

1928.



THE PARLIAMENT OF THE COMMONWEALTH OF AUSTRALIA.

By Senator Reid

Pursuant to Statute

By Command

In return to Order

PARLIAMENTARY STANDING COMMITTEE

ON PUBLIC WORKS.

Clerk of the Senate.

SEP 12 1928

REPORT

TOGETHER WITH

MINUTES OF EVIDENCE

RELATING TO THE PROPOSED ~~ESTABLISHMENT OF AN~~ ^{ESTABLISHMENT OF AN}

AUTOMATIC TELEPHONE EXCHANGE AT CITY WEST MELBOURNE,

AND

CONVERSION OF SOUTH MELBOURNE AUTOMATIC EXCHANGE.

TO SIX FIGURE WORKING.

MEMBERS OF THE PARLIAMENTARY STANDING COMMITTEE ON PUBLIC WORKS.

(Fifth Committee.)

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

Senate.

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

House of Representatives.

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

* Resigned 30th June, 1926.

† Appointed 1st July, 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. 161, DATED 29th March, 1927.

2. PUBLIC WORKS COMMITTEE—REFERENCE OF WORK—AUTOMATIC TELEPHONE EXCHANGE AT CITY WEST, MELBOURNE, AND CONVERSION OF SOUTH MELBOURNE AUTOMATIC EXCHANGE.—Mr. HILL (Minister for Works and Railways) moved, by leave, 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, viz.:—
Establishment of Automatic Telephone Exchange at City West, Melbourne, and Conversion of South Melbourne Automatic Exchange to six-figure working.
Mr. Hill having laid on the Table plans, &c., in connexion with the proposed work—
Question—put and passed.

LIST OF WITNESSES.

Beecher, Edgar, Supervising Engineer, P.M.G.'s Department.
Crawford, John Murray, Chief Engineer, Postmaster General's Department.
Fanning, Lawrence Bede, Chief Inspector of Telephones, P.M.G.'s Department.
Murdoch, John Smith, C.M.G., Commonwealth Director-General of Works.

PARLIAMENTARY STANDING COMMITTEE ON PUBLIC WORKS.

ESTABLISHMENT OF AN AUTOMATIC TELEPHONE EXCHANGE AT CITY
WEST (MELBOURNE)
and
CONVERSION OF SOUTH MELBOURNE AUTOMATIC EXCHANGE TO SIX
FIGURE WORKING.

R E P O R T .

The Parliamentary Standing Committee on Public Works to which the House of Representatives referred for investigation and Report the question of the establishment of an automatic telephone exchange at City West (Melbourne) and the conversion of the South Melbourne automatic exchange to six figure working has the honour to report as follows:-

INTRODUCTORY.

1. The telephone requirements of the city of Melbourne are at present catered for by a common battery manual exchange situated in Lonsdale Street, Melbourne.

With the increase ~~in~~ in the number of subscribers it is represented that the equipment in this building has reached ~~the~~ the limit of its capacity, and, in pursuance of its policy of telephone development, the Postmaster General's Department has in view the division of the present manual exchange area of the city into two parts, each of which will be served by an automatic exchange.

consideration The exchange now under ~~construction~~ construction aims to serve the western half of the city bounded by Spencer Street, Flinders Street, Elizabeth Street, and Lonsdale Street.

PRESENT PROPOSAL.

2. The proposal submitted is to erect on an area of Commonwealth property at the rear of the existing central manual telephone exchange in Lonsdale Street, a modern building, and to install therein an automatic telephone switching system having an initial equipment for 10,000 subscribers' lines, and capable of extension in the proposed building to 18,000 lines, and thus ~~to~~ enable requirements in the proposed automatic telephone exchange area to be met for approximately 12 years after the proposed date of opening.

3. The general scheme for the conversion of the Melbourne metropolitan area to automatic working necessitates that the present South Melbourne automatic telephone exchange be a "branch" exchange, working into City West as a "main" exchange. With the establishment of City West as proposed, therefore, it will be necessary to provide more space and install additional equipment at

South Melbourne.

ESTIMATED COST.

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

	<u>City West</u>	<u>South Melbourne</u>	<u>Total</u>
	<u>£</u>	<u>£</u>	<u>£</u>
Site (already acquired)	2,450	2,450	2,450
Building	67,200	2,600	69,800
Air Conditioning Plant etc.	14,100	550	14,650
Exchange equipment -			
Automatic Switching Plant	377,359	32,032	409,391
Trunk line exchange	22,260	-	22,260
Carrier wave equipment	12,306	-	12,306
Junction equipment at other exchanges	24,443	-	24,443
Substation equipment	55,510	-	55,510
Line Plant (diversion)	7,509	-	7,509
Sundries	1,403	61	1,464
	<u>£ 584,540</u>	<u>£35,243</u>	<u>£619,783</u>

COMMITTEE'S INVESTIGATIONS.

5.

The Committee visited the existing automatic telephone exchange at South Melbourne and the central manual exchange at Lonsdale Street, Melbourne, and inspected the site on which it is proposed to erect the new building. The Chief Commonwealth Architect gave full particulars of the building proposed to be erected, and details were obtained from the postal and works engineers as to the equipment to be installed, the methods to be adopted for regulating the temperature and humidity of the air, etc.

S i t e.

6. The land upon which it is proposed to ~~xx~~ erect the new exchange is situated at the rear of the existing central manual exchange, and has a frontage of 66 feet to Little Bourke Street by a depth of 103 feet to the end of the central exchange building. It is good building land, and conveniently situated from the telephonic point of view, and, in the ~~an~~ opinion of the Committee, should prove quite suitable for the purpose for which it is intended.

~~XXXXXXXXXXXX~~B u i l d i n g.

7. The building is designed to be of 7 floors

and a basement. It will be of modern high-class fire-resisting construction, with concrete floors throughout, and reinforced concrete stanchions. The height of the basement from floor ~~level~~ ^{line} to floor ~~level~~ ^{line} will be 11 feet; that of the ground floor 17 feet; the first, second, third, and 4th floors 13 feet, and the 5th, ~~6th~~ and 6th ~~storeys~~ 12 feet. The building is to have a flat roof capable of being used by the staff for recreation, and for the accommodation of water tanks etc.

8. The design of the building is simple, and the style of the front elevation has been suggested by the adjoining law courts buildings, with which it will be in harmony. The construction will be of brick with bluestone introduced in the form of cornices and other mouldings about the windows and doors from the ground level to the second floor, with a bluestone cornice also introduced at the top of the building.

9. The walls will be 14 inches thick from foundations to roof. The postal department, after many experiments have come to the conclusion that the equipment should rest directly on the finished face of the concrete floors, and that in order to ~~prevent~~ prevent the creation of bust by pedestrians, the passages between the frames should be covered with stout linoleum set in bitument.

10. The basement will provide the usual well into which the cables will be brought, and from which they will be carried to the floors above. In addition, provision is included for 2 air conditioning rooms 50 feet by 20 feet, and 40 feet by 18 feet respectively; a boiler room 22 feet by 18 feet; and a power room 44 feet by 30 feet. On the ground floor a staircase and lift will be introduced in the south ~~western~~ ^{eastern} corner giving communication to all floors. Here also will be situated the main frame room 101 feet by 22 feet, a battery room 66 feet by 36 feet, a switch room 36 feet by 14 feet, and a small store. The ground, first and second floors will extend

through fire-proof doors into corresponding floors of the existing exchange. On the first floor will be a main switch room 101 feet by 45 feet with an annex 40 feet by 19 feet. The communication by fire-proof doors to the corresponding floors of the existing building will give a switch room of a total length of 251 feet.

The second, 3,4,5, and 6 floors will provide further rooms each 101 feet by 45 feet with an annex in each case of 40 feet by 19 feet. The 5th floor will accommodate trunk line apparatus, and the top floor the trunk exchange.

~~XXXXXXXXXXXX~~

Lighting.

11. The frontage to Little Bourke Street will derive light along its full extent, and the west side of the building will have natural light for the whole distance of 103 feet. Above the ground floor a light area 40 feet by 19 feet will be taken out of the building on the eastern side, because on that side the building will abut on private property and no light will be obtainable there excepting by this special arrangement.

~~12.~~

Time for Completion.

12. It is estimated that the construction of the building will take 18 months, but in case of urgency it might be possible to give the postal department possession of the lower floors within 12 months to permit them to proceed with the installation of their equipment concurrently with the completion of the upper structure.

