UNIVERSITY OF ARIZONA
ARIZONA BUREAU OF MINES
J. D. FORRESTER, DIRECTOR

GEOLOGIC MAP
OF
NAVAJO AND APACHE COUNTIES, ARIZONA

PREPARED BY THE

ARIZONA BUREAU OF MINES
UNIVERSITY OF ARIZONA

TUCSON, ARIZONA

BY

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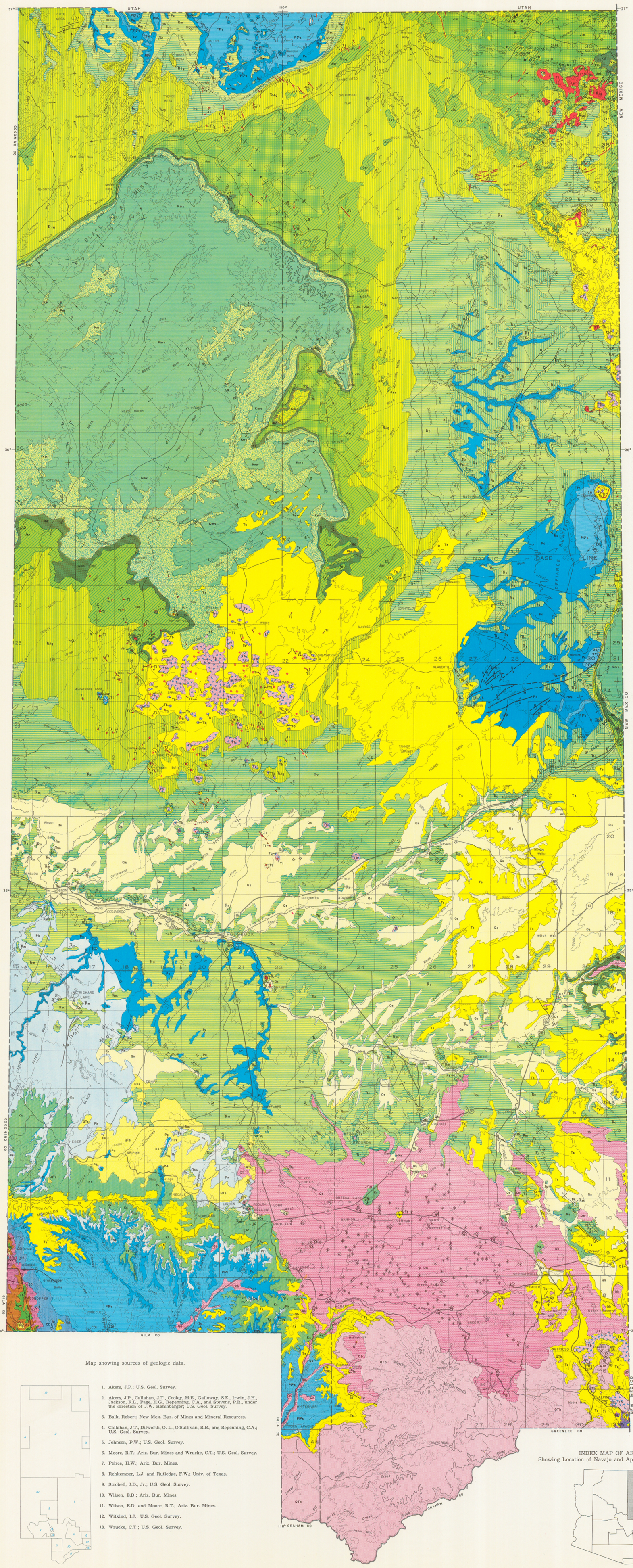
Scale $\frac{1}{375,000}$

10 0 10 20 30 Miles

10 0 10 20 30 Kilometers

Contour interval 500 feet
datum is mean sea level

1960



EXPLANATION

QUATERNARY

- Qs — **Sand, silt, and gravel**
- Qb — **Basalt** — *Locally includes tuff and agglomerate.*
- Ql — **Dikes and plugs** — *Mainly basaltic in composition.*

TERTIARY

- QTs — **Sand, silt, gravel, and conglomerate**
- QTb — **Basalt** — *Locally includes tuff and agglomerate.*
- Ts — **Sandstone, shale, and conglomerate**
- Tg — **Andesite** — *Flows, tuff, and agglomerate*
- Tb — **Basalt** — *Flows, tuff, and agglomerate*
- Ti — **Dikes, plugs, and sills** — *Intermediate to basaltic in composition.*

