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PARLIAMENTARY STANDING COMMITTEE
ON PUBLIC WORKS.

Clerk of the Senate.

AUG 22 1929

REPORT

TOGETHER WITH

MINUTES OF EVIDENCE

RELATING TO THE PROPOSED

EXTENSION OF THE INSTALLATION
OF MAIL-HANDLING APPLIANCES

AT THE

GENERAL POST OFFICE, SYDNEY.

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MEMBERS OF THE PARLIAMENTARY STANDING COMMITTEE ON PUBLIC WORKS.
(Sixth Committee.)

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Senate.

Senator John Barnes,
Senator Herbert James Mockford Payne,
Senator Mathew Reid.

House of Representatives.

Percy Edmund Coleman, Esquire, M.P.
Josiah Francis, Esquire, M.P.
The Honorable Henry Gregory, M.P.
David Sydney Jackson, Esquire, M.P.
David Charles McGrath, Esquire, M.P.

EXTENSION OF INSTALLATION OF MAIL HANDLING
APPLIANCES, GENERAL POST OFFICE, SYDNEY.

REPORT

INDEX.

Report	3
Minutes of Evidence	9

VOTES AND PROCEEDINGS OF THE HOUSE OF REPRESENTATIVES, No. 16.

Dated 8th March, 1929.

4. PUBLIC WORKS COMMITTEE—REFERENCE OF WORK—EXTENSION OF MAIL-HANDLING APPLIANCES, SYDNEY GENERAL POST OFFICE.—Mr. Gibson (Minister for Works and Railways) moved, pursuant to notice, that, in accordance with the provisions of the Commonwealth Public Works Committee Act 1919-21, the following work be referred to the Parliamentary Standing Committee on Public Works for investigation and report, viz.:—Sydney General Post Office—Extension of the installation of Mail-Handling Appliances.

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

Debate ensued.

Question—put and passed.

LIST OF WITNESSES.

	PAGE
Brown, Harry Percy, Director-General, Posts and Telegraphs	9
Conolly, Harold William, Inspector, Central Staff, Postmaster-General's Department	14
Corbett, Arthur Brownlow, Superintendent of Mails, Sydney	21
Fleming, Thomas, Chief Mechanical Engineer, Department of Works	16
Gardner, John Coman, Inspector of Postal Services	24
Moss, Henry Percival, Chief Electrical Engineer, Department of Works	25

The Parliamentary Standing Committee on Public Works, to which the House of Representatives referred for investigation and report the question of the Extension of the Installation of Mail-Handling Appliances at the General Post Office, Sydney, has the honour to report as follows:—

INTRODUCTORY.

1. The Mail Branch of the Sydney General Post Office handles on an average about a million and a half articles per day. A rapid expansion is taking place in the volume of business transacted, and the rate of growth is said to be in the neighbourhood of 17 per cent. per annum. The existing premises at Central-square, near the railway station, which are the departmental head-quarters reserved for mail branch purposes, are reported to be inadequate to meet the growing demands; moreover, it is represented that they are not suitably situated to cater for the commercial needs of the city.

2. In 1921 the Parliamentary Standing Committee on Public Works approved of a proposal for the re-modelling of the Sydney General Post Office, the intention being that the main activities now undertaken at Central-square should be transferred to the new premises as soon as possible.

3. In August, 1926, the Postmaster-General's Department submitted a proposal for the expenditure of £41,000 on the installation, in the re-modelled building, of mechanical aids to expedite the transaction of business, to ensure the more economical handling of mail matter, and to eliminate, as far as practicable, what was regarded as a serious waste of human energy.

The Committee reported favorably on this scheme in October, 1926.

4. As the design developed it was realized by the Department that the estimate of £41,000 would be exceeded, and in October, 1927, a scheme was submitted for the re-consideration of the Committee at a revised estimate of £71,000.

It was explained that as a result of the preparation of detailed drawings and the invitation of tenders for the various parts of the equipment, it was found that the apparatus would be much more costly than was anticipated; furthermore, that a more intensive study of the statistics and careful observations of the volume of mail matter handled at peak periods pointed to the necessity for increasing the capacity of the plant to some extent.

On 30th November, 1927, the Committee again recommended that the scheme be proceeded with at the revised estimate of £71,000.

PRESENT PROPOSAL.

5. It is now represented that in view of a change in the system of sorting, and as a result of information obtained abroad, a re-arrangement and extension of equipment is essential, which will have the effect of increasing the cost of the installation by an additional £32,500.

DESCRIPTION OF THE EQUIPMENT.

6. Mail handling will be carried out on three floors, to and from which it will be necessary to transport the various classes of mail matter, and the equipment proposed will consist mainly of (a) lifts and elevators; (b) belt conveyors; and (c) sorting machines.

(a) LIFTS AND ELEVATORS.

7. Lifts and elevators are used in most large post offices, and may be regarded as indispensable for any system of mail handling where mails have to be conveyed to upper floors. Under the present proposal it is intended to install two small passenger lifts, two letter lifts, one 2½-ton mail lift, a series of inclined belts to convey loose mails from the posting slips to the third floor, and a Spencer type bag elevator for raising mail bags from the cart dock to the third floor.

The lifts and elevators will be electrically operated and the lifts will be automatically controlled.

(b) BELT CONVEYORS.

8. The belt conveyors will consist of flat rubber-coated canvas belts, some 24 inches and some 30 inches in width, carried on structural steel framing and supported at suitable intervals on ball-bearing rollers. These conveyors will be used for carrying the mail matter from place to place, and will largely supersede the present method of wheeling in hand-trucks or carrying in bags or baskets. Conveyors of the type proposed are frequently used in various industrial concerns, and are generally regarded as the most economical and expeditious way of transporting large quantities of small articles from one place to another. Their use is consequently by no means an experiment or a new departure, though the scheme under consideration probably utilizes them on a more extensive scale than usual.

(c) SORTING MACHINES.

9. The sorting machines are of metal, and comprise a series of inclined pigeon holes with doors at the back which can be mechanically opened and closed at pre-determined intervals. Conveyor belts running at a speed of 240 feet a minute are placed in a position to receive the contents of the pigeon holes when the doors are opened.

Some of the sorting machines have as many as 600 pigeon holes or bins. These are arranged in, say, 20 sections of 30 bins, each set being labelled exactly alike. All No. 1 doors open simultaneously and discharge the contents of the bins on to the moving belt, and, after remaining open for about twenty seconds, close simultaneously. About ten seconds later—in order to allow a space to occur on the belt between the end of one despatch and the beginning of the next—all No. 2 doors follow, and so on until the 20 sets of 30 bins have been cleared. This cycle is repeated as long as the machine is running, so that all the officials have to do is to place the articles in the correct bins—the machine attending to all clearing and conveying.

10. The belt conveys the material, in some cases hundreds of feet, passing from one belt to another, and where necessary down chutes to lower floors, until finally its load is met by a diverter which has set itself at an angle across the belt, and the load is swept off into another receptacle, where it will be again dealt with. When the last article has reached the diverter and been swept off, the diverter restores to the normal position, allowing the next batch of mail to proceed to some other diverter, where it will be swept off to another destination.

11. These diverters will be electro-pneumatically operated in synchronism with the opening of the doors which release the flow of the material from the sorting bins. One belt may carry 30 or more clearances for 30 or more separate destinations, each of which has its own diverter to clear its own material from the belt. No manual control is required, once the motor of the sorting machines has been started the doors open and shut, the diverters select their own material, and do not touch the material belonging to other destinations.

COMMITTEE'S INVESTIGATIONS.

12. The Committee visited the General Post Office, Melbourne, and witnessed the manual system of mail handling, saw at the Post Office, Elizabeth-street, Melbourne, the mechanical mail-handling appliances in operation there, and inspected, at the General Post Office, Sydney, the portion of the mechanical plant which has been constructed. An examination was made of a great number of plans explanatory of the scheme; evidence was taken from the Director-General of Posts and Telegraphs, engineers of the Works and Postal Departments, and the Superintendents of Mails, Sydney and Melbourne; and the Committee, by all means available, endeavoured to obtain a comprehensive grasp of the proposal.

13. It has been shown that in the General Post Office, Sydney, no less than 400,000,000 articles per annum are dealt with, and the separate processes of treatment number over 1,000,000,000. The weight of this volume of mail matter is in the vicinity of 16,000 tons, and the actual distance which is travelled by the staff in innumerable short walks moving it from bin to bin, from the time it enters the building until the time it leaves, is estimated at 150,000 miles per annum.

14. It was ascertained that the main objective of the various mechanical mail-handling appliances under consideration is not so much to speed up the rate of sorting by the individual, as to eliminate wasted human effort. Generally, those functions which require the mental effort of the sorter have been left to the sorter to do with the most convenient appliances possible, and those functions which require no mental effort and are irksome, monotonous, and uninteresting repetition work, will, as far as possible, be done by mechanical means.

15. It is also claimed, as advantages of the proposed installation, that it will enable the large influx of mail matter at peak periods to be more smoothly and expeditiously dealt with, and will considerably increase the possible business which can be dealt with per square foot of the existing building, thus enabling expensive accommodation to be more effectively utilized.

VARIATION IN ESTIMATES
SYSTEMS.

16. While aware from previous investigations, and the evidence then taken, of the main advantages claimed for the installation of mechanical mail-handling appliances, the Committee devoted itself to a consideration of the wide variation in the estimates of cost submitted in 1927 and under the present reference. These figures are:—

Item.	Previous Estimate.	Present Estimate.	Increase.
1. Lifts and elevators	£ 13,500	£ 18,500	£ 5,000
2. Conveyors	8,000	22,031	14,031
3. Sorting machines and posting slips clearing machines (including item 9—£840)	39,520	42,330	3,410
4. Overhead runways	230	1,630	1,310
5. Tables, platforms, bag racks, and automatic baggers	4,000	4,000	..
6. Mail chutes and weighing machine	1,460	1,720	260
7. Bag-cleaning machine	1,000	1,000	..
8. Letter sifting machine (deleted and replaced by extension of pillar postings table at similar cost)	100	100	..
9. Automatic travellers for primary machines	..	..	..
10. Seats for sorters	800	800	..
11. Tracks for trucks (new item)	..	660	660
12. Increase in electrical equipment	..	7,675	7,675
13. Contingencies	2,000	2,000	2,000
	70,870	103,016	32,346
Say	71,000	103,500	32,500

* Included in Item 3.

REASONS FOR INCREASED COST.

17. The explanations furnished as to the reasons for these increases were:—

(1) Lifts and Elevators.

This item includes:—

- two small passenger lifts,
- two letter-lifts,
- one mail lift, 2½ ton,
- one loose mail elevator from posting slips to third floor,
- one mail bag elevator from cart dock to third floor.

The original estimated cost of these was £13,500, and items (a), (b) and (c) have been completed at a total cost of approximately £9,000, leaving £4,500 for (d) and (e), which was considered sufficient. As a result, however, of investigations and inquiries made by the Director-General of Posts and Telegraphs while abroad last year, it was found that several postal administrations which had installed items on the lines of (d) and (e) found several disadvantages in their employment, and have recently discarded them in favour of improved apparatus. Profiting by this experience, then, it is proposed to provide in lieu of (d) a series of inclined belts, and in lieu of (e) a Spencer type of bag elevator, similar to one successfully used in the London Post Office. The estimated cost of these new appliances is £9,500 as against £4,500 provided for—being an increase of £5,000.

(2) Conveyors.

18. A recent decision arrived at to substitute an alphabetical system of sorting for the former geographical system, has necessitated a change in the routes over which the mails are to be conveyed, consequently the previous system of conveyors has had to be completely discarded and a new and more elaborate one substituted. In addition, the experience gained with the smaller mechanical system in operation in the Elizabeth-street Post Office, Melbourne, has indicated that better results are obtained with a wider type of belt, so that the previous standard of belts 18 inches wide has been altered to belts 24 inches wide, and in some cases 30 inches. This increase in width requires heavier supporting structures, more powerful drives, and larger diverters, adding substantially to the cost. The small storage hoppers attached to the sides of the conveyors have also been re-arranged and increased in size and number.

This has entailed an increase in the estimate for this work from £8,000 to £22,031—£14,031.

(3) Sorting Machines, &c.

19. The estimate for sorting machines and posting slips clearing machines, including item 9 of £340 for automatic travellers, was £39,520, the revised estimate is £42,930—an increase of £3,410.

The equipment included in this item is:—

	£
(a) Five second-class sorting machines	22,000
(b) Twelve letter primaries with travellers	9,700
(c) Opening tables	700
(d) Posting slips clearing machine	1,300
(e) Six face up machines	4,500
(f) Postmen's group sorter	1,000
(g) Cancelling and counting tables	300
(h) G.P.O. second-class cancelling tables	700
(i) Pillar postings, second-class cancelling	300 (plus £100 included in Item 8).
(j) Compressed-air plant and piping	1,630
Sundries	500
Total	42,930

The increase of £3,410 represents 8½ per cent. of the previous estimate, and, it was advanced in evidence that considering the nature of the plant, a closer estimate could not have been reasonably expected.

(4) Overhead Runways.

20. Under the original scheme it was intended to provide an overhead wire for the conveyance of letter trays on the ground, first, and second floors. Owing to the shape of the building, however, manufacturers of this class of equipment consider it impracticable to effect a satisfactory installation on the ground floor, and alternative offers were submitted for a belt type of conveyor which is claimed to be eminently suited for the work but much more costly. Under these circumstances it was decided to install a belt conveyor on the ground floor at a cost of £1,800, and to replace the conveyors on the first and second floors with tracks and trucks, as mentioned in Item 11, at a cost of £660. During the course of the Committee's investigations, however, the opinion was expressed that the use of trucks on the first and second floors would tend to congestion and confusion, and that an overhead wire conveyor would be more satisfactory. With this opinion the Committee is in agreement, and, as it was stated that the overhead runways could be erected with the funds already provided for, the Committee recommends that this be done.

(12) Electrical Equipment.

