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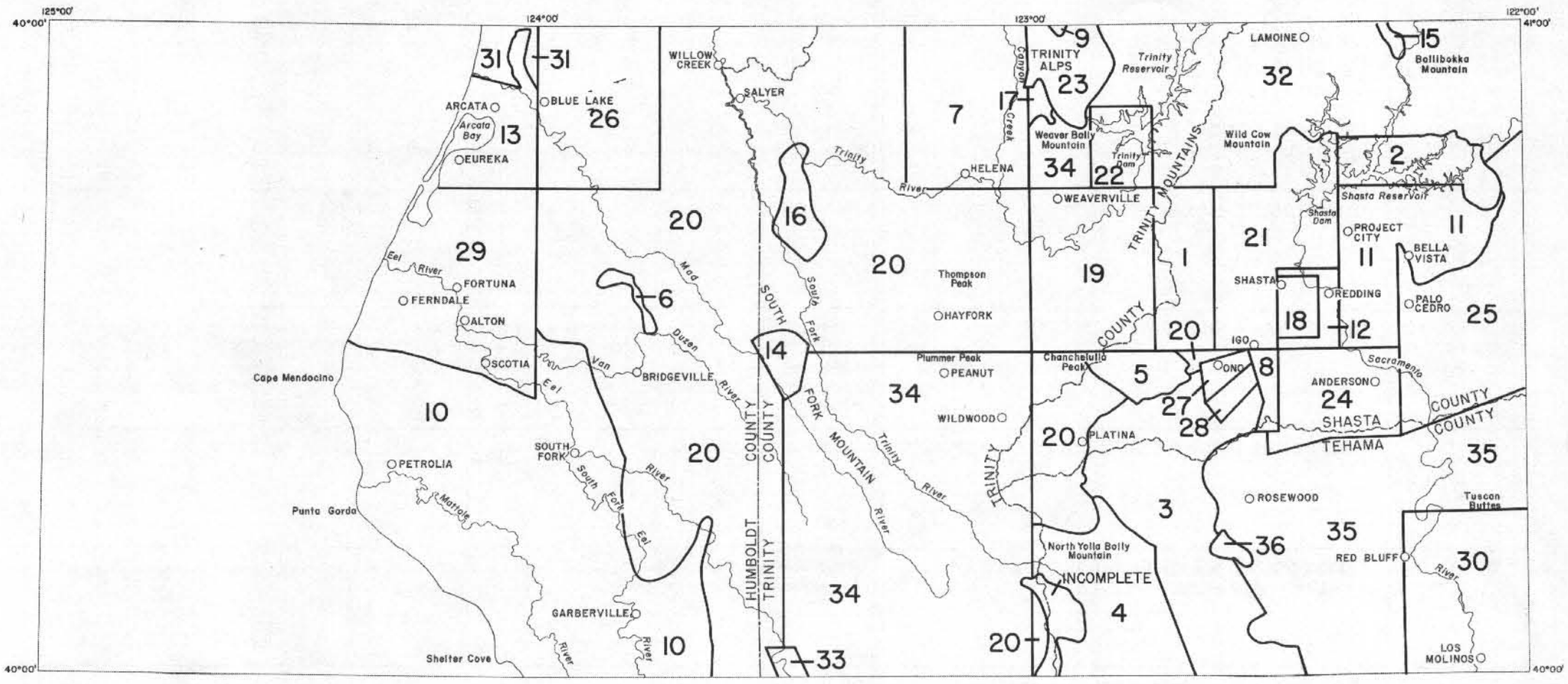
EXPLANATORY DATA
REDDING SHEET
GEOLOGIC MAP OF CALIFORNIA
OLAF P. JENKINS EDITION

Compiled by Rudolph G. Strand, 1962

(Second Printing, 1969)

INDEX TO GEOLOGIC MAPPING
USED IN THE COMPILATION OF THE REDDING SHEET



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For a complete list of published geologic maps of this area see Division of Mines Special Report 52.

