DEPARTMENT OF THE INTERIOR
U. S. GEOLOGICAL SURVEY

THIS MAP CONCERNS WORK DONE BY THE U.S.
GEOLOGICAL SURVEY ON BEHALF OF THE DIVISION OF
RAW MATERIALS OF THE U.S. ATOMIC ENERGY COMMISSION

TRACE ELEMENTS
MEMORANDUM REPORT 923

Base map from U. S. Soil Conservation Service photomosaic

APPROXIMATE MEAN DECLINATION, 1954

SCALE 1:24000

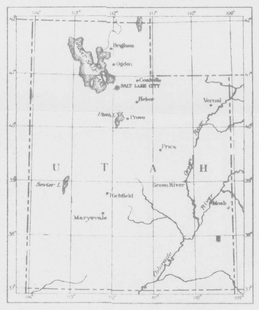
CONTOUR INTERVAL 40 FEET
DATUM IS MEAN SEA LEVEL

Geology by I. J. Witkind, assisted by H. T. Cantor, and P. C. Griffin, 1954-55

PRELIMINARY GEOLOGIC MAP OF THE VERDURE 2NW QUADRANGLE, SAN JUAN COUNTY, UTAH

by

Irving J. Witkind



INDEX MAP OF UTAH SHOWING AREA OF THIS REPORT

EXPLANATION

QUATERNARY — Pleistocene and Recent

Qal — Alluvium

Dark-brown poorly sorted mixture of stream deposited clay, silt, sand, gravel, and in a few places near the heads of streams, boulders. Commonly deposits are as much as 15 feet thick in the lower reaches of the stream valleys.

Qd — Dune sand

Reddish-brown to light-brown unconsolidated deposits of windworked fine- to coarse-grained sand. Most of the grains range from subangular to round. All are coated with a thin film of reddish-brown iron oxide. Most of the surficial deposits that mantle the broad pediments which surround the mountains are covered more or less thickly by dune sand. These eolian deposits commonly are about 3 feet thick, although in a few places they are as much as 6 feet thick.

Qb — Boulder field

Commonly found in the mountains proper near the tops and along the flanks of steep peaks. Includes rock slides and rock glaciers. The boulder fields are composed of angular igneous cobbles and boulders as much as 2 feet on a side. The thickness of the boulder fields is as much as 10 feet near its farthest extremities.

Qcl — Colluvium

Unconsolidated to partly consolidated unsorted mixture of clay , silt , sand , gravel, cobbles, and boulders that form widespread irregular-shaped detritus sheets and talus piles. Locally includes small landslide blocks. Ranges in thickness from 1 to 25 feet. For purposes of clarity deposits of this unit less than 3 feet thick have not been mapped.

Qpg — Pediment gravels

Light-gray unconsolidated poorly sorted deposits of angular to well-rounded sand, gravel, cobbles, and boulders of igneous and sedimentary rocks that form broad flaring aprons around the base of the mountains. Ranges in thickness from 1 foot to as much as 80 feet.

UNCONFORMITY

TERTIARY — Miocene(?)

Tha — Porphyritic hornblende andesite

Light-gray porphyritic igneous rock composed essentially of distinct euhedral phenocrysts of plagioclase feldspar (andesine) and hornblende scattered irregularly through an aphanitic ground mass composed principally of quartz, orthoclase(?), plagioclase microlites, magnetite dust, and hornblende. Forms prominent peaks and ridges.

UNCONFORMITY

CRETACEOUS — Upper Cretaceous

Km — Mancos shale

Dark-gray to black even-bedded fissile shale containing fossiliferous sandy limestone beds. Locally where the unit is in contact with the igneous intrusives the shale is faulted, crumpled, folded, indurated, baked to a light-gray color, and locally intruded by dikes, sills, and laccoliths. The unit is not exposed in its entirety in this area, hence total thickness is unknown. A limy sandstone bed about 8 inches thick, that contains many fragments of the fossil Gryphaea newberryi, is commonly about 40 feet above the base of the unit, although locally it is at the basal contact.

