

1927.



THE PARLIAMENT OF THE COMMONWEALTH OF AUSTRALIA, *Brought*

by Senator Reid

Pursuant to Statute

By Command

In return to Order

PARLIAMENTARY STANDING COMMITTEE
ON PUBLIC WORKS. *Mark by the Senate.*
15th Dec. 1927.

REPORT

TOGETHER WITH

MINUTES OF EVIDENCE

RELATING TO THE PROPOSED ESTABLISHMENT OF AN

AUTOMATIC TELEPHONE EXCHANGE

AT

MAROUBRA, NEW SOUTH WALES.

By Authority:

H. J. GREEN, GOVERNMENT PRINTER, CANBERRA.

F.1287.

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 20th June, 1926.

† Appointed 1st July, 1926.

‡ Resigned 2nd March, 1927.

§ Appointed 24th March, 1927.

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EXTRACT FROM THE VOTES AND PROCEEDINGS OF THE HOUSE OF REPRESENTATIVES.

No. 108, DATED 12TH OCTOBER, 1927.

4. PUBLIC WORKS COMMITTEE—REFERENCE OF WORK—MAROUBRA, NEW SOUTH WALES—AUTOMATIC TELEPHONE EXCHANGE.—Mr. Hill (Minister for Works and Railways) moved, pursuant to notice, That, in accordance with the provisions of the *Commonwealth Public Works Committee Act 1913-21*, the following work be referred to the Parliamentary Standing Committee on Public Works for investigation and report:—Maroubra, New South Wales—Automatic Telephone Exchange.

Mr. Hill having laid on the Table plan, &c., in connexion with the proposed work—

Debate ensued;

Question—put and passed.

LIST OF WITNESSES.

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Butler, Victor Edward, Superintendent of Telephones, New South Wales	4 7
Crawford, John Murray, Chief Engineer, Postmaster-General's Department	1
McKay, Roy Vincent, Supervising Engineer, Postmaster-General's Department, New South Wales	4 5
Todd, Charles Herbert Uttley, Works Director, New South Wales	4 6

MAROUBRA AUTOMATIC TELEPHONE EXCHANGE.

REPORT.

THE PARLIAMENTARY STANDING COMMITTEE ON PUBLIC WORKS, to which the House of Representatives referred, for investigation and report, the question of the proposed establishment of an automatic telephone exchange at Maroubra, New South Wales, has the honour to report as follows:—

PROPOSAL.

1. The proposal submitted for the consideration of the Committee is to erect on certain Commonwealth property in Storey-street, Maroubra, a building in which will be installed an automatic telephone switching system having an initial equipment for 1,400 subscribers' lines and an ultimate capacity of approximately 7,000 subscribers' lines. It is proposed that the initial equipment shall be capable of extension to the ultimate capacity named, and thus enable requirements in the proposed automatic exchange area to be met for twenty years after the date of opening.

REASONS FOR THE PROPOSAL.

2. The area which would be served by the Maroubra Automatic Telephone Exchange suggested, comprises the southern portion of the present Randwick Exchange area, and a small portion of the adjacent Mascot Exchange area. The new exchange is said to be necessary in order to meet the rapid development due to the sale of Crown lands in the locality, and to avoid further unnecessarily high expenditure on external plant. It is claimed that the installation of the proposed exchange will enable the Department to provide a cheaper and more efficient service to subscribers in the extreme limits of the areas mentioned.

ESTIMATED COST.

3. The estimated immediate cost of the work as submitted to the Committee is set down at:—

	£
Site (already acquired)	700
Building	8,050
Air conditioning plant, &c.	3,750
Exchange equipment (including that necessary at other exchanges)	28,071
Substation equipment	148
Line plant	10,860
Sundries	70
Total	52,249

and the time fixed for completion, about ten months from date of commencement.

COMMITTEE'S INVESTIGATIONS.

4. The Committee visited Maroubra and inspected the existing Post Office site, and the site suggested for the new automatic installation, and traversed portion of the district which would be served by the new exchange. Careful attention was given to the plans submitted, and evidence taken from the telephone and works officials concerned with the proposal.

SITE.

5. The site proposed is situated in Storey-street, Maroubra, adjoining the public school, and forms portion of what was, at one time, the Randwick rifle range. This land was handed over to the Commonwealth as a "Transferred Property," but owing to the closing of the range has since been re-transferred to the State, with the exception of about 201 acres retained for the Small Arms School, and this block retained for telephone exchange purposes. The proposed

telephone exchange site has a frontage of 100 feet to Storey-street, by a depth of 200 feet, and is level land of a sandy nature. It is reported to be a good building site, and the telephone officials state that after careful survey it is found to be as near as practicable to the telephonic centre of the proposed automatic exchange area.

6. Inquiries were made by the Committee as to whether it would not be possible to locate the proposed exchange on portion of the land now partially occupied by the Maroubra Post Office in Anzac-parade. It was stated in evidence, however, that this was not advisable for the reasons that the unoccupied portion of the post office area would not be large enough to accommodate the proposed exchange as a single story building; it is quite possible that with the increased development of the district an extension of the post office premises themselves may be necessary; the theoretical telephonic centre of the district is situated approximately at the site chosen for the exchange, and to establish the exchange on the post office property would mean greater expenditure in cabling which could not be justified.

7. After satisfying itself on these points, the Committee is of opinion that the site chosen is quite suitable for the proposed telephone exchange.

BUILDING.

8. The building suggested has been planned to suit the site and conforms with the requirements of the Postmaster-General's Department. The design is for a simple, fire-resisting structure which will comprise a switch room 100 ft. 6 in. by 37 feet, flanked on the western side by a power room 26 ft. 6 in. by 19 feet, and a battery room of the same dimensions. On the eastern flank will be an air-conditioning room 26 ft. 6 in. by 19 feet, a mechanics' room 19 feet by 10 feet, an entrance porch and lobby, a small store, and the necessary lavatory accommodation.

9. The type of construction proposed is reinforced concrete foundations, with external brick walls of hollow construction cemented on the outer face. The ceiling of the exchange room is to be of concrete, with light wooden frame principals, and an iron roof over the ceiling surrounded by parapet walls. The ceilings and roofs of the two flanking buildings will be of reinforced concrete; and the whole of the floors will be of concrete covered with a suitable finish—that in the battery room being provided with an acid-proof covering.

10. The height of the main room is to be 14 ft. 3 in. in the centre, and 12 feet at the under side of the rolled steel joists supporting the ceiling. The other portions of the building will be 9 ft. 6 in. high. Steel window frames will be used throughout, and suitable provision will be made against fire.

11. After carefully examining the plans and hearing the evidence of the Commonwealth Works Director for New South Wales and the telephone officials, the Committee is satisfied that the structure has been designed with due regard to economy, and will be quite suitable for the purpose for which it is intended.

FINANCIAL ASPECT.

