

Age determinations from other publications—list 5,

S.L. Tingley

Isochron/West, Bulletin of Isotopic Geochronology, v. 35, pp. 3-12

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Isochron/West was published at irregular intervals from 1971 to 1996. The journal was patterned after the journal *Radiocarbon* and covered isotopic age-dating (except carbon-14) on rocks and minerals from the Western Hemisphere. Initially, the geographic scope of papers was restricted to the western half of the United States, but was later expanded. The journal was sponsored and staffed by the New Mexico Bureau of Mines (now *Geology*) & Mineral Resources and the Nevada Bureau of Mines & Geology.



ISOCHRON/WEST
A Bulletin of Isotopic Geochronology

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AGE DETERMINATIONS FROM OTHER PUBLICATIONS—LIST 5

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This is the fifth 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 space limitations the data presented here is abbreviated and generalized, therefore the user should refer to the original article for additional details.

This fifth list completes coverage of the following jour-

nals issued during 1980: American Association of Petroleum Geologists Bulletin (vol. 64); American Journal of Science (vol. 280, 280A); Canadian Journal of Earth Science (vol. 17); Earth and Planetary Science Letters (vol. 46, no. 2-vol. 51); Economic Geology (vol. 75); Geochimica et Cosmochimica Acta (vol. 44); Geological Society of America Abstracts with Programs (vol. 10, no. 6, vol. 12); Geological Society of America Bulletin (vol. 91); Geology (vol. 8); and Journal of Geology (vol. 88).

I would appreciate receiving any corrections and/or suggested improvements.

AGE (MY)	METHOD	MINERAL	FORMATION/ROCK	LOCATION	REFER- ENCE
CANADA					
British Columbia					
20-23	K-Ar	—	Coquihalla Volcanic Complex	Hope area	6
22.3	Rb-Sr	whole rock	Coquihalla Volcanic Complex	Hope area	6
Manitoba					
2424	Rb-Sr	whole rock	Bayly Lake Pluton	Gods Lake area	17
2455	Rb-Sr	whole rock	Magill Lake Pluton	Magill Lake area	17
2680	Rb-Sr	whole rock	Hayes River Group volcanic rocks	Beaver Hill—Goose Lake area	17
New Brunswick					
334-827	U-Pb	zircon	Greenhead Group	St. John area	70
771	Rb-Sr	whole rock	Greenhead Group	St. John area	70
Newfoundland					
191-201	K-Ar	—	diabase dike trans-Avalon lineament	SE Newfoundland	41
338	K-Ar	muscovite	Ackley City batholith	SE Newfoundland	93
355-405	Ar-Ar	whole rock	Love Cove Group	Newfoundland Appalachians	24
580	U-Pb	zircon	Swift Current pluton	Newfoundland Appalachians	24
590	U-Pb	zircon	Love Cove Group	Newfoundland Appalachians	24
Northwest Territories					
1804	Pb-Pb	whole rock	Seton Formation	East Arm, Great Slave Lake	23
1860	U-Pb	zircon	plutons	Great Bear belt	89
1875	U-Pb	zircon	lower section	Great Bear belt	89
1890	U-Pb	zircon	plutons	Hepburn plutonic belt	89
1920	U-Pb	zircon	granodiorite	Hottah Lake	89
Nova Scotia					
201	K-Ar	—	Shelburne diabase dike	SE Nova Scotia	41
Ontario					
2560-2660	Rb-Sr	whole rock	granodioritic to granitic dikes	E Lac Seul region	96
2729.6	U-Pb	zircon	Okanse Lake pluton	Uchi-Confederation Lakes area	67
2734	U-Pb	zircon	dynamothermal metamorphism	Uchi-Confederation Lakes area	67
2738	U-Pb	zircon	rhyolite	Uchi-Confederation Lakes area	67
2780	Rb-Sr	whole rock	trondhjemitic-granodioritic gneiss	E Lac Seul region	96
2958.6	U-Pb	zircon	crystal tuff	Uchi-Confederation Lakes area	67
3000-3100	Rb-Sr	whole rock	Sen Bay plutonic complex, gneiss	E Lac Seul region	96
Quebec					
2330	Rb-Sr	whole rock	gneiss overprint	James Bay region	9
2490	Rb-Sr	whole rock	Cold Water paragneiss	Eastmain district	90
2500-3060	Rb-Sr	whole rock	Duxbury massif	Eastmain district	90
2540-2730	Rb-Sr	whole rock	Chibougamau pluton	SW Quebec	10
Saskatchewan					
1626	K-Ar	biotite	Johnson River Granite	57°11'09"N, 104°26'00"W	72
1646	K-Ar	biotite	Wathaman batholith	57°01'04"N, 104°04'05"W	72
1689,2177	K-Ar	biotite, hornblende	Peter Lake complex	57°05'55"N, 104°07'15"W	72

CANADA

Saskatchewan (continued)

1865	U-Pb	zircon	Wathaman batholith	57°01'04"N, 104°04'05"W	72
2494	U-Pb	zircon	Johnson River Granite	57°11'09"N, 104°26'00"W	72
2538	U-Pb	zircon	Peter Lake complex	57°05'55"N, 104°07'15"W	72

Yukon Territory

85-103	K-Ar	whole rock	Keno Hill quartzite	Keno Hill-Galena Hill area	80
184-243	U-Pb	zircon	Klotassin grandiorite	62°36'00"N, 137°15'00"W	86
271-322	U-Pb	zircon	Pelly Gneiss	62°47'30"N, 138°17'15"W	86
271-378	U-Pb	zircon	Pelly Gneiss, quartz monzonite	63°47'30"N, 140°28'00"W	86

GREENLAND

2600-2800	Rb-Sr	whole rock	gneiss	Fiskenaeset area	45
2750-2980	Rb-Sr	whole rock	orthogneisses, anorthosites	S West Greenland	85
2760-3020	Pb-Pb	whole rock	orthogneisses, anorthosites	S West Greenland	85
2880-2950	U-Pb	zircon	gneiss	Fiskenaeset area	45
3560, 3625	Rb-Sr, Pb-Pb	whole rock	Amitsoq granulites, metamorphism	West Greenland, S of Ameralik	38

GUYANA

2250	U-Pb	zircon	Guiana greenstone belt	Guiana Shield	35
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JAMAICA

11-56	Ft	zircon	bauxite, plateau	Moneague	19
15-66	Ft	zircon	bauxite, plateau	Kendal	19
20-44	Ft	zircon	bauxite, plateau	Tabolski	19
36-76	Ft	zircon	terra rosa	Claremont	19
37-52	Ft	zircon	bauxite, graben	Nain	19

MEXICO

29.1	K-Ar	K-feldspar, quartz	rhyolite breccia	Las Cuevas fluorite deposit	75
30.2	K-Ar	whole rock	rhyolite breccia	Las Cuevas fluorite deposit	75

PERU

9.5	Sr-Sr	—	quartz monzonite stock	Pasto Bueno deposit	66
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UNITED STATES

