GLOSSARY

OF

PHOTOGRAPHIC TERMS

Ontario Police College
Identification Training

ABERRATION In geometrical optics, a general term for the failure of a lens to produce a theoretically perfect image of a point. See chromatic aberration; spherical aberration.

ABSORPTION The process by which a medium neither reflects light nor transmits it, but transforms light energy into heat. Black absorbs most of the spectrum and white reflects all colours equally. A coloured surface absorbs its complementary and reflects light of its hue.

ABSOLUTE Characterizing a temperature scale with the zero point at about -273 C, and with degree intervals equal to those of the Celsius scale.

ACCELERATOR A component of a developer, usually an alkali, that increases the rate of development. Most developing agents for silver halide materials are usefully active only in alkaline solutions.

ACHROMATIC Specifying neutrals, i.e., blacks, grays, and whites. Visually neutral.

ACTINIC Specifying radiation that is efficacious in producing a photographic effect. Such radiation varies in wavelength with the spectral sensitivity of the photographic material.

ACUTANCE A numerical value usually derived from micro-densitometric traces of edges, a geometrical average of slopes at different points on the edge trace divided by the density difference between the limits of the trace. Acutance is correlated to some extent with sharpness, which is the visual impression of edge quality.

ADDITIVE (1) (adj) Specifying a colour reproduction system by which colours are synthesized by combinations of red, green, and blue primaries, i.e., coloured lights. Colour television is an additive process. Photo-mechanical colour halftone reproduction is additive to the extent that the dots of ink lie side-by-side without overlapping. All current photographic processes are subtractive rather than additive. (2) (noun) A nonessential emulsion ingredient, such as a stabilizer or antifoggant.

AFTERIMAGE A visual phenomenon in which an observer continues to see an image after the stimulus has been removed. Afterimages are momentarily positive, then change to negative with respect to both brightness and colour.

AGITATION In chemical processing, the action that causes a flow of processing solution with respect to the photographic material. The intent is to assure sufficiently uniform chemical activity by replacement of spent solution with fresh.

AMBIENT Prevailing. Ambient light is that which is encountered at the scene, as distinct from that which the photographer provides by flashbulbs or other means. Syn: existing light.

AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI) In 1970, replaced the organization formerly known as the United States of America Standards Institute (USASI), which before that was known as the American Standards Association (ASA).

ANGLE OF ACCEPTANCE As applied to luminance (commonly called reflectance) light metres, the number of degrees within

which the metre effectively receives and responds to light. Spot metres receive light over only a few degrees, whereas the angle of acceptance of conventional light metres roughly approximates the angle of view of cameras equipped with normal lenses: approximately 30 to 50 degrees.

ANGLE OF COVERAGE In photographic optics, the angle formed by lines connecting the rear nodal point to opposite sides of the circle of good definition, i.e., the maximum angle over which a lens is capable of forming an acceptable image. Syn.: angular field.

ANTIREFLECTION COATING A thin layer of transparent material, usually magnesium fluoride, applied to a lens surface in contact with air. The effect of the coating is to reduce light reflection, and thus to lessen stray (flare) light and to improve image contrast. An additional benefit is the increased transmittance of the lens, and therefore greater effective lens speed.

APERTURE A mechanical and adjustable opening usually incorporated within the lens system. The function of the aperture is to control the volume of light entering the camera.

AVERAGE SCENE (SUBJECT) A scene in which the reflected light from each of its components, when averaged, reflect 18% of the light incident on the scene.

BACKING A layer applied to the back of film or plates during the manufacturing process to absorb light that passes through the emulsion (antihalation backing) and, with film, to minimize curling (anticurl backing).

BARRIER FILTER When photographing fluorescence, a filter used in front of the camera lens to absorb the radiation that produces the fluorescence (ultra-violet radiant, for example), while transmitting the radiant energy produced by the fluorescence. The barrier filter prevents the fluorescence from being obscured by exciting radiation to which the film is sensitive. See exciter filter.

BEAM CANDLEPOWER-SECOND (BCPS) A unit of the maximum light-energy output of a lamp in a reflector, commonly used to measure the on-axis output of electronic flash.

BED The base of some types of cameras (especially view, press, and process) that generally supports the lens standard, back standard, and focusing tracks. Beds may be identified more specifically as monorail, folding flatbed, etc. The folding parts of beds on press cameras normally serve as protective covers when the cameras are not in use. Extension units can be attached to the beds of some cameras.

BELLOWS A flexible, light-tight enclosure between the lens plane and the film or negative plane of some cameras and enlargers. The sides are typically folded in a manner that minimizes sagging.

BELLOWS EXTENSION (1) The lens-to-film distance for a specific situation. (2) The maximum lens-to-film distance for a camera as limited by the bellows, the bed, or the focusing mechanism.

BINOCULAR VISION Seeing with two eyes working in close cooperation, as distinguished from monocular vision, which involves one eye.

BLACK (1) Applied to a perception of low lightness (value) and indistinguishable hue. (2) Applied to an object of low reflectance, at one extreme of a gray scale. Opposite to white. (It is a common misapprehension that black is the absence of colour or of light. In fact, the sensation we call black arises whenever the light level is sufficiently low. Black is one of the family of neutrals, which includes whites and grays.)

BLACK-AND-WHITE (b & w) Designation for a photograph, material, or process in which the resulting image contains only tones of gray. Toned prints are commonly included for the purpose of distinguishing them from colour prints made on colour paper. (The term “monochrome”, however, is more appropriate than “black and white” for toned prints.)

BLEACH To convert, by chemical means, metallic-silver photographic images to silver compounds to aid in removing the silver. Such a process is necessary part of the production of dye images, as in colour prints and transparencies. It is often preliminary to toning, intensification and reduction of the image.

BLUE A colour which corresponds to the 400-500 nm wavelength region of the spectrum and which can be produced by removing the red and green components from white light. As applied to a filter, pigment, dye, etc., absorbing red and green about equally and blue less so.

BLUE-SENSITIVE Specifying photographic emulsions that are sensitive only to ultraviolet and short-wavelength visible radiation, as distinct from orthochromatic and panchromatic emulsions. Syn.: colour-blind.

BRIGHTNESS The subjective aspect of visual perception that is approximately correlated with the luminance of objects seen as light sources. Since brightness is a psychological concept, there are not units of measurement. The term “photometric brightness” should be replaced by “luminance”. See lightness.

