Summary of radiometric ages of Washington rocks supplement 1: July 1972 through December 1976

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SUMMARY OF RADIOMETRIC AGES OF WASHINGTON ROCKS — SUPPLEMENT 1: JULY 1972 THROUGH DECEMBER 1976

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This paper summarizes information on 251 radiometric ages of diverse rocks in Washington, compiled from published and unpublished sources as a supplement to our earlier paper (Laursen and Hammond, 1974) in Isochron/West. Some dates here are corrections and additions to the earlier summary. Analytical methods include K-Ar, Pb-alpha, U-Pb, Pb^{207}/U^{235}, Pb^{208}/Th^{232}, Pb^{206}/U^{238}, and Rb/Sr. The list includes anomalous and discordant ages. We acknowledge R. L. Armstrong for his recommendations in the format for preparation of this summary.

The dates are grouped into geologic provinces and their subdivisions (fig. 1), and listed in order of province from oldest to youngest. No dates are reported from the Puget Sound Lowland, Willamette Valley, and the Yakima Fold Ridges of the Columbia Plateau. When a rock unit has two or more ages, the oldest age is listed first, followed by decreasing ages in order for the same unit. Replicate dates on the same unit appearing in more than one report are also included.

Each description includes reference source, sample number where supplied by reference, analytical method, rock unit, and location, if such data were available. Analytical methods and constants are keyed to letters, identified in the first table. Locations can be easily spotted on topographic quadrangles of the U.S. Geological Survey.

CODES FOR METHODS AND CONSTANTS

Methods:

a. K – atomic absorption
b. K – atomic absorption done in duplicate
c. K – using a modal 303 Perkin-Elmer atomic absorption spectrometer with a Na-Li alkali buffer
d. K – using a flame photometer
e. K – using a flame photometer with a lithium internal standard
f. K – using Techtron AA4 spectrophotometer
g. K – using Instrumentation Laboratories flame photometer with a lithium internal standard
h. K – using Baird and Instrumentation Laboratories flame photometer with a lithium internal standard
i. K – X-ray fluorescence
j. K – Armstrong (1970)
k. Ar – standard isotope dilution techniques
l. Ar – using AE 1 MS-10 mass spectrometer
m. Ar – using a Nier-type 6-inch 60° mass spectrometer
n. Ar – using bulb tracer system and a Reynolds-type mass spectrometer
o. Ar – Armstrong (1970)
p. Ar – Baksi and Watkins (1973)
q. Ar – Dalrymple and Lanphere (1969)
r. Sr – isotopic compositions measured on an automated 60°-sector 12-inch-radius solid mass spectrometer
s. Rb/Sr ratios determined by X-ray fluorescence
t. sample concentrated by fractionation with heavy liquids

Constants:

a. $\lambda_\beta = 4.72 \times 10^{-10} yr^{-1}$
b. $\lambda_\epsilon = 0.584 \times 10^{-10} yr^{-1}$
c. $\lambda_\epsilon = 0.585 \times 10^{-10} yr^{-1}$
d. $K^{40} = 0.0119$ atom percent
e. $K^{40}/K_{total} = 1.22 \times 10^{-4}$ gm/gm
f. $\lambda = 1.42$
g. $U^{238}\lambda = 0.155125 \times 10^{-9} yr$
h. $U^{235}\lambda = 0.984850 \times 10^{-9} yr$
i. $Th^{232}\lambda = 0.049475 \times 10^{-9} yr$
j. atomic ratio $U^{238}/U^{235} = 137.88$

SAMPLE DESCRIPTIONS

Ia. OLYMPIC MOUNTAINS

1a. *Cady and others (1966)* K-Ar
Crescent Formation, diorite xenoclasts in lavas and mudflow breccias believed to be from the Mesozoic metamorphic and granitic terrain of Northern Cascade Mountains of Washington and Coast Mountains of British Columbia.

65±2.5 m.y.

1b. *Engels and others (1976)* K-Ar
TC-65-627-A1
Crescent Formation, diorite (47°50.0'N, 123°4.9'W; Tyler Peak 15' quad., Jefferson Co., WA). *Analyzer:* Obradovich. *Analytical data:* K = .47%; $^*Ar^{40}$ = .3759 x 10^{-10} moles/gm (Ar_{rad} = 47%) *Note:* xenoclast in lava. Date in Cady and others (1966) incorrect.

(hornblende) 53.4±2.6 m.y.

2. *Engels and others (1976)* K-Ar
RWT 66-72 & RWT 66AB-72
Lyre Formation, andesite boulder interbed in conglomerate (47°55.2'N, 123°00.4'W; Tyler Peak 15' quad., Clallam Co., WA). *Analyzer:* Tabor. *Analytical data:* (RWT 66-72) K_2O = .200, .197, .202, .203%; $^*Ar^{40}$ = .1499, .1256, .1109 x 10^{-10} moles/gm (Ar_{rad} = 32.7, 27.3, 24.1%) mesh size 150-375; (RWT 66AB-72) K_2O = .191, .186%; $^*Ar^{40}$ = .09966 x 10^{-10} moles/gm (Ar_{rad} = 19.0%) mesh size 200-325.

