



INCEMMET
BIENES CULTURALES
54.810

CONTENTS

INVENTARIO 1996

Title	Page
Age determinations from other publications—list 4, by <i>Susan L. Nichols Tingley</i>	3
K-Ar dating of hydrothermal alteration, Ixtapan de la Sal, Mexico State, Mexico, by <i>J. Urrutia-Fucugauchi and Enrique Linares</i>	15
The Mule Mountain stock, an early Middle Devonian pluton in northern California, by <i>John P. Albers, Ronald W. Kistler, and Loretta Kwak</i>	17
K/Ar ages of the Pyramid sequence in the vicinity of the San Emidio Geothermal Area, Washoe County, Nevada, by <i>Stanley H. Evans, Jr., Joseph N. Moore, and Michael C. Adams</i>	19
Uranium-thorium-lead isotopic ages of metamorphic monazite from the Northern Snake Range, Nevada, by <i>Donald E. Lee, T. W. Stern, Richard F. Marvin</i>	23
Uranium-thorium-lead isotopic ages of zircon from the Southern Snake Range, Nevada, by <i>Donald E. Lee, T. W. Stern, Richard F. Marvin</i>	25
K-Ar ages of plutonism and mineralization, western Cascades, Oregon and southern Washington, by <i>S. G. Power, C. W. Field, R. L. Armstrong, and J. E. Harakal</i>	27
Age of Imnaha Basalt—oldest basalt flows of the Columbia River Basalt Group, northwest United States, by <i>Edwin H. McKee, Peter R. Hooper, Wallace D. Kleck</i>	31

The following information was omitted from No. 30 of Isochron West:

Several stratigraphic names used in *Radiometric ages of volcanic and plutonic rocks and hydrothermal mineralization in Nevada—determinations run under the USGS-NBMG cooperative program*, by Larry J. Garside, Harold F. Bonham, Jr., Roger P. Ashley, Miles L. Silberman, and Edwin H. McKee, specifically those in age date entries 8–14, 16–20, 23, 24, 30, and 32–34, are those of Bonham, H. F., Jr., and Garside, L. J., 1979, *Geology of the Tonopah, Lone Mountain, Klondyke, and northern Mud Lake quadrangles, Nevada*: Nevada Bur. Mines and Geol. Bull. 92, 142 p.

AGE DETERMINATIONS FROM OTHER PUBLICATIONS—LIST 4

SUSAN L. NICHOLS TINGLEY *Nevada Bureau of Mines and Geology, University of Nevada, Reno, NV 89557*

This is the fourth list summarizing age determinations that have appeared in recent months in other publications. The dates are grouped alphabetically by country; for Canada, and the United States, by state or province. Under each geographical subdivision the ages are listed from youngest to oldest. The numbers in the citation columns correspond with the numbered references at the end of the article. Because of the abbreviated and generalized nature of the data presented here, the user should refer to the original article for additional details.

This fourth list completes coverage of the following journals issued during 1979: American Association of

Petroleum Geologists Bulletin (vol. 63); American Journal of Science (vol. 279); Canadian Journal of Earth Science (vol. 16); Earth and Planetary Science Letters (vol. 42-46, no. 1); Economic Geology (vol. 74); Geochimica et Cosmochimica Acta (vol. 43); Geological Society of America Abstracts with Programs (vol. 10, no. 4, vol. 11); Geological Society of America Bulletin (vol. 90); Geology (vol. 7); and Journal of Geology (vol. 86, nos. 3-6, vol. 87).

I would appreciate receiving any suggestions of additional journals which should be included. Also appreciated would be any corrections and/or suggested improvements.

AGE (MY)	METHOD	MINERAL	FORMATION/ROCK	LOCATION	REFERENCE
BOLIVIA					
6.2-6.4	K-Ar	biotite	dacite ignimbrite	Morococala	40
7.4-7.5	K-Ar	biotite	dacite ignimbrite	Los Frailes	40
11.7	K-Ar	biotite	Huakachi rhyolite	Potosi	39
12.2-13.8	K-Ar	—	Chocaya rocks	Chocaya	39
12.5-14.4	K-Ar	—	rhodacite lava	Chocaya	40
13.2-14.1	K-Ar	whole rock	Cerro Rico stock	Potosi	40
13.3-13.8	K-Ar	whole rock	Cerro Rico stock	Potosi	39
15.4-16.0	K-Ar	biotite	rhodacite lava	Tatasi	40
16.0-18.4	K-Ar	whole rock	rhodacite lava	Chorolque	40
16.2-16.5	K-Ar	whole rock	quartz porphyry dike	Tasna	40
16.5	K-Ar	biotite	tuff under Chocaya complex	Chocaya	39
16.8-17.2	K-Ar	biotite	rhodacite tuff	Atocha	40
20.0-24.8	K-Ar	—	porphyry	San Pablo-Morococala	40
20.5	K-Ar	—	Llallaqua intrusion	Llallaqua	39
20.6-21.6	K-Ar	—	Salvadora stock	Llallaqua	40
20.6-21.7	K-Ar	biotite	rhodacite porphyry	Kari-Kari	40
21.7-22.6	K-Ar	—	quartz latite	Colquechaca	40
134-142	K-Ar	—	Velasco alkaline province	north of San Ignacio de Velasco	25
140, 143	Rb-Sr	whole rock	Velasco alkaline province	north of San Ignacio de Velasco	25
1323, 1336	K-Ar	hornblende	gneiss	north of San Ignacio de Velasco	25
BRAZIL					
479	Rb-Sr	mineral	charnockitic fm	coast of São Paulo State	37
546-558	Rb-Sr	whole rock	charnockitic fm	coast of São Paulo State	37
CANADA					
British Columbia					
7.3-46	FT	—	Quottoon pluton	near Prince Rupert	45
12.1-37.8	FT	—	Kasiks pluton	near Prince Rupert	45
31-83	Rb-Sr	—	pegmatite, qtz monzonite	56°22'30"N, 125°20'10"W	76
33, 70	Rb-Sr	—	schist	56°22'00"N, 125°20'10"W	76
36	Rb-Sr	—	Central Gneiss Complex	near Kwinitsa	4
36.2-59.7	FT	—	Ecstall pluton	near Prince Rupert	45
37.3-59.8	K-Ar	biotite	Nicola batholith	19 km NE of Merritt	81
39.5-49.6	K-Ar	—	Quottoon pluton	near Prince Rupert	45
40, 122	Rb-Sr	—	quartzite	56°29'51"N, 125°10'56"W	76
41.1-44.6	K-Ar	—	Kasiks pluton	near Prince Rupert	45
42-62	Rb-Sr	—	Blackpine Lake stock, qtz monzonite	56°21'05"N, 125°21'30"W	76
43.7	K-Ar	biotite	schist	56°22'00"N, 125°20'10"W	76
44.7	K-Ar	hornblende	dike	56°32'N, 125°19'W	76
48	Rb-Sr	biotite	Quottoon pluton	near Prince Rupert	45
51	Rb-Sr	whole rock	Quottoon pluton	near Prince Rupert	4
52	K-Ar	biotite	porphyritic monzonite	Dunhamel Creek on Warm of Kootenay Lake	29
60	U-Pb	zircon	Quottoon pluton	near Prince Rupert	4
60	Rb-Sr	biotite	Ecstall pluton	near Prince Rupert	45
60.2-70.6	K-Ar	hornblende	Nicola batholith	19 km NE of Merritt	81

CANADA

British Columbia (continued)

