The Journal of Documentary Reproduction

JUNE · 1940

Microfilm at the Historical Society of Pennsylvania

A Microfilm Storage Cabinet

A Capital Truancy

Lighting the Microphotographic Laboratory

Volume 3 · Number 2

A QUARTERLY REVIEW OF THE APPLICATION OF PHOTOGRAPHY AND ALLIED TECHNIQUES TO LIBRARY, MUSEUM AND ARCHIVAL SERVICE

THE JOURNAL OF DOCUMENTARY REPRODUCTION was established to meet a need for an independent, critical, impartial periodical in this field, and is published on a cooperative nonprofit basis. It deals with problems confronting scholars, scientists, archivists, librarians, editors and other concerned groups. The JOURNAL, in attempting to meet this need, urges other periodicals to continue disseminating helpful news concerning scientific aids to learning, and seeks their cooperation, as its editors and publishers are motivated only by the spirit of scientific inquiry and service to scholarship.

The Editorial Board is assisted by members of several organizations interested in the scope of a professional periodical devoted to the use of photography and related processes in reproducing materials in print and manuscript form. Improvements and new procedures are appearing so rapidly that a central source of information is essential, particularly if science and scholarship are to receive the greatest benefits from the application of these means to definite educational ends.

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A QUARTERLY REVIEW OF THE APPLICATION OF PHOTOGRAPHY AND ALLIED TECHNIQUES TO LIBRARY, MUSEUM AND ARCHIVAL SERVICE

THE JOURNAL OF DOCUMENTARY REPRODUCTION

Published quarterly, March, June, September and December by the American Library Association and edited under the supervision of its Committee on Photographic Reproduction of Library Materials. Publication made possible in part by a grant from the Carnegie Corporation of New York.

Subscription price: $3.00 a year in the United States, Canada, and Latin America; $3.25 in other countries; single copy, $1.00. Payment should be made direct to the publisher: The American Library Association, 520 North Michigan Avenue, Chicago, Illinois. This address should be used for all business correspondence.

Communications for the editors and all manuscripts should be addressed to the Editor, JOURNAL OF DOCUMENTARY REPRODUCTION, Post Office Box 622, Franklin Station, Washington, D.C.

Entered as second class matter May 2, 1939, at the post office at Chicago, Illinois, under the Act of March 3, 1879.

A Capital Truancy

M. LLEWELLYN RANEY

ONE EVENING in late February a couple of curious librarians and a Foundation scout sat down to dinner at the Cosmos Club in Washington with a dozen microphotography experts. They were enjoying the Proverbial sweetness of stolen waters and pleasure of bread eaten in secret, because they had come to town at the call of the Inter-American Bibliographical and Library Association but turned truant now for four hours.

A question had been posed in advance: How best proceed with the miniature reproduction of 100,000 volumes if scheduled for discarding? Miniature, note, not necessarily microphotographic, while discarding might introduce a new economy. The discussion was lively and took a wide range.

Back of the question lay the fact that American university libraries have been doubling each 20 years and something will have to be done about it, for no institution can indefinitely support such a geometric ratio of growth with construction of new centrals every few years. Those of Yale and Columbia are good for but a short generation. Harvard's Widener Memorial was full in a decade, while Chicago's Harper overflowed in less time. Leaving to future authorities the problem of trying to fix a final size and character for their collections, what are we now to say about the next doubling?

Warehousing, and even regional warehousing, of less-used materials is one suggestion. Another is miniature reproduction. It was the latter that February's Fifteen hid away to consider for a while.

If the volumes in question could be abandoned afterward, then the bindings might be removed and the books reduced to loose sheets in case anything were gained by this course. Gain there would be, because sheets could be fed down the chute to a rotary camera glimpsing both sides at once far more rapidly than the open volume on a cradle by successive turning of the leaves. The feeding rate is given as 40 a minute for ordinary sheets, or 80 pages. That would make 192,000 pages a week for a single camera.

If now our 100,000 volumes be counted as having an average of 500 pages each, the total is 50,000,000 pages, which at the above rate could theoretically be handled by one camera in 260 weeks or 5 years. The rental would be $30 a month, or a total of $1,800.

The labor cost on such a machine would, at 50 cents an hour, or $20 a week, come to $5,200.

Supposing these volumes to have an average text spread of 5 x 8 inches, we could get the photography done on 16mm. film, with pages crosswise, at a reduction ratio of 23:1, which would mean 50 pages a foot, or 1,000,000 feet of film for this job. The charge for such an amount of film in 200-foot rolls at $5.50 a roll, including processing, would be $27,500.

To sum up the cost of producing a negative film of 100,000 octavo volumes averaging 500 pages each:

Film and processing, 5,000 rolls @ $5.50	$27,500
Camera rental @ $30 a month	1,800
Labor @ 50c an hour	5,200
Total	$34,500

These figures, save for labor rate at 50 cents an hour instead of 40, were supplied by Mr. C. Z. Case, of the Eastman Kodak Company.

It is necessary to recognize at once that $34,500 does not represent the total cost of this project even if it proved true that the operator, or rather shift of operators, could without surcease or error handle 80 pages a minute, 40 hours a week, for 5 years. There is much more to it than feeding and processing. The volumes must be brought from the shelves and reduced to leaves, after collation and change of all catalog entries. Then for ease of film consultation, every entry should be set off with caption and tail pieces, giving brief title in large letters and marking the end with similar conspicuousness. Finally, every frame needs proofreading, and that by one competent not only to insure the appearance of all pages in proper order but to pass on the adequacy of the photography as well. These operations, coupled with the inevitable tests and corrections, might very easily cost more than the photography. This should suffice to put librarians on guard when they are offered quotations on big jobs. Just what does the quotation cover? Still, even if the total in the present case ran to $75,000 for the negative or $100,000 for the negative and one positive, this would be marvelously cheap work—7 negative pages for a cent or 20 in positive.

Necessary to the reading of such film would be an excellent projector, such as the prospective Model C Recordak, because of the high reduction employed in this project (23 diameters) and the substitution of 16mm. film for the usual 35mm. width. But we should hardly strain at the $325 gnat if we had managed to swallow the $75,000 camel.

So much for ribbon film. Other methods were then canvassed. Could *sheets* of paper or film be employed? Consultation and filing would appear to be easier.

The first witness on this count would be the Readex Microprint Corporation, since it is about to market such an offering. It proposes books in octavo sheets of 100 miniature pages each and a $150 reading machine capable, it is claimed, of handling as much as 15-diameter reductions, despite the fact that here would be reflection rather than projection reading—a remarkable accomplishment. But this is ruled out in our case because such microprint is a mode of publication and requires an edition to be economically feasible. Its production cost is said to cross that of film at six copies. In this method the text is run off on 35mm. film as usual and the sheet copies are made by contact print from positive film strips on diazo paper or, in the case of larger editions, printed with ink from a plate on nonsensitized stock.

Sheet *film,* such as recently proposed by Professor Ralph D. Bennett, of the Massachusetts Institute of Technology, was also passed up on economic grounds.

1. Making sheet film by shooting multiple pages at a time was out because (1) two copies of the text would be necessary to secure right sequence of pages, and (2) an optical difficulty would generally be encountered in employing the full lens field, owing to its higher resolving power at the center.

2. Transfer of strip film images to sheet film would be in the reckoning only if a positive were desired, while in this instance a printer designed not only to sow a row of film across a sheet but at the end drop a notch to sow another would be slower and more complicated than one that copied a roll from end to end by continuous contact.

3. There then remained the idea of devising a step camera that could fill the sheet directly with row after row of page images made singly. Precedent has been set by the Polyfoto Camera, which uses a plate 13 x 18cm or film 5 x 7 inches in size, on which are placed 48 photographs in sequence, each ¾ inch square. Aside from the fact that this mechanism scans successive lines in opposite directions and a new camera rather than an adaptation of this one would seem advisable, such a step camera, if designed, would seemingly lose our 100,000-volume opportunity, because as yet its entire procedure in a big project, whether of photography, processing or printing, would, it appears, be more costly than with the mechanizations now employed at all these three stages in roll film usage. Professor Bennett thinks the difference may run to 25 per cent. Yet there is no manner of doubt that flat photography is destined to play an important role, especially in the high reduction range. The possibility of an entire book of four or five hundred pages on a sheet of standard-card size is discernible. If the first copy proved feasible, duplicates would come cheaply, because diazo-sensitized material could be employed, and this, while too slow for photography, requires only immersion in ammonia vapor for processing, instead of the usual developing and fixing baths necessary with emulsions. Projection in such cases is not thought difficult to attain, at low price range in fact. But as things now stand the sheet scheme worked out by Mr. Albert Boni for the Readex Microprint Corporation offers all the available advantage to be got from flat photography, and, as seen above, this is economical only for multiple copies.

One further possible solution of our posed problem remained for examination. This is not microphotographic, though it involves the use of diazo stock. It is the old process of facsimile production by scansion, such as is commonly illustrated in the electrical transmission of photographs. In an application now being evolved by Mr. James R.

Balsley for the duplication of catalog cards in full size, two light beams, each of .004-x.008-inch point, are set to the synchronous scansion of the textual card and the sensitized one respectively. The first is from an incandescent lamp; the second, a mercury vapor arc; the transmission, via photo-electric cell and amplifier. Three controls are envisaged —density, contrast and size, though initially only 1:1 reproduction is attempted. As already indicated, the latent image is brought out in ammonia vapor and is pronounced capable of permanency. The entire operation can be effected in the open. The rate of the trial setup is asserted to be 4 cards a minute, though 40 is the aim.

The scheme is under investigation by Electrical Research Products, Inc. (ERPI) and decision as to whether the card-copying machine is to be developed commercially is expected to be made the very week this report goes to press. If produced, it should prove the cheapest possible method of duplicating catalog cards. The machine could hardly be put on the market much before the first of the year.

Whether book reproduction in miniature could follow seems less likely as the resolution at present attainable is not very high and the extreme instrumental precision required in this case would indicate high cost of manufacture, but a real challenge to the photostatic copying of pages would seem altogether possible.

So for the present, at any rate, we are back to microphotography, and in the single miniature reproduction of 100,000 books it is roll film all the way. Here separation into loose sheets would yield marked economies. But if a half dozen copies are desired, then look out for microprint.

Under all circumstances a market tightening of standards in the production of record film and certification by a competent body were recognized as distinctly in order, the more difficult work to be properly confinable to the best-equipped laboratories. In this connection, the announcement by Dr. Raymond Davis, Photographic Technologist at the National Bureau of Standards, that resolution test charts for evaluating camera performance had been prepared was most welcome, as also the news of recommendations covering maximum hypo content permissible in such films.

Emphatic attention was called to the unwisdom of expecting the impossible of miniature reproductions in usage. Structurally they are capable of indefinite survival in storage, just as acid-free paper is, but like books they suffer from use. A master negative should, therefore, be kept aside in the case of all important or much-employed reproductions.

Welcome, too, was the prospective appearance of a $25 strip film reader and a $50 one for both roll and strip film in medium reduction. The Committee on Scientific Aids to Learning was inciting the former in behalf of individual scholars, though the group urged some amendment in the model shown lest library roll film be damaged. Mr. Bert J. Kleerup, of the Society for Visual Education, was working on the general-utility, portable design, at the instance of The University of Chicago Libraries.

Attention was called to the lack of provision for the economical storage of film. The only container at present in the market comes to 20 cents a spool. There was one in high place who pooh-poohed excessive coddling but at home he is himself a model coddler. The smile of the sheet advocates at this point was broad enough to be heard.

