



CONTACT INFORMATION
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Arizona Geological Survey
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The following file is part of the John E. Kinnison mining collection

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PRODUCT	BLACK and WHITE PRINTS			COLOR PRINTS		
	1-25	Over 25	FULL ROLLS	1	2 or OVER	FULL ROLLS
CONTACT PRINTS (PAPER ONLY)						
70MM	1.25	1.00	0.65	4.00	2.50	1.25
5"x5"	1.50	1.00	0.75	NA	NA	NA
9"x9" or 10"x10" Neg. to Pos. Pos. to Pos.	1.75	1.25	0.85	7.00	3.00	2.00
10"x12" (PHOTOINDEX)	2.50	2.50	NA	7.00	5.00	2.50
20"x24" (PHOTOINDEX)	3.00	3.00	NA	NA	NA	NA
ENLARGEMENTS (PAPER ONLY)						
9"x9" (from 70mm only)	1.75	1.25	1.00	7.00	5.00	3.75
18"x18" THRU 20"x20"	3.50	3.00	NA	15.00	9.00	NA
24"x24" THRU 30"x30"	4.50	3.50	NA	20.00	14.00	NA
36"x36" THRU 40"x40"	9.00	8.00	NA	25.00	20.00	NA
FILM TRANSPARENCIES-INTER-NEGS						
16MM (100FT. ROLLS)	NA	NA	10.00	NA	NA	20.00
35MM (100FT. ROLLS)	NA	NA	11.50	NA	NA	25.00
70MM	2.50	2.50	1.25	4.00	2.50	1.25
5"x5"	2.75	2.75	1.35	NA	NA	NA
9"x9" or 10"x10"	3.00	3.00	1.50	10.00	8.00	4.00
FILM TRANSPARENCIES-ENLARGEMENTS						
9"x9" (from 70MM only)	3.00	3.00	2.25	10.00	8.00	4.00
20"x20"	NA	NA	NA	20.00	15.00	NA
30"x30"	NA	NA	NA	30.00	25.00	NA
40"x40"	NA	NA	NA	60.00	55.00	NA
KELSH PLATES						
Contact Prints on Glass. Specify thickness (0.25 or 0.06 inch) and method of printing (emulsion to emulsion or through film base)	6.50	6.00	NA	NA	NA	NA
ER-55 PLATES						
Reductions on Glass (11x11cm)	5.00	4.50	NA	NA	NA	NA
TRANSFORMED PRINTS						
From CONVERGENT or TRANSVERSE Low Oblique photographs	3.50	3.00	NA	NA	NA	NA

NOTES:

Prices listed are per frame except for 16mm and 35mm transparencies which are 100ft rolls. The "over 25" price applies only to those prints in excess of 25 of the same size. The full roll price applies to orders for all frames on the roll and for the product to be delivered in roll form.

For an intermediate-size enlargement, use the price listed for the next larger size.

ERTS DATA FACT SHEET

INTRODUCTION

On Sunday, July 23, 1972, the Earth Resources Technology Satellite (ERTS-A) was launched into a sun synchronous polar orbit around the earth. The satellite has the capability for producing coverage of most of the earth on an 18-day repetitive cycle. The sensors on board the spacecraft transmit images to NASA receiving stations in Fairbanks, Alaska; Goldstone, California; and Greenbelt, Maryland. Images are also received by the Canadian government at their antenna in Prince Albert, Saskatchewan. The images received at the NASA antennae are converted from electronic signals to photographic negatives at the Goddard Space Flight Center in Greenbelt, Maryland. Master copies of the images are immediately flown to the EROS Data Center in Sioux Falls, South Dakota where the images are placed in the public domain and where requests for reproductions of the images can be filled for the scientific community, industry, and the public at large.

THE ERTS-A SENSORS

The ERTS-A spacecraft carries two types of imaging sensors: The Multi-Spectral Scanner (MSS) and the Return Beam Vidicon (RBV) cameras.

Multi-Spectral Scanner

The Multi-Spectral Scanner (MSS) is a line-scanning device which uses an oscillating mirror to simultaneously scan the terrain passing beneath the spacecraft. The scanner produces four synchronous images, each at a different wave band. The wave-length ranges of each band are:

Band 4 (green)	0.5 to 0.6 micrometers
Band 5 (lower red)	0.6 to 0.7 micrometers
Band 6 (upper red-lower infrared)	0.7 to 0.8 micrometers
Band 7 (infrared)	0.8 to 1.1 micrometers

Band 7 is the best for land-water discrimination. Band 5 is best for showing topographic and cultural features, such as drainage patterns, roads, and towns. Band 4 sometimes discriminates, qualitatively, the depth and/or turbidity of standing bodies of water. Band 6 shows the best tonal contrasts that reflect various land use practices; it also gives maximum land-water contrast.

Thus, for general display purposes, a scene is best presented by four photos. If only one photo is wanted, however, band 5 will usually be the best selection.

Bands 4, 5, 6 and 7 correspond respectively with MSS bands 1, 2, 3 and 4 on the ERTS Order Form.

The electronic signals are converted to 70mm System Corrected Images (Bulk) at Goddard Space Flight Center, and master reproductions are shipped to the EROS Data Center. The image scale is approximately 1:3,369,000 and the swath width is approximately 100 nautical miles wide. Although the scanner data are acquired in a continuous swath, in the process of electronic signal to image conversion the images are divided into frames to correspond with the frame coverage of the RBV cameras.

Return Beam Vidicon

The Return Beam Vidicon cameras are television cameras mounted side by side in the spacecraft and bore-sighted to simultaneously photograph the earth beneath the spacecraft. The individual frames of RBV images cover approximately 100 x 100 nautical miles and overlap by 10% along the spacecraft track. They are converted from electronic signals to black and white photographic positives on 70mm film by Electron Beam Recorders (EBR's). These original images, called System Corrected Images (Bulk), have a scale of approximately 1:3,369,000. Master reproducible copies of all System Corrected Images (Bulk) collected by the spacecraft and processed by Goddard Space Flight Center are supplied to the EROS Data Center in the 70mm format.

Because of functional problems, the RBV sensor was rendered inoperative on approximately August 15, 1972. Therefore, we have received no RBV images since that time. Until such time that the RBV camera might be turned on again, we will substitute MSS images on all orders, if RBV scenes are not available.

Some RBV scenes, viewed prior to its deactivation, are in our data base. The wave-length ranges of each band are:

Band 1 (green)	.460 to .600 micrometers
Band 2 (red)	.560 to .680 micrometers
Band 3 (infrared)	.660 to .820 micrometers

The spectral bands for the two systems are similar; the main difference is in the way in which the images are formed. The biggest loss resulting from failure of the RBV system was use of the images for cartography; the geometric fidelity of the RBV is higher than that of the MSS.

