ACTUAL TRAINING OF THE SYSTEM OPERATION

Part II. Prepared by the Contractor

Part III. Prepared by the Manufacturer

(total 4 books)

2.2 Content of Microfilm

1) Documents ..... 603 frames / 14 Jackets

2) Drawings ..... 658 frames / 658 Aperture Cards

3. TELUK LADA

3.1 Title of data

1) PHASE I Design Note.

2) PHASE II Cibaliung Scheme Design Note.

(Total 2 books)

3.2 Content of microfilm

1) Documents ..... 850 Frames / 16 Jackets

2) Drawings ..... 52 Frames / 52 Aperture Cards.

Attachment
(reference)

GLOSSARY OF MICROGRAPHICS

(by AIIM)

TABLE OF CONTENT

Glossary

A

aberration—a defect in the formation of an optical image, e.g., astigmatism, chromatic aberration, curvature of field, etc.

abrasion marks—(1) fine hairline marks on the print or film surface that do not fully remove the image as does a scratch which penetrates to the base. (2) The defect in prints or film which results from moving contact with another surface. (3) Visible defects that result from rubbing the emulsion of a photographic material.

absorption—the conversion of radiant energy into other forms, usually heat, by interaction with matter.

accelerated aging—a laboratory method of speeding up the deterioration of a product in order to estimate its long-time storage and use characteristics.

accelerator—a chemical constituent of photographic developers that increases the rate of development. *See also* activator.

acetate—*see* acetate film *and* cellulose triacetate.

acetate film (acetate base)—safety film with a base composed principally of cellulose acetate or triacetate.

acetic acid—a colorless acid used in stop baths, fixing baths and hardener formulas.

achromatic colors—colors perceived as having no hue (white, black, gray).

acid fading—*see* fading.

acid fixing bath—*see* fixing.

actinic light—light that is capable of causing photochemical changes in a photosensitive material.

activator—(1) an agent that either initiates or accelerates the activity of development. (2) One part of a two-part developer which is added at the time of use to increase developer activity. Most often, it is a developing agent dissolved in an acidic solution. *See also* accelerator.

acuity—keenness or sharpness of perception.

acutance—an objective measure of the ability of photographic material to show a sharp line of demarcation between contiguous areas receiving low and high exposures. It correlates well with subjective judgments of picture sharpness.

addressability—the capability of placing intelligence at a specific point within an area. *See also* addressable capacity.

addressable capacity—the number of addressable positions, within a specified image, or display space as follows: addressable horizontal positions by addressable vertical positions. *See also* ANSI Y14.26.3.

addressable horizontal positions—the number of positions, within a specified film frame, at which a full-length vertical line can be placed. *See also* ANSI Y14.26.3.

addressable vertical positions—the number of positions, within a specified film frame, at which a full-length horizontal line can be placed. *See also* ANSI Y14.26.3.

adhesive face—the aperture card position in which the tape is on the face (printed surface) and the tacky surface is toward the reverse side of the card. *See also* aperture adhesive, aperture card.

adhesive reverse—the aperture adhesive position in which the tape is on the reverse side and the tacky surface is toward the face (printed surface) side of the card.

ADSTAR—automated document storage and retrieval. *See* automated retrieval.

aging—changes in characteristics of photographic materials related to time.

aging blemish—*see* redox blemish.

agitate—to move intermittently or constantly during processing. This may be performed by moving the film or paper or by moving the processing solutions.

agitation—the act of moving a photographic film, plate or paper in a processing bath or moving the bath relative to the photographic material during processing.

air bells—*see* air bubbles.

air bubbles—(1) pockets of air that prevent contact between a processing bath and localized areas on the surface of a photographic material. (2) Undeveloped spots on negatives or prints caused by air pockets that prevented access by the developer to the film. (3) Voids in optical glass.

alkaline development—the process of development of a diazo material by bringing it in contact with an alkaline solution or an atmosphere of high pH, which promotes coupling or diazonium compound with a coupler to form a dye image.

alphameric—*see* alphanumeric.

alphanumeric—pertaining to a character set that contains letters, numbers and usually other characters such as punctuation marks and symbols. Synonymous with *alphameric*.

ambient light—(1) surrounding light. (2) The general room illumination or light level.

ammonia process—the development of diazo materials by immersion in a concentrated atmosphere of ammonia. Development is achieved by alkalizing (neutralizing) the acidic stabilizers in the diazo coating. *See also* diazo *and* diazo material.

ammonium thiosulfate—a chemical compound used in the preparation of fixing solutions. Synonymous with *hypo*. *See also* sodium thiosulfate.

analog transmission—transmission of electronic signals analogous to tonal variations constituting the content of a document page or any form of original graphics; the representation of visual tonal variations at the input of a scanning system by proportional variations in strength or frequency of a transmitted electrical current.

angstrom—obsolete unit of length equal to one hundred millionth of a centimeter (10^{-8} cm). *See* nanometer.

anion—an ion that has a negative electrical charge.

ANSI—American National Standards Institute, formerly USASI and ASA. ANSI is composed of representatives from industry, technical societies, consumer organizations and government agencies.

antihalation—the reduction of halation (light scattering and/or reflection) within a film. Four common methods are used to reduce halation. (1) Tint the film base with a light-absorbing dye. (2) Coat the back of the film with a light-absorbing material. (3) Introduce a layer of light-absorbing dye between the base and the emulsion. (*See also* antihalation undercoat.) (4) Tint the emulsion layer.

antihalation backing—an opaque coating on the back of the film to suppress light reflection. *See also* backcoating *and* dye-back film.

antihalation undercoat—a separate layer of light-absorbing dye located between the emulsion and the base to suppress light reflection. During processing of this film, the dye layer becomes transparent.

aperture—(1) in an optical system, an opening through which light can pass. This is frequently referred to as the "lens stop," "lens opening" or "diaphragm." (2) An opening in a card that is specifically designed to hold frame(s) of microfilm.

aperture adhesive—a tacky material for holding microfilm in an aperture card.

aperture card—(1) a card with a rectangular opening(s) specifically prepared for the mounting or insertion of microfilm. (2) A processable card of standard dimensions into which microfilm frames can be inserted. *See also* camera card *and* image card.

mm in diameter, that is used in a densitometer to vary the amount of light sensed or the area covered in measurement.

aperture slot—a narrow rectangular opening in the optical system of a rotary camera, through which light passes from the continuously moving document to the synchronized moving film; or in certain types of projection printers, an opening through which light passes through continuously moving film to the synchronized, moving surface being exposed. Synonymous with *aperture slit*.

aperture stop—the physical element (such as an opening, diaphragm or a lens periphery) of an optical system that limits the amount of light traversing the system.

archival film—a photographic film that is suitable for the preservation of records having permanent value when the film is properly processed and stored under archival storage conditions, provided that the original images are of suitable quality. *See also* archival quality, archival storage conditions, ANSI PH1.28, ANSI PH1.41 *and* ANSI PH1.43.

archival permanence—*see* archival quality.

archival quality—the ability of a processed print or film to permanently retain its original characteristics. The ability to resist deterioration. *See also* ANSI PH1.43.

archival standards—the standards that must be met by a given type of recording material or process for this material to retain specified characteristics. *See also* archival quality.

archival storage conditions—conditions suitable for the preservation of a photographic print or film having permanent value as defined in ANSI PH1.43.

array—an arrangement of elements in one or more dimensions.

ASA—American Standards Association. *See* ANSI.

ASCII—American Standard Code for Information Interchange. An American National Standard binary-coding scheme consisting of 128 seven-bit patterns for printable characters and control of equipment functions.

aspect ratio—ratio of width to height of a whole image, document, reproduction format, etc.

astigmatism—a defect in a lens in which rays of light converge unequally, thus causing imperfect images.

autogeneration—the process by which an image is duplicated on a product of the same kind. Commonly used in the duplication of diazo film.

automated retrieval—a microform retrieval system in which the image(s) are displayed automatically. Commonly, the user interrogates an index, which may be manipulated by a computer, to locate the images.

automatic exposure—exposure control by photoelectric means for maintaining substantially constant exposure in the focal plane for a range of field luminance.

automatic exposure control—a camera component that senses the brightness of an object and adjusts exposure.

automatic feeder—a powered mechanical device used to move documents, one at a time, into the camera exposure area.

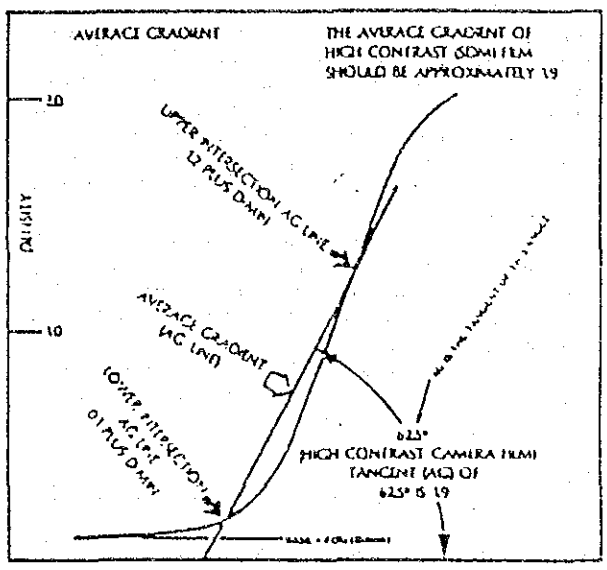
automatic feed mechanism—a powered mechanical device used to advance documents, film or paper.

automatic focus—a feature of certain cameras or enlargers by which the image is kept in focus automatically, over some range of reduction or magnification. Synonymous with *autofocus*.

automatic threading—the extraction of the leading end of the film and threading of the film by means built into a reader or other device and done without manual manipulation other than the manual operations associated with the actuation or "starting" of a reader, processor, camera, etc.

auxiliary operations—supplementary activities to the primary operations of a micrographic system, e.g., film cleaning, splicing, mounting, packaging, loading, coding.

average gradient—that contrast expressed by the slope of a straight line joining two density points on the sensitometric curve. In micrographics the density points generally are 0.1 and 1.2 density units above base-plus-fog density. Synonymous with *average contrast*.



Average gradient *(art courtesy Harold Dorrman)*

azo dye—a compound formed during development of diazo materials by the reaction between a diazonium salt and a coupling agent. A number of different colors may be formed depending on the starting compounds. Blue, blue-black and a combination of dyes to yield a neutral (black) appearance are most common in microfilm. *See also* diazo.

B

backcoat—*see* backcoating, dye-back film.

backcoating—a light-absorbing sensitive layer on the back of a film base stock. *See also* dye-back film.

background—the portion of a document, drawing, microfilm or print that does not include the line work, lettering or other information.

background density—*see* density, background.

backlight—*see* subsurface illuminator.

back projection—*see* rear projection.

back-projection reader—*see* rear-projection reader.

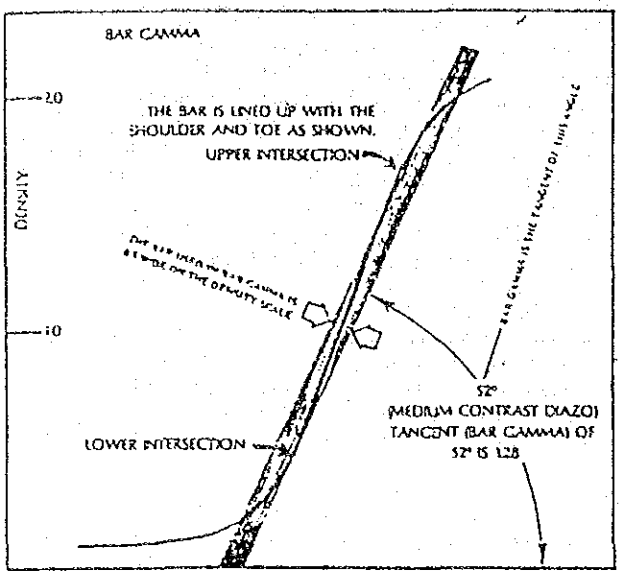
back sheet—*see* support sheet.

bar code—an array of rectangular marks and spaces in a predetermined pattern.

bar-code symbol—a machine-generated and readable representation of data (usually numeric) in the form of a printed series of contrasting parallel bars of various widths, spacings and/or heights.

bar gamma—a measure of the average gradient of a sensitometric curve. The slope of two parallel lines drawn 0.1 coordinate units apart framing the sensitometric curve. One line is tangent to the high-density portion (shoulder) of the curve; the other line is tangent to the low-density portion (toe) of the curve. Bar *gamma* is the slope of the framing lines and is expressed as the tangent of the angle made by the lines and the log exposure base line. Bar *gamma* is normally used in micrographics to

express the contrast of diazo and vesicular films. *See also* ANSI PH2.2.



Bar gamma *(art courtesy Harold Oorfman)*

bar gamma ratio—bar *gamma* of the third-generation microfilm divided by the bar *gamma* of the second-generation microfilm. Bar *gamma* ratio is normally used in micrographics to compute the printing contrast of the second-generation diazo film when printed to a third-generation diazo film.

base—a transparent plastic material, usually of cellulose triacetate or polyester, upon which a photographic emulsion or other material may be coated.

base area—optional area at the bottom edge of a microfilm jacket to allow notching.

base color—tint of the base stock.

base density—the optical transmission density of a film base not including any contribution from the emulsion layer.

base plus fog—the transmission density of the base, plus unexposed but processed emulsion, of a negative or positive film.

base-plus-fog density—the transmission density of a film which has not been exposed, but which has been developed and fixed. Base plus fog is the inherent density of the film base plus the inherent chemical fog of the developed emulsion. *See also* NMA MS23.

base stock—the carrier (such as paper, plastic or cloth) for a photosensitive emulsion.

batch code—the mixture identification code and/or roll number that serves to identify and define the source of unexposed photographic material.

bath—any chemical solution used in the processing of photographic materials. *See also* fixing bath *and* stop bath.

beam recording—a method using an electron or laser beam to record directly onto film.

bibliographic target—*see* target.

bidirectional code—a code format that permits reading in complementary (opposite) directions.

binary—pertaining to a system of numbers with a base of two.

binary digital code—*see* photo-optical coding.

bit—a binary digit. The smallest element of binary machine language represented by a magnetized or optical spot on a recording surface. Six to eight bits are required to form a character or byte.

black light—a term applied to radiant energy lying outside the visible range in the ultraviolet region of the spectrum. It can be converted to visible light by the action of suitable fluorescent materials.

black line—cathode-ray tube (CRT) images produced by standard procedures are regarded as black line and positive. When referring to computer-output microfilm (COM) that is recorded from CRTs, it is necessary to specify the polarity of the image.

bleaching—the process of converting the metallic silver photographic image into a compound of silver halides in preparation for toning, intensifying, reducing or complete removal as in reversal processing.

bleaching bath—in reversal processing, a bath used to convert the primary silver image to soluble compounds that are washed out of the emulsion.

bleed—(1) a line-width change or a change in the character of the edge of a line usually due to overexposure or overdevelopment. (2) Lateral spread or diffusion of an image.

bleed-through—the undesired appearance of information from the back of a document when its front is photographed.

blemish—*see* redox blemish.

blip—*see* document mark.

blip encoder—*see* document mark encoder.

blister—(1) a defect in photographic materials in which the emulsion separates from the base. (2) In optics, an elongated bubble, elliptical in shape.

block—a set such as documents, words, characters or digits handled as a unit.

blocked up—areas of a negative that contain no detail usually caused by overexposure and/or overdevelopment.

block indexing—a system of separating information, as it appears on the microfilm, into groups, or "blocks," identified by readily distinguishable numbers, letters, codes, etc., to facilitate reference or retrieval.

blocking—unintentional adhesion of adjacent sheets of film or paper.

blowback—the optical enlargement of the microimage. *See also* enlargement.

blow up—to enlarge.

blow-up—an enlargement.

book carriage—*see* book holder.

book cradle—*see* book holder.

book form drawing—a multisheet drawing having a single drawing number with each sheet identified by a page number. *See also* drawing.

book holder—a device that permits the rapid photographing of large bound books.

booster—*see* replenisher.

bow—*see* curl *and* curl direction.

BPI—bits per inch, as on a magnetic tape.

brightness—the visual sensation that enables an observer to detect luminance.

brittleness—that property of a material that causes it to break or crack when deformed by bending. *See also* ANSI PH1.31.

browsing—the quick examination from one frame to another on a reader screen in the processing or searching for a specific image on a multiimage microform.

BSI—British Standards Institute.

bubble memory—*see* magnetic bubble memory.

buckle—(1) a curvature of film due to shrinkage of the edges while the film is rolled, usually caused by storage at improper humidity. (2) Temporary buckle results from loss of moisture from the edges of the film when stored under dry air conditions. (3) Permanent buckle is caused by loss of solvent from the edges of the film when stored under moist air conditions. (4) Piling up of film in a camera, cassette, jacket or magazine due to a film-transport malfunction.

buffer—(1) a routine or storage device used to compensate for a

difference in rate of flow of data or time of occurrence of events when transmitting data from one device to another. (2) A substance or solution that resists a change in the pH of the solution.

buildup area—that portion of card construction consisting of the laminate of card and aperture adhesive or of card and microfilm (as applicable).

buildup thickness—the difference between the thickness of the aperture card alone and the total thickness within the buildup area of the laminate, consisting of the card and aperture adhesive or of the card and microfilm (as applicable).

burn-in—a technique by which selected areas of the image are given extra exposure while the rest of the image is protected.

burn-out—exposure of a diazo-coated material to the point of complete destruction of the photosensitive diazo component making the film incapable of producing density when developed.

burn-out density—the density of a diazo material after exposure to sufficient actinic light to decompose the diazo completely.

butt splice—*see* splice.

butt weld—*see* splice.

byte—a sequence of adjacent binary digits that represent a character.

C

calibrate—to determine the relationship between measured values and true values for any apparatus.

camera—a photographic device, employing an optical system, used for exposing light-sensitive material. *See also* computer-output microfilmer, planetary camera, rotary camera *and* step-and-repeat camera.

camera base—the bed or bottom support of some planetary cameras to which the column and light arms, or other camera support, are attached. Documents are generally placed on the base or in a copyholder mounted on the base for filming.

camera card—(1) an aperture card containing unexposed and unprocessed microfilm which is to be exposed and processed while in the aperture. (2) The unexposed and unprocessed card input of a processor–camera.

camera head—the portion of a microfilming device that embodies the film, film-advance mechanism and the lens.

camera microfilm—first-generation microfilm; also called the *master film*.

camera–processor—a device that has both the functions of a processor and a camera.

can—a metal container used in packaging, transporting and storage of films.

candela—the international standard unit of luminous intensity, 1 lumen per steradian.

candle—obsolete term superseded by candela in 1948. *See* candela.

caption—the information recorded on a frame of microfilm or the title of a microfiche that identifies the photographed material. It should be readable without magnification. *See also* heading area.