21. In order to carry out electrically the various functions required, special apparatus has in many cases had to be designed, due to the fact that the control and operations provided for are entirely new, no previous work of this character having been carried out in any part of the world. Under the original scheme it was estimated that these functions could be performed for £4,500, to which was added later an additional £3,425, transferred from the amount provided for certain mechanical operations when it was decided to do them electrically instead of mechanically—making a total of £7,925. Owing to the changes now contemplated in mechanical equipment—entailing an increase in the number of motors from 93 to 113; the increased use of automatic starters for the operation of motors in larger groups; and the considerable extension of the diverter and synchronizing system, an additional amount of £7,675 is now required, making the total cost of electrical equipment £15,600.

Expenditure and Commitments.

22. During the course of its investigations the Committee ascertained that under the authority given in 1927 the expenditure and commitments entered into up to 12th March, 1929, were:

Item.	Expenditure.	Commitments.	Total.
	£ s. d.	£ s. d.	£ s. d.
1. Lifts and elevators	9,033 16 0	3,197 8 0	17,231 4 0
2. Conveyors	829 5 0	1,169 5 9	1,998 10 9
3. Sorting machines, &c.	20,433 16 5	8,617 5 4	29,051 1 9
4. Overhead runways .. .. .	.. .. .	1,550 0 0	1,550 0 0
5. Tables, platforms, &c.	777 7 6	.. .. .	777 7 6
6. Mail-chutes and weighing machines	313 8 0	.. .. .	313 8 0
7. Electrical equipment	2,784 2 10	3,820 11 2	6,604 14 0
Contingencies	115 7 6	110 4 7	225 12 1
	34,287 3 3	23,464 14 10	57,751 18 1

Originality of the Scheme.

23. At the outset of its inquiries the Committee was inclined to take a grave view of the fact that there should have been such a wide variation in the estimates, but closer investigation showed that the officials concerned were labouring under considerable difficulty. It was explained that the undertaking is of an exceptional character, and there is an almost entire absence in this country of any previous experience in either the design or manufacture of plant of the nature required. During the progress of the designing of the plant, important alterations had to be made, and some pre-conceived ideas departed from: as knowledge and experience were gained from the small plant installed in Melbourne. Attention was directed to the fact that even in the foremost postal administrations of the world mail-handling equipment is passing through an evolutionary process, and the extent to which these facilities have been developed is extremely small. During the recent visit abroad of the Director-General of Posts and Telegraphs also, certain ideas were obtained which have helped in the development of the scheme under review, but in general it may be said that what is now proposed for Australia is in advance of anything attempted in any other part of the world.

This is a pioneering work, and the Committee is willing to agree that the magnitude complexity and originality of the enterprise may perhaps be accepted as an excuse for the lack of accuracy in attempting to forecast the ultimate expenditure involved.

24. The estimate of £103,500 covers the whole of the equipment required for the mechanical handling of mails, but it is claimed that all this sum would not be saved if the present manual system were retained, as obviously equipment of some kind would still be required.

The minimum amount of equipment said to be required for the manual system is:—

(1) Two small passenger lifts	£
Two letter lifts	9,000
One mail lift	As in item (1)
Supporting structures and enclosures .. .. .	.. .. .
(2) Spencer elevator as in item (1)—£4,600 plus £400 contingencies	5,000
(3) Inclined elevator, posting slips, and conveyor between posting slips and elevator	6,700
(4) Chutes and weighing machine	1,700
(5) Bag cleaning machine	1,000
(6) Tables and bag racks	3,000
(7) Seats for sorters	800
(8) Sorting presses in place of letter primaries	5,000
(9) Trucks	1,500
(10) Extra baskets	200
(11) Sorting presses in place of second-class machines	6,000
	39,900
Say	40,000

(NOTE.—If items 2 and 3 were omitted, three extra lifts would be required at a cost of £4,000 each = £12,000.)

Taking this £40,000 from £103,500, the actual increase in cost due to the introduction of mail handling would be £63,500.

25. Two sets of figures were submitted to the Committee to arrive at the amount which might be charged annually against each system. Taking the more conservative ones the comparison would be:—

Annual charges on mechanical system:—

	£
Interest at 5½ per cent. on £103,500	5,692
Depreciation at 10 per cent. on £103,500	10,350
Maintenance	2,500
Running costs	1,200
Total	19,742

Annual charges on manual system:—

	£
Interest at 5½ per cent. on £40,000	2,200
Depreciation at 10 per cent. on £40,000	4,000
Maintenance	300
Running costs	200
Total	6,700

so that the additional annual cost due to the installation of mechanical appliances is £19,742 — £6,700 = £13,042.

26. The savings which it is claimed would be effected by the use of mechanical mail-handling plant are claimed to be £16,276 per annum, and deducting from this figure the extra cost of £13,042 mentioned above, it may be shown that the net saving on the project is £2,234 per annum.

COMMITTEE'S DECISION.

27. After reviewing all the evidence received and taking into account the important service which the installation of mechanical appliances for the handling of mails entitles the public to expect; having regard also to the great importance of original work which Australia is doing with the object of finding the best means of dealing economically and expeditiously with large quantities of mail matter: and giving full consideration to the financial aspect of the scheme as now submitted, the Committee recommends that steps be taken to complete the installation at the total estimated cost of £103,500, as now projected, as early as possible.

M. Cameron
M. CAMERON,
Chairman.

Office of the Parliamentary Standing Committee on Public Works,
Parliament House, Canberra,
27th April, 1929.

MINUTES OF EVIDENCE.

(Taken at Canberra.)

FRIDAY, 15th MARCH, 1929.

Present:

Mr. M. CAMERON, Chairman;
Mr. J. FRANCIS
Senator Barnes
Senator Payne
Senator Reid
Mr. COLEMAN
Mr. Gregory
Mr. McGrath.

Harry Percy Brown, Director-General, Posts and Telegraphs, sworn and examined.

1. To the Chairman.—To some extent the suggestions that I have made are responsible for an increased amount being sought for the installation of mechanical mail-handling appliances at Sydney General Post Office. Many changes have been brought about as a result of investigations that have been made overseas and because of information that has come into our possession. In the first place, I should like to express my personal regret and that of the department at the fact that the estimates which were originally put forward have been so very greatly exceeded. We can only claim as an excuse the somewhat exceptional character of the undertaking, and the almost entire absence in this country of any previous experience in either the design or the manufacture of plant of that character. I should like also to emphasize the fact that throughout the progress of this work extreme caution has been exercised in order that during the process of evolution we might decide upon designs and plant that would give the very best possible results. On the last occasion when evidence was given before this committee, it was necessary to point out that there was a great disparity in the tenders which had been received for a portion of the plant. I think that that might be taken as an indication of the extreme difficulties to which our engineers were subjected in the very early days in forming estimates of plant that had not then been designed in detail. When the designs, quantities, specifications and all the details were known of the particular machines that were required, we invited tenders, and there were differences of over 100 per cent. in the quotations received. That will indicate to the Committee the extreme difficulty of determining the cost. In one particular case a portion of the work was let to a contractor at a cost of £8,800. That contractor fulfilled his obligations. He lost £4,000 over the deal, and went into liquidation. I mention these things to indicate how awkward it was for the engineers to reach a conclusion regarding the anticipated cost without having detailed data before them. Another point which I should like to emphasize is that wherever we found any evidence during the progress of the designing of this plant that any of our pre-conceived notions could be departed from with advantage, there was no hesitation in making that departure so as to ensure that we would get what was most suited to our purpose. We gained a great deal of knowledge from the installation of the comparatively small plant in Melbourne. We learned its weaknesses, and the directions in which definite improvements could be made. That knowledge and experience have been incorporated in the designs upon which the whole of the Sydney plant has been based. I should like to direct the attention of the Committee to the fact that even in the foremost postal administrations of the world mail-handling equipment is passing through an evolutionary process.

The extent to which these facilities have been developed is extremely small. It is surprising to one who makes a study of these matters in countries overseas, that are very progressive from the engineering stand-point, to find that they have not progressed further than the stage which they have reached. When I was abroad last year I was engaged on other important matters that occupied nearly the whole of my time, but, nevertheless, I had an opportunity to see the principal things which had been done in the United States of America, Great Britain and Germany. I had also the opportunity to consult with all of those men who have devoted their thought to the question of solving these problems. In Great Britain, which has done as much as any other country in an effort to evolve machinery suitable for postal purposes, they have appointed a committee of departmental officers, consisting of postal traffic men and engineers. They have also sought the co-operation of the more important engineering firms throughout Great Britain who know anything about machines for handling goods of all sorts, such as transportation and conveyor belt manufacturers. The post office people represent to them what the real problems are, and also permit them to inspect the mail rooms and investigate at first hand the difficulties that are encountered, in the hope that they will be able to submit ideas that will prove valuable. Much the same sort of thing is going on in Germany. The German post office officials have been studying these problems intensely, and have also sought the co-operation of some of the big firms in Berlin and other parts of Germany. I was privileged to visit one of the big factories where they have built up all sorts of experimental models with a view to solving certain problems in the handling of mails. Action along similar lines is being taken in the United States of America. I think it may be generally accepted that the stage which has been reached in the installation of appliances in mail rooms is restricted almost entirely to conveyors of one sort or another, the object being to minimize or to prevent altogether the carrying of mail matter from one point to another. The Committee is probably aware that we have gone much further than that. The people overseas with whom I had an opportunity to discuss matters were, it is needless to say, very deeply interested in some of the designs and ideas which are being incorporated in the Sydney plant, and are watching with very great interest the work that is being done there. One of the things which I should like to mention is that a very close relationship has been established between these administrations and ours. There is a continual interchange of ideas, which ought to prove valuable to both of us. One of the items of equipment which is being used a great deal in postal administrations is the bucket type of elevator. I had an opportunity to see it in operation in several places, and invariably the authorities were disappointed with the results that were being obtained. Bucket elevators were being used for two purposes:—(1) For the elevation of loose mail matter; and (2) for the elevation of bags of mail matter. I think it may be accepted that their use for loose mail matter has practically ceased to exist, and there will be no development on that basis if it can possibly be avoided. Also, wherever it can be avoided, the use of bucket elevators for the conveyance of bags of mail matter will be dispensed with. There are all sorts of difficulties with which one is confronted, such as stoppage of, and damage to, mail matter, blockage

of the machine, and things of that character. The solution of the problem is to be found in the use of moving belt elevators on an inclined plane. In the United States of America they have given much thought to this aspect of the matter, and have decided upon the limitations of the angle at which the elevators must rise for various purposes. Generally speaking, these are confined to angles of from 15 degrees to 30 degrees. Where you can get the space to run an elevator on an inclined plane, even though you make it in a number of sections, that is the solution of the matter. In the Sydney mail branch we have been able to provide for that space for the elevators that are required to take the letters from the posting-slips right up to the third floor, where distribution takes place. That is one direction in which we have been involved in some additional cost, because we have found it necessary to substitute a belt elevator for an earlier type of elevator that we had in mind. I do not mean that we actually did the work, and that now it has to be scrapped. Fortunately, we have not done any work of that nature. We were in possession of information concerning the inadvisability of proceeding with the bucket elevator before we had actually ordered any equipment. This is an illustration of the extreme caution that has been exercised by the engineers who have had the designing of the plant. There is an elevator which has to carry the bags of mail matter from the cart dock to the third floor. Unfortunately, in that case there is no space to put in an inclined belt. While I was in London I discussed this matter with numerous authorities, and, finally, had an opportunity of seeing the very large bucket elevator that is used on the London tube-railway system. It is perhaps the biggest thing of its kind in the world. They had very great trouble, and now have an elevator which was made by the Spencer Engineering Company, which is eliminating many of the weaknesses that were discovered in these elevators. We have determined that it would be a proper thing for us to use the elevator of the Spencer Engineering Company. That also entails a heavier cost. We have given a great deal of thought to the question of what is the most suitable method of separating papers, packets and letters, and also to the method of facing up, which means getting all the stamps in the one direction. In the early stages of this enterprise we considered the utilization of a special table that was being designed here for sorting out the different classes of mail matter. But there is a great diversity of items in mail matter, in regard to size, thickness and bulk generally, which makes the problem rather difficult to solve with a machine of that character. For example, there are papers which are no thicker than letters. You cannot sort on the basis of thickness, and keep the two classes absolutely separate. A little later I shall explain one of the reasons why we have abandoned the idea of using the sifting machine; it is the result of something I saw in London. Associated with this matter was a machine which we included in the original designs. It was a slot facing up machine that had been made and used in England some time previously. We were on a less copied and developed it in regard to design, for use in Sydney. The machine supplies letters to the sorter. He has in front of him a certain number of slots. We had in mind eight slots. The letters are faced up and broken up into a first subdivision of mail matter. They are then dropped through these slots and fall on edge on to a moving belt. The different slots are continued in channels along the belt. In London I had the opportunity to speak to the engineers who were responsible for the design of that equipment and who also had carried out all the experimental trials; and they had decided to abandon it. Certain difficulties were experienced, arising principally from the great differences in the mail matter that had to be handled. For example, you would

