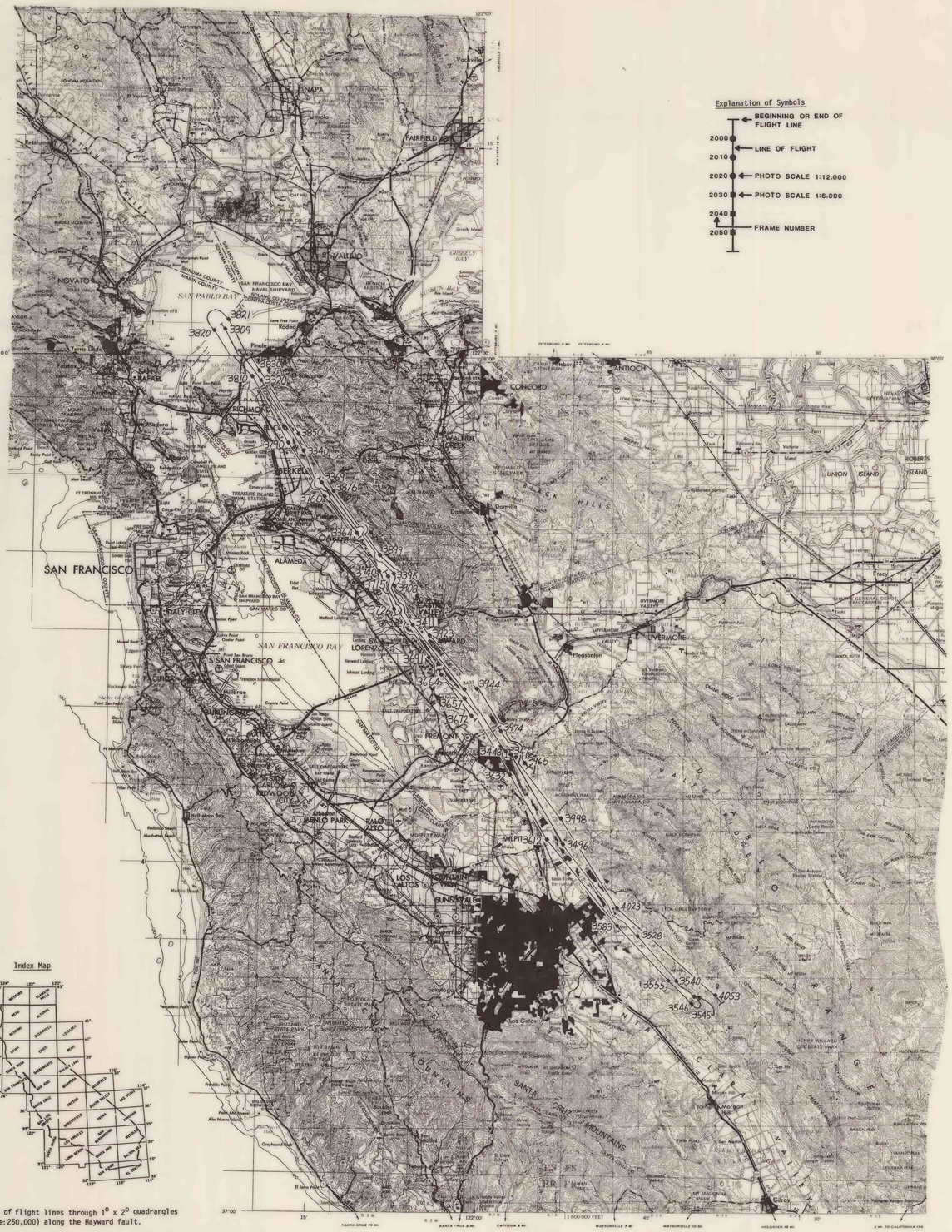
