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THE PARLIAMENT OF THE COMMONWEALTH OF AUSTRALIA

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PARLIAMENTARY STANDING COMMITTEE
ON PUBLIC WORKS.

REPORT

TOGETHER WITH

MINUTES OF EVIDENCE

RELATING TO THE PROPOSED ESTABLISHMENT OF AN

AUTOMATIC TELEPHONE EXCHANGE

AT

ARNCLIFFE, NEW SOUTH WALES.

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.
Hon. Henry Gregory, M.P.
Edward James Holloway, Esq., M.P.
William John Long, Esq., M.P.

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EXTRACT FROM THE VOTES AND PROCEEDINGS OF THE HOUSE OF REPRESENTATIVES, No. 4, DATED 26TH NOVEMBER, 1929.

8. PUBLIC WORKS COMMITTEE—REFERENCE OF WORK—ARNCLIFFE, 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 1913-1921*, the following proposed work be referred to the Parliamentary Standing Committee on Public Works for investigation and report :—Arncliffe, New South Wales—Establishment of Automatic Telephone Exchange.

Mr. Lyons having laid on the Table plans, &c., in connexion with the proposed work—
Debate ensued.

Question—put and passed.

LIST OF WITNESSES.

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Crawford, John Murray, Chief Engineer, Postmaster-General's Department	1
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Hill, Thomas, Director-General of Works	3
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AUTOMATIC TELEPHONE EXCHANGE, ARNCLIFFE, 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 Arncliffe, New South Wales, has the honour to report as follows:—

PROPOSAL.

1. The proposal submitted for the consideration of the Committee is to erect on a site which has been acquired at the corner of Bayview-street and Forest-road, Arncliffe, a modern exchange building, and install therein an automatic telephone switching system having an initial equipment for 1,700 subscribers' lines, and an ultimate capacity of approximately 4,400 subscribers' lines. It is proposed that the initial equipment shall be capable of extension to the ultimate capacity named, and thus enable requirements to be met in the proposed automatic exchange area for a period of approximately twenty years from the proposed date of opening. /2

REASON FOR THE PROPOSAL.

2. The area which will be served by the proposed exchange comprises the northern portion of the present Kogarah exchange area, which includes the populous and rapidly developing areas of Rockdale, Banksia, and Arncliffe, and a small portion of the adjacent Petersham exchange area, Earlwood.

It is represented that the exchange is necessary in order to meet the rapid developments in these areas which cannot be catered for in the future in the existing Kogarah exchange. It is stated that the installation of the proposed exchange will obviate unnecessarily high expenditure on external plant, and will enable the Department to provide a cheaper and more efficient service to subscribers in the extreme limits of the areas mentioned.

ESTIMATED COST.

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

	£
Site (already acquired)	700
Building	6,850
Air conditioning plant, &c.	2,900
Exchange equipment, including that necessary at other exchanges	30,606
Substation equipment	6,199
Line plant	13,800
Sundries	2,155
	63,210

and it is estimated that the new exchange will be opened for traffic by about April, 1931.

COMMITTEE'S INVESTIGATIONS.

4. The Committee visited the exchange at Kogarah, inspected the site for the proposed new building, and traversed portion of the area which would be served by the new automatic exchange. A careful scrutiny was made of the plans submitted, and evidence obtained from the Chief Engineer, Postmaster-General's Department, the Director-General of Works, and the Principal Designing Architect, Department of Works.

SITE.

5. The site, which was acquired by the Commonwealth for the sum of £700, forms portion of a garden adjacent to an old stone house, and is situated at the corner of Bayview-street and Forest-road, as near as practicable to the theoretical telephone centre. It has a frontage of approximately 67 feet to Forest-road, by a depth of about 201 feet along Bayview-street. It is almost level in character, with a slight fall to the eastern boundary. On the land are fifteen or sixteen trees, each about 25 feet high, which will be removed. The cost of clearing the site is estimated at approximately £20. The area is good building land, and, in the opinion of the Committee, eminently suitable for the purpose for which it is intended.

BUILDING.

6. The building proposed will cover an area of about 58 feet by 83 feet, and is to be of simple construction, two story in the front, and one story at the rear. The walls are to be of brick with steel beams, and the floors and staircases of reinforced concrete. Over the switch room the roof will be constructed of steel principals covered with galvanised iron and ceilings of fibro-cement sheets fixed to wooden bearers. Owing to the prominent position of the building, it is proposed to use terra-cotta tiles for the two-story portion forming the front of the building. In addition to the natural lighting, three skylights in the south-west side of the roof will give direct lighting through a similar number of fixed lights in the ceiling. The whole of the building is to have steel frame windows glazed with wired rolled plate glass. The elevations are designed in brick, with cement finishings, and, generally speaking, the building will be of plain design, and fire resisting.