CAR—*see* computer-assisted retrieval.

card, camera—*see* camera card.

card column—one character position on a punched card (camera card or aperture card).

card field—a column or group of columns on a camera card allocated for punching specific information.

card, image—*see* image card.

card-to-card printer—a device for bringing together and holding a processed microform (image card, jacket, microfiche) in contact with an unexposed microform, while making a light exposure through the first onto the second, thus resulting in a reproduction. *See also* MS23.

card-to-roll printer—(1) device in which an image-forming optical system lies between a processed microform (image card) and a roll of unexposed film onto which the image is to be printed. The image generally is printed the same size; however, it can be enlarged or reduced. The device is usually a step printer. *See also* projection printer. (2) A device in which a processed microform (image card, microfiche) is brought into contact with a roll of unexposed film onto which the image is to be printed. After each exposure, the exposed portion of the film is cut from the roll and processed.

carriage—the table or stage on a unitized microform reader or reproduction device that holds the microform.

carrier—a device for holding a frame or frames of microfilm, e.g., aperture card, jacket.

cartridge—a container enclosing processed microforms, designed to be inserted into readers, reader–printers and retrieval devices. When applied to roll microfilm, it describes a single-core device. *See also* cassette *and* magazine.

cartridge loader—a device used to put processed film into cartridges.

cassette—(1) a double-core container enclosing processed roll microfilm designed to be inserted into readers, reader–printers and retrieval devices. (2) A lightproof container of rigid metal or plastic containing film for daylight loading in cameras. (3) A container for magnetic tape. *See also* cartridge and magazine.

cathode-ray tube—an electronic tube in which a well-defined and controllable beam of electrons is produced and directed to give a visible or otherwise detectable display or effect. The displayed image may be read visually, microfilmed, photographed or recorded in some other manner. Synonymous with *CRT*.

cathode-ray tube recording—the recording of an image created on the phosphor-coated cathode-ray tube via an optical system onto a light-sensitive material.

cation—an ion that has a positive electrical charge.

CBEMA—Computer and Business Equipment Manufacturers Association; also Canadian Business Equipment Manufacturers Association.

CCD—*see* charge-coupled device.

cellulose acetate—*see* cellulose triacetate.

cellulose ester—a film base composed mainly of cellulose esters of acetic, propionic or butyric acids or mixtures thereof. *See also* ANSI PH1.28 *and* ISO 4331.

cellulose nitrate—a transparent plastic that was once used as a film base. Because of its flammability, it has largely been replaced.

cellulose triacetate—transparent plastic used widely as a film base because of its transparence and relative nonflammability.

cement, film—an adhesive used for splicing film.

centering arrows—markings on documents to aid in the positioning of the document being filmed and on microfilm for mounting in cards.

central processing unit—the main component of a computer that includes the circuits controlling the interpretation and execution of instructions. Synonymous with *mainframe* and *CPU*.

certification—(1) the confirmation or identification that microphotographics are accurate and complete reproductions of the records. (2) Attestation to the accuracy of measuring equipment or standards.

chamber—*see* film channel.

chamber separator—*see* channel separation area.

channel separation area—the area in which the support sheet is joined to the emulsion sheet to form the film channels. Usually formed by adhesive ribs or by ultrasonically sealed welds. Synonymous with *chamber separator*.

character—one of a set of symbols that may be arranged in ordered groups to express information. The symbols may include the numbers 0 through 9, the letters *A* through *Z*, punctuation marks and special characters. The character may be human readable and/or machine readable.

character generator—the electronic device, such as a computer-output microfilmer, which converts digital signals to visible characters. *See also* stroke generator *and* dot matrix.

character recognition—the identification of graphic characters by automatic means. *See also* magnetic ink character recognition, optical character recognition *and* optical scanning.

character transfer rate—the rate at which characters are transferred from one place to another, e.g., magnetic tape to computer, computer to magnetic tape, computer to microfilm, etc.

characteristic curve—*see* sensitometric curve.

charge-coupled device—a semiconductor that can collect, store and move charges in packets. An imaging charge-coupled device responds to light and provides electrical signals. Synonymous with *CCD*.

chemical development—the formation of a visible image from a latent image, involving the reduction of the exposed silver-halide grain to silver by a developing agent that is simultaneously oxidized.

chemical fog—a chemically initiated background density occurring either previous to or during development. *See also* fog *and* base plus fog.

chip—a piece of microfilm that is smaller than a microfiche.

chromatic aberration—a lens defect that causes rays of light of different wavelengths to focus in different planes.

CIM—*see* computer-input microfilm.

cinching—pulling film tight when wound on a reel. This generally results in a series of straight, longitudinal scratches.

cinch marks—abrasion defects on roll film, produced when the roll is tightened by pulling.

cine mode—*see* vertical mode.

class A films—films that must be usable both visually and for printing onto ultraviolet-sensitive materials after their intended storage life. *See also* PH1.60.

class B films—films that must be usable visually after their intended storage life. Such films do not have any density requirements for printing onto ultraviolet-sensitive materials. *See also* PH1.60.

clean room—an area from which all dust, down to a certain size particle, has been removed and is prevented from entering, in order to handle delicate materials such as precision photographic film. The size of the dust particle that can be controlled determines the measure of cleanliness.

clear base—the colorless material on which some photographic emulsions are coated. Generally, the base density is 0.06 or less. *See also* base, film *and* safety film.

clearing—(1) the removal of silver halides from developed films in the fixer. The film is said to be cleared when no visible unchanged silver halides remain in the emulsion. However, about 5 percent of the silver halide usually remains at this point. (2) With vesicular films, clearing is the process of exposing film to ultraviolet radiation after development to decompose any remaining diazonium salts.

clear line image—a microfilm image in which the dark lines of the original are reproduced as clear or transparent lines. A negative-appearing reproduction.

coating—a thin layer that is applied to a base material.

coating, anticurl—a thin layer, generally applied to the side opposite the emulsion of sensitized material, to prevent curl.

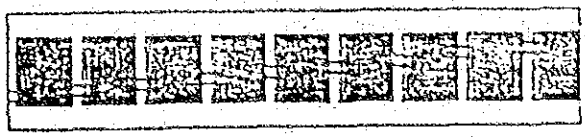
coating, protective—a thin, transparent coating that is applied to processed microfilm to protect the film from scratches, fingerprints, perspiration, etc.

code—(1) the unique bit configuration describing a symbol or character. (2) A system of symbols representing rules for handling the flow or processing of information.

code area—that part of the image area or film frame reserved for retrieval coding.

code density—the number of code elements that can appear per unit of length.

code line—a visual index consisting of an optical pattern of clear and opaque bars parallel with the long edge of the microfilm, located between image areas.



Code lines.

code medium—the material used to construct a machine-readable code. Such material may be reflective or transmissive.

code notch—*see* notch.

code reader—a device used to read and identify a pattern of coded information. Synonymous with *code scanner*.

coding—any identifying information added to or made a part of the microform to enable the selection of a specific unit (microfiche, jacket, aperture card or a specific frame within a roll or microform). *See also* code line, flash card, document mark *and* target.

coherent radiation—radiation in which the waves are in phase both temporally and spatially. The laser is a source of coherent radiation.

collimate—to render parallel to certain line or direction; to render parallel, as rays of light; to adjust the line of sight or lens axis of an optical instrument so that it is in its proper position relative to the other parts of the instrument.

color microfilm—microfilm that provides a record of and displays with reasonable accuracy the colors in the original document or scene.

color stripe—a color (or colors) placed at the top edge of the heading area of a jacket, aperture or microfiche used for identification and retrieval.

column—(1) a vertical series of images on a microfiche or micro-opaque card. *See also* card column. (2) The part of a planetary camera that projects vertically from the base and supports the camera head above the object being photographed.

column stop—a camera head vertical positioning point on the column of a planetary camera.

COM—*see* computer-output microfilm. *See also* computer-output microfilmer *and* computer-output microfilming.

comic mode—*see* horizontal mode.

computer animation—movies produced by COM onto film in the vertical mode.

computer-assisted retrieval—the capability to have micrographic images located or identified by commands initiated through a computer terminal. Synonymous with *CAR*.

computer graphics—the methods and techniques for converting data to graphic displays by means of a computer.

computer-input microfilm—the process of reading data contained on microfilm by a scanning device and transforming this data into a form suitable for computer use. Synonymous with *CIM*.

computer-output microfilm—microforms containing data produced by a recorder from computer-generated electrical signals. Synonymous with *COM*.

computer-output microfilmer—a recorder that converts data from a computer into human-readable language and records it onto microfilm.

computer-output microfilming—a method of converting and recording data from a computer onto microfilm in human-readable language.

condenser, optical—*see* condensing lens.

condensing lens—a lens or a combination of lenses used to gather light from a source and to converge (condense) it, as upon the aperture of a reader or reader-printer.

conditioning—(1) a process of restoring microfilm for active use after a period of storage. (2) The placing of material or equipment in a specified environment before specific tests are made. Generally, material is kept for a definite length of time at a specific temperature and humidity.

constant voltage transformer—an electrical device that maintains constant voltage output, although input voltage may vary. Synonymous with *CVT*.

contact print—a copy produced by exposure of the unexposed stock in contact with a master or an intermediate.

contact printer—an exposing device containing a light source and a means for holding the film to be reproduced in contact with the sensitized material on which the copy is to be made. The image made with a contact printer is the same size as the image copied. *See also* projection printer *and* step printer.

contact printing—a method of copying in which the raw stock is held in contact with film bearing the image to be copied.

contact printing, continuous—a method of printing in which the roll of film being copied is held in contact with a roll of paper or film and moved at a related speed over the printing aperture.

contact printing density—*see* density, diffuse transmission *and* density, printing.

container—a generic term for boxes, cans, cartridges, magazines and cassettes or other structures for enclosing microforms.

continuous-tone copy—photographic copy that contains a varying gradation of gray densities between black and white.

contractions—defects in microfilm caused when the film slows up as the document passes through a rotary microfilmer, which results in a compressed image.

contrast—an expression of the relationship between the high and low brightness of a subject or between the high and low density of a photographic image.

contrast, average—*see* average gradient.

control character—a character whose occurrence in a particular context initiates, modifies or stops an operation, e.g., a character to control line spacing, line skipping, character size, intensity, style, etc.

control strips—strips of a stable film that are exposed to a photographic step wedge under rigidly controlled sensitometric conditions. They are processed and evaluated to measure normality of a process, material or technique. Synonymous with *sensitometric strips*.

conventional processing—(1) silver-gelatin films: a series of steps consisting of developing, fixing, washing and drying. (2) Dry-silver films: processing by heat. (3) Diazo films: processing in an alkaline environment (e.g., ammonia). (4) Vesicular films: processing by heat. *See also* partial-reversal processing *and* reversal processing.

conversational mode—a mode of operation of a data-processing system in which the user of a terminal carries on a dialogue with the computer such that each unit of input entered by the user elicits a prompt response from the computer. *See also* automated retrieval *and* terminal.

coordinate data—data, expressed in coordinates, that specify an addressable point on a surface or grid (CRT display, microfiche, etc.).

copy—*see* duplicate.

copyboard—the surface, frame, platform or other device for holding material to be photographed.

copyholder—any device used to prevent the movement of material on the background while being photographed. *See also* copyboard.

core—(1) the center portion of a reel, spool, cartridge, magazine or cassette. (2) An unflanged cylindrical form on which film or paper is wound. *See* ANSI PH1.13.

core, double—*see* cassette.

core set—the distortion or curl of a sensitized material caused by its being wound on a core, reel or spool.

core, single—*see* cartridge.

corner cut—on aperture cards and microfiche, a diagonal cut at the corner of a card as a means of identification of the photosensitive side of the film. *See also* edge notch.

counter—an automatic device that records use, output or locations, e.g., in a camera the number of exposures made, in a reader the number of frames from the first on the film.

coupler—in a diazo material a compound that can combine with the unexposed diazonium salt to form the visible dye image.

coverage—the portion of the document included in the lens field.

cover sheet—*see* emulsion sheet.

CPU—*see* central processing unit.

Crabtree test—*see* Ross–Crabtree test.

critical focus—that point of focus at which lens resolution is at its maximum.

CRT—*see* cathode-ray tube.

curl—departure from physical flatness, characterized with respect to curl direction (*L*, *T* or *D*); curl sign (+ or -) and curl value. This flatness defect is evident by a tendency of film to coil into a cylindrical shape. *See also* ANSI PH1.29 *and* ISO 4330.

curl direction—the means of identifying by letters *L*, *T* or *D* the direction of curl about a specific axis of a film specimen corresponding to that of the sample from which it is taken. *L* represents "lengthwise curl" about the axis perpendicular to the length or machine direction of the sample for roll film or to the longest specimen dimension for sheet film. *T* represents "transverse curl" about the axis parallel to the length or machine direction of the sample. *D* represents "diagonal curl" about the diagonal of the specimen.

curl sign—the mathematical signs, + or −, used to indicate the direction of curl which, if toward the emulsion (sensitized) side (emulsion-in) is +, or, if toward the backside (emulsion-out), is −. The sign is always plus for materials sensitized on both surfaces.

curvature of field—the aberration of a lens that causes the image of a plane to be focused into a curve instead of into a flat focal plane.

cut film—film cut to specific sizes. *See also* sheet film.

cut mark—a mark added to film to permit automatic cutting of microfiche from a roll of film. *See also* ANSI/NMA MS2.

cutter—a device, which may be mechanically or photoelectrically actuated, used to cut film or paper.

cutting lines—lines added to the film at the time of microfilming to permit automatic cutting of prints reproduced on roll paper.

D

dark line image—see positive-appearing image.

darkroom—a room in which all light not safe for unprocessed, sensitized materials can be controlled or eliminated for the safe handling of these materials.

darkroom filter—an optical element of glass, gelatin or other material used to modify the radiation from the darkroom light source so that only certain wavelengths are transmitted.

darkroom loading—the requirement, capability or act of placing light-sensitive material in a camera, cassette, etc., under safelight conditions to prevent unwanted exposure of the light-sensitive material.

darkroom processor—a device for subjecting exposed, photosensitive materials to the sequential steps of development, fixing and washing, to produce a stabilized image under safelight conditions.

data—a representation of facts, concepts or instructions in a formalized manner suitable for communication, interpretation or processing by humans or computers.

data bank—a comprehensive collection of data.

data base—a collection of data fundamental to an enterprise.

data compression—the detection and encoding of black-white transitions in a graphic image in a way that differentiates between essential image elements and wasted space. Synonymous with *redundancy reduction*.

data element—the smallest unit of data that has meaning in describing information. Synonymous with *data item* or *field*.

data processing—the execution of a systematic sequence of operations performed on data.

data storage and retrieval systems—data storage and retrieval systems have as their main function the storage of file items for later reuse rather than modification, and most often to maintain the file items unaltered, with the exception of updating and purging.

dated—the year and month after which aging effects on a photographic product may be significant. Information commonly stamped on packages of film and paper to serve as a warning to the user. *See also* expiration date *and* shelf life.

daylight loading—*see* room-light loading.

declaration of intent and purpose—a statement designed to meet a legal requirement of the Uniform Photographic Copies of Business and Public Records as Evidence Act, Title 28 U.S.C., Section 1732.

definition—distinctness or clarity of detail in a photo image, microfilm image or enlargement.

deformation—in thermoplastic recording, fine ripples on the surface of a plastic layer that scatter light, thereby making images composed of such ripples visible with an appropriate illumination system.

deionized water—water purified in an ion exchange apparatus that removes anions, such as chloride and sulfate, as well as cations, such as calcium and magnesium. Deionized water is as useful as distilled water in most photographic applications. *See also* anion, cation *and* ion.

deionizer—apparatus for removal of the mineral content of water through the use of ion exchange resins.

delamination—physical separation between layers of material that have been sealed or adhered to one another.

deliquescent—the ability of certain chemical substances to absorb moisture from the air and to dissolve in the absorbed water.

dense—relatively opaque, generally applied to film images or areas that are darker than normal.

densitometer—a device used to measure the optical density of an image or base by measuring the amount of incident radiant energy (light) reflected or transmitted.

densitometric method (silver)—a testing procedure that produces a yellow stain for density measurement; used for indicating the presence of thiosulfate or other potentially harmful residual chemicals in processed films.

densitometry—the science or practice of measuring the optical density of an image or base by determining the amount of incident radiant energy (light) reflected or transmitted by a test sample.

density (*D*)—the light-absorbing or light-reflecting characteristics of a photographic image, filter, etc. Density is the logarithm to the base 10 of the ratio of the radiant energy (light) falling on a sample and the radiant energy transmitted or reflected. Density is expressed as $D = \log I/I$ where I is the radiant energy that falls on the sample and I is the radiant energy that is transmitted). In practice, there are many types of density depending on the optical system used (geometric) and on the spectral quality (color) of the radiant energy (light). *See also* ANSI PH2.17 *and* ANSI PH2.19.

density, background—the opacity of the noninformation area of microform. *See also* density.

density, diffuse transmission—a measure of density that simulates contract printing. It is obtained when the incident radiant energy (light) is perpendicular to the plane of the sample and all the transmitted radiant energy is collected and evaluated. It provides the same density value as a projection density measurement when the film consists of a nonscattering material, e.g., diazo. *See also* ANSI PH2.19.

density, line—the opacity of the line work, letters or other nonbackground information of a microform. *See also* density.

density, maximum—the highest obtainable density for a particular photosensitive material. Synonymous with *D*max.

density, minimum—the lowest density obtainable in a processed film. Synonymous with *D*min. *See also* base-plus-fog density.

density, opal diffuse—a standard method of measuring density that gives values of density closely approaching the density observed in practical photographic applications. Most commercially available densitometers utilize pot opal glass to diffuse the light in determining the density of a sample.

density, optical—*see* density.

density, printing—a density measurement in which the incident and the transmitted radiant energy are evaluated by a receiver having a similar spectral response as the photographic material on which the sample is to be printed. It is usually identified by a filter notation, e.g., 18 A printing density or 400 nanometer printing density. *See also* ANSI PH2.19 *and* PH2.25.

density, projection—a density measurement in which the angular distribution of the incident and transmitted radiant energy are equal and specified. For microfilm applications, the angular distribution is a nominal half-angle of 6.3 degrees which corresponds to an *f* number of *f*/4.5 and simulates a microform reader. *See also* ANSI PH1.60 *and* ANSI PH2.19.

density scale—a measure of the density range of a photographic image, obtained by subtracting the minimum density from the maximum density. Synonymous with *net density*.

density, spectral—density evaluated at any given wavelength of the electromagnetic spectrum.

density, visual—a density measurement in which the incident and the transmitted (or reflected) radiant energy are evaluated by the human eye or by a receiver having the same relative spectral response as the human eye. *See also* ANSI PH1.60 *and* ANSI PH2.19.

density wedge—a strip of paper or film that has graduated tones from white to black. *See also* gray scale *and* step tablet.

depth of field—the distance between the points nearest and farthest from the camera that are acceptably sharp at a given focus and aperture setting.

depth of focus—the allowable tolerance in lens-to-film distance within which an acceptably sharp image of the subject focused on can be obtained at a particular lens aperture setting.

desensitization—the process by which the sensitivity of a photographic material to a subsequent exposure to light is greatly reduced.

desensitizer—a chemical agent that decreases the sensitivity of photographic material to radiant energy.

destructive testing—a testing procedure by which the material being tested is rendered useless.