12. It was stated in evidence that the total annual charges, including interest and depreciation for the proposed automatic system as at the date of establishment, namely 31st December, 1929, are estimated at £11,739, and five years later at £19,018. The estimated revenue at 31st December, 1929, is set down at £11,328, and five years later at £23,788. The assets, thrown spare, if the automatic system is installed on the 31st December, 1929, are estimated to have a recoverable value of £1,264.

COMMITTEE'S RECOMMENDATION.

13. After due consideration, the Committee unanimously agreed to recommend that the proposal for the installation of an automatic telephone exchange at Maroubra, New South Wales, as submitted, be proceeded with.

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

Office of the Parliamentary Standing Committee on Public Works,
Parliament House, Canberra, 18th November, 1927.

MINUTES OF EVIDENCE.

(Taken at Canberra.)

WEDNESDAY, 9TH NOVEMBER, 1927.

Present:

Mr. MACKAY, Chairman;

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

John Murray Crawford, Chief Engineer, Postmaster-General's Department, sworn and examined.

1. To the Chairman.—I am acquainted with the fact that Parliament has asked the Public Works Committee to inquire into the proposal for the erection of an automatic telephone exchange at Maroubra. The proposal has been brought forward at the present time owing to the necessity for establishing an exchange to relieve the Randwick exchange—a course rendered necessary by the rapid growth of telephone services in the Maroubra section of Randwick. It is considered to be uneconomical to continue serving that area through the Randwick exchange. There is nothing unusual in the figures submitted in connexion with this proposal, as compared with those which apply to similar installations elsewhere. The proposal is to erect a building on a site which is Commonwealth property in Storey-street, Maroubra, and install therein an automatic telephone switching system having an initial equipment for 1,400 subscribers' lines and an ultimate capacity of approximately 7,000 subscribers' lines. It is proposed that the initial equipment shall be capable of extension to the ultimate capacity named, and thus enable requirements in the proposed automatic exchange area to be met for twenty years after the proposed date of opening. The area which will be served by the proposed Maroubra automatic telephone exchange comprises the southern portion of the present Randwick exchange area and a small portion of the adjacent Mascot exchange area. The exchange is necessary in order to meet the rapid development due to the sale of Crown lands and to obviate further unnecessarily high expenditure on external plant. The installation of the proposed exchange will enable the department to provide a cheaper and more efficient service to subscribers in the extreme limits of the areas mentioned.

ESTIMATED COST.

The estimated immediate cost of the work is—

	£
Site (already acquired)	700
Building	8,650
Air-conditioning plant, &c. ..	3,750
Exchange equipment, including that necessary at other exchanges ..	28,071
Substation equipment	148
Line plant	10,800
Sundries	70
	<u>£52,249</u>

ESTIMATED REVENUE.

The annual revenue, if it is estimated, will be obtained on the date of opening and five years thereafter is shown hereunder:—

Estimated number of subscribers' lines, 31st December, 1929 (date of opening).	Estimated annual revenue, 31st December, 1929.	Estimated number of subscribers' lines, 1934 (five years later).	Estimated annual revenue, 31st December, 1934.
1,000	£11,328	2,100	£23,788

The above figures have been checked by the Accountant to the Postmaster-General's Department, whose signed statement I now present:—

POSTMASTER-GENERAL'S DEPARTMENT, NEW SOUTH WALES

REVENUE—PROPOSED AUTOMATIC EXCHANGE, MAROUBRA.

(a) The average revenue per line received from the subscribers in the proposed Maroubra area for the year ended the 31st December, 1926, was as follows:—

	Per line.
Including revenue from trunk conversations	11 1 0
Excluding revenue from trunk conversations	11 0 0

(b) The estimated annual revenue for the proposed Maroubra automatic exchange area, as at the proposed date of the cut-over and as at a date five years after, based upon the number of subscribers' lines being 1,000 and 2,100 respectively at those dates:—

	No. of Lines	Rent and Calls.	Misc. Charges.	Trunk Conversations.	Total.
At cut over ..	1,000	£ 15,000	£ 240	£ 87 10 0	£ 15,327 10 0
Five years later ..	2,100	£ 23,100	£ 504	£ 185 15 0	£ 23,787 15 0

I hereby certify that the above figures have been computed from the books and records of this office, and the figures with respect to revenue are correct to the best of my knowledge and belief.

A. P. WESTGROVE, Accountant.

Postmaster-General's Department, Sydney.

26th April, 1927.

SITE.

The proposed site is situated in Storey-street, Maroubra, and is Commonwealth property. It has a frontage of 100 feet to Storey-street, and a depth of 200 feet, and is located as near as practicable to the telephonic centre of the proposed automatic exchange area.

BUILDING.

It is proposed that the building shall be of simple design, and built on the latest fire-resisting principles. The immediate installation in the exchange is for an equipment of 1,400 subscribers' lines, but the building will be designed to accommodate equipment having a capacity of approximately 7,000 lines.

FINANCIAL ASPECT.

Item.	As at 31/12/29.	As at 31/12/34.
1. Capital cost—New	£ 52,249	£ 73,043
2. Capital cost—New and <i>in situ</i> ..	88,653	120,614
3. Annual working expenses of proposed automatic exchange ..	3,280	6,388
4. Total annual charges for proposed automatic exchange	11,739	19,018
5. Annual revenue— Estimated as at 31st December, 1929	11,328	
Estimated as at 31st December, 1934		23,788
6. Assets recoverable or thrown spare if an automatic exchange is established on new site on 31st December, 1929— (i) Book value	1,666	
(ii) Recoverable value	1,264	
(iii) Cost of recovery	70	

Regarding item 6 of the foregoing statement, the difference between sub-items (i) and (ii), namely, £402, is an amount which will have to be written off in the departmental accounts as representing the proportion of the capital outlay on the original assets which is irrecoverable, and includes depreciation due to wear and tear and labour in installation.

