

1925.



THE PARLIAMENT OF THE COMMONWEALTH OF AUSTRALIA

Pursuant to Statute

By Command

In return to Order

PARLIAMENTARY STANDING COMMITTEE
ON PUBLIC WORKS.

H. J. Green
Treas. Chmn. of the Senate.
25th June, 1925.

REPORT

TOGETHER WITH

MINUTES OF EVIDENCE

RELATING TO THE PROPOSED ESTABLISHMENT OF

AN AUTOMATIC TELEPHONE EXCHANGE

AT

MANLY, NEW SOUTH WALES.

Presented pursuant to Statute, 1925.

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MEMBERS OF THE PARLIAMENTARY STANDING COMMITTEE ON PUBLIC WORKS.

(Fourth Committee.)

The Honorable HENRY GREGORY, M.P., Chairman.

Senate.

Senator John Barnes,†
Senator Hatch Spencer Poll,‡
Senator Patrick Joseph Lynch,†
Senator John Newland,‡
Senator William Plant,§
Senator Matthew Reid,†

* Ceased to be a member of the Senate, 26th June, 1923.

House of Representatives.

Arthur Blakeley, Esq., M.P.
Robert Cook, Esq., M.P.
David Sydney Jackson, Esq., M.P.
George Hugh Mackay, Esq., M.P.
James Mathews, Esq., M.P.

† Appointed 6th July, 1923. ‡ Resigned 26th June, 1923.

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COPY OF EXECUTIVE COUNCIL MINUTE No. 289 DATED 19TH NOVEMBER, 1924.

Postmaster-General's Department,
5th November, 1924.

No. 289:

MINUTE PAPER FOR THE EXECUTIVE COUNCIL.

Subject:—Proposal for the establishment of an automatic telephone exchange at Manly, New South Wales.

Cd. No. 50.

I recommend for the approval of the Governor-General in Council that, in accordance with the Commonwealth Public Works Committee Act 1913-1921, the following work be referred to the Parliamentary Standing Committee on Public Works for investigation and report thereon to the House of Representatives, viz.:

Approved in Council.

Manly, New South Wales.—Establishment of an automatic telephone exchange.

(Signed)

W. G. GRINSON,
Postmaster-General.

(Sgd.) FORSTER,
Gov.-General,
19th Nov., 1924.

Filed in the Records of the Council,

(Signed) J. H. STARLING,

Secretary to the Executive Council.

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MANLY AUTOMATIC TELEPHONE EXCHANGE.

REPORT

The Parliamentary Standing Committee on Public Works, to which His Excellency the Governor-General in Council referred, for investigation and report to the House of Representatives, the question of the proposed establishment of an automatic telephone exchange at Manly, New South Wales, has the honour to report as follows:—

INTRODUCTORY.

1. The Manly telephone area is at present served by a manual switchboard of the multiple magneto type. It is represented that the switchboard equipment is old and unsuitable for the requirements of a large and important exchange; that the limit of the capacity of the existing building and plant has been reached; and that a new exchange is necessary. Moreover, it is claimed that it is essential, in view of the conversion of Sydney network to automatic, that early action be taken to replace the existing manual exchange with modern automatic switching plant.

PRESENT PROPOSAL.

2. The proposal submitted is to establish an automatic telephone exchange at Manly on the present site in Pittwater-road, to replace the existing Manly magneto exchange, and provide for future development. Steps are being taken to alter and enlarge the existing building to meet immediate requirements, but it is represented that to provide for future growth an automatic telephone switching system should be installed, having an initial capacity of 3,200 subscribers' lines and an ultimate capacity of approximately 5,000 subscribers' lines. It is proposed that the initial equipment shall be capable of extension to the ultimate capacity named, thereby affording sufficient accommodation for the anticipated development in the proposed Manly automatic telephone area.

ESTIMATED COST.

3. The estimated immediate cost of the proposal as submitted to the Committee is as follows:—

Building ..	£7,000
Air-conditioning, heating, ventilating, vacuum-cleaning, and air-compression plant ..	4,500
Exchange equipment, including that necessary at other exchanges ..	51,625
Sub-station equipment ..	8,266
Diversion of line plant and cut-over of equipment ..	470
	£71,861

COMMITTEE'S INVESTIGATIONS AND RECOMMENDATIONS.

4. The Committee visited Manly and inspected the existing telephone exchange, took evidence from the Commonwealth Works Director for New South Wales, the Chief Electrical Engineer, Superintendent of Telephones, and Telephone Manager of the Postmaster-General's Department, and carefully scrutinized the plans submitted in respect of the building.

SITE.

5. The site of the automatic exchange adjoins the Post Office and is occupied by the existing Manly exchange. The whole of the land is valued at about £800, of which about £430 is being debited against the exchange proposal. The site is fairly level ground, centrally situated, and appears quite suitable for the purpose for which it is intended.

BUILDING.

6. To accommodate the proposed automatic telephone exchange, it is intended to alter the existing building now containing the Manly switchboard, but to carry out the work in such a manner as not to disturb the present service. The building, as completed, is to have brick walls, with solid concrete floor, and a flat concrete roof with a parapet wall. The ceiling on the ground floor will be of reinforced concrete, and that on the first floor of plaster. The ground floor will be occupied by the power plant and air-conditioning plant and quarters for the linemen and mechanics, while the first floor will be devoted almost entirely to the exchange.

It was ascertained in evidence that hydrants, fire-extinguishers, and water service are being provided in strict accordance with Fire Board regulations.

After a careful scrutiny of the plans, the Committee is satisfied that the building will be suitable, and may be expected to house equipment necessary to meet developments for about twenty years.

FINANCIAL ASPECT.

7. It was stated in evidence that the total annual charges, including interest and depreciation for the proposed automatic system as at proposed date of cut-over, viz., 31st December, 1926, are estimated at £19,462 and five years later at £24,049.

The estimated annual revenue at 31st December, 1926, is estimated at £23,340 and five years later at £23,904.

The assets thrown spare if the automatic equipment is installed on 31st December, 1926, are estimated to have a recoverable value of £9,090 the amount to be written off being valued at £10,544.

COMMITTEE'S RECOMMENDATION.

8. Under these circumstances, the Committee recommends that the proposed installation of the automatic telephone exchange at Manly as proposed by the Department be put in hand as early as possible.

H. Gregory
H. GREGORY,
Chairman.

Office of the Parliamentary Standing Committee on Public Works,
Parliament House, Melbourne,
28th May, 1925.

MINUTES OF EVIDENCE.

(Taken at Melbourne.)

THURSDAY, 17TH APRIL, 1925.

Present:

Mr. GREGORY, Chairman;
Senator Barnes | Mr. Cook
Senator Lynch | Mr. Mathews.