But nobody said a word about the shyness of catalogers at the sight of films loose in their quarters. The Fifteen, despite absence from home, were perfect gentlemen.

So ended an intriguing night out. The participants are of a mind to repeat it—often.

Handling Microfilm at the Historical Society of Pennsylvania

FRANK W. BOBB

MICROFILMS present problems which differ considerably from those raised by books and manuscripts. Probably the most important basic decision involves storage either in roll or strip form.

Experience has demonstrated that roll microfilm is more readily usable than strip film. For scanning or rapid checking of newspapers, books of reference, directories, etc., the roll unquestionably is superior; and it is also more rapid, especially when a method similar to the "flash" system is employed.

The "flash" system is the placement at predetermined intervals of blank or numbered frames or spaces thus permitting any desired section to be located easily while the film is being rapidly scanned. The ease of handling flash-indexed roll microfilm was shown at the Social Security Board in Baltimore, Maryland, which has over 76,000,000 cards photographed on 16mm. microfilm. A card selected at random by the writer was given to a clerk. It was located and the image projected on the screen of a reading machine for inspection in less than 40 seconds. This demonstration was not prearranged, and the operation was not considered to have been performed with unusual speed.

Roll film requires less attention from the administrator since the reel selected by the reader can be placed in a reading machine and forgotten. The reader need only turn a handle to advance successive pages. After the film has served its purpose, it is removed from the reading machine and returned to the shelves. On the other hand, reading strip microfilm necessitates the administrator's attention each time a change in the strip is desired, or alternatively places undue responsibility upon the reader.

Since microfilms cannot be treated like books or arranged like manuscripts, the administrator at the Historical Society of Pennsylvania was presented with a serious problem which could not be solved by the usual rules of library classification. It was decided, therefore, that microfilm collections would be placed on 35mm. film in rolls of 100 feet, as this length proved to be the most satisfactory both to the reader and for storage. No roll is considered complete and placed upon the shelves until it contains approximately 100 feet. Small lengths are spliced to the roll until this length is reached. The reel number and other items of descriptive information are typed or written on a strip of rope manila paper 35mm. wide and 13 inches long. This is spliced to the film. The paper strip serves a dual purpose: first, as an index, and second, as a protective covering strip for the film. The initial exposure on the reel of film is an easily legible title frame reading "START, REEL NUMBER 1," the second exposure is a large "NUMBER 1." After each 25 exposures the next number in the sequence appears. At the end of the roll is another identification frame reading "END, REEL NUMBER 1." The exposures between any two numbers are considered as a decimal, i.e., the sixth exposure following "NUMBER SEVEN" would be 7.6. This method has been found to be quite flexible as the number need not appear at any fixed position on the film, but can be placed wherever desired. Moreover, the time required by an operator to make the insertions while filming is offset by the many hours saved in use.

One collection of over 10,000 eighteenth-century documents, stored in an old frame building, and not available either through purchase or gift, was microfilmed on location. As the documents were filmed in no fixed order, it was unusually difficult to locate any particular document, or after finding it to devise a method by which it could be relocated when required. At present, numbers on the film (following the previously outlined system) are being spliced into the collection, in this instance, after every 30 exposures. The film is then spooled on lacquered, tin projection reels with open sides which permit air to have free access to the film. The reels are fitted into a long drawer which is divided into sections each wide enough to permit half of the reel to stand upright, thus exposing the typewritten or handwritten table of contents. Directly under each reel and along the length of the drawer the reel number is painted. The cabinet containing the drawers is not specially conditioned, nor are the films housed in cardboard "cells." The moisture content of photographic films is important and since it tends to approach that of the surrounding atmosphere, films housed in cardboard containers to protect them from dust are frequently subject to extreme brittleness. Reels stored as previously outlined have been found to be as free from dust as those housed in cardboard containers and much less brittle.

It is sometimes advisable to have an open vessel containing a saturated solution of sodium dichromate in the cabinet. It will be found that the cellulose acetate film, which ideally should be stored at 50 per cent relative humidity and around 60-70°F., will remain flexible in temperatures from 40-80°F. Apparently temperature is not as important a factor in storage as humidity.

The films are cataloged on standard library catalog cards with the usual entries and filed in the main catalog. The only difference in appearance of the card is its classification number which reads, for example, Smith, John, ... Film, Reel Number 7-6.20. The librarian knows that when reel number 7 is placed in the reading machine the 20th exposure following the index number 6 will be the designed item.

A more exact system of identification is required for cataloging microphotographic negatives of the Society's extensive collection of portraits and museum objects. These are photographed with a Contax camera on double-frame 35mm. film. Each negative or group of duplicate negatives is spliced to a 35mm. strip of rope manila paper. The overall length of the strip is 6 inches. In most instances three negatives of the same portrait or object are made, as considerable time and trouble are involved in obtaining and arranging the items before the camera. The paper leader bears the number of the negative on the upper lefthand corner and all required descriptive information. It serves not only as an index but also as a guide for arranging the negative in the enlarger. Strips are used in this case rather than reels as most enlargers are constructed for use with strip film.

The negatives are arranged numerically and are cataloged by subject, artist or engraver, donor and by number. The number card gives full particulars concerning the photographing of the portrait or object, as, for example, the type of film used, lens aperture, exposure time, exposure meter reading, intensity and kind of light used, filters if any, and a general description of the subject. The completed negatives are coated with "Cinelac," manufactured by the American Bolex Company of New York. This solution applied to the emulsion acts as a preserver and conditioner and protects the negatives from scratches and fingermarks.

A New Microfilm Printer

HERMAN H. FUSSLER

THE LIMITATIONS of commercially-available 35mm. step printers and low-priced continuous printers for microphotography are already so well known that no attempt will be made here to describe them. Essentially, the difficulties involved in the use of standard printers require the construction of special microfilm printers, particularly where high resolution work (as in the case of newspapers) is undertaken.

In order to utilize the various camera advantages to the utmost, it is desirable that a printer be constructed to handle with equal facility 35mm., nonperforate, single perforate, or double perforate film. Additional general specifications are outlined as follows:

1. The machine should be capable of conversion into a 16mm. printer.
2. Leader lengths should not be excessive.
3. The machine should be capable of high resolution work; maintain perfect positive-negative contact; and be free from slippage.
4. The latitude of the light source should be controllable, and ample to provide for printing negatives of extremely low and high densities.

The printer, which is illustrated herewith, was the result. It was constructed by Mr. Oscar B. Depue, of Chicago, for the Department of Photographic Reproduction of the University of Chicago Libraries. Mr. Depue is a well-known designer and builder of 16 and 35mm. professional printers.

Figure 1 illustrates the general appearance of the pedestal machine. Beneath the self-contained safelight a rheostat knob and ammeter are connected with the direct-current motor generator on the base. This control is used for setting the basic range only, and changes of light intensity, to compensate for variations in negative density, are automatically made by a separate control unit which is not illustrated.

To the left of the switch panel is a 1,000-foot, raw film magazine, and to the right is a negative spindle with 600-foot capacity. Both negative and positive (raw) films are pulled down by rollers which have soft rubber centers, in order to form a free loop before they are pulled over

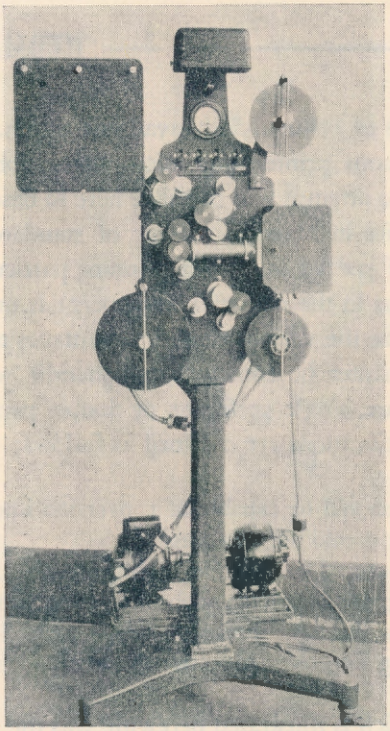


FIG. 1.—Specially-constructed continuous printer for 35mm. perforate or nonperforate film, The University of Chicago

the printing roller which, of course, is mounted directly in front of the lamp house and printing slit. The positive and negative are instantly separated after printing so that any tendency toward slippage on the printing roller will be eliminated. The third, and final, driving roller is centered between the two take-up spindles.

The roller, on which printing occurs, is not driven except by the film and inertia is provided by placing a small flywheel on its shaft. The printing light is a 6-volt, 9-amp., R.C.A., ribbon-filament lamp which is focused by a single lens on the slit. The motor generator current supply is very smooth and free from line distortion.

The film-driving rollers are operated by means of a fine pitch chain which is, in turn, driven by a large flywheel which is connected by belts to a 220-volt, 3-phase motor. The use of this type of motor has several advantages. It is free from 60-cycle impulse variation or line surge and drop, and it reaches full speed almost instantly. Any of these variations, if present, will be faithfully reflected by the printed film. Operating speed of the machine is about 50 feet of film per minute.

The machine has been in use for several months on all types of film and has proved eminently satisfactory.

A Microfilm Storage Cabinet

EUGENE B. POWER

MANY LIBRARIES and institutions are faced with the problem of storing film, both in short lengths and in 100-foot reels. The cabinet here illustrated was built to meet a need for inexpensive, dustproof, humidi-

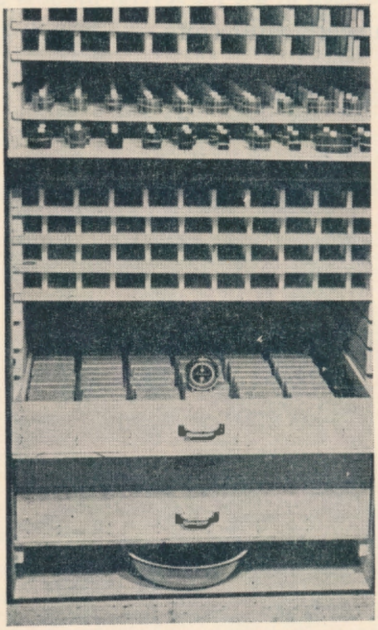


FIG. 1.—Microfilm Storage Cabinet

fied storage. In use it has proven very satisfactory. It can be built by any competent carpenter for a cost of about $50.

Short lengths of film are stored on shelves with 70 evenly spaced pegs, over which the rolls are placed. Below, drawers, with ¼-inch three-ply partitions, provide space for 6 rows of cartons, 14 deep, containing 100-foot reels of film. The depth of the drawers is such that one drawer will interchange with two shelves. Thus the cabinet can be altered to fit changing needs. Both shelves and drawers are easily removable.

For convenience, the front door of the cabinet is divided into two sections, and sealed at the edges with a strip of sponge rubber weather stripping which is glued in place. Ordinary spring cupboard latches hold the door tightly closed. A space at the bottom of the cabinet provides for two containers of sodium dichromate solution to maintain proper humidity. Experience has shown that a relative humidity of 56 per cent is consistently maintained by this arrangement. A vertical strip in the center of the back panel serves as a stop and insures space for air circulation, while similar space is provided at the front of the shelves and drawers.