7. The ground floor will contain an air-conditioning room 22 feet 7½ inches by 21 feet 4 inches; power room 28 feet by 21 feet 4 inches; and a switch room 50 feet by 53 feet. On the first floor there will be a staff room 21 feet 9 inches by 16 feet; locker room 11 feet by 11 feet 6 inches; a battery room 28 feet by 21 feet 9 inches, and a store 10 feet by 7 feet, together with the necessary lavatory accommodation. The height of the ceiling in the switch room will be 13 feet clear, while that of the ground and first floor ceilings in the front sections of the building will be 10 feet 6 inches.

It is estimated that the building can be erected in about eight months from the date of commencement.

8. Owing to the fact that the site is not rectangular, the plan submitted to the Committee showed the front of the building as placed not parallel to the building line, but with one corner on the street alinement and the other some twelve feet back from the street. In the opinion of the Committee, arrangements might with advantage be entered into with the local municipal council to utilize portion of this area for the purpose of rounding off the sharp corner at the intersection of Bayview-street, and Forest-road, thus improving the appearance of the building and avoiding a possible traffic danger. With this exception the Committee is satisfied that the building as designed will prove satisfactory.

MECHANICAL SERVICES.

9. The mechanical services proposed to be installed are as follow:—

	£
Heating and ventilating and de-humidifying plant	2,500
Vacuum cleaning plant	400
Total	<u>2,900</u>

The Committee agrees with the provision of the proposed air-conditioning plant, which is similar to those approved for other exchanges in New South Wales, and is represented by the telephone engineers to be necessary to ensure the efficient working of the equipment under the climatic conditions to be expected at Arncliffe.

The estimated annual running cost of this installation is approximately £565, made up as follows:—

	£
10 per cent. interest and depreciation on capital cost	250
Fuel for boiler	25
Electric power	<u>290</u>
	<u>565</u>

VACUUM CLEANING.

10. In the opinion of the Committee, the expenditure of £400 on the installation of a vacuum cleaning plant for a switch room 50 feet by 50 feet is high.

Investigations were made as to the possibility of reducing this item, and the Committee inspected a portable type of vacuum cleaner which the agents claim can adequately remove the dust from the switch room.

Although the Committee was impressed by what it saw of the possibilities of the cleaner, it can be ascertained only by experiment whether it would be completely effective under actual working conditions. It is therefore urged that full investigation in this direction be carried out prior to expenditure on a fixed installation, and, if the claims for the portable vacuum cleaner can be substantiated, the Committee recommends that it be provided and thus result in a saving on this service of probably £300.

11. The estimate of the building is a tentative one, based on the preliminary sketches, and allows for sewerage and water services, and electrical installation. These services present no difficulties, the necessary main sewers, electric light and water mains being in the adjacent streets. Fire appliances will be installed in accordance with the regulations governing these services as laid down by the Commonwealth Fire Board for all exchanges.

FINANCIAL ASPECT.

12. It was stated in evidence that the total annual charges for the proposed automatic telephone system as at the proposed date of cut-over, namely April, 1931, are estimated at £13,720
and five years later at 17,200

The estimated revenue as at April, 1931, is 14,930
and the estimated revenue five years later is 19,910

The assets thrown spare if the automatic system is installed in April, 1931, are estimated to have a recoverable value of £12,325

An amount of £11,355 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.

CANCELLATIONS OF TELEPHONES.

13. In the course of its investigations the Committee ascertained that during the past few months a number of telephone subscribers have cancelled their telephones, and there has been a reduction in the number of applications received for new telephones, especially in the metropolitan areas.

In the Kogarah and Petersham exchange areas, portion of which would be served by the proposed new Arncliffe exchange, cancellations during the six months ended 30th June, 1930, have exceeded applications for telephones by 41. Should this state of affairs continue, the necessity for a new exchange may not become urgent for some time. The Committee has received the assurance that the Postmaster-General's Department is carefully watching this aspect of the question with a view to avoiding the provision of any plant which may not be economically justified.

COMMITTEE'S RECOMMENDATION.

14. With this assurance the Committee is content; and while approving in principle of the establishment of the automatic telephone exchange at Arncliffe when the volume of business demands it, relies on the Department to postpone the actual installation of any plant until it is reasonably certain that the normal rate of telephone development in this area is resumed, and is likely to be maintained.

A. W. Lacey

A. W. LACEY,
Chairman.

Office of the Parliamentary Standing Committee on Public Works,
Parliament House, Canberra, 24th July, 1930.

MINUTES OF EVIDENCE.

(Taken at Canberra.)

WEDNESDAY, 14th MAY, 1930.

