

1930.



THE PARLIAMENT OF THE COMMONWEALTH OF AUSTRALIA.

*Brought up  
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in return to Order

PARLIAMENTARY STANDING COMMITTEE  
ON PUBLIC WORKS.

*[Signature]*  
Clerk of the Senate.  
12 MAR 1930

## REPORT

TOGETHER WITH

## MINUTES OF EVIDENCE

RELATING TO THE PROPOSED ESTABLISHMENT OF AN

# AUTOMATIC TELEPHONE EXCHANGE

AT

## HURSTVILLE, NEW SOUTH WALES.

*[Signature]*  
By Authority:

H. J. GREEN, GOVERNMENT PRINTER, CANBERRA.

MEMBERS OF THE PARLIAMENTARY STANDING COMMITTEE ON PUBLIC WORKS.

(Seventh Committee.)

ANDREW WILLIAM LACEY, Esq., M.P., Chairman.

Senate.

Senator John Braidwood Dooley.  
Senator Matthew Reid.  
Senator Burford Sampson.

House of Representatives.

Malcolm Duncan Cameron, Esq., M.P.  
John Curtin, Esq., M.P.  
The Honorable Henry Gregory, M.P.  
Edward James Holloway, Esq., M.P.  
William John Long, Esq., M.P.

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EXTRACT FROM VOTES AND PROCEEDINGS OF THE HOUSE OF REPRESENTATIVES, No. 4.

Dated 26th November, 1929.

10. PUBLIC WORKS COMMITTEE—REFERENCE OF WORK—HURSTVILLE, NEW SOUTH WALES—AUTOMATIC TELEPHONE EXCHANGE.—Mr. Lyons (Minister for Works and Railways) moved, pursuant to notice, That, in accordance with the provisions of the Commonwealth Public Works Committee Act 1918-1921, the following proposed work be referred to the Parliamentary Standing Committee on Public Works for investigation and report:—Hurstville, New South Wales—Establishment of Automatic Telephone Exchange.

Mr. Lyons having laid on the Table plans, &c., in connexion with the proposed work—  
Question—put and passed.

LIST OF WITNESSES.

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Middleton, Henry Audsley, Ex-President Hurstville Chamber of Commerce .. .. .	3
Todd, Charles Herbert Murray, Commonwealth Works Director, New South Wales .. .. .	6

AUTOMATIC TELEPHONE EXCHANGE, HURSTVILLE,  
NEW SOUTH WALES.

REPORT

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 Hurstville, New South Wales, has the honour to report as follows:—

PROPOSAL SUBMITTED.

1. The proposal submitted for the consideration of the Committee is to erect, on a site which has been acquired at the corner of Bridge-street and Railway-parade, Hurstville, a modern exchange building, and install therein an automatic telephone switching system having an initial equipment for 1,400 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, and thus enable requirements in the proposed automatic exchange area to be met for twenty years after the proposed date of opening.

REASONS FOR THE PROPOSAL.

2. The area which will be served by the proposed Hurstville automatic telephone exchange comprises the south-western portion of the present Kogarah exchange area, which includes the populous and rapidly developing areas of Hurstville, Blakehurst, Penshurst, Mortdale and Otley.

It is represented that the exchange is necessary in order to meet the rapid developments in these areas which cannot be catered for economically in the future in the existing Kogarah exchange, and that it will obviate unnecessarily high expenditure in external plant.

It is further claimed that the installation of the proposed exchange will enable the Department to provide a cheaper and more efficient service to subscribers in the extreme limits of the areas mentioned.

ESTIMATED COST.

3. The estimated cost of the work is set down at—

	£
Site (already acquired) .. .. .	760
Building .. .. .	6,750
Air-conditioning plant, &c. .. .. .	3,120
Exchange equipment, including that necessary at other exchanges .. .. .	27,071
Sub-station equipment .. .. .	5,407
Line plant .. .. .	12,762
Sundries .. .. .	2,460
Total .. .. .	58,330

and the estimated date of opening of the exchange is April, 1931.

COMMITTEE'S INVESTIGATIONS.

4. The Committee visited Hurstville, viewed the proposed site for the exchange, and inspected the existing exchange at Kogarah, which now caters for these districts. Evidence was taken from the Mayor of Hurstville, and from the Works and Postal officials in regard to the proposal, and a careful scrutiny was made of the plans submitted for the building.

## SITE.

5. The proposed site is a diamond-shaped piece of land which comes to a point at the corner of Bridge-street and Railway-parade. It has a frontage of approximately 95 feet to Bridge-street, and a frontage of approximately 88 feet to Railway-parade. It is level in character, and good building land, and, as it is located as near as practicable to the telephone centre of the proposed automatic telephone exchange area, it is considered quite suitable for the purpose for which it is intended.

6. The building is designed to face the angle formed by Railway-parade and Bridge-street, and in the course of the Committee's investigation it was shown that on its completion a small triangular portion of the site, having a maximum depth of 11 feet between the building and the footpath, will not be required for the purposes of the exchange. The Committee recommends that such portion be transferred to the municipality of Hurstville free of charge on condition that it be properly maintained by the Council.

## BUILDING.

7. The exchange proposed is a plain, single story brick building of modern fire-resisting construction, comprising a switch-room 79 feet by 37 ft. 6 in., flanked on one side by a battery room 25 feet by 17 feet, and a power room 25 feet by 16 feet, and on the other side by an air-conditioning room 25 feet by 15 ft. 6 in., mechanics' room 16 feet by 12 feet, together with the necessary lavatory accommodation.

The ceiling of the switch room is to consist of fibro-cement with wired glass down the centre, the roof will be of corrugated fibro cement sheets supported on steel roof trusses, with wood purlins, with sky-lights on the south-west face of the roof.

The building, as designed, is stated to be satisfactory from the point of view of the officials of the Postmaster-General's Department, and the system of supplying light by means of sky-lights in the roof and ceiling commends itself to the Committee. At the same time it is recommended that special precautions be taken to ensure that the sky-lights are made thoroughly water-proof to preclude the possibility of the entry of water with consequent damage to the valuable equipment in the switch room.

With this proviso, the Committee is satisfied that the exchange as planned will be quite satisfactory.

## AIR-CONDITIONING PLANT.

8. Hurstville, being one of those exchanges located close to the sea, the Postal Department engineers consider it essential that a full air-conditioning plant be installed capable of giving complete control of the moisture contents of the air.

The proposed plant would consist of a centrifugal multivane fan, delivering sufficient air to change the atmosphere of the switch room completely eight times in every hour; an air washer and heater; a refrigerating plant for cooling spray water; a cast-iron hot water boiler; circulating water pumps, and galvanized iron ducts and registers to distribute the air in the most effective manner throughout the switch room.

The estimated cost of this plant is set down at—

	£
Full air-conditioning and de-humidifying plant .. .. .	2,500
Vacuum cleaning service .. .. .	400
Compressed air service .. .. .	220

and the approximate annual charges of the air-conditioning plant are estimated to be—

	£
Interest and depreciation 10 per cent. on £2,500 .. .. .	250
Power for refrigerator .. .. .	52
Power for fans .. .. .	114
Circulating water pump .. .. .	114
Power for hot water pump .. .. .	10
Coke for heating boiler .. .. .	25
	565

9. To enable the dust to be cleaned from the intricate automatic equipment, it is proposed to install a compressed air system, at an estimated cost of £220. Hoses fitted with suitable nozzles may be plugged into sockets at convenient points in the exchange, and will be supplied through piping with air at a pressure of 40 lb. to the square inch.

10. Evidence obtained by the Committee, however, indicated that this system has in the past not proved effective, and the Committee recommends that this portion of the equipment be not installed, thus effecting a saving on the proposal of £220.