The dimensions are as follows:

Height 70″ Width 34″ Depth 25″
Sides and doors ¾″ 5-ply clear white pine
Shelves 32⅝″ x 21¾″— ½″ 5-ply pine
Pegs: Dowels ½″ x 2″ x 1½″ above base, placed 10 across and 7 deep, 3″ centers
Drawers: Base 32⅝″ x 21¾″— ½″ 5-ply pine. Front and sides 4¾″ high. Front ½″ plywood, sides ⅜″ plywood
Shelf guides: Pine, ¾″ x 1⅞″ x 18½″ pine, 2½″ centers

The pegs are glued into holes in the base. A better plan would be to drive galvanized nails through from the bottom, for it would take less time and lower the cost. A further advantage of nails instead of pegs would be that short lengths of film could be wound on small wooden cores, like those furnished with raw film, bored to fit the spindle of a reading machine. Thus short lengths could be stored and used with a minimum of handling and wear.

The sodium dichromate solution should be in a glass container, placed inside a larger vessel, as during the summer months the inner one will overflow.

Since each drawer will hold 84 100-foot rolls of film, and each shelf 70 shorter rolls, it is evident that the capacity of the cabinet is considerable. On the basis of 16 pages to the foot of film, assuming 5 drawers and 15 shelves, the cabinet could easily provide storage for well over a million pages of material.

Such a storage cabinet* is not fancy or finished in appearance, nor is it fireproof. However, for the average library which is in itself fireproof, it can be a thoroughly satisfactory means of microfilm storage at a cost of $50.

*Since the foregoing was written a manufacturer of filing equipment has made plans to place on the market a film-storage unit constructed in metal on the plan outlined above. When available it will be announced in the *Journal*.— EDITOR.

The 35mm. Slide Projector as a Microfilm Reader

CARL W. MILLER

IN CONNECTION with the film service which is a part of the new *Mathematical Reviews* project, we have become interested at Brown University in the problem of microfilm reading equipment. Although excellent reading machines are available commercially, their cost appears to be prohibitive for many small institutions and private individuals who would normally be interested in the microfilm service. We have accordingly been carrying out some experiments with a view to constructing a reading machine from one of the commercially available projectors for screening Kodachrome slides. It so happened that during the past summer the Kodak Company placed on the market two new projectors, the less expensive of which, retailing for less than $20, appeared to us particularly attractive for this purpose, and formed the basis for all of our recent experiments. Despite its moderate cost this projector has an excellent triple condenser containing a disc of heat-absorbing glass, operates at a reasonably low temperature for long periods of time, and has a 4-inch projection lens of rather better quality than that provided in many similar instruments. Admittedly it is not ideal for use in a reading machine. Intended to give the brightest possible image on a fairly large screen, it provides more light than is necessary for our purpose, and the 100-watt condensed filament lamp has a shorter life than a lower-powered lamp which could be used in an instrument designed especially for a reader. The aperture of the projection lens is also unnecessarily large, and sacrifices for this purpose something in the way of desirable definition. This latter defect, however, is largely corrected by fitting a diaphragm to the front rim of the lens mount, and the projection lamp is inexpensive to replace when burned out. As compensation for these undesirable features, the projector itself can be easily removed from the reader and used for its normal purpose. More and more schools and colleges are coming to recognize the advantages of miniature slides for classroom instruction, and a reader which is built about such a projector can be looked on as a double-purpose instrument of very general utility.

In designing such a machine we have kept constantly in view the following necessary requirements: (1) compactness, (2) convenience of operation, (3) reading comfort, and (4) inexpensive construction. We recognized at the outset that reading material projected on a white opaque screen simulated more accurately the printed page and could be perused for long periods with less eyestrain than material projected on a translucent screen. Several machines were constructed which formed the image on a white inclined tablet in a satisfactory position for comfortable reading. All of these attempts, however, left much to be desired in the way of compactness or convenience of operation, and the best of them would prove relatively expensive to manufacture. We accordingly turned rather reluctantly to the use of a translucent screen.

Figure 1 shows the design which finally emerged as the most satisfactory from all standpoints, and Figure 2 is a photograph of the final instrument. The Eastman projector is regularly equipped with a standard

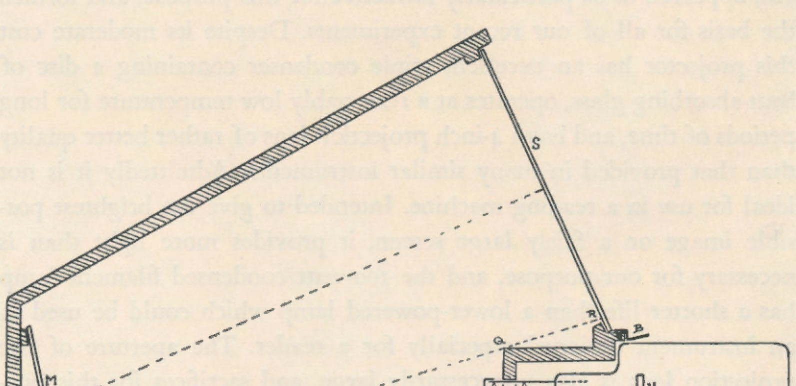


FIG. 1.—Design for Microfilm Reader adapted from 35mm. Slide Projector

tripod socket by which it is attached to the base of the instrument directly in front of the reader. It can be removed from the base for classroom use by a few turns of the wingbolt W. The beam from the projection lens, after traversing the box horizontally, is reflected by the mirror M to the translucent screen S. The axial ray LMS must fall

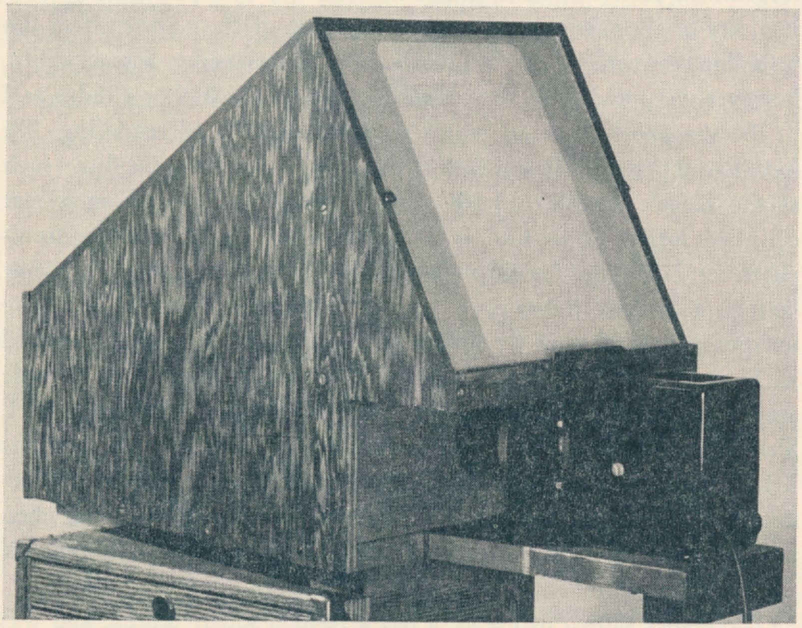


FIG. 2.—Photograph of Microfilm Reader adapted from 35mm. Slide Projector

perpendicularly on the screen if distortion is to be avoided and if the entire image is to be in focus at the same time. A small baffle B is desirable to shade the screen from light which escapes from the cooling slots in the top of the projector. For best results the mirror should be of the type only recently available in which the front surface is coated by evaporation with a highly polished film of aluminum. These mirrors leave little to be desired either in the way of reflecting power or permanence. The pure aluminum is rather soft when first deposited, but it soon becomes covered with a layer of hard transparent aluminum oxide which is remarkably resistant to reasonably careful handling. If finger marks or dust accumulate on such a mirror, they can be washed off by soap and water with little chance of damage. Such a mirror should function satisfactorily for an indefinite length of time, and its initial cost is only a small percentage of the total expense of the reading machine. All translucent screens which we have tried are imperfect in their scattering ability. The effect of this is to produce a greater intensity of illumination (glare) in that area of the screen which lies on a line between the mirror and the eyes of the reader. Screens differ, however, very widely in the amount of glare which they exhibit and in the sharpness of detail which they are capable of rendering. We have found particularly satisfactory the type of photographic film (such as the Kodak Translite), both sides of which are coated on a mat celluloid surface. This film is intended primarily for window transparencies, but when the photographic salts have been fixed out, it may be mounted between two plates of glass to form an excellent and quite inexpensive translucent screen for use in a reader. It should be noted in Figure 1 that the space under the screen is recessed to provide ample space for inserting and changing slides in the carrying slot H. Sharp focus can be checked at any time by moving the projection lens L backward or forward in its mount. Adequate space is provided beneath the screen so that this operation can be performed even when slides containing as many as six frames are being advanced through the slide holder.

The reader shown in Figure 2 has a 10-inch square screen, and was designed to reproduce in natural size a single page of the standard $6\frac{1}{2} \times 9$-inch format common to all the publications of the American Institute of Physics. The square screen makes projection possible from a microfilm slide whether in a horizontal or a vertical position. In the horizontal position two pages can be projected with adequate clarity although of somewhat reduced size. The effort was made to secure maximum compactness consistent with the 4-inch focal length of the projection lens. It is easily shown that the sum of the distance from the slide holder to the mirror and that from the mirror to the screen must be $\frac{(M+1)^2}{M} f$ if M is the magnification and f the focal length of the lens. The magnification in the instrument described is 7.1, and the estimated total path of the light beam is 37 inches. The overall length of the instrument is $25\frac{1}{2}$ inches and its height 16 inches. The dimensions of the aluminum mirror necessary to obtain maximum compactness are approximately one half the dimensions of the screen, in the present instrument 5 x 5 inches. A smaller mirror could be used only if the path from projector to mirror were decreased at the expense of an increase in the distance from mirror to screen. This would locate the projector in a less accessible position under the screen with consequent cooling difficulties. Further compactness could be achieved by the use of a shorter focus objective, but this would decrease the value of the projector for classroom use.

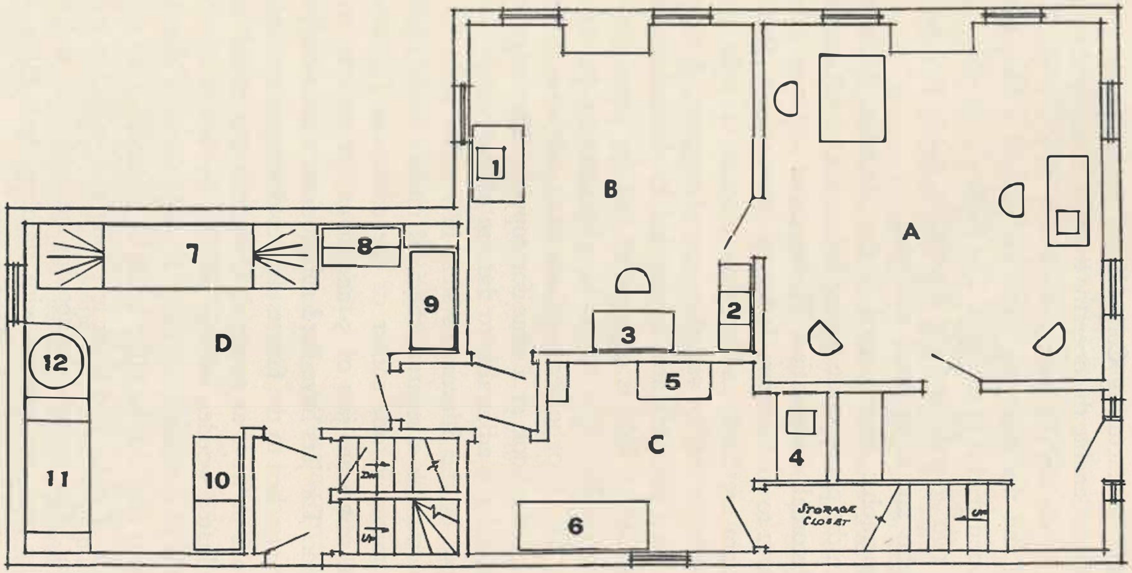
The Photographic Laboratory at Brown University

EDWARD C. ROOSEN-RUNGE

THE PHOTOGRAPHIC laboratory at Brown University began operations on December 7, 1939. It was established through a grant from the Rockefeller Foundation in connection with *Mathematical Reviews,* a new abstract journal for mathematics. Subscribers to *Mathematical Reviews* may obtain either on microfilm or in the form of photoprints the complete text of any article abstracted by requesting it under the serial number printed with the abstract. Microfilm negatives of all the articles accepted by the editorial office are made by the photographic laboratory. These are filed under the respective serial numbers and positive films are made only after an order has been received. Current work for *Mathematical Reviews* keeps the laboratory busy one and a half to two days per week.

