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This paper is written as an introduction to the visit of the members of the Engineering Association of Ceylon, during the 1936 session, to the Government Press, and deals with the development of the institution, showing effects the re-organization of 1930 has had on the Press. The mechanical details of the printing machinery have been left for the visit itself.

The Government Printing Office, as it was then called, started as a small affair in 1831, with about 10 compositors, attached to the Secretariat and housed in the same buildings in the Fort. Up to 1833 the office was in charge of Head Printers, usually the senior compositors. From 1833 to 1849 the business was conducted by "non-professional" Superintendents, from whom the Head Printers received instructions. The first Superintendent was Mr. G. Lee, afterwards Postmaster-General. He was succeeded by Lt.-Col. Gray, who held the appointment for one year. Afterwards this office was filled successively by clerks of the Colonial Secretary's Office till 1849, when the Secretary of State created the office of Government Printer and conferred it on Mr. W. Skee.

Manual labour and hand presses were used till 1851. Mr. W. Skee introduced the first printing machine in the year he assumed duties. This is referred to in later reports as "The Old Brown Cylinder Machine". Very soon one reads of efforts being made to condemn this machine, presumably because of its doubtful utility to the printers.
Motive power was first introduced in 1854, when a 12 H.P. Tange's horizontal steam engine and a 18 H.P. Cornish boiler working at 60 lbs. per $\Box^*$ were introduced. The internal combustion engine is mentioned for the first time in the Administration Report of 1896, where it is stated that the plant included a 3½ H.P. Crossley "OTTO" gas engine. Stereo-typing was placed on an adequate footing in 1884, while type casting by machinery was introduced in 1891 and electro-typing in 1895. All work in the Bindery continued to be hand operations till 1871, when the first ruling machine was introduced. In 1901 this section was further mechanised by the addition of wire stitchers, numbering machines, addressographs, embossing presses, etc.

In 1903 a 28 H.P. gas engine superseded the steam plant mainly because of the complaints from the Prince Street merchants and tea tasters as to the smoke and smell from the steam boiler during the S.-W. Monsoon. Electricity as a motive power was ruled out because of the higher running cost, but in 1900 the Press Room was lit electrically. Monotype Composing Machinery was first installed in 1904 and Linotypes in 1926.

The rapid growth of all branches of the Press and the need for more room at the Secretariat necessitated moving the Press to larger premises. In 1911 the present premises, totalling 46,543 sq. ft. floor space, was occupied. To this was added in 1926 a new wing with a floor area of 3,166 sq. ft. A new Mess Room for the staff with washing facilities and lockers for clothes and a Time Office is in course of construction. A new Type Stores and Foundry are urgently needed and its construction is now being considered by the authorities. The Type Stores is needed to house the Voters' Registers (which are now accommodated in a temporary shed) and other standing matter. This will relieve the congestion in the Composing Room. The present Foundry is installed in the old garages where conditions are unsuitable for lead workers.

The Welikada site was chosen so that prison labour might be utilised in the Binding Sections.
This experiment was abandoned in 1928 as unsuitable for the following reasons:

(1) Inability to co-ordinate the work of "free" and prison labour owing to the difference in hours of work, intervals, holidays (these are observed only by the free labour) and the inability to compel prison labour to work overtime.

(2) Uncertainty and fluctuations in the daily strength of prison labour.

(3) More space was required for the convict party.

(4) The inferior work of convicts required greater supervision.

(5) The moral effect prison labour had on the rest of the staff.

Very little new machinery was added when the Press was transferred to the new premises. The main addition was a new 28 H.P. gas engine to drive the Machine Room. Till 1928 the additions and improvements were very meagre. The machinery was old and inadequate for the growing needs of the Press. It is best described by Mr. R. T. Porte, of the Porte Publishing Company, U.S.A., in a book in which he describes the Printing Presses he saw on his world tour. Referring to the Government Press he writes:

"It was here that I saw the two-feeder cylinder presses which I describe as a realization of my boyhood dream, and I saw other presses which in my 'Dictionary of Printing Terms' I had described as 'obsolete'. The two feeders, if I remember right, were manufactured by Cowles, about sixty or seventy years ago. Another old press, date of purchase unknown, was still working amid a conglomeration of ropes and pulleys to operate the inking apparatus and other parts of the machine. The exhibit 'de luxe,' however, was a machine, name and manufacturer unknown, consisting of two large cylinders through which printed sheets were run in order to iron the heavy impressions in the paper.