(hornblende) 41.0±6.9 m.y.
(hornblende) 35.5±1.3 m.y.

Ib. COAST RANGE

1. *Snavely and others (1973)* K-Ar
R. E. Denison (written commun., 1971)
Pack Sack basalt (46°44.9'N, 123°33.6'W; Pack Sack Lookout area; Raymond 15' quad., Pacific Co., WA). *Analyzer:* Denison, Mobil Research and Development Corp.

9.0±1.4 m.y.

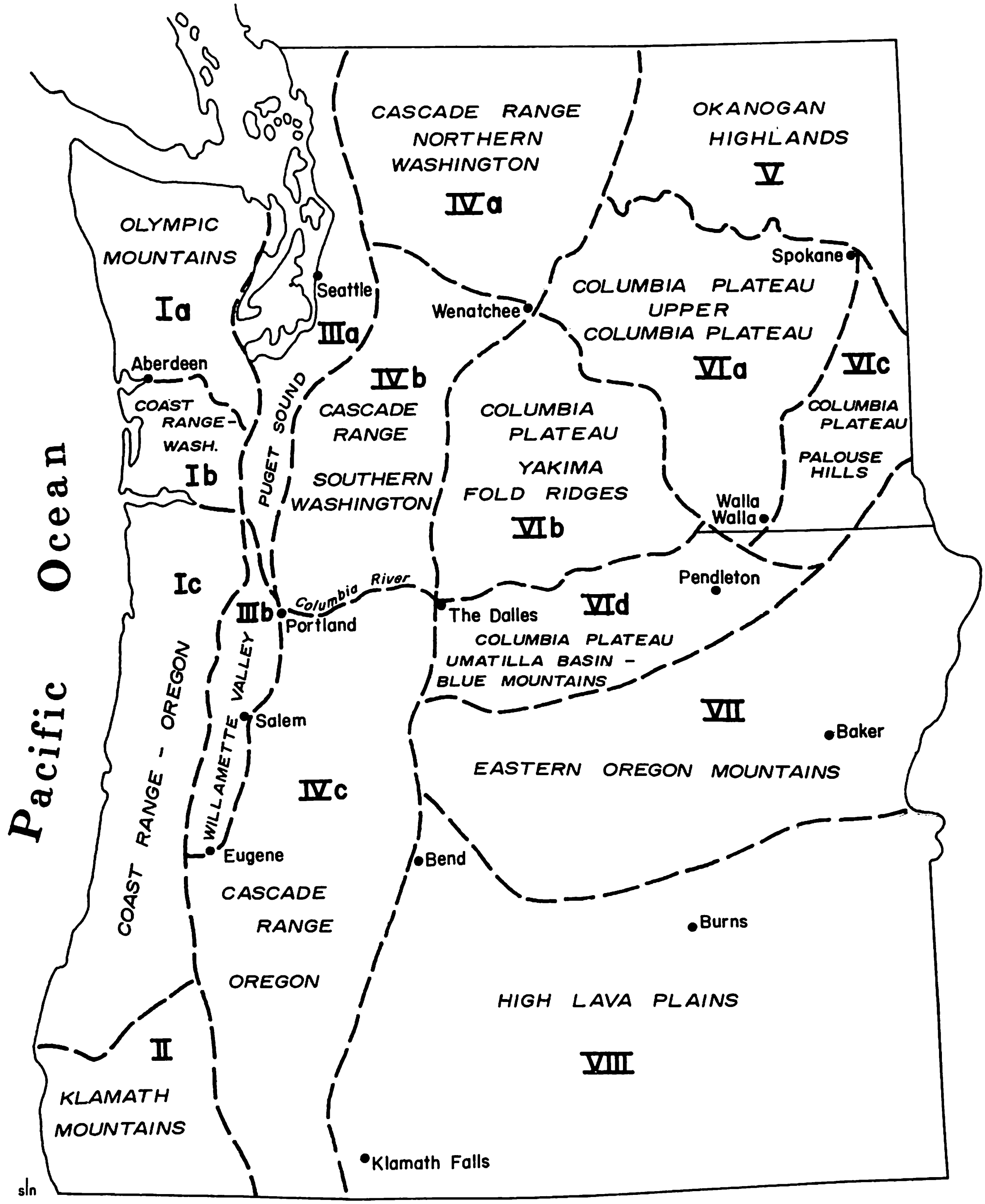

FIGURE 1. Geologic provinces of Oregon and Washington.

IVa. NORTHERN CASCADE RANGE

1. *Engels and others (1976)* Pb-alpha
DFC 179-60
Swakane biotite gneiss (48°12.8'N, 120°58.2'W; Holden 15' quad., Snohomish Co., WA). *Analyzer:* Stern. *Analytical data:* 261 d/mg/hr; Pb = 35 ppm. *Note:* K-Ar date of 20.4±2.0 m.y. for the same sample reported in Tabor and Crowder (1969) [Laursen and Hammond (1974) p. 18, IVa. 76].
(zircon) 320±40 m.y.