STRATIGRAPHIC NOMENCLATURE— REDDING SHEET

AGE	STATE MAP SYMBOL	STATE MAP UNIT State Map Units listed here are not necessarily in stratigraphic sequence; the sequence used has been standardized for all sheets of the Geologic Map of California	STRATIGRAPHIC UNITS AND CHARACTERISTIC LITHOLOGIES (The formally named formations grouped within an individual State Map Unit, are listed in stratigraphic sequence from youngest to oldest.)
CENOZOIC – QUATERNARY – Recent	Qs	**RECENT DUNE SAND**	Modern and older beach sand along the coast.
	Qal	**RECENT ALLUVIUM**	Alluvium, old alluvium, and young stream terrace deposits.
	Qsc	**RECENT RIVER AND MAJOR STREAM CHANNEL DEPOSITS IN THE GREAT VALLEY**	Recent sand, gravel, silt, and minor amounts of clay deposited along channels, flood plains, and natural levees of major streams.
	Qf	**RECENT ALLUVIAL FAN DEPOSITS IN THE GREAT VALLEY**	Pleistocene and Recent fan deposits which overlie the unnamed Pleistocene gravel deposits shown here as Qc, (fan deposits include Victor Formation as mapped by Olmsted and Davis, 1958).
		RECENT VOLCANIC ROCKS:	
	Qrv^b	**BASALTIC**	Recent basalt flows.
	$QrvP$	**PYROCLASTIC**	Recent pyroclastic deposits.
CENOZOIC – QUATERNARY – Pleistocene	Ql	**QUATERNARY LAKE DEPOSITS**	Pleistocene glacial lake deposits.
	Qg	**QUATERNARY GLACIAL DEPOSITS**	Pleistocene glacial moraines of the following principal glacial episodes: Late (Morris Meadow), Middle (Rush Creek), Early (Alpine Lake) and Ancient (Swift Creek). (The three youngest are judged Wisconsin, the oldest pre-Wisconsin.)
	Qt	**QUATERNARY NONMARINE TERRACE DEPOSITS**	Rohnerville Formation—*gravel, sand, and clay.* Undifferentiated terrace deposits (may be equivalent to Rohnerville or Hookton Formations).
	Qm	**PLEISTOCENE MARINE DEPOSITS AND MARINE TERRACE DEPOSITS**	Hookton Formation in the Eureka 15 minute quadrangle (includes some nonmarine units; grades laterally southward into the predominantly nonmarine Hookton shown as Qc).
	Qc	**PLEISTOCENE NONMARINE SEDIMENTARY DEPOSITS**	Hookton Formation—*yellow-orange gravel, sand, and clay* (present in Humboldt County; includes some marine shales which are dominant to north where Hookton is shown as Qm). Red Bluff Formation—*well-rounded boulders and gravel within a tan to brick-red iron-stained matrix of sand and some clay;* unnamed gravels of basalt and andesite which unconformably overlie the Tuscan Formation and which may be stratigraphically lower than the Red Bluff Formation. Undifferentiated later terrace deposits associated with the Red Bluff Formation (Red Bank quadrangle).
		PLEISTOCENE VOLCANIC ROCKS:	
	Qpv^b	**BASALTIC**	Pleistocene basalt flows.
CENOZOIC – TERTIARY – Pliocene	QP	**PLIOCENE-PLEISTOCENE NONMARINE SEDIMENTARY DEPOSITS**	Carlotta Formation—*massive conglomerate with sandstone and claystone* (marine in part).
	✳	**QUATERNARY AND/OR PLIOCENE CINDER CONES**	Cinder cones of Recent age.
	Puc	**UPPER PLIOCENE NONMARINE SEDIMENTARY ROCKS**	Tehama Formation—*poorly sorted pale yellow to greenish gray silt, silty clay, locally tuffaceous sand and gravel which weathers to pale buff and yellow-brown color.* Contains the Nomlaki tuff member near its base.
	Pu	**UPPER PLIOCENE MARINE SEDIMENTARY ROCKS**	Scotia Bluffs Sandstone—*massive sandstone containing mudstone members;* Rio Dell Formation—*massive mudstone, alternating thin sandstone and mudstone, phantom-banded mudstone, very fine-grained sandstone, and siltstone.*
	Pml	**MIDDLE AND/OR LOWER PLIOCENE MARINE SEDIMENTARY ROCKS**	Eel River Formation—*dark gray-black mudstone, siltstone and glauconitic sandstone.*
		PLIOCENE VOLCANIC ROCKS:	
	Pv^a	**ANDESITIC**	Light to dark gray flows of medium to coarse grained hornblende or pyroxene andesite, weathers to yield subrounded boulders of fresh rock embedded in deeply weathered reddish soil.
	Pv^b	**BASALTIC**	Dark gray augite-olivine basalt, medium gray porphyritic hypersthene basalt, and diabase. Basalt in the Tuscan Buttes quadrangle (Table Mtn.) which overlies the Tuscan Formation and underlies the Red Bluff Formation.
	Pv^p	**PYROCLASTIC**	Nomlaki Tuff Member of the Tuscan and Tehama Formations—*pale gray or salmon-pink, massive, poorly consolidated andesite and dacite tuff.* Tuscan Formation—*andesitic tuff, tuff breccia, agglomerate, and basal sand and gravel beds, includes dacite tuff member that is locally welded and characterized by abundant black glass* (much of the formation is considered to be a volcanic mudflow deposit).

