



सत्यमेव जयते

CAREERS INFORMATION SERIES: 12

CAREERS IN PRINTING

CAREER STUDY CENTRE
CENTRAL INSTITUTE FOR RESEARCH & TRAINING
IN EMPLOYMENT SERVICE, (D.G.E. & T.),
MINISTRY OF LABOUR, GOVERNMENT OF INDIA
PUSA, NEW DELHI-110012





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CHAPTER I

THE PRINTING INDUSTRY

Introduction

THE PRINTING process is basically a means of transferring ink impressions of words, numerals, symbols and photographs and other illustrations to paper, metal or other materials. Printing has played a significant role in the field of mass communication and dissemination of knowledge. It has helped to bring education to the masses and has enabled people all over the world to keep in touch with ideas and events everywhere. Printing has been mainly instrumental in the spread of knowledge in diverse fields, such as literature, medicine, engineering, technology, science and industry. Printing is, therefore, truly known as the 'Mother Art of Civilization'.

Historical Background

In China printing from wooden blocks was practised since the Sixth Century A.D. and many block books found their way along the trade routes to the West. There were shops selling hand copied books in many parts of Europe. But it was the epoch making effort of Johann Gutenberg of Mainz, Germany which led to the European invention of printing in the 15th Century. Gutenberg introduced setting in of movable type alongwith the manufacture of a new kind of paper and ink and the adaptation of a small domestic press. His discovery led to the reproduction of thousands of identical copies, each one exactly the same as the other.

Later on, printing methods were considerably improved. Power-operated printing machines were invented and type-setting machines were introduced. The most commonly used methods of printing today are letter press, lithography, gravure and screen printing. However, technological advances have brought about a revolutionary change in the printing

industry. Electronics, for example, has now transformed the printing industry into a highly mechanised and sophisticated industry. The advent of computer, in particular, has led to rapid developments in phototypesetting, offset printing, colour scanning and various other products which are in common use.

Employment Pattern

Printing has grown into a leading industry today. Some of the major functions of the printing industry are the printing and publishing of newspapers and periodicals, magazines and books, the production of business forms, the production of greeting cards and gift wrappings, commercial or job printing, book-binding and the provision of typesetting, photoengraving, platemaking and other printing services primarily for printing establishments. Most of the daily and weekly newspapers in the country do their own printing. Commercial or job-printing establishments produce a great variety of materials such as advertising matter, business cards, calendars, labels and pamphlets. They also print limited run newspapers, books, and magazines.

According to the All-India Printers' Organisation, there are at present 50,000 small, medium and big printing presses in the country employing about 50 lakh of people in a wide variety of occupations. These occupations are found principally in printing and publishing industry, but also in Government presses both under Central and State Governments. About one-third of all printing employees work in printing craft occupations. Among other employees in printing occupations are artists, photographers, executives including specialists in labour management, business management, commerce etc., salesmen, engineers, maintenance mechanics, dispatchers, labourers, etc.

In the organised sector of the economy which covers all establishments in the Public Sector and non-agricultural establishments employing 10 or more workers in the Private Sector, there were 2,082 printing establishments employing over 1.60 lakh workers as indicated in the table that follows :

TABLE 1
EMPLOYMENT IN PRINTING AND PUBLISHING INDUSTRY IN THE ORGANISED SECTOR

Industry	Public Sector			Private Sector			TOTAL	
	No. of Establishments	Employment	No. of Establishments	Employment	No. of smaller Establishments	Employment	No. of larger Establishments	Employment
1	2	3	4	5	6	7	8	9
Printing & Publishing of Newspapers & Periodicals (ICI Code 284)	5	254	190	32,417	89	9,600	284	13,571
Printing & Publishing of periodicals, books, journals, atlases etc. (ICI Code 285)	87	45,146	259	21,185	580	9,411	806	71,742
Printing of bank notes, currency notes, postage stamps, security presses etc. (ICI Code 286)	10	4,139	..	..	..	..	..	4,139
Engraving, Block making etc. (ICI Code 287)	51	23,558	5	19,860	481	4,804	..	48,362
Printing & Publishing & Allied Activities (not elsewhere classified) (ICI Code 289)	..	..	774	74,453	1,137	12,517	..	1,06,123
Total	153	73,097	774	74,453	1,757	12,517	..	1,06,123

It is evident that the organised sector employs only a small fraction of total employment in the Printing Industry. Bulk of the employment is found in the informal or self-employment sector.

Wage-paid employment opportunities for printing craftsmen and other workers exist mostly in Government Presses, both Central and State, Newspaper establishments, magazine offices, printing and publishing houses, job presses and also presses owned by universities, trusts, railways, research institutions etc. It may be interesting to record that from six printing presses under Central Government in 1947 employing a little over 4,000 employees, the number of presses has gone upto twenty in 1983 with about 16,000 employees.

There are at present 18,140 newspapers employing more than 4,50,600 persons. Most of the large newspapers have their own printing presses to print their dailies and other periodicals. These are located in metropolitan towns like Delhi, Bombay, Calcutta and Madras. Of late, regional newspapers with their own printing presses are also coming up consequent to Government policy. Many such presses employ several hundred skilled craftsmen. However, smaller dailies and weeklies owning small job presses employ fewer than 10 skilled workers.

Private commercial presses and job shops are the next largest employer of printing craftsmen.

Most of the printing presses are located in large towns as there are opportunities for setting up of presses and their sustained growth. Small towns have limited scope for their growth. These presses handle the local printing jobs of the community, such as printing of letterheads, wedding, visiting and invitation cards, posters, handbills, circular letters, labels, paper and telephone bags and boxes etc. Firms publishing books of general interest and also college and technical textbooks, periodicals and greeting cards also offer employment to skilled printing craftsmen.

Though Government Presses and large commercial presses have separate binding sections, quite often book-binding jobs are handled by separate trade bindaries which cater to the local printing industry in assembling, stitching and binding the printed materials into books, magazines or pamphlets.

Printing Processes

Printing is an art or a technique of reproducing and duplicating texts, drawings, illustrations, photographs, etc. through mechanical and photo-mechanical processes on printing materials like paper, cloth, metal, glass, wood, synthetic materials, etc.

The most common processes of printing are :—

- (i) Letter Press Printing.
- (ii) Litho Printing.
- (iii) Gravure Printing.

In addition to the above, Silk Screen, Collotype, Flexography, Xerography and printing from steel and copper engravings are the other important processes making important contributions to the printing industry.

(i) Letter Press Printing.—The technical name of this process is the relief printing. It is the oldest and the most common printing process. It is the technique of printing from types, blocks, stereotypes, electros, etc. having in relief the character or design to be printed. The printing images in this process are physically above the non-printing areas. When ink is applied on letterpress printing surfaces, only the printing areas catch ink because of the non-printing areas are at a lower level. The inked printing images when brought in contact with the printing materials transfer the ink onto them, thereby producing a print.

The biggest advantage of the letterpress process is that the last moment changes in the text are possible in this process. Also it is quickest process between the receipt of

manuscript and the supply of the printed copies. The printing by letterpress process is very sharp and bright. The limitations of the letterpress printing process are the higher cost of blocks and the need of good quality art paper for the printing of half tone illustrations.

The machines used in this process are called treadles, platens, cylinders and rotaries. The letterpress process is best suited for the printing of letterheads, visiting cards, invitation cards, bill books, etc. and also for the printing of newspapers, book magazines and journals with a limited print order.