The Maroubra area has hitherto been served principally from Randwick. The population of Randwick is estimated to be 62,600, and of that area the portion proposed to be served by the new Maroubra exchange has a population of approximately 10,000. Of the existing lines in the area, 600 go to Randwick, and about 20 to Mascot. The number of waiting applicants for service in the latter area is 31. The Randwick exchange was opened in May of 1894, and was converted from manual to automatic in June, 1926. The Mascot exchange was opened in February, 1903, and is still manually worked. The site of the proposed Maroubra Public School. It has a frontage of 100 feet, and a depth of 200 feet. It was part of the old rifle range, and as such was already Commonwealth property. It was transferred from the Defence Department to the Postmaster-General's Department, and though the value was estimated at £700, it was really only a book entry. Some years ago a site was acquired in Allison-road for a new post office, but this is about half a mile from the copper centre of the exchange area, and it would not be economical to place the exchange there; neither did the site lend itself to the erection of the type of building required. It is estimated that the cost of installing lines for a five years' service would be £2,100, while the cost of providing a service for the estimated requirements for the next twenty years would be £7,000. The scheme has been worked out in the best interests of economical running, as well as in the interests of satisfactory transmission. If copper conductors have to be run three or four miles to the exchange, there might be more loss in transmission over that distance than would be the case if one were speaking from Melbourne to Sydney on the existing lines. We estimate that about 50 per cent. of the present Randwick subscribers would be favorably situated to benefit from the installation of the new exchange. Though at present their service is satisfactory for local conversation, subscribers are distinctly handicapped when speaking over trunk lines to distant places. I have carefully examined the proposal, and consider the department will be quite justified in spending the sum of £22,240 to serve the 1,000 subscribers who are immediately in view. Moreover, much of the estimated expenditure will go towards providing a service to meet the next five years' requirements, but the building and a large part of the equipment will be adequate to meet requirements for the next twenty years. I consider that this is a good telephonic area, with satisfactory prospects of development. The recoverable assets referred to in the financial statement which I have just made relate to portion of the existing switches now in use at Randwick, and to portions of the lines which will not be required when the new exchange is installed. Actually, the assets will not be recovered, because the growth of the Randwick Exchange will necessitate their being used in that area. Provision is made in the estimated expenditure for the installation of an air-conditioning plant. This plant, we believe, will be rendered necessary by the peculiar local situation of the exchange. Lying due east of the exchange, and within less than a mile of it, is the Pacific Ocean, and west and south-west of it is Botany Bay. The new exchange, therefore, will really be on a peninsula, and, in these circumstances, it is more than probable that a full air-conditioning plant will require to be installed. As I explained in connexion with the Box Hill inquiry, the department is not at present satisfied that it is necessary to install air-conditioning plants in all exchanges, but it is much cheaper for us to make provision for them in the buildings in case we need to install them later. In this case there is hardly any doubt that the plant will be needed. If the plant is not installed, it is practically certain that there will be trouble with the

apparatus. It is true that the cost of air-conditioning plants for exchanges of approximately the same capacity varies from place to place. This variation in cost may be attributed largely to the nature of the work which the exchange is called upon to perform. The amount of switching equipment required in an exchange depends wholly upon the calling rate, and upon the amount of transfered traffic. The amount of transfered traffic in the case of Maroubra will be probably 90 per cent., which means that only one call in twenty will be for a subscriber in the Maroubra area itself. The other nineteen calls will be for places outside that area. Therefore, the switching equipment will have to include a very large quantity of junction apparatus for other exchanges. If it were possible largely to increase the amount of lone traffic, the exchange could be established with a minimum amount of switching. Take, for example, extreme cases such as the City North and Vaucluse exchanges. Say that Vaucluse had one-fourth the number of lines that are in the City North exchange, yet it might need only one-hundredth the number of switches. It is necessary to have a great deal more switching apparatus in the main exchanges than in the smaller ones. In regard to the air-conditioning plant, we have to take the figures and estimates supplied by the Works and Railways Department, and I am not, therefore, in a position to explain any discrepancies which might appear in the figures as between one exchange and another. I consider it necessary that the switch room at Maroubra should be 100 x 37 feet, because we have to provide ultimately for 7,000 lines. I note the comparison you make between the floor space at the Unley and Norwood exchanges, in South Australia, and that provided for in the plans for the new Maroubra exchange. The estimated cost of the air-conditioning plant for the Unley building was £3,250. The initial equipment provided service for 5,600 subscribers, and the ultimate capacity was 9,400. To house such an installation a switch room 75 ft. 6 in. x 36 ft. was provided, the total floor space being 2,718 square feet. For the Norwood exchange the estimated cost was £3,250, the initial equipment for 5,700, the ultimate capacity 8,000, and the floor space of the switch room 73 feet x 36 feet, or 2,628 square feet. Yet at Maroubra, where there will be an initial equipment of only 1,400, with an ultimate capacity of 7,000, it is proposed to have a switch room 100 feet by 37 feet, making a total floor space of 3,700 square feet. Why so much more space should be needed for Maroubra than for those other exchanges is a question I cannot definitely answer at the moment. I know that at Unley and Norwood we merely extended existing buildings, thereby just about doubling the accommodation. I shall ask Mr. McKay, who is to give evidence to-morrow, to furnish the committee with full information. I consider that the Maroubra site is quite suitable for an exchange. It is true that there is loose sand in the vicinity, but there has been no trouble with any of the buildings already erected there. It is not likely to interfere with any of the instruments or plant. We will probably plant grass around the buildings, and the windows will be sealed. The site is in a good telephonic centre. The actual telephonic centre is about 600 or 700 yards away from the post office site, and the saving on copper would be sufficient to buy a new site. I do not think, however, that there will be any land to spare at the post office site, as it will probably be used later for extensions to the post office itself. For five years a saving of £2,000 will be effected upon the purchase of copper through having the exchange situated on the proposed site; in twenty years the saving will amount to £8,000. I regard the work as one of urgency. We are really losing money on every line we take to Randwick from that area.

2. To Senator Reid.—I do not think that the department was influenced in coming to a decision regarding

the site by the fact that the land was already owned by the Commonwealth, although the fact that the land was government-owned made it very easy to secure it for our purposes. Our first work in connexion with a proposed new exchange is to make a telephonic survey. As a result of that survey, we fix the copper centre at a particular point. In this case that point happened to fall on the site of the old rifle range near the school, and we needed only to ask the Defence Department to have that portion reserved for us. In determining upon this site the department's officers followed the same procedure as that usually adopted in settled areas. Maroubra has grown enormously since 1918. The principles on which we carry out our surveys are as follows:—We will assume that it is required to serve a certain area from an existing exchange. We already have an exchange at Randwick. The department gives service without additional ground rental for distances up to two miles, and we may therefore assume that Randwick can serve the area satisfactorily within a radius of two miles. However, the extreme end of the Maroubra district, in the direction of La Perouse, is four, or possibly five miles away from the Randwick exchange in the direction of the ocean. As the Maroubra district developed, subscribers in the more distant parts were paying a considerable amount extra in the way of ground rent. It was evident that the growth of the district would be fairly rapid, and, therefore, we determined to create a Maroubra area which would embrace a portion of Randwick and also a portion of Mascot. The department, after estimating the likely future growth of population in the area, drew up a map showing for each block the telephonic requirements for the present, for five years, and for twenty

years hence. A calculation was then made to ascertain the copper centre, which is the theoretical centre involving the least amount of copper required to serve the area. I expect that in the next twenty years the whole of the peninsula embracing the La Perouse district will be as thickly populated as South Head road is now. At present we have only twenty subscribers in the Mascot portion of the area, because settlement has not extended over in that direction. The chief body of subscribers is in the Randwick direction. At Vaucluse there is an exchange where the geographical conditions are similar to those which will obtain at the proposed new exchange at Maroubra. It is situated on a peninsula which lies between Watson's Bay and the ocean. In regard to the need for an air-conditioning plant, the Vaucluse exchange is in much the same positions as will be the Maroubra exchange, while Mosman exchange is not quite so badly off. It lies between Port Jackson and Middle Harbour. Both at the Vaucluse and Mosman exchanges it was found necessary to install air-conditioning plants, and there is very little doubt that one will be needed also at Maroubra. We are still watching very carefully the costs and working of these plants, but it will be some time before we can come to a definite decision regarding the best type to install. We would not like to make a mistake.

