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PLATE 4

GEOLOGIC MAP of CIENEGA GAP

DANIEL J. BRENNAN

1956-57

LEGEND

	SEDIMENTARY ROCKS	IGNEOUS ROCKS	METAMORPHIC ROCKS
PLEISTOCENE and RECENT	Qal — Alluvium		
	Tsd — Stream Deposits	TKqm — Quartz Monzonite	TKgn — Gneiss
LATE TERTIARY	Tfg — Fanglomerate		Tlc — Limestone Conglomerate
MIOCENE(?)	Tp — Pantano Formation	Tpv — Pantano Volcanics	Tbr — Quartzite-Quartz Monzonite Breccia
LOWER CRETACEOUS	Kb — Bisbee Formation	PKgr — Pre-Cretaceous Granite	
CARBONIFEROUS	C — Undifferentiated		
CAMBRIAN	Cb — Bolsa Formation		
PRECAMBRIAN		pCgr — Granodiorite	

SYMBOLS

- Contact, dashed where inferred.
- Fault, dashed where inferred
- Folds, showing plunge
- Bedding (inclined overturned, vertical)
- Foliation (inclined, vertical)
- Mine shaft

CONTOUR INTERVAL 100 FEET

SCALE
Miles 0 1/2

N

R. 16 E. R. 17 E. R. 18 E.

RANCHO del LAGO

DAY'S RANCH

VAIL

MOUNTAIN VIEW

U.S. 80

ARIZONA - 83

T. 16 S.

T. 17 S.

CIENEGA CREEK

PANTANO CREEK

AQUA VERDE CREEK

MARSH

CROSS HILL

EMPIRITA RANCH

HILL NO. 5

PANTANO HILL

AMERICAN SMELTING AND REFINING COMPANY
Tucson Arizona

April 1, 1958

J. H. C.

APR 14 1958

T 14 S
R 16-17 E

MEMORANDUM TO J. H. COURTRIGHT

CIENEGA GAP
Pima County, Arizona
(Brennen Thesis)

At your request I reviewed a thesis on file at the University of Arizona Library entitled A Geological Reconnaissance of Cienega Gap, Pima County, Arizona, by Daniel J. Brennen. The thesis was submitted to the University in the spring of 1957 in partial fulfillment of requirements for the doctorate and was written under the direction of John Lance. It is filed under the call number E9791-1957-53. In connection with this review, I traced Brennen's geologic map of Cienega Gap, and a copy of the map is attached to this memorandum.

The thesis was concerned mainly with stratigraphic and structural questions. Two important points were stressed: first, the study of the Pantano beds, which were reclassified as the Pantano Formation, and second the mapping of an imbricate thrust system which resulted in Pre Cambrian granodiorite being thrust over Tertiary sediments. The thrusting is the resultant of compressive forces from the southeast.

Following are quotations and abstracts from various parts of the text:

Bisbee Formation

Cretaceous rocks are nowhere in normal stratigraphic position, and have been thrust into area. The basal member of Bisbee is arkosic -- the material being derived from Pre Cretaceous granite. The coarse grained arkose grades upward into sandstone and arkosic shale. The upper parts of the formation contain fossiliferous black limestone. Total thickness 9,000-11,000 feet.

Pantano Formation

While the Pantano "beds" have been long known in the literature, Brennen is the first to recognize the Pantano formation. The formation consists of mudstone and conglomerates which are interbedded with an andesite flow. Total thickness 13,720 feet.

Granodiorite (Page 26)

"One of the thrust blocks present in the area is composed of Pre-Cambrian granodiorite". P. 26. Granodiorite has granitoid texture with grey green color. Composed of quartz plagioclase, muscovite and chlorite.

Quartz Monzonite (Page 30)

"All contacts of the quartz monzonite are either faults or concealed by

quaternary alluvium. Because of the faulting, the age of the quartz monzonite cannot be determined within the area." P. 30.

"Indirect evidence suggests that the quartz monzonite was not exposed or not present during deposition of the Pantano formation .... on this tenuous basis this quartz monzonite is tentatively assigned a Cretaceous-Tertiary age."