"I cannot help comparing the Government plant, which was housed in a large building and cluttered up with such antiquated machinery, with the
Governement plant of the Japanese, where the presses were right up to the minute.

"The present building was first occupied 10 years ago, and it is in good condition. A clearing out of the old presses, ruling and binding machinery, paper cutters and other junk to make room for the installation of modern equipment would put the plant in excellent shape for economic production."

This was written in 1926. The presses referred to by Mr. Porte were 75 years old. From 1837 up to 1930, which is practically a century, only a total sum of Rs. 403,125 was spent on machinery.

In 1929, Mr. A. J. Biggs, Director of H.M. Stationery Office, came out to Ceylon and advised on the re-organization of the Press. In 1930, Government decided to give effect to the recommendations made by Mr. Biggs and the Legislature passed a supplementary estimate of Rs. 346,240 for staff and machinery.

The details of the re-organization in each department may be set out briefly as follows:

COMPOSING DEPARTMENT

This department was subdivided into sections in charge of clickers, one such section dealing exclusively with State Council work. All standing matter was classified and indexed and a ready reference is now available. Most of the old hand presses were discontinued and lightning presses for pulling proofs were installed. New imposing surfaces, forme trolleys, diss-metal trucks, galley racks for sorting new matter, and better type of stereo boards were introduced. A chute for sending out broken type was fixed. The composing racks were re-arranged to get the full effect of natural light. In addition, artificial flood lighting was installed. The Government publications are now turned out in a more economical size. The Reading Room was equipped with a new type of reading desks.

STEREO DEPARTMENT

The scattered components of this section are now centralised in a corner of the Machine Room. A gas furnace has superseded the old open hearth.
furnace and the old Stereo Room was converted into a Type Store. To get an even thickness on the stereo plates, a Winkler milling machine was installed. This is driven by a direct coupled 1/2 H.P. motor, and the milling cutter runs at a speed of 800 R.P.M. The plate is clamped on a work table which is reversed by two cone clutches with bevel gears mounted on one shaft. An adjustable stop, which can be positioned to suit the length of the plate, automatically trips the cone clutches. Large plates are prevented from rising owing to vibration by two combs placed on either side of the milling cutter and work alternatingly according to the travel of the table. The combs automatically exert the correct pressure on to plates of various thickness as they are mounted on the same bracket which carries the cutter shaft bearings and the milling table is raised or lowered independently to accommodate the various thickness of plates.

A new nickel facing plant by Canning, complete with motor generators, regulators, resistance boards and vats makes this department self contained.

COMPOSING MACHINERY SECTION

The Monotype Keyboards occupy the end of the Composing Room. Compressed air is supplied by a compressor driven off the Machine Room shafting and is distributed through a network of pipes overhead. Two Keyboards and banks for setting Tamil characters were purchased and has proved a useful asset to the vernacular section. The casters are installed in the new wing, with shafting underground. The casters are alternated so that one man could operate two machines. A flume is built over the lead pots which are heated by gas and an electric exhauster extracts the lead fumes. A 15 H.P. motor drives the shafting and air compressor. The Mono Casters are being sent in batches to the manufacturers to be overhauled and all the latest improvements and attachments to be incorporated. From an engineering point of view the rebuilt casters are as good as the new models and has cost only £300 each against £630 for a new machine.

The following are the new features introduced into the rebuilt machines:
(a) All cams run in oil-bath.
(b) New style low quad bridge attachment with a new centering pin device for quicker adjustments.
(c) New style type carrier and galley attachment to take up type matter up to 60 ems wide.
(d) New type metal pot with lowering device operated from top by a skew gear.
(e) A new attachment whereby all pie or incomplete lines are not cast by putting the pump out of action.
(f) A gas thermostat operating on the principle of the diaphragm for cutting out gas supply when the proper heat is obtained.

A line repeating attachment for headings and repeating folios was installed and proved satisfactory.

Eight Linotype Composing Machines (four No. 6 and four No. 4) forms this section and are now housed in the new wing. Three of these are installed in the Confidential Section and are available for general work when not required for confidential printing. The motors were changed on the older machines from D.C. to A.C. Electric heaters are now fitted to all the machines. The old type of mercury bulb thermostats were changed to a mechanical type and are functioning with greater satisfaction. Special sectional moulds for these machines were got down for setting the Voters' Registers. A hand press was added to the department so that proofs could accompany the finished work.