BRIGHTNESS ADAPTION A process by which a person's visual perceptual system adjusts to variations in the level of illumination producing increased sensitivity with low illuminance and decreased sensitivity with high illuminance.

BRIGHTNESS CONSTANCY A psychophysical visual phenomenon whereby the brightness of a surface is perceived as remaining unchanged when viewed under different levels of illumination. A white object, for example, continues to be perceived as white rather than gray when a light source is moved away from the object, decreasing the illuminance. Since brightness refers to surfaces perceived as sources of light rather than as reflecting surfaces, the term “lightness constancy” is preferred.

BRIGHTNESS RANGE (1) The visually perceived relationship between the lightest and darkest areas of a scene. (2) As commonly used by photographers, the ratio of luminances for the lightest and darkest areas of a scene. Preferably, luminance ratio. (3) A method of using a luminance (reflection) photo-electric metre. Measurements are made of the luminances of the darkest and lightest areas of interest, and the calculator indicator is set midway between the two readings.

CALCULATED MIDTONE Identifying a method of using an exposure (light) metre in which two luminance (reflection-type)

readings are taken, one from the lightest area where detail is desired and one from the darkest. A position halfway between the two readings is used in selecting the combination of f-number and shutter speed. Syn.: luminance-range.

CAMERA (1) In photography, a light-tight apparatus containing a lens (or pinhole) to form images on photosensitive materials for the purpose of making photographs. Numerous refinements are provided on various cameras, including shutters, focusing mechanisms, viewfinders, interchangeable lenses and backs, and integral light metres. Cameras designed for specific purposes generally contain only those features needed to perform that function.

CAMERA FLARE Non-image-forming light in a camera, caused by the reflection of light from interior surfaces of the camera, and resulting in an increase in illuminance and a decrease in contrast of the image.

CAMERA MOVEMENT Any of various parts of a camera designed to allow the location or angle of the lens or the film to be changed. The purpose of camera movements is to modify the shape, sharpness, or placement of the image; e.g., focus, lens tilt, lens swing, back tilt, back swing, revolving back, rising-falling front, rising-falling back, front lateral shift, back lateral shift. Also known as movement, adjustment, and camera adjustment.

CELL A sheet of cellulose acetate or other transparent material used for animation drawings so that two or more separate drawings can be superimposed and photographed as a unit.

CELSIUS (C) The preferred name of the centigrade thermometer scale, on which the freezing point of water is 0° and the boiling point is 100°.

CENTER-WEIGHTED A through-the-lens exposure (light) metre designed so that the metre reading is determined more by subject luminances on or near the lens axis than by those nearer the edges of the field.

CHARACTERISTIC CURVE A graph obtained by plotting the logarithms of a series of exposures (quantity of light per unit area) received by a photographic material and the corresponding resulting densities. Such graphs are used to determine information such as base-plus-fog level, speed, gamma contrast index, useful exposure range, and maximum density.

CIRCLE OF CONFUSION The out-of focus image formed by a lens of an object point; specifically, the diameter of the circular image. Since circles smaller than a certain size appear to a viewer as points under standardized conditions, the diameter of the maximum acceptable circle of confusion can be used in computing depth-of-field tables, etc.

CIRCLE OF GOOD DEFINITION The area in the image plane within which the lens is capable of forming an image having acceptable optical quality. For a given lens, the size of the circle tends to increase as the aperture is reduced, and the diameter increases in proportion to image distance as the lens is focused on closer objects. Among lenses, the size of the circle varies with focal length and lens design.

COLOUR (1) That aspect of visual perception associated with the attributes of light identified as hue, saturation, and brightness. The Munsell system of colour notation with pigment samples uses the

corresponding attribute terms “hue” (red, green, blue, etc.) “chroma” (difference from gray) and “value” (lightness). Only the neutrals (blacks, grays, and whites) have no hue and zero chroma, and thus can be arranged into a scale on the basis of value (lightness) only. (2) As applied to objects, their reflection or transmission properties for different wavelengths of light. For example, yellow objects reflect little blue light and much green and red light. Red filters absorb much green and blue light and little red light. Data about the colour of objects may be displayed in the form of a graph, in which absorptance (or density or transmittance) is plotted against wavelengths. (3) As applied to light sources, the energy produced at different wavelengths, often expressed in the form of a graph of energy (or relative energy) versus wavelength. The plots are called spectral energy distributions.

COLOUR ADAPTATION A process by which a person's visual perceptual system adjusts to variations in stimulus colour, producing decreased sensitivity to complementary colours and increased sensitivity to complementary colours. For example, when the observer is fully adapted to the light source, either tungsten or daylight may appear white, despite the wide differences in the relative amounts of red, green, and blue light produced by these sources.

COLOUR ANALYSIS The separation of subject colours into primary colour components, normally red, green and blue; an essential procedure in all conventional colour processes. With multilayer colour films, each primary colour is recorded on a different emulsion layer. Compare with colour synthesis.

COLOUR ANALYZER A device that measures the primary colour components of images, typically the red, green, and blue light transmitted by or reflected from an image. Such devices are commonly used in making colour prints from negatives and transparencies, to assist the photographer in obtaining the correct filtration and exposure.

COLOUR BALANCE (1) A general term for the apparent fidelity with which a photographic image simulates the subject colours, especially neutrals. If the image of a gray scale appears too blue, for example, the colour balance is said to be blue. (2) A psychological equilibrium of the hue, value, and chroma attributes of a colour image about the midpoints of the corresponding scales.

COLOUR-COMPENSATING (CC) Identifying a class of filters produced in red, green, blue, cyan, magenta, and yellow hues and a variety of densities (based on the spectral region of maximum absorption) from .025 to .50. The filters are designated by the letters CC (for colour-compensating), followed by the density (with the decimal omitted) and the first letter of the name of the hue, e.g., CC05Y. Colour compensating filters are commonly used on cameras and projection printers to produce controlled changes in the colour balance of colour photographs.

COLOUR CONSTANCY A psychophysical visual phenomenon whereby the colour of a surface is perceived as remaining unchanged when viewed under illumination of different colours. A white object, for example continues to be perceived as white when viewed first under daylight illumination and then under tungsten illumination. Colour constancy includes both lightness constancy (a white

object continues to appear white, not gray, when the illuminance is decreased) and chromatic constancy (a white object continues to appear neutral when the colour temperature of the illumination is altered).

COLOUR CONTRAST Relative variations or perceived variations of hue or chroma in a scene or image. The perceived colour contrast is typically greater when two colours are adjacent than when they are separated by a neutral area. A blue area, for example, appears to be more saturated when it is surrounded by yellow than when it is surrounded by gray, an effect known as simultaneous colour contrast.