A project is now being organized to complete the mathematical library at Brown University by means of microfilm copies under a grant from the Rockefeller Foundation which will provide for the making of negative microfilms of more than 250,000 pages from rare books and manuscripts. The photographic laboratory also fills orders for negative or positive microfilm, projection prints and lantern slides (preferably 2 x 2-inch size) of material in the University collection. Newspaper reproduction can be undertaken with particular facility.

The laboratory occupies the first floor of 10 Manning Street, Providence; the second floor of the building is used by the editorial office of *Mathematical Reviews.* There are four rooms (see Fig. 1): the office (A), the camera room (B), the enlarging room (C), and the dark room (D). Rooms B, C, and D are air-conditioned, and maintained at 68°F., 50 per cent relative humidity, summer and winter, and are connected by a light trap. When a door to the light trap is opened, a buzzer warns the operator in the darkroom or enlarging room. All



A. Office
B. Camera Room
C. Enlarging Room
D. Darkroom

1. Microfile Camera
2. Book Rack
3. Operator's Desk
4. Table for two enlargers
5. Table for checking and splicing
6. Table for trimming and printing

7. Sink
8. Cabinet for chemicals
9. Mixing Table
10. Paper Dryer
11. Film Dryer
12. Washer

FIG. 1.— Photographic Laboratories, Brown University

windows in the laboratory rooms have lightproof shades made to order by the Kane Manufacturing Corp., Kane, Pennsylvania; these are very satisfactory and enable the operator to work in daylight whenever possible and to darken the rooms completely in a few seconds. The camera room and the enlarging room are painted a blue-green which has been found restful to the eyes. The darkroom is white and is illuminated by two 40-watt daylight fluorescent tubes, two safety indirect ceiling lights and eight small safelights.

The microphotographic camera used is the Microfile Recordak, Model C (No. 1 in the plan) made by the Eastman Kodak Company and sold by the Recordak Corporation. This machine works at reduction ratios of from 12 to 30 diameters. It focuses automatically. Shutter speed and diaphragm are fixed, and only the amount of light from the four photoflood bulbs may be varied to control exposure. A photoelectric cell meter on a swinging arm is provided for determining the exposures. The amount of light is adjusted so that the meter always indicates seven foot candles. This results in a background density of approximately 1.1. The bookholder oscillates from side to side, presenting one page of the book at a time for copying. The length of travel of the bookholder is adjustable to the size of the book.

Film is developed by the Stineman system in 100-foot reels. As it was impossible to establish a separate chemical mixing room, chemicals are carefully mixed in one corner of the darkroom (9). Stock solution is kept in stoneware jars of 5- and 10-gallon capacity on a shelf above the sink. The jars have hard rubber faucets near the bottom. Rubber hoses attached to the faucets deliver developer and fixing solution to the tanks or trays as required. Chemicals are mixed only once a week. Graduated wooden stirring paddles, by which the contents of the jars can be measured, are used. A water faucet is installed above the jars so that they can be filled while in position on the shelf.

The sink is made of cedar and is six feet long and 30 inches wide, inside measurement. The 39-inch drainboards on each side and the splash board at the back are covered with stainless steel. Films are washed on the Stineman reel in the Lens rotary print washer (12) which is built in beside the drying reel (11). The film dryer was suggested to us in outline by Dr. V. D. Tate of The National Archives, and was built according to our plans by the University carpenters (see Fig. 2). It consists of a squirrel-cage drying reel, 39 inches long and 28 inches in diameter, which is enclosed in a box. It is rotated by a small motor and aerated by a furnace blower attached to one side of

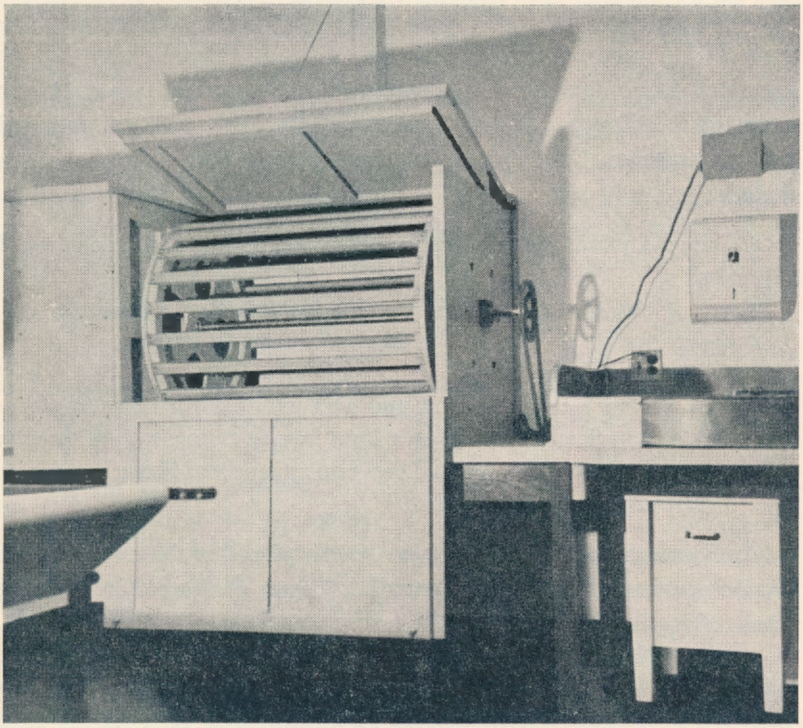


FIG. 2.—Corner of Darkroom in the Photographic Laboratory. At left: Film Drying Machine. At right: Lenz Rotary Print Washer

the box. Air is first blown into a pressure chamber, then through a filter of unbleached cotton cloth into the reel. Rotating the reel about 8 times per minute in a stream of unheated air is sufficient to dry approximately 200 feet of film in 15 minutes. Paper prints are dried on a Pako Liberty dryer (10) which is electrically heated. This completes the equipment of the darkroom.

The enlarging room contains facilities for enlarging, printing, making lantern slides, splicing and trimming. There are two enlargers. A 35mm. nonautomatic Leitz enlarger, fastened to the wall, is used at a fixed focus only for prints 10 x 14 inches in size. This enlarger works rapidly and inexpensively in all cases except those where projection to the exact size of the original is required. Ordinarily two pages can be enlarged together. For finer work and greater enlargement, an Eastman Kodak 35mm. precision enlarger is used. This machine has an excellent Ektar lens and a glassless negative carrier, which never scratches the film, but it is not automatic. Both enlargers are operated by foot switches. Other pieces of equipment in the enlarging room include:

- 2 Griswold 35mm. splicers, one for perforated and one for unperforated film
- 1 pair of film rewinds (Newmade Corp.) fastened to a board
- 1 24-inch and 1 10-inch Milton Bradley trimming board
- 1 Federal film viewer
- 1 Leitz printer for 35mm. films and 2 x 2-inch lantern slides, made in our laboratories. It consists of a light box to transmit light through the 3¼ x 4-inch slides, with a Leica camera mounted above in position for copying

An Eastman transmission densitometer is placed in the camera room on the operator's desk (3). A Recordak library projector for checking films is kept in the office.

Thus far unperforated microfile film has been used for negative making, but the pictures have been made within the area of perforated film. Positives are ordinarily printed on positive film or in special cases on high contrast positive film. The photographic laboratory charges three cents per negative exposure (usually two pages) and three cents per positive exposure. The minimum charge per order is 50 cents, which includes mailing charges. Projection prints are made for 20 cents, size 5 x 7 inches, and 30 cents, size 8 x 10 inches, etc.

Lighting the Microphotographic Laboratory

WILLIAM DEWEY

ARCHITECTS and factory managers, psychologists and physiologists, educators and institutional directors, home designers and many others, all are becoming increasingly "light conscious" as scientists and engineers in the research laboratories of large electrical corporations discover new means and methods of improving interior lighting conditions. The far-reaching importance of this new consciousness is ably expressed in *Studio* by Dr. Matthew Luckiesh, Director of the Lighting Research Laboratory of General Electric Company, as follows:

> Candlelight, lamplighr, gaslight, electric light! We have been building our artificial world by and for eyesight. Naturally. Vision is our most important sense. Our use of it overwhelmingly affects our efficiency as producers, and our progress, welfare, and happiness as human beings. We can do little abour sight except to aid it and safeguard it. But we can do much about its partner—light.... Science now dictates that artificial light should compete with daylight, as well as with darkness. Light is more than a necessity—it is a benefactor. It can do much toward mitigating some of the penalties imposed by the prolonged, close-visioned tasks of the present day....

Few will dispute—microphotographic technicians least of all—that photography, and microfilm production in particular, is one of the most "...prolonged, close-visioned..." professions of modern times. Any means that can be reasonably utilized to lighten eyestrain should certainly be investigated.

Intelligent use of lighting equipment that is now available will transform a dismal darkroom into a pleasant and efficient laboratory. This transformation, in most cases, has been a long neglected necessity, either because of ignorance or sheer inertia, as it is surprisingly inexpensive.

In planning the laboratory's lighting equipment, it immediately becomes evident that the problem assumes three divisions: White lighting, Dark lighting, and Intermediary lighting.

White lighting includes general room lighting, spot lighting for work tables, and diffused white lights for the inspection of films and prints; Dark lighting: all illumination that is used during loading and unloading cameras, processing film, handling sensitized papers, etc.; Intermediary lighting: light "trapping" for entering and leaving the laboratory while dark processes are taking place, pilot lights, warning signals for outside entrances, outlet receptacles for connecting hot plates, fans, safelights, etc., and a main control switch for all electrical outlets.

The basic fundamental of a well-lighted laboratory is that, with all lights off, the rooms are absolutely dark. It is useless and often disastrous to attempt modern laboratory lighting until this has been accomplished. Proper ventilation must be assured, but not at the expense of lightproofness. Thorough tests should be conducted to locate any possible light leaks. It must be remembered that it takes nearly 15 minutes in a completely darkened room for the iris of the eye to attain its largest aperture. After waiting for this time to pass, the technician should walk slowly about all sides of each room in the laboratory, holding a large (about 15 x 20 inches) glossy-surfaced white card about 18 to 24 inches in front of his eyes. By slowly turning the vertical edges of the card alternately away from and toward his eyes, he will be able to locate any stray reflections that may result from minute cracks which permit light seepage into the room. A little patience and careful attention to this procedure will quickly locate all leaks.

