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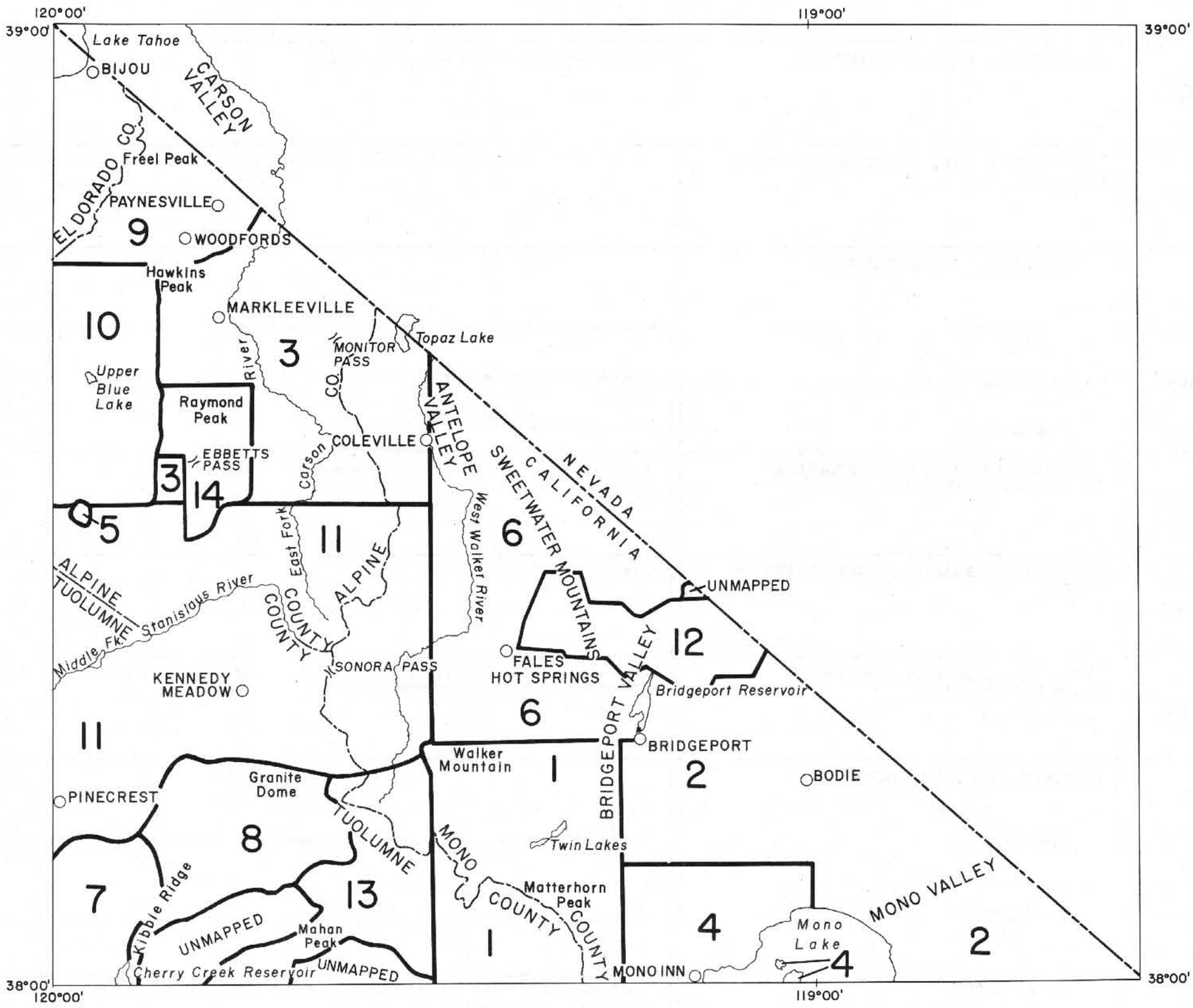
EXPLANATORY DATA
WALKER LAKE SHEET
GEOLOGIC MAP OF CALIFORNIA
OLAF P. JENKINS EDITION