62	Rb-Sr	—	Blackpine Lake stock, qtz monzonite	56°21'00"N, 125°21'10"W	76
63.2	K-Ar	biotite	quartzite	56°29'51"N, 125°10'56"W	76
65, 116	Rb-Sr	—	layered quartzite and schist	56°32'40"N, 125°07'40"W	76
65, 154	Rb-Sr	—	schist	56°34'52"N, 125°15'10"W	76
66-97	U-Pb	—	Quottoon pluton, gneiss	near Kwinitsa	4
68.9	K-Ar	biotite	Rey Lake qtz monzonite stock	19 km NNE of Merritt	81
70.4-74.0	K-Ar	—	Ecstall pluton	near Prince Rupert	45
76, 166	Rb-Sr	—	schist	56°32'N, 125°18'W	76
78	Rb-Sr	feldspar	Ecstall pluton, pegmatite	near Prince Rupert	4
79	Rb-Sr	feldspar	Ecstall pluton, pegmatite	near Prince Rupert	4
83.6, 104	K-Ar	—	layered quartzite and schist	56°32'40"N, 125°07'40"W	76
91.1, 94.5	K-Ar	—	schist	56°32'N, 125°18'W	76
93.3, 116	K-Ar	—	schist	56°34'52"N, 125°15'10"W	76
99.2-101	K-Ar	—	Summers Creek stock, qtz monzonite	along Summers Creek	81
104	Rb-Sr	whole rock	porphyritic monzonite	Dunham Creek on	29
			Warm of Kootenay Lake		
112	Rb-Sr	whole rock	Kingsvale volcanic sequence	20 km N of Princeton	81
115-171	Rb-Sr	—	Central Gneiss Complex	Hawkesbury Island	4
137	Rb-Sr	plagioclase	porphyritic monzonite	Dunham Creek on	29
			Warm of Kootenay Lake		
139	K-Ar	hornblende	porphyritic monzonite	Dunham Creek on	29
			Warm of Kootenay Lake		
141	K-Ar	biotite	Mount Martley batholith	W of Nicola Belt	81
150	Rb-Sr	whole rock	granodiorite	Nelson batholith	29
+ 150	Rb-Sr	whole rock	Mt Carlyle pluton	N of Nelson batholith	29
165	Rb-Sr	whole rock	Kitkiata pluton	near Prince Rupert	4
181-203	K-Ar	hornblende	Thuya batholith, granodiorite	80 km N of Kamloops	81
190	Rb-Sr	—	Ecstall pluton, pegmatite	near Prince Rupert	4
194-209	K-Ar	biotite	Iron Mask batholith	W of Kutsford	81
200, 203	K-Ar	hornblende	Wildhorse batholith	13 km SE of Kamloops	81
205	Rb-Sr	whole rock	Guichen Creek batholith	40 km NW of Merritt	81
204, 207	K-Ar	—	Allison batholith	40 km S of Merritt	81
215, 234	K-Ar	hornblende	Coldwater stock	19 km S of Merritt	81
267	K-Ar	biotite	Coldwater stock	19 km S of Merritt	81
524	Rb-Sr	whole rock	schist	near Prince Rupert	4
New Brunswick					
409	Rb-Sr	whole rock	Costigan Mtn Fm volcanics	Gulquac Lake area	36
409	Rb-Sr	whole rock	Redstone Mtn granite	Gulquac Lake area	36
Newfoundland					
332	Rb-Sr	whole rock	Newport granite	Bonavista Bay	10
443	Rb-Sr	—	Loon Pond pluton	Loon Pond	16
445	Rb-Sr	—	Spencer's Dock pluton	Spencer's Dock	16
447	Rb-Sr	—	felsite, Roberts Arm Group	Roberts Arm	16
464	Rb-Sr	—	Sunday Cove granite pluton	Sunday Cove	16
594	Pb-Pb	zircon	Mansfield Cove oceanic plagiogranite complex	Mansfield Cove	16
2515-2573	U-Pb	zircon	Nulliak gneiss	northern Labrador coast	7
2530	U-Pb	sphene	gneiss and granite	northern Labrador coast	7
~2530	U-Pb	zircon	Qorqut granite	northern Labrador coast	7
2600-2800	U-Pb	zircon	intrusive	northern Labrador coast	7
2698-3006	U-Pb	—	Uivak augen gneiss	Saglek area, Labrador	100
~2800	U-Pb	whole rock	Uivak gneiss	northern Labrador coast	7
~3600	U-Pb	zircon	Uivak gneiss I and II	northern Labrador coast	7
Northwest Territories					
345	K-Ar	biotite	qtz monzonite stock	Axel Heiberg Island	97
360	K-Ar	biotite	qtz diorite pluton	Axel Heiberg Island	97
376	K-Ar	biotite	gabro-vorite pluton	Cape Fanshawe Martin, N Ellesmere Island	97
390	K-Ar	hornblende	syenite-qtz monzonite complex	Cape Richards, N Ellesmere Island	97
390	K-Ar	hornblende	granitic rock	M'Clintock Inlet	97
2057	K-Ar	rieckekite	granite	Blachford Lake complex	9
Nova Scotia					
125-196	K-Ar	—	North Mtn Basalt	southern shore, Bay of Fundy	46
Ontario					
873-1130	K-Ar	—	Umfreville Gabbro	20 km S of Bancroft	74
911	Ar-Ar	whole rock	Umfreville Gabbro	20 km S of Bancroft	74
1160	U-Pb	zircon	syenite	20 km S of Bancroft	74
1897-2572	Ar-Ar	—	Shelley Lake granite	Quetico area, NW Ontario	11
2150	Ar-Ar	—	diabase dike, Abitibi swarm	SW of Lake Abitibi	41

CANADA
Ontario (continued)

2534	Rb-Sr	whole rock	Stephen Lake stock	Kakagi Lake area	104
2616	Rb-Sr	whole rock	Rainy Lake batholithic complex	Wabigoon belt	13

Saskatchewan

494-1281	Pb-U	—	pitchblende	Rabbit Lake uranium deposit	24
----------	------	---	-------------	-----------------------------	----

Yukon

51	K-Ar	whole rock	tuffs, flows, and breccias	Whitehorse map area	64
51.2, 55.0	K-Ar	biotite	qtz monzonite	Whitehorse map area	64
52	K-Ar	whole rock	rhyolite stocks, plugs, and dikes	Whitehorse map area	64
59-113	K-Ar	—	granodiorite-qtz monzonite	Whitehorse map area	64
64.3, 75.3	K-Ar	—	qtz monzonite	Whitehorse map area	64
75, 92	Rb-Sr	whole rock	qtz monzonite	Whitehorse map area	64
92, 116	Rb-Sr	whole rock	granodiorite-qtz diorite	Whitehorse map area	64
92.1-116	K-Ar	—	granodiorite-qtz diorite	Whitehorse map area	64
97.3, 98.6	K-Ar	—	qtz monzonite	Whitehorse map area	64
108	K-Ar	plagioclase	skarn	Whitehorse map area	64
144	K-Ar	hornblende	altered qtz diorite-granodiorite	Whitehorse map area	64
177	K-Ar	biotite	mineralized gneiss	Minto copper deposit	78
180	K-Ar	biotite	Klotassin granodiorite	Minto copper deposit	78

CHILE

4.4-16	K-Ar	whole rock	upper olivine basalt	Meseta Buenos Aires	19
57	K-Ar	whole rock	lower olivine basalt	Meseta Buenos Aires	19

MEXICO

33	Pb-Pb	—	mineralization	northern Mexico	23
1438	Pb-Pb	—	basement rocks	northern Mexico	23

PERU

9.1	K-Ar	biotite	transition zone	Antamina district	60
9.6	K-Ar	K-feldspar	alteration	Antamina district	60
10.1	K-Ar	biotite	alteration	Antamina district	60
10.2	K-Ar	K-feldspar	alteration	Antamina district	60
10.4	K-Ar	K-feldspar	alteration	Antamina district	60
18.7-23.3	K-Ar	—	Nazca Tuff	Antamina district	60
31.1	K-Ar	plagioclase	Casapalca Fm	E of Nazca	71
31.2	K-Ar	biotite	rhyolitic tuff	12°24.0', 75°18.4'	73
34.9	K-Ar	sanidine	ash-flow tuff	13°19.7', 74°59.3'	73
35.2	K-Ar	plagioclase, qtz	volcanic strata	12°29.2', 75°37.8'	73
36.7	K-Ar	sanidine	rhyolitic tuff	12°26.2', 75°40.5'	73
38.0	K-Ar	plagioclase	volcanic strata	12°01.2', 75°29.7'	73
39.2	K-Ar	plagioclase	volcanic strata	12°46.9', 75°31.3'	73
39.8	K-Ar	plagioclase, qtz	volcanic strata	12°36.2', 74°57.0'	73
39.8	K-Ar	biotite	Altiplano volcanic sandstone	11°33.5', 76°18.0'	73
40.2	K-Ar	plagioclase, qtz	unaltered ash-flow sheet	12°00.7', 75°28.6'	73
40.2	K-Ar	plagioclase, qtz	tuff	12°08.1', 76°34.6'	73
40.9	K-Ar	biotite	volcanic breccia	Santo Domingo de los Olleros	72
41.2	K-Ar	biotite	volcanic breccia	13°05.4', 75°03.2'	73
41.3	K-Ar	biotite	tuff	13°05.2', 75°03.3'	73
41.3	K-Ar	biotite	unaltered ash-flow sheet	Santo Domingo de los Olleros	72
41.4	K-Ar	plagioclase	dacite	12°08.1', 76°34.6'	73
				13°24.9', 74°54.8'	73

