

ABSTRACTS OF PAPERS PRESENTED AT THE MEETING IN BERKELEY,
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Cordilleran Section of the Geological Society

PRE-CAMBRIAN GEOLOGY OF THE BAGDAD AREA, ARIZONA*

C. A. ANDERSON, E. A. SCHOLZ, AND J. D. STROBELL, JR.

Of 38 square miles mapped in the Bagdad area, Arizona, about two-thirds of the exposed rocks are of pre-Cambrian age. These were separated into units of bedded and younger intrusive rocks. The former (Yavapai schist) includes metavolcanics, metatuffaceous sediments, and metasediments in this stratigraphic sequence. The bedded rocks were folded and faulted before dike and sill intrusions of rhyolite, locally along faults in the Yavapai schist. Next, widespread invasion of heterogeneous gabbro took place, with minor intrusions along older faults. The gabbro includes anorthosite, anorthositic gabbro, diabase, and titaniferous magnetite lenses. However, some diabase is younger than the gabbro. Several large masses of alaskite porphyry were intruded into the Yavapai schist, rhyolite, and gabbro. Some of the volcanic rocks intruded by alaskitic magma formed mixed rocks or contaminated alaskite porphyry. Granodiorite was intruded next in the sequence. The igneous activity culminated in the large-scale invasion of granite, most of it porphyritic with large orthoclase phenocrysts. A younger facies of fine-grained granite is present in small masses followed by aplite-pegmatite in dikes and stocklike masses.

All of the above rocks except the granite and aplite-pegmatite have been metamorphosed, but the porphyritic granite is locally gneissic at some borders. The foliation in the bedded rocks is essentially parallel to the bedding even in minor folds.

PACIFIC NORTHWEST EARTHQUAKE OF FEBRUARY 14, 1946

J. D. BARKSDALE AND HOWARD A. COOMBS

At approximately 7:18:30 p.m. (P.S.T.) the Pacific Northwest was shaken by an earthquake of far more than average intensity. Two shocks, separated by a 30-second interval, originated from a provisional epicenter in the southeastern Olympic Mountains.

From preliminary investigations of damage done to buildings and from data supplied from questionnaires, the intensity ratings varied greatly, not only from city to city, but in various parts of the same city. In Olympia, the largest city near the provisional epicenter, the highest intensity reached was VII on the Wood-Neumann (1931) modified Mercalli scale. In Seattle and Tacoma the intensities locally reached VII. The most severe damage in Seattle was on deltaic and artificially filled land. Large cracks developed in brick buildings, plaster fell, and a few windows were shattered. Slightly lesser intensities were reported on the low, alluvial-filled portions of Seattle. The least intensities were on the hills of glacial drift.

An isoseismal map of Seattle and also one embracing all of Washington and Oregon is being prepared.

EFFECT OF HOT SPRINGS AND FUMARoles ON GLACIAL TILLITE IN YELLOWSTONE
NATIONAL PARK

CLYDE MAX BAUER

Several localities within the park where concentrations of tillite occur are described, and the character of the deposits is discussed. The processes of deposition and cementation are also analyzed.

PHYSICAL CHARACTER OF HOT-SPRING AND GEYSER DEPOSITS

CLYDE MAX BAUER

The behavior of a geyser or a hot spring is reflected in the structure of its deposits. The characteristics of sinter which reveal its history and indicate the nature and length of active and dormant periods are discussed.

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Petalite and helvite have been found associated with spodumene, in a small pegmatite near Rincon, San Diego County, and a titano-niobate of iron and yttrium, possibly a new mineral, has been found in rough orthorhombic crystals in the Southern Pacific Silica quarry near Nuevo, in Riverside County.

NOTES ON THE MANZANITA AND NORTH MANZANO MOUNTAINS, NEW MEXICO

PARRY REICHE

The area discussed is part of the northeasternmost unit of the Basin and Range province. About 1200 feet of gently dipping Magdalena formation (Pennsylvanian) rests on peneplaned pre-Cambrian. A few miles west of the mountains disturbed Permian, Triassic, and Pliocene (?) sediments are exposed.

The pre-Cambrian includes: (1) several thousand feet of greenstones, chloritic schists, and basic metatuffs; (2) red and gray phyllites with associated schistose grits and quartzites correlative with the latter, forming two or more formations totalling 1-2 miles thick; (3) granitized rhyolites, aggregating 4000 feet or more, and (4) a granite stock. Dikes of diabase, granite, rhyolite, and several small serpentine intrusions complete the tally. Bedding and schistosity in the pre-Cambrian dip 50° to 80° S.-SE.; they are usually parallel, but locally their strikes (not dips) diverge as much as 20°. Fracture cleavage and plication in the phyllites are common. An angular unconformity within the clastic sequence indicates an early disturbance; the later-formed major structure is most simply interpreted as a fold overturned toward the north-northwest, with associated thrusting and intrusion.

Sedimentary evidence first noted by C. B. Reed indicates some uplift here or near by in pre- and in mid-Magdalena times. Later, the initial North Manzano Mountains rose on a steeply west-dipping thrust, very possibly of Laramide age. During the Tertiary, roughly north-south, high-angle normal faults outlined the west face of the present range. A fault scarp in the piedmont and seismicity farther west recently discussed by S. A. Northrop indicate continuing adjustments.

SWARM OF EARTHQUAKES IN LASSEN VOLCANIC NATIONAL PARK

HARRY B. ROBINSON AND PERRY BYERLY

During the last 3 months of 1945 a swarm of small earthquakes was recorded at the Mineral Seismographic Station. Five were strong enough to be felt at Park Headquarters. The total number of shocks recorded in October and November was 377. The S-P intervals as measured varied from 0.5 to 6.1 seconds, but the strong maxima were at about 3.0 and 2.2. By our usual formula these are converted to distances of about 15 and 11 miles respectively. These distances reach to Warner Valley and Lassen Peak respectively. Some of these shocks were recorded at the Shasta Station of the Coast and Geodetic Survey. For those for which we have readings the shocks with interval 3.0 at Mineral show intervals of 11.2 at Shasta while those of interval near 2.2 at Mineral show around 9 seconds at Shasta. These readings check the general Warner Valley region for the first type and a location near Lassen Peak for the second type.

From the geological point of view all these shocks probably originated within Lassen Volcanic National Park or its immediate vicinity. Possible sources are a number of known faults located within an average radius of 15 miles from the Mineral seismograph station. The most likely source is the Warner Valley fault zone. Other sources include faults associated with the Brokeoff Mountain caldera and concentric faults associated with the origin of volcanic domes.

BRAUNITE FROM SNOWMASS, PITKIN COUNTY, COLORADO

AUSTIN F. ROGERS

Braunite, tetragonal, with the probable composition $3\text{Mn}_2\text{O}_3 \cdot \text{MnSiO}_3$, a comparatively rare mineral in this country, is recorded from a new locality in Pitkin County, Colorado.

It is a massive, somewhat granular, black metallic mineral which shows in cavities the pseudo-octahedral crystals so characteristic of it.

Associated minerals are calcite, barite, a pleochroic mica [probably manganophyll] (manganian