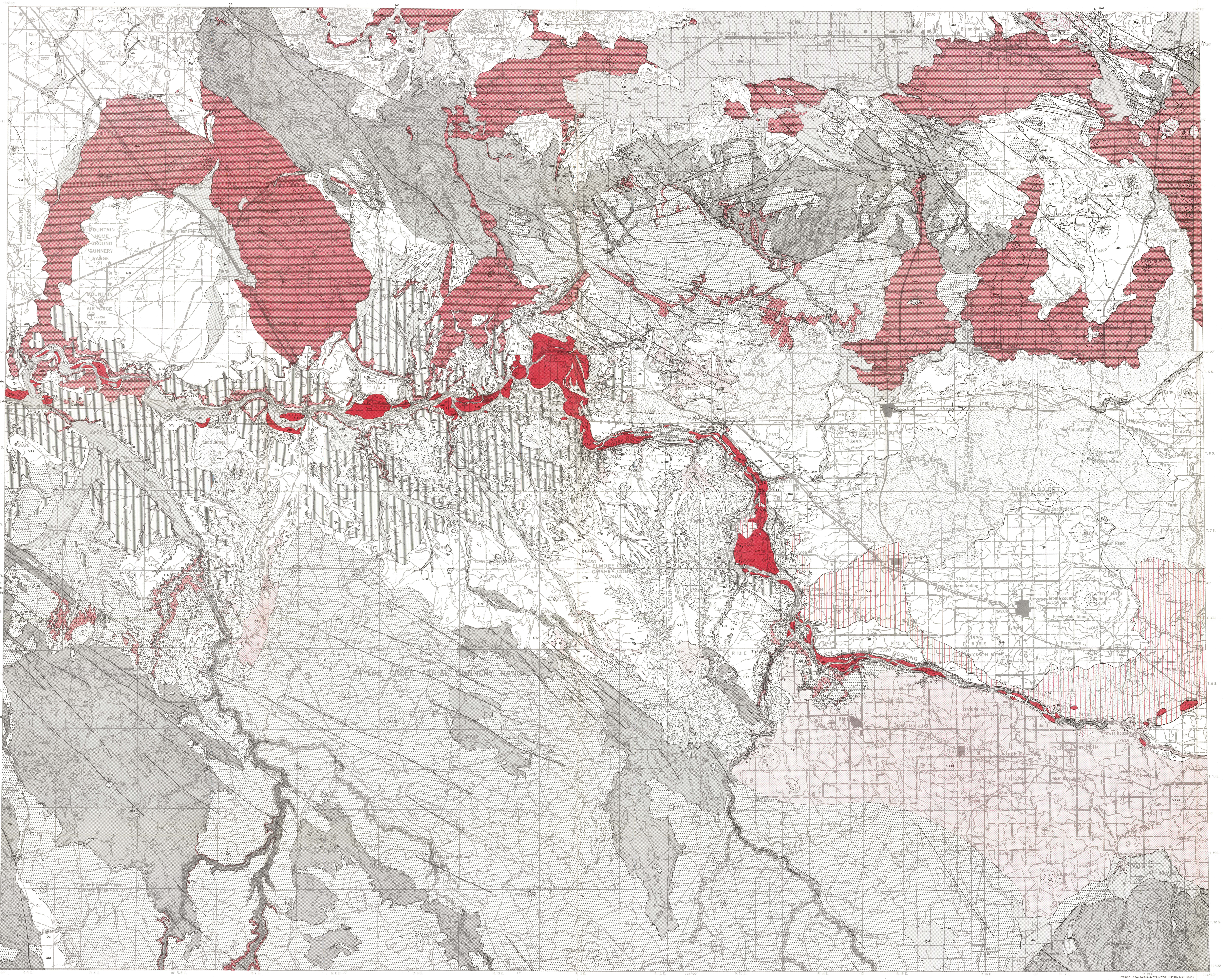
DEPARTMENT OF THE INTERIOR
UNITED STATES GEOLOGICAL SURVEY

MISCELLANEOUS GEOLOGIC INVESTIGATIONS
MAP I-373



Base enlarged from Hailey and Twin Falls 1:250,000 scale maps. Base north of 43°00′ has military grid lines; base south of 43°00′ has township and range lines

APPROXIMATE MEAN DECLINATION, 1963

INTERIOR—GEOLOGICAL SURVEY, WASHINGTON, D. C.—62330

Photogeology by C. H. Marshall, 1958–59; field completion by H. A. Powers, 1959, and H. E. Malde, 1961

