SECTION ONE

COMPOSITION SYSTEMS

TYPEWRITER COMPOSITION

Anyone who has visited a newspaper office, a Government
Printer or the like, will have seen large and costly machines
being used to set type. Some use molten metal to form the
characters and words (hot metal setting); some use photo-
graphic methods (photocomposition). All are very expensive
and employ skilled operators who need special training .
These machines therefore lie outside the scope of this
handbook.

Small type-composition units are recommended to use an office
typewriter rather than any of the specialist machines for
setting text. One reason is that a typewriter can be
operated by anyone with ordinary secretarial skills. Another
is that it can be used for ordinary letters, invoices, and a
host of office jobs, so the machine need never be left
wastefully idle. The results are satisfactory for a wide
range of publications. Many organisations, including the
Commonwealth Secretariat, make frequent use of typewriter
setting. This book is no exception: it was set on an IBM
Selectric II typewriter using Orator, Diplomat and Courier
golfballs.

Manual Typewriters

Manual typewriters will have to be used where: (a) there is
no power supply or where the supply is subject to frequent
interruption; and (b) there are severe financial limitations.

If a manual typewriter is used it must be kept in the best
possible condition. The typist needs to operate the machine

This is an example of typing done on a 12-pitch
manual typewriter. 12-pitch means that there
are 12 letters to the inch. The ribbon has been
used more than once. The lines are one space
apart.

This is an example of 10-pitch typing on

a golfball machine. There are 10 letters

to the inch. The lines are 1½ spaces

apart.

Here are some examples of golfball typing

ORATOR - A 10-PITCH GOLFBALL FOR HEADINGS

Bookface - a 10-pitch ball for clear text

Diplomat - a 12-pitch golfball, good for subheads

Prestige Elite - the standard 12-pitch golfball

Courier - used for typing this handbook

Courier Italic - for emphasising certain words

This is an example of a passage printed by a word
processor. It stores the words set by the operator
and prints them whenever they are required
according to the instructions it is given.

One of the things a word processor can do is
to space the words in such a way that each
line is exactly the same length. In the first
paragraph it was instructed to print lines four
inches long; in this paragraph 3½ inches long.

Diagram 1

more slowly than usual. One reason for this is to maintain an evenness of strike not always possible when a manual machine is being used at speed. Another is to keep errors to a minimum. Messy typing will show up badly in the finished copy.

Manual typewriters are adequate for simple printing oper-ations such as stencilling. They are seldom satisfactory for scanning (see page 37) or for producing offset masters. (See pages 41-43) If they have to be used for these purposes it is best to use "once only" ribbons to produce good results.

Electric Typewriters

One of the advantages of an electric machine is that it con-trols the impact. Even the full stop strikes with just the right amount of force to mark the surface of the paper and not drive right through. Another advantage is that the op-erator can reach higher speeds with less fatigue. Each key needs only a touch on it to make the electrical connection whereas the manual typewriter needs a physical effort to make the character strike the paper. As with manual type-writers, "once only" ribbons are the best to use.

Both manual and electric typewriters can have either 10-pitch or 12-pitch characters. The 10-pitch machine has 10 characters to the inch: the 12-pitch machine has 12 charac-ters to the inch (see diagram 1). Obviously the 12-pitch machine is more economical in its use of space.

It is worth trying out various makes of typewriter before you buy. Specimen pages typed on different machines will help you to choose the model best suited to the needs of the unit.

Golfball Typewriters

The golfball typewriter is an electrically operated machine with the big advantage of having interchangeable type-heads. For a small outlay, a variety of typefaces can be selected, and bold and italic versions of them can also be obtained to help to emphasise headings, book titles, quotations, etc.

The typefaces used for any publication should be chosen with care. Where they are randomly mixed, the pages look ugly.

Golfballs not only come with different typefaces, they also come in different sizes. The two commonest are 10-pitch and 12-pitch. 10-pitch is usually best for cutting stencils as the characters come out looking clearer than they do from a smaller typeface.

It should be noted that some machines which look alike take differently designed golfballs. This means that great care must be taken when ordering additional or replacement golfballs.

Some golfballs are designed with floating accents (i.e. without characters beneath or above them). They can be used to put the appropriate accent above (or below) any character with careful use of the backspace. It is also possible to obtain golfballs designed for languages other than English and for typing mathematical symbols.

For a little more money it is possible to buy golfball typewriters with a correcting facility which enables the operator to rectify errors with ease, provided they are noticed before the page has been removed from the carriage.

Golfball Composition Typewriters

The next step up the ladder is the golfball composition typewriter. This produces a wider variety of size of print. With this machine the traditional kind of justified print can be produced, that is the right-hand ends of the lines are not left ragged as they are in this handbook. Two examples of justified print (produced by a word processor) are shown in diagram 1.

It must be emphasised that a golfball composition typewriter is extremely delicate and needs: (a) trained operators; (b) readily available technicians; and (c) high capital outlay.