South Melbourne Exchange.

13. Concurrently with the erection of the City West exchange it will be necessary to convert the South Melbourne exchange from a separate entity into an adjunct of the City West exchange. The South Melbourne exchange is of one story, but, as the ultimate need for duplication was foreseen, precautions were taken to admit of a second story being added when required. The proposal now is to add this second story which will give a new switch room 65 feet by 52 feet 8 inches.

It is estimated that it will cost £2600 to put this second story over the existing switch room only, and ~~xx~~ probably an additional £550 to extend the air conditioning and and vacuum cleaning plant.

Air Conditioning Plant.

14. The Committee gave special consideration to the fact that included in this proposal is an item of £14,100 for air conditioning plant. This plant, designed to eliminate dust and regulate the temperature and humidity of the air in the switch rooms, is said to be necessitated by the fact that the manufacturers of the automatic switching equipment do not guarantee reliability unless the atmosphere of the switching room be kept free from dust, the temperature below 70° Fah., and the relative humidity under 70%.

It was stated in evidence that in the exchange scheme now under consideration the number of contacts in the City West exchange for the 2 year period will be not less than 5 million, and that it is imperative that the whole of these contacts shall be kept free from dust and moisture to ensure that the most efficient service shall be rendered to the public.

The Committee visited the automatic exchanges at South Melbourne and City East (Sydney), and made themselves acquainted with these typical examples of the air conditioning plants now in use, and subsequently made inquiries to ascertain whether it was possible to arrive at an effective system of air treatment at a lower expenditure than that involved in the somewhat elaborate plant installed up to the present.

In the course of the Committee's investigations it was suggested that as a detailed study of the meteorological conditions in Melbourne indicated that the ~~instances~~ ^{incidence} of high temperature and high relative humidity simultaneously were of infrequent occurrence, economy might be effected by eliminating the air washing device which in turn demands the installation of a dehumidifying plant to rid the air of surplus ~~xxx~~ moisture, and to rely on a

Mechanical air filter for ridding the air of the switch room ^{of} from dust particles.

Inquiries made by the Committee elicited the ^{information} ~~opinion~~ that one type of this mechanical air filter is successfully used in some of the largest telephone concerns in the United States and has proved satisfactory. The installation of this apparatus would result in a direct saving of probably £3000 and reduce annual upkeep to the extent of about £300 per annum.

As the postal engineers are convinced that this system of treating the air of the switch room will be sufficient to keep the equipment in a state of perfect efficiency, the Committee is satisfied to recommend that the cheaper plant be installed.

Financial Aspect.

15. It was stated in evidence that the total annual charges of the proposed automatic system as at date of cut-over would be £176,674 and 5 years later they would amount to £210,431, while the additional annual charges at South Melbourne due to conversion would be £681.

The revenue estimated to be obtained from the installation is set down at £246,995 at date of cut-over, and 5 years later at £348,750. The assets thrown spare if the automatic be installed are said to have a recoverable value of £151,411 at City West and £20,835 at South Melbourne.

COMMITTEE'S RECOMMENDATION.

16. Under these circumstances the Committee has no hesitation in recommending that the proposed installation be put in hand as recommended by the departmental officials at as early a date as possible.

SAVINGS EXPECTED BY THE COMMITTEE.

17. If the Committee's recommendation be followed, ^a ~~the~~ saving will be effected in the project of about £3000 installation cost and approximately £300 per annum.

8.

Acting Chairman.

M. Reid

Office of the Parliamentary Standing Committee on
Public Works.

Parliament House, Canberra, 12 September, 1928.

City West (Melb.) Aut. Tel. Exchange 1

(Taken at Melbourne.)

TUESDAY, 28TH AUGUST, 1928.

Present:

Senator BARNES, Chairman;

Senator Reid

Mr. McGrath

Mr. Cooke

Mr. Lacey.

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

1. *To Senator Barnes.*—The department proposes to divide the present city manual exchange area bounded by Spencer-street, Spring-street, Flinders-street and Lansdowne-street, into two areas, and the proposal now before the committee relates to the western half bounded by Spencer-street, but actually including the docks, Flinders-street, Elizabeth-street and Lonsdale-street. At a latter date the department will submit to the committee a further proposal to convert the remainder of the central manual area to automatic working by the establishment of another automatic exchange to be known as "city east". The project now before the committee is to erect a building on a site which is Commonwealth property at the rear of the existing Central manual telephone exchange, Lonsdale-street, Melbourne, and install therein an automatic telephone switching system having an initial equipment for 10,000 subscribers' lines, and capable of extension in the proposed building to 18,000 lines, and thus enable requirements in the proposed automatic exchange area to be met for approximately twelve years after the proposed date of opening. In connexion with this proposal it is necessary to add an additional storey over part of the existing automatic telephone exchange building in Bank-street, South Melbourne, so as to convert the exchange to a six-storey branch exchange of this new exchange.

The existing common battery manual exchange switchboard, the major portion of which was installed in 1911, has already reached the limit of its capacity and, owing to building limitations, cannot be extended in the existing building. The installation of modern plant in a new building is necessary in order that efficient service may be rendered to existing and prospective subscribers in the proposed City West exchange area, which is roughly the western half of the existing Central exchange area.

The general scheme for the conversion of the Melbourne metropolitan area to automatic working necessitates that the present South Melbourne automatic exchange be a "branch" exchange working into City West as a "main" exchange. I may explain that a "main" exchange is one which has junctions for communication with all other main exchanges, whereas a "branch" exchange is one where channels of communication are through a "main" exchange. When South Melbourne exchange was opened, it had to be worked as a "main" exchange instead of a "branch" exchange until such time as the city area was dealt with and converted to automatic working. The establishment of the City West exchange will therefore necessitate the conversion of the South Melbourne exchange from its present arrangement as a "main" exchange to a "branch" exchange working into City West as its "main".

City West (Melb.) Aut. Tel. Exchange 2

The estimated immediate cost of the work is:—

—	City West.	South Melbourne.	Total.
	£	£	£
Site (already acquired) ..	2,450	..	2,450
Building	67,200	2,000	69,200
Air Conditioning Plant, &c. ..	14,100	650	14,650
Exchange Equipment—			
Automatic Switching Plant ..	377,350	32,032	409,381
Trunk Line Exchange ..	22,200	..	22,200
Carrier Wave Equipment ..	12,506	..	12,506
Junction Equipment at other Exchanges	24,443	..	24,443
Substation Equipment ..	55,610	..	55,610
Line Plant (diversion) ..	7,609	..	7,609
Sundries	1,403	61	1,464
	584,640	35,243	619,783

The actual revenue from the subscribers in the existing Central Melbourne exchange area for the year ended 30th November, 1927, and the annual revenue it is estimated will be obtained from the subscribers in the proposed City West automatic exchange area on the date of opening and five years thereafter, is shown hereunder:—

Average Number of Subscribers' Lines connected during the Year ended 30th November, 1927, in the existing Area.	Actual Total Revenue received for the Year ended 30th November, 1927.	Estimated Number of Subscribers' Lines in Proposed City West Area as at 30th June, 1929 (date of opening).	Estimated Annual Revenue as at 30th June, 1929 (date of opening).	Estimated Number of Subscribers' Lines in Proposed City West Area as at 30th June, 1933 (five-year date).	Estimated Annual Revenue as at 30th June, 1933 (five-year date).
	£		£		£
10-188	296,123	8,500	246,995	12,000	348,750

It is proposed to erect the building for the City West automatic exchange on the vacant rear portion of the existing Central exchange site. This site extends from Lonsdale-street to Little Bourke-street, the whole block having a frontage of approximately 66 feet to Lonsdale-street, and having a depth of approximately 316 feet extending to Little Bourke-street. The proposed building will occupy the Little Bourke-street frontage and has a depth of approximately 103 feet. We contemplate that the building, consisting of seven floors and a basement, shall be of simple design and built on the latest fire-resisting principles. It will be approximately of the maximum height permitted by the City Council for that locality. The immediate installation in the exchange is for an equipment of 10,000 subscribers' lines, but the proposed building will accommodate equipment having a capacity of approximately 18,000 lines.

