UNIT 5 TYPES OF COMPOSING

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5.0 AIMS

In this unit we shall talk about the methods by which the written manuscript/typescript is composed for the printing press. You will be told about the traditional methods which continued till phototypesetting and computer technologies took over from the metal type composing to computer setting.

At the end of the unit you will be able to:

- define and explain the concept of composing;
- know the various methods of composing the matter in type;
- describe the historical/traditional methods of composing;
- distinguish between cold composing and hot composing; and
- apply the latest computer aided technologies of composing.
5.1 INTRODUCTION

Historically speaking, type matter had been produced from metal type, set by hand or typesetting machines. This was applicable to all kinds of printing surfaces which were required for printing the composed matter.

This has already been discussed in the unit on printing processes. With the introduction of new technologies, the matter to be printed is produced photographically, more and more, or by other computer aided techniques. This has resulted in reduction in various operations before the actual printing. The unit is an attempt to explain the various methods which were and are presently used for composing matter required for printing.

5.2 DEFINITION OF COMPOSING

Literally speaking, composing can be defined as the combining of distinct parts or elements to form a whole. Composing can be defined as the process of setting the type or assembling by hand or machine individual pieces of type which are cast on type casting machines or which are supplied to the printer by a type founder.

It can also be defined as the combining of distinct parts or elements to form a whole. It is the process of assembling characters, figures, symbols, signs and spaces to make words and paragraphs in the required type size and page measure.

5.3 TYPES OF COMPOSING – IN RETROSPECT

The various methods of composing can be broadly divided into the following categories:

i) Composing— in Retrospect
   - Hand Composing or Manual Typesetting
   - Mechanical or Hot Metal Composing

ii) Composing— the Current Scene
   - Cold composing or Photo mechanical methods
   - Digital Cathode Ray Tube (CRT)
   - Laser Composing
   - Desk Top Publishing
   - Computer to Film
   - Computer to Plate (CTP)

Hand composing and Mechanical composing methods are discussed here as merely of historical interest as it is out of these methods that the present computerized typesetting has evolved.
Activity 1

Define the term composing.

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(Check your answer with that given at the end of the unit)

Hand Composing or Manual Typesetting

Hand composing is a very conventional method of arranging matter by hand. With the introduction of new, unconventional, methods of composing matter into type like photo-typesetting and Desk Top Publishing, hand composing has been relegated to jobs like printing of letter heads, visiting cards, bill books and such other small printing works. Though speed is not on the side of hand composing but the economy of process and the ability to set at one time a range of varying sizes or different styles of type make it a favoured method in similar jobs. Hand composing is also useful where large and varied characters are required.

The type that a compositor uses is stored in a shallow box called a case. It is a metal type storage case, traditionally holding two drawers, the upper for the capital or upper case and the lower for small or lower case letters. These cases are usually made of wood. There are several compartments of different sizes to hold types and spaces etc.

The compositor picks up a single type from the composing case and places it on the composing stick- a piece of compositor's equipment. A compositor's stick is a three sided tray made of metal and used for setting lines of type. It is called a stick because originally it used to be made of wood. The tray is about 9" long by 2" wide by ½" deep and has a sliding head that can be fixed to any desired width either by a screw or by a lever.

The stick is kept in the left hand with the head set to the desired length of the line. Letters and characters are placed one after the other and the process of lifting and placing characters in a desired sequence continues until the whole line or paragraph is complete or the composing stick fills up.

Then, composed lines of type are transferred to a long shallow tray meant for holding composed matter. Such a tray is called a galley. Proofs drawn from such trays from uncorrected copy set in a single column of any width, prior to page make up, are called galley proofs.

After these proofs have been taken, corrections are also made by hand, removing the wrong letter or character and replacing it with the correct one.

The corrected matter is then finally printed. The type is cleaned and distributed back into the case and individual letters are kept back in their respective compartments for future use. Care needs to be taken while distribution otherwise numerous mistakes will occur when type is reused for composing. The process of hand composing is slow and has become too expensive for lengthy typesetting jobs.
5.4 HOT COMPOSING / MACHINE COMPOSING

With the spread of education and interaction between nations, the hand composing method could not keep pace with the demand for the printed word. Innovators were trying to build machines which could overcome the handicaps of hand composing.

