had taken part in the competition should be invited to collaborate in preparing a fresh design. I have seen the sketch plans which were submitted as a result of this but I have not seen the actual working drawings. I can say quite definitely, however, that there is nothing in the

design of this building which would make it objectionable, or out of harmony with the rest of the buildings which will be erected in Canberra. I know of the artificial building material known as *Benedict stone*. From an aesthetic point of view I should prefer granite to be used for facing the memorial. It would not matter from the point of view of harmonizing with other buildings, but granite is an everlasting stone, and conveys the idea of an everlasting memorial. We have not used this *Benedict stone* in any buildings in Canberra as yet, but we propose to use it in a small building to be used as a fish hatchery, and which will be a monumental building of its kind. We propose to use this material in order to demonstrate locally what can be done with it. The life of the stone will be quite satisfactory, and I think that it would be suitable for a national memorial. I think the proposed site for the memorial is satisfactory. In fact, I do not think that there is a better site in Canberra for the purpose. In Griffin's original plan I think he intended this site to be occupied by a casino. Exactly what he meant by that I do not know, and whether a casino would ever be tolerated in Canberra I do not know. At any rate, it was marked in the original plan as for that purpose. The Commission does not contemplate that a casino will ever be established in Canberra. I do not think that in the development of Canberra as projected, there is any likelihood of the view of the memorial being obstructed from any important point. I am aware that under the *Seat of Government (Administration) Act 1924-26*, it is prescribed that the powers of the Commission in relation to the Territory shall include, subject to the approval of the Minister, the construction of all works and buildings required by the Commonwealth in the Territory, except works exempted by order in Council. I presume that this work will be carried out in accordance with the governmental policy that the Commission shall construct all government works. It is almost certain that a job of this kind will be done by contract. There will be no difficulty in utilizing the services of suitable officers of the Public Works Department who may be available. If we want assistance, we shall call on the department and if men are available, they will be lent to us. We do that quite frequently. There would be no clash of authority if the designing architects are asked to supervise the erection of the building. We shall simply employ them in the capacity of supervising architects. There would be no trouble or duplication. It is our practice to charge a percentage on the cost of erection of buildings to cover supervision, but no definite charge is fixed for this work. In the erection of this memorial it would be our duty to attend to the business portions of the work, and we should detail an assistant architect, or a building inspector, to be resident on the job. This is paid for by the client, not by the architect. I am aware that the conditions of the competition provided that the cost of preparing the site, including the laying out of the surrounding grounds and constructing such walls, terraces, steps, roads, &c., as might be incidental thereto, would be additional to the fixed cost of the building and that the execution of these works would be arranged for by the Commonwealth independently. I do not regard this work as necessarily a part of the general development of the Federal Capital city. I have not had an opportunity of seeing what is required. Under the competition rules, it is required that the architects shall submit a proposal for laying out the grounds. So far we have not had any propositions submitted by the architects for the treatment of the grounds. We shall have to consider such a proposition when it is put forward, and determine how much of the cost the Commission will be justified in charging to general account,

and how much to the war memorial account. It was laid down during the competition that the sum of £50,000 mentioned as the amount to be spent on this work referred to the memorial itself. I am quite clear on that point. It did not include the treating of the ground and approaches. That was a separate matter for which separate finance would be arranged. I am not prepared to give an opinion on the statement of the Commission's Acting Chief Engineer, Mr. Potts, that a sum of £103,000 would be necessary for work required within and adjacent to the memorial site in order to complete the development of the locality, and that of this sum £49,000 should be chargeable to general city development. I must learn exactly what improvements Mr. Potts proposes before I can say anything on the matter. I do not think, at the present stage, that much general expenditure would be justified in this district if the war memorial were not to be erected, but it might follow immediately upon the building of the second bridge over the river. We cannot lay down hard and fast rules in regard to such things as this. I agree that if a national memorial is to be built, the city must contribute something towards setting that memorial off. The Commission does not approve of everything put in front of it by its officers. It must and does consider all matters placed before it. I take it that the services mentioned would include the water mains running up to serve the surrounding district. Other services, such as the installation of water and vacuum cleaning provision in the building itself should be included in the architects' estimate. I could not accept such things as that as a charge against the development of the site. We might even make ourselves responsible for water services, &c., right up to the walls of the building, but everything within the building would be charged against the building itself. We should probably be able to finance the installation of these services up to the walls of the building as we go along; special provision would be made for it. The Commission has given no consideration to the treatment of the 30 acres of park land surrounding the proposed building. We are waiting for a design and, in the meantime, we have determined that we shall plant the background thickly with trees in order to show the building off. Nothing more than that can be determined until the plans are finished. In the event of the building being authorized, these improvements could be spread over a number of years. I should think that a building of this class would take about three years to build. Practically only a water supply need necessarily be installed at once, although it might be advisable to install lighting as well. The upkeep of the grounds has not been discussed, and it has not been decided whether this shall be a charge against the Commission. I think that expenditure within the grounds should be a charge against the Memorial Committee, but we shall not take a hard and fast view on such matters as this. It would be at the public expense in any case. Under the rules of the competition, the architect is required to collaborate in the laying out of the grounds, and we shall ask him to submit a design for this purpose, and we shall develop it in consultation with him. Personally, I do not think that any heating device will be necessary in the building, and I would not dream of recommending it. As a general proposition, I should say that building costs in Canberra are about 15 per cent. higher than in Sydney or Melbourne. For certain classes of work involving heavy freight charges on material, the difference might be greater, but at any rate 15 per cent. difference is a fair figure, because materials are dearer here and wages are 15 per cent. higher. I do not consider myself to be the building costs expert in the Commission, and cannot say with any assurance whether 2s. 6d. per cubic foot would be sufficient for building at this time, but I think it would be a fairly safe

estimate. That is what we have already arrived at, and it should be fairly right unless there are going to be a lot of embellishments on the building. We usually work on a basis of 2s. 6d. a cubic foot for a plain stone-fronted building. For a building which includes a proportion of fine work, we sometimes find it necessary to proceed on a basis of 3s. a cubic foot. The Commission would not allow any important buildings to intervene between the memorial and Parliament House in such a way as to obstruct the view of the memorial. In the original plan it was suggested that the Natural History Museum should be built across the river to the north of the memorial site. We do not regard it as necessary, however, to carry out that plan literally. We follow the plan in regard to the lay-out of streets and the zoning system, but not necessarily in detailed matters such as this. The Zoological Museum will be included in the University grounds, but that is a different matter altogether. It was referred to by a witness who gave evidence the other day, but that witness very often talks before he knows what he is talking about. The National Museum of Australian Zoology is a building for the housing and display of the Dr. MacKenzie collection of Australian fauna, and will provide rooms for the study of these things. It is not a zoological museum in the ordinary sense of the word. It is certainly not a natural history museum. It is a special building for the display and study of Australian fauna, and, as lectures will be delivered there on these subjects, it obviously should be near the University. It is looked upon by the university and medical authorities as a very important adjunct to the University, and later on it will be an important adjunct to the Royal College of Surgeons, when that institution is established here. The cathedral, when erected, will not interfere with the view of the memorial. A cathedral will not be built that will dominate everything in Canberra, and it will be a feature of its own. Every building that is put up is bound to obstruct something. There is no contravention of the *Seat of Government Act* in that. As a matter of fact, the site for the Roman Catholic Cathedral is not definitely fixed yet. It has certainly not been definitely allotted. The Commission would be careful to see that no design was proceeded with which represented a serious departure from the plan of the city. We are not only trying to carry out the letter, but the spirit also of the provisions dealing with the design of Canberra. We cannot carry out the design literally any more than the designer himself would have been able to do so, and during the short time he was here he made a number of alterations himself. It may be taken for granted that we are definitely trying to carry out what was laid down in the act in regard to the Griffin plan. In regard to the estimate given by Mr. Potts for the provision of water, roads, sewerage, and other services, I do not think that the committee can take these as definite until they have been approved by the Commission. If those who have sought this information had come to the secretary of the Commission, their request would have come before the Commission through the ordinary channels, and would have received consideration. The chief engineer would then have been instructed to prepare a report. The chief engineer, so far as has not had an opportunity of submitting his views to the Commission. As soon as I saw that Mr. Potts had given evidence before the committee, I instructed him to prepare a report on the matter as quickly as possible, and submit it to the Commission. We shall receive that report in a day or two, and after considering it we shall send it on to the committee. In the meantime, it may be taken that Mr. Potts is a very competent officer, and his figures

are not likely to be very far out. It is possible that the Commission may not find anything to disapprove of in them, but we cannot take that for granted.

177. *To Mr. Lacey.*—I do not regard the synthetic stone to which I have referred as an experimental material. I have seen examples of it used in the United States of America, in Canada, and in England. However, it is not familiar to the people of Australia, and we have not previously made a synthetic stone of that kind from our own local material. Therefore, in order that we might have an example of a building made of this stone, we thought we should erect the fish hatchery of this material. The cement used in America is not better than ours. There is no cement better than the Australian article. If I had an absolutely free hand, I should use granite, which is an everlasting stone; but, from the point of view of permanence, I should prefer a properly manufactured synthetic stone to sandstone. The order of my preference would be, granite first, then synthetic stone, and finally sandstone. The architects would not be subject to instructions from the Commission on architectural points. They would, however, receive instructions on business points, and that is usually found to be very necessary. In practice, we do not have any trouble over this matter at all. The Commission does not do foolish things. We have never yet made a suggestion to an architect that he has not agreed to after the matter has been discussed. Frequently, as a result of our experience, we are able to see things that are not apparent to the architect.

178. *To Mr. Cameron.*—If the memorial were not being built in this area, it is not likely that there would be very much development there for a year or two. However, there is already a road running right up to the south-east boundary of the area, and skirting the corner of the memorial site. By the time the memorial is completed, I think the Commission would be justified in going ahead with the erection of the second bridge over the river. The site of the bridge will be up-stream from the memorial site, and it will carry a considerable amount of the traffic that now comes through the central portion of the city. All the prominent buildings in the city will be of a semi-monumental design. We have not yet got to the stage when we have designed the buildings such as the opera house, the theatre, and art gallery, nor any buildings which will ultimately occupy the ground between Parliament House and the site of the war memorial. The committee can take it, however, that no building will be erected which will obstruct the view from Parliament House. These proposed buildings would necessarily harmonize with the prevailing style of architecture, though they would not necessarily all be of the same type. It might be that they would be of quite different style, but they would not be of a type which would clash. The conditions of the competition prescribe that the money for the actual building of the war memorial should not be in excess of £250,000. I do not know exactly what the war memorial committee has in mind, and so I cannot offer an opinion on the estimates of Mr. Potts that the services associated with the building will cost £69,000. Everything in the building itself must be chargeable to the cost of the building. It may be that the committee has provided for the installation of sprinklers for the protection of its exhibits. My interpretation of the competition rules was that everything within the building to enable it to house the collection was to be provided for the sum of £250,000. That sum was intended to complete the building so that it would be able to function as it was intended to do. I may be wrong on that point, and I shall check it up with the competition conditions, and with any answers sent to the competition.

179. *To Mr. Seabrook.*—Personally, I should prefer to see the building with a wider frontage to Parliament House, but the architects cannot see how they can

build it that way for the money available. It would, I understand, be much more costly. I certainly think the building would look better with its long axis across the line of vision from Parliament House. I do not think that the building would look more squat if it was placed in the way which I favour. The impression I formed from studying the design was that it would be better if it had a wider front. The fear of awkwardness does not worry me much, because the high dome would overcome any tendency towards that defect. Moreover, the building will be framed in a mass of greenery, I have the feeling that it would be a more impressive building if it stood in the front of a park rather than in a frequent consultation with the two architects working on these plans, and we know the process of development which this design has undergone, and the number of sketch plans which were made out before this stage was reached. A number of these plans had to be eliminated, because it was impossible to carry them out within the prescribed limit. This one can, the designers think, be carried out, but there is no margin. If it is proposed to flood-light the building, I should like to see the whole of it lighted, not merely the dome. I could not say off-hand what the cost of flood-lighting would be, but I believe it would be very expensive. Mr. Potts is getting out some figures now, and he will be able to tell the committee what the cost of flood-lighting will be. However, flood-lighting these memorials does not appeal to me. Unless you want to impress people who come to the place that this city is a mass of architectural gems, and that this memorial is one of them, I do not see that any benefit will be derived from flood-lighting. The value of the flood-lighting would only be for the purpose of seeing the memorial from the Parliament House side. If it would only cost £20,000 more to face the memorial with granite instead of freestone, I should recommend the use of granite.