Alaska

4-32	K-Ar, Ft	—	volcanic ash	Kachemak Bay	88
5	K-Ar	hornblende	volcanic ash	Gulkana River	88
5-7	K-Ar, Ft	—	volcanic ash	SE Cook Inlet	88
12-14	K-Ar	biotite, hornblende	Kagalaska pluton	Kagalaska Island	16
16	K-Ar	plagioclase	volcanic ash	Chuitna River	88
32-36	K-Ar	biotite, hornblende	Hidden Bay pluton	Adak Island	16
91-106	K-Ar	actinolite, sericite	metavolcanic, metasedimentary rocks	Chichogof Island	25
345, 2312	U-Th-Pb	zircon	augen gneiss	Big Delta quadrangle	28
365	U-Pb	zircon	plutons, metavolcanics	S central Brooks Range	26
373	Rb-Sr	whole rock	plutons, metavolcanics	S central Brooks Range	26
1567	Rb-Sr	whole rock	San Carlos Granite	S Amazonas Territory	69
1624	Rb-Sr	whole rock	Atabapo Granite	S Amazonas Territory	69
1758, 1859	Rb-Sr, U-Pb	whole rock, zircon	Minicea Gneiss	S Amazonas Territory	69
1783	Rb-Sr	whole rock	Casiquire plutonic rocks	S Amazonas Territory	69
1793	Rb-Sr	whole rock	Atabapo Gneiss	S Amazonas Territory	69
1803	Rb-Sr	whole rock	quartz diorite gneiss	S Amazonas Territory	69
1805	Rb-Sr	whole rock	Padamo Granite	S Amazonas Territory	69
1823, 1846	U-Pb, Rb-Sr	zircon, whole rock	Macabana Gneiss	S Amazonas Territory	69

Arizona

3-7	K-Ar	whole rock	basalt lava	NW Arizona	7
9.6	K-Ar	whole rock	basalt	34°22'N, 113°42.5'W	79
16.2	K-Ar	whole rock	basalt	34°21'N, 113°37'W	79
52.3	K-Ar	biotite	schist	34°15'N, 113°41'W	79
56-61	K-Ar	biotite	Schultze Granite, porphyry phase, altered(?)	Globe-Miami district	21
57	K-Ar	biotite	biotite vein	Globe-Miami district	21
57.4	K-Ar	hornblende	gneiss	34°15'N, 113°41'W	79
57-1870	K-Ar	biotite	Willow Spring Granodiorite	Globe-Miami district	21
58-67	K-Ar	biotite	Lost Gulch Quartz Monzonite, mineralized	Globe-Miami district	21
59-64	K-Ar	biotite	Schultze Granite, porphyry phase, unaltered	Globe-Miami district	21

UNITED STATES
Arizona (continued)

60-63	K-Ar	biotite	Schultze Granite, main phase	Globe-Miami district	21
61	K-Ar	biotite	Schultze Granite, early phase	Globe-Miami district	21
61-64	K-Ar	muscovite	quartz-sericite-sulfide vein	Globe-Miami district	21
61-1106	K-Ar	biotite	Lost Gulch Quartz Monzonite, unmineralized(?)	Globe-Miami district	21
62-619	K-Ar	muscovite, biotite	Solitude Granite	Globe-Miami district	21
75	U-Th-Pb	zircon	disturbance of monazite, xenotime, titanate	Bagdad area	94
228	U-Th-Pb	zircon	disturbance of apatite, epidote, and zircon	Bagdad area	94
821	K-Ar	biotite	Madera Diorite	Globe-Miami district	21
821-1079	K-Ar	hornblende, biotite	diabase	Globe-Miami district	21
1072-1271	K-Ar	biotite, muscovite	aplite dikes	Globe-Miami district	21
1411	U-Th-Pb	zircon	Lawler Peak adamellite, crystallization	Bagdad area	94
1422	K-Ar	biotite	Ruin Granite	Globe-Miami district	21
Arizona/California					
15-27	K-Ar	—	"intrusion"	Whipple-Buckskin Mtns	53
16	K-Ar	—	flat-lying volcanics	Whipple-Buckskin Mtns.	53
17-26	K-Ar	—	volcanic rocks, upper plate	Whipple-Buckskin Mtns.	53
42-50	K-Ar	hornblende	mylonitic rocks	Whipple-Buckskin Mtns.	53
58	K-Ar	—	"crystalline rocks"	Whipple-Buckskin Mtns.	53
79	K-Ar	—	mylonitic clast	Whipple-Buckskin Mtns.	53
California	<i>see also</i> Arizona/California				
9.5-10.4	K-Ar	—	trachyandesite flow	Kennedy Table Mtn.	58
11.7	K-Ar	—	rhyolite tuff	Long Valley Caldera, N side	58
68-74	Ar-Ar	biotite	tonalite	34°36.48'N, 117°118.55'W	57
75-100	Ar-Ar	biotite	monzonite	34°37.37'N, 117°07.65'W	57
88-109	U-Pb	zircon	Ortogonal gabbro	Diablo Range	54
100	U-Pb	zircon	batholithic rocks	SW Sierra Nevada foothills	77
100	U-Pb	—	granodiorite dike, Lower Coon Mtn. pluton	NW California	39
110-130	K-Ar, U-Pb	hornblende, zircon	gabbro	SW Sierra Nevada foothills	77
119-164	Ar-Ar	hornblende	gabbro	34°38.42'N, 117°05.02'W	57
145	K-Ar	biotite	thermal resetting	lower Last Chance Canyon	20
150-233	Ar-Ar	hornblende	monzonite	34°37.37'N, 117°07.65'W	57
151	U-Pb	zircon	granodiorite	Lake Eleanor 15' quadrangle	13
154-170	U-Pb	zircon	quartz dioritic phase	SW Sierra Nevada foothills	77
157	K-Ar	biotite	quartz monzodiorite to quartz diorite	NE of Last Chance Canyon	20
157	U-Pb	—	plagiogranite, Josephine Ophiolite	NW California	39
157-190	K-Ar	whole rock, mica concentrate	quartz-muscovite phyllite	North Fork Yuba River, near Downieville	78
163,166	U-Pb	zircon	Sierra Nevada batholith, tonalite	Lake Eleanor 15' quadrangle	13
164	U-Pb	zircon	Standard pluton, diorite	Lake Eleanor 15' quadrangle	13
190+	K-Ar	hornblende	amphibolite	SW Sierra Nevada foothills	77
190-225	U-Pb	zircon	dioritic bodies	SW Sierra Nevada foothills	77
230, 239	K-Ar	biotite, hornblende	granodiorite to tonalite	lower Last Chance Canyon	20
270-305	U-Pb	zircon	plagiogranitic bodies	SW Sierra Nevada foothills	77
Colorado					
3-4	Ft	zircon	alaskite porphyry	Rico	65
4-6	Ft	zircon, apatite	Calico Peak porphyry	Rico	65
4.5	K-Ar	biotite	Calico Peak porphyry	Rico	65
5-65	Ft	zircon, apatite	hornblende latite-porphyry	Rico	65
5.4, 5.5	K-Ar	sericite	vein along Black Hawk fault	Rico	65
6-78	Ft	apatite, sphene, zircon	augite monzonite	Rico	65
16.0	Ft	apatite	aplite dike	Sawatch Range, near Lake Creek	11
19.9	Ft	apatite	Monitor rock plug	Sawatch Range, Monitor Rock	11
20.0	Ft	apatite	Twin Lakes stock	Sawatch Range, Lake Fork Valley	11
24-25	K-Ar	sericite	hydrothermal alteration	Ophir mining district	42
25.7	K-Ar	biotite	Sultan stock	Ophir mining district	42
25.9	K-Ar	biotite	Ophir stock	Ophir mining district	42
27.9	Ft	apatite	migmatite	Sawatch Range, Express Creek Valley	42
29.9	Ft	apatite	Twin Lakes stock	Sawatch Range, near Lake Creek	42
45.1	Ft	apatite	gneiss	Middle Fork Swan River	11