STRATIGRAPHIC NOMENCLATURE—Continued

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CENOZOIC – TERTIARY – Miocene	Mu	**UPPER MIOCENE MARINE SEDIMENTARY ROCKS**	Pullen Formation—*mudstone, in part diatomaceous, siltstone, and local basal sandstone member.*
CENOZOIC – TERTIARY – Oligocene	Φc	**OLIGOCENE NONMARINE SEDIMENTARY ROCKS**	Weaverville Formation—*fine grained sandstone, shaly sandstone, sandy shale, lake beds, lignitic shale, lignite, tuff, and coarse stream conglomerate* (yields reddish soil).
CENOZOIC – TERTIARY – Eocene	Ec	**EOCENE NONMARINE SEDIMENTARY ROCKS**	Montgomery Creek Formation—*gray-green arkosic sandstone, conglomerate, and shale, light colored quartz sandstone, and thin coal seams.*
CENOZOIC – TERTIARY – Undivided	Tm	**TERTIARY MARINE SEDIMENTARY ROCKS**	Wildcat Group, undifferentiated—*mudstone, siltstone and sandstone* (upper Miocene to upper Pliocene). Falor Formation—*poorly cemented gray-to buff sandstone, gray to tan clay, lenticular limestone, thin red beds, and pebbly conglomerate* (Pliocene).
CENOZOIC – TERTIARY – Undivided	Ti	**TERTIARY INTRUSIVE (HYPABYSSAL) ROCKS: UNDIFFERENTIATED**	Porphyritic anorthoclase trachyte, shallow plug-like intrusive rock.
MESOZOIC – CRETACEOUS	K	**UNDIVIDED CRETACEOUS MARINE SEDIMENTARY ROCKS**	Undifferentiated Cretaceous graywacke and shale of the coastal area (includes the area shown by Ogle, 1953, as the False Cape shear zone).
MESOZOIC – CRETACEOUS	Ku	**UPPER CRETACEOUS MARINE SEDIMENTARY ROCKS**	Yager Formation[1]—*dark gray mudstone, shale, graywacke, and conglomerate.* Bald Hills Formation—*conglomerate, sandstone, and mudstone.* Upper Cretaceous strata in the northern part of the Sacramento Valley—*gray, tan and brown well-bedded shale, sandy shale, sandstone, and some conglomerate beds near base.*
MESOZOIC – CRETACEOUS	Kl	**LOWER CRETACEOUS MARINE SEDIMENTARY ROCKS**	Ono Formation—*thick mudstone, siltstone, conglomerate, graywacke, and limestone*; Rector Formation—*thin sandstone and conglomerate.* Lower Cretaceous strata on west side of Sacramento Valley—*massive conglomerate, dark-green shale, conglomeratic sandstone,* and *sandstone,* (in part this may include some Knoxville or Upper Jurassic strata in the area north of Elder Creek). Lower Cretaceous strata in the Weaverville quadrangle.
MESOZOIC – CRETACEOUS	KJf	**FRANCISCAN FORMATION**	Franciscan Formation—*massive graywacke and minor amounts of platy, dark-gray shale, thin-bedded chert, greenstone where undifferentiated, and glaucophane schist*; also some areas of mildly metamorphosed equivalents of the sedimentary and volcanic rocks of the Franciscan Formation.
MESOZOIC – CRETACEOUS	KJfv	**FRANCISCAN VOLCANIC AND METAVOLCANIC ROCKS**	Diabase, basalt, and agglomerate. (Mafic volcanic rocks associated with the undifferentiated Cretaceous strata of the coastal area are shown as KJfv?).
MESOZOIC – JURASSIC	gr	**MESOZOIC GRANITIC ROCKS**	Mule Mountain area intrusive rocks—*trondhjemite, albite granite, and some quartz diorite* (Late Jurassic). Shasta Bally Mountain area—*biotite-hornblende-quartz diorite, granodiorite (locally ranges to gabbro). Also includes "birdseye" diorite and dacite porphyry dikes* (Late Jurassic or Early Cretaceous). Trinity Alps area—*quartz diorite.* Helena quadrangle and Ironside Mtn. area—*hornblende diorite.* McCloud River area—*mafic quartz diorite and metadiorite.*