After all of the light leaks have been found and sealed, it is advisable to make a regular fog test with a strip of the most sensitive emulsion that will be used in the laboratory. Place the strip, emulsion side up, in complete darkness, covering all but an inch of it with a piece of black paper. At the end of two minutes, expose another inch of the strip for another two minutes, and so on until five inches of the strip have been exposed and at least one inch has not been exposed. The first inch will now have been exposed for ten minutes, the second for eight, the third for six, etc. Develop in total darkness for the normal length of time required by the particular solution used to approximate maximum density without chemical fog. After fixing, examine in white light. If no traces of fog are found, it may safely be assumed that the room is light tight.

When the light tightness of the rooms has been assured, the general room lighting may be undertaken. Bearing in mind that light, the right type and the right amount for each operation, is the object of this work, we find that there are two general types of illumination—direct light and indirect (reflected) light. Technically, direct light rays are known as specular rays, while indirect, that is, reflected light rays are known as diffuse rays. Indirect light, with its diffuse rays, is much "softer" and therefore the eyestrain coefficient is much lower than the corresponding coefficient of specular rays. Consequently, provided that diffuse light is present in sufficient quantity, it is more desired than specular light. However, in order to have diffuse light in larger quantities it is necessary to have efficient reflective surfaces.

The old-fashioned method of painting darkroom walls black was originally used as an absorption means in an effort to combat light rays entering the room through light leaks. As the modern laboratory technician now eliminates the entrance of these rays, he does not have to consider them and consequently is able to paint his walls any color that will give satisfactory reflective surfaces. Should these surfaces be too glossy, they will not spread the light rays enough and hence there will be too little diffusion. The resultant glare will cause eyestrain. Most pure white and other glossy finish paints have usually proven unsatisfactory. Flat wall paints, in ivory, cream, buff, or light yellow, have been found to provide ample reflection and high diffusion and therefore are very satisfactory when large quantities of soft light are desired.

Indirect illumination is best provided from the ceiling of the room as the light source must be shaded to prevent the direct light rays from striking the eyes. Therefore, most of the light is concentrated at the ceiling, and gradually tapers off in brilliancy as it travels down the side walls. An effort to counterattack highly brilliant ceilings and less brilliant walls has met with considerable success. This consists in blending the paint used on the side walls from a dark tone at the top of the walls to successively lighter shades down the walls to the floor. Thus, a deep cream, nearly buff, is used on the side walls from the ceiling intersection downward for about two feet, then a medium deep cream is applied for the next two feet, then a medium, next a light medium, and finally a light cream to a line about two feet above the floor. Thus the lighter color on the lower sections of the walls reflects nearly as much light as the deeper color at the top of the walls. The ceiling is painted in the same manner, dark on the edges blending to a lighter color in the center.[1]

Indirect general illumination in sufficiently large amounts is produced by a row of clear 150-watt bulbs set out one foot from the wall, two feet down from the ceiling, and spaced three feet apart, filament center to filament center. The bulbs are covered with an L-shaped hood, on the bottom and toward the inside of the room to prevent any direct rays from striking the eyes or the work of the technician.

This position of the general illumination source, in the majority of cases, has been found to be the most satisfactory as it affords a maximum distribution of a minimum amount of light, especially when the walls have been blended from dark to light as described above.

General illumination may also be provided by one main ceiling outlet. This usually requires an extra high ceiling as almost all of the light must be directed upwards to the ceiling by means of a shade and then re-reflected down along the side walls. Unless the shade is a goodly distance above the technician's head, a dark spot will be quite noticeable in the center of the room. This, of course, is simply the shadow of the shade.

Spot lighting for specific work on the work benches of the laboratory is a relatively simple matter. Ordinary desk lamps using 60-watt bulbs are usually satisfactory. However, in many cases it is possible to place a one-foot wide shelf about 18 inches above and extending the full length of the work bench. The shelf itself is very useful, and the underside affords an excellent place to fasten the work bench lights. These may be made of electrical outlet boxes with flat, one-hole cov-

[1] It is recommended that the lower walls be painted the same color as the floor, as this will minimize the effects of broom scratches, mop splashing, and water sprays resulting from cleaning and flushing the laboratory floor.

ers. Three-eighths-inch pipe elbows are fastened to the covers loosely enough to permit them to swivel. An ordinary key socket fastened to the elbow and equipped with an elliptical shade completes the light. The underside of the shelf is painted the color of the wall so that, by revolving the shade, indirect light is reflected on the work. Thus, either a soft indirect light or, by again revolving the shade, an intense direct light is secured. Lights of this type may be placed every 12 inches along the underside of the shelf, using alternate red and white bulbs. Two sets of wires should be run through the connecting conduit, with a red and white switch, which will then permit either circuit to be completely disconnected or connected with one motion.

Diffused illumination is usually preferred when inspecting films and prints. Such a type of light is sufficiently intense, yet is absolutely flat, which qualifications eliminate light and dark spots. With this type of light it is not necessary for the technician to make mental compensation for bright spots while judging the quality of his work. Diffusion viewers may be built in the surface of the work bench by recessing a quarter-inch piece of plate glass in the surface of the bench. A piece of ground glass is placed against the underside of the plate glass, and a box containing a 15- or 25-watt light is fastened to the underside of the bench. By using a rectangular box with the bulb at the far end, an indirect light is obtained which, when coupled with the ground glass, assures adequate diffusion for all practical purposes.

When using the rack and tank system of processing film it is often desirable to inspect the rack of film as soon as it has passed through the hypo solution. A hand type of diffused viewer may be quickly made by slipping a 5 x 7-inch piece of ground glass into an Eastman safelight. A permanent inspection rack may be made by constructing a vertical wooden frame with either a ground glass or tracing paper cover. After mounting several equally spaced 15-watt frosted bulbs directly behind the cover, the frame may be hinged to the ceiling and raised and lowered with a rope and pulley so that it hangs directly over the wash tanks, allowing the rack to be placed in front of it for inspection while the hypo flows into the wash tanks.

Other demands for White lighting may be satisfied by the same general rules that have been illustrated. In considering each demand that is made of light, it is necessary to determine whether specular or diffuse light is required, and then to balance that type of light source with the proper type of reflective surfaces. Indeed, it is this correctness of balance that usually determines success or failure in lighting problems.

NEWS and TECHNICAL NOTES

American Weekly Mercury Filmed

Under the sponsorship of Mr. Austin K. Gray, of the Library Company of Philadelphia, and of the American Antiquarian Society of Worcester, Mass., the complete files of the *American Weekly Mercury* from December 22, 1719 to May 22, 1746, have been placed on microfilm. The joint files of both institutions were used to secure a complete file. Positive film copies are available at a price of $40 per set. Further information, including details of the collation, and a complete description of the film file and its arrangement, may be obtained from the Graphic Microfilm Service of Philadelphia, 328 Chestnut St.

Barron's Weekly Not Available on Microfilm

In the last issue of the JOURNAL (3:43. March, 1940), announcement was made of the availability of *Barron's Weekly* on microfilm. The announcement was in error. A project to film this periodical was being considered, but sufficient subscriptions from libraries to cover the cost were not forthcoming; hence, it was abandoned.

Cheap Quantity Reproductions of Graphs, Diagrams, Charts and Maps on Standard Lantern Slides

School systems, business organizations, and governmental agencies frequently need a cheap method of duplicating lantern slides of graphs, diagrams, maps, etc., for wide distribution. In the Cleveland Public Schools where many duplicate lantern slides are required for city-wide radio lessons, some of these slides have been produced by rotoprinting on plastacele or transolene. The process has proved very satisfactory as it produces a nonbreakable, lightweight, and low-cost slide.

Sketches, maps, diagrams, or charts are prepared on 7 x 8 inch two-tone drawing paper, and are then photographed regular lantern slide size, 3¼ x 4 inches, on a sensitized aluminum plate. Six slides are placed on each plate and printed on a sheet of transolene or plastacele. This sheet is then cut to size and may be bound into booklets or made up into packages for cheap transportation through the mail. Each slide is ready to be mounted between two cover glasses or heavy lumarith. The glass or the lumarith may be hinged on the long side with scotch tape to accommodate a series of slides or may be bound up permanently in regular lantern slide form. When projected the slides are clear and are considered equal to photographic reproductions.

Transolene is transparent, heat resisting (500-watt lamp), moisture-proof, and absorbs a special ink which produces an opaque line. Plastacele is colorless cellulose acetate .010 inch thick, usually sold in sheets 20 x 50 inches in size. If a light-colored amber material is used it is more restful to the eyes than clear white.

The above process is superior to the photographic method in speed and cost. A state school system can provide illustrative material at a very small cost for a large number of rural schools. University extension centers can use these slides to provide cheap material for study courses. State supervisors of instruction in trade courses could implement courses in mechanical drawing and machine operation with many explanatory diagrams.—W. M. GREGORY, Director, Educational Museum of Cleveland Schools, Cleveland, Ohio.

COMMITTEE ON HISTORICAL PHOTOGRAPHS

At the recent Washington convention, The Photographic Society of America announced the formation of an Historical Division for the purpose of collecting and disseminating photographic information that will be of interest to historians. Under the chairmanship of Dr. A. J. Olmsted, Chief Photographer and Custodian of the Section of Photography of the Smithsonian Institution and the United States National Museum, the Committee will endeavor to work through existing agencies and coordinate the activities of institutions and individuals working in this field rather than undertake the formation of a special collection. One section of the Committee will be concerned with stereoscopic slides and cameras; a loan collection of slides and views may be assembled. Loan collections illustrative of American life at various periods as recorded by photography may also be prepared.

Additional information on the Committee and its activities may be secured from Mr. F. Quellmalz, Jr., The Photographic Society of America, 10 Park Ave., New York, N.Y.

FILM STORAGE CABINET

John G. Bradley, Chief of the Division of Motion Pictures and Sound Recordings, The National Archives, has just received Letters Patent No. 2,190,229 on a storage cabinet for motion-picture films. The cabinet is so designed that a fire in any one compartment or from any other source will operate a water sprinkler located in the top of the flue at the rear of the cabinet. In such a case the sprinkler automatically throws a spray of water simultaneously into each compartment of the cabinet, thus affording instant protection to all the films stored both from a spread of fire and from excessive heat. The water thus sprayed into the compartment falls on showerproof containers holding the films, and completely encases the containers in a thin sheet of water. In a few seconds, according to the claims, the water fills the bottom of each compartment and forms a moving "water seal" at the juncture of two overlapping baffles in the rear so that the heat from the flue or from adjacent compartments is effectively kept out of unaffected compartments.

One of the principal features in this patent is the provision that keeps the water constantly moving or cascading from each compartment to the one next below it; thus the water never becomes overheated and it effectively carries off heat resulting from combustion. The cabinet, although primarily designed for the storage of motion-picture films, is adaptable to the storage of any type of inflammable material—still films, documents, papers, etc.

Prior to the filing of claims, a total of 66 burning tests were made in which both internal and external fires were deliberately started as a means of measuring the effectiveness of the cabinet. In the last test the cabinet was placed inside a specially designed cubicle where approximately 1,400 pounds of combustible material was piled around the cabinet and ignited. This represents a rather high concentration of combustibles and approximates the condition one would find in a burning building. The fire burned actively for three and one-half hours, after which it was allowed to diminish. The test was terminated at the end of 24 hours. The maximum temperature reached on the outside of the cabinet was approximately 1500°F.; the maximum temperature reached on the inside of the cabinet, however, was only 148°F.—a temperature considerably below the flash point of film. None of the film was damaged.