Lawrence Bede Fanning, Superintendent of Telephones,
Central Administration, Postmaster-General's Department, sworn and examined.

1. To the Chairman.—The proposal before the Committee is to install an automatic telephone switching plant on the existing site in Pittwater-road, Manly, to replace the present manual magneto exchange and provide for future development. Steps have been taken to alter and enlarge the existing building to meet immediate requirements and to make suitable provision for future development. The automatic system which it is proposed to install will have a capacity at the outset of 3,200 lines and an ultimate capacity of approximately 6,000. The initial equipment will be capable of extension to the ultimate capacity mentioned, and will afford the accommodation necessary to meet development. The Manly telephone area is at present served by a manual switchboard of the multiple magneto type. The switchboard equipment is old, and unsuitable for the requirements of a large and important exchange. It is essential, in view of the conversion of the Sydney network to automatic, for early action to be taken to replace the existing manual exchange with modern automatic switching plant. The limit of the capacity of the existing building and plant has been reached, and a new exchange is essential. The estimated cost of the proposal is as follows:

Air-conditioning plant, &c.	£4,500
Exchange equipment, including that necessary at other exchanges	51,625
Substation equipment	8,266
Diversion of line plant and cut-over of equipment	470
	£64,861

The actual revenue received from the subscribers in the existing manual exchange area for the year ended 30th June, 1924, and the annual revenue which it is estimated will be obtained from the subscribers in the proposed Manly automatic exchange area on the date of the opening and with five years' development, are shown hereunder:

Average number of lines from existing exchange area during year ended 30.6.24.	Revenue from subscribers for the year ended 30.6.24.	Estimated number of subscribers for the year ended 30.6.24.	Estimated annual revenue, 31.12.25 (date of opening).	Estimated number of subscribers for the year ended 30.6.24.	Estimated annual revenue, 31.12.31 (5 years after date of opening).
1,640	£ 16,643	2,250	£ 23,340	3,200	£ 33,904

The financial aspect is as follows:—

Item.	—	31st December, 1925.	As at December, 31st 1931.
1 Capital cost—New	£ 64,861	£ 73,396	
2 Capital cost—New and in situ	140,697	160,640	
3 Annual working expenses of proposed automatic system	0,470	8,032	
4 Total annual charges of proposed automatic system	19,462	24,049	
5 Annual revenue	23,340	33,904	
6 Assets irrecoverable or thrown spare if an automatic exchange is established on 31st December, 1925			
(i) Book value	10,634		
(ii) Fair market value	0,600		
(iii) Cost of recovery	531		
7 Annual working expenses of existing manual system	10,030		
8 Total annual charges of existing manual system	19,534		
9 Assets by which the revenue exceeds the annual charges for the proposed automatic system	3,878		0,865

Regarding item 6 of the foregoing statement, the difference between sub-items (i) and (ii), viz., £10,544, is an amount which will have to be written off in the departmental accounts. It represents 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. In the estimate no provision has been made for the remodelling of the building, as that work is necessary to provide for the existing manual equipment, and has, in fact, already been commenced. The cost of the remodelling will be about £6,000. In the total interest charges a proportion of the cost of remodelling the building is included.

2. To Mr. Mathews.—Even if the proposal to establish an automatic telephone exchange is turned down, the expenditure in remodelling the building will have to be incurred. The expenditure is included in the item, "Capital cost new and in situ."

(Taken at Melbourne.)

FRIDAY, 17TH APRIL, 1925.

Present:

Mr. GREGORY, Chairman;
Senator Barnes | Mr. Cook
Senator Lynch | Mr. Mathews.

Lawrence Bede Fanning, Superintendent of Telephones, Central Administration, Postmaster-General's Department, recalled and further examined.

3. To the Chairman.—You asked me yesterday whether the cost of the building at Manly had been taken into consideration in calculating the annual

charges. I wish to supplement my statement of yesterday by showing how the amount of £140,000, in item 2 of the schedule, is made up. It includes £430 for the site. The present site is that occupied by the post office and existing exchange, and is valued at about £300. Approximately half that amount has been debited against the exchange proposal. The various items are as follows:—

Site	..	..	..	..	£430
Building	..	..	..	..	7,000
Air-conditioning plant	..	..	..	..	4,500
Exchange equipment, including that necessary at exchanges	..	..	..	..	51,025
Sub-station equipment—					
New	..	..	..	..	8,966
In situ	..	..	..	..	1,240
Line plant—					
Diversion	..	..	..	..	460
In situ	..	..	..	..	67,166
Cost of cut-over equipment	..	..	..	..	10
Total	..	..	..	..	£140,697

The proposed building is to be of brick, and will consist of two floors. The ground floor will be occupied by the power plant, the air-conditioning plant, and quarters for the linemen and mechanics. The first floor will be devoted almost entirely to the exchange. Tenders are now about to be called for the renovations. The building is being designed with the object of accommodating automatic plant, should the proposal be approved. Provision will be made to house the plant necessary to meet developments for about 30 years, and the plant will be capable of extension as the size of the exchange increases. The ultimate capacity of the building will be for 5,000 lines, but that will not meet the development expected in the Manly area. It will probably be found necessary in four or five years to open a new exchange at Balgowlah. Settlement at Manly is spreading westerly towards the Harbour and northwards towards Narrabeen and The Spit. It is estimated that in 1931 there will be 588 lines connected with Balgowlah, in 1939, 1,150; and in 1948, 2,500. The present proposal simply covers the township of Manly, and I think that 5,000 lines will be sufficient. It would be economical as the demand for service increases to open a new exchange at Balgowlah, which is, roughly, a mile from the existing one. You point out to me that the total annual charges of the proposal automatic exchange are £19,492, and the total annual charges of the existing manual system £18,584. The former amount includes interest on the present capital and also the operating costs. With the conversion of the Manly exchange to the automatic system we shall save, roughly, about 25 officers at present required to operate the manual exchange. The operating cost of this exchange, including salaries and wages of the operating staff, is £5,256. The annual working expenses of the present manual system amount to £10,030, made up as follows:—

Operating cost	..	..	..	£5,256
Maintaining—				
Building	..	..	..	13
Exchange equipment	..	..	..	1,828
Sub-station equipment	..	..	..	2,315
Line parts	..	..	..	618
				£10,030

The total annual charges of the existing manual system at 31st December, 1926, are as follows:—

Annual working expenses	..	..	£10,030
Interest	..	..	4,439
Depreciation—			
Building	..	..	18
Exchange equipment	..	..	547
Line plant	..	..	615
Administration charges	..	..	2,885
Total	..	..	£18,584

Comparisons of the annual working expenses of the automatic and manual systems are shown in items 3 and 7 of the financial aspect of the proposal. The relative amounts are—Automatic, £6,470; manual, £10,030.

