UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

PROFESSIONAL PAPER 980
PLATE I

Base from U.S. Geological Survey:
Bright Angel, 1962; De Motte Park, 1962;
Hermit Rapids Point, 1963; Kanab Point, 1962;
Nankoweap, 1954; Powell Plateau, 1962;
Supai, 1962; and Vishnu Temple, 1962

EXPLANATION

SURFICIAL DEPOSITS

- Alluvium of Holocene and late Pleistocene age; includes bars, multiple-fill terraces, channel deposits, alluvial fans, and dissected alluvial fans
- Reddish-brown unit of probable Pleistocene age; includes deposits in the Surprise Valley area
- Terrace and dissected alluvial-fan deposits of Pleistocene and late Tertiary(?) age along the Colorado River
- Travertine and cemented colluvium of Pleistocene and late Tertiary(?) age; includes landslides in the Surprise Valley area

CONSOLIDATED ROCKS

CENOZOIC

MESOZOIC

- Tcm — Chinle and Moenkopi Formations of Triassic age
- Pkc — Kaibab Limestone, Toroweap Formation, and Coconino Sandstone, undifferentiated, of Permian age
- Phf — Hermit Shale of Permian age; Supai Formation of Permian and Pennsylvanian age; Redwall Limestone of Mississippian age; Temple Butte Limestone of Devonian age; and Muav Limestone, Bright Angel Shale, and Tapeats Sandstone, undifferentiated, of Cambrian age. Redwall Limestone forms large cliff in central part of outcrop

PALEOZOIC

- pCg — Grand Canyon Supergroup of Precambrian age; shown only east of Crystal Creek
- pCv — Vishnu Schist and granitic rocks, undifferentiated, of Precambrian age; includes exposures of Grand Canyon Supergroup west of Crystal Creek

PRECAMBRIAN

- Contact
- Drainage divide
- Path of mudflow
- × Debris slide caused by storm of December 1966
- × Debris slide caused by storm prior to December 1966
- Approximate area having above-average runoff, during the December 1966 flood
- Spring
- 31 Site where peak discharge was determined by slope-area method; figure is site number
- 12 Site where peak discharge was estimated from approximate measurements; figure is site number
- 5 / 3Fl CHANNEL DEPTH, TERRACE HEIGHT, AND FLOW DEPTH – Upper figure shows depth of channel or height of terrace, in feet above streambed; lower figure shows maximum depth of flow, in feet, for 1966 flood. One foot equals 0.3048 metre
- 5/12/15 Site showing height of more than one terrace, in feet above the streambed. One foot equals 0.3048 metre (5/ third terrace / 12/ second terrace / 15/ first terrace)
- A — A' Cross section of stream channel, letters are cross-section designation
- Healed arroyo or continuous channel present before December 1966 flood
- Renewed arroyo or channel cutting caused by the December 1966 flood
- Main areas containing archeological sites
- × A Location discussed in text; letter is location designation used in text

B = Channel cut into bedrock
D = Ditch
H = Depth of channel below headcut
J = Discontinuous channel
M = Channel modified by manmade structure
<= Less than
/ = Separates terrace levels

APPROXIMATE MEAN DECLINATION, 1970

SCALE 1:62 500

1 ½ 0 1 2 3 4 5 MILES

1 0 1 2 3 4 5 6 7 KILOMETRES

CONTOUR INTERVAL 80 FEET
DOTTED LINES REPRESENT 40-FOOT CONTOURS
DATUM IS MEAN SEA LEVEL

U.S. Interior–Geological Survey, Menlo Park, CA.—1976—W76141

Stratigraphy of the consolidated rocks modified from Noble, 1914; Metzger, 1961; Maxson, 1966-67; and Cooley and others, 1969; by M. E. Cooley, 1967

Stratigraphy of the surficial deposits modified from Springerson, 1965; and Maxson, 1967; by M. E. Cooley, 1967

RECONNAISSANCE GEOLOGY AND LOCATION OF MUDFLOWS, DEBRIS SLIDES, PEAK-FLOW MEASURING SITES, ARCHEOLOGICAL SITES, AND EROSIONAL FEATURES, EASTERN GRAND CANYON AREA, ARIZONA