Deutsche Industrie Norm—*see* DIN.

develop—to subject to the action of chemical agents or physical agents (as in electrophotography) for the purpose of bringing to view the invisible or latent image produced by the action of radiant energy on a sensitized surface.

developed image—the reproducible, visible image resulting from the processing of an exposed sensitized material.

developed image stabilizers—chemical compounds employed to impart stabilization to a processed image.

developed silver—silver produced by the reduction of a silver salt through a development process.

developer—(1) a chemical reagent that makes the latent image visible on an exposed photographic emulsion. (2) A physical material, or mixture of physical materials, used to develop a latent electrophotographic image.

developer oxidation products—the compounds formed in the reaction of a chemical-reducing (developing) agent with silver salts or oxygen.

developer replenisher solution—a chemical solution added to a used developer solution to restore the desired processing characteristics for continued use.

developer starter solution—*see* starter solution.

developer streaks—(1) generally, nonuniformity within a uniformly exposed region, caused by a flow of developer from adjacent areas of the image. A sign of inadequate agitation. (2) Specifically, in a processed image, regions of higher or lower than normal density from the surrounding areas.

developing agent—*see* developer.

development—that part of processing that makes the latent image of an exposed photographic emulsion visible. *See also* electrolytic development *and* heat development.

development accelerators—*see* accelerator.

development activators—*see* activator.

development centers—latent image centers capable of reacting with the developer.

development restrainer—*see* restrainer.

diagonal curl—*see* curl direction.

diameters—a measure of the number of times a given linear dimension of an object or image is reduced or enlarged by an optical system. *See also* enlargement ratio, magnification ratio *and* reduction ratio.

diaphragm—a device, such as a perforated plate or an iris, that limits either the aperture of a lens, the field covered by the lens or both, depending on its location.

diaphragm, iris—the adjustable aperture fitted into the barrel of a lens to control the size of the opening through which light passes.

diazo—materials (coated films or papers) containing sensitized layers composed of diazonium salts that react with couplers to form azo dye images. The color of the image is determined by the composition of the diazonium compound and the couplers used in the process.

diazo coupler—a chemical compound that during processing combines with an unexposed diazonium salt to form a dye image. Couplers may be in the coating with the diazonium salt or in the processing solution.

diazo material—a slow print film or paper, sensitized by a coating of diazonium salts, which, subsequent to exposure to light (strong in the blue to ultraviolet spectrum) and development, forms an image. Diazo material generally produces nonreversed images; i.e., a positive image will produce a positive image and a negative image will produce a negative image.

diazonium salts—light-sensitive compounds of a specific chemical class sensitive to the blue through ultraviolet spectrum. In the presence of a coupler and ammonia vapor or alkaline solution these salts can yield a visible image.

diazo print—a diazo reproduction made on material having a support base of paper, cloth or plastic. Synonymous with *white, blue line, black line, brown line,* etc., *print.*

diazo processor—a machine designed to expose and process diazo-sensitized materials.

diazo, thermal—a photographic material containing sensitized layers composed of diazonium salts that react with couplers when developed by the application of heat.

diffuse density—*see* density *and* diffuse transmission.

diffused light—radiation that either passes through or is reflected from a surface that causes the light rays to scatter.

diffused light source—any light source that is intended to produce scattered, nonparallel rays of light. A frosted lamp is a typical diffused light source.

diffuse reflection—(1) the type of reflection obtained from a relatively rough surface from which the reflected rays are scattered in all directions. (2) A process by which reflected energy is distributed over a wide range of angles.

diffuse transmission density—*see* density *and* diffuse transmission.

diffuse transmittance—(1) transmittance measured with diffusely incident flux. (2) Ratio of the flux diffusely transmitted in all directions to the total incident flux.

diffuse visual density—*see* density, diffuse transmission, *and* density, visual.

diffusing object—an object that diverts an appreciable fraction of the energy of any one incident light ray into many directions.

diffusion—the scattering of light rays so as to cause the light falling on a surface or passing through an aperture to be coming from all directions in contrast to the radiation of light from a point source. Diffusion may be introduced by reflection from a matte surface, by transmission through a frosted or opal glass or by the use of an integrating bar. When diffusion is complete, a sharp image of the light source can no longer be formed.

diffusion screen—a screen that diverts an appreciable fraction of the energy of any one incident light ray into many directions.

digital transmission—the transmission of information in the form of electrical representations of the binary digits (bits) 0 and 1.

dimensional stability—the ability of photographic materials to maintain their original size and shape during and after processing and also under various conditions of temperature and humidity.

DIN—(1) Deutsche Industrie Norm. The official German designation for standards. (2) A European system of measuring film speed in logarithmic units.

direct development—*see* chemical development.

direct-duplicating film—*see* direct-image film.

direct-image film—a film that will retain the same polarity as the previous generation or the original material; that is, tone for tone, black for black, white for white, negative for negative or positive for positive with conventional processing. *See also* polarity.

direction of winding processed microfilm—processed microfilms are right reading when the direction of the light passing through the film is from the outside toward the center of the reel. If the supply reel of processed microfilm has a round spindle hole, the film should unwind downward from the right-hand side when the round hole is toward the observer. *See* ANSI PH5.3.

direct positive—a positive-appearing image obtained directly from another positive-appearing master without the use of a negative intermediate.

direct-reversal film—*see* reversal film.

display—a visual presentation. *See also* cathode-ray tube, reader *and* reader-printer.

distortion—an aberration of a lens that causes imaging of straight lines as curves usually near the edge of the field of view.

distribution microform—a duplicate microform intended for actual use, as distinct from master and intermediate, whose function it is to create distribution microforms.

divergence—the bending of light rays away from each other as by a concave or minus lens, or a convex mirror.

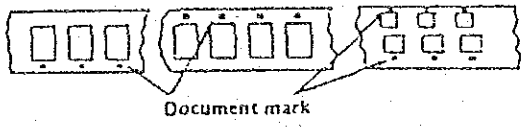
***D*/log *E* curve**—a graphical representation of the variation in density as a function of the logarithm of the exposure. Synonymous with *characteristic curve, H and D curve* and *sensitometric curve.*

***D*max**—*see* density, maximum.

***D*min**—*see* density, minimum.

document—(1) a medium and the data recorded on it for human use, for example, a report sheet, a book. (2) By extension, any record that has permanence and can be read by man or machine.

document mark—an optical mark, usually rectangular, within the recording area below (and/or above) the image on a roll of microfilm; used for counting images or frames automatically. *See also* ANSI/NMA MS14 *and* ANSI PH5.20.



Document Mark (Blip) Coding

document-mark channel—the specified position or location along a microfilm, within the recording area, below or above the image on a roll of microfilm, for recording an optical mark to be used in counting or locating an image frame. *See also* ANSI PH5.20.

document mark encoder—a mechanism on a camera used to place a retrieval mark (blip) above and/or below images as desired.

document plane—the surface upon which the object (document) is placed for microfilming.

document retrieval systems—a system that searches, finds and presents to the user a specified document or a complete copy of the document instead of just a citation or reference.

document stop—a device incorporated into most rotary cameras that prevents the entry of more than one document at a time. Document stops generally may be adjusted to permit the passage of one sheet of paper, however thin, but will not permit the passage of two sheets. This also is referred to as "double document stop." *See also* overlap.

DOD—Department of Defense.

dot generator—*see* dot matrix.

dot matrix—an array of points of ink, light or similar image-forming elements that are used to form alphanumeric characters.

double document—*see* overlap.

double document stop—*see* document stop.

double exposure—the superimposition of two or more images on the same photosensitive area. *See also* NMA MS23.

double frame—a combination of two horizontal, adjacent, single frames.

double-perforated film—*see* perforated film.

downtime—any period of nonoperation of equipment during a period in which the equipment is supposed to be operating.

downward projection—the vertical optical display of a photographic image onto a sensitized surface or viewing screen, usually in magnified size, toward a lower position.

drawing—an original line representation of physical objects or schematics drawn on a suitable transparent or translucent material.

drop-in—identifying a system that permits film or tape in a cartridge to be placed in operational position in compatible equipment without threading or other such manipulation.

dryer—an apparatus for removing moisture from photographic materials.

drying—the process of removing water from photographic materials.

drying cabinet—*see* dryer.

dry ink—in electrophotography, a fine powder of resin plus pigment, deposited to form the image. *See also* toner.

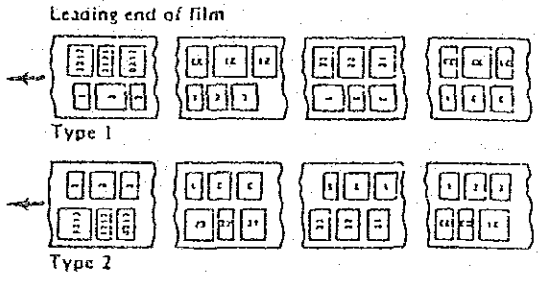
dry-process diazo—a diazo process in which development is achieved without wetting, such as through the use of ammonia gas or chemicals incorporated in the film.

dry processing—development of a latent image achieved without wetting, usually accomplished by application of heat.

dry-process silver film—a nongelatin silver film that is developed by application of heat.

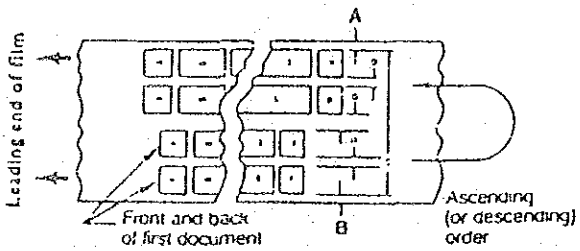
dry-silver materials—sensitized film and paper products that are developed by the application of heat rather than by a liquid or viscous process.

duo—(1) a method of recording images on each half of the usable width of the microfilm. Exposures are made first on one half and then continued on the other half in the reverse direction. (2) Format on microfilm using the technique described in (1). *See also* ANSI/NMA MS14 *and* image arrangement.



Duo Format

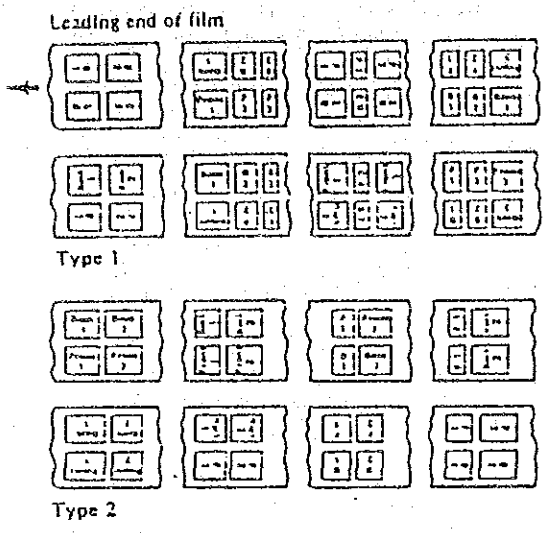
duo-duplex—(1) a combination of duo and duplex methods in which, through the use of mirrors or prisms, images of both the front and rear sides of the documents are recorded simultaneously on half of the width of the film (the other film half being masked). When the full length of the film has passed through the camera, it is reloaded so that a second set of images can be photographed on the half previously left unexposed. (2) Format on microfilm using the technique described in (1). *See also* ANSI/NMA MS14 *and* image arrangement.



Duo-Duplex Format

dupe—*see* duplicate.

duplex—(1) a method of recording on roll microfilm in one exposure the image of the front and back of a document. The microimages appear side by side across the width of the microfilm. (2) A term applied to any camera capable of performing duplex work as described in above. (3) Photographic paper having emulsion coating on both sides. (4) Format on microfilm using the technique described in (1). *See also* ANSI/NMA MS14 *and* image arrangement.



Duplex Format

duplicate—(1) a copy of a microform made by contact printing or by optical means. (2) To make multiple copies of a document or microfilm, usually with the aid of a master or intermediate.

duplicate microfilm card—(1) Exposed: An aperture card containing an exposed and processed frame of microfilm in the card aperture and which is made from first- or later-generation microfilm. (2) Unexposed: An aperture card containing unexposed or raw film, usually diazo film, in the card aperture and intended for use in card-to-card printing. *See also* aperture card *and* camera card.

duplicate original—(deprecated) an intermediate or master used to insure no damage occurs to an original in repeated operations.

duplicate original film—either of two camera films exposed at the same time.

duplicating—*see* duplicate.

duplicator—any of the variety of devices designed to produce copies of photographic images.

dust spot—a defect on a photographic image resulting from the obstruction of light by a small particle of foreign material (dust) during the exposure.

dye-back film—any film having a light-absorbing dye coating on the base side of the film to improve daylight-loading characteristics and to reduce halation. The dye must be removed or made transparent during processing.

E

EBCDIC—Extended Binary Coded Decimal Interchange Code. An 8-bit computer code that is used to represent upper- and lowercase characters and special symbols.

edge fog—dark margins along the length of the film or paper due either to exposure to light or to the effects of age and/or poor storage conditions. *See also* NMA MS23.

edge gradient—(1) (subjective) the rate of change in lightness in crossing the boundary between two areas of different lightness. The perceived sharpness of an image increases as the edge gradient increases. (2) (objective) The rate of change in density in crossing the boundary between two areas of different density. *See also* acutance.

edge notch—(1) on sheet films, notches of various size, shape and spacing, cut into the edge of the films during manufacture to permit identification of the emulsion side and of the type of film in total darkness. *See also* corner cut. (2) One of a pattern of notches along an edge of a microform; used to assist automated retrieval. *See also* edge notching *and* notch.

edge notching—a system of coding unit microfilm for automated retrieval by cutting a pattern of notches along one edge (usually the bottom with respect to the position of the microform as filed) or alternatively by affixing a prenotched clip to one edge of the microform.

edge printing—the exposure of a latent image on the edge of a film, outside the normal image area, usually by the film manufacturer. The edge printing may identify the manufacturer, show that the film has a safety base and that the base meets archival standards of permanence.

edgewave—an undulating deformation along border areas of photographic material, commonly caused by expansion of these areas due to excessive humidity in storage.

editing codes—*see* editing symbols.

editing film—the act of checking, cutting and splicing images into desired sequence.

editing symbols—alphanumeric and geometric symbols on microfilm readable with the unaided eye; used to provide cutting, loading and other preparation instructions.

effective reduction—a measure of the number of times an imaginary document would have been reduced to equal the size of the Computer-output microfilmer generated microimage, expressed as 1:24, 1:30, etc. *See also* reduction ratio.

electrolytic development—the use of electricity to convert a latent image on a photosensitive material into a visible image. With silver-halide materials, the electricity serves as a substitute for the developing agent as a source of electrons. With photoconductive systems, an electric current forms a deposit on the latent image from a solution applied to the surface.

electron—a negatively charged subatomic particle capable of exposing photographic film. Electrons are also used, for example, to form images on cathode-ray tubes.

electron beam recording—*see* beam recording *and* electron.

electronic mail—a technique that includes equipment and communications technology which can permit entry, storage and delivery of person-to-person messages.

electronic shutter—a shutter powered by an electromagnet, in which the duration of exposure is controlled electronically. Compare with electromechanical shutters, which are mechanically powered and electronically timed, and conventional shutters, which are mechanically powered and timed. *See also* shutter.

electrophotography—a process in which the effects of radiation and electricity, usually with the aid of electrophotographic developers, are used to produce a photographic record.

electrostatic—(1) stationary electrical charges generated in nonconducting media as films, prints, etc., by friction or peeling adhered layers of materials. (2) Electrical energy with the capability of attracting and holding small particles carrying an opposite charge. This form of energy is used in xerography to form latent images on photoconductive substances.

electrostatic latent image—the invisible image formed on a charged photoconductive surface by the action of radiant energy. *See also* latent image.

ectrostatic photography—the formation of reasonably permanent images by the development of electrostatic latent images.

ectrostatic process—the formation of a latent electrostatic image on a surface by action of light on a charged photoconducting material. The latent image may be made visible by a number of methods, such as applying charged pigmented powders or particles in a liquid which are attracted to the latent image. The particles either directly or by transfer may be applied and fixed to a suitable medium.

ectrostatography—*see* electrostatic process.

nulsion—a single or multilayered coating consisting of light-sensitive materials in a medium carried as a thin layer on a film base.

nulsion blisters—*see* blister.

nulsion layer—the layer that contains the image-forming, light-sensitive substances or photoconductors in a photographic material.

nulsion numbers—numbers used by photographic film, plate and paper manufacturers to identify coating data.

nulsion side—the side of a photographic film, plate or paper on which the emulsion is coated. In silver film it is typically the dull side. The converse of base side.

nulsion sheet—usually, a sheet of material that is affixed by suitable means to the support sheet to form the film channel into which the microfilm is inserted. The emulsion side of the film is placed against this sheet. It is intended to be the contact printing surface. Synonymous with *cover sheet* and *face sheet*.

nulsion speed—a quantitative measure of the sensitivity of a photographic emulsion utilized to determine the correct exposure.

ncoded data—(1) signals converted to coded form. (2) Data converted by the use of a code or coded character set in such a manner that reconversion to the original form is possible.

ndorser—a camera accessory that automatically stamps documents as they are filmed. It is used principally by banks in order to place a bank endorsement or cancellation on checks.

nd-use microfilm—*see* distribution microform.

nlarge—to reproduce in a size larger than the original or the intermediate.

nlargement—a copy larger than the microimage.

nlargement ratio—the ratio of the linear measurement of the enlarged image of a document to the linear measurement of a microimage; expressed as 20X, 30X etc.

nlarger—a device that can produce through projection onto sensitized material an image larger than the original.

nlarger-printer—a device that projects an enlarged image from a microform and develops and fixes the image on suitable material.

nvelope—a piece of folded paper, chemically inert, used for storing microfiche.

ven generation—the second, fourth, sixth, etc., copies of an original document or microform. *See also* generation; generation, Nth; *and* odd generation.

ven illumination—having the subject lighted uniformly over its entire surface. *See also* illumination.

xhaustion—the state of inaction reached by a processing solution due to age or use which makes it incapable of producing satisfactory results.

xpendable film—*see* short-term film.

xpiration date—a date placed on sensitized photographic material packages by the manufacturers to identify the period during which the product is warranted to produce normal results if stored under recommended conditions. *See also* dated *and* shelf life.

xpose in sections—to make more than one photograph to cover the whole document if original documents are larger than the maximum area of coverage of a camera.

exposure—(1) the act of exposing a sensitive material to radiant energy. (2) The time during which a sensitized material is subjected to the action of radiation. (3) The product of radiation intensity and the time during which it acts on the photosensitive material.

exposure counter—a mechanical device on some cameras, film holders, etc., that indicates the number of frames or sheets of film or other sensitized material that have been exposed or that remain to be exposed.

exposure index—a number designating the speed rating of a photographic material that is intended for use with an exposure meter in determining the correct conditions of exposure for the photographic material.

exposure latitude—permissible change in camera exposure without significant effect on image quality. The change is affected by the definition of image quality, the usable extent of the sensitometric curve and the subject luminance range (contrast).

exposure meter—an instrument for measuring either (1) the illuminance on the subject (incident light) or (2) the light reflected from the subject (field luminance). By means of a calculating device, the camera exposure settings in terms of lens aperture and shutter exposure time interval may be determined. Erroneously known as a *light meter*.

exposure setting—the time (camera shutter speed, or light level) used to control the quantity of light or radiant energy received by photosensitive material.

exposure time—*see* exposure.

extraneous light—uncontrolled illumination such as sunlight that affects the uniformity of illumination of the copy being photographed or the legibility of images in a microform reader.

eyeball characters—images recorded on microfilm that are large enough to be read without magnification.

eye-legible copies (images)—copies readable without magnification.

eyepoint—(1) a position in relation to the screen that simulates the location of an observer's eye. (2) The position on the lens axis at which the brightest and sharpest visual image is obtained.

