JUNE 17, 1976

TO: BOB PRATT

FROM: MARK MEYER

SUBJECT: SOME NEW TOOLS AND TECHNIQUES THAT THE ENQUIRER COULD USE TO PHOTOGRAPH UFO'S

1. BASICLY, WHAT WE HAVE HERE ARE TOOLS (FILMS, LENSES, IMAGE INTENSIFIER SYSTEMS, INFRARED SURVEILLANCE SYATEMS, IMAGE INHANCEMENT SYSTEMS,ECT.) THAT HAVE BEEN DEVELOPED IN TWO MAJOR FIELDS: MILITARY INTELLIGENCE, AND THE SPACE PROGRAM. ALSO WE HAVE SOME NEW TECHNIQUES SUCH AS NIGHT USAGE OF STABALIZATION SYSTEMS AND GAINING HIGH SPEEDS FROM CONVENTIONAL PHOTOGRAPHIC FILMS. (AND IR)

2. I THINK WE COULD DELIVER SOME PHOTOGRAPHS OF UFO'S PROVIDED (A.) WE COULD GET WITHIN ONE MILE OF UFO LOCATION (B.) THE INTENSITY OF THE UFO'S LIGHT WAS ENOUGH TO PHOTOGRAPH.

AVAILABLE NOW, AT ABOUT THE SAME COST AS CONVENTIONAL PHOTO FILMS, ARE SOME MATERIALS ALMOST 100 TIMES AS FAST AS KODAK TRI-X. THESE FILMS, IN CONVENTIONAL CAMERAS SHOOTING THRU (A.) HIGH SPEED MIRROR LENSES AND (B.) LIGHT INTENSIFIER SYSTEMS SHOULD ENABLE US TO PHOTOGRAPH A MAN LIGHTING A MATCH AT A HALF TO THREE QUARTERS OF A MILE.

(ZOOMAR AND NIKON INC. BOTH MAKE VERY HIGH SPEED LENSES. SINGER MAKES AN EXCELLENT IMAGE INTENSIFICATION SYSTEM WHICH WE MIGHT USE.)

INFRARED PHOTOGRAPHY IS A BIT BEHIND CONVENTIONAL PHOTOGRAPHY, BUT THE NAVY HAS MADE SOME STARTLING ADVANCES IN THE LAST FEW YEARS. WE COULD PROBABLY WORK AT A DISTANCE OF A HALF MILE WITH IR EQUIPMENT.

ALL THE EQUIPMENT IS AVAILABLE, UNCLASSIFIED, AND COULD PROBABLY BE BORROWED OR RENTED FOR LITTLE MONEY.

ID NEED A WEEK OR TEN DAYS TO GET MY HANDS ON THE EQUIPMENT AND LEARN TO USE IT. THEN ALL WED NEED WOULD BE SOME COOPERATIVE UFO'S.

2484

KODAK 2484 Pan Film (ESTAR-AH BASE)

PHOTOGRAPHIC AND PHYSICAL PROPERTIES

KODAK 2484 Pan Film (ESTAR-AH Base) is an extremely high speed panchromatic film which is very useful for photorecording under weak illumination or when extremely short exposure times are encountered. A wide range of Exposure Index values may be used with this film, depending on the contrast of the original scene and the development selected. The high speed and flexibility of exposure and processing characteristics provide a unique capability for photorecording under a wide variety of conditions.

Features

- Extremely high speed
- Panchromatic
- ESTAR-AH Base (a tough, dimensionally stable, polyester support). The 0.10 density of this base reduces light piping and provides halation protection.
- Fast-drying PX backing

Uses

- Cine photography under low-light-level conditions
- CRT photography
- High-speed photography
- Missile tracking and reentry phenomena
- Spark-chamber photography

Color Sensitivity

Panchromatic

Darkroom Handling

KODAK 2484 Pan Film (ESTAR-AH Base) should be handled in total darkness

Storage

For best storage, keep the unopened box in a cool place 21 C (70 F) or below. To avoid moisture condensation on film that has been refrigerated, allow 16mm film to stand at room temperature for at least 1 to 1½ hours before removal from the package; for 35mm film, allow 2 to 3 hours.

Base

.004-inch ESTAR-AH with 0.10 density

RAR

KODAK 2479 RAR Film (ESTAR-AH Base)

PHOTOGRAPHIC AND PHYSICAL PROPERTIES

KODAK 2479 RAR Film (ESTAR-AH Base) is a member of the Kodak family of RAR Films designed especially for rapid-access recording and high-temperature processing up to 54.5° C (130° F). (See "The KODAK RAR Film Family" table on page 6.)