UNITED STATES

Colorado (continued)

49.8	Ft	apatite	quartz monzonite	Kenosha Batholith, Kenosha Pass	11
51.1	Ft	apatite	quartz monzonite	Sawatch Range, Woody Creek Valley	11
52.5	Ft	apatite	quartz monzonite, granodiorite	Sawatch Range, Hunter Creek Valley	11
58-134	Ft	apatite	gneiss	Front Range, Mt Evans pluton	11
79	Ft	apatite	amphibolite	Georgia Pass	11
124, 148	Ft	apatite	quartz monzonite	Kenosha Batholith, Michigan Creek Valley	11
130	Ft	apatite	quartz monzonite	Kenosha Batholith, Tarryall Creek Road	11
245	Ft	apatite	quartz monzonite	Kenosha Batholith, Packer Road	11
352	Ft	apatite	granite	Elkhorn Road	11
473	Ft	apatite	quartz monzonite	Kenosha Batholith, Elkhorn Spring	11
Colorado/Utah					
925-1100	Rb-Sr	whole rock	shale	Uinta Mtn Group	15
Connecticut					
236	Sr-Sr	—	gneiss	Monson anticline	95
338	Sr-Sr	—	gneiss	Killingworth dome	95
374	Rb-Sr	whole rock	Canterbury Gneiss	Fitchville-Hamburg quad	71
394	Sr-Sr	—	gneiss	Selden Neck dome, upper limb	95
402	Rb-Sr	whole rock	cataclastic rocks	Honey Hill fault area	71
416	Rb-Sr	whole rock	Canterbury Gneiss	N Honey Hill fault area	71
438	Rb-Sr	whole rock	Yantic Member, Tatnic Hill Fm.	N Honey Hill fault area, Yantic	71
510	Rb-Sr	whole rock	Alaskite Member, Sterling Plutonic Group	S Honey Hill fault area, Barret Quarry	71
595	Sr-Sr	—	gneiss	Seldon Neck dome, lower limb	95
Georgia					
238	K-Ar	biotite	Elberton Granite	Inner Piedmont	40
345	Sr-Sr	—	Elberton Granite	Inner Piedmont	40
Idaho					
37-95	K-Ar	biotite	granitic rock	Idaho batholith, Atlanta lobe	22
38	K-Ar	—	Logan Creek stock	Stibnite area	5
48	K-Ar	—	Ima stock	Blue Wing district	5
48-52	K-Ar, Ar-Ar	biotite, hornblende	granite	Bitterroot lode, Idaho batholith	30
52-53	K-Ar, Ar-Ar	biotite	gneissic quartz diorite-tonalite	Bitterroot lode, Idaho batholith	30
61-66	K-Ar, Ar-Ar	amphibole	gneissic quartz diorite-tonalite	Bitterroot lode, Idaho batholith	30
Kansas					
0.71	Ft	glass	volcanic ash	NW¼ S16, T1S, R6W	56
Maine					
365	Rb-Sr	whole rock	Cadillac Mtn pluton	Mt Desert	63
373	Rb-Sr	whole rock	Bays of Maine Complex	Mt Desert	63
377	Rb-Sr	whole rock	granite	Schoodic Peninsula	63
396	Rb-Sr	whole rock	Flint Island volcanics	Mt Desert Island area	63
408	Rb-Sr	whole rock	Upper Bar Harbor Fm	Mt Desert Island area	63
Massachusetts					
278, 1511	U-Pb	zircon	Westboro Fm	Middlesex Fells Reservation	68
289, 730	U-Pb	zircon	Fishbrook Gneiss	Sharpners Pond area	68
375, 480	Ar-Ar	biotite, hornblende	Lee Gneiss	Berkshire Massif	64
445	Rb-Sr	whole rock	metavolcanics	NE Massachusetts	68
454	Rb-Sr	whole rock	metasediments	NE Massachusetts	68
517, 2042	U-Pb	zircon	Shawsheen Gneiss	Along Middlesex Turnpike	68
Minnesota					
1270-1320	Pb-Pb	—	Duluth Gabbro	Near town of Ely	52
Missouri					
0.02-0.08	U-Th	whole rock	fossil bones	Trolinger Spring	84
0.03-0.04	U-Th	whole rock	organic sand	Trolinger Spring	84
Montana					
63.6	Rb-Sr	biotite, sanidine	bentonite	Hell Creek	3
2630-2938	Rb-Sr	—	gneiss	Horse Creek road	43
2662	Rb-Sr	—	Dillon Granite Gneiss	SW¼, S6, T8S, R6W	43
2662	Pb-Pb	—	Stillwater Complex	between Stillwater River and West Fork Stillwater River	52

UNITED STATES

Montana (continued)