Scene Corrected Images

Selected frames of the RBV and MSS images are being further processed by the Goddard Space Flight Center into images called Scene Corrected Images (Precision Processed). In this process, the images are matched to ground control points with known locations, and the images corrected to a truly orthographic projection. A Universal Transverse Mercator (UTM) grid is super-imposed on the image. System Corrected Images (Precision Processed) are prepared at a scale of 1:1,000,000 with an image area of approximately 7½" x 7½" on a 9" x 9" format, including marginal data. Master reproducible copies of all scene corrected images produced by Goddard are supplied to the EROS Data Center in the 9" x 9" format.

COLOR COMPOSITES

Only selected scenes of the RBV and MSS images are reproduced as color composites. Therefore, color composites do not exist for all ERTS scenes. These are selected and created at the Goddard Space Flight Center and added to our data base at intervals as a master reproducible color positive.

Three spectral bands from either the RBV or MSS images are registered and sequentially exposed through appropriate filters onto color film at a scale of 1:1,000,000. The image size is approximately 7½" x 7½" on an overall format of 9" x 9".

Inquiry should be made as to the availability of a color composite over a certain area before submitting payment.

PRODUCTS AVAILABLE

Bulk Images

The individual frames of system corrected (bulk) RBV and MSS images are available at contact scale (approximately 1:3,369,000 on a 70mm format) or as enlargements at a scale of 1:1,000,000 with an image area of approximately 7½" x 7½" on a 9" x 9" format; at a scale of 1:500,000 with an image area of approximately 15" x 15" on a 20" x 20" material; and at a scale of 1:250,000 with an image area of approximately 30" x 30" on 40" x 40" material. Reproductions can be provided on resin-coated paper at all scales above or on film as positive or negative images at the 1:3,369,000 or 1:1,000,000 scales.

Precision Images

For the selected frames that have been precision processed by Goddard Space Flight Center and master reproducible supplied to the EROS Data Center, Scene Corrected Images (Precision Processed) reproductions are available at 1:1,000,000; 1:500,000; and 1:250,000 with image sizes corresponding to those listed above. Reproductions are available on paper at the above scales or on film as positive or negative images at the 1:1,000,000 scale.

Negative Products

All negative products produced by the Data Center are being reproduced on Eastman Kodak 2422 duplicating film unless specified otherwise by the customer. This film, which is a direct reversal film, allows us to make a duplicate negative in one photographic generation. It has, however, a limited density range (equal to 1.7 with a gamma of 1.14) which is not capable of encompassing the entire density range inherent in the original ERTS negative. These negatives are quite useful for making paper reproductions of the imagery since paper inherently has an even more compressed density

range. They are of limited value, however, for customers planning to do radiometric studies or creating their own color composites. For these purposes, we suggest that an N-4 negative be ordered. This requires that an intermediate positive be produced on Eastman Kodak 2430 film which is then contacted again to Eastman Kodak 2430 film to produce a fourth generation negative. This product has a density range of 2.0 corresponding to the second generation master reproducible negative. Customers ordering the fourth generation negative must specifically specify this product and pay for the intermediate positive which is required. The intermediate positive (P3) will be delivered along with the fourth generation negative.

Color Reproductions

For those RBV and MSS scenes that are color composited by Goddard and supplied to the EROS Data Center, color reproductions are available at 1:1,000,000, 1:500,000, and 1:250,000 as paper prints with image sizes corresponding to the above.

Computer Compatible Tapes

Computer compatible digital tapes of ERTS images may be ordered from the Data Center. However, only those scenes prepared in computer compatible tape (CCT) form by NASA/Goddard will be available. This represents a small percentage of the total scenes imaged by the ERTS Satellite. Those CCT's that are available for distribution are listed in NASA publications, the U.S. Standard Catalog and the non-U.S. Standard Catalog. Four CCT's are required for the digital data corresponding to one scene observation by either the RBV (three spectral images) or the MSS (four spectral images). The price per scene (four CCT's) is \$160.00.

MICROFILM

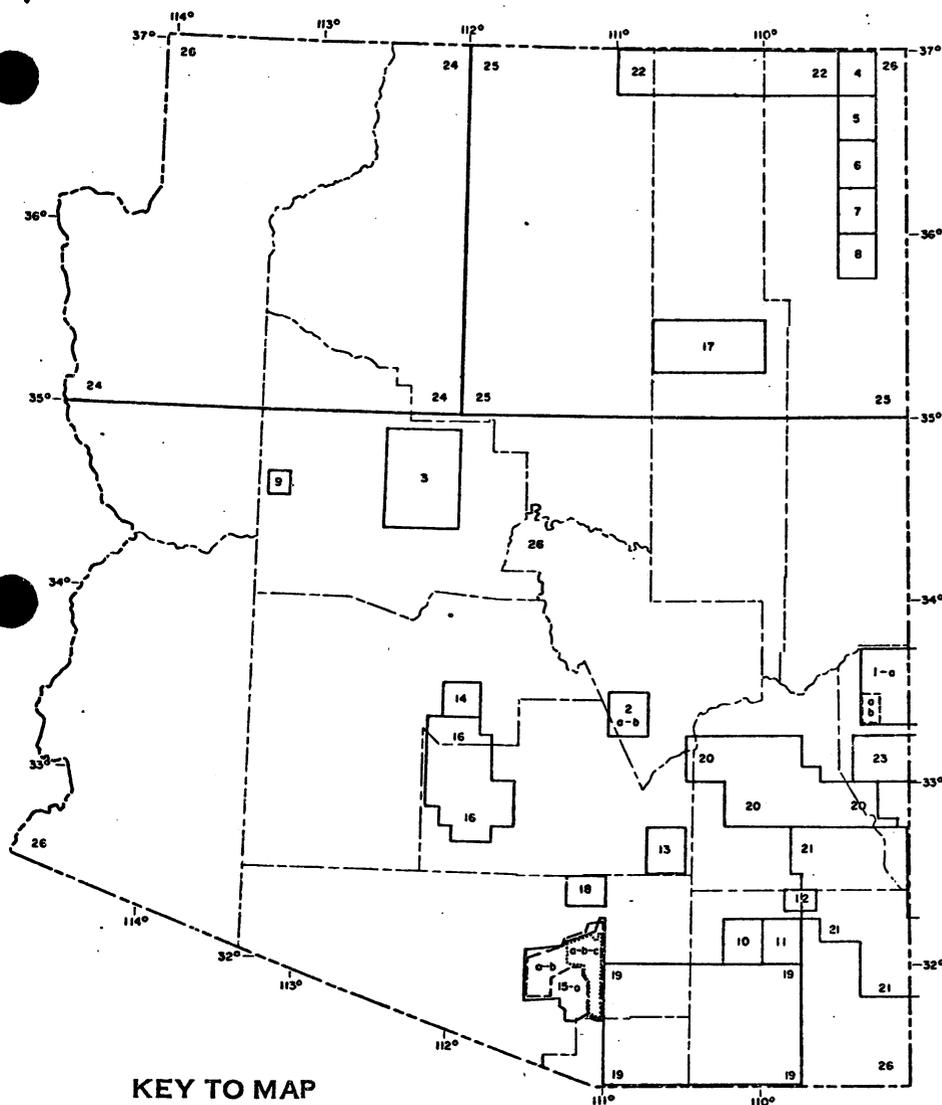
After every 30 days, the Goddard Space Flight Center prepares a complete listing of photography acquired and a 16mm "browse" microfilm of representative images acquired during the previous 30 days. The microfilms are not intended for analysis purposes, but are instead intended to provide visual index to the coverage and a capability for cloud cover assessment by the user. The Band 2 RBV and Band 5 MSS image from each scene will appear on the microfilm. The microfilms are available for purchase from the Data Center on open reels suitable for mounting by the user in a cartridge of his choice or in microfiche jackets.