Features

- High speed
- Panchromatic emulsion with extended red sensitivity
- ESTAR-AH Base (.004 inch thick): a tough, dimensionally stable, polyester support with an optical density of 0.10 for light-piping protection
- Antihalation layer under the emulsion for improved halation protection
- Fast-drying backing suitable for processing in high-speed processors

IR!

Uses

CRT photography (all phosphors)
High-speed photography
Spark-chamber, explosion, flame-study photography
Schlieren photography
Radar recording (P7, P12 phosphors)
UV fluorescence photography
Modulated neon glow-tube photography

image intensification systems

Color Sensitivity

Panchromatic with extended red sensitivity

Exposure Information

Photorecording Sensitivity: 500. This figure is based on the reciprocal of the tungsten exposure in meter-candle-seconds required to produce a density of 0.10 above gross fog at an exposure time of 1/10,000 second and recommended development. The film was processed in KODAK Developer D-19, for 1 minute, at 35° C (95° F), with continuous agitation.

CRT Exposure Index: The figures given below are based on the reciprocal of the exposure in ergs/cm² required to produce the densities listed, with the given simulated phosphor, and with development in KODAK Developer D-19, for 1 minute, at 35° C (95° F), with continuous agitation.

Simulated Phosphor	CRT Exposure Index at Net Densities of	
	0.10	1.0
P11	160	20
P16	320	32
P24	64	8

Exposure Index: 320 [KODAK D-76 Developer for 1¾ minutes at 35° C (95° F), with continuous agitation]

Darkroom Handling

Total darkness required. After development is 50 percent completed, you can use a KODAK Safelight Filter, No. 3 (dark green), or equivalent, in a suitable safelight lamp with a 15-watt bulb for a few seconds if it is kept at least 1.2 meters (4 feet) from the film.

Storage

For best storage, keep the unopened box in a cool place 21° C (70° F) or below. To avoid moisture condensation on film that has been refrigerated, allow 16 mm film to stand at room temperature for at least 1 to 1½ hours before removal from the package; for 35 mm film, allow 2 to 3 hours.

Base
.004 inch, 0.10 density ESTAR-AH

KODAK High Speed Recording Films

For low-contrast or flatly lighted subjects—Development for maximum speed.

KODAK Film	Exposure Index[1]	Photo-recording Sensitivity[2]	CRT Exposure Index[3] (P11 Phosphor)	Resolving Power Class	RMS Granularity Class	Processing		
						KODAK Developer	Time (in minutes)	Temperature
2485 High Speed Recording (ESTAR-AH Base)	6,500	2,000	10,000	Low	Coarse	857	2½	95 F (35 C)
2475 Recording (ESTAR-AH Base)	4,000	1,250	1,600	Moderately Low	Coarse	DK-50	8	68 F (20 C)
2484 Pan Film (ESTAR-AH Base)	2,000	800	2,500	Medium	Moderately Coarse	D-19	4	68 F (20 C)

For normal pictorial photography or average scenes—Development for 0.65 to 0.80 gamma.

KODAK Film	Exposure Index[1]	Processing		
		KODAK Developer	Time (in minutes)	Temperature
2485 High Speed Recording (ESTAR-AH Base)	800	857	1½	95 F (35 C)
2475 Recording (ESTAR-AH Base)	1,000	DK-50	5	68 F (20 C)
2484 Pan (ESTAR-AH Base)	1,000	D-76	3	95 F (35 C)

1. For use with meters marked in Exposure Indexes or ASA Speeds.

2. Defined as 1/E @ 0.10 above gross fog; 1/10,000 sec tungsten exposure.

3. Measured at a density of 1.0 above gross fog.

For additional information, write to

Instrumentation Products Sales

EASTMAN KODAK COMPANY • ROCHESTER, N.Y. 14650

9-71 Major Revision-AX
Printed in the United States of America

2485

KODAK 2485 High Speed Recording Film (ESTAR-AH Base)

PHOTOGRAPHIC AND PHYSICAL PROPERTIES

KODAK 2485 High Speed Recording Film (ESTAR-AH Base) is an extremely high-speed, panchromatic film with extended red sensitivity. It is especially recommended for a wide variety of photorecording applications where weak signals of extremely short duration must be recorded, or where very high writing speeds are required. Speed and contrast can be varied over a very wide range for such a high-speed film by selecting the most suitable combination of developer time and temperature.