2766	Rb-Sr	—	gneiss	SW¼, S1, T8S, R7W	43
2807	Rb-Sr	—	Dillon Granite Gneiss	N side of Axes Canyon	43
2819	Rb-Sr	—	gneiss	N side of Axes Canyon	43
2887, 2935	Rb-Sr	—	gneiss	Portal Creek road	43
3193	Rb-Sr	—	gneiss	US 191, near bridge over Gallatin River	43
4696, 5114	Rb-Sr	—	gneiss	Timber Creek road	43
Nevada					
9-14	K-Ar	whole rock	basalt lava	SE Nevada	7
16.2	K-Ar	biotite	granite	Silver Dyke Canyon, Excelsior Mtns	82
78.8	K-Ar	hornblende	granite	Marietta Summit, Excelsior Mtns	82
84.1	K-Ar	biotite	granite	Marietta Summit, Excelsior Mtns	82
89.8	K-Ar	biotite	granite	Miller Mtn	82
91.2	K-Ar	biotite	granite	Gates Mill, Candelaria Hills	82
91.7	K-Ar	muscovite	granite	Miller Mtn	82
103	Rb-Sr	—	volcanics	Excelsior Mtns	82
142	Rb-Sr	—	volcanics	Pilot Mtns	82
150	K-Ar	biotite	tuff of Lavinia Wash sequence	35°46'57"N, 115°28'33"W	14
New Hampshire					
81	Ft	apatite	Conway Granite	Merrymeeting stock	27
82	Ft	apatite	Conway Granite	Cannon Mtn stock	27
90	Ft	apatite	Albany Quartz Syenite	Belknap stock	27
94	Ft	apatite	Conway Granite	Redstone Quarry, White Mtn Batholith	27
96	Ft	apatite	Conway Granite	Gore Mtn stock	27
102	Ft	apatite	Conway Granite	Mad River stock	27
107	Ft	zircon	Moat volcanics	Ossipee complex	27
108	Ft	zircon	hornblende diorite	Mt Pawtuckaway complex	27
122	Ft	apatite	hornblende diorite	Mt Pawtuckaway complex	27
163	Ft	zircon	Conway Granite	Redstone Quarry, White Mtn Batholith	27
173	Ft	zircon	Conway Granite	Cannon Mtn stock	27
441	Rb-Sr	whole rock	syenite	Pliny Range	31
641, 671	Rb-Sr	whole rock	Massabesic orthogneiss	Manchester to Raymond	46
New Jersey					
435	—	biotite	Martinsburg Fm	Beemerville area	74
975-1010	U-Pb	—	gneiss	Ringwood	36
New Mexico					
1.1	K-Ar	sanidine	Bandelier Tuff	Sandoval County	4
3-25	K-Ar	whole rock	basalt flows	N New Mexico	4
18.9	K-Ar	whole rock	olivine nephelinite flow	Cerro Negro	4
20-29	K-Ar	—	Espinosa Fm	N New Mexico	4
21.4	K-Ar	polyhalite	Castile Fm	Kerr-McGee Potash Mine	8
22-25	K-Ar	whole rock	Jarita Basalt Member, Los Piños Fm	N New Mexico	4
25.1	K-Ar	whole rock	Cieneguilla Limburgite	near La Cienega	4
30.2	K-Ar	biotite	monzonite porphyry	near La Cienega	4
131	Rb-Sr	montmorillonite	Morrison Fm	Ambrosia Lake district	48
142	Rb-Sr	montmorillonite	Morrison Fm	Laguna district	48
154	K-Ar	polyhalite	Castile Fm	DH AEC 8	8
174-216	K-Ar	polyhalite	Castile Fm	DH ERDA 9	8
198-212	K-Ar	polyhalite	Castile Fm	Mississippi Chemical Corp Mine	8
469	Rb-Sr	whole rock	syenite	Pederal Hills, Labo Hill	50
New York					
936-958	U-Pb	—	gneiss	West Point	36
949-1980	U-Pb	—	sulfide ore	Camp Smith	36
961-1110	U-Pb	—	gneiss	Camp Smith	36
966-974	U-Pb	—	pegmatite	Camp Smith	36
988-4600	U-Pb	—	gneiss	Camp Smith	36
1023	Rb-Sr	whole rock	sill, mangeritic zone	Schroon Lake quad	87
1067	Rb-Sr	whole rock	sill, gabbroic zone	Schroon Lake quad	87
1300-1350	U-Pb, Rb-Sr	zircon, whole rock	Fordham Gneiss, Unit C	SE New York	62
1322	Rb-Sr	whole rock	sill, total	Schroon Lake quad	87
North Carolina					
34.8	Rb-Sr	glauconite	Castle Hayne Limestone	Martin-Marietta quarry, New Hanover Co.	33
245	Rb-Sr	whole rock, biotite	Fountain belt	North Carolina Piedmont	29
245-255	Ar-Ar	biotite	Rolesville granite, Raleigh belt gneiss	North Carolina Piedmont	29

UNITED STATES

North Carolina (continued)

260-270	Ar-Ar	hornblende	Raleigh belt gneiss	North Carolina Piedmont	29
287	Rb-Sr	whole rock	Sims Granite	E Carolina slate belt	92
322-430	K-Ar	hornblende	country rock, amphibolite	Ore Knob	34
392-868	K-Ar	hornblende	ore zone	Ore Knob	34
393	Rb-Sr	whole rock	mylonite	Old Fort, Black Mtn area	55
423	Pb-Pb	galena	ore deposits	Adams Mine, Fontana district	49
519-567	U-Pb	zircon	tuff, Uwharrie Fm	Carolina volcanic slate belt, near Asheboro	97
561	K-Ar	hornblende	wall rock, amphibolite	Ore Knob	34
Ohio					
337	Rb-Sr	glauconite	Belfast Member, Brassfield Fm	S-central Ohio	47
Oregon					
220.3	Ar-Ar	hornblende	amphibolite	S of Oxbow	2
223.0	Ar-Ar	hornblende	quartz diorite, Sparta ophiolite	S of Sparta	2
223.2	Ar-Ar	hornblende	trondhjemite, Sparta ophiolite	S of Sparta	2
254.8	Ar-Ar	hornblende	Amphibolite knocker	S of John Day	2
261.8	Ar-Ar	hornblende	pegmatite, Canyon Mtn ophiolite	S of John Day	2
268	U-Pb	zircon	quartz diorite, Canyon Mtn Complex	NE Oregon	91
278	U-Pb	zircon	plagiogranite, Canyon Mtn Complex	NE Oregon	91
278	U-Pb	zircon	gabbro, Canyon Mtn Complex	NE Oregon	91
Pennsylvania					
360, 375	Ar-Ar	hornblende, biotite	Avondale Anticline gneiss	Glenarm Terrane	83
410	Ar-Ar	biotite	Wissahickon schist	S of Rosemont Fault	83
465	Ar-Ar	hornblende	amphibolite	Rosemont Fault Zone	83
850, 880	Ar-Ar	hornblende, biotite	basement gneiss	Honey Brook Upland	83
919-948	U-Pb	—	marble	Easton	36
Puerto Rico					
71	Rb-Sr	whole rock	San Lorenzo pluton	E Puerto Rico	44
South Carolina					
34.1	Rb-Sr	glauconite	Cross Fm	Santee Portland Cement quarry, Orangeburg Co	33
36.7	Rb-Sr	glauconite	Santee Limestone	Martin-Marietta quarry, Berkeley Co	33
254	Rb-Sr	whole rock	granite, pegmatites	Edgefield area	81
284	Rb-Sr	whole rock	lineated gneiss	Batesburg area	81
291	Rb-Sr	whole rock	augen gneiss	Batesburg area	81
299	Rb-Sr	whole rock	Lake Murray pegmatites	Lexington area	81
313	Rb-Sr	whole rock	Lake Murray gneiss	Lexington area	81
423	Rb-Sr	whole rock	gneiss	Inner Piedmont	32
Tennessee					
420	Ar-Ar	hornblende	Boyd Mine	Ducktown	34
635	K-Ar	hornblende	ore zone	Ducktown	34
892	Ar-Ar	hornblende	Callaway Mine	Ducktown	34
Texas					
71-98	Rb-Sr	—	Dessau Fm	Austin, 15 km SW	60
267-290	Rb-Sr	—	Marble Falls Fm	Llano Uplift, Elm Pool	60
282	K-Ar	—	Barnett Fm	Llano Uplift, Elm Pool	60
291-354	Rb-Sr	—	Barnett Fm	Llano Uplift, Elm Pool	60
346-349	Rb-Sr	—	Houy Fm	Llano Uplift, Elm Pool	60
348	K-Ar	—	Stribling Fm	Llano Uplift, Doublehorn Creek	60
360-386	Rb-Sr	—	Stribling Fm	Llano Uplift, Doublehorn Creek	60
394	Rb-Sr	—	Cap Mtn Member, Riley Fm	Llano Uplift, Morgan Creek	60
408-434	Rb-Sr	—	Lion Mtn Member, Riley Fm	Llano Uplift, Morgan Creek	60
422-430	Rb-Sr	—	San Saba Member, Wilberns Fm	Llano Uplift, State highway 87	60
429-852	Rb-Sr	—	Morgan Creek Member, Wilberns Fm	Llano Uplift, Morgan Creek	60
435	K-Ar	—	Morgan Creek Member, Wilberns Fm	Llano Uplift, Morgan Creek	60
448	K-Ar	—	San Saba Member, Wilberns Fm	Llano Uplift, State highway 87	60
Utah <i>see also</i> Colorado/Utah					
0.2-13	K-Ar	whole rock	basalt lava	SW Utah	7
0.3-10	K-Ar	whole rock	andesite lava	SW Utah	7
0.3-13	K-Ar	whole rock	Hawaiiite	SW Utah	7
1.7	K-Ar	whole rock	ankaramite	SW Utah	7
3-5	U-Pb	opal	hot spring activity	Spor Mtn	51
8-21	U-Pb	opal	beryllium-fluorine-uranium mineralization	Spor Mtn	51
21-37	K-Ar	whole rock	potassium-rich mafic lava	SW Utah	7
23-42	Ft	apatite	Valco and Glencoe stocks	Park City mining district	59
32-37	Ft	apatite	Pine Creek and Flagstaff stocks	Park City mining district	59