UNITED STATES

Alabama					
282-407	K-Ar	—	Conasauga shale	Alabama, NW Georgia, or Tennessee	88
363-599	K-Ar	—	Conasauga shale	Alabama, NW Georgia, or Tennessee	88
382-1097	K-Ar	—	Conasauga shale	Alabama, NW Georgia, or Tennessee	88
444, 458	Pb-Pb	zircon	Hillabee Chlorite Schist	Alabama, NW Georgia, or Tennessee	88
Alaska					
6-10	K-Ar	—	Devil's batholith	Clay County	85
9.4	K-Ar	—	mafic intrusion	south of Chignik	103
19-31	—	—	granite plutons	Chignik Bay	103
21.2	K-Ar	—	altered quartz diorite	Coast Mtns, near Ketchikan	91
22.3-27.1	K-Ar	—	volcanic rocks	Mallard Duck Bay copper prospect	103
				Mallard Duck Bay copper prospect	103

UNITED STATES
Alaska (continued)

22.8	K-Ar	biotite	pluton	near mouth of Burroughs Bay, N side	48
22.9, 26.8	K-Ar	—	granite	west shore Portland Canal, 1 km S of Tombstone Bay	48
23.8	K-Ar	biotite	gabbro	3.7 km E of south shore Upper Chechats Lake	48
26.9	K-Ar	biotite	Quartz Hill stock	1 km SW of Quartz Hill	48
29.6, 30.4	K-Ar	biotite	granite, Divide stock	head of Tunnel Creek	48
30.2-34.7	K-Ar	—	Meshik Fm	Chignik and Sutwik Island area	103
33.5-39.1	K-Ar	—	andesite plugs	Capes Kumlik and Kunmik	103
42-52	—	—	granite and granodiorite	eastern Portland Peninsula	91
51	Rb-Sr	whole rock	granitic rock	Sanak and Shumagin Islands	63
56-66	K-Ar	—	schist	Willow Creek area	90
56-66	K-Ar	—	qtz vein	Willow Creek area	90
58	K-Ar	—	propylitized tonalite	Willow Creek area	90
59	K-Ar	biotite	granitic rock	Sanak and Shumagin Islands	63
59.3	K-Ar	—	granodiorite pluton	Semidi Islands	103
65-67	K-Ar	—	biotite granite	Willow Creek area	90
66-67	K-Ar	—	dikes	Willow Creek area	90
69-78	K-Ar	—	tonalite	Willow Creek area	90
89-91	K-Ar	—	ultramafic	Willow Creek area	90
90	—	—	granodiorite	northern Revillagigedo Island	91
90.0-758	K-Ar	—	metasediments	southwestern Brooks Range	98
140	—	—	tonalite and granodiorite	Revillagigedo Island	91
205	—	—	Texas Creek Granodiorite	Coast Mtns, near Ketchikan	91
325	Rb-Sr	whole rock	plutons	Mt Igikpak, Arrigetch Peak, Survey Pass quad	70
360	U-Pb	zircon	plutons	Mt Igikpak, Arrigetch Peak, Survey Pass quad	70
360	U-Pb	zircon	Arrigetch and Wild River plutons	Arctic Camp and Wiseman quad	28
360-970	U-Pb	zircon	Ernie Lake and Sixtymile plutons	south-central Brooks Range	28
Arizona					
5.5	FT	—	Big Sandy Fm	south of Wikeup, approx. 9 km	57
19.4	K-Ar	phlogopite	minette	Outlet Neck, Navajo Field	83
24.3-33.9	K-Ar	phlogopite	minette	Buell Park, Navajo Field	83
25.8	K-Ar	phlogopite	minette	Black Rock, Navajo Field	83
25.9	K-Ar	phlogopite	minette	Fluted Rock, Navajo Field	83
California					
0.006-0.172	U-Th	—	pedogenic carbonates	Vidal Valley	54
0.078	U-Th	—	first marine terrace	San Pedro	47
0.080	U-Th	—	first marine terrace	Dume, Santa Monica coast	47
0.610-0.620	U-trend	—	Pearlette type-O ash tuff	Lake Tecopa area	84
0.700	U-trend	—	Bishop ash tuff	Lake Tecopa area	84
>0.900	U-trend	—	tuff	Lake Tecopa area	84
2.52	K-Ar	—	rhyodacite flows	NW flank of the Coso Range, east of Haiwee Reservoir	8
2.99	K-Ar	—	rhyodacite pumice-fall	SE of ridge of Coso Range	8
3.14	K-Ar	—	rhyolite pumice-flow	between N end of ridge and Haiwee Reservoir	8
3.56	K-Ar	—	basalt flow	near Centennial Flats	8
5-10	K-Ar	—	basalt	Modoc County	59
5.3-6.0	K-Ar	—	5 basalts	between Coso Range and Inyo Mtns	8
5.7	K-Ar	—	rhyolite plug	Sugarloaf	8
5.9	K-Ar	—	rhyolite dome	between Coso Range and Inyo Mtns	8
6.0	K-Ar	—	rhyolite plug	3 km NE of Sugarloaf	8
6.7, 7.4	K-Ar	whole rock	basalt	Elsinore fault zone	65
6.8	K-Ar	whole rock	basalt	Mesa de Burro	65
10.1	K-Ar	—	Dike 4	Wildwood Park, Santa Monica Mtns	50
10.4, 10.8	K-Ar	whole rock	basalt	Hogback Ridge	65
13.1-56.4	K-Ar	—	capping volcanic, Sequence Cb	Mojave and Colorado Deserts	22
15.4-24.3	K-Ar	—	volcanic rocks	Transverse Ranges	22
22.0-26.0	K-Ar	—	plutonic rocks	Chocolate Mtns	22
22.1-35.0	K-Ar	—	silicic volcanic, Sequence B	Mojave and Colorado Deserts	22
25.1-30.0	K-Ar	—	capping volcanic, Sequence Ca	Mojave and Colorado Deserts	22
25.5-34.7	K-Ar	plagioclase	basal volcanic, Sequence A	Mojave and Colorado Deserts	22
62.8, 66.3	K-Ar	biotite	quartzto-feldspathic schist	Sierra de Salinas	82

UNITED STATES
California (continued)