With this exception the Committee is satisfied from the evidence advanced that a full air-conditioning plant is necessary under these circumstances, and recommends that it be installed accordingly.

## FINANCIAL ASPECT.

11. It was stated in evidence that the estimated total annual charges, including interest and depreciation, for the proposed automatic system as at date of opening are set down at £11,910; and five years later at £16,000.

The annual revenue at date of opening is estimated to amount to £11,950, and five years later at £17,920.

The assets recoverable or thrown spare if the automatic exchange is established on the new site in April, 1931, are estimated to have a recoverable value of £11,515.

An amount of £9,120 will have to be written off in the Departmental Accounts as representing the proportion of the capital outlay on the original assets which is irrecoverable, and includes depreciation due to wear and tear, and labour in installation.

## COMMITTEE'S DECISION.

12. Under these circumstances, the Committee recommends that the establishment of the automatic telephone exchange at Hurstville be proceeded with as early as possible.

A. W. LACEY,

Chairman.

Office of the Parliamentary Standing Committee on Public Works,  
Parliament House, Canberra.

11th January, 1930.

# MINUTES OF EVIDENCE.

(Taken at Canberra.)

TUESDAY, 3rd DECEMBER, 1929.

Present:

Mr. Lacey, Chairman;  
 Senator Dooley      Mr. Curtin  
 Senator Reid        Mr. Gregory  
 Senator Sampson    Mr. Holloway  
 Mr. M. Cameron     Mr. Long.

Thomas Hill, Director-General of Works, Department of Works, sworn and examined.

1. To the Chairman.—I am aware of the proposal to establish an automatic telephone exchange at Hurstville. I am responsible for the design of the building and the inclusion in it of the mechanical services. The design of the building will be explained to the committee by the Works Director in Sydney. I propose now to deal with the mechanical services. The estimated cost of the mechanical services for the Hurstville Automatic Exchange are as follows:—

(1) Full air-conditioning and de-humidifying plant	£2,600
(2) Vacuum cleaning service	400
(3) Compressed air service	220

Hurstville, being one of those exchanges located close to Botany Bay and the Pacific Ocean, the Postal Department's engineers consider it essential that an installation capable of giving complete control of the moisture contents of the air should be provided. The proposed plant would consist of a centrifugal multi-vane fan delivering sufficient air to change the air in the switch room completely eight times in every hour; an air washer and heater, a refrigerating plant for cooling spray water, a cast-iron hot water boiler, circulating water pumps, and galvanized-iron ducts and registers to distribute the air in the most effective manner throughout the switch room. All air entering the switch room will pass through the washer spray chamber, the water being cooled when necessary; then through a battery of bent baffle plates, eliminating water which might otherwise be carried through from the washer in suspension; then through a battery of heaters, through the fan, and by means of suitable ducts into the exchange. Ducts and registers are also provided to allow foul air to escape into the roof space. They will have the effect of reducing the temperature of the roof and ceiling.

#### APPROXIMATE ANNUAL CHARGES OF AIR-CONDITIONING PLANT.

Interest and depreciation, 10 per cent. on £2,600	£ 260
Power for refrigerator	52
Power for fan	114
Circulating water pump	114
Power for hot water pump	10
Coke for heating boiler	25
	<hr/> 565

To enable the dust to be cleaned from the intricate automatic equipment it is proposed to install a compressed air system at an estimated cost of £220. Hoses fitted with suitable nozzles may be plugged into sockets at convenient points in the exchange, and will be supplied through piping with air at a pressure of 40 lb. per square inch. By this means the air is directed into the equipment and instruments and harmlessly blows dust away from parts which would otherwise be

very difficult of access. It is also proposed to install a vacuum cleaning system at an estimated cost of £400. The dust from the floor and fittings will be picked up by means of suitable tools attached to hoses which may be plugged into sockets located at the side of the compressed air points and the dust will be conveyed through piping to the machine room where it can be effectively dealt with. The estimated costs of the vacuum and compressed air systems are small, probably about £16 per annum, as they are in use for only a few hours each day. The installation which has been described has proved most effective in districts where humidity is likely to prove detrimental to the automatic telephone equipment. It is up to date in all respects, and in accordance with the latest practice. Water from the ordinary mains will be used. On cold days there will be no need to use the refrigerator, but on hot days the water will have to be cooled. The air entering the chamber will pass through an intense mist produced by water being sprayed through a number of small jets. Dust will be washed out of it, but a good deal of moisture will remain. The eliminator plates will absorb a lot of that moisture. The air will be completely under control. By warming it we can reduce the relative humidity of the atmosphere to 70 per cent. On hot days we shall have to cool the water. The warm air coming in will be sprayed with the cold water, with the result that the air, after passing the eliminator, will enter the switch room with the prescribed degree of humidity. We try to work the chamber at 63 degrees Fahr., which keeps the relative humidity well under 70 per cent. The effect is very noticeable. In summer the staffs of the Sydney and Brisbane exchanges prefer to be inside in the cool and comparatively dry air to being outside in the heat. One of the principal difficulties in the past has been the cost of the cooling device. This exchange will require an ice machine with a capacity of 6 tons per 24 hours. The cost of running that plant will be fairly high, as it will require a 15 B.h.p. motor. There will also be a 5 B.h.p. spray pump and a 5 B.h.p. fan. Even at 14d. per unit, the cost would be from 1s. 6d. to 2s. an hour. In our earlier installations we have to keep the refrigerator going to get cool air. Now we use an oil filter with the idea of cutting out the refrigerator when the atmospheric conditions are suitable. By that means we hope to save hundreds of pounds per annum. The system proposed at Hurstville will be an improvement on that in the Collingwood exchange. It is designed on similar lines, but modified in the light of our experience. Hurstville is a very humid spot, and the plant proposed is necessary. It is on the eastern side of the Dividing Range, north of 35 degrees latitude, and is one of those places which experience long periods of humidity in the summer and autumn.

2. To Senator Dooley.—There is no exchange at Hurstville now. The location of the proposed exchange is at the corner of Bridge-street and Railway-parade, Hurstville, near both the railway station and the post office. The Arcliffe exchange is about 2½ miles in a straight line from the proposed Hurstville exchange. I am not aware whether the existing exchange at Kogarah will be continued after the new exchange has been put into operation. We have allowed 5½ per cent. for interest on the cost and 4½ per cent. for depreciation.

3. *To Senator Reid.*—There will be both a vacuum cleaning and a compressed air service. The vacuum cleaning plant can be used for general cleaning as well as for cleaning the automatic equipment. The compressed air equipment will blow the dust on to the floor, after which it will be picked up by the vacuum cleaner. It is impossible to eliminate every trace of dust, which sometimes adheres to the grease on the equipment. We have tested the efficiency of the apparatus by placing sheets of paper in certain positions, and have found after a number of months, very slight traces of dust. The equipment proposed to be installed is now used in all automatic exchanges. Tenderers for automatic telephone equipment have said that they cannot guarantee the efficiency of their plant when the humidity of the building exceeds 70 per cent. The necessity for a cleaning equipment was greater when macadamized roads were more common. Wherever the atmosphere was dust laden some means of removing the dust were found necessary. The equipment has been designed by the department to meet the circumstances.

4. *To Mr. Curtin.*—Our experience has shown that the ordinary staff necessary to attend to the switchboard of an automatic exchange can attend to the cleaning equipment as part of their duties. The life of the cast-iron water boiler will depend largely on the water used. As we are not troubled with bad water, the boilers already in use have proved satisfactory. Some flakes of rust get into the spray chamber, as the sample of water taken from the cooling tank at Parliament House, Canberra, shows. After about three months the water shows evidence of rust, but it can be cleaned easily.