3. To Mr. Cook.—It cannot be said that the interests of country residents are not receiving as much attention as those of city dwellers. The following table sets out clearly the relative growth of metropolitan and country telephone systems since 1916:—

TELEPHONE LINES CONNECTED IN THE COMMONWEALTH.

GROWTH SINCE 1916.

Metropolitan Areas.

State.	1916.		1917.		1918.		1919.		1920.		1921.	
	31st December.	Per cent. Increase.	31st December.	Per cent. Increase.	31st December.	Per cent. Increase.	31st December.	Per cent. Increase.	31st December.	Per cent. Increase.	31st December.	Per cent. Increase.
New South Wales ..	33,051	3.1	35,297	6.8	37,847	7.2	41,619	9.7	43,369	4.5	46,411	7.0
Victoria ..	25,055	2.9	26,439	5.6	28,738	8.7	31,069	10.2	34,164	7.9	35,710	4.5
Queensland ..	6,082	5.4	7,486	23.0	8,185	9.6	8,942	9.3	9,633	7.7	10,124	5.1
South Australia ..	7,074	3.9	8,073	14.1	8,485	5.1	9,753	15.0	11,128	14.0	12,662	8.4
West Australia ..	5,016	1.6	6,097	21.6	6,324	3.8	6,993	10.9	6,486	9.9	6,474	18*
Tasmania ..	1,898	1.5	1,932	1.8	2,007	3.9	2,201	9.7	2,402	9.1	2,648	6.1
Totals ..	70,875	3.2	84,239	19.0	90,566	7.5	100,800	10.4	107,182	7.2	113,329	5.7

Country Areas.

State.	1916.		1917.		1918.		1919.		1920.		1921.	
	31st December.	Per cent. Increase.	31st December.	Per cent. Increase.	31st December.	Per cent. Increase.	31st December.	Per cent. Increase.	31st December.	Per cent. Increase.	31st December.	Per cent. Increase.
New South Wales ..	22,903	7.7	24,737	8.0	26,911	8.5	27,695	2.9	29,394	6.2	31,633	7.6
Victoria ..	12,059	7.3	12,728	5.5	13,753	8.0	16,183	10.3	16,840	4.1	19,041	13.0
Queensland ..	11,170	5.1	11,696	4.6	12,297	5.4	13,053	6.1	13,633	4.4	14,690	5.4
South Australia ..	2,805	8.8	3,053	10.3	3,530	15.6	3,840	9.1	4,067	5.9	4,702	17.1
West Australia ..	3,469	2.8	3,422	1.3	3,445	0.7	3,618	5.0	3,832	5.9	4,071	6.2
Tasmania ..	2,307	11.8	2,422	5.0	2,630	8.5	2,874	9.3	3,214	11.8	3,540	10.4
Totals ..	64,721	6.6	68,065	5.1	71,855	5.6	76,302	7.2	79,350	4.0	86,746	9.3
Totals for Commonwealth ..	134,596	4.8	152,304	13.2	162,421	7.1	177,102	9.1	186,532	7.4	200,075	7.0

* Decrease.

TELEPHONE LINES CONNECTED IN THE COMMONWEALTH—continued

Growth since 1922.

Metropolitan Areas.

State.	1922.		1923.		1924.		1925.		1926.		Percentage Increase over Ten Years.
	31st December.	Per cent. Increase.	31st December.	Per cent. Increase.	31st December.	Per cent. Increase.	31st December.	Per cent. Increase.	31st December.	Per cent. Increase.	
New South Wales	46,073	7.0	54,004	10.5	60,731	10.6	65,537	7.9	70,401	7.4	113
Victoria	37,408	5.0	42,794	14.1	48,707	14.7	52,501	8.0	57,394	9.2	129
Queensland	11,031	0.0	12,016	8.9	13,133	0.3	14,380	9.5	15,047	0.0	124
South Australia	12,010	7.1	14,155	0.0	16,650	10.9	18,201	10.9	20,176	11.0	163
West Australia	5,783	4.8	7,305	7.7	7,849	7.4	8,358	6.4	8,842	7.0	78
Tasmania	2,670	5.0	2,875	7.4	3,217	11.0	3,302	4.6	3,462	3.0	82.3
Totals	120,577	6.4	134,048	11.1	150,193	12.0	162,435	8.9	176,032	8.4	121

Country Areas.

State.	1922.		1923.		1924.		1925.		1926.		Percentage Increase over Ten Years.
	31st December.	Per cent. Increase.	31st December.	Per cent. Increase.	31st December.	Per cent. Increase.	31st December.	Per cent. Increase.	31st December.	Per cent. Increase.	
New South Wales	33,775	6.8	37,230	10.2	41,092	12.8	47,372	12.8	52,202	10.4	128
Victoria	20,882	0.7	22,767	13.9	24,412	23.7	26,826	16.8	29,554	13.2	205
Queensland	15,540	8.8	16,901	9.3	18,494	14.7	20,514	16.0	22,534	13.0	129.3
South Australia	5,408	13.6	6,913	27.8	10,138	46.6	13,204	30.2	15,504	17.9	455
West Australia	4,339	0.0	4,833	11.4	5,788	19.8	7,217	24.7	8,315	15.2	140
Tasmania	5,540	8.2	4,958	17.4	5,234	16.1	5,827	11.3	6,517	7.0	170
Totals	83,790	7.8	94,248	12.5	112,038	18.9	131,052	17.8	148,006	12.6	172
Totals for Commonwealth	204,367	7.0	228,296	11.8	262,231	14.8	293,487	12.2	324,038	10.3	142

TELEPHONE LINES CONNECTED TO AUTOMATIC EXCHANGES IN THE COMMONWEALTH.

Growth since 1919.