F

face sheet—*see* emulsion sheet.

facsimile—(1) an exact copy of a document. (2) The process or result of the process by which fixed graphic images are scanned, transmitted electronically and reproduced either locally or remotely.

fading—loss in density of photographic images.

fast—(1) having a high photographic speed. The term may be applied to a photographic process as a whole, or it may refer to any element in such a process, such as the optical system, the emulsion or a developer. (2) Resistance to the action of destructive agents, i.e., image may be fast to light, fast to heat or fast to diffusion.

fast film—a photographic material of high sensitivity to light (radiant energy).

feathering—the spreading or bleeding of lines and photographic images.

feeder—*see* automatic feeder.

feed shelf—an accessory for cameras used to facilitate the insertion of documents for filming.

feed spool—a holder that contains unexposed film or paper. *See also* spool *and* supply spool.

fiche—*see* microfiche.

field—(1) the area covered or "seen" by the optical system of a camera. (2) A unit of data within a card, record, etc.

file—(1) *a collection of records; an organized collection of* information directed toward some purpose. (2) Data stored for later processing by a computer or computer-output microfilmer.

film—any sheet or strip of transparent plastic coated with a light-sensitive emulsion. *See also* diazo material, dry-silver materials *and* vesicular film.

film advance—(1) the movement of film across the exposure area of a camera in regular increments for successive frames. (2) *The length of film moved after a given exposure. See also* pulldown.

film backing—*see* antihalation *and* antihalation undercoat.

film base—*see* base.

film chamber—*see* film channel.

film channel—the space in the jacket into which the film is inserted. Synonymous with *film chamber. See also* channel separation area.

film cleaning—the removal of foreign matter that may cause damage to the film or that detracts from the film's image. The techniques include dusting or wiping, cleaning solvents, ionized air and ultrasonics.

film gate—a mechanism in cameras, printers, projectors or similar devices that holds the photographic film in a precise plane and limits the area of illumination at the time of exposure or projection.

film insert—a strip of microfilm cut to fit a film jacket, aperture card or holder.

film measure indexing—*see* odometer indexing.

film, nonreversing—*see* direct-image film.

film plane—*see* focal plane.

film size—film width, generally expressed in millimeters, e.g., 16 mm.

film speed—an expression of the sensitivity of a film to light.

film strip—a short strip of processed photographic film, usually 16 or 35 mm, containing a number of frames.

film unit—that part of a microfilm camera which contains the film, film-advance mechanism and, in some microfilm cameras, the lens.

film weld—see splice.

filter—an optical element of glass, gelatin or other material used to modify selectively the transmitted radiation, so that only certain wavelengths are transmitted. *See also* darkroom filter, heat filter *and* neutral density filter.

finder light—a light beam projected from the camera to show the outline of the photographic field.

fine grain—(1) descriptive of film emulsions in which the grain size is small. The term is relative since there is a wide variation in grain size among various fine-grain films. (2) Applicable to films or developers that tend to produce images of relatively low granularity. *See also* grain, graininess *and* granularity.

fingerprint—a defect in microforms that appears as a visual image of a fingerprint. This defect is caused by improper handling by the camera operator, processing technician or inspector. *See also* NMA MS23.

first-generation image—an image, generally used as a master, produced directly from a subject. *See also* camera microfilm *and* master.

film-reproduction microfilm—see second-generation microfilm.

fixed focus—applied to cameras and other photographic and optical equipment for which the position of the lens and film plane are established by the manufacturer and cannot be altered by the user.

fixer—the agent used in the fixing process.

fixing—a processing step that renders the material no longer light sensitive in order to make the developed image stable.

fixing bath—a chemical solution in which fixing takes place.

flange—(1) the side plate of any reel or spool. (2) A disk with a thick hub used to support lengths of film wound on plastic cores.

flare—nonimage-forming light that results from reflections at optical surfaces, the interior of the camera or imperfections in the optical parts. If it reaches the image plane, it produces an overall or local decrease in contrast that degrades the photographic quality of the resulting image.

flash card—a target, generally provided with distinctive markings, that is photographed to facilitate indexing of the film. *Synonymous with flash indexing and flash target.*

flash indexing—a method of dividing a roll of film into batches of information by using flash cards to identify the sections, thus providing a method of retrieval. Synonymous with *flash target coding.*

flash target—*see* flash card.

flash target coding—*see* flash indexing.

flat-bed camera—*see* planetary camera.

flatness of field—(1) in optics, the characteristic of a lens that *produces equal sharpness over the entire image area.* (2) *In* copy work, the accuracy of a plane intended to be perpendicular to the axis of a lens.

flats—two pieces of glass polished to a high degree of smoothness and evenness used to hold film in cameras, readers, enlargers, etc.

flow camera—*see* rotary camera.

flow chart—a graphical representation for the definition, analysis or solution of a problem, in which symbols are used to represent operations, data, flow, equipment, etc. *See also* ANSI PH5.17.

flow-chart symbol—a symbol used to represent operations, data, flow or equipment on a flow chart. *See also* ANSI PH5.17.

flux—(1) the rate of transfer of radiant energy across a given surface (real or imaginary). (2) Radiant energy.

flying spot scanner—a scanning device employing a moving spot of light over a document, a microimage or along the contour of a character to read it. *See also scanner.*

f number—the *f* number for a given lens aperture equals the focal length divided by the diameter of the entrance aperture. Synonymous with *f stop.*

foam—a mass of bubbles that can interfere with processing or with the formation of a uniform emulsion layer during coating. Foam can prevent the processing solutions from acting on the emulsion.

foaming—the formation of a mass of bubbles (foam) on the surface of processing solutions. It can be reduced by wetting agents and certain antifoam solutions.

focal length—the distance between the focal point and the lens when the optical system is focused to record an object at infinity (or a large distance).

focal plane—the surface (plane) on which an axial image transmitted by a lens is brought to sharpest focus; the surface where the light-sensitive film in a camera is located.

focal point—a point at which converging rays of light from a lens meet.

focus—(1) the plane in which rays of light reflected from a subject converge to form a sharp image after passing through different parts of a lens. (2) To adjust the relative positions of the lens and film to obtain the sharpest possible image.

fog—nonimage photographic density. A defect in film that can be caused by (1) the action of stray light during exposure, (2) improperly compounded processing solutions or (3) wrongly stored or outdated photographic materials. *See also* base-plus-fog, chemical fog, light fog *and* NMA MS23.

folded documents—a defect in the filmed image in which the imaged document has folded over itself, causing some of the information to be blocked out. This is caused by improper feeding or transporting of the documents. *See* NMA MS23.

foot candela—a unit of illuminance. The measure of luminous flux density falling upon any surface. One foot candela is equal to 1 lumen per square foot of area.

foot candle—*see* foot candela.

footlambert—a unit of luminance equal to the uniform luminance of a perfectly diffusing surface emitting or reflecting light into unit solid angles at the rate of 1 lumen per square foot.

format—*see* image arrangement *and* image orientation.

form flash—*see* form slide.

form overlay—*see* form slide.

form slide—a piece of glass or film that contains a document format, graphics or other standard information which is superimposed on a frame of computer-output microfilm containing other data.

f/4.5 projection printing density—*see* density, printing, *and* density, projection.

f/4.5 projection visual density—*see* density, projection, *and* density, visual.

frame—that area of the film on which radiant energy can fall during a single exposure. *See also* double frame, microfiche frame *and* single frame.

frame pitch—the distance between two corresponding points in two contiguous frames.

fresnel lens—a lens comprised of a series of concentric stepped rings that result in a very thin, lightweight lens. Fresnel lenses are sometimes used in combination with translucent screens for readers to increase and improve uniformity of brightness.

frilling—a puckering and peeling of a photographic emulsion layer from its base. Frilling can be caused by (1) excessive temperature or improper compounding of the baths, (2) poor adhesion qualities of the material, (3) improper hardening of the gelatin or (4) the use of very soft wash water. *See also* NMA MS23.

front projection—the process of forming an optical image on a reflective surface for viewing or photographing such that the projector is on the same side of the receiving surface as the viewer or the camera.

front-surface mirror—a polished reflecting device (mirror) that has the reflecting material on the side which faces the incident light (front).

f stop—*see f* number.

G

gamma—a sensitometric quality derived from the sensitometric curve (D/log E curve) of a photosensitive material. *Gamma*, a measure of the contrast properties of film, is the slope of the straight-line portion of the sensitometric curve and represents the rate of change of density with respect to the logarithm of the exposure.

gammeter—a transparent template containing calibrated markings, used by positioning it on a sensitometric curve, to determine the slope of the straight-line portion.

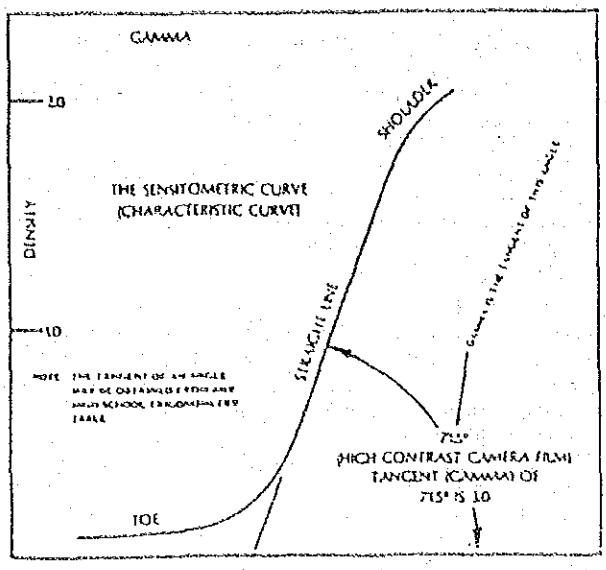
gas bells—bubbles forcing the emulsion to separate from the support; caused by strong chemical action and resulting in minute holes in the negative. *See also* pinhole.

gaseous development—the conversion of a latent image into a visible image through the action of an agent in vapor form, e.g., the processing of diazo material with ammonia vapor.

gate—*see* film gate.

gelatin—a colloidal protein used as a medium to hold silver-halide crystals in suspension in photographic emulsions, as a protective layer over emulsions, as a carrier for dyes in filters, etc.

generation—one of the successive stages of photographic reproduction of an original or a master. The first generation is the camera film. Copies made from this first generation are second generation, etc. *See also* generation, Nth.



Gamma (art courtesy Harold Dorfman)

generation, Nth—the number of photographic generations from the original or master. For example, the second generation is a copy from a camera film or master.

generation printing—the use of copies from an original or master to make additional copies. *See also* generation, Nth.

generation test—a means of determining the number of times usable copies may be reproduced from succeeding generations of microfilm. In this test, copies are successively reproduced until a print has been generated that is unusable. This indicates the anticipated range of generation copies that may be reasonably expected from that microform.

ghost images—spurious multiple images of objects caused by reflections from lens surfaces in cameras, etc.

glass flats—*see* flats.

glass guide—a transparent bar of optical glass used to guide documents through the photographic field of a microfilm camera.

glassine—(1) a translucent material used to store short-term processed microfilm. (2) A material used to protect and preserve adhesive on some types of unmounted aperture cards. *See also* protection sheet.

gradation—in photographic originals and reproductions, the rate at which density changes.

gradient, average—*see* average gradient.

grain—(1) the discrete particles of image silver in photographs. The random distribution of these particles gives rise to the appearance of clumping known as "graininess." (2) The direction, arrangement or appearance of fibers, strata, etc. *See also* grain direction, machine direction *and* width direction.

grain direction—direction in which most of the paper fibers are oriented, usually the machine direction of the master roll from which the paper was cut. *See also* machine direction *and* width direction.

graininess—(1) the appearance of silver particles in a negative or positive. The size of the particles determines the degree of graininess in the processed material. (2) The subjective impression of nonuniformity in an area of a photograph corresponding to uniform exposure.

grain size—a measure of the fineness of grains of silver halide in an emulsion.

granularity—a measure of grain distribution in a uniformly exposed and processed area of photographic material.

graphics—art or science of drawing. Also used as an adjective, e.g., graphics computer-output microfilmer.

gray chart—*see* gray scale.

gray scale—an array of adjacent neutral density areas varying by a predetermined rate or step from black to white and used to expose film to determine its sensitometric curve. Synonymous with *gray wedge* and *step tablet*.

gray wedge—*see* gray scale.

grid—*see* grid pattern.

grid area—the total area of the microfiche contained within the perimeter of the grid pattern. *See also* grid line *and* grid pattern.

grid gauge—an inspection tool that is used to check the position of frames (images) relative to the grid, usually on microfiche. *See also* grid pattern.

grid line—a vertical or horizontal line that defines an edge of the frame boundary. The line is of zero width on the microfiche proper and does not infringe on the usable area of a single or double frame. *See also* grid area *and* grid pattern.

grid pattern—an array of horizontal and vertical lines (usually imaginary) that divide an area of a microform (usually a microfiche) into spaces called *frames*. The grid defines the arrangement of the rows and columns. *See also* grid area *and* grid line.

gross density—the total density of film including base density, image density and fog. *See also* base-plus-fog density, density, *and* fog.

gross fog density—*see* base-plus-fog density.

gutter—the combined marginal space formed by adjacent margins of any two pages of an open document.

H

hairline—(1) any of a variety of fine lines, such as a scratch on a negative. (2) A fine reference line having little apparent width.

halation—a halo or ghost around the desired image on a photographic emulsion caused by the reflection of rays of light from the base to the emulsion or by internal scattering of light within the film. *See also* antihalation *and* antihalation undercoat.

halide—any compound of chlorine, iodine, bromine or fluorine and another element. The compounds are called *halogens*. The silver salts of these halogens are the light-sensitive materials used in silver-halide emulsions.

halide-reversal processing—*see* partial-reversal processing.

H and *D* curve—Hurter and Driffield curve. *See* sensitometric curve.

hand feeder—on a rotary microfilm camera, a platform used to manually guide or feed single documents into the camera.

hand viewer—a small, portable magnifying device used for viewing microfilm or transparencies.

hardcopy—(1) an enlarged reproduction from a microform usually on paper. (2) A printed copy of machine output in a readable form, for example, output from a computer printer. Synonymous with *printout*.

hardener—a chemical (the hardening agent) that limits softening of wet gelatin or a formulated solution (hardening bath) containing such a chemical. Hardening agents are generally added to photographic emulsions during manufacture to reduce the danger of physical damage to the emulsion during processing. Potassium alum, aluminum chloride and formaldehyde are examples.

hardware—equipment, as opposed to software.

hard water—water that contains mineral salts. Since some such salts can cause undesirable reactions in photographic solutions, the danger can be eliminated or reduced by distilling or deionizing the water or by treating it with a chemical softener.

haze—light scatter in film base or other essentially transparent material.

header—*see* heading.

heading—inscription placed at the top of the microform (microfiche, jacket) to identify its contents. It is readable without magnification. Synonymous with *title*.

heading area—an area located at the top edge of the image area of the microform (microfiche, jacket) for the heading. Synonymous with *title area* and *title space*. *See also* ANSI/NMA MS2 *and* heading.

heading area coating—a translucent coating applied to the support sheet area of the microform (microfiche, jacket) reserved for the heading. This makes it possible to add the heading and to make it more visible. It is also incorrectly referred to as the *title backing*. *See also* ANSI/NMA MS2.

heading backing—*see* heading area coating.

heat-developing film—a type of film in which the image is developed by heat. *See also* dry-process silver film *and* vesicular film.

heat development—an image-forming method dependent on the absorption of heat.

heat filter—any filter, generally glass, which absorbs energy of long wavelength (infrared) without absorbing light from the visible range. Used to reduce the temperature at the film plane in readers, enlargers, printers and projectors.

high contrast—(1) a relationship of image tones in which the light and dark areas are represented by extreme differences in density. (2) A photographic material whose sensitometric curve has a high value of average gradient, i.e., average gradient greater than 1.8 when measured as described under average gradient. *See also* low contrast *and* medium contrast.

high reduction—reductions above 1:30 up to and inclusive of 1:60. *See also* ultrahigh reduction *and* ultrafiche.

hold-down bar—a device for holding a document flat while it is being photographed.