ERTS DATA CATALOGS

The listing of the imagery shown on the microfilm mentioned previously, is published in ERTS Standard Catalogs. These catalogs may be purchased from: Main GEO Bookstore, 710 North Capitol Street, Washington, DC 20402 at the following prices:

Standard U.S. Catalog	\$1.25
Standard non-U.S. Catalog	\$2.00

AEROMAGNETIC MAP INDEX OF ARIZONA



KEY TO MAP

1. 1969. (a) Ratte, J.C., Landis, E.R., Gaskill, D.L., U.S. Geological Survey, and Raabe, R.G., U.S. Bureau of Mines, with a section on Aeromagnetic interpretation by Eaton, G.P., U.S. Geological Survey, Mineral resources of the Blue Range primitive area, Greenlee County, Arizona, and Catron County, New Mexico: U.S.G.S. Bulletin 1261-E, p. 91, Plate 1. Aeromagnetic Map scale 1:62,500.
1969 (b) Eaton, G.P. and Ratte, J.C., Aeromagnetic map of southwest part of Blue Range primitive area, Arizona: U.S.G.S. Open-file, scale 1:62,500.
2. 1964. (a) Jespersen, A., Aeromagnetic interpretation of the Globe-Miami copper district, Gila and Pinal Counties, Arizona: U.S.G.S. Professional Paper 501-D, pp. 70-75, figure 3. Aeromagnetic map by Dempsey, W.J. and Hill, M.E., 1946.
1952. (b) Dempsey, W.J., Aeromagnetic map of Globe quadrangle, Gila County, Arizona: U.S.G.S. Open-file.
3. 1963. Dempsey, W.J., Hill, M.E., and others, Aeromagnetic map of central Yavapai County, Arizona, including the Jerome district: GP-402, scale 1:62,500.
4. 1963. Frischknecht, F.C., Petrafeso, F.A. and others, Aeromagnetic map of part of the Toh-Atin Mesa quadrangle, Apache County, Arizona: GP-403, scale 1:62,500.
5. 1963. Frischknecht, F.C., Petrafeso, F.A., and others, Aeromagnetic map of part of the Los Gigantes Buttes quadrangle, Apache County, Arizona: GP-404, scale 1:62,500.
6. 1963. Frischknecht, F.C., Petrafeso, F.A., and others, Aeromagnetic map of the Yellowstone Canyon quadrangle, Apache County, Arizona: GP-405, scale 1:62,500.
7. 1963. Frischknecht, F.C., Petrafeso, F.A., and others, Aeromagnetic map of the Canyon Del Muerto quadrangle, Apache County, Arizona: GP-406, scale 1:62,500.
8. 1963. Frischknecht, F.C., Petrafeso, F.A., and others, Aeromagnetic map of the Nazlini quadrangle, Apache County, Arizona: GP-407, scale 1:62,500.
9. 1963. Dempsey, W.J., Fackler, W.D., and others, Aeromagnetic map of the Bagdad area, Yavapai County, Arizona: GP-411, scale 1:62,500.
10. 1963. Dempsey, W.J., Fackler, W.D., and others, Aeromagnetic map of the Dagoon quadrangle, Cochise County, Arizona: GP-412, scale 1:62,500.
11. 1963. Dempsey, W.J., Fackler, W.D., and others, Aeromagnetic map of the Cochise quadrangle, Cochise County, Arizona: GP-413, scale 1:62,500.
12. 1963. Dempsey, W.J. and Hill, M.E., Aeromagnetic map of parts of the Willcox and Luzena quadrangles, Cochise County, Arizona: GP-418, scale 1:62,500.
13. 1963. Dempsey, W.J. and Hill, M.E., Aeromagnetic map of the Mammoth quadrangle, Pinal and Pima Counties, Arizona: GP-419, scale 1:62,500.
14. 1963. Dempsey, W.J. and Hill, M.E., Aeromagnetic map of parts of the Phoenix, Mesa, Camelback, and New River SE quadrangles, Maricopa County, Arizona: GP-420, scale 1:62,500.
15. 1963. (a) Andreasen, G.E., and Pitkin, J.A., Aeromagnetic map of the Twin Buttes area, Pima and Santa Cruz Counties, Arizona: GP-426, scale 1:62,500.
1962. (b) Andreasen, G.E. and Pitkin, J.A., Aeromagnetic map of the Twin Buttes area, Pima and Santa Cruz Counties, Arizona - flown at 4,000 feet barometric elevation: U.S.G.S. Open-file, scale 1:62,500.
1962. (c) Andreasen, G.E. and Pitkin, J.A., Aeromagnetic map of the Twin Buttes area, Pima and Santa Cruz Counties, Arizona - flown at 500 feet barometric elevation: U.S.G.S. Open-file, scale 1:62,500.
16. 1965. Mitchell, C.M. and Zandle, G.L., Aeromagnetic map of the Casa Grande area, Maricopa and Pinal Counties, Arizona: GP-548, scale 1:62,500.
17. 1966. Mitchell, C.M. and Vargo, J.L., Aeromagnetic map of Hopi Buttes and vicinity, Navajo County, Arizona: GP-575, scale 1:125,000.

OTHER AEROMAGNETIC MAPS
ON OPEN-FILE.