UNITED STATES

Utah (continued)

35-46	Ft	apatite	Clayton Peak and Mayflower stocks	Park City mining district	59
496	—	—	diorite dike	Deadman Lake	73
1420	Rb-Sr	whole rock	quartzite	Mt Watson	15
Vermont					
101, 125	Ft	apatite, zircon	Conway Granite	Mt Ascutney complex	27
114, 165	Ft	apatite, zircon	syenite	Mt Monadnock stock	27
840, 930	Sr-Sr	biotite, hornblende	basement rock	Green Mtns	64
Virginia					
454	Rb-Sr	—	pluton	Virginia Piedmont	61
494	Rb-Sr	—	pluton	Occoguan pluton	61
Washington					
0.2	U-Th	—	petrocalcic horizon	Pasco Basin	12
34	Ft	zircon	Wenatchee Fm	Chiwaukum graben, Central Cascade Range	37
44.6	Ft	zircon	Chumstick Fm	Chiwaukum graben, Central Cascade Range	37
122	K-Ar	whole rock	Shuksan Metamorphic Suite	N Cascades	1
126	Rb-Sr	muscovite	Shuksan Metamorphic Suite	N Cascades	1
128-164	K-Ar	muscovite	Shuksan Metamorphic Suite	N Cascades	1
148	K-Ar	hornblende	Shuksan Metamorphic Suite	N Cascades	1
219, 221	K-Ar	whole rock	Shuksan Metamorphic Suite	N Cascades	1
Wyoming					
0.6-0.8	Ft	zircon	coal ash	Keyton Creek	18
0.8-0.9	Ft	zircon	coal ash	N of Little Thunder Creek	18
19, 20	U-Pb	whole rock	uraniferous secondary silica, White River Fm	Shirley Basin	98
Miscellaneous					
380	Ft	apatite	conodont, <i>Siphonodella</i> , Chappel Limestone	unknown	76
VENEZUELA					
1567	Rb-Sr	whole rock	San Carlos Granite	S Amazonas Territory	69
1624, 1793	Rb-Sr	whole rock	Atabapo Gneiss	S Amazonas Territory	69
1758, 1859	Rb-Sr, U-Pb	whole rock, zircon	Minicea Gneiss	S Amazonas Territory	69
1783	Rb-Sr	whole rock	Casiquire plutonic rocks	S Amazonas Territory	69
1803	Rb-Sr	whole rock	quartz diorite gneiss	S Amazonas Territory	69
1805	Rb-Sr	whole rock	Padamo Granite	S Amazonas Territory	69
1823, 1846	U-Pb, Rb-Sr	zircon, whole rock	Macabana Gneiss	S Amazonas Territory	69

REFERENCES

- Armstrong, R. L. (1980) Geochronometry of the Shuksan Metamorphic suite, north Cascades, Washington: GSA Abst. with Programs, v. 12, p. 94.
- Ave Lallemand, H. G., Phelps, D. W., and Sutter, J. F. (1980) ^{40}Ar - ^{39}Ar ages of some pre-Tertiary plutonic and metamorphic rocks of eastern Oregon and their geologic relationships: *Geology*, v. 8, p. 371-374.
- Baadsgaard, H., and Lerbekmo, J. F. (1980) A Rb/Sr age for the Cretaceous-Tertiary boundary (Z Coal), Hell Creek Montana: *Canadian Jour. Earth Sci.*, v. 17, p. 671-673.
- Baldrige, W. S., Damon, P. E., Shafiqullah, M., and Bridwell, R. J. (1980) Evolution of the central Rio Grande rift, New Mexico — new potassium-argon ages: *Earth Planetary Sci. Letters*, v. 51, p. 309-321.
- Bennett, E. H. (1980) Granitic rocks of Tertiary age in the Idaho batholith and their relation to mineralization: *Economic Geology*, v. 75, p. 278-288.
- Berman, R. G., and Armstrong, R. L. (1980) Geology of the Coquihalla Volcanic Complex, southwestern British Columbia: *Canadian Jour. Earth Sci.*, v. 17, p. 985-995.
- Best, M. G., McKee, E. H., and Damon, P. E. (1980) Space-time-composition patterns of late Cenozoic mafic volcanism, southwestern Utah and adjoining areas: *Amer. Jour. Sci.*, v. 280, p. 1035-1050.
- Brookins, D. G., Register, J. K., Jr., and Krueger, H. W. (1980) Potassium-argon dating of polyhalite in southeastern New Mexico: *Geochimica et Cosmochimica Acta*, v. 44, p. 635-637.
- Brooks, C. (1980) Apebian overprinting in the Superior Province east of James Bay, Quebec: *Canadian Jour. Earth Sci.*, v. 17, p. 526-532.
- Brooks, C. (1980) The Rb/Sr geochronology of the Archean Chibougamau pluton, Quebec: *Canadian Jour. Earth Sci.*, v. 17, p. 776-783.
- Bryant, B., and Naeser, C. W. (1980) The significance of fission-track ages of apatite in relation to the tectonic history of the Front and Sawatch Ranges, Colorado: *Geol. Soc. Amer. Bull.*, Part I, v. 91, p. 156-164.
- Bunker, R. C. (1980) Catastrophic flooding in Badger Coulee, south-central Washington—facies, paleohydraulics, and timing: GSA Abst. with Programs, v. 12, p. 99.
- Calk, L. C., Dodge, F. C. W., and Stern, T. W. (1980) Jurassic granitoids in the western central Sierra Nevada: GSA Abst. with Programs, v. 12, p. 100.
- Carr, M. D. (1980) Upper Jurassic to Lower Cretaceous(?) synorogenic sedimentary rocks in the southern Spring Mountains, Nevada: *Geology*, v. 8, p. 385-389.
- Chaudhuri, S., and Hansen, W. R. (1980) Rb-Sr ages of the Uinta Mountain Group of Utah and Colorado: GSA Abst. with Programs, v. 12, p. 269.