67.4	Ar-Ar	biotite	quartz monzonite	Pine Canyon	82
73.16	Ar-Ar	biotite	quartz monzonite	34°36.48'N, 117°18.55'W, Victorville quad	61
76.59	Ar-Ar	biotite	monzonite	34°37.37'N, 117°07.65'W, Apple Valley quad	61
103	U-Pb	zircon	postdike pluton	Alabama Hills and Argus Range	21
128.8	Ar-Ar	hornblende	Sidewinder Mtn stock	34°38.42'N, 117°05.02'W, Stoddard Well quad	61
144, 145	U-Pb	zircon	pluton	Sage Hen Flat	38
148	U-Pb	zircon	silicic dikes	Alabama Hills and Argus Range	21
149-198	U-Pb	zircon	predike plutons	Alabama Hills and Argus Range	21
152	Rb-Sr	whole rock	argillite	NW Sierran foothills	58
159, 160	U-Pb	zircon	pluton	Joshua Flat	38
159-175	Pb-Pb	zircon	ophiolite dike	Smartville	86
161, 180	U-Pb	zircon	pluton	Beer Creek	38
165, 166	U-Pb	zircon	pluton	Mt Barcroft	38
179, 180	U-Pb	zircon	pluton	Eureka Valley	38
186-783	U-Pb	zircon	ophiolite dike	Smartville	86
197.9	Ar-Ar	hornblende	monzonite	34°37.37'N, 117°07.65'W, Apple Valley quad	61
216-255	U-Pb	zircon	peridotite body	Feather River	86
233	Ar-Ar	hornblende	monzonite	34°37.37'N, 117°07.65'W, Apple Valley quad	61
275-290	Pb-Pb	zircon	peridotite body	Feather River	86
1650	U-Pb	zircon	Harkless Fm	White Mtns	38
Colorado					
3-4	K-Ar/FT	—	alaskite porphyry dikes	Rico	69
4-5	K-Ar/FT	—	Calico Peak stock	Rico	69
5,5	K-Ar	sericite	vein	Argentine tunnel	69
<6	FT	—	hornblende-latitude porphyry sills	Rico	69
511	Sr-Sr	—	syenite	Democrat Creek	2
530	Sr-Sr	—	syenite	McClure Mtn	2
Connecticut					
180.8,	Ar-Ar	—	Cross Rocks dike	Hartford Basin area	96
194.2	—	—	—	—	—
181.4	Ar-Ar	—	Fairhaven dike	Hartford Basin area	96
181.6	Ar-Ar	—	Buttress dike	Hartford Basin area	96
191.1	Ar-Ar	—	Mt Carmel sill	Hartford Basin area	96
Delaware					
282-302	K-Ar	K-feldspar	Arden pluton, granite	Wilmington Complex	32
340	K-Ar	quartz	Arden pluton, granite	Wilmington Complex	32
342-380	Rb-Sr	biotite	Arden pluton, granite	Wilmington Complex	32
363-592	K-Ar	biotite	Arden pluton, granite	Wilmington Complex	32
368	Rb-Sr	biotite	gneiss	Wilmington Complex	32
423	K-Ar	biotite	gneiss	Wilmington Complex	32
426-539	K-Ar	hypersthene	Arden pluton, granite	Wilmington Complex	32
Georgia					
281	Rb-Sr	—	Siloam pluton	eastern and central Piedmont	34
282-407	K-Ar	—	Conasauga shale	NW Georgia, Alabama, or Ten- nessee	88
363-599	K-Ar	—	Conasauga shale	NW Georgia, Alabama, or Ten- nessee	88
382-1097	K-Ar	—	Conasauga shale	NW Georgia, Alabama, or Ten- nessee	88
Idaho					
41.3	K-Ar	muscovite	molybdenum mineralized granite	Ima Mine, Lemhi County	3
44	—	—	small granitic plutons	NE Idaho batholith	20
66	—	—	granite-granodiorite magma	NE Idaho batholith	20
68, 72	U-Pb	zircon	batholith	Idaho batholith	27
78	—	—	quartz-diorite intrusion	NE Idaho batholith	20
88.4	K-Ar	biotite	granodiorite stock	Thompson Creek deposit	87
1755-2075	U-Pb	zircon	batholith	NE Idaho batholith	20
Iowa					
0.002- 0.025	U-Th	—	speleothems	Coldwater Cave	43

UNITED STATES (continued)

Kentucky					
0.106–0.217	U-Th	—	speleothems	Flint Ridge-Mammoth Cave System	43
0.121	U-Th	—	stalagmite 72041	Flint Ridge-Mammoth Cave System	42
0.159	U-Th	—	stalagmite 72041	Flint Ridge-Mammoth Cave System	42
0.202	U-Th	—	stalagmite 72041	Flint Ridge-Mammoth Cave System	42
894	K-Ar	biotite	marble	Monitor Petroleum 1 Blanton, Morgan County, 1,300 ft	1
913	K-Ar	biotite	marble	Monitor Petroleum 1 Blanton, Morgan County, surface	1
Maryland					
171.2, 183.7	Ar-Ar	—	Gettysburg sill	Gettysburg Basin area	96
175.2, 177.0	K-Ar	whole rock	Frederick dike	Gettysburg Basin area	96
180.4, 194.2	Ar-Ar	—	Frederick dike	Gettysburg Basin area	96
Massachusetts					
191	K-Ar	whole rock	Medford dike	Newark trend	96
325, 361	K-Ar	hornblende	Belchertown pluton	Chicopee River, south bank	5
380	U-Pb	zircon	Belchertown pluton	Three Rivers railroad cut	5
Minnesota					
1234	Sr-Sr	—	Partridge River Troctolite	Partridge River	62
2000	Sm-Nd	—	anorthosite inclusion	north shore Lake Superior	6
Missouri					
0.025–0.236	U-Th	—	speleothems	Tumbling Creek Cave	43
360	Rb-Sr	glauconite	Davis Shale and Bonnetterre Fm	Magmont Mine, near Bixby	53
Montana					
71–74	K-Ar	—	Tobacco Root Batholith	Tobacco Root Mtns	99
2565	Rb-Sr	—	quartz-feldspathic dike, post-F ₃	eastern Beartooth Mtns	67
2638	Rb-Sr	—	quartz-feldspathic dike, post-F ₃	eastern Beartooth Mtns	67
2640	Rb-Sr	whole rock	granitic rock	Yellowstone Nat'l Park	105
2670	Rb-Sr	zircon	granodiorite	Yellowstone Nat'l Park	105
2694	Rb-Sr	—	pink granite	eastern Beartooth Mtns	67
2701	Sm-Nd	—	gabbro	Stillwater complex	26
2740	Rb-Sr	muscovite	quartz monzonite stock	Yellowstone Nat'l Park	105
2745	Rb-Sr	whole rock	granitic intrusive event	eastern Beartooth Mtns	106
Nevada					
3.3	K-Ar	—	basalt	S25,T17N,R23E	94
3.5	K-Ar	—	basalt	S25,T17N,R23E	94
10.6–11.9	FT	zircon	red sandstone-silver tuff	eastern Clark County	15
13.0	FT	zircon	tuff	Lovell Wash	15
13.2–17.4	FT	zircon	tuff, limestone of Bitter Ridge	Bitter Ridge	15
17	K-Ar	whole rock	basalt dike	northern Ruby Mtns	92
24	K-Ar	biotite	biotite schist	northern Ruby Mtns	92
72–1408	Pb-U-Th	—	biotite schist	northern Ruby Mtns	92
110	K-Ar	hornblende	quartz gabbro intrusive	northern Ruby Mtns	92
>1000	Pb-Pb	—	granitic orthogneiss	northern Ruby Mtns	92
New Mexico					
20.7, 24.9	K-Ar	phlogopite	minette	The Beast, Navajo Field	83
85	Rb-Sr	—	Mancos Fm	Laguna district	18
92	Rb-Sr	—	Dakota Fm	Laguna district	18
110–115	Rb-Sr	—	reprecipitation	Laguna district	18
135–138	Rb-Sr	chlorite	mineralization	Ambrosia Lake, Smith Lake districts	18
140–145	Rb-Sr	montmorillonite	sedimentation	Ambrosia Lake, Smith Lake districts	18
1313	K-Ar	biotite	monzonite	Sandia Mtns	31
1334	K-Ar	biotite	orbicular rocks	Sandia Mtns	31
1335	K-Ar	biotite	orbicular rocks	Sandia Mtns	31
New York					
387	Rb-Sr	—	granite dikes	Croton Falls area	17
555	Rb-Sr	whole rock	Manhattan Schist	Manhattan Prong	66

UNITED STATES (continued)

North Carolina

34.8	Rb-Sr	glauconite	Castle Hayne Limestone	near Wilmington	44
78.7	K-Ar	—	trachyte	Halifax County	95
282	Rb-Sr	—	Churchland pluton	eastern and central Piedmont	34
285	Rb-Sr	—	Wilton pluton	eastern and central Piedmont	34
292	Rb-Sr	—	Landis pluton	eastern and central Piedmont	34
313	Rb-Sr	—	Castalia pluton	eastern and central Piedmont	34
322-430	K-Ar	hornblende	country rock	4-11 km from Ore Knob	35
326	Rb-Sr	—	Lilesville pluton	eastern and central Piedmont	34
392-868	K-Ar	hornblende	ore zone	Ore Knob	35
483	K-Ar	whole rock	metasediments	Carolina slate belt	51

Oklahoma

1370	U-Pb	zircon	Spavinaw Granite	Mayes County	12
1374	U-Pb	zircon	Tishomingo Granite	E Arbuckle Mtns	12
1396	U-Pb	zircon	Blue River Gneiss	E Arbuckle Mtns	12
1399	U-Pb	zircon	Troy Granite	E Arbuckle Mtns	12