180. *To Senator Reid.*—For the carrying out of this work the Commission is, to all intents and purposes, merely a government department, and the Commission would be the instrument for carrying out the Government's will. It is more likely that the Commission will call tenders for the work, than that they will be called by the Works and Railways Department. After the plans have been completed and tenders called, it will be our duty to see that the work is done properly, and we shall have somebody to oversee the construction. We are representing a client who is getting the building erected for him. The Commission will be responsible, but it will be under an obligation to employ a particular firm of architects, namely, Messrs. Sodersten and Crust, if this particular design is adopted. It is up to us to see that they carry out their duties to the Commission, which represents the Government. In the future development of Canberra there will be, from time to time, a series of Government offices, and eventually, perhaps, a High Court erected between Parliament House and the river. On the other side of the river is a zone for a national museum, an art gallery and other buildings of that kind, but all these will be so designed and constructed that they will not obstruct what we assume to be an essential prospect, that is, of the national war memorial museum from the Government centre. The buildings to be put up will really add to the beauty of the whole place. Nothing will be allowed to detract from the beauty of the structure which we are now considering. The Commission has not yet really dealt with the matter of this memorial in any detail. We received a preliminary estimate from the architects to the effect that the building would cost £250,000, and the matter has only now come back into our ken. I should think that the facing of the building could be done in synthetic stone for practically the same price as it could be done in sandstone, and of the two materials I should prefer synthetic stone.

I am of the opinion that a memorial faced with the synthetic stone, of which we have had a sample before us now, would be quite suitable. The building would have a comparatively dark base and a light coloured top. We have been keeping in close touch with the manufacturers of Benedict synthetic stone, so that we might get a first-class sample of stone made from our own material. We can improve on this sample yet. Fairy Meadow stone is used in one sample, and Tharwa granite in the other. The whiter sample is Fairy Meadow limestone chippings, and the other is from Tharwa granite. We have written to the manufacturers to inform us just exactly what the different samples mean. As far as I know, this is a fair sample of the Fairy Meadow stone. I prefer any of these synthetic stones to sandstone for this memorial. It is a very difficult thing to say whether people would object to our using an artificial material for facing this memorial. I do not think they would, though it is possible that some might. Still, the same people would probably accept the use of ordinary bricks, while they would object to concrete bricks because they regard them as artificial. Yet both materials go through the same process, except that the one is subjected to heat. I am quite certain that the great majority of people would not be interested, and would not know the difference between one material and the other. There is no doubt, however, that in some art and architectural circles, stone-work is thought to be the only possible thing. Sometimes, however, the economic aspect forces one to take a different view. There does not seem to be any really solid reason why the memorial should be open at night. Most museums, I believe, are closed up at sundown. I do not think that internal lighting should be considered if it would mean the sacrifice of anything else from the building. Rather than cut anything else out, I should prefer to go without the lighting. A lighting system can always be installed afterwards.

181. *To Mr. Cook.*—I think the limit of £250,000 for the building has been fixed by Parliament in the act. The Commission has not had anything to do with it, and we have not considered the pros and cons of the matter. We know, however, that it has been extraordinarily difficult to get a design for a building which will cost only this sum, and this difficulty has accounted for the long delays. I do not care to express an opinion as to whether the sum to be provided is too low for the purpose for which it is intended. I should say that your information is wrong when you say that you have been informed by builders in other towns in New South Wales and Victoria that building there is as cheap as in Sydney and Melbourne. It is not possible to build in country towns in New South Wales as cheap as in Sydney or Melbourne. If it is true that building is being done cheaper in Warragatta than in Melbourne, it must be remembered that in Victoria they are working under a different wages award from that in operation in New South Wales. Wages are lower in Victoria than in New South Wales. Then, in Canberra, we have not only a higher New South Wales rate of wages to contend with, but we have to pay an additional 12 per cent. over and above the wage rate ruling in Sydney. Furthermore, we have to pay freight on most of the things we use, and the interposition of the Commonwealth line between Queanbeyan and Canberra adds quite a lot to our costs. There is a scheme in operation in New South Wales, by which the Railway Department does not charge country districts any more for freight over a certain distance. Freight rates increase progressively up to about 200 miles, and after that the goods are carried practically for nothing. This is done so as to refrain from penalizing people in the country. With us, however, it costs nearly half as much to carry goods from

Queanbeyan to Canberra as it does from Sydney to Queanbeyan. Up to the present time, I think that the increased wages paid to a man working in Canberra over and above those received by the man working, say, in Sydney, have been justified. While there is plenty of employment in Melbourne and Sydney, we cannot expect workmen to come up here, where they have to live in camps instead of their own homes, unless they get some extra financial inducement. It is true that there is a dearth of employment now, but wages are not fixed on the continual changes in supply and demand. They are fixed on the basis of general conditions prevailing as between Canberra and New South Wales, and it has to be remembered that hundreds of men who work here have to keep their wives and families elsewhere. At the present time, judged by the law of supply and demand, the higher prices for labour ruling in Canberra cannot be justified. Personally, I think that the 12 per cent. increase over the New South Wales rates, even in ordinary times, is too high. That margin will, I believe, be reduced as it is found that we will be able to keep a large number of workmen resident in the place. The Commission has expressed the opinion that it does not think that this memorial can be completed for £250,000; but the architects are equally confident that it can. The general feeling, therefore, is that the best way to test the matter is to complete the drawings, call for tenders, and see what tenders are received.

(Taken at Canberra.)

THURSDAY, 3rd MAY, 1928.

Present:

Mr. MACKAY, Chairman;

Senator Barnes

Mr. Cook

Senator Reid

Mr. McGrath

Mr. M. Cameron

Mr. Seabrook

Kenneth Binns, Librarian, Commonwealth Parliament Library, Canberra, sworn and examined.

182. *To the Chairman.*—With regard to the preservation and handling of records, I think I can claim that I have had some considerable experience. I have been a librarian for a period of 27 years in the Sydney University Library, and in the Commonwealth Parliament Library, and I have endeavoured to inform myself as far as possible upon all the latest methods connected with the preservation and the recording of records. In many be of interest to the committee, if I make a few remarks upon the value of national records and the responsibility which rests upon each generation to preserve them. Unfortunately, Australia has not in the past realized fully that responsibility, perhaps because of indifference or carelessness, and the result is that many of our early records are now very difficult to obtain. Of course this may be largely accounted for by the fact that Australia is quite a young nation, and that her energies have been devoted more to the development of her natural resources than to the preservation of her records. It is difficult to-day to replace records that have been lost in the past. I refer to official printed records, not to private documents, such as explorers' journals and records of that character. Only this week I went through *Magg's Catalogue of Australiana*, looking for items that are required to complete the collection in the library. In it I found quoted at £12 12s. the Acts and ordinances of the Governor in Council of New South Wales, passed during the administration of His Excellency John

Ralph Darling, 1828, consisting of two volumes comprising respectively 62 and 80 pages. I shall recommend the purchase of those two volumes to complete the collection in our library. I doubt whether there are more than one or two institutions in Australia which have copies of those Acts and ordinances of the Government of New South Wales at that particular period. I mention this fact to show that even official records connected with the early history of Australia are extremely rare. As a further proof of the ease with which records can become both rare and valuable, I may mention that only this week I received from a bookseller in Sydney a catalogue in which were quoted one or two issues of the trench magazine, *Aussie*, which was published for the benefit of soldiers on the western front during the war. Thousands of copies were issued, but, although not quite ten years have elapsed since the signing of the armistice, the price quoted in this catalogue for separate copies is 25s. Of course there are other trench papers and war magazines of even greater value, because they were issued in much smaller numbers, and in places like Mesopotamia and Palestine, where it was not easy to preserve them. We have in the library quite a number of these publications. Among the most valuable of our war records is a complete set of German internment camp newspapers, published throughout New South Wales. I doubt whether there is in Australia any other institution which has as complete a set of these very interesting and important newspapers, which records the feelings and the activities of the internees in our internment camps. I take it you would wish me to offer suggestions relating to what I consider to be the requisites for the proper preservation of the very valuable collection of war records which is in the possession of the War Memorial Museum. First of all I should like to say that books, manuscripts and documents of all kinds are like human beings in that for their proper preservation and life they must have suitable conditions and environment. I consider that Canberra possesses wonderful advantages in regard to many of the requisites for the permanent preservation of records. Among those requisites I would place air first. Books and documents, like human beings, require good air. The danger to their preservation which damp air conditions cause is very great. I refer, of course, to preservation, not for a short period, but for hundreds of years. Even in moist air, books and documents will last a considerable time. But in the present case we are dealing with national records, which we hope to safeguard for centuries. Perhaps the oldest records in the world are the Egyptian papyri, containing the records of Egyptian civilization. One of the reasons why they have been preserved for thousands of years without being eaten or soiled by man, is that the atmosphere of Egypt is a dry one, and they have not been affected by moisture. If Egypt had possessed a moist climate probably we should not have to-day any of these papyri. We have in our library Wills' diary of the Burke and Wills expedition. The explorers died at Cooper's Creek, in the centre of Australia, and, after their death, the diary remained exposed to the weather for twelve months, that is until the relief expedition arrived at the spot and recovered the remains of the ill-fated explorers. If there had been a moist, wet climate in the centre of Australia, that diary would have been almost pulp by that time; but on account of the dryness of the atmosphere it was and still is wonderfully well preserved. The writing which it contains, although in pencil, is still quite readable. For the reasons I have stated, therefore, I would place among the requisites essential to the permanent preservation of records and documents, suitable air. Then, also, you

must have a clear air, free from grime, dirt, or other impurity. I remember that, while I was attached to the library of the Sydney University, we received a presentation of a number of books from a gentleman who lived at Newcastle-on-Tyne. One of the first things that struck me when we opened them up was their grime, due to the large quantity of coal dust with which the atmosphere at Newcastle-on-Tyne is charged. It had penetrated right into the paper. I think we can claim for Canberra that it has both a dry and a very clear atmosphere. The basement where these records are to be stored, does not appear to me to have any natural ventilation. If the records are to be preserved for centuries, it will be necessary for the air in that basement to be kept pure. Therefore, if there is no natural ventilation, I consider it essential that some form of artificial ventilation should be provided. I come now to the second requisite which, in a way, is similar to the first; that is, damp. You can have damp air due to climate with which you cannot deal, but you can also have damp coming up from the ground or through the walls. In Melbourne we stored a number of our most valuable records in a strongroom in the basement. Unfortunately the floor, which was of concrete, was damp and some of our most valuable documents were injured. We experienced a great deal of difficulty in providing safeguards against this dampness in preserving the records. We endeavoured to have the floor made damp-proof and attempted to dry the strongroom by installing radiators; but we still found that the damp came through the floor and some of our books showed traces of mildew. Once mildew attacks any document it is a very serious matter indeed. It is very difficult to kill mildew when it gets into the texture of paper. Really the only way apart from using acids, which is risky, is to expose the document to sunlight for long periods, but, even then, you can never be sure that complete eradication has been effected. The basement of the war memorial building, I understand, will be below the surface of the surrounding ground. In my opinion, therefore, it is highly desirable that every possible precaution should be taken to see that there is no chance of damp coming up from the ground or through the walls. The third requisite which I would lay down as essential to the preservation of records is the prevention of fire. This requisite, and that which I last mentioned, are in the nature of negative requisites; that is, they are things which you should prevent. Of course, we are all aware that fire can destroy the most valuable records of a nation. Therefore, it is essential that the building in which these are to be housed should be made as fireproof as possible. There are two aspects from which we can view the danger of fire. First of all, there is the danger of fire originating in the room or section of the building where the records are stored. By the use of steel shelving and the elimination of wood and inflammable substances to as great an extent as is possible, the danger of fire originating there can be almost completely excluded. The second aspect is that of a fire occurring in some other part of the building in which there are inflammable materials, breaking through into that section in which the records are stored. It is, therefore, essential that the latter section shall be made as fire-proof as possible against the other parts of the building. We have temporary accommodation for the National Library in the No. 2 Secretariat. As we were to occupy only a section of that building, I went very carefully into that aspect, and reported reinforced concrete floors so that in the event of a fire occurring in the floor above, the likelihood of its being transferred to the basement in which the records were stored would not be so great. Also, we