COLOUR CORRECTION (1) Adjustment of the colour balance of a colour photograph, for example, by a change in filtration in making a colour print. (2) The modification of a subject colour to compensate for the unsatisfactory reproduction of the original colour by the photographic process being used. For example, if a certain colour appears darker on the photograph than in the subject, a lighter colour (or possibly a fluorescent colour) would be substituted in the subject.

COLOURLESS (1) Without colour, as air. (2) Without hue; gray, white, black. (3) Relatively weak in hue; unsaturated.

COLOURLESS INTERVAL In visual perception, the difference between the minimum intensity of a light stimulus at which hue becomes apparent (chromatic threshold) and the minimum intensity that can be detected (absolute threshold). Syn.: photochromatic interval.

COLOUR NEGATIVE A photographic image in which light subject tones are reproduced as dark and vice versa, and subject colours are reproduced as complementary colours; e.g., a blue object is recorded as yellow. The complementary relationship is partly obscured on some colour negatives by the presence of colour-masking dyes.

COLOUR POSITIVE A photographic image in which the colours approximate those of the corresponding areas of the subject, as distinct from colour negative, in which subject colours are reproduced as complementary colours and the light-to-dark relationship is reversed.

COLOUR TEMPERATURE A scale for rating the colour quality of illumination. The colour temperature of illumination being calibrated is the actual temperature in degrees Kelvin (K) of a “blackbody” heated to a temperature that produces a visual colour match. That two sources have the same colour temperature by no means implies that they are equivalent photographically or physically.

COLOUR TRIANGLE A systematic representation of hue and chroma relationships of light in which the additive primary red, green, and blue hues are positioned at the points of a triangle and the respective complementary cyan, magenta, and yellow hues are positioned on the opposite sides. White is represented in the centre of the triangle.

CONSTANCY Any of various phenomena whereby a person's perception of some aspect of a scene or object, such as brightness, colour, or size, remains unchanged or resists change despite changes in the corresponding stimulus.

CONTINUOUS TONE Applied to an original or to an image in which there is a

smooth gradation from light to dark as distinct from line and halftone.

CONTRAST (1) (noun) The actual (objective) or the perceived (subjective) variation between two or more parts of an object or image with respect to any of various attributes such as luminance, colour or size. Subjective contrast is commonly described in general or relative terms (e.g., high contrast, lower-than normal contrast).

CONTRAST FILTER Strongly coloured transparent material that effectively absorbs red, green, blue, cyan, magenta, or yellow light. Commonly used in a camera optical system to lighten or darken selected subject colours in black-and-white photographs.

CONVERGING LINES A perspective effect whereby parallel subject lines are represented by nonparallel lines in the image. The effect can be altered by tilting or swinging the back on cameras having such adjustments, or by tilting the easel when making a projection print.

COPY In copy work, two dimensional material such as photographic prints, drawings, paintings and documents.

COPYBOARD In copy work, an illuminated board or easel to which the original is attached for copying.

COPY NEGATIVE In copy work, the negative obtained by photographing the original.

COVERING POWER (1) (optical) The extent to which a lens is capable of forming a usable image off the lens axis, expressed variously as the maximum film size that can be used with the lens, the diameter of the circle of good definition, or the angle of coverage (which see). (2) (sensitometric) The ratio of the optical density of an image area to the mass of silver (or dye, etc.) per unit area of the processed image. The reciprocal of the photometric equivalent.

CROP To alter the boundaries of an image. Variously applied to limiting the area of a scene included by a camera, the area of a negative or transparency included on a print, the trimming or masking of a finished print or transparency, and the reproduction in a publication of a selected part of a photograph.

CYAN (1) A colour that can be produced by removing the red component from white light or by mixing blue light and green light. One of the three subtractive primary colours, the other two being magenta and yellow. Cyan also exists as a spectral hue, associated with wave-lengths in the region of 485 nm. Syn.: blue-green. (2) As applied to a filter, pigment, dye, etc., red absorbing. Syn.: minus red.

DAYLIGHT The combined illumination from the sun and sky. The colour quality, intensity, and contrast vary with numerous factors, including latitude, atmospheric condition, season, and time of day. The colour temperature of the combination of sunlight and clear skylight that is considered typical for photographic purposes (i.e., photographic daylight) is 5500 K.

DEFINITION The clarity of detail of an image as perceived by the viewer. Applied both to images, although the term “photographic definition” is preferred for the latter.

DENSE (1) Applied to a photographic image or area that is darker than is considered normal. (2) Applied to transparent or

translucent material that transmits relatively little light.

DEPTH OF FIELD (DOF) The range of object distances go within which objects are imaged with acceptable sharpness. Depth of field varies with numerous factors, including number, focal length, object distance, viewing distance, and viewer criterion. A circle having a diameter of 1/100 in. is generally considered to be the largest that will appear as a point on a print viewed at a distance of 10 in., although smaller values are used in calculations for depth-of-field scales, tables, etc., when the viewer is expected to examine the image more critically, and vice versa.

DESATURATE To lower the chroma of colours, i.e., to make them less vivid. A high level of ambient light in an auditorium, for example, will desaturate the colours of images projected on a screen.

DETAIL Relatively small-scale parts of a subject or their reproduction in an image. A high degree of detail reproduction in a portrait, for example, involves the ability of the observer to detect individual hairs in the head, pores in the skin, etc. The reproduction of detail is included in the concept of definition, which also involves edge reproduction. Detail reproduction is a subjective concept closely related to the measure of resolution, an objective concept.

DEUTSCHE INDUSTRIE NORM (DIN) A standard established by the German counterpart of ANSI; i.e., Deutschen Normenausschuss (DNA).

DEVELOPMENT The process of converting a latent image into a visible one. For conventional (silver halide) materials, the reduction of silver ions to silver by a developing agent that is simultaneously oxidized. In electrophotography, the application of toner particles to the charged surface.

DICHROIC Basically, two-colour. Applied to materials that change colour with changes in thickness or dilution, or when viewed alternately by reflected and transmitted light.

DIFFRACTION A fundamental property of all wave motions including light and other electromagnetic radiation, shown in the spreading of the wave after it passes through an aperture or past an edge. Diffraction limits the quality of an optical image, making the image worse as the aperture of the lens, etc., is made smaller beyond a critical point.