The type setting machinery for want of room elsewhere was housed in the new wing which was originally meant for confidential work only. The building is now overcrowded, but it is proposed to extend this section when funds permit, to allow the Linotype Machines to be installed away from the Mono Casters, as it is very desirable that there should be more air space to minimise lead poisoning.

The Confidential Section is partitioned off and is self contained in that it has in addition to the three Linotype Machines mentioned earlier, a lightning press, imposing table, and type cabinets, and is capable of being locked up while work is in progress.
MACHINE DEPARTMENT

This section absorbed a good part of the money voted for the re-organization. The shafting in the Machine Room was divided into four sections. One section was dismantled and in the floor space served by this shafting were installed the following new presses fitted with independent motors and switch gears:

(1) Four Quad Crown Two-Revolution "Michle" presses with Koenig pile stroker feeders.

(2) Three "Falcon" platens with feeders.

(3) One Greyhound Automatic "Master Speed" platen.

The Michle is known as a two-revolution press because the cylinder makes two revolutions to each impression. The first revolution takes place when the type bed is travelling from the ink fountain or delivery end to the feed board, that being the revolution when the impression is taken. The second revolution takes place when the type is travelling in the opposite direction. Immediately after the impression is taken the cylinder begins to lift in order to clear the forme. The cylinders are kept up by four powerful springs and pulled down on the impression by long bolts attached to a cam shaft mounted on eccentric blocks. The cam shaft is oscillated by a hook lever working in a grooved cam wheel. The hook can be kept out of action when not required by the operator. The method of obtaining the reversal of the type bed is different to the older models. A crank with a sliding gear drives the bed through two toothed racks placed above and below the driving gear. These two racks are staggered. The bed motion lever shifts the gear either to the top or bottom rack. The reversals of the bed is obtained by means of rollers fixed on to the extension of the crank which slide between two pairs of shoes, one pair being a fixture. The inside shoe swings to and fro. Immediately the crank touches the outside shoe the inside shoe closes behind holding the rack hanger in position for the crank to do the reversing. Immediately the half circle is completed the inside shoes swing out and the rack is engaged with the pinion. Two plates at both ends of the machine guide the inside shoes to work in and out. To balance the strain produced
by the sudden reversal at high speeds the machine is provided with two air cylinders at each end as fixtures. Into these cylinders run leather pistons attached to the bed. The air thus compressed by the pistons act as buffers. Spring loaded valves are provided in the piston heads to allow air into the cylinders while the piston is being withdrawn so that no vacuum or back pressure is created. The faster the machine is running the earlier the air valves close, thus automatically giving more compression. To attain still higher speeds with flat bed machines the manufacturers have now provided a centrifugal governor to regulate and control the amount of air in the cylinders. All machines are now adjusted to deliver printed sheets up, but provision is made to convert to fly delivery also.

The feeders fitted to these machines are Koening pile feeder stroker models. The paper is piled on a board and the correct height irrespective of the thickness of paper is maintained by a feeder mechanism. A tipped finger similar to that of a governor on the inlet of a gas engine regulates the control. Two stroker wheels which are mounted on rocking arms come automatically into contact with the paper pile when a sheet is required to be fed forward. By revolving at high speed they carry the sheet forward to main carrier tapes where the sheet is partly registered. The rotation of the strokers is then instantly arrested and the second sheet is firmly held from going forward by rubber fingers. The strokers are put out of action by sensitive fingers that feel the lightest pressure of the paper edge. One stroker is movable and can be placed on any part of the pile. This makes it possible to fan all classes of work where there is a gutter. A special slowing device brings the paper to the front lays and any tendency for the sheet to rebound on touching the front lays is overcome by using special flicker wheels. Correct side register is obtained by a friction draw type side lay. Another feature of the feeder is the device for stopping the press whenever a sheet fails to reach the front lays at the correct moment. If a sheet is not correctly laid, electric contacts attached to the front lays complete the electric circuit and energise an electro-magnet which operates a trip gear. This gear checks the cylinder
and switches off the motor. A 4-volt battery operates this. A clutch is provided on the drive to the feeder to enable it to be turned by hand.