2. *Engels and others (1976)* Pb-alpha
Cater and Crowder (1967)
DCF If-60
Swakane biotite gneiss (48°07.9'N, 120°54.0'W; Holden 15' quad., Chelan Co., WA). *Analyzer:* Stern. *Analytical data:* 176 d/mg/hr; Pb = 21.5 ppm. *Note:* detrital(?) zircon. Same as IVa. 43.
(zircon) 300±40 m.y.

3. *Misch (1963)* K-Ar
Misch (1964)
PM 24
Shuksan metamorphic suite, greenschist, crossite schist (48°47'N, 121°58'W; E ridge Goat Mountain North Summit; Mt. Baker 15' quad., Whatcom Co., WA).
(whole rock) 259±8 m.y.

4. *Misch (1963)* K-Ar
PM 9
Shuksan metamorphic suite, greenschist, crossite schist (Finney Cr. S side lower Skagit River; Hamilton 15' quad., Skagit Co., WA). *Analyzer:* Geochron Lab. *Note:* from western part of Shuksan thrust plate, far from any exposed granitic intrusives.
(crossite) 218±40 m.y.

5. *Engels (1971)* K-Ar
L-618
Similkameen batholith, granodiorite (48°58.4'N, 119° 39.4'W; Loomis 15' quad., Okanogan Co., WA). *Analyzer:* K – Schlocker. *Note:* date corrected for cross-contamination of mineral separates.
(hornblende) 177.2±5.3 m.y.
(biotite) 70.9±2.1 m.y.

6. *Engels (1971)* K-Ar
L-301
Kruger Alkalic Complex, shonkinite (48°59.4'N, 119°32.9'W; Loomis 15' quad., Okanogan Co., WA).
(hornblende, hastingite) 170.9±5.1 m.y.
(biotite) 69.9±2.1 m.y.

7. *Fox and others (1975)* K-Ar
L-277Y
Kruger Alkalic Complex, hornfelsed Kobau Formation at contact with alkalic complex (48°59.3'N, 119° 33.4'W; Loomis 15' quad., Okanogan Co., WA). *Analyzer:* K – Schlocker. *Analytical data:* (hornblende) K = 1.28, 1.29%; $^*Ar^{40}$ = 3.988 x 10^{-10} moles/gm (Ar_{rad} = 93.8%); (biotite) K = 7.63, 7.65%; $^*Ar^{40}$ = 1.038 x 10^{-9} moles/gm (Ar_{rad} = 92%). *Method:* g, m. *Constants:* a, c, d.
(hornblende) 166.7±5.0 m.y.
(biotite) 74.8±2.2 m.y.

8. *Engels and others (1976)* K-Ar
L-620R
Ellemeham Formation, fenitized greenstone (48° 57.8'N, 119°31.1'W; Loomis 15' quad., Okanogan Co., WA). *Analyzer:* Engels. *Analytical data:* K_2O = 8.40, 8.36%; $^*Ar^{40}$ = 20.32 x 10^{-10} moles/gm (Ar_{rad} = 96.5%).
(biotite) 157.4±4.7 m.y.

9. *Fox and others (1975)* K-Ar
L-589C
Similkameen batholith, granodiorite (48°59.1'N, 119° 32.9'W; Loomis 15' quad., Okanogan Co., WA). *Analyzer:* K – Schlocker. *Analytical data:* (hornblende) K = .98, .99%; $^*Ar^{40}$ = 2.843 x 10^{-10} moles/gm (Ar_{rad} = 88.8%); (biotite) K = 6.71, 6.72%; $^*Ar^{40}$ = 1.020 x 10^{-9} moles/gm (Ar_{rad} = 92.6%). *Method:* g, k, m,. *Constants:* a, c, d.
(hornblende) 155.5±4.7 m.y.
(biotite) 83.4±2.5 m.y.

10. *Rinehart and Fox (1976)* K-Ar
C-246-D
Blue Goat pluton, granodiorite (48°37.9'N, 119° 42.4'W; Conconcully 15' quad., Okanogan Co., WA). *Analyzer:* Engels. *Analytical data:* (hornblende) K_2O = 1.1895%; $^*Ar^{40}$ = 2.586 x 10^{-10} moles/gm (Ar_{rad} = 83.2%); (biotite) K = 8.35%; $^*Ar^{40}$ = 1.253 x 10^{-9} moles/gm (Ar_{rad} = 88.8%).
(hornblende) 141.6±8.2 m.y.
(biotite) 98.9±3.0 m.y.

11. *Fox and others (1975)* K-Ar
L-277Z
Kruger Alkalic Complex, biotite pyroxenite (48° 59.4'N, 119°33.2'W; Loomis 15' quad., Okanogan Co., WA). *Analyzer:* K – Schlocker. *Analytical data:* K = 7.87, 7.87%; $^*Ar^{40}$ = 2.050 x 10^{-9} moles/gm (Ar_{rad} = 89.3%). *Method:* g, k, m. *Constants:* a, c, d.
(biotite) 140.9±4.2 m.y.

12. *Fox and others (1975)* K-Ar
L-277W
Kruger Alkalic Complex, pegmatite-alaskite dike, cuts pyroxenite (48°59.9'N, 119°33.3'W; Loomis 15' quad., Okanogan Co., WA). *Analyzer:* K – Schlocker. *Analytical data:* K = 8.47, 8.55%; $^*Ar^{40}$ = 2.132, 2.130 x 10^{-9} moles/gm (Ar_{rad} = 96.9, 93.8%). *Method:* g, k, m. *Constants:* a, c, d.
(muscovite) 135.7±4.1 m.y.