have provided for fireproof doors for the entrance to the library section, which could be closed against the other portions of the building. From my study of the plans of the War Memorial Museum I do not think there is any danger of a fire originating in the basement where the records will be stored; but I do not know what provision has been made to protect the entrance to the basement against a fire which may occur in some of the other rooms, and which may afterwards pass into the basement. This is an aspect which is worthy of the committee's consideration. Then, as a fourth requisite, I would mention an even temperature. It is bad for records or books to be subjected to sudden and extreme variations of temperature. This is not a vital necessity, but it is one which does count in the preservation of records. We have in Canberra extremes of both heat and cold, and I understand that no provision has been made for the heating of the basement in which the records will be stored. It would be desirable to incorporate some form of heating, both for the preservation of the books, and also in the interests of the officers who will have to work there. Our officers have had experience of a winter in Canberra, during which their working hours were spent in the library basement, where there is artificial heating. I can say that it would be not only a great inconvenience, but also a danger to the officers of the War Memorial Museum if they had to go into the very cold basement of their building during the winter months to handle or extract records, if no form of heating were provided. The fifth requisite is the provision of adequate shelving space. In the handling of records it is essential to have a highly scientific system of classification, and that can be applied only if you have ample space for the arrangement of your records. I can speak feelingly on this matter, because, whilst I was in Melbourne the library was faced with the position of having to manage with altogether inadequate shelving accommodation for its books. This caused considerable trouble and annoyance to the officers who had to handle them, and also resulted in books being misplaced, and therefore lost until they were traced. In the proper administration of a library or a records department, very great difficulty is caused if adequate space for the classification and arrangement of records is not provided. Looking at the plans for the War Memorial Museum I doubt whether they will be faced with any difficulty in that regard. I understand that shelving space has been provided on a very liberal scale; that altogether there are 30,000 lineal feet of shelving to house their records. I should think that adequate. Of course, I am not so fully conversant with the extent of the records and documents in the possession of the War Memorial Museum, but I can say that 30,000 lineal feet of shelving should be sufficient to house quite a large number of records. If it were utilized for the housing of books only, it would provide space for 250,000 books. A foot of shelving space will carry 8.5 books. The last requisite is accessibility. These records are being stored, but so that they may be used by students and others who may wish to investigate or write up some aspect of Australia's part in the war. If they are to be used properly it is necessary that they shall be readily accessible. It is most irritating for a person who is conducting any research work to have to wait for long periods while a search is being made for books or records. The duty of librarians and library staffs is to make their books and records available as promptly as possible. The plans for the War Memorial Museum provide for a considerable degree of accessibility, but I consider they are susceptible of improvement. I notice that there is only one entrance, and a rather narrow one, to the big storage basement.

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Of course there will not be a large number of readers requiring books or records to be looked up; but, even so, I am not prepared to say whether that entrance is as convenient as it might be for the officers who will be in charge of the Records Department, and the students who will use the reading room. That matter might be gone into carefully by those who have the administration of that section. Also the arrangement of the stacks for the shelving of records, while straightforward and simple, are in some cases a little too long. I should prefer to see them broken up with main passages and converted into smaller sections. The length of the central passages would, in my opinion, improve the accessibility of the basement. I understand from Mr. Treloar that they intend to follow the recognized practice of having steel shelving similar to that in our library, and limiting the height to 7 feet, so that the use of ladders will not be necessary. This is quite a proper practice, and one which is now generally adopted. Those are the six essentials which I think you ought to have placed before you. I feel rather but there are three aspects which I would recapitulate. I would strongly urge the provision of adequate natural ventilation, and as there are difficulties in the way of ventilating it efficiently by natural means, artificial ventilation should be installed. In the interests of the officers who will be working in the basement, it is highly desirable that the air in that portion of the building shall be as free and as pure as possible. Officers who have to work for any length of time in a basement in which the air is not thoroughly cleared and renewed at regular intervals, suffer very considerably in health. As I mentioned titles, is as necessary for books as for humans. I have referred to one or two points from the aspect of accessibility. The only other point to which I would draw attention is the treatment of the reading room. We find in our library that it is highly desirable to have complete supervision of the reading-room. The records of the War Memorial Museum are very valuable, and the students who use them should be under complete supervision during the whole of the time they are in the reading-room. I suggest that the reading-room be made more open to another room occupied by an officer of the War Memorial staff, so that he may be able to exercise at all times some supervision over the students who use the reading-room. It is known that persons mutilate books or papers. If such practices were followed by students who were allowed to handle war records, it would be a very serious matter on account of the value of those records. There is just one other aspect of the plan to which I shall refer; that is, the recording of the names of Australia's dead on the walls of the Museum. The point I have in mind is the alphabetizing of the names. I believe that altogether about 80,000 names are to be recorded on the walls. That is a very considerable number. I think that those names are to be arranged according to the district or town in which the soldier enlisted. They will thus be divided into groups. Those groups will need to undergo a further division alphabetically. It can be recognized that thousands of names will have to be recorded of soldiers who enlisted in, say, Melbourne or Sydney. The alphabetizing of those names have read many lists of names on honour rolls, and have also seen the attempts that have been made at alphabetizing by persons who have had no experience or training in correct alphabetizing. It is not unusual to find glaring inconsistencies, and even actual mistakes. Seeing that people will come to Canberra to

look for the names of their relatives who have fallen. It is essential that we should make the discovery of these names as easy as possible for them. There are one or two examples I may mention of the problems which have to be faced when the task is undertaken of alphabetizing large numbers of names. Take, for instance, combined names. Are these to be placed under the first or the second portion of the name? Would you alphabetize Sir Henry Campbell-Bannerman under "Campbell" or "Bannerman"? Theodore Watts-Dunton under "Watts" or "Dunton"? It is necessary to lay down some definite rule. It would be quite wrong to enter the former names under "Campbell-Bannerman" and the latter under "Dunton-Watts". The problem of hyphenated names is a difficult one, but definite rules have been adopted by libraries, and other institutions, in which alphabetizing must of necessity be made an exact science. Then there is the great family of Smiths. Some members of that family in order to distinguish themselves tack on a family name, as in the case of Jellie-Smith, and Joynton-Smith. There is the further big family of Macs. They are indeed a problem. It always irritates me when I consult the telephone directory and find that in this regard it lacks a proper, scientific method of alphabetizing. You have M' as in McKinnon; Mc as in McDougall; and Mac as in MacKell. You must have some definite rule. That which has been adopted by all libraries is to treat the three forms as one, as though they were all Mac. Thus the order for the three names I have mentioned would be McDougall, MacKell and McKinnon. Then there is the question of foreign names. Although there will not be many of these, they will constitute a small percentage of the total number. You have a name such as Du Barry; would you put it under "D" or "B", the "Du" or the Barry? We have these anglicized in De Quincey and De Montgomery. It will be necessary for those who are responsible for the alphabetizing of the names to give very careful consideration to these problems. I have given only one or two typical illustrations. There are many other problems connected with alphabetizing which will have to be faced, and rules will have to be carefully laid down so that the whole of the alphabetizing will be uniform and scientific. It is highly desirable that the names of the soldiers who have given their lives shall be discoverable to their relatives and friends with as little trouble as possible. Therefore, this matter might well be considered by those on the staff of the War Memorial Museum, who will be responsible for the placing of those names. There has been, and there must be, some duplication in regard to purchases by the War Memorial Museum and the National Library. I am not in favour of it being extended beyond what is absolutely essential. It would be desirable to come to some arrangement whereby clashes would be avoided in the future. The War Memorial Museum might limit the scope of its purchases to objects that were actually created up to the signing of the armistice. It would not be desirable to impose such a rigid limitation upon them in regard to the purchase of books, because some of the most valuable critical studies of the tactics and campaigns of the war are only now appearing. It is not desirable or requisite that they should purchase all the war books that will appear. If the museum is to provide material for students of the war, however, it will have to purchase some books which have appeared since the signing of the armistice. Only this week we added to our library Bergmann's *History of Reparations*. Reparations are a very important aspect of the war, but it is one which I think can be regarded as being outside the scope of the War Memorial Museum. We have also added to our library recently

Field Marshal Sir Henry Wilson's diaries. The scope of the war museum's purchases might be wide enough to enable it to acquire a book of that character, or perhaps a work like General Montgomery's *Story of the Fourth Army*, which is one of the most important works that have been published dealing with the tactics and conduct of the final stages of the war on the western front. But I certainly agree that it is desirable to have some definite delimitation and definition of the scope of the War Museum, so as to avoid any conflict with the work of other libraries and institutions in the Commonwealth. During the winter months there will not be many visitors to Canberra, and it is thus unlikely that a large number of persons will pass through the War Memorial Museum during that season. Even if the number were considerable, they would be constantly on the move from one exhibit to another. Therefore, I do not think it is essential that a heating system should be installed throughout the building. It is, however, highly desirable in out the building. It is, however, highly desirable in those portions in which officers will be working, or in which records will be stored. I am not in a position to say what staff will be necessary for the details of the work and the scope of the museum. Heating should be supplied for the reading room, and the rooms in which officers will be engaged in recording and indexing the records. Students engaged in perusing records in the reading room, would find it very uncomfortable during the winter months, because that room will have no natural sunlight. It is essential that some form of heating should be provided in that room. Radiators would be very acceptable in the absence of central heating and, for a room of that size should prove adequate; but they would not be adequate for the records room of the building. On no account would I support the proposal to install sprinklers of any kind in the big basement. Water is quite as dangerous as fire. Books burn very slowly, but water can quickly do an enormous amount of damage. If, by any chance, one of these sprinklers should operate without cause, the result would be enormous damage; or in the event of a small fire occurring in any section, the damage would be accentuated by the use of the sprinkler when it might be possible for a chemical extinguisher to cope with the fire without serious injury to the records. I cannot give details of the actual cost of the steel shelving which would be required, but I can say that the tender for the shelving provided for our library was surprisingly low when considered in relation to the amount of book storage capacity obtained. Actually it was less than would have been the case if wooden shelving had been adopted. The minimum space between the stacks in the ordinary passages should be 3 ft. 6 in., and in all main passages 4 ft. 6 in. Even from the stand-point of the shelving of records, I would certainly recommend subdivision of the central stacks. In a library accessibility is an important factor, because numbers of people are continually asking for books. In this War Memorial Museum, I take it they will have to deal with a very limited number of students. In the library we require a number of main passages so that the officer concerned may reach his objective as quickly as possible, instead of having to walk around a long bookcase. A central passage enables him to shorten his journey considerably, and facilitates the arranging of the library. Main passages in addition to the narrower passages between the bookcases themselves also make it much more convenient to handle our book trolleys. The value of a collection of books is determined by the degree of scientific classification and indexing which has been given to it. On that account an expert officer should be engaged to undertake this work in connexion

with the War Memorial Museum. Of course the qualifications requisite for the handling of war records are different from those of library officers, who handle general literature.

183. To Mr. M. Cameron.—The officers of the library could assist materially in the task of alphabetizing of the names. We have definite rules in regard to

alphabetizing. We have in our catalogue approximately 600,000 cards, all of which have to be alphabetized. 184. To Senator Reid.—If the basement of the War Memorial Museum, which occupies a position similar to that of the ground floor of Parliament House, were constructed on similar lines, there should be no danger of damp getting into it. Particular attention was devoted to the question of making the floor of the book-stack of the library damp-proof. That was specially insisted upon when the plans of the building were under consideration. Adequate damp courses and damp-proof materials were used. I mention that merely as an aspect which should receive special attention. The fact that there will be excavation round about it will lay upon the builders a greater obligation to see that the floor is made damp-proof. Where there is excavation, the seepage is greater than where the ground is level. The authorities must use their discretion with regard to the acquisition of war trophies or war records. In the case of trophies, it might be possible to limit purchases to those which came into existence during the actual period of the war; but there would be some special works, such as that of General Montgomery, which they ought to acquire, even though they were published after the armistice.

185. To Mr. Cook.—There should be some form of heating in case the air should be too cold. In very cold weather the moisture in the air is deposited on the books or the records. Some form of heating would check that deposit, and help to dry the atmosphere if it should be too damp.

(Taken at Canberra.)

FRIDAY, 4TH MAY, 1928.

Present:

Mr. MAONAY, Chairman;
Senator Reid Mr. McGrath
Mr. M. Cameron Mr. Seabrook
Mr. Cook

John Linton Treloar, Director Australian War Memorial, at present seconded for special duty in connexion with the proposed British Empire Exhibition, Sydney, sworn and examined.