Word processing and phototypesetting are possible alternatives to golfball composition typewriters.

Daisywheel Typewriters

As the name suggests, the type element of these machines looks something like a flower with the characters at the ends of spokes resembling petals which radiate from the centre of the element. It is claimed that faster typing speeds can be reached with this type of machine.

They are recent developments and clients are advised to seek out and compare the capabilities of daisywheel and golfball models before deciding which to buy. They are roughly the same price. The availability of replacement parts and of reliable servicing may be important factors in determining which kind of machine, and which model, to buy.

WORD PROCESSING

This is also called "information processing", "text processing" and "copy processing". The term "word processing" was used as long ago as 1960 when IBM defined it as "the sum of activities involved in composing, dictating, recording, transcribing, and typing words in a modern office" — the ultimate in office printing.

The important word here is "recording". The early machines punched a paper tape for this purpose; machines today use magnetic cards or discs which store the typewritten word. When fitted into the word processor, they will automatically retype any material stored on them, in full or in part and in a variety of layouts.

The things to look for when considering purchase are:

The Keyboard

This consists of a standard typewriter layout of modern electronic design. In addition to the normal alphabet, numeral and symbol keys, a number of command or instruction keys are provided.

The Visual Display Unit (VDU)

The material keyed by the typist is displayed on the VDU. This looks very much like a television screen, and what

is displayed on it should bear a fairly realistic resemblance to what appears on the printed-out copy. At the very least the tabular matter should be aligned on the screen, and indented material should appear indented. Whether or not it is possible to display justified text, the line-endings should be the same on screen as on the print-out.

Storage

This is usually on floppy discs or diskettes with a capacity of 250,000 to 300,000 characters. Some word processors use paper or magnetic tape. Material stored on a disc can be merged with other information from another disc. This gives the facility for preparing documents from standard paragraphs or for compiling standard letters and merging them with existing address lists. Variable information can be prepared in advance and inserted automatically into a recorded document.

Print-out

Most word processors print from a daisy-wheel head at a speed of 45 to 50 characters per second. The print-out unit can be on-line to the keyboard, or can stand separately and service the product from more than one keyboard. A bold face is sometimes produced by the characters being printed twice, the second time a minute fraction of an inch to the side of the first set. Extra copies can be produced as often as necessary from information keyed in.

Operating a Word Processor

All material keyboarded is displayed on the screen as it is keyed. The number of characters displayed at any one time varies from system to system; the average is between 1500 and 2000.

Format details giving the document name, line length, line spacing, margins and tabs are displayed at the top of the screen and can be changed at any time, for example to extend or shorten line length, alter line spacing, etc.

Corrections can be made at any time. Typing errors can be corrected by substituting characters. Words or paragraphs can be deleted or inserted as necessary. A cursor can be

moved independently by the operator to the position where corrections are to be made.

The VDU can also be used to display material that has been stored on disc. This can be updated or corrected and put back on the disc ready to be printed out.

Training

To get the best from the machine, a competent office typist should be selected for training. One or two weeks' instruction will be necessary depending on the complexity of the word processor. This training will teach the typist all the programming necessary to operate the machine. Training is normally provided at the offices of the suppliers of the machine and is usually without charge. Any additional costs (i.e. travel, subsistence or accommodation) will have to be paid for by the purchaser.

Factors in Making a Choice

There is an extremely wide choice of word processors on the market. Prices vary with complexity: the more the word processor can do, the more it will cost.

Very few machines are compatible with one another - probably only those produced by the same manufacturer. The incompatibility arises from the number and function of the instruction keys. To make keyboards compatible, an interface must be used. This is an electronic unit (black box) programmed to change the instructions on one disc to instructions that can be read by the other keyboard or print-out unit.

Before a word processor can be interfaced to a photo-typesetter, not only must a black box be made to produce compatible discs, but extra instructions must be programmed into the keyboard. Phototypesetters have different typefaces, styles and sizes available at the touch of a key. The word processing print-out unit has not. Consequently, almost no word processors are being used as input for phototypesetting systems.

Because of the amount of research being carried out on word

processors, models may become obsolete almost as soon as they are sold. Anyone thinking of making use of one should therefore consider hireage as an alternative to purchase. Most suppliers operate a rental system which will enable you to update the equipment without incurring large capital costs.
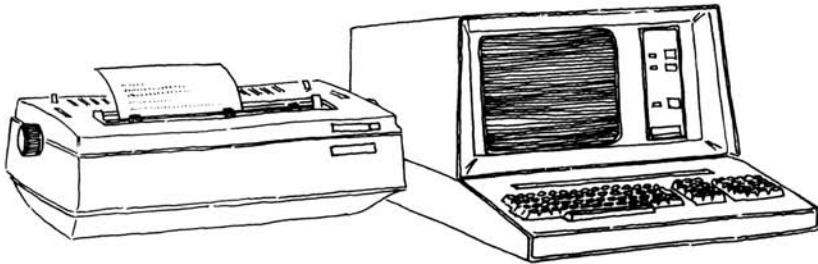

Diagram 2: A Word Processor. The keyboard and VDU are on the right and the printer on the left.