City West (Melb.) Aut. Tel. Exchange 3

It is proposed to add one floor to the existing single floor building, the foundations, walls and ceilings of which were designed and constructed in anticipation of a second storey being required. The financial aspect of the whole scheme may be stated thus—

Items.	City West.		South Melbourne.
	As at 30th June, 1930.	As at 30th June, 1935.	As at 30th June, 1930.
	£	£	£
1. Capital Cost—New ..	684,540	732,400	35,243
2. Capital Cost—New and In situ ..	1,036,415	1,183,602	..
2a. Increase in Capital Value of Exchange due to Conversion ..	..	..	7,804
3. Annual Working Expenses of Proposed Automatic Exchange ..	71,114	87,900	..
4. Total Annual Charges for Proposed Automatic Exchange (includes Item 3)	176,674	210,431	..
4a. Additional Annual Charges due to Conversion ..	..	..	681
5. Annual Revenue — Actual for year ended 30th November, 1927, £296,125. Estimated as at 30th June, 1930	246,995	..	..
Estimated as at 30th June, 1935 .. ..	..	318,750	..
6. Assets recoverable or thrown spare if the Proposed Automatic Exchange is established on 30th June, 1930— (i) Book Value	226,402	..	27,439
(ii) Recoverable Value	161,411	..	20,835
(iii) Cost of Recovery	893	..	61

Regarding item 6 of the foregoing statement, the difference between sub-items (i) and (ii), namely, £74,991 for City West and £8,604 for South Melbourne, are amounts which will have to be written off in the departmental accounts as representing the proportion of the capital outlay on the original assets which are irrecoverable and includes depreciation due to wear and tear and labour in installation. The amount shown for City West is made up as follows:—

Exchange equipment—		
Manual switchboard	£32,383	
Trunk line equipment	14,203	
Carrier wave equipment	5,014	
	<u>£51,594</u>	
Substation equipment	22,801	
External line plant	206	
	<u>£74,991</u>	

The economic life of a common battery manual exchange switchboard is estimated to be fifteen years. The exchange was placed in operation in 1911 and a considerable portion of the switchboard will, therefore have reached the end of its life by 1930. The economic life of manual substation equipment is estimated to be ten years, and by 1930, the proposed date of cutover, it is estimated that this plant will have depreciated by the amount shown above. I hand in the following certificate by the accountant to the Postmaster-General's Department:—

City West (Melb.) Aut. Tel. Exchange 4

REVENUE—PROPOSED AUTOMATIC TELEPHONE EXCHANGE— CITY WEST.

(a) Actual total revenue received from the subscribers and public telephones in the existing Central telephone exchange area for the twelve months ended 30th November, 1927:—

Rents	£88,081
Calls	150,330
Miscellaneous charges	7,002
Trunk line calls	44,504
Totals	£290,123

Average number of lines connected during the above-mentioned twelve months, 10,183.

Average revenue per line, £29 1s. 3d.

(b) Estimated annual revenue for the proposed City West automatic telephone exchange area as at the proposed date of cut-over, i.e., June, 1930, and five years later:—

	No. of Lines.	Rents.	Calls.	Miscellaneous Charges.	Trunk Line Calls.	Total.
As at cut-over ..	8,500	73,454	130,681	5,844	37,110	240,095
Five years later ..	12,000	103,750	184,350	8,250	62,400	348,750

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

E. G. TERRILL, Accountant,
Postmaster-General's Department, Melbourne.
4th February, 1928.

Such of the old material as is recoverable will be re-conditioned in the workshops and re-issued; the balance will be scrapped, the separate parts being used departmentally or sold by tender. Metal merchants buy the copper and brass, and there is always a market for a limited number of telephones. Although the proposed building is being carried to the maximum height prescribed by the city council by-laws for narrow streets, its capacity will be limited to ten years, at the end of which we shall either pull down the present two-storey exchange building facing Lonsdale-street, or gut it and rebuild on the front portion of the site to meet the development in the remaining eight of the twenty years' period upon which we base all our telephone exchange estimates. Little Bourke-street has a maximum width of only 32 feet, and the city by-laws restrict buildings therein to a height of 30 feet. Probably when we build on the Lonsdale-street frontage we shall carry the structure two storeys higher. We estimate that we shall not need to touch the existing exchange building for at least nine years, but we are anxious that the present proposal shall be put in hand as speedily as possible. The telephone requirements of Melbourne are growing at the rate of approximately 10 per cent. per annum, and we cannot meet them with the present exchange. We went carefully into the possibility of serving the whole city area from one automatic exchange. We investigated the practicability of erecting one large exchange in the vicinity of the present Elizabeth-street post office, but we found that it was more economical to divide the city into two areas, east and west, and to develop the site at the back of the present exchange for a City West exchange, than to buy another site in Little Collins-street for a City East exchange. The plan now before the committee is the result of a careful study of all the economies of the telephone situation. The urgency of

the scheme is due to unforeseen delays. After we had taken out the figures for two city exchanges, we were called upon to consider the alternative of concentrating all the city business in one large exchange. In New York and some of the other American cities, three or four exchanges are accommodated in one building. We considered the possibility of doing that, but after getting all the data and making an exhaustive study of the economics, we decided that the original proposal, to divide the city into two areas would be the better. *The consideration of these alternatives occupied some time; meanwhile the growth of telephone business has been rapid, and temporarily we have to connect new subscribers in the city area to adjacent exchanges.* For instance, Temple Court is connected to the Carlton exchange; that is not economical. It should be connected to Central, but we have no room there for further lines. In the conversion from manual to automatic exchanges, Sydney is much more advanced than Melbourne. Sydney had more magneto exchanges and Melbourne more of the more modern common-battery exchanges. Therefore, we first started to convert Sydney to automatic, and it had three or four automatic exchanges in operation before Melbourne had one. The Geelong automatic exchange, which was opened in June, 1912, was the first to be established. Having proved that automatic exchanges were satisfactory, we proceeded to convert Sydney because of the obsolescence of its then plant. Melbourne has reached the stage when it does not pay the department to install further manual equipment, and this scheme now before the committee is a step towards the conversion of Melbourne city to automatic. The expenditure involved is large, but we believe that the revenue will justify it. It is easy to estimate the approximate revenue of an exchange, and our estimates of expenditure also have proved to be remarkably accurate. It is generally known that the city telephone services pay for the country ones. The site of the South Melbourne automatic exchange was acquired in 1916, and the exchange was opened in November of last year. When it was designed, we had in mind the development that is now sought, and made provision for the erection of a second storey. That expense was not warranted at the time. The first telephone exchange in Melbourne was opened in the Equitable building in Collins-street in 1879, and, after three or four years, was transferred to Wills-street. It was a private enterprise, but in 1887 the Victorian Government took over all telephone services in Victoria and established the present Central exchange. Gradually Central absorbed the Wills-street subscribers, and they were eventually cut-over about 1910-11. The site of the exchange is much more valuable than it appears on the books of the department. If we could show its present value as an asset, we could present a very handsome balance-sheet, but the departmental practice is to allow land to remain on the books at the original purchase price.

2. *To Senator Reid.*—The loss of £74,000 representing irrecoverable capital outlay on the original assets and depreciation due to wear and tear and labour in installation, is unavoidable. The large manual switch-board is valued at £32,583, and its recoverable value is comparatively small, but we have to scrap the old plant in order to substitute more up-to-date plant that will serve the public better, and we are making one of those sound business sacrifices which in the end pay

handsomely. Two exchanges will be more economical than one, because the copper costs in connexion with one central exchange would be greater than the equipment cost of two exchanges. Rather than carry all the cables to one central point it is cheaper to buy another site and erect a second exchange; 60 per cent. of our costs is in respect of line plant. We can serve the city effectively under present conditions, but at an extra cost; from a departmental point of view this is not economical. The present service is efficient, but it is more costly to the department than it would be if we could connect the subscribers to a local centre. When we have the two city exchanges in operation we shall be able to give better service to the public, while at the same time conserving the public funds.