State.	1919.		1917.		1918.		1919.		1920.		1921.	
	31st December.	Per cent. Increase.	31st December.	Per cent. Increase.	31st December.	Per cent. Increase.	31st December.	Per cent. Increase.	31st December.	Per cent. Increase.	31st December.	Per cent. Increase.
New South Wales	10,243	23.8	11,100	8.4	11,889	7.1	12,991	9.3	15,794	21.6	17,489	10.7
Victoria	2,482	4.5	2,659	7.1	2,884	12.2	6,540	110.2	7,120	8.9	7,824	9.0
Queensland	765	1.5	768	1.7	793	3.3	2,991	277.0	3,343	11.8	3,651	9.2
South Australia	5,145	1.5	5,174	0.9	5,339	8.3	5,713	11.2	4,091	10.2	5,095	23.8
Tasmania	..	..	..	..	..	..	..	..	..	..	..	..
Totals	16,025	20.9	17,701	6.5	19,005	7.4	26,235	38.0	30,348	15.7	32,059	8.6

State.	1922.		1923.		1924.		1925.		1926.		1927.		Percentage Increase over Six Years.
	30th June.	Per cent. Increase.	30th June.	Per cent. Increase.	30th June.	Per cent. Increase.	30th June.	Per cent. Increase.	30th June.	Per cent. Increase.	30th June.	Per cent. Increase.	
New South Wales	19,308	10.4	21,895	13.5	25,481	16.5	29,033	14.0	40,337	32.0	47,454	17.7	363.3
Victoria	7,980	2.1	10,703	34.1	12,510	16.8	19,452	55.5	21,508	12.9	24,808	12.9	890.5
Queensland	..	..	..	..	..	..	..	..	3,103	..	7,006	128.6	129.6
South Australia	3,750	9.0	3,982	6.1	4,543	16.6	5,371	15.7	6,038	13.3	6,766	11.5	79.8
West Australia	3,065	0.7	4,402	11.1	4,804	10.4	6,138	5.6	6,470	6.6	6,503	8.0	89.0
Tasmania	..	..	..	..	..	..	..	..	..	..	..	..	..
Totals	35,010	6.2	40,082	16.9	47,498	15.0	59,014	24.2	78,074	30.4	92,107	19.7	460

†Percentage increase for six months only. *Decrease.

We are trying to meet the requirements of both country and metropolitan areas. I do not think that any requests for service in the country have been turned down to enable this work to be done. We have to do the work within the funds allotted to us by Parliament. I daresay we could do more if we got more. I have carefully studied the proposed site for this exchange,

and I am satisfied that the area will be large enough. There will be room for a building capable of accommodating 7,000 lines, which, it is estimated, will be sufficient to meet requirements for the next twenty years. If more than 7,000 lines are required, there is plenty of room to increase the size of the exchange. I admit that our calculations with regard to the growth of

population have sometimes been out rather badly. The Dec Why exchange is a case in point. When we built that exchange, we thought it would provide accommodation for fifteen years, but it had to be enlarged within seven years. That, however, is an exceptional case. As far as it is possible to foresee, adequate provision has been made in the present case.

4. To Senator Payne.—We estimate that the number of subscribers in four years' time will be 2,100, which is just over 100 per cent. more than the number which will be served when the exchange opens. We consider we are justified in anticipating such a large increase, owing to the exceptionally rapid rate of development in Maroubra. The growth in the number of subscribers in the Maroubra area may be expected to be very much more rapid than in the more settled portions of the metropolis. In Maroubra last year the rate of increase was 19.6 per cent., but in the city it was probably not more than 5 per cent. The rate of building in Maroubra is, I think, higher than in any other part of the metropolitan area. In my financial statement I set out that the new capital cost of the exchange was estimated at £52,240, while the estimated capital cost, new and in situ, would be £58,653. The big margin between these sums is due to the difference in the nature of the plant which will be added to meet future requirements. While there will be a comparatively small increase in expenditure in respect to switches, there will, in that area, be a big increase in the expenditure on lines. It is estimated that there will be a loss during the first two years of operation of about £100, but in five years' time that loss will be wiped out, and there will be a profit of £4,700. The annual working expenses will increase from £3,289 in 1920 to £6,388 in 1934. This additional expense will be incurred not only as a result of installing additional switches due to the growth of the Maroubra district itself, but will be incurred largely as a result of the extra business handled for Randwick, and other main exchanges.

5. To Mr. Cameron.—Eventually the whole of the area in the vicinity of the proposed site will be levelled right from the ocean back into the sand hills, and will be built over. It is possible that the surveyor anticipated that the land would be terraced, and not levelled, but I do not think that that would affect the situation to any great extent. I am quite satisfied that it would not be an economical proposition to place the exchange on the post office site, even if that site were suitable as regards size and shape, which it is not. It would not enable us to effect the most economical lay-out.

6. To Mr. Seabrook.—In building these automatic exchanges, we are standardizing the machinery and plant as far as possible, and are even endeavouring to standardize the buildings. We are getting the Works and Railways Department to adopt as a standard the type of building which we propose to erect at Maroubra, and they are quite willing to meet us. It is true, as has been pointed out by the chairman, that in reference to the air-conditioning plant there is a difference in the estimated cost as between different exchanges. At Box Hill, for instance, the cost is £3,750, while at Cottesloe it is only £2,500. I am unable to give the reason for such differences as this, because we have to take, in respect to air-conditioning plant, the figures supplied to us by the Works and Railways Department.

(Taken at Canberra.)

THURSDAY, 10TH NOVEMBER, 1927.

Present:

Mr. Mackay, Chairman;

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

Ray Vincent McKay, Supervising Engineer of Telephone Equipment, Postmaster-General's Department, sworn and examined.

7. To the Chairman.—I have occupied my present position for nearly five years, and prepared the engineering details relative to the proposed automatic telephone exchange at Maroubra. The new exchange is urgently required in order to reduce congestion at the Randwick automatic exchange; without it we shall have to add to the Randwick exchange lines of undue length. One advantage of the new exchange will be a reduction of the rentals at the Maroubra end of the Randwick area by about 10s. per quarter mile. There will be lines five or six miles long running to the Randwick exchange if the new exchange is not established at Maroubra. If the work before the committee is proceeded with, the maximum length of line will be reduced by approximately 13 miles. In the area to be served there are at present about 600 subscribers, of whom many are in the vicinity of the selected site for the Maroubra exchange. The area is chiefly residential. Phenomenal development is following the subdivision of the old Randwick rifle range, and of all residential areas in the vicinity of Sydney this part is progressing the most rapidly. As an indication of the rate of growth I may mention that in December last there were about 550 lines in this area and by Christmas the number will have increased to 720. The Maroubra exchange will not financially affect the Randwick exchange. The plans for the latter were based upon an assumption that another exchange would be established at Maroubra, but did not anticipate the sub-division of the rifle range for residential purposes. The Randwick exchange was opened in June, 1926, and is already working up to 75 per cent. of its capacity. Of course some of the lines will be transferred to the Maroubra exchange, and the present equipment at Randwick will cater for a correspondingly increased period. The original provision at Randwick was to cover the growth of that area, including Maroubra over a period of fifteen years. The site selected at Maroubra for the exchange is one of the best that the department has ever acquired. It is eight chains from the theoretical centre of the district and only about six chains from the practical centre. The site occupied by the school is the only suitable one that would be more central. The post office site is 28 chains distant. That objection is not fatal but the site itself is unsuitable, its width being such that a two-storey building would be necessary and such a building for a telephone exchange is not economical. When I inspected the post office site it did not appear suitable for a telephone exchange because it is on a busy and dusty corner. Some people think that we exaggerate the seriousness of dust, but as a matter of fact it is almost the worst element with which we have to contend. An automatic exchange has many thousands of very fine contacts and small particles of dust falling in between them create all sorts of trouble. Our aim is