PHOTOTYPESETTING

Phototypesetting is also known as photocomposition. It is a fast and flexible method of setting type by photographic means. Its crispness of image and the fit of character to character gives a quality equal to that of hot metal setting and much better than any typewriter.

Phototypesetting equipment is expensive. The cheapest machines cost at least twelve times as much as a golfball typewriter; expensive ones over 150 times as much. All modern machines make use of computer memories and work with discs or with paper or magnetic tape. It is the complexity of the computer in the phototypesetter that controls the price. Cheap phototypesetters have very limited computer facilities.

The most important advantage that phototypesetters have over other systems is speed: many thousands of characters per hour can be exposed by the machine onto photographic paper or film.

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Various typefaces and sizes can be used at a command from
the keyboard. Most phototypesetters manufactured today have
visual display units which look like those on word processors
and fulfil the same sort of functions. The VDU enables the
operator to adjust spacing and correct errors before the
material is actually exposed onto the paper or film.

A disc or tape similar to those used in word processors will
act as long-term storage for a job after it has been
processed. If the job is needed again at a later date, with
alterations, the disc or tape can be fed into the VDU which
will then display the job on the screen. The operator can
then modify the material and pass it back to be recorded on
the disc or tape for immediate output and/or storage.

The machines are made up in two modules: (a) a keyboarding
unit which consists of the keyboard with the instruction keys
and VDU; and (b) the exposure unit, which will hold the
photographic material, the light source, lenses and the
character matrix. These modules are common to all machines.
They can be combined in one case or can be separate. While
one job is being keyboarded, a different text can be exposed
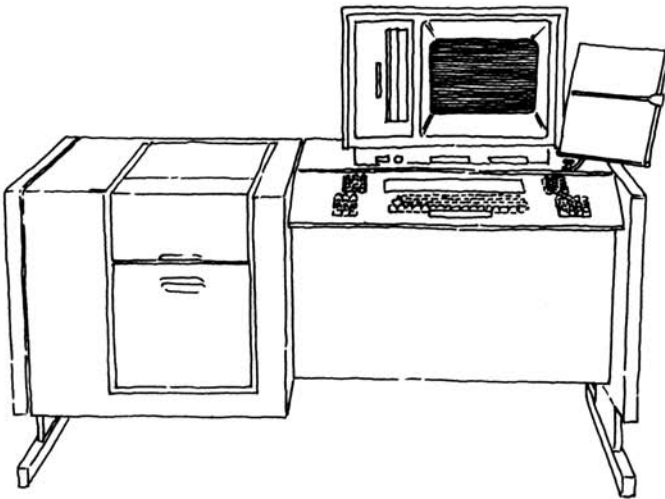onto the photographic material.

Diagram 3: A Phototypesetter

The range of typefaces available at any particular time will depend on the model of machine. Most typefaces are adapted from typestyles of hot metal typefaces. Others have been designed specifically for photocomposition. The operator can expect to have at least two typefaces in two or four styles available on the machine at any one time. With the system of lenses in the expensive unit, he will have type sizes from 5 point to 36 point available in those typestyles.

The typefaces are in negative form either on a disc matrix or on a strip matrix, and can be changed very quickly and easily. The more expensive machines can have a number of disc matrices which are selected by command. This gives the operator an even wider choice of typeface.

Prices vary: the cheapest strip matrices will cost about twice the price of a golfball typewriter head; the average price for disc matrices is about 12 times that of a golfball head.
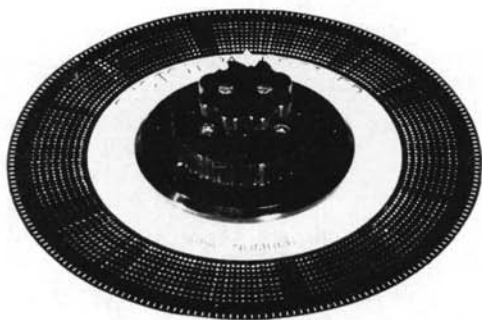

Diagram 4: Disc matrix

Phototypesetters are programmed to carry out many tasks when the appropriate key is pressed: line right, centre, line left, justify to full measure, tabulate, hyphenate, etc. Machines are now available which check spelling. So far very few small printing units are using phototypesetting. However, some people believe that before many years have passed phototypesetting will be as commonplace in the small printing unit as golfball typesetting is today.

As with word processing, phototypesetting is a technique that is changing from day to day and machines quickly become obsolete. If print managers wish to keep in touch with all the advances in this area, they can do so through such trade journals as *The British Printer, Printing World,* and *The Lithoprinter*.

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Further information on these matters is given in *The Copyright System: Practice and Problems in Developing Countries,* published by the Commonwealth Secretariat.