Lower Cretaceous

Kdb — Dakota sandstone and Burro Canyon formation, undifferentiated

In this area limited exposures and dense foliage make differentiation of the units impossible. Commonly the two units form a cliff 80 to 100 feet high composed of light-brown to brown well-indurated massive crossbedded conglomerate, conglomeratic sandstone, and sandstone beds. Light-green mudstones are common in the basal Burro Canyon formation, whereas the overlying Dakota sandstone is marked by dark-gray mudstones, carbonaceous shales and seams, and low-grade coal seams.

JURASSIC — Jurassic and Jurassic(?)

Jm (Jmb, Jms) — Morrison formation

Consists of an upper member, the Brushy Basin member (Jmb), composed chiefly of light-gray, greenish-gray, and pale-red discontinuous intertonguing beds of mudstone and siltstone. Locally contains thin sandstone and conglomerate lenses. The basal unit of the Brushy Basin member is a conglomerate marked by a profusion of well-rounded red and green chert pebbles. Commonly the Brushy Basin member is about 400 feet thick. The lower member, the Salt Wash member (Jms), consists of discontinuous light-brown massive crossbedded sandstone beds alternating with light-gray and pale-red mudstone beds. This member ranges in thickness from 300 to 400 feet. Small uranium-vanadium deposits are scattered through the sandstone beds of the Salt Wash member. Two types of uranium-vanadium ore bodies have been recognized. The first are small podlike deposits, cigarlike in shape, that are about 25 feet long and average 6 feet in diameter at their widest point. The other type is tabular in shape and is about 300 feet long, 40 feet wide, and about 3 feet thick. The vanadium-uranium ratio in both types of ore bodies is about 10:1. Locally the $CaCO_3$ content is as high as 18 percent.

Js — Summerville formation

Reddish-brown even-bedded poorly fissile siltstone locally separated by a yellow-brown massive crossbedded fine-grained sandstone. A layer 2 to 6 inches thick of white chert nodules marks the upper contact. Commonly the unit is about 80 feet thick.

San Rafael group

Je — Entrada sandstone

Light-tan massive crossbedded friable fine- to medium-grained sandstone. Where protected by the more resistant beds of the overlying Summerville formation, it forms near vertical cliffs; unprotected, it forms hummocky knobs. Included in the Entrada are 65 feet of sediments that may be part of the Carmel formation. These strata consist of a basal light-tan crossbedded fine-grained sandstone about 40 feet thick, overlain by a red even to crossbedded fine-grained sandstone and siltstone about 25 feet thick. This upper unit grades imperceptibly into characteristic Entrada sediments. The Entrada is about 240 feet thick.

Jc — Carmel formation

Consists of two units; a basal tan even-bedded fine-grained sandstone about 5 feet thick that is unconformable on the underlying crossbedded Navajo sandstone, and an upper red even to crossbedded fine-grained sandstone and siltstone that ranges in thickness from 5 to 10 feet.

UNCONFORMITY

Glen Canyon group — Jurassic(?)

Jn — Navajo sandstone

Tan to light-brown massive crossbedded friable sandstone. Where the Navajo is protected by beds of the more resistant Carmel formation it stands as a cliff; unprotected, it forms hummocky knobs. The unit is about 420 feet thick.

Jk — Kayenta formation

Pale red, massive crossbedded intertonguing sandstone and conglomerate lenses; irregularly bedded; locally contains a few thin red shale beds. Unit is about 230 feet thick.

Contact

(Dashed where approximated located; dotted where concealed)

High angle fault

(Dashed where inferred; dotted where concealed)

Strike and dip of beds

Horizontal beds

Operating uranium mine

Abandoned uranium mine

Intermittent stream

Irrigation ditch

Dam and reservoir

Unimproved road