5. *To Mr. Long.*—For six months in every year the humidity at Hurstville is over 70 per cent.—probably from 85 to 90 per cent. At no time would it be less than 60 per cent. The de-humidifying plant proposed will meet all requirements. I am not aware of the size of the area which the proposed exchange will serve.

6. *To Mr. Cameron.*—It has been found necessary to install this type of plant in all Sydney exchanges. Without such a plant, there is danger of a breakdown of an essential service. This type of plant has proved so satisfactory that it has been copied in New Zealand.

7. *To Mr. Gregory.*—There has been a considerable reduction in the cost of de-humidifying plants during recent years. We now have our own patterns, and there is greater competition between tenderers. The Hurstville exchange will necessitate a fairly large plant. The ultimate capacity of the exchange will be about 5,000 subscribers' lines. It will not be as large as the exchanges at City South or City East. When the Collingwood plant was installed we had no patterns, and there was little or no competition. Moreover, since that time our requirements have been reduced to a minimum. The estimated cost includes all piping. The plans for the building were prepared in Canberra. The head architect in preparing them visited the site of the proposed exchange. That was not the case in connection with the proposed Brunswick exchange, for at that time he had not been appointed. I am endeavouring to eliminate the flat roofs shown in the plan. At present the power room, the mechanics' room, and the air-conditioning room are shown with flat roofs. The plan shows that over the switch room there will be steel principals and overhanging eaves. Over the small rooms of each side the design shows a flat concrete roof, but we are endeavouring to alter that. The use of wired glass is a wise precaution. It does not cost a great deal, and it gives greater safety from breakages and fire. I advocate the use of wired glass in the Brunswick exchange. Anything which tends to prevent a stoppage of an essential public service should be

considered, and, where the cost is not great, it should be used. Should the flat roof be done away with, the roof will be either of tiles or corrugated iron.

8. *To Senator Reid.*—Air entering the exchange will come in at the top and escape through the ceiling. We have experimented by allowing the air to enter near the floor, near the ceiling, and at different heights. The disposition of a switchboard makes it unwise to allow the air to enter near the floor because it is blocked by the frame and the machines. The method proposed is the result of our experience. We always endeavour to provide air-locks. In the Hurstville exchange two doors in the corridor will act as air-locks. Air entering the chamber will tend to escape along the passage, but it will be blocked by two pairs of swing doors. We always endeavour to provide these air-locks to prevent dust from entering the exchange when persons enter the building. At one end of the building there is a pair of doors not provided with air-locks. Those doors will be used only occasionally in order to bring machinery into the room. All other entrances will be provided with air-locks. Even if foul air were not heavier than fresh air, the pressure of the air entering the room would remove it. No air will enter the chamber unless it first passes through the cleaning and cooling pipes. It will escape through the ceiling and the air-locked doors.

(Taken at Sydney)

SATURDAY, 7TH DECEMBER, 1929.

Present:

Mr. Lacey, Chairman;	Mr. Cameron
Senator Dooley	Mr. Curtin
Senator Reid	Mr. Gregory.
Senator Sampson	

Henry Hill, Mayor of Hurstville, sworn and examined.

9. *To the Chairman.*—I am aware of the proposal to establish an automatic telephone exchange at Hurstville. I consider that the district has developed to the point where this exchange is warranted. I know the land upon which it is suggested that the exchange shall be erected and regard it as a suitable site. There are principally private dwellings in the neighbourhood, and they are a good class of building. There are a few old buildings that have been up for a number of years, but those that have been erected within recent years are of an improved type. None of the adjacent buildings offers any undue risk of fire to the exchange. In 1901 the population of the area that the exchange will serve was 4,019. On the 20th June last it was 25,200. The municipalities of Kogarah and Hurstville are parted by the railway line, and similar developing has taken place on the other side of the line. The number of buildings in 1921 was 3,251; to-day it is 5,002. The area of the Hurstville municipality is between nine and ten miles square. The construction of the Tempe to East Hills railway we anticipate will increase the development at a much more rapid rate than has been the case in the period for which I have given you the figures. The district that will be served by the new railway is the gem of our municipality, and one of the finest in the metropolitan area. The telephone congestion is so great under existing conditions that it is extremely difficult to secure efficiency. That congestion has existed for quite a number of years, but latterly it has become more acute.

10. *To Mr. Cameron.*—There are no industries being built up within the area to be served by the proposed exchange. Our industrial area is confined to the main road. Every other part of the district is residential. The population comprises principally people who go to business in the city.

11. *To Senator Reid.*—We have splendid residential sites. The majority of the population are of the artisan class. There is a splendid railway service to the city; in fact, it is one of the best in the metropolitan area. There is also a bus service which goes direct to the city, but 95 per cent. of the people travel by the electric trains. I consider that ours is a telephone population. I believe that the majority of the people would have the telephone installed if the service were satisfactory. Our Council has received quite a number of complaints from time to time.

12. *To Senator Dooley.*—Since the last triennial valuation our values have increased by about 54 per cent. over the whole area. Great difficulty has been experienced in securing fresh services, and the only conclusion to which we can come is that the congestion is the cause. The nearest point on the Tempe to East Hills railway to the proposed site would be about a mile. That district is at present sparsely populated because up to the present the travelling facilities have not encouraged people to go so far out and we have had plenty of room for them nearer in. We have been informed by the Engineer for Railways that the line will pay from the start. Undoubtedly the increase of population that will follow the completion of that line will make for a greater demand for telephone services.

13. *To Mr. Curtin.*—Future development must be in the direction of the proposed site. Why that occurs the site will be the centre of the area. You could not get a better site.

14. *To Mr. Gregory.*—I have seen a plan of the building and consider it a very fine one. I feel sure that the residents of this great municipality will thank the Government if it consents to the establishment of this exchange. If the corner were cut off, the site would be tremendously improved. We are prepared to make representations to the Postal Department to have that done.

15. *To the Chairman.*—If the corner piece were vested in the municipality the Council would make it ornamental.

The witness withdrew.

Henry Ainsley Middleton, Ex-President of the Hurstville and District Chamber of Commerce, sworn and examined.

16. *To the Chairman.*—The present telephone service is altogether inadequate, and great difficulty is experienced at times in getting reasonable efficiency. On many occasions I have felt inclined to break up the instrument with an axe, but I recognize that we must be reasonably patient and give the postal authorities credit for doing the best they can with the service at their command. But the time has arrived when the district is entitled to more consideration. The congestion is almost intolerable at times. I should imagine that the proposed site is a suitable one. You do not require an exchange in the business centre; it would not matter if it were in the bush. The site could be still further improved if the department were to resume the weatherboard cottage which adjoins it, and thus have a frontage to Belmore-road. That property fronts what will be the main road. If it were resumed the value of the site would be very much greater and there would be no risk of fire. If you give you a main road frontage to your building, I consider that the proposed building will be a suitable one. It will certainly improve the neighbourhood, because it is superior to the majority of buildings in the vicinity. This municipality has made enormous progress during the last few years. At one time we had business sites on only one side of the main street. The railway authorities cut up property on the other side and it is now built upon. I think the highest value offered at the site was

about £40 a foot. One portion of it, called Station House, has a frontage of 32 feet to the main street. There is erected upon it an inexpensive building. The other day it was sold for £25,000. If the improvement in values is as great in the next few years as it has been within recent years, this will become the most important suburb of Sydney. I believe that it has made greater progress than any other suburb during the last five years. The Chamber of Commerce has battled to put it on the map, and has succeeded to such an extent that property to-day is worth ten times more than it was five years ago. It really deserves very much more consideration than it has received from either the State or the Federal Government. I am pleased that we have such an up-to-date man as Mr. Tully to represent us.