DIFFUSION The scattering of light when reflected from a textured surface or when transmitted through a translucent but not transparent medium.

DIRECT REFLECTION See REFLECTION.

DIRECT TRANSMISSION See TRANSMISSION

DISPERSION The separation of white light into its component colours when white light is transmitted through a refractive medium such as a glass prism.

DYE COUPLING In the development of a silver image, the deposition of a coloured substance at or near the site of the developed silver. In many modern colour photographic processes, the dyes are formed by reaction between developer by-products and other chemicals called “couplers.”

EFFECTIVE APERTURE In its simplest terms, the largest opening of a lens.

EMULSION (1) A dispersion of silver halide crystals in gelatin or other suitable material. Preferred term: photographic emulsion. (2) A colloidal suspension of one liquid in another.

EXPOSURE (1) The act of allowing light or other radiant energy to fall on a photosensitive material. (2) Specifically, H. the quantity of light per unit area received by photosensitive materials, commonly expressed as exposure equals illuminance times time ($H = E \times t$, formerly $E = 1 \times t$). Preferred term: photographic exposure. Often extended to include radiant energy other than light, such as ultraviolet and infrared. (3) Loosely, the time and relative aperture settings used to control the quantity of light or radiant energy received by photosensitive material. Preferred terms: exposure settings, camera exposure settings, and print exposure settings.

EXPOSURE INDEX (EI) A number intended to be used with an exposure meter to determine the camera settings that will produce an image of satisfactory quality. For a given material, exposure indexes may vary with the subject and the desired effect, whereas film speeds are determined in a standard way, usually sensitometrically.

EXPOSURE LATITUDE Permissible change in camera exposure, usually expressed in stops, without significant effect on image quality. The change is affected by the definition of image quality, the usable extent of the characteristic curve, and the subject luminance range (contrast). For images of high quality for usual subjects, the latitude in exposure is small with conventional films.

FERROTYPE A process for producing glossy surfaces on photographic prints by drying them with the emulsion side in intimate contact with a highly polished surface.

FILM A flexible, transparent support coated with photo sensitive material.

FILM SPEED A number intended to be used with an exposure metre to determine the camera settings that will produce an image of satisfactory quality, e.g., ASA 125.

FILTER A layer of more or less transparent material used to modify the quality or quantity of radiation. Three basic types of modifications are selective absorption by wavelength (colour filters), nonselective absorption by wavelength (neutral-density filters), and selective absorption by angle of polarization (polarizing filters).

FILTER FACTOR A multiplying number used to compensate for the absorption of radiant energy (light) by a filter. Specifically, the exposure time is multiplied by the number when a filter is added, or an equivalent change is made in the relative aperture. The intent is to reproduce neutral (gray) tones in the image in the same way with as without the filter. The value of the filter factor will vary with the quality (colour) of the light source, the type of film and the development conditions, among other factors.

FINE-GRAIN Applied to films or developers that tend to produce images of relatively low granularity; and to the resulting images.

FINGERPRINT A defect resulting from touching a photographic material. Touching

an emulsion before it is processed may result in either raised or lowered density in the areas of contact, whereas touching processed materials may deform the surface of the gelatin or leave a deposit that may be visible or that may react chemically with the image.

FIRST-GENERATION As applied to an image, one step away from the original. The original may be a subject or, in copying contexts, a photograph. Thus, a first generation copy would be a reproduction of the original photograph.

FIX To remove underdeveloped silver halides from photo sensitive materials to make the images permanent.

FIXER A solution of sodium thiosulfate or other silver halide solvent used in processing photosensitive materials to make the images permanent. Syn.: fixing bath; hypo.

FLARE Non-image-forming light in a camera or other optical system due to the reflection of light from lens surfaces, interior surfaces or the mechanism, etc., causing an overall or local decrease in contrast and increase in illuminance of the image. The effect of flare is most noticeable with backlighted subjects.

F-NUMBER A number (f/16, for example) obtained by dividing the focal length of a lens by the effective aperture, used to control the amount of light transmitted by a lens. (The image illuminance is inversely proportional to the square of the f-number.) Selected f-numbers, usually representing the maximum aperture and consecutive whole stops, are normally printed on the lens mount. Syn.: relative aperture.

FOCAL LENGTH The distance from the best axial focus of an infinitely distant object to the rear nodal point of a lens. Preferred term: equivalent focal length.

FOCAL PLANE (1) A hypothetical flat surface in image space that represents the focus of an infinitely distant flat object surface perpendicular to the lens axis. (2) A hypothetical flat surface in image space that represents the focus of a flat object surface at any distance and at any angle to the lens axis. Definition (1) is identified as the principal focal plane. Syn.: image plane.

FOCUS SHIFT (1) Failure of a variable-focal-length lens to remain locked in on a given object distance as the focal length is changed. (2) In a lens not fully corrected for aberrations, a change in the position of the best-defined image with a change in the aperture (due to spherical aberration), or with the addition of a filter (due to chromatic aberration). (3) In generate a change in the position of the best-defined image due to any of various causes, including loose-fitting mechanical parts in the focusing system, a change in the position of film in a projector, and the addition of refracting material (such as a glass plate or filter) to an optical system.

FORESHORTENING A perspective effect whereby an object dimension or the distance between objects appears unrealistically small. Usually the result of viewing that part of the scene obliquely, using a long-focal-length lens on a camera placed at a relatively large distance from the subject, or viewing the image at a shorter than normal distance.

G Average gradient. For the D-log H (D-log E) curve, the slope of a straight line drawn between two defined points on the curve. Contrast index is an average gradient.

GELATIN (1) A colloidal-protein obtained by processing skins, bones, and other selected parts of animals. 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. The desirable characteristics include transparency, flexibility, permeability by processing solutions, and ease of conversion from liquid to solid. Some gelatins increase the sensitivity of the silver halide crystals to light. Gelatin also serves to protect the crystals imbedded in it. (2) Short for gelatin filter, a term used especially for material that is placed in front of a spotlight to alter the colour of the light. Syn.: gel.

GLARE (1) Intenselight. (2) Identifying a specular (mirror-like) reflection as distinct from a diffuse reflection.

GRADATION A change in tone, texture, etc., between adjacent areas of an object or the corresponding image. Gradation provides the viewer with information concerning the form or depth of the subject, e.g., the facial features of a portrait subject as revealed by the lighting. Syn.: local contrast.

GRAIN (1) A silver halide crystal in a photographic emulsion. (2) A silver particle resulting from the development of one or more silver halide crystals. (3) An attribute of photographic paper related to the orientation of the fibers.