186. To the Chairman.—I have been connected with the proposal to establish a National War Memorial at Canberra since its inception. In 1917 I was appointed by Field-Marshal (then General) Birdwood to organize and control the Australian war records section, which was responsible for gathering together the relics and records now known as the Australian War Memorial Collection. It was intended by the Government that the amount to be expended on the proposed Australian War Memorial building should be limited to £250,000. That was intended to be the contract price of a stone-faced building of fire-resisting construction providing the accommodation specified by the War Memorial Board and including the points required for a portable vacuum cleaner. It was not intended to cover architect's remuneration; interest on capital during construction; statutory or carrying heating system; the cost of preparing the site, including the laying out of surrounding grounds and constructing the walls, terraces, steps, roads, &c., as may be incidental thereto; the extension of electricity, water,

sewerage and other essential services to the walls of the building; special fire precautions, such as a sprinkler system or automatic fire doors; or flood-lighting. The conditions with which Messrs. Sodersten and Crust were required to comply, the printed based upon, and practically identical with, the printed conditions that were issued in connexion with the War Memorial competition. The War Memorial Board have examined the plans of Messrs. Sodersten and Crust, and on the authority of expert advisers, who were closely associated with the competition, they consider that there is a reasonable prospect of the building being completed for the amount of £250,000.

In estimating the cost of maintenance, reliable data are available, as the collections have now been on exhibition for six years. At Canberra there will be a larger floor space, but practically all exhibits will be under glass, and in a new building the labour involved in cleaning and preservation will not be nearly so heavy as it is at present. As the memorial will be open to the public on every day in the year except Good Friday and Christmas Day, it would appear to be quite unnecessary to keep it open at night. Having regard to these considerations, I estimate that the maintenance will be—

Salaries—	
Curator and librarian (a combined appointment)	£450
Typists and clerk (a combined appointment)	200
Senior attendant	350
Three cleaner-attendants at £5 per week	780
Caretaker (with free quarters in the building)	200
Reliefs for recreation leave, Sunday and holiday pay	200
Total per annum	£2,580

Contingencies—	
Stationery, office requisites, postage, telephones, electricity for lighting and heating, petty cash, cleaning materials, water, &c.	£400
Maintenance of building	250
Total per annum	£650

The estimate of the maintenance of the building has been supplied by the architects. In addition, conditional upon the terms of the committee's recommendation, there may be two other items—flood-lighting, and heating and ventilation. The annual maintenance charges will be given later.

There will also be the maintenance of the grounds, comprising an area of 30 acres. The superintendent of parks and gardens has advised me that, if the intense cultivation is restricted to the immediate vicinity of the building, and the remainder of the area developed as a park, it will be possible for four gardeners to maintain it, although during the first two years an additional two men will probably be needed. He also estimates that contingencies such as plants and tools will equal about 5 per cent. of wages when the gardens are established, although they may represent 10 or even 15 per cent. during the first two or three years. Water per cent. requirements have been estimated by the engineer for requirements have been estimated at about £50 a year. Summarized, the maintenance of the gardens when properly established will be—

	Per annum.
Four gardeners at £5 12s. per week	£1,184
Plants, tools, and other contingencies	60
Water	60
Total	£1,274

It has always been intended that the cost of laying out the 30 acres of ground surrounding the building should be regarded as additional to the £250,000, but I am not aware whether the Government intends to make the War Memorial Board responsible for the whole area,

including building and grounds, or whether it will restrict its control to the building only. A small revenue will be received. As an indication of what this may be, I may mention that during the last twelve months the War Museum in Sydney received from the sale of guide books, reproductions of pictures, photographs and so on, a revenue of £720, of this about 98 per cent. is profit.

The advisability of flood-lighting has been generally considered. In this mechanical age, the perpetual burning of a light has not the same sentimental appeal as had the burning of a lamp which required constant watchfulness and tending. The adoption of flood-lighting in connexion with the Albury memorial has appealed to the imagination of the public. The Goulburn memorial, which is also flood-lighted, is never mentioned, because train travellers pass through Goulburn when most of them are in their sleeping berths. This suggests that the chief advantage of regular flood-lighting is that it attracts the attention of those who would otherwise pass by unheeding. To the local inhabitants the flood-lighting quickly becomes familiar and it is taken as a matter of course. I think, therefore, that flood-lighting would not enhance the sentimental appeal of the war memorial in Canberra, and I am not in favour of the perpetual flood-lighting of the building. On a moonlight night, as Mr. Whiteford has suggested, the silent majesty of the building, if light in colour, will be most impressive. At the same time I realize that flood-lighting is probably the most effective method of ornamenting a building on special occasions, and I think that, provided the cost is reasonable, it would be desirable to provide facilities for flood-lighting the building on such occasions. These might be the anniversaries of the outstanding achievements of the Australians in the war. Such anniversaries would number about 40. If this were thought to be placing an insistence on national achievements in war, which is out of keeping with the outlook of the Australian people, one could select instead national holidays. As a third alternative, and one to which probably no one could take exception, Anzac Day and Armistice Day—the days on which, so far as Australia was concerned, hostilities commenced and ended—might be chosen as the special occasions on which the memorial would be flood-lighted. With reference to cost, the installation necessary for flood-lighting all sides of the Hall of Memory and dome has been estimated at £550. The working expenses (renewal of lamps and current), would cost approximately £1 18s. 3d. (say £2) per night of five hours. It would appear to be sufficient to light only three sides of the Hall of Memory and the cost of installation and working expenses could be reduced by 35 per cent. If flood-lighting is adopted, I think it should be confined to the Hall of Memory and the dome, not only for financial reasons, but also on aesthetic grounds. The opinion is based on an inspection of photographs of the flood-lighting of a number of important buildings in America including the Capitol at Washington, which, in some instances, showed full and partial lighting and enabled one to form an opinion of the comparative beauty of each method. The use of search-lights from Australian warships which served in the war has been noted for consideration in connexion with flood-lighting. It was thought that this would appeal to the public as being appropriate. It was never intended, however, that the search-lights should be used as search-lights. All that was intended was that the projector should be used to house, reflect and focus an electric lamp as ordinarily used for flood-lighting.

In the Sydney Sun of the 17th April, Sir John Sulman is reported to have informed the committee that:

In 1923, when he was in touch with the War Museum Committee, he made a rough plan of the building to

suit the committee's needs, and found that the £250,000 allotted by the Government was inadequate. He advised the committee to decrease their wants. They declined to do so. He asked the Government to increase the amount. This was refused. He then left for Europe and, on his return, no progress had been made."

Doubtless, owing to the fact that he has not been in a position to refresh his memory by consulting the records, Sir John overlooked certain facts. In a letter dated 29th December, 1923, from Sir John Sulman to the Acting Director, Australian War Memorial, to which was attached a draft copy of the conditions for a competition, together with a specification of the war memorial's requirements, he stated that:

"The building can, I believe, be carried out for £200,000 if it is kept simple but, as 10 per cent. is allowed as a margin, the cost will probably run to £220,000."

In the draft conditions, £200,000 was given by Sir John as the sum allowed for the building, although provision was made for a 10 per cent. margin. The recommendations prepared by the representatives of the War Memorial and the Federal Capital Advisory Committee, of which Sir John Sulman was Chairman, were submitted to the Government at the first Cabinet meeting at Canberra, which was held on the 30th January, 1924. In this it was recommended that £250,000 should be allowed. This was approved. If the specification of the War Memorial's requirements issued to the architects is compared with the specification attached to Sir John Sulman's letter of the 29th December, 1923, it will be found that various alterations have been made, the net result of which was to reduce the floor space required for exhibits by 10 per cent. It will be seen, therefore, that the war memorial did reduce its requirements and that the amount was increased by the Government. After approval was given by Cabinet, action was taken to prepare the conditions of the war memorial competition. It was, however, considered advisable to defer the launching of the war memorial competition so that it would not clash with the competition for the administrative offices. This explains why it was not possible to proceed with greater speed with the launching of the competition.

In answer to your inquiry whether or not the War Memorial Board considers it necessary that statuary should be provided at the outset, I may say that the Board does not think that this is necessary. In the Board's opinion statuary is not essential, and the building will not be unfinished without it. Statuary is, if I may use the term, in the nature of a "luxury." It will not be a charge against the building but the Board will be responsible for finding the funds. This will mean that the provision of statuary will be spread over a period of years. Another factor which will contribute to the same result is that such embellishments must be worthy of the Memorial and the Board will prefer to wait for really good designs rather than take the first which may be offered.

P. R. Montford, a witness who appeared before the committee, is reported to have stated that it would be necessary to bring out a sculptor from England to execute the statuary required for the War Memorial. The War Memorial Board has taken the view that it is the wish of the Australian people that the National War Memorial should, as far as possible, be the work of Australians. For this reason, the collection of works of art which will be housed in the memorial are the work of Australians with, I think, one exception. The exception is a Scottish artist who was attached to the Australian Camel Corps in Palestine for several months. The offer of his works to the memorial was so attractive that it could not be declined. He offered seven etchings to the memorial at the cost price

of £50. To-day these etchings are worth approximately £2,000, a price which is based on the amount received for copies of the etchings recently sold in America.

In pursuance of this policy the board will, doubtless, prefer to endeavour to arrange for Australian sculptors to produce the statuary required for the memorial. There is reason to believe that this will be practicable. Sir Bertram Mackennal and Harold Parker, to mention two living Australian sculptors, have work in the Tate Gallery in London, which is the hallmark of a modern British artist: G. W. Lambert, A.R.A., and W. L. Bowles, who are working in Australia as sculptors, are also doing good work. In several competitions in Australia they have been placed ahead of the sculptor who advised the committee that there are no Australians capable of doing the work the War Memorial will require. W. W. Anderson is another sculptor who is doing promising work. Lambert, Anderson and Bowles also served with the Australian Imperial Force and, therefore, know something of the spirit of its members.

With reference to the central feature in the Hall of Memory, I am afraid that in collecting the data to be submitted to the committee, I took too narrow a view of the scope of its investigation. I thought that it would be confined to the building proper, and would not extend to the statuary and other features, which I looked upon as exhibits rather than as appertaining to the structural side of the proposal. Had I realized that the committee would have been interested in statuary and such-like details, I should have suggested that the War Memorial Board prepare a concrete proposal. As it is, the board has not considered this matter. The board would, however, I think, take the view that this is essentially a matter in which it is desirable to take the advice of experts. Probably the most satisfactory way to effect this would be to hold a competition, open to architects and artists, and adopt the suggestion which was considered the most appropriate and suitable. I believe that Messrs. Sodersteen and Crust would prefer that nothing should be placed in the centre of the hall, so as to foster the suggestion of spaciousness. They would treat the floor with a design of a memorial character. Personally I would like to see the War Memorial associated with the war cemeteries in which the fallen lie, by including in it the beautiful slender Cross of Sacrifice and the Stone of Remembrance, which are the common features of all the British military cemeteries in Christian countries. The Stone of Remembrance would be appropriately placed in the centre of the Hall of Memory, and the Cross might be placed in the recess or sanctuary facing the entrance to the Hall of Memory, or in the courtyard, so that it would be seen from the entrance standing out in clear relief against the subdued light in the Hall of Memory. Upon the Stone, or at the foot of the Cross could be laid the floral tributes which visitors will doubtless desire to place there. As the committee will observe from the illustration that I shall leave for their inspection, the Stone of Remembrance is without any adornment. If it should be felt that it is too severe, I would favour the idea of a regimental infantryman, such as G. W. Lambert has designed for St. Mary's Cathedral in Sydney. Although it would not be appropriate as the central feature of the Hall of Memory, I hope that the Memorial will eventually include a work expressive of the sacrifice of the women of Australia in giving up to the service of their country and the Empire their sons and husbands. But this is only one of the many ideas which will be developed while the War Memorial is in course of being established. In my opinion, the success of the Memorial will depend very largely upon the devotion and inspiration with which those responsible for its establishment are actuated. Provided that the problem is approached in the right way, and I think it