Present:

Mr. LACZY, Chairman;

Senator Reid

Mr. M. Cameron

Senator Sampson

Mr. Gregory.

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

1. To the Chairman.—The proposal before the committee is to erect a building on a site which has been acquired at the corner of Bayview-street and Forest-road; Arneliffe, and install therein an automatic telephone switching system having an initial equipment for 1,700 subscribers' lines, and an ultimate capacity of approximately 4,200 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 comprises the northern portion of the present Kogarah exchange area, which includes the populous and rapidly developing areas of Rockdale, Banksia and Arncliffe, and a small portion of the adjacent Petersham exchange area, Earlwood. The exchange is necessary in order to meet the rapid development in these areas, which cannot be catered for 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	0,850
Air conditioning plant, &c.	2,000
Exchange equipment, including that necessary at other exchanges	30,600
Substation equipment	6,100
Line plant	13,800
Sundries	2,155
	<u>63,210</u>

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

Average number of subscribers' lines connected during year ended 31st Dec., 1928, in the existing Kogarah area.	Actual total revenue received for year ended 31st December, 1928.	Estimated number of subscribers' lines in proposed Arncliffe area as at April, 1931 (date of opening).	Estimated annual revenue as at April, 1931 (date of opening).	Estimated number of subscribers' lines in proposed Arncliffe area as at April, 1935 (five year date).	Estimated annual revenue, as at April, 1935 (five year date).
2,605	£20,837	1,500	£14,930	2,000	£10,910

The proposed site is situated at the corner of Bayview-street and Forest-road, and is Commonwealth property. It has a frontage of approximately 68 feet to Forest-road, and a frontage of approximately 201 feet to Bayview-street, and is located as near as practicable to the telephone 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 1,700 subscribers' lines, but the building will be designed to accommodate equipment having a capacity of approximately 4,200 subscribers' lines. The following table shows the financial aspect of the project:—

Item.	As at April, 1931.	As at April, 1935.
1. Estimated capital cost—new	£3,210	£8,740
2. Estimated capital cost—new and in situ	120,980	154,010
3. Estimated annual working expenses of proposed automatic exchange	3,050	5,020
4. Estimated total annual charges for proposed automatic exchange	13,720	17,200
5. Annual revenue— Estimated as at April, 1931	14,030	
Estimated as at April, 1935		19,910
6. Assets recoverable or thrown spare if an automatic exchange is established on new site at April, 1931:—		
(i) Book value	23,680	
(ii) Recoverable value	12,325	
(iii) Cost of recovery	943	

Regarding item 6 of the foregoing statement, the difference between sub-items (i) and (ii), namely, £11,355, 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. I submit the following certificate by the acting accountant regarding actual and estimated annual revenue:—

REVENUE, PROPOSED AUTOMATIC TELEPHONE EXCHANGE, ARNCLIFFE.

(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 (or the latest date available):—

	£	s.	d.
Rents	13,860	8	10
Calls	10,683	11	7
Miscellaneous charges	1,008	3	4
Trunk line calls	1,195	1	0
Total	<u>26,837</u>	4	0

Average number of lines connected during the above-mentioned twelve months, 2,605.

Average revenue per line, £9 10s. 1d.

(b) Estimated annual revenue for the proposed Arncliffe Automatic Telephone Exchange area as at the proposed date of cut-over, i.e., April, 1931, and five years later:—

	Number of Lines.	Rents.	Calls.	Miscellaneous Charges.	Trunk Line Calls.	Total.
As at cut-over	1,500	£ 774	£ 5,941	£ 611	£ 605	£ 14,031
Five years later	2,000	10,288	7,922	816	887	19,903

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.

F. FINLAY,

Acting Accountant, Postmaster-General's Department.
Sydney, 25th March, 1929.

The map before the committee shows the Kogarah exchange area bounded by a blue line. That area is being divided into three parts; the Hurstville automatic exchange will serve the south-western portion; the Arncliffe exchange, the northern portion; and the

Kogarah manual exchange the remainder. The Arncliffe area has developed very rapidly, especially since the electrification of the railway, and a fair extent of land has been reclaimed in the vicinity of the Tempe River. It adjoins the Petersham and Canterbury areas; the latter has developed more rapidly than any other exchange district within my knowledge. The manual equipment of the Kogarah exchange has reached the limit of its useful life, and is very crowded. If it is relieved of the Hurstville and Arncliffe load, it will be able to continue for a time. The site chosen for the Arncliffe exchange is the nearest available to the telephonic centre. It was acquired by the superintending engineer, Sydney, through the survey branch of the Commonwealth Works Department. In urgency, this proposal ranks next to the North Sydney automatic exchange. As the building will be on a corner site, the lighting will be good. The front of the building will have two stories; the switchroom at the back will have only one story, but we are allowing for a 25-feet extension of the structure later, if necessary. In most of the automatic exchanges the fire risk is negligible. All the units are enclosed, and if a fire did break out probably only two or three would be affected before the flames were got under control.