get window envelopes containing accounts, that were almost as thin as a piece of tissue paper. When they fell on to the belt they would probably not maintain an upright position, and might slip and cause a blockage of the system. Naturally, we have decided to drop the idea here. In London I also found that they had experimented with a facing-up table. The matter had really progressed beyond the experimental stage. On this table the letters are placed in such a way that they can be arranged with all the stamps in one direction, and distributed to the sorting presses. It struck me that this idea was likely to help us very materially. The designs were sent out here, and the engineers who were concerned with the Sydney equipment, had one made up and put in the existing sorting office in Sydney. It has been an unbounded success, and has proved one of the best things that we have used. The use of that table, adapted to meet our requirements, with an overhead feed for the letters that are brought in from outside sources, has solved our problem and enabled us to dispense with two machines about which we had some misgivings, and what subsequent experience showed would have caused very great trouble if we had continued to use them. One is the sifting machine, and the other the slot facing and breaking-up machine. This table, which is an adaptation of the British Post Office facing-up table, is one of the most simple pieces of mechanism—if you can call it such—that you could get. It is very robust and reliable. The method of working on it is expeditious, and it gives an absolute sub-division of mail matter. There is no chance of anything going in the wrong direction which would be the case with the sifting machine. Perhaps another cause of the numerous changes that have been found necessary in the layout, particularly of the equipment, is the introduction of what is known as the alphabetical system of sorting mail matter, in contradistinction to what has hitherto been the practice, the geographical basis of sorting. In the United States of America, Great Britain and Germany a great deal of thought has been given to this problem, and there can be no doubt that the treatment of mail matter is being greatly facilitated by breaking it up as far as possible on an alphabetical basis. We have introduced the system into the Sydney mail branch. It has caused a re-arrangement of the plant, and entailed a complete remodelling of the conveyor system, because we have had to abandon the original idea of sub-division on a geographical basis. Then, as the result of experience, particularly that gained in the use of the Melbourne plant, we have deemed it advisable, in fact, essential, to increase the width of the belts to be used in the conveyor systems. In the original designs we expected that, generally speaking, an 18-inch belt would suffice; but it has now been found necessary to increase the width to 24-inch, and in some cases to 30-inch. That may mean a little more than appears on the surface, because heavier and wider belts will entail an alteration in the supporting structures, and perhaps a little extra power to drive the belts. Another feature of the Melbourne plant from which most valuable information has been obtained, is the method of sorting, opening of the doors on the second-class sorting presses—the presses that are used for the sorting of packets, papers and mail matter of that character. The engineers have shown a great deal of ingenuity in this particular connexion. They have got out a mechanism which is very reliable and very robust, and which does away with certain of the drawbacks that were inherent in the use of the earlier type. I should like again to impress the Committee with what this problem has meant. We started from zero, and it is interesting to consider the stages of development through which we have passed. I think we are to be congratulated upon having had men who have given such intensive thought to the solving of these very difficult problems. One feature in the design of the plant

which is being used in Sydney is the extent to which diverters are used. They sweep across a moving belt and cause the mail matter which is coming along the belt to be deposited at a fixed point. These diverters are numerous, and are rather complicated pieces of mechanism, because of the synchronization which has to be introduced into the whole system so as to bring off the mail matter at its pre-determined point. I have not in my travels seen diverters in any other plant, and I think it may be taken for granted that the idea originated and has been developed here. The Melbourne plant had diverters which gave a certain amount of trouble. The success which was achieved from the outset in the design of these diverters has been remarkable. Nevertheless, our experience has shown us directions in which they can be improved, and the present type is really something to be proud of. We have now got, at some additional cost, what we believe to be a highly efficient type of diverter. I have explained that the belts are to be wider. That necessarily means that the diverters are to be larger than they were in the original scheme. We shall be fully recompensed for any additional cost, in the efficiency with which the plant will work, and, perhaps, in a lower amount for maintenance. The re-arrangement of the plant has necessitated an increase in the number of diverters from 33 to about 141. Another very important change is taking place in connexion with the second-class sorting machines. As you will see when you inspect those machines in Sydney and Melbourne, they are very big and very heavy. They have gone through a process of development since we started on our first design. The Melbourne equipment has been invaluable in another respect. The provision in that plant is for the mail matter to be distributed to the sorters by an overhead belt, on which there are deflectors. These deflectors throw the mail matter from the moving belt into scuttles, which, more or less, are over the heads of the sorters. In front of the sorter there is a trough to hold the mail matter which he has to sort into the bins. A device is provided whereby, when that is empty, the scuttle can be tipped on its hinge and shoot the mail matter into the trough. We have had certain difficulties in that direction, but the engineers have fortunately been able to find a way out. We believe that we shall eliminate those weaknesses, and very materially improve the facilities afforded. The mail handling plant in Melbourne has been remarkably successful considering the circumstances, but I believe the Sydney plant will be much better, for the reason that we have been able to make improvements in the light of our experience. Even if we had to scrap the Melbourne plant, it would have been profitable to do what we have done. The amount of money which we have spent in carrying out the experiment in Melbourne would not have been wasted, even if that plant had proved a comparative failure, because it has supplied postal engineers and traffic officers with valuable information and knowledge. The modifications that are being incorporated in the new designs provide for the mail matter to travel on a belt to the end of the machine, where there is a reservoir in the shape of a hopper, which can empty itself on either of the two sides on to a moving belt in a trough in front of two rows of sorters. Therefore, there is a continuous flow of mail matter in front of the sorters, and they have not to do anything to obtain supplies. That is exactly the same principle as has been adopted in the biggest parcel mail handling plant in the world, at Chicago. I had an opportunity of seeing that. They handle 2,000 tons of parcels a day, and the basic principle is that the parcels are sorted from a continuously moving belt. The sorters are stationed in front of the belt. They pick the parcels off that belt and sort them on to other moving belts. The difference is that ours is not a parcel machine, but one for breaking up second-class

mail matter. We think that these alterations will materially improve the efficiency and reliability of the plant, and substantially prolong the life of the equipment. The parts which need maintenance are much more accessible in the new equipment than in the old. The design is well adapted for quick repair and maintenance. I am quite certain that there will be no regrets at these changes having been made. So far as foresight and care can ensure it, if the plant is developed along the lines that are now being pursued, it may be expected to fulfil its functions admirably. Even so, however, I should not be prepared to venture the opinion that finally has been reached. As I pointed out earlier, the brains of all the postal administrations in the world are engaged on this problem, and it is inconceivable that improvements and better methods will not be evolved. We have to recognize that a start must be made somewhere. If the beginning promises to be profitable in comparison with the practice hitherto in vogue, we must have the courage to go ahead. We must also do our part in the development work that inevitably must be undertaken by the foremost postal administrations of the world. May I at this stage give some information concerning costs. At the present time we have authority to spend £71,000 on this plant. Unfortunately, we have found it necessary to ask the Committee to approve of an additional expenditure. This is the third occasion upon which we have come before the Committee. We now ask it to approve of a further expenditure of £39,500, which will bring the total estimated cost of the work to £110,500. These increases come under certain headings, and I shall give a summary of them. They are as follows:—

Lifts and elevators. The previous amount authorized was	13,500
That provision of our figures indicate that that item will cost	18,200
An increase of	5,000
Conveyors. The previous authorization was	8,000
The new estimate is	22,031
An increase of	14,031
Sorting machines and postal slip clearing machines. We are authorized to expend	38,680
The revised estimate shows the figure to be	42,000
An increase of	3,410
Overhead runways. These are really wire carriers for trays to shoot the tray from one position to another. It has been found almost impossible to develop that scheme, because the manufacturers are not prepared to do the work. We are using a belt conveyor. The original figure was	890
Our revised estimate is	1,810
An increase of	1,310
Clutches and automatic weighing devices. The amount authorized was	1,400
The revised figure is	1,720
The increase being	280
There is one item which was not provided for originally—tracks for trucks, or alternatively some form of overhead conveyor. We have not yet decided what it is to be, but whatever we use we say that the cost will be something in the neighborhood of	600
Contingent on all these changes that have been made, there is increased electrical work resulting from a larger number of motors; some more elaborate synchronizing gear, which entails switching equipment and wiring of a more extensive and complicated character than was anticipated originally. The cost of that part of the work is	7,263
Making a total increase of £32,340, or say	32,500

Where I have not made mention of any increase, the original figure stands. One naturally is very concerned to find that the pre-conceived notion we had of what was going to be entailed in carrying out this work has been shown by experience to be inaccurate and so wide of the mark. One wonders whether we should still be justified from an economic stand-point, in going ahead. We have, therefore, investigated the matter further, and I should like to indicate what the effect will be in regard to annual costs. I shall take

the original figure. By that I mean the amount which was authorized by the committee on the second occasion. At the moment I am comparing our position with what it was when the committee dealt with it on the last occasion. I am not going back to the original application, because that ground has already been covered. In the original statement of annual costs we made provision for an interest payment at the rate of 6 per cent. on £71,000, which amounted to £4,260. I do not know why we decided on 6 per cent., because we do not pay that rate of interest for our loan money. In the present instances I am taking the interest at the rate of 5½ per cent., which on £103,500 amounts to £5,692. Depreciation was originally put down at 10 per cent. On £71,000—the sum of £7,100. Depreciation, at the rate of 10 per cent. on £103,500, is £10,350. On the question of depreciation I should like to say that it is almost inconceivable that a plant of that nature, with all its motors, generators, and gear of one sort and another, should be written off as of no residual value, even if it had to be taken out, at the end of ten years. Therefore, the figure set down for depreciation was a very conservative estimate. I cannot imagine for a moment that it will not have a much longer life, and a greater realizable residual value when it has to be dispensed with, than is indicated by this figure. The maintenance on the old basis was estimated at £1,172. We estimate the cost of maintenance on the remodelled plant at £2,500. The power consumption and running costs on the original installation amounted to £500, and on the remodelled plant the estimate is £1,200. Adding those amounts, we find that the annual costs of the plant at the stage to which it was developed when we last came before the committee were £13,033; and under the new proposal they will be £19,742. When this matter was considered on the first occasion by the committee a figure of £15,276 was mentioned as being the saving that would be effected in labour costs alone on one section of the work. The committee was pleased to take that figure as a guide in considering the economics of the case. If we use the same figure—and there is no reason why we should depart from it, unless it be in the direction of increasing it—we find that the difference in the annual costs of the plant as now designed, and the saving to be effected in labour by its use, is £19,742, less £15,276, showing a loss of £4,466. That loss, however, is based on the assumption that the whole of the work which we propose to do with the machines—just the four walls of the room and no equipment inside them. I should like to bring to your notice the items of equipment which we would need, and the cost which would be incurred, if we had no intention of going on with the installation of mechanical equipment but proposed to continue on the existing basis. I shall give a summary of items which are the result of some investigation which has recently been made. It compares roughly with the statement that Mr. Corbett gave to the committee on the last occasion. The revised figures are a little less than his were. We should still need the lifts to convey the letters between the ground floor and the third floor, whether we introduced a mechanical scheme or not. There would have to be installed four small lifts for letters between the floors, as well as the 2½-ton goods lift which is there to-day. We estimate the cost of those at £5,800. We should need also a bucket elevator to take the mail bags from the cart dock to the third floor. The cost, we know, would be roughly £4,000. We should need the posting slips for the public to post their letters, and means for getting those letters upstairs—either by inclined belt elevators, or by the old-fashioned type of mail lift.

12

If we used the old type it would cost more than we propose—£7,500 as against £6,700. Then we should need chutes to take the bags from one floor to another, and a weighing machine such as we have incorporated in the new design. The latter could be put in or left out with equal advantage and with the same disabilities and drawbacks in either case. The cost of those items is £1,720. A bag-clearing machine would cost £1,000. That has no bearing on the question, no matter what system you use. Other items are: Postmen's setting-up tables and bag racks, £5,000; seats for sorters, £800; sorting presses, £1,500; trucks, which must be used for conveying the mail matter about the room if there are no belts to do it, £1,500; baskets and bins to hold the mail matter in order that it may be moved about from point to point, £200; second-class sorting presses of the old type, £6,000; contingencies, £652; a total of £40,000. When Mr. Corbett presented a similar statement to the committee, he made the figure £44,125. He may be more nearly right than the revised figure, but we have preferred to take the latter, although it is against our financial consideration. The annual charge on that sum would be as follows: Interest at 5½ per cent. would be £2,200. We have again adopted 10 per cent. for depreciation, which at that rate would amount to £4,000. I think the depreciation would possibly be higher on some of the items—such as trucks and baskets—which would be liable to damage. The maintenance cost would be £300; and the cost for running, power, &c., £200. Therefore, the annual charge would be £6,700. If we set against that sum the estimated loss of £4,466, the net saving on the revised mechanical appliances would seem to be £2,234. I think that reasonable reliance may be placed on those figures. Without taking into account the improved service which we are justly entitled to expect, and without having regard to the value of the great mass of original work which Australia is doing with the object of finding the best means of dealing economically and expeditiously with large quantities of mail matter, the scheme in its present form is economically sound and fully justified. I am naturally sorry that it has been necessary to embarrass the committee somewhat by seeking its support for so material a departure from the scheme to which it originally gave its approval. I can only hope that the magnitude, the complexity, and the originality of the enterprise may be accepted as our excuse for the shortcomings that are now manifest. We have striven very hard to make a success of this equipment. We believe that it will be a great asset to the Australian postal administration. We are particularly anxious not to mark time at this juncture and thus be prevented from getting the equipment into position before Christmas. The change which takes place in the volume of mail matter that has to be dealt with in the post office as Christmas approaches is so great, and the burden imposed on the staff and administrative officers so severe, that we could not contemplate an alteration of this character being carried out anywhere near the Christmas season. We believe that, if we are able to proceed without interruption, and everything runs smoothly, we may be able to change over about the end of August or early in September. I appeal to the committee, if they feel that they are able to support our proposal to spend this additional money and go ahead with the scheme, to help us by expediting their decision. I make the suggestion with all deference. I am aware that when the committee inquired into this matter on the last occasion it took evidence from Mr. Corbett, in the course of which he said—"I am quite satisfied now that there is no possibility of failure. The job will be entirely successful. . . . From what I have seen of the Melbourne plant in operation I should be quite prepared to guarantee that the Sydney plant will be