17. *To Mr. Curtin.*—After years of battling we have succeeded in getting reasonably good roads. The sewerage system is partially completed. Now we are hoping to be given a reasonable telephone service.

(Taken at Sydney.)

MONDAY, 9TH DECEMBER, 1929.

Present:

Mr. Lacey, Chairman;	Mr. Curtin
Senator Dooley	Mr. Gregory
Senator Reid	Mr. Sampson
Senator Sampson	Mr. Cameron

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

18. *To the Chairman.*—I am aware of the proposal to establish an automatic telephone exchange at Hurstville. I am the officer responsible for bringing the proposal forward. The proposal is to erect a building on a site which has been acquired at the corner of Bridge-street and Railway-parade, Hurstville, and install therein an automatic telephone switching system having an initial equipment for 1,400 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, and thus enable requirements in the proposed automatic exchange area to be met for twenty years after the proposed date of opening. The area which will be served by the proposed exchange comprises the south-western portion of the present Kogarah exchange area, which includes the populous and rapidly developing areas of Hurstville, Blackhurst, Penshurst, Mordale and Oatley. The exchange is necessary in order to meet the rapid development in these areas, which cannot be catered for economically in the future in the existing Kogarah exchange, and to obviate unnecessarily high expenditure on external plant. The installation of the proposed exchange will enable the department to provide a cheaper and more efficient service to subscribers in the extreme limits of the areas mentioned. The estimated immediate cost of the work is:—

Site (already acquired) .. .. .	£	700
Building .. .. .	0,750	
Air conditioning plant, &c. .. .. .	3,120	
Exchange equipment, including that necessary at other exchanges .. .. .	27,071	
Sub-station equipment .. .. .	5,497	
Line plant .. .. .	12,702	
Sumdries .. .. .	2,400	
	<b>69,330</b>	

The actual revenue from the subscribers in the existing Kogarah exchange area for the year ended 31st December, 1928, and the annual revenue it is estimated will be obtained from the subscribers in the proposed Hurstville automatic exchange area on the date of opening and five years thereafter are shown hereunder:—

Average number of subscribers lines connected during the year ended 31st December, 1928, in the existing Kogarah area.	Actual total revenue received for the year ended 31st December, 1928.	Estimated number of subscribers lines in proposed Hurstville area at April, 1921 (date of opening).	Estimated annual revenue at April, 1921 (date of opening).	Estimated number of subscribers lines in Hurstville area at April, 1925 (five year date).	Estimated annual revenue at April, 1925 (five year date).
2,695	£ 26,837	1,200	£ 11,950	1,800	£ 17,920

The proposed site is situated at the corner of Bridge-street and Railway-parade, and is Commonwealth property. It has a frontage of approximately 95 feet to Bridge-street, and a frontage of approximately 53 feet to Railway-parade, and is located as near as practicable to the telephonic centre of the proposed automatic exchange area. It is proposed that the building shall be of simple design and built on the latest fire resisting principles. The immediate installation is for an equipment of 1,400 subscribers' lines, but the building will be designed to accommodate equipment having a capacity of approximately 5,000 subscribers' lines. The financial aspect is as follows:—

Item.	As at April, 1921.	As at April, 1924.
1. Estimated capital cost new	58,330	68,410
2. Estimated capital cost—new and its 2½%	102,860	143,080
3. Estimated annual working expenses of proposed automatic exchange ..	3,490	4,740
4. Estimated total annual charge for proposed automatic exchange ..	11,910	16,060
5. Annual revenue— Estimated as at April, 1921 .. Estimated as at April, 1925 ..	11,950	17,920
6. Assets recoverable or thrown spare if an automatic exchange is established on new site at April, 1921— (i) Book value .. (ii) Recoverable value .. (iii) Cost of recovery ..	20,035 11,215 846	

Regarding item 6 of the foregoing statement, the difference between sub-items (i) and (ii), namely, £9,120, is an amount which will have to be written off in the departmental accounts as representing the proportion of the capital outlay on the original assets which is irrecoverable, and includes depreciation due to wear and tear and labour in installation.

The following is the accountant's certificate of the correctness of the figures submitted:—

POSTMASTER-GENERAL'S DEPARTMENT—NEW SOUTH WALES.  
REVENUE—PROPOSED AUTOMATIC TELEPHONE EXCHANGE—HURSTVILLE.

(a) Actual total revenue received from the subscribers and public telephones in the existing Kogarah Telephone Exchange area for the twelve months ended 31st December, 1928 (for the latest date available):—

	£	s.	d.
Rents .. .. .	13,860	8	10
Calls .. .. .	10,953	11	7
Miscellaneous charges .. .. .	1,028	3	4
Trunk line calls .. .. .	1,195	1	0
Totals .. .. .	26,837	4	9

Average number of lines connected during the above-mentioned twelve months, 2,695.  
Average revenue per line, £9 10s. 1d.  
(1) Estimated annual value for the proposed Hurstville Automatic Telephone Exchange area as at the proposed date of cut-over, i.e., April, 1921, and five years later:—

	Number of lines.	Rents	Calls.	Miscellaneous Charges.	Trunk Line Calls.	Total.
As at cutover ..	1,200	£ 6,171	£ 4,763	£ 489	£ 532	£ 11,945
Five years later ..	1,800	9,257	7,150	734	798	17,915

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.

T. FINLAY,  
Acting Accountant,  
25th March, 1929.  
Postmaster-General's Department, Sydney.

The population of the area which the exchange is designed to serve, is approximately 42,000. There are already in the area, which will be carved out from the Kogarah exchange area, approximately 800 subscribers' lines. At the present time there are in the Kogarah area 32 waiting applicants. The site was purchased in June, 1927, for the sum of £760. It is much more valuable to-day. I should say it would now be worth £1,400 or £1,500. It may interest the committee to know that the Kogarah manual exchange was installed on the 1st October, 1896; therefore, it is now more than 33 years old. I regard this proposal as an extremely urgent one. We cannot extend the Kogarah exchange, and unless we take action quickly to relieve the congestion we shall be unable to give service to the subscribers. There are a number of subscribers now waiting for service. We hope to be able to give them that service temporarily in an extension of the temporary automatic exchange on the site at Hurstville. The problem is a pressing one, and that is the only way in which we can solve it. The temporary building will be at the rear of the proposed exchange, and will not interfere with the construction of that exchange. The temporary equipment will not be wasted subsequently. At Kogarah we have been extending the exchange so far as we have been able to do so by putting in automatic equipment, the idea being to reduce the wastage that is due to the installation of what is afterwards useless material. The development of the area will be rapid.

The electrification of the railway as far as Sutherland, has caused the population to move steadily in that direction. Hurstville is expanding as rapidly as any area in Sydney, and I have not the slightest doubt that within the period named the development we estimate will take place. There are no unusual features in the lay-out of the exchange except that the land is somewhat irregular in shape. We would co-operate with the council in the improvement of the triangular piece of land in front. It is proposed to provide a wide-spread single-storey building instead of a two-storey building, because of the shape of the land. The shape of the land suits this particular lay-out. You will also notice that we shall obtain a maximum amount of light in the building, and that is of tremendous advantage to an automatic exchange. Wherever we can do so, we like to have single-storey buildings for automatic exchanges, because we get roof lighting. This plan will not interfere with the efficient and economical working of the exchange. It is a very suitable plan. The air conditioning plant will be on one side of the building, and the battery room and power room on the other. I am satisfied that it is necessary to install air-conditioning and de-humidifying

plants in exchanges in both Sydney and Brisbane. We had an experience last summer which proved to us that without these plants there is an element of danger which it is not wise to incur.