4. To Senator Lynch.—You remark that in the case of the Lakemba exchange a 900-line service was stipulated for at the outset, and that the capital cost to accommodate that very small number is set down at £62,000. That sum includes the external as well as the internal plant. You point out that five years from date in the case of Lakemba the capital cost is increased from £62,537 to £65,329, and in the case of Manly from £140,697 to £156,540. That is so. The increase is £5,000 in one case, and £16,000 in the other, and I think it is a fair increase having regard to the difference in the size of the two exchanges. The number of subscribers at Lakemba increases in five years from 570 to 900, or by 330, and in the case of Manly the increase is expected to be from 2,250 to 3,200, or 950. Proportionately the increase is much about the same. You point out that in the case of the Manly exchange with a total annual charge of £19,492 the revenue is £23,340, and five years from date the charges are estimated to be approximately £24,000 and the revenue £23,000. In the case of Lakemba, however, you say that a loss at the commencing period was converted into a profit at five years from date. That is so. The profit in the case of Manly increases in five years from £3,878 to £9,855. The revenue which it is estimated will be received per line at Manly is much about the same as at Lakemba, being, roughly, £10. You wish to know whether the cost of giving service in an exchange or network increases as the exchange or network grows. My answer is that the cost definitely increases as the exchange or network is enlarged. The increase in cost is frequently in greater proportion than the increase in the number of subscribers. It is an established fact in any telephone system that the greater the volume of business dealt with the more complicated becomes the plant required to handle it, and the greater the cost of giving service per subscriber. Rather than a reduction of telephone rates being brought about through the increased demand for service I think that an increased charge will become inevitable with the increased growth owing to the increased cost of giving service.

5. To Mr. Mathews.—The value of the service given increases in proportion to the number of people with whom a subscriber can communicate at the unit fee rate, but our reason for any increase in telephone rates would be the increased cost of giving the service.

6. To Senator Lynch.—This principle applies both to manual and automatic exchanges. We have no serious complaints now in regard to the automatic system. Our difficulty in Melbourne and Sydney is that we still have a large number of subscribers connected with manually-operated exchanges, and there are inherent difficulties in providing service between different classes of exchange. Special equipment is at present necessary, but when we have complete automatic working the quality of the service will be considerably improved. So far as I am aware, no attempt has been made to manufacture telephone equipment in Australia. Probably the demand is not great enough to warrant

the laying down of the necessary plant. All our telephone equipment is purchased abroad; but, of course, copper wire and also cable are now being manufactured at Port Kembla. You ask me whether we find any difference between the quality of the material supplied by one firm as compared with another. Most of the automatic equipment used so far has been supplied by one firm, viz., the Automatic Telephone Company.

This company manufactures a special type of equipment, which is found to be suitable. The Chief Electrical Engineer (Mr. Crawford) could best advise the Committee as to the procedure adopted in calling for tenders. No doubt it would be a boon to the country if the telephone charges were reduced, but I am afraid that then the system would not show a fair return on the capital invested. A rate must be fixed commensurate with the cost of giving service, if the system is to pay like any ordinary business concern. In the last few years the telephone branch has shown a profit on its working. The latest figures, however, are not available, and there is a possibility in the future of the profit being converted into a loss. All costs are taken into consideration, and, therefore, the system stands on independent ground.

7. To Mr. Mathews.—You wish to know whether the estimates furnished to the committee of the recoverable value of the plant thrown idle as the result of the new system are always realized. In the case of Manly, the equipment is very old. It was in operation at the Manly Exchange for many years. Then it was reconditioned and put into use at Manly, so that its recoverable value is fairly low. There are certain expenses incurred in the opening of all automatic exchanges, and there is less likelihood of a profit being shown in the case of a small exchange. There is a certain initial expenditure such as the building which is non-recurring. The estimate of the cost of the air-conditioning plant was prepared by the engineering branch of the Works and Railways Department.

8. To Mr. Cook.—The book value of the present plant at Manly is £10,634. The value of the exchange equipment when it was taken to Manly in 1912 was £4,418; but, allowing for depreciation at the rate of 6 per cent, the present value is only £2,773. Since its installation additions have been made. In 1922 the equipment was increased at a cost of £3,164, and that plant has since depreciated in value to £2,404. A proposal is in action to increase the existing equipment at a cost of £1,542, and by the date of the cut-over of the new automatic exchange it will depreciate to £1,387. The book value of this equipment is, therefore, £9,120, but the estimated value prior to recovery will be only £4,334.

In considering the establishment of automatic telephone exchanges we study large networks, and as a particular locality is developed to such an extent as to warrant a new exchange, we open one in order to meet developments. We do not wait until a request is made for a new exchange, but provision is made ahead. In arriving at the annual charges, we know definitely what the value of the existing plant is. We know what it costs to maintain a telephone and a line, and, therefore, in calculating maintenance costs we are working on known figures. Our estimate is calculated on the assumption that the price will be about the same as in previous similar cases. I do not think that the figures now before the committee will be materially altered. In the last six or seven years our estimates have proved fairly accurate.

In the case of South Brisbane, owing to competition, there was a phenomenal drop in the tenders for equipment, and the price at which we purchased the equipment was below what was estimated.

9. To the Chairman.—You point out that in New Zealand a flat rate is charged, whereas in Australia there is a ground rental, and an additional charge for each call. You contend that, as the calling capacity of the people is increased, the revenue should increase, and that should do away with any necessity for an

increased telephone rate. My reply is that the greater the number of calls, the greater the cost of giving service. The quantity of equipment at any automatic exchange depends entirely on the rate at which the subscribers use their telephones. We have to provide sufficient plant to cope with the maximum number of calls made simultaneously. Most of the equipment in the exchange is lying comparatively idle for 23 hours out of the 24, but we have to cater for the peak hour. This applies to the manual system as well as to the automatic. I admit that a couple of years ago the telephone system was showing a good profit. Our annual costs have been considerably increased by recent arbitration awards, and by superannuation. If we examine the telephone network as a whole, it is doubtful if we would show a profit.

10. To Senator Lynch.—The exchange buildings now being erected are suitable for their purpose, and are built in as economical a manner as possible. I am concerned in the equipment to this extent, that the whole of that purchased for automatic exchanges is calculated on the probable traffic. These figures pass through my hands, and I have to certify that the volume of traffic will be forthcoming before the equipment is ordered. I am satisfied that there is nothing seriously wrong with the present method. We are proceeding with the installation of new exchanges, and the conversion of obsolete exchanges to automatic working as rapidly as possible.

(Taken at Sydney.)

MONDAY, 20TH APRIL, 1925.