to get a building as nearly dust-proof as possible, but where practicable we avoid a dusty area. There are differences of opinion as to the extent to which air-conditioning plants are necessary. I think such a plant is essential. The compressed air portion is required for blowing out dust and working the pneumatic tools on installation work, and vacuum cleaning apparatus is indispensable. The only debatable portion is the ammonia compressor and the air washer. We cannot have an air washer without a compressor, so we may consider the air washer and ammonia compressor as one. At Mosman and other exchanges near the sea we have had serious trouble with humidity. Our only large experience in air-conditioning plants has been in the city exchanges and there they are indispensable. At coastal exchanges they are even more necessary. In the Sydney metropolitan area are twenty automatic exchanges, but not every one is equipped with an air-conditioning plant. We are gradually gaining experience of automatic exchanges. The original procedure was to seek accommodation for a proposed automatic exchange in the existing post office building, and as the room occupied by the manual exchange was usually too small, the simplest expedient was to occupy the postmaster's quarters. Such premises usually had tile roofs and corrugated metal ceilings. The dust-percolated through the tiles and the ceiling and we experienced electrolytic and other troubles due to our inability to condition the air. In all of the later exchanges we started with an air-conditioning plant. The City North exchange has given the best service and caused the least trouble. In other exchanges which started with an air-conditioning plant, such as City South, we do not expect much trouble. The equipment at City North, after five or six years' service, is as good as new; not only is the dust excluded but the insulation is fairly high and we

have been free from troubles which we experienced at Mosman and other exchanges near the coast. The guarantee given by manufacturers of automatic equipment has not always been subject to the installation of an air-conditioning plant. Some time ago only one firm made this type of automatic equipment. I am unable to explain the reason for the air-conditioning plant at Maroubra being estimated to cost £2,750, as compared with £2,600 at Oakleigh, Victoria. The main cost is in connection with the ammonia compressor and the air washer, but the expenditure should bear some relation to the quantity of air to be conditioned. The estimates of the architects and engineers are usually based upon details supplied by the officials of the telephone department. The size of the air-conditioning plant is in no way governed by the number of lines in the exchange, except in so far as the number of lines governs the size of the building. Whilst one can reduce the initial automatic plant it is difficult to do that with the air-conditioning plant, except by omitting the air washer and ammonia compressor.

I know that the possibility of dispensing with these plants has been discussed but so far there has been no development to warrant the declaration that we can do without some portion of the plant. The director of postal services, Mr. Brown, is at present making enquiries in America, and I think his policy is to provide accommodation for full air-conditioning plant and vacuum cleaning apparatus and to defer the installation of the air washer and ammonia compressor. That policy has been followed at Canberra. The switch room at Maroubra will measure 37 feet by 100 feet. The ultimate capacity of the exchange will be 7,000 subscribers. Supplementing the evidence given by Mr. Crawford, I submit the following comparative statement regarding the Maroubra, Unley (South Australia), and Norwood (South Australia) exchanges—

Exchange.	Type.	Ultimate Lines.	Ultimate Switchroom Area, Square feet.	Ultimate Square Feet Per Line Switchroom.	Total Area of Building, Square feet.	Ultimate Square Feet Per Line Building.	Remarks.
Maroubra	Branch.	7,000	3,790	0.53	5,687	0.81	*Existing 2,124 plus additional 3,270
Unley ..	Main	9,400	*5,400	0.57	8,298	0.87	
							5,400
Norwood	Main	8,000	*5,184	0.65	8,926	1.10	*Existing 2,100 plus additional 5,024
							5,184

*Maroubra being a branch exchange would have proportionately a little less switching equipment than Unley and Norwood which are main exchanges, therefore the figure for square feet per line is in both cases a little lower for Maroubra than the other two.

I am not acquainted with the Unley and Norwood exchanges, but I have had a conversation with an engineer, who at the time had these plans in front of him. He did not say that there had been any alteration at Unley since the original inquiry.

8. *To Mr. Seabrook.*—The building must have been extended prior to the installation of the automatic

exchange, so as to enable the work to be carried out. It was semi-automatic and had to be converted to full automatic.

9. *To the Chairman.*—I suggest that the figures in the report relating to dimensions should be amended in the following manner:—Instead of "an extension to 75 feet" the report should read "an extension by

75 feet" in the case of Unley; and in the case of Norwood, "an extension by 75 feet" instead of "an extension to 75 feet." I cannot conceive of the department making such small extensions.

10. *To Mr. Cook.*—There is not necessarily an advantage in having the exchange and the post office in the same building. The automatic equipment would be controlled by a foreman in the exchange, and over him the postmaster would have no control. There might be a slight economy in cleaning and maintenance if both establishments were under the one roof, but the exchange is cleaned with vacuum equipment. Some advantage might accrue where we had a large exchange and more than one floor was required for the equipment; the ground floor or portion of it might then be utilized for postal purposes. At Ashfield there is a two-storey building, and the exchange occupies the whole of the first floor and shares the ground floor with the post office. Had accommodation not been required for the post office, we would have adopted a different and less convenient lay-out. Where we can house the whole of the exchange plant on one floor without inconvenience nothing is gained by combining the exchange with the post office. At Maroubra, if time should prove that we underestimated the rate of development, we shall be able to extend the exchange building in a convenient way without disturbance of the original plant.

11. *To Mr. McGrath.*—If the committee recommends the establishment of an automatic exchange at Maroubra, I do not think it would be wise to install a complete air-conditioning plant before Mr. Brown returns. Undoubtedly we shall require portions of the plant, and probably we shall, as we did at Canberra, install indispensable parts and leave room for the addition of other parts if experience proves them to be necessary.

12. *To Senator Payne.*—Unless special precautions are taken the roofs are unsuitable for automatic exchanges. In the modern structures we have a concrete ceiling and sometimes a galvanized iron roof. A few years ago we planned to equip all these exchange buildings with double concrete roofs, but this committee disapproved of them. Even a single concrete ceiling does not entirely seal a room because the dust filters through the apertures made for fittings. I would prefer that suburban exchange buildings should have slate roofs and concrete ceilings. Whatever ceiling offers the best protection against dust should be adopted.

13. *To Mr. Cameron.*—During the past few months telephone lines in the Randwick district have been increasing at the rate of probably 60 a month. Many of the new services were in Randwick proper, but extra development is resulting from the cutting up of the rifle range at the Maroubra end. The estimate of development in the Maroubra exchange area, based on a survey of the district, is 150 to 160 new lines annually. Our experience has been that the exchanges equipped with air-conditioning plants cause less trouble than those without, but the extent to which the air-conditioning is responsible is uncertain because we have old plants without air-conditioning and new plants with. I have had no experience of slate roofs on exchange buildings. We have had an unfortunate experience with tile roofs, but mainly on old residences that were merely converted for use as exchanges. Those buildings were fitted with corrugated iron ceilings and through them very fine dust was sifted.