Finch Facsimile Process

The Finch system of facsimile duplication was demonstrated in connection with the United States Patent Office exhibition held in Washington, D.C., during the second week of April. Machines were in continuous operation throughout the exhibition producing facsimile editions of newspapers, printed matter and manuscript. An interesting booklet entitled *Finch Facsimile Field Laboratory,* which explained some of the aspects of facsimile wire and radio transmission, was distributed. A limited number of additional copies are available and may be obtained by writing Finch Telecommunications, Inc., Passaic, N.J.

Grant to Temple University

Announcement has just been made of a Rockefeller grant of $750 to Temple University Library. A portion of the sum is to be used to provide academic training and technical laboratory experience in microphotography at Columbia University this summer for Mr. Charles Elfont of Temple University Library and the balance will be applied to the general work at the Department of Microphotography during the academic year 1940-41.

Iconovisor

The DeHaven Iconovisor, a continuous intermittent automatic slide film projector has recently been placed on the market by Marks & Fuller, 44 East Ave., Rochester, N.Y., the exclusive distributors. The machine will project, automatically, up to 350 single frames on 35mm. safety film at predetermined intervals of 1, 3, 6, or 16 seconds. Approximately 40 pictures may be made into a loop for continuous projection. It is streamlined in appearance and will project either monochrome or color, pictorial or textual materials. The Iconovisor is intended principally for lectures, displays, exhibits and the like. Automatic rewind and remote-control attachments are also available.

Leica Information Bulletin

When publication of *Leica Photography* was suspended in September, 1939, announcement was made of a special information bulletin to be issued from time to time. Number 1 bearing the date of April, 1940, has appeared containing latest information on the products of E. Leitz, Inc. Copies are available without charge to all registered Leica owners in the United States, and sample copies will be mailed upon application to E. Leitz, Inc., 730 Fifth Ave., New York, N.Y.

Microfilm Bulletin

A microfilm bulletin of four pages may be secured on application to the Graphic Service Corporation, 663 Beacon St., Boston, Mass. It contains specifications, a description and an illustration of the Micro-News Reader, a brief description of the Micro-Copy Reader and information on some of the microfilm educational publications of the Corporation.

Microfilm Publication

A unique venture in the realm of book publishing has been undertaken by University Microfilms in cooperation with the Macmillan Company. Volume I of Professor Paul Monroe's *Founding of the American School System, A History of Education in the United States from the Early Settlements to the Close of the Civil War Period* has been printed and published in the conventional manner. Volume II, however, comprising 1,700 pages of carefully typed fully quoted source material has been microfilmed and is only available in the form of microfilm positives. Volume II parallels exactly the order of the chapters and topics in Volume I, and the reader may consult references and footnotes with far greater facility than heretofore.

Complete information on this project may be secured from University Microfilms, 313 North First St., Ann Arbor, Mich.

Microfilm Service Announcement and Order Form

University Microfilms, 313 North First St., Ann Arbor, Mich., has recently prepared a brief description of its microfilm copying services and an order form listing rates, conditions, etc. Copies may be obtained by writing to the above address.

Microfilm Supply List

A seven-page mimeographed price list of materials and supplies for microphotography, including chemicals, tests, films, photographic paper, etc., is available from the Photorecord Department, Marks and Fuller, Inc., 15 Gibbs Street, Rochester, N.Y. Special order forms to expedite delivery have been prepared and will be supplied on request.

Supplemental items of supplies and equipment will be added to the list from time to time.

Microphotography and Book Charging

Microphotography is being used experimentally to charge library books in the Gary Public Library, Gary, Ind., under the direction of Mr. Ralph R. Shaw, Librarian. Serially numbered date due cards are kept ar rhe charging desk. When a patron wishes to borrow a book, his card, the book card and a date due card are photographed on microfilm on an automatic camera. The film used will accept 7,010 exposures and costs $2.75 developed. When the book is returned, the date due card is removed and the book is returned immediately to the shelf. The work of discharging books is simplified through the use of the consecutively numbered date due cards, and the cost of issuing overdue notices can be decreased from about 30-35 cents to 2 cents per volume. It is expected that the new process will simplify, facilitate and reduce the cost of the charging process.

Microphotography in Mexico

Dr. Silvio Zavala, Secretary of the Museo Nacional, Mexico, D.F., has just received a grant from the Rockefeller Foundation for a complete small microphotographic outfit, including camera and reading machine. Dr. Zavala is at present in the United States on a Guggenheim Fellowship to study materials for the history of Mexico in collections in this country. On his return to Mexico the equipment will be employed in the Archivo General de la Nación, the Biblioteca Nacional, the Museo Nacional and other depositories. The grant will be administered by the American Library Association Committee on Photographic Reproduction of Library Materials, and the Committee has also made arrangements to instruct Dr. Zavala in the operation of the equipment.

MULTIFAX DUPLICATOR

A machine for the rapid preparation of hectograph master sheets in copying ink and of wax stencils for the mimeograph has been developed by engineers of Western Union. Originals measuring up to 11 x 17 inches in pica or elite typewriting, printing in the same size or larger, clear black and white drawings and print may be reproduced. The machine is not intended for pictures, half tones or the smaller type sizes. A full-size letter sheet can be copied in about 12 minutes. Operation has been simplified; a push button control starts the machine which stops automatically at the end of the carriage. Certain adjustments for variation in originals are provided. It is possible, for example, to make positive copies from blueprints or negatives from black on white originals simply by pressing a button. When the master sheet or stencil is completed it is placed on a duplicating machine and the required number of copies run off.

This machine, technically designated Western Union Duplicator 2-A, has a 24-inch horizontal rotary cylinder or drum on which the original and the blank sheet are formed. A moving carriage behind the drum carries a scanning system and a percussion unit. In operation the drum rotates and a light beam traces a path over the entire surface of the original writing or drawing while the percussion unit passes over the carbon sheet or stencil. The scanning light interrupted by black portions of the original is reflected into a photoelectric cell where it creates corresponding electrical impulses that actuate the percussion unit. As the percussion arm strikes the carbon or stencil blank with tiny hammer blows, a master copy is created dot by dot.

The Multifax is intended for the office machine field and is one of the newest devices pioneering "facsimile" duplicating.

NEW PRODUCTS FROM AGFA

The Agfa Ansco Division of General Aniline and Film Corporation has recently placed two new products on the market. These include: an inexpensive *tray clip thermometer* for use in trays or small open tanks, mounted in stainless steel, calibrated with large numerals and degree marks; visibility is further aided by a prism-type magnifying glass column and black thermometer fluid; and a *stainless steel developing tray,* size 5 x 7 inches, of rigid construction, proof against chipping or breaking, and having no chemical or fogging effect upon sensitized photographic materials.

Photo Developing Water Cooler

Temprite Products Corporation, 47 Piquette Ave., Detroit, have placed the Temprite Water Cooler assembly on the market. It is intended to maintain temperature of developing solutions at 65°F. plus or minus 1°. It is stated that the average load encountered in photographic work is one gallon of water for each square foot of film processed. The Temprite unit is capable of delivering 80 gallons of water per hour under favorable conditions. The unit is small and capable of being installed in restricted space. Details and diagrams may be secured from the above address.

Photographic Reproduction of Public Records

The following list of references to state laws dealing with the photographic reproduction of public records was compiled by the State Law Index, Legislative Reference Division, the Library of Congress:

Arkansas. Laws 1929 No.189 Sec.5 (b, c)

Authorizes photographic recording of public records when the necessary equipment is provided.

Photographic copies admissible in evidence.

Connecticut. Cumulative Supplement 1935 Sec.1735c

Provides that any officer, court, board, institution, agent or employee of the state, or any political subdivision thereof may record or copy instruments of writing by means of "any photographic process approved by the examiner of public records."

Photographic copies admissible in evidence.

Hawaii. Laws 1931 No.45

Provides for the photostating of old records in the Bureau of Conveyances for the purpose of preserving same.

Maine. Laws 1935 c.99

Photographic copies of records admissible in evidence.

Maryland. Laws 1929 c.200

Provides for copying by photographic process the early land records (prior to 1787) by the commissioner of the land office, for the purpose of preserving same.

Ohio. Laws 1937 p.546-547

Provides for the copying of legal papers by "any photostatic, photographic or miniature photographic process" and further provides that when so copied the originals may be destroyed. Such copies are admissible in evidence.

Pennsylvania. Laws 1937 No.199

Authorizes the recording and copying of documents, plats and other instruments in writing by "any photostatic, photographic or other mechanical process." Such copies are admissible in evidence.—LUTHER H. EVANS.

PHOTOMETER FOR MICROPHOTOGRAPHY

Listed as U.S. 2,196,234 (*See* Patent Section) a patent has just been issued to Mr. Leonard G. Townsend for a simple photometer for use in microphotography. Intended to measure light reflection from an original with more accuracy than the conventional photoelectric-cell meter, the instrument is said to enable greater accuracy in making exposures and in adapting negative material to the reproduction of difficult originals. Essentially, the device employs a standard comparison sample for black and white and colored originals, and must be calibrated to a standard film quality desired. It is said to be simple and inexpensive, and is expected to be available on the market at an early date.

POLAROID VARIABLE DAY GLASS

An eye protection device that permits the wearer to control the brightness of the view and reduce brilliance as much or as little as he wishes has been marketed by the Polaroid Corporation. It operates on the Polaroid variable density principle used in camera faders, train windows, etc. A pair of superimposed Polaroid disks is used and are instantly adjustable to any desired brightness. The use of these glasses has been suggested for reading positive microfilm material on the translucent screen of a reading machine, but as yet no extensive trial has been reported. Many other uses will probably appear. Complete information may be secured from the Polaroid Corporation, 730 Main St., Cambridge, Mass.

PROJECTION MEASUREMENT OF STRESSES AND STRAINS

A projection technique used to measure stresses and strains in models of automobile parts is illustrated in *Automobile Facts,* II, no.10 (June, 1940), p.2. A transparent plastic model of some highly stressed metal part, as, for example, a gear or connecting rod, is examined by projecting it with polarized light on a screen. When the model is subjected to loads which represent the conditions of actual use, bright bands of color like miniature rainbows show up the sections of greatest strain and clearly reveal the magnitude, distribution and direction of the stresses.

SUMMARY OF READING KNOWLEDGE REQUIREMENTS AND A TRANSLATION SERVICE

Dr. L. E. Hinkle, Head of the Department of Foreign Languages and

Director of the Translation Service, North Carolina State College, and I. O. Garodnick have just completed a bulletin bearing the above title. The publication is a concise but comprehensive report of a survey of leading institutions in the United States. The readers of the JOURNAL who have benefited from the translations of foreign articles on documentary reproduction will doubtless be interested in the practical aspects of a translation service as revealed in this study. Copies are available for free distribution as long as the supply lasts, and inquiries should be addressed to Dr. L. E. Hinkle, North Carolina State College of the University of North Carolina, Raleigh, N.C.

FOREIGN SECTION

French Libraries and the War

Emile Leroy

(translated by Lucy F. Cowdin)

French libraries have not escaped the upheavals war brings into the lives of belligerent countries. Mobilization of personnel of army age, unfamiliar working conditions imposed by the requirements of the "passive defense," and the indispensable precautionary measures taken to safeguard precious collections have greatly affected the conditions under which libraries operate. They have been able, however, to pass from a peacetime to a wartime regime without too much difficulty, because these precautionary measures had been decided upon long before the danger became imminent.

Most of our establishments are operating in low gear, however, because, when the international situation grew alarming, many of our own readers were obliged to rejoin their army units and a great number of the foreigners who came to France to study returned home. The number of readers was consequently so diminished that regulations for limiting the number of admissions, imposed by circumstances, have inconvenienced them very little. The period of change was short, and if, during the first weeks after reopening the libraries on a wartime basis, people occasionally had to wait for a place to be vacated before they could obtain access to the reading rooms at the Bibliothèque Nationale, all cause for complaint disappeared when the rule was made a little more flexible.