entirely satisfactory. . . . We have passed the experimental stage. I feel quite sure that we will not have to ask for any more money to complete the Sydney installation. . . . It is a dangerous thing in these matters to be absolutely positive in one's assertions. I do not see how either I or any other man could be. There is no reason why the present designs, if executed, should not give a very satisfactory result. I have already taken the precaution of reminding the committee that this problem is under intensive study all over the world. It might be that in six months' time some revolutionary idea might come along. If the experiments which are now being continued should be successful, we might find it desirable, in a year or two, to alter the method of sorting our letters. I know exactly what is happening. We have not reached the stage when it is possible to say that new ideas are not likely to be developed. If we follow the practice of the delaying action until we have what we consider is the best word, we shall never know and experience, I believe we shall be doing the right thing in going ahead to finality with the plans we have so far evolved. I could not commit myself to the statement that we shall not want to do something else at a later date. I am aware that, in 1926, it was anticipated that there would be a saving of £10,000 per annum in the handling of mails, and that that figure was reduced in 1927 to about £2,000. In arriving at the present figure of £2,234 we started off with the basic figure which was accepted originally as the saving which might reasonably be anticipated in labour costs. That was £15,000. There is nothing hidden in the figures that I have put before the committee. We have endeavoured to lay the whole of the facts before you for your judgment. I believe that the basis on which we have arrived at those conclusions is perfectly sound, simple and straightforward. The figures indicate, on a very conservative basis, the saving we might expect to make. My own feeling is that the financial effect should be infinitely better than is revealed by those figures. I have always made it a point to strive not to indicate the gross savings that can be effected, but to decide upon something which is quite beyond dispute. As a general practice it would be foolish to go to the limit in an endeavour to indicate how much money we might save. Accidents will happen. If we can show that the proposal is financially sound, and that we are warranted in going ahead with it, that is all that is necessary. The main thing is the expeditious handling of mail matter. So far as I know, we have obtained, or are in process of obtaining, about 50 per cent. of the whole installation. When the amount of £71,000 that has already been approved will have been spent depends upon the action of this committee. We cannot go ahead and order machines that will involve us in a total expenditure of more than £71,000 unless the committee is agreeable to our doing so. Therefore, if that approval is withheld we shall probably not reach the £71,000, because the effect would be to shut the job down. We should have to start afresh and see to what extent we could go back to the original idea of handling mail matter on a manual basis—which, of course, is inconceivable. The cost of preparing plans of particular works is not a direct charge against us. The Works and Railways Department charges an overhead figure for what it calls its administrative work. It is a definite percentage for the services which it renders to the post office; or, in other words, we pay a proportion of the cost of upkeep of the whole establishment, which is at our disposal for buildings and other works whenever the necessity arises. We have spent a certain amount in the manufacture of models. It must be in the region of £1,000. So far as it is humanly possible to judge, there is very little

likelihood of any appreciable variation in our present designs; but I do not want to be so emphatic as to say that that will not happen. Nobody could be. There has been a very comprehensive study to determine whether the General Post Office should be used for mail purposes, bearing in mind the distance of the General Post Office from the railway station. That was undertaken before I came here. The General Post Office from the building of the mail room then committed to the building of the mail room in the existing Sydney General Post Office. I had another investigation made, and it showed beyond all reasonable doubt that it was best to proceed with the sorting office in the General Post Office. A good many years ago a special committee investigated the question of having a postal clearing house near the railway station. It came to the conclusion that, under existing conditions, it would be more economical and expeditious to equip the General Post Office. If we were starting from zero I should not build a place like that in the heart of the city, and centralize all our activities there. A decentralization scheme, with some main depot to feed the outlying places, might be better than the present arrangements. It is inconceivable that the General Post Office will not be an extremely important mail handling point for many years to come. Even though we decentralize and have branch depots in various parts of Sydney, the General Post Office must inevitably be an extremely important centre, and such as to warrant the continued operation of the plant we are now installing. It is the policy of the department to have a number of mail-sorting branches in the cities. We commenced an investigation on that question four years ago, and we are gradually giving effect to the policy where there is justification for it. The provision of these branch offices will not appreciably reduce the amount of matter to be handled in the General Post Office. An enormous proportion of the total quantity of mail matter posted originates in the city area where you would not have branch offices.

2. To Mr. Gregory.—To a certain extent we have adopted the policy of starting this scheme in a small way. One of the most important and costly types of machine was installed in Brisbane. It operated successfully and has continued in service. Naturally I should always wish to take advantage of an opportunity to do a thing on a small scale and build it up; but there is this to be said against it: that machinery is only of value in the very big offices, where there is a heavy load. The heavier and more constant the load, the greater the benefit you get from a machine. That has been our real difficulty. When it has been reasonably possible to have certain processes tried out by machinery, we have adopted that course. In other words, we have made full-sized working models and tried them out before we have gone ahead with the final designs. Had we not done that, I do not think we would have got where we were before the Melbourne equipment was installed. That was the result of trials with full-sized models. The bucket elevator which was imported when the Melbourne General Post Office was built in Spencer-street was never utilized. It was more like a dredge than a postal machine. We are all liable to make mistakes, but we must have courage and show enterprise or we shall be in the backwaters for ever.

3. To Senator Reid.—We do not blindly design the plant as we think best, and put it in; we work very cautiously. Our extreme caution in this matter is revealed by the fact that we now want to make such revolutionary alterations. The department has been very careful in regard to the expenditure of money. All the models that have been built have been necessary for the purpose of experimenting. I am quite satisfied that the officers of the department have done their very best to curtail expenditure. We are fortunate in having had

14

such enthusiastic, keen and able men engaged on this problem. I believe we are ahead of others in our ideas. Our contribution towards the solving of the problem will be a very valuable one. I am perfectly satisfied that the expenses that have been incurred were justified. I should willingly incur a similar expenditure to achieve such valuable results, but knowing what I do now I would act differently from what I did three years ago. I have a very strong desire to ensure that there shall be no waste of public money, but that we shall conserve and use our resources to the greatest possible advantage. The plant has not yet been constructed; therefore, its success could not have been influenced by error. I do not think there is any evidence of wilful action towards the plant on the part of employees. Representations have been made to us by the president of the union in relation to the introduction of the system of alphabetical sorting, to which objection is taken. I have a feeling that, unfortunately, we are not getting the co-operation we might expect from the staff, quite apart from the introduction of machines. I do not think they are justified in their attitude. Only a very little part of the plant has been put in operation. I know of no trouble that has been caused to it by the employees. The contractor who has had to make and supply. Apparently he made a mistake in his tender. The department kept him strictly to his contract. If a man gets a job in competitive tendering that is the only thing to do, unless there are special circumstances which make the purchasing authority feel disposed to do something for him. It would be a dangerous practice to pay compensation in such a case. A contractor is a specialist in his particular line. He takes the risk of making a big profit, or occasionally a loss. It is on the balance of his endeavours that he keeps going. It was not the contractor who was experimenting. He was making equipment from detailed working drawings, specifications, and quantities. He failed in his estimation of the cost that would accrue in his particular organization, and in the facilities he had available for turning out the work.

4. To Mr. McGrath.—It is inevitable that when a new system is introduced there should be a tendency towards slowing down, even if you have the full co-operation of the staff from the start. I do not think that the department has had the co-operation it might have expected from the staff in connexion with the introduction of the alphabetical system. There is evidently a feeling of suspicion, judging from communications that have been sent by the union, that this system has been introduced with the sole purpose of minimizing the value of the services rendered by this staff. The staff considers that the occasion may arise when we may say—"This work is not to be highly skilled as it was when you got your classification, and, therefore, we have a right to reduce your pay." I do not know of any case in which that has been done. There have been cases of delay in handling mail matter, and some letters have been left over. We put off a large number of temporary com- ployees after the Christmas pressure was released. The alphabetical system will be used in conjunction with the manual system which is now proposed. There has been no delay in asking for approval of this additional expenditure. As soon as it was possible to get a survey of what the altered conditions would entail, the matter was brought forward. It has simply been a question of making up our mind as to what the cost would be, before presenting the case to the committee. None of the machinery that we have bought will have to be discarded.

5. To Senator Payne.—I do not think that any of the money we have spent will be wasted because of the revision of our plans.

(Taken at Melbourne.)

MONDAY, 25th MARCH, 1929.

PRESENT:

Mr. M. CAMERON, Chairman;

Senator Barnes
Senator Payne
Senator ReidMr. J. Francis
Mr. Jackson
Mr. McGrath.

Harold William Conolly, Inspector, Central Staff, Postmaster-General's Department, sworn and examined.

6. To the Chairman.—I have been acting as Superintendent of Mails, Melbourne, since 13th February last. I am aware of the proposal to install mechanical mail handling appliances in the General Post Office, Sydney. I had no part in installing the plant in use in Melbourne; that apparatus has been in operation since about September, 1927. It consists of a mail elevator, conveyor belts, second class sorting machines and conveyors to the private box-room on the ground floor of the adjacent building. The plant has worked in a generally satisfactory manner, and there have been no serious delays to my knowledge. The although there may have been minor troubles. The work has been done as efficiently by the machine as if it had been done manually, and it has always functioned satisfactorily at peak periods. I do not know what saving in time was anticipated when the installation was decided upon, but I can say that there has been no increase in staff in the city section since 1927, and comparing the figures for the year 1926-27 with those for 1927-28, the volume of mail matter handled had increased approximately 33 per cent. Based on statistics taken in November last, it is found that the daily volume of mail matter handled in the city section of the mail branch, Elizabeth-street, were 151,000 letters and 48,000 other articles. The "other articles" pass through the second class machines, however, which are intended for the private box-room are taken by means of conveyor belts to the sorting presses in the box-room. About 50,000 letters daily are conveyed to the box room and about 15,000 other articles. The remaining letters are cleared by hand-articles and taken to the postmen's tables. The second class matter is mechanically conveyed to the sorting position, and from that position conveyed by hand to the postmen's tables.

7. To Mr. Jackson.—Actually an unsealed letter is second class mail matter, but for this purpose we call it a letter.

8. To the Chairman.—I have not been brought into consultation in regard to the Sydney proposition, and know nothing definite about it. After my experience of the Melbourne installation I would say that the of the Melbourne installation. They have given hoppers are not in the way of tearing wrappers from papers, but I understand that Mr. Gardner has overcome that difficulty and has another system for Sydney. From what I have seen of the apparatus at Elizabeth-street, Melbourne, I should decidedly recommend the installation contemplated for Sydney. With them it is necessary for efficient working and expeditious transfer of mail matter within the section, and also within the mail branch. In a mail branch we are working against the clock the whole time, and under the manual system of handling there is too much movement of staff. At peak periods we have a large number of men moving about clearing the pigeon holes and transferring the mail matter to the final sorting positions, and eventually to the other sections. It is difficult to keep track of all these men at times, and it may be that a clearer after bringing his letters may

stop to have a few words with the final sorter—and two men are unnecessary. It may be only for a few minutes, but it is a busy mail room every minute counts. With a large number of men moving about supervision is difficult. With the manual system close supervision is necessary to ensure that all the pigeon holes are cleared, and no odd letters are overlooked by the clearing staff, with the mechanical system nothing can be left behind. Then, again, the conveyance of mail matter by belts to different points provides a better system of working, and we can get more order in the mail branch; this is very difficult under present circumstances. When you inspect the machines at Elizabeth-street, and see the manual operations at Elizabeth-street later, you will realize the difference in the two systems. Comparing the volume of mail matter handled in 1926-27 with that dealt with in 1927-28, there has been a 33 per cent. increase at Elizabeth-street, and approximately the same at Spencer-street. I do not know what the figures are for Sydney. The installation at Elizabeth-street has made the work easier for the employees, to an extent; it has done away with the clearing of mail of second class matter; reduced the distance which mail bags had to be carried within the section, and obviated the carrying of the mail matter over the top of the point. No employees have lost positions through the installation of mechanical handling. The cost of handling has been reduced, inasmuch as we handle our letters and second class matter more expeditiously; we also clear our overseas mails with greater facility. In my opinion the installation has meant an improved service to the public.

9. To Mr. Francis.—I may not appear to be very enthusiastic over the mechanical system, because I have not been in such close touch with it as was the late superintendent, and I can speak of it only as an observation made over a short period, but I will say that it has improved the system of working and is giving better service to the public. In connexion with manual handling I would like to say that in sorting into presses, unless you can make arrangements for the expeditious clearing, they become congested and slow up the operations. This machine overcomes that, because the pigeon holes are automatically cleared and the sorting staff can go on with its work uninterruptedly.

10. To Mr. McGrath.—I am not conversant with the details of the Sydney scheme. This system, I understand, differs very little from Melbourne, excepting that we have only a very small section of what is proposed for there. With us the first class matter is cleared by hand and conveyed by belts to the box room; that for postmen's delivery is cleared by hand and taken by postmen to the postmen's tables. From my knowledge of what has occurred in Melbourne I would recommend a system which would give us an improved method of working, as the indications are that this would. We have had sufficient experience in Melbourne to say that about Sydney.

11. To Senator Payne.—In my opinion the installation of the mechanical handling system in Melbourne has made the work easier, especially in regard to second class matter. Without the installation, there must have been an increase in staff. I would not say that the installation has led to an appreciable saving, but I do not know that I would look for a saving of money; it is a better system of working we want. An immediate saving may not be apparent, but we may make a saving in staff as the volume of mail increases over a period of years. With the mechanical installation, when men are not engaged on the machines, they can be employed on other duties. It does not necessarily follow that you get a saving of staff out of an installation, but I do not think we should look for it. In Sydney, with a big installation and a large staff, some saving may be

made. If I were a business man I would not consider that point if it were shown that mechanical equipment that meant greater efficiency without greater cost. With a regular increase in the volume of mail matter handled from year to year, the mechanical system of handling must show a saving in the long run. I think you would best arrive at the financial aspect if it is considered over a period of, say, twenty years.

12. To Mr. Francis.—The Melbourne machine has been in operation since September, 1927. I have not seen any complaints as to its destruction of mail matter. I would not see every complaint that was made, but if there were a substantial number I would hear of them. The apparatus in use here is large enough for the city section; we have never found the machine too small for the staff available for the work. The capacity of the machine is sufficient for the expeditious handling of the mail received, and under normal conditions we handle it expeditiously.

13. To Mr. Jackson.—Anything like a Christmas rush may put us behind half a day.

14. To Mr. Francis.—We generally have to resort to overtime to overcome congestions. You ask me whether the working of the machine is in any way detrimental to the men's health. I had a complaint the other day from the union that the dust from the chalking on the belts was causing trouble, and a recommendation has been forwarded for the installation of a couple of exhaust fans, although I have no knowledge of any of the staff having suffered any injury at all. From what I have heard of the plant intended for Sydney, and what I know of the appliances here, I should say it must make for greater efficiency, and should be installed in Sydney. I would not suggest any delay in the installation, or any further trials. I am not conversant with the estimated cost of the proposed installation, or the economic aspect, but I hold that mechanical mail handling gives greater efficiency and a better service to the public.