MESOZOIC – JURASSIC	bi	**MESOZOIC BASIC INTRUSIVE ROCKS**	Gabbro, hornblende gabbro, and banded gabbro schist. (The rocks within the Helena quadrangle shown by this unit are possibly metavolcanic.)
MESOZOIC – JURASSIC	ub	**MESOZOIC ULTRABASIC INTRUSIVE ROCKS**	Peridotite, minor pyroxenite and dunite, largely serpentinized. Area 5 miles north-northwest of Trinity Dam shown as "ub" is composed of serpentine breccia, believed to be early Tertiary.
MESOZOIC – JURASSIC	Jk	**KNOXVILLE FORMATION**	Knoxville Formation—*shale, containing many sandstone and calcareous layers.*
MESOZOIC – JURASSIC	Ju	**UPPER JURASSIC MARINE SEDIMENTARY AND METASEDIMENTARY ROCKS**	Unnamed Upper Jurassic strata—*slaty and phyllitic sandstone, shale, and minor conglomerate.*
MESOZOIC – JURASSIC	Jml	**MIDDLE AND/OR LOWER JURASSIC MARINE SEDIMENTARY AND METASEDIMENTARY ROCKS**	Potem Formation—*brown to green shaly sandstone, thin-bedded gray to green shale and gray impure limestone* (includes Bagley Andesite where undifferentiated). Arvison Formation—*chiefly marine pyroclastic rocks, buff and maroon to lavender tuffs, some shale, sandstone and andesitic flow rocks.*
MESOZOIC – JURASSIC	JŦRv	**JURASSIC AND/OR TRIASSIC METAVOLCANIC ROCKS**	Bagley Andesite—*andesitic tuff, generally fine and stratified, locally agglomeratic, contains traces of marine fossils* (Jurassic); Bully Hill Rhyolite—*porphyritic and non-porphyritic silicic volcanic rocks* (Triassic). Quartz porphyry hypabyssal intrusive rock (possibly genetically related to the Bully Hill Rhyolite).
MESOZOIC – TRIASSIC	ŦR	**TRIASSIC MARINE SEDIMENTARY AND METASEDIMENTARY ROCKS**	Modin Formation—*andesitic tuffaceous beds containing a basal volcanic conglomerate, and gray, thin-bedded sandstone and slaty shale*; Brock Shale—*black, medium to thick-bedded shale, calcareous in part, and red toward top.* Hosselkus Limestone—*thick to thin-bedded light gray limestone*; Pit Formation—*shale, mudstone, siltstone, limestone, and lenses of tuff and tuff breccia.* Limestone in the Dubakella Mtn. quadrangle.
MESOZOIC – UNDIVIDED	m ls	**PRE-CRETACEOUS METAMORPHIC ROCKS UNDIFFERENTIATED, ls = LIMESTONE AND/OR DOLOMITE**	Undivided Triassic and Paleozoic rocks—phyllite, meta-chert and metavolcanic rocks. Trinity Alps area—quartz-mica schist, graphitic phyllite, and meta-chert (rocks contain relict textures and possibly correlate with less metamorphosed rocks shown as "m" in the Helena quadrangle). Undivided Triassic and Paleozoic crystalline limestone shown as "ls".
MESOZOIC – UNDIVIDED	ms	**PRE-CRETACEOUS METASEDIMENTARY ROCKS**	Kerr Ranch Schist and other rock units in the northwestern part of Redding map sheet which may be more highly metamorphosed equivalents of the unnamed Upper Jurassic strata—*thinly foliated dark-grey quartz-sericite schist, and epidote-bearing greenschist.* Phyllite metachert, metagraywacke and breccia in the North Yolla Bolly Mountain area. In the southern part of the Yolla Bolly quadrangle "m" includes rocks which may be metamorphosed Franciscan rocks or may be part of an older complex—*phyllite, mica-quartz schist, and slate.*
MESOZOIC – UNDIVIDED	mv	**PRE-CRETACEOUS METAVOLCANIC ROCKS**	Diabase in the Helena quadrangle.