19. To Senator Dooley.—I cannot say exactly how much floor space there is to each operator in the Kogarah exchange. It is extremely congested. When the committee inspected it on Saturday it was at its maximum. The traffic begins to fall off about midday on Saturdays. It is proposed to provide more room at Kogarah, but it has not yet been decided whether it would be better to have a new exchange or make extensions to the existing building. There would be fully fifteen or sixteen operators employed in the exchange. The effect upon their employment of the installation of automatic equipment would not be very pronounced. We shall have two years in which to prepare for the cut over. In all these cases we are able to make provision according to the exigencies of the service. Our telephone manager frequently supplies outside employers with operators. There is also a heavy wastage by marriage. In the proposed building we touch the building line at two points. I do not anticipate that the traffic will be affected in any way, or that the view of motorists will be obscured. There are 32 applicants awaiting service, due principally to the fact that a cable here and there is filled owing to the survey figures having been not quite accurate. We propose to supply the service from the small temporary exchange that will be situated at the rear of the proposed building. That will be more economical than connecting them to Kogarah. We may be able to provide for these 32 in 10 days or a fortnight.

20. To Mr. Curlin.—We do not install any more equipment than we consider will be needed for a period of two years. We are able to build to meet requirements for twenty years, and put in shelving and frames sufficient for five years; but we never put in equipment for more than two years.

21. To Mr. M. Cameron.—We do not propose to build in such a way that another storey could be added to the building to meet later developments. We have sufficient space for expansion on the ground floor; we could accommodate there practically twice the estimated number.

22. To Mr. Long.—The building is designed for an ultimate capacity of 5,000 subscribers' lines. The lay-out of the apparatus will be such that we shall not need to move any units until we have reached that capacity. There might then be need for re-arrangement. For twenty years, however, no alterations will be necessary. If we found that we had underestimated the demand, and that it was necessary to provide for 1,500 subscribers' lines immediately, it would be an easy matter to divert a unit of 100 lines from some other exchange and install it at Hurstville. There is nothing which is likely to prevent us from carrying the work out expeditiously. The item, "Sundries, £2,460," includes laterals, and stores administration on such material as we have to buy.

23. To Mr. Gregory.—There is also included interest on capital cost and some junction sundries. The amount is estimated on a unit basis from previous experience.

24. To Mr. Long.—They are largely accessories. At Braemarwick we are at the rear of the proposed exchange, and practically no temporary diversion work will have to be done. We simply need to extend the cables. There is a considerable amount of incidental work to be done at Hurstville, because lines are to be diverted partly from the back of the building and partly from Kogarah.

That will necessitate a good deal of adjustment in regard to cabling, which we do not have to carry out at Braemarwick. That accounts for the fact that sundries at Braemarwick are estimated to cost only £750.

25. To Mr. Gregory.—We have a fair amount of automatic apparatus, all of which is usable, at Kogarah. A large amount of cable is laid in the area. This has been taken into account in estimating the capital cost *in situ*. The £102,000 does not include any of the internal plant at Kogarah. The conditions at Kogarah are difficult, but I should not say that we are transgressing in any way the health regulations. There are only about three mechanics on the ground floor in a room the dimensions of which are approximately 25 feet by 28 feet. There is plenty of air space. I would undertake to say that there is a greater amount of air space than the minimum allowed by the health regulations. It looks congested, but a third of the space is taken up by the frame and the frame takes up very little air space. Upstairs at the peak load there would probably be about twenty girls. That is not in any way excessive. The room is splendidly ventilated all round. We do everything we can to make the girls as comfortable as possible, believing that thereby we obtain the maximum degree of efficiency.

26. To Senator Reid.—The peak period would not last for more than an hour or so.

27. To Senator Dooley.—The operating-room has windows along one side and double doors at the end. We have placed our switchboard sufficiently near the wall to allow of the passage of one person between it and the wall. I can assure you it would not be right to say that we are breaching the health regulations. I admit that the existing conditions have been allowed to continue too long. It might have been to our advantage if we could have got out of Kogarah earlier; but so long as we can give service from an exchange we do so, because we have to consider the question of finance. There are many places in which we could install automatic equipment to-day if we had the money.

Copper wire costs about £98 a ton. We procure it from Port Kembla.

28. To Mr. Gregory.—The reason that it will not be a very profitable venture immediately is partly because of the heavy charges involved in undergrounding and partly because it is a very scattered area. Undergrounding is justified in the early stages in outside areas when provision has to be made for a certain number of subscribers' lines. When you can be reasonably certain that within seven years a pole line, if erected, would be full and you would have to lay cables, it pays to lay the cable at the beginning. We never lay underground without considering all the annual charges. There are various types of underground equipment. In one type the cable is laid in an open trench with a plank over it. But the ordinary underground that we put in the cities is put in by means of earthenware ducts—the ordinary 4 inch drain pipe. In that we can draw anything up to 1,600 pair cable. In an area like this the first thing we look at is, which is going to be the most economical to put in—a pole line only, part cable and part pole line, or wholly cable. We are governed by the annual charges. Actually there is not very much difference between the cost of the cable and the cost of aerial, but the maintenance charges are almost negligible in the case of cable and very high with aerial lines. Heavy cable runs out at about 32s. 6d. a yard for 800 pair cable. The cost of jointing and laterals also is heavy. I should not like the committee to think that we would put up an aerial line without looking ahead. Before I make any submissions to this committee I get a statement from Mr. Lawson showing how he proposes to serve the area. We

then pass the charges in review and ascertain whether it is preferable to have cables instead of aerial or vice versa. The whole of the area is gone over carefully before we pass the statement of annual charges. If we disagree with any part of his statement he amends his estimate, or we may do it for him. The statement of annual charges and estimated capital cost is prepared with the utmost care. Every piece of cable or aerial line required in the area is estimated and valued. Every aspect is carefully thought out before we prepare our proposals. We separate the cost of material, labour and administration. The administrative cost of labour runs as high as 40 per cent., whereas on cable stores administration is only about 2½ per cent., and on most of the other materials about 6 per cent. Overhead includes ordinary leave, sick leave, superannuation and every other administration charge. This proposition shows very little margin of profit. When I was superintending engineer in Sydney I knew the district better than I do now. I have been away for six years, but I still know its main features. It would not pay to install a manual exchange.

29. *To Senator Reid.*—We never do anything which may offend the aesthetic taste of the community. The laying down of cable may cause a little inconvenience to the public, but not more than the laying of water and electric light services. Our wires never carry any dangerous voltage. If an electric light wire came down across our wires it would make our wires live and there might then be danger; but our regulations and inspections prevent any dangerous construction that might lead to an accident of that nature. There is no danger whatever. All our wires could come down with perfect safety to life. Health inspectors have not the power to inspect our premises. The Commonwealth is not bound to observe the regulations of the State; but, as those regulations are framed in the interests of the community, we endeavour to observe them. I would never be a party to the breaking of any State regulation, because I consider that in all cases they are reasonable. The Commonwealth has held this land for two and a half years. We have not experienced very much difficulty in Sydney with our underground cables from the electrification of the railway system, but we are having a good deal of difficulty in Melbourne from both the railways and tramways. The attitude of the constructing authorities appears to be that, although they could prevent a leakage of current by incurring very heavy expenditure, it does not pay them to do so, and they reduce their constructional costs. There is a certain tolerance of leakage that sometimes becomes misafe. Sydney had the benefit of Melbourne's experience and the Chief Electrical Engineer in the State Railway Department in New South Wales went to considerable lengths to prevent leakage. It is a bit early yet to say that there will not be a certain amount of leakage; but I know that we have not had very much trouble from the tramways, although they have been electrified for 25 years. We are having a lot of trouble because of tramway leakage in Melbourne, proving that the work here was done rather better than it was there. As a matter of fact the damage done to our system by the railways in Melbourne is as great as that done by the tramways. Since the Metropolitan Tramways Trust took over construction in Melbourne the standard has been much better, and we are not likely to have the same trouble with new extensions as we had with the older ones. I do not think that any benefit would be derived from the purchase of the dwelling which adjoins this site. We have sufficient space to meet all our requirements. There is no fire risk. There is a fair distance between where our buildings will be and the dwelling to which you refer. I do not know that it would be of any great advantage

to have a square block of land. We have a limited amount of money, and we cannot purchase land for speculative purposes.