Closed on August 25, 1939, the Bibliothèque Nationale and its subsidiary establishments were again made available to the public on October 27. This temporary closing, however inconvenient it may have been for readers and students, was necessary for the execution of a plan carefully worked out on the basis of a study that took into account the experience of the war of 1914-18 and the progress made since then in the construction of airplanes and modern armaments. Recent experiences had shown that the risks were greatly multiplied and that they now extended to regions far removed from zones of military operations.

This plan, which left nothing to be decided at the last minute, made it possible, in a minimum of time and inconvenience, to remove the most precious documents to a safe place, even before they were in danger. It should be said that at the time of the crisis of September, 1938, a preliminary trial, made for testing purposes, had revealed several imperfections that were easily corrected, so that, when the real alarm sounded, all the precautionary measures planned could be applied surely and methodically.

These measures were of two kinds: general measures relating to the protection of the buildings and their content, and specific measures relating to precious collections. The purpose of the first was to combat the danger from incendiary bombs. The most important step was removing all inflammable material from the attics and covering the attic floors with a layer of sand. Naturally, the number of portable fire extinguishers has been increased and first-aid equipment has been augmented.

The question of safeguarding valuable documents was more difficult to solve. Removal, the method which seems to be most efficacious, presents so many disadvantages that certain librarians wondered if it would be better not to attempt it. Their point of view may be explained thus: The transfer of collections to a place supposedly safe from aerial bombardment necessitates handling that exposes the documents to dangers of deterioration or loss which appear more certain than their hypothetical destruction by engines of war. No building, unless it is underground and protected by a thick covering impenetrable to the largest shells, can assure complete safety. Furthermore, since bomb shelters are not arranged as libraries, documents must remain piled in their packages, which jeopardizes their preservation. Under these conditions—the substitution of an almost certain risk for a problematical danger—is it worth while to deprive readers of the use of these documents during a period that might be a very long one?

These objections have not prevailed. It is possible, in fact, by taking certain precautions, to avoid the risks of handling and transportation and the dangers of poor conservation in places not arranged as libraries. And although it is true that, theoretically, no place is entirely safe from bombardment, it is possible to find isolated places that offer conditions of security infinitely superior to those found in urban centers that, with their industrial importance and the strategic value of the major communication lines serving them, constitute a tempting target for enemy aviation. Therefore, the decision was made in favor of removal from each library its most precious stores.

On August 25 the order was given to begin this removal. By September 1, the first day of general mobilization, the greater part of the documents to be sent away by the Bibliothèque Nationale had been packed in cases, a large number were already at the place of safekeeping, and others were en route. To realize the immensity of this task, one must remember that the Bibliothèque Nationale has charge not only of its own collections, but also of those of the libraries of the Mazarine, of the Arsenal, of the Opera, and of the National Conservatory of Music, and that each of these is rich in documents of great value.

This undertaking was successful because of the precision of the preliminary plans that had been made. Documents and objects to be removed had been carefully selected a long time before. A list of the order in which they were to be removed was also determined, for it was feared that transportation difficulties would retard the operations and that the danger might appear before the process was completed. The books, manuscripts, engravings, and medals that made up the shipment of "primary urgency" were wrapped, packed in cases, and sent off by August 27.

The packing cases, of a model especially constructed for the conditions under which they were to be used, had been on hand for some time. They were of several types, according to the nature and weight of the documents, and were designed to be easily handled. In general, they weighed, when filled, not more than 50 to 60 kilograms, and most of them measured 70 x 30 x 30 centimeters (interior dimensions). Cases for the medals were built in such a way that the shelves of the regular storage cabinets could be placed in them; each medal remained in its place on its shelf, and the shelves were separated from each other by protective padding. The precaution was taken of using a very dry wood for their construction. Finally, in order to assure the ventilation inside as well as outside the cases that is necessary for proper storage of books and manuscripts, the two boards forming each side were very slightly separated (slightly enough, however, to prevent the entrance of insects) and, at each end of the top side, a small board was nailed that acts as a support when the cases are piled on top of each other. This same necessity for ventilation accounted for our not using tar paper on the inside, which was lined with plain wrapping paper. Books with valuable bindings were covered with sheets of silk paper to prevent them from rubbing. The top of the case, or preferably the front, to permit opening the case without moving it, formed the lid. Each case was numbered and carried the name of its library. No less than two thousand cases were required for all the valuable collections of the national libraries. We do not pretend to have eliminated all danger with these measures, but the risks have been reduced to a minimum.

This experiment, imposed on us by recent events, brings up in a more general way the question of means of remedying to some extent the loss of valuable works, for none can be insured against loss. In addition to their own material value, which is irreplaceable, they represent for art, for science and for history a value that can and must be saved. A good cast, a perfect facsimile, a photographic reproduction, faithful evidences and tangible souvenirs, contain in certain ways the same interest as the original. This is true primarily of documents whose text constitutes their only value. There is no lack of processes of reproduction, and the use of microfilm now permits a considerable extension of the possibilities of conserving texts. We have used this method in reproducing the only catalog in existence of the library of the National Conservatory of Music. This reproduction appeared all the more necessary because certain parts of the catalog, notably those concerning unique documents, ancient music, the music of the King's Chapel, and of the Revolution, hold great interest for all musical libraries. These cards, reproduced on 35mm. film, are now available.

This rapid account concerns only the libraries, but the same measures of protection have been taken in all archival depositories and in museums. This great undertaking, which for several weeks transformed these ordinarily peaceful and silent places into vast packing houses, was accomplished with magnificent spirit by men and women representing all degrees of the administrative hierarchy, all inspired by the same zeal to bring rapidly to conclusion a task whose importance each understood. Thanks to their devotion, innumerable treasures will be able to survive the turmoil with no other harm than a temporary absence from the establishments where it is to be hoped they will soon reoccupy their places.

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AGFA FORMULAS FOR PHOTOGRAPHIC USE. Rev. ed. Binghamton, N.Y.: General Analine and Film Corporation, Agfa Ansco Division, 1940. 32p. 6½ x 8½ inches. paper, 10c.

This is the revised edition of a popular pamphlet on photographic developing formulas. It contains notes on such subjects as photographic chemistry, chemical mixing, etc., and also includes 46 formulas recommended for use with Agfa materials.

AGFA PHOTOGRAPHIC PAPERS. Binghamton, N.Y.: General Analine and Film Corporation, Agfa Ansco Division, 1940. 48p. 5½ x 7½ inches. illus. paper, 15c.

This is an amply illustrated pamphlet devoted to Agfa photographic papers, their properties, processing and applications, with characteristic curves, exposure scales and speeds, developing formulas and other valuable data.

CAMERA, TAKE THE STAND, by Asa S. Herzog and A. J. Ezickson. New York, N.Y.: Prentice-Hall, Inc., 1940. 195p. 6 x 9 inches. illus. cloth, $3.

In recent years the camera has come to play an increasingly important role in crime detection; law enforcement has become a science. The authors, one a member of the New York Bar and the other of the New York Times Wide World Photos, have prepared an extraordinarily interesting and readable account of the part played by photography in the detection, capture, identification and conviction of the criminal.

Few people realize how inadequate and fallibile the human eye and memory may be in recording and preserving data accurately. Once this fact is demonstrated, the superiority of the camera is evident. Criminals have been trapped by photography while actually committing a crime. This subject is discussed and illustrated. Fingerprints, prints, tracks, traces and their recording occupy two chapters. Photography at the scene of the crime, the identification of firearms, bullets and missiles are discussed.

The examination of questioned writing and the place of photography in document work receive full treatment in this book, although unfortunately microphotography is not mentioned. Photography in evidence is well handled. A grim chapter, "Death on the Road," discusses uses and applications of photography in automotive accident cases and in accident prevention. "Clues in the Laboratory" and "Around the Clock with the Police Camera" are the concluding chapters of the book. The former and Chapter 7, "Clues in Ink," will be of most immediate significance to those interested in documentary reproduction.

The reviewer was impressed throughout with the realism of the account. Famous or notorious cases have been drawn upon almost exclusively for data to illustrate specific points. There is no bibliography, but frequent exact citations have been incorporated in the footnotes.

The book is neither a textbook on procedure, a manual of methodology nor a sensationally written "exposé." It is a well-presented factual account which is intelligible and attractive to the layman, and informative to the specialist.

EASTMAN PHOTOGRAPHIC PAPERS. Rochester, N.Y.: Eastman Kodak Company, 1940. 46p. 5¾ x 8½ inches. illus. paper, 15c.

This booklet contains a wealth of data on the more popular photographic papers marketed by the Eastman Kodak Company. The various characteristics of each material are discussed and illustrated by photographs. Charts, tables, characteristic curves, exposure formulas, instructions in printing, finishing, toning and mounting combine to make this pamphlet valuable alike to the beginner and the professional.

INFRA-RED PHOTOGRAPHY WITH KODAK MATERIALS. Rochester, N.Y.: Eastman Kodak Company, 1940. 35p. 5¾ x 8½ inches. illus. paper, 25c.

The various aspects of infrared photography with Kodak materials are concisely discussed with many illustrations including photographs, charts, data tables, etc. Two pages are devoted to documentary photography with infrared sensitive materials. Developing formulas, exposure time, sensitometric and time-temperature charts are included. There is a four-page bibliography.

KODACHROME PHOTOGRAPHY. Rochester, N.Y.: Eastman Kodak Company, 1939. 50p. 5¾ x 8½ inches. illus. paper, 25c.

The present publication on the Kodachrome process of color photography will be found indispensable by anyone interested in this type of color reproduction. The process is briefly described and working notes on exterior and interior lighting, exposure meters, exposure, duplication, projection of color transparencies, storage and the making of black and white prints are provided. A list of Kodachrome processing stations in the United States and abroad is given. Specifications for the various Kodachrome emulsions are set forth in detail. Many illustrations in monochrome and color illustrate the text.

KODAK FILMS. Rochester, N.Y.: Eastman Kodak Company, 1940. 55p. 5¾ x 8½ inches. illus. paper, 15c.

The subtitle of this booklet reads "A Data Book on Negative Materials." Here in compressed form will be found exceedingly valuable technical information on Eastman negative materials. It is intended for the professional or serious amateur. Sensitometric determinations are defined; color sensitivity, grain, resolving power and speed rating are concisely discussed. There are suggestions on development, on the best sensitive material for various subjects, developing formulas and sensitometric curves for various negative emulsions. Microphotographers will turn at once to pages 54 and 55 which contain data on Micro-File Safety Film, Kodak Safety Positive Film and Kodak High Contrast Safety Positive Film. An abridged price list for the United States is interleaved.

KODAK LENSES AND SHUTTERS. Rochester, N.Y.: Eastman Kodak Company, 1939. 51p. 5¾ x 8½ inches. illus. paper, 15c.

This monograph is designed to acquaint the photographer or interested amateur with some of the properties of Kodak lenses, their manufacture and performance. Treatment has been simplified and well illustrated. A brief description is given of several Kodak shutters. Specifications for 14 Kodak lenses are included. Formulas for computing effective aperture for close-ups for supplementary lenses, for depth of field and circle of confusion computations, angle of view, and for calculating approximate position of subject and image will be found useful. There are notes on range finders and the care of lenses.

