SUPPLEMENTARY REPORT OF RESEARCH COMMITTEE*

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VISION SUBCOMMITTEE

THE Vision Subcommittee of the Research Committee is currently working on the development of a work sample test which can be administered in a short period of time and which will permit an objective rating of a multiplex operator's ability. A tentative test procedure has been adopted by the Subcommittee. However, its final adoption or modification will depend upon a trial run. The Vision Subcommittee then plans to test a minimum of one hundred operators on both the work sample test and the Bausch and Lomb Ortho-rater. It is believed that a good screening test score profile, for prediction of success, for prospective multiplex operators, can be developed from the data that will be collected. The screening test score profile is then validated by careful recording of progress made by those selected. The members of the Vision Subcommittee are: R. S. Brandt, Army Map Service; Herbert Cain, U. S. Forest Service; S. J Friedman, Engineering Research and Development Laboratories; W. D. Harris, U. S. Coast and Geodetic Survey; H. J. McMillen, U. S. Geological Survey; Ray Nelson, U. S. Navy Photographic Intelligence Center; and M. H. Salzman, U. S. Navy Hydrographic Office, Chairman.

PHILIP B. KAIL ASSOCIATES

THE DOUBLE REFLECTING PROJECTOR

The Double Reflecting Projector is a projector designed for maximum ease of operation and minimum space. It has a range of 3 to 1 reduction to 1 to 3 enargement. The image is reflected from below and the tracing must be done on

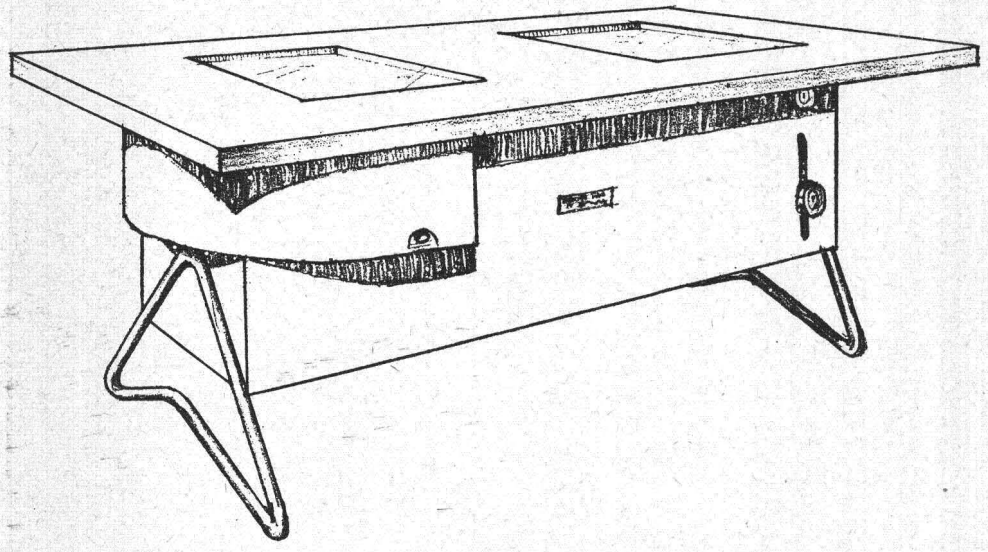

FIG. 1. Double Reflecting Projector.

* This continues and supplements the report of this committee included in Volume XVI, No. 4, pp. 593–611. Additional contributions will be published in later issues.—*Editor.*

† Committee Chairman in 1950.

some semi-transparent material such as tracing cloth, tracing paper, frosted acetate, etc. See illustration.

In operation, the drawing or photo to be traced is placed face down on the glass plate on the left side of the table. The image of this drawing or photo is reflected up on the drawing material placed over the glass plate on the right side of the table top.

The desired change of scale is obtained by turning the upper control knob on the right front of the projector. The image is brought into sharp focus by turning the lower control knob.

Both the work to be copied and the work being done are within easy reach on the top of the table. Large sheets may be used without folding. The controls are also within easy reach of the operator at all times.

The over-all size of the projector is: 6 ft. long, 2 ft. 11 in. wide and 3 ft. high. Both lights and fan operate on 110 volt 60 cycle A.C.