South Carolina

162-204	K-Ar	—	basalt	Clubhouse Crossroads #2	49
278	Rb-Sr	—	Coronaca pluton	eastern and central Piedmont	34
285	Rb-Sr	—	Columbia pluton	eastern and central Piedmont	34
292	Rb-Sr	—	Lexington pluton	eastern and central Piedmont	34
292	Rb-Sr	whole rock	Augen gneiss	Batesburg	52
292	Rb-Sr	—	Edgefield pluton	eastern and central Piedmont	34
293	Rb-Sr	—	Liberty Hill pluton	eastern and central Piedmont	34
293	Rb-Sr	—	Pageland pluton	eastern and central Piedmont	34
296	Rb-Sr	whole rock	Lexington pluton	Kiokee belt	52
298	Rb-Sr	—	Lake Murray pegmatites	Lake Murray spillway	52
313	Rb-Sr	—	Clouds Creek pluton	eastern and central Piedmont	34
313	Rb-Sr	—	York pluton	eastern and central Piedmont	34
322	Rb-Sr	—	Catawba pluton	eastern and central Piedmont	34
323	Rb-Sr	—	Clouds Creek pluton	Carolina slate belt	52
325	Rb-Sr	whole rock	lineated gneiss	Batesburg	52
356	Rb-Sr	whole rock	andesite tuff from Badin Greenstone	Carolina slate belt	14
550	Rb-Sr	—			

South Dakota

1777	Rb-Sr	whole rock	Harney Peak Granite, stream quartz	Black Hills	80
------	-------	------------	------------------------------------	-------------	----

Tennessee

282-407	K-Ar	—	Conasauga shale	Tennessee, NW Georgia or Alabama	88
363-599	K-Ar	—	Conasauga shale	Tennessee, NW Georgia or Alabama	88
382-1097	K-Ar	—	Conasauga shale	Tennessee, NW Georgia or Alabama	88
400	Ar-Ar	—	—	Ducktown	35
635	K-Ar	hornblende	ore zone	Ducktown	35

Texas

32.1	K-Ar	biotite	quartz monzonite	Cave Peak breccia pipe complex	89
33.8	K-Ar	amphibole	intrusion	W of Paisano Peak	75
35.3	K-Ar	feldspar	Decie Fm	Paisano Pass area	75
35.6	K-Ar	feldspar	Barrel Springs Fm	Barrilla and NE Davis Mtns	75
36.1	K-Ar	biotite	quartz monzonite porphyry	Cave Peak breccia pipe complex	89
36.2	K-Ar	feldspar	Sleeping Lion Fm	Fort Davis area	75
36.6	K-Ar	feldspar	Gomes Tuff	Barrilla and NE Davis Mtns	75
36.8	K-Ar	feldspar	Goat Canyon Fm	Fort Davis area	75
36.9	K-Ar	feldspar	intrusion	W of Paisano Peak	75
37.1	K-Ar	feldspar	Adobe Canyon Fm	NE Davis Mtns	75
37.2	K-Ar	feldspar	Star Mtn Rhyolite	Limpia Valley	75
38.4	K-Ar	plagioclase	Huelster Fm	mouth of Madera Canyon	75
39.5	K-Ar	whole rock	rhyodacite plug	Cave Peak breccia pipe complex	89

Utah

3.4-4.8	U-Pb	—	fracture-filling opal	Spor Mtn	56
8-21	U-Pb	—	opal, Spor Mtn Fm	Spor Mtn	56

Virginia

46.1	Rb-Sr	glauconite	Nanjemoy Fm	near Hopewell	44
300-340	U-Pb/	—	Falmouth Intrusive Suite	near Fredericksburg	77
	Rb-Sr	—			
385-415	U-Pb/	—	Falls Run Granite Gneiss	near Fredericksburg	77
	Rb-Sr	—			

UNITED STATES (continued)

Virgin Islands

66.0	K-Ar	hornblende	East End Member, Caledonia Fm	Pull Point	93
66.1	K-Ar	hornblende	East End Member, Caledonia Fm	Green Cay	93
70.1	K-Ar	hornblende	East End Member, Caledonia Fm	Grapetree Point	93
71.8	K-Ar	hornblende	East End Member, Caledonia Fm	East Point	93
75.2	K-Ar	hornblende	East End Member, Caledonia Fm	Robin Bay	93

Washington

0.68	FT	glass	volcanic ash	Auburn	30
41.3	FT	—	Tukwila Fm, volcanic	western foothills	33
43	K-Ar	—	Naches Fm, volcanic	central Cascades	33
45.9	K-Ar	—	Tukwila Fm, volcanic	western foothills	33
47	K-Ar	—	Teanaway Basalt	central Cascades	33
47	K-Ar	—	basalt	Frost Mtn	33
49.8	FT	zircon	Chuckanut Fm, volcanic cobble	western foothills	33
50	FT	zircon	Silver Pass Volcanics of Foster	central Cascades	33
51.0	U-Pb	—	quartz/uraninite	Midnite Mine	101
51.8	FT	—	tuffs, Taneum Andesite of Smith	central Cascades	33
52-55	FT	—	quartz/uraninite	Midnite Mine	101
145	K-Ar	hornblende	Shuksan blueschist	north Cascades	102
160	K-Ar	muscovite	Shuksan blueschist	north Cascades	102

Washington, D.C.

469	Rb-Sr	muscovite	pegmatite	near Great Falls on the Potomac River	68
-----	-------	-----------	-----------	---------------------------------------	----

West Virginia

0.060-0.159	U-Th	—	speleothems	Grapevine Cave	43
0.169-0.200	U-Th	—	speleothems	Norman-Bone Cave	43

Wisconsin

1545, 1655	Rb-Sr	mineral	granitic pluton	northern Wisconsin	79
1598, 1615	K-Ar	biotite	granitic pluton	northern Wisconsin	79
1885	Rb-Sr	—	granitic pluton	northern Wisconsin	79

Wyoming

12.2, 17.8	U-Pb	whole rock	arkose	Union Carbide Mine, Gas Hills district	55
16.8-33.3	U-Pb	whole rock	arkose	Lucky McMine, Gas Hills district	55
17.3, 21.3	U-Pb	whole rock	arkose	Golden Goose Mine, Crooks Gap district	55
17.5, 40.8	U-Pb	whole rock	ore	Union Carbide Mine, Gas Hills district	55
18.7, 22.1	U-Pb	whole rock	arkose	West Gas Hills	55
19.3-28.4	U-Pb	whole rock	ore	Lucky McMine, Gas Hills district	55
25.4, 26.3	U-Pb	whole rock	ore	Lucky McMine, Gas Hills district	55
27.6-32.1	U-Pb	whole rock	arkose	Seismic Mine, Crooks Gap district	55
27.8, 30.1	U-Pb	whole rock	breccia	Lucky McMine, Gas Hills district	55
32.7, 35.4	U-Pb	whole rock	ore	Golden Goose Mine, Crooks Gap district	55
2640	Rb-Sr	whole rock	granitic rock	Yellowstone Nat'l Park	105
2670	Rb-Sr	zircon	granodiorite	Yellowstone Nat'l Park	105
2740	Rb-Sr	muscovite	quartz monzonite stock	Yellowstone Nat'l Park	105
2745	Rb-Sr	whole rock	granitic intrusive event	eastern Beartooth Mtns	106