Features

- Extremely high speed
- Panchromatic emulsion with extended red sensitivity
- ESTAR-AH Base (a tough, dimensionally stable, polyester support)
  The 0.10 density of this base reduces light piping and provides halation protection
- Fast-drying PX backing

Uses

Wide range of photo instrumentation with all types of light sources

~~CRT recording with all phosphors~~

High-speed photography at low light levels

~~Streamer-chamber photography~~

Medical-science applications, such as pupillography

Photography of re-entry phenomena, and other applications which require that fleeting signals be recorded on a "go-or-no-go" basis

Color Sensitivity

Panchromatic with extended red sensitivity

extends slightly into INFRARED

Storage

For best storage, keep the unopened box of film in a cool place (70 F or below). If it is stored in a refrigerator, allow it to reach approximate room temperature before opening it. For 16mm film (any length) this will require a warm-up time of 1 hour for a 25 F increase in temperature or 1½ hours for a 100 F increase; 35mm film (any length) will require 3 hours for a 25 F increase, 5 hours for a 100 F increase. Keep the exposed film cool and dry (below 70 F and 50 percent relative humidity); process it promptly after exposure.

Base

.004-inch ESTAR-AH, with 0.10 density

HANDLING AND PROCESSING SURVEILLANCE PHOTOGRAPHS

Storage and Handling of Special-Purpose Films

Films designed to have high sensitivity to red and infrared radiation are also sensitive to the effects of heat and humidity. KODAK 2475 Recording Film and KODAK High Speed Infrared Films require special care in handling and storage.

Whenever possible, store unexposed recording films (in sealed containers) in a refrigerator or freezer. Unexposed rolls of KODAK High Speed Infrared Film *must* be stored in a refrigerator or freezer at 55 F (13 C), or lower, in the original container. Where the unexposed films are to be kept for extended periods of time (6 months or more), store film in sealed packages at 0 to –10 F (–18 to –23 C). If the film is stored in a refrigerator, remove it 2 hours before opening the package or can; if stored in a freezer, remove it about 4 hours before opening. This will prevent condensation of atmospheric moisture on the cold film.

Keep exposed film cool and dry. Process the film as soon as possible after exposure to avoid undesirable changes in the latent image. If it is necessary to hold exposed but unprocessed film for several days (such as over a weekend) it should be refrigerated below 40 F (4 C).

Infrared films *must* be handled in *total* darkness. This includes camera loading and unloading as well as processing. When processing infrared films, you should make sure that your darkroom does not admit infrared radiation. Some types of film developing tanks may also leak infrared radiation.

To avoid fogging recording films, load and unload the camera under subdued light or, better still, in total darkness. Make certain that the darkroom is actually lighttight for loading processing reels or loading cassettes from bulk rolls. Keep the film in its sealed container until it is loaded into the camera, and return it to the container after exposure to await processing.

Processing Surveillance Films

Where exposures are made under normal lighting conditions, medium-contrast fine-grain development will provide the most useful negatives. In many cases, however, the lighting conditions are not ideal, so that films must be exposed and processed for maximum film speed. It is best to choose a low-light-level surveillance film which has recommendations for processing to obtain maximum speed. Where such a film is not available, however, it is possible to increase the speed rating of normal black-and-white films by push-processing.

Push-Processing KODAK Black-and-White Films

For surveillance situations in which you don't have enough film speed and cannot change to a high speed surveillance film, you may have to underexpose and push-process the film. Although some quality is lost when you underexpose and push-process your black-and-white film, you can accept the slight loss in detail and image quality to get a picture that would otherwise be impossible. By increasing development time, you can obtain acceptable quality in *most* black-and-white pictures that have been underexposed by 1½ to 2 stops. The amount by which you can underexpose will depend on the contrast of the scene. For example, you can expose KODAK TRI-X Pan Film at EI 1250-1600 instead of its normal speed of EI 400.

Normal film speeds are based upon adequate exposure in the shadow end of the tone scale. Increasing development does not greatly increase the film speed based upon this shadow rendition. However, increased development does increase the contrast of most black-and-white films, and it significantly increases the densities in the middle-tone and highlight areas. There is, in effect, a speed increase for the middle-tone and highlight areas of the negative. This means that the film can be rated at a much higher than normal speed (with appropriate development) if the photographer is willing to sacrifice shadow detail.

Negatives that are underexposed and overdeveloped can give usable prints at the expense of increased grain and loss of shadow detail. Underexposed negatives will show better quality with push-processing than with normal processing, but

KODAK High Speed Recording Films

For low-contrast or flatly lighted subjects—Development for maximum speed.

KODAK Film	Exposure Index[1]	Photo-recording Sensi-tivity[2]	CRT Exposure Index[3] (Simulated P11 Phosphor)	Resolving Power Class	RMS Granularity Class	Processing		
						KODAK Developer	Time	Temperature
2485 High Speed Recording (ESTAR-AH Base)	6,500	2,000	800	Moderately Low	Coarse[4]	857	2½ Min	35 C (95 F)
2475 Recording (ESTAR-AH Base)	4,000	1,250	400	Moderately Low	Coarse[5]	DK-50	8 Min	20 C (68 F)
2484 Pan (ESTAR-AH Base)	2,000	800	320	Medium	Moderately[5] Coarse	D-19	4 Min	20 C (68 F)

For normal pictorial photography or average scenes—Development for 0.65 to 0.80 gamma.