Compiled by James B. Koenig, 1963

(Second Printing, 1975)

INDEX TO GEOLOGIC MAPPING
USED IN THE COMPILATION OF THE WALKER LAKE SHEET



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14. Wilshire, H. G., The history of Tertiary volcanism near Ebbetts Pass, Alpine County, California, scale 1:31,680, University of California, Berkeley, unpublished Ph.D. thesis, 1956.
Wilshire, H. G., 1957, Propylitization of Tertiary volcanic rocks near Ebbetts Pass, Alpine County, California: Univ. California Pubs. Geol. Sci., vol. 32, no. 4, pp. 243-272, Fig. 1: Geologic map of the Ebbetts Pass region, scale 1:58,500.

* Glacial geology modified after Eliot Blackwelder, 1931, Pleistocene glaciation in the Sierra Nevada and Basin Ranges: Geol. Soc. America Bull., vol. 42, pp. 865-922, Fig. 21; scale 1:168,960; and unpublished geologic maps of the Bridgeport (30′) quadrangle, scale 1:125,000, 1934.

For a complete list of published geologic maps of this area see Division of Mines and Geology Special Reports 52 and 52-A.

STRATIGRAPHIC NOMENCLATURE—WALKER LAKE 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**	Sand dunes north and east of Mono Lake.
	Qal	**RECENT ALLUVIUM**	Stream and river alluvium; glacial outwash; Recent fan deposits.
	Ql	**QUATERNARY LAKE DEPOSITS**	Quaternary lake beds; playa deposits; calcareous tufa mounds along east shore and north of Mono Lake.
Pleistocene	Qg	**QUATERNARY GLACIAL DEPOSITS**	Glacial moraines and till of the Tioga, Tahoe, and Sherwin Stages.
	Qc	**PLEISTOCENE NONMARINE SEDIMENTARY DEPOSITS**	Older alluvium; Pleistocene fans and pediment sands and gravels; terrace gravels; travertine deposits east and south of Bridgeport.
		PLEISTOCENE VOLCANIC ROCKS:	
	Qpv^p	**PYROCLASTIC**	Basaltic lapilli and ash of Black Point. Pyroclastic debris, of probable Pleistocene age, comprising cinder cone near Aurora.
	Qpv^a	**ANDESITIC**	Andesite flows and tuffs of Negit and Paoha Islands in Mono Lake.
	Qpv^b	**BASALTIC**	Basalt and andesitic basalt flows (may be Pliocene in part).
	QP	**PLIOCENE-PLEISTOCENE NONMARINE SEDIMENTARY DEPOSITS**	Dissected fanglomerate of probable Plio-Pleistocene age, at south end of Carson Valley.
	✳	**QUATERNARY AND/OR PLIOCENE CINDER CONES**	Cinder cones.
TERTIARY – Pliocene	Pc	**UNDIVIDED PLIOCENE NONMARINE SEDIMENTARY ROCKS**	Sands, conglomerates and silts, in part of lacustrine origin, locally indurated and cemented. East of Mono Lake they contain fossils of upper Pliocene age (C. W. Chesterman, oral communication, 1962).