1952. Dempsey, W.J., Aeromagnetic map of part of Cortaro quadrangle, Pima County, Arizona: U.S.G.S. Open-file.
19. 1965. Andreasen, G.E., Mitchell, C.M., and Tyson, N.S., Aeromagnetic map of Tombstone and vicinity, Cochise and Santa Cruz Counties, Arizona: U.S.G.S. Open-file, scale 1:125,000.
20. 1966. Andreasen, G.E. and Galot, G.A., Aeromagnetic map of Safford and vicinity, Graham and Greenlee Counties, Arizona: U.S.G.S. Open-file, scale 1:125,000.
21. 1966. Andreasen, G.E. and Galot, G.A., Aeromagnetic map of the San Simon Valley area, Cochise, Graham, and Greenlee Counties, Arizona, and Hidalgo County, New Mexico: U.S.G.S. Open-file, scale 1:125,000.
22. 1970. U.S. Geological Survey, Aeromagnetic map of the central Colorado Plateau, Utah, Colorado, and Arizona: U.S.G.S. Open-file, scale 1:250,000.
23. 1970. U.S. Geological Survey, Aeromagnetic map of the Morenci-Monticello area, southeastern Arizona and southwestern New Mexico: U.S.G.S. Open-file, scale 1:62,500.

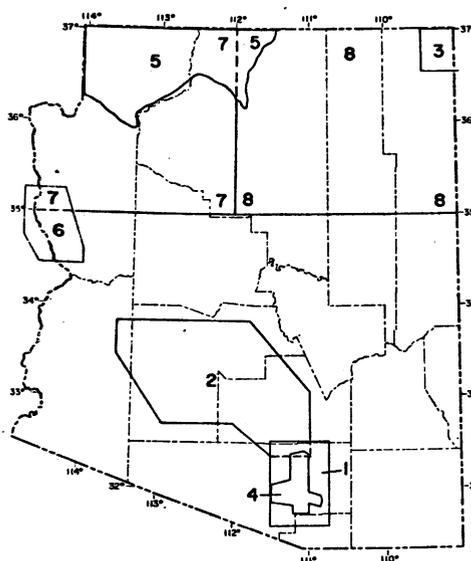
U.S.G.S. MISCELLANEOUS
GEOLOGIC INVESTIGATIONS
MAP I SERIES

24. 1968. Zietz, I. and Kirby, J.R., Transcontinental Geophysical Survey (35°-39°N) Magnetic map from 112°W longitude to the coast of California: I-532-A, scale 1:1,000,000.
25. 1968. Zietz, I. and Kirby, J.R., Transcontinental Geophysical Survey (35°-39°N) Magnetic map from 100° to 112°W longitude: I-533-A, scale 1:1,000,000.

OTHER
AEROMAGNETIC MAPS

26. 1971. Sumner, J.S. and Sauck, W.A., Residual Aeromagnetic map of Arizona: scale 1:1,000,000. Map may be obtained from the Department of Geoscience, College of Earth Science, University of Arizona, Tucson, Arizona 85721, at a cost of \$3.00.

GRAVITY MAP INDEX
OF ARIZONA



KEY TO MAP

1. 1961. Plouff, D., Gravity Survey near Tucson, Arizona: U.S.G.S. Professional Paper 424-D p. 258 Figure 384.2.
2. 1968. Peterson, D.L., Bouguer Gravity map of parts of Maricopa, Pima, Pinal, and Yuma Counties, Arizona: GP-615 scale 1:250,000.
3. 1958. Plouff, D., Bouguer Gravity Anomaly map of the Carrizo area, Arizona and New Mexico: Figure 5 U.S.G.S. Open-file.
4. 1962. Plouff, D., Bouguer Gravity Anomaly map of the Twin Buttes area, Pima and Santa Cruz Counties, Arizona: U.S.G.S. Open-file.
5. 1968. Popenoe, P., Complete Bouguer Gravity Anomaly map of the area north of the Grand Canyon in Arizona: U.S.G.S. Open-file, scale 1:250,000.
6. 1969. Peterson, D.L., Bouguer Gravity map of the Needles area, San Bernardino County, California, Mohave County, Arizona, and Clark County, Nevada: U.S.G.S. Open-file, scale 1:125,000.
7. 1968. Compiled by the United States Air Force Aeronautical Chart and Information Center, Transcontinental Geophysical Survey (35°-39°N) Bouguer Gravity map from 112°W longitude to the coast of California: U.S.G.S. Map I-532-B, scale 1:1,000,000.
8. 1968. Compiled by the United States Air Force Aeronautical Chart and Information Center, Transcontinental Geophysical Survey (35°-39°N) Bouguer Gravity map from 100° to 112°W longitude: U.S.G.S. Map I-533-B, scale 1:1,000,000.

PUBLICATIONS

NEW U.S. GEOLOGICAL
SURVEY PROFESSIONAL PAPERS

Professional Paper No. 521-C entitled "Geology of the Paleozoic Rocks, Navajo and Hopi Indian Reservations, Arizona, New Mexico and Utah," recently released can be obtained from the Superintendent of Documents, Government Printing Office, Washington, D.C. 20402, price: \$1.25.

Also newly released and obtainable from the Superintendent of Documents is Professional Paper No. 521-D entitled "Hydrogeology of the Cenozoic igneous rocks, Navajo and Hopi Indian Reservations, Arizona, New Mexico, and Utah," by J.P. Akers, J.C. Shorty, and P.R. Stevens, price: \$1.25.

NOTE

Note: Publications and maps issued by agencies other than the Arizona Bureau of Mines must be ordered directly from the issuing agency. Arizona Bureau of Mines publications and maps may be purchased at, or ordered from the Arizona Bureau of Mines, University of Arizona, Tucson, Arizona 85721.

ERRORS AND OMISSIONS

The editors of "Fieldnotes" are human and in spite of careful checking, typographical mistakes, errors, and omissions do creep into the finished copy. For these, we offer our sincere apologies.

In the Vol. 1, No. 2, on page 11, under Arizona State University, Dr. Péwé's first name should be Troy and not Roy and in listing the faculty we failed to include Dr. Chester F. Royse, Assistant Professor of Geology, who specializes in physical and chemical sedimentology of Tertiary and recent fluvial, lacustrine, and shallow marine deposits, and in paleo-environmental reconstruction.

We have been reminded that in the same number on page 6, column 2, under the discussion of the Multiple Surface Use Act, petrified wood was removed from location under the mining law by a 1962 amendment.

We gratefully appreciate the several letters and information received concerning omissions in the "Geologic Map Index of Arizona" and "Index to Road and River Logs in Arizona" that were included in the first two editions. These indices are to be updated periodically in future issues of "Fieldnotes" and the items missed will be included.