(ii) **Litho Offset Printing.**—The technical name of this process is the planographic process of printing and is based on the principle that the grease and water do not mix rather they repel each other. In the offset process, the printing and non-printing areas lie almost on the same plane but are separated from each other chemically. The printing is done from plates in which the printing areas are made grease receptive and non-printing areas are made water receptive. When water is applied on a offset plate, only the non-printing areas accept water while the printing areas repel it. Now when ink is applied on this plate, the printing areas accept ink while the non-printing areas repel it because of the presence of water on it.

In the actual printing process the printing image is first transferred from the plate on to the blanket and then from the blanket onto the paper. Since the paper do not directly come in contact with the printing plate in this process, it is also known as indirect method of printing.

The offset printing surfaces comprise of paper masters, zinc and aluminium plates, bi-metal and tri-metal plates, etc. The machines used in the offset process of printing are called sheet-fed and web-fed rotaries.

The main advantage of this process is that it is cheaper for jobs having larger print order and also for the jobs with large number of illustrations. Offset is best suited for re-print jobs in which no re-composing and block making is involved. The make-ready time is almost negligible in this process and the best results can be achieved even on cheap quality paper by this process. The speed of offset machines is much higher than that of letterpress machines.

The disadvantage of the offset process is that the printing is not so sharp and bright as in the letterpress process. The last moment changes in the text are not possible in the offset process because even for a small correction, the whole plate has to be prepared again. It is very difficult to maintain uniform impression in offset if the print order is short.

(iii) **Gravure Printing.**—The technical name of this printing process is the 'Intaglio Process' of printing. It is just the reverse of the letterpress process in appearance. The printing areas in gravure are depressed while the non-printing areas are raised.

The printing areas are in the form of small cavities. When ink is applied on a gravure printing surface, the ink gets filled into the cavities. The superfluous ink lying on the non-printing areas is removed with the help of a doctor blade. The paper is now brought in contact with the printing surface. The paper absorbs ink from the cavities and in this way a print is obtained on it.

The gravure printing is generally done from copper plates and copper electro plated cylinders. The gravure process is best-suited for the printing of jobs having large number of multi colour halftone illustrations and the jobs with more than 2 to 3 lacs of impressions. The mass circulation coloured and illustrated magazines such as Illustrated Weekly, Dharmayug, Femina, etc. are printed by this process. With gravure printing it is possible to achieve depth of colours and rich gradation of tones even on cheapest possible papers.

The preparation of gravure plates and cylinders is comparatively expensive than all other printing processes.

There are other commonly used printing processes.

(i) **Silk Screen Printing.**—Silk screen or Serigraphy is a stencil printing process. It uses a stencil which allows the ink to pass through the printing areas and block the ink from non-printing areas. The original process is slow in operation. However, the process has since been mechanized, silk screen printing machines with automatic feeder and infrared driers are now available.

The shape of the stencil opening determines the design to be printed in the silk screen process. It is the only process used for the printing on the irregular shaped and cylindrical surfaces in addition to the usual flat surfaces.

The process is widely used for the printing of posters, show cards, greeting cards and all other jobs requiring liberal deposit of colours.

(ii) **Flexography.**—It is also known as Anilene process. It is practically a letterpress process making use of rubber and plastic stereotypes for the printing of wall papers, flexible plastic sheets and other similar packaging materials on a very high speed. Due to the high speed of the machines, the inks used in this process are the dyes dispersed in water, alcohol, spirit, etc. It is a cheap process of printing industrial jobs in large runs.

(iii) **Xerography.**—It is an inkless process of printing which uses static electricity rather than pressure to transfer the design from the plate to the paper. The darker parts of the image are heavily charged and the lighter parts are slightly charged in this process. A cloud of fine powder is released over the electrified plate and this gets transferred to the paper. The paper is now heated to make the image permanent. The heating melts the resins in the powder thereby printing the design on the paper.

This process is extensively used for making quick copies of records and correspondence and for printing engineering drawings, rule forms, etc.

Printing Occupations

Whatever the printing process used, most printing work goes through at least three printing stages : composing, plate-making and printing. Additional operations in a bindery are also needed for publications requiring binding, e.g. books, magazines, journals, pamphlets, etc.

Printing occupations can be classified in the following six groups :—

- (i) Composing Room Occupations, concerned with hand composition, display composition, and machine composition (called type-setting), including proof-reading.
- (ii) Photo-engraving and block-making.
- (iii) Electro-typing and stereo-typing. These are the processes for duplicating the type matter to be printed.
- (iv) Lithographic Occupations for printing multi-colour jobs.
- (v) Machine-Room Occupations concerned with actual printing operations.
- (vi) Book-binding and Packing Occupations.

In the skilled occupations, practically all the workers are men. In some presses, however, women are also engaged as skilled and semi-skilled workers in the composing room and binding branches.

CHAPTER II

COMPOSING ROOM OCCUPATIONS

PRINTING by the letter-press process begins in the composing room where the manuscript copy is set in type, chiefly by hand in small presses and typesetting machines in large presses. The composed matter (in hand or machineset), blocks, photo engraving cuts etc., for the printing jobs are then assembled and got ready for the machine room. Composing is an art of assembling characters, figures, symbols, signs and spaces to make words, lines and paragraphs in the required type and page size. In letter press printing a 'type' is used for each letter of the alphabet.

A type is a rectangular piece of metal consisting of lead, tin and antimony alloy on one end of which is cast or engraved a character, sign, symbol etc., for use in printing. Types are available in different sizes and designs. Composing is done using different sizes and shapes of 'types' for composing running matter, tabular matter, text books, magazines, account books, advertisements, letter-heads, labels etc. These types are stored in a particular order in a tray which is usually made of wood. This tray is called the 'typecase' and has small pigeon holes (compartment) for each character in the script of a language.

Composing room workers include make up men, hand compositors, typesetters (lino operators, mono key board operators, mono casters operators, teletype setters) photo compositor and proof readers.

r. Hand Compositors

(i) Hand Composing is the oldest composing room occupation. The man who does this work is called a Hand compositor N.C.O. (921.20). He works in composing rooms

of a letter-press printing press and composes (assembles) the printing material by hand according to the manuscript or typescript.

The original copy of the manuscript and other instructions are studied to determine the depth of the page, the length of lines and the size and families of types to be used by picking up relevant types from appropriate cases, the type is set by hand in an oblong adjustable metal device called a 'composing stick'. The compositor follows the manuscript rigidly but breaks up words at the end of a line when necessary. As the matter is being composed, lines of type are transferred from the stick on to the metal tray called 'gally'. The proof taken out from the composed matter lying in the gally is called a gally proof.

The proof is checked by a Proof Reader with the original copy for removing typographical, composing and grammatical errors. A copy holder assists the proof reader in proof reading by reading out the manuscript. Corrections are then carried out by the compositor in the composed matter according to corrections marked in the proof copy. Now the Make-up-Man divides all the type set matter placed in a galley, into pages of specified measure, introducing page numbers, headings etc., according to instructions and by positioning blocks and arranging type for effective display.

A good compositor is expected to possess fair knowledge of different sizes and families of types, spacing material, various signs and correction marks used in proofs. He is often expected to possess some knowledge of scientific symbols for composing technical publications. On the top of it all he has to acquire a certain degree of speed and accuracy.

In small printing shops, he is usually an all round printer and also performs the functions of a 'Compositor', 'Proof Reader', 'Lock-up Man' and 'Distributor'.