		PLIOCENE VOLCANIC ROCKS:	
	Pv^b	**BASALTIC**	Basalt and olivine basalt flows with minor intrusive rocks. The basalts east of Mono Lake may be in part Pleistocene.
	Pv^r	**RHYOLITIC**	Rhyolite and dacite flows, tuffs, and shallow intrusive plugs and dikes. Tryon Peak Flows—*rhyolite, dacite and minor basalt flows.*
	Pv^p	**PYROCLASTIC**	Andesitic breccias, mudflows, flows, tuffs, and fluvial and lacustrine sediments[1] (stratigraphically above unnamed latites, Pv^a, in the Sonora Pass-Dardanelles area). Welded latite and dacite tuff and tuff-breccia[2] interbedded with latite flows, Pv^a (west of Sonora Pass these tuffs are included in Pv^a—unnamed latite flows).
	Pv^a	**ANDESITIC**	Latite flows of Table Mountain and unnamed latite flows with interbedded latite welded tuffs[1,3]. Raymond Peak Andesites—*andesite flows and breccias*[1]. Silver Peak Andesites—*andesite flows, breccias and tuffs, and dacite flows*[1]. Unnamed andesite and dacite flows and andesite breccias[1].
	Pv?	**UNDIFFERENTIATED**	Andesitic breccias, mudflows, tuffs, flows, and interbedded sediments[1] (stratigraphically below latite flows and welded tuffs, Pv^a); locally includes volcanic rocks of different lithology. These andesitic rocks may range in age from middle Miocene to Pliocene. The position of the Mio-Pliocene boundary is a matter of controversy at present[4].
Miocene		**MIOCENE VOLCANIC ROCKS:**	
	Mv^p	**PYROCLASTIC**	Rhyolite and dacite tuffs, welded tuffs and minor tuffaceous sediments—possible source of detritus comprising the Valley Springs Formation in the foothills of the Sierra Nevada; dated by G. B. Dalrymple, University of California, Berkeley (written communication, 1962), by potassium-argon method as being 23-29 million years old at Eagle Creek and Leavitt Creek.
	Mv?	**UNDIFFERENTIATED**	Propylitized and silicified andesitic breccias, tuffs, flows, and intrusive plugs[5], and silicified rhyolitic flows, tuffs, and intrusive bodies.
Undivided		**TERTIARY INTRUSIVE (HYPABYSSAL) ROCKS:**	
	Ti	**UNDIFFERENTIATED**	Plugs, domes, sills, and dikes.
	Ti^r	**RHYOLITIC**	Rhyolite, dacite and minor andesite domes and plugs.
	Ti^a	**ANDESITIC**	Andesite domes, plugs, necks, dikes, and sills.
	Ti^b	**BASALTIC**	Basalt plug and dikes near Ebbetts Pass.