2. *To Mr. M. Cameron.*—Manual exchanges in metropolitan areas are established now only where there are very few subscribers; later, even in those circumstances, we shall establish an automatic unit. We have surveyed the whole of the metropolitan area and divided it into areas which can be most economically and efficiently served by telephone. Upon this plotting we base our proposals for the conversion of existing exchanges and the establishment of new ones. We estimate that in from eight to ten years the whole of the metropolitan area will be converted to automatic. Every area is thoroughly examined by a survey officer, who obtains reliable information regarding its prospects and the nature of its probable development in the next twenty years. We have in Sydney a most efficient survey officer who has been engaged in this work for the last fifteen to twenty years. We are able to see how areas he surveyed seven or eight years ago have developed, and, in most instances, the accuracy of his forecast has been remarkable. The Arncliffe exchange is planned for twenty years' development, but if the limit of its capacity should be reached in fifteen years, the site will be sufficient to allow of an extension of the building.

3. *To Senator Reid.*—The site of the proposed Arncliffe exchange is not occupied by any buildings; it is portion of a garden that surrounded an old stone house which probably will be demolished very soon. At present, subscribers are being connected over long distances to the Kogarah exchange, and that means heavy line expenditure. The establishment of the new automatic exchange will nearly halve our line costs.

(Taken at Canberra.)

WEDNESDAY, 25TH JUNE, 1930.

Present:

Mr. LACEY, Chairman;

Senator Dooley	Mr. Curtin
Senator Reid	Mr. Gregory
Senator Sampson	Mr. Long

Edwin Hubert Henderson, Principal Designing Architect, Department of Works, sworn and examined.

4. *To the Chairman.*—I am aware of the proposal to establish an automatic telephone exchange at Arn-

cliffe, Sydney, New South Wales. Mr. Murdoch is responsible for the plans before the committee. The site is situated in an excellent position, on one of the main thoroughfares, and is bounded by Forest-road on the north, Bayview-street on the west, and by adjoining properties on the south and east. Vehicular traffic is to be provided for by right-of-way on the east. The dimensions of the various frontages are—north, 67 ft. 5½ in.; south, 66 ft. 4 in.; east, 163 ft. 10 in.; and west, 201 ft. 2 in., the total area of the site being approximately 13,193 square feet. The site is almost level, having a slight fall to the eastern boundary. There are fifteen or sixteen trees, each 25 feet or 30 feet high, which will be removed. The cost of clearing the site, which is good building land, will be approximately £20. The entrance staircase and air-conditioning and power-room are placed on the ground floor at the front, while the first floor will contain the battery-room, staff-room, lockers, storeroom, and lavatories. The general construction of the building will be of brick with steel beams, with the floors and staircases of reinforced concrete. The roof over the switch-room will be constructed of steel principles covered with corrugated iron. Ceilings will be of fibro-cement sheets fixed to wooden bearers. To assist the natural lighting three skylights are provided in the south-west side, giving direct lighting to a similar number of fixed lights in the ceiling. The sketches of the building were completed some time ago and do not show this lighting, which is now considered necessary. The roof over the two-storied structure is to have terra-cotta tiles to conform to the surrounding buildings, while it is proposed to erect an iron roof over the switch-room. Steel frame windows will be used throughout, glazed with wired rolled plate-glass. The design of the building has been carefully considered, and is similar in plan and elevation to the North Sydney automatic telephone exchange, upon which evidence was taken some weeks ago. It is proposed to install air-conditioning and dehumidifying plant at an estimated cost of £2,500, and a vacuum cleaning system at an estimated cost of £400. The plant will be similar to that described in detail to this committee in connexion with the Hurstville telephone exchange. The postal engineers consider that a full air-conditioning plant is necessary, as the location of the building is such that the telephone equipment must be protected against the humid atmosphere, particularly during the summer months. The estimated annual running cost of the installation is £565, made up as follows:—

Interest and depreciation on capital cost at	
10 per cent.	£250
Fuel for boiler	25
Electric power	200
	£665