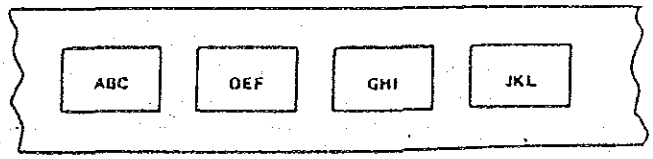
holography—a method of recording images on microfilm by splitting a laser beam into two components, one of which is directed toward the object or scene and the other (the reference wave) toward the film. When the reference and object waves meet again at the film, certain interference patterns develop and are the means of recording the image. The image can be viewed by passing laser light through the processed film.

hood—a part of the structure of a microform reader designed to shield the screen from ambient light.

hopper—in rotary microfilm recorders, the receiving area or tray for documents after they have been microfilmed.

horizontal bar code—a "picket fence" or horizontal array of vertical bars and spaces.

horizontal mode—(1) the arrangement of images on roll microfilm in which the lines of print or writing are parallel to the length of the film for horizontal script and perpendicular for vertical script. (2) The arrangement of images on a microfiche in which the first microimage is in the top left-hand corner of the grid pattern and succeeding microimages appear in se-



Horizontal Mode

quence from left to right and in rows from top to bottom. Synonymous with comic mode, orientation B and landscape. *See also* ANSI/NMA MS14.

hot splice—*see* splice.

hot spot—an area that appears appreciably lighter than the surrounding area, commonly the result of uneven distribution of light by a reflector or optical system. For example, the central portion of an unevenly illuminated reader screen.

hr—*see* high reduction.

humectant—a moisture absorbing and retaining agent such as glycerine, added to a photographic film to minimize curl and brittleness under excessively dry atmospheric conditions.

humidify—to add moisture to the air, thereby reducing the accumulation of static electricity and extending the life of photographic materials that become brittle in excessively dry air.

humidity—the moisture or water vapor in the atmosphere. Specifically, relative humidity is the relation between the concentration of water vapor present in air to the maximum that could be present at a given temperature. Humidity is of importance for micrographic materials because it affects physical properties such as brittleness, curl, and dimensions.

Hurter and Driffield curve—*see* sensitometric curve.

hydrometer—an instrument designed to measure the specific gravity of liquids. Used, for example, as a rough check on the accuracy with which a processing solution has been compounded. Not to be confused with hygrometer.

hygrometer—an instrument designed to measure relative humidity. Not to be confused with hydrometer.

hypo—*see* ammonium thiosulfate *and* sodium thiosulfate.

hypo clearing agent—a bath containing sulfite which is permissible as a washing aid for archival film. *See also* hypo eliminator.

hypo elimination—the use of a bath that converts residual hypo into substances that will not react with the silver image and can be easily removed by washing. In a broader sense, hypo elimination also includes the use of an alkaline or salt bath that increases washing effectiveness without reacting with the sodium thiosulfate or other fixing agent.

hypo eliminator—a chemical compound used to neutralize or speed up the diffusion of the hypo from a photographic material, thus shortening the washing time. Compounds containing oxidizing agents such as peroxide are not permitted for archival washing.

hypo, residual—*see* residual thiosulfate ion.

hypo test—*see* residual thiosulfate ion test.

I

illuminance—the measure of light falling at a given point on a surface; the rate at which luminous energy (quantity of light) is received by a unit area, expressed in footcandles (lumens per square foot), lux (lumens per square meter) or phot (lumens per square centimeter).

illuminants—(1) heated radiant energy sources, including the original bulb whether clear, colored, coated or metallic, and excluding auxiliary devices such as dyes, reflectors, filters or attenuators. (2) Something that gives off light.

illumination—the act of providing with light. The process by which a surface receives light. Erroneously used for illuminance.

illumination control—apparatus for varying lighting (illumination).

illumination level—the amount of light falling on a surface. *See also* illuminance.

image—a representation of information produced by radiation. Images are real when they are formed in a plane, as on film in a camera. They are virtual when viewed as in a telescope.

image area—(1) the part of a recording area reserved for the images. (2) The area of a jacket containing film channels for the storage of microfilm images.

image arrangement—the placement of microimages within a given microform. *See also* duo, duo-duplex, duplex, multiplex *and* simplex.

image card—an aperture card containing a processed film image. *See also* aperture card.

image conversion—the operation or function of transferring or reproducing microimages from one stage in a microfilm system to the next.

image count—*see* document mark.

image mark—*see* document mark.

image, negative—*see* negative-appearing image.

image orientation—the arrangement of images with respect to the edges of the film. *See also* horizontal mode *and* vertical mode.

image placement—*see* image arrangement.

image positioning—*see* image arrangement.

image, positive—*see* positive-appearing image.

image reversing film—a film which when conventionally processed will reverse the polarity and tonal scale of the original material; that is, whites from blacks, blacks from whites, negatives from positives and positives from negatives. *See also* polarity.

image rotation—the ability to rotate microfilm images in readers in order to allow projection of all images right side up and right reading on the screen.

impact printer—*an output unit that prints characters on paper* by physical contact.

incident light—the light which strikes an object, distinguished from the light absorbed by, reflected from or transmitted by the object.

index frame—usually, the first or last frame of a series of images on a microform that records a table of contents or index to facilitate the locating of information within the microform.

indexing—a listing of the contents of a microform.

index page—*see* index frame.

information—data that has been given value through analysis, interpretation or compilation in a meaningful form.

information area—the area of a document that contains intelligence, usually exclusive of the margin.

information retrieval—the methods and procedures for recovering specific information from stored data. For example, selection of a specific document from a roll of microfilm.

in-house—within the organization. Expression applied to work such as microfilming done within an organization, as distinct from work done by a service company. Synonymous with *in-plant.*

input—(1) the process of entering information into a system, e.g., a computer. (2) The data entered in (1) above.

insert—a microfilm strip cut in lengths to fit a jacket, film holder or for stripping up a master microfiche.

inserter—*see* jacket filler.

insertion opening area—an opening in the support sheet of the film channel through which the film is inserted into the jacket.

integrating bar—a long, narrow, diffuse source of light, e.g., a fluorescent light covered with a diffusing glass.

interactive mode—*see* conversational mode.

interface—the common boundary where electronic devices or systems are matched.

interference rings—*see* Newton rings.

intermediate—duplicate microform specifically prepared for producing further copies.

ion—an atom or molecule that also has an electrical charge.

iris diaphragm—*see* diaphragm, iris.
ISO—International Organization for Standardization.

J

jacket—a flat, transparent, plastic carrier with single or multiple film channels made to hold single or multiple microfilm images. Synonymous with *microfilm jacket.*
jacket filler—equipment that cuts microfilm into strips and inserts them into film jackets. Usually equipped with a viewer for frame verification.
jacket locating holes—an opening (hole) located in the heading area of the jacket for alignment with some loading equipment.
jacket, notched—*see* notch.
jacket rib—thin adhesive strips that form the channels on some jackets.
jam—a defect in microfilm that appears as parts of documents followed by a dark streak on the film. *See also* NMA MS23, *and* jamming.
jamming—piling up of film or paper in a camera, cassette, jacket or magazine due to a film or paper transport malfunction. Also known as *buckle.*
jig—a device used to hold documents (for example, catalog cards) in a precise alignment or position to facilitate filming.
j-type defects—defects in microfilm appearing as tiny spots 10 to 150 microns in diameter. *See also* redox blemish.

K

K—*see* kelvin.
kelvin—an absolute temperature scale used in measuring the color of light in degrees. Numerically the Kelvin temperature is equal to the Celsius temperature plus 273. Synonymous with *K.*
keyboarding—the act of depressing keys on a computer terminal, microfilm equipment, typewriter, etc.
key slot—an opening in the flange or hub of a film spool or cassette, which is engaged by the film winding key of the camera. Also known as *turning slot.*
KWIC—key word in context. An indexing technique that permutes each significant word in an entry, e.g., title of a document. *See also* KWOC.
KWOC—key word out of context. An indexing technique in which each significant word in each entry is extracted and listed alphabetically. *See also* KWIC.

L

ladder pattern—a band of parallel lines that are perpendicular to the length direction of the band and in which line width and line spacing are equal and uniform throughout the band length.
lambert—a unit of luminance equal to the uniform luminance of a perfectly diffusing surface emitting or reflecting light into unit solid angle at the rate of 1 lumen per square centimeter.
lamphouse—that part of an enlarger, reader, printer, etc., which contains the light source (lamp).
landscape—*see* horizontal mode.
lap marks—a processing defect that is characterized by longitudinal marks along the length of the film, usually caused by defective rollers.
lap reader—a microform reader that can be placed on a person's lap during use.
lap splice—*see* splice.
laser—a source that produces light that is nearly monochromatic (of only one wavelength) and highly coherent (with waves in phase both temporally and spatially). Acronym for *light amplification by stimulated emission of radiation.*
latent image—the invisible image produced by action of radiant energy on a photosensitive material. It may be made visible by the process of development.
latent-image fade—the change in the effects of radiant energy on a photosensitive surface which occurs during the time between exposure and development. The amount and rate of change depends on time, temperature, humidity, storage conditions and type of emulsion.
lateral reversal—a right-to-left change in image orientation, e.g., one's image as seen in a conventional mirror.
latitude—the change in camera exposure that is permissible without significant effect on image quality.
leader—(1) a length of film at the beginning of a roll used for protection and for threading into equipment such as cameras, processors and readers. (2) An unused or blank length of magnetic tape at the beginning of a reel of tape. The leader precedes the text or the recorded data. *See also* trailer.
leading end of film—the end portion of the film in advance of the first image or, if a separate leader is attached, the precise end portion of this leader. *See also* trailing end of film.
lead microfiche—the first microfiche in a microfiche set. *See also* microfiche set *and* trailer microfiche.
LED—a semiconductor device that produces a visible luminescence when a voltage is applied to it. Acronym for *light-emissive diode.*
legend—a caption, title or brief description.
legible—capable of being read or deciphered.
length direction—*see* machine direction.
lengthwise curl—*see* curl direction.
lens—the optical instrument or arrangement of light-refracting elements designed to collect and distribute rays of light in the formation of an image. *See also* condensing lens.
lens coating—a thin, transparent coating applied to the surface of lenses or other optical parts to reduce reflection and improve transmission.
lens elements—individual optical components that are combined to form a compound lens.
lens flare—*see* flare.
lens opening—that portion of the lens through which light can pass. Also referred to as *aperture. See also* lens stop.
lens speed—(1) a measure of the capacity of a lens to admit light to the image. (2) A measure of the ratio of the image illuminance given by a lens to the object luminance, the ratio being proportional to the square of the reciprocal of the *f* number.
lens stop—a diaphragm or aperture setting of a lens that determines the amount of radiant energy (light) passing through the lens.
light arms—the portion of a camera or camera accessory used to support the lamps which illuminate the objects being photographed.
light box—a device for inspecting film that provides diffused illumination evenly dispersed over the viewing area.
light fog—an image defect or degradation produced by accidental exposure of a photographic material to nonimage-forming light. *See also* chemical fog *and* fog.
light meter—an instrument used to measure luminance or illuminance. *See also* exposure meter.
light scatter—diffusion of light by refraction, reflection and scattering as from particles of moisture or solid matter suspended in the atmosphere or by irregularities in any medium.
light sensitive—materials that undergo changes when exposed to radiant energy (light).
light struck—film that has been fogged either accidentally or deliberately. *See also* fog *and* light fog.
lighttight—applied to film holders constructed so as to protect the photosensitive material from radiation (light).

light trap—(1) extra winding of film or leader added to the outside layers of film on a reel to protect it against unwanted exposure. (2) Any means of excluding unwanted light.

line copy—documents containing only lines and solids with no intermediate tones.

line density—the opacity of the line work, letters or other nonbackground information of an image.

line pairs—*see* resolving power.

line pitch—the vertical distance between the beginning of successive lines within a frame.

lines per millimeter—*see* resolving power *and* spurious resolution.

log *E*—*see* log exposure.

log exposure—the logarithm of the product of the intensity of illumination (or irradiation) measured at the film plane, multiplied by the exposure time (log *E*).

logic—the preplanned, automatic series of steps by which an electronic- or mechanical-controlled device achieves its purpose.

longitudinal—parallel to the edges of a roll film.

longitudinal lines—defects in a film image that appear parallel to the film edges. May be caused by problems in film exposure, handling or processing.

long-term film—film suitable for the preservation of records for a minimum of 100 years when stored under proper conditions, providing the original film was processed correctly. *See also* archival film, medium-term film *and* short-term film.

lot—a batch or quantity of one type of sensitized material, all packages of which have been labeled with the same number by the manufacturer. Similar results can be expected of all material bearing this number.

low contrast—(1) a relationship of image tones in which the light and dark areas are represented by small differences in density. (2) Photographic materials whose sensitometric curves have low values of average gradient, i.e., average gradient of 0.5 to 1.1 when measured as described under average gradient. *See also* high contrast *and* medium contrast.

low reduction—reductions up to and inclusive of 1:15.

lr—*see* low reduction.

lumen—(1) a fundamental light unit, applied to the concept of light flux (rate of flow of light). (2) The rate at which light from a point source of one candela crosses a surface that subtends a solid angle of one steradian, as viewed from the point source. *See also* candela, steradian.

luminance—(1) the intensity of light produced or reflected per unit area viewed (the area viewed) by the observer or camera. (2) Luminous flux per unit solid angle per unit area of the source of flux projected on a plane perpendicular to the direction specified. (3) Former term: *photometric brightness.*

luminous flux—the time rate of flow of light; unit of measurement is the lumen.

luminous intensity—the luminous flux per unit solid angle, measured in candelas (lumens per steradian).

lux—an international unit of illuminance equal to 1 lumen per square meter.

M

machine curl—the curvature of sensitized material about an axis perpendicular to the machine direction of the coating. *See also* curl.

machine direction—the direction of the film parallel to its forward movement in the film-manufacturing equipment. *See also* curl, grain direction *and* width direction.

macro—(1) prefix meaning large. (2) An arbitrarily established size comprising pattern geometry above 0.0508 mm (0.002 inch).

macrodensitometry—densitometry of large areas in which the measuring aperture is usually 0.5 mm^2 or larger. The opposite of microdensitometry.

macrograph—*see* photomacrograph.

macroscopic—large enough to be read without magnification, e.g., heading or title information on microfiche.

magazine—lighttight container that facilitates the loading and unloading of sensitized material used in micrographic equipment, e.g., camera, printer, processor. *See also* cartridge *and* cassette.

magnetic bubble memory—small, cylindrical magnetic domains (magnetic bubbles) found in single-crystal, thin films of synthetic ferrites or garnets. Used for high-density data storage.

magnetic ink character recognition—the machine recognition of characters printed with magnetic ink. Contrasted with optical character recognition. Synonymous with *MICR.*

magnetic tape—a continuous flexible recording medium, which has a base material impregnated or coated with a magnetic material, on which data can be stored by selective polarization of portions of the surface.

magnification—apparent enlargement.

magnification range—the range or span of magnification possible in a given optical system which is usually expressed in diameters or times. *See also* magnification ratio.

magnification ratio—the expression of the relative degree an object is enlarged by an optical instrument; usually expressed in diameters or times, e.g., 16X, 24X, 30X, etc. *See also* magnification range.

magnifier—a lens or lens system that enlarges an image.

mandrel block—a mold or form upon which articles are shaped or formed with the use of a mandrel (bar used as a core).

manual retrieval—a microform system in which the user, without the aid of mechanization, extracts the microform from a file by hand, inserts it in a viewer and scans the microform to arrive at the appropriate location. This type of system may or may not be supported by auxiliary indexes to the filmed information.

margin—(1) on drawings, the area of the drawing beyond the line enclosing the information area. (2) On a film frame, the area of background between the edge of the drawing and the edge of the film frame. (3) In a document, the space between the information area and the edges of the sheet. (4) In a microfiche, the space between the sides and bottom of the microfiche and the periphery of the grid. (5) In a microfiche frame, the space between the information area and the boundaries of the frame.

mask—a device or opaque material to protect specific areas of photosensitive material from exposure.

master—a document or microform from which duplicates or intermediates can be obtained.

master film—any film, but generally the camera microfilm, used to produce further reproductions, such as intermediates or distribution copies.

master negative—*see* master film.

master positive—*see* master film.

maximum density—*see* density, maximum.

MC—meter-candle. *See* lux *and* meter-candle.

measles effect—*see* redox blemish.

medium contrast—(1) a relationship of image tones in which the light and dark areas are represented by average or normal differences in density. (2) Photographic materials whose sensitometric curve has normal values of average gradient, i.e., an average gradient of 1.11 to 1.80. See also low contrast *and* high contrast.

medium reduction—reductions above 1:15, up to and inclusive of 1:30.

medium-term film—a photographic film that is suitable for the

preservation of records for minimum of 10 years when stored under proper conditions, providing the original film was processed correctly. *See also* archival film, long-term film *and* short-term film.

meter—(1) a general term for a measuring instrument. (2) A unit of length in the metric system equal to 100 centimeters (39.37 inches).

meter-candle—metric unit of illuminance, the light received at an illuminated surface. One meter-candle is the light received at a point 1 meter away from a point source having an intensity of 1 candela (formerly candle). One meter-candle is equivalent to 1 lumen per square meter (lux), which is the preferred unit.

methylene blue—a chemical dye formed during the testing of archival permanence of processed microimages using the methylene-blue method. *See also* ANSI PH4.8.

metricate—*see* metricize.

metricize—to convert any unit to its metric equivalent. This may be an exact, rounded or rationalized equivalent.

metric system—a set of measuring units, almost universally employed except in the United States, based on a decimal mathematical relationship. Also known as *Systeme International d'Unites (SI)*.