AIR MATERIEL COMMAND

PHOTOGRAPHIC MULTIPROCESSOR FOR NEGATIVES AND PRINTS

A photographic printing and processing machine with an output of approximately 14,000 prints in an eight hour day is being given field tests by the U.S.A.F. Photographic Laboratory at Wright-Patterson A.F.B., in Ohio (Figure 1.) Completely assembled and ready for work, the processor is 31 feet long, 5 feet high and 17 inches wide. In spite of its formidable dimensions, it may be readily transported by air or by truck as it breaks down into eleven easily boxed sections,

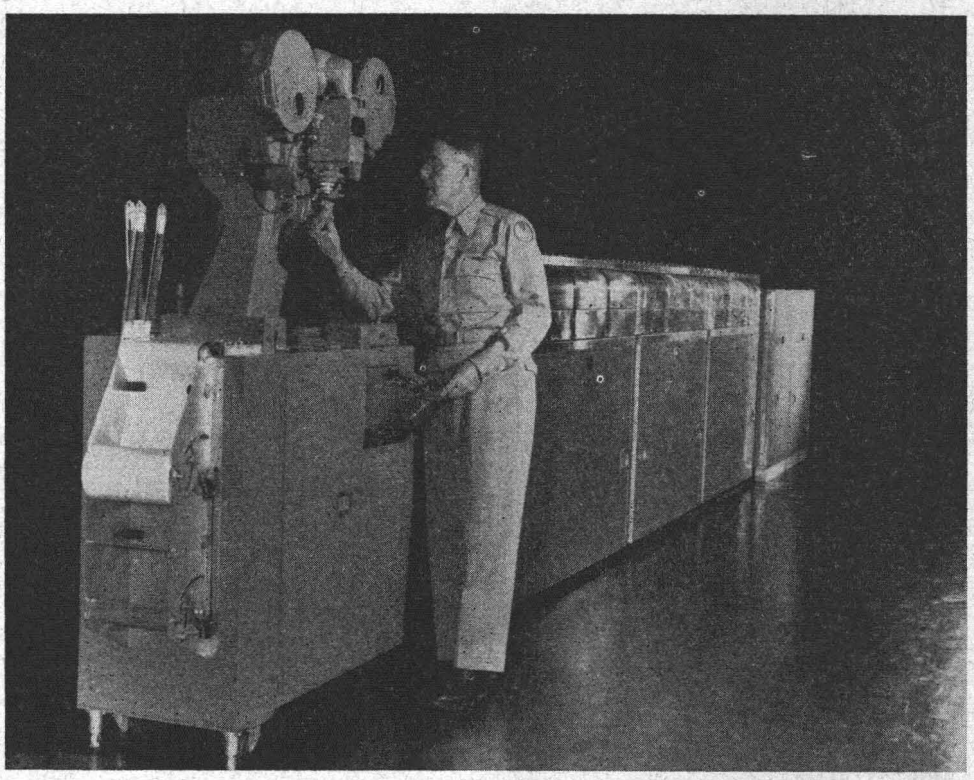

FIG. 1. Col. G. W. Goddard sets lens mechanism in photographic multiprocessor for negatives and prints.

with no dimension larger than 6 feet thereby permitting handling by as few as three men at one time. The processor has been developed to serve as a complete developing and printing unit for use in forward military zones, where fast production of aerial photographs in quantity is essential for effective action against an enemy.

The machine is made up of separate units consisting of a previewer, a printer, a spray rinse, a hypo bath, wash tanks and a convection-type dryer based on heating elements and a heavy-duty blower. It can be used to develop film or to

FIG. 2. Pilot's view finder.

make finished prints. The printer section is provided with interchangeable units which produce 9×9-inch or 9×18-inch prints from negative material 35 mm, 70 mm, 5 inches or 9 inches in width. The only difference in the handling of negative or paper is in tank solutions and several minor adjustments. Color film may be processed by adding tank sections, and black-and-white roll film may be processed at the rate of 600 feet per hour.

Negative dodging is done manually, with the aid of 24 lights. In the production of prints the paper automatically advances with the negatives. The negative material is re-spooled after exposure while the paper passes through the various chemical and wash tanks and the dryer, emerging at the end of the machine cut to the proper size. The machine may easily be operated by three men, replacing approximately twelve technicians who would be required to equal its volume of production by hand methods.

Although the multiprocessor was developed for mass production of reconnaissance photography, it also presents many advantages in the developing and