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PALEOZOIC	PERMIAN	Pm	**PERMIAN MARINE SEDIMENTARY AND METASEDIMENTARY ROCKS**	McCloud Limestone—*light gray, very thick-bedded limestone and dolomite, locally some chert.*
	PERMIAN	Pmv	**PERMIAN METAVOLCANIC ROCKS**	Dekkas Andesite—*keratophyre, spilite, a thin-bedded medium gray mudstone member, fossiliferous impure limestone lenses, and silicic volcanic rocks similar to Bully Hill Rhyolite* (in part Triassic); Nosoni Formation—*tuffaceous black mudstone and tuff, a thin basal conglomerate, and some keratophyric tuff breccia.*
	MISSISSIPPIAN	C	**UNDIVIDED CARBONIFEROUS MARINE SEDIMENTARY AND METASEDIMENTARY ROCKS**	Baird Formation—*fossiliferous mudstone, undifferentiated tuff, and small limestone lenses* (deposits probably confined to Mississippian time).
	MISSISSIPPIAN	Cv	**CARBONIFEROUS METAVOLCANIC ROCKS**	Porphyritic greenstone unit of the Baird Formation; Bass Mountain Diabase—*altered mafic lava flows and volcanic breccia* (Mississippian).
	MISSISSIPPIAN	CM	**MISSISSIPPIAN MARINE SEDIMENTARY AND METASEDIMENTARY ROCKS**	Bragdon Formation—*dark greenish-gray to black thinly bedded meta-shale, interstratified metamorphosed siltstone, sandstone, grit, and conglomerate in upper part, and metamorphosed local thin-bedded chert, rhyolitic tuff, and mafic volcanic rocks in the lower part.* (In the French Gulch and Lamoine 15 minute quadrangles the Bragdon Formation is in thrust contact with the underlying rock units—John Albers, personal communication, 1961).
	DEVONIAN	D	**DEVONIAN MARINE SEDIMENTARY AND METASEDIMENTARY ROCKS**	Kennett Formation—*dark gray to black siliceous meta-shale, silicic tuff and tuffaceous shale in the lower part of the formation, and massive fossiliferous limestone in upper part.*
	DEVONIAN	Dv	**DEVONIAN METAVOLCANIC ROCKS**	Balaklala Rhyolite—*silicic flows interlayered with coarse and fine pyroclastic material and small intrusive bodies* (similar to the Bully Hill Rhyolite).
	DEVONIAN	Dv?	**DEVONIAN AND PRE-DEVONIAN ? METAVOLCANIC ROCKS**	Copley Greenstone—*fine-grained keratophyre and some tuff beds in lower part of unit, amygdaloidal pillow lava, and fine to coarse pyroclastic material with diabase in upper part (includes some black siliceous metashale in the Shasta Dam quadrangle).*
	UNDIVIDED	pSs	**PRE-SILURIAN METASEDIMENTARY ROCKS**	Abrams Mica Schist—*recrystallized carbonate-rich schist, mica schist, and calc-silicate rocks.* (A gneissic amphibolite which may possibly be a unit of the Salmon Hornblende Schist is shown as pSs?).
	UNDIVIDED	pSv	**PRE-SILURIAN METAVOLCANIC ROCKS**	Salmon Hornblende Schist—*amphibolite, hornblende schist, amphibolite hornfels, and amphibolite migmatite.* (Includes a mixed rock unit of of amphibolite-rich rocks and rocks similar to those shown on this map as "m".)