14. *To Mr. Seabrook.*—Apart from the saving in rental to the subscriber, the establishment of an exchange at Maroubra will mean a reduction to the department in the cost per line, owing to the fact that the wires will not have to be carried so far. The lines are put in underground cables only in areas

where there is congestion. If we can give five or six services with open lines we do so, but where there is a congestion of lines we use underground cables. We anticipate no trouble from the sandy nature of the Maroubra soil. The dust-proof features of the building will include double doors and sealed windows. We have not considered the use of rubberoid roofing under the tiles. That might be effective if it could be properly sealed, but we are not allowed to use any inflammable material. I do not think that the prevention of a double ceiling will be necessary. With an air-conditioning plant we should be able to manage with a fibrous plaster or concrete ceiling and a slate roof. The mechanism is not so delicate that every speck of dust must be excluded, but the maintenance cost is reduced if we can make the building reasonably dust-proof. Before the post office site at Maroubra was acquired, the establishment of an exchange in the district was anticipated, but I recommended that the post office site was not suitable for an exchange. We had no idea of utilizing that site for exchange purposes.

15. *To Senator Reid.*—Telephone business in the Randwick area has grown so fast that we can hardly keep pace with it. Although the exchange opened only on the 1th June, 1936, we have found it necessary to make additions to the plant already. The services have increased at the rate of 60 per month, which is quite abnormal. If the Maroubra exchange is established the development of Randwick will not be so fast, but it will be quite fast enough. Only a small portion of the Mascot district will be included in the Maroubra area, so development in that direction will not substantially affect this proposal.

16. *To Senator Payne.*—Despite the fact that we expect the Maroubra business to increase at the rate of 160 new subscribers a year, our estimate of an ultimate capacity of 7,000 lines in twenty years is sound. It must be remembered that those people in the Maroubra area who are connected with the Randwick exchange have to pay high fees because they are beyond the two-mile radius, and that retards the rate of development.

The witness withdrew.

Victor Edward Butler, Superintendent of Telephones, New South Wales, sworn and examined.

17. *To the Chairman.*—The establishment of an automatic telephone exchange in the Maroubra district is urgently necessary. A very good survey is being rendered to subscribers in that area through the Randwick exchange, but from an engineering point of view an exchange at Maroubra is necessary to avoid the running of unduly long lines from Randwick. So far as the Randwick building and equipment are concerned, there is no necessity for an additional exchange at Maroubra, because we could carry on for some years, but considerations of external plant make a new exchange essential. Lines outside the two miles radius in the direction of Long Bay and Little Bay would have to be carried right into Randwick. That would involve an extension of the cable system from Randwick to Maroubra, whereas if we run junction circuits from Maroubra only we can avoid the cost of the separate lines from Maroubra to Randwick. The principal considerations governing the recommendation for the establishment of the new exchange are the savings to the department in respect of external plant, and the saving in rental to certain subscribers. Ultimately a large number of subscribers will get the benefit of a considerable saving. About 160 of the lines now connected to Randwick will cut over to Maroubra and 165 subscribers will enjoy reductions of rental by from 10s. to 2s per annum, according to their distance from the Randwick exchange. From a study of the engineering figures I am satisfied that the establishment of a new exchange at Maroubra at a cost of £52,000 is a first

take over to not pay.

class proposition. No complaints have been made regarding the service given to subscribers through the Randwick exchange. The transfer of certain subscribers from Randwick to Maroubra will not mean any reduction of the mechanical staff at the existing exchange. I do not anticipate that there will be 1,200 subscribers connected with the Maroubra exchange at the time of the cut-over. The initial equipment will not be fully completed when the exchange opens, but by 1930 it will have nearly 1,300 subscribers. The new exchange is designed to meet new developments, and, I understand, that if it is not established the whole cable system at Randwick will have to be augmented. The existing cables are nearly full, and the Randwick equipment has at the present time only about 150 spare lines. Subscribers are increasing at the rate of 32 a month. Two additional units are nearing completion, and the capacity of the exchange will then be 4,700.

I can see no economical alternative to the provision of an exchange at Maroubra, although I cannot recollect off-hand any other exchange that started with so few initial subscribers. The present capacity of the Randwick exchange is 4,500 lines, and the existing subscribers number 4,346. The Randwick building can accommodate equipment sufficient to serve 7,000 subscribers' lines. The area about the Maroubra-road junction is developing into a business section, and on the Mascot side the development also will be largely commercial. The Maroubra district is being settled very rapidly. By the time the Maroubra exchange is ready, say, two years hence, approximately 1,900 subscribers will be transferred to it. It is a better financial proposal to establish the Maroubra exchange than to go on extending the cables from the Randwick building.

18. To Senator Payne.—Our estimate of development based on a survey of the district and information gathered from various local authorities is—1931, 1,485 subscribers; 1932, 1,676; 1933, 1,832; 1934, 1,944; 1935, 2,100; 1936, 2,260; 1937, 2,420; 1938, 2,580; 1939, 2,740; 1940, 2,900; 1941, 3,060; 1942, 3,220; 1943, 3,380; 1944, 3,540; 1945, 3,700; 1946, 3,860; 1947, 4,020; 1948, 4,180; 1949, 4,340; 1950, 4,500. The Maroubra building will be capable of extension up to 10,000 lines.

19. To the Chairman.—Although the development of the Randwick exchange has not been actually restricted, the department has not canvassed the district for subscribers. When I was last before the committee I was asked why the department did not canvass for business. At that time it was difficult to cater for the business that came to us unsought. Now we are actually engaged in canvassing and selling telephone service to the public. Randwick is one of the districts to which I have not yet been able to give my attention, but I am convinced that when my canvassers go into Randwick and Maroubra the development figures I have furnished to the committee will be increased considerably. In the metropolitan area we have gathered in 1,250 new subscribers in the last twelve months. We canvass only in those areas in which we have the equipment to give service within a reasonable time. Having consulted the engineers regarding external and internal plant, a house to house canvass is made in those districts where there are spare cables. The public seems to appreciate this attention. I suppose our personal interviews average between 300 and 400 weekly, and we follow them up with circulars. We are engaged at the present time in canvassing country districts also. Every postmaster in a town where there is a telephone exchange is actively engaged in looking for new subscribers. We are also embarking upon a comprehensive advertising scheme. In these various ways we shall considerably increase the telephone business throughout the State. The profit resulting to the department from an increase of subscribers depends to a large extent upon the capital expenditure involved in giving service and the use that is made of the new lines. In some areas the telephone service is not pay-

ing. The department is opening up offices to meet country development and endeavour to increase the services to the man on the land. If my officers report to me that a telephone service in a district is a public necessity and will not cost more than £1,500, I immediately approve of it. Many of these services are not profitable, but they are installed as a public necessity.