16. Citron, G. P., Kay, R. W., Mahlburg Kay, S., Snee, L. W., and Sutter, J. F. (1980) Tectonic significance of early Oligocene plutonism on Adak Island, central Aleutian Islands, Alaska: *Geology*, v. 8, p. 375-379.
17. Clark, G. S., and Cheung, S. P. (1980) Rubidium-strontium ages from the Oxford Lake-Knee Lake greenstone belt, northern Manitoba: *Canadian Jour. Earth Sci.*, v. 17, p. 560-568.
18. Coates, D. A., and Naeser, C. W. (1980) Fission-track ages of clinker development, eastern Powder River Basin, Campbell County, Wyoming: *GSA Abst. with Programs*, v. 12, p. 270.
19. Comer, J. B., Naeser, C. W., and McDowell, F. W. (1980) Fission-track ages of zircon from Jamaican bauxite and terra rosa: *Economic Geology*, v. 75, p. 117-121.
20. Cox, B. F., and Morton, J. L. (1980) Late Permian plutonism, El Paso Mountains, California: *GSA Abst. with Programs*, v. 12, p. 103.
21. Creasey, S. C. (1980) Chronology of intrusion and deposition of porphyry copper ores, Globe-Miami district, Arizona: *Economic Geology*, v. 75, p. 830-844.
22. Criss, R. E., Lanphere, M. A., and Taylor, H. P. (1980) Effects of regional uplift, doming and meteoric-hydrothermal metamorphism on K-Ar ages of biotites in granitic rocks of the southern half (Atlanta lobe) of the Idaho batholith: *GSA Abst. with Programs*, v. 12, p. 408.
23. Cumming, G. L. (1980) Lead isochron dating of the Seton Formation, East Arm of Great Slave Lake, Northwest Territories: *Canadian Jour. Earth Sci.*, v. 17, p. 1591-1593.
24. Dallmeyer, R. D., Odom, A. L., O'Driscoll, C. F., Hussey, E. M., and O'Brien, S. J. (1980) Chronology of igneous and metamorphic events in the southwestern Avalon Zone of the Newfoundland Appalachians: *GSA Abst. with Programs*, v. 12, p. 410.
25. Decker, J., Wilson, F. H., and Turner, D. L. (1980) Mid-Cretaceous subduction event in southeastern Alaska: *GSA Abst. with Programs*, v. 12, p. 103.
26. Dillon, J. T., Pessel, G. H., Chen, J. H., and Veach, N. C. (1980) Middle Paleozoic magmatism and orogenesis in the Brooks Range, Alaska: *Geology*, v. 8, p. 338-343.
27. Doherty, J. T., and Lyons, J. B. (1980) Mesozoic erosion rates in northern New England: *Geol. Soc. Amer. Bull.*, Part I, v. 91, p. 16-20.
28. Dusel-Bacon, C., and Aleinikoff, J. N. (1980) Proterozoic cataclastic augen gneiss in the southeastern part of the Big Delta quadrangle, Yukon-Tanana Upland, east-central Alaska: *GSA Abst. with Programs*, v. 12, p. 104-105.
29. Farrar, S. S., Glover, L., III, and Russell, J. S. (1980) Alleghanian deformation in the eastern North Carolina Piedmont, and its possible extension to the east under coastal plain cover: *GSA Abst. with Programs*, v. 12, p. 424.
30. Fleck, R. J. (1980) Latest Cretaceous and early Tertiary emplacement of the Bitterroot lode of the Idaho batholith: *GSA Abst. with Programs*, v. 12, p. 273.
31. Foland, K. A., and Loiselle, M. C. (1981) Oliverian syenites of the Pliny region, northern New Hampshire: *Geol. Soc. Amer. Bull.*, Part I, v. 92, p. 179-188.
32. Fullagar, P. O. (1980) Rb-Sr ages of granitic gneisses of the Inner Piedmont belt of South Carolina: *GSA Abst. with Programs*, v. 12, p. 177.
33. Fullagar, P. D., Harris, W. B., and Winters, J. (1980) Rb-Sr glauconite ages, Claibornian, and Jacksonian strata (Eocene), southeastern Atlantic Coastal Plain: *GSA Abst. with Programs*, v. 12, p. 430.
34. Fullagar, P. D., Kish, S. A., Odom, A. L., Dallmeyer, R. D., and Bottino, M. L. (1980) Possible excess ^{40}Ar in hornblende and biotite from the Appalachian massive sulfide deposits at Ore Knob, North Carolina, and Ducktown, Tennessee: *Economic Geology*, v. 75, p. 329-339.
35. Gibbs, A. K. (1980) The Archean-Proterozoic transition-perspective from the Guiana Shield: *GSA Abst. with Programs*, v. 12, p. 433.
36. Grauch, R. I., and Ludwig, K. R. (1980) Precambrian uranium mineralization in the central Appalachians: *GSA Abst. with Programs*, v. 12, p. 39.
37. Gresens, R. L., Naeser, C. W., and Whetten, J. T. (1981) Stratigraphy and age of the Chumstick and Wenatchee Formations; Tertiary fluvial and lacustrine rocks, Chiwaukum graben, Washington; summary: *Geol. Soc. Amer. Bull.*, Part I, v. 92, p. 233-236.
38. Griffin, W. L., McGregor, V. R., Nutman, A., Taylor, P. N., and Bridgwater, D. (1980) Early Archaean granulite-facies metamorphism south of Ameralik, West Greenland: *Earth Planetary Sci. Letters*, v. 50, p. 59-74.
39. Harper, G. C., and Saleeby, J. B. (1980) Zircon ages of the Josephine Ophiolite and the Lower Coon Mountain pluton, western Jurassic belt, NW California: *GSA Abst. with Programs*, v. 12, p. 109-110.
40. Hess, J. R., and Stormer, J. C. (1980) The geochemistry of the Elberton Granite, northeastern Georgia: *GSA Abst. with Programs*, v. 12, p. 179.