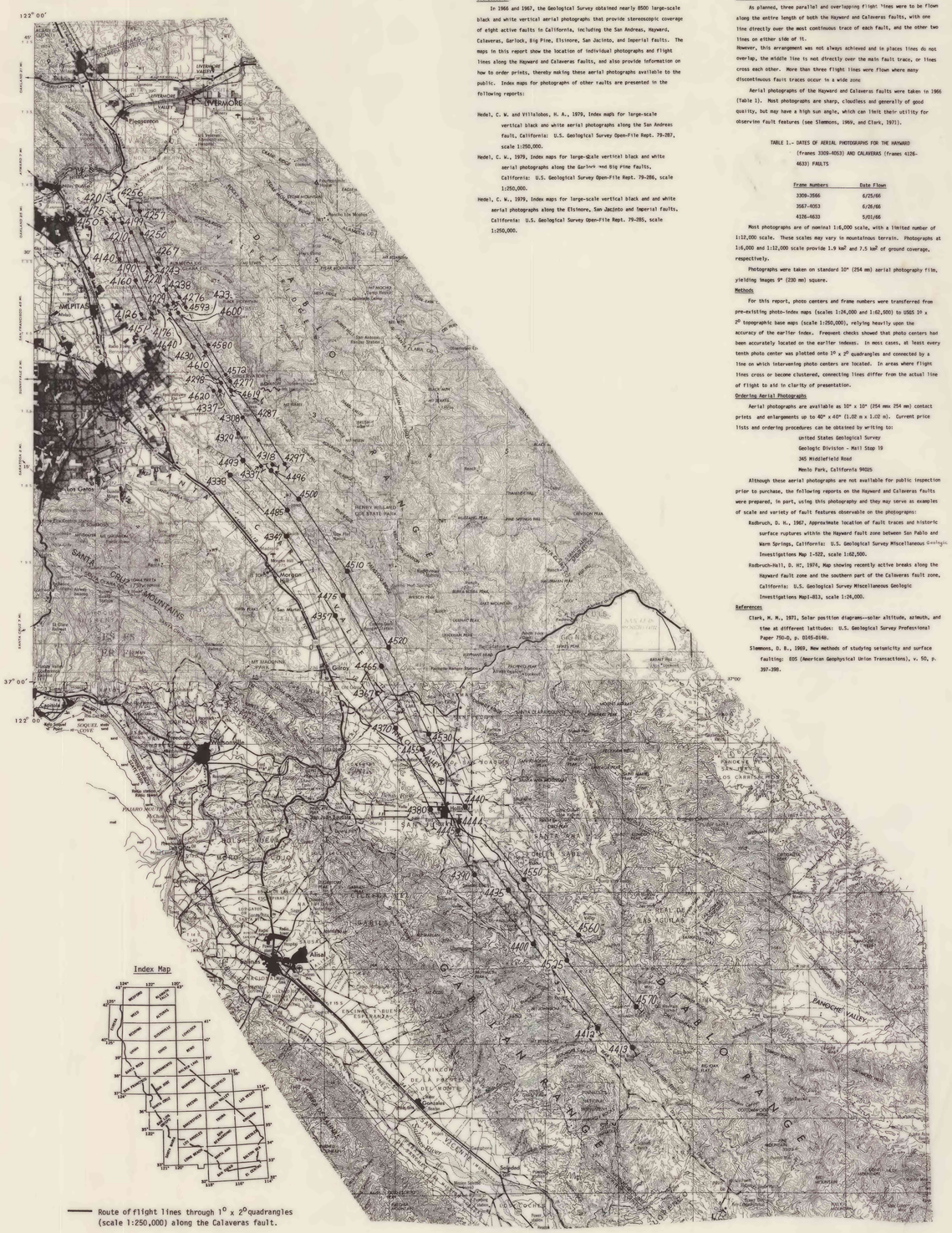