30. *To Mr. Curtin.*—We do not pay rates; but the purchase price would have to come out of our loan money.

31. *To Senator Reid.*—We have more land than we want immediately, and I do not anticipate that we shall ever need more than this block. If it were found necessary we could make provision on this block for 10,000 subscribers' lines. The only thing we would get by the purchase of the dwelling would be a microscopic fire risk. The Kogarah exchange area will be reduced by two-thirds when Arncliffe and Hurstville exchanges are established. The Kogarah exchange will not be done away with; it is a good centre for that smaller area. Obviously there will be further growth, but we shall be able to meet it in the Kogarah exchange when Hurstville is established. Similarly Arncliffe will relieve Kogarah; and at a later date the Kogarah exchange will be converted to automatic working.

32. *To the Chairman.*—There has not been congestion at Kogarah for very long. It was nothing like that as it is now when it was State Engineer. We do not like to carry on our service with such congestion; we like to have more space than is available at Kogarah, although we do not admit that the conditions there are adversely affecting the health of the employees.

*The witness withdrew.*

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

33. *To the Chairman.*—The plans of the proposed automatic telephone exchange at Hurstville were prepared in our branch. The building is comparatively regular in type, although it differs slightly in the layout from other telephone exchanges in the suburbs of Sydney, on account of the nature of the site. It comprises a switch room, the internal dimensions of which are 79 ft. x 37 ft. 6 in.; a battery room, 25 ft. x 17 ft.; a power room, 25 ft. x 16 ft.; an air conditioning room, 25 ft. x 15 ft. 6 in.; and a mechanic's room, 16 ft. x 12 ft., in addition to the usual lavatory accommodation. It is proposed to erect the building in brick. Externally we shall have 11 in. hollow walls. Other walls will be 9 in. and 4½ in. The finish will be plain so far as the elevation is concerned. The roof will be covered with fibro cement, and will have steel trusses with wood purlins. It was proposed to follow the practice that has been adopted for the last few years of roofing the air-conditioning room and the power and battery room with a concrete roof, but I am informed that it is now proposed to have the same type of roof as that over the switchboard and to ceil the whole building with fibro-plaster. The usual electric lighting will be installed. There is to be an air-conditioning plant. The sewerage system has not yet reached the site, but it is expected that it will be there in the near future, and we are planning our building so that we can make the connections as soon as the sewerage is available. The floors will be of reinforced concrete and in the switch room will be covered with battle-ship linoleum. It has been found that that gives better results than the flooring we were in the habit of putting in our exchanges. The site is quite a good one, although a little awkward in shape. It is at the corner of Railway-parade and Bridge-street, a little to the south of Hurstville Railway Station. It has a frontage of 87 ft. 6½ in. to Railway-parade and 94 ft. 11 in. to Bridge-street. On the western boundary the alignment length is 150 ft. 10½ in., and on the northern boundary 139 ft. 4½ in. There are a few tiled roofs and slate roofs within a near radius, but the roof of the adjoining building is of corrugated

iron. The reason that we have turned to the fibro-cement roof is that it is a little cooler than iron, and does not set up condensation in cold weather. We have had excellent results from the fibro-cement roof at the Randwick Hospital for ten or twelve years, and we know quite well that this class of roof will satisfy the postal department. It was very highly thought of by the former Director-General of Works, and we have no reason to believe that it will not continue to be satisfactory. It gives slightly more consistency of temperature, and will look quite as good as any roof in the vicinity. Fibro-cement sheeting is about 12½ per cent. dearer than iron. Tiles are 40 per cent. dearer, and slate about 60 per cent. dearer. Fibro-cement in an area as near to the sea as this one should have a slightly longer life than iron. I should say that it would last three to four years longer than iron. We have just completed at Maroubra a building for an automatic telephone exchange in which the type of construction is similar to this. I should not say that there is any undue risk of fire, but that on the contrary the fire risk is good. There is an adequate fire break all round the building, and I do not think it is necessary to acquire additional land on the eastern side. There is an excellent water supply. We shall be able to run a 4 in. main into the building for fire fighting purposes. The pressure is good. The reason for providing a wall on the Bridge-street and Railway-parade frontages in lieu of fencing is probably that it was considered more durable and a little more finished. It certainly minimises the fire risk, although I do not think that that aspect was considered. I think you can take it that it was a question of design. The cost will be twice as great as that of a fence, but the life of the wall will probably be twice as long. The cost works out at between £70 and £80, including the piers for the gates. A fence would cost about £24. Pending the coming of the sewerage system the sanitary-pan system will be used. We have not a sufficiently large area to put in a septic tank. The disposal of the effluent would be difficult. The main sewer is being brought to Hurstville, and we are hoping that it will be available in eighteen months. Therefore, the time during which we shall have to rely on a temporary arrangement should not be long. The municipality has a properly organized pan system for this portion of the area.

34. *To Senator Dooley.*—The sewer at the present time is distant about half a mile from the site, on the other side of the railway. They are not proceeding with the work yet, although the scheme has been approved.

35. *To Mr. Curtin.*—I believe that the preparation necessary for a septic system could be such that we should be able to link up in the future with the sewerage system; but, seeing that the Council has a properly organized pan system in operation, why should we not take advantage of it until the sewer is ready. We should waste a lot of money if we put in a septic tank which would be used for only a short period. Those who occupy this building will be no worse off than the occupants of adjoining buildings. If we had to wait indefinitely for the sewer, I should favour the installation of a septic tank; but with the sewerage coming slowly towards our doors why should we expend the money? I should not like to guarantee that the work will not be stopped before it reaches us, because I notice that the Board is short of funds, and you can never tell which area they will cut out. At the moment they are working in the district; but they may stop before they get to our street, and in that case we should not be able to make the connexion. We shall require nine months after the contract is accepted to complete the work on this building.

36. *To Mr. M. Cameron.*—There are certain mechanics attached to each radial centre who will draw on this lavatory accommodation when they are at their

head-quarters. On one day there might be ten, and on another not more than two. The installation of a septic tank would cost another couple of hundred pounds.

37. *To Mr. Curtin.*—I do not think we would be allowed to put a septic tank on this site, because of the trouble in getting rid of the effluent.

38. *To Mr. Long.*—At the present time the nearest dwelling is 20 ft. from our boundary. The nearest point at which a building could be erected on the western side would be 15 feet away. The layout of the building will enable us to extend the switch-room by 27 feet. I consider that a fibro-cement roof is a better paying proposition than iron. The temperature of the room would be about the same with fibro-cement as with tiles, but slightly less than with iron. From that point of view I regard the cement roof as an asset. Although we can override the regulations of the municipality, it is a standing rule with us to endeavour to conform to them as far as possible. We have not considered the installation of a septic tank because we have been working on the assumption that in the near future we shall have the sewerage system. It will probably be eighteen months before the sewerage is available in this area; in that case we shall have to use the sanitary-pan system for nine or ten months.

39. *To the Chairman.*—There should be no doubt that the sewerage system will be available by the time that this building is operating as an exchange.