CRETACEOUS

- Kmv — **Mesa Verde group** — *Includes Yale Point sandstone, Wepo formation, and Toreva formation.*
- Km — **Mancos shale**
- Kd — **Dakota sandstone**

CRETACEOUS UNDIVIDED

- Ks — **Limestone, shale, and sandstone**

JURASSIC

- Jm — **Morrison formation**
- Jsr — **San Rafael group** — *Includes Summerville formation, Cow Springs sandstone, Bluff sandstone, Entrada sandstone, and Carmel formation.*
- RJg — **Glen Canyon group** — *Includes in descending order, Navajo sandstone, Kayenta formation, Moenave formation, and Wingate sandstone.*

TRIASSIC

- Rc — **Chinle formation** — *Including Shinarump conglomerate south of lat. 35° 15'*
- Rs — **Shinarump conglomerate** — *Including Moenkopi formation at southern end of Defiance uplift.*
- Rm — **Moenkopi formation**

PERMIAN

- Pk — **Kaibab limestone** — *Includes Toroweap formation*
- Pc — **Coconino sandstone** — *Including De Chelly sandstone in Defiance Plateau and Monument Valley areas.*
- PPs — **Supai formation** — *Including Organ Rock tongue, Cedar Mesa sandstone, and Halgaito tongue in Monument Valley area.*

CARBONIFEROUS AND DEVONIAN

- CDl — **Limestone, shale, and sandstone** — *Includes Pennsylvanian Naco formation, Mississippian Redwall limestone, and Devonian limestone and sandstone*

YOUNGER PRECAMBRIAN

- Au — **Apache group** — *Mescal limestone, Dripping Spring quartzite, Barnes conglomerate, Pioneer shale, and Scanlan conglomerate.*

OLDER PRECAMBRIAN

- gr — **Granite**

YOUNGER PRECAMBRIAN TO TERTIARY

- db — **Diabase**

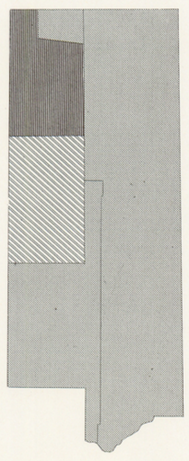
YOUNGER PRECAMBRIAN CAMBRIAN AND DEVONIAN UNDIVIDED

- ss — **Sandstone and quartzite**

SYMBOLS

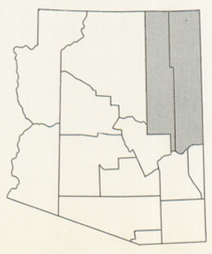
- Contact
- Fault — *Dashed where approximately located* U, *upthrown side;* D, *downthrown side*
- Axis of anticline showing direction of plunge
- Axis of syncline showing direction of plunge
- Axis of monocline
- Oil well
- Gas well
- Oil and gas well
- Exploratory well
- Cinder Cone
- Collapsed structure
- Mine
- Quarry

Map showing sources of topographic data.



- U.S. Geol. Survey Topographic Map of Arizona (1956)
- Army Map Service, Flagstaff, Ariz. 2° sheet (unpublished).
- Army Map Service, Marble Canyon, Ariz. 2° sheet (unpublished).

Map showing sources of geologic data.

1. Akers, J.P.; U.S. Geol. Survey.
2. Akers, J.P., Callahan, J.T., Cooley, M.E., Galloway, S.E., Irwin, J.H., Jackson, R.L., Page, H.G., Repenning, C.A., and Stevens, P.R., under the direction of J.W. Harshbarger; U.S. Geol. Survey.
3. Balk, Robert; New Mex. Bur. of Mines and Mineral Resources.
4. Callahan, J.T., Dilworth, O. L., O'Sullivan, R.B., and Repenning, C.A.; U.S. Geol. Survey.
5. Johnson, P.W.; U.S. Geol. Survey.
6. Moore, R.T.; Ariz. Bur. Mines and Wrucke, C.T.; U.S. Geol. Survey.
7. Peirce, H.W.; Ariz. Bur. Mines.
8. Rehkemper, L.J. and Rutledge, F.W.; Univ. of Texas.
9. Strobell, J.D., Jr.; U.S. Geol. Survey.
10. Wilson, E.D.; Ariz. Bur. Mines.
11. Wilson, E.D. and Moore, R.T.; Ariz. Bur. Mines.
12. Witkind, I.J.; U.S. Geol. Survey.
13. Wrucke, C.T.; U.S Geol. Survey.

INDEX MAP OF ARIZONA
Showing Location of Navajo and Apache Counties, Arizona.