The older two-revolution presses are fitted with continuous feeders. The essential difference between the two-feeders is that the paper in the latter is spread on an upper table and moved automatically round a drum to the lower table. This feeder can be constantly loaded whilst the machine is running. The process of feeding is the same except that the end is achieved by variation in the mechanical details.

The Falcon automatics have suction pile feeders. Here the paper is sucked one at a time from the pile by rubber nozzles. A stream of air pumped by a pair of bellows separates the paper so that one sheet is separated from the pile at a time. Mechanical fingers complete the delivery on the opposite end.

The Greyhound Automatic "Master Speed" platen also has a suction pile feeder. An ingenious air pump creates a vacuum of 5 lbs. and sends a jet of air of sufficient pressure to separate the paper. This pump resembles a centrifugal but the core is solid and is mounted eccentric. Four slits are cut into the core and four easy fitting blades slide in these slits and rub against the machined inside surface of the casing. In the downward position the blades drop on to the casing and sweep the air behind it creating a vacuum whilst creating pressure in front. A special feature of this machine is that both the feeder and delivery end of the machine are incorporated on one side, making it easier for the minder to watch what he is doing.

The other three sections of the Machine Room are driven by two 15 H.P. and one 20 H.P. motor housed in cages suspended from the floor joists. This arrangement has resulted in considerable saving of floor space. The starting gear of these three motors, along with the main switches and motors, are centralised and placed in immediate view of the Superintendent.

The first motor drives a set of old stop-cylinder presses (which were reconditioned), the Stereo and
Stamp Room machinery. The second and third motors drive new and old presses grouped together, the platens and two-revolution presses forming one section and the old and new stop-cylinder presses forming the other group. A knife grinder was installed in the Machine Room for grinding cutting machine knives.

The other main additions were four Demy stop-cylinder presses with perfection delivery. One of these was fitted with a Koenig pile feeder similar to those fitted to the Miehle.

The paper for all work is stacked on wooden platforms and are moved about to the different departments on elevating trolleys which get under the platform and raise the pile together with the platform. A new type of trolley operated hydraulically was introduced last year. This system has reduced handling charges considerably. A new type of "make-ready" table placed near the windows has displaced the cumbersome benches which occupied treble the space. All the sunshades were removed and the ceiling painted white to improve the lighting. In spite of this electric lights have to be used on a dull day. Consequently the building was rewired for new positions for lamps suitable to the requirements of each machine.

BINDERY

Machinery has superseded hand work in many sections of this branch. A 15 H.P. electric motor has taken the place of the old gas engine. The line shaft was extended to take some of the new machinery such as ruling machines, folders, book-sewing machines, wire stitchers and cutters. The machines are so arranged that the different operations are done in continuity. For instance the Seybold Three-Knife Trimmer which does the last operation in bookwork is the last on the line. Several new machines with independent motors are arranged in a separate line parallel to the line shaft with clear space for trolleys to move the "matter" from machine to machine. All trolleys, lines and stacking spaces are marked out on the floor.
Some of the machines installed in the Bindery are new introductions to Ceylon, and the following notes will help to form an idea of their working:

1. **Seybold Three-Knife Book Trimmer.**—This is a machine designed to cut in one operation the three sides of hard or soft bound books, stitched and sewed binding and paper material. The pile of books are held firmly under an automatic clamp and two side knives first descend and cut from the back towards the front of the books simultaneously.

   The shear travel of these knives is against the bound edge so that folds are cut clear. The front knife then trims the front edge. The knives are capable of easy adjustment within the maximum and minimum limits. The clamp is entirely automatic and is provided with a flexible joint which prevents the pattern block to adjust itself to the difference in height between the front and back of bound books. Pressure is applied through a friction clutch. A safety washer interposed between the drive shaft and operating parts of the machine breaks away when subjected to overload through maladjustment of the friction brake, thus ensuring the safety of the operator.

2. **Crawley Backing and Rounding Machine.**—This machine is designed to give the backs of books the convex and the front the concave form.