NOTE

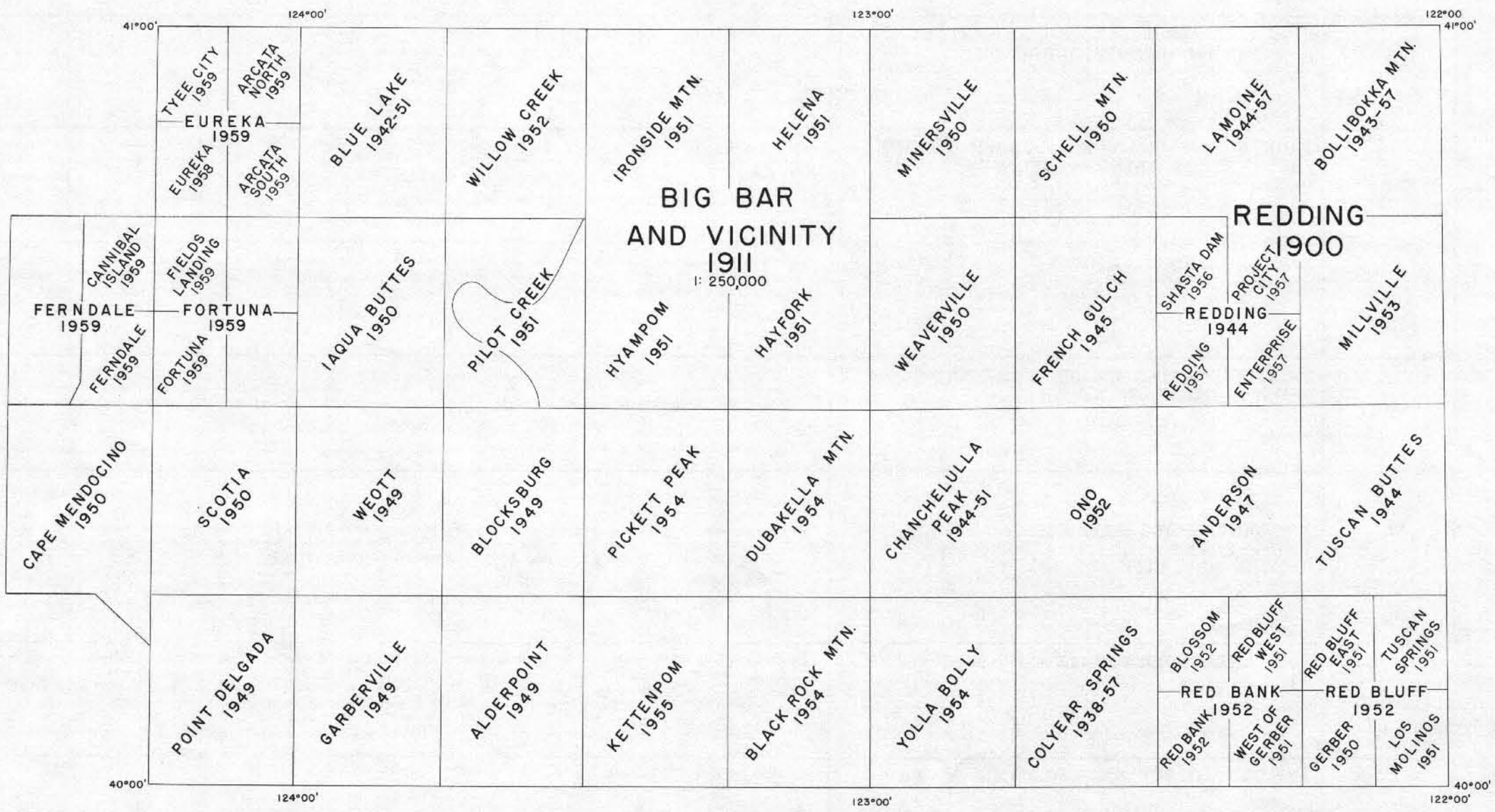
[1] Not in stratigraphic sequence.

TOPOGRAPHIC QUADRANGLES

WITHIN THE REDDING SHEET

AVAILABLE FROM THE U.S. GEOLOGICAL SURVEY

1962



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