With the introduction of **monotype** and **linotype** in the last decade of the nineteenth century, the composing methods underwent revolutionary changes. Since the type in both the methods is cast from a hot metal, therefore such composing is also known as ‘hot metal composing’. These machines not only assemble type, but create it afresh from molten metal.

There are four major type casting methods:

- **Monotype**: A trade name of a machine that casts lines of type out of hot metal in single characters.
- **Linotype**: It casts line of types in a single slug created from hot metal.
- **Intertype**: It produces lines of type as in linotype.
- **Ludlow Caster**: Produces type from 12 point to 72 point.

### 5.4.1 Monotype

The monotype machine was invented by Talbot Lanston. The first such machine was produced in London in 1889. As the name indicates, in this system, single character composing can be done not in lines and slugs. It is, therefore, also called ‘single letter composing machine’. The main innovative features of the machine were justified composed line and the use of paper tape to drive a casting and composing machine.

The monotype system comprises two distinct parts or machines (i) key board and (ii) caster—the first perforates a roll of paper with holes in a pattern forming a set of instructions; the second casts letters, figures and spaces in metal according to the instructions.

Keyboard: the keyboard of a monotype machine is similar to that of a typewriter and characters are arranged in the same manner. But the keyboard is divided into a few key banks such as key bank, bar bank, rock shaft and justification drum and stop bar etc.

Above the key board is a roll of paper which is fed from one spool to another, an eighth of an inch at a time, as each character is completed. Below the spool of paper there are 31 punches. When a key is pressed it releases compressed air which actuates two valves; two punches rise to perforate the paper. At the same time, as the codes are punched, the width of the characters which have been punched, is registered, adding it to the total of the letters already in the line and a mechanism known as justifying drum indicates to the operator the space which remains in the line. As the end of the line approaches, the mechanism calculates the correct amount of space necessary to justify the line. The operator needs only to press the indicated justification key and the line is complete. A key resets the pointer and a new line is started. When the last line has been keyed and justified the perforated paper is taken to the caster.

The perforated paper is placed on the type caster where the compressed air mechanism reads the perforation, causing pins to move the draw rods which control
the movement of the mould. The air passing through the perforations brings the matrix holder and the specified matrix ready to be filled with molten metal, into proper position.

The mould is water cooled and as the metal solidifies, the excess is cut off at the foot and a piece of newly cast type is ejected into a channel. By the same process, the types accumulate in the channel until the line is complete. It then ejects the complete line into a galley.

Monotype provides a very high standard in mechanical composing. It is regarded as being very useful for those jobs where quality of typesetting is of great importance.

It is ideal for complex setting such as tables, charts, scientific and mathematical materials. It is widely used for text books.

Monotype composing sets each character separately. Individual elements in a line may be corrected by using pre-cast sorts out of the type case without having to reset the entire line. Monotype can set type and leading as one piece. One great advantage of monotype composing is the ease with which corrections can be carried out. However, it is possible to increase the leading, but not reduce it.

5.4.2 Linotype

The linotype machine incorporates both the keyboard and caster within one frame and both the operations are controlled by one operator. It stores its type characters in a large number of single matrices in the magazine of the machine. A monotype caster uses only one matrix for each individual character, linotype carries a number of identical matrices for each character. As a result of this, a complete line is composed as one piece instead each character being cast individually.

Linotype was invented in 1886 by Ottmar Mergenthaler of Baltimore. Intertype, which is also based on the linotype principle, was developed in 1911. Because both these machines cast lines of type (called slug), they are also called slug casting machines.

The system works like this: The keyboard operator adjusts the machine to set type to a desired pica measure and leading. When the operator presses a key on the keyboard, this causes the appropriate matrix to drop from the magazine to an assembly point above the keyboard. The operator presses the key buttons one after another till a line is completed in a given width. The assembled line of matrices is now transferred to a type moulding unit which casts the metal line of types (slug) and then transfers the cast line in the galley and distributes the brass matrices in the respective boxes for further composing and casting purpose.