40. *To Mr. Long.*—We have not made any plans to meet the sewerage requirements of the employees if the work on the sewerage system should be interrupted, but to take advantage of the consent already given by the Council; that is to use the sanitary pan system. While we are installing the plant the number of employees in the building will be from six to eight. When the plant is in operation as an exchange equipment, there will be three or four employees always at the exchange and a mechanics' gang, numbering four or five, in the district. We believe that the pan system will meet requirements. There are certain closets that have chemical attachments to obviate anything offensive. We should probably use that type. Our figures regarding cost have been based on the actual cost of buildings of a similar nature round the suburbs. It works out at 1s. 1d. a cubic foot or from 22s. 6d. to 23s. per 100 feet super. I should not like to say that the building could be erected for the same amount under departmental day labour, but the time occupied probably would not be longer. For the last fourteen years we have been organized exclusively for contract work. The cost would be greater if we had to construct by day labour. Certain men have been doing this particular class of work for years and they have the necessary plant. If the Department decided to construct by day labour, plant would have to be purchased. At the present time the Department has not available any experienced master builders whom it could put on to day-labour construction work. A contractor becomes fairly expert in organization, purchase of material and engagement of labour. He has his own particular gang of men. In the Department we are somewhat differently situated. First of all we must give preference to returned soldiers and preference to unionists. A contractor may have a brother who is a tip-top general foreman and is prepared to work a few hours more than the ordinary man in the course of a week. He has his brother's interests at heart. It is very difficult to get skilled general foremen whose mental attitude towards Government work is the same as that which they show towards their own work. There is a tendency to believe that the Government does not expect quite as much as a private employer. That is general all over the world today. All our specifications enforce strictly, first, preference to returned

soldiers, and secondly, preference to members of recognised organizations. I do not think you will find a solitary non union man on a Commonwealth work. That has been the practice for years. The last Government was very particular about these preferences.

41. *To Mr. Gregory.*—It might be possible to complete this building in eight months but it has been my experience that buildings of this nature take about nine months to complete. It might be completed in four months, but I should not care to promise it. There will be a small plot in front of the building. I suggest that we make the Council a present of that piece of land, and allow it to be used as a footpath. The front of the building will be sufficiently ornate, considering the purpose to which the building is to be put. The appearance will be as nice as that of an ordinary hall, although there will be no front door. You would not object to three windows on the elevation of a small church. It looks what it is—a decent departmental building. Money will not be wasted on ornamentation. There will be an entrance on each side. The suggestion is to light the switchroom from the ceiling. In October last Mr. Murdoch wrote to me stating that experiments were being carried out with roof lighting at one or two automatic exchanges in Victoria. Whether the suggestion in connexion with Hurstville can be carried out will, of course, require consideration. We shall be able to decide when we have before us the results of the experiments. There will have to be some overhead light. The construction will be of such a nature that we shall have immunity from damage by hailstorms. We shall reinforce the glass where it is exposed to the full force of hailstorms. The pitch of the roof will be sufficiently great to prevent any storm from having direct contact with the glass. We find it necessary in Queensland to afford this protection. We can ensure freedom from leakage. It would be a very serious matter to us if water got into the exchange, and we must take every care to see that these buildings are absolutely watertight. We now have a chain of exchanges with a similar type of roof around Sydney, and we have not received any complaints. Evidently, therefore, our methods are satisfactory.

42. *To Mr. Long.*—The height of the gable is exactly ten feet.

43. *To Mr. Gregory.*—I would not install a Kaustine plant, in view of the probability that we shall have the sewerage system in the near future. We should have the same trouble with the effluent as in the case of the septic tank. We have used Kaustine plants in other places. We generally allow the effluent to soak into the soil. On this site there is a rather impervious bed of clay. The usual practice is to have a drain underneath to take away the effluent, and a herringboned discharge which enables it to get away into the soil. We could not have a latrine in the building if there were no sewerage connexion to it.

44. *To the Chairman.*—The latrines are to be actually part of the structure. We are gambling on getting the sewerage system. If that is not available we shall have to provide a second E.C. We should not think of having a pan system inside the building. As a matter of fact we would not be allowed to do so.

45. *To Senator Reid.*—We shall make the pan system as inefficient as possible. The size of the fibre cement sheets is the same as that of iron sheets, and they are also corrugated. They are screwed to wood purlins on the outside. They are not considered a serious fire risk. We have found this type of roof quite suitable. A man could walk over it with tomia shoes on. In case of emergency an employee could walk over this type of roof without a crawling board. The Randwick Hospital was roofed with fibre cement in 1918 or 1919 and it is as good to-day as it was in the

beginning. The natural cement colour is allowed to remain for upwards of twelve months, at the expiration of which period the roof will take paint in the same way that any external cement will. Until you give the way that any external cement will go ahead with an exchange postal officials permission to go ahead with an exchange they cannot let a contract for the equipment. It takes eight or nine months to obtain delivery of the equipment and a further twelve or fourteen months to install it. It is our object to have the buildings ready when the equipment arrives.

#### The witness withdrew.

Robert Lawson, Superintending Engineer, Postmaster General's Department, sworn and examined.

46. *To the Chairman.*—The whole of the information in connexion with this proposal was compiled in my office. A slight modification of the figures is necessary because of the revision of the telephone rates from the 14th December next. That will amount, generally speaking, to an increase of 10s. per annum per line. I regard the proposal as an urgent one. I am personally acquainted with the development in the Kogarah district. The committee paid to the Kogarah exchange showed it the congestion that exists there.

The question of relieving Kogarah has been under consideration for some time. The relief could be afforded in two ways; one, by making a considerable enlargement of the Kogarah exchange, or alternatively, by providing additional exchanges. An examination in connexion with Arncliffe is the most economical means of meeting the development in the Kogarah network. Figures were submitted to our central office towards the end of 1924, showing that the area could be most economically served by the establishment of three exchanges. There will be considerable economy in connexion with external plant, and improved efficiency in connexion with the existing plant. The total cost is made up of exchange equipment costs, and line costs. The latter are very often predominant, and are always important. The cost of the visible exchange equipment is comparatively a small part of the total. The most expensive plant is underground. It is provided in cables having wires of different dimensions.

Length for length we get higher efficiency over wires of the greatest dimensions. If we wanted to comply with the standards that have been laid down for the Commonwealth it would be impossible to provide the desired efficiency in the Hurstville network without a very considerable increase in the capital cost of the external plant. The first examination showed us the saving of £10,010 in external plant at the time that we were considering the proposal. That consideration did not include the desirability of improving the present service to the standard that we have now established. The saving made possible by this and the Arncliffe proposal can be said to be from £20,000 to £25,000. This will not only relieve the existing congestion, but also provide a more economical service. The Hurstville site is only seven chains distant from the theoretical telephone centre. That is as near as you can get. Frequently in the middle of a block of buildings and therefore quite inaccessible. The site is at the junction of what will be two main thoroughfares; therefore we shall be able to get our underground plant to the exchange with a minimum amount of inconvenience and cost. I have a general knowledge of the district, and with small it is a reasonably good working class suburb, with small industries. The main part of the population works in and about Sydney. The district is growing rapidly. A very excellent train service enables it to be reached easily and cheaply. The present train service meets the needs of the district. Quite a number of our men

live on that line and are well satisfied with the service. I anticipate that there will be a regular and progressive increase in the development of the area. It has continued high for quite a long time. In the last ten years the rate of development has been 10.35, 9.65, 13.01, 9.01, 20.53, 16.66, 12.74, 10.26 and 11.4. In 1927 we opened the Lakemba exchange and it took a large number of lines from Kogarah. The Kogarah development has been much greater than the average for the metropolitan area, which is seven per cent. or eight per cent. There is no feature which is likely to lower it. The improvement of the service in the Kogarah district, but especially the opening of the Hurstville exchange, will give us an immediate increase in the number of subscribers' lines, because up to date there has been a block on the Hurstville side. At that moment the block amounts to about 140 lines. There has been a resistance to growth. As soon as we are able to cope with the growth I have no doubt that the rate of increase will be higher than in the past. The possibilities of the area are not limited. The Kogarah area at present is relatively highly developed in the centre but not so highly developed in the surrounding portions. As the population of Sydney grows these surrounding sections will be filled; therefore there will be a continuous increase in the number of subscribers in the Hurstville area. I consider that the installation of an air-conditioning plant in this building is highly necessary. Quite recently we suggested the elimination of portion of these plants. Hitherto it has comprised the air-conditioning plant itself, plus a vacuum and pressure plant for dust removal and exchange cleaning purposes. It is the pressure plant which we have recommended should not be included in future plants. But an air-conditioning plant is highly necessary. I do not know of any suitable alternative. The plant that we now have is the most modern.