3. *To Mr. Cook.*—The estimates of cost are based on the latest tenders. The cost of equipping an exchange varies according to the calling rate to be provided for. The calling rate in a city area is greater than a suburban area. Therefore, the equipment in the city exchange is more costly. The price of equipment would be approximately the same in Perth as in Melbourne, but in the latter the switchboard equipment is more extensive, and, therefore, more costly. Some of the figures relating to the proposed expenditure seem more alarming than they really are. The cables we are laying from the city to South Melbourne will later be used for junction cables to meet the development of the city and South Melbourne areas, but we are incurring that expenditure sooner than it is required. The delay in bringing this scheme forward is due to the department having possibly erred on the side of caution, coupled with the fact that the overtaking of arrears and the carrying on of development have kept the engineering staff too busy to cope with all the work. We had prepared this scheme in good time, but a certain delay occurred in the investigation of what seemed possibly a better alternative; then further delay has occurred in connexion with this inquiry by the committee. I regard this proposal as the most urgent before us. Immediately it is approved, we shall concentrate our energies upon it in the interests of economy. The quicker it is through, the more money we shall save. In consultation with the Department of Works and Railways, we have given full consideration to the air-conditioning plant in the light of information that our departmental delegates brought back from America, and the conclusion we have arrived at is that we should provide for this exchange a full air-conditioning plant. The difference in cost between a full and a partial plant is not very great, perhaps, £15,000 as against £12,000. Even though we do not proceed with the refrigerating plant, it is better to provide for it. We know that we shall require vacuum cleaning, heating and air purifying apparatus. The sum of £14,800 provides for the full possible requirements, but later experience may show that £2,000 or £3,000 of that amount need not be expended. No automatic equipment is manufactured in Australia. Originally, we bought most of our plant from America. Now the English tenderers are beating the Americans and most of our latest apparatus has been imported from England. Large though our telephone requirements are, they are small in comparison with the production of the big factories abroad, and it would not pay to manufacture automatic equipment here especially as there is now effective competition between overseas suppliers; we are by no means at the mercy of two or three com-

paucity. The departmental policy is to give a certain amount of preference to British goods, and greater preference to Australian. The labour prices in the capital cities of Australia are practically the same. Where no postal and telephonic facilities are provided in the country, we are endeavouring to supply them. In stressing the urgency of this project we are not setting it against others of smaller magnitude. We are asking the Treasury for money that will enable us to meet all reasonable requirements. I do not know of any really urgent telephone projects that are held up on account of the lack of funds. If there are such, the longer this essential provision in the city is delayed, the longer we shall have to wait for funds for other projects. Undoubtedly, the profits from this exchange will help to pay for unprofitable country services. The metropolitan area consists of a network within a radius of ten miles of the telephone centre; and in it are approximately half the telephones in the State. These urgent city works are amongst the more profitable of our enterprises. The one now under consideration would be profitable from the start, but on the country services we are losing money. If this proposal be rejected, we shall have to scrape along at greatly increased annual cost as against a lump capital cost. We can always keep the service going at a price with obsolete equipment, but no business man would contemplate such a thing. At present we cannot give any service to certain applicants.

4. *To Mr. McGrath.*—All the telephone projects that have been approved are progressing. Approximately three years is required to bring an exchange into operation. Since the Cottesloe exchange was investigated by the committee last year, a lot of work has been done in the preparation of specifications and plans, and even if the building has not been started, I am quite confident that it will be ready when the equipment is available. The tenders for the equipment are being dealt with now. We have to wait from four to five months for the receipt of tenders. The detailed examination of the tenders may occupy two or three months, and usually nine months elapses between the placing of the order and the delivery of the equipment. Roughly, 21 months must elapse between the date of approval of the project by Parliament and the commencement of installation.

The witness retired.

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

5. *To Senator Barnes.*—I am responsible for the plans of the building for the proposed automatic telephone exchange at City West. The present exchange building has been in existence about seventeen or eighteen years and being of high class and well lighted, has still an indefinite life. The only reason for interfering with it is the need to provide further accommodation for more up-to-date equipment. When it is no longer used as a telephone exchange, it can house some of the other functions of the Postal Department, which is extending so rapidly that it is in constant need of additional accommodation. The proposed new building will occupy a site in Little Bourke-street at the rear of the present exchange building. The land available is a frontage of 160 feet to Little Bourke-street by a depth of 103 feet to the end of the present building. It is proposed to erect over the whole of

that area a building of seven floors and a basement. Above the ground floor a light area 40 ft. x 10 ft. will be taken out of the building on the eastern side. On that side the building will abut on private property, and no light will be obtainable there except by this special provision. The frontage to Little Bourke-street will derive natural light along its full extent, and the west side of the building will have natural light for the whole distance of 103 feet, because there it will abut on land owned by the State Government and leased to the Commonwealth as a site for a High Court building. Victoria erected the present exchange building on its own land and both land and building are leased to the Commonwealth. The cables will be brought into the exchange from Little Bourke-street through the tunnel constructed down the centre of the street about twenty years ago. It is anticipated that the whole of the seven floors and basement will be required for telephone purposes. The basement will provide the usual well into which the cables will be brought for extension to the floors above. In addition, there will be two air-conditioning rooms, 50 ft. x 20 ft., and 40 ft. x 18 ft., respectively, a boiler-room 22 ft. x 18 ft., and a power-room 44 ft. x 30 ft. On the ground floor a staircase and lift will be introduced in the south-eastern corner giving communication to all floors. Here also will be situated the main frame-room 101 ft. x 22 ft., a battery-room 66 ft. x 36 ft., a switch-room 36 ft. x 14 ft., and a small store for cleaning purposes and the usual electric light shaft and air-duct. The ground, first, and second floors will extend through fire-proof doors into the corresponding floors of the existing exchange. On the first floor will be the main switch-room, 101 ft. x 45 ft., with an annex 40 ft. x 19 ft. This floor will be lighted naturally from Little Bourke-street, and the western side of the building and also from the light area. The communication by fire-proof doors to the corresponding floor of the existing building will give a switch-room of a total length of 251 feet. On the second, third, fourth, fifth and sixth floors will be further rooms each 101 ft. x 45 ft., with an annex 40 ft. x 19 ft. The fifth floor will accommodate the trunk line apparatus, and the top floor the trunk exchange. The whole building will be topped by a flat roof capable of being used by the staff for recreation, for the accommodation of water tanks, and for many other purposes. The heights of the floors from floor line to line are: basement, 11 feet; ground floor, 17 feet; first, second, third and fourth floors, 13 feet; fifth and sixth floors, 12 feet. The design of the building is simple. The locality in which it will be situated does not demand architectural elaboration, and the style of the front elevation has been suggested by the adjoining law court buildings which is an honest expression in brick and bluestone. For the sake of harmony, the architectural lines of the law court will be continued along the front elevation of the exchange building. The construction will be high-class, and fire-resisting concrete floors will be provided throughout with reinforced concrete stanchions. We propose to employ the cantilever system of construction, and to omit floor beams entirely. The stanchions will go to the flat concrete ceiling with a plate introduced at the junction to take the shear. The Postal Department anticipates being able to open the exchange on the 30th June, 1930; but I do not think that expectation will be realized. This submission was first made early in the present year, almost three-quarters of which has expired. The building is estimated to cost £67,000, and even if a commencement were made now, construction

under even the most favorable circumstances would probably occupy eighteen months. Inside twelve months, however, the Postal Department might be able to take possession of the lower floors and the installation of equipment could proceed concurrently with construction. We have yet to learn the committee's decision, and a good deal of work has to be done before tenders can be called, but if no further delay is caused, we should be able to commence building operations early next year. I regard the site as suitable for the purpose. The cables concentrate upon it now, and it is in the heart of the western half of the city. The foundations are good. There would be no undue fire risks from adjoining properties, but the usual precautions will be taken to make the building as nearly fire-proof as is possible. Concurrently with the erection of this new exchange, the South Melbourne exchange will be converted from a separate entity into an adjunct to the City West exchange. The South Melbourne exchange building is of one story, but as the early need for duplication was foreseen, precautions were taken to admit of a second story being added when required. The proposal now is to add the second story which will give a new switch-room 65 ft. x 52 ft. 8 in. The amount of £2,600 is the estimated cost of putting a second story over the existing switch-room only.