The linotype machine can set in a large variety of type faces ranging from 4¾ point to 48 points. Some condensed typefaces can be set up to 60 point. The machines are used mainly in the newspaper industry where they are employed for composing type of standard size in variable column setting.

5.4.3 Intertype

Intertype machines work much faster but are not free from certain pitfalls. Corrections are more difficult to perform. For a single correction, the entire line or even all succeeding lines in the paragraph may be required to be reset. The characters on the slug can not be altered in any way as the whole line is one piece of metal. Problems also arise from the wearing out of the matrices. If they do not fit snugly together, excess metal can be forced up between them to print as fine hairlines
between letters. Tiny pieces of grit between the matrices can also cause the same problem.

5.4.3 Ludlow Caster

Ludlow is a proprietary name of a display size type casting machine which used hand assembled matrices. The Ludlow system is a combination of hand composing and line composing; the system was conceived by Washington Ludlow and later perfected by A. Reade in 1906. The first Ludlow machine appeared in 1911 and was advancement in hot metal composing.

The Ludlow system can be defined as a semi mechanical line casting machine mainly used for display work. The system consists of (i) a composing stick, (ii) matrices, (iii) cabinets, and (iv) a casting machine. Brass matrices are set justified by hand in a composing stick and locked in it. The stick full of matrices is inserted in the Ludlow typographic casting machine and a knob is pressed. Depression of the lever moves the machine whereby the type slug comes out in the galley. The stick is taken out of the casting machine. A proof is pulled out after which the slug is melted down for reuse.

The Ludlow system was developed for display type composition and can produce letters up to 144 point and figures up to 240 point. The system had certain advantages over hand composing as Ludlow type is always new and free from defects of using a worn out type.

Activity 2

What is hot composing and why it is called so?

(Check your answer with that given at the end of the unit)

5.5 COLD COMPOSING

Cold composing can be explained as a method of composing which does not use hot metal for casting type for printing. Cold composing is also known as phototypesetting. The increasing cost of type metal has made phototypesetting an important alternative to mechanical hot metal composing.

Several methods of composition, in offset lithography and gravure, not utilizing metal, are used for a flat plate direct-impression method of printing, also called nonmetallic composition. Examples include photocomposition. Cold-type composition is less expensive than metallic-type composition but is not as durable for long runs and varies in quality.
Speed is a distinct advantage of phototypesetting system due to reduction of mechanical movements. Phototypesetting provides fast, flexible, clean and relatively inexpensive method of setting type through photographic means on photosensitive film or paper which can be directly used for making off-set plates for final printing. Cold composing is also called flat type composing, and non-metallic composing.

Photocomposing or cold composing can be divided into the following three categories:

5.5.1 Photomechanical
5.5.2. Digital Cathode Ray Tube (CRT)
5.5.3. Laser composing

5.5.1 Photomechanical

In the photomechanical method, images are produced by shining light through a glass or film negative of the character onto a photographic film or paper. There are two main categories of cold type photomechanical composing:

1. Electric Typewriter Composing
2. Phototypesetting System

1) Electric Typewriter Composing

Electric typewriter system consists of two units: the keyboard unit and the caster unit. The keyboard unit receives, corrects, changes, shuffles and memorizes the instructions given by the operator. The electric typewriter keyboard, with some modifications, types the copy. The typed image is converted into the required printing image carrier by means of photography and photo-mechanics.

In electric typewriter composing, the reproduction copy (from which off-set printing plates will be made) is created by exposing photosensitive paper or film where light formed into shapes of type characters one by one. The paper or film is processed like any other photograph under safe light. In this system, copy is directly typed on to repro paper, either manually or automatically. Corrections are inexpensive.

Typewriter composing also has its limitations. It produces only one repro. If more than one is required, either the job has to be retyped or the tape has to be run through again to produce a second copy.

2) Phototypesetting System

Phototypesetting is a fast and inexpensive method of setting type through photographic means.