MODERN DEVELOPING METHODS FOR PRINTS AND FINE GRAIN NEGATIVES, by the technical staff of the Edwal Laboratories, Inc., under the direction of Edmund W. Lowe. Chicago, Ill.: The Edwal Laboratories, 1939. 96p. 5½ x 7⅝ inches. illus. paper, spiral bound, 50c.

The present book is the successor to a less elaborate handbook entitled *Modern Developing Technique* which appeared a few years ago. It is concerned with the treatment of the negative after the exposure has been made and includes the making of paper prints.

Complete instructions are given for the use of Edwal formulas with various negative emulsions, including those used in documentary reproduction. Similar material for paper processing has been incorporated. Edwal materials receive prominent although not undue attention, and a price list of chemicals and prepared formulas appears in the closing pages. Amply illustrated with pictures, charts, graphs and tabulations, and containing much valuable information, the handbook is well worth its modest price.

PHOTOGRAPHY IN LAW ENFORCEMENT. Rochester, N.Y.: Eastman Kodak Company, 1939. 44p. 5½ x 8½ inches. illus. paper, 25c.

Intended as a manual for police officers, the study is divided into four chapters: Field Photography; Headquarters Photography; Cameras and Outfits Especially Suited for Law Enforcement Photography; and Printing and Enlarging Equipment. Details of photographing room interiors, fingerprints, crimes of violence, arson, burglary, automobile accidents, "mugging," firearms identification, and making copies are included. Equipment is discussed. The treatment is adapted to the subject matter and thumbnail sketches of several procedures allied to documentary reproduction are given.

PATENT SECTION*

U.S. 2,133,537, Oct. 18, 1938, Arthur W. Carpenter assigned to United Research Corp., Long Island City, N.Y.

Optical reduction printer based on patent 1,993,085 of March 5, 1935 for making reduced-size film prints from film originals; as for example, 16mm. prints from 35mm. negatives. 4p. 4pl.

U.S. 2,133,978, Oct. 25, 1938, Rupert H. Draeger, U.S. Navy.

Copying apparatus incorporating base, standard, object support, camera and reflector with suitable calibrated scales for reproducing material on 35mm. film. 4p. 5pl.

U.S. 2,134,704, Nov. 1, 1938, Virgil H. Cornell, New York, N.Y.

Field photostating apparatus of the reflex copying type with sponge rubber platen bookholder, hinged-cover glass plate, light bracket and incandescent light supported above the cover glass. 4p. 2pl.

U.S. 2,140,567, Dec. 20, 1938, Leonard G. Townsend, Washington, D.C.

Apparatus for making and/or utilizing photorecords (see U.S. 2,121,061, June 21, 1938, J.D.R. 3:76), microphotographic machine usable as a camera, reading machine or projection printer. 11p. 6pl.

U.S. 2,142,853, Jan. 3, 1939, Paul Landrock assigned to Photostat Corp., Providence, R.I.

Film magazine construction for copying cameras particularly of the photostat type; includes film feed to maintain sensitive material flat in focal plane and tensioning means. 5p. 4pl.

U.S. 2,142,881, Jan. 3, 1939, Harry R. Bell, Chicago, Ill.

Photographic film-processing apparatus, particularly adapted for long lengths of narrow film; employs a motor-driven drum with take-up to compensate for film expansion, and means to support it in trays of solution. 3p. 3pl.

U.S. 2,143,059, Jan. 10, 1939, Glenn L. Dimmick assigned to Radio Corp. of America, Camden, N.J.

Optical system for reduction film printers. 2p. 1pl.

U.S. 2,174,660, Oct. 3, 1939, Henry D. Hirsch, Chicago, Ill.

Film-feeding device for projection apparatus, as photographic enlargers, projectors, etc., for use with perforated film in relatively short lengths. 2p. 1pl.

U.S. 2,176,000, Oct. 10, 1939, Michael W. Albano, Springfield, Mass.

Portable photographing and developing camera of the type used principally by itinerant street photographers. 4p. 3pl.

* The Patent Section is made possible through a grant received from the Committee on Scientific Aids to Learning. The listings include the patent number, date of issue, patentee and assignee (if available), a brief description of the published purpose or title of the patent and an indication of its size; for example, 4p. means 4 pages; 4pl. means 4 plates of accompanying drawings.

U.S. 2,176,283, Oct. 17, 1939, Carlton L. Whiteford, Brooklyn, N.Y.

Slide mounting for preparing a photographic film for projection between two glass plates in a special holder, particularly intended for 2 x 2 inch slides. 3p. 1pl.

U.S. 2,176,573, Oct. 17, 1939, Samuel Hershberg, Brooklyn, N.Y.

System of photography incorporating a camera, camera stand and lighting mechanism" whereby an unskilled operator is enabled to produce a photograph of a quality comparable to that produced by a finished and experienced artisan." 9p. 9pl.

U.S. 2,176,910, Oct. 24, 1939, Lionel F. Levy, Philadelphia, Pa., assigned one half to Howard S. Levy, Feasterville, Pa.

Photographic apparatus for copying and making half-tone reproductions; compact unit comprising copyholder, illuminating system, lens holder with mirror system and gearing arrangements. 3p. 2pl.

U.S. 2,177,135, Oct. 24, 1939, Elgin G. Fassel, Milwaukee, Wis.

Photographic recording equipment for microfilming both sides of flat documents continuously with provision for indexing and "recording upon a single section of film the withdrawal of a group of documents from their files and the time of such withdrawal." 8p. 6pl.

U.S. 2,177,638, Oct. 31, 1939, Rupert H. Draeger, U.S. Navy.

Reading machine for 35mm. microfilm (*See* U.S. 2,113,578, April 12, 1938), incorporating a motor-driven film-advancing mechanism. 3p. 3pl.

U.S. 2,190,229, Feb. 13, 1940, John G. Bradley, Willisville, Ill.

Film storage cabinet (*See* p.116-17 of this issue of the JOURNAL); fireproof, inexpensive cabinet for the safe storage of combustible and explosive material, as photographic (nitrate) film and the like. 5p. 4pl.

U.S. 2,196,234, April 9, 1940, Leonard G. Townsend, Washington, D.C.

Means for comparative determination of transmitted and reflected light particularly in microphotographic operations (*See* p.122 of this issue of the JOURNAL). 4p. 3pl.

EDITOR'S CORNER

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Microphotography at Cincinnati

The annual conference of the American Library Association in Cincinnati the week of May 27 held much of interest for those working in microphotography and documentary reproduction. No special microphotographic program was planned this year; instead special papers were presented at various sections and subsections. These included: "The Photographic Reproduction of Library Material" by Mr. Ralph H. Carruthers of the New York Public Library, and "The Union Catalog and Photography as an Aid to Reference Work at Long Range" by Mr. George A. Schwegmann, Director of the Union Catalog and of the Photoduplication Service of the Library of Congress; both papers were presented before the Association of College and Reference Libraries, the former at the University Libraries Subsection and the latter at the Reference Libraries Subsection. Mr. William A. Jackson of Harvard College Library read a paper entitled "Some Limitations of Microphotography" at a session of the Bibliographical Society of America. Mr. George A. Schwegmann presented another paper, "Microphotography in Business and Industry" before the Business and Technology Section. Dr. J. Periam Danton, Librarian, Temple University, spoke on "The Place of Microphotography in Serials Work" at a session of the Serials Section. Mr. Herman H. Fussler, of the University of Chicago, read a paper before the Catholic Library Association, and Mr. V. D. Tate, of The National Archives, presented a paper, "Microphotography and Public Documents," at the meeting of the Public Documents Committee. The Bibliography Committee held a joint session with the Archives and Libraries Committee devoted exclusively to International Documentation with papers by Dr. F. Donker Duyvis, Secretary of the International Federation for Documentation, Dr. Ernest Posner, of American University, Mr. Arthur Berthold, of the Union Library Catalogue of Philadelphia, and Mr. V. D. Tate. Most of the papers will be printed, some in subsequent issues of the JOURNAL, others in the various papers, proceedings, etc., of the Conference. Notations of publication will be made through the section of Bibliography in succeeding issues of the JOURNAL.

There were several interesting exhibits at the Conference. The Graphic Service Corporation showed the Micro News Reader and the newly developed Micro-Planreader. It was the first public showing of this latter machine, which was built for the Navy Department in Washington, D.C., and is intended to be used for the reading and photographic printing of microfilm reproductions of engineering drawings. A final engineering model of the Micro-Scholar-Reader was also shown. This reader was built after the plans and specifications of the Committee on Scientific Aids to Learning for a low-priced reading machine for the individual scholar; it may shortly be placed in production. The Recordak Corporation exhibited a Model D camera, a Model C reading machine and the Recordak Junior, a combined camera and reading machine for use with 16mm. film. The Readex Microprint Corporation demonstrated the Readex semiprivately throughout the Conference. The Globe Wernicke Corporation showed plans for an inexpensive microfilm storage cabinet with a capacity of 1,000,000 exposures of roll or strip microfilm (See p.98). The *New York Times* booth contained a reading machine and samples of the *New York Times* on microfilm. Similarly the Works Progress Administration exhibited newspaper microfilm and associated indexes of Cleveland papers. The American Library Association Committee on Photographic Reproduction of Library Materials was allocated a booth and displayed in the form of mounted photographs, charts and similar matter a complete outline of microphotographic applications to scholarly and library work.

Several meetings of committees and groups were held. The A.L.A. Committee and the editors of the JOURNAL met to discuss policies and activities for the coming year. A dinner meeting of microphotographic technicians and administrators, in reality the second "get together" following the Washington meeting described by Dr. M. L. Raney in this issue, was held on Wednesday, May 29. Most of the discussion centered about standardization of film quality and the potentialities of radio facsimile duplication as adapted to documentary reproduction.

As usual, the papers, exhibits and meetings afforded many individuals their annual opportunity to discuss mutual problems. The meeting was a great success.

A Statement of Policy by the Historical Society of Pennsylvania

The April number of the *Pennsylvania Magazine of History and Biography,* p.153-63, contains an article entitled "A Statement of Policy by the Historical Society of Pennsylvania." In the introduction Dr. Julian P. Boyd wrote:

> This statement evolved out of a growing conviction that historical societies in America, now more than a century and a half on their way, have been blown off their course and their forces scattered by the contrary winds of narrowed interests, preoccupation with antiquarian subjects, jealous competition with each other, unsystematic and even unenlightened acquisitiveness, and a reluctance to accept improved methods or new interpretations.

The body of the article is divided into two parts: I—A Declaration of Faith, and II—Principles and Standards Redefined.

This courageous statement should be read and thoroughly digested by archivists, librarians, scholars and all who are seriously interested in documentary research. It is particularly significant from the standpoint of documentary reproduction. Part II (e) reads in part as follows:

> That it is a firm obligation of the Society to increase the utility of its own collections, particularly manuscripts, by securing photostats or microfilms of related documents or collections located elsewhere....That, since microphotography is an enormously significant means of making large bodies of research materials accessible to scholars, thus removing or minimizing the obstacle of distance to the scholar's examination of his sources, it is the duty of the Society to interpose no restrictions between this new technique and its legitimate use in furtherance of scholarly activity; that, therefore, the Society stands ready to permit the photographic reproduction by scholars and institutions of such of its manuscript sources as are open to consultation and to facilitate their use through the distribution of pho-

tographic or other copies, it being understood, of course, that the Society retains the right to pass upon any proposal of publication or of further reproduction.

The significance of the "Statement of Policy by the Historical Society of Pennsylvania" is enormous. The Society possesses one of the richest libraries and collection of manuscripts in the country. The public enunciation of a generous and enlightened policy at this time should stimulate and encourage others to do likewise.