RECONNAISSANCE GEOLOGIC MAP OF WEST-CENTRAL SNAKE RIVER PLAIN, IDAHO

By
Harold E. Malde, Howard A. Powers, and Charles H. Marshall

SCALE 1:125 000

CONTOUR INTERVAL 200 FEET
DATUM IS MEAN SEA LEVEL

1963

EXPLANATION

QUATERNARY — Recent

Qal, Qls, Qd — Surficial material
Unconsolidated detritus conforming to present topography. Talus commonly present below rocky cliffs not shown.
Qal, *stream alluvium.*
Qls, *landslide debris.*
Qd, *dune sand*

Qmk — McKinney Basalt
Lava flow of porphyritic plagioclase-olivine basalt from McKinney Butte 8 miles northwest of Gooding. Terminus less than 20 feet above Snake River near King Hill where the thickness is about 20 feet

Ql, Qlo — Lava flows
Basalt conforming to present topography and largely unmodified by surficial deposits or by weathering. Some flows locally identified as older, Qlo, *than adjacent flows*

Qwg — Wendell Grade Basalt
Lava flow of olivine basalt from Notch Butte 4 miles south of Shoshone. Overlaps landslide and talus debris younger than Melon Gravel near Hagerman where the flow thickness does not exceed 20 feet

Pleistocene — Upper Pleistocene

Qm — Melon Gravel
Boulders, cobbles, and pebbles of basalt in matrix of basaltic sand arranged in giant crossbeds. Derived from nearby outcrops of basalt of various ages. Boulders commonly 3 feet in diameter, some as large as 10 feet. Downstream from Twin Falls, the gravel is confined to floor of present canyon, but farther east the gravel also occupies uplands. Within the canyon, the gravel forms constructional bars and terraces that rise as high as 300 feet above the Snake River, generally downstream from canyon constrictions. Terraces commonly separated from canyon walls by marginal troughs 50 to 150 feet deep. Terrace surfaces characteristically veneered with pavement of boulders ("melon patches")

EROSION OF CANYON-FILLING LAVA FLOWS

Snake River Group

Qs — Bancroft Springs Basalt
Lava flow of porphyritic plagioclase-olivine basalt, probably from a concealed source near McKinney Butte 8 miles northwest of Gooding. Includes part of McKinney Basalt of Stearns (1936) and Bliss Basalt of former usage. Surface moderately rough but partly mantled with eolian material. Fills a canyon as deep as 500 feet discontinously exposed from mouth of Malad River to Pasadena Valley. Most of the canyon fill is pillow lava

UNCONFORMABLE ON THOUSAND SRINGS BASALT; RELATIONS TO SAND SPRINGS BASALT UNKNOWN

Qss — Sand Springs Basalt
Lava flow of olivine basalt from vent 23 miles northeast of Twin Falls. Undulating surface largely mantled by eolian sand and silt. Surface east of U.S. Highway 93 locally denuded and scoured along abandoned stream channels. Fills a canyon as deep as 350 feet exposed at Blue Lake Alcove 4 miles north of Twin Falls and near Thousand Springs

CANYON CUT TO PRESENT DEPTH

Qc — Crowsnest Gravel
Lithology variable. Upstream from Hagerman composed mostly of silicic volcanic pebbles, but farther downstream has abundant quartzite and porphyry cobbles. Occupies terraces that range from 50 feet above Snake River near Bruneau to more than 250 feet above the river near Hagerman. Ranges from 25 to 75 feet in thickness

Qg — Unnamed gravel
Pebble and cobble gravel along Bruneau and Big Wood Rivers. Deposits mostly about 25 feet thick, on terraces 50 feet above present streams

Qsr — Basalt of Snake River Group, undivided

Qtt, Qtm — Thousand Springs Basalt
Lava flows of porphyritic plagioclase-olivine basalt and some olivine basalt from several vents east of Hagerman. Includes Malad Basalt and Thousand Springs Basalt, as well as parts of Sand Springs Basalt as mapped by Stearns and others (1938). Smoothly mantled with alluvial and eolian deposits of gravel, sand, and silt as thick as 50 feet.
Qtt, *lava flows that form canyon fill as thick as 75 feet near Thousand Springs, and undivided lava flows farther east.*
Qtm, *Malad Member; lava flows of porphyritic plagioclase-olivine basalt, capped locally with olivine basalt, from Gooding Butte. Fills a canyon 200 feet deep near mouth of Malad Canyon*

UNCONFORMABLE ON MADSON BASALT; RELATIONS TO SUGAR BOWL GRAVEL UNKNOWN

Qsb — Sugar Bowl Gravel
Pebble gravel rich in quartzite and porphyry that forms terrace deposit 25 feet thick and 400 feet above Snake River between Pasadena Valley and Indian Cove

TERRACE CUTTING

Qma — Madson Basalt
Lava flow of olivine basalt probably from a vent east of Gooding. Fills a canyon 300 feet deep discontinuously exposed from mouth of Malad River to Swiss Valley