Phototypesetting is a method of setting type, which has been rendered obsolete with the popularity of the personal computer and desktop publishing software that use a photographic process to generate columns of type on a scroll of photographic paper. Typesetters used a machine called a phototypesetter, which would quickly project light through a film negative image of an individual character in a font, through a lens that would magnify or reduce the size of the character onto film, which would collect on a spool in a light-tight canister. The film would then be fed into a processor, a machine that would pull the film through two or three baths of chemicals, where it would emerge ready for paste up.

The phototypesetting mechanism is guided by four characteristics:
1. **Character storage** with photographic negative/positive on film or light sensitive paper is the common feature of phototypesetting. Character storage enables one to view matter on the screen electronically. In advanced mechanics, the characters are stored in magnetic diskettes and cassettes.

2. **Controlled light source** so that the density of type matter remains the same throughout the whole page.

3. **Enlargement or reduction** of image area with the help of lenses is possible.

4. **Positioning of characters** to set the next character adjacent to the earlier exposed one in a position so that words and characters may maintain legibility and readability. This also helps controlling space between lines.

Phototypesetting has the following advantages:

- Type is sharper and there is no pressure of metal type against the paper which may cause ink to squeeze and tend to make edges of the printed matter irregular.

- It is easier to acquire accuracy in type size and inter-linear spacing.

- In phototypesetting, since no metal is used, letters can be set touching, overlapping or in any other way one wishes to display.

- Changing type faces is easy and simple.

- Page make up can be done on visual display screen of the phototypesetting machine. Positioning of illustrations, captions, headings etc. can be changed with ease.

### 5.5.2 Digital Cathode Ray Tube (CRT)

The Digital Cathode Ray Tube is a vacuum tube, such as television picture tube or a computer system display device, which is used to show images of data or design. It is especially useful in settings where information often needs to be modified or rearranged.

A cathode ray tube (CRT) is a specialized vacuum tube in which images are produced when an electron beam strikes a phosphorescent surface.

In a Cathode Ray Tube advanced computer electronics and electronic video tube are used for producing character images either by a contact process where a film or paper is placed over the front of the cathode ray tube or by optical transmission of the tube beamed directly on to the film or paper. It is much faster than an ordinary photocomposing machine.

The main features of the CRT system are (i) formation and (ii) projection. Formation means computer logic character formation. In this system characters are stored as digital information in the computer. The computer will flash the set of characters to the Cathode Ray Tube as electronic signals when commanded.

A lens in the machine helps in focusing and projecting the needed information to form each character on photosensitive film or paper as series of dots.

Some machines use formation for projecting the information on to the photosensitive film or paper. In this method, character projection is done by scanning the character to be set that translates this information by breaking it down to thousands of lines. These lines are transmitted to Cathode Ray Tube and projected on to the
photosensitive film or paper. This makes possible to complete page make up with both text and illustration. Page making can be done on photosensitive (bromide) paper, film or even offset plates.

The CRT system has certain advantages over other phototypesetting systems. It can set type in ½ point increments and spacing between two lines can be 0.1 point i.e. 1/10th part of a point. Because of very high speed in composing, CRTs are mainly used for newspapers, books, periodicals, telephone directories where high speed composing is required.

5.5.3 Laser Composing

In this method of composing, LASER instead of CRT is used to produce the image. Light Amplification by Stimulated Emission of Radiation (LASER) is a light beam of specific kind which can apply vast energy by extreme accuracy. A laser system comprises three main elements viz. (i) an amplifying medium, (ii) a resonator, and (iii) a power supply.

The laser is used to project an extremely small accurate spot of light directly onto the photographic film or paper, creating a sharp dense image of the character. The machine uses the laser as the light source to digitize characters. The digitized fonts are translated into a form understood by the computer system and are stored on magnetic cartridge or discs. This technology being used in the photocomposing machines is one of the fastest methods of setting the matter through photographic means.

5.6 DESK TOP PUBLISHING

Desk Top Publishing is the use of a personal computer to perform publishing tasks that would otherwise require much more complicated equipment and human effort. Desktop publishing allows an individual to combine text, numerical data, photographs, charts, and other visual elements in a document that can be printed on a laser printer or more advanced typesetting machine. The primary advantages of desktop publishing over conventional publishing apparatus are low cost and ease of use.