The estimated cost of the building, £3,850, is a tentative one, based on the preliminary sketches, and it allows for sewerage, water services, and electrical installation. These services present no difficulties, the necessary main sewers, electric light and water mains being in the adjacent streets. Fire appliances will be in accordance with the regulations governing these services and as laid down by the Commonwealth Fire Board for all exchanges. A detailed estimate of the cost will be prepared on completion of the working drawings, and before the work is begun. The dimensions of the rooms are as follows:—Switch-room, 50 feet x 50 feet; air-conditioning room, 22 ft. 7½ in. x 21 ft. 4 in.; power-room, 28 feet x 21 ft. 4 in.; staff-room, 21 feet x 16 feet; battery-room, 28 feet x 21 ft. 9 in.; and locker-room, 11 feet x 11 ft. 6 in. The height of the ceiling in the switch-room will be 13 feet clear, while that of the ground and first-floor ceilings in the front section of the building will be 10 ft. 6 in. The building should take seven or eight months to complete after the work

is begun. I have seen the site. The position is good, and it is good building land. The building will cover an area of 56 feet frontage and 83 feet depth. I think that it would have been better had the frontage been parallel with the street. I am not responsible for the plans. Information could be obtained from Mr. Murdoch. The building could be placed back another half-dozen feet from the roadway. I do not think that the additional cost of cable connections would amount to very much if that were done. The exchange will be fenced by a paling fence along the side street. I am personally of the opinion that it would be an excellent idea to put the whole building back 10 or 12 feet, leaving a grass plot in front. That appears to me to be more desirable than to have the building come out on an angle. The vacant land in front is merely for beautification purposes. The site presents no difficulties with regard to drainage and sewerage service, nor are there any great fire risks associated with it. A full air-conditioning plant is considered necessary by the postal engineers, who decide that matter.

5. *To Senator Reid.*—If the plan were altered to have the building parallel with both street frontages the arrangement of the front would be changed; there would be a more acute angle. If the grass plot area in front were increased, it could be given to the municipal authorities to care for, or could be looked after by the Commonwealth. Such a re-arrangement of the plan would still leave 10 feet space at the side of the building. I believe that it would be preferable to put the building back. The building is parallel with Bayview-street. If it is left in the position proposed in the plan ample space will be left for storing plant at the rear, and if it were placed back another 10 feet it would make no material difference to the area available at the rear. As at present arranged there would be about 113 feet left for a yard. An additional 6 or 10 feet off that will not make much difference. If the council refused to take care of the grass plot, it would need very little attention from the Commonwealth authorities to keep it in order. I do not think that it would be left in an untidy, dilapidated condition.

6. *To Senator Sampson.*—It is a cheaper method to use iron roofing over the switch-room, employing tiles only for the section that faces the more important street. The iron would be painted to match the tiles; it is all a matter of cost.

7. *To Mr. Gregory.*—I believe that the usual height of the ceilings in switch-rooms is about 12 ft. 6 in. That was the case with the North Sydney exchange. An exception was made in the case of the Malvern exchange to meet special requirements there; 12 ft. 6 in. is the height specified by the Postal Department. I think that it would be better to have the building put back, say, another 6 feet. It would improve its appearance. In any case there would be a grass plot in front that would have to be cared for. It would cost about £30 to £40 to rail in the front area. The main entrance is in the centre of the front of the building. Machinery will be taken in through the back entrance. At the front there are swing doors to prevent the entry of dust. I submit a plan to the committee showing the front and side elevations. It will give a rough idea of the appearance of the finished building. I do not think that it is essential to have wired glass in the front portion of the building; that is purely a safeguard against fire. Naturally, the switch-room must be fully protected. The nearest building will be a cottage on the left, but it is fairly well back, and in addition there is the 10-feet dividing lane. The roof overhang will be ceiled. Fibre-cement or sheet iron will be employed for the purpose, so that in the event of fire on either side there would be no great risk of the roof catching alight. Tiles cost about £17 a thousand, or £4 10s. a square laid. The building will

be in brick, with ordinary concrete foundations. I do not think that any special reinforcement is needed. I have not heard of any letter coming from a Sydney firm offering to equip the building with a portable vacuum cleaner at a cost of about £40 to £60. It would go direct to the chief engineer.

8. *To Senator Dooley.*—There is a distance of about 11 feet from the corner of the building to the corner of Bayview-street. The space in front then runs to nothing, in a distance of about 57 feet, to Forest-road. I think that it would be an excellent idea to hand over the plot at the corner of Bayview-street and Forest-road with a view to its being rounded off. That would certainly improve the appearance of the place, and would give greater visibility rounding the corner. Possibly, too, the Council might compensate the Commonwealth for the resumption of the piece of land. I am opposed to buildings being placed on the corner of an intersection, as they obscure the view.

9. *To the Chairman.*—Negotiations for the transference of that piece of land could either be done direct by my department, or through the Sydney office.

(Taken at Canberra.)

THURSDAY, 3rd JULY, 1930.