Compositors have often to work, along with other workers, in composing rooms, which are usually small and

congested. The work involves continuous standing for long hours and contact with dust, lead, ink and cleaning fluids. Working hours are fixed at 48 hours a week. In newspaper offices, night work is often required.

(ii) **Make-up-Man.**—After having the matter composed and corrected and the blocks of the illustrations prepared, the next job is to combine them and prepare pages of the required size for final printing. This is known as Page Make Up. The person who attends to this work is called a make up man. Generally, the job of make up is done by the experienced compositors since it requires more skill and intelligence.

(iii) **Lock-up-Man/Impositor/Imposer (N.C.O. 921.80).**—He transfers the pages to an imposing surface also called stone in a prescribed pattern so that when locked, printed and folded the pages have proper margins and correct numerical sequence. The pattern or the scheme of imposition often differs according to the number of pages contained on each printing sheet. The imposer fixes spaces of margins using wooden pieces and lead. By using a planer, he levels up the pages and locks them up in position in a metal frame called the chase. A final check is made and proof is taken out to ensure that material is securely locked, the type is firmly upright and that the margins are correct. The complete locked up matter known as the 'forme' is then sent to the printing section for printing.

(iv) **Distributor (N.C.O. 921.40)** who is usually a junior compositor, unlocks the chase and breaks down the type 'forme'. He separates spacing material types and blocks and returns the type and other material used in composing to their respective places in the type cases and racks for re-use.

2. **Machine Type-Setters.**—As already mentioned, composing is the primary or basic occupation. In small presses, composing is done by hand; but in most large presses, this work is done on composing machines called linotype, intertype, monotype, photo-setter etc. For speedy and accurate

composing most of the large presses have installed these machines. The bulk of printed books and newspapers is composed by machines these days. Machine Type setters are the second largest composing room workers. They are usually classified according to the type of machines operated by them and are designated as Lino-Operator, Mono-Keyboard Operator, Mono-caster Operator etc.

(i) The Lino-type Operator (N.C.O. 922.10) sits in front of the machine and clips the 'copy' (manuscript) to the machine's copy board and adjusts the machine according to size of type and length of lines to be composed. A lino-type machine has a keyboard of about 90 keys of letters and other characters, somewhat similar to that of a typewriter keyboard.

The Lino-operator types the material by pressing keys of the keyboard to assemble matrices (metal pieces in which the characters or dies are stamped) and space bands to form words and lines. He follows manuscript rigidly, but breaks up words, if necessary, at the end of each line.

After a line has been composed, he presses a lever, and the machine automatically casts the whole line of types in a solid strip of metal, called a 'slug'. The slugs are then delivered in a gally and later assembled into type forms, from which either copies are finally printed or duplicate plates are made for final printing.

Other duties performed by a Lino-type Operator include casting of new lines to remove errors pointed out by the proof-reader; removal of casted slugs from the machine; putting new ingots (blocks) of the type metal into the melting pot to keep it full; and doing minor adjustments. Occasionally, he may be required to draw proofs of composed slugs and send them to the proof-reader for corrections. In a small press, he may maintain, repair and operate the lino machine but in the large presses, mechanics are employed to adjust, repair and maintain the machines.

Lino-type operator goes by many other job-titles, viz., Lino-type operator, Lino-typesetting Machine Operator; Composing Machine Operator; etc.

(ii) A Photo-setting Operator or Intertype Photosetter (N.C.O. 922.10), sets types with the aid of photography on a typesetting machine called the Linofilm, the Intertype Photo Setter, Rotofot etc. He operates a machine similar in character to a lino-type machine which is popularly known as a slug Monophoto compset Diatext Compugraphic or a line composing machine. These machines are operated more or less, in a similar way with some differences in their operations.

(iii) The Mono-type Key-board Operator (N.C.O. 922.20) also called Mono Operator, Composing Machine Operator, Mono-type Operates keyboard of a composing machine which makes performance on a spool of paper used for casting types for printing.

A mono-type machine consists of two separate units the keyboard and the caster (casting machine). Unlike the lino-type, which does the entire type-setting job, the mono-type keyboard produces only a perforated paper roll which is later fed into a mono-type casting machine which casts and assembles types automatically. In contrast to the lino-type, the mono-type makes possible the automatic casting of individual letters and other characters. This permits corrections to be made by hand without the need of re-setting the entire line as in lino-type. Mono-type, thus, retains some of the flexibility of hand composition, while offering the advantage of speed of machine operation.

The manuscript to be composed is kept in a copy holder, and a line-length indicator scale is set on the machine corresponding to the length of the line to be composed. The spool of paper is mounted at the top of keyboard. The operator is required to make certain adjustments in the machine before actually starting the work. He starts and operates the keyboard which perforates the paper. The perforated paper then automatically winds on another spool.

While operating the keyboard, which is similar to that of a type-writer, except that it has four times as many keys, the operator follows the manuscript rigidly. Of course, he breaks words, when necessary, at the end of each line. When all the matter has been transferred on the roll of paper, he tears off the perforated strip for use by Mono Caster Operator.

(iv) The Mono-type Caster (N.C.O. 922.30) also called Caster Operator and Mono Caster, operates the monotype casting machine, which casts and assembles type automatically, guided by the perforations in the paper spools prepared by mono-type keyboard operators. New type is made for every job.

The spool of paper, perforated by mono operator, is fed into the mono-type casting machine. The composing stick is set to the required length; matrix case of required size of type is inserted and galley is locked on bed of machine. Molten type metal is forced into the matrix (die) to cast the individual letters. The operator ensures that the metal pot is adequately supplied with metal and that proper temperature of molten metal is maintained. When machine is started, matrices for casting the letter are automatically selected by means of perforations on the tape.

The duty of a Caster Operator is not only to operate the caster machine, but also to mend it while it is operating and to look after its maintenance and repairs.

(v) The Phototype Setting Machine Operator (N.C.O. 922.60) operates the keyboard of a machine which reproduces letters on film or sensitized paper for reproduction in printing. The unexposed film or sensitized paper is loaded in the photographic unit of machine; then he examines the layout of the copy of typographical indications, such as spacing, type faces, length of lines etc. After reading the copy, he depresses keys of the keyboard to reproduce required letters on film or sensitized paper, manipulates machine controls, as necessary to change type size and spacing, and adjust

camera light to eliminate incorrect lines. When the operation is completed, he removes container with exposed film/sensitized paper and sends it to the process room for development. The end product of a phototype setter is either a negative or a positive as per the requirement.

(vi) The Maker-up, Photo-type Setting (N.C.O. 922.50) arranges photo-composed type film and fixes it on positive paper in readiness for reproduction on printing plates. After examining the layout of the copy, he marks the positive paper to guide in arranging type, and also draws lines on positions for decoration purposes and tabular matter. He waxes proof-sheets of photo composition and cuts out letters and line as required. Later on, he places the cut-out pieces in position on paper, using measuring instruments for guidance. He presses a sheet of tissue paper over photo-composition to ensure that wax holds pieces in position. Then he checks arrangements of composition and makes necessary alterations and passes on completed positive for printing reproduction.

All type-setting machine operators generally work in noisy conditions, where a number of people work on different machines.