A typical desktop publishing system comprises a personal computer, a video monitor, a high-resolution printer, and various input devices, such as a keyboard, mouse, or digital scanner. Some systems also integrate advanced memory storage units, communication devices, and other peripheral equipment. One or a number of different combinations of software applications are necessary to operate the system. Text and graphic elements are commonly created or manipulated with several softwares programmes and then combined with or copied into a page makeup programme that allows the user to arrange them into a final composite. More powerful desktop publishing software programs offer full-featured word processing and graphics capabilities.

Desk Top Publishing (DTP) is the power of personal computer to create paper based publications that, until very recently, required powerful machines and highly skilled craftsmen to produce. It is a medium of producing screen based, camera ready copy and artwork without recourse to conventional cut and paste system.

Desk Top Publishing is the result of developments in three other technologies.

1. Graphically based personal computers

2. Low cost laser printer
3. New computer language specifically intended to describe an entire page at once.

In 1984 Apple Macintosh introduced the magic of the DTP system that anyone could use. Developments in other computer languages and laser printers made it possible to produce a variety of type styles in an infinite variety of sizes. This literally made possible for a Macintosh user to produce phototypeset pages from a desk top. Introduction of Page Maker technology changed the way of producing a printed page.

Activity 3

What is cold composing?

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( Check your answer with that given at the end of the unit )

5.6.1 How DTP Works

DTP is usually understood as a publishing process, whereas it is primarily a system of composing pages. When the text is fed into the computer, it comes onto the monitor screen. Here it is possible to play about with the format, the way it should look on the page, shift the graphics and photographs till you get a page that is exactly the way you want it to be.

The main features of DTP are:

1. It is able to use multiple type fonts in a single document or page.

2. It can combine text and graphic in a single computer printed document.

3. It can create page layout or place previously created text and graphics into that layout.

4. It has the ability to see in part or all of a page as it will print and modify the page until it has achieved the desired appearance.

5. It can format a page by deciding or altering columns, margins, gutters etc.

The DTP system to work needs a Personal Computer which serves as the data entry device in which text and graphics are transferred from other sources, typing directly on the keyboard or via scanners and digitizers.

Another device essential to operate a DTP system is a Laser printer for producing reproduction of the data fed into the computer directly on a plain paper. It allows the printing of text and graphics simultaneously.

The Computer Programme allows finalization of page layout with cut and paste on the computer screen with the help of soft wares.
5.6.2 Page Maker and DTP

There are many page composition software available but the one most commonly used in DTP is Page Maker. Page Maker is a page composition software package which gives all your printed pages or documents a neat and professional look.

Page Maker makes it possible to work up to five different views of a page and it is possible to work on two facing pages side by side. It is possible to manipulate general characteristics like page size, margins, columns etc. One can import graphics from other sources and introduce variety in typographical presentation on a single page. It is possible to move, resize and vertically resize the text block.

Other main features of Page Maker include editing of text by correcting errors of spellings, deleting certain portions and adding a few lines or paragraphs instead.

The programme contains certain graphics such as charts, graphs, borders, boxes, circles etc. which can be used to highlight the text.

All the pages in the text can be numbered automatically and any alteration is also possible without disturbing any arrangement.

5.6.3 Advantages and Disadvantages

Desk Top Publishing has revolutionized the composing scene. It is much more economical, efficient and quick in production and has unmatched quality control with the ability to not only edit but allows author’s alterations without taking much time and money.

It ensures complete control over contents and aesthetics.

The processes of pulling out galleys, paste up, proof marking and carrying corrections have been eliminated by this system.

The system also has its pitfalls with some traditional fonts with thick and thin strokes and differing character width and other complex fonts, but the output is not very attractive. The ability to use multiple typefaces in one page layout by this system can make for distracting reading.

Activity 4

Mention the main features of DTP.

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(Check your answer with that given at the end of the unit)

5.7 COMPUTER-TO-FILM

(CTF) is a print workflow involving the printing from a computer, straight to film. This film is then burned onto a lithographic plate, using a plate burner. The plate is then put on an offset printing press to make a product (usually thousands of
This process requires a clean environment, skilled workers, and a well thought out proofing system / workflow to maximize quality.