Present:

Mr. GREGORY, Chairman;
Senator Barnes | Mr. Blakely
Senator Reid | Mr. Cook

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

11. To the Chairman.—The proposal is to establish an automatic telephone exchange at Manly on the existing site in Pittwater-road to replace the existing manual magneto exchange and provide for future development. Steps are being taken to alter and enlarge the existing building to meet immediate requirements, but, at the same time, provision for future growth will be made. The proposed automatic telephone switching system will be installed therein, and will have initial equipment for 3,200 subscribers' lines and an ultimate capacity in twenty years of, approximately, 5,000 lines. It is proposed that the initial equipment shall be capable of extension to the ultimate capacity named, thereby affording sufficient accommodation for the anticipated development in the proposed Manly automatic exchange area. The subscribers in the Manly telephone exchange area are served by a manual (multiple magneto) switchboard which is unsuitable for operation in the Sydney metropolitan network. It is necessary, therefore, to provide an up-to-date system by installing automatic telephone exchange equipment. The estimated cost of the work is £

Air-conditioning, heating, ventilating, vacuum cleaning, and air-compression plant	£4,500
Exchange equipment, including that necessary at other exchanges	..
Sub-station equipment	..
Diversion of line plant and cut-over of equipment	470

£64,801

The actual revenue received from the subscribers in the existing manual exchange area for the year ended

30th June, 1924, and the annual revenue which it is estimated will be obtained from the subscribers in the proposed Manly automatic exchange area on the date of opening, and with five years' development, are shown herunder:—

Average number of lines in automatic exchange area connected 30.6.24.	Revenue received from subscribers	Estimated number of subscribers' lines, 31.12.24 (date of opening)	Estimated annual revenue, 31.12.24	Estimated number of subscribers' lines, 31.12.31 (5 year date)	Estimated annual revenue, 31.12.31.
1,640	£ 10,643	2,250	£ 23,340	3,200	£ 33,904

The financial aspect may be summarized as follows:—

	At 31.12.20.	At 31.12.31.
Item.	£	£
1 Capital cost—New	64,861	73,395
2 Capital cost New and in situ	140,697	165,540
3. Annual working expenses of proposed automatic system	6,470	8,932
4. Total annual charges of proposed automatic system	19,462	24,040
5. Annual revenue	23,340	33,904
6. Assets recoverable or throw away if an automatic exchange is established on 31st December, 1924—		
(i) Book value	10,643	...
(ii) Recoverable value	9,600	...
(iii) Cost of recovery	631	...
7. Annual working expenses of existing manual system	10,030	...
8. Total annual charges of existing manual system	18,534	...
9. Amount by which the revenue exceeds the annual charges for the proposed automatic system	3,878	9,855

Regarding item 8 of the foregoing statement, the difference between sub-items (I) and (II), viz., £10,554, is an amount which will have to be written off in the departmental accounts. It represents the proportion of the capital outlay on the original assets which is irrecoverable and includes depreciation due to wear and tear in installation. The need for this expenditure has been occasioned by the increase in the number of subscribers in Manly, and by the inability of the existing system, having regard to the other parts of the network, to cope with requirements. The existing manual plant at Manly is one of the most obsolete in Sydney. The useful part of the plant will be recovered and used chiefly in country switchboards and wherever we are erecting boards which will take that type of equipment. The present building is to be altered, the estimated cost of the alterations being £6,250. We are proposing to build right around the existing exchange. The value of the building now in position is estimated at £740. At least that is the value which it will be assessed when incorporated in the building as altered, making the total cost of the completed structure £7,000. The site is estimated to be worth £430, the price actually paid for it years ago. Of course, it is worth more today. It will be possible to make the alterations and install the automatic plant without interfering with the existing manual service. There will be no disturbance of the service, even at the cut-over from the manual to the automatic. The date on which the cut-over will take place will depend upon deliveries. When the new exchange is completed it will form part of the Sydney metropolitan automatic network. Our estimate of the cost of the equipment, £16 10s. a line, is based on the latest figures. It is not a substantial reduction on what automatic equipment cost two or three years ago. It is a slight reduction on the last price received, but the reduction is neither here nor there. Of course, it is lower than during the war period, but we have had several tenders since then. I do not expect this class of equipment to be supplied much cheaper in the near

future. There does not seem to be any marked reduction in price in the last tenders received. In the matter of cost Australia compares very favorably with New Zealand, Great Britain, and the United States of America, but it is very difficult to take any particular exchange elsewhere and compare it with an exchange here. In certain exchanges in Great Britain the contractors do all the work, whereas here we do the installation work with our own men. The New Zealand networks are not comparable with the Sydney networks. The junction apparatus in New Zealand is therefore not comparable with what we require in Sydney or Melbourne. Many varying factors have to be taken into account in order to arrive at any reasonable comparison between costs in one country and those in another. Where the contractor installs the plant he adds the cost of that work to the cost of the equipment he supplies. We get tenders for the supply of the equipment, but we install it ourselves. We could have the installing done by the contractors, but to do so would add greatly to our costs. The best comparison is the actual cost per switching unit. We have made inquiries in that regard, and we have ascertained that our costs compare very favorably with those in the British Post Office, New Zealand, and Canada. I could ascertain for the Committee the cost of the creation of a similar plant in Great Britain and here. We used to charge a flat rate such as is charged in New Zealand, but it is a very unscientific system. I would not go to New Zealand for a comparison of costs, I would go to Great Britain or America, where the charge is exactly on the same basis as ours. Our costs compared with British or Americans are distinctly advantageous to us. In Great Britain and America the charge per call to the subscriber is higher than it is in Australia. Trunk line calls are 100 per cent. higher in America than they are in Australia. In America you would not get a network such as we have in Sydney. There all calls across a harbour would be classed as trunk calls, costing about 2d. per call, instead of 1d. as charged here. Our trunk-line rates are admitted to be the lowest in the world. Even our subscribers' rates are distinctly lower than in most countries; and when it is remembered that our costs in the matter of wages and hours of labour are higher than in most countries you can see that the cost to the users is distinctly lower than it is in any of the other countries I have mentioned. In the United States of America a commission fixes prices, and I should not like to say that any American price I may quote is in actual operation to-day. I have seen in the press that variations have been made in America. However, the existing trunk-line charges there are distinctly higher than ours. Our wire costs us approximately from 30 per cent. to 40 per cent. more than it costs in Great Britain. It is manufactured in Australia, and we have to make an allowance in our rates for the Australian manufacturer's price. One of the reasons the Americans might urge in favour of their higher rates is that they provide their services on a no-delay basis. We have not reached anything like that stage yet, the result being that we load up our lines far more than they do in America. Consequently, they have far more idle time on their lines than we have, and that, of course, adds to the cost. They provide for the busy-hour traffic. If we provided for the busy-hour traffic between Sydney and Melbourne we would need very many more telephone channels. We are now installing a carrier wave apparatus which will give several more channels on the existing line between Sydney and Melbourne, and we hope that these will be available for service about the middle of the year. In America the telephone is in use in nearly every home. The telephone companies there have touched a stratum of workmen we never touch as subscribers. Of course, I do not say that we never shall. One reason why even with higher costs the telephone is so popular in the United States of America is that the companies there employ canvassers. There was very