MICR—*see* magnetic ink character recognition.

micro—(1) in the metric system, prefix meaning one-millionth, as in micrometer (one-millionth of a meter). (2) Generally, a prefix meaning "small." (3) In photofabrication, involving at least one dimension less than 0.0508 mm (0.002 inch).

microcard—*see* micro-opaque.

microcopy—a copy obtained by photography in a size too small to be read without magnification.

microdensitometer—an optical instrument that can measure the density of very small image areas on a photographic image. *See also* densitometer *and* density.

microfacsimile—*the transmission and/or reception of microimages via facsimile communication. See also* facsimile.

microfiche—a transparent sheet of film with microimages arranged in a grid pattern. A heading or number large enough to be read without magnification normally appears at the top of the microfiche in a space reserved for this purpose. *See also ANSI/NMA MS2 and ANSI/MNA MS5.*

microfiche envelope—*see* envelope.

microfiche frame—an area on the microfiche formed by the grid pattern, within which a microimage may be recorded. *See also* grid pattern.

microfiche grid—*see* grid pattern.

microfiche jacket master—*see* master.

microfiche set—two or more microfiche. A lead microfiche followed by one or more additional microfiche. *See also* lead microfiche *and* trailer microfiche.

microfilm—(1) a fine-grain, high-resolution film used to record images reduced in size from the original. (2) A microform *consisting of strips of film on rolls that contain multiple microimages.* (3) To record microphotographs on film.

microfilm camera—the picture taking portion of a microfilming mechanism and the lens.

microfilm card—*see* aperture card, camera card *and* image card.

microfilm chip—*see chip.*

microfilmer—*see* camera, planetery camera, rotary camera, *and* step-and-repeat camera.

microfilm frame—*see* frame.

microfilming—the techniques and processes used to record microimages on film.

microfilming stretch—*see stretch.*

microfilm jacket—*see* jacket.

microfont—(deprecated) An uppercase character font designed by NMA specifically for microfilm applications. *See* OCR-B.

microform—a form, usually film, which contains microimages. *See also* aperture card, jacket, microfiche, roll microfilm, ultrafiche *and* ultrastrip.

microform holder—a device to hold the microform in the object plane of the projection lens.

microform production—the process of creating a microform from documents, from another microform or from images stored in an electronic medium (e.g., magnetic tape) and recreated by a transducer such as a CRT (cathode-ray tube) or a computer-output microfilm recorder.

microform reader—*see reader.*

microform recording—*see* microfilming *and* microform production.

micrographics—techniques associated with the production, handling and use of microforms.

microimage—an image of information too small to read without magnification.

micromire—an array of 10X-reduced ISO Mire 1 legibility test charts. *See also* mire *and* ISO 689.

micro-opaque—a very small image on a reflective as opposed to transparent base, viewed by reflection rather than projection. *See also* microfiche.

microphotography—*an application of photographic techniques* to produce images smaller than the original material.

microprinting—in-house micropublishing.

micropublishing—to issue new (not previously published) or reformatted information in microform for sale or distribution.

microreproduction—*see* microfilming, microimage.

microrepublishing—to issue on a microform material previously or simultaneously published in hardcopy for sale or distribution.

microscopic spot—*see* redox blemish.

microspot defects—*see* redox blemish.

microtransparency—a microimage on a transparent base.

mil—one one-thousandth (0.001) of an inch, often used as a measure of thickness of film base, emulsion coatings, magnetic tape, etc.

military D—the Department of Defense specified size and location of a specific opening on an aperture card.

milky—cloudy; not clear. Characterizing the appearance of insufficiently fixed films or of nearly exhausted (or improperly compounded) fixing baths or other solutions.

minimum density—*see* density, minimum.

mire—French for test chart. The ISO Mire 1 is the basic microcopy legibility test standard in several countries outside the United States.

mirror image—(1) characterizing a reversal of orientation, as the image of an object formed by a plane reflecting surface. Right-to-left change, as seen in a flat mirror. (2) The reversed image of an object as seen in a mirror. *See also* reverse reading *and* right reading.

MKS—the metric system based on the meter-kilogram-second units.

MKSA—the metric system based on the meter-kilogram-second-ampere units.

mm—abbreviation for millimeter.

modulator—in sensitometry, a step tablet (wedge) or other device used to generate an exposure series. *See also* step tablet.

monobath—a processing agent that combines the actions of the developer and fixer. An inhibiting agent prevents fixing before development.

monolayer—thin film, a single molecule thick. Sensitizing dyes are applied to silver-halide crystals in such thicknesses.

monopaste—a viscous (thickened) monobath, i.e., a combined developer and fixer. Processing by the use of this material requires no agitation and little water.

mordant—a chemical that causes a dye to become insoluble and prevents it from being washed out of its carrier.

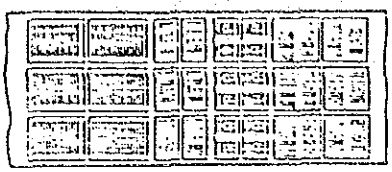
mottle—a defect in an image in which the film appears to be cloudy, blotchy and having uneven density. It is generally caused by insufficient agitation during processing, poor storage conditions or defective emulsions.

mounter—a device that simultaneously cuts, positions and fastens film frames in aperture cards.

mr—*see* medium reduction.

multiple exposure—successive exposures of the same subject.

multiplex—a method of recording images on film such that there are two or more rows of images across the width of the film.



Leading end of film

Multiplex Format

This sequence results in the first image in one row being opposite the first image in the other row or rows. (2) Format on microfilm using the technique described in (1). *See also* ANSI/NMA MS14 *and* image arrangement.

N

N—the symbol for negative-appearing microfilm.

nanometer—a measure of length equal to 10^{-9} meters. A unit used in spectrophotometry and generally in expressing wavelengths of visible and ultraviolet radiation.

National Bureau of Standards Microcopy Resolution Test Chart—a small chart containing a graded series of blocks of lines and spaces used for determining the optical performance of microfilm equipment and the resolution characteristics of materials used in microrecording.

NBS—National Bureau of Standards.

NBS chart—*see* National Bureau of Standards Microcopy Resolution Test Chart.

negative—*see* negative-appearing image.

negative-appearing image—an image in which the lines and characters appear light against a dark background.

negative intermediate—a negative that has been produced expressly for the purpose of making additional copies.

negative-positive process—a process, such as gelatin dye transfer or diffusion transfer reversal, in which both a negative and a positive copy are produced.

net density—*see* density scale.

neutral density filter—a filter having essentially flat absorption over the visible spectrum, thus reducing the intensity of light without changing the chromaticity of the transmitted light.

Newton rings—colored rings seen as a result of two surfaces, at least one of which is transparent, being in close contact. Synonymous with *interference rings*.

nip—*see* nonimpact printer.

nit—a unit of luminance equal to 1 candela per square meter. *See also* lambert.

nm—*see* nanometer.

NMA—National Micrographics Association.

noncurl backing layer—a layer usually made of gelatin, applied to the side of the film base opposite that of the emulsion to prevent curl. It is comparable to the emulsion layer in thickness and is not removed in processing. (Antihalation or other layers removed in processing are excluded from this definition). *See also* ANSI PH1.28 *and* PH1.41.

nondestructive testing—procedures that do not harm the material being tested. *See also* destructive testing.

nonimpact printer—a printing device in which the paper is not struck, but imaged by other means, e.g., ink jet, electrostatic.

nonperforated film—roll film that has no sprocket holes.

nonreversal film—a film designed specifically for processing in a conventional mode. *See also* conventional processing.

nonreversing film—*see* direct-image film.

nonunitized microfilm—microforms that contain unrelated information units, e.g., roll microfilm can be nonunitized, since it can contain a variety of unrelated information units on the same roll.

notch—a cut-out in either the top or bottom edge of the microform (microfiche, jacket) which is used for indexing, coding or retrieval.

O

objective lens—the lens as in a camera which forms an image of the object.

OCR—*see* optical character recognition.

OCR-B—International Standard set of characters used in optical character recognition systems.

odd generation—the first, third, fifth, etc., copies of an original document or microform. *See also* even generation; generation; and generation, Nth.

odometer—instrument for measuring distance traversed. It can be used in microfilm cameras and roll-film retrieval devices for indexing and locating images on roll film.

odometer indexing—a method of image location using the linear location of the images on film.

offline—(1) pertaining to equipment or devices not under direct control of the central processing unit. (2) Pertaining to equipment or devices not directly linked to a computer-output microfilmer. *See also* online.

omni directional—referring to a code format that can be read regardless of orientation on a given plane.

one-component diazo—diazo material that carries both the diazonium salt and the dye coupler in its emulsion.

online—(1) pertaining to equipment or devices under control of the central processing unit. (2) Pertaining to a user's ability to interact with a computer. (3) Pertaining to equipment or devices under control of a computer-output microfilmer. *See also* offline.

opacity—(1) the ratio of the light level (illuminance) on a sample of film, etc., to the light transmitted by the sample. (2) The characteristic of a material that prevents light from passing through it.

opal diffuse visual density—*see* density, opal diffuse, *and* density visual.

opaque—characteristic of material, e.g., film, which makes it incapable of transmitting visible light.

opaque copy—material that, being impervious to transmitted light, must be reproduced by light reflected from it.

opaque paper—paper through which light will not pass. It may be used to protect sensitized materials or as a base for microopaques, etc.

opaque reader—a projection device for viewing a microimage on opaque material.

opaque screen—a reader screen of opaque material on which an image is projected.

optical—(1) containing lenses, mirrors, etc., as in optical viewfinder and optical printer. (2) In general, having to do with light and its behavior and control, as in optical properties, optical rotation. (3) Pertaining to the science of light and vision.

optical axis—the optical center of a lens through which a light ray passes as a straight line.

optical center—a reference location (point) on the film about which the image area is centered with respect to length and width.

optical characteristics—those properties of an optical system such as field of view, magnification, brightness of image, image quality and correction for aberrations.

optical character recognition—a technique by which printed or photographically recorded characters can be rapidly recognized by a combination of scanning techniques and electronic logic and converted to binary digital codes for storage, transmission, etc.

optical density—*see* density.

optical disk—*see* video disk.

optical element—(1) an optical part constructed of a single piece of optical material, usually single lenses, prisms or mirrors. (2) A part of an optical system.

optical path—the course followed by light rays as they pass from the object (subject) through the components of the optical system, e.g., lenses, prisms, mirrors, etc., to (normally) form an image.

optical print—any print made by projection. *See also* contact printer *and* projection printer.

optical printer—*see* projection printer.

optical scanning—a technique to recognize printed or written data and generate a digital representation for storage, transmission, etc. *See also* flying spot scanner, optical character recognition *and* raster scan.

optical skew—a condition in rotary microfilm equipment in which angles on the target are not truly reproduced in the film image, i.e., square corners do not appear as right angles on the film.

optical system—all the essential and accessory optical elements designed to contribute to the formation of an image.

optical wedge—a device for reducing illuminance, such as a continuously graded filter, used in sensitometers and in some visual densitometers.

optimum exposure—an exposure of the correct intensity and duration required to produce a negative or positive of best reproductive quality.

orientation A—*see* vertical mode.

orientation B—*see* horizontal mode.

original—a document that may be reproduced.

orthochromatic film—a black-and-white film coated with an emulsion that is sensitive to ultraviolet, violet, blue and green radiation. Not being sensitive to red, red objects photographed with orthochromatic film are rendered dark on a print.

out of focus—applied to an image that is not sharp because the lens and film planes and object are not in the correct relative positions.

output—pertaining to a device, process or channel that delivers data in any of a variety of media, e.g., hardcopy, cathode-ray tube display, processed film, etc. *See also* NMA MS1.

overcoat—a thin layer of material applied on top of the emulsion surface of a film to act as a filter layer or to protect the emulsion from abrasion during exposure and processing.

overdevelopment—characteristic of the film in which images or *D*min are both darker than normal. This is caused by the film being developed too much because of one or more of the following factors: excessive time, temperature, agitation or overstrength solution. *See also* NMA MS23.

overexposure—characteristic of the film in which images are too dark, but the *D*min remained normal. This is caused by one or more of the following: improper response of exposure control, light intensity too high, aperture too large or exposure time too long. *See* NMA MS23.

overlap—(1) a defect in which one image or document partially covers or obscures another. In planetary cameras, this is caused by improper film advance causing the images to overlap. In rotary cameras, overlap is caused by improper setting of the document stop or improper clutch adjustment. (2) On sectionalized, multiframe documents, the portion of a document that appears again in the succeeding frame to assist in matching. *See also* NMA MS23.

override control—a mechanism that stops the automatic operation of a device. On electric-eye cameras, the override permits exposure without the automatic compensation.

oxidation—loss of activity of a photographic developer caused by chemical action, especially associated with exposure to oxygen.

P

P—the symbol for positive-appearing microfilm. *See also* positive-appearing image.

packing density—the number of useful storage cells per unit of dimension, e.g., the number of bits per inch stored on a magnetic tape.

pagination—*see* image arrangement *and* image orientation.

panchromatic film—a film sensitive to ultraviolet, blue, green and red radiation.

partial-reversal processing—processing of silver-gelatin emulsions in which an image polarity is obtained which is identical to that of the original. Partial-reversal processing omits the secondary exposure and development. The remaining halide image is not permanent; therefore, the film is not acceptable for archival keeping. Synonymous with *halide-reversal processing*. *See also* conventional processing *and* reversal processing.

passive graphics—the use of a display terminal in a nonconversational mode, usually involving the use of such items as plotters and microform viewers.

peak sensitivity—the wavelength of light that provides the most efficient response of a light-sensitive layer.

perforated film—roll film having sprocket holes accurately located along one or both edges to aid in transporting and positioning the film for successive exposures in a camera. Earlier designs of microfilm cameras utilized the perforations in advancing the film. Since the presence of the perforations substantially reduced the usable area of the film, most contemporary camera designs utilize film-advance mechanisms that do not require perforations in the film.

permanent curl—in a print or film that has come to equilibrium with the surrounding atmosphere, curl which cannot be removed by reverse winding. *See also* curl.

permanent record film—*see* archival film.

pH—a measure of the acidity or alkalinity of chemical substances expressed as the logarithm of the reciprocal of the hydrogen ion concentration. The pH scale extends from 0 to 14. A pH of 7 is neutral. A pH less than 7 indicates acidity. A pH greater than 7 indicates alkalinity.

photoconductor—(1) a material which is an electrical insulator in darkness but which becomes electrically conductive when exposed to light to which the material is sensitive. (2) A material that will hold an electrical charge in the dark, but the charge is dissipated when the material is illuminated with light to which the material is sensitive.

photoelectric cell—a single unit in a device that converts radiant energy (light) into electrical energy either radiant energy (light) depending on the spectral sensitivity of the cell. It is used in equipment such as exposure meters.

photoflood—a lamp designed to yield brilliant diffuse illumination.

photograph—any image recorded on photosensitive material.

photographic emulsion—*see* emulsion.

photographic layer—*see* emulsion.

photographic paper—a high-grade paper base coated on one or both sides with a photosensitive layer or layers.

photographic wedge—*see* step tablet.

photomacrograph—(1) a photograph of an object, either magnified or slightly magnified. (2) A photographic image which can be read without magnification.

photometer—an instrument for measuring the intensity of light.

photometric brightness—*see* luminance.

photometric units—units used in photometry.

photometry—the measurement of light by visual comparison or by some other method which gives the same results as visual comparison.

photomicrograph—a photograph of a magnified image, e.g., the object is magnified by a microscope and a photograph is taken *of the magnified image.*

photomultiplier tube—an electronic device that converts light into electrical energy and amplifies it.

photo-optical coding—descriptive data related to documents in photo-optical format on the film. The coding is either adjacent to the document frame or along the edge of the film. It is also possible to encode instructions along with the identification information.

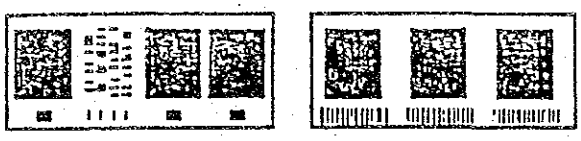


Photo-optical Coding

photoplastic film—a polyester-base film with a photoplastic emulsion that is sensitized by an electrostatic change and processed by dry procedures (thermal) with the images recorded as deformations (intaglio) in the film emulsion.

photosensitive—receptive to the action of radiant energy (light).

pinhole—(1) a substitute for a lens in a camera. (2) A camera *which utilizes a pinhole rather than a lens. (3) A small aperture.* (4) Tiny, clear spots in a photographic negative.

pixel—a picture element, for example, elements which make up the display on a cathode-ray tube.

placement—*see* image arrangement.

planetary camera—a type of microfilm camera in which the document being photographed and the film remain in a stationary position during the exposure. The document is on a plane surface at the time of filming. Also known as *flatbed camera. See also* camera.

planetary filming—a method of microfilming in which the document and the microfilm remain stationary during exposure. *See also* computer-output microfilming, rotary filming *and* step-and-repeat filming.

platen—a mechanical device that holds the film in the focal plane during exposure.

pocket—*see* film channel.

point source light—light from a lamp containing a very small radiating element.

polarity—the change or retention of the dark to light relationship of an image, i.e., a first-generation negative to a second-generation positive indicates a polarity change, while a first-generation negative to a second-generation negative indicates the polarity is retained.

polarization—*see polarized light.*

polarized light—light of which the electrical or magnetic vector vibrates in only one plane rather than in all planes as it does in ordinary (unpolarized) light.

polyester—a transparent plastic made from polyesters and used as a film base because of its dimensional stability, strength, resistance to tearing and relative noninflammability.

polyethylene terephthalate—a film base composed mainly of a polymer of ethylene glycol and terephthalic acid (polyester). *See also* ANSI PH1.41 *and* ISO 4332.

portable reader—a microform reader of suitable size and weight such that it can be carried by hand.

portrait—*see* vertical mode.

positive-appearing image—an image in which the lines and characters appear dark against a light background.

PPF—*see* photoplastic film.

precoat—a layer applied to the film base to improve the adherence of the emulsion or sensitized material. Synonymous with *subbing.*

precoupling—spoilage caused by the premature development of diazo material.

prefocus lamp—a special light bulb whose filaments are precisely positioned with respect to the lamp base used in projectors.

prerelease—premature freeing of the protection sheet on an aperture card.

prerinse—a water bath used prior to development.

pressure marks—a defect found in processed film that may appear as reduced or increased density. *See also* NMA MS23 *and* pressure sensitive.

pressure plate—a flat plate, metal, glass or other substance that holds the film in the focal plane for exposure, projection, printing, etc.

pressure sensitive—(1) characteristic of a material in which an adhesive bond is caused by physical contact. (2) Characteristic of photographic emulsions such that abrasion or striking the emulsion may cause the formation of a latent image or the destruction of an existing latent image. *See also* pressure marks.

preventive maintenance—upkeep of equipment on a regular basis specifically intended to prevent downtime and to insure trouble-free operation.

print—(1) a reproduction or copy on photographic film or paper. (2) To produce a reproduction or copy on photographic film or paper.

printer—a device capable of producing hardcopy or film copy. *See also* contact printer *and* projection printer.

print film—a fine-grain, high-resolution film used primarily for making contact film copies.

printing—(1) the process used to produce microform copies from the developed microfilm. (2) The process used to produce hardcopy from microforms. *See also* contact printing, projection printing *and* step printing.

printing density—*see* density, printing.

printing frame—a device consisting of a glass front and spring-loaded back, used to hold a film in close contact with light-sensitive material for contact printing.

printing master—*see* intermediate *and* master.

printing speed—rate at which a light-sensitive material is exposed, usually expressed in feet per minute of printer operation.

printout—*see* hardcopy.

prism—a transparent body with at least two polished plane faces inclined with respect to each other, from which light is reflected or through which light is refracted. Prisms are often used for rotating an image.

process-control strips—*see* control strips.

processed film—*film that has been exposed to suitable radiation* and has been treated to produce a fixed or stabilized visible image.

processing—a series of steps involved in the treatment of exposed photographic material to make the latent image visible

and ultimately usable, e.g., development, fixing, washing, drying.

processor—any machine that performs the various operations necessary to process photographic material, e.g., development, fixing, washing, etc.

processor-camera—*see* camera-processor.

process photography—generally the reproduction of line copy as opposed to continuous-tone copy. Process photography employs high-contrast materials.

projection—(1) formation of an image through optical means onto a sensitized surface or viewing screen, usually in magnified size. (2) An image that is visible after it has been optically projected onto a surface.

projection paper—generally, a fast photographic paper that is exposed by projecting the image of the film onto the paper emulsion.

projection printer—a device in which the developed film image is projected through an optical system onto the unexposed print material. The image of a print made by a projection printer may be smaller, larger or of equal size. It is also called an *optical printer*. *See also* card-to-roll printer *and* step printer.

projection printing—a method of printing in which the film image is projected onto the sensitized material. *See also* contact printing *and* step printing.

projector—an optical device for producing an image, usually magnified, onto a viewing screen or sensitized surface.

protection sheet—the material used to protect and preserve the adhesive on aperture cards before film is mounted.

protective coating—*see* coating, protective.

pulldown—the distance between the corresponding points on two successive frames.

punched card—(1) a card punched with a pattern of holes to represent data. (2) A card as in (1) before being punched.