CTF is being replaced with the more advanced CTP (Computer to Plate) technology.

## 5.8 COMPUTER-TO-PLATE (CTP)

The production of printing plates directly from the computer without requiring film as an intermediate step is called ‘direct-to-plate’. The plates are typically made of aluminum, but polyester, polymer and silicon plates are also used. Off-press imaging refers to using a plate setter to create the plates and then manually attaching the plates on the press. In on-press imaging, or direct imaging (DI), images plates that are already on the press.

Computer to plate is an imaging technology used in modern printing processes. In this technology, an image created in a Desktop Publishing (DTP) application is output directly to a printing plate.

This compares with the older technology, Computer to film (CTF), where the computer file is output onto a photographic film. This film is then used to make a printing plate, in a similar manner to a contact proof in darkroom photography.

The term computer-to-plate indicates printing directly from digital files. Since all computer printers are computer-to-press, it could refer to a large digital printer. It could also refer to an on-press computer-to-plate machine. It would not refer to off-press computer-to-plate.

In the Computer-to-Plate or CTP process, the image of the page from a digital file is recorded directly from the file to the printing plate instead of creating film and making the plate from the film. Although CTP is a printing process, in order to insure the best possible output, it is important that the designer discusses CTP with their printer. The printer’s familiarity with the process, their equipment, the type of plates, and file format and preparation, all play a major role in the success of the computer-to-plate process.

### Activity 5

**Briefly explain the process of CTP.**

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(Check your answer with that given at the end of the unit)

### Advantages of CTP

CTP has several advantages over conventional plate making.

- In CTP, transfer of film image to the printing plate is removed from the printing process, increasing sharpness and detail.
- In this process, plates produced consume less time and are more consistent and economical. CTP can also improve registration and image-to-edge repeatability over traditional methods.
• Defects due to dust, scratches or other artifacts are minimized.
• CTP systems can significantly increase print shop productivity.

5.9 SUMMING UP

In this unit we have tried to explain the various methods by which the matter to be printed is composed. We have also given the information on hand composing, and hot metal composing machines like monotype and linotype and other machines which were used to convert printing matter into metal type. These methods of composing were called hot metal composing. With the rising cost of raw materials in casting the type followed by other photo mechanical devices, these methods have become largely outmoded in the present computer aided technologies.

Desk Top Publishing has made possible the use of a personal computer to perform publishing tasks that would otherwise require much more complicated equipment and human effort.

Software like PageMaker, in combination with the computer, have revolutionized the process of composing matter. In fact, the process of Computer to Film makes possible the printing from a computer, straight to film. Computer to Plate makes possible the production of printing plates directly from the computer without requiring even film as an intermediate step. It is hoped that the unit will help in understanding the various process in composing the matter for printing.

5.10 AIDS TO ANSWERS

Activity 1

It can be defined as the combining of distinct parts or elements to form a whole. It is the process of assembling characters, figures, symbols, signs and spaces to make words and paragraphs in the required type size and page measure.

Activity 2

Since in this method in the type casting machines, the type is cast from a hot metal, therefore, such composing is known as ‘hot metal composing’. These machines not only assemble type, but create it afresh from molten metal.

Activity 3

Cold composing can be explained as a method of composing which does not use hot metal for casting type for printing. Cold composing is also known as phototypesetting.

Activity 4

The main features of DTP are:
• It is able to use multiple type fonts in a single document or page.
• It can combine text and graphic in a single computer printed document.
• It can create page layout or place previously created text and graphics into that layout.
• It has the ability to see in part or all of a page as it will print and modify the page until it has achieved the desired appearance.

• It can format a page by deciding or altering columns, margins, gutters etc.

Activity 5

Computer to plate is an imaging technology used in modern printing processes. In this technology, an image created in a Desktop Publishing (DTP) application is output directly to a printing plate. In the Computer-to-Plate or CTP process the image of the page from a digital file is recorded directly from the file to the printing plate instead of creating film and making the plate from the film.