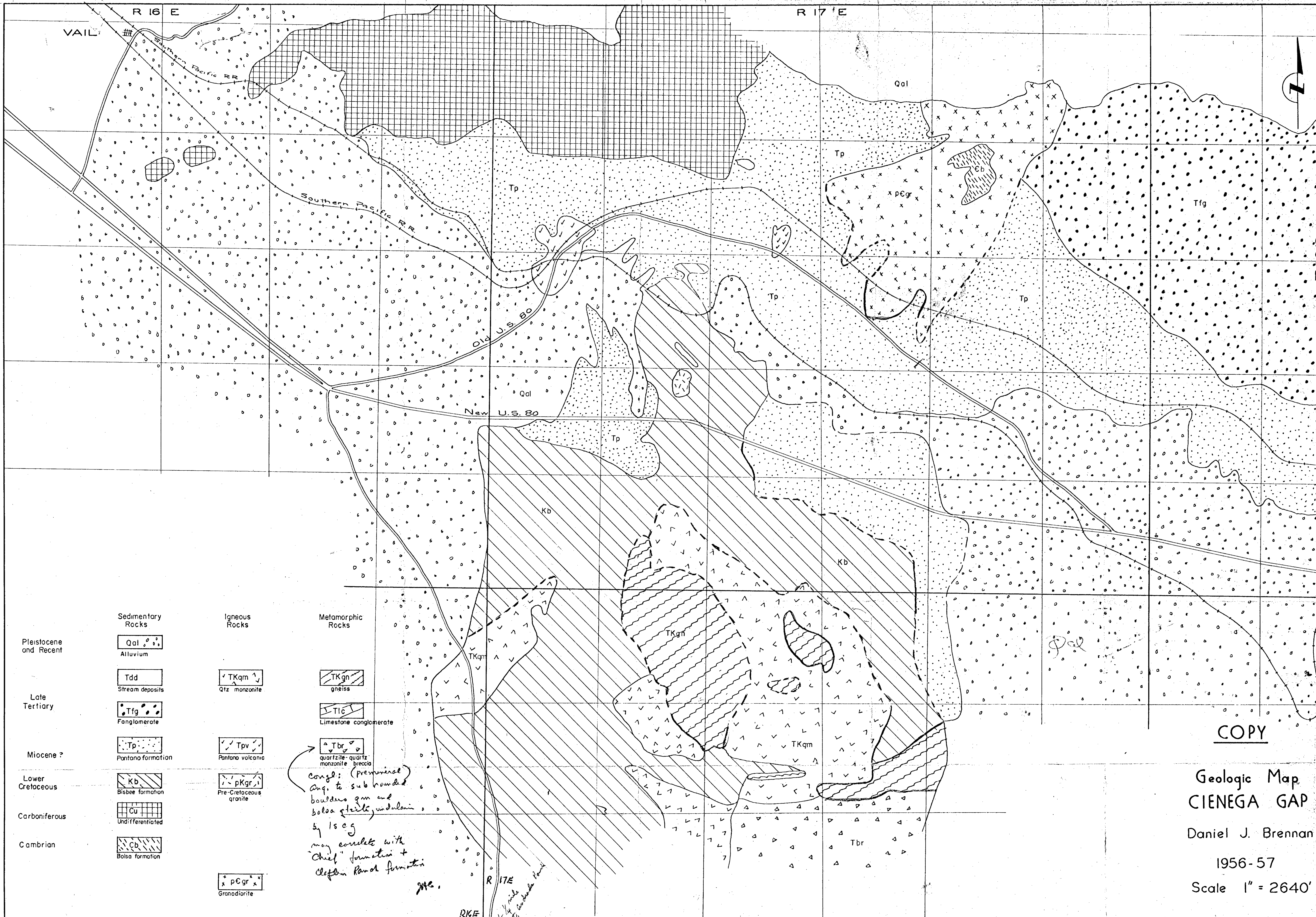
Gneiss (Page 32)

"By far the greatest part of the metamorphic body lies in fault contact on quartz monzonite and Cretaceous sediments. However, in the NE 1/4, section 9, an anomalous relationship is observed. Here the quartz monzonite intrudes the gneiss and the fault contact is not apparent. It may be that the fault cuts across the original contact between the gneiss and quartz monzonite and here reveals a primary relationship. "

Age not known, suggests the metamorphic equivalent of Pantano formation.

R. L. BROWN

RLB/ds



R 16 E
R 17 E
VAIL
Southern Pacific RR
Southern Pacific R.R.
Old U.S. 80
New U.S. 80
T 16 S
Qal
Tp
Tfg
pЄgr
Єb
Kb
TKgn
TKqm
Tbr
R 17E
R16E
Sedimentary Rocks
Igneous Rocks
Metamorphic Rocks
Pleistocene and Recent
Qal
Alluvium
Tdd
Stream deposits
TKqm
Qtz monzonite
TKgn
gneiss
Late Tertiary
Tfg
Fanglomerate
Tlc
Limestone conglomerate
Miocene ?
Tp
Pantano formation
Tpv
Pantano volcanic
Tbr
quartzite-quartz monzonite breccia
Lower Cretaceous
Kb
Bisbee formation
pKgr
Pre-Cretaceous granite
Carboniferous
Cu
Undifferentiated
Cambrian
Єb
Bolsa formation
pЄgr
Granodiorite
Congl: (premineral)
Ang. to subrounded
boulders qm and
bolsa qtzite, underlain
by ls cg
may correlate with
"Chief" formation +
Clifton Ranch formation
COPY
Geologic Map
CIENEGA GAP
Daniel J. Brennan
1956-57
Scale 1" = 2640'