47. *To Mr. Long.*—The initial equipment will meet the requirements of 1,400 subscribers' lines and the ultimate capacity will be 5,000 subscribers' lines. That represents our view of the development of the area. The exchange will be so disposed on the site that we shall be able to take in more lines if necessary. I do not think we have underestimated the requirements. This is the form of building that we insist on for New South Wales; it offers the maximum possibility of extension. It could be extended without interfering with the lighting of the building. Even if there should be some at present undiscovered growth, we should be able to cope with it. The question whether we should have underground cables or adopt the overhead method, is one of economies. In the more densely settled parts of the network nothing but underground cables would be suitable. Aerial lines in sections where there are not more than 8 or 10 pairs of wires are required, as in the most economical. Especially is that the case in an area like Hurstville, where there is not very great density of population. There are some areas in Sydney in which it is economical to lay cable to individual houses; but where the settlement is not so dense, that would not be a payable proposition. Hurstville comes within that category. Where we can more conveniently give service with the underground method, we do so. There is a very considerable difference in the cost of the cable and the overhead method. You can take it as an approximation that if we can serve one telephone to each 60 foot frontage, or a little less than that, it would pay us to lay cables, especially if the development was reasonably rapid. But in cases where you have one telephone installed to-day and another in the distant future, it would not pay you. We lay G. I. piping. It is under the ground, and needs no special covering. You can put it in only pick deep, and gain entry to a subscriber's house much more cheaply than would be the case if you

erected poles. In those circumstances underground cable is entirely justified. In other parts, where the telephone density is not so great, it is not justified. The overhead method is more economical for Hurstville. We shall have a large quantity of cable down, because we desire to limit to 15 the number of pairs of aerial wires that go from any one point, and gradually peter out to none, when there should be another distribution point. Ultimately, the radius to be served by the exchange may reach three miles, but our main service will have a radius of one mile. The minimum figure relates to the area towards Kogarah and the maximum to the south western portion of the area. The district demands relief. The only way of providing service in a modern metropolitan telephone network is by the automatic system. The relief afforded to Kogarah will be that which is represented by 1,200 lines. That relief will take place in the area where the radius is lowest. From an efficiency point of view I consider that the proposed plan is the best that could be prepared. Tenders have been called for the plant. I have no doubt that whatever the plant is, it will be the best available. We shall not necessarily accept the lowest tender; our first consideration will be efficiency. The humidity in Sydney is so great as to render essential the installation of dehumidifying plants in automatic telephone exchanges. By their means we can maintain conditions that make for the efficient working of the apparatus in all circumstances. Without this plant the temperature indoors might reach to as high as 85° or 90°, and the humidity up to 90 per cent. Last February 12 months the humidity in the Sydney network, but particularly in Edgely, was over 90 per cent. for about 10 days and over 95 per cent. for more than 30 hours. It touched 99 per cent. more than once. The result was that the people were not getting a proper service. One effect of a high humidity is to put out of action our engaged signal. Therefore a subscriber cannot tell whether the number he is calling is engaged or not. This plant deals with the humidity efficiently. Electric trains and trams will not give us any leakage trouble and do not now give us noise trouble, although from the point of view of electrolysis, electric trains always present a danger to us.

48. *To Mr. Gregory.*—We expect to have 1,200 subscribers when the plant is in operation. I understand that the plants erected in the small exchanges in Brisbane are working satisfactorily, but I have no special knowledge on that subject. Hurstville will be a sub-exchange, not a satellite exchange. It will be staffed and its operation will not be different from the operation of the Dee Why exchange. The dimensions of this exchange would prevent its being operated as a satellite exchange. A satellite exchange is almost always unattended. You could not operate satisfactorily, unattended, an exchange with more than 1,000 lines. At Lakemba there is a day staff but no evening staff. There will be no evening staff at this exchange, although the operation of the air conditioning plant; it can be left unattended. I do not know of any occasion when the humidity has risen rapidly at night. Usually it rises rapidly in the morning. By the time the staff is going off duty at night the temperature as a rule has dropped, and after that the humidity is not likely to rise because the temperature of air inside the exchange is humidity would have dropped. In the process of conditioning the air we lower its temperature. If there were a certain volume of water in the atmosphere and its humidity was 90 per cent., it



would probably be lowered to 75 per cent. or 80 per cent. by raising the temperature 4° or 5°. That is the effect when night air enters a relatively warm exchange. This plant can be left unattended after 5 o'clock in the evening without causing the humidity inside the exchange to rise higher than 72 per cent. or 73 per cent. The lighting of this exchange will be chiefly through the roof. That is another alteration for which we are responsible. We are anxious to get the roof lighting continuously. This is the first exchange in which we shall really have got it. Trials that we carried out in Glebe satisfied us that roof lights can be made weather-tight. This plan provides for a hipped glass roof with a sectional lighting system over the top. There is no danger of moisture getting into the exchange. The lay-out provides for the lighting to go on continuously and in a very desirable way. We do not propose to make use of the north light because we wish to keep the heat in. We discussed with Mr. Murdoch the possibility of getting satisfactory skylights. There would be no immediate effect of the breaking of some of the windows by a hailstorm. A vertical hailstorm might penetrate the roof, but to give any trouble it would have to penetrate two sets of skylights that are not directly underneath one another. I do not think that any advantage would be gained by having fine wire netting above the glass. Of course if water got into the plant it would be a very serious matter. Care has been taken to avoid the entry of water to the exchange. It would be almost impossible for that eventuality to occur. The lighting will be excellent and there will not be much need of artificial light.

49. *To Senator Reid.*—Our severe storms come from the south-west. That is the side on which the lighting is placed. I would be prepared to wager that a hailstorm could not get through a wired glass skylight. The south-west side was chosen with a view to avoiding heat; it is on the dead side of the building. There will be a false ceiling between the skylights. There is no compression machine which will keep water or oil out of the pressure stream, and more harm is caused from the blowing in of water and oil than good is done by blowing off dust. That is the reason for our suggestion that this part of the equipment should not be included in the future. Only last week I received a letter stating that it would not be included in future specifications.

50. *To the Chairman.*—At Kogarah there are 3,304 lines and the maximum that can be accommodated is 3,600. It may appear that if there is a capacity for 3,600 you ought to put them in. From an operating point of view there are many reasons why you cannot. You cannot reissue an exchange number for some months after it has been given up. Therefore, although there may be capacity for 3,600 lines, you are almost full when you have connected 3,304. We always have to carry 150 or 200 lines which are of no value to us. At Hurstville the conditions are especially difficult because we have not the capacity in the underground plant to bring those lines in.

51. *To Mr. Long.*—The 1,200 lines that will be taken from Kogarah will quickly be taken up again.

*The witness withdrew.*

*The committee adjourned.*