13. *Engels and others (1976)* K-Ar
L-451C
Anderson Creek pluton, granodiorite (48°55.6'N, 119°40.7'W; Loomis 15' quad., Okanogan Co., WA). *Analyzer:* Engels. *Analytical data:* (hornblende) K_2O = .701, .686%; $*Ar^{40}$ = 1.221, 1.225 x 10^{-10} moles/gm (Ar_{rad} = 80.4, 77.6%); (biotite) K_2O = 8.26, 8.32%; $*Ar^{40}$ = 12.59 x 10^{-10} moles/gm (Ar_{rad} = 94.2%).

(hornblende) 115.6±3.0 m.y.
(biotite) 100.1±3.0 m.y.

14. *Misch (1963)* K-Ar
Misch (1964)
PM 16
Goat Mountain phyllite = Darrington phyllite, graphitic sericite-quartz phyllite (48°49'N, 121°56'W; S side Lookout Mountain; Mt. Baker 15' quad., Whatcom Co., WA). *Note:* age appears to represent post-crystalline deformation associated with emplacement of Shuksan thrust plate.

(whole rock) 113±3 m.y.

15. *Berry and others (1976)* K-Ar
T-155
Gneissic trondhjemite of Tiffany Mountain, (48° 35.8'N, 120°4.5'W; Doe Mtn. 15' quad., Okanogan Co., WA). *Analytical data:* (biotite) K_2O = 9.37, 9.41%; $*Ar^{40}$ = 1.543 x 10^{-9} moles/gm (Ar_{rad} = 93%); (muscovite) K_2O = 10.71, 10.78%; $*Ar^{40}$ = 1.540 x 10^{-9} moles/gm (Ar_{rad} = 67%). *Note:* probably same as unnamed trondhjemitic gneiss (samples OK-3 and OK-6) in Menzer (1970) [Laursen and Hammond (1974) p. 14, IVa. 43 and 41].

(biotite) 108±3 m.y.
(muscovite) 94.6±2.8 m.y.

16. *Misch (1963)* K-Ar
Misch (1964)
PM 17
Goat Mountain phyllite = Darrington phyllite (48° 45'N, 122°03'W; short distance SE below Nooksack Lookout, N above Johnson Pass; Van Zandt 15' quad., Whatcom Co., WA). *Note:* age appears to represent post-crystalline deformation associated with emplacement of Shuksan thrust plate.

(whole rock) 108±4 m.y.

17. *Misch (1963)* K-Ar
Misch (1964)
PM 18
Goat Mountain phyllite = Darrington phyllite (48° 42.5'N, 122°12.6'W; Baker road directly S of Acme, 4.9 road mi N Skagit-Whatcom Co. line; Wickersham 15' quad., Whatcom Co., WA). *Note:* age appears to represent post-crystalline deformation associated with emplacement of Shuksan thrust plate.

(whole rock) 105±3 m.y.

18. *Berry and others (1976)* K-Ar
T-152
Old Baldy pluton, porphyritic granodiorite (48°36.7'N, 119°56.8'W; Tiffany Mtn. 15' quad., Okanogan Co., WA). *Analytical data:* (hornblende) K_2O = 1.265, 1.254%; $*Ar^{40}$ = 1.882 x 10^{-10} moles/gm (Ar_{rad} = 83%); (biotite) K_2O = 9.06, 9.06%; $*Ar^{40}$ = 1.236 x 10^{-9} (Ar_{rad} = 94%). *Note:* probably the same unnamed granodiorite gneiss (sample OK-5) in Menzer (1970) [Laursen and Hammond (1974) p. 16, IVa. 54].

(hornblende) 98.5±3.0 m.y.
(biotite) 90.1±2.7 m.y.

19. *Berry and others (1976)* K-Ar
H-1
Cathedral pluton, quartz monzonite (48°52.3'N, 120° 01.0'W; Coleman Peak 7½' quad., Okanogan Co., WA). *Analytical data:* K_2O = 8.88, 8.87%; $*Ar^{40}$ = 1.316 x 10^{-9} moles/gm (Ar_{rad} = 90%).

(biotite) 97.7±2.9 m.y.

20. *Berry and others (1976)* K-Ar
T-153
Gneissic trondhjemite of Tiffany Mountain (48°39.8'N, 119°57.9'W; Tiffany Mtn. 15' quad., Okanogan Co., WA). *Analytical data:* (hornblende) K_2O = .580, .576%; $*Ar^{40}$ = 8.196 x 10^{-11} moles/gm (Ar_{rad} = 51%); (biotite) K_2O = 9.01, 9.00%; $*Ar^{40}$ = 1.206 x 10^{-9} moles/gm (Ar_{rad} = 93%). *Note:* probably same as unnamed trondhjemitic gneiss (samples OK-3 and OK-6) in Menzer (1970) [Laursen and Hammond (1974) p. 14, IVa. 43 & 41].