6. *To Senator Reid.*—The old exchange building in Lonsdale-street could never be extended to seven stories. It might carry another two stories but not more. Having regard to the value of the site, it would be more economical to remove the old building and erect a new one. No provision is made in the new exchange building for luncheon or retiring rooms, because good retiring accommodation is provided in the existing building which houses a very large staff. In the new building the staff will be much smaller. The harmonize with the law courts bluestone will be introduced in the form of cornices and other mouldings about the windows and doors from the ground level to the second floor, and will be re-introduced at the top of the building in the form of a cornice. The cantilever system of concrete construction obviates the need for beams and provides a level floor suitable to carry machinery. The working plans are three-quarters complete, and I think we could let a contract before the end of the year. In regard to the estimated cost, wages are not falling, and they govern the cost of labour and material. But owing to shortage of works, competition is keener amongst builders, and that may tend to reduce the cost slightly. Only a reduction of wages would materially reduce the cost of building, and I do not think the people of Australia desire wages to be reduced. The walls will be 14 inches thick from foundation to roof. The Postal Department has come to the conclusion after many experiments that the equipment should rest directly on the finished face of the concrete floors, and that in order to prevent the creation of dust by pedestrians, the passages between the frames should be covered with stout linoleum set in bitumen.

7. *To Mr. Lacey.*—This project was submitted to my department as an urgent one, but the operations of the Postal Department are governed to a large extent by the funds available, and we make urgent starts with many works which afterwards are set aside. At the end of twelve years, when the accommodation in the proposed new buildings is fully occupied, extension will be carried on to the site of the existing building. The latter, however, need not be completely demolished; by inletting additional stanchions, the present walls can be strengthened to carry additional stories.

The witness retired.

The committee adjourned.

Public Works Committee

Minutes of Evidence

Taken at Melbourne

MONDAY 8 SEPTEMBER 1928

Present:
Sen Barnes (in the chair)

Sen Reid
Mr. Cook

Mr McGrath
Seabrook

Edgar Becher, Supervising Engineer, Central Office, Postmaster General's Dept, Melbourne; sworn and examined.

Q To ~~the~~ Sen Barnes—The scheme now before the Committee was prepared ^{under my direction} by me for submission to the chief electrical engineer. The ~~modified~~ proposal for the air conditioning plant was estimated to cost £14,100 in addition to the heating plant but after a detailed study of the meteorological conditions in Melbourne I suggested to the Engineer for Works and Rlys that we might eliminate the dehumidifying plant and instal instead a mechanical ventilator instead of the air washing device which is contained in the dehumidifying plant. A mechanical air ventilator ^{of this type} consists of a series of elements which are made up by an assembly ^{of a number of} of copper gauge screens and knitted mats. These screens are rather coarse in mesh at the front of the element and become finer in mesh towards the back. The air, when passing through the element ^{first} strikes the coarse screen which is coated with a substance called viscoline and the larger particles of dust are absorbed in the element. By the time that the air ~~has~~ ^{is} passed through the smaller meshes in the screen, ^{practically} all dust ~~has been~~ ^{is} eliminated. To ~~clear~~ ^{remove} the element of dust particles ~~the screen is~~ ^{it} is lifted out and dipped in a solution of hot caustic soda. The cost of maintaining this plant is nominal as ~~there is practically no replacement of parts~~ ^{and} is required. I saw this type of air filter in operation in St Louis, U.S.A. in Sept last. The chief engineer for the Bell Telephone Co told me that it was the most efficient filter that had come under his notice. I may add that the St Louis Co is part of the American Telephone and Telegraph Co, the largest telephone concern in the

world. That Co has very highly technical organization for the study of all problems in connection with the telephone industry.

I gathered from Mr Pennell, the chief engineer, that the parent company had made elaborate trials with this type of filter before ^{he} ~~instructing him~~ ^{advised} to instal it. Since my return to Australia I

have been advised of another type of filter, called the Visco, a British product, constructed on much the same lines as the Mid-West air filter which I have just described. Inside ^{an expanded metal} ~~a steel casing~~ ^{copied steel} ~~no frame~~

^{frame} ~~there are~~ a number of ~~copper~~ or brass ferrules, through which the air passes. The ferrules are coated with a substance called viscinol, and the action of the filter is exactly the same as the mid-west ~~filter~~ ^{type}. I have endeavoured to see a sample of this type of British filter, but unfortunately the only one available has been sent to Mr Wilkinson, the Comlth analyst, and he has not yet ~~xxx~~ prepared a report on it; ~~but~~ ^{from} the literature which I have perused on the subject I am not satisfied that it is as efficient as the mid-west plant. There are three reasons why an air conditioning plant should be installed in an up-to-date telephone exchange, whether operated manually or automatically. One is the comfort of the staff. To keep dust in a bldg down to the minimum the atmosphere must be under complete control. This means that all windows and doors must be kept closed. Windows may be closed permanently, but the doors must be opened to allow of ingress and egress. Under these conditions it is necessary, to insure the comfort of the staff, to filter the atmosphere in the bldg and keep it moving, at all events during the summer months of the year.

Another reason is that all ^{parts} ~~parts~~ of the equipment must be kept absolutely clean. If dust is allowed to alight on contacts ~~and~~ ^{of} relays it will cause faults in the working of the mechanism and ~~thus~~ ^{exchange} interfere with the progress of a subscriber's call. In the scheme now under consideration, the number of contacts in the ^{ex. work} ~~Exchange~~ ^{the} for a two year period ^{will be} is no less than 5,000,000. It is imperative that the whole of those contacts shall be kept clean and free from dust. The third reason why the plant should be installed is that no manufacturer of an automatic equipment will guarantee that the plant will work efficiently unless the relative humidity in the

atmosphere is kept below 70%. This condition is insisted upon because when the relative humidity rises above that figure the electrical characteristics of the cable are interfered with. During January, Feb and March of this year we had the greatest difficulty in keeping many of the exchanges in the Sydney net work in operation on this account, and the subscribers there were getting an inferior service because the relative humidity rose as high as 98% over a considerable period. Those exchanges equipped with air conditioning plants ^{put} had no difficulty in carrying on a satisfactory service. The modified ^{air conditioning plant} scheme which I suggest will be cheaper than the original proposal. I have consulted Mr Hill, the Chief Engineer for Works and Rlwy's and I understand that he is prepared to reduce his estimate by about £2,000 or £3,000 for the bldg. Some portions of the plant will have to be imported. It is an accepted fact that if the temperature in a bldg falls below 65 deg Fahr, the extremities of the body ^{of an employee} get cold and illness is likely to supervene if the low temperature indicated prevails for any length of time, ~~so that~~ ^{that} in places like Melbourne, it is necessary to instal a heating plant to insure the comfort and good health of the staff, many of whom have to work for several hours ^{at a time} on benches making adjustments of equipment and ^{thus} are not able to keep warm in a cold atmosphere. I should say that the difference in upkeep of the two plants would be about £200 or £300 in favour of the modified scheme. These figures were given tentatively to me this morning by ~~my~~ engineer in Mr Hill's office and they are subject to confirmation. I am convinced that the installation of an air conditioning plant is essential to the efficient working of the exchange. I consulted with Mr Brown, the Postal Director, this morning with regard to the modified scheme which I have submitted to the comtee, and I am satisfied that it will meet our needs in accordance with our present knowledge. I have heard of the Silicagel system. When he was in ^{recently} England, Mr Brown communicated with the Company and was supplied with a questionnaire which must be answered before the Company mentioned can advise us whether the system will meet the needs of telephone exchanges in Australia. I have no information to guide me as to the cost, and therefore I am unable to say whether it will be cheaper than the system which I propose, or whether it's

will be as efficient. I am loth to believe, with all the experience of air conditioning plants which ~~have~~ ^{been} ~~gained~~ ^{learned} in America, that the ~~silicagel~~ ^{air} system would not have been introduced there, if it had proved satisfactory. If this system were adopted for Australia the whole of the plant would have to be imported, but in the case of the other two, only the main elements would have to be imported. All the racking and duct work could be made here and erected by Austln workmen. The boiler will be placed in the basement, and the rest of the plant will be on the next floor. When the South Melbne exchange was opened it was known as a five figure system, but but owing to the expansion of the Melbourne net work we require ~~what is known as another level for~~ ^{routing} subscribers calling. The switches in the Strowger Exchange have ten levels of contacts. Each level is allotted to a particular exchange, and as there are only ten levels to allot, we have to arrange the numbering scheme so that we shall have eight or nine main exchanges in the net work. ~~The other exchanges that are opened up must be branch exchanges.~~ It so happens that the main exchange for the Sth Melbne net work is located in the city at the present Central Exchange site and as ^{the} B level is used for city calls, we must arrange another call letter for the Sth Melbne Exchange. To do this we have to make the changes that are suggested in the proposal now before the Comtee. It is about six or seven years since the Sth Melbne Exchange proposal was before the Comtee. At that time there was no immediate thought of converting the Central Exchange to automatic operation, but the changes now proposed will not mean that any of the plant at Sth Melbne will have to be scrapped. ^{equipment that will become spare} The whole of it can be recovered and used for other exchanges. Until recently the economic life of an automatic exchange was considered to be only 15 years. The economic life is now ^{building} calculated to be 20 years. Accordingly the Sth Melbne proposal was based on an economic life of 15 years for the automatic equipment. Since then experience has shown that the life may be extended to ~~25 years~~ at least 20 yrs. The proposal before the Comtee is urgent. We are experiencing great difficulty in carrying on ~~with the existing plant~~ under existing conditions. At present we are ~~connecting~~ subscribers who ask for ~~connections~~.

services in the city area are connected ^{to} through both Carlton and Sth Melbne exchanges. We have to do this in order to meet the public demand.