3. Proof Readers and Copy-Holders

(i) Proof Reader (N.C.O. 359.60).—Proof reading is an art of marking corrections in the proofs pulled from a composed matter. It is accomplished with the help of signs and symbols which are marked by a proof reader in a particular way with the help of a copy-holder. These marks made by a proof-reader indicating various corrections are called the reader's marks. Such marks are necessary to cut short the writing of long words in place of errors in a proof. In this the proof reader simply cuts through the word or a character in the text and makes a special sign in the margin in the same line. In other words these are marks or indications of errors to be corrected or improvements required in a composed matter.

The proof reader should be able to decipher badly written copy and should have a good general knowledge. He should have a quick eye for errors, a good handwriting and a retentive memory. He should know abbreviations and contractions and their meanings, foreign phrases and their meanings, rules of grammar, division of words, punctuation points and their use, uses of figures and roman numerals, impositions, knowledge of type sizes and different type faces. He should also know the utility of materials used in different printing presses. He should have great patience and should never try to hurry through a proof. A bit of hurry may mar the charm of the well printed matter. He should be able to mark the proofs at the speed at which a copy holder reads the copy for him.

(ii) The Copy Holder (N.C.O. 359.70) reads the manuscript aloud to the Proof-Reader to enable him to make corrections in proof.

Normally, the work of proof-reading is done in the reading room of a press, which may be comparatively calm and quiet; but in small presses, where there is no separate reading room, the proof-reader has to work in a noisy and disturbing environment. Sometimes, proof-readers and copy-holders, having the same qualifications and training, exchange their work among themselves for breaking the monotony of the work.

CHAPTER III

PHOTO-ENGRAVERS AND BLOCK MAKERS

PHOTO-ENGRAVERS (N.C.O. 926.50) prepare metal printing plates of illustrations, pictures, maps, charts and other printing images that cannot be set in type. On such plates the printing surfaces stand out in relief above the non-printing portion like in any letter press printing images. When the image (printing portion) is etched below the plate surface for use in gravure process, workers engaged on making such plates are called photogravure plate makers or roto-gravure photo-engravers. In making a photo-engraved plates i.e. blocks for the letter-press process, the entire job may be done by one man or may be divided among a number of skilled workers each specialising in a particular operation. These specialised workers are known as photo-engravers, printers, etchers, finishers routers etc. In large printing shops, this work is always divided among a number of specialists.

(i) In Photo-engraving, the process is started by a Cameraman (NCO. 926.10). For a half tone block, he photographs the image to be printed through a cross-lined screen which breaks down the copy into a large number of tiny dots. For a line block, the screen is not required. The photograph or illustration to be printed is exposed on a sensitive film or plate on a process camera after making the necessary adjustments. The exposed film/plate is then developed in the dark room to prepare the negative.

(ii) The Printer (N.C.O. 921.10) prints the image on a metal plate. This is done by coating the metal plate with a sensitizing solution, exposing the plate to lights through a negative, and thus making the coating insoluble in the exposed areas. The image is then developed and burnt to make it acid resist. The back of a plate is also coated with a shillac solution to stop etching. The edges of the image

are protected by a bitumen powder during the etching process. Zinc, Copper or Magnesium plates are used for preparing blocks according to the requirements. The colour blocks are usually prepared on copper.

(iii) The Etcher (N.C.O. 926.50) etches (cuts away) the non-printing areas by means of an appropriate acid bath leaving the image standing out in relief.

The plate is then finished (carefully inspected) and touched up with retouching ink and etched and re-etched to bring out sharp details of the image. The zinc plates are etched in a dilute solution of nitric acid and the magnesium plates are etched in a dilute solution of sulphuric acid. For copper plates a dilute hydro-fluoric acid is used.

(iv) A Router (N.C.O. 925.30) removes or routs away unwanted metal from the non-printing parts of the plate to prevent it from touching the inking rollers during printing.

(v) A Mounter (N.C.O. 925.20) fixes the engraving (etched plate) by cutting it to size, levelling its edges, drilling holes and mounting the plate on wooden block by nails, to bring it to the type/height for use in printing.

(vi) A Proofman (N.C.O. 921.90) then takes out a sample proof for checking the details and comparing these with the original supplied for block making.

In roto-gravure-photo-engraving, operations involved are the same as in the letter press photo engraving, except that a positive and not a negative is used in making the plate and that it is the image (rather than the non-image areas that are etched away).

CHAPTER IV

ELECTRO-TYPERS AND STEREO-TYPERS

MOST large letter press printing jobs require the use of duplicate printing plates. For instance, when a large edition of a book or magazine is printed, several plates are used one after the other, to replace those which become worn out to give clear impressions. Again by means of duplicate plater printers may print the same job simultaneously on several presses in the same place or in different towns to finish a large print order quickly. For example, in publishing daily newspapers the press may have to print thousands of copies in a few hours and then rush the printed newspaper to the readers.

Electro-typers and stereotypers are employed to make the flat or carved duplicate plates for use in letter press printing. Duplicate plates are made by electro-typing and stereo-typing processes from the flat printing formes. The covered plates are used on the high speed rotary machines for the printing of magazines and newspapers.

(i) The Electro-typer (N.C.O. 924.30) prepares the duplicate printing plate used in electro-plating process, by using handtools, electro-plating equipment and various machines. This involves several steps. A mould of the type formes is made and the required metal is then deposited on the mould by coating it with a (copper sulphate or nickel) solution if the mould is made of wax or by depositing a film of metallic silver if the mould is made of plastic. The mould is then suspended in electrolytic solution, which forms a metallic shell deposit on the coated mould. Later on, the metallic shell is stripped off from the mould and the shell is backed with a filling metal alloy and carefully finished.

(ii) The Stereotyper (N.C.O. 924.90) casts duplicate printing plates from a flong (specially prepared thick sheet of papier mache). The stereo-typing process is much simpler, quicker and less expensive than electro-typing, though it does not make an equally durable and fine plate. In stereo-typing moulds called mats (matrices) are made of flong (paper mould, a mould composed of blotting papers and tissue papers instead of wax or plastic). For this, the moist mat/or a dry mat, as in the case of newspapers printing is placed on the type formes (typeset matter and blocks) and is covered with a padding-blanket and a sheet of fibre board or even by extra sheets of thick paper (to protect flong from damage). Then the covered forme is pressed under heavy bower-driven steel rolls or hydraulic presses which forms impressions of the type and photo-engravings on the mat. Next, the paper mould is dried and placed in a stereo-type casting box from which a stereo plate is cast. In the larger presses, stereo-type plates are cast automatically in a machine (called autoplate). In smaller shops, electro-typers/stereo-typers are all-round workers, but in larger establishments, they may specialise or perform only specific work e.g. wax casting, moulding, finishing block making, etc.

CHAPTER V LITHOGRAPHIC OCCUPATIONS

LITHOGRAPHY, also known as OFFSET printing, is used for printing office and bank stationery, stock and share certificates and other forms. The printing is done on rotary processes from zinc or aluminium plates using the principle that oil and water do not mix. It is also used in the production of printings art subjects, magazine covers, book jackets, calendars, charts and posters, drawings, maps, display cards, children's books, text books, advertising literature, artistic labels and cartoons. The lithographic printing is more particularly used when a copy to be reproduced includes lot of colour and black and white photography and drawings. It is more frequently used for display jobs, specially those requiring large print orders. This method of printing is growing very fast because of lower cost of production and better quality of finished jobs in the long run. There are mainly four departments (excluding bindery) in lithographic printing presses : Camera, art, plate making and printing. The workers in each of these departments perform specific duties connected with the lithographic process. In small lithographic shops, workers have to be skilled in more than one occupation.