GRAININESS Nonuniformity of density in a presumable uniformly exposed and processed area of a photographic image as perceived by a viewer. A measure of graininess is the magnification at which the non-uniformity just disappears. Graininess is a subjective property that corresponds with granularity, an objective property.

GRAPHIC ARTS Hand and photomechanical processes for producing or reproducing images, generally applied to production aspects of the art and printing fields but excluding some operations such as typesetting.

GRAY A neutral in colour with a luminosity greater than black and less than white.

GRAY CARD A neutral-colour board, having 18% reflectance, used as a standard artificial medium tone for luminance with reflection-type exposure metre readings. In the zone system, and 18% reflectance gray card corresponds to zone V. In the Munsell system of colour notation, middle value 5 has a reflectance of approximately 18%.

GRAY SCALE A series of neutral tones arranged in sequence from light to dark, usually in discrete calibrated steps, ideally with equal density differences between steps. Transmission (as distinct from reflection) gray scales are also known as step tablets and “step wedges.” A gray scale is often included with a subject or added at an intermediate stage of a reproduction process as a standard for control purposes. In the zone system, a ten-step scale representing the print tones produced by a series of negatives, exposed at “one stop” or 2 X increments and developed “normally,” is used to define the ten steps from 0 (maximum black) to 1X (“pure” white).

GREEN A colour that corresponds to the 500-600 nm (middle) wavelength region of the visible spectrum, and that can be produced by removing the red and blue components from white light.

HALATION An effect, or defect depending on intention, consisting of an unsharp image around the desired image of a bright object, caused by image-forming light that penetrates the photosensitive layer, with some scattering, and is then reflected back from the base. Minimized on some photographic films by the addition of a light-absorbing anti-halation material to the back surface, between the emulsion and the base, or as an integral part of the base.

HALFTONE A photomechanical reproduction process in which gradations of tone are represented on the image as dots of varying size and nearly uniform density. Under normal viewing size and nearly uniform density. Under normal viewing conditions the eye does not resolve the individual dots and the viewer perceives progressively darker tones as the dots increase in size.

HALIDE A compound of bromide, chlorine, fluorine, or iodine, e.g., silver bromide.

HALOGEN LAMP A tungsten lamp, the filament of which is surrounded by an active (rather than an inert) gas, which is effective in prolonging lamp life and permitting higher operating filament temperatures. (Note that the colour of the emitted light is little affected by the presence of the active gas, since the light is emitted by the filament itself. Note also that the envelope is fused silica, rather than the mineral quartz.) Syn.: quartz-halogen (quartz-iodine, etc.) lamp.

HAZE (1) An atmospheric condition in which small suspended particles scatter radiation from the sun and sky, and thereby reduce the contrast of images of distant objects. Since scattering is an inverse function of wavelength, scattered radiation reaching the observer or the camera under hazy conditions is rich in the ultraviolet and blue regions. (2) Light scatter in film base or other essentially transparent material.

IMAGE (1) In optics, the intersection or the apparent intersection of light rays. The first is the real image, the second, virtual. Real images typically fall on the photographic material or on the viewing screen of a camera. (2) The visible change in a photographic material caused by the absorption of radiation (latent image) (3) Visible differentiation in silver or dye or other deposit in a photographic material, as in “negative image” or “positive image.”

INCIDENT Identifying energy, especially light, falling on a surface, as contrasted with that reflected, transmitted, or emitted by a surface. An incident light metre estimates the illuminance on a surface of interest, such as a part of a scene or an exposure plane.

INFINITY (∞) In optics, an object distance so great that the image is essentially at the principal focal plane of the lens or curved mirror.

INFRARED Electromagnetic radiation just greater in wavelength than red light, of wavelength from approximately 700 to 300,000 nanometers. Photography with infrared requires emulsions that are especially sensitized. (The phrase, “infrared light” is inappropriate since infrared radiation is invisible, and light is defined as visually effective radiation. Infrared radiation is sometimes, also inappropriately, called “heat” rays, as in “heat-absorbing” filters. Heat is the energy of molecular motion.)

INTEGRATED Identifying a light-metre reading made so that the instrument receives light from many parts of the scene, as distinct from a spot or close-up reading. An integrating metre has a large angle of acceptance; it reads an average value that is determined by the luminance and area of each part of the subject.

INVERSE-SQUARE LAW At a point on a surface receiving radiation from a point source, the irradiance (or illuminance) diminishes as the square of the distance from the source is increased. E = l/d2, where E is illumance at the surface, l is the intensity of the source toward the surface in candelas, and d is the distance. For real (i.e., not point) sources, the law applies sufficiently for most purposes if the greatest dimension of the source is not more than one-tenth of the distance. The law fails for nearby nonpoint sources like fluorescent lamps, of broad sources such as banks of lights.

K (formerly, k°) Kelvin. A temperature scale based on absolute zero, and used for the specification of the colour of some light sources. See colour temperature.

KELVIN Identifying a thermodynamic temperature scale with degree intervals equal to those of the Celsius formerly centigrade scale, but with the zero at approximately -273 C. Thus, the Kelvin value is approximately 273 greater than the Celsius value. Sometimes called the “absolute” scale. One application is to light sources as a 3200 K lamp. See colour temperature. (Note the omission of the degree sign, a recently adopted convention.)

LATENT IMAGE (l) The image in a photosensitive material, after exposure but before it is made visible and usable by development. (2) That change in a photographic material, caused by the absorption of radiant energy (or by chemical action), which makes the material develop at a much higher rate than would otherwise be the case. In silver halide grains, the latent image is most probably a group of a small number of atoms of silver. Development is normally necessary for a study of its characteristics.

LATITUDE IN EXPOSURE The permissible change in camera exposure usually expressed in stops, without significant effect on image quality. Often, simply called latitude. Latitude is affected by: the definition of image quality, the usable extent of the characteristic curve, and the subject luminance range (contrast). For images of high quality of usual subjects, the latitude in exposure of many stops for usual subjects. Syn.: exposure latitude.

LENS (1) A piece of glass or other transparent material, curved so as to form an image by the refraction of light or other radiation. (2) A combination of several transparent curved pieces of glass, etc., capable by refraction of producing an image of quality better than is possible with a single piece.

LENS SPEED A measure of the capacity of a lens to admit light to the image. Lens speed is usually expressed by the f-number (the ratio of the lens focal length to the diameter of the cylindrical bundle of light that can pass through the lens). Lens speed is inversely proportional to the square of the f-number. Thus, an f/2 lens is four times as fast as an f/4 lens.