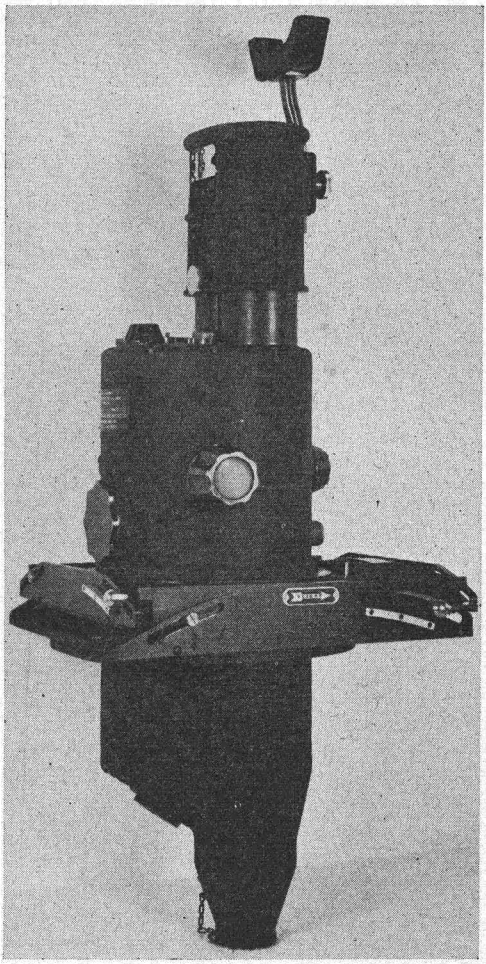

FIG. 3. Photographer's view finder.

printing of photographic material used as a basis for charts and maps. The possibility of human error in processing technique is largely eliminated; and consistent and predictable results comparable to those enjoyed by the motion picture industry for many years may be attained with ease. It has been demonstrated, furthermore, that the multiprocessor can handle standard topographic-base film and waterproof paper without the distortion due to shrinkage or deformation of the plastic base because of mechanical stress.

PILOT'S VIEW FINDER

In many types of aircraft now in use, the pilot or co-pilot functions also as navigator or photo-navigator. Accurate flight line navigation for photographic purposes is sometimes extremely difficult from their stations in the airplane, because the field of view is blocked out by aircraft structure. No vertical view or reference is possible and usually the nearest terrain visible to the pilot or co-pilot is miles away from the flying aircraft.

To overcome this obstacle to accurate flight line navigation, the U.S.A.F. Photographic Laboratory has developed a pilot's view finder (Figure 2). This has been designated Photographic Navigator's View Finder Type B-2, and which has been so designed that it may be used by pilot or co-pilot without interference to standard aircraft controls.

A screen on or near the instrument panel will present to view an upright, unreversed image of terrain below, or below and in front of the airplane. The exit screen is approximately 8 inches in diameter and picks up the image through an opening in the bottom skin of the airplane, only 5 inches in diameter. Two optical systems are provided and may be selected by the use of a single switch. A wide-angle system covers terrain below and ahead of the aircraft, while a vertical, narrow-angle system covers terrain directly below. Reticles permit the calculation of aircraft drift and overlap for successive exposures.

A built-in filter system is provided and the over-all mechanical structure of the instrument is flexible enough to fit most aircraft. Total weight is less than 100 pounds.

PHOTOGRAPHER'S VIEW FINDER

A new view finder, to be designated view finder, photographic aerial mapping Type A-6, has been developed for use in aircraft, and will present the camera operator with an erect, unreversed, field image of the terrain being photographed

(Figure 3). It is a binocular vision type instrument, with interpupillary adjustments on the exit eyepieces, and has two optical systems with different angular field coverages. One is a drift system with an effective field coverage of 30°, ±3°. It has a reticle used to determine the drift of the aircraft. This reticle is also used for interval selection, and for computing the ground speed of the aircraft. The other optical system is wide-angle, with an effective field of coverage of 100°, ±3°. It also is reticle equipped and is used with short focal length cameras. Selection of the proper optical system may be made in less than two seconds.

Three interchangeable filters are provided, yellow, orange and neutral density. A single control permits the use of any of these filters or no filter at all.

