TECHNICAL PUBLICATIONS—BOOKS OR MICROFILMS

The Joint Service Technical Publications Policy Committee is investigating the use of microfilm techniques for technical publications, i.e., handbooks, PILs, and Maintenance Schedules for equipments and systems. Cost considerations apart, microfilm has considerable advantages from the production point of view; there is much uncertainty, however, about its effect on the user—particularly the ship user. This article has been prepared by the JSTPPC, and edited by the naval members of that body. It is published in the hope that it will elicit comment and user opinion.

Has the time now arrived when the bulk of naval technical publications should be on microfilm instead of in printed books? Would such a change be just a 'smart' thing to do, or are there compelling reasons for doing it? What benefits could we expect and what penalties might we have to pay? This article does not claim to be comprehensive neither does it contain detailed information on the many different pieces of equipment now pouring on to a burgeoning market. What it sets out to do is briefly to examine the issues and provoke thought by potential users who, it is hoped, will contribute views on how the problem would appear to affect them.

Microfilm first came into prominence during the Franco Prussian war in 1870, when the besieged defenders of Paris used carrier pigeons for carrying messages to and from the outside world. The efforts of one, René Dagron, resulted in each pigeon being ably to carry an 80,000-word message contained on a tiny piece of film weighing less than half a grain. Today, microfilm is widely used and, in the engineering field, it is becoming a common means of trafficking in drawings and large diagrams.

There are two basic methods used for portraying images by use of microfilm, namely, Roll Film and Unitized Film. Each embraces many different techniques and these, in turn, feature an impressive array of various types of equipment. Closely allied to each of the basic methods is the art of retrieval of selected images. Retrieval devices range from simple hand selection of a piece of film bearing the wanted image to a complex electronic machine costing a million dollars. Under the two basic headings, the types of equipment likely to be suitable for naval technical information are described below.

Roll Film

The subject material is photographed on a 16mm silver halide master film by a high-speed continuous-flow camera. By a cheap and rapid duplication process, the master film is used to produce the required number of duplicate films (usually diazo) which can be regarded as the equivalent of our familiar technical publications. The duplicate films, each of which is 100 feet long and can contain the equivalent of about 2400 pages of a conventional book, are held in snap-on cassettes four inches square by about one inch thick. These are labelled to show the contents and index locations of chapters. Access to the required piece of information is gained by selecting the right cassette, clipping it on to a mains-powered reader/printer and selecting the desired chapter. The film is wound at high speed by an electric motor to the selected point, when precise location of the required image may be made by 'slow-wind' in either direction. The image may be read on an illuminated screen and, if necessary a dry print may be had in a few seconds. Alternatively, a small battery-powered portable reader may be used but this will not produce prints.

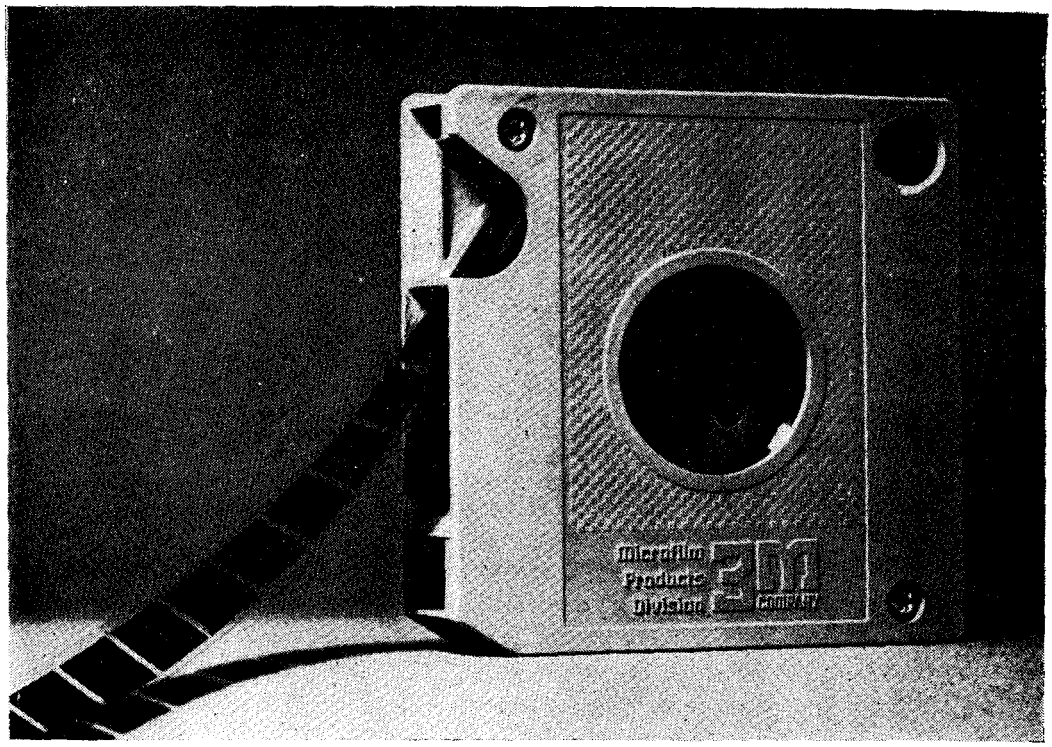

FIG. 1—TYPICAL 16 MM MICROFILM CASSETTE
(Courtesy of 3M Company Ltd.)