Present:

Senator DOOLEY (in the chair);

Senator Reid	Mr. Gregory
Senator Sampson	Mr. Holloway
Mr. M. Cameron	Mr. Long.
Mr. Curbin	

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

10. *To the Chairman.*—I am aware of the proposal to establish an automatic telephone exchange at Arncliffe. The proposal does not involve any engineering difficulties or unusual types of construction. It is considered that eventually this exchange will cater for 5,000 subscribers, and in view of that, we propose to install what is known as the fixed system of vacuum cleaner. This system involves the installation of a 3 horse-power motor outside the exchange itself, and metal pipes around the skirting of the walls, with fittings for attachment of rubber hoses. The alternative system would be a portable vacuum cleaning plant, but we have come to the conclusion that such a plant is not suitable for exchanges of more than 3,000 subscribers. It has been found that the ordinary domestic type of vacuum cleaner is quite unsuitable for an exchange of any size. It is not powerful enough.

Vacuum cleaning is not cleaning by means of the vacuum in itself, but by means of the rush of a large volume of air at high velocity through the cleaning implement into the suction pipe, carrying with it the dust and other refuse with which it comes into contact. This rush of air is induced by the exhausting apparatus connected to the other end of the suction pipe. The vacuum required to be produced by the apparatus is simply that which is required for the different conditions of cleaning, such as carpets, linos, bare boards, or the displacement of dust from irregular surfaces, such as wires, &c.

Investigations carried out with the majority of the domestic type of vacuum cleaners on the market have so far proved that, owing to their limited power, they are inadequate in cleaning capacity to secure rapid and effective results over large areas of equipment, bunches of cables, &c. A permanent installation has the following additional advantages over a portable cleaner:—

1. Greater and more rapid cleaning capacity is secured.

2. All dust is deposited in a container adjacent to the plant, and outside the switch room.

3. Exhaust air is discharged into the outside atmosphere instead of into the switch room as is the case with a portable plant.

4. Comparative silence in operation.

Portable plants of the truck type, however, are being used in the smaller telephone exchanges of under 3,000 capacity, but the use of this type of machine in a larger exchange invariably filled with equipment, leaving only very narrow passages between, is impracticable, owing to the difficulty in moving the machine from one end of the room to the other. The plant proposed for Arncliffe Telephone Exchange would consist of a vacuum producer of the exhauster fan type direct coupled to an electric motor, a dust separator, and the necessary piping to connect the machine to hose points conveniently spaced in the switch room. The cleaning tools may be connected to hose points through suitable rubber hose. The whole of the vacuum producer, motor, dust separator, tools and hose would be of Australian manufacture. Rubber tools are provided for cleaning the delicate electrical telephone equipment. The fixed cleaning plant would not be unduly noisy; in fact, it would not be as noisy as the small plant. It has been found that the small motors, due to their high rate of revolution, are more noisy than the large ones. Besides the standard rubber hose and nozzle, we provide special rubber fittings which are attached to the hoses, and can be inserted amongst the equipment, so that all portions may be thoroughly cleaned.

One objection urged against fixed vacuum cleaners is that much of the power is lost by drawing the air through long lengths of piping. In the proposed Arncliffe exchange the greatest length of piping will be 110 feet, and the loss of vacuum from friction, will, over that distance, register not more than .34 of an inch on the mercury; that is practically negligible. The large fixed plant would be capable of exhausting about 100 cubic feet of air per minute, while the portable machine could exhaust only from 8 to 10 cubic feet per minute. Moreover, with the large plant we would employ 25-ft. lengths of 1½-inch hose, while 9-ft. hosing would be the maximum capacity of the portable machine. We are always on the lookout for a satisfactory portable plant, and we have given the inventors every opportunity of demonstrating the suitability of their products. Many machines have been tried out, but with only indifferent success. I can assure members of the committee that the department is anxious to hit upon some system of vacuum cleaning which will enable us to cut down costs. Periodically we test the market by inviting public tenders for the machines. Recently, in answer to an invitation for tenders, we received thirteen responses for a semi-portable machine. They were mostly American productions, but there were one or two Australian machines also. We are testing them out now, but so far we have found them to be not too effective. In many cases, in an effort to get the weight down, the manufacturers have run to very light sections and thickness of metal; consequently the machines break down under practical conditions. One portable plant, known as the "Invincible", which we have tested out, is priced at £79 10s. No duty was payable, because at the time it was imported it was not subject to a duty. I think a duty has been imposed since then. It was of the dry type, and weighed approximately 70 lb. We have installed one or two of those machines, but have experienced difficulty with the propellers. We have made many improvements with the fixed type of cleaner, and have now got it practically to a condition of perfection. We have no trouble at all

with that system, but we frequently have trouble with the lighter portable types. We have not been able to obtain a truck type of plant of Australian manufacture, or even an imported machine, which stands up to the work after a year or two. We have been able to reduce the cost of the fixed type of cleaner very considerably, due principally to the fact that we have been able to get the parts manufactured in quantity. The plant really consists only of a motor, fan, dust collector and piping. All parts of the plant are made in Australia, except the wrought iron piping, and we hope that when they start making such piping at Broken Hill, we shall be able to use Australian piping also. So far, Australian-made piping has not been available except in the smaller diameters suitable for electric wire conduits. The materials available in Australia are quite as good as can be obtained elsewhere.

