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POTASSIUM-ARGON AGES OF SOME MINERALS FROM IGNEOUS ROCKS
OF WESTERN NEVADA

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Twelve new potassium-argon ages of minerals from Tertiary and Mesozoic (and Permian ?) rocks in the Dixie Valley and Mina regions of western Nevada are given below. Eleven of the analyses (sample nos. with YU prefixes) were made in 1969 at the geochronology laboratory of Yale University by Armstrong; one analysis was made (USGS(M) prefix) in 1968 at the Menlo Park laboratory by E. H. McKee and L. B. Schlocker of the U. S. Geological Survey. An additional date (I prefix) was determined in 1964 by R. Kologrivov, Isotopes, Inc.; cited elsewhere (Page, 1965), this date is presented here for completeness. Specimen collection and mineral separations were by Speed. The ages listed here were obtained as part of a continuing investigation of the tectonic evolution of western Nevada; we will employ them in local and regional tectonic studies to be presented elsewhere.

The new data were obtained using standard analytical techniques as described by Armstrong (1970). Argon was determined by isotope dilution, potassium by atomic absorption spectrophotometry. The dates are computed using the following constants: $K^{40} = 0.0119$ atom percent; $K\lambda_{\beta} = 4.72 \times 10^{-10} \text{ yr}^{-1}$, $K\lambda_{\epsilon} = 0.584 \times 10^{-10} \text{ yr}^{-1}$. Analyses of standards indicate that calibrations are accurate within 2%. Uncertainties reported are for analytical error only and represent one standard deviation, or the standard error for averaged dates.

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sandstone of probable Lower Jurassic age (Willden and Speed, in press). The widespread contact metamorphism of pre-Tertiary rocks from Topog Pk. northeast for 3 miles indicates that granitic rock occurs under most of this part of the West Humboldt Range at shallow depth. The dated quartz monzonite thus probably represents a small exposure of much more laterally extensive pluton.

USGS(M)-NKS7-3

K/Ar

(biotite) 69 \pm 3 m. y.

New York Canyon pluton. Medium-grained biotite quartz monzonite (NW/4 SE/4 Sec. 11, T. 25 N., R. 35 E.; 40°02'57"N., 118°00'31"W.; Stillwater Range; Pershing Co., NV). Pluton crops out over about 2 square miles. Analytical data: K = 6.68, 6.57, 6.55, and 6.60%; $\bar{A}r^{40} = 0.0274$ ppm (83% ΣAr^{40}); analyzed fraction (lab no. RS-67-B-McK) was > 99% biotite (grain size +60 mesh). Collected by: N. K. Stablein, Northwestern Univ. Comment: Pluton intrudes Upper Triassic pelites (Willden and Speed, in press; Wallace, et al., 1969); the petrography and structure were studied by Stablein (1969).

I-SW193

K/Ar

(biotite) 28 \pm 2 m. y.

IXL Canyon pluton. Quartz monzonite (floor of IXL Canyon, 200 yards upstream from mouth, T. 21 N., R. 34 E.; 39°41'27"N., 118°08'20"W.; Stillwater Range; Churchill Co., NV). Rock is fine- to coarse-grained plagioclase, K feldspar and quartz in variable quantities, and brown biotite. Analytical data: K = 6.91%; $\bar{A}r^{40} = 0.0136$ ppm (69% ΣAr^{40}); analyzed separate was > 99% biotite (grain size +80 mesh). Collected by: B. M. Page, Stanford Univ., and R. Speed, Northwestern Univ. Cited: Page, 1965. Comment: This large composite pluton (Page, 1965) invades and metamorphoses welded tuff of post-Triassic and probable Tertiary age; the intrusive and extrusive rocks are probably cogenetic.

ppm ($65\% \Sigma \text{Ar}^{40}$); analyzed separate was 98.3% brown hornblende, 1.7% epidote and chlorite (grain size +100 mesh). Collected by: R. Speed, Northwestern Univ. Comment: See also YU-M1 (above), and YU-Exc68 and YU-Excl (below).