INTER-OFFICE MEMORANDUM

TO
ATJ. J. Durek
Oakland, California

DATE November 20, 1972

FROM John E. Kinnison
AT Tucson, Arizona

COPIES TO

File
BlueSUBJECT Aerial Photography,
Arizona

As we discussed last week via the telephone, I am forwarding to you a list of high-altitude photography and mosaics to supplement our existing coverage in Arizona. I have prepared a transmittal letter to the Map Information Office of the USGS which you may or may not wish to relay when you handle ordering through an Oakland requisition. The payment should accompany the order, both to facilitate handling of the photography and to place the charge on this year's budget.

/fn
Enclosures

November 20, 1972

Map Information Office
U. S. Geological Survey
Washington, D. C.

Gentlemen:

I kindly request that you fill the attached order for 801 contact prints (9" x 9", trimmed) of vertical, high-altitude photography of Arizona. These photos are to be used in geological mapping.

I also request that you fill the order for photo-index sheets (20" x 24") of this high-altitude photography also listed on the attached sheet.

From our latest price list, we calculate the following cost of 801 photographs and 14 photo-index sheets:

25 x (\$1.25 + 0.05)	\$ 32.50
776 x (\$0.90 + 0.05)	737.20
14 x (\$2.50)	<u>35.00</u>
	\$804.70

Enclosed please find payment for the above amount.

Very truly yours,

John E. Kinnison
Regional Geologist

JEK/fn
Enclosures

b.c.c. J. J. Durek
File
Blue

PRINTS

<u>PROJECT NO.</u>	<u>LOT</u>	<u>SHEET</u>	<u>STRIP</u>	<u>EXPOSURES</u>	<u>TOTAL</u>
134	FA	4 of 4	17	1056 - 1078	23
			18	1 - 25	25
			19	65 - 89	25
			20	125 - 149	25
			21	152 - 174	23
			22	214 - 236	23
			23	1079 - 1089, 245 - 255	22
			24	293 - 313	21
			25	355 - 373	19
			26	1128 - 1142	15
			27	474 - 486	13
			28	1143 - 1155	13
					<u>247</u>
120	AK	5 of 9	1	557 - 571	14
			2	275 - 289	15
			3	32 - 50	19
			4	538 - 556	19
			5	108 - 128	21
			6	472 - 494	23
			7	449 - 471	23
			8	174 - 198	25
			9	607 - 633	27
			10	1050 - 1075	26
			11	638 - 662	25
			12	1017 - 1043	27
		<u>264</u>			
120	AK	9 of 9	13	675 - 705	31
			14	942 - 970	29
			18	800 - 811	12
			19	878 - 888	11
			20	919 - 929	11
			21	345 - 354	10
			22	378 - 388	11
			23	416 - 426	11
			24	1296 - 1305	10
		<u>136</u>			
145	Area M14	18 of 19		4968 - 4978	11
				5025 - 5037	13
				5056 - 5069	14
				5119 - 5133	15
				5306 - 5318	13
		<u>66</u>			

PRINTS (continued)

<u>PROJECT NO.</u>	<u>LOT</u>	<u>SHEET</u>	<u>STRIP</u>	<u>EXPOSURES</u>	<u>TOTAL</u>
145	Area M14	17 of 19		4960 - 4967	8
				5038 - 5045	8
				5070 - 5092	23
				5093 - 5118	26
				5319 - 5341	23
					<u>88</u>

TOTAL NUMBER OF PRINTS

801

MOSAICS

AN-7	AK-3	Area M14-17
AN-8	AK-4	Area M14-18
FA-1	AK-7	AM 81-2
FA-2	AK-8	AM 81-3
FA-3		AM 81-4

TOTAL NUMBER OF MOSAICS

14

P. O. Box 3605
903 University Boulevard
Tucson, Arizona 85722

November 20, 1970

Map Information Office
U. S. Geological Survey
Washington, D. C.

Gentlemen:

I kindly request that you fill the attached order for one set of stereoscopic contact prints (9" x 9", trimmed) of vertical, high-altitude photography of Arizona. These photos are to be used in geological mapping.

I also request that you send the following photo-index sheets (20" x 24") of this high-altitude photography:

<u>Project No.</u>	<u>Sheet</u>
120 - AK	5, 6, 9
134 - FA	4
55 - AM - 81	1

From our latest price list, we calculate the following cost of 246 photographs and 5 photo-index sheets:

25 x (\$1.25 + 0.05)	\$ 32.50
221 x (\$0.90 + 0.05)	209.95
5 x (\$2.50)	12.50
Total	<u>\$254.95</u>

Enclosed, please find cashier's check for the above cost.

Very truly yours,

John E. Kinnison
Regional Geologist

JEK/bl
Encls.

b. c. c. Dr. T. F. O'Neill
File
Blue

AERIAL PHOTOGRAPHY, WESTERN U. S.
 Project # 120
 Lot AK

Strip	Roll	Exposures	Date	Total Photos
1	5	572 - 586	3-22-53	15
2	3	290 - 304	3-11-53	15
3	1	50 - 62	3-08-53	13
4	1	85 - 74	3-08-53	12
5	5	527 - 521, 512 - 515	3-22-53	11
6	5	494 - 498	3-22-53	5
7	5	448 - 445	3-22-53	4
8	2	198 - 207	3-10-53	10
9	6	608 - 598	3-23-53	11
10	2	145 - 134	3-10-53	12
11	6	662 - 672	3-23-53	11
12	8	1018 - 1010	3-31-53	9
13	6	675 - 673	3-23-53	13
48	21	2722 - 2727	4-29-53	6
49	20	2665 - 2659	4-25-53	7
50	21	2708 - 2702	4-29-53	7

AERIAL PHOTOGRAPHY, WESTERN U. S.
 Project # 55
 AM 81

Strip	Roll	Exposures	Date	Total Photos
1	11	1049 - 50, 1055 - 60	2-3-56	8
2	11	1048 - 46	2-3-56	<u>3</u>
				11

Project # 134
 Lot FA

Strip	Roll	Exposures	Date	Total Photos
23	3	257 -	11-25-53	1
24	4	313 - 317	11-28-53	5
25	4	355 - 348	11-28-53	8
26	11	1127 - 1118	2-17-54	10
27	6	486 - 498	12-6-53	13
28	11	1155 - 1170	2-17-54	16
29	5	457 - 442	11-29-53	16
30	5	406 - 420	11-29-53	<u>15</u>
				84

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

Date Rec'd 11-25-70
Regular Mail
SHIPPED Registered Mail
VIA Sent to lab
Air Mail
Railway Express
Messenger

SHIPPING TRANSMITTAL

Type of reproductions **Photo Indexes, Contact Prints** QUANTITY
Paper **DWOM** **Trimmed**
Area

Symbol	Roll No.	Print numbers	Total	Account No.
		One photo index and contact prints each as listed on the attached sheet:		9993-99

5 Photo Indexes

246 Contact Prints

Purchase Order No.