REFERENCES

1. Ammerman, M. L., and Keller, G. R. (1979) Delineation of Rome trough in eastern Kentucky by gravity and deep drilling data. *Amer. Assoc. Petroleum Geologists Bull.*, v. 63, p. 341-353.
2. Armbrustmacher, T. J., Hedge, C. E., and Parker, R. L. (1979) Alkaline rock complexes in the Wet Mountains area, Fremont and Custer Counties, Colorado—genetic implications of minor-element and Sr-isotope geochemistry. *Geol. Soc. Amer. Abstr. with Programs*, v. 11, p. 380-381.
3. Armstrong, R. L., Hollister, V. F., and Harakal, J. E. (1979) K-Ar dates for mineralization in the White Cloud-Cannibal porphyry molybdenum belt of Idaho and Montana—a reply. *Econ. Geology*, v. 74, p. 699.
4. Armstrong, R. L., and Runkle, D. (1979) Rb-Sr geochronometry of the Ecstall, Kitkita, and Quotquot plutons and their country rocks, Prince Rupert region, Coast Plutonic Complex, British Columbia. *Canadian Jour. Earth Sci.*, v. 16, p. 387-399.
5. Ashwal, L. D., Leo, G. W., Robinson, P., Zartman, R. E., and Hall, D. J. (1979) The Belchertown Quartz Monzonite pluton, west-central Massachusetts—a syntectonic Acadian intrusion. *Amer. Jour. Sci.*, v. 279, p. 936-969.
6. Ashwal, L. D., Morrison, D. A., Pinney, W. C., Cochran, A., and Wooden, J. L. (1979) Anorthositic inclusions in Keweenaw diabase, Minnesota—effects of chemical and isotopic contamination. *Geol. Soc. Amer. Abstr. with Programs*, v. 11, p. 381.
7. Baadsgaard, H., Collerson, K. D., and Bridgewater, D. (1979) The Archean gneiss complex of northern Labrador; 1. Preliminary U-Th-Pb geochronology. *Canadian Jour. Earth Sci.*, v. 16, p. 951-961.
8. Bacon, C. R., Giovannetti, D. M., Duffield, W. A., and Dalrymple, G. B. (1979) New constraints on the age of the Coso Formation, Inyo County, California. *Geol. Soc. Amer. Abstr. with Programs*, v. 11, p. 67.
9. Badham, J. P. M. (1979) Geology and petrochemistry of lower Achean (2.4-2.0 Ga) alkaline plutonic and hypabyssal rocks in the East Arm of Great Slave Lake, Northwest Territories. *Canadian Jour. Earth Sci.*, v. 16, p. 60-72.
10. Bell, K., Binkinsop, J., Berger, A. R., and Jayasinghe, N. R. (1979) The Newport granite—its age, geological setting, and implications for the geology of northeastern Newfoundland. *Canadian Jour. Earth Sci.*, v. 16, p. 264-269.
11. Berger, G. W., and York, D. (1979) $^{40}\text{Ar}/^{39}\text{Ar}$ dating of multi-component magnetization in the Archean Shelly Lake granite, northwestern Ontario. *Canadian Jour. Earth Sci.*, v. 16, p. 1933-1941.
12. Bickford, M. E., and Lewis, R. D. (1979) U-Pb geochronology of exposed basement rocks in Oklahoma. *Geol. Soc. Amer. Bull.*, Part I, v. 90, p. 540-544.
13. Birk, D. (1979) Rb/Sr chronology of the Rainy Lake Archean granulite batholith, Wabigoon Belt, northwestern Ontario. *Canadian Jour. Earth Sci.*, v. 16, p. 141-149.
14. Black, W. W. (1978) Considerations in obtaining Rb-Sr dates for low rank metavolcanic rocks, Carolina slate belt. *Geol. Soc. Amer. Abstr. with Programs*, v. 10, p. 162.
15. Bohannon, R. G. (1979) Fission track ages from the Miocene continental deposits of eastern Clark County, Nevada. *Geol. Soc. Amer. Abstr. with Programs*, v. 11, p. 70.
16. Bostock, H. H., Currie, K. L., and Wanless, R. K. (1979) The age of the Roberts Arm Group, north-central Newfoundland. *Canadian Jour. Earth Sci.*, v. 16, p. 599-606.
17. Brock, P. W. G., and Mose, D. G. (1979) Tectonic and younger deformation and metamorphism in the Croton Falls area, southeastern New York—summary. *Geol. Soc. Amer. Bull.*, v. 90, p. 705-707.
18. Brookins, D. G. (1979) Periods of mineralization in Grants mineral belt, New Mexico: *Amer. Assoc. Petroleum Geologists Bull.*, v. 63, p. 687.
19. Charrier, R., Linare, E., Niemeyer, H., and Skarmeta, J. (1979) K-Ar ages of basal flows of the Meseta Buenos Aires in southern Chile and their relation to the southeast Pacific triple junction. *Geology*, v. 7, p. 436-439.
20. Chase, R. B., and Bickford, M. E. (1979) Origin, structural evolution, and age of the northeastern Idaho batholith igneous-metamorphic complex. *Geol. Soc. Amer. Abstr. with Programs*, v. 11, p. 400.
21. Chen, J. H., and Moore, J. G. (1979) Late Jurassic Independence dike swarm in eastern California. *Geology*, v. 7, p. 129-133.
22. Crowe, B. M., Crowell, J. C., and Krummenacher, D. (1979) Regional stratigraphy, K-Ar ages, and tectonic implications of Cenozoic volcanic rocks, southeastern California. *Amer. Jour. Sci.*, v. 279, p. 186-216.
23. Cumming, G. L., Kesler, S. E., and Krstic, D. (1979) Isotopic composition of lead in Mexican mineral deposits. *Econ. Geol.*, v. 74, p. 1395-1407.
24. Cumming, G. L., and Rimsale, J. (1979) Isotopic studies of lead-depleted pitchblende, secondary radioactive minerals, and sulphides from the Rabbit Lake uranium deposit, Saskatchewan. *Canadian Jour. Earth Sci.*, v. 16, p. 1702-1715.
25. Darbyshire, D. P. F., and Fletcher, C. J. N. (1979) A Mesozoic alkaline province in eastern Bolivia. *Geology*, v. 7, p. 545-548.
26. DePaolo, D. J., and Wasserburg, G. J. (1979) Sm-Nd age of the Stillwater complex and the mantle evolution curve for neodymium. *Geochimica et Cosmochimica Acta*, v. 43, p. 999-1008.
27. Dexter, J. J., Chase, R. B., Bickford, M. E. (1979) U/Pb zircon ages and crustal contamination of the northeastern Idaho batholith. *Geol. Soc. Amer. Abstr. with Programs*, v. 11, p. 270.
28. Dillon, J. T., and Pessell, G. H. (1979) Tectonic significance of lead Devonian and Late Proterozoic U/Pb zircon ages from metagneissic rocks, Brooks Range, Alaska. *Geol. Soc. Amer. Abstr. with Programs*, v. 11, p. 75.
29. Duncan, I. J., and Parrish, R. R. (1979) Geochronology and Sr isotope geochemistry of the Nelson Batholith—a post-tectonic intrusive complex in southeast British Columbia. *Geol. Soc. Amer. Abstr. with Programs*, v. 11, p. 76.
30. Easterbrook, D. J., and Briggs, N. (1979) Age of the Auburn reversal and the Salmon Springs and Vashon glaciations in Washington. *Geol. Soc. Amer. Abstr. with Programs*, v. 11, p. 76.
31. Enz, R. D., Kudo, A. M., and Brookins, D. G. (1979) Igneous origin of the orbicular rocks of the Sandia Mountains, New Mexico—summary. *Geol. Soc. Amer. Bull.*, Part I, v. 90, p. 138-140.
32. Foland, K. A. (1979) Limited mobility of argon in a metamorphic terrain. *Geochimica et Cosmochimica Acta*, v. 43, p. 793-801.
33. Frizzell, V. A., Jr., Tabor, R. W., Gaum, W., and Hetherington, M. J. (1979) Ages and stratigraphic relationships of selected Paleogene nonmarine rocks, central Cascades and western foothills, Washington. *Geol. Soc. Amer. Abstr. with Programs*, v. 11, p. 428.
34. Fullagar, P. D., and Butler, J. R. (1979) 325 to 265 m.y.-old granitic plutons in the Piedmont of the southeastern Appalachians. *Amer. Jour. Sci.*, v. 279, p. 161-185.
35. Fullagar, P. D., Kish, S. A., Odum, A. L., Bottino, M. L., and Dallmeyer, R. D. (1979) Apparent excess ^{40}Ar in hornblende from the Ore Knob, N.C., and Ducktown Tenn., massive sulfide deposits. *Geol. Soc. Amer. Abstr. with Programs*, v. 11, p. 179.
36. Fyfe, L. R., and Cormier, R. F. (1979) The significance of radiometric ages from the Gulquac Lake area of New Brunswick. *Canadian Jour. Earth Sci.*, v. 16, p. 2046-2052.
37. Gasparini, P., and Mantovani, M. S. M. (1979) Geochemistry of charnockites from São Paulo State, Brazil. *Earth Planetary Sci. Letters*, v. 42, p. 311-320.
38. Gillespie, J. G., Jr. (1979) U-Pb and Pb-Pb ages of primary and detrital zircons from the White Mountains, eastern California. *Geol. Soc. Amer. Abstr. with Programs*, v. 11, p. 79.
39. Grant, J. N., Halls, C., Avila, W., Snelling, N. J. (1979) Potassium-argon ages of some Bolivian rocks—a discussion. *Econ. Geology*, v. 74, p. 702-703.
40. Grant, J. N., Halls, C., Salinas, W. A., and Snelling, N. J. (1979) K-Ar ages of igneous rocks and mineralization in part of the Bolivian tin belt. *Econ. Geology*, v. 74, p. 838-851.
41. Hanes, J. A., York, D. (1979) A detailed $^{40}\text{Ar}/^{39}\text{Ar}$ age study of an Aibiki dike from the Canadian Shield province. *Canadian Jour. Earth Sci.*, v. 16, p. 1060-1070.
42. Harmon, R. S., Schwarcz, H. P., and Ford, D. C. (1978) Stable isotope geochemistry of speleothems and cave waters from the Flint Ridge-Mammoth Cave System, Kentucky—implications for terrestrial climate changes during the period 23,000 to 100,000 years B.P. *Jour. Geol.*, v. 86, p. 373.
43. Harmon, R. S., Schwarcz, H. P., and O'Neill, J. R. (1979) D/H ratios in speleothem fluid inclusions—a guide to variations in the isotopic composition of meteoric precipitation? *Earth Planetary Sci. Letters*, v. 42, p. 254-266.
44. Harris, W. B., Fullagar, P. D., and Dischinger, J. B., Jr. (1979) Rb-Sr glauconite ages and revisions of the Eocene time-scale, southeastern Atlantic coastal plain. *Geol. Soc. Amer. Abstr. with Programs*, v. 11, p. 439.
45. Harrison, T. M., Armstrong, R. L., Naeser, C. W., and Harakal, J. E. (1979) Geochronology and thermal history of the Coast Plutonic Complex, near Prince Rupert, British Columbia. *Canadian Jour. Earth Sci.*, v. 16, p. 400-410.