15. To Senator Reid.—I prefer the machine to manual handling because it is more efficient, and, taking everything into consideration, generally more reliable. It also enables the staff to be profitably employed. The conditions of mail branch work are peculiar; as the amount of mail to be dealt with varies considerably from day to day, but it must all be got rid of by a certain time. If the staff is not sufficient to deal with the mail at the peak period, we must increase it. Although these men may not be fully occupied at all times during the day, their services cannot be dispensed with. I am in favour of the machines because they increase efficiency, favour of a better system of working, and permit of better supervision of the staff. I should say that the Postal Department and the public get value for the capital sunk in the appliances in greater efficiency, quicker service, and, in the course of time, saving in staff as the volume and the cost of mail increases. The Melbourne system has been in operation nearly two years. In that time the volume of mail matter dealt with has increased approximately 33 per cent. If there had been no machines during that period we would have had to increase the staff. The machines have been able to deal with the increased turnover with the same number of men, and have not been working to full capacity excepting at peak periods. We could deal with a much greater volume of mail without increasing the staff if only we had the machines. Service due to dishonesty. The machines would provide a safeguard to a certain extent against that by clearing packets instead of having them cleared by hand.

16. To Mr. Jackson.—I do not know if anything could be used on the belts in place of chalk. It is the engineer's province to look after the equipment.

	£	s.	d.
Taking the estimated total saving in annual costs at £13,270 as before, the net annual saving in favour of the mechanical scheme is	15,276	0	0
Less	10,747	10	0
Total	4,508	10	0
Say	4,500	0	0

The change in the conveyor system is due in some measure to the introduction of the alphabetical system, but it is also largely due to the change in the system of breaking up the mails which was introduced by Mr. Brown on his return from abroad. The sinking fund of 5 per cent. on £103,500, will completely pay off the whole of the capital cost in about fourteen years, but the plant itself will not be obsolete after fourteen years' use. Although I have allowed a 5 per cent. sinking fund, it could easily be made 3½ per cent., because the plant should be good for twenty years. The sum of £3,000 per annum allowed for maintenance, should keep the plant in good working order, and at the end of twenty years it should be practically as serviceable as at the beginning of its life. Consequently, the estimated savings are on the conservative side. They could quite well be increased by another £1,000 or so. The net annual saving in favour of the mechanical scheme, £4,500, is not a stationary amount. That figure will gradually increase as the capital cost is reduced by the sinking fund, and by the time the capital cost has been covered it will have increased to about £11,000. The estimate of cost was prepared by me, and the statement I have read contains practically all the information I could give to the committee as to the reasons for the increased cost of the revised scheme. All the material alterations are mentioned in my statement. In 1927, the committee was supplied with a reasonably close estimate of the cost of the scheme as then proposed; but since that time, changes have been introduced which have added considerably to the cost. I do not consider that the previous scheme was taken up without sufficient thought being given to it. This is a pioneering work, and it is impossible to set up a plant of this description and say definitely in the first place that no alteration will be needed. I do not think that any money could have been saved if two years ago the department had called in the assistance of a first-class consulting engineer. He would have been in the same position as the rest of us. He would have had no knowledge of mail handling unless he had been a postal officer. Changes have been made in the system of handling mails, and that is the main reason for the extra cost. The only variation of the proposed plant that could be regarded as a big one is the alteration in the conveyor system. The first proposal has been discarded almost in its entirety, and consequently the previous estimate must go. You ask me how the plant that has been installed in the Sydney General Post Office originated. The early history of the matter is that Mr. Brown wanted to introduce some system of handling mails mechanically, and he deputed Mr. Corbett of his own department to draw up a scheme for the purpose. That was done, and our department was called upon to prepare the working plans and carry out the scheme. If we had engaged an expert consulting engineer I do not think it would have been of any advantage. The officers handling the matter were quite competent to do the work. An outside engineer would have been of no use unless he had a knowledge of postal requirements, and was able to criticize the scheme drawn up and submit an alternative one. I do not think such a man could have been obtained in Australia. If an engineer had been brought here from abroad he would have lacked a knowledge

of the local conditions so far as the handling of mails is concerned. The mechanical handling of mails has been under consideration since about 1924, and my department came into the matter in about 1926. I have not been able to obtain any information on it from outside. I am satisfied that the scheme as it now stands is advanced to such an extent that £103,500 will be sufficient to complete the work. We are within a few weeks of the completion of the working drawings. Of course, if further alterations are introduced, which I do not consider to be likely, those alterations would have to be separately considered. The capacity of the plant has been gone into by the postal officials. They have considered the probable annual increase in the volume of mails to be handled. They know the quantity of mail matter that this machine is capable of dealing with, and they are satisfied that the plant is of sufficient capacity to meet their requirements for about fifteen or sixteen years. By that time I think that some decentralization of mail handling will be required; therefore the plant now proposed will be sufficient to handle all the mails that can be dealt with in the present building. You ask if I am satisfied that the same thing will not happen in connexion with this estimate as occurred with regard to the two previous estimates. If Mr. Brown told us to-morrow that the proposed system would not suit him we should have to provide something else. If it cost less we should save money; and if it cost more, the expenditure would be greater. I am satisfied that this plant will do the work required and will be as satisfactory as any machines ever are. I am convinced that it will not cause trouble or hold-ups in the handling of mails.

18. To Mr. McGrath.—If we got a quick decision from the committee we could get the work done by the end of August to permit of occupation of the building by the end of the year. The general system of conveying the mails is new to the extent that we propose to convey them to several different destinations, but over one conveyor belt. We sweep the mail matter off the belt at a pre-determined point by the use of automatically controlled diverters. That method, I understand, is not in use elsewhere. Similarly the system of self-clearing sorting machines is not employed in other post offices. I am satisfied we have overcome the jamming of letters in the belting. When the plant was first installed we were not satisfied with the diverters, and we tried different types. One of those types worked satisfactorily. It has the inclined flap at an angle of 45 degrees. It has been tested for several months, and we know it to be satisfactory. Mr. Corbett was originally detailed to draw up a scheme for the mechanical handling of mails, but he has since been appointed superintendent of mails. Mr. Gardner has been appointed by the Postal Department to carry on his work in connexion with the mail-handling plant. I do not think that that alteration would have anything to do with the fact that the previous estimate of £41,000 was inadequate. If an assurance can be given that no further changes will be introduced I can say definitely that the present scheme can be completed for £103,500. I am not in a position to say what is the volume of mail matter passing through the Sydney General Post Office; I have to accept the figures of the Postal Department. I did not advise as to the general scheme; nor did I fix the routes the mails were to take. My work was simply to develop the scheme as suggested by the postal authorities and install it. The plant will no doubt have its small breakdowns, the same as any other machinery; but we are taking every safeguard against serious breakdowns. We are supplying a large number of spare parts, spare motors, and spare drives of every description, and I do not see how there could be any serious stoppage which would badly dislocate the

sorting. The items to which I have referred in my statement as commitments are liabilities entered into for plants for which payment has not been actually made. They may be regarded as items of expenditure.

19. To Senator Payne.—I have no reason to anticipate that any alteration will be suggested at this stage in the general lay-out of the plant. There will be very little opportunity for alteration. If the committee approve of the scheme we shall be definitely committed to practically the whole of the work in three or four weeks, and by that time the opportunity for any alteration will have passed. After the original estimate of £290 for overhead runways was obtained there was no alteration in the lay-out of the ground floor which affected this portion of the plant to any extent. An inquiry was made, and it was reasonable to assume that the Lamson people could have provided what was necessary. I consulted the agents here, and they thought there would be no difficulty; but when tenders were called the London office of the company expressed a different view from that of the agents, and did not advise the installation. I realize that 5 per cent. is a high figure for a sinking fund, but I am content to show that the scheme is financially sound on a conservative basis.

20. To Mr. J. Francis.—In most cases I had the actual cost of the material required for the sorting machines, so there is no danger of their proving more costly than was anticipated. Only in regard to the second-class machines could there be any mistake, and I am satisfied about their cost. There are no engineering firms in Australia who use machines capable of doing a similar type of work. These machines are quite new. Of course, ordinary conveyor belt systems because they use straight out conveyors for taking material from one point and delivering it at another, in which case none of the problems which we have had to face arise. Outside assistance would have been of no value to us. Our only trouble has been with the automatic diverter. Before calling in outside advice one would naturally consider whether it would be of any great assistance. Such advice could have shortened the time spent in completing the work if the consulting engineer had been an expert in it; but as the work was quite new no such expert was to be found. No new principle of engineering were involved. It is necessary to use a fair quantity of chalk on the belting when the plant is first put into operation, until the guides are well polished. I do not think that a fan is necessary. There will be no more trouble on account of dust with the mechanical system than with the manual system. If the dust nuisance becomes serious, the provision of mechanical ventilation of the building will have to be considered as a separate undertaking. I do not think that serious trouble is likely to be caused by dust. Ducts have been provided in the building to enable a ventilation scheme to be carried out if necessary. Such a scheme would be fairly costly. At the present time there is no indication that it will be found necessary. You have directed my attention to a paragraph in my statement indicating that the small storage-hoppers attached to the sides of the conveyors have been re-arranged and increased in size and numbers, and that these hoppers and diverters represent a considerable proportion of the conveyor costs. I am satisfied that the provision now made under the amended scheme will meet the requirements of the department. As an engineer I can only say how much each of these hoppers will hold. It is for the Postal Department to say whether they are sufficient to deal with the volume of mail matter to be handled. I am not a postal expert, but I can say that the storage space provided at the Sydney General Post Office is regarded

by the postal officials as satisfactory. You draw my attention to the following paragraph in my statement—

Tenders were invited for the ground-floor conveyor, and no offers were received, manufacturers of this class of equipment considering that the number of turns necessary to clear building obstructions rendered the scheme impracticable.

We have had no problems of that nature with regard to the new plant that rendered it desirable to call in outside advice. No time could have been saved by doing so. The manufacturers of the plant were best able to express an opinion, but unfortunately they have only agents in Australia. I asked the local representatives of Lamson if they could put in wire conveyors, and they said they could. I drew up a specification and plan showing what was required, called tenders, and gave them sufficient time to refer the matter to their head-quarters in Europe or America. Word came back that they could not undertake the wire system. They suggested a belt, and that is the reason for the difference in the cost. I think we could get a wire system that would do the work, but we must have some means of conveying the mails overhead. A belt is the safe and sure way. Our original proposal to put in a wire was made solely for the purpose of keeping down the cost. You refer me to the statement in my report that if an inexpensive type of overhead runway can be obtained it will be installed on the first and second floors in preference to the floor tracks. The revised scheme was only decided upon immediately before the Christmas holidays. We have been working on the conveyors and we have not had a chance to settle details such as the type of runways to be installed on the first and second floors. We know that trucks would be satisfactory, but if on investigation we find that a wire can be used we shall put it in. There is nobody in Australia from whom we could obtain reliable advice on this matter. You ask me whether any plant or equipment will have to be discarded entirely owing to the change-over to the alphabetical system. I pointed out in my report that the item of £777 7s. 6d. represents the cost of sorting presses and tables suitable for the alphabetical system which it was found necessary to install temporarily in Central-square Post Office for the purpose of testing that system. It may be possible to incorporate some of that material in the new plant. I should need to spend two or three years in the mail handling before I could say whether it would be possible to submit a better scheme than that now under the consideration of the committee. I could not suggest a better route for the mails through the Sydney General Post Office than that now proposed. I shall certainly not ask for an alteration of the route, but I cannot say what is in the mind of the Postal Department.

21. To Senator Reid.—It was pointed out to the committee on its previous investigation that when the estimate of £41,000 was prepared very little had been done in the designing of sorting machines. The present estimate shows an increase in cost of a little less than 8½ per cent. on the previous estimate. If an estimate is within 10 per cent. of the cost of a new class of work, I should say it is a fair one. The scheme was altered because the Director of Posts and Telegraphs asked us to delay action on the conveyor system until he had investigated some change he desired to make in regard to the breaking up of the mails and the adoption of the alphabetical system. That is responsible for the radical change in the system of conveyors. When we first started the Sydney scheme we had to stop it for a time and put in the plant in Melbourne, and the experience of the work in Melbourne has shown us the weak points of the lines on which we have been working. We have eliminated those weaknesses in the

Sydney plant. The only loss has been in time, and that has been compensated for by the increased advantages gained. The suggestions from the Postal Department did not involve changes in the design of the machinery so much as changes in the methods of handling mails, and these have meant alterations in the equipment. They made one alteration in connexion with the facing-up machines. Mr. Brown says something abroad which I think is a great improvement on what we contemplated putting in. It is a decidedly good alteration from a mechanical point of view. If I noticed that improvements could be made I should undoubtedly suggest their adoption; as a matter of fact, I have suggested quite a number of improvements in matters of detail, in order to improve the reliability of the plant. As we have progressed with the work we have eliminated all the weaknesses that we could detect. I know of nobody outside the Postal Department whom I could call a postal engineer. No advice of value concerning this work could have been obtained outside. If it had been available I should have welcomed it. It was entirely a matter of handling postal material, and the cleverest engineer in the world would have had to obtain knowledge on that subject by experience, just as we have had to do. There is no Government department to which I could have referred the matter of the conveyors for experiment.