9 To Mr Seabrook-I have seen the plant which I am now recommending ^{work} in operation in other parts of the world. I have not seen the British Visco air filter in operation, ~~but I have been endeavouring to get a sample~~ ^{on demand} Mr Wilkinson, the Govt Analyst, has one, but has not yet finished his study of it. Speaking as an engineer, I am inclined to the belief, based on my knowledge of the principles in the two filters, that the mid-west filter would deal with dust accumulation in a more efficient way, but I am free to admit that a trial of the Visco filter may cause me to alter my opinion. If I found it to be more efficient, I shld unhesitatingly recommend its adoption. Further investigations in this connection are being made to see if the Visco filter can be used. There is ^{not a chance of} no other way for the efficient ventilation of automatic exchange bldgs. ^{group of automatic} I installed the first telephone exchange in ~~Mid-west~~ ^{group of automatic} the Sydney network ^{was installed under my direction}. Two years after the ~~the~~ ^{was} plant had been installed ^{was cancelled} it ran up against trouble owing to the high degree of relative humidity and also ~~in regard to~~ dust. I had the bottom sections of the windows fitted with cheese cloth screens, which became blocked with solid particles of dust in three or four months and ~~had~~ we had to keep on replacing them. We then tried ^{copper} gauze screens, but found that they became coated with dust more quickly than the ^{mean} ^{relative} cheese cloth screens. The humidity in Melbne ranges from 71 to 81 degs from May to Sept. The highest mean ~~from March to Sept~~ ^{degs in March} ranges from 71 to 89 degs in June. As the relative humidity is high in the winter months the modified plant will enable us, by heating the atmosphere, to take up the moisture in the air and so automatically reduce the humidity ^{during that period} in the winter months. It would not be practicable to do this in ~~the summer months~~ ^{the summer months}, because the process would make the working conditions too unpleasant for the staff. Accordingly we propose to take a chance ^{concerning} about the degree of high relative humidity in ~~the summer months~~ ^{do not think it}. It is ^{further} not likely to affect the efficiency of the automatic plant, ~~and besides we are now able~~

to get supplies of enamelled insulated cable, and after ^{such} each treatment the electrical characteristics of the cable will remain more stable. We propose to keep the manual exchange in use till it reaches the end of its economic life in about four or five years' time. When the change over is made it is not anticipated that the ^{permanent telephone} ~~telephone attendants~~ at present employed will be thrown out of work. Experience has shown that they can be absorbed in other avenues of employment in the dept. The proposal includes the addition of another storey to the 8th Melbne exchange for the housing of the automatic equipment.

10. ^{to Mr. Mr. Rath} ~~to Mr. Rath~~ - The modified scheme proposed for Melbne could not be applied to the Cairns exchange because of the ^{high} ~~tremendous~~ relative humidity there during the summer months. At present many subscribers in the City West area are connected through the Carlton and 8th Melbne exchanges. The atmospheric conditions in London are different from those in Australia, ^{as high relative humidity occurs in the former city} ~~as high relative humidity occurs in the former city~~ in ~~Victoria~~ ^{low temperatures prevailing} for the greater part of the year with ~~low relative humidity~~ ^{temperatures}.

11. ^{to Mr. Cook} ~~to Mr. Cook~~ - With the dehumidifying plant the atmosphere is washed by water and then cooled in a refrigerator and heated again before it enters the bldg. With the ~~modified~~ mid-west filter the air is passed through a mechanical ventilator which frees it of ^{most of the} ~~all~~ particles of dust. The dehumidifying plant is more costly to instal and also ⁱⁿ ~~in~~ maintenance. Anything above 70 deg relative humidity is high and if it persists over long periods as at Cairns, Brisbane and Sydney, ^{with our present knowledge} ~~it is necessary to~~ instal a dehumidifying plant. It is not possible to ~~ex~~ compare the air conditioning plants in England and America, because the atmospheric conditions are not comparable. Where the relative humidity in the winter months is high it is necessary ~~to~~ to heat the bldgs to insure the comfort of the staff as well as deal with the dust problem, and for this purpose I recommend the mid-west ^{type of} ~~plant~~ for Melbne. Exchanges that are not fitted with air conditioning plants are not operating quite so efficiently as those where such appliances have been installed. Geelong exchange may be cited as an illustration. The faults due to dust there are 10% above exchanges equipped with air conditioning plants. I regard expenditure on this equipment as an insurance against inefficiency in the working of an exchange. In my opinion it is not an economic proposition

to attempt to work automatic exchanges without such equipment

12 To Sen Reid—There is practically no dust in air after it has passed ^{made by the manufacturer} through a mid-west filter. Tests have shown only 0.05 gr of dust per thousand ~~cubic~~ cubic ft of air. The Visco filter, a British product works on much the same principle. In the absence of any definite information about the Visco filter, I am satisfied that the mid-west filter is the best for Austln conditions. In Cairns, Brisbane and places where the relative humidity is high in summer, it is essential to have exchanges equipped with a dehumidifying plant to wash the air and reduce it to the right temperature. The components of the Silicagel ^{-Gel} plant are sulphuric acid and silicate of soda which, when mixed, have a great affinity for the absorption of moisture in the atmosphere. ^{1/2} This system was not in use in either England or America when I was there, but I have read literature on the subject. When Mr Brown, the Postal Director was in England he wrote to the directors of the Co and received a questionnaire which has to be answered before the manufacturers can say definitely if the system will suit Austln conditions. Special attention has been given to air conditioning plants in America. In one exchange which I visited the plant is working day and night for an automatic equipment ~~exactly~~ the same as ours, and it is giving complete satisfaction. We have tried various devices to avoid the cost of an air conditioning plant. At Glebe exchange many years ago we put in an air hydrometer to record the humidity in the atmosphere, ^{the instrument was on contract} and so ~~arranged the contacts~~ that at any pre-determined ^{a pair of contacts} ~~xxxxxx~~ degrees of humidity, they closed and operated a remote ^{by controlled} power circuit which immediately set in operation a number of ~~fans and radiators~~ ^{not found} for the purpose of reducing the humidity. The experiment was not a success, ^{because} the atmosphere became most uncomfortable for the staff and ~~really~~ it did more harm than good

13 To Sen Barnes—Many American exchanges have a much larger plant than we contemplate installing at City West. The largest boiler that we have in Austlia is 40 h.p. In one American exchange there are no less than three 25 h.p. boilers, one to operate the plant continuously, one ^{as} a standby and the third available for ^{overland} ~~spaces that may be wanted ur-~~
 14 To Sen Reid—
 gently. There are about 15,000 subscribers to the St Louis exchange. ^{New York Telephone Company's new building}
 The new ~~blag~~ in New York has been designed ~~in xxxxxx~~ for 80,000 subscribers

15. To Mr McGrath-At present we have only technical information about the Silicagel system. The manufacturers can give us no definite idea about cost or upkeep until we have replied to their questionnaire. I have an open mind with regard to its efficiency. All I can say is that up to the present no telephone administration, within my knowledge has used it. The automatic telephone system has passed beyond the experimental stage, but conditions governing rural exchanges such as Bunninyong ~~xxx~~ ^{near Ballarat (Victoria)} differ materially from conditions in the capital cities. The traffic is much lighter and there are party lines to be served as well as trunk line ^{calls} ~~services~~ to be attended to. In capital cities we have ^{for this class of service} ~~all trunk lines~~ ^{housed} ~~generally~~ in the main exchange where calls are attended to ~~at once~~. In country districts like Bunninyong trunk line calls are filtered through the manually controlled centre at Ballarat. This is one reason why there has been reference recently to the installation of rural automatic telephone exchanges as an experiment. The manually controlled exchange at Ballarat is capable of taking care of the demand for a number of years yet because it is in excellent order and is by no means nearing the end of its useful economic life.