KODAK Film	Exposure Index[1]	Processing		
		KODAK Developer	Time (in min)	Temperature
2485 High Speed Recording (ESTAR-AH Base)	800	857	1½	35 C (95 F)
2475 Recording (ESTAR-AH Base)	1,000	DK-50	5	20 C (68 F)
2484 Pan (ESTAR-AH Base)	1,000	D-76	3	35 C (95 F)

1. For use with meters marked in Exposure Indexes or ASA speeds.

2. Defined as 1/E @ 0.10 above gross fog; 1/10,000 sec tungsten exposure.

3. Measured at a density of 1.0 above gross fog.

4. Measured at a specular density of 1.0.

5. Measured at a diffuse density of 1.0.

For additional information, write to

Instrumentation Products Sales

EASTMAN KODAK COMPANY • ROCHESTER, N. Y. 14650

KODAK 2475 Recording Film (ESTAR-AH Base)

KODAK Pamphlet No. P-95

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in the use of infrared photography are so numerous that specific exposure settings should be determined by tests. If you do not know the beam-candle-power-second (BCPS) output of your electronic flash, try a guide number of about ¼ to ⅓ that which you use for Tri-X Pan Film. With an electronic flash unit of 1000 BCPS or ECPS, a Kodak Wratten Filter No. 87 and Kodak High Speed Infrared Film, start exposure tests with a guide number of about 55. With a 4000 BCPS unit try a guide number of 110 as a starting point.

Focusing for Infrared

Infrared rays, because of their longer wavelength, do not focus in the same plane as visible rays. It is therefore necessary to make an increase in the lens-to-film distance to correct for the focusing difference between infrared and visible rays. For best definition, infrared photographs should be exposed with the smallest lens opening that conditions permit. If large apertures must be used, and the lens has no auxiliary infrared focusing mark (usually a small red dot), a focusing correction can be established by photographic focusing tests. A basis for trial is the *extension* of the lens by ¼ of 1 percent of its focal length or a shift in the focus setting to a *nearer* distance by about the space between the infinity and 50-foot marks.

A

Infrared Surveillance Scopes

Several manufacturers provide infrared surveillance scopes that allow continuous observation of a suspect without detection. These devices use an image converter to translate the infrared into a visible image which is displayed on a screen. The screen is observed through an eyepiece and can also be photographed through this eyepiece. The infrared scope can be used to direct a camera which can photograph the suspect with the ambient infrared radiation or with infrared flash.

C

Using a Light Meter as a Guide for Exposures on Infrared Film

Regular exposure meters, which are essentially sensitive to visible radiation only, cannot be used with infrared film in daylight because of the varying ratio of infrared to visible radiation. With tungsten light sources, however, meters can be used as indicators of exposure. For infrared film, the exposure is best determined by actual photographic tests under prevailing conditions.

B

Light-Intensifier Scopes

Even in relatively dim light, high-speed films can usually capture the subject if the photographer can see clearly enough to focus his camera. For still lower light levels, developments in electronics provide a means for seeing and photographing subjects where even the eye cannot discriminate objects. Unlike the devices that convert invisible infrared radiation to visible light, these image intensifier systems require no external radiation source. Instead, the light provided by a distant street light, moonlight, or even starlight and reflected by the subject is captured and amplified electronically. The output of the electronic amplifier is converted to a bright image which can be observed with the eye or which can be photographed.

UFO'S

Most image intensifier systems have a high-speed, long-focal-length lens which forms the low-light-level image on an image converter tube. This tube converts the light image to electronic signals which are amplified several thousand times. The signal is transmitted to a screen that produces a visible display of the amplified image.

Observation and photography of the display can be done with a 35mm single lens reflex camera or a reflex-viewing movie camera placed at the eyepiece. (The manufacturer of the image intensifier unit recommends appropriate extension tubes or other devices required to focus the camera properly.) Adjusting the intensity of the displayed image may be done with the aperture of the objective lens on the scope. Use Kodak Tri-X Film or Kodak 2475 Recording Film (with normal processing) to photograph the display. The scope manufacturer provides a guide for trial exposures. Do not rely on through-the-lens metering systems to establish exposure requirements. The meter may serve as a guide to exposure after tests have been made to relate its response to actual film exposure.