Index Map

Route of flight lines through 1° x 2° quadrangles (scale: 250,000) along the Hayward fault.

Hayward Fault



Index Map

Route of flight lines through 1° x 2° quadrangles (scale 1:250,000) along the Calaveras fault.

Calaveras Fault

N

Scale 1:250,000

5 0 5 10 15 20 Statute Miles
5 0 5 10 15 20 25 30 Kilometers
5 0 5 10 15 Nautical Miles

CONTOUR INTERVAL 200 FEET
WITH SUPPLEMENTARY CONTOURS AT 100 FOOT INTERVALS

INDEX MAPS FOR LARGE-SCALE VERTICAL BLACK AND WHITE AERIAL PHOTOGRAPHS ALONG THE HAYWARD AND CALAVERAS FAULTS, CALIFORNIA

By

Charles W. Hedel

1979

BASE MAPS FROM SANTA ROSA (1970), SAN FRANCISCO (1969), SAN JOSE (1969), AND SANTA CRUZ (1965) U.S. GEOLOGICAL SURVEY 1° X 2° QUADRANGLES (SCALE 1:250,000).

This report is preliminary and has not been edited or reviewed for conformity with Geological Survey standards and nomenclature.

Introduction

In 1966 and 1967, the Geological Survey obtained nearly 8500 large-scale black and white vertical aerial photographs that provide stereoscopic coverage of eight active faults in California, including the San Andreas, Hayward, Calaveras, Garlock, Big Pine, Elsinore, San Jacinto, and Imperial faults. The maps in this report show the location of individual photographs and flight lines along the Hayward and Calaveras faults, and also provide information on how to order prints, thereby making these aerial photographs available to the public. Index maps for photographs of other faults are presented in the following reports:

Hedel, C. W. and Villalobos, H. A., 1979, Index maps for large-scale vertical black and white aerial photographs along the San Andreas fault, California: U.S. Geological Survey Open-File Rept. 79-287, scale 1:250,000.

Hedel, C. W., 1979, Index maps for large-scale vertical black and white aerial photographs along the Garlock and Big Pine faults, California: U.S. Geological Survey Open-File Rept. 79-286, scale 1:250,000.

Hedel, C. W., 1979, Index maps for large-scale vertical black and and white aerial photographs along the Elsinore, San Jacinto and Imperial faults, California: U.S. Geological Survey Open-File Rept. 79-285, scale 1:250,000.

Description of flight lines and photographs

As planned, three parallel and overlapping flight lines were to be flown along the entire length of both the Hayward and Calaveras faults, with one line directly over the most continuous trace of each fault, and the other two lines on either side of it.
However, this arrangement was not always achieved and in places lines do not overlap, the middle line is not directly over the main fault trace, or lines cross each other. More than three flight lines were flown where many discontinuous fault traces occur in a wide zone

Aerial photographs of the Hayward and Calaveras faults were taken in 1966 (Table 1). Most photographs are sharp, cloudless and generally of good quality, but may have a high sun angle, which can limit their utility for observing fault features (see Slemmons, 1969, and Clark, 1971).

TABLE 1.- DATES OF AERIAL PHOTOGRAPHS FOR THE HAYWARD (frames 3309-4053) AND CALAVERAS (frames 4126-4633) FAULTS

Frame Numbers	Date Flown
3309-3566	6/25/66
3567-4053	6/26/66
4126-4633	5/01/66

Most photographs are of nominal 1:6,000 scale, with a limited number of 1:12,000 scale. These scales may vary in mountainous terrain. Photographs at 1:6,000 and 1:12,000 scale provide 1.9 km^2 and 7.5 km^2 of ground coverage, respectively.

Photographs were taken on standard 10" (254 mm) aerial photography film, yielding images 9" (230 mm) square.

Methods

For this report, photo centers and frame numbers were transferred from pre-existing photo-index maps (scales 1:24,000 and 1:62,500) to USGS 10 x 2° topographic base maps (scale 1:250,000), relying heavily upon the accuracy of the earlier index. Frequent checks showed that photo centers had been accurately located on the earlier indexes. In most cases, at least every tenth photo center was plotted onto 10 x 2° quadrangles and connected by a line on which intervening photo centers are located. In areas where flight lines cross or become clustered, connecting lines differ from the actual line of flight to aid in clarity of presentation.

Ordering Aerial Photographs

Aerial photographs are available as 10" x 10" (254 mm x 254 mm) contact prints and enlargements up to 40" x 40" (1.02 m x 1.02 m). Current price lists and ordering procedures can be obtained by writing to:

United States Geological Survey
Geologic Division - Mail Stop 19
345 Middlefield Road
Menlo Park, California 94025

Although these aerial photographs are not available for public inspection prior to purchase, the following reports on the Hayward and Calaveras faults were prepared, in part, using this photography and they may serve as examples of scale and variety of fault features observable on the photographs:

Radbruch, D. H., 1967, Approximate location of fault traces and historic surface ruptures within the Hayward fault zone between San Pablo and Warm Springs, California: U.S. Geological Survey Miscellaneous Geologic Investigations Map I-522, scale 1:62,500.

Radbruch-Hall, D. H., 1976, Map showing recently active breaks along the Hayward fault zone and the southern part of the Calaveras fault zone, California: U.S. Geological Survey Miscellaneous Geologic Investigations Map I-833, scale 1:24,000.

References

Clark, M. M., 1971, Solar position diagrams--solar altitude, azimuth, and time at different latitudes: U.S. Geological Survey Professional Paper 750-D, p. D145-D149.

Slemmons, D. B., 1969, New methods of studying seismicity and surface faulting: EOS (American Geophysical Union Transactions), v. 50, p. 397-398.