will be, the Memorial can be made something more than a structure of stone and mortar housing a memorial collection, something which will be rich in symbolism and alive with sentiment, something which will truly express the affectionate remembrance in which the fallen are held by their comrades, by their relatives, by the people of Australia. The scope of the Australian War Memorial is prescribed in Act No. 15 of 1925. In this act it is stated that the Memorial shall consist of the collection of war relics of the Commonwealth, and such building for the accommodation of those relics as is specified by the Governor-General by notice in the *Gazette*. It is further stated that the war relics of the Commonwealth shall include the relics, records, models, pictures, photographs and any other articles which at the commencement of the act comprise the Australian War Museum, and any other articles having relation to the war which were acquired in pursuance of the act. Under the act, the board is empowered to acquire relics, records, models, pictures, photographs, publications and other articles relating to war. Although it is not expressly so required, the board has followed the policy of acquiring exhibits which relate only to Australia's part in the war. In reply to your question whether the shelving provided for records is adequate or excessive, and how many books will be in the library, I may state that books represent only a very small proportion of the records in the possession of the memorial, the bulk of which are written documents. It was convenient to specify the War Memorial's requirements as 30,000 feet of adjustable shelving, 15 inches deep, and 15 inches wide, as, when the specification was drawn up in 1923 it was, and it still is, impracticable to describe in detail the varying width and depth of shelving which will be required. Many of the records are in boxes and are inconvenient to place them on the shelves as they stand. This may increase the width and distance between shelves which they will occupy, but reduce the length in running feet. The records already in the possession of the War Memorial, or which the Department of Defence has agreed to transfer thereto as soon as they are no longer needed for administrative purposes, will occupy the equivalent of 21,000 feet of shelving of the dimensions specified. This leaves 9,000 feet for records, both printed and written, collected in future. This, in my opinion, and having regard to the volume of records which may be expected, is a reasonable margin. At present the classification of records is being proceeded with, and satisfactory progress is being made. The records comprise different classes, and it has been necessary to deal with each class as was considered most suitable. The papers which deal with administrative subjects such as equipment, munitions, training, rations, and such things, are filed by subjects. The operation papers are classified according to the actions to which they refer, and arranged in a certain order, convenient to those who will use them. The maps and air photo mosaics are classified according to the battle-fields. Vertical and oblique air photographs are filed numerically, and indexed according to map references. Press cuttings are classified according to subjects, while books are classified on the well-known decimal system, which has been adapted to the special requirements of the War Memorial. As illustrating the suitability of the methods adopted, I may quote the following from the report of a gentleman associated with the Memorial, and who had a fairly lengthy attachment to the war record sections in Great Britain, Canada, New Zealand and the United States of America.

I have explained the system adopted in connexion with the Australian records to the department to which I have been attached, and the unanimous opinion is that this is the most thorough and ideal method of arrangement, making

for the convenient use of the records by historians and others. In regard to the progress made in classifying the war records, the work in Australia is greatly in advance of that of the countries which I visited. This fact, together with the desire for the greater use of classification, is probably responsible to date for the progress made in the Australian records. This will be appreciated when it is realized that Australia has produced six volumes of the Official History, and has three volumes in the hands of the printer, and due to be published before the end of this year. In America and Canada, where the historical sections have been in existence for a similar period and with larger staffs than the War Memorial, no volumes have, up to the present, been published.

In order to avoid any clashing with other bodies such as the Commonwealth Library, the scope of the War Memorial Library received very careful consideration by the War Memorial Board. The matter was discussed by Captain Bean, on behalf of the Board, and Mr. Binns on the 28th August, 1919. Captain Bean put forward the view that the War Memorial should have—

(a) All documents of a "museum" value (i.e., interesting as exhibits); and

to which Mr. Binns agreed; and

(b) All books or records reasonably necessary for writing histories of the Australian forces or for the study of their part in the war. (This would not involve the acquisition of every scrap that was ever printed relating to the war, or novels with a war flavour unless they throw a particularly illuminating light upon war. The National Library to have everything that was ever written on war, at any rate, if it can be obtained in Australia.)

Mr. Binns generally agreed to this, and it was decided that he should draw up a proposal along the lines of (b).

The scope of the War Memorial Library was further considered by the Board on the 23rd March, 1920, when it was decided that the library should be limited to—

(a) written records dealing with the war;

(b) trench, transport and unit papers and magazines;

(c) publications and books having a special value by reason of their historical connexion with, and reference to, the Australian Naval and Military Forces, and providing data for the compilation or study of Australian war records.

This was submitted to the Prime Minister, and approved in a letter dated 8th April, 1920. The collection of records has since proceeded within the terms of this arrangement.

I do not agree with the suggestion that the war memorial should confine itself so far as books are concerned, to those published during the war. Books published during the war were censored, and many were written as propaganda. If the War Memorial's collection of books were limited to those which were published during the war, this section of the Memorial could never be accepted as providing a record uncoloured by national prejudice. Unless the Memorial contains a true record its value will be discounted. Another important consideration is the convenience of historians, research workers and students who will make use of the records in the War Memorial. The needs of the War Memorial staff, which has to make frequent references to war books, must also be provided for. Any one who wishes to understand the work of the Australian Forces must refer to the written records such as the official war diaries, correspondence files, returns, &c., together with the maps and air-photos. These exist only in the possession of the War Memorial. In addition, the War Memorial has the models, pictures, photographs, relics, &c. By including also the books, we enable the person who is interested to find, under one roof, all the material he requires. If we do not have the books he will find in the Memorial 95 per cent. of his material, and have to go to another institution

for the remainder, being thus subjected to irritating interruptions and delay. It is a common practice for an institution specializing in a subject to have a library dealing with its subject even although there may be in the same city a public library. For example, in Sydney the Australian Museum has its own library of about 40,000 volumes, and one could mention numerous examples in London. It has been said that what may be desirable in a city such as London or Sydney, is unnecessary in Canberra. The War Memorial Board is providing for the Memorial not in the terms of a capital city with a population of about 7,000, but with the anticipation that Canberra will develop into a city with an importance parallel to that of Sydney, and it is taking a limited view to contend that, merely because Canberra is now small, these books should not be collected. The justification of this so-called duplication is not only that it promotes the convenience of students, but it enables the subject to be covered more thoroughly than would be practicable in a public library. Of the books acquired by the War Memorial, probably 50 per cent. are works which would not be purchased by an Australian public library, because they are technical military works, often in a foreign language, which would not be of interest to the general public. These books never come to Australia in the ordinary trade way, but have to be specially ordered. For this latter reason the War Memorial has been obliged to establish machinery whereby it becomes aware of the publication of such books, and thus placed in a position to acquire them. The War Memorial confines itself to Australia's war effort and makes no attempt to cover the whole war. It acquires only works which have a definite record value. It is in a position to subject its selection to a running practical test as the Australian Official Historian depends upon the Memorial for the books and other records on which his work is largely based. The value of the books which it acquires annually, and which also would be acquired by a national library, is at present about £25. This figure will decrease as the publication of war books of historical value dwindles. Another consideration not unworthy of notice is that the so-called duplication is a safeguard against the total loss to the nation of important records in the event of the destruction of the collections of either institution. It should, perhaps, also be mentioned that, as the War Memorial is responsible for supplying the records required by the Official Historian, it would appear that it must continue to obtain, until the Historian has completed the History in several years' time, the books which he will need. I do not think that there is any probability that the purchase of books will outgrow the accommodation which is to be provided. The margin of 9,000 feet of shelving for books and written records acquired in future would accommodate 72,000 books, which is in excess of the number likely to be collected. At present the collection numbers between 8,000 and 9,000 volumes, but as I have already mentioned, books represent only a small percentage of the records in the library. From this morning's newspaper, I gathered that Mr. Binns suggested that the alphabetical arrangement of the Honour Roll should be based on recognized scientific principles. That, of course, was really an elementary matter which had received the attention of the War Memorial Board, and was regarded merely as one of a number of machinery matters which will be developed as the compilation of the Honour Roll is undertaken. Another such detail is the action which shall be taken in regard to soldiers who served under assumed names. I believe that the board will follow the example of the Imperial War Graves Commission and record those men under both names. Captain Bean explained to this committee

that the War Memorial Board had come to the conclusion that the best method of grouping the names would be by towns or districts. He gave the reason which induced the board to come to that decision and the reasons why the alternatives of arrangement by date of death or unit were considered less satisfactory. I may, perhaps, mention, however, that from press reports I understand it has been proposed that in the grouping of the Honour Roll, notice should be taken of States and municipalities. One serious objection to basing the grouping on these lines is that municipal boundaries are constantly changing, and this must be expected to continue indefinitely. Classification by municipalities, and possibly even by States, would gradually become out-of-date and unintelligible, and, as many changes have occurred since the war, would complicate the compilation of the Honour Roll. If a locality classification is adopted, and it seems to the War Memorial Board by far the best, the only safe course will be to take the town as the basis. By disregarding State boundaries, as the board proposes to do, not only will the possibility of a change in State boundaries be guarded against, and the roll made a national one in the truest sense, but the task of the visitor in finding the town in which he is interested will be made as simple as possible. It is the intention of the board to follow a scheme wherein the towns will be grouped, not by States, but alphabetically. Where a town of the same name occurs in several States, the State will be added in brackets. The Board has given the matter very careful consideration.

The General Secretary of the Returned Sailors and Soldiers Imperial League of Australia, in the course of his evidence stated:

"We are also, to some extent, responsible for the placing of 80,000 names on the walls of the cloisters. It was originally intended to have 60,000, representing only those persons killed overseas, but upon our representations of the names of those persons who have died since as a result of war injuries are to be included."

From the sequence of events as known to the general secretary, it must have appeared to him that the position was as stated. It was however never the intention of the War Memorial Board that the honour roll should be limited to members of the forces who died during their service.

When the conditions of the war memorial competition were being prepared the Department of Defence advised the acting director that the total number of deaths during service were 60,377, and that the works branch, which is arranging for the erection of headstones over the graves of members and ex-members of the A.I.F. who died in Australia as the result of injuries or illness contracted on active service, expected to erect approximately 9,000 such headstones. The deaths in the Naval Forces were roughly 225. On these data it was concluded that the number of names to be recorded in the Hall of Memory would be approximately 69,500. After I resumed duty at the War Memorial in the latter half of 1920, I commenced making inquiries with the object of testing the accuracy of the estimate of numbers and also in connexion with the compilation of the list of the Australians whose names are to appear in the roll of honour. Chiefly because of the letter, the inquiries extended over a lengthy period, and were not completed until the end of last year. The result of these inquiries was embodied in a statement prepared for consideration by the War Memorial Board, which did not, however, meet until February last. The board then agreed that the estimate of the number of names previously adopted was incorrect, and that the number would be about 80,000. As this report by this committee will become of historical interest, it appeared to me advisable to make it clear that the War Memorial Board at no time contemplated limiting the honour roll to those who died during the war.

The direction to the architects that "No central heating system will be necessary" was, I understand, inserted when the conditions of the competition were being considered by the adjudicators. The reason probably was that they did not wish to burden competitors with the need to provide a service which, in their opinion, was not absolutely essential. At that time they were, I believe, thinking only of the comfort of visitors, and failed to appreciate that the question of temperature might play an important part in connexion with the preservation of the collections. While Messrs. Sodersteen and Crust were collaborating in the production of a design, the suggestion was made to representatives of the War Memorial, in the course of conversations in Canberra, that it was hoped heating would be provided in the War Memorial building. This suggestion was passed on to the architects, with the result that they drew attention to this in the specification. I realized that the Public Works Committee would be able to form its own opinion as to the necessity for heating from the point of view of comfort of visitors, but the committee would probably be glad of expert advice upon the necessity for heating, having regard to the preservation of the collections. I, therefore, consulted the Directors of the Australian Museum, the Technological Museum in Melbourne, and the Tasmanian Museum, and arranged for the High Commissioner's Office to be instructed to take the advice of the British Museum. All the Australian authorities are agreed that a system of heating and ventilation is desirable, particularly so during the first two or three years, until the walls have become completely dry. The British Museum says that heating is essential, as the change of temperature and condensation of moisture is harmful. A standard temperature of 60 degrees is recommended, and it is said that a hot-water system would be satisfactory.

It will be observed that the problem is one not merely of providing heating, but of maintaining an equal temperature throughout the year, thus requiring heating in winter and cooling in summer. The mean summer temperature in Canberra is 68 degrees, which is fairly close to the temperature recommended by the British Museum. It is probable, therefore, that by the intelligent manipulation of the natural ventilation provided in the building it will be possible to keep the summer temperature about right, without the necessity to provide artificial cooling.