fierce competition in the earlier days between the competing companies. Many factors explain the greater readiness of the people of the United States of America to take telephone service than is displayed in Australia, but there is no doubt that the time will come when Australian workmen will have telephones. As the system grows so its utility increases. If every man were on the telephone the telephone service would reach its maximum of usefulness. The manual system is still much in evidence in the United States of America. They were slow there in moving to convert from the manual to the automatic, but they are doing so very rapidly now. It was not the advantages afforded by a manual service that caused telephones to be popular in America. An automatic service ought to make the system more popular than it has been with manual equipment, because the element of human error is eliminated. Our anticipation of the increase in the number of subscribers at Manly is based on a careful survey which has taken into consideration as far as possible all known factors. In five years' time we anticipate there will be 3,200 subscribers on the exchange. The building will provide for an ultimate capacity of 5,000 subscribers. The actual increase in new subscribers for the last completed year shows that we are not anticipating more than we have a right to anticipate. Between 30th June, 1923, and 30th June, 1924, the percentage increase throughout the Sydney metropolitan area was 11.7 per cent., and in the country was 10.2 per cent. We anticipate an increase of nearly 30 per cent. at Manly in eighteen months. But one has to remember that there are certain areas where the increase is only 5 per cent., whereas in other areas on the outskirts, in good residential properties, you may even get an increase of as much as 40 per cent. Our estimated revenue for the Manly exchange is a little over £10 a subscriber, against about £14 a subscriber for West Adelaide. There is a great deal of difference between a sub-exchange and a main exchange, because the main exchange has much more switching apparatus than has a sub-exchange. West Adelaide will be almost on the edge of the city. The daily calling rate of each subscriber in the city North (Sydney) is about 15, whereas the calling rate at Wahroonga is about 2.8 per subscriber. The nearer you get to the city the greater the revenue, because you have very many more business firms to cater for. A large proportion of our expenditure goes on copper lines. We get all the copper wire and most of the lead-covered cable manufactured in Australia. The Australian manufacturer has not gone in for manufacturing bronze, or cadmium wire, which we are now using in lieu of bronze, and which is manufactured in England. The Australian price of copper wire is, roughly, 30 per cent. higher than the English price. We use a great deal of cable in switchboards, and copper is the main content of cable. The heavy cost of copper and copper wire is a great disadvantage to the manufacturer of telephone apparatus in Australia. The manufacturer who has to purchase his raw material, such as copper wire, in Australia, has to pay the Australian manufacturer's profit. If he were producing coils, and had to use locally-produced raw material, obviously he would have to pay the Australian price for his copper wire. Undoubtedly to an extent that fact tends seriously to retard the local manufacture of these things. I submit the certificate of the accountant of the Postmaster-General's Department, Sydney, as to the revenue at the Manly telephone exchange. It is as follows:—

(a) Actual total revenue received from the subscribers in the existing Manly Exchange area for the twelve months ended 30th June, 1924.—

Rents and calls	£	s. d.
Miscellaneous charges	15,452	6 3
Trunk line calls	494	10 4
	556	0 6
Total	16,008	17 1

Average number of lines connected, 1,640.

(b) Estimated annual revenue for the Manly Automatic Exchange area at the proposed date of cut-off, i.e., 31st December, 1926, and five years later:—

No. of Rents and charges	Trunk line calls	Total
2,250	£21,600	£700
3,200	31,600	1,220

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, to the best of my knowledge and belief, correct.

12. To Senator Reid.—On the 4th April, 1921, the population of Manly was 18,507. In 1923, the estimated population, according to the Statistician, was 21,170—roughly an increase of 3,000 persons in two years. On the 31st December, 1924, the number of stations in the Manly exchange was 1,907. There were then 32 waiting applicants. The population being 21,000, the proportion of telephone users to the population is, roughly, 1 in 10. I can use the lighter type of bronze wire to get the same tensile strength as copper. You often want tensile strength more than low conductivity on the light short lines. We mainly use phosphor-bronze lines 40 lb. to the mile. If we used copper of the same small gauge the tensile strength would be inadequate. It would break too easily. The difference in cost between bronze and copper is very little. Advantage is gained in the strength of the bronze against the weight of the copper. That is why we are now switching from phosphor-bronze to cadmium copper, which in comparison with copper has equal conductivity with greatly reduced weight and potentially equal tensile strength. Where now we use 70 lb. bronze or 100 lb. copper wire, we shall be able to use 40 lb. or 70 lb. cadmium copper. Cadmium is a copper alloy giving high tensile strength and very slightly affecting the conductivity. It is comparatively new. We are only getting the first consignments of it to-day. It has been tested elsewhere, and we have tested it. We are quite satisfied with it, and the British Post Office is using it. It has been known for a long time, but I cannot say whether there is any patent process for the manufacture of it. It is an economical proposition so far as our Department is concerned. It would not be used for long distances, for which the ordinary hard-drawn copper would give an adequate tensile strength. It is only used for small gauge wires. Of course, there are certain cases where it would have its advantages even in larger gauge wires where streams have to be crossed by wide spans. But those cases are exceptional.

13. To Mr. Blakeley.—The tensile strength of cadmium wire is approximately one and a half times greater than that of hard-drawn copper. It is about the same as that of bronze, but its cost is very much lower than that of bronze gauge for gauge; you get a lower resistance in cadmium than you do in phosphor-bronze. The loss of efficiency is very little less than that of copper. The following are the latest prices we have paid for copper, bronze, and cadmium copper:—

Local manufacturer*	English manufacturer†
Copper Wire—	
100 lb. per mile	£110 0 0
150 lb. per mile	79 15 0
200 lb. per mile	107 10 0
300 lb. per mile	107 10 0
	—

* The above prices are for delivery into store.

† The above prices are for delivery f.o.b. Liverpool, and are exclusive of duty. Freight and charges amount to approx 3d. per ton.

Bronze Wire—	
40 lb. per mile	£100 15s. per ton f.o.b. Liverpool
70 lb. per mile	£100 15s. per ton f.o.b. Liverpool

Cadmium Copper—

40 lb. per mile—£105 15s. per ton f.o.b. Liverpool.