22. *To Mr. Gregory.*—In my opinion, no great advantage would have been gained if in 1926 a consulting engineer of high qualifications such as Sir George Julius had been called upon to give his advice on the proposal. He would have had to study the problem from the beginning. From the electrical standpoint no trouble has been experienced with the plant. We have been able to open and close the diverters without trouble. The difficulty has been to get a diverter which would not allow any part of the mail matter to pass underneath it. This could only be done by experiment. You ask me whether in launching a new scheme it is not always advantageous to secure outside advice. Of course, two heads are often better than one, and I realize that Sir George Julius is a highly-skilled engineer. If any big mathematical problem had been involved, I should have welcomed his assistance; but as no such problems arose he would have been in the hands of the Postmaster-General's Department, just as I was, so far as its requirements were concerned. His qualifications as an engineer would not have enabled him to say that the sorting could be done in a different way from that in which the postal authorities wished to do it. You refer me to the paragraph in my statement setting out that tenders were invited for the ground floor conveyor and no offers were received, manufacturers of this class of equipment considering that the number of turns necessary to clear building obstructions rendered the scheme impracticable. In my opinion, that does not show that the advice of a consulting engineer might have been very valuable. We have had no trouble in providing for the synchronizing of the operations, and I do not think that there is any chance of that part of the work getting out of order. Of course, you may have a short circuit at any time, or the insulation may break down, but beyond that there is no more tendency for this work to get out of gear than any other electrical system. I anticipate no difficulty with regard to the angles of the turns to be taken by the rubber conveyors. The awkward shape of the building has been one of our difficulties, and the conveyors have been arranged to meet this condition. It is desirable that there should be collaboration between the Postal Department and the Works Department when the erection of new buildings is contemplated. For mail sorting, I should prefer a large square two-storied building with no architectural pretensions; but the difficulty in a city, such as Sydney,

is to obtain a suitable site at a reasonable cost. If the sorting could be done away from the centre of the city where a large site could be obtained at a reasonable figure many of the problems could be solved. I am satisfied that for every pound spent so far in connexion with this scheme full value has been obtained. Rubber belting is the cheapest that can be purchased. The introduction of the alphabetical system of sorting does not affect the type of the plant; it affects the conveyors more than anything else. It has meant a complete change in the routing of the mails. There was no problem involved; we merely had to alter the routes and introduce additional conveyors. For about one-fourth of the length and on one side of the large second-class machine in Sydney the space is restricted, and the light is not altogether satisfactory; but that machine will be fully manned only for a short period in each day, and at other times the dark corner can be left unoccupied. I think that the estimated saving in manual labour by the adoption of mechanical handling is based on the quantity of mail matter handled at the present time. If there is a saving of £4,500 shortly after the installation of the new plant, the saving should increase annually as the capital cost is gradually wiped out and the volume of mail matter increases. In fifteen or twenty years the Sydney Post Office should reach saturation point, irrespective of the type of plant employed. The machinery will not be noiseless, but it will not make as much noise as comes from the belt now used at the Sydney General Post Office. We are employing worm reduction gearing. The drives will be similar to those on the big belt elevator at Spencer-street.

23. *To Mr. Coleman.*—It will not be necessary to secure the equipment that has already been installed. I have already referred to the purchase of furniture costing about £770 suitable for use in connexion with the alphabetical system. If that system were abandoned and the district system reverted to, I cannot say with certainty that it would be suitable for use in connexion with the manual system; but, apart from that, all the plant on which we have spent money is required for the new system. We have obtained definite prices for the sorting machines, and also for practically all the material required for the construction of the second-class sorting machines. We have not spent much on the conveyors, but we have prices for the component parts. We know the price of belting, and we have purchased enough to know the cost of the supporting structures and the diverters. From those particulars we have compiled our estimates. You ask me whether there is likely to be a considerable reduction in staff when the new plant is in full operation. You cannot effect a saving in working expenses without a saving in staff. Any surplus men would probably be employed in other directions. The annual wastage in the department due to retirements, dismissals and resignations is such that if new appointments were not made for twelve months or so positions could probably be found for all the surplus men.

24. *To Mr. Jackson.*—The capacity of the plant now suggested has been increased, but one reason for the increase in the estimate is the wider conveyor belts that have been provided to ensure better work and eliminate the faults found with the small plant of which we have already had experience. We have also changed the type of diverter used. The main factor in the increased cost is the change in the system of handling and breaking up the mails. I think that the original estimate of £41,000 was too low. We had not then visualized the full extent of the scheme; but the previous estimate of £71,000 for the scheme as it then stood was a reasonable one. There was no plant that we could have copied; it was entirely new. As you go on making the plant you discover improvements

that can be embodied. In Sydney, we have had to work on the building already erected. It would be a different proposition if we could design the plant and then erect a building to suit it. Under those conditions, the cost of the plant would be considerably reduced. The proposed plant will be wholly of Australian manufacture. A certain quantity of the raw material to be used will come from abroad, but it is all British. The policy of the department is to give first preference to goods of Australian manufacture, and second preference to British goods. The ball bearings and the D.C. motors are British; they are not made in Australia.

25. *To the Chairman.*—You direct my attention to the fact that in the 1926 estimate, the interest charged was set down at 6 per cent., and the depreciation of conveyor belts at 20 per cent., and of other parts at 7 per cent.; while in the 1927 estimate the interest was still 6 per cent., but 10 per cent. was allowed for depreciation, and on the present occasion the interest charged is 5½ per cent. You ask me the reason for those alterations. When we launched the scheme I was a little doubtful as to the life of the conveyor belts. I allowed a life of four or five years; but from inquiries I have made, I find that there are conveyor belts working in American post-offices that have been running for twenty years and are still in good condition. I think that a life of fifteen years is not too much to allow. The figures originally submitted for depreciation on conveyor belts were extremely conservative. The alterations are due to our further inquiries and the knowledge we have acquired; but the figures now submitted are still on a conservative basis. If it were necessary to show a greater saving than has been indicated it could be sensibly done by reducing the sinking fund allowance from 6 per cent. to 3½ per cent.

26. *To Senator Baxendale.*—The scheme for the mechanical handling of mails originated in Australia.

Arthur Brownlow Corbett, Superintendent of Mails, Sydney, sworn and examined.

27. *To the Chairman.*—I have occupied my present position for about fifteen months. Although I am not taking an active part in connexion with the installation of mechanical mail-handling appliances at the Sydney General Post Office, I am still in close touch with the work. I was instructed, as engineer, to make a study of postal requirements in order to devise a scheme for the mechanical handling of the mails, and I was engaged on that work from about 1924 until the matter was first placed before the committee in September, 1926. The proposal was initiated in 1924. It was estimated at that time that the work could be done for about £41,000. In 1927, the estimate was increased to £71,000 after the plans had been partly drawn and further developed. It was explained when the proposal was first put forward, that the department had no detailed drawings. Having no approval for the work, no money was available for drawings. After the committee had approved the scheme, and working drawings had been put in hand, it was found that the cost would be very much greater than £41,000. Before we incurred any large expenditure, we told the committee quite frankly that the original estimate was too low. At that time I was of the opinion that the second estimate would prove approximately correct; but even at that time we had not completed the drawings, and we were not aware that certain changes would be made that have since been introduced. If we had gone on with the proposal as it stood when we came to the committee the second time we should have been able to complete the work for about £70,000; but since that time, further experiments have been made with the

Melbourne plant which has shown us weaknesses. Although this has added to the cost, we thought it desirable to improve the plant so as to get the greatest possible use out of it. For instance, one of the biggest items in the increased expenditure is due to the decision to use belts 24 inches wide throughout, instead of 18 inches. We found in Melbourne that a certain number of articles had the wrappers torn through congestion on an 18-in. belt; and it was shown in practice that less damage occurred with the 24-in. belt. We decided then to use 24-in. belting throughout; but that decision had not been reached when we came to the committee the second time. When the estimate of £71,000 was submitted, we had obtained information as to the practice in the United States of America and Great Britain; but no officer from Australia was sent abroad. Looking back, I am of the opinion that if a mistake was made, it was in not sending abroad a postal officer or an engineer, or an officer possessing the qualifications of both, so as to study on the spot, the details which we have found out ourselves by experiment. The question of whether we should have consulted an outside engineer was raised three years ago when I was witness before the committee. I said then, and still think, that nothing would have been gained by obtaining the services of a consulting engineer. The Lamson Company in America are the largest manufacturers of mail-handling machinery in the world. They have done a great deal of developmental work in the United States of America, running into much larger sums than we are now proposing to spend. In 1919, this company was asked to provide plans for mail-handling equipment for Melbourne, and those plans are now available in our central office. They were drawn up by American engineers who had had experience of the work in America, and I say quite seriously that those plans were a joke so far as mail-handling conditions in Melbourne were concerned. Owing to a lack of knowledge of the local conditions, the scheme put forward was unworkable, and the plans were never seriously considered. At that time, a mail conveyor proposed by I lay in the basement for years, and was sold as old iron, because as soon as it arrived here, it was seen to be useless for our requirements. It cost several thousand pounds. That is the result of engaging a consulting engineer who was unfamiliar with local conditions. No consulting engineer in Australia, outside the Postal and Works Departments, could give us useful information on this subject. When the £71,000 proposal was placed before the committee I was of the opinion that it was suitable for the work to be done in the General Post Office in Sydney. Since then, owing to the discovery of improved appliances abroad, the system proposed for the Sydney office has been altered. This is entirely the cause of the increased cost of the present scheme; but for £71,000 we would not have had such an efficient plant as we shall have for the extra money now asked for. I had been engaged in the problem of devising mechanical mail-handling appliances for nearly five years, and I left that work to accept my present position at an additional remuneration of £350 a year. The Superintendent of Mails need not necessarily be an engineer, but it is useful for him to know something of the engineering side of the department's activities. I have been in close touch with Mr. Gardner ever since he took over my old position, and I am keenly interested in seeing that we obtain the type of plant that we require. Any advice that I have been able to give has been gladly placed at the disposal of my successor. The volume of mail matter likely to be handled at the Sydney General Post Office has always been closely under consideration, and I am satisfied that we are quite justified in proposing the installation

of the suggested plant. You draw my attention to the fact that on the 27th October, 1927, in giving evidence before the committee, I said—

I am quite satisfied now that there is no possibility of failure. The job will be entirely successful. . . . From what I have seen of the Melbourne plant in operation I should be quite prepared to guarantee that the Sydney plant will be entirely satisfactory. . . . We have passed the experimental stage. I feel quite sure that we will not have to ask for any more money to complete the Sydney installation.

I was satisfied at that time that the plant then proposed would do the job, but I did not then have the information that has come to hand in the years that have elapsed. All the greatest nations are looking for machinery for mail handling, and developments are constantly taking place. Every year some new discovery will probably be made, but the equipment at Sydney will be up to date as that at any post office in the world. We are doing things in Melbourne and Sydney that have not yet been done in any post office in Europe or America. The plant that would have cost £71,000 would have done the work satisfactorily, but we have now enlarged, strengthened, and developed it. It should now meet all the normal expansion of business for the next fifteen years. The volume of mail matter increases from 15 per cent. to 17 per cent. every year in Sydney, and as time goes on we must have more floor space if we largely increase the staff. Still, the time will come when we shall have to decentralize the work there and prevent a certain quantity of the mail matter going into the central office. In London, for instance, there are at least three large mail-handling centres where different classes of mail matter are dealt with. All the foreign mails are handled in one building, the London city mails in another, and what corresponds to our country section in a third building. Probably for the next fifteen years we shall be able to carry on in Sydney with the plant now proposed, but even after that this machinery will still be usefully employed in the Sydney office. I listened to the evidence given this morning by Mr. Fleming, and I am afraid that possibly some members of the committee gained a wrong impression from his reference to the alphabetical system. I should like to explain exactly how it differs from the old system. In New South Wales there are 2,500 post offices. Imagine in front of you 2,500 letters, one addressed to each post office in the State. It is obvious that you could not have 2,500 bags hanging on racks into each of which you placed one letter. You have to divide the 2,500 letters up so that the sorters can place them into bags that they can reach. One man can work in front of only about 30 bags. So you have to divide the letters into convenient lots. The first thing to decide is the system under which you will divide them. Under the old system we said that all the letters for the north coast should go into one heap, all those for the west into another, and all those for the south into another. First of all, the sorter had to learn the names of 2,500 offices, and the railway lines on which they were located. With a separate heap for the Sydney letters, we then had four heaps; but we found they were still too large. So we divided the western section into eight further divisions. Then the sorter had to know that Bathurst was West 5, Orange West 2, and so on. It took quite a number of years before a man became an expert sorter, and could put letters into their proper divisions at the rate of 25 a minute. So we had to get men to learn the number of the offices and the divisions. That was the primary sort. Not only did we find it difficult to train young men to learn this, but the work in the mail branch is not highly paid, and if young men had ability they tried to get into the higher branches, where they had opportunities of earning more money. Naturally, numbers of these young men did not learn the sorting job thoroughly, because they did not intend to stay in that branch. Owing to this difficulty the alphabetical

system was introduced in America. Under this system letters addressed to offices beginning with "A" were put into one heap, and so on until there were 20 heaps, if there were offices whose initial letters comprised every letter in the alphabet. Then the sorter merely had to know that a letter addressed to, say, Abbotsford Point went into the pigeon-hole marked "A," and a letter addressed to Brigalow went into box "B." That was a simple system, under which untrained men, so long as they were intelligent and had some sense of responsibility, could be engaged on work that previously could only be done by fairly highly-trained men. There is another difficulty with the alphabetical system. We do not despatch from Sydney 2,500 separate mails. For instance, the Abbotsford Point mail goes to Five Dock. We only despatch about 700 direct mails to the 2,500 post offices served. These are divided, again, and sent to the smaller offices. The sorter either had to know that Abbotsford Point letters were sent to Five Dock, and should be put into the pigeon-hole marked "F," or else they would be put into the pigeon-hole marked "A" and subsequently transferred to "F." Our sorters at the present time know that letters addressed to Abbotsford Point go into the Five Dock pigeon-hole, and for the time being that method will be adopted; but eventually as new sorters are engaged we shall work on a purely alphabetical system, putting all the letters addressed to offices beginning with "A" into the boxes marked "A." The introduction of the alphabetical system merely involves a different arrangement of the furniture in the mail room. When we decided to change over from the geographical to the alphabetical system a complete alteration of the plans which had already been drawn was necessitated. There is no doubt that in the long run the alphabetical system will be more successful than the other method. General efficiency depends on simplicity, and undoubtedly the alphabetical system is simpler. Under it a sorter can do useful work the day he joins the department; but under the old system an apprenticeship was required. For about five years was the normal annual increase in the volume of mail matter handled at the Sydney General Post Office has been about 17 per cent. The plant now proposed will be sufficient for the next fifteen years, because it will enable us to deal with the mails at peak periods. If the public persists in making the peak period from 4.30 to 6.30 p.m., we shall have to close the mails half an hour earlier than at present. That would reduce the peak by giving us more time in which to handle the mails. I prefer the system of belts to be installed on the ground floor to the trucks proposed for the upper floors. I am not in agreement with Mr. Fleming regarding his proposal to use trucks on tracks on the first and second floors. He stated in his evidence that if an inexpensive type of overhead runway could be installed it would be used in preference to the trucks. In my opinion, we must have the overhead runway. It causes too much confusion to have men pushing trucks about the floor. A straight run could be obtained on the first and second floors, and an overhead wire conveyor would be most satisfactory. There is no reason why a small tray of letters should not be carried in that way. Mr. Fleming agrees with me that the funds that we contemplate will be made available will be sufficient to enable this portion of the plant to be installed. There is £680 provided for floor trucks, and £2,000 for contingencies. That would permit of the purchase of wire overhead conveyors.