Q

QI—*see* quality index.

quality control—the techniques and procedures designed to maintain the repeatability and continuity of sensitometric and physical characteristics of photographic film and/or paper within statistically defined limits during processing.

quality index—the subjective relationship between legibility of printed text and the resolution pattern resolved in a microimage. Used to predetermine legibility in the resulting images. *See* NMA MS23.

quartz-halogen lamp—an incandescent light source containing a tungsten filament and a trace of iodine or bromine.

R

rack and tank—a method of film processing in which lengths of film are fastened to wood, plastic or metal racks or frames and subsequently immersed in tanks containing processing solutions.

radiant dryer—a mechanical device utilizing radiant energy (infrared) for the evaporation of water in the processed, sensitized material.

radiant energy—energy in the form of waves of the same or different wavelengths that make up the electromagnetic spectrum, including visible light, invisible "light" (ultraviolet and infrared), heat, X rays, radio waves, microwaves and others.

radiant flux—radiant energy transferred per unit of time.

radiation—the process of emitting electromagnetic energy or the energy so emitted.

range of luminous reflectance—the difference in luminance between portions of a scene, document or reflective image that have maximum luminance and those that have minimum luminance.

raster—a predetermined pattern of scanning lines that provides substantially uniform coverage of an area.

raster scan—a method of generating or recording the elements of a display image via a line-by-line sweep across the entire display surface, e.g., the generation of a picture on a television screen.

ratio of enlargement—*see* enlargement ratio.

ratio of reduction—*see* reduction ratio.

raw stock—unexposed, unprocessed photographic film, paper or other recording material.

reader—a device that enlarges microimages for viewing; usually consisting of a light source, illuminating optics, microform holder, objective lens and screen.

reader-copier—*see* reader-printer.

reader image contrast—the ratio of the screen luminance of the light portion to that of the dark portion of the image of the test object as displayed on the reader screen under specified conditions. *See also* ANSI/NMA MS12.

reader magnification—the ratio of a linear dimension of the screen image to the corresponding dimension of the image on the film (e.g., 24X). *See also* magnification range *and* magnification ratio.

reader-printer—a device that enlarges microimages for viewing and also has the capability of producing a hardcopy of the enlarged image.

reader resolution—the ability of the reader optical system to separate close detail on the screen. *See also* resolution *and* resolving power.

rear projection—the projection of an image onto a translucent screen from the side opposite to that from which the image is viewed.

rear-projection reader—readers in which the enlarged image is projected onto a translucent screen from the side opposite that from which the image is viewed.

receiving reel—the reel used to wind up film after it has been processed; also called *take-up reel*. *See also* reel.

receiving spool—the spool used to wind up film in a camera after it has been exposed; also called *take-up spool*. *See also* spool.

reciprocity law—the reciprocity law of Bunsen and Roscoe states that exposure is equal to the irradiance "intensity" of the exposing radiant energy multiplied by the time during which it acts. The law is only approximately followed by photographic materials and deviations from it are known as "reciprocity law failures."

recommended practice—a document containing customary methods and procedures for producing and/or testing products, materials and processes.

record—(1) a group of one or more words containing related information about a common subject. One or more records make up a file. (2) To copy or set down information in some form for future use. (3) Any information that is stored by any device.

recorder—*see* camera.

recording area—the maximum useful area of film or other medium that, subject to equipment constraints, can record information including the image and retrieval codes.

recording density—(1) the number of bits in a single linear track measured per unit of length of the recording medium. (2) The number of bits recorded per unit area.

records preparation—a series of steps that could include sorting, flattening, removing fasteners (such as staples and paper clips) and index planning preliminary to microfilming.

redox blemish—a microspot formation on silver-gelatin type

films caused by air pollution, improper packaging or storage conditions. Synonymous with *aging blemishes, measles, microspots* and *red spots.*

red spots—*see* redox blemish.

reducer—(1) a photographic processing bath for reducing the density of the silver image. (2) The chemical agent in a development solution (metol, hydroquinone, etc.) that reduces the silver halide to metallic silver.

reduction—the quotient of a linear dimension of an object and the corresponding linear dimension of the image of the same object expressed as 1:24, 1:48, etc. *See also* effective reduction, high reduction, low reduction, medium reduction *and* ultrahigh reduction.

reduction, effective—*see* effective reduction.

reduction ratio—the relationship (ratio) between the dimensions of the original or master and the corresponding dimensions of the microimage; e.g., reduction ratio is expressed as 1:24.

reel—a flanged holder on which processed roll film is wound; designed to be inserted into readers, reader–printers and retrieval devices. *See also* ANSI PH5.6 *and* ANSI/MS15.

reel processing—a method of processing film in which the film is wound on a reel that provides space between layers of film. The reel is immersed in a tank or tanks that contain processing solutions.

reference corner and edge—a corner and/or edge of a microform used as a base in checking dimensions or positioning the microform in a reader, printer, etc.

reflectance—the ratio of luminous flux reflected from a surface to the luminous flux incident on the surface. *See also* ANSI MS12 *and* spectral reflectance.

reflectance density—a method of expressing reflectance in terms of density. If reflectance is R and reflectance density is D, then

$$D = \log_{10} (1/R)$$

reflectance target—a test target that has a known fixed reflectance.

reflected light—light that has been deflected from a surface, not having been absorbed or transmitted.

refraction—deviation of a ray of light in passing obliquely from a medium of one index of refraction to a medium of another index of refraction, as light passing from air into glass or water.

register—to adjust two or more identical images to be in exact superimposition with each other.

relative aperture—the ratio of the equivalent focal length to the diameter of the effective aperture. The symbol for relative aperture written as a fraction is *f/* followed by a number. *See also* ANSI PH3.29 *and f* number.

remounting—removing a film from one aperture card, usually because of damage to the card or incorrect mounting, and mounting it in another aperture card.

replenisher—a chemical that is added to a processing solution to maintain uniform activity.

reprint bar *gamma*—the *bar gamma* obtained from a $D/\log E$ curve in which the densities of a third-generation (reprint) material are related to the log exposures of second-generation material (used as an intermediate printing master).

reprint *D*max—maximum image density of a print made from an intermediate master.

reprography—the art and science of reproducing documents.

residual dye-back—black particles or dark streaks remaining on the microfilm after processing; caused by incomplete removal of the backcoating material. *See also* NMA MS23.

residual hypo—*see* residual thiosulfate ion.

residual thiosulfate ion—ammonium or sodium thiosulfate (hypo) remaining in film or paper after washing. Synonymous with *residual hypo. See also* ANSI PH4.8.

residual thiosulfate ion test—a test method to measure residual thiosulfate ion content in films. Synonymous with *residual hypo test. See also* ANSI PH4.8.

resolution—the ability of a photographic system to record fine detail. *See also* resolution test chart, resolving power *and* spurious resolution.

resolution test chart—a chart containing a number of increasingly smaller resolution test patterns. The pattern is a set of horizontal and vertical lines of specific size and spacing. The NBS Microcopy Resolution Test Chart 1010A is generally used in micrographics.

resolvable horizontal lines—the maximum number of visually distinguishable horizontal lines that can be recorded within a specific image.

resolvable line pitch—the number of resolvable lines divided by the image dimension (in millimeters) perpendicular to the resolvable lines; expressed in lines per millimeter.

resolvable vertical lines—the maximum number of visually distinguishable vertical lines that can be recorded within a specified image.

resolve—to distinguish between adjacent parts. To distinguish the lines within groups of lines that constitute a test pattern.

resolving power—the numeric expression of the ability of an optical or photographic system to distinguish or separate two entities spaced closely together. In micrographics, it is the product of the number of the standard NBS test pattern resolved in the image multiplied by the reduction and is expressed in line pairs per millimeter.

restrainer—an ingredient of a photographic developer that prevents too rapid development and minimizes chemical fog.

retake—refilming of documents.

reticulation—a processing defect affecting emulsion layers of photographic film which, on drying, show an irregular surface due to the formation of small irregular scaly patterns. Sharp differences in the temperature or pH of successive processing solutions are the usual causes. *See also* NMA MS23.

retrieval coding—the techniques for retrieving specific images or data from microfilm. *See also* automatic coding, code line, document mark, flash indexing, odometer indexing and sequential numbering.

retrieval film—any generation of film that is produced for use in a retrieval device.

retrieval mark—a line, blip or other mark recorded adjacent to the microimage and used for automatic retrieval on appropriate equipment.

retrieval system—*see information retrieval.*

reversal film—film designed specifically for processing in a reversal process. *See also* reversal processing.

reversal processing—a photographic process used for silver-gelatin film in which an image is produced by secondary development of the silver halide grains that remain after the latent image has been changed to silver by primary development and destroyed by chemical bleach. The process consists of development, bleaching, clearing, reexposure, redevelopment, fixing, washing and drying. In this process the polarity of the image is reversed between the first development and the redeveloper. However, the final image has the polarity of the previous generation or the original material: that is, tone for tone, black for black, white for white, negative for negative or positive for positive. *See also* conventional processing, direct-image film, reversing film, polarity *and* partial-reversal processing.

reverse reading—an image that must be viewed in a mirror in order that the characters, words and sentences assume the same sequence *and* arrangement shown in the original. *See also* mirror image and right reading.

reversible film—*see* reversal film.

reversing film—*see* image-reversing film.

rewind—(1) a support and a device consisting of a spindle geared to a crank, used in pairs to wind film from one reel to another. (2) The act of transferring film from one reel to another.

rewind processing—a method of processing rolls of film in which the material is automatically wound alternately onto two reels that are immersed in processing chemicals. On each pass of the material a portion of the desired operation is performed, so that several passes each are required in developer, fixer, etc., to complete the processing.

right reading—an image that, when viewed directly, shows the characters, words, and sentences in the same sequence and arrangement present in the original. *See also* mirror image *and* reverse reading.

rinse—(1) to wash off, to cleanse. (2) A liquid bath to remove foreign matter and chemicals.

roll microfilm—microfilm that is or can be put on a reel, spool or core.

roll-to-card printer—equipment for producing duplicate, card-mounted microfilm from roll microfilm by contact printing.

roll-to-roll printer—equipment for producing duplicate rolls of microfilm by contact printing.

room-light loading—the requirement, capability or act of placing light-sensitive material in a camera, magazine, reader-printer, etc., under ambient light conditions.

Ross–Crabtree test—a test for residual thiosulfate described in ANSI PH4.8 but which has been superseded by two new test methods: methylene blue and silver densitometric.

rotary camera—a type of microfilm camera that photographs documents while they are being moved by some form of transport mechanism. The document transport mechanism is connected to a film-transport mechanism, and the film also moves during exposure so there is no difference in the rate of relative movement between the film and the image of the document. *See also* camera.

rotary filming—a method of microfilming in which the document and the microfilm are in synchronized movement during exposure.

row—a horizontal series of microimages on a microform.

S

safelight—a darkroom light source that provides some visual light, but has a negligible effect on photographic materials.

safelight tolerance—the resistance of sensitized materials to safelight exposure.

safety film—a comparatively nonflammable film support (base) that meets ANSI requirements for safety film. *See also* ANSI PH1.25 *and* ANSI PH1.28.

scale—a range of various photographic characteristics such as brightness, exposure and density.

scale, gray—*see* step tablet.

scanner—a device that impinges a narrow beam of light on a document or on its microfilmed image and converts the reflected or transmitted light to electrical signals.

scanning—(1) the systematic impingement on an area by a narrow beam of light or other radiation. (2) The movement of an image on a reader screen in a direction perpendicular to the direction of roll-film transport.

scanning device—(1) a mechanism found in certain microfilm readers where the entire image does not appear on the screen. The scanning device permits shifting the film or the entire optical system so that different portions of the microfilm frame or reel may be viewed. (2) A device that electrically dissects an image into sequential and essentially contiguous lines, within each of which the sequential density variations are converted to analogous electrical variations.

scanning, optical—*see* optical scanning.

scratch—a dark or light linear groove that damages the base or the sensitized side of the film, and that is usually caused by faulty equipment or improper handling. *See also* NMA MS23.

screen—a surface onto which an image is projected. *See also* opaque screen *and* translucent screen.

screen, fresnel—*see* fresnel lens.

screen gain—(1) for a front-projection screen, a measure of the ratio of luminance leaving the screen in a given direction from a given point to the luminance obtained when a perfectly diffusing object (such as magnesium-carbonate block) is placed at that point. (2) For a rear-projection screen, a measure of the ratio of luminance leaving the screen in a given direction from a given point to the luminance obtained in the opposite direction when a perfectly diffusing object is placed at that point. *See also* ANSI/NMA MS12.

scroll—the controlled vertical or horizontal movement of the microform image such that, as new data appear on the reader screen at one edge, other data disappear at the opposite edge.

scroll fiche—a microform in roll or scroll form (105 mm wide by an indeterminate length) produced by standard microfiche techniques.

secondary end of microform—a term used in 16-mm computer-output microfilming that designates the end of a roll in which a job was not completed; the job is to be completed on another roll of film. *See also* ANSI/NMA MS2.

secondary start of microform—a term used in 16-mm computer-output microfilming that designates the beginning of a roll on which a job is continuing, the job having been started on another roll. *See also* ANSI/NMA MS2.

second-generation microfilm—a microfilm copy made from the camera film.

sectioning—*see* expose in sections. *See also* ANSI PH5.9.

semiautomated retrieval—a microform retrieval system in which the user receives mechanical assistance in selecting the appropriate microform from the file and then manually positions the microform for viewing. These systems are usually supported by auxiliary indexes.

sensing mark—an indicator on film or paper which activates a device to perform a function, e.g., cutting film.

sensitivity—the degree to which an emulsion reacts by the formation of a latent image under exposure to radiation or other agents; especially as this relates to exposure by different wavelengths of light.

sensitize—(1) to treat a photographic layer with a chemical that makes it more photosensitive or to extend the spectral sensitivity of a photosensitive layer by treating it with dyes. (2) To coat a support material with a photographic layer. (3) To establish an electrostatic surface charge of uniform density on a photoconductor.

sensitometer—an instrument with which a photosensitive material is given a graduated series of exposures to radiant energy of controlled spectral quality, intensity and duration.

sensitometric curve—the curve showing the relation between the logarithm of exposure and the resulting density in a developed photographic image. It is usually plotted as the density against log exposure. Synonymous with *characteristic curve* and *H and D curve*.

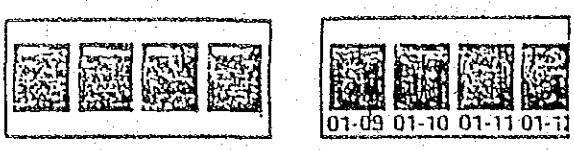
sensitometric strips—*see* control strips.

sensitometry—the science of testing and evaluating photographic films and paper to accurately establish the relationship between exposure and resulting density in a developed image.

sequential indexer—a device that automatically stamps numbers on documents as part of the microfilming operation.

sequential numbering—a technique used for coding and locating images on roll microfilm. The numbers stamped during the

filming process can be seen on the reader screen and used to identify and retrieve the image.



Sequential numbering

service company—an organization that is equipped to provide under contract micrographic and related services. Synonymous with *service bureau.*

shall—as used in ANSI and NMA standards, the word implies a requirement.

sharp edge gradient—*see* edge gradient.

sharpness—(1) the visual sensation (subjective) of the slope of the boundary between a light and a dark area. (2) The degree *of (line/edge) clarity. See also acutance.*

sheet film—a precut rectangle (not in roll form) of flexible, transparent-base material coated with a photosensitive emulsion.

shelf life—the period of time before deterioration renders a material unusable.

shoot—to make an exposure.

short-term film—*microforms* that will be needed only for a limited period, e.g., months or a few years. *See also* ANSI PH1.43.

shot—a single exposure.

should—as used in ANSI and NMA standards, the word implies a recommendation.

shoulder—the high-density portion of a sensitometric curve where the curve departs from a straight line.

show-through—*see* bleed-through.

shutter—any device that regulates the time that light is permitted to act on sensitized film or paper. *See also* electronic shutter.

shutter speed—the length of time during which light is permitted to act on film or paper as a result of the shutter having opened and closed.

SI—systeme international d'unites. *See* metric system.

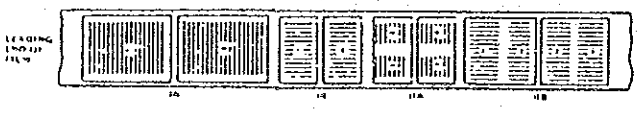
silver-densitometric method—a method of measuring residual thiosulfate in film. *See also* ANSI PH4.8.

silver film—a photographic film containing photosensitive silver compounds suspended in a suitable material. When developed, the image consists of metallic silver.

silver halide—a compound of silver and one of the following elements known as halogens: chlorine, bromine, iodine and fluorine.

silver recovery—the reclamation of silver from spent photographic fixing baths.

simplex—(1) a method of recording images in which a single microimage occupies all or a major portion of the usable width of the microfilm. (2) Format on microfilm using the technique in (1). *See also* ANSI/NMA MS14 *and* image arrangement.