14. To Senator Barnes.—We anticipate having 5,000 subscribers in Manly in twenty years. We estimate the life of our automatic plants at twenty years, and that estimate seems to be borne out by the experience

here and elsewhere. We are only putting in immediate provision for five years' expansion.

15. *To Mr. Blakeley.*—The mechanics decidedly appreciate the atmosphere created by air-conditioning plants. In the City North automatic exchange the mechanics admit that on days when it is uncomfortable outside it is quite sweet, cool and nice in the exchange. I would hardly like to say that from an economical stand-point it would pay the Commonwealth to install air-conditioning plants for the benefit of employees. The number of days in an ordinary office where a man is inconvenienced by high humidity may be only three or four in the year in Sydney—perhaps half a dozen at the outside—and it is doubtful whether it would pay the Commonwealth to incur a fairly high cost merely to bring up the efficiency of the staff on that limited number of days. In the case of an automatic exchange the advantages of an air-conditioning plant are felt. At Manly, for example, the humidity will be over 70 per cent. on a great number of days in the year. I would not say that there were not places where it would not pay in the interests of public health to have an air-conditioning plant where large numbers of people are employed. There are places in the Commonwealth which have a very high percentage of humidity. Sydney is one of them, but I do not think it would pay to have an air-conditioning plant in the new General Post Office, Sydney. I know that they have air-conditioning plants in some factories in America, but I rather think that their conditions are somewhat different from ours. I do not think that even in Queensland it would be necessary to have such a plant in an ordinary office as distinct from a telephone exchange. We have higher humidity readings in Sydney than in Brisbane. In every month of the year there are occasions when the humidity of Sydney is above 75 per cent. The highest readings are as follows:—January, 73; February, 81; March, 85; April, 87; May, 90; June, 89; July, 88; August, 84; September, 78; October, 77; November, 79; and December, 77. The humidity is greater in the winter than in the summer. The average mean throughout the year I have quoted was 72. These figures have been supplied by the Meteorological Bureau.

16. *To Mr. Cook.*—The installation of an air-conditioning plant in an automatic telephone exchange tends to economy. The manufacturers of automatic equipment do not guarantee its efficiency if it is worked when the humidity exceeds 75 per cent. For this reason we install an air-conditioning plant. At the same time, these plants make it more comfortable for the employees to work, but we do not install them for that reason in manual exchanges. It can show the Committee how our actual cost per line compares with the estimated cost in quite a large number of exchanges recently built. For seventeen exchanges throughout the Commonwealth we estimated the cost would be £20 a line, but actually only three exchanges exceeded that estimated. These were Collingwood, £20 16s. 8d.; City South (Sydney), £22 9s. 1d.; and South Melbourne, £23 8s. 9d. The others fell as low as £15 0s. 8d. But these figures have to be interpreted reasonably. You have to remember that the cost per line is a straight line factor relative to the amount of switching apparatus. At City North we have about 7,000 subscribers, but much more switching apparatus than at any five other exchanges in the Sydney metropolitan area, where the total number of subscribers may be 1,500. That is because City North is the main switching centre dealing with practically all the calls that pass between the north side and the south side of the harbour. City North is Sydney's main exchange. When City South exchange opens the exchanges which will be subordinate to City South will be all the western exchanges. Therefore, you cannot go wholly by the number of lines in any particular exchange. You have also to consider the traffic handled, and in order to do that you have to take into account the total quantity of switching apparatus, whether it be first, second, third,

or fourth directors, repeaters, or such like. We get our estimate of the cost of the building from the Works and Railways Department. Most of our wire and cable comes from Port Kembla. The number of telephones installed in Australia has enormously increased in the last few years. It has to be remembered that the telephone system is one of the exceptions in industry. With it you do not make a profit on quantity. It does not necessarily follow that with more telephones in use they can be supplied at a lower cost. Indeed, you can sometimes say that the reverse applies. Certainly it does apply in regard to manual C.B. equipment, more so than in a case of automatic. Take the Sydney Central exchange, which is a common-battery system. This, with its huge multiple, allows every operator to give a subscriber direct connexion with every other subscriber on the exchange. Take Melbourne Central, with nearly 12,000 subscribers. Every operator in that exchange can give connexion on her multiple to 12,000 subscribers. You can see that the more you build up that multiple the less possibility you have of reducing your costs per subscriber or per line. It does not quite follow in the same ratio in the case of an automatic exchange, but even there I do not hold out any hope, and neither would any other telephone expert of getting cheaper telephones because you have more of them. But do not forget that as the telephone service grows so the relative utility of the telephone line becomes greatly enhanced. In the Sydney network, where you have 50,000 subscribers, each subscriber can speak to that number. If you have 100,000 subscribers the service becomes more valuable still. When you have every family on the telephone your service will have attained its maximum usefulness. Your fire risks will be greatly reduced, because every man in every house will have practically instant communication with the fire brigade. I mention these facts to show that the value of the telephone grows with any increase in the number of subscribers. We are not sending out canvassers as is done in America. It takes us all we can do to keep level with the demands of the new applicants. There comes a time when it becomes more economical to divide an existing exchange. Each telephone subscriber has a separate pair of copper wires leading right to the exchange. As you increase your area, as far as your telephone distribution on the outer edges goes denser and denser, it pays the department to establish a new exchange near that edge. To give an extreme example, it would be quite possible to bring all Sydney subscribers into the Sydney Post Office, but it would not be economical to do so. We are now cutting the Lakemba area out of a number of other exchanges. It would not have paid to do this many years ago, but it pays now, because of the lengths of copper wire required to connect distant subscribers.

(Taken at Sydney.)

WEDNESDAY, 22ND APRIL, 1925.

Present:

Mr. GREGORY, Chairman;	Mr. COOK.
Senator Barnes	
Senator Reid	

Victor Edward Butler, Telephone Manager, New South Wales, sworn and examined.