46. Hayatsu, A. (1979) K-Ar isochron age of the North Mountain Basalt, Nova Scotia: *Canadian Jour. Earth Sci.*, v. 16, p. 973-975.
47. Hille, P. (1979) An open system model for uranium series dating: *Earth Planetary Sci. Letters*, v. 42, p. 138-142.
48. Hudson, T., Smith, J. G., and Elliott, R. L. (1979) Petrology, composition, and age of intrusive rocks associated with the Quartz Hill molybdenite deposit, southeastern Alaska: *Canadian Jour. Earth Sci.*, v. 16, p. 1805-1822.
49. John, G. S., Gottfried, D., Schneider, R. R., Lanphere, M. A., Higgins, B. B., Hess, M. M., Force, L. M., and Perlman, S. H. (1978) Preliminary report on the geology of two deep test holes: Clubhouse Crossroads #2 and #3, near Charleston, South Carolina: *Geol. Soc. Amer. Abst. with Programs*, v. 10, p. 169.
50. Kamberling, M. J., and Luyendyk, B. P. (1979) Tectonic rotations of the Santa Monica Mountains region, western Transverse Ranges, California, suggested by paleomagnetic vectors: *Geol. Soc. Amer. Bull.*, Part I, v. 90, p. 331-337.
51. Kish, S. A., Butler, J. R., and Fullagar, P. D. (1979) The timing of metamorphism and deformation in the central and eastern Piedmont of North Carolina: *Geol. Soc. Amer. Abst. with Programs*, v. 11, p. 184.
52. Kish, S., Fullagar, P. D., Snoke, A. W., and Secor, D. T., Jr. (1978) The Kiokee belt of South Carolina (Part II—evidence for Late Paleozoic deformation and metamorphism in the southern Appalachian piedmont): *Geol. Soc. Amer. Abst. with Programs*, v. 10, p. 172.
53. Kish, S. A., and Stein, H. J. (1979) The timing of ore mineralization, Viburnum Trend, southeast Missouri lead district—Rb-Sr glauconite dating: *Geol. Soc. Amer. Abst. with Programs*, v. 11, p. 458.
54. Ku, T., Bull, W. B., Freeman, S. T., and Knauss, K. G. (1979) $Th^{232}-U^{238}$ dating of pedogenic carbonates in gravelly desert soils of Vidal Valley, southeastern California: *Geol. Soc. Amer. Bull.*, Part I, v. 90, p. 1063-1073.
55. Ludwig, K. R. (1979) Age of uranium mineralization in the Gas Hills and Crooks Gap districts, Wyoming, as indicated by U-Pb isotope apparent ages: *Econ. Geol.*, v. 74, p. 1654-1668.
56. Ludwig, K. R., Lindsey, D. A., and Zielinski, R. A. (1979) U-Pb isotope dates of uraniumiferous opals associated with beryllium-fluorine-uranium mineralization, Spor Mountain, Utah: *Geol. Soc. Amer. Abst. with Programs*, v. 11, p. 469.
57. MacFadden, B. J., Johnson, N. M., and Opydek, N. D. (1979) Magnetic polarity stratigraphy of the Mio-Pliocene mammal-bearing Big Sandy Formation of western Arizona: *Earth Planetary Sci. Letters*, v. 44, p. 349-364.
58. McJunkin, R. D. (1979) An isotopic age for Smartville ophiolite and the obduction of metavolcanic rocks in the northwestern Sierra foothills, California: *Geol. Soc. Amer. Abst. with Programs*, v. 11, p. 91.
59. McKee, E. H., and Duffield, W. A. (1979) Age and volume of basaltic rocks, Modoc County, California: *Geol. Soc. Amer. Abst. with Programs*, v. 11, p. 91.
60. McKee, E. H., Noble, D. C., Scherkenbach, D. A., Drexler, J. W., Mendoza, J., and Eyzaguirre, V. R. (1979) Age of porphyry intrusion, potassic alteration and related skarn mineralization, Antamina district, northern Peru: *Econ. Geology*, v. 74, p. 928-930.
61. Miller, E. L. (1979) $^{40}Ar/^{39}Ar$ incremental release ages on plutonic rocks from the Victorville region, California: *Geol. Soc. Amer. Abst. with Programs*, v. 11, p. 92.
62. Molling, P. A., Grant, N. K., Tyson, R. M., and Chang, L. Y. (1979) A strontium isotope study of a drill core in the Partridge River Troctolite, Duluth Complex, Minnesota: *Geol. Soc. Amer. Abst. with Programs*, v. 11, p. 236.
63. Morris, J. D. (1979) Sr-isotope geochemistry of near-trench plutons, southwest Alaska: *Geol. Soc. Amer. Abst. with Programs*, v. 11, p. 483-484.
64. Morrison, G. W., Godwin, C. I., and Armstrong, R. L. (1979) Interpretation of isotopic ages and $^{87}Sr/^{86}Sr$ initial ratios for plutonic rocks in the Whitehorse map area, Yukon: *Canadian Jour. Earth Sci.*, v. 16, p. 1988-1997.
65. Morton, J. L., and Morton, D. M. (1979) K-Ar ages of Cenozoic volcanic rocks along the Elsinore fault zone, southwestern Riverside County, California: *Geol. Soc. Amer. Abst. with Programs*, v. 11, p. 119.
66. Mose, D. G., and Hall, L. M. (1979) Rb-Sr whole-rock age determination of Member C of the Manhattan Schist and its bearing on allochthony in the Manhattan Prong, southeastern New York: *Geol. Soc. Amer. Abst. with Programs*, v. 11, p. 46.
67. Mueller, P. A. (1979) Ages of deformation in the Hellroaring Plateau area, eastern Beartooth Mountains, Montana: *Canadian Jour. Earth Sci.*, v. 16, p. 1124-1129.
68. Muth, K. G., Arth, J. G., and Reed, J. C., Jr. (1979) A minimum age for high-grade metamorphism and granite intrusion in the Piedmont of the Potomac River gorge near Washington, D.C.: *Geology*, v. 7, p. 349-350.
69. Neeser, C. W., Cunningham, C. G., Marvin, R. F., and Obradovich, J. D. (1979) Pliocene intrusion and mineralization—Rico, Colorado: *Geol. Soc. Amer. Abst. with Programs*, v. 11, p. 485.
70. Nelson, S. W., Grybeck, D., Silberman, M. L., and Brooks, D. (1979) Cataclastic granitic rocks in the central Brooks Range, Alaska: *Geol. Soc. Amer. Abst. with Programs*, v. 11, p. 119.
71. Noble, D. C., Farrar, E., and Cobbing, E. J. (1979) The Nazca Group of south-central Peru—age, source, and regional volcanic and tectonic significance: *Earth Planetary Sci. Letters*, v. 45, p. 80-86.
72. Noble, D. C., McKee, E. H., and Megard, F. (1978) Eocene uplift and unroofing of the coastal batholith near Lima, central Peru: *Jour. Geol.*, v. 86, p. 403.
73. ——— (1979) Early Tertiary "Incaic" tectonism, uplift, and volcanic activity, Andes of central Peru: *Geol. Soc. Amer. Bull.*, Part I, v. 90, p. 903-907.
74. Palmer, H. C., Hayatsu, A., Waboso, C. E., and Pullan, S. (1979) A paleomagnetic and K-Ar study of the Umfraville Gabbro, Ontario: *Canadian Jour. Earth Sci.*, v. 16, p. 459-471.
75. Parker, D. F., and McDowell, F. W. (1979) K-Ar geochronology of Oligocene volcanic rocks, Davis and Barrilla Mountains, Texas: *Geol. Soc. Amer. Bull.*, Part I, v. 90, p. 1100-1110.
76. Parrish, R. R. (1979) Geochronology and tectonics of the northern Wolverine Complex, British Columbia: *Canadian Jour. Earth Sci.*, v. 16, p. 1428-1438.
77. Pavides, L., Stern, T. W., Arth, J. G., Muth, K. G., Newell, M. F., and Crawford, S. L. (1979) Middle and late Paleozoic plutonic suites in the Piedmont near Fredericksburg, Virginia: *Geol. Soc. Amer. Abst. with Programs*, v. 11, p. 208.
78. Pearson, W. N., and Clark, A. H. (1979) The Minto copper deposit, Yukon Territory: a metamorphosed orebody in the Yukon crystalline terrane: *Econ. Geol.*, v. 74, p. 1577-1599.
79. Peterman, Z. E., and Sims, P. K. (1979) Rb-Sr dating of lower Proterozoic granitic rocks, northern Wisconsin: *Geol. Soc. Amer. Abst. with Programs*, v. 11, p. 253.
80. Powers, L. S., Brueckner, H. K., and Kinsley, D. H. (1979) Rb-Sr provenance ages from weathered and stream transported quartz grains from the Harney Peak Granite, Black Hills, South Dakota: *Geochimica et Cosmochimica Acta*, v. 43, p. 137-146.
81. Preto, V. A., Osatkenko, M. J., McMillan, W. J., and Armstrong, R. L. (1979) Isotopic dates and strontium isotopic ratios for plutonic and volcanic rocks in the Quesnel Trough and Nicola Belt, south-central British Columbia: *Canadian Jour. Earth Sci.*, v. 16, p. 1658-1672.
82. Rapoport, M. L., Silberman, M. L., and Morton, J. L. (1979) The age of the schist of Sierra de Salinas with implications on the stability of the Salinian block: *Geol. Soc. Amer. Abst. with Programs*, v. 11, p. 123.
83. Roden, M. F., Smith, D., and McDowell, F. W. (1979) Age and extent of potassic volcanism on the Colorado Plateau: *Earth Planetary Sci. Letters*, v. 43, p. 279-284.
84. Rosholt, J. N. (1979) Uranium-trend dating of altered tuffs in Pleistocene Lake Tecopa, California: *Geol. Soc. Amer. Abst. with Programs*, v. 11, p. 505.
85. Russell, G. S. (1978) Isotopic evidence for the age of the Hillabee Chlorite Schist: *Geol. Soc. Amer. Abst. with Programs*, v. 10, p. 196.
86. Saleeby, J., and Moores, E. M. (1979) Zircon ages on northern Sierra Nevada ophiolite remnants and some possible regional correlations: *Geol. Soc. Amer. Abst. with Programs*, v. 11, p. 125.
87. Schmidt, E. A., Worthington, J. E., Thomssen, R. W. (1979) K-Ar dates for mineralization in the White Cloud-Cannivan porphyry molybdenum belt of Idaho and Montana—a discussion: *Econ. Geology*, v. 74, p. 698-699.
88. Sedivy, R. A., and Broekstra, B. (1978) K-Ar age analyses of size-fractionated samples of Conasauga shale: *Geol. Soc. Amer. Abst. with Programs*, v. 10, p. 197.
89. Sharp, J. E. (1979) Cave Peak, a molybdenum-mineralized breccia pipe complex in Culberson County, Texas: *Econ. Geology*, v. 74, p. 517-534.
90. Silberman, M. L., Cseltsey, B., and Connor, C. L. (1979) K-Ar ages of metamorphic rocks, granitic rocks, and hydrothermal alteration-mineralization in the Willow Creek area, southwestern Talkeetna Mountains, Alaska: *Geol. Soc. Amer. Abst. with Programs*, v. 11, p. 128.