PARTIAL ENTRENCHMENT OF SNAKE RIVER

Middle Pleistocene — Idaho Group

Qp — Black Mesa Gravel
Gravel and sand as thick as 25 feet on Black Mesa and related remnants of a widely preserved pediment surface south of the Snake River and 550 feet higher. Gravel largely reworked from gravel beds of older formations. Capped by caliche layer about 5 feet thick

BROAD VALLEY EROSION

Qbf, Qbs, Qbb, Qbby, Qbbo — Bruneau Formation
Canyon fill of undeformed, unconsolidated detrital material and interbedded basaltic lava flows associated with marginal deposits of gravel and basalt. Canyon fill sequences interrupted by several local disconformities caused by dissection of lava dams. Thickness of fill about 800 feet near Bruneau.
Qbs, *detrital material dominated by massive lake beds of white-weathering fine silt, clay, and diatomite in layers 50 feet or more thick, with minor amounts of alluvial silt and sand. Includes conspicuous beds of iron-stained pebble and cobble gravel reworked as beach deposits from contiguous older gravels. Lake deposits rise to altitude of 3,200 feet and are overlain locally by mixed alluvial and colluvial deposits of sand, clay, and gravel that rise nearly 300 feet higher.*
Qbf, *fan gravel, cobbly to pebbly. Deposits north of Snake River merge with detrital material and lava flows in the canyon fill. Fan debris north of Mountain Home consists largely of coarse sand derived from decayed granite. Deposits north of Camas Prairie merge with lava flows on valley floor. Deposits west of Grasmere are of uncertain age but are physiographically similar.*
Qbb, *basaltic lava flows that erupted from several vent areas at various times so as to form a series of lava plateaus and canyon-filling volcanic dams. Lavas locally stained brown and yellow but not generally softened by decomposition. Canyon fill includes some fragmental material altered locally to palagonite. Flows not generally divided on the map, but some are identified as older,* Qbbo, *or as younger,* Qbby, *than contiguous flows*

CANYON CUTTING

Lower Pleistocene

Qt — Tuana Gravel
Pebble and cobble gravel interbedded with layers of massive brown to gray sand and silt. Composed dominantly of silicic volcanic debris along Tuana Gulch and Salmon Falls Creek, but includes much cobbly to bouldery quartzitic debris south of Bruneau. Covers erosion surface south of Snake River and 600 to 800 feet higher. Capped by massive caliche layer several feet thick. Top eroded; about 200 feet thick at Indian Butte, 10 miles southwest of Hagerman

PLANATION OF BASIN DEPOSITS; MINOR FAULTING

QUATERNARY AND TERTIARY — Upper Pliocene — Idaho Group

QTg, QTgb — Glenns Ferry Formation
Basin fill of poorly consolidated detrital material and minor lava flows of basalt. Includes most of the Hagerman Lake Beds of former usage. Sequence of bedding interrupted by numerous minor unconformities as a consequence of contemporaneous basin subsidence. About 2,000 feet of beds exposed.
QTg, *lake and stream deposits characterized by abrupt lateral changes in facies. Facies include: (1) silt in massive layers marked with faint banding; (2) sand in evenly layered thick beds cemented locally to flaggy sandstone; (3) thinly bedded dark clay, olive silt, and carbonaceous shale; (4) ripple-marked sand and silt; (5) granitic sand and fine pebble gravel; and (6) quartzitic cobble gravel. With these facies are several thin beds of silicic volcanic ash and thicker beds of basaltic fragmental material.*
QTgb, *lava flows of olivine basalt, mostly subaerial, that form sheetlike bodies within the detrital deposits. Generally altered to basaltic saprolite with residual spheroids of undecomposed rock. Includes some basaltic ash, commonly altered to palagonite and usually at the bases of flows. Several source areas identifiable within the basin of detrital accumulation, but other possible source areas in uplands cannot be reliably distinguished from vents of Banbury Basalt*

MINOR DEFORMATION AND EROSION

TERTIARY — Pliocene — Middle Pliocene

Tc, Tcb — Chalk Hills Formation
Basin fill of consolidated, locally indurated, clastic deposits and minor lava flows of basalt. Exposed thickness about 300 feet.
Tc, *lake and stream deposits and less abundant silicic volcanic ash in variegated sequences of white, pink, brown, and gray beds 2–10 feet thick. Individual beds well sorted, ranging from crossbedded sand to massive silt, clay, and diatomite. Ash beds generally only a few inches thick. Adjacent beds of contrasting texture and color generally form well-layered banded sequences of wide lateral extent, but the deposits are locally drab and monotonous, consisting of massive, brownish-gray tuffaceous silt. Volcanic ash comparatively fresh but cemented locally by opal.*
Tcb, *lava flow of olivine basalt. Overlies baked detrital material. About 25 feet thick*