3. **Super Imperial Double-Sided Disc Ruling Machine.**—This machine as the term denotes employs circular discs instead of pens to perform the ruling. It is capable of ruling both sides of the paper at high speeds at one operation. The machine is driven by a 1 H.P. motor with panel and various speed starter and is fitted with a mechanical feeder capable of holding 15 to 20 reams according to the thickness of paper and is arranged to lift automatically. The sheets are separated by the pressure of two rubber rollers which are locked by
a ratchet on the pulling stroke and made to freewheel back on the non-feeding return stroke. Knife points adjusted to correct pressure prevents more than one sheet being drawn at a time. The ruling cylinders are steel tubes with C.I. hubs and have movable ruling cloths running over these. Unlike the printing presses which grip the paper to the cylinder to ensure accuracy of register, the ruling machine holds the paper to the cylinder by endless cords. Different colours can be ruled in one run. The delivery is the usual Jogger type.

(4) The Bracket Stripper in short is a machine designed to join by glue a strip of material to paper covers, files, etc. The glue is melted and kept hot by an electric heater and the jointing material (in continous strips) is wound on spools like a camera film. The material to be jointed is fed on to a hopper and the machine guides these apart at the set distance and the gummed strip is automatically pasted. A knife with a trigger action cuts off the endless strip at the set time.

(5) Folding Machines.—There are two examples of knife folders, one of which is fitted with a Camco Rotary Feeder. In knife folders the sheet is first fed by tapes to an upper table where the paper is registered and then a knife with a saw edge strikes on the line of the first fold and tucks the sheet between two rollers. The folded sheet is passed on to a second table where the second fold is executed similarly. Another machine working on an entirely different principle is the Camco Folder. Here the paper is hand fed on to a table on which a series of rollers are mounted at an angle of 30° to the feed side of the table and flush with the tops. The rollers are rotated by a belt stretched on the underside. When the paper is fed the rollers carry the paper against the feed side up an inclined plane to a set distance. The speed with which it
strikes makes the paper sag at the middle point. Two grooved rollers grip this sag and pull the sheet down making the first fold, etc.

Machinery has done much to relieve the congestion which existed in this department before the re-organization. A new type of table is built on both sides of the cutting machines, with waste boxes placed under the tables. This arrangement has saved much space. The machinery occupy the right side of the building and all hand operations and working tables together with the new Gold Blocking Room and Paper Stores the left. Automatic cutters, baling, punching, embossing and wire-stitching machines are needed to cope with the increase in volume of work, and till arrangements could be made to shift the Paper Stores from this section of the building the installation of these machines are held in abeyance for want of room. It must be admitted that the Bindery as it stands cannot cope with the output of the Machine Room.

ROLLER CASTING

One of the finest roller casting plants is now installed. The modern practice is to force the hot composition upwards into battery of moulds arranged in groups in a large cylinder with a water jacket instead of pouring it down the stocks from above. The advantages of this method of casting are that several rollers can be cast simultaneously and air bubbles are eliminated. The hot composition is forced by compressed air into the moulds which are preheated by hot water and cooled by the admission of cold water through a two-way valve. The moulds are contained in a Gatling gun which is pivotted. The rollers are removed by allowing them to slide under their own weight when the gun is in the vertical position.

This paper will not be complete without recording in brief the measures taken to re-organise the office and accounting system which play an important part in the smooth working and general efficiency of the Press. It is hoped that the paragraph on the Costing System will be of special interest to Engineers in charge of general engineering workshops.
All necessary instructions and material for carrying out each piece of printing work as required by the indenting officers are entered on a Work Ticket by the Work Ticket and the Planning Sections. A Work Ticket accompanies each job through the Works. The Planning Section visualises the requirements of the finished job and suitably plans it in the most economical method. All the information and figures from the Costing System are made available to, and are used to great advantage by, the Planning Section. When a job is completed its Work Ticket and Cost Sheet and other connected papers are received in the Planning Section to check whether individual operational times are fair and reasonable and also to ascertain whether the work has been carried out in the production departments according to the planned details written on the Work Ticket. All helpful information derived from this final check is recorded on a card and filed in the Planning Section for reference and use when the same work is next received.

There is a special section of the office called the Complaint Section which looks into all complaints received either by letter or 'phone. On receipt of a complaint the position of the job is located and a report card is addressed to the Superintendent of the department in which the work is progressing. The Superintendent enters the time the job will leave his section and passes it to the next Superintendent, etc., and the card is returned to the office with all details required to give the indenting officer a satisfactory reply. There is another function that the Complaint Section performs, i.e., preventing and minimising all complaints. All urgent jobs are followed through all the departments and earliest possible despatches are made.