(hornblende) 93.5±2.8 m.y.
(biotite) 88.5±2.7 m.y.

21. *Rinehart and Fox (1976)* K-Ar
C-139
Aeneas Creek pluton, quartz monzonite (48°43.0'N, 119°35.4'W; Conconcully 15' quad., Okanogan Co., WA). *Analyzer:* Engels. *Analytical data:* K_2O = 9.065%; $*Ar^{40}$ = 1.273 x 10^{-9} moles/gm (Ar_{rad} = 89.6%).

(biotite) 92.7±6.6 m.y.

22. *Berry and others (1976)* K-Ar
T-154
Gneissic trondhjemite of Tiffany Mountain (48° 29.5'N, 119°56.4'W; Loup Loup 15' quad., Okanogan Co., WA). *Analytical data:* (biotite) K_2O = 9.34, 9.30%; $*Ar^{40}$ = 1.295 x 10^{-9} moles/gm (Ar_{rad} = 94%); (muscovite) K_2O = 10.26, 10.34%; $*Ar^{40}$ = 1.379 x 10^{-9} moles/gm (Ar_{rad} = 77%). *Note:* probably same as unnamed trondhjemitic gneiss (samples OK-3 and OK-6) in Menzer (1970) [Laursen and Hammond (1974) p. 14, IVa. 43 & 41].

(biotite) 91.7±2.7 m.y.
(muscovite) 88.5±2.8 m.y.

23. *Engels and others (1976)* K-Ar
JE 16-67

Ten Peak pluton, gneissic quartz diorite (47°57.2'N, 120°56.2'W; Wenatchee Lake 15' quad., Chelan Co., WA). *Analyzer:* Engels. *Analytical data:* (hornblende) K_2O = .857, .862%; $*Ar^{40}$ = 1.177 x 10^{-10} moles/gm (Ar_{rad} = 56%); mesh 140-200; (biotite) K_2O = 9.42, 9.45%; $*Ar^{40}$ = 10.71 x 10^{-10} moles/gm (Ar_{rad} = 87%); mesh 60-100.

(hornblende) 90.5±3.1 m.y.
(biotite) 75.4±2.4 m.y.

24. *Rinehart and Fox (1976)* K-Ar
C-554
Evans Lake pluton, granodiorite (48°29.7'N, 119° 36.3'W; Okanogan 15' quad., Okanogan Co., WA). *Analyzer:* Engels. *Analytical data:* K_2O = 8.55%; $*Ar^{40}$ = 1.188 x 10^{-9} moles/gm (Ar_{rad} = 78.6%).

(biotite) 88.7±2.8 m.y.

25. *Engels and others (1976)* K-Ar
68-10
Dumbbell pluton, quartz diorite gneiss (48°09.4'N, 120°51.2'W; Holden 15' quad., Chelan Co., WA). *Analyzer:* Engels. *Analytical data:* K_2O = .803, .797%; $*Ar^{40}$ = 1.068 x 10^{-10} moles/gm (Ar_{rad} = 80%); mesh 140-200. *Note:* metamorphic event(?). Pb^{207}/Pb^{206} ages of 216-278 m.y. for same sample in Mattinson (1972) [Laursen and Hammond (1974) p. 10, IVa. 10].

(hornblende) 88.3±3.3 m.y.

26. *Engels and others (1976)* K-Ar
JE 15–67
Ten Peak pluton, gneissic quartz diorite (48°01.2'N, 120°58.6'W; Holden 15' quad., Chelan Co., WA). *Analyzer:* Engels. *Analytical data:* (hornblende) K_2O = 1.003, 1.003%; $*Ar^{40}$ = 1.338 x 10^{-10} moles/gm (Ar_{rad} = 82%); mesh 100-140; (muscovite) K_2O = 8.21, 8.32%; $*Ar^{40}$ = 8.757 x 10^{-10} moles/gm (Ar_{rad} = 61%); (biotite) K_2O = 8.85, 8.94%; $*Ar^{40}$ = 9.379 x 10^{-10} moles/gm (Ar_{rad} = 82%); mesh 35-140.

(hornblende) 88.2±3.2 m.y.
(muscovite) 70.4±3.4 m.y.
(biotite) 70.1±2.2 m.y.

27. *Engels and others (1976)* K-Ar
DFC 60-62
Ten Peak pluton, quartz diorite gneiss (48°02.9'N, 121°01.6'W; Glacier Peak 15' quad., Chelan Co., WA). *Analyzer:* Engels. *Analytical data:* (hornblende) K_2O = .922, .937%; $*Ar^{40}$ = 1.156 x 10^{-10} moles/gm (Ar_{rad} = 85%); mesh 80-120; (muscovite) K_2O = 8.26, 8.35%; $*Ar^{40}$ = 8.759 x 10^{-10} moles/gm (Ar_{rad} = 89%); mesh 40-115; (biotite) K_2O = 8.68, 8.71%; $*Ar^{40}$ = 8.628 x 10^{-10} moles/gm (Ar_{rad} = 91%); mesh 40-100.

(hornblende) 82.4±2.5 m.y.
(muscovite) 70.1±2.1 m.y.
(biotite) 66.0±2.0 m.y.