The architects obtained estimates for heating, and also for heating and ventilating. The former was £14,000 and the latter £13,000. I think that the latter would be preferable, as it will provide for the building to be warmed by heated air. It is generally recognized by museum experts that no class of exhibits can stand continued heat. If radiators, either hot water or electric, were employed it would be necessary to leave the wall and floor space in their immediate vicinity clear of exhibits. This would be a very great disadvantage, as the amount of accommodation provided is exactly right.

I am informed that the working expenses for the heating system would be approximately 50 per week, covering fuel 25, and sundries 25. The working expenses for the heating and ventilating system would be £14, representing fuel and sundries as for heating, with the addition of 25 for the current required to work the ventilation fans. No provision is made in either case for wages, as it would be practicable for the caretaker or one of the attendants to undertake this work as part of his duties.

The plant would be in operation during about six months of the year only, so that the cost per annum would be £224 for heating or £364 for heating and ventilation.

That estimate is for the whole building. When the museum was housed in Melbourne and Sydney, no heating was provided, but we experienced a great deal of difficulty from damp, especially in Sydney. We were even obliged to remove many exhibits from exhibition because of our inability to protect them from damp. The opinion of experts is that heating is essential. So far as the Board are concerned, the only additional expenditure on the building proper of which they are aware is that associated with heating, ventilation, and flood-lighting. I understand that a considerable amount of money will have to be spent on the ground in the vicinity of the memorial, but perhaps its effect might be lessened if the Federal Capital Commission concentrated upon the settlement of that area.

As one who knows from practical experience the great difficulty of preserving the collections from pests, damp, fire, &c., in the buildings in which they are at present housed, I do hope that the committee may be able to see its way to urge upon Parliament the importance of providing as soon as possible this building in which the collections will be permanently housed. I intend to propose that the contractor should be required to make the lower ground floor habitable as quickly as possible, so that the whole of the collections can be moved there, pending the completion of the remainder of the building. Once the construction of the building is in hand it will be necessary to leave undone nothing which will help to ensure the safety of the collections, which will be, as it were, the soul of the memorial, and without which the whole idea would break down. The course suggested would be not only in the interests of the collections and the memorial generally, but would result in an annual saving of about £3,000 on rent, staff, and other charges.

187. *To Mr. Seabrook*.—Most of the services previously enumerated by me are essential at the outset and could not be postponed. Perhaps the instalment of a fire sprinkler system may not, on the surface, appear to be essential, but it is remarkable how other buildings seemingly fireproof have found it necessary to install fire sprinklers, which have at a later period had to come into operation when a fire occurred. The contents of the Memorial, as for example aeroplanes, will be of an inflammable nature, and when I urge that a sprinkler should be installed, I take the view that it is better to be sure than sorry. I am aware that the occasions on which a sprinkler is called into operation are few, but when that does occur the saving is substantial. I am also aware that the operation of a sprinkler would cause very considerable damage to the contents of the memorial. Certainly our knowledge of the construction of the building suggests that the possibility of a fire is very remote.

(Taken at Canberra.)

WEDNESDAY, 9TH MAY, 1928.

Present:

Mr. MACKEY, Chairman;
Senator Reid Mr. Lacey
Mr. Cook Mr. Seabrook.

Sir John Henry Butters, M.Inst. C.E., M.Am. Soc. C.E., M.I.E. Aust., Chief Commissioner, Federal Capital Commission, Canberra, recalled and further examined.

188. *To the Chairman*.—When I last appeared before the committee, you asked me whether the Federal

Capital Commission had considered the acting chief engineer's estimate of £103,905 as the cost of the work adjoining the site of the Australian War Memorial and also the foundations. Since then the Commission has reviewed that estimate, and I now hand in the following statement, which represents a close preliminary estimate of the cost of the work, and one of which the Commission approves:—

9th May, 1928.

Subject.—Engineering Services—Australian War Memorial.

ESTIMATES OF COST.

Service.	Service within the Building.	Accessory Services Chargeable to the Building.	Other Services to be Provided by the Commission.
1. Sewerage.—A 6-in. sewer will be required to drain the War Memorial Building. The sewer will be run from Gallipoli-avenue direct to the building, and only a small proportion of the length will be available for future subdivisional purposes. The estimated costs are ..	£	£	£
2. House drainage and plumbing, wholly within the building. Estimated cost ..	1,110	650	275
3. Water supply and fire protection. It is proposed to run a 6-in. main from Gallipoli-avenue and to encircle the building, and to provide four hydrants for fire protection. Estimated cost ..		1,375	
4. Sprinkler system for internal fire protection. Estimated cost ..	5,000		
5. Electric supply. It is proposed to have a substation in the basement of the building near the front entrance. For supply it is suggested that an underground cable be run from the intersection of the proposed City Railway and Anzac Park, along Anzac Park to the building. Estimated cost ..		2,852	
6. Lighting of building, not including flood lighting of dome. Estimated cost ..	6,150		
7. Flood lighting of dome. Estimated cost ..	850		
8. Hot water heating system ..	14,000		
9. Formation of grounds, including excavation on site of building. Estimated cost ..	7,825	7,825	
10. The following items are provided and estimated for by the Architect:— Concrete paving of terrace at 1933 level. Estimated cost ..		2,444	
Concrete paving of terrace at 1925 level. Estimated cost ..		6,722	
Concrete paving of side entrances. Estimated cost ..		1,375	
Concrete paving of main entrance. Estimated cost ..		684	
Brick paving of paths and terraces. Estimated cost ..		1,650	
Terrace wall (concrete retaining wall) ..		4,400	
Front steps between 1925 level terrace and 1933 level terrace ..		4,400	
Carried forward ..			

ENGINEERING SERVICES—AUSTRALIAN WAR MEMORIAL—continued.

Service.	Service within the Building.	Accessory Services Chargeable to the Building.	Other Services to be Provided by the Commission.
Brought forward ..	£	£	£
11. Stormwater drainage. It is proposed to construct an underground stormwater drain along the depression to the west of the building. Provision will be made to collect surface water from this depression by inlets at frequent intervals. The invert of the drain is below basement level of the building. Branch drains from the building, carrying roof water and surface water from the courtyard may be connected to the drain. Two culverts will be required on the Anzac catch-water drain on Peronne-crescent and Flanders-avenue. Estimated cost ..		700	2,900
12. Plantations in grounds and beautification generally. Estimated cost ..		3,385	
13. Surrounding roads including kerbing and guttering— Gallipoli-avenue ..	128	5,022	
Peronne-crescent ..	300	5,000	
Flanders-avenue ..	128	4,497	
Anzac-place ..	48	2,072	
Road north of Anzac Park Western roadway, Anzac Park ..		1,076	
Eastern roadway, Anzac Park ..		780	
14. Formation of parking area including kerbing and guttering. Anzac-place ..		3,500	
15. Plantations, beautification parking area, Anzac-place ..		675	
16. Possible Extras— (a) Concrete footpaths in Gallipoli-avenue, Flanders-avenue and Peronne-crescent ..		1,178	1,178
(b) Concrete footpaths in parking area, Anzac-place ..			850

The Commission thinks that the various works could be carried out at the cost stated, but it has not given a total because some of the works may not be required. The Commission considers, for instance, that a sprinkler system is not justified. It is also of the opinion that provision need not be made for flood-lighting the whole building, although it may be desirable to provide for the cost of flood-lighting the dome. The Commission is also of the opinion that a hot-water system is not justified. Some of these estimates have been prepared by the architects and not by the Commission, and those which have been so prepared are so marked. The Commission is of the opinion that, although it may be desirable to have a permanent concrete road, that expense in the early stages would not be justified. It suggests that kerbing and guttering should be provided at the outset, and that roads properly ballasted and lightly gravelled should meet the purpose for the immediate future. It is also of the opinion that it would be wise to provide concrete footpaths around the site, because a number of persons, particularly local residents, will promenade at that locality on Saturday and Sunday afternoons and on holidays. As the Memorial will also

doubtless be visited by numbers of tourists, it is desirable to provide concrete footpaths around the park and Anzac Place, and the area itself. The details of the different estimates are shown separately, so that the committee can ascertain the approximate cost of the work it decides to recommend. The estimates in columns 2 and 3 do not include the services within the building, which are a part of the building itself. The accessory services which are chargeable to the building include concrete paving of the terraces, the front steps, water supply from the ordinary mains into the building, sewerage connexion from the building itself to the district main, and the formation of the ground, &c. As I have said, the estimated costs of these works have been shown separately, so the committee can determine the costs of those which it considers necessary. For that reason the total has not been given. I also hand in for the information of the committee, plans numbered C.C. 433 and C.C. 436, showing concrete footpaths which should be put in hand. The estimates I have handed in have been approved by the Commission, and will show what should be charged against the memorial building, and also what should be regarded as part of the Commission's ordinary civic operations. I should make it clear that the amount submitted for the preparation of the ground around the War Memorial cannot be regarded as the ultimate cost of the treatment of the ground, but as only representing the cost of what should be done at the outset. Undoubtedly the Commission is of the opinion that more work will have to be undertaken in time to come. The Commission will have to undertake some terrace work, the planting of lawns and plantations, but for a period of years we do not expect to reach a state of perfection. As I received only this morning a copy of the evidence which I have previously tendered, I have been unable, as promised, to get Mr. Potts to give an estimate of the cost of the flood-lighting. The capital cost of this is given in the statement I have submitted. When previously giving evidence, I believe I stated that we usually work on an estimated cost of 2s. 6d. a cubic foot for a building with a stone front, and that I also said that the Commission had expressed the opinion that it does not think the memorial could be constructed at the estimated cost of £239,000. I have been informed that when the architects were giving evidence they stated that the estimate of £250,000 did not include the cost of lighting, heating, fire sprinklers, vacuum cleaning, &c. When I gave an estimate of cost of 2s. 6d. a foot, I did not include those services. The Commission has had a careful investigation made by Sir John Harrison, and I would suggest that the committee obtain his views on this aspect of the matter. He went to a good deal of trouble to obtain certain data before advising the War Memorial Committee. He took out what he thought would be a fair estimate, in order to enable the Commission to state whether it thought the work could be completed for £250,000. He came to the conclusion that he did not think it could, and the Commission accepted his view on the matter. An estimate of 2s. 6d. cubic foot is for an ordinary plain stone front without any embellishment, and without the services mentioned. A considerable portion of the building could not be included in an estimate of 2s. 6d. a cubic foot. There is bound to be a lot of special work undertaken in connexion with the interior of the dome, and in relation to which Sir John Harrison's evidence would be very valuable. It seems most unlikely that the whole of the building could be completed at an estimated cost of 2s. 6d. a foot. It is proposed to construct a low-level bridge over the Molonglo at a point opposite the site. This would serve the purpose for some years to come, and would not be likely to be affected by flood waters excepting for a short period, as is the case in connexion with a similar bridge at Acton. It is proposed to erect a substantial

structure at a proper level when circumstances warrant it. It is estimated that the memorial building will be completed within three years from the date on which the work is commenced; it is not anticipated that a permanent bridge would be available within that time. A low-level bridge could probably be constructed for about £2,600.

189. To Mr. Seabrook.—The figures which Mr. Potts gave the other day did not include concrete footpaths, but they do not represent a very big item. The area surrounding the building is to be planted with trees, and this cost is included in the £103,000. It is proposed to introduce, as far as possible, trees from the fighting zones, and it is hoped that they will thrive in this climate. Already flower seeds have been obtained from these sources, and an effort will also be made to introduce special features, probably by making small plantations, representative of Flanders, Mesopotamia, and other war zones. We shall, however, have to wait some time before this branch of the work can be undertaken.

190. To the Chairman.—From the figures I have supplied the committee can obtain information as to the way in which the cost of the building can be reduced. If the structure is not to be lighted at night, the cost of internal lighting can be eliminated. The Commission does not think that the provision of a sprinkler system is necessary, as the building will be of stone and a watchman will be employed on the premises. If the building is properly patrolled, there should not be any fire risk. Possibly the estimate could be reduced in this direction by £20,000. The risk of fire could be minimized by prohibiting smoking within the building, and by having it closely watched. In addition to the saving of £20,000, some of the work suggested could be eliminated, as it would not be immediately necessary. Storm-water drains would have to be provided, and the surrounding roads would have to be constructed within a period of two years. The formation of the working area would have to be completed fairly quickly, and most of that work recommended would have to be done during the period in which the building was under construction.

191. To Mr. Cook.—I cannot suggest any direction in which the cost of the work can be further reduced, as it must be done thoroughly. We must provide roads, footpaths, kerbs, and a sewerage and water supply.

(Taken at Canberra.)