Total prints

Please send reproductions to

Kaiser Exploration & Mining Company - Attn: Mr. John E. Kinnison

Date

11-20-70(itr.)

P.O. Box 3505 - 903 University Boulevard

Tucson, Arizona 85722

MIO No.

S-529

254.95 Ck.

(61-2)

THIS

IS

NOT

A

BILL

Remarks:

Please sign and return one copy to the Map Information Office. Washington, D. C. 20242

Photographs received by

(Signature)

(Date)

<u>Project</u>	<u>Roll</u>	<u>Exposures</u>	<u>Total</u>
120-AK	1	50-62, 74-85	25
	2	134-145, 193-207	22
	3	290-304	15
	5	445-448, 494-498, 512-515, 521-527,	
	5	572-586	35
	6	598-608, 662-672, 673-675	25
	8	1010-1018	9
	20	2659-2665	7
	21	2702-2708, 2722-2727	13
			<hr/> 151
55 AM-81	11	1046-1048, 1049-1050, 1055-1060	11
134-FA	3	EX 257	1
	4	313-317, 343-355	13
	5	406-420, 442-457	31
	6	486-498	13
	11	1118-1127, 1155-1170	26
			<hr/> 84

One photo index each as listed:

<u>Project</u>	<u>Sheet</u>	<u>Total</u>
120-AK	5, 6, 9	3
134-FA	4	1
55AM-81	1	1

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

Date Rec'd 11-25-70
Regular Mail

SHIPPED Registered Mail
VIA Air Mail Sent to lab

Railway Express
Messenger

SHIPPING TRANSMITTAL

Type of reproductions Photo Indexes, Contact Prints QUANTITY
Paper BWSM Trimmed
Area

Symbol	Roll No.	Print numbers	Total	Account No.
		One photo index and contact prints each as listed on the attached sheet:		9993-99

5 Photo Indexes
246 Contact Prints

Purchase Order No.

Total prints

Please send reproductions to
11-20-70(itr.)
Date

Keiser Exploration & Mining Company - Attn: Mr. John E. Kinnison
P.O. Box 3605 - 903 University Boulevard
Tucson, Arizona 85722

MIO No. S-529

254.95 Ch.

(61-3)

THIS IS NOT A BILL

Remarks:

Please sign and return one copy to the Map Information Office. Washington, D. C. 20242

Photographs received by

(Signature)

(Date)

<u>Project</u>	<u>Roll</u>	<u>Exposures</u>	<u>Total</u>
120-AK	1	50-62, 74-85	25
	2	134-145, 198-207	22
	3	290-304	15
	5	445-448, 494-498, 512-515, 521-527,	
	5	572-506	35
	6	598-608, 662-672, 673-675	25
	8	1010-1018	9
	20	2659-2665	7
	21	2702-2708, 2722-2727	13
			<u>151</u>
55 AM-81	11	1046-1048, 1049-1050, 1055-1060	11
134-PA	3	EX 257	1
	4	313-317, 348-355	13
	5	406-420, 442-457	31
	6	486-498	13
	11	1118-1127, 1155-1170	<u>26</u>
			84

One photo index each as listed:

<u>Project</u>	<u>Sheet</u>	<u>Total</u>
120-AK	5, 6, 9	3
134-PA	4	1
55AM-81	1	1

P. O. Box 3605
903 University Boulevard
Tucson, Arizona 85722

November 20, 1970

Map Information Office
U. S. Geological Survey
Washington, D. C.

Gentlemen:

I kindly request that you fill the attached order for one set of stereoscopic contact prints (9" x 9", trimmed) of vertical, high-altitude photography of Arizona. These photos are to be used in geological mapping.

I also request that you send the following photo-index sheets (20" x 24") of this high-altitude photography:

<u>Project No.</u>	<u>Sheet</u>
120 - AK	5, 6, 9
134 - FA	4
55 - AM - 81	1

From our latest price list, we calculate the following cost of 246 photographs and 5 photo-index sheets:

25 x (\$1.25 + 0.05)	\$ 32.50
221 x (\$0.90 + 0.05)	209.95
5 x (\$2.50)	<u>12.50</u>
Total	\$254.95

Enclosed, please find cashier's check for the above cost.

Very truly yours,

John E. Kinnison
Regional Geologist

JEK/bl
Encls.

b. c. c. Dr. T. F. O'Neill
File
Blue

AERIAL PHOTOGRAPHY, WESTERN U. S.
 Project # 120
 Lot AK

Strip	Roll	Exposures	Date	Total Photos
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48	21	2722 - 2727	4-29-53	6
49	20	2665 - 2659	4-25-53	7
50	21	2708 - 2702	4-29-53	7

151

AERIAL PHOTOGRAPHY, WESTERN U. S.
 Project # 55
 AM 81

Strip	Roll	Exposures	Date	Total Photos
1	11	1049 - 50, 1055 - 60	2-3-56	8
2	11	1048 - 46	2-3-56	<u>3</u>
				11

Project # 134
 Lot FA

Strip	Roll	Exposures	Date	Total Photos
23	3	257 -	11-25-53	1
24	4	313 - 317	11-28-53	5
25	4	355 - 348	11-28-53	8
26	11	1127 - 1118	2-17-54	10
27	6	486 - 498	12-6-53	13
28	11	1155 - 1170	2-17-54	16
29	5	457 - 442	11-29-53	16
30	5	406 - 420	11-29-53	<u>15</u>
				84

Agricultural Stabilization

& Conservation Services

— 444 E 6th - Tucson, Ariz

①

Casa Grande - ^{office} Florence Blvd. - front of high school
(for Pinal County - ^{only} agricultural lands) photographed

Mr. Earl Whitfield
836 - 7485

Have photos for area

1964 flight 660' - 1"

1970 flight 1000' - 1" (photos expected this month)

photo mosaic in Casa Grande

order thru: Western Laboratory

②

Coch Xavier - 1967' flight
good coverage - 1 - 20,000 scale

Tucson office
444 E 6th St.