28. *Engels and others (1976)* K-Ar
C-724-1
Chelan Complex, quartz diorite (47°50.4'N, 120° 12.2'W; Winesap 7½' quad., Chelan Co., WA). *Analyzer:* Engels. *Analytical data:* (hornblende) K_2O = .909, .910%; $*Ar^{40}$ = 1.128 x 10^{-10} moles/gm (Ar_{rad} = 82%); mesh 20-42; (biotite) K_2O = 7.14, 7.17%; $*Ar^{40}$ = 6.454 x 10^{-10} moles/gm (Ar_{rad} = 92%); mesh 42-60.

(hornblende) 82.2±2.5 m.y.
(biotite) 60.1±2.0 m.y.

29. *Berry and others (1976)* K-Ar
T-156
Conconcully pluton, locally seriate porphyritic granodiorite (48°35.7'N, 119°52.1'W; Tiffany Mtn. 15' quad., Okanogan Co., WA). *Analytical data:* (hornblende) K_2O = .561, .567%; $*Ar^{40}$ = 6.914 x 10^{-11} moles/gm (Ar_{rad} = 61%); (biotite) K_2O = 9.16, 9.16%; $*Ar^{40}$ = 1.089 x 10^{-9} moles/gm (Ar_{rad} = 90%). *Note:* probably same as unnamed granodiorite and quartz monzonite (samples OK-1 and OK-4) in Menzer (1970) [Laursen and Hammond (1974) p. 14, IVa. 42 & 38].

(hornblende) 81.2±2.4 m.y.
(biotite) 78.8±2.4 m.y.

30. *Engels and others (1976)* K-Ar
DFC 86-60
Foam Creek stock, granodiorite (48°02.7'N, 121° 06.5'W; Glacier Peak 15' quad., Chelan Co., WA). *Analyzer:* Engels. *Analytical data:* (muscovite) K_2O = 9.98, 9.98%; $*Ar^{40}$ = 11.39 x 10^{-10} moles/gm (Ar_{rad} = 92%); mesh 40-200; (biotite) K_2O = 7.49, 7.52%; $*Ar^{40}$ = 7.837 x 10^{-10} moles/gm (Ar_{rad} = 89%); mesh ~35-200.

(muscovite) 75.7±2.1 m.y.
(biotite) 69.4±2.1 m.y.

31. *Misch (1964)* K-Ar
PM 26
Black Peak batholith, quartz diorite.

(biotite) 73±2 m.y.

32. *Rinehart and Fox (1976)* K-Ar
Engels and others (1976)
C-555
Conconcully pluton, quartz monzonite (W of Salmon Creek; 48°32.2'N, 119°46.5'W; Conconcully 15' quad., Okanogan Co., WA). *Analyzer:* Engels. *Analytical data:* (hornblende) K_2O = .5885%; $*Ar^{40}$ = 6.45 x 10^{-10} moles/gm (Ar_{rad} = 45%); (biotite) K_2O = 9.105%; $*Ar^{40}$ = 8.537 x 10^{-10} moles/gm (Ar_{rad} = 71.5%). *Note:* same as Loup Loup granodiorite (Menzer, 1965).

(hornblende) 72.7±4.6 m.y.
(biotite) 62.4±2.2 m.y.

33. *Engels and others (1976)* K-Ar
DFC 285-62
Sulfur Mountain pluton, quartz diorite (48°14.8'N, 121°06.8'W; Glacier Peak 15' quad., Snohomish Co.,

WA). *Analyzer:* Engels. *Analytical data:* (hornblende) K_2O = 1.40, 1.42%; $*Ar^{40}$ = 1.493 x 10^{-10} moles/gm (Ar_{rad} = 79%); (biotite) K_2O = 8.82, 8.83%; $*Ar^{40}$ = 7.639 x 10^{-10} moles/gm (Ar_{rad} = 93%); mesh 60-120.

(hornblende) 70.4±2.1 m.y.
(biotite) 57.7±1.7 m.y.

34. *Engels and others (1976)* K-Ar
C-679-1
Chelan Complex, quartz diorite (47°46.6'N, 120° 08.7'W; Winesap 7½ quad., Chelan Co., WA). *Analyzer:* Engels. *Analytical data:* K_2O = .779, .782%; $*Ar^{40}$ = .7949 x 10^{-10} moles/gm (Ar_{rad} = 82%); mesh 60-100.

(hornblende) 67.7±2.0 m.y.

35. *Engels and others (1976)* K-Ar
C-677-1
Entiate pluton, quartz diorite (47°42.8'N, 120°13.2'W; Ribbon Cliffs; Entiate 7½ quad., Chelan Co., WA). *Analyzer:* Engels. *Analytical data:* (hornblende) K_2O = .950, .945%; $*Ar^{40}$ = .9205 x 10^{-10} moles/gm (Ar_{rad} = 84%); mesh 60-115; (biotite) K_2O = 7.49, 7.61%; $*Ar^{40}$ = 6.936 x 10^{-10} moles/gm (Ar_{rad} = 92%) mesh 60-115.

(hornblende) 64.3±1.9 m.y.
(biotite) 61.2±1.8 m.y.