LINE ART or ORIGINAL In copy work, a high contrast original consisting lines or lettering such as line drawings or printed documents.

LIGHT (1) Radiant (electromagnetic) energy that can evoke a human visual response. Light differs from other radiation in wavelength, lying between about 380 and 780 nanometers. Since the standard luminosity curve is nearly zero near 400 and 700 nanometers, such as range is often taken as the limits of light. (Note: Terms such as "invisible light," "black light," "ultraviolet light," and "infrared light" are inappropriate. The term "visible light" is redundant.) (2) (adj.) Pale (colour), the converse of dark.

LIGHT. METER (Usually called exposure meter.) An instrument, usually photoelectric, used to measure luminance (intensity of light produced per unit area of a subject) or illuminance (light falling at a given point on an illuminated surface). The differences between the two types of measurements are in the angle of view of the devices (luminance metres having a narrow angle and illuminance metres having an angle approaching 180 degrees), and in calibration. Luminance metres are often called "reflectance" or "reflected-light" metres; illuminance metres are often called "incident light" metres. (Note that photocells have a spectral response different from that of the eye, and therefore require special filters to measure light reliably.) (Note further that since photocells have a spectral response that is no doubt different from that of any film, they do not reliably predict at correct camera settings except for a specific colour of light.)

LIGHTNESS (1) That aspect of colour which applies to reflecting surfaces and which relates the appearance of such surface to a scale of grays. Whites are grays of high lightness; blacks are grays of low lightness. High lights are tones of high lightness; shadows are tones of low lightness. Lightness corresponds roughly with luminance. In the Munsell system, the dimension of value is closely correlated with lightness. Brightness is similar to lightness but differs in that brightness is applied to surfaces seen as sources of light, rather than reflecting surfaces. (2) A number on a scale from 0 to 100 which is related to the visual appearance of a tone. Black has a lightness of 0; white has a lightness of 100. L (lightness) = 253/y -17, where y is the reflectance (in visual terms) of the object patch in percent. Lightness is approximately 10X the Munsell value of the patch.

LOW CONTRAST (1) In a subject, little difference between tones; i.e., a small ratio of subject luminances. (2) In a negative, little density difference; soft; flat. (3) In a negative material, small slope of the characteristic curve; small gamma infinity. (4) In a print, with less than normal tonal differences, usually because of the absence of light highlights and dark shadows.

MAGENTA (1) A green-absorbing colourant, having maximum density in the 500-600 nm wavelength region. One of the three fundamental colourants in subtractive colour processes, the other two being yellow (blue-absorbing) and cyan (red absorbing). (2) An additive mixture of red and blue light.

MIDTONES In a scene or photographic image, areas intermediate in lightness or brightness between highlights and shadows. Grays, as distinguished from whites and blacks.

MONOCHROMATIC ("single-colour") As applied to light, consisting of a narrow band of wavelengths. Laser sources generate nearly monochromatic radiation. Vapor light sources, which produce "line" spectra,

are used to produce monochromatic light. Mercury arcs, for example, produce four wavelengths of light. The term "monochromatic" is sometimes extended to apply to radiation other than light.

MONOCHROME Identifying a photographic process in which the image consists of a range of tones of a single hue, or of no hue (black-and-white).

NANOMETRE (nm) One billionth of a metre, the preferred unit of wavelength for light. Equivalent to, and replacing, millimicron. One angstrom equals 0.1 nanometre; in photographic contexts, the nanometre has replaced the angstrom.

NEGATIVE (1) A photographic image in which light subject tones are reproduced as dark (dense) and dark tones as light (thin).

NEUTRAL (1) Without noticeable hue; white, gray, or black; achromatic. (2) Ideally, absorbing the same fraction of any wavelength of light; nonselective.

NULL In measuring instruments, based on establishing a balance between a known and an unknown quantity, and the restoration of the device always to the same slate; the converse of direct recording. Some densitometres are null instruments, a calibrated wedge being used to bring the light level to a fixed value.

OPTICS The study of the properties and behavior of light, especially the effects on light of lenses, mirrors, etc. Geometrical optics treats problems by the use of rays; physical optics involves the wave theory of light; quantum optics involves the interaction of light and the atomic and subatomic particles of matter. (The term "optics" is often extended to include radiations other than light, such as x-rays, infrared, etc.) Also see physical optics.

ORIGINAL In copy work, the material to be copied.

ORTHOCHROMATIC (1) For emulsions, sensitive to blue (and ultraviolet) and green light, but not to red. The green light sensitivity is obtained by adding a dye to a "colour blind" emulsion. (2) Correct in colour rendering (now rare). Distinguish from panchromatic and colour-blind.

PAN Short for panchromatic, having sensitivity to red as well as to green and blue light and ultraviolet radiation.

PASTEL Any light colour of low saturation (chroma). Examples: pink; lavender.

PERSISTANCE OF VISION The continuance of a visual image after the stimulus is removed. The duration of the image is usually about 1/25 second, but the time varies with luminance and other factors. The phenomenon permits the fusion of successive images, as in motion pictures and television, into an apparently smooth and continuous change.

PERSPECTIVE (1) Generally, the impression of depth when a three-dimensional scene is represented in a two-dimensional photograph of drawing. Many factors, such as change in size of similar objects, converging lines, atmospheric effects, etc., contribute to perspective in this sense. (2) (adj.) Applied to an image made in principle from a fixed viewpoint, through which straight lines from object points are drawn to generate image points by intersecting the image surface. In this sense, a photographic image made with a pinhole or with a lens free of optical distortion is a

perspective image. It will display shapes and sizes correctly when examined from the correct viewpoint, which is at a distance from the image equal to the taking lens-to-film distance for a contact print (multiplied by the magnification for an enlargement). See strong perspective; weak perspective.

PHOTOGRAPH (1) A relatively permanent image produced by the action of light on a sensitive material, commonly restricted to images of objects formed by means of optical devices, such as lenses or mirrors, as distinct from sound recording, etc. (2) By extension, any image formed by the action of radiation, including light, infrared ultraviolet, and gamma rays.

PHOTOMACROGRAPHY The production in the camera of images at reproduction of l-to-l or larger. Distinguish from microphotography, which is the production of very small images, and from photomicrography, which employs a microscope to obtain high magnifications. Syn.: macrophotography, to which photomacrography is preferred.