Up-dating is quickly and easily made by the issue of a new duplicate film in exchange for the out-dated one. (FIG. 1.)

Unitized Film

A large number of different techniques are used within this basic method. Aperture cards, with which most people are familiar and which are already firmly established in the engineering drawing field, are not considered suitable for conveying large quantities of textual matter and are not discussed. Similarly, microfiche, which is a transparent sheet of film containing multiple micro images (about 60 is usual) is not thought to be a likely general medium for Services technical information; having a number of flimsy pieces of film at a working location might well lead to loss and confusion.

The unitized version considered most likely to be suitable is Jacketised Film. Strips of 16mm film are inserted into transparent holders by a special filler machine. The holders are of various sizes but all consist of a row of narrow chambers sealed at the bottom and top, and open at one or both sides of each chamber to allow film to be inserted. Most jackets have a white strip at the top edge which can be used for index and classification markings. Both the original and duplicate films are produced in roll-film form by means of high-speed continuous-flow camera and duplicator. About sixty images are contained on each card, therefore some forty cards would hold the equivalent of one 100 ft roll in a cassette. Readers are relatively cheap compared with motorized roll-film equipment, but reader/printers are expensive. Equipment exists to retrieve a selected card from about 750 in a sealed drum, but its high cost would make it unlikely as an alternative to books.

Many types of equipment exist for use with both roll and unitized film in its various sizes. The sizes cover a range from 8mm to 105mm (and even larger for special tasks) but those most commonly used are 16mm and 35mm. Many factors influence the size of film used; reduction ratios, original document