(i) The Photo Lithographer (N.C.O. 927.10) also known as lithographic cameraman, cameraman/camera operator, photographs original art work on film or glass to obtain a negative which in turn becomes a copy which is to be transferred to lithographic plates.

After mounting (placing) illustrations or type-set material on copy-board of copying frame, he adjusts lights and cameras, focusses with help of ground glass focussing screen, loads plate in a dark room, mounts the loaded mate on camera and exposes it to material (copy). Using a screen.

he breaks up shadings of the copy into dots for halftone printing. He also uses colour filters for preparing separate colour wise negatives for preparing individual plates. At times, he is called upon to make a positive film or glass plate.

In large lithographic presses, individual cameramen almost always specialise either in black and white or in colour photography. Alternatively, they may specialise as process photographer, halftone photographer or line photographer.

(ii) The Lithographic Re-toucher (N.C.O. 925.10).— After negatives have been made and developed, they frequently need re-touching to lighten or intensify certain parts after the photographic process has broken up the lines, images and designs of the printed material into a series of small dots. Making corrections by sharpening or reshaping dots is a highly skilled task and is done by hand with the use of chemicals, dyes and special devices.

The Lithographic Retoucher (also called Lithographic Process Artist, Colour Artist Retoucher, or Tono Artist) corrects film or glass plate negative or positive by comparing it with original copy and determining where and how much correction is necessary. He refines and corrects imperfections in designs even on lithographic plates by drawing on them with scribbling tools, crayons, pen and ink, etc. to make them fit for printing. In the process, he has to intensify or reduce unsatisfactory tone values, to blank out unwanted portions of negatives or positives, to add missing details, to change shades of colours, to apply tints to photographic plates (film or glass) and lithographic printing plates by brushing tint through a fine screen or to correct colours in the final press plates.

(iii) The Lithographic Artist (N.C.O. 030.80) draws posters maps, or other pictures on polished or grained stone or metal (zinc or aluminium) plates or on special transfer or glazed paper, when hand method are used in place of photo-mechanical methods. He may produce key patterns either by copying or creating original designs with soft greasy

crayons or pen and ink for subsequent processing and printing. Lithographic artists may specialise in various media, and are known as Stone Engraver Ben-Day artist (using Ben-Day's medium); Opaquer and Tuscher (who blanks out, outlines or shades portions of negative or positive film with lithographic ink called tusche).

Photographic negatives or positives, made by cameraman and corrected by artists, are transferred to press plates by workers in the plate making department. This is done usually by hand, and at times by machine.

(iv) When hand method is adopted, the Photo-Plate Maker transfers impressions from photograph negative to metal plates for subsequent processing for direct use in lithographic printing; covers the surface of the grained metal plate, usually zinc, copper or aluminium, with a coating of photo-sensitive chemicals. After the plate has dried, the negative or positive is placed in contact with the sensitized plate and exposed under strong arc lights, and is developed with photo-developing chemicals. The image is thereby formed on the plate from the negative or positive.

When the machine method is used, the plate worker exposes the prepared plate and the photographs in a vacuum printing frame or photocomposing machine. The plate is then developed and chemically treated to bring out the image.

The plate is then passed on to the press machine section for printing (description in Chapter VI).

Before printing a Proofer (N.C.O. 921.90), takes out proof from a hand operated offset press, by applying ink to Plate with a hand roller and turning crane to rotate rubber-blanket roller against plate and over paper to transfer image to proof paper.

There are numerous other semi-skilled workers to assist the workmen in the studio, art room and workshop.

CHAPTER VI

MACHINE ROOM OCCUPATIONS

THE ACTUAL printing operation is done in the machine room. The type formes from the composing room, the plates from the process department, Stereos and Electros from the stereo-typing department, lithographic plates from plate making department are all assembled and made ready for final printing. Different types of printing machines are used depending upon the type of printing surface. In brief, mechanical features of machines vary to suit the way impressions are made.

The 'Platen' or Treadle is the most common of all letter press printing machines and is still widely used in almost all small job presses. Platen is a plate in the printing machine by which paper is pressed against the types and blocks locked and fixed on the bed of the machine. Platen machines may be handfed or automatic. The second type of machine is called a flat-bed or a cylinder printing machine. On this machine the forme is placed on a flat horizontal bed (as distinct from the vertical bed of platens) and the impression is obtained by means of a rotating cylinder which revolves on it. The impression is accordingly taken in a continued succession of narrow strips or contacts and hence lesser force is required to obtain the impression. On account of this fact, machines of larger sizes can be worked with great speed. The capacity of the cylinder machines is much more than that of the platens and for doing jobs of a larger size these are indispensable. Besides, these machines give an even impression at a much greater speed. The third type of a machine is called a rotary machine. This can be a sheet fed rotary or a web fed rotary, depending on the form in which the paper is fed in to the machine. The web-fed rotary machine is a pretty big machine which is fed by large paper

rolls, prints the paper normally on both sides by means of a series of cylinders, cuts the printed web of paper into sheets, folds them and counts the finished products that emerge from the machine. All these tasks are performed automatically by means of different mechanisms. This mechanical feature makes it possible to achieve a very high speed and accordingly all newspapers and publications requiring large runs are printed on such machines. Because of the varieties of presses and the different methods of printing, the machinemen's (also known as the printer) work varies but on whatever machine he may work he has to do the skilled work.

(i) The Printing Machineman has to ensure that printed impressions are distinct, even and neither too dark nor too light. For this he places pieces of paper of the right thickness underneath low areas of the plates or type formes to level it and also sticks pieces of tissue paper to the surface of the cylinder or platen. He has also to make many other adjustments to control margins, to ensure uniform flow of ink and trouble free feeding and delivery of papers on the machine.

He sets formes or plates (the type set matter, assembled and locked in an iron frame called chase, by means of wooden wedges) for printing on the machine, and makes the machine ready by running a few samples through it to ensure that the impression is even and the flow of ink is uniform. When the machine is running, he has to examine the printed sheets from time to time to satisfy himself about quality printing and to ensure uniform quality throughout the run.

Pressmen's work varies from establishment to establishment. In many small printing presses, which are owned by Job Printers they are not only responsible for tending the machine but also for oiling and cleaning it and for attending to minor repairs and adjustments. In larger presses, they are assisted by attendants and helpers.

According to the type of machine operated, the machinemen may be known as pressman, Flat Bed Letter Presses Pressmen, Platen Machine Machineman, Cylinder Printing Machineman; (N.C.O. 923.10); Machineman Hand Printing (N.C.O. 923.20); Machineman Automatic Printing (N.C.O. 923.30) Machineman Rotary Printing (N.C.O. 923.40).

(ii) However, for machineman, Lithographic/Offset Printing has a few varied functions though the basic duties are the same as of letter press and gravure printers.

The pressman's job is to fix the plate and blanket on the press, adjusting the proper printing pressure. He is also required to mix inks and maintain proper ink-water balance on the offset machines.

CHAPTER VII BOOK BINDERS

MANY PRINTED items *viz.*, books, magazines, periodicals, pamphlets folders etc. required to be folded, sewn, stapled, stitched or bound. This work is done by bookbinders (N.C.O. 927.40). This may be got done in the bindery of a large press or alternatively by job binders who work on contract or piece rate basis for other printers publishers or customers. Binding is of many types. In edition case binding, which is the most complicated kind of binding books are made in quantity out of the big flat sheets of printed paper. The printed sheet (each containing many pages) are assembled and folded so that pages are in the proper sequence. Folding is generally made into sections of 16 or 32 pages each called 'signatures'. These signatures are gathered and assembled in proper order (illustrations which have been printed separately are also inserted) and sewn together into 'book bodies' which are shaped with various machines and trimmed to size, on the cutting machine. Fabric or cloth strips known as lining materials are glued to the backs (spines for reinforcement).