TUESDAY, 15TH MAY, 1928.

Present:

Mr. MACRAT, Chairman;

Senator Reid Mr. McGrath.
Mr. Cook Mr. Seabrook.
Mr. Lacey

Sir John Harrison, Commissioner, Federal Capital Commission, Master Builder, sworn and examined.

192. To the Chairman.—I am aware that the committee is inquiring into the subject of a war memorial building for Canberra. I made an investigation into this proposal on behalf of the Commission. I wish to make it clear that I had only sketch plans before me, which were supplied by Messrs. Sodersteen and Crust, the architects. It would be impossible from such sketch plans to arrive with certainty at an accurate estimate of the cost of the proposed building. I had no specifications, nor did I have any detailed drawings. Those are necessary in order accurately to estimate the cost of a monumental building such as it is proposed to erect. My investigation was made at the request of the Chief Commissioner; but it came

originally from the War Memorial Committee. To the best of my recollection, the letter containing the result of my inquiries was sent by the Chief Commissioner to the Minister for Home and Territories some time in November, although I am not sure of that. I was not able to make my investigation during Commission hours. I did it chiefly at night at the hotel. I spent about three weeks going into the whole thing. I did not rely upon the architects' cubing; but my investigations are certainly in favour of the architects. The information upon which I based my investigation was contained in the letter received from the architects under date 27th September. I have had no consultation with the architects in any shape or form. With the Chief Commissioner I interviewed them in their offices on two or three occasions, but those were not in the nature of consultations on the proposal. I regard the proposed design as very suitable and beautiful. I do not think that a conference with the architects would have enabled me to arrive at more definite conclusions, for, frankly, it is impossible to arrive at accurate estimates without detailed drawings and quantities. While it is possible, under the cubing system, to arrive at fairly definite conclusions in regard to, say, cottages, or buildings of a set type, it is not possible to do so in regard to buildings such as those now under consideration. After working out the matter on the cubing principle, the architects may think that they can construct this building for £250,000; but they cannot say so definitely until detailed drawings have been made and the quantities taken out. I am acquainted with the cubing method adopted by the architects; it is the one usually employed. The method I employed recently received the approval of the London Institute of Surveyors. The method adopted by the architects gave 2,024,632 cubic feet; the method that I adopted gave 1,943,109 feet. My estimate is, therefore, favorable to the architects to the extent of 81,523 cubic feet. That is not such a very great deal in a job of this magnitude, though it is worth considering. I am fairly confident that my figures are accurate, for I made two estimates. I did not, in estimating the cost of the building, take an all-round estimate of 2s. 6d. per cubic foot, such as the architects did. I sectioned certain portions of the work, took out rough skeleton quantities, and made my estimate in that way. In the light of my experience of somewhat similar work, and in the light of the difference in costs between Canberra and Sydney, I regard my estimate as reasonably accurate; but I repeat that this is not the way in which to obtain a sound estimate. It must be understood that the bulk of the materials required for this building will have to come from Sydney or Melbourne. I assume that Sydney freestone would be used; but that the bricks, sand and gravel would be provided locally. My estimate of the cost of the building is £283,000. I think it reasonable to allow £17,000 for contingencies, which would increase the estimate to £300,000. Taking all the factors into consideration the architects have a fighting chance of doing the job for their estimate. I say this because I have received information subsequent to preparing my estimate which shows that, while I allowed £30,000 for the lettering, the architects claim that they can get it done for £9,000. That cuts £21,000 off my estimate in one item. I estimated on cast bronze for the lettering. I believe that that would allow the work to be done in a dignified manner. I do not, of course, suggest that the method that the architects propose to adopt would be undesirable. I have allowed for facing with stone. I disagree with the architects' estimate in that regard. If they have obtained a firm tender at the figure they state, then I should be favourable to accepting it as soon as possible. I have not included any architectural remuneration, or charge for supervision. I take it that the architects'

charge of 6 per cent. would cover supervision. I have not allowed any interest on capital nor any amount for statutory. I did not include an amount for heating in the general sense. I considered that all that would be necessary would be the installation of radiators for the office staff and in the caretaker's quarters. The cost of the preparation of the site is laid down. Provision is made for electric lighting, although I have assumed in my estimate that as the Museum will not be open at night, only such lighting would be necessary as would permit the caretaker and his staff to do their work. I allowed provision for sufficient lighting points throughout the building to ensure that this would be well provided for. Fire provision would be made from the main service, but I did not allow for sprinklers. I have not allowed for flood lighting the dome. The following is my estimate on the cube basis:—

Estimate Sydney cost ..	£200,395
Freight, additional cost of materials and increased wages ..	47,275
Names ..	30,000
Five per cent. contingencies, say ..	16,337
	£300,000
Sydney cost, excluding names. Per cubic ft. 2s. 14d.	
Percentage of increased Canberra cost, excluding Canberra cost, excluding contingencies, £283,000.	22.72%
Per cubic ft. 2s. 11d.	
Canberra cost, including contingencies, £300,000.	
Per cubic ft. 3s.	
Estimated net cost, Canberra ..	£283,004

I notice however that the architects have obtained a quote of £48,430 for carrying out the stonework, and that they estimate the names in the Court of Honour can be suitably executed for £9,000. If the Committee can accept the figures given by the architects then there is reason to believe the building can be erected for the amount they state. I say this, as it would appear that the difference between my estimate and that of the architects lies particularly in our view of what will be the cost to carry out the stonework in the building and to execute the names. For instance, my total estimated cost for the building is £283,004, less my allowance for masonry and names £38,985, leaving £194,679 as the cost of the balance of the building. The architects' estimate for masonry and names amounts to £57,432, making the total cost of the building according to my estimate but accepting the architects' figures for masonry and names £252,100. Therefore, as stated in my previous evidence, subject to the architects satisfying themselves and the War Memorial Committee that the masonry and names can be executed for the amount stated by them and by methods in both cases which would meet with the approval of the proper authorities, I would say there is sufficient ground for opinion that the building can be erected for the sum provided—£250,000—but I again repeat that definite statements as to cost of this building cannot be made without further and detailed descriptions of the method of construction, materials to be used and general treatment. Therefore, provided the assurances I have already referred to can be given, I am of opinion the architects might be asked to prepare the required descriptions and that quantities should then be taken out and tenders publicly invited for the work. I do not anticipate that any difficulty will be experienced in regard to foundations. We ought to get a good shief below without any trouble, although it would, of course, be necessary to take proper precautions to ensure that the ground is not faulty. I had an experience on one occasion of boring down, when we found that even after passing through 3 feet

of ironstone, we came to a 14-in. clay seam. That was in Sydney. The Chief Commissioner could give more accurate evidence than I as to interest charges; but I understand that 6 per cent. is usually allowed. Under the cube system I estimate the cost of the building to be 2s. 11d. and a fraction per cubic foot. We may take it as being approximately 2s. The architects for the administrative block estimated the cost of it on the basis of 3s. 3d. per cubic foot. I repeat, however, that the cube system is not absolutely dependable. The cost of two buildings containing the same areas but of different shapes may vary considerably under the cube system. I have had 40 years' experience in New South Wales as a builder. The following are recent instances of the cubic cost of city buildings. A building being erected in Pitt-street at present works out at 2s. 6d. per cubic foot. It is a stone-faced job estimated to cost £160,000, and is of ten storeys. That is exclusive of lifts, electric lighting, &c. A building is being erected in Commonwealth-place, Sydney, at a cost of 2s. 4½d. per cubic foot. It, also, is stone-faced. A first-class stone-faced job in Macquarie-street costs 2s. 7½d. per cubic foot. The cost of a big stone-faced building commenced in Sydney about six weeks ago works out at 2s. 4½d. per cubic foot. A stone-faced job in Bridge-street works out at 2s. 7½d. per cubic foot. I have no knowledge of the cost of the Commonwealth Bank building in Sydney. In any case it was a pre-war job. The cost per cubic foot in Sydney of the War Memorial building should be lower than that of the buildings which I have mentioned, for it will contain a lot of voids. It is for this reason that I think the architects have what I call a fair sporting chance of getting the job done at their estimated price. Professional chambers were erected in Macquarie-street recently for 2s. 8d. per cubic foot. An instance of the absurdity of relying absolutely on the cube system came under my experience within the last six months. A small suburban bank of two storeys and a basement erected within the last nine months, and containing only the usual bank equipment, worked out at 3s. 5½d. per cubic foot. I do not think the Assembly Hall would be a fair comparison to make with the proposed War Memorial. No. 1 Secretariat worked out at 1s. 8d. per cubic foot, and No. 2 Secretariat, now called the Public Offices, worked out at 1s. 7d. per cubic foot. The most accurate estimate I can arrive at as to the cost of Parliament House, excluding mechanical contrivances, lifts, lighting and things of that character, is about 2s. 6d. per cubic foot. The cost of Hotel Acton was 1s. 4½d. per cubic foot and of Hotel Alsille 1s. 5½d. per cubic foot. The Assembly Hall cost 14½d. per cubic foot; but that is accounted for by reason of it being practically all void. Suburban picture theatres may be erected in certain suburbs in Sydney at 9d. per cubic foot. Building costs in Canberra show an undoubted tendency to decrease. I worked out some time ago the comparative cost of building certain type houses in Canberra, Melbourne and Sydney. Let me give Federal Capital Commission type 9, which is the most favoured of the Canberra types, as an illustration. I have taken the current rate of wages in each of the several places, and fixed a unit basis. Material for type 9 cottage, costs, in Canberra, £249; labour costs £109. Allowing 3 per cent.—a fair percentage—for wet weather, public holidays here, which would give £12, would bring the cost of the cottage to £1,270. In Melbourne, the cost of material would be £766, and of labour £361. In Sydney the respective figures would be £785 and £278. This works out at £92 per square for Canberra, £81 6s. for Melbourne, and £84 2s. per square for Sydney. The Canberra rate is, therefore, 12.78 per cent. over Melbourne and 9.20 per cent. over Sydney. The percentage of material to labour is 61.5 per cent.

to 38.5 per cent. From time immemorial, it has been understood that it costs two-thirds of the total price for the erections of a building and one-third for the finishing trades. It will be seen, therefore, that we are not far out of it here. It must be obvious, I think, that the cost of constructing a War Memorial in Canberra, as against Sydney, would be higher. For instance, Sydney freestone costs 3s. 6d. per cubic foot at the quarry. The freight rate is 28s. 10d. per ton. The stone would have to be dressed at the quarry, for it would not pay to install plant here for the purpose. It would have to be very carefully packed on the trucks for transport to Canberra, and it would have to be just as carefully unpacked from the trucks, loaded on to lorries, and taken to the job. All this means that you could reasonably allow 3s. per cubic foot for freight. It is reasonable to assume, therefore, that the cost of the sandstone would be at least 25 per cent. higher in Canberra than in Sydney. This also applies to structural steel, and certain other materials. The more I think about this proposal, the more convinced I am that it would be well worth while to have detailed drawings made and quantities taken out. Even with one-eighth sketch drawings, I would undertake to take out the quantities in a week. It may have been said that it would take six months to make detailed drawings, and take out quantities. I know that it did not take six months, nor anything like it to do it for the Administrative Block which is shortly to be completed with. Although I cannot say definitely that the architects should be able to construct the War Memorial at an average of 2s. 6d. per cubic foot, I am perfectly satisfied that the work could be done for 3s. per cubic foot. I repeat, however, that it would be more satisfactory to take out quantities and go into the thing more carefully. Canberra bricks cost £5.5s. per thousand at the kiln, whereas Sydney bricks cost £3.10s. There is no doubt that ours are superior bricks; everybody admits that. Our high cost is not due to inefficiency. Here you are dealing with a semi-plastic process, and this adds to the cost. It might be possible to reduce the price of our bricks to £5 per thousand, but the Commission is not making any profit on them at the present figures. In fact, I think that they are losing money, for they have 3,000,000 bricks at grass now. We have only one machine working at present. I gave careful consideration to the possibility of modifying the proposed design with the object of reducing costs. But I think it would be folly to attempt to do it. It is rather an experiment to use Sydney sandstone here. The Canberra frosts may have a detrimental effect upon it. Personally I should prefer granite to be used for it would give an everlasting job. There is not much trouble about the sandstone fretting in the ordinary way, but fretting occurs where there are overlapping courses, and so on. I think the stone might make a permanent job even here, for in this building it would have a flat surface. If the architects have received a firm tender of £48,000 for the sandstone required on this job I would strongly recommend that the offer be closed with provided that it was supported by satisfactory deposits. If an equally firm offer of £68,000 has been made for a facing of 4-in. granite, I should very much prefer a granite to the sandstone; but I am firmly of the opinion that it is not possible to provide either the sandstone or the granite at the prices quoted. I think it would be financial suicide for any person to attempt to do it. In any case if £48,000 is to be taken as a fair price for the sandstone, the price of granite ought to be £68,000. I should have strong objections to merely facing the building with either 6 inches of sandstone or 4 inches of granite. I think that every alternate course of the facing should overlap. That is to say one course of sandstone should be 6 inches, but the next 9 inches. Otherwise you would not have

any kind of a satisfactory bond. I would not agree to the adoption of the tying process for a building of this character. It is true that at one time bricks were only £4 10s. per thousand at our kiln, but at the peak building period here we had to buy 3,000,000 or 4,000,000 bricks, which cost an extra £3 per thousand. That was a dead loss to the yards, and I have no doubt that it had to be made up. It may have contributed somewhat to the extra cost. I do not think that the Commission would profit. I received a report this morning, as I was leaving, the office which may have enabled me to say something further about the price of the bricks; but I had not time to read it. On behalf of Sir John Butters I tender the following statement on the proposed flood lighting of the building:

Since no aspect of the National War Memorial presents a lofty vertical face, flood-lighting of the whole structure would require either:

- (a) Numerous projectors in banks situated at a considerable distance from the building directing light more or less horizontally; or
- (b) Numerous projectors as individual units located close to the masonry at the base of each floor directing light vertically.