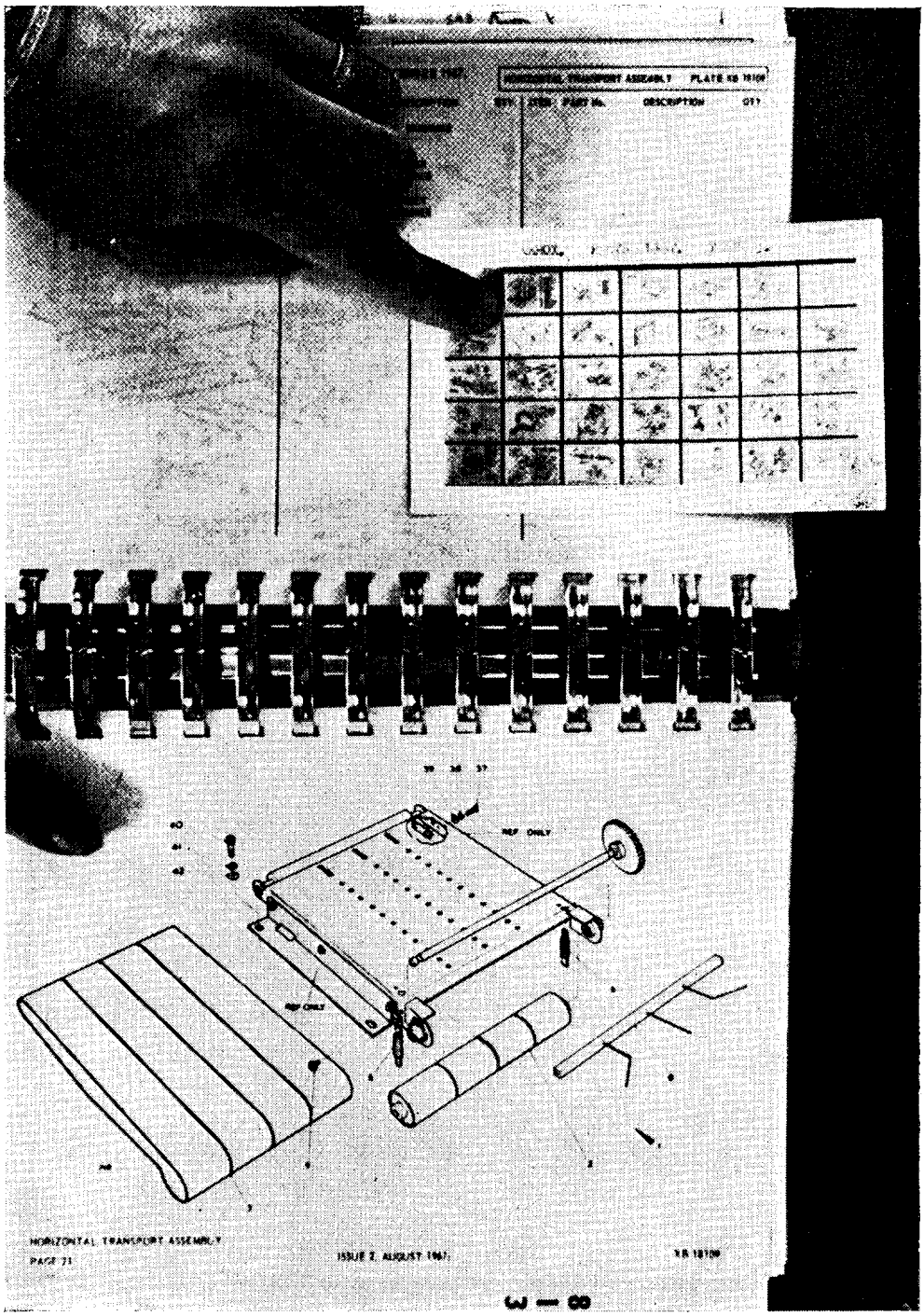

FIG. 2—MICROFICHE REPRODUCTION OF SPARE PARTS INFORMATION COMPARED WITH STANDARD SPARE PARTS LIST
(*Courtesy of Rank-Xerox Ltd.*)

size, clarity of image to be copied, to name a few. Excluding the fields of engineering drawings and large diagrams, 16mm is quite suitable for clear portrayal of textual matter and the types of diagrams shown in present day technical publications. But the layout of information in handbooks may well have to be substantially altered by concentrating the information presented into a more 'digital', i.e., unitized form. This breaks away from the chaptered, paragraphed and illustrated presentation normally in use today and would,