Low-light image intensifier mechanisms can also be coupled to closed-circuit-television monitoring systems. Such a display can be monitored by several persons and photographed simultaneously. To photograph a closed-circuit-television monitor, load the camera with Kodak Tri-X Pan Film, focus the camera on the screen, and shoot at 1/30 second and $f/5.6$ with a leaf-type shutter or at ⅛ second and $f/11$ with a focal-plane shutter.

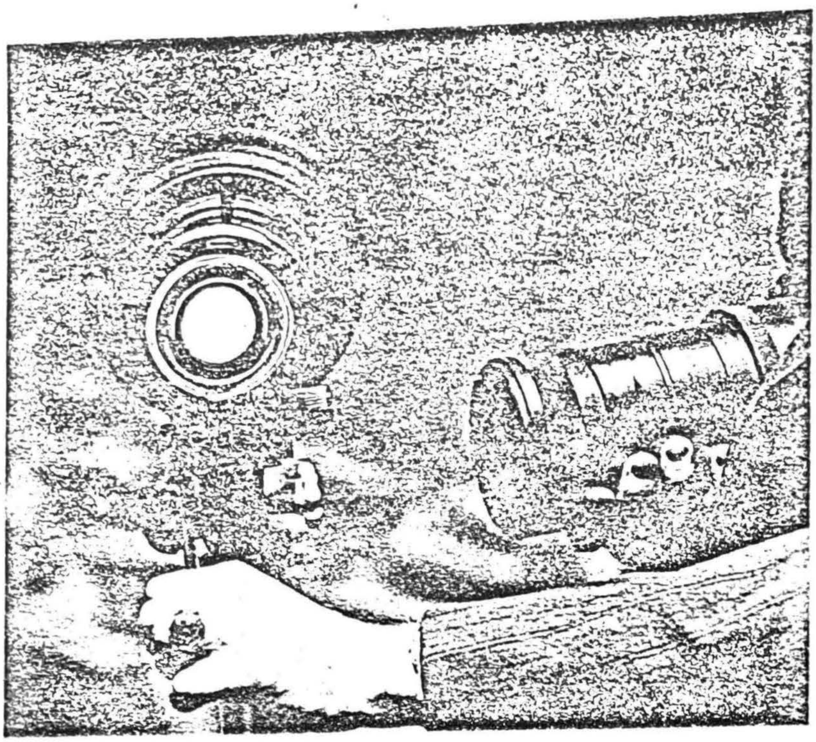

FIG. 28: Over the face of the intensifier tube, shown here, a focusing lens and camera back are fitted. Through a reflex prism, the photographer can observe actions which can be recorded on film by actuating the camera's focal-plane shutter.

Passive Surveillance

Normally in police surveillance, the camera is actively manned by an officer or controlled by him with a remote switching device. There are times, however, when a passive surveillance system, triggered by the suspect himself, can serve as a photographic stakeout. Many devices can sense the presence of an intruder and trigger the operation of a camera.

Photoelectric Detectors

Photoelectric detectors are among the oldest and most widely used types of detectors. One type of photoelectric detector relies on a beam of light falling on a photosensitive detector. When the light beam is broken, by a person entering a room for instance, the interruption causes the camera to operate.

Another type of photoelectric unit relies on the use of a detector that is sensitive to infrared radiation. The detector senses an increase in infrared radiation such as that radiated from the body of an intruder, and through electronic circuitry, causes the camera to operate.

Audio Detectors

This system relies on a microphone detector that detects only unusual or out-of-the-ordinary sounds such as those made by a person moving items in the protected area.

Vibration Detectors

These are very sensitive detectors of any movement in the protected area. They are generally employed in areas in which there should be no personnel during particular hours.

Capacitance Detectors

A capacitance field is established around the area. A person entering the area disturbs the balance of this field; this imbalance is detected by the unit and the camera is actuated.

Ultrasonic Detectors

The area is filled with ultrasonic sound waves having a frequency above 20,000 hertz. A frequency this high cannot be heard by the human ear. However, movement by a person in the area will cause a disturbance of the sound-wave pattern monitored by the detector, and the detector will activate the camera.