17. *To the Chairman.*—The State Engineer and I have conferred in regard to the class of exchange to be installed at Manly, and also with a view to securing information to show the prospective development of the area. Having reached an agreement consistent with the policy of the department, the class and size of exchange to be erected is recommended. Altering an existing exchange such as that at Manly to automatic is consistent with the policy of the department, but the

whole operation is usually dependent on the ability of the existing exchange to carry on, or the necessity for an alteration in order to increase efficiency. The proposal in this case originated in the engineering branch. The usual procedure is for the engineer to forward particulars to the Telephone Branch in regard to the proposed establishment of, or alteration to, an exchange. It is our duty then to show the traffic development figures for the district. If the Traffic Branch finds that the business in an exchange is increasing by leaps and bounds, special attention is given to it. The development and survey studies are not always done by the Telephone Branch. A re-organization of the branch is now under consideration, and I hope that very shortly it will definitely be my function to carry out that duty. Nevertheless, at present there is the fullest collaboration between the two branches of the service. My responsibility covers the output from every exchange. I am responsible for the service provided, the convenience to the public, public facilities, and such like. All complaints in regard to the service come to me. If a matter concerns the engineering service they report on it. Any traffic matter is referred to the traffic branch for a report. The business done at Manly shows that it is necessary to have an automatic exchange established there immediately. There are very few spares on the present switchboard. We now have make-shift arrangements to enable us to carry on, and must have an automatic equipment to give the necessary efficient service. There is very little accommodation for an increase in the number of subscribers. At present there are approximately 150 spare lines at Manly, and about 50 applications in hand and being dealt with. Considerable trouble is experienced in keeping our supplies well in hand, but the position has improved, and we can now supply a service at Manly fairly promptly. The difficulty in giving service is frequently caused by insufficient cable accommodation. In other cases it is due to insufficient switchboard accommodation, and sometimes there is a shortage of telephones. We have been extremely short of table telephones, but supplies of these are now coming to hand. The figures which have been submitted to the Committee by the State Engineers are based upon a survey and the past development. I think that the proposed exchange will enable us to comply with the requirements of the Manly district for the next 20 years. A sub-exchange proposed to be built at Balgowlah will relieve the Manly exchange to a small extent. A larger building is necessary at Manly. We cannot carry on any longer in the space now occupied by the manual exchange there. The size of the building proposed will be ample for all requirements during the next 20 years. I think the estimated increase of users will be maintained. Manly is a place where the telephone is used very extensively, despite the small type of houses erected. The buildings at Manly are not elaborate, but a lot of them will have telephones. It is usually found in places where the buildings are of low value that the telephone is used to a limited extent only. The calling rate at Manly is higher during the summer months than in the winter. The department employs two or three extra operators in the exchange to handle the business in the summer. The calling rate falls off during the winter, so that the percentage over the whole year is affected.

18. *To Senator Reid.*—The existing manual exchange is likely to reach its maximum in about twelve months, and if the Manly applications are not reduced, we shall have to make some further make-shift arrangement pending the opening of the automatic exchange. At the present rate of growth the existing equipment will not last for twelve months. We are hoping to have the cut-over to the new exchange at the end of December, 1926. The existing equipment is not at all satisfactory from a traffic point of view. To tide us over our difficulties we have three extra boards across the room in a position which they would not occupy in a properly

constructed exchange. If we are positively stuck we shall have to do something to tide us over, but the present make-shift arrangement is about as far as we really can go. From a departmental point of view, as well as from the stand-point of the public, it is a matter of urgency that the new exchange should be erected. 19. *To Senator Barnes.*—For automatic equipment the department must send abroad. The Chief Electrical Engineer and his officers have consulted upon the general question of the department constructing its own apparatus. Undoubtedly we should be up against patents and things of that character. We should be obliged to get permission to use patents for local construction. Special investigations were made some time ago, but I do not know the result. I am frequently consulted by the other branches of the department. The features of co-operation are closely observed. If we did not have these almost daily consultations we could not carry on as efficiently. Any decision arrived at passes through the ordinary channels to the secretary, and, if necessary, to the Postmaster-General for acceptance or rejection. The secretary is the determining officer. Of course, if it is a matter of policy which the Minister should decide it would go on to him personally. I should like to see Australia provide its own telephone apparatus if practicable. Our workshops are doing all they possibly can constructing small switchboards. They have never attempted anything like large automatic installation, but most of the private exchange switchboards are made by them, and I see no reason why their operations should not be extended ultimately to cover all the requirements of the department. An Australian I should like to see that policy adopted. Almost all our country exchange equipment is made in our own workshops. The department is doing an immense amount of work which was never attempted before the war.

20. *To Mr. Cook.*—Our department has very frequently considered the advisability or otherwise of canvassing for business, but the trouble is that, so far, we have not been able to meet the demands that come in unsought. If we had been in a position to supply telephones freely we would have canvassed long ago. The matter has been discussed many times. I cannot say that it has been brought under the notice of Parliament, but it has certainly been carefully considered by the Central Administration. It would not be advisable to employ canvassers until we were in a position to meet the demands which might arise from that canvass. There are certainly circumstances in which it would pay to canvass. There is no place in Australia as far as I know at the present time where we could meet the extraordinary demand. There are now 527 lines in the Sydney metropolitan area waiting for service. The principal trouble in the past has been the scarcity of switchboards and cable. These requirements are now coming along fairly well. At one time in New South Wales 5,000 people were waiting for a service. The war was the cause of the whole difficulty, and not only the war but the aftermath of the war when the whole world was reconditioning the telephone service. Australia is a long way from the source of manufacture, and it is correspondingly difficult for us to get supplies. It may appear strange that greater pressure is not put upon the Government to meet a demand for a service which would certainly pay for itself, but at the same time it must be remembered the Government has made money available, and has been anxious to supply equipment with which to meet the public demand. It has, however, been impossible to obtain the material to meet the demand that came unsought. There has been a world shortage of material. All our automatic material is imported. The department would have undertaken a canvass to increase the service and give the public what they require if we could have met the demand in any possible way.

21. *To Senator Reid.*—If we had the money there were times when we could not get all the equipment

we wanted. Sometimes the equipment has been available, but no money has been available. At other times the money has been available but not the equipment. That has been the position during the last six years. If the department had a plan laid out for five years' work, and could get the money from the Government, it would thus be in a better position to meet the demands of the public within a limited time by placing orders for equipment sufficiently far ahead.

The witness withdrew.

George John Oakeshott, Commonwealth Works Director for New South Wales, sworn and examined.