③

White Tank Mts - no coverage of mts - but takes in Phoenix Valley 4 miles E of mts.
Wickenburg - no coverage

④

Wickenburg -

GS - VAO H 12000

9-11-62 1030 XF 6750

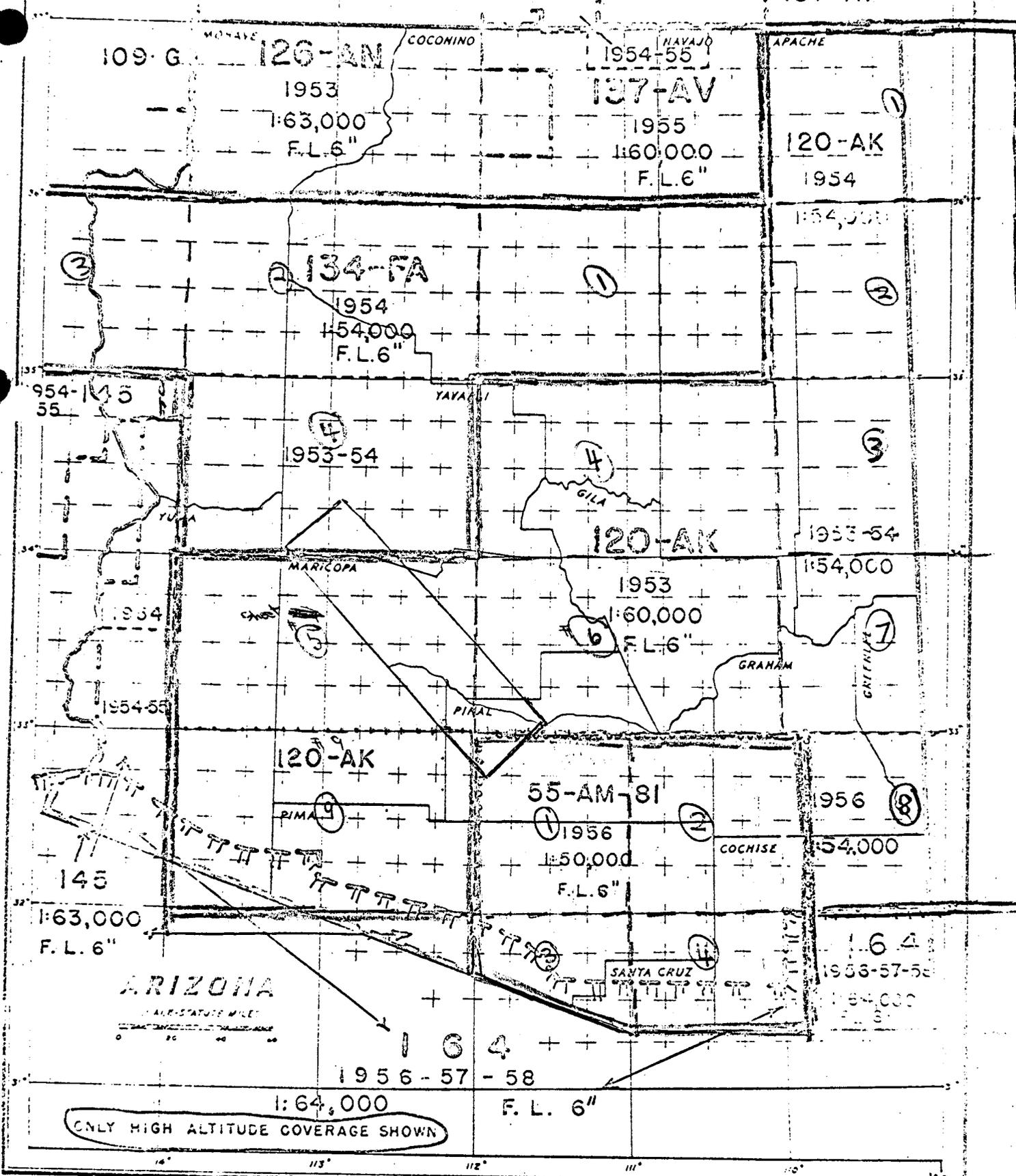
Map Information Office
U. S. Geological Survey
Washington, D. C. 20242

High Alt Index Maps

approx scale of each index map is
137-AV

260,000

400,000



aerial photographic reproductions

The Map Information Office of the U.S. Geological Survey maintains records of aerial photographic coverage of the United States and outlying areas, based on reports from Federal and State agencies and commercial companies. From these records, the Map Information Office furnishes data to prospective purchasers on available photography and the agency holding the aerial film.

There is no central sales office from which reproductions of aerial photographs may be obtained; they must be purchased from the agency holding the film. Because reproductions are not stocked, but are custom processed for each order, they cannot be returned for credit or refund.

For photographs of restricted areas, the purchaser must obtain clearance from appropriate military authorities. If such clearance is required, sales offices will advise purchasers and explain how to submit applications for clearance.

GEOLOGICAL SURVEY PHOTOGRAPHY

Geological Survey vertical aerial photography is obtained primarily for topographic and geologic mapping. Reproductions from this photography are usually satisfactory for general use. If reproductions are needed for specialized use, the purchaser should inquire regarding the characteristics of the photography before placing an order.

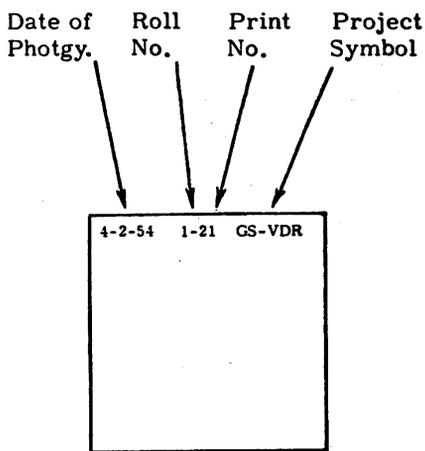
The Survey also uses low-oblique photography for some mapping projects. This specialized type of photography is taken with cameras tilted approximately 20° from the vertical. It is described in detail in a leaflet "Twin Low-Oblique Photography," which is available free from Survey sales offices. Prospective purchasers who are not familiar with this photography should study this leaflet before purchasing prints.

Reproductions of Survey aerial photographs are sold with the understanding that the purchaser will not use them to show, by implication or otherwise, that the Department of the Interior or the Geological Survey endorses any product.

Orders will be filled as quickly as laboratory conditions permit but official requirements for mapping will be given priority whenever necessary.

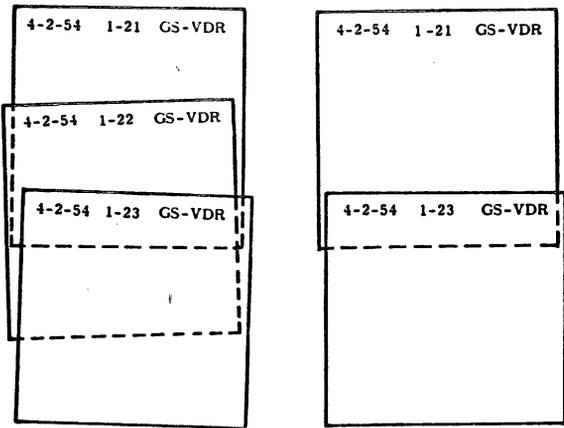
PRINT SIZES

Contact prints are the same size as aerial negatives, approximately 9 x 9 inches.