91. Smith, J. G., Stern, T. W., and Arth, J. G. (1979) Isotopic ages indicate multiple episodes of plutonism and metamorphism in the Coast Mountains near Ketchikan, Alaska: *Geol. Soc. Amer. Abst. with Programs*, v. 11, p. 519.
92. Snoke, A. W., McKee, E. H., and Stern, T. W. (1979) Plutonic, metamorphic, and structural chronology in the northern Ruby Mountains, Nevada—a preliminary report: *Geol. Soc. Amer. Abst. with Programs*, v. 11, p. 520.
93. Speed, R. C., Gerhard, L. C., and McKee, E. H. (1979) Ages of deposition, deformation, and intrusion of Cretaceous rocks, eastern St. Croix, Virgin Islands: *Geol. Soc. Amer. Bull.*, Part I, v. 90, p. 629–632.
94. Spellman, H. A., Jr. (1979) written communication to Wallace, R. E.
95. Spense, W. H., and McDaniel, R. D. (1979) Upper Cretaceous trachytes of the northeastern North Carolina Piedmont: *Geol. Soc. Amer. Abst. with Programs*, v. 11, p. 213.
96. Sutter, J. F., and Smith, T. E. (1979) $^{40}\text{Ar}/^{39}\text{Ar}$ ages of diabase intrusions from Newark trend basins in Connecticut and Maryland—initiation of central Atlantic rifting: *Amer. Jour. Sci.*, v. 279, p. 808–831.
97. Trettin, H. P., and Balkwill, H. R. (1979) Contributions to the tectonic history of the Innuition Province, Arctic Canada: *Canadian Jour. Earth Sci.*, v. 16, p. 748–769.
98. Turner, D. L., Forbes, R. B., and Dillon, J. T. (1979) K-Ar geochronology of the southwestern Brooks Range, Alaska: *Canadian Jour. Earth Sci.*, v. 16, p. 1789–1804.
99. Vitaliano, C. J., Cordua, W. S., Burger, H. R., Hanley, T. B., Hess, D. F., and Root, F. K. (1979) Geology and structure of the southern part of the Tobacco Root Mountains, southwestern Montana—map summary: *Geol. Soc. Amer. Bull.*, Part I, v. 90, p. 712–715.
100. Wanless, R. K., Bridgwater, D., and Collerson, K. D. (1979) Zircon age measurements for Uivak II gneisses from the Saglik area, Labrador: *Canadian Jour. Earth Sci.*, v. 16, p. 962–965.
101. Weiland, E. F., Ludwig, K. R., and Simmons, E. C. (1979) Dating of uranium mineralization using fission-tracks in associated gangue: *Geol. Soc. Amer. Abst. with Programs*, v. 11, p. 537.
102. Wilson, D. L., and Brown, E. H. (1979) Garnet amphibolite and eclogite in the Shuksan blueschist terrane, north Cascades, Washington: *Geol. Soc. Amer. Abst. with Programs*, v. 11, p. 541.
103. Wilson, F. H. (1979) K-Ar geochronology and Tertiary igneous history: Chignik and Sutwik Island area, Alaska Peninsula, Alaska: *Geol. Soc. Amer. Abst. with Programs*, v. 11, p. 541–542.
104. Wolff, J. M., and Crockett, J. H. (1979) Geochronology and geochemistry of felsic rocks in an Archean volcanic-plutonic suite in the Wabigoon belt, northwestern Ontario: *Canadian Jour. Earth Sci.*, v. 16, p. 1978–1987.
105. Wooden, J. L., Montgomery, C. W., and Casella, C. J. (1979) Rb-Sr and zircon U-Pb ages of the granitic rocks of the southwest Beartooth Mountains within Yellowstone National Park, Montana and Wyoming: *Geol. Soc. Amer. Abst. with Programs*, v. 11, p. 306.
106. Wooden, J. L., Mueller, P. M., and Hunt, D. K. (1979) A major late Archean intrusive event, eastern Beartooth Mountains, Montana-Wyoming: *Geol. Soc. Amer. Abst. with Programs*, v. 11, p. 543–544.