41. Hodych, J. P., and Hayatsu, A. (1980) K-Ar isochron age and paleomagnetism of diabase along with trans-Avalon aeromagnetic lineament—evidence of Late Triassic rifting in Newfoundland: *Canadian Earth Sci.*, v. 17, p. 491-499.
42. Jackson, S. E., Harmon, R. S., Lux, O. R., Rice, C. M., and Ringrose, C. R. (1980) Isotopic geochemistry and chronology of porphyry-style mineralization near Ophir, San Juan Mountains, Colorado: *GSA Abst. with Programs*, v. 12, p. 454.
43. James, H. L., and Hedge, C. E. (1980) Age of basement rocks of southwest Montana: *Geol. Soc. Amer. Bull.*, Part I, v. 91, p. 11-15.
44. Jones, L. M., and Kesler, S. E. (1980) Strontium isotopic geochemistry of intrusive rocks, Puerto Rico, Greater Antilles: *Earth and Planetary Sci. Letters*, v. 50, p. 219-224.
45. Kalsbeek, F., and Pidgeon, R. T. (1980) The geological significance of Rb-Sr whole rock isochrons of polymetamorphic Archaean gneisses, Fiskenaasset area, southern West Greenland: *Earth Planetary Sci. Letters*, v. 50, p. 225-237.
46. Kelly, W. J., Olszewski, W. J., Jr., and Gaudette, H. E. (1980) The Massabesic gneiss revisited—a Rb/Sr whole rock study of the Massabesic orthogneiss, southern New Hampshire: *GSA Abst. with Programs*, v. 12, p. 45.
47. Laskowski, T. E., Fluegeman, R. H., and Grant, N. K. (1980) Rb-Sr glauconite systematics and the uplift of the Cincinnati arch: *Geology*, v. 8, p. 368-370.
48. Lee, M. J., and Brookins, D. G. (1980) Rubidium-strontium minimum ages of sedimentation, uranium mineralization, and provenance, Morrison Formation (Upper Jurassic), Grants mineral belt, New Mexico—reply: *Amer. Assoc. Petroleum Geologists Bull.*, v. 64, p. 1718-1719.
49. LeHuray, A. P. (1980) Lead isotopic ratios of some southern Appalachian sulfide deposits—indications of the origin of the ore-forming agents: *GSA Abst. with Programs*, v. 12, p. 470.
50. Loring, A. K., and Armstrong, D. G. (1980) Cambrian-Ordovician syenites of New Mexico, part of a regional alkalic intrusive episode: *Geology*, v. 8, p. 344-348.
51. Ludwig, K. R., Lindsey, D. A., Zielinski, R. A., and Simmons, K. R. (1980) U-Pb ages of uraniumiferous opals and implications for the history of beryllium, fluorine, and uranium mineralization at Spor Mountain, Utah: *Earth and Planetary Sci. Letters*, v. 46, p. 221-232.
52. Manhès, G., Allegre, C. J., Dupre, B., and Hamelin, B. (1980) Lead isotope study of basic-ultrabasic layered complexes—speculations about the age of the earth and primitive mantle characteristics: *Earth Planetary Sci. Letters*, v. 47, p. 370-382.
53. Martin, D. L., Barry, W. L., Krummenacher, D., and Frost, E. (1980) K-Ar dating of mylonitization and detachment faulting in the Whipple Mountains, San Bernardino County, California and the Buckskin Mountains, Yuma County, Arizona: *GSA Abst. with Programs*, v. 12, p. 118.
54. Mattinson, J. M., and Echeverria, L. M. (1980) Ortigalita Peak gabbro, Franciscan complex—U-Pb dates of intrusion and high-pressure—low-temperature metamorphism: *Geology*, v. 8, p. 589-593.
55. McGile, K. A., Butler, J. R., and Fullagar, P. D. (1980) Tectonic history of the Brevard zone and Blue Ridge east of Asheville, North Carolina: *GSA Abst. with Programs*, v. 12, p. 480.
56. Miller, B. B., Eshelman, R. E., and Hager, M. W. (1980) A molluscan faunule collected beneath the Hartford(?) Ash (0.71 mybp) Jewell County, Kansas: *GSA Abst. with Programs*, v. 12, p. 251.
57. Miller, E. L., and Sutter, J. F. (1981) $^{40}\text{Ar}/^{39}\text{Ar}$ age spectra for biotite and hornblende from plutonic rocks in the Victorville region, California: *Geol. Soc. Amer. Bull.*, Part I, v. 92, p. 164-169.
58. Moore, J. G., and Dodge, F. C. W. (1980) Late Cenozoic volcanic rocks of the southern Sierra Nevada, California—I. Geology and petrology—summary: *Geol. Soc. Amer. Bull.*, Part II, v. 91, p. 1995-2038.
59. Morrissey, A. M. (1980) Apatite fission track ages from six intrusive porphyries, Park City mining district, Utah: *GSA Abst. with Programs*, v. 12, p. 252.
60. Morton, J. P., and Long, L. E. (1980) Rb-Sr dating of Paleozoic glauconite from the Llano region, central Texas: *Geochimica et Cosmochimica Acta*, v. 44, p. 663-672.
61. Mose, D., Cohen, S., and Glover, L. (1980) Rb-Sr whole-rock age of the Occoquan pluton and Fluvanna County pluton in northern Virginia: *GSA Abst. with Programs*, v. 12, p. 202.
62. Mose, D. G., and Eckelmann, F. D. (1980) Age determination and zircon morphology of the Fordham Gneiss in the Appalachians of southeastern New York: *GSA Abst. with Programs*, v. 12, p. 488.
63. Mose, D. G., and Metzger, W. J. (1980) Whole rock Rb-Sr age determinations of volcanic and plutonic rocks from Mt. Desert Island Maine and vicinity: *GSA Abst. with Programs*, v. 12, p. 74.