REFERENCES

1. Albina. N. 1965. (Palestine Archaeological Museum) Personal communication.
2. Anderegg, F. 1940. Agar plate photography. **Photo Technique, 2,** 78-79.
3. Anderson, D. C. 1961. (Forest Insect Laboratory. Ontario. Canada) Personal communication.
4. Andreucci. E. 1964. The behaviour of vegetation in infrared photography. **Ferrania, 12,** 13-19.
5. Anon. 1953. A new tool for weed control and defoliation research. **Am. Cyanograms, 3,** 26.
6. Anon. 1963. Infra-red microscope. **Med. Biol. Ill., 12,** 193.
7. Anon. 1966. Good subject, good idea. **Pop. Photogr., 59,** No. 6. 102-111.
8. Babel, A. 1935. Infrarot-photographie im Pflanzenschutz. **Angew. Botan., 17,** 45-53.
9. Barnes. D. F. 1958. Infra-red luminescence of minerals. **Geol. Survey Bul., 1052-C.** Washington: United States Government Printing Office (*visual study only*).
10. Barnes. R. B. 1963. Thermography of the human body. **Science, 140,** 870-877.
11. Bawden. F. C. 1933. Infra-red photography and plant virus diseases. **Nature, 132,** 168.
12. Beardsley. N. F. 1936. The photography of altered and faded manuscripts. **Library J., 61,** 96-99.
13. Bendikson. L. 1932. Phototechnical problems: some results obtained at the Huntington Library. **Library J., 57,** 789-794.
14. Bendikson. L. 1933. Charred documents. **Library J., 58,** 243-244.
15. Beral. L. 1949. Photographic techniques in combustion research. **Phot. J., 89B,** 98-107.
16. Binkin. J. 1933. **Mikrophotographie mit infraroten strahlen,** diss., Basel.
17. Blair, D. M., and Davies, F. 1933. Infra-red plates in neuro-histological illustration. **Lancet, 225, II,** 801.
18. Bridgman. C. F. 1957. (Rochester Museum Association) Personal communication.
19. Bridgman. C. F., and Gibson. H. L. 1963. Infra-red luminescence in the photographic examination of paintings and other art objects. **Studies in Conservation, 8,** 77-83.
20. Cade, C. M. 1962. Unlimited scope for infra-red photo surveys. **Can. Ind. Phot.,** 33-35. Oct.
21. Cade, C. M. 1964. The industrial potential of the "heat camera." **New Scientist No. 400,** 165-167. J1.
22. Calzavara, E., and Bertrand, I. 1927. Emploi des cyanines en micrographie. **Bul. Soc. Franc. Phot., 14,** 169-173.
23. Cartwright, H. C. 1930. Infra-red transmission of the flesh. **J. Opt. Soc. Am., 20,** 81-84.
24. Casida, L. E., Jr. 1968. Infrared color photography: selective demonstration of bacteria. **Science, 159,** 199-200.
25. Ciesla. W. M., Bell, J. C. Jr., and Curlin, J. W. 1967. Color photos and the southern pine beetle. **Photogram. Eng., 33,** 882-888.
26. Clark, C. N. 1961. (General Electric Company) Personal communication.
27. Clark. W. 1941. Atmospheric haze. **Photo Technique, 3,** 50-55.
28. Clark. W. 1946. **Photography by infrared,** 2nd ed.. New York: John Wiley and Sons, Inc.
29. Colwell, R. N. 1956. Determining the prevalence of certain cereal crop diseases by means of aerial photography. **Hilgardia (Cal. Agric. Exp. Sta.), 26,** No. 5.
30. Colwell, R. N. 1964. Aerial photography—a valuable sensor for the scientist. **Am. Scientist, 52,** 16-49.
31. Colwell, R. N. 1967. Remote sensing as a means of determining ecological conditions. **BioScience, 17,** 444-449, and cover.
32. Colwell, R. N. 1968. Remote sensing of natural resources. **Sci. Am., 218,** 54-69.
33. Colwell, R. N., Estes, J. E., Tiedeman, C. E., and Fleming. J. E. 1966. The usefulness of thermal infrared and related imagery in the evaluation of agricultural resources. **Report of the University of California, 1 & 11.**°
34. Coremans, P. 1938. Les rayons infra-rouges; leur nature; leurs applications dans les musées. **Bulle. Musées Royaux Art Hist., 6,** 87-91.
35. Cornwell, W. S. 1963. (Rochester Academy of Science) Personal communication.
36. Cott, H. B. 1956. **Zoological photography in practice.** London: Fountain Press.
37. de Latil, P. 1961. Color photography as an instrument of scientific observation and measurement (with technical data by I. Kitrosser). **Camera (Lucerne), 40,** 29-56.
38. Delay, A., and Lecomte, J. 1943. La photographie infrarouge et la pérméabilité des bois. **Sci. Ind. Phot. (2), 14,** 56-60.
39. Dent, R. V. 1941. The photographic aspect of light reflection from human skin. **J. Lab. Clin. Med., 26,** 1852-62.
40. Dhéré, C., and Biermacher, O. 1936. Spectrochimie biologique. **Compt. Rend., 203,** 412-414.
41. Drechsel, L. 1958. Ultrarot Polarisationsfilter. **Jenaer Jahrbuch, 1,** 55.
42. Eggert, J. 1936. La photographie au service de la paléontologie. **Procès-Verbaux, Rapports et Mémoires, IX Cong. Intern. Phot. (Paris, 1935),** 737-747.
43. Emerson, H. J. 1941. Stamp forger beware! **Photo Technique, 3,** 42-45.
44. Engel, C. E. 1959. Modern developments in infra-red recording. **Discovery, 20,** 392-396.
45. Engel, C. E. 1961. Infrared rays and their application. In: **Medical photography in practice,** (London: Fountain Press) 137-174.
46. Engel, C. E., Ed. 1968. **Photography for the Scientist.** London and New York: Academic Press.
47. Facto, L. A., and Catron, D. V. 1961. Time lapse cinematography as a method of studying animal behaviour and ration preferences. **J. Biol. Phot. Assoc., 29,** 113-123.
48. Farnsworth, M. 1938. Infra-red absorption of paint materials. **Technical Studies, 2,** 88-98 (*Fogg Museum of Art*).
49. Fielding, R. 1965. **The technique of special-effects cinematography.** New York: Hastings House.
50. Fowler, F. W., Jr., and Harlow, W. M. 1940. Infrared photomicrography reveals plant cell-wall structure. **Paper Ind. Paper World, 21,** 1159-60.
51. Fremlin, J. H., and Srirath. S. 1964. Thermo-luminescent dating; examples of non-uniformity of luminescence. **Archaeometry, 7,** 58-62.
52. Fricke, W., and Völger, K. 1965. Falschfarben-photographie für die Luftbild-interpretation. **Umschau Wiss. Tech., 65,** 441-442.
53. Friedel, R. A., and Gibson, H. L. 1964. Infra-red and ultra-