STRATIGRAPHIC NOMENCLATURE—Continued

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.)
MESOZOIC — JURASSIC–CRETACEOUS		**MESOZOIC GRANITIC ROCKS**	
	gr	**UNDIFFERENTIATED**	Granitic rocks, ranging in composition from granite to diorite, probably representing several plutons (in part sheared and metamorphosed).
	gr^a	**GRANITE AND ADAMELLITE (QUARTZ MONZONITE)**	Rocks similar to the Cathedral Peak Granite (mostly porphyritic quartz monzonite). Rocks similar to the Half Dome Quartz Monzonite. Tamarack Leuco-adamellite[6]. Burnside Lake Adamellite[6]. Stanislaus Meadow Adamellite[6]. Unnamed granite, adamellite, alaskite, aplite and pegmatite, and minor diorite.
	gr^g	**GRANODIORITE**	Rocks similar to the Sentinel Granodiorite. Ebbetts Pass Granodiorite (Wilshire, 1957). Unnamed granodiorite, and minor amounts of tonalite, diorite, aplite and pegmatite.
	gr^t	**TONALITE (QUARTZ DIORITE) AND DIORITE**	Carson Pass Tonalite[6]. Lookout Peak Tonalite[6]. Unnamed tonalite and diorite, and minor amounts of aplite and pegmatite.
	bi	**MESOZOIC BASIC INTRUSIVE ROCKS**	Gabbro, diorite, and minor pyroxenite (locally metamorphosed).
	ub	**MESOZOIC ULTRABASIC INTRUSIVE ROCKS**	Serpentine.
	Jml	**MIDDLE AND/OR LOWER JURASSIC MARINE SEDIMENTARY AND METASEDIMENTARY ROCKS**	Clastic metasediments of the Lobdel Lake area—dated as Lower Jurassic by S. W. Muller (Halsey, 1953).
	JŦv	**JURASSIC AND/OR TRIASSIC METAVOLCANIC ROCKS**	Meta-andesite. Metatuff. Metarhyolite. Schistose rocks of metavolcanic origin.
UNDIVIDED	m ls	**PRE-CRETACEOUS METAMORPHIC ROCKS, UNDIFFERENTIATED, ls = LIMESTONE AND/OR DOLOMITE**	Metamorphic rocks of undifferentiated lithology. Metamorphosed limestone.
	mv	**PRE-CRETACEOUS METAVOLCANIC ROCKS**	Meta-andesite. Metarhyolite. Greenstone. Schist derived from volcanic rocks. Metatuff. Metabreccia. (Probably largely of Jura-Triassic age. May include metasedimentary rocks locally.)
	ms	**PRE-CRETACEOUS METASEDIMENTARY ROCKS**	Hornfels. Quartzite. Calc-silicate rocks. Metasiltstone and metasandstone. Slate. Metachert. Limestone. (May include rocks of Jurassic age in Sweetwater Mountains, and rocks of Paleozoic age in vicinity of Mono Lake. Locally includes metavolcanic rocks.)
	gr-m	**PRE-CENOZOIC GRANITIC AND METAMORPHIC ROCKS**	Migmatite. Sheared, gneissic granite and diorite. Metadiorite, southwest of Antelope Valley.
PALEOZOIC — CARBONIFEROUS	ℙ	**PALEOZOIC MARINE SEDIMENTARY AND METASEDIMENTARY ROCKS**	Hornfels. Quartzite. Metashale. Metasandstone. Calc-silicate rocks. (May include rocks of Ordovician, Pennsylvanian and Permian ages.)
	C?	**UNDIVIDED CARBONIFEROUS MARINE SEDIMENTARY AND METASEDIMENTARY ROCKS**	Marble and crystalline limestone—dated by S. W. Muller (Dunn, 1951).