It is true that in one exchange in Sydney trouble was experienced with ammonia fumes which constituted a danger to employees. That was one of the earliest exchanges equipped, and was in an old building in a congested area. The building was not erected specially for a telephone exchange, and it was found impossible to provide an outside engine room, so that the ammonia plant would be separate from the exchange itself. The trouble has now been remedied by cutting off the engine room entirely from the exchange, so that the fumes from the ammonia compressor cannot find their way into the exchange building. The Arncliffe exchange is to have a capacity of 1,700 subscribers to begin with, but it is intended later to increase that capacity to 5,000. I cannot say what proportion of the load now carried by the Petersham exchange will be taken over by the Arncliffe exchange. I am convinced that the fixed type of vacuum cleaner is necessary for the Arncliffe exchange, and the extra expenditure involved is justified. These exchanges, once established, grow very rapidly, and it is just as well to face the expense of installing a proper cleaning apparatus at the beginning. We have tried the portable cleaning plant in exchanges of this kind, and they have not given satisfaction. For one thing, the equipment in the exchanges is set so close together that there is barely sufficient room to operate a portable cleaner. The widest passages between blocks of equipment are only 3 feet, and the narrowest 2 feet.

I am aware that in the plans submitted to the committee the front of the building is not parallel to the street, and in view of that I think it would be a very good idea to set the building back, say 6 feet or 8 feet from the building line. I do not favour handing over the small triangular piece of land which would be left in front of the building to the municipality. It would be better, I think, for the department to keep control of it; but it could be made available in the municipality for footpath purposes, so as to round off the corner at the intersection of Bayview-street and Forest-road.

11. To Senator Reid.—We usually employ portable vacuum cleaning sets in exchanges with a capacity of 3,000 and under. Portable sets are unsuitable as a rule in exchange buildings of more than one story, as difficulty is experienced in getting them up and down stairs. The fixed sets are from three to four times as expensive as the portable sets, but they are much more powerful and efficient. With the fixed plant it is only necessary to insert the nozzle of the hose within one of the glass cases, and all the equipment is immediately cleaned. With the portable set the nozzle has to be poked in amongst the equipment, and the cleaning process is much longer. Moreover, it has been found that the presence of the portable machines in the narrow passages between blocks of equipment hinders

the mechanic's approach to the equipment to make adjustments or repairs. In the fixed type of plant all the material is Australian except the iron piping; we are endeavouring to use as much Australian material as possible, even on the portable machines. The portable machines are not covered by patents, and there is nothing to prevent the parts from being made by local manufacturers.

12. *To Mr. Long.*—The cleaning plant which we propose to install at Arncliffe is similar to that which has been tested out and used in other places with satisfactory results.

13. *To Mr. Holloway.*—The iron piping which we use in the fixed cleaning plant is of 2½ inch and 2 inch diameter, and is carried round the skirting of the walls of the exchange. It is connected with the power room outside, and fittings are attached to the pipes for joining up the rubber hoses. All our rubber hosing is made in Australia, as is also the special rubber tubing on the nozzles. With the imported portable machine the necessary gear is usually imported also.

(Taken at Sydney.)

SATURDAY, 5TH JULY, 1930.

Present:

Senator DOOLEY (in the Chair);

Senator Reid	Mr. Gregory
Senator Sampson	Mr. Holloway
Mr. M. Cameron	Mr. Long.

Charles Probyn-Smith, Sales Manager, Hoover (Aus.) Limited, Sydney, sworn and examined.