16. To Sen Barnes-I ~~xxx~~ did not come across the Visco system in operation in England, but there should be no difficulty in determining by tests whether it is efficient

17. To Mr Seabrook- If it is proved to be efficient, I shall have no hesitation in recommending its adoption in Australia.

The witness withdrew.

The Comtee adjourned

(Taken at Melbourne)
TUESDAY 4th SEPTEMBER 1928

Presents:

Sen. Reid
Mr Cook

Sen Barnes (in the chair)
Mr M'Grath
Mr Seabrook

Lawrence B. Fanning, Chief Inspector of Telephones, Central Office,
Melbourne, sworn and examined =

18. To Sen Barnes

10

7

PROPOSAL FOR ESTABLISHING NEW AUTOMATIC TELEPHONE EXCHANGES
AT CITY WEST, MELBOURNE, AND CONVERTING SOUTH MELBOURNE
FROM A MAIN TO A BRANCH EXCHANGE.

The proposal is necessary in order that the Department will be in a position to cater for telephonic development in the City of Melbourne.

2. The establishment of the City West automatic exchange will represent the most important step taken by the Department towards the ultimate conversion of the Melbourne metropolitan telephone system to the automatic system of working. City West will be one of the two large automatic exchanges which will be necessary to meet development in the city area of Melbourne.
3. The existing Central manual exchange, which was designed to meet development in the City, is full and the plant cannot be extended. For some time past it has not been practicable to connect additional subscribers to the Central exchange. In order to avoid refusing service to applicants, arrangements were made to connect new subscribers in the Central area to contiguous automatic exchanges, viz., Collingwood, Carlton, and South Melbourne.
4. This arrangement, which was the only practicable course that could be followed, is costly, and it is not desirable to continue it any longer than is necessary. The equipment at the exchanges referred to is rapidly being absorbed, and the time is approaching when the accommodation at these exchanges will be overtaxed, and they will not meet the requirements of the areas which they were designed to serve.
5. It is proposed therefore to meet the situation by the opening of a new automatic exchange to be known as City West, the building to be erected on a site already acquired in Little Bourke Street, immediately at the rear of the existing Central manual exchange.
6. The new exchange will meet the telephone requirements of that portion of the City of Melbourne west of Elizabeth Street. The equipment installed initially will provide for 14,000 lines and it will be capable of extension to 18,000 lines, which is the estimated development twelve years after the date of the opening of the exchange.
7. In addition to the equipment necessary to cater for subscribers' needs, the main trunk line exchange will also be transferred from the present manual exchange building to the new building as the existing exchange room will not accommodate the development in trunk lines beyond 1931.
8. The building in which the proposed City West automatic exchange will be housed will comprise a basement and seven floors, and will be erected to the maximum height permitted by the City Council. The basement will contain the cable well, boilers, and battery room. The main frame will occupy the ground floor. The automatic exchange apparatus will be housed on the first, second, third, and fourth floors, and the trunk exchange and associated apparatus will absorb the two upper floors. The necessary conveniences for male and female staffs will be provided.
9. Theoretically, the City of Melbourne is now telephonically served by the Central manual exchange situated in Lonsdale Street. The major portion of the manual switchboard equipment at this exchange was installed in 1911

and has been in continuous use since then. The normal life of a common battery switchboard similar to that installed at the Melbourne Central exchange is about fifteen years, and it can therefore be assumed that the existing switchboard is approaching the end of its economic life.

12. The present Central exchange cannot accommodate more than 8,500 lines. There are approximately 11,000 subscribers' lines in the Central area which should be served by this exchange. Only 8,500 are connected to the manual exchange, however, and the remainder are distributed over contiguous exchanges, namely, Carlton, Collingwood, and South Melbourne.

13. It will be necessary to continue meeting the Central area development by diverting the new subscribers' lines to these exchanges until such time as the City West automatic exchange is placed in commission approximately at December, 1931. By this time it is estimated there will be 13,640 telephone subscribers in the Central exchange area, and, allowing for roughly 8,000 being connected to the Central manual exchange, the remainder will be distributed as follows:-

Carlton	2,700
Collingwood	1,000
South Melbourne	1,940

14. By this time the whole of the available equipment at Carlton, Collingwood, and South Melbourne will be exhausted. It is imperative therefore that the City West exchange be in operation then or, otherwise, it will be necessary to close down and refuse service to intending subscribers.

15. It is proposed, when City West automatic exchange is opened, to transfer thereto immediately approximately 8,500 subscribers whose premises are situated in the western portion of the city. These subscribers' lines will, at that stage, be connected to the following exchanges prior to the opening of City West:-

Central manual exchange ..	4,800
Carlton, Collingwood, and South Melbourne	3,700

16. The Central manual exchange will be continued for as long a period as it can be economically operated. At a later stage not yet definitely determined, a new exchange will be opened which will be known as City West. This exchange will absorb all those lines remaining on the Central exchange after the City West takeover. It will also absorb those subscribers connected to Carlton, South Melbourne, and Collingwood whose premises are in the City West area.

17. The transfer of the main trunk exchange from its present position to the new exchange building is essential as most of the existing trunk switchboard apparatus was installed in 1912 and it has reached the end of its economic life. Furthermore, the floor space available in the present trunk exchange will not meet requirements beyond December, 1931. In view of the rapid development in trunk line business, it is a matter of importance that the new plant in the new building should be ready by the date mentioned.

18. When the new trunk exchange is opened the present trunk switchboard will be recovered, re-conditioned, and installed at other suitable exchanges.

19. It is proposed to add an additional storey to the existing automatic telephone exchange building in Bank Street, South Melbourne, and to replace portion of the present five-figure equipment by apparatus necessary to convert this exchange to a six-figure exchange, operating as a branch of City West.

20. It was the intention originally that the South Melbourne exchange should operate as a branch exchange of City West but, when the opening of the South Melbourne exchange became a matter of urgency in order to relieve the telephonic congestion prevailing in the area served by the present manual exchange, it was not practicable to install the apparatus that would be necessary at the City manual exchange owing to lack of space, consequently South Melbourne was opened as a main exchange and the letter "K" was allotted.

21. The original plans for making South Melbourne a branch of the City West automatic exchange should be proceeded with and this will involve the provision of additional apparatus at South Melbourne to convert it to six-figure working. When this is done, probably just prior to the opening of City West, the call letter "K" will be freed so that the necessary plans can be proceeded with to meet further development in the eastern portion of the city by opening the City East automatic exchange. If the conversion of the South Melbourne exchange to six-figure working is not proceeded with it will not be possible for the Department to meet the development in the City East area.

22. The following figures are indicative of the progressive development of the telephone service in Melbourne:-

Year	Number of subscribers' lines	Number of exchanges	Revenues from rentals and local calls
1922/23	39,253	19	£558,513
1923/24	45,288	19	£621,142
1924/25	50,863	19	£683,853
1925/26	54,988	20	£738,488
1926/27	59,451	20	£803,795

The Department's estimate of the probable telephonic development in a network is based on the past rate of development and, in addition, a survey is made of the area in which it is ^{proposed} ~~proposed~~ to establish a new exchange with a view to calculating the probable number of telephone subscribers. For example, whenever a new building like Temple Court is being erected, it is the practice to get in touch with the architects, ascertain the probable number of tenants, and in this way estimate the number of telephone connections likely to be required. In order to avoid unnecessary expenditure in making the connections and probable damage to the building, the Department co-operates with the builder so that the internal wiring may be proceeded with during the time that the building is being erected. It is ~~essential~~ essential to have the new City West automatic exchange in operation as soon as possible. Unless provision is made to meet development in the city area, the Department will be forced, in a year or two, to refuse service to new subscribers. It is proposed, at a later date subsequent to the establishment of City West exchange, to open another new exchange to be called City East, which will serve that portion of the city east of Elizabeth Street. After the City West exchange is opened, it is proposed to transfer thereto 4,800 subscribers who are connected with the Central manual exchange and 3,700 subscribers who are connected to the Carlton, Collingwood, and South Melbourne automatic exchanges. The Central exchange has been in operation for seventeen years and has reached the end of its economic life. It is still working efficiently and there is no immediate danger of its breaking down. The existing arrangements for connecting city subscribers to suburban branch exchanges are costly. The costs for external plant in a telephone system exceed those for internal equipment. Approximately 350 persons are employed on the operating staff of the Central exchange. It is not expected that any of them will be dismissed when the new City West automatic exchange is opened. At present it is possible to accommodate 120 subscribers on each operating position at the Central manual exchange. The whole character of the traffic will be altered when the City West exchange is opened. A large proportion of the