POLARIZER A filter that transmits light waves which vibrate essentially only in a single direction (plane). Such a filter is useful for modifying glossy (specular) reflection from nonmetallic surfaces such as water or glass, and in changing the photographic reproduction of sky tone, etc. A pair of polarizing filters can be useful in combination as a variable neutral density filter, by turning one with respect to the other.

PRIMARY (1) Fundamental; applied to a standard. The primary light standard is a blackbody at a temperature of 2048K. Contrast with secondary. (2) In the additive formation of various colours, one of three variable lights usually blue, green, and red. Different amounts of these can duplicate any hue. (3) In the subtractive formation of colours, one of three colourants (inks, dyes, etc.), usually yellow, magenta, and cyan. Superposition of different amounts of these can produce any hue. (4) In psychology, simple, in the sense that a given colour does not look like any other. Psychological primary hues are red, green, blue, and yellow. Black and white (though not hues) are sometimes added.

PROCESS FILM A photographic material on a transparent base, especially used to make line and half-tone negatives for photomechanical reproduction purposes.

RANGEFINDER An optical device used to estimate the distance to a subject. Such devices commonly use movable mirrors or prisms to bring two images of the subject (each from a different viewpoint) into alignment. The required motion of the moveable element is related to the distance. The motion may be translated, by way of a mechanical linkage, to the camera lens, so that when the images are aligned the lens is in the correct focal position. See coupled rangefinder.

RECIPROCITY LAW (FAILURE) The law is a statement that the photographic response (usually density) will be constant if the quantity of light received by the photosensitive material is constant, regardless of the rate at which the energy is supplied. In practice, the reciprocity law implies that the density of the image will be the same at a camera setting of 1/1000 second at f/2 as at 1 second at f/64. The law does not hold in general for the developed image made by exposure to light; hence the term “reciprocity-law failure” (RLF). The practical consequence is that adjustments in

camera settings and often development time need to be made whenever exposure times are unusually small or large, the adjustments being best determined by experiment. (It is a common misapprehension that the defining equation, Exposure = illuminance x time, is a statement of the reciprocity law. The equation in fact defines photographic exposure, and in that sense never "fails.")

RED (1) As applied to a hue, associated with long spectral waves, beyond about 650 nm. (2) As applied to a filter, having major absorption for short and middle wavelength of light, i.e., from about 400 to 600 nm. (3) One of the three primary additive colours.

REFLECTION The process where light rays are bounced off a surface. ***Direct or Specular Reflection*** occurs on smooth and highly polished surfaces creating flare or a "hotspot**".** ***Diffuse Reflection*** occurs on textured surfaces which spread the reflected rays in various directions.

REFRACTION The bending of light rays associated with a change in velocity when light is transmitted through media of different optical densities there is a change of optical medium, such as from air to water or from air to glass. All rays except those perpendicular to the surface between the two media will be deviated.

RESOLUTION (1) The result of an experiment in which a target consisting of groups of adjacent light and dark lines is imaged and the closest visually distinguishable set is determined. The unit of measure is lines per millimetre (l/mm), in which a "line" is a light-dark pair of elements. As so measured, the resolution is dependent upon every significant factor in the experiment, such as target contrast, optics, photographic material and conditions of observation.

SATURATION That aspect of colour which distinguishes a perception from a gray of the same lightness; vividness. Spectral colours have maximum saturation; grays have zero saturation. Syn.: chroma.

SCHEIMPFLUG RULE In imaging an object plane that is not perpendicular to the lens optical axis, maximum sharpness is obtained when the planes of the object, lens, and film (etc.) intersect in a single line.

SHUTTER A device that controls the time of exposure. Between-the-lens (leaf) shutters comprise blades that open and close. Focal-plane shutters typically consist of slits in curtains moved laterally near the film. In motion picture cameras and in some sensitometres, the shutter is a rotating disk with a sector aperture.

SHUTTER SPEED (1) The effective exposure time produced by a shutter, usually defined as the time interval between the half-open and half-closed positions of the shutter. Distinguish from total operating time and from fully-open time. In focal-plane shutters, the speed is controlled by varying the width of the slit and/or the speed with which it travels. (2) The marked exposure time on a shutter, which may differ significantly from the actual exposure time, caused by inaccuracy or by a change in the effective exposure time as the lens aperture is changed.

SILVER HALIDE Any compound of silver and halogen, e.g., silver chloride, silver iodide, silver bromide. Crystals of such compounds are the radiation-sensitive elements of silver halide emulsions.

SINGLE-LENS REFLEX (SLR) A type of camera that is fitted with a movable mirror behind the lens, and a ground-glass or other screen for viewing the image. Just before the shutter opens, the mirror moves out of the way to permit the image to fall upon the film. SLR cameras usually include a reflecting prism to produce a correctly oriented image for viewing.

SKIN TONE The appearance (lightness, hue and saturation) of an area of the face, or other part of a human subject that is illuminated by the main light but does not include a specular highlight. Proper reproduction of the skin tone is important in colour photography, etc. A measurement of the skin tone is sometimes used in preference to that of a gray card as a reference for evaluating and controlling the density and colour balance of photographs when (a) it is inconvenient to include a gray card in the scene, (b) it is impossible to match both tones simultaneously, or (c) it is considered more important to obtain a pleasing effect than an accurate reproduction of the gray card. When it is not possible to consider individual variations, it is assumed that the typical subject is Caucasian with a skin reflectance of about 36%. Syn.: face tone; flesh tone; in the zone system, zone VI.

SKYLIGHT (1) Radiation reflected from the atmosphere, which together with sunlight (direct light from the sun) makes up daylight. Skylight is generally bluish, and thus causes outdoor shadow areas to reproduce as bluish in colour photographs. (2) A window, usually facing upward and northward, used as a source of light in some photographers' and artists' studios.

SKYLIGHT FILTER A nearly colourless filter that absorbs mainly ultraviolet radiation (and a small amount of blue light) typically used over a camera lens when making colour photographs of subjects in open shade that are illuminated by blue skylight. The result is a better colour balance with daylight films, which tend to record ultraviolet radiation as blue.

SLAVE A supplementary flash or electronic-flash lighting unit that operates by detecting a pulse of light from the primary unit.

SPECTRUM A display of radiation along a scale of wavelengths. The electromagnetic spectrum contains all radiation, from the shortest gamma radiation to the longest radio waves. The visible spectrum includes only those radiations to which the human eye is sensitive. The “photographic” spectrum includes those radiations which affect photosensitive materials: gamma and x-radiation, ultraviolet, light, and infrared radiation.