64. Mukasa, S. B., Sutter, J. F., and Ratcliffe, N. M. (1980) Comparative metamorphic and tectonic history of the Berkshire Massif, NW Massachusetts and the Green Mountains, SW Vermont: *GSA Abst. with Programs*, v. 12, p. 74.
65. Naeser, C. W., Cunningham, C. G., Marvin, R. F., and Obradovich, J. D. (1980) Pliocene intrusive rocks and mineralization near Rico, Colorado: *Economic Geology*, v. 75, p. 122-133.
66. Norman, D. I., and Landis, G. P. (1980) Source of mineralizing components in hydrothermal ore fluids as evidenced by $^{87}\text{Sr}/^{86}\text{Sr}$ and stable isotope data from the Pasto Bueno deposit, Peru: *GSA Abst. with Programs*, v. 12, p. 493.
67. Nunes, P. D., and Thurston, P. C. (1980) Two hundred and twenty million years of Archean evolution—a zircon U-Pb age stratigraphic study of the Uchi-Confederation Lakes greenstone belt, northwestern Ontario: *Canadian Jour. Earth Sci.*, v. 17, p. 710-721.
68. Olszewski, W. J., Jr. (1980) The geochronology of some stratified metamorphic rocks in northeastern Massachusetts: *Canadian Jour. Earth Sci.*, v. 17, p. 1407-1416.
69. Olszewski, W. J., Jr. and Gaudette, H. E. (1980) Geochronology of the basement rocks, southern Amazonas Territory, Venezuela: *GSA Abst. with Programs*, v. 12, p. 494.
70. Olszewski, W. J., Jr., Gaudette, H. E., and Poole, W. H. (1980) Rb-Sr whole rock and U-Pb zircon ages from the Greenhead Group, New Brunswick: *GSA Abst. with Programs*, v. 12, p. 76.
71. Pignolet, S., Grant, N. K., and Hickman, M. H. (1980) Rb-Sr geochronology of the Honey Hill fault area, eastern Connecticut: *GSA Abst. with Programs*, v. 12, p. 77.
72. Ray, G. E., and Wanless, R. K. (1980) The age and geological history of the Wollaston, Peter Lake, and Rottenstone domains in northern Saskatchewan: *Canadian Jour. Earth Sci.*, v. 17, p. 333-347.
73. Ritzma, H. R. (1980) Diorite dike, eastern Uinta Mountains, Daggett and Duchesne Counties, Utah: *GSA Abst. with Programs*, v. 12, p. 302.
74. Rowlands, D. (1980) Age of slaty cleavage in the Martinsburg Formation—evidence from the Beemerville area, northwestern New Jersey: *GSA Abst. with Programs*, v. 12, p. 512.
75. Ruiz, J., Kesler, S. E., Jones, L. M., and Sutter, J. F. (1980) Geology and geochemistry of the Las Cuevas fluorite deposit, San Luis Potosi, Mexico: *Economic Geology*, v. 75, p. 1200-1209.
76. Sachs, H. M., Denking, M., Crough, S. T., Bennett, C., and Harris, A. G. (1980) Conodonts can yield radiometric age determinations: *GSA Abst. with Programs*, v. 12, p. 514.
77. Saleeby, J., and Sharp, W. (1980) Chronology of the structural and petrologic development of the southwest Sierra Nevada foothills, California—a summary: *Geol. Sci. Amer. Bull.*, Part I, v. 91, p. 317-320.
78. Schweickert, R. A., Armstrong, R. L., and Harakal, J. E. (1980) Lawsonite blueschist in the northern Sierra Nevada, California: *Geology*, v. 8, p. 27-31.
79. Shackelford, T. J. (1980) Tertiary tectonic denudation of a Mesozoic-early Tertiary(?) gneiss complex, Rawhide Mountains, western Arizona: *Geology*, v. 8, p. 190-194.
80. Sinclair, A. J., Tessari, O. J., and Harakal, J. E. (1980) Age of Ag-Pb-Zn mineralization, Keno Hill—Galena Hill area, Yukon Territory: *Canadian Jour. Earth Sci.*, v. 17, p. 1100-1103.
81. Snoke, A. W., Kish, S. A., and Secor, D. T., Jr. (1980) Deformed Hercynian granitic rocks from the piedmont of South Carolina: *Amer. Jour. Sci.*, v. 280, p. 1018-1034.
82. Speed, R. C., and Kistler, R. W. (1980) Cretaceous volcanism, Excelsior Mountains, Nevada: *Geol. Soc. Amer. Bull.*, Part I, v. 91, p. 392-398.
83. Sutter, J. F., Crawford, M. L., and Crawford, W. A. (1980) $^{40}\text{Ar}/^{39}\text{Ar}$ age spectra of coexisting hornblende and biotite from the Piedmont of SE Pennsylvania: *GSA Abst. with Programs*, v. 12, p. 85.
84. Szabo, B. J. (1980) Extreme $^{234}\text{U}/^{238}\text{U}$ and $^{230}\text{Th}/^{234}\text{U}$ activity ratios in Missouri groundwaters and spring deposit—dating organic sand samples and fossil bones by the uranium-series methods: *GSA Abst. with Programs*, v. 12, p. 532.
85. Taylor, P. N., Moorbath, S., Goodwin, R., and Petrykowski, A. C. (1980) Crustal contamination as an indicator of the extent of early Archean continental crust—Pb isotopic evidence from the late Archean gneisses of West Greenland: *Geochimica et Cosmochimica Acta*, v. 44, p. 1437-1453.
86. Tempelman-Kluit, D., and Wanless, R. K. (1980) Zircon ages for the Pelly Gneiss and Klotassin granodiorite in western Yukon: *Canadian Jour. Earth Sci.*, v. 17, p. 297-306.
87. Turner, B. B., Mose, D. G., and Nagel, S. (1980) Pre-Grenville rocks of the Adirondack Mountains, New York: *GSA Abst. with Programs*, v. 12, p. 538.
88. Turner, D. L., Triplehorn, D. M., Naeser, C. W., and Wolfe, J. A. (1980) Radiometric dating of ash partings in Alaskan coal beds and upper Tertiary paleobotanical stages: *Geology*, v. 8, p. 92-96.
89. VanSchmus, W. R., and Bouring, S. A. (1980) Chronology of igneous events in the Wopmay Orogen, Northwest Territories, Canada: *GSA Abst. with Programs*, v. 12, p. 540.
90. Verpaest, P., Brooks, C., and Franconi, A. (1980) The 2.5 Ga Duxbury massif, Quebec—a remobilized piece of pre-3.0 Ga sialic basement(?): *Canadian Jour. Earth Sci.*, v. 17, p. 1-18.
91. Walker, N. W., and Mattinson, J. M. (1980) The Canyon Mountain Complex, Oregon—U-Pb ages of zircons and possible tectonic correlations: *GSA Abst. with Programs*, v. 12, p. 544.
92. Wedemeyer, R. C., and Spruill, R. K. (1980) Geochemistry and geochronology of the Sims Granite, eastern Carolina slate belt, North Carolina: *GSA Abst. with Programs*, v. 12, p. 211.
93. Whalen, J. B. (1980) Geology and geochemistry of the molybdenite showings of the Ackley City batholith, southeast Newfoundland: *Canadian Jour. Earth Sci.*, v. 17, p. 1246-1258.
94. Williams, I. S., Silver, L. T. (1980) U-Th-Pb/RAD isotopic studies in six cogenetic mineral species from a uraniumiferous Precambrian granite: *GSA Abst. with Programs*, v. 12, p. 549.
95. Wintsch, R. P., and Grant, K. K. (1980) Major element, rare earth element and Sr isotope geochemistry of "Monson Gneisses", eastern Connecticut: *GSA Abst. with Programs*, v. 12, p. 89.
96. Wooden, J. L., and Goodwin, A. M. (1980) A Rb-Sr isotopic study of the Archean rocks of the eastern Lac Seul region, English River subprovince, northwestern Ontario: *Canadian Jour. Earth Sci.*, v. 17, p. 569-576.
97. Wright, J. E., and Seiders, V. M. (1980) Age of zircon from volcanic rocks of the central North Carolina Piedmont and tectonic implications for the Carolina volcanic slate belt: *Geol. Soc. Amer. Bull.*, Part I, v. 91, p. 287-294.
98. Zielinski, R. A. (1980) Uranium in secondary silica—a possible exploration guide: *Economic Geology*, v. 75, p. 592-602.