NOTES

[1] The name Mehrten Formation has been at times extended to these volcanic rocks near the crest of the Sierra Nevada. Probably these rocks were the source of the detritus comprising the Mehrten Formation in the foothills of the Sierra Nevada. However, on the State Geologic Map the Mehrten Formation is restricted to the deposits in the foothills.

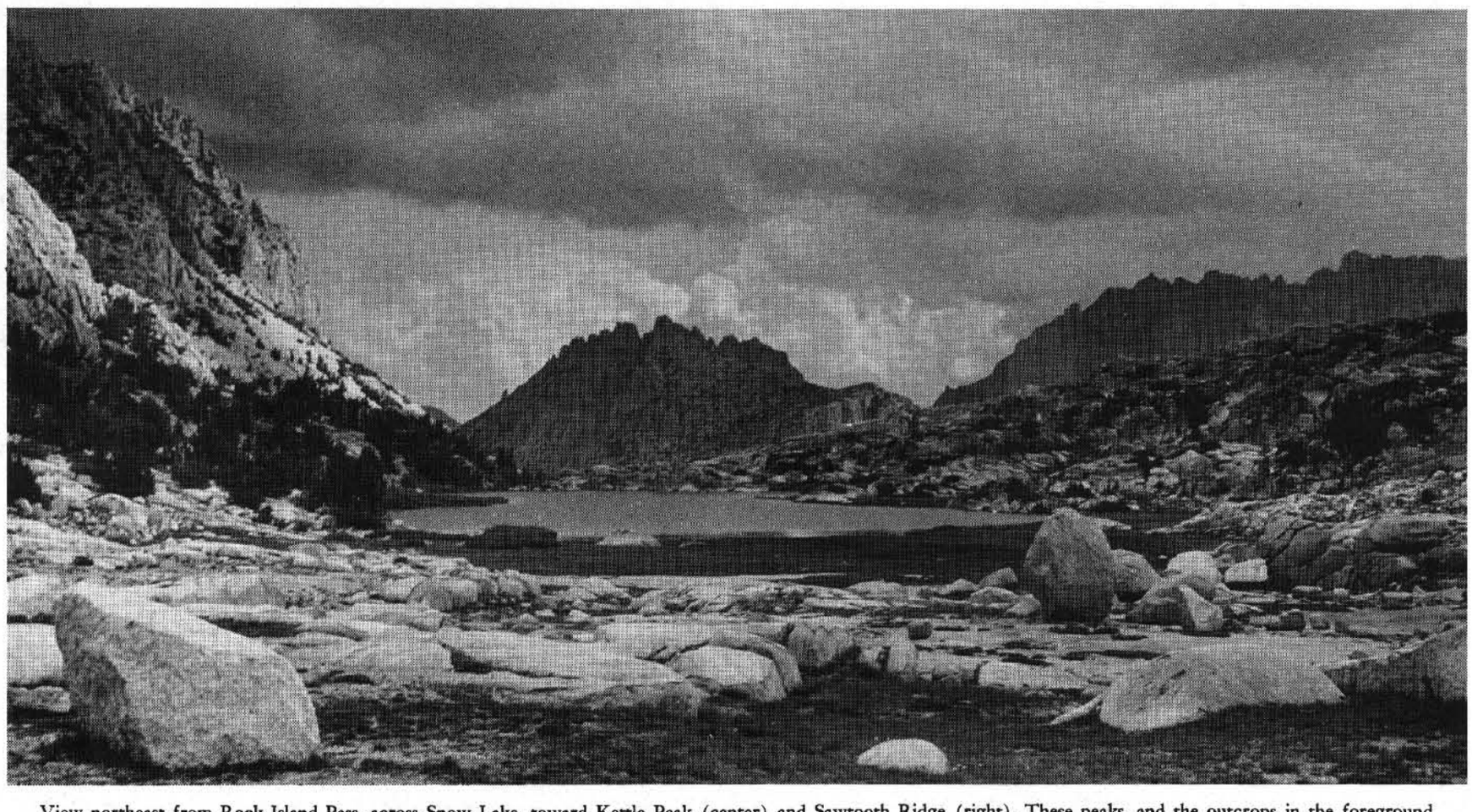
[2] Welded tuff from West Walker River Canyon dated as 10.7 million years by potassium-argon method (Curtis, G. H., 1961, Geochimica et Cosmochimica Acta, v. 23, p. 86).

[3] Dated by G. B. Dalrymple, University of California, Berkeley, by potassium-argon method as 8.6 million years on Bald Peak (written communication, 1962).

[4] Floras of Miocene age have been dated from this unit in the Niagara Creek, Ebbetts Pass, and Carson Pass areas (Axelrod, D. I., 1962, Geol. Soc. America Bull., v. 73, no. 2, p. 191, and written communication, 1962).

[5] D. I. Axelrod has suggested (Halsey, 1953) that these rocks may be equivalent to the propylitized andesites comprising the Alta Formation (Nevada) of Oligocene age.

[6] These intrusive bodies were named by Parker, 1961, and described by him in his Ph.D. thesis (see bibliography).



View northeast from Rock Island Pass, across Snow Lake, toward Kettle Peak (center) and Sawtooth Ridge (right). These peaks, and the outcrops in the foreground, are composed of porphyritic quartz monzonite. This rock, comprising the Cathedral Peak pluton, is characterized by phenocrysts of microcline feldspar up to 6 inches in length, and is exposed over a large area along the crest of the Sierra Nevada.