Simplex Format

single core—a basic design feature of a cartridge that has only a single reel and therefore a single core. This is a distinguishing feature as compared to a cassette, which has two cores. *See also* ANSI/NMA IT15.

single frame—a frame that is bounded by adjacent pairs of grid lines; the smallest subdivision of a grid.

skew—*see* optical skew.

sleeves—*see* channel.

slippage—any relative movement that occurs between negatives and print during exposure which results in loss of resolution.

slow emulsion—a photographic layer having moderate or relatively low sensitivity to light.

sludge—a flocculent (woolv) precipitate that forms in processing tanks.

sodium thiosulfate—a salt used in many fixing solutions. This salt, in water solution, dissolves and removes the silver halides remaining in film after development. Synonymous with *hypo.*

soft—pertains to photographic emulsion or developer producing low contrast.

softcopy—a display of data or information. The opposite of *hardcopy.*

soft water—the opposite of *hard water. See also* frilling *and* hard water.

software—a set of programs, procedures and documentation concerned with the operation of a data-processing system.

source-document microfilming—the conversion of documents, usually paper, to microimages.

spacing—the distance between the trailing edge of one frame and the leading edge of the succeeding frame on a microform.

specification—a document that describes the essential and technical requirements for items, materials and services including procedures by which it will be determined that the requirements have been met.

spectral—pertaining to the electromagnetic spectrum. A quantity measured with respect to a narrow wavelength interval, as spectral transmittance or spectral reflectance.

spectral reflectance—the ratio of radiant flux in a narrow wavelength interval reflected from a surface to that incident on the surface.

spectral sensitivity—the variation in the sensitivity or speed of a photographic emulsion as a function of the wavelength of the exposing radiation.

spectrophotometer—an instrument used to measure the radiant energy transmitted by or reflected from a sample, in narrow spectral bands. *See also* spectrophotometry.

spectrophotometry—a procedure to measure the intensity of various frequencies (wavelengths) or narrow band of light transmitted by or reflected from materials.

specular reflection—reflection from a glossy surface or mirror.

speed—(a) a quantitative measure of the response of the sensitized material to radiant energy for the specified conditions of exposure, processing and measurement. It is often expressed numerically according to one of several systems (H and D, DIN, Scheiner and USA Standard Speed). (2) The maximum aperture of an objective lens. (3) The chemical activity of a processing solution.

spherical aberration—the failure of an optical system to form an image of a point as a point: This results in a point object being imaged as a blurred circle.

spindle—a shaft onto which a film reel or spool is mounted during the transport of film from one reel to another.

spiral reel—a device that holds film during development. It generally consists of flanges with spiral grooves on their inside surfaces into which (and along which) the film slides.

splice—a joint made by cementing, taping or welding (heat splice) two pieces of film or paper together so they will function as a single piece when passing through a camera, processing machine, viewer or other apparatus. Cemented splices are called lap splices, since one piece overlaps the other. Most welds are called butt splices, since the two pieces are butted together without any overlap.

splicer—a device for joining strips of photographic film or paper.

spoking—a physical film distortion caused by loose winding of film that has a high degree of curl. Permanent spoking is seen as twist when the film is unwound. Temporary spoking disappears when the film is unwound.

spool—a flanged holder on which unprocessed roll film is wound, designed to be inserted into cameras and processors. *See also* ANSI PH1.33.

spool gauge—a device used to check the distance between spool flanges.

spot—a fault of the printing master caused by a lack of cleanliness or an emulsion pinhole. The fault may appear on the final reproduction as either a white spot caused by dirt or as a black spot caused by the pinhole.

spot exposure meter—a reflected light exposure meter capable of measuring the luminance of a small field.

spotting—the removal of small blemishes in photographic negatives or prints.

spray processing—a technique for processing sensitized materials in which solutions are sprayed on the material from jet orifices to provide maximum agitation and close control over the processing variables.

sprocket—a wheel with teeth that engages the perforations in a film to move the film through a camera, printer, processing machine or viewer.

spurious resolution—a false indication of resolving power that may be recognized by counting the number of lines in a pattern which appears to be resolved. Usually there is a failure to resolve one spatial frequency when apparent resolution of a fewer number of lines occurs at a higher frequency. *See also* resolution *and* resolving power.

squeegee—(1) a device designed to remove excess moisture from the surface of film or paper. For example, a blade, a roller or a high velocity stream of air. (2) To remove excess moisture using a device as defined in (1).

stability—the degree to which negatives or prints resist change by the action of light, heat or atmospheric gases.

stabilization—(1) for silver-gelatin film, a processing step replacing fixing in which residual silver halides are converted into relatively light-stable, colorless compounds that remain in the image layer. This permits rapid processing but with reduced image permanence. (2) For vesicular film, a processing step that renders the material no longer light sensitive in order to make the developed image stable.

stabilizer—an agent used in the stabilization process.

stage—a device on a microfiche reader used to move unitized film from image to image.

stain—a local or general discoloration of negatives or prints.

standard—(1) a document that establishes engineering and technical limitations and applications for items, materials, processes, methods, designs and engineering practices. (2) A fundamental unit or physical constant, e.g., ampere, meter, absolute zero (Kelvin).

starter solution—(1) a solution added to a fresh developer to produce the desired processing characteristics at the start-up of an automatic processor. (2) A solution added to a developer replenisher solution to convert it to a developer.

start margin—the distance from the beginning of the roll film to the beginning of the first exposure. Included in the start margin is an allowance for attaching a developing clip.

static marks—black spots, streaks or treelike marks produced on sensitive materials by discharges of static electricity during handling or winding and made visible by developing. *See also* NMA MS23.

static eliminator—(1) a chemical that reduces static on the surface of film or paper. (2) An ionized bar that emits small amounts of radiation to discharge inherent static buildup.

step-and-repeat camera—a type of microfilm camera that can expose a series of separate images on an area of film according to a predetermined format, usually in orderly rows and columns, e.g., microfiche. *See also* camera.

step-and-repeat filming—a method of microfilming a series of separate images on an area of film according to a predetermined format, usually in orderly rows and columns.

step printer—a film or paper printer, either contact or projection, that exposes one frame at a time by means of an intermittent advance mechanism and a shutter. *See also* contact printer *and* projection printer.

step printing—a method of contact reproduction in which the film images being copied and the unexposed film or paper are advanced intermittently (frame by frame) and exposed to the actinic light only when stationary. *See also* contact printing *and* projection printing.

step tablet—(1) a length of film containing gradations of density, which may or may not be calibrated. (A calibrated step wedge is used as a standard in the calibration of a densitometer.) (2) A gray scale. A series of tones in steps of regularly increasing known densities from white to black on a film base or glass plate. Used for processing and printing control. Synonymous with *gray chart, gray scale, gray wedge, modulator, photographic wedge* or *step wedge*.

step test—a graded series of exposures made to determine the optimum exposures for films, papers or other media.

step wedge—*see* step tablet.

steradian—a unit of measure equal to the solid angle subtended at the center of a sphere by an area equal to the radius squared on the surface of the sphere. The total solid angle of a sphere is 4 [] steradians.

stock solution—a concentrated liquid that is to be diluted with water for use.

stop—the aperture which limits or varies the amount of light passing through the lens of a camera. *See also* aperture stop *and* stop down.

stop bath—a slightly acid solution used to neutralize the alkaline developer remaining on the sensitized material after the first processing step is completed and before it is transferred to the fixing solution.

stop down—to reduce the diaphragm stop (aperture) of a photographic lens.

stop, *f*—*see f* number.

straight-line portion—in photographic sensitometry, the portion of the sensitometric curve that is substantially straight. Along this portion of the curve, equal density increments are produced by equal increments of the log of the exposure. *See also* gamma.

streak—a light or dark area through a number of images, parallel to the edges of film. *See also* NMA MS23.

stress marks—dark streaks or lines on negatives caused by mechanical contact or friction.

stretch—an elongated image that is caused by the document stopping, hesitating or slowing down, while the microfilm continues to advance in the rotary camera. *See also* NMA MS23.

stria—a defect in optical glass consisting of a sharply defined streak of transparent material with a slightly different index of refraction than the body of the glass.

stripe—*see* color stripe.

strip film—any short length of film that is too short to be wound on a reel and that is generally housed in a small container or inserted in a jacket or other type of holder.

strip-up—a technique used for the production of microfiche in which short lengths of roll film are attached in rows to a transparent support, which is then used as a master.

strobe—a light source for photographic illumination that produces a continuous series of high-intensity flashes of short

duration (of the order of one one-thousandth second or less) at a repetitious, controllable rate.

stroke—a straight line or arc used as a segment of a graphic character.

stroke generator—a method of generating characters using short strokes to draw the alphanumeric character in a manner similar to that used in ordinary handwriting. Some computer-output microfilm devices use this technique to draw the characters on the cathode-ray tube (CRT). *See also* vector generator.

subbing—*see* precoat.

subject copy—the material in graphic form that is to be transmitted for facsimile reproduction. *See also* ANSI/NMA MS3 *and* ANSI C16.45.

subject holder—*see* copyholder.

substage illumination—*see* subsurface illuminator *and* transilluminator.

subsurface illuminator—a device in the form of a light box used in optical copying to eliminate shadows caused by incident light at the edges of a subject. *See also* transilluminator.

subtractive direct-positive process—any photographic process in which the sensitized material develops completely without exposure to light, since light destroys its ability to develop.

supply spool—a spool that contains unexposed film or paper.

support—*see* base.

support sheet—the material that forms the limiting dimensions and provides the main support for the microfilm jacket. Synonymous with *back sheet*.

surface development—a method of development in which the processing solutions are applied to the sensitized side of the photographic material, while the backside of the photographic material remains dry.

suspension-type aperture card—an aperture card that suspends the frame of microfilm in the aperture between two sheets of transparent film, one mounted to each side of the card and completely covering the aperture.

swivel point—a point in a fixed relation with the screen that simulates the location of an observer's upper cervical vertebrae and about which a luminance meter is swiveled when making measurements. *See also* ANSI/NMA MS12.

symbology—(1) the graphic representation of alphanumeric characters that can be scanned by a variety of techniques to give the specified information, e.g., Universal Product Code (UPC). (2) The science or study of symbols. (3) The use of symbols.

symmetrical lens—a lens whose front and rear group of elements correspond in every detail.

synchronization, out of—a condition that causes images to have blurred bands across the width of the film. In rotary cameras it is caused when the speed of the film transport is not synchronized with the speed of the document transport. *See also* NMA MS23.

synchronize—to take place at the same time, e.g., the film and documents in a rotary camera are synchronized.

synchronizing signal—a signal used for maintenance of predetermined speed relations between the scanning spot and recording spot within each scanning line. *See also* ANSI/NMA MS3 *and* ANSI C16.45.

synchronous film speed—movement of the photographic film in a camera at the same rate and in the same direction as the movement of the image during exposure for the purpose of eliminating image motion. This design feature is built into rotary cameras.

system—an organized collection of people, machines, data and methods required to accomplish a set of specific functions. *See also* ANSI/NMA MS4 *and* ANSI PH5.17.

systeme international d'unites—*see* metric system.

T

take-up reel—*see* receiving reel.

take-up spool—*see* receiving spool.

target—(1) any document or chart containing identification information, coding or test charts. (2) An aid to technical or bibliographic control that is photographed on the film preceding or following the document. *See also* NMA MS23.

technical target—an aid to technical control that indicates the reduction and resolution of the film. *See also* NMA MS23 *and* target.

teleconferencing—a technique that permits person-to-person messages, usually with an agenda and a group of communicators who may operate in real-time mode. Current systems can include video, audio and computer technologies as well as communications.

TEP—transparent electrophotographic process. *See also* transparent photoconductor film.

terminal—any remote device, distant from the computer, capable of sending or receiving information over a communications channel.

test chart—*see* resolution test chart.

test frame—a microfilm image of a test target, used to check microfilm quality.

test target—(1) a high-quality form slide used to evaluate computer-output microfilmer quality. (2) An object (target) containing images or patterns useful in evaluating optical systems or photographic materials.

thermal diazo—*see* diazo, thermal.

thermal plastic film—*see* photoplastic film.

thermal plastic recording—*see* photoplastic film.

thiosulfate—*see* sodium thiosulfate.

threading—transferring the leading end of the film from the supply spool, cartridge, etc., into photographic or micrographic equipment, around all idlers, rollers, sprockets, etc., to the take-up device of the equipment.

throat—the entrance used to feed documents into rotary cameras.

throughput—(1) the rate at which documents can be processed through a microfilm camera. (2) The number of film frames, amount of film, etc., output by a computer-output microfilmer, processor, etc.

time sharing—a method of using a computing system that allows a number of users to execute programs concurrently and to interact with the programs during execution.

tinted base—*see* tinted stock.

tinted stock—a film base having a light-absorbing color for antihalation and which remains after processing.

title—*see* heading.

title area—*see* heading area.

title backing—*see* heading area coating.

title block—the space on a drawing set aside for an identifying legend.

title space—*see* heading area.

toe—The low-density portion of a sensitometric curve.

tonal latitude—*see* tonal range.

tonal range—the relative ability of a light-sensitive material to reproduce accurately the varying tones between black and white. *See also* latitude.

toner—the material employed to develop a latent electrostatic image. *See also* developer.

top lighting—the method for lighting a document for microfilming in which the lights are above the document (as opposed to back lighting). *See also* subsurface illumination.

TPC—*see* transparent photoconductor film.

trailer—that portion of film beyond the last images recorded. *See also* leader.

trailer microfiche—in a set of microfiche, all related microfiche after the first. *See also* lead microfiche, microfiche set *and* ANSI/NMA MS2.

trailing end of film—*see* trailer.

transilluminator—a diffuse light source of large area, such as a light box.

translucent screen—a reader screen of treated glass or plastic onto which an image is projected.

transmission density—*see* density *and* density, diffuse transmission.

transmitted light—light that passes through a material.

transparency—an image on a transparent base that may be viewed by transmitted light or used to make copies.

transparent photoconductor film—a microfilm that includes a photoconductive layer which, in combination with a special electrostatic image system, permits the adding of new images or overprinting existing images on to an existing photoconductor film.

transport—the moving belt or roller device in a camera that moves documents through the machine.

transverse curl—*see* curl direction.

triacetate—*see* cellulose triacetate.

tripper—a mechanical or electronic device that may control lights, film advance or the beginning or end of operation: e.g., in a rotary camera the tripper is actuated by the moving document.

turning slot—*see* key slot.

U

uhr—*see* ultrahigh reduction.

ultrafiche—microfiche with images reduced more than 1:90. *See* high reduction, microfiche and ultrahigh reduction.

ultrahigh reduction—reductions more than 1:90. *See also* ultrafiche.

ultrastrip—short lengths of processed microfilm containing material photographed at high reductions. *Ultrastrips generally* are created in a two-step process that consists of filming the material and then refilming this film at higher reductions. *See also* ultrahigh reduction.

ultraviolet—pertaining to or designating those radiations that lie beyond (wavelengths shorter than) the blue end of the visible spectrum, approximately from 200 to 400 nanometers.

underdevelopment—insufficient development of sensitized material that produces a too light image, due to developing for too short a time, use of a weakened developer or too low a temperature. *See also* NMA MS23.

underexposure—insufficient exposure of sensitized material, due to insufficient illumination, too short an exposure time, too small a lens aperture or improper response of an exposure-control device. *See also* NMA MS23.

unitize—(1) to separate a roll of microfilm into individual frames or group of frames and insert them in a carrier, e.g., aperture cards, jackets. (2) To microfilm on one or more microfiche a unit of information, such as a report, a specification, periodical, etc.

unitized microfilm carrier—*see* carrier.

universal camera—a special microfilm camera that can handle 16-, 35- and 105-mm film.

unperforated film—*see* nonperforated film.

up—the number of documents being in position to be photographed at the same time on the same frame, e.g., one up, two up, etc.

updatable microfilm—a microfilm that permits the addition or deletion of images. *See also* transparent photoconductor film *and* photoplastic film.

updatable microform—a microfilm medium to which additional images can be added at any time. *See also* jacket *and* updatable microfilm.

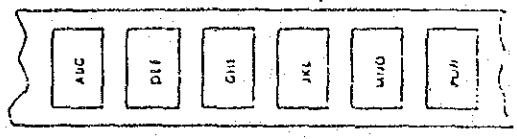
USASI—United States of America Standards Institute. *See* ANSI.

V

VDT—video display terminal. *See* cathode-ray tube.

vector generator—a method of generating graphical information using direction and line length. *See also* stroke generator.

vertical mode—(1) the arrangement of images on roll microfilm in which the lines of print or writing are perpendicular to the length of the film for horizontal script and parallel for vertical script. (2) The arrangement of images on a microfiche in which the first microimage is in the top left-hand corner of the grid pattern and succeeding microimages appear in sequence from top to bottom and in columns from left to right. Synonymous with *cine mode, orientation A* or *portrait. See also* ANSI/NMA MS14.



Vertical Mode

very high reduction—reductions above 1:60 up to and inclusive of 1:90.

vesicular film—a film in which the light-sensitive component is suspended in a plastic layer. On exposure, the component creates optical vesicles (bubbles) in the layer. These imperfections form the latent image. The latent image becomes visible and permanent by heating the plastic layer and then allowing it to cool.

vhr—*see* very high reduction.

video disk—a device that contains data (audio/video) recorded on spiral or circular tracks with a low-power laser.

video display terminal—*see* cathode-ray tube.

viewer—*see* hand viewer, reader *and* reader-printer.

visible light—radiant energy that can evoke a human visual response.

visual range—the portion of light spectrum that can be seen by the human eye (approximately 400 to 700 nanometers).

W

washboard—a defect in film that appears as alternate bands of greater and lesser density across the width of the film. This may be caused by fluctuating illumination or faulty document or film transport. *See also* NMA MS23.

washing—a processing step that uses water to remove unwanted soluble chemicals from photographic materials.

water spot—a defect in film that may be caused by (1) deformation of the gelatin layer in an irregular spot pattern which is caused by water drops on the surface during drying, due to improper squeegeeing, or (2) residue from materials in the wash water.

wavelength—the length of a wave measured from any point on one wave to the corresponding point on the next wave, usually from crest to crest. Wavelength determines whether radiant energy is classed as gamma rays; X rays; or ultraviolet, visible, infrared radiant energy or radio waves. The wavelength of visible radiant energy is the chief determinant of its perceived color.

wedge, optical—*see* optical wedge.

wet processing—processing carried out by using chemicals in liquid or vapor form.

wetting agent—a chemical added to water to reduce surface tension, thereby improving wetting characteristics and reducing the formation of water drops.

white light—radiation having a spectral energy distribution that produces the same color sensitive to the average human eye as average noon sunlight.

width direction—the direction of the film or paper at right angles to the forward movement in the film- or papermaking machine. *See also* grain direction *and* machine direction.

winding—*see* direction of winding processed microfilm.

word processing—a system for organizing people, procedures and automated equipment to transfer information more efficiently from a spoken or recorded form to a written form.

working solution—a solution which is of the correct strength for use and which is frequently made by dilution of a stock solution.

WPOM—word-processing-output microfilm. The procedures and equipment which provide a direct means of digitally transmitting from word-processing equipment to a computer-output microfilmer via data communications or magnetic medium (disk, tape) without using a computer mainframe.

wrapping band—a band, usually made of paper, that is wound and secured around a reel of processed film for ease of handling and to protect the film.

X

xerography—the formation of a latent electrostatic image by action of light on a photoconducting insulating surface. The latent image may be made visual by a number of methods, such as applying charged pigmented powders or liquids that are attracted to the latent image. The particles either directly or by transfer may be applied and fixed to a suitable medium.

Z

zirconium lamp—a special, high-intensity point source lamp frequently used because of its low emanation of long (heat) wavelength light and its concentrated source.

zoom lens—a lens with movable optical elements that can retain an object in focus, while changing the lens focal length. Consequently, the size of the object can be varied, while the camera or reader remains in the same position.