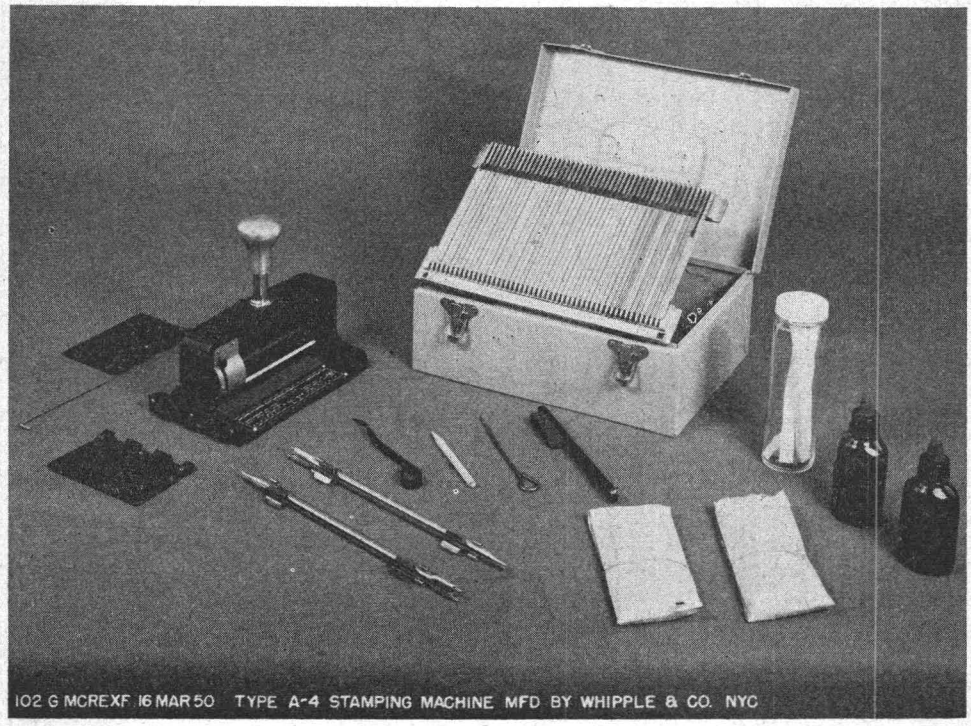

FIG. 4. Negative lettering outfit.

During flight tests in a Type B-17 aircraft the view finder was compared with a standard bombsight operated by a qualified photo navigator. All drift readings were within ±1/2 of the drift figure obtained from the bombsight; exposure intervals for overlap were the same; and ground speed computations showed an error of less than two miles per hour at 250 miles per hour aircraft speed.

The instrument is 36 inches high and 10 inches in diameter excluding the mount assembly. It weighs approximately 35 pounds including the mount assembly.

NEGATIVE LETTERING MACHINE

A new photographic negative lettering machine designated Type A-4 is now being delivered by the manufacturer (Figure 4). The instrument has undergone extensive service testing and has been pronounced satisfactory. The need for a suitable machine of this type has been acute, and requests for it have been so numerous that it will not reach the status of being an easily available stock item for quite some time.

An Army Air Force regulation of 1944, still in effect, requires that every aerial negative be stamped with identifying information such as type of photography, mission number, date the photograph was made, negative and camera identification, project number, camera focal length, aircraft altitude, geographical coordinates and security classification. Hand lettering such an amount of data on each negative on a roll of aerial film has always been a time-consuming task. No lettering machine, including the now obsolete Type N-3, has ever been considered satisfactory.

The instrument operates manually, using Multigraph gothic type, inking automatically after each impression and numbering negatives consecutively. A type rack with type, ink, and type-setting and inking tools are provided with each machine.

Comparative tests have shown that after a one-half hour briefing two men can letter 190 negatives in 12 minutes; one man moving the film and the other operating the stamp. Twelve minutes were required to set up the machine. These tests showed that by hand lettering methods only 135 negatives could be lettered in 6-1/2 hours by an experienced lettering man. A conservative production figure for two men with the machine is believed to be approximately 800 negatives per hour.

NATIONAL RESEARCH COUNCIL

The Division of Geology and Geography, NRC, in which the American Society of Photogrammetry is a constituent member, held its annual meeting at the National Academy of Sciences Building in Washington, D. C., on April 27 and 28, 1951.

A "Conference on Maps and Mapping Problems" was held on the second day when the following papers were presented:

Geological Mapping—Edmund Spieker
Advances in Photogrammetry—David Landen
Maps and National Defense—Arch Gerlach
The National Mapping Program—Charles H. Davey
Advances in Mapping Human Phenomena—Edward L. Ullman

A joint exhibit on photogrammetry and the status of topographic mapping was arranged.

The Society representative in the National Research Council, David Landen, brought out that in the United States, photogrammetry is still a young science while in Europe dating from the first experiments of Aimé Laussedat in 1839, photogrammetry is already a hundred years old. The paper discussed some recent developments in cameras and aerial reconnaissance, the new Bausch and Lomb "Cartogon" photogrammetric lenses, present trends in the calibration of mapping cameras, and new developments in stereoscopic mapping machines. The Kelsh Plotter and the Twinplex, both winners of the Fairchild Award, are important steps into the area of precision instrumentation, an area which for the most part has been up to now covered by foreign instruments. In the electronic methods related to photogrammetry are three different applications of Shoran: Straight Line Indicator for flying very straight lines, Shoran control of aerial photography by registering the distance to two ground stations, and the Shoran Line Crossing Method which relates to the measuring of geodetic distances. The newest electronic aid to photogrammetry is the airborne radar altimeter APR, for determination of ground elevations.

George D. Whitmore, First Vice-President of the Society and David Landen, NRC delegate, represented the Society. Mr. Gerald FitzGerald, President, and Mr. Charles H. Davey represented the American Congress on Surveying and Mapping. A lively interest in photogrammetry, and what it can do in the fields of geology and geography, was displayed at this meeting.