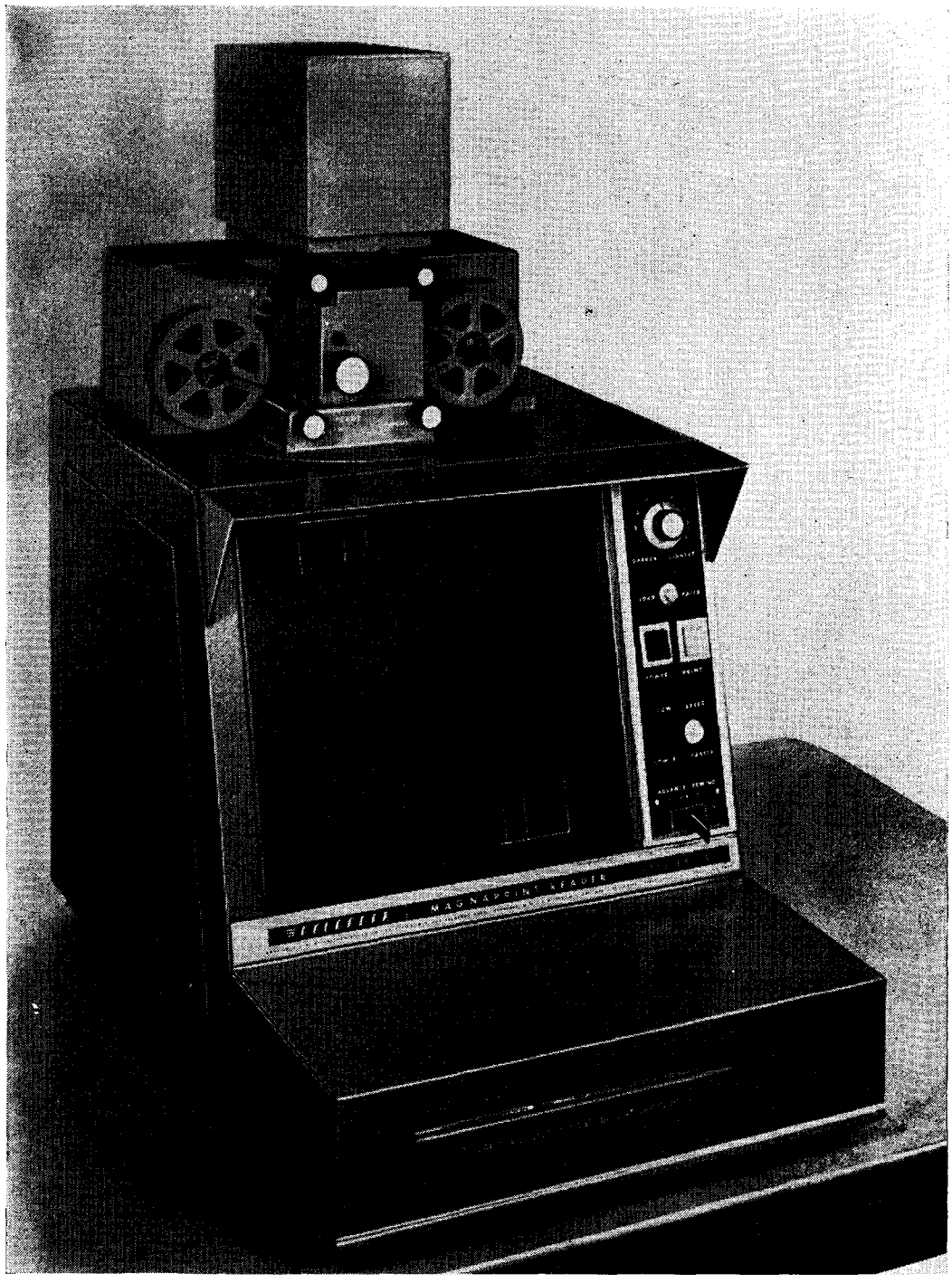

FIG. 3—KODAK RECORDAK READER PRINTER FOR 16 MM REEL MICROFILM
(*Courtesy of Eastman Kodak Ltd.*)

perhaps, follow more closely the functionally integrated form coming into use in the electronic field. (FIG. 2.)

If microfilm superseded conventional technical publications what advantages and disadvantages might be expected? Those which come readily to mind are listed below:-

Advantages

(*i*) 90 to 95 per cent saving of space—vital in certain circumstances.

(*ii*) Ease of general up-dating of information—no tedious changes or amendments by the user.

(*iii*) Errors in amendment incorporation are greatly reduced.

(*iv*) Complete integrity of information if roll film used—no loose pages.

(*v*) Security of information from casual prying eyes.

(*vi*) Ease of handling and low-cost transmission of vast quantities of information.

(*vii*) Possibility of link up with automatic data devices and document recording systems.

(*viii*) Economy of effort for user and distributor.

Disadvantages

(*i*) Vulnerability of vital information to sabotage—equipment and films easy to destroy.

(*ii*) Diminished general security because of profusion of reader/printer equipment.

(*iii*) Mains or battery power required for the hitherto simple process of reading.

(*iv*) Considerable amount of expensive equipment required to confer the same flexibility of access to information as that which now exists by books.

(*v*) Loss of the facility to make an important immediate handwritten alteration to information.

(*vi*) Introduction of two processes (shrinking and enlarging), and fairly complex equipment which might require skilled attention when extensively used.

(*vii*) Probability that out-of-date 'prints outs' will be hoarded and used in error.

(*viii*) Problems of control of classified 'print outs'.

(*ix*) Extensive 'print out' or profusion of equipment would be required in the training field.

(*x*) Possibility of queueing for access to information.

(*xi*) Certain types of information not suitable for microfilming—maintenance schedules, maintenance procedures in handbooks, operational information, etc.

(*xii*) Initial cost of introduction of new equipment at a time of national financial stringency.

(*xiii*) Possible differences of environment of potential readers—e.g., ship users or training establishments.

One could conjure up an almost endless list of reasons for and against. The most important question to be considered is whether a change to microfilm methods would benefit the user of technical publications. If so, some of the advantages conferred would vary in value according to the environment in which the information is to be used. Other important general factors to be considered are those of vulnerability, security and cost. The latter may show, by careful analysis, that once the initial cost has been borne, running costs would be relatively low. The timing of a change to the new medium would need to be chosen with great care to avoid equipping with a system which became obsolete too soon—even before the initial costs were amortized. Again, the

'locking up' of information in a form not readily accessible to the unaided human eye might be likened to the early days of written information—only the specially tutored few had access to the knowledge stored in ancient scripts.

Microfilm concerns the storage and release of information. Information is the basis of action; the knowledge upon which we act is acquired through the medium of information. Successful action depends to a large degree upon the accuracy and accessibility of information. Is microfilm, despite its disadvantages, some of which may be simple to overcome, likely to enhance the accuracy and accessibility of our information? If the answer is yes, our ensuing action ought to show an increase in success. One further important point arises—are we likely, in the foreseeable future, to be forced to adopt some form of microfilm system because of the sheer mass of information to be handled, or because microfilm becomes the internationally accepted method of trafficking in technical information? If so, ought we to consider an entirely new approach to the layout and presentation of the information?

The purpose of this article is to stimulate thought and discussion and to obtain user reaction to the possibility of change to microfilm format for technical publications; will microfilming be particularly appropriate (or inappropriate) to any one type of technical publication—handbook, PIL, or maintenance schedule? An important point which may well affect future policy is whether there will be circumstances in which printed books will be needed to supplement microfilm, or whether microfilm alone will be sufficient for all requirements.

The Editor is awaiting *your* views!