14. *To Senator Dooley.*—I am aware that this committee is inquiring into the establishment of an automatic telephone exchange at Arncliffe, New South Wales. My firm, in a letter to the committee, suggested that portable vacuum cleaners might with advantage be installed in automatic telephone exchanges constructed in future, in lieu of the built-in vacuum installation hitherto favored. My firm markets three different types of portable vacuum cleaners in Australia. They comprise a portable dust extracting machine, a new household model Hoover vacuum cleaner with a more powerful motor than was previously incorporated in such a machine, and the big model Hoover, which has a very powerful motor, and should be entirely suited for an automatic telephone exchange. I should like to demonstrate the three machines to the committee so that it may appreciate their various points. [Witness demonstrates machines]. The small portable model is to be recommended because of its remarkable portability. It has a ball-bearing motor of one quarter horse power which develops 6,500 revolutions a minute, and weighs only 10½ lb. The household model is also exceedingly light and it has a one-fifth horse-power motor. The big model has a quarter horse-power motor. I recommend the last named as entirely suited for the purpose that the committee has in view. A 50 x 50 ft. telephone switch room would present no difficulty to such a machine. Its price is £35 10s., complete with all outfit. It is manufactured in Canada and is similar to others supplied to His Majesty the King by special appointment. The company is entitled to use the Royal Warrant on its machines which is sufficient guarantee that our cleaners are Empire products. The machines may be converted into blowers, to dislodge dust from intricate parts. The dust is picked up from the floor and the more accessible portions of the

machinery by suction. The average term of life of a Hoover vacuum cleaner is from fourteen to twenty years. Some of our machines have been in use for sixteen years at Government House, Sydney, others have been in operation for fifteen years at Scott's Hotel, Melbourne. Mr. Watt, K.C., has had one of our vacuum cleaners for approximately fifteen years. The household model consumes approximately 1.3 amps an hour, which would cost about 4d. an hour at Sydney power prices. The large model consumes very little more power than that.

15. *To Senator Reid.*—Although I recently visited a Sydney automatic telephone exchange and examined the vacuum equipment installed, I have not yet had an opportunity to demonstrate a Hoover machine for the purpose. I should like to be given a chance to do so. The Hoover vacuum cleaner is perfectly insulated and its use would not impose any danger on to the operator. It has many advantages over the present built-in vacuum installations in exchanges. Because of its portability it would be easier to reach the various sections of the exchange and, if it were desired, the blower could be employed to dislodge the dust which could be in some instances be blown right out of the window. I understand that the fixed installation costs about £400 as against £35 10s. for the big Hoover. I suggest that it is a great advantage to have the machine nearer to the power point, as would be the case with a Hoover. A rubber nozzle could be affixed to the end of the Hoover vacuum tube to obviate any possibility of damage being done to the delicate machinery installed in an exchange. In addition the suction would be even greater because of the fact that the aperture of the nozzle would be made smaller.

16. *To Mr. Holloway.*—If it were considered inadvisable to agitate the dust with the blower as a preliminary step, the suction of the nozzle would be quite effective. It is not even necessary to place it in contact with the sections to be cleaned.

17. *To Mr. Long.*—As well as the places that I have mentioned, our machines have been installed in other places for very long periods. In the earlier Hoover models the agitation was done by means of brushes. It is now effected by means of a steel cylinder, augmented with brushes. That has cut down the wear on the brushes very appreciably. The agitator and brushes do not injure the nap of a carpet in any way, nor can it injure the most delicate fabric as I shall demonstrate. [Witness demonstrates operation of agitator on a piece of voile, and on a piece of woven fabric in which pieces of wool had been loosely inserted]. No suction machine will extract dust that was gummed to a surface by oil. The cost of operation that I have mentioned is based on actual demonstrative figures. The City Municipal Council of Sydney has rated the cost of running our household model at four hours for 1d. There would be very little difference in the operating costs of the large model. My firm keeps a complete stock of spare parts, and there would be no difficulty in that respect. From experience we find that it is rarely necessary to replace other than carbon and hair brushes, which wear in time. The carbon brushes have a life of about 2,000 working hours, which is a very lengthy term.

18. *To Mr. M. Cameron.*—Apart from the replacement of carbon and hair brushes on the old models that have been so long in use in Sydney and elsewhere I can recall only one other expenditure, that of 7s. 6d., incurred to service the electrical portion of an old Hoover. Australia does not manufacture any vacuum cleaner similar to the Hoover and our product is not a prohibited item under the new tariff. I do not think that there is any likelihood of a prohibition being enforced against it.

19. *To Mr. Gregory.*—My company desires to be granted permission to demonstrate the Hoover to the officials of the Telephone Department and to this committee, and I should be obliged if arrangements could be made to enable that to be done. I suggest that the committee, an electrical engineer of the department, and an independent private engineer should be present in order that a definite conclusion may be arrived at as to the effectiveness of the Hoover in cleaning an automatic exchange. The base of the

biggest machine is about 14 inches wide, and there would be ample room to manipulate it in an exchange without blocking the passage of operatives. Two additional lengths of rigid tubing would be needed in order to reach a 12-ft. roof, and their cost would be about 14s. each.

20. *To Senator Reid.*—The larger Hoover would be just as effective in a large as in a small automatic telephone exchange. It would be merely a matter of adding a few yards of flexible wire.