YU-Exc68

K/Ar

(hornblende) 253 \pm 3 m. y.

Andesite of central Excelsior Mts. (SE/4 NE/4 SE/4 Sec. 21, T. 5 N., R. 33 E.; $38^{\circ}17'05''\text{N.}$, $118^{\circ}18'30''\text{W.}$; Excelsior Mts.; Mineral Co., NV) from a 5-inch diameter breccia fragment from a unit of breccia and interbedded volcanogenic clastic sedimentary rocks which are petrographically similar to andesites from which YU-M1 and YU-M2 (above) were obtained. The fragment consists of andesine, brown hornblende, epidote, chlorite, and iron oxide; the hornblende occurs as unaltered 5-10 mm acicular phenocrysts. The rock is virtually unmetamorphosed. Analytical data: $K = 0.909, 0.929, 0.912\%$; $\bar{A}\text{r}^{40} = 0.01782$ ppm ($73\% \Sigma \text{Ar}^{40}$), 0.01752 ppm ($82\% \Sigma \text{Ar}^{40}$); analyzed separate was 96.0% hornblende, 4% other minerals, chiefly chlorite (grain size was +100 mesh). Collected by: R. Speed, Northwestern Univ. Comment: The andesite lies above the Dunlap Formation (Toarcian) and was originally included in the Dunlap by Ferguson and Muller (1949); it is here correlated with andesite (YU-M1 and YU-M2 above) in the Garfield Hills and is believed to have been thrust to its present position in post-Toarcian time (later than the emplacement of the Luning Formation on thrusts exposed in the Pilot Mtns. and Garfield Hills).

YU-Excl

K/Ar

(hornblende) 211 \pm 3 m. y.

Andesite of central Excelsior Mts. (SE/4 NE/4 SE/4 Sec. 21, T. 5 N., R. 33 E.; $38^{\circ}17'00''\text{N.}$, $118^{\circ}18'20''\text{W.}$; Excelsior Mts.; Mineral Co., NV) from a homogenous, very feldspathic, hornblende-bearing breccia from the same lithic unit but 200 feet stratigraphically above YU-Exc68. The hornblende is mottled brownish green and occurs as stubby 3-4 mm long phenocrysts. Analytical data: $K = 1.00, 1.03\%$; $\bar{A}\text{r}^{40} = 0.0602$ ppm ($79\% \Sigma \text{Ar}^{40}$), 0.01623 ppm ($84\% \Sigma \text{Ar}^{40}$); analyzed separate was 96.9% hornblende, 3% chlorite, epidote, and feldspar (grain size +100 mesh). Collected by: R. Speed, Northwestern Univ. Comment: The age difference YU-Excl and YU-Exc68 is believed to be due to alteration of the amphibole in YU-Excl and perhaps to some included feldspar. Field observations provide no basis for subdivision of the andesite into two units of significant age difference.

YU-Aug1

K/Ar

(clinopyroxene) 24 \pm 5 m. y.

Andesite of southern Augusta Mts. (NE/4 NE/4 SW/4 Sec. 15, T. 24 N., R. 39 E.; $39^{\circ}56'47''\text{N.}$, $117^{\circ}34'36''\text{W.}$; Augusta Mts.; Churchill Co., NV)

from porphyritic lava consisting of 70% plagioclase, 10% clinopyroxene, 5% brown hornblende, and 15% glass, and lying unconformably on Triassic rocks and below siliceous tuffs. Analytical data: K = 0.041, 0.042%; $\bar{A}_{r^{40}} = 0.000066$ ppm (2.3% $\Sigma A_{r^{40}}$), 0.000073 ppm (3.1% $\Sigma A_{r^{40}}$); analyzed fraction was > 99% clinopyroxene (grain size +100 mesh). Collected by: R. Speed, Northwestern Univ.

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