28. To Mr. McGrath.—It would have cost about £5,000 for detailed drawings when the previous proposal was submitted to the committee, and we had no money for that purpose. When the expenditure of £41,000 was proposed, we put before the committee all the facts that we had. We could not possibly have done more. I think the committee was aware that no working drawings had been made at that stage. Nobody but

myself had been employed up till that time, and no one person could have prepared those drawings in a lifetime. The plant that will be installed for £105,500 will be much more robust and efficient than the plant that would have been provided for £41,000. The country will receive good value for the extra money. If the committee agreed to a proposal for the construction of a railway on the 3-ft. 6-in. gauge, and subsequently decided that it should be built on the 4-ft. 8½-in. gauge, increased expenditure would be inevitable. Instead of the 18-in. belt we are now proposing to use 24-in. belts. The method of addressing letters according to the numbers of postal districts is not adopted in Sydney. It would not be beneficial to introduce it there. In Melbourne probably 45 per cent. of the letters are correctly addressed according to the numbers of postal districts, and the remaining 55 per cent. are more or less incorrectly addressed. The 45 per cent. are probably addressed by the same people, who would have addressed the letters correctly in any case, and the 55 per cent. are received from those who would never address them correctly. You ask me how it is that owing to the introduction of the alphabetical system we close mails at suburban post offices an hour earlier than formerly, and have as many as 11,000 letters undelivered at the end of the day. That is not correct. You are referring to the fact that letters posted in the suburbs for other suburbs must reach Sydney and be despatched by trains which leave about 1 p.m. For years before we thought of the alphabetical system we could not be sure of the despatch of all the morning letters unless they reached Central-square by 11 a.m. When they arrived at noon it was not possible to despatch them all by 1 p.m., because we also had the Brisbane and Melbourne mails in as well as other suburban letters. Under the new proposal we shall not be affected by the earlier closing time. No matter how much room you have you must have a certain amount of time in which to do a certain amount of work. Between 4.30 and 6 p.m., 52 per cent. of the postal business done in 24 hours is transacted. The main portion of our staff ceases work at 6 p.m., and another big staff goes off at 6.30 p.m., when the evening mails begin to come in. We either have to penalize the staff by making them work a shift from 10 a.m. to 8 p.m. or make the best of things by inducing the people to post their letters in reasonable time, so that the staff can dispose of them before they leave for their homes. Under any system the difficulties associated with an increasing volume of business that has to be dealt with in a certain time have inevitably to be met.

29. To Senator Payne.—I am satisfied that the plant proposed for £71,000 would have proved efficient up to a certain point; but it would not have done the work that will be possible with the plant now proposed. The additional expenditure will provide additional conveniences which will be well worth the extra money. I think that Mr. Fleming's estimate of an annual saving of £4,500 was a conservative one. Apart from the saving and expense there will be an increase in efficiency which in a mail branch is most important. At busy times we must try to see that the first article to come into the office is the first to be sent out. If the mail matter were thrown into one basket, and other parcels were constantly added, it is conceivable that a number of articles in the bottom of the basket would never be moved. There is always a tendency for some mail matter to be despatched before other matter that has reached the post office earlier; but when the machinery has been installed, the conveyor belt will distribute it as soon as it arrives. The proposed plant should double the efficiency of the work.

30. To Mr. J. Francis.—Practically all the plans in connexion with the proposed plant will be completed within a few weeks. They are sufficiently advanced

to enable us to say exactly where we stand as to the cost of the work and the result to be obtained. The new scheme is certainly worth while. It will give us a far better job for the extra money. I have no anxiety concerning it. I am as confident regarding its success as I was regarding the utility of the scheme previously proposed. With the exception that I have mentioned with regard to conveyors I am in entire accord with the present proposal.

31. To Senator Reid.—Certain large firms post as many as 1,000,000 articles in the course of an advertising campaign. Ordinary business houses are the greatest offenders in the matter of late posting. Some firms send out their catalogues on Christmas Eve in order to get ahead of their competitors. We cannot take action to prevent them doing it. If this mail matter comes in it must go out; but, of course, we give preference to first-class mail. To overcome the peak-period trouble we have interviewed large business firms and tried to induce them to post early; but instead of that the trouble continues. Under the new system the mails will be handled twenty minutes earlier than they are now, and they will be dealt with more quickly. Sorters will be made available by the promotion of telegraph messengers, or we may engage assistants from the country who have been transferred. There is a plentiful supply of boys rising in the service, and there is no difficulty in getting all the men we require. The standard of skill necessary is not very great. Any ordinary individual could pick up a knowledge of the plant work without trouble. Temporary employees brought in at Christmas time would be able to do more efficient work under the new scheme than they can under present conditions.

32. To Mr. Gregory.—I consider that my optimism regarding the present proposal is justified. I admit that I was equally as sanguine in 1926 of being able to carry out the work then proposed for £41,000. That scheme was honestly put forward with the best information then at our disposal. Before we spent any money at all we realized that we could not do what we thought we would be able to do for that expenditure. We came to the committee practically before we had spent any money and said that the estimate was too low. We went to the committee voluntarily, and it complimented us in its report on the attitude we had adopted. The report of the committee, dated the 30th November, 1927, contains this paragraph—

At the same time members desire to record their appreciation of the frankness with which the departmental officials, when faced with a larger expenditure than had been recommended, placed the full facts before the committee with a view to obtaining sanction for the larger project.

Careful consideration was given in the first place to the probable future growth of the business in the Sydney General Post Office. Experience in Melbourne has proved that while an 18-in. belt would be adequate to carry the requisite load, the wider belt was necessary in order to prevent damage to mail matter such as a long article with a flimsy wrapper. By watching both the 18-in. and 24-in. belts at work we found that postal matter was damaged on the smaller, but not on the larger conveyor. The money spent on the plant in Melbourne would have been justified, even if we scrapped it to-morrow, because of the experience we have gained. You ask me whether it would have been wise to proceed cautiously and gain further experience before proceeding with the new plant. We have four floors of a new building standing idle in Sydney, and the interest on the capital outlay is probably more than the cost of the proposed installation. We could not leave those four floors idle for a number of years. The whole plant must be used simultaneously. It would

be impossible to use the building under the manual system while we developed a scheme of mechanical handling in Melbourne. The plant now proposed could be installed only in an empty building. In the arrangement of the furniture in connection with the adoption of the alphabetical system we required an additional 500 feet of conveyors, but we should still need wider conveyors even if we reverted to the geographical system. The wider conveyors are required solely to ensure the safety of the mail matter. Owing to the shape of the Sydney building two positions occupied by the sorters are not well lit, and the ventilation is probably not perfect. A fan would overcome the difficulty, but the men have divided opinions about the desirability of working near fans. I adhere to the opinion I expressed three years ago that no advantage would have been derived if an outside consulting engineer of high qualifications had been called in. I have the greatest respect for consulting engineers, but there was no man in Australia who could have given us any information that we did not already possess. No outside engineer whom we might have consulted could have done anything on this job with less than a couple of years' study of the problems of mail handling. There are men in America and England who could have given us a lot of information on mail handling, but they would have had to study our problems on the spot. I have proved that by quoting our experience with the Lamson Company, who were the pioneers in America of mail-handling machinery. A replica of the bag elevator that the Lamson Company proposed to install in Melbourne was placed in the Chicago Post Office, and it was operated there for a number of years.

33. *To Mr. Coleman.*—I advised the adoption of the alphabetical system. It is largely in use in America, Germany, England, and in parts of France. It has advantages over the district system because of its simplicity. A sorter can do quite good work after five minutes' tuition, while it may take several years' experience before equally efficient work can be done under the geographical system. Once a sorter has learned the geographical system his work is probably equal to that of a sorter using the alphabetical system. You refer me to the statement by Mr. Fleming that he is not in a position to advise on the relative merits of the alphabetical and district systems of sorting, and that reversion to the latter system at the present stage would delay completion of the work by at least six months. I point out that the alphabetical system is in operation only in the inland section. It takes 1,000 men a good many months to forget what they have learnt under the old system, and there has been little improvement since the adoption of the new system, which has certainly slowed up the work of handling the mails. I do not suggest that the men as a body are refraining from full co-operation in the introduction of the new system. The executive officers of the Post Office are unanimously in favour of it.

34. *To Senator Barnes.*—The £7,000 included in the estimate for electrical equipment was previously shown under various items. It is now a separate item. The request for additional money for the electrical equipment is due to similar reasons to those for the increased expenditure required on mechanical equipment.

35. *To Mr. J. Francis.*—Italy and Germany have adopted the Chinese system of addressing envelopes, but the British public could not be persuaded to employ it. It would be no use getting the people of Australia to adopt it unless it was used uniformly throughout the world. The present method of addressing envelopes is world wide, and many countries are too conservative to change it. For years we have endeavoured to introduce an envelope of a standard size, but without success. The 14,000 pigeon holes required in a large post office have to be made wide enough to receive the largest

envelopes used. A great deal of space could be saved if the size of those pigeon holes could be reduced to take an envelope of a standard width.

(Taken at Melbourne.)

WEDNESDAY, 27th MARCH, 1920.

Present:

Mr. M. CAMERON, Chairman;	
Senator Barnes	Mr. J. Francis
Senator Payne	Mr. Gregory
Senator Reid	Mr. Jackson
Mr. Coleman	Mr. McGrath.

John Connan Gardner, Inspector of Postal Services, sworn and examined.

30. *To the Chairman.*—I have occupied my present position since the beginning of 1923. I first became connected with the work of installing mechanical mail-handling plant early in January, 1923, and I am now considered responsible for the designs, for giving details, for checking drawings, and for seeing that the plant fulfils the requirements of the department. The decision to complete the installation as now intended was not arrived at before I became engaged on the work. When I was first associated with it one machine was installed in Melbourne, and was in use, and another machine had been installed in Sydney. Approval had then been given for the installation of the £71,000 scheme, but it was found that the machine in use in Melbourne could be improved in many ways. Up to a few months ago we have gone on improving it and making designs for the newer class of machines. The plant in operation in Melbourne was the outcome of the small model made by Mr. Corbett and the small hand-clearing machine made in Brisbane. When I came on the job the plant in Melbourne was in operation. Experience in its working showed us that the diverters were inefficient. The 18-in. belts were found to be too narrow, and the machine required to be made more robust. The machines to be installed in Sydney are to be provided with 24-in. conveyor belts right through. I was mainly responsible for the improvement in the diverters in the Sydney plant. As an engineer I am satisfied that the designs are very good. The whole machinery is designed on robust lines, and everything has been done to safeguard the passage of the mail matter and to carry the full quantity of material to be handled. I do not anticipate any breakdown. The electrical equipment is amply safeguarded right through, and the mechanical equipment is exceptionally strong. I agree to the provision of a 5 per cent. sinking fund. Mr. Fleming and I arrived at the figures between us. We have made ample allowance to cover everything. The estimate is a conservative one. I have been working in close collaboration with the Works Department and have checked most of their drawings. The Chief Inspector passed on to me for perusal all the correspondence from Mr. Brown regarding postal machinery used in other countries. I cannot see any reason why any important alterations should now be required. There may be minor alterations, such as in regard to the method of sending letters from the primary to the final sort. That is the only detail in doubt, but I do not anticipate any difficulty in that respect. At first we were rather disappointed at the high prices received from tenderers for this part of the work, but we now think we can use wire conveyors for the first and second floors. We put forward a scheme for trucks because we thought it would be cheaper, but on further consideration we considered overhead runways desirable, and the cost will be not much greater, if it is any greater. By the end of August we hope to have the plant erected so that it will be in full operation for the Christmas mails.

This will allow us time to train the staff so that it will be able to deal with the peak period at the end of the year. A month's training of the men should enable us to get the plant into full working order, and the months of September, October and November would be available to enable the staff to become efficient. It is not anticipated that the installation will lead to delays in the delivery of mails. On the other hand it should expedite the work. I am quite satisfied that the mails will be handled more economically and expeditiously than at the present time.

37. *To Senator Payne.*—I have had every opportunity of looking fully into the subject from the time I started on the job. The additional expenditure proposed to be incurred will give us a much superior plant to the machine first designed. This will be a first class engineering job from start to finish. The appliances are so strong that there is little danger of a breakdown. Electrically the plant is very substantial and very well designed. The electrical appliances made for the Melbourne plant have given practically no trouble. Of course, motors may break down, but the plant as now designed will be sufficiently strong to ensure a minimum of breakdowns.

38. *To Senator Reid.*—I served my time as an electrical and mechanical engineer in Sydney, and I have worked in various engineering shops there. I have also been a mechanic. I have been employed in the Post Office for about 22 years. I took on the postal side of the work only about eighteen months ago. Previously I was engaged for my present position on account of my engineering experience. Since Mr. Corbett relinquished his work in connexion with mechanical mail-handling I have frequently visited Melbourne and watched the plant there through various periods of the day. We are improving it at the present time by providing new diverters and making small alterations here and there. Our observations in Melbourne have enabled us to improve the plant to be installed in Sydney. This plant will more than meet the demands that will be made upon it. The increase in the width of the conveyor belt from 18 inches to 24 inches will add 50 per cent. to the carrying capacity of the plant. I have seen big blocks in Melbourne on an 18-in. belt, but I have never seen a block on a 2-ft. belt.