BLOCK FAULTING AND EROSION

Tbu, Tbs, Tb — Banbury Basalt
Lava flows of olivine basalt interbedded locally with minor amounts of stream and lake deposits. Basalt commonly altered to greenish-brown basaltic saprolite with residual spheroids of undecomposed rock. Thickness exceeds 1,000 feet northeast of King Hill and 800 feet in canyon of Bruneau River.
Tbu, *basalt of upper part; olivine basalt and some porphyritic plagioclase-olivine basalt generally in columnar flows as thick as 50 feet. Includes several thin sedimentary layers that are usually baked by overlying lava flows. Lava along upper Clover Creek is possibly of Glenns Ferry age.*
Tbs, *sedimentary deposits of middle part; largely brownish sand and pebble gravel in lenticular channel deposits, but includes light-colored silt, clay, and diatomite in lake deposits.*
Tb, *undivided basalt; lava flows mostly vesicular and less than 15 feet thick. Vesicles commonly filled with zeolites and calcite in basin area near canyon of Snake River. Locally includes stream deposits of massive brownish sand and fine gravel, as well as basaltic pyroclastic material in vent deposits. On upland surface south of Snake River very likely includes some flows and vents of Glenns Ferry age*

SUBSIDENCE OF SNAKE RIVER PLAIN

Lower Pliocene

Tmr — Rhyolite of Magic Reservoir
Rhyolite tuff, densely welded and rich in large phenocrysts of quartz and sanidine held in a pale purplish-gray aphanitic groundmass. Conspicuously broken by widely spaced columnar joints that control weathering into spires and domes. Weathered surfaces commonly stained reddish brown. Vent areas, indicated by dots, characterized by vertical and outward-dipping flow banding and by massive outcrops. At head of Magic Reservoir includes crystal-poor, lapilli-rich thin ash flows with black glassy lower parts and pumiceous upper parts that weather yellow. At least 500 feet thick southwest of Magic Reservoir

Tiv — Idavada Volcanics
Silicic latite; chiefly thick layers of devitrified welded tuff, but includes some bedded vitric tuff and lava flows. Rhyolitic rocks occur in minor amounts, mainly as vitric tuff. Predominantly porphyritic with phenocrysts of andesine, clinopyroxene, hypersthene, and magnetite, but with no quartz, sanidine, hornblende, or biotite. Includes granitic pebble and cobble gravel at the base along north side of Mount Bennett Hills. Thickness exceeds 2,000 feet at Bennett Mountain and 1,200 feet along upper Rock Creek southeast of Twin Falls.

PROLONGED EROSION AND WEATHERING

Eocene(?) to Miocene(?)

Tcv — Challis Volcanics
Tuffs and flows of variable lithology, ranging from rhyolite to andesite. Rhyolite commonly has phenocrysts of quartz, sanidine, and biotite. Andesite has phenocrysts of plagioclase and hornblende. Coarse-textured rocks weather to craggy outcrops. Fine tuffaceous rocks weather to smooth yellow slopes. Forms layered sequences, highly tilted and broken, along north side of Mount Bennett Hills and northeast of Magic Reservoir

MAJOR UNCONFORMITY

CRETACEOUS

Kg — Granitic rocks of Idaho batholith
Includes small areas of Challis Volcanics west of Camas Prairie, and gneissic rocks along South Fork of Boise River

Contact
Dashed where approximately located; short dashed where inferred

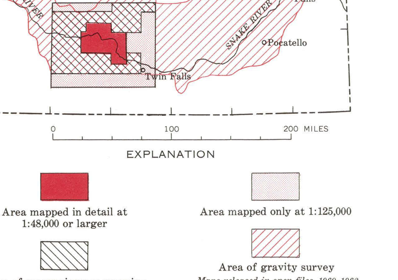
Normal fault
Dashed where approximately located; dotted where concealed. Bar and ball on downthrown side

Strike and dip of beds
Barb indicates direction of dip estimated from a distance or from aerial photographs. Shown mainly in Idavada Volcanics where dips are generally less than 10°

Source of basaltic lava flow

REFERENCES CITED

Stearns, H. T., 1936, Origin of the large springs and their alcoves along the Snake River in southern Idaho: Jour. Geology, v. 44, no. 4, p. 429-450.
Stearns, H. T., Crandall, Lynn, and Steward, W. G., 1938, Geology and ground-water resources of the Snake River Plain in southeastern Idaho: U.S. Geol. Survey Water-Supply Paper 774, 268 p.



EXPLANATION

- Area mapped in detail at 1:48,000 or larger
- Area mapped only at 1:125,000
- Area of reconnaissance mapping on 15-minute quadrangles
- Area of gravity survey — *Maps released in open files, 1960-1962*
- Outline of geologic map

INDEX MAP OF SOUTHERN IDAHO SHOWING AREAS SURVEYED

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For sale by U. S. Geological Survey, price 75 cents