Sometimes edges of pages may be coloured or decorated, covers are then glued or pasted on to the book bodies and the books are then finished and wrapped in paper jackets (loose removable cover over a book). Quite often, letters and symbols are embossed on covers in gold, silver or other colours. Machines are being increasingly used particularly in big presses for folding, gathering, creasing, sewing, trimming, gluing, back lining, case making, casing-in etc.

Blank books and loose leaf binders bind ledgers and book keeping and accounting registers. This also involves many operations *viz.*, assembling, folding, gathering perforating, cutting and stitching, fixing covers of card board/cloth, fixing leather or calico back and corners etc.

In small binderies, which are common in most towns, most operations are done by hand though there also, various operations are divided among a number of workers, each doing a specialised job of gathering, folding, stitching, gluing etc.

There are also Map and Chart Mounters who specialise in gluing muslin backing or backboard to paper maps and charts for reinforcement; and book Menders/Repairers who mend/repair and renovate damaged or worn out books, manuscripts and other records and make them fit for re-use or re-sale. The latter type of workers are particularly in demand for handling library books, museum antique collections, archives etc.

CHAPTER VIII TRAINING AND PREPARATION

IN EARLIER days the common method of preparation for a career in printing was through apprenticeship. Generally the persons who are 8th class pass used to enter as learner, helper or apprentice. They generally picked up the skill of various jobs in printing within 5 to 10 years. Now a days the practice of on the job training is also common in small presses. The apprentices learn the job without any remuneration and on acquiring skill, they are paid nominal stipend. A number of institutions have started facilities for various printing crafts.

Regional Schools of Printing

Six regional schools of printing technology, located at Bombay, Allahabad, Madras, Calcutta, Delhi and Pune train students in all the subjects of printing technology. These schools offer both full-time and part-time courses in printing technology. The courses are open to persons who have passed 12th class or equivalent examination. The age limits are 17-20 years and relaxable to graduates. Diploma course in printing technology is of three years duration followed by apprenticeship ranging from six months to one year in a recognised printing press. Recently printing technology at degree level has been introduced at Regional Engineering College, Allahabad to meet the demand in the printing industry. Four to five year part-time courses are also open to bonafide press workers and apprentices engaged in various printing presses. Certificate courses of 3 years duration in hand composition, letter press printing, binding and packaging are also available at these schools. Local institutions in various states also offer courses in printing technology. Full details are given in Appendix-A.

Apprenticeship

Under the Apprentices Act, 1961, trade apprenticeship courses are available to persons in various government and commercial printing presses. Apprenticeship is available in the trades of (i) Compositor Hand, (ii) Lino Operator, (iii) Mono Operator, (iv) Mono Caster, (v) Process Cameraman, (vi) Retoucher Lithographer, (vii) Engraver, (viii) Letter Press Machineman (Platen and Cylinder), (ix) Plate Maker, (x) Machine Minder (Litho-officer, Lithographic), (xi) Book Binder. Those who have passed Matriculation examination or its equivalent or 10th class under the 10 plus 2 system with proficiency in English are eligible the trades (i) to (viii). The minimum qualification prescribed for trade ix is 8th class examination or its equivalent while for trades x and xi are 8th class. The minimum age requirement is 14 years. The duration of the apprenticeship varies between two to three years.

All apprentices are paid a stipend of Rs. 230 per month during the first year of training, Rs. 260 during the second year of training and Rs. 300 during the third year of training and Rs. 350 per month during the fourth year of training.

The apprentices have to sign a contract of apprenticeship, before joining the apprenticeship. Full details are given in Appendix-B.

On the job training is also simultaneously continuing in small local job presses. For this there are no uniform or prescribed educational and age norms.

CHAPTER IX WORKING CONDITIONS

MOST PRINTING presses are covered by Labour Legislation Acts. In accordance with the provisions of these Acts, working hours of printing workers have been fixed at eight hours a day. In many large commercial and Government presses, there are two shifts. The day shift varies from ever may be the shift (night or day), eight hours-a-day is the common working day, over six days a week.

Summer months are usually slack months when printing craftsmen take casual and annual leave so that the maintenance and repair of the equipment and plant is not properly looked after. Vacation with pay is provided according the rules and there are other benefits also, such as Contributory Provident Fund, Sickness and Accident Insurance under Employees' State Insurance Corporation Act.

Over-time work is usually common in all the private and Government presses during busy season.

Generally, working conditions in most of the presses are the same: the only difference is the arrangement of presses and equipment. Most printing workers (except proof-readers, copy holders and machine type setters) are required to work standing. Quite often they have to move constantly, seeing whether the machine is working smoothly and ensuring that the impression on the paper is uniform. Hand compositors have also to compose the matter standing, moving from tray to tray. Pressmen (Printing machine operators) and type setting operators work inside a printing press which at times, may not be sufficiently lighted and ventilated. Working area is often dirty, permeated with smells of printing inks, driers, cleaning agents, paper stocks etc. Printing

machinemen have often to work in cramped quarters, amidst the din, noise and vibrations of machinery. Operators and type setters, however, work in adequately lighted and ventilated rooms, though often congested.

Occupational Hazards

Most printing occupations are not 'White-collar' jobs, but are known as 'Blue collar' occupations. Naturally, clothes and hands get dirty with grease and ink etc. Most operations are also repetitive and monotonous e.g. hand-feeding of paper, unloading and piling of paper and finished sheets. Work is not exacting, except during the busy seasons, when workmen have to work day and night to complete assignments within the prescribed periods. On such occasions, over-work till late hours in the night may be done for consecutive days.

Most printing workmen are exposed to dust, dirt, inks and cleaning fluids and to vapours and odours of lead fumes, acids, solvents and other chemicals which may cause skin infections and respiratory ailments. At times, there is a possibility of injury from moving machinery and sharp edges of metals, tools, plates and other heavy loads. Injury to legs and feet can be caused by lifting and pushing type forms and metal chases. Type-setting operators working near metal moulding pots have to work in a hot area.

Litho-operators are exposed to possible skin infections and allergies, because of constant contact with chemicals, inks, dyes, acids and cleaning agents.

Proof-reading and composing jobs may cause eye strain from constant reading (of copy) and correcting proofs.

Most hazards are, however, caused by one's own carelessness, and can be avoided, if sufficient precautions are taken as stipulated under safety rules and orders.

CHAPTER X EARNINGS AND ENTRY

Wage Paid Employment

WAGE paid employment opportunities for printing craftsmen exist in the Central and State Government printing presses, national and local newspapers, magazines offices, printing and publishing houses, job presses and also in the presses owned by Universities, trusts, railways, research institutions etc.

Wages offered to printing craftsmen would vary from establishment to establishment and place to place. In general, remuneration to printing apprentices is paid Rs. 230 to Rs. 350 per month. A workman forming the lowest cadre as a compositor, copy holder, machine operator, etc. earns Rs. 260 per month plus allowances. The middle level posts carry a pay range of Rs. 380 to Rs. 560 plus allowances per month. The senior supervisory posts, like foremen carry a pay range of Rs. 425 to 700 per month. Salaries paid to different types of workmen in the Government of India's presses are given in Appendix-E.