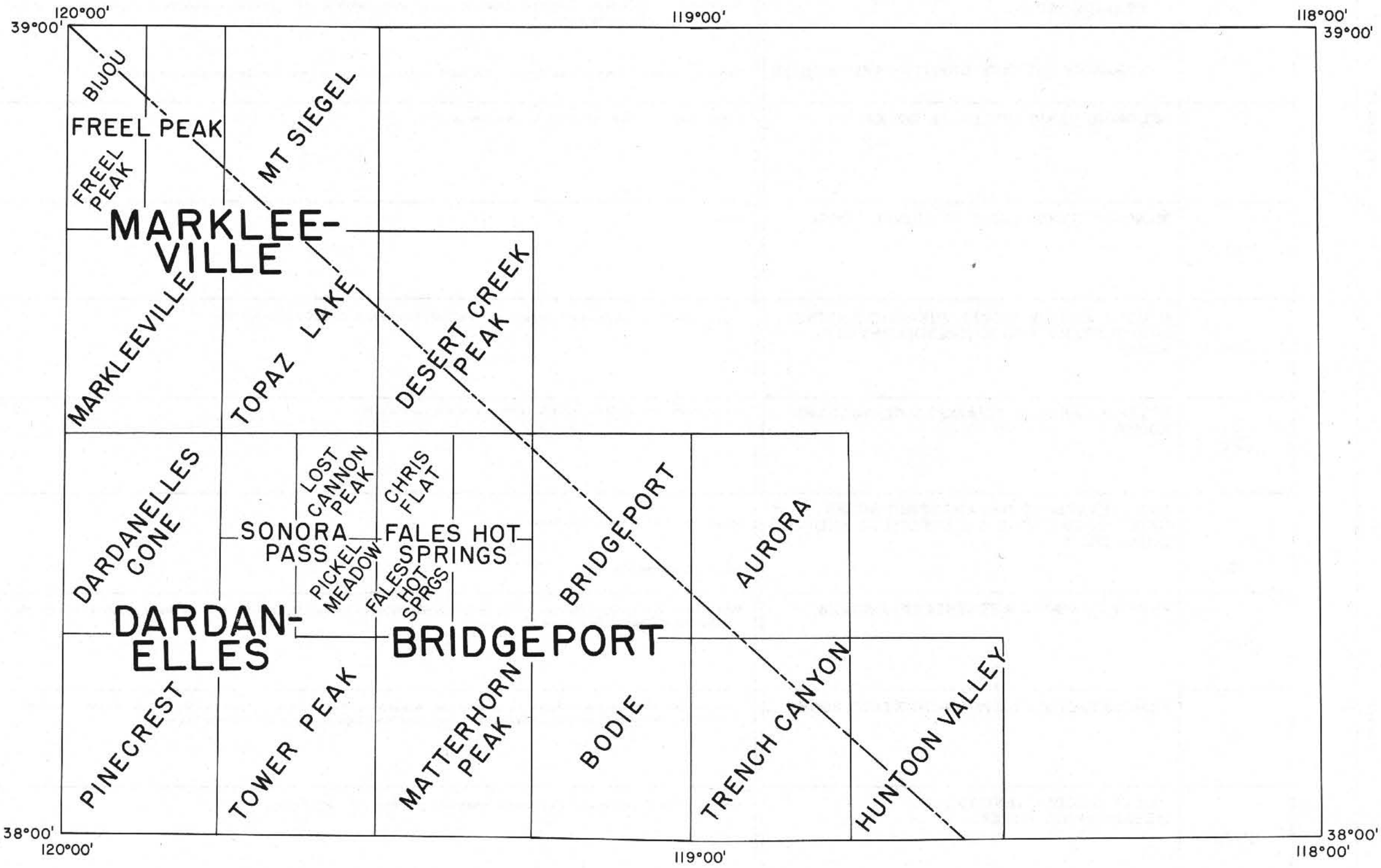
Photo by C. W. Chesterman, 1955

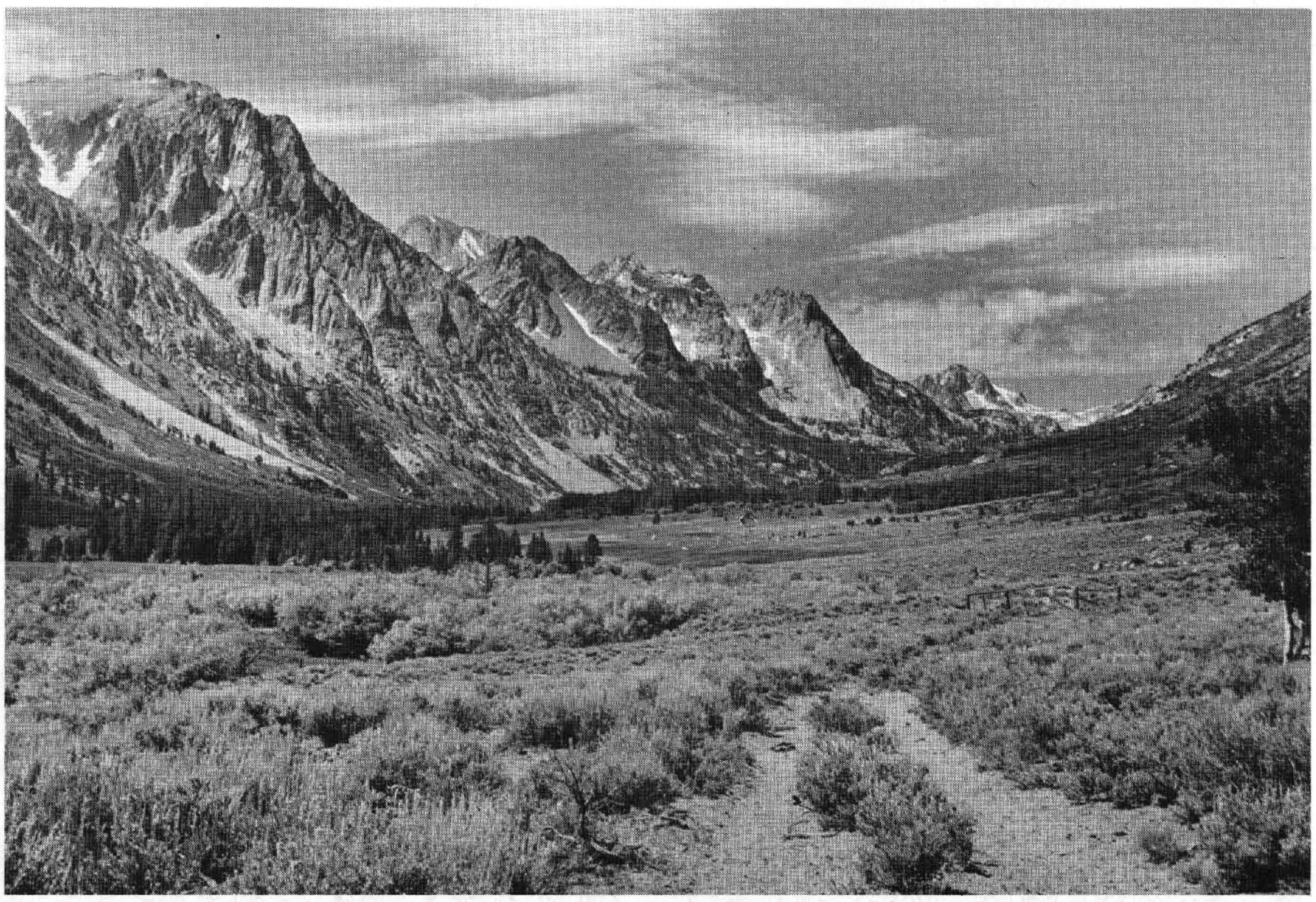
TOPOGRAPHIC QUADRANGLES

WITHIN THE WALKER LAKE SHEET

AVAILABLE FROM THE U.S. GEOLOGICAL SURVEY

1963





View southwest up Buckeye Creek, toward Hunewill Peak, with Buckeye Ridge forming the skyline at left. The valley of Buckeye Creek was formed by glacial activity, and is filled with alluvium and deposits of glacial origin. Granitic rocks are exposed along the lower slope of Buckeye Ridge, in part covered by talus. The middle and upper slopes of Buckeye Ridge are composed of metasedimentary hornfels and quartzite. The crest, at the far left, is capped by Tertiary andesite.

Photo by C. W. Chesterman, 1955

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