The Costing System as followed in the Government Press is based on the principles advocated by the English Master Printers' Federation. The details differ considerably owing to the different bases adopted in England and Ceylon for the payment of wages. In England the wages paid vary according to the number of hours worked and, therefore, are a reliable indication of the amount
of work performed. The majority of the employees of the Government Press are paid monthly wages and are no indication whatsoever of the amount of work performed since employees are entitled to leave on full-pay. The conditions in Ceylon make it practically impossible to provide a weekly check on the cost and the value of production. In matters of principle the rules laid down by the English Master Printers' Federation are followed.

LABOUR CLASSIFICATION

Labour is classified into two sections, viz., "Chargeable" and "Non-chargeable". A labour classification is maintained in the Costing Section showing the branch in which every person works, and whether his work is chargeable or non-chargeable.

All chargeable hands produce docket, showing the number of the Work Ticket, the nature of the work done, and the number of hours engaged against the respective job. These docket are in English and it did not take long for the workmen to grasp a working knowledge of the forms. These daily docket are checked in the Costing Branch with the labour classification and are summarised in order to ascertain the total number of hours worked on each job. The time thus arrived at is posted to the relative Cost Sheet under the branch where the work was done, and the total number of hours worked in the various branches are multiplied by the respective hourly rates to ascertain the cost of the work.

To arrive at the hourly rate for each department it is necessary first to ascertain the cost of maintaining each section. The Expenditure for the previous financial year is taken as a basis, but allowance is also made for any perceptible variation in the current estimates. In allocating this expenditure officers are guided by a table showing the basis of such apportionment to the different branches. The expenditure apportioned to overhead is again redistributed in proportion to the different production branches and totalled up. This total divided by the chargeable hours (arrived at from production sheets) gives the hourly rate.
The hourly rates of machines vary according to the cost and capacity of each machine. Therefore the rates for the Machine Department and the Machine Section of the Bindery are calculated in two parts, viz.:

(A) To recover chargeable wages.

(B) To recover all other expenses.

Chargeable wages are calculated as follows:

(i) The total chargeable wages for the year divided by the number of chargeable men gives the average cost per chargeable man.

(ii) Each machine bears the cost of the number of men employed to work it; e.g.—

**Specimen Calculation**

90 chargeable men are employed at a total cost of Rs. 45,000 = Rs. 500 per chargeable man per annum.

Quad Crown Machine No. 4 employs two chargeable men and will therefore bear Rs. 500 × 2 = Rs. 1,000 of the total chargeable wages paid.

Assuming that the machine is running for Rs. 2,000 chargeable hours per annum, the cost per hour for chargeable wages is Rs. 1,000 ÷ 2,000 = Cts. 50.

And other recoverable expenses are calculated as follows:

(i) The value of each machine is expressed in units of Rs. 500.

(ii) The units of value is multiplied by the number of chargeable hours which the machine runs during the year to obtain an “Index” figure.

The “Index” figures for all machines are totalled.
(iii) The total expenses of the Machine Room for the year, excluding chargeable wages, is divided by the total "Index" figures to give an "Index" unit cost.

(iv) The "Index" figure for each machine is multiplied by the "Index" unit cost to give each machine its share of the total cost (excluding chargeable wages).

(v) The share which each machine bears to the total cost (excluding chargeable wages) is divided by the number of chargeable hours run during the year to give the hourly cost, exclusive of chargeable wages.

The two hourly rates are added together to give the total hourly rate for the machine.

As the allocation of work between two exactly similar machines may vary due to purechance, and since it is desirable that similar machines should be charged at the same rate, machines are grouped for the purpose of rate calculations and one average rate calculated for each group.

The effects of the re-organization upon the votes and personnel of the Department are shown in the following tables:
## TABLE I.—EXPENDITURE FROM VOTES