SPECULAR REFLECTION See REFLECTION

STABILIZATION (1) A process that reduces unwanted changes in a material over long periods of time. (2) Identifying a photographic printing process involving a paper that contains developing agents within the emulsion, and treatment of the exposed paper in two solutions (an activator and a stabilizer) in a roller-transport device.

STOP (BATH) An acid or acid-forming solution, used to halt development in silver halide photographic processing by lowering the pH below that at which the developing agent functions. Syn.: shortstop. Stop bath is the preferred term.

SUBJECT CONTRAST The ratio of luminance values from highlight to shadow in a scene. The average value for outdoor scenes is 160-1.

SUBJECTIVE Characterizing data obtained by visual examination of an image. Graininess, sharpness, and definition are subjective qualities of image structure. Compare with objective, implying instrumental means of obtaining data. Granularity and acutance are objective measures of image quality.

SUBTRACTIVE (1) Identifying a colour photographic process in which the final image consists of superimposed dyes, pigments, etc. The dyes are typically yellow (blue-absorbing), magenta (green-absorbing), and cyan (red-absorbing.) Thus each of the dyes removes by absorption more or less of each of the three primary regions of the visible spectrum as opposed to the additive process. (2) Identifying an optical or contact printing apparatus in which colour balance of the image is achieved by the use of filters inserted into the light path, usually with a single exposure. Compare with additive printers.

TELEPHOTO LENS A long-focal-length lens having a shorter lens-to-film distance than a conventional lens of the same focal length, obtained by placing a positive element in front of a negative element, the two being separated by a space. A similar arrangement, reversed end-for-end, the inverted telephoto or retrofocus lens, is used for wide-angle lenses when a long back-focal distance is required as for single-lens reflex cameras.

THRYRISTOR An electronic device used in electronic-flash circuits to stop the capacitor discharge when the photosensor indicates that enough light has reached the subject for correct exposure. Compare with quenching tube.

TIME-TEMPERATURE (1) Specification of development by objectively measured factors, as compared with development by inspection. In the first case, on processes, for example, for 5 minutes at 68 F, other factors being constant; in the second, one processes until the image appears correct. (2) Followed by “chart”, a graphical means of finding the correct time of development at a temperature other than standard.

T-NUMBER The f-number on an ideal lens (of 100% transmittance), which would produce the same image illuminance on axis as the lens under test at the given aperture. Syn.: T-stop. Unlike the f-number, the T-number takes into account the actual light transmitted by the lens. Thus, the T-number equals the f-number divided by the square root of the transmittance of the lens. Used mainly in motion-picture equipment; obsolescent in still-camera lenses.

TRANSMISSION ***Direct Transmission*** involves the passing of light through a transparent medium. ***Diffuse Transmission*** is the passing of light through a translucent medium.

ULTRAVIOLET (UV) Radiation similar to light, but of shorter wavelength and invisible. Ultraviolet radiation consists of wavelengths from about 400 nm down to about 10 nm. Most photographic materials are very sensitive to ultraviolet radiation. Good sources of UV are mercury and carbon-arc lamps and daylight. (UV is sometimes called black light or ultraviolet light. Both phrases are inappropriate since, by definition, light is visible.)

UNDERDEVELOPMENT Processing a photographic material for too short a time, at too low a temperature, with insufficient agitation, or in a weak developer. The effect is lower-than-normal image contrast, and sometimes lowered effective speed of the material.

UNDEREXPOSURE The provision of too little light for a correct response of a photosensitive material. In a negative exposed in the camera, the effect is too little density and contrast in the dark tones of the subject, and thus insufficient shadow detail. Underexposure in the print causes the dark tones to be too light and the light tones to have too little contrast and thus insufficient highlight detail.

VIEWING DISTANCE The spatial separation between and observer and a scene or image. For correct perspective, the viewing distance for a contact print should be the same as the camera image distance (usually the focal length of the taking lens). For an enlargement, the camera image distance should be multiplied by the image magnification. For example, if a 10X enlargement is made from a negative produced with a 2-inch camera lens, the viewing distance for correct persepective is about 20 inches. Depth of field also varies with the viewing distance of the image.

VIGNETTE In making photographic negatives or prints, to cause the subject gradually to merge into a featureless surround. The procedure is used especially for portraits.

VISIBLE LIGHT A redundant phrase, to be avoided, inasmuch as light itself is defined as the radiation capable of serving as a stimulus for the normal eye.

WAVELENGTH The distance between two corresponding points in an oscillation that moves in space. For electromagnetic radiation, wavelength is the chief physical distinction between light, infrared, ultraviolet, etc. A spectrum consists of a display of such radiation according to wave-length. For light, wavelength is associated with colour, long waves ordinarily appearing red, middle waves green and short waves blue. In photographic contexts, wavelength of light is measured in nanometres (billionths of a metre).

WHITE (1) As applied to a reflecting surface, highly reflective, nearly neutral, and diffuse. A surface coated with magnesium oxide is the closest approximation to a perfect white. (2) As applied to a visual sensation, of high lightness and without identifiable hue. Such a sensation may be produced in many ways, among them a proper mixture of red, green and blue lights. (3) As applied to light sources, producing energy well distributed throughout the visible spectrum. Among such sources are daylight, tungsten lamps, fluorescent lamps, xenon flashtubes, etc.

WHITENER A fluorescent substance added to a photographic printing paper to increase the lightness of the highlights, and thus to increase the possible tonal range of the image. Syn.: (optical) brightener.

WEIN'S LAW As the temperature of an incandescent solid or liquid is raised, the light emitted becomes relatively richer in short (blue) waves, and relatively less rich in long (red) waves. The peak wavelength shifts toward short wavelengths.

YELLOW (1) Colour name for the hue associated with wavelengths of light between green and red, i.e., near 580 nm.

(2) One of the three colourants (pigments or dyes) used in colour photography, having the property of absorbing blue light. (3) Identifying a blue-absorbing filter. (4) Applied to a small spot in the retina that is exceptionally sensitive to light at normal levels, the macula.

YOUNG-HELMHOLTZ THEORY OF COLOUR VISION The hypothesis that there are in the retina three different sensors, each sensitive to a different colour of light; blue, green, and red. Recent evidence in favour of the hypothesis involves the discovery that such sensors do exist.

ZOOM Identifying a lens having some movable elements, such that the focal length of the system can be changed without an appreciable change in focal position or f-number.

NOTES