36. *Engels (1975)* K-Ar
DFC 1g-60
Leroy Creek pluton, quartz diorite (48°07.4'N, 120° 48.6'W; Holden 15' quad., Chelan Co., WA). *Analyzer:* Engels. *Analytical data:* (muscovite) K_2O = 9.28, 9.38%; $*Ar^{40}$ = 7.647 x 10^{-10} moles/gm (Ar_{rad} = 91%); mesh 150-200; (biotite) K_2O = 8.58, 8.64%; $*Ar^{40}$ = 5.817 x 10^{-10} moles/gm (Ar_{rad} = 94%); mesh 70-120.

(muscovite) 54.8±1.5 m.y.
(biotite) 45.2±1.5 m.y.

37a. *Misch (1963)* K-Ar
Misch (1964)
PM 6
Chilliwack composite batholith, main phase diorite (48°38'N, 121°19'W; SE of Skagit River one mi E of locality of PM 4; Lake Shannon 15' quad., Skagit Co., WA). *Note:* rerun of PM 6 Misch (1963) [IVa. 37, this paper].

(hornblende) 50±1 m.y.
(biotite) 39±1 m.y.

37b. *Misch (1963)* K-Ar
PM 6
Chilliwack composite batholith, main phase diorite (48°38'N, 121°19'W; SE of Skagit River one mi E of locality PM 4; Lake Shannon 15' quad., Skagit Co., WA). *Analyzer:* Kulp.

(biotite) 49 m.y.

38. *Misch (1963)* K-Ar
Misch (1964)
PM 15
Golden Horn batholith, granodiorite (SE ridge Mt. Hardy, W of Methow Pass).

(biotite) 48±2 m.y.

39. *Misch (1963)* K-Ar
PM 3
Skagit metamorphic suite, Cascade River schist, (Skagit River between Bacon Creek and Damnation Creek; Marblemount 15' quad., Skagit Co., WA). *Analyzer:* Kulp. *Note:* age contradicts geological age of Skagit metamorphism and is interpreted as due to reheating by Tertiary intrusions.

(biotite) 48±2 m.y.

40. *Engels and others (1976)* K-Ar
JE 26-67
Golden Horn batholith, granite (48°31.4'N, 120° 38.4'W; Washington Pass 7½' quad., Okanogan Co., WA). *Analyzer:* Engels. *Analytical data:* K_2O = .938, .943%; $*Ar^{40}$ = .6728 x 10^{-10} moles/gm (Ar_{rad} = 21%); mesh 35-60.

(riebeckite) 47.8±4.7 m.y.

41. *Engels and others (1976)* K-Ar
JE 29A-67
Golden Horn batholith, granite (48°34.3'N, 120° 37.7'W; Washington Pass 7½' quad., Okanogan Co., WA). *Analyzer:* Engels. *Analytical data:* K_2O = .774, .778%; $*Ar^{40}$ = .5425 x 10^{-10} moles/gm (Ar_{rad} = 62%); mesh 80-100.

(hornblende) 46.7±1.9 m.y.

42. *Engels and others (1976)* K-Ar
C-541-1
Duncan Hill pluton, granodiorite (47°54.0'N, 120° 21.1'W; Stormy Mtn. 7½' quad., Chelan Co., WA). *Analyzer:* Engels. *Analytical data:* K_2O = 4.85, 4.90%; $*Ar^{40}$ = 3.365 x 10^{-10} moles/gm (Ar_{rad} = 80%); mesh 42-60.

(biotite) 46.2±1.4 m.y.

43. *Engels and others (1976)* K-Ar
DFC If-60
Swakane biotite gneiss (48°07.9'N, 120°54.0'W; Holden 15' quad., Chelan Co., WA). *Analyzer:* Obradovich. *Analytical data:* K_2O = 7.94%; $*Ar^{40}$ = 5.41 x 10^{-10} moles/gm (Ar_{rad} = 86.2%). *Note:* same sample as Pb-alpha date (IVa. 2).

(biotite) 45.6±1.8 m.y.

44. *Engels and others (1976)* K-Ar
DFC 74d-55
Leroy Creek pluton, quartz diorite gneiss (48°08.6'N, 120°49.2'W; Holden 15' quad., Chelan Co., WA). *Analyzer:* Engels. *Analytical data:* K_2O = 7.90%; $*Ar^{40}$ = 5.320 x 10^{-10} moles/gm (Ar_{rad} = 73%); mesh

100-250.

(biotite) 45.1±2.8 m.y.

45. *Engels and others (1976)* K-Ar
DC 6626
Gangue (48°11.2'N, 120°46.9'W; Holden Mine; Holden 15' quad., Chelan Co., WA). *Analyzer:* Engels. *Analytical data:* K_2O = 5.69, 5.70%; $^*Ar^{40}$ = 3.754 x 10^{-10} moles/gm (Ar_{rad} = 86%); mesh ~ 10-20. *Note:* biotite formed with ore.

(phlogopite) 44.1±3.0 m.y.