°No. 12-14-100-8316(20)

ments compared with panchromatic and infrared aerial photographs. (AD 603 499)

154. Pax. F. 1934. Die Untersuchung von Korallenskeleten im infraroten Licht. **Zoolog. Anzeiger, 106,** 15-17.

155. Plotnikow, J., and Mibayashi, R. 1931. Ausmessungen der Ausbreitung der Warmestrahlen in verschiedenen Tierkörperteilen nach der photographischen Methode. **Strahlentherapie, 40,** 546-561.

156. Popp, H. W., and Brown, F. 1936. Effects of different regions of the visible spectrum upon seed plants. In: B. M. Duggar, **Biological Effects of Radiation.** New York and London: McGraw-Hill; Chap. XXII.

157. Prát, S. 1935. Demonstration of photomicrographs of chromosomes made in infra-red rays. **Zesde Intern. Botan. Cong. Proc., 2,** 24.

158. Prát, S. 1936. Botanical photography with infra-red light. **J. Biol. Phot. Assoc., 4,** 191-201.

159. Preissecker, E. 1931. Über Mikrophotographie im infraroten Licht. **Wien. Klin. Wochschr., 2,** 1458-60.

160. Radley, J. A. 1948. **Photography in crime detection.** London: Chapman and Hall, Ltd.

161. Rawling, S. O. 1945. **Infra-red photography.** London and Glasgow: Blackie & Son, Ltd.

162. Reed, F. C. 1960. Lighting techniques for the photography of agar diffusion plates. **Tech. Bul. Registry. Med. Technol., 30,** 48-50.

163. Reinert, G. C. 1934. Note on the technique of infra-red photography. **Brit. J. Phot., 81,** 27-29.

164. Rhoads, D. C., and Stanley, D. J. 1966. Transmitted infrared radiation: a simple method for studying sedimentary structures. **J. Sedimentary Petrol., 36,** 1144-49.

165. Rieck, J. 1954. Infra-red kinematography. **Med. Biol. Ill., 4,** 89-94.

166. Rieck, J. 1964. Bild- und Ton-Zeitdehnung. **Kino-Tech., 18,** 277-278.

167. Rolfe, W. D. I. 1965. Uses of infrared rays. In: Kummel, Bernhard, and Roup, D. M., Eds.; **Handbook of paleontological techniques.** San Francisco: W. H. Freeman and Co.; 345-350.

168. St. Joseph, J. K. S., Ed. 1966. **The uses of air photography.** London: John Baker, Publishers.

169. Shillaber, C. P. 1949. The use of infrared to show differences in material. In: **Photomicrography in theory and practice,** 4th printing. New York: John Wiley and Sons, Inc.; 594-597.

170. Simon, I. 1966. **Infrared radiation.** Princeton: D. Van Nostrand Co. Inc.

171. Somerford, A. W. 1961. Technique of infra-red luminescence photography. **Identification News, 11,** No. 7, 4-6, 10.

172. Sonne, C. 1929. Investigations on the actions of luminous rays and their modes of action. **Arch. Phys. Ther. X-ray Radium, 10,** 93-103.