39. *To Mr. Gregory.*—The second class diverters are to be placed in a position convenient for the final sorting. I do not anticipate any difficulty with the employees in regard to the lighting of the building in Sydney. The worst position will be on the ground floor, where the big second class machine is installed. On the other floors the machines will be lower, and the lighting will not be much affected. It is quite possible that in another building a new type of plant would be required. Really the building should be thought of putting in a butcher's rail on the first and second floors so that trays could be carried from point to point. The cost of runways would be considerably less than rubber belts. It has taken ten months to design the new plant. I do not see that an outside specialist could have been of any assistance to us. You ask me whether an engineer such as Sir George Julius might have been able to contribute valuable advice in the design of the plant. I point out that the men who evolve new ideas are not university professors, but those who are working on the job, and even in the elaboration of schemes these men generally know more than the specialists. There are not many men who have the attainments of Sir George Julius, but I do not think that he could have assisted us in any way. For instance, he might not have hit upon the idea of a diverter. We have reached the stage where we are now sure of success.

40. *To Mr. Jackson.*—The proposed plant has been brought to its present stage by a process of evolution. The Works Department and the Postal Department have worked conscientiously together during the last twelve months to devise a plant that will meet all requirements. Mr. Brown furnished us with certain information with regard to the method adopted in other countries for facing up letters. That was an excellent idea. We are familiar with all the conveyor systems in operation in England, America and Germany, and I think that the proposed plant will be more up to date than those in any of those great countries.

41. *To Mr. McGrath.*—I am attached to the head office in Sydney. I am quite satisfied that we shall not have to inform the committee six months hence that the design of the proposed plant leaves something to be desired.

The witness withdrew.

Henry Percival Moss, Chief Electrical Engineer, Department of Works, sworn and examined.

42. *To the Chairman.*—I was associated with the Melbourne installation, and I have been connected with the Sydney proposal for about eighteen months. I am responsible for the electrical portion of the work. I have prepared the following statement:—

Electric Supply.—Electric supply for the mail handling equipment will be obtained from the main switchboard of the General Post Office, which is situated in the corner of the basement near George-street and Martin-place. This switchboard is supplied from the mains of the Sydney City Council by feeders from the Town Hall and Lang Park sub-station. It is understood that the City Council is now making provision for a supply from Clarence-street sub-station in lieu of the Town Hall, so that there should be no likelihood of serious interruption to the supply at any time. In order to give the benefit of the main switchboard for the mail handling plant it will be necessary to add an additional panel to the main switchboard, and to run mains from this panel to a position on the first floor almost directly above the main switchboard room, where space has been reserved for the control of all mail-handling machines. The estimated cost of installing the necessary switchboard panel on the main switchboard and feeders from this panel to the control room on the first floor is £25. The electrical equipment to be used in connexion with mail handling plant may be divided into two distinct classes—(1) Motors and starting equipment for same, (2) control equipment concerned in routing of mail matter, starting of machinery, &c., as required. For the first-mentioned class of work the supply voltages of 480 and 240 volts D.C. are considered to be quite satisfactory. In the second class, however, it is deemed to be imperative that the operating voltage should be very much lower than 240, owing to the greater risk of shock with the class of equipment necessary, and also due to the fact that with the higher voltage it is necessary to space the metal considerably further apart, thus increasing the space required and incidentally the cost of making the necessary equipment for control circuits. It has therefore been decided to operate at 40 volts, which is quite safe from the point of view of danger to life, and to some extent also permits the use of standard telephone equipment for various purposes. One 50-volt supply will be obtained from two motor generators, one being a stand-by to the other, of 5 k.w. capacity each, which are to be installed in the control room, first floor.

Motors and Controls.—In order to operate the mail handling equipment it will be necessary to provide a total of 11 1/2 motors, ranging from 1 h.p. to 10 h.p. in size, and making a combined load of 400 h.p. Owing to the necessity for synchronizing operations, many of these motors must be operated by groups, that is to say, a number of them started and stopped simultaneously. This can, of course, only be done by providing automatic starters and operating by push buttons or switches placed in convenient positions. A large extent of attention is given to the design of the motor in the matter of lubrication than would normally be required where manual starting can be used. The supply of motors with automatic starters, manual starters, wiring, &c. is estimated at £1,000. It may be mentioned that several small motors are used as part of the control equipment in the control room, but the cost of these is included in the equipment which they are primarily intended to operate.

Control and Auxiliary Circuits at 50 Volts.—From the electrical point of view, the break-up machines may be said to have two functions—(a) Bin opening and control, (b) diverter operation and control. Bin operation and control in the first

machine installed in Melbourne and in Sydney was carried out mechanically by means of cams and rods operated by the main motor as other parts of the machine. Experience has shown, however, that this method of operation, although fairly satisfactory, requires considerable maintenance and is noisy. It was therefore decided to operate the doors as follows:—A vertical rod operated by a cam-ratchet and raised slightly, and also raised by the bin door is held in position against the cores of two small electro-magnets. When it is desired that a given door shall open, the small that the latches are held; as the moment of lifting, so follows it, thus releasing the contents of the bin. If it is not desired that the door shall open, no current is supplied to the electro-magnets, and as the rod drops the doors are retained by the latches. Shortly after the doors are retained magnets are de-energized, releasing the latches, which drop to their normal position, so that on the next up-stroke of the push about 2,700 bin magnets to wire up and control. There would be general principles bin operation of the main break up machines as in the case of the auxiliary break up machines, but they vary considerably in details. In the main break up machines, the small bins, while the remaining 3 are large. In the case of operated in the main break up machines, doors are opened at intervals of 28 seconds, so that a complete cycle of operations for bins of these machines takes 28 x 27 seconds, that is, 12 minutes 36 seconds, whereas the auxiliary break up complete cycle taking 24 x 12 = 288 seconds, = 4 minutes 48 seconds. The cycle of operations with the main break-up machines is:—Bins 1 to 8, then a large bin; then a bin 9 to 16, then a large bin, bins 17 to 24, then a large bin, and then the cycle starts over again. This cycle of operations is carried out by means of a radial contactor driven by the same motor whenever the machine is running. In the case of the auxiliary break up machines the same arrangement is used, but in this case the radial contactor has only 24 contact studs. Prior to the operation of the three large "B" bins alone on a time that would be taken in traversing the machine and the magnets are being made to divide the control into two halves, that all magnet from bins in one half is discharged eight seconds ahead of the corresponding magnets on the other half, so a length of belt corresponding to half the length of the machine. Owing to the fact that four machines, namely, arranged for operation either separately or in different combinations of all together, certain circuits have to be superimposed on these machines in order that the bin operation of that is to say, assuming machines "A" and "B" running, the cycle of bin opening and closing on machine "A" must be complete before the cycle of bin opening and closing on machine "B" commences, and this in turn must be complete before the cycle of bin opening and closing on machine "A" commences again. The same thing applies if three machines or four machines are running together. This operation also involves interlocking of diverter operations but this will be dealt with more fully under the heading of diverter control. The cost of supplying and installing the 2,700 bin magnets, together with the wiring, selector switches, junction boxes, protective devices, &c., is £3,026. The cost of superimposing circuits on the first-floor machines to enable one, two, three, or four machines to operate on one clearing above, is £400. These amounts are offset by savings due to the use of mechanical devices, and no additional funds that are therefore required to carry out this section of the work; that is to say, the previous estimates of the cost of the mechanical section of the work would have been reduced by £3,426, and the electrical estimate correspondingly increased, had it been known that bins were to be operated electrically, when the previous estimates were being prepared. The second function of the break-up machines, namely, diverter control, is carried out, broadly, on the following lines:—The which the admission valve is normally closed by means of a magnet, this opening the air inlet of the core of an electro-magnet, thus opening the valve by the pull of a rod. The current for this electro-magnet will be supplied from the 50-volt supply break-up machine. Through a rotary switch mentioned in the report of contacts for each diverter, which is to be operated by the machine so that, if eight diverters are to be operated by the machine there should be eight contacts on the rotary switch.

If 50 diverters are to be operated from it, 50 contacts would be necessary, and so on. The rotary contacts are adjustable, so that any diverter can be arranged to operate at a predetermined time, so that should it be necessary at any time to alter any diverter this can easily be done. In the case of machines on the first floor, namely, suburban, inter operated in various combinations as mentioned previously, and interlocking devices to ensure that correct sequence of diverter operations as between these machines is carried out as well as the correct bin-cycle sequence referred to previously. There are considerable distances in some cases between diverters controlled from the break-up machines, it will be readily understood that the complete cycle of diverter operation must be stopped until vision is therefore being made by suitable interlocking devices to ensure that no machine and its corresponding diverters shall go through a full cycle of operations before the machine is at the point which they stopped and carry it to completion of diverter, with their wiring, protective devices, rocking switches and change-over switches, relays and selectors, are £1,750, completely installed. In order to carry out this will be various functions, special apparatus had to be designed, in many cases, owing to the fact that the control and operation in any part of the world. Wherever it is possible to use standard commercial equipment this has been done. Owing to the horizontally but vertically also, it is not considered desirable to risk 240 volts, which in certain circumstances could result in death, whereas 50 volts would not be dangerous.

43. To Senator Payne.—The fact that a new substation is being provided at the corner of Clarence-street and King-street does not necessarily mean that the supply from the Town Hall will be cut out. The Clarence-street sub-station provides an additional safeguard. Much more power will be available from that point than from the Town Hall sub-station. So far as I am aware, failures of supply are not frequent.

44. To Mr. J. Francis.—I am satisfied that there is no danger of employees being electrocuted through contact with the proposed plant. You direct my attention to a paragraph in the *Sunday News Pictorial* stating that three men in Brisbane had received fatal shocks within 24 hours, one while working on an electric drill, another while operating an electric grinding machine, and the third while overhauling a motor car. Two of them were factory workers, who would probably have come into contact with alternating current of about 240 volts. Most of these accidents are due to negligence on the part of the users of the appliances. Our proposed plant is made fool-proof as far as possible, and 50 volts would not prove harmful. We had nothing to gain by calling in an outside engineer so far as the electrical side was concerned. I do not see that anything could be gained at the present time by consulting an outside expert. Had such an expert been consulted, he would have had to take the word of the men who required the plant. He could have checked up the details, but he could only have come to the same conclusions as ourselves. You do not know anything about the postal sorting aspect. I have to be satisfied by the postal officers in that respect. While I do not say that it would be impossible to find another solution, I am prepared to say that the solution adopted will work. I do not think it is possible to devise a simpler method than that adopted, so far as the electrical side of the plant is concerned.

45. To Senator Reid.—The principles on which the insoluble. In fact, it would be very hard to imagine any electrical control problem which would be incapable of solution by officers of the Works or Postal Departments. It should be remembered that the departmental officers must necessarily have very wide knowledge in order to handle their ordinary work, and this versatility ensures that they are able, in many cases, to benefit by experiences which the specialist or the consulting engineer does not have. The members of the committee should not overlook the fact that the departmental engineers are in most cases men who have had not only sound technical training, but also years of practical experience. It must also be remembered that outside consultants are not infallible, and that the usual method of paying fees does not tend to keep costs down. Were a consultant engaged, his fees would be proportional to the cost of the work, and there would be no inducement for him to save money in any way. I am quite sure that the supply voltage of 480 and 240 D.C. will be quite satisfactory for the motors and starting equipment. In the case of the control circuits, we have such a large number of contacts and terminals that if they were set out for the standard spacing required for 240 volts we could not get the material into the space allowed. But by adopting 50 volts we can keep the space down to half as much between live terminals. An employee might possibly get into contact with bare terminals, particularly on the bin magnets, which is not considered desirable to risk 240 volts, which in certain circumstances could result in death, whereas 50 volts would not be dangerous.

46. To Mr. Gregory.—At the present time we are entirely dependent on the supply of current from the Sydney City Council. In the event of a breakdown in the supply the whole plant would stop. In the event of such a failure in the supply we should have to consider putting in a temporary power plant. It could not be placed in the basement. Probably the best method would be to install an oil engine. Assuming such a plant was available, we might obtain an emergency supply in two or three days. About 400 horse-power is connected, but the maximum load would be about 100 kilowatts. Interruptions are so much that I do not think it would pay us to make provision for such a temporary supply. In connexion with the Spencer-street post office we found that up to about 1924, when the State Electricity Commission began to supply the current, interruptions were very frequent. Then for a period of about twelve or eighteen months we had frequent failures for brief periods; the longest of these was a little over half an hour; but in the last two or three years there have been very few interruptions, and they have only lasted for five or ten minutes. A breakdown for a whole day would be a serious matter, and I do not see how it could possibly occur. Even in the event of a strike some provision would be made for carrying on public services such as the handling of mail; it would be possible to isolate the feeders supplying the post office from all other feeders. I think that it would be desirable to have a mechanic on duty to look after the plant generally. The electric control of diverter used in Melbourne has proved most satisfactory in operation. In the early stages of the development of the scheme it might possibly have been of benefit if outside advice had been called in; but I think it would have been hard to find anybody with the necessary special knowledge to say definitely what should be done. He would have had to rely on the requirements and ideas of the Postal Department. I am satisfied that at the present stage nothing could be gained by obtaining outside advice.

47. To Mr. Coleman.—I know of no source of electrical supply such as storage batteries from which an emergency supply could be obtained; but there is a 50 or 60 volt supply for the telephone system.

48. To Senator Barnes.—If we had called in outside advice the person consulted would have had to give as much special study to the subject as we have given it.

The witness withdrew.

I draw attention to the following paragraph in my statement:—

In order to carry out these various functions special apparatus had to be designed, in many cases, owing to the fact that the control and operation are novel, no previous work wherever it is possible to use standard commercial equipment this has been done.

I could not have obtained outside assistance in solving the particular problems with which I was faced. The matter of the interlocking was the greatest problem. The experiences obtained in Melbourne showed us that the bins used there, while operating satisfactorily, required considerable maintenance, and that could not be avoided so long as they were operated mechanically. Mr. Fleming, Mr. Gardner and I devised a method, partly mechanical and partly electrical, by which it was considered that we should have considerably less maintenance costs and probably ensure a good deal more satisfactory operation. This method has been tested and found to meet requirements.

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