20. To Mr. Cook.—Although I cannot speak of the conditions in other States, I understand that the telephone officials throughout the Commonwealth are working under the same instructions from the central administration regarding canvassing for new business. In certain areas there are telephone exchanges with internal plant and cable schemes sufficient to handle the developments for a number of years ahead, and only in such districts do we canvass for new business.

21. To Mr. Cameron.—Probably we shall have to wait a couple of years to learn whether the new subscribers brought in by the canvass will be permanent. As they pay a ground rent of £5 or more in advance, they are sure to retain the service for at least a year.

(Taken at Canberra.)

FRIDAY, 11TH NOVEMBER, 1927.

Present:

Mr. MACKAY, Chairman;

Senator Payne

Senator Reid

Mr. M. Cameron

Mr. Cook

Mr. Lacey

Mr. McGrath

Mr. Seabrook

Charles Herbert Uttley Todd, Commonwealth Works Director for New South Wales, sworn and examined.

22. To the Chairman.—The plans for the Maroubra automatic telephone exchange have been prepared in my branch. It is proposed to erect the exchange on land which forms portion of the old Randwick rifle range. The site has a frontage of 100 feet to Storey-street, by a depth of 200 feet. It is in every way suitable for this class of building, and I understand it is the radial centre of the area to be served by the exchange. The drainage is satisfactory, and there is the usual provision for water supply, sewerage, electric light, gas, and all the contingent services required for a building of this nature. The sewerage system will be connected with the Long Bay outfall. The building may briefly be described as of the standard type which has been evolved to meet the requirements of the Postal Department for telephone exchange buildings. It consists of one large room to house the equipment, 100 ft. 6 in. by 37 feet, with subsidiary rooms on either flank. On the west flank is the power room 26 ft. 6 in. by 19 feet, and a battery room of the same dimensions. On the eastern flank there is a room of the same size for the air-conditioning plant, and another room 19 feet by 10 feet for the mechanics, with lavatory accommodation, an entrance lobby, and a small store. The type of construction is reinforced concrete foundations of suitable dimensions, with external brick walls of hollow construction and cemented on the outer face. The ceiling of the exchange room is concrete with light wooden frame principal, and iron roof over the ceiling, and the ceilings and roofs of the two flank buildings are reinforced concrete. The whole of the floors are concrete, covered with a suitable finish, and the battery room is provided with an acid-proof covering to the floors. The height of the main room is 14 ft. 2 in. in the centre, and 12 feet at the underside of the rolled steel joists supporting the ceiling. The height of the

other portion is 9 ft. 6 in. Steel window frames will be used throughout and suitable provision will be made to safeguard against fire. We shall install fire extinguishers. I understand from the Postal Department that the exchange will provide all the accommodation required at present. This type of building must be dust-proof. It is similar to many other exchange buildings which members of the committee have inspected. The ceiling will be 5 inches or 6 inches in thickness, in the case of the main room, and 5 inches in the case of the rooms on either flank. There will be no possibility of dust entering the switch room through the roof. I have heard complaints of the presence of dust in some of the earlier types of exchange buildings, in which plaster ceilings had been built; but exchange rooms constructed in concrete as this will be, are absolutely dust-proof. It is not intended that the windows should be opened at any time. Ventilation will be provided by means of the air-conditioning plant, which is an engineering service. The estimated cost of the building is £7,500, and for the electric light £450, making a total of £8,050, excluding engineering services. When the estimate was prepared we included the probable additional cost of child endowment, but as at the end of last month it was decided not to collect it any longer, it is possible we may be able to save about £200 on that account. I estimate that the building will be completed in ten months. I tender the complete and approved plan of the building. Members of the committee will note that it differs in certain minor details from the blue print copy. In designing these buildings we comply with conditions laid down by the Postal Department. If we are advised that an air-conditioning plant has to be installed, we take the necessary precautions to ensure immunity from dust, and the varying of temperature. The difference in the cost of certain exchanges of similar type is in the main due to the provision required for the air-conditioning plants. I think Mr. Brown, the Director of Posts and Telegraphs, is investigating that aspect of the problem in America. The estimate includes the necessary fencing. About £100 is allowed. The fence will be 6 feet high. The ceiling of the building would be reinforced. I do not anticipate any trouble with regard to the foundations.

23. To Senator Payne.—If the department decided not to install an air-conditioning plant in this building, we should have to make provision for natural ventilation. The estimated cost includes accommodation for an air-conditioning plant. There will be a concrete ceiling over the main switch room, and a light frame truss and iron roof over that. The iron roof is provided because it costs less than a tiled roof.

24. To Mr. Cameron.—We propose to have a magnesite finish to the concrete floor. This obviates any expenditure for linoleum; it is easy to the feet, and more durable. At present there are not many other

dwellings in the immediate neighbourhood; but Randwick is developing rapidly. I should prefer a tiled roof, but it would add probably £150 to the cost.

25. To Mr. Lacey. The magnesite finish which we propose for the main switch room is similar to the finish in the floors of the S.M. chamber. A concrete floor is the best, and magnesite is a paste prepared of proper proportions of magnesite and other materials. It sets very hard.

26. To Mr. Seabrook. The varying estimates of costs for air-conditioning plants are due to differences in the size of buildings. Certain fundamentals cost practically the same, but the cost of a plant depends on the amount of work it will have to do. The size of a building determines the cost.

27. To Mr. Reid. It is proposed to cement the outside walls to make them absolutely weather-proof. Randwick is in rather an exposed position, subject occasionally to terrific south-easterly gales. The cementing of the walls makes them more weatherproof even than hollow brick external walls, untreated. The main floor will be of reinforced concrete. Owing to the weight and cost of the telephone plant we cannot afford to take any risks.

28. To Mr. Cook.—I am not in a position to say if the air-conditioning plant is absolutely necessary. The Postal Department determines that matter. We are advised that the plant is necessary to ensure efficient working of the automatic exchanges. If I were erecting the building myself, I would have a tile roof on it.

29. To Mr. McGrath.—I estimate that if we have not to provide for child endowment, we should be able to save about £200 in the cost of the building. For that amount we could provide a tile roof.

30. To the Chairman. The iron roof will not be visible to any extent.

31. To Mr. Seabrook. The girders to carry the concrete ceilings will be 24 inches by 7½ inches.

32. To Senator Payne. A tile roof, properly wired down, is not likely to be damaged in heavy weather, and tiles are not more costly to maintain than iron.

33. To Senator Reid.—Parapet walls provide a greater protection against fire. With the development of Randwick, we expect that other buildings will be erected in proximity to the exchange building, so it is deemed advisable to adopt the latest approved methods of construction for this type of building. The parapets will be 4 feet above the ceiling line. They will add from £150 to £160 to the cost. This type of building is approved by the permanent head of the Postal Department and Director-General of Works.

The witness withdrew.

The committee adjourned.