<table>
<thead>
<tr>
<th>Sub Heads</th>
<th>Description</th>
<th>1929-30 Rs.</th>
<th>1930-31 Rs.</th>
<th>1931-32 Rs.</th>
<th>1932-33 Rs.</th>
<th>1933-34 Rs.</th>
<th>1934-35 Rs.</th>
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<tbody>
<tr>
<td>Recurrent Expenditure</td>
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<td>1</td>
<td>Personal Emolument</td>
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<td>318011</td>
<td>284992</td>
<td>253939</td>
<td>269837</td>
<td>277857</td>
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<td>2</td>
<td>Stationery, Office furniture and office requisites</td>
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<td>b</td>
<td>240</td>
<td>220</td>
<td>230</td>
<td>238</td>
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<td>Electric current</td>
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<td>12975c</td>
<td>3872</td>
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<td>Water supply</td>
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<td>1052</td>
<td>1567</td>
<td>1374</td>
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<td>Temporary labour</td>
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<td>119464</td>
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<td>Paper plant &amp; material</td>
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<td>141734d</td>
<td>116238d</td>
<td>116376d</td>
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<td>7</td>
<td>Gas</td>
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<td>4535</td>
<td>4346</td>
<td>4286</td>
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<td>Incidental expenses</td>
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<td>Total Recurrent Expenditure</td>
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<td>515807</td>
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<td>Decrease on 1929-30 Rs.</td>
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<td>—</td>
<td>1054838</td>
<td>1885748</td>
<td>2668582</td>
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<td>Decrease on 1929-30 %</td>
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<td>—</td>
<td>13.71%</td>
<td>24.52%</td>
<td>34.66%</td>
<td>32.94%</td>
<td>28.43%</td>
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<td>Special Expenditure</td>
<td>9</td>
<td>Overhauling of 4 Mono Casting Machines</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>12747</td>
</tr>
<tr>
<td>Total Expenditure : Recurrent and Special</td>
<td>769206</td>
<td>663723</td>
<td>580632</td>
<td>502624</td>
<td>515807</td>
<td>550541</td>
<td>563288</td>
</tr>
</tbody>
</table>

(a) Under the provisions of paragraph 110 of Sessional Paper XIX of 1921, daily-paid employees of the Press are entitled on the completion of ten years' satisfactory service to promotion to the Fixed Establishment. Under this rule 21 men were promoted during the financial year 1934-35, and this sum includes provision for their salaries.

(b) Not paid out of departmental votes prior to 1931-32.

(c) The heavy consumption of electricity in 1930-31 was due to overtime working on election printing.

(d) Includes binding materials and consumable stores previously paid from Incidental expenses. The increase in 1934-35 was due to greater demand of printing by Departments, formation of new Departments and purchase of stores for election printing.

(e) Paid from Incidental expenses prior to 1931-32. Since 1930-31 used only for melting metal, roller composition and glue.

(f) In this year the whole of the printing in connection with the New Constitution was done.

(g) The aggregate of these five items, viz., Rs. 1,032,703, represents the minimum saving in the years 1930-31, 1931-32, 1932-33, 1933-34, 1934-35, attributable to the re-organization.
Mr. Biggs estimated that a saving of £10,000, (say Rs. 1,35,000) or 15 per cent. per annum would be effected if his recommendations were carried out. Table I above shows that this estimated saving has been achieved.

In the first year of the re-organization, in addition to wiping out some 3,000 items of arrears, the department was called upon to undertake the whole of the printing in connection with the introduction of the New Constitution.

The following remarks will serve to indicate the means adopted to effect the re-organization of the Department:—

(i) Adoption of a more economical format: e.g., royal octavo in place of foolscap. A comparison between a Sessional Paper printed in 1929 and one printed in 1936 will clearly show that appreciable economy ensues. The change of style has allowed the expenditure on raw materials of manufacture to be reduced although more work is being done.

(ii) The new high speed printing and binding machinery, equipped with individual electric drives and automatic feeding and delivering attachments, has enormously increased the output per man.
It has thus been possible to do more work with less staff. The new format adopted has assisted in this direction also, because it permits a greater number of pages to be printed on one sheet than was before possible with larger size pages.

(iii) Prior to 1930 the activities of the staff were controlled "in the mass" by means of foremen acting under the direction of three Assistant Government Printers and one Superintendent of Linotype. Under the new system every man engaged on directly productive work has definite tasks allotted to him daily and is required to complete each one within a given time. Failure to complete the task within the time limit is immediately detected, the causes investigated, and steps taken to prevent a recurrence. Detailed records of production and cost are now available and provide reliable information upon which to base decisions as to further improvements in equipment and system. Thus a steady improvement in both quality and quantity of the output may be expected, accompanied by a progressive decrease in cost.

In conclusion my thanks are due to Mr. A. C. Richards, Government Printer, for reading over this paper and to the various suggestions given.