173. Spurr, S. H. 1960. **Photogrammetry and photointerpretation,** 2nd ed., New York: The Ronald Company.

174. Stellingwerf, D. A. 1966. **Practical applications of aerial photographs in forestry and other vegetable studies,** Series B, No. 36. Delft: International Training Center for Aerial Survey ITC Publications.

175. Sternitzky, J. L. 1955. **Forgery and fictitious checks.** Springfield: Charles C. Thomas, Publisher.

176. Strandberg, C. H. 1964. An aerial water quality reconnaissance system. **Photogram. Eng., 30,** 46-54.

177. Strandberg, C. H. 1966. Water quality analysis. **Photogram. Eng., 32,** 234-248.

178. Strandberg, C. H. 1967a. **Aerial discovery manual.** New York: John Wiley and Sons, Inc.

179. Strandberg, C. H. 1967b. Photoarchaeology. **Photogram. Eng., 33,** 1152-57.

180. Strandness, D. E. Jr. 1967. Liquid crystals monitor skin temperature. **Rassegna, 44,** 16-22.*

181. Swindle. P. F. 1935. The architecture of the blood vascular networks in the erectile and secretory lining of the nasal passages. **Ann. Oto. Rhino. Laryng., 44,** 913-932.

182. Tarkington, R. G., and Sorem, A. L. 1963. Color and false color films for aerial photography. **Photogram. Eng., 28,** 88-95.

183. Tholl, J. 1951. Infrared photography of documents. **J. Phot. Soc. Am. (Phot. Sci. Tech.), 17B,** Part I, 10-13, Part II, 34-39.

184. Tholl. J. 1967. Short wave ultraviolet radiation—its uses in the questioned document laboratory. **Police, 11,** 21-28.

185. Thompson, M. M.. *et al.* 1966. **Manual of photogrammetry,** Vol. I, II, 3rd ed.. Washington: American Society of Photogrammetry.

186. Tombaugh, C. W. 1964. Planetary and lunar research in the photographic infrared, visible, and ultraviolet. U. S. Govt. Res. Rept., 39, 39.

187. Tonzig, S., and Viterbi, E. 1935. La fotografia die vegetali mediante le radiazioni infrarosse. **Atti I. Congr. Intern. Elletro-Radio-Biologia, 1,** 459-463.

188. Treffers, H. P., and Moore, D. H. 1941. The use of infrared film for electrophoretic and ultracentrifugal analyses. **Science, 93,** 240.

189. Viterbi, E., and Cirolinia, W. 1934. L'opacita differenziale all' infrarosso utilizzata in richerche anatomiche—I. **Mon. Zool. Ital., 45,** 12-17.

190. Wagman, I. H., and Gullberg, J. E. 1942. The relationship between monochromatic light and pupil diameter. The low intensity visibility curve as measured by pupillary measurements. **Am. J. Physiol., 137,** 769-778.

191. Wagner, G. 1965. **Infrarot Fotografie. Stuttgart: Verlag** Die Schönen Bücher, Dr. Wolf Strache.

192. Wallis, F. G. 1952. Process work by infra-red. **Proc. Engraver's Monthly, 59, 110-115.**

193. Walton, J. 1935. An application of infra-red photography in paleobotanical research. **Nature, 135,** 265.

194. Waters, L. A. 1934. Further experiments in infra-red. **Camera (Phila.), 48,** 233-238.

195. Weber, H. 1967a. Exotic emulsions. **Camera 35, 11,** 50-52, 69.

196. Weber, H. 1967b. A primer on infra-red. **Camera 35, 11,** 64, 79-80.

197. Weber, K., and Savic, M. L. 1934. Die photographische Unterscheidung der natürlichen Perlen von gezüchteten. **Phot. Korr., 70,** 10-11.

198. Wehlte, G. 1955. Gemäldeuntersuchung im Infrarot. **Maltechnik, 61,** 52-58.

199. West, L. 1956. Infrared film for special effects. **Pop. Photogr., 50,** 72-73, 122.

200. Whipple, H. E., ed. 1964. Thermography and its clinical applications. **Ann. New York Acad. Sci., 121,** 1-304.

201. White, E. E., and Hayes, R. J. 1961. The use of stereocolor photography for soil profile studies. **Phot. J., 101, 211-215.**

202. Williams, K. Lloyd-, and Cade, C. M. 1964. Pictorial recording of body temperature. **Med. Biol. Ill., 14,** 105-112.

203. Wilson, R. C. 1960. **Manual of photographic interpretation,** Chap. VII. Menasha: The George Banta Co., Inc.

204. Wolfe, W. L., Ed. 1965. **Handbook of military infrared technology.** Washington: Office of Naval Research. Department of the Navy.

*Medical review, English edition.