Contact print. At a scale of 1:24,000, the area covered by a 9-x-9-inch contact print is about 12 square miles.

Prints are available with stereoscopic overlap or without such overlap (pictorial coverage). Stereoscopic coverage requires about twice as many prints as pictorial photography. Orders for photographs or requests for information should specify which type is needed.



Coverage with stereoscopic overlap

Pictorial coverage

Enlargements to an exact ratio or to a specific scale are available. If ratio factors are not furnished by the purchaser, enlargements will be processed to ratios derived from lens focal lengths and flight heights specified in the photographic contract or reported by the contractor. Permissible tolerance in flight height combined with ground relief can cause considerable variation in scale.

The Geological Survey will process enlargements to approximate scales desired by purchasers, but cannot eliminate variations in scale due to shrinkage or expansion of paper caused by atmospheric or other conditions, uncertainty in reported flight altitude, and the effect of ground relief.

Prints are processed only from whole negatives; prints of selected parts of negatives are not available.

PHOTOGRAPHY ORDERS

Because many types of reproductions are available, requests should state the purpose for which the photographs are desired, and define the specific area of interest by means of a detailed description, sketch, or latitude and longitude position. The size of photographs and type of coverage (pictorial or stereoscopic) should also be specified.

Geological Survey aerial photographic reproductions may be ordered from any of the offices listed below:

Map Information Office
U.S. Geological Survey
Washington, D. C. 20242

Atlantic Region Engineer
U.S. Geological Survey
1109 N. Highland St.
Arlington, Va. 22210

Central Region Engineer
U.S. Geological Survey
Box 133
Rolla, Mo. 65401

Pacific Region Engineer
U.S. Geological Survey
345 Middlefield Road
Menlo Park, Calif. 94025

Rocky Mountain Region Engineer
U.S. Geological Survey
Building 25, Federal Center
Denver, Colo. 80225

Sometimes two or more laboratories may be involved in one order.

Shipment by parcel post or railway express is prepaid. Extra charges for shipment by air express or airmail and special delivery are paid by the purchaser.

Check, money order, or draft payable to the U.S. Geological Survey, must accompany the order unless a credit account has been established. Refund will be made for any part of the order that is not filled.

Index maps (circled) — high altitude photos

U.S. Topographic Division

(Current indexes)

index for most recent coverage

Circle in red the area needed

also let. long.

low flights 1-20,000 1" = 1600'

1" = 4800'

J. O. Kilmartin
Chief
Map Information Office
Washington

Photoindexes are available for practically all Geological Survey aerial photography. These show the assemblies of prints in standard quadrangle units (generally 7½-minute units, but in some cases, 15-minute units) so that from the indexes a prospective purchaser can select prints covering areas in which he is interested. Where large areas are involved, photoindexes are essential for selecting prints and should be requested. In addition, photoindexes are available showing high-altitude photography held by the Geological Survey, generally in units of 1° x 2°, but sometimes in units of 1° x 1° or 2° x 2°.

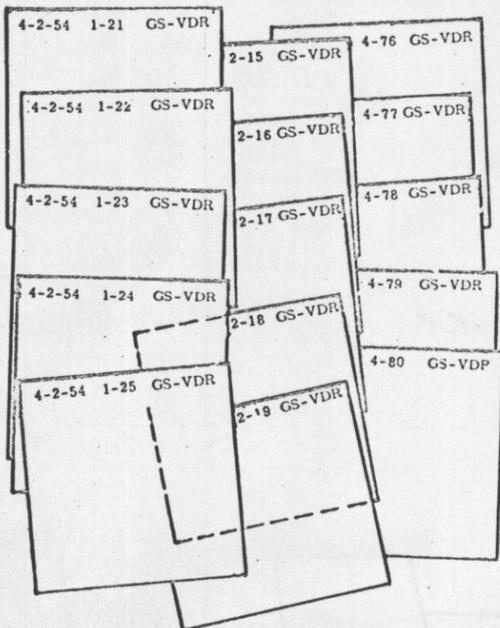


Diagram showing the overlapping arrangement of 9- x 9-inch exposures on a photoindex.

PRICES

Contact prints, enlargements, and transformed prints are unmounted and untrimmed, however, trimming may be specified at 5 cents extra per print. These reproductions are printed on double-weight semimatte paper unless the order specifies other paper. Waterproof (low-shrink) paper is available for contact prints only, at 25 cents extra per print.

Similar prices are charged by other Federal agencies. Prices are subject to revision at any time.

	1 to 25 each	Over 25* each
Contact prints (9 x 9 in.)----	\$1.25	\$0.90
Enlargement		
Magnification:		
1.5X (14 x 14 in.)-----	\$2.50	\$2.00
2X (18 x 18 in.)-----	2.75	2.25
3X (27 x 27 in.)-----	3.50	2.75
4X (36 x 36 in.)-----	8.00	7.00

For an intermediate-size enlargement, use the price listed for the next larger size. For example, one 24- x 24-inch enlargement costs \$3.50.

Transformed prints from either convergent or transverse low-oblique photographs----- \$2.75 \$2.50

Film positives contact printed from aerial negatives----- \$2.50 \$2.50

Kelsh plates
Contact prints on glass. Specify thickness (0.25 or 0.06 inch) and method of printing (emulsion to base)----- \$5.50 \$5.00

ER-55 plates
Reductions on glass (11 x 11 cm.)----- \$4.25 \$4.00

Photoindexes
7½- & 15-minute quadrangle units (10- x 12-in. sheet)-- \$2.00
High-altitude photography (20- x 24-in. sheet)----- **\$2.50**

*Quantity prices apply only to those prints ordered in excess of 25 of the same size. For example, 26 contact prints cost \$32.15 (25 at \$1.25 = \$31.25 + 1 at \$0.90).

Specify on order -
"photos with
stereoscopic coverage"

Photo Index
for
high altitude
photography



U. S. DEPARTMENT OF THE INTERIOR / GEOLOGICAL SURVEY



In its assigned function as the Nation's principal natural resource agency, the Department of the Interior bears a special obligation to assure that our expendable resources are managed to produce optimum yields, and that all resources contribute their full measure to the progress, prosperity, and security of America, now and in the future.

Order indiv. photos to cover strip

Photo mosaics for Southern half of Arizona
Project 120 AK 1952-1954
Price / index
if how many order to cover strip



**aerial
photographic
reproductions**