Surrounding shrubbery would likely interfere with the beams in case (a), and would obscure the view of the flood-light lower portions of the building in the case of (b). In addition, both of these arrangements would be costly. It would be practicable to floodlight all faces of that portion of the dome above the level of the roof of the aeroplane museum. The area of such surface would be, approximately, 10,200 square feet. For a cement grey surface on a building standing in a park away from other buildings, the usual practice is to secure an illumination intensity of 2-foot candles with flood-lighting. This intensity is of the same order as is produced in a well-lit room at night, and is approximately 200 times that which would be produced on the building by bright moonlight.

It is proposed to provide twelve 1,000-watt projectors arranged in six banks of two projectors per bank. These would deliver a total of 67,200 lumens of light on the dome, which, with its area of 10,200 square feet, would give about 6½ lumens per square foot.

The flux of light per square foot is of the same order as obtained in the case of the dome of "The Capitol" at Washington, where 280,000 lumens are thrown on an area of approximately 40,000 square feet. The conditions are comparable in each case. "The Capitol" constitutes an example of effective flood-lighting.

The equipment would be concealed from view so that no glare would offend the eye, and the greatest efficiency in projection beams could be made after mounting to concentrate or distribute light as desired to secure the best effect. The minimum intensity would be five foot candles, provision being made for lamp deterioration and light obstruction through dirty lenses.

The intensities in foot candles about the peripheries of the dome at each 10-foot level above the base have been calculated. The banks of projectors would be controlled from a central position within the building, and so arranged that any or every face could be flood-lit.

It is estimated that £550 would be the cost for flood-lighting equipment complete.

The following table shows the cost of electric current per annum at 7d. per unit for operating for various hours per day and days per week.

Lamp renewals would be an additional 5 per cent. on each of these figures.

SUMMARY OF FIGURES.

No. of projectors ..	12
Size of projectors ..	1,000 watt
No. of banks or groups ..	6
No. of projectors per bank ..	2
Total beam lumens ..	67,200
Area of dome ..	10,200 square feet
Minimum intensity ..	5 foot candles
Maximum intensity ..	15 foot candles
Cost of current per unit ..	7d.
Life of lamp ..	800 hours
Cost of lamp renewals ..	6 per cent. of cost of current

NOTE.—Messrs. Soderstrom and Grant, the architects of the National War Museum, considered that the projectors would be sufficient for the flood-lighting of the dome, but after investigation of the conditions it is estimated that this would be insufficient.

COST OF FLOOD-LIGHTING NATIONAL WAR MEMORIAL IN POUNDS PER ANNUM AT 7d. PER UNIT.

		HOURS PER DAY.							
Days per Week.		1	2	3	4	5	6	7	8
	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
1 ..	18 4 0	36 8 0	54 12 0	72 16 0	90 0 0	108 4 0	127 8 0	145 12 0	163 16 0
2 ..	36 8 0	72 16 0	109 4 0	145 12 0	182 0 0	218 4 0	254 8 0	291 2 0	328 0 0
3 ..	54 12 0	109 4 0	163 16 0	218 8 0	273 0 0	328 4 0	383 8 0	438 12 0	493 16 0
4 ..	72 16 0	145 12 0	218 8 0	291 4 0	364 0 0	438 4 0	512 8 0	586 12 0	660 16 0
5 ..	90 0 0	182 0 0	273 0 0	364 0 0	455 0 0	546 4 0	637 8 0	728 12 0	819 16 0
6 ..	108 4 0	218 8 0	327 12 0	436 16 0	546 0 0	656 4 0	766 8 0	876 12 0	986 16 0
7 ..	127 8 0	254 16 0	382 4 0	500 12 0	619 0 0	738 4 0	857 8 0	976 12 0	1,095 16 0

COST PER WEEK AT 7d. PER UNIT.

		HOURS PER DAY.							
Days per Week.		1	2	3	4	5	6	7	8
1 ..	0 7 0	1 4 0	2 1 0	2 16 0	3 15 0	4 14 0	5 13 0	6 12 0	7 11 0
2 ..	1 4 0	2 1 0	3 16 0	4 15 0	5 14 0	6 13 0	7 12 0	8 11 0	9 10 0
3 ..	2 1 0	3 16 0	4 15 0	5 14 0	6 13 0	7 12 0	8 11 0	9 10 0	10 9 0
4 ..	2 16 0	3 15 0	4 14 0	5 13 0	6 12 0	7 11 0	8 10 0	9 9 0	10 8 0
5 ..	3 1 0	4 16 0	5 15 0	6 14 0	7 13 0	8 12 0	9 11 0	10 10 0	11 9 0
6 ..	3 16 0	4 15 0	5 14 0	6 13 0	7 12 0	8 11 0	9 10 0	10 9 0	11 8 0
7 ..	4 1 0	5 16 0	6 15 0	7 14 0	8 13 0	9 12 0	10 11 0	11 10 0	12 9 0
8 ..	4 16 0	5 15 0	6 14 0	7 13 0	8 12 0	9 11 0	10 10 0	11 9 0	12 8 0

Cost of four Radiators in four Strong Rooms, 1,000 watts each for seven months of the year continuously is, say, £200 per annum.

Flood-lighting is not necessary, although, of course, it would be very effective. The installation of a plant would cost £550. The cost of flood-lighting the dome for one hour per day for seven days in a week would be £197 per annum. That is taking the cost of lighting at 7d. per unit. To light the building two hours per day for seven days per week would cost £394 per annum. To light it three hours per day would cost £591 per annum. To put it in another way, the cost of lighting the building for one hour per day for seven days in the week would be 49s. per week.

193. To Mr. Cook.—I would not say definitely that the building could not be constructed for the amount estimated by the architects, but I would say definitely that it could be constructed for £300,000. I think flood-lighting would be very effective. As an alternative, it would be possible to glass in part of the top of the dome and have suitable lights showing through the glass. Although that would not illuminate the whole of the building, it would give a good light from the top of the dome. It would not need any structural alterations to the building to provide for such a scheme as that. On the estimates which the committee has obtained of the cost of facing the building with granite, I would unhesitatingly recommend that that should be done, but I very much doubt whether it could be done for £85,000. Because of the voids in the building, the architects have what I call a fair sporting chance to construct the building for the amount of their estimate, but I strongly favour the taking out of quantities, so that an accurate estimate of the cost could be obtained. Seeing that the architects have been able to save £21,000 on my estimate of the cost of the lettering, and £30,000 on my estimate of the sandstone facing, there is not very much difference between my estimate of the total cost and theirs.

194. To Mr. McGrath.—My estimate of the cost of facing the building with sandstone is about £20,000. I point out, however, that I have allowed for bonding in the way that I have indicated, whereas the architects have only allowed for tying. I contend that some of the stone facing would have to be 9 inches and some would have to be even 14 inches. This would not make a

very great difference in the cost. It would be practically only a question of the extra cost of the stone. I do not believe in tying the facing of a building of this character.

195. To Mr. Lacey.—If granite were used instead of sandstone, such careful packing would not be required and there would be some reduction in freight charges, but it is easy to destroy the arrives of granite. On most of the jobs where facing has been done the construction has been of reinforced concrete and bonding has not been so necessary. I think that facing as has been proposed on a monumental building of this description would be experimental. I strongly favour the bonding myself. The red granite on the side of the State Bank buildings in Sydney is only facing. I think it only goes up two stories. The architects are proposing to have the names made quite differently from the way I have allowed for. I do not dispute the practicability of doing this; but it appeared to me that cast bronze would give a more dignified job. If I had the power I would at once close with the offer of £48,000 for the sandstone facing of the job, and I would even more readily close with an offer of £68,000 for the granite facing.

196. To Mr. Seabrook.—I was satisfied in making my estimates to make a dead-water measurement. My estimate of the cost per cubic foot is based upon my experience extending over 40 years. I think that 2s. 6d. per foot is rather fine for this class of work, though, as I have said, the architects have a fair chance to do it for that price. I would not like to suggest that this building could be put up in Sydney for 1s. 9d. per cubic foot. No one has had any previous experience of constructing a monumental building of this character, so that in the absence of quantities and detailed drawings our estimates are not reliable. The architects' estimate at my rate per cubic foot, but on their cubing would work out at about £303,000. I believe that the architects' estimate was honestly made, with the intention to do an honest job. I do not for a moment suggest that it was formulated merely with the idea of getting the work put in hand. I cannot say that the work can be done for that estimate, nor can I say that it cannot be

done. I think quantities should be taken out, I admit, that the stone facings of various city buildings are tied; but I do not think that it would be wise for us to attempt to tie the facings on to a building of brick construction. I do not think that it would be desirable to construct this building of concrete. In my opinion it would not be economical, apart from any other consideration. The economy of using concrete in ordinary warehouse and office buildings is that the forms can be used over and over again. A contractor usually has two sets of forms and by the time he has got to the second storey he is able to take the forms off the lower storey and use them again. It would not pay to make forms simply for one building. With all respect I differ from the opinion of Sir John Sulman, that the War Memorial building could be satisfactorily constructed with steel forms. I understand that Sir John expressed the opinion that the use of these forms would render unnecessary any facing of the building, but I have had sufficient experience to know that it is a very simple matter for forms to get out of plumb. Of course, when forms slip a little in the ordinary way, the plastering covers it up. I favour the flood-lighting of the dome on sentimental grounds. I admit that familiarity with the Albion flood-lighted column may lead one to disregard it somewhat, but, nevertheless, it stands as a silent reminder of the great sacrifice that was made by the men who fought to keep a roof over our heads, and it will be there for our children after we have gone. It is quite true that some of the residents of Canberra may forget flood-lighting our memorial or only think of it periodically, but

there is, nevertheless, something inspiring in the idea, and on that ground I favour it. The cost per head of the Commonwealth would be infinitesimal, and would, in all the circumstances, be justified.

197. To Senator Reid.—My estimates are based upon the costs of material and labour in Canberra. The figure I have given is one for which, as a master builder, I think that I could do the job. I repeat, however, that it is very deceiving to frame estimates on sketch drawings. This is well illustrated in connexion with the proposed aeroplane court. It might appear to be a simple matter to put a roof over that court, but it needs a very big span, and one only realizes that after some consideration. Although I retired from active business during the war, my son is carrying on the business of the firm of Messrs J. C. Harrison and Son, and has £200,000 worth of work on hand at present. The firm has just completed a £133,000 job. I consider that I am just as closely in touch with building costs as I was when I was closely identified with the business. The architects have not allowed for bonding and I have. It must be remembered that from the base of this building to the top of the dome is 100 feet, and that the ordinary walls are 40 feet high. The alternative proposal that I have made in regard to flood-lighting would not involve heavy costs. The lighting would not be visible from the inside of the dome, but would shine through the glass at the top. I think it would pay the Commission to provide the bricks for this War Memorial, which will be a very big job, at a cheap rate. For one thing it would save stacking.