Entry and Advancement

In most cases a person who seeks employment in printing has to start his career as a learner, distributor or apprentice, training himself to be technically qualified to become an efficient printer. Persons qualifying from the regional schools of printing have to undergo a practical training for one year. After completion of training, the young printing trainees are usually absorbed in Government and private presses.

After acquiring some experience, one may respond to advertisement asking for qualified and experienced technicians in commercial and Government presses.

I.T.I. Courses

Trade Courses in printing are conducted at Industrial Training Institutes located all over the country. The trades offered are : (i) Hand composing and proof reading, (ii) letter press machine and (iii) Book-binding. The duration of these courses is one year. Boys and girls who have passed 10th class or matriculation examination are eligible for Hand composing and proof reading course and minimum qualification prescribed for book binding is 8th class examination. Full details are given in Appendix 'C'.

In earlier days printing provided only lower and middle level careers. The job opportunities were confined upto the Foreman level. Due to technological improvements in printing and reader's liking for quality printing, the printing industry particularly in the private sector has now started providing careers at Management level. The objective of the training programme is to train managers who can ultimately occupy middle level positions in their technical areas. On gaining some experience they may rise to the level of Senior Executives. Science graduates with diploma in printing technology are offered employment opportunities at the Executive and management level in big presses and newspapers houses. The recruitment is done through paper advertisements. Selections are made after rigorous tests and interviews. On selection, they undergo a comprehensive training programme known as management training programme. Recruitment is also made through Employment Exchanges.

Apprentices, under the Apprenticeship Act, are recruited directly by employers. The advertisements are issued by State Apprenticeship Advisers, who may be contacted for further details.

Appointment to middle level posts of foremen, assistant works managers (technical), etc. in the Government presses are made by promotion from the lower cadre of workmen, depending upon their qualifications, merit and seniority, etc. Supervisory and executive posts are open to degree/diploma holders in printing technology, with adequate work experience. These posts are filled through the Union and State Public Service Commissions through advertisements. Similar posts in private presses are filled up through advertisements in the leading dailies.

CHAPTER XI

SELF EMPLOYMENT OPPORTUNITIES

WAGE paid employment though offering numerous opportunities is not that attractive in terms of wages and salaries. This type of employment does not bring in opportunities for an ultimate rise and deserved status in life. The real financial reward for a career in printing is through entrepreneurship. In fact, it is not uncommon to find young men setting up their own small job presses, after spending several valuable years in learning the craft. Opportunities for opening of such presses exist in almost all towns and cities. Both big and small binderies also offer potential scope for self-employment. In fact, most binderies are owner operated and managed.

The enterprising qualified young men with some experience if provided with sufficient financial background can go for setting up their own job-printing press or a binding establishment. Even where financial resources are not available, with dedication for the cause and determination to take risks, one can set up one's own small press by raising loans through Nationalised banks and other financial institutions located in various States and Union Territories. The loan is given upto Rs. 2 lakhs depending upon the size of the machine and other equipments. The loan is repayable within 5-7 years.

Scheduled Castes and Scheduled Tribes who want to set-up small printing press can contact the State Financial Development Corporation for Scheduled Castes/Tribes located in various States, to obtain loan on liberal terms. Those who are not financially sound can start business in any of the following fields. (i) Composing, (ii) Binding, (iii) Printing.

For setting up a small printing press unit, one has to purchase one of the following presses : Trade Press, Chandler, Cylinder or Off-set press, which costs about rupees 20 thousand per single press. On a single press one has to employ three persons including a machineman, a compositor and a paperman. Besides this one has to invest rupees ten thousand for composing material and other accessories. After incurring all expenditure one is able to earn about rupees one thousand per month.

Before setting up the printing press unit, one has to obtain "No Objection Certificate" for printing press from the State Police Head Quarter, a licence from the State Directorate of Industries by paying a fee of Rs. 10,000. This fee varies from state to state and a shop establishment 'K' Form has to be taken from the office of the State Labour Commissioner.

Similarly one can also establish his own book-binding unit for which one has to invest initially about rupees 10,000 including the cost of the paper cutting machine, which costs about rupees five thousand. This way one can earn about rupees 1,500 per month. For binding unit one has to obtain only the shop establishment 'K' Form.

CHAPTER XII

EMPLOYMENT OUTLOOK

PRINTING is a growing industry. Alongwith industrial expansion, economic development and progress of educational programmes, printing industry has been steadily developing. With the increase in literacy, multiplication of governmental and business activities, and economic affluence, the boundries of this trade will further widen considerably. An idea about the growth of printing industry can be had from the fact that at the end of 1979 there were nearly 18,000 newspapers and periodicals published in 75 different languages and native dialects, with a total circulation of 46.5 million copies per publishing day. In addition, the publishing industry brings out about 20,000 new titles every year which ranks next only to the U.S.A. and U.K. Furthermore, as the industry develops, the standard of printing will automatically improve, creating numerous avenues for specialised jobs. Presently the problem in the industry is not one of unemployment, but of under-employment.

The following table gives an idea of the number of newspapers in existence including periodicals during the last five years.

Year	No. of Newspapers
1976	13,320
1977	14,531
1978	15,814
1979	17,168
1980	18,140

This indicates an annual increase of about 9% in newspapers and periodicals on an average.

The total number of persons employed as on 1st March, 1981 in Government of India Presses was 16,088 and five new Government of India Presses are to be set up in Assam, Bihar, Delhi, Faridabad (Haryana) and Rajasthan during the Sixth Plan. This will generate additional employment opportunities for about 3,000 persons.

However, because of the continuing increase in the student population, and the consequential creation of opportunities for academic, professional and technical education, a growing demand for books, periodicals, journals and newspapers is expected to be generated. Printing industry on the whole will thus offer vast scope for wage-paid employment, as also for entrepreneurship and self-employment.

According to a survey conducted by the Indian Academy of Printing and Graphic Arts in 1981, the additional requirement of manpower in printing industry for the period 1981-85 has been estimated as follows :—

LETTERPRESS

Compositors 2000; Proof Readers 500; Line Operators 50; Mono Operators 80; Make-up men 1000; Printers 4000; Binders 3000; Supervisors 200; Others 1500; Semi-skilled 8000 making a total of 20000.

OFFSET

Photosetter Operators 600; Proof Readers 600; Camera/dark room operators 300; Layout/paste-up men 300; Plate makers 300; Offset printer 1000; Binders 1000; Others 1000; Supervisors 300; Semi-skilled 6000; making a total of 11000.

In addition to the additional demand for workers in the printing industry as indicated above, technological changes will also require men who could prepare better press copy, artists, photosetter operators knowledgeable in optics and electronics, layout men, platemakers etc.

From all accounts, the printing industry is poised for throwing vast opportunities of wage-paid as well as self-employment.

CHAPTER XIII FACILITIES FOR SCHEDULED CASTES AND SCHEDULED TRIBES

SCHEDULED Castes and Scheduled Tribes candidates are given facilities in education and employment. In Technical Colleges/Institutions 20% of the seats are reserved for Scheduled Castes/Tribes of which 15% are for the Scheduled Castes and 5% for the Scheduled Tribes for admission to different printing Technology Courses. Relaxation in the minimum percentage required for admission is given upto the extent of 5%. Relaxation in the maximum age limit for admission to different Courses is also given by 3 to 5 years.