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calls which an operator now answers and completes without the aid of another operator will be transferred to the new exchange. This operation will add to the time that it takes to handle a call, in effect the labor value of each call at the Central Exchange will be increased. For this reason each operator will not be able to handle calls from as large a group of subscribers as at present. In order, therefore, to maintain the same standard grade of service, it will be necessary to reduce the number of subscribers per position or per operator at the Central exchange from about 120 to approximately 80. Accordingly, it will be necessary to maintain the same operating staff as we have at present. In addition, provision must be made to deal with the traffic incoming from City West for Central subscribers. I anticipate that after the cutover of City West, the position respecting operating staff at the Central exchange will be approximately the same as it was before. Hitherto, we have been able to absorb all employees thrown spare as a result of the conversion of exchanges from manual to automatic working. This is accounted for by the extraordinary development in the Telephone Branch of the Department's activities.

19. TO Sen. Reid. Every telephone call handled by an operator is valued in terms of a common standard unit. For example, a call between two subscribers connected to the same common battery exchange is regarded as the standard and has a unit value. For every call that is transferred to another exchange an additional value of 0.5 units must be added. This is due to the fact that it takes half as long again to handle a transferred call as a unit call. The greater proportion of the traffic handled at the central exchange after the City West exchange is opened will be transferred and therefore the number of subscribers' lines that can be attended to by each operator will have to be reduced from about 120 to approximately 80. The equipment that will be released at the Carlton, Collingwood, and South Melbourne exchanges as a result of the transfer of so many lines to City West will be utilised to meet the normal development in the areas served by those exchanges. At present, they are handling business which

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they were never designed to carry. After the outover of City West it may be profitable to withdraw certain of the cable plant at present being used. There will be no difficulty in making use of plant thrown spare. In the last financial year 1927/28 we added to the telephone system throughout the Commonwealth 25,000 new lines. The average capital value of the plant used in giving service to each of the subscribers added to the telephone system in Melbourne during the year 1926/27 was £119. It is difficult to ascertain whether the business transacted at any particular exchange in the Melbourne network is profitable or otherwise. The financial results of working of a multi-office network ~~such as Melbourne should be judged~~ ~~xxxxxxisxxxxxxxxxxxx~~ judged on the operation of the network as a whole and not on the operation of any individual exchange in that network. The average annual charge for each subscriber's line in the Melbourne metropolitan network for the year 1926/27 was £11.42. This figure includes all working expenditure, including interest on capital, etc. The average revenue per subscriber's line during the same period was £13.52. It would be difficult to estimate the additional cost involved due to the connection of City subscribers to South Melbourne, Collingwood, and Carlton exchanges. The additional external plant cost involved was, however, considerable. The existing facilities at the Central manual exchange will not meet demands after December, 1931. Therefore, the opening of the City West exchange is urgent. I estimate that it will take from 3 to 3½ years to erect the building, instal the plant, and have the City West exchange ready for working.

20. TO Mr. Cook. The City West exchange is the most urgent telephone work that I know of. A fairly satisfactory grade of service is being rendered to subscribers connected to the Central exchange and to the Carlton, Collingwood, and South Melbourne exchanges. The opening of the City West automatic exchange will tend to improve the grade of telephone service rendered in the Melbourne metropolitan network. Development in the City West area is being met by connecting new subscribers to the branch exchanges already referred to, but that course is proving very

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costly. In my opinion, financial stringency should not be advanced as a reason why this network should be deferred. An efficient telephone service is essential to modern business. In a city like Melbourne the Department would not be fulfilling its functions if it neglected the telephone needs of the people. Therefore, the Department should be in a position to meet any demands that is made for telephone facilities.

21. TO Sen. Barnes. The telephone is the last of the public services that should be restricted on the score of economy.

22. TO Mr. Cook. I am satisfied that this proposal is a sound investment and it is an essential work. The Postmaster-General's Department is showing a loss on working results due to the low tariff charged for the services rendered. The telephone charges in Australia are the lowest in the world. If our telephone tariff were the same as the New Zealand tariff we would have made a profit last year of £1,050,000. If the charges were on the same scale as in Great Britain, the profit would have been £1,580,000, and if they had been as high as in the United States the profit would have been £2,000,000. If the rates here were fixed on the same basis as the Canadian rates the profit would have been £2,580,000. The deficit on the various services rendered by the Postmaster-General's Department during the financial year 1926/27 was £172,000. This deficit took all financial factors into consideration, including interest at $3\frac{1}{2}\%$ on capital assets valued at £42,000,000. As far as can be judged, the deficit this year will be still greater as all new assets are now being financed from Loan Funds involving interest charges of over 5%. In addition, and in conformity with the recent financial agreement between ^{the} Commonwealth and the States, interest at 5% instead of $3\frac{1}{2}\%$ will be payable on the value of transferred properties. This addition to the interest rate will mean an extra £87,000 to be paid by the Postmaster-General's Department on its portion of the transferred properties. The Department's turnover for the year 1926/27 was £11,000,000 as that the deficit is not a serious one.

23 TO Sen. Reid. We are losing heavily on all country telephone services. Last year the average cost of each country telephone service added to the system was £92, and the average rental

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received a shade over £3. Nevertheless, the Department is pushing development in country districts. If the Department had to provide for interest on transferred properties at their present market value the deficit would be considerably higher. I have a thorough knowledge of telephone conditions in all capital cities. I would not say that the service in Melbourne is better or worse than in any other capital city. The Department's policy is to give a satisfactory service in every part of the Commonwealth. Every proposal for development of the telephone service is treated in its relative order of urgency. Very shortly a proposal will be put forward for the establishment of a new Central automatic exchange in Adelaide. At the ~~present~~^{moment} the City West automatic exchange is the most urgent proposal in hand. I would prefer not to express any opinion as to whether or not telephone rates should be increased. I can say with every confidence that the telephone service in each of the capital cities is improving. The tests made of the service rendered bear out this statement and it is supported by the fact that we are getting fewer complaints. My responsibility is to see that a satisfactory telephone service is rendered in every part of the Commonwealth. Statistics and other information respecting this matter are regularly furnished to the Central Office showing the grade of service rendered in all parts of the Commonwealth. In addition, I frequently inspect the work of the telephone branches in the several States and have a good knowledge of rural requirements. If £500,000 were placed in my hands to-morrow and I had unfettered discretion as to its use on telephone work, I would have no hesitation in spending it on this proposal because I know the telephone needs of areas outside Melbourne are not being neglected. Demands for service in rural areas are being met and the only congestion that exists is in the capital cities.

24. To Mr. Seabrook. The site for the suggested City East exchange is in Little Collins Street, near Exhibition Street. From development figures which I have prepared, it is estimated that by 1934 there will be 19,000 telephone subscribers

In the areas to be served by City East and City West exchanges. When the City East exchange is in operation, it will relieve Collingwood, Carlton, and South Melbourne of a certain number of lines connected to premises which are in the proposed City East area. It is expected that during the present financial year approximately 40,000 new telephone instruments will be added to the system throughout the Commonwealth. The Department is canvassing for new business. If the present rate of development continues, the City West building will meet requirements for about 12 years. Trunk line equipment will be housed on the two upper floors of the new building. At present there are 241 long distance lines terminating at the Central exchange. It is anticipated that this number will be increased to 285 by the date of the opening of the new exchange. There will be ample room in the new building to meet all development during the next twelve years. The existing building in which the manual exchange is situated will ultimately be incorporated with the new building for the purpose of catering for future needs. The new building will provide accommodation for equipment having a capacity of 18,000 subscribers' lines. The addition of another storey to the South Melbourne exchange building will permit of development in that area being met for approximately 20 years. I have no doubt that the new City West building will meet all expected demands. I consider that the City West and the City East exchanges will, as far as can be forecasted at present, meet the telephone requirements of the City of Melbourne for fifteen or twenty years.

The witness withdrew.

The Committee adjourned.