46. *Misch (1963)* K-Ar
PM 2
Skagit metamorphic suite, biotite gneiss (48°42'N, 121°12'W; Skagit River below Gorge Creek; Marblemount 15' quad., Whatcom Co., WA). *Analyzer:* Kulp. *Note:* age contradicts geological age of Skagit metamorphism and is interpreted as due to reheating by Tertiary intrusions.

(biotite) 44±2 m.y.

47. *Engels and others (1976)* K-Ar
DFC 1b-60
Railroad Creek pluton, quartz monzonite (48°11.4'N, 120°38.6'W; Lucerne 15' quad., Chelan Co., WA). *Analyzer:* Engels. *Analytical data:* (biotite) K_2O = 7.92, 7.93%; $^*Ar^{40}$ = 5.172 x 10^{-10} moles/gm (Ar_{rad} = 87%); mesh 40-60; (hornblende) K_2O = .381, .387%; $^*Ar^{40}$ = .2442 x 10^{-10} moles/gm (Ar_{rad} = 32%); mesh 60-120.

(biotite) 43.7±1.3 m.y.
(hornblende) 42.6±2.0 m.y.

48. *Misch (1963)* K-Ar
PM1
Skagit metamorphic suite, garniferous biotite schist (48°42'N, 121°12'W; Skagit River above Gorge Creek; Marblemount 15' quad., Whatcom Co., WA). *Analyzer:* Kulp. *Note:* age contradicts geological age of Skagit metamorphism and is interpreted as due to reheating by Tertiary intrusions.

(biotite) 43±2 m.y.

49. *Berry and others (1976)* K-Ar
C-559
Dacite lava of Twin Peaks (48°41.2'N, 119°45.5'W; Tiffany Mtn. 15' quad., Okanogan Co., WA). *Analytical data:* K_2O = .556, .564%; $^*Ar^{40}$ = 3.587 x 10^{-11} moles/gm (Ar_{rad} = 27%).

(hornblende) 42.9±1.3 m.y.

50. *Engels and others (1976)* K-Ar
JE 1-68
Eldorado Orthogneiss of Misch (1966), granodiorite gneiss (48°27.2'N, 120°59.8'W; Goode Mtn. 7½' quad., Chelan Co., WA). *Analyzer:* Engels. *Analytical data:* K_2O = 1.042, 1.047%; $^*Ar^{40}$ = .654 x 10^{-10} moles/gm (Ar_{rad} = 58%); mesh 140-200.

(hornblende) 41.9±1.5 m.y.

51. *Engels and others (1976)* Pb-alpha
TLW 252
Duncan Hill pluton, granodiorite (48°00.6'N, 120° 34.4'W; Lucerne 15' quad., Chelan Co., WA). *Analyzer:* Stern. *Analytical data:* d/mg/hr = 520; Pb = 8.8 ppm.

(zircon) 40±10 m.y.

52. *Misch (1963)* K-Ar
PM 5
Golden Horn batholith, biotite granodiorite (cirque at head of Cutthroat Creek, central SW part of the batholith). *Analyzer:* Curtis.

(biotite) 38.8 m.y.

53. *Misch (1963)* K-Ar
Misch (1964)
PM 14
Chilliwack composite batholith, main phase diorite (48°39.6'N, 121°17.7'W; 1 mi above Thornton Creek, 1 mi NE of PM 13; Marblemount 15' quad., Skagit Co., WA).

(hornblende) 36±1 m.y.
(biotite) 29±1 m.y.

54. *Misch (1963)* K-Ar
PM 4
Chilliwack composite batholith, main phase diorite (48°38'N, 120°20'W; NW of Skagit River short distance above Damnation Creek; Lake Shannon 15' quad., Skagit Co., WA). *Analyzer:* a. Kulp; b. Curtis.

a. (biotite) 34 m.y.
b. (biotite) 31.4 m.y.

55. *Misch (1963)* K-Ar
Misch (1964)
PM 12
Chilliwack composite batholith, main phase diorite (48°38'N, 121°19'W; Skagit Highway above Damnation Creek, 1 mi NE of locality of sample PM 4; Lake Shannon 15' quad., Skagit Co., WA).

(biotite) 32±1 m.y.

56. *Engels and others (1976)* K-Ar
RWT 482-67
Diorite dike, (48°51.7'N, 121°28.8'W; Mt. Challenger 15' quad., WA). *Analyzer:* Engels. *Analytical data:* K_2O = .255, .251% $^*Ar^{40}$ = .1196 x 10^{-10} (Ar_{rad} = 21%); mesh 140-200. *Note:* cuts Chilliwack composite batholith.

(hornblende) 31.7±2.1 m.y.

57. *Misch (1963)* K-Ar
Misch (1964)
PM 13
Chilliwack composite batholith main phase diorite (48°39'N, 121°18.4'W; Skagit Highway immediately above Thornton Creek, 1 mi NE of PM 12; Marblemount 15' quad., Skagit Co., WA).

(biotite) 31±1 m.y.

58. *Misch (1963)* K-Ar
PM 7
Perry Creek quartz diorite (48°57'N, 121°10'W; ridge N lower Perry Creek, W of upper Skagit Valley, Ross Lake; Mt. Spickard 7½' quad., Whatcom Co., WA). *Analyzer:* Kulp.

(biotite) 31 m.y.

59. *Engels and others (1976