In the Government of India Presses about 13% of the employees are Scheduled Castes and 2% are Scheduled Tribes. In direct recruitment on all India basis by open competition through Union Public Service Commission or any other authority under Central Government, 15% and 7½% posts are reserved for Scheduled Castes/Tribes respectively. The maximum age limit for direct recruitment is relaxed by 5 years.

APPENDIX A—Contd.

1	2	3	4	5	6
6.	Spicer Memorial College, Aundh Road, Ganesh Khind, Poona-4.	1. Degree in Graphic Arts Printing 2. Diploma in Graphic Arts Printing	S.S.C. Dol.	4 years 2 years	..
7.	Pune Vidyarthi Griha's Maharashtra Institute of Printing Technology, Pune-411030.	1. Diploma (Full-Time) (i) Letterpress Printing (ii) Litho-offset Printing 2. Diploma (Part-Time) (i) Letterpress Printing (ii) Litho-offset Printing 3. Certificate Course in (i) Letterpress Machine Work (ii) Hand Composing (iii) Book Binding.	S.S.C. Examination with Physics, Chemistry, Gen. Science and English. S.S.C. or equivalent examination with Physics, Chemistry, Gen. Science and English. S.S.C. or equivalent examination with Physics, Chemistry, Gen. Science and English.	4 years 4 years 1 year	..
8.	Department of Technical Education, Institute of Printing Technology, Shoranpur—Kerala.	1. Diploma in Printing Technology	S.S.L.C./J.T.S.L.C. Examination,	3 years	..
9.	Kala Niketan, Jabalpur (M.P.)	Diploma Course in (i) Hand & Machine Composing. (ii) Letterpress Printing (iii) Book Binding & Packaging. Diploma Course in	Matriculation	3 years	..
10.	School of Printing Technology, Shri Jayachamrajinder Polytechnic Building, Bangalore-560001.	(i) Letterpress Printing (ii) Lithography Printing	S.S.L.C. Pass S.S.L.C. Pass	3 years 3 years	..
11.	M.H. Saboo Siddik Technical Institute, 8 Shepherd Street, Byculla, Bombay-8.	Certificate Course in Composing (Advanced)	Xth Class	3 years	..
12.	Maharashtra Mudran-shala, 1786, Sadashiv Peth, Poona-2.	(i) Advanced Certificate course of Composing. (ii) Advanced Certificate course in Printing. (iii) Craftsmen course in Hand Composing. (iv) Craftsmen course in Letterpress Printing.	Xth Class VIIth Class VIIIth Class VIIIth Class	3 years 1 year 1 year 1 year	..
13.	K.E.S. Topiwala Industrial School, Alibagh (Distt. Kolaba).	Composing (Certificate)	VIIIth Class	1 year	..

APPENDIX A—Contd

1	2	3	4	5	6
14.	K.E.S.K. High School, Panvel (Distt. Kolaba).	Composing (Certificate)	VIIIth Class	1 year	..
15.	Topiwala Memorial Technical School, Sawantwadi (Distt. Ratnagiri).	Composing (Certificate)	VIIIth Class	3 years	..
16.	I.T.I. Howrah Home Santragachi, Howrah-711104	1. Hand Composing (Certificate). 2. Printing Machine Operator. Composing (Certificate)	VIIIth Class VIIIth Class	.. 3 years	..
17.	Phulia Polytechnic, Phulia, 24 Pargana, West Bengal.	Professional Education Programme.	Higher Secondary	5½ years	..
18.	National Institute of Design, Paldi, Ahmedabad-7.	2. Professional Education Programme (Advanced Entry Programme).	Pre-Engineering or +2 of the 10+2	3 years	..
19.	Govt. Kalaniketan, Jabalpur, Govt. of Madhya Pradesh.	National Certificate Course in printing Technology (equivalent to Diploma). (i) Letterpress Printing (ii) Lithography.	S.S.C. or Hr. Secondary School Certificate Examination.	3 years	15-21 Years.
20.	Board of Technical Education, Uttar Pradesh, Lucknow.	Printing Technology (i) Letterpress (ii) Lithography.	..	3 years	..

APPENDIX B
APPRENTICESHIP FACILITIES UNDER APPRENTICES ACT,
1961

(a) Trades	Qualification	Duration of Training
(i) Type Setting Group		
1. Compositor Hand	..	2 years
(ii) Printing Group		
2. Lino Operator	Pass in Matriculation Examination Or its equivalent or the 10th Class under 10+2 system with proficiency in English and any Regional Language.	3 years
3. Mono Operator	..	3 years
4. Mono Caster	..	2 years
(iii) Photo Mechanic Group		
5. Letterpress Machineman (Platen & Cylinder)	Pass in Matriculation Examination or its equivalent or the 10th Class under 10+2 system.	3 years
(iv) Photo Mechanic Group		
6. Process Cameraman	Pass in Matriculation examination or its equivalent or 10th Class under the 10+2 system with Physics and Chemistry	3 years
7. Retoucher Lithographic	..	3 years
8. Engraver	..	3 years
(v) Litho Offset Group		
9. Book Binder	Passed in 8th Class examination or its equivalent.	2 years
10. Plate Maker (Lithographic)	Passed the 8th Class examination or its equivalent or the 10th Class under the 10+2 system with Physics and Chemistry as subjects.	2 years

(b) Admissions

Apprentices are generally recruited twice a year during February and August each year. The minimum age limit is 14 years. ¶

(c) Mode of Recruitment

The employers may recruit either freshers or passed out trainees from Industrial Training Institutes as apprentices. The entire responsibility and discretion to recruit and select candidates rests with the employers. In addition to issuing advertisements in the newspapers employers also utilise Employment Exchanges and Industrial Training Institutes to render assistance to them in the recruitment of apprentices.

(d) Rates of Stipend

The minimum rates of stipend payable to trade apprentices under the rules are indicated below. In fact employers are encouraged to pay higher stipends.

Period	Stipend
During the First year of training	Rs. 230 per month
During the Second year of training	Rs. 260 per month
During the Third year of training	Rs. 300 per month
During the Fourth year of training	Rs. 350 per month

The period of training already undergone by apprentices in Industrial Training Institutes is taken into account for the purpose of determining the rate of stipend.

(e) Contract of Apprenticeship

Every person recruited as an apprentice, or if he is a minor his guardian has to execute a contract of apprenticeship with the employer in the prescribed form, which has to be registered with the Apprenticeship Adviser. The apprenticeship training is imparted in pursuance of this contract and the apprentices and the employers have to carry out their obligations under this contract.

Source : —Apprenticeship (Amendment) Rules, 1982.

APPENDIX C

PRINTING COURSES AVAILABLE WITH INDUSTRIAL TRAINING INSTITUTES

(a) Trades	Qualification	Duration
(i) Printing Machine Operator	Matriculation or equivalent Examination.	1 year
(ii) Hand Composing and Proof Reading.	Matriculation or Equivalent Examination with proficiency in English and any Regional Language.	1 year

(b) Admission

Admissions are made in July every year and the courses start in August. The age limits are 15-25 years.

(c) Training

Training is free. Free medical/recreational facilities are offered. Free Hostel Facilities and also available for a limited number of students. Stipends Rs 40 p.m.) are available to the needy students on merit cum-mean basis (Subjects to Seats). At the end of training, successful trainees are awarded trade certificates, as a result of written practical tests.

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