22. *To the Chairman.*—The plan of the proposed automatic telephone exchange at Manly was prepared by me. The proposal is to alter the existing building now, accommodating a manual switchboard and so permit of accommodating an automatic installation capable of lasting for a considerable number of years. My difficulty was to carry on the existing frames and switchboards during the whole of the building operations. They could not be disturbed until sufficient of the new building was ready, and until the new automatic equipment was fixed up. All this has to be done before we can touch the building now occupied by the racks, frames, and switchboards in use in the manual exchange. The plan submitted to the Committee shows how this difficulty has been overcome. It gives an idea of how the alterations will take place under the first contract, and what the eventual lay-out of the whole scheme will be when the manual switchboard is absolutely abolished. The plans themselves do not require much explanation. Almost the whole of the old building will ultimately be pulled down, the only exception being the wall on the northern side of about half the building, and the frame-room and battery-room on the ground floor, which will be kept to form an air-conditioning room. The existing building will not be pulled down under the first contract except that portion in front of the switch-room and the racks and frames fronting Pittwater-road. The existing switch-room and racks and frames, and also the battery-room on the ground floor, will be kept intact during all the building operations under the first contract. The only portion of the old building to remain on the first floor will be on the northern side of the switch-room, but the other walls of the switch-room will be of valuable temporary use, enabling us to keep the existing manual exchange going, and as free from dust as is humanly possible during all the building operations. For a length of 38 feet on the northern side of the building, a space 3 ft. 6 in. wide along the boundary of the block upon which the exchange will be built will be permanently lost. But it will be absolutely necessary as a light area. Otherwise there could be no windows on that side of the building. I think it wise to have lights on that side of the switch-room. The postal authorities are always most anxious that we should give as much light as possible into their switch-rooms. We guard against fire by putting on that side fire-resisting windows with wire-netted glass. I have known cases where such windows have cracked badly when within 4 feet or 5 feet of a fire, but have yet prevented the fire from entering the building. On the side of this building liable to fire risk the windows will have steel frames and wire-netted glass. There is very little difference in the cost of altering the present building at Manly and enlarging it and that of building an entirely new structure. We are really only keeping on the first floor the wall towards the northern side, and the saving in that respect will be more than covered by the precautions we shall have to take to keep the existing switchboard going. Our whole trouble is that we must keep the existing switch-room going until the very last moment. We must not disturb that switch-room until the new equipment has been installed. The only alternative was to build a permanent new exchange on a separate plot of ground,

but that would be an expensive way of doing it. The present plant could not be installed in the post office. The switch-room and all the paraphernalia could not be changed and the service kept going. It would have been necessary to put an entirely new equipment in the post office. That would have meant two entirely new equipments for Manly—one entirely new manual equipment, and an entirely new automatic equipment to ultimately replace the other. The wall on the northern side will be built of brick. The stone work of the old building will not be used as a facing for the new building. The front of the new building will be built of concrete. It would cost at least £1,000 more to build it in stone. There will be contrast and not harmony between the front of the new building and that of the adjoining post office. There will be no windows on the northern side except in the wall of the switch-room, and those will face the light area. The other portion of the wall on the side will be a parapet wall without windows. I think I am justified in using wire-netted glass windows facing that light area. Of course, there is always danger of fire, and to have a window close to an adjoining edifice provides an extra fire risk, but with all the precautions we have taken, namely, brick walls, steel frames, glass with wire netting, and a parapet wall, I think we have done all we should to make the building fire resisting. We can use ordinary glass windows on the harbour side of the building, because there will be absolutely no danger of fire from that quarter. There will be at least 10 feet between the wall of the exchange and the wall of the post office. The post office is built of stone and brick with a slate roof. The division between the Commonwealth property and the private property adjoining will probably be a fence. I do not think that will increase the danger of fire to any appreciable extent. There will be nothing in the exchange to catch fire on this side, because it will be nothing but brick, steel, and glass. Of course, a 9-in. brick wall dividing the two properties might increase the safety of the exchange. The sum of £134 is provided in the estimate for fire services, viz., hydrants, fire extinguishers, and 3-in. water service pipes. The provision made is in strict accordance with the Fire Board regulations, and as a matter of fact the Fire Board will undertake the supervision of the fire appliances. The building will be built of reinforced concrete except for the outside walls, which will be of brick. The roof will be concrete with a parapet wall. It will be a flat roof. The ceiling on the first floor will be of plaster. The ground floor ceiling will be of cement, reinforced and rendered. The ground floor will be of solid concrete. The staircase will be of reinforced concrete. There will be one staircase in the corner at the junction of Sydney-road and Whistler-street, that should be ample for all requirements. The estimated cost of the building is £5,760. At least that is the first contract. When we have completed the building according to our first estimate and installed the automatic exchange in the switch-room facing Pittwater-road we shall do away with the manual switch and remove all the internal walls to provide an automatic switch-room of the full size shown on the plan. That work will cost very little more than the price I have mentioned, because the actual shell of the building, as well as the staircase, will have been completed. The only thing remaining to be dealt with will be the inside fittings of the switch-room and frame-room on the ground floor. We shall have to leave the ceiling of the existing switch-room and frame-room absolutely alone until the automatic equipment is installed. Then we shall fill in the gap in the ceiling. That work is included in the first contract.

23. *To Mr. Cook.*—The use of brick, concrete or wood depends on the situation of the building. In all automatic exchanges we believe that reinforced concrete is the best not only from an efficiency point of view, but also because it is the cheapest method of construction where we have big spans for which we cannot provide intermediate supports. A switch-room must be

left without any columns. Therefore, reinforced concrete is by far the most efficient and cheapest way of carrying out that class of work. In the case of the Manly exchange the outside walls will be of brick. A well finished brick wall is very beautiful. For floors and roofing and also where front ornamentation is required, no doubt concrete and cement provide the cheapest method. During the war the cost of building was almost prohibitive, but during the last few years it has not varied very much, and it is now fairly stationary. Reinforced concrete is by far the best type of material to use for a building in which machinery is to be installed. An automatic exchange must be as far as possible fire proof and dust proof. It must also have an even temperature. There is little difference between the cost of concrete and that of brick. It all depends upon the amount of ornamentation you put into the concrete. If you make it very elaborate it costs more than brickwork.

24. *To Mr. Blakely.*—To overcome the difficulty of having a temporary roof over the existing switch-room, I think the best way is to build the whole of the fire-proof ceiling right over that room. If it is possible to do so, I shall build the whole flat concrete roof in one section. There is a roof over the existing switch-room, and we may be able to manage by cutting it off and constructing a temporary roof. The stone in the existing front will be removed in the first operation. The frame-room will be one of the first portions of the existing building to be removed. In regard to the

material in the old building we are quite satisfied to leave it to the contractor to use it in the existing building if he cares to do so. I should be only too pleased to have the dressed stone work used for concrete work, but the contractor may get an advantageous offer for it. Some of the dressed stone removed from a building is worth a lot to a man who wants it, but if he does not want it at the moment, and if nobody else wants it for any purpose, he gets a ridiculous price for it. The sale of such material is a capricious matter. It is impossible to estimate what to allow for it. Wooden joists, for instance, would be an excellent saleable material, but they are full of nails and they may have to be dressed and cut to a different size. If a man wants 6 in. by 2 in. joists, and they are available he will pay for them if he can take them straight on to his job, but if he wants 6 in. by 2 in. joists when only 6 in. by 3 in. are available he will get them from a timber merchant, because it pays him to do so. Sometimes you have to pay to have buildings pulled down.

25. *To Senator Reid.*—It would cost more to cut and dress the old stones for use as a base in the new building than to build in brick. If the contractor offers to do it I shall accept his offer, but if I were to specify that it should be done he would charge for it. He would very likely claim that all the old stones would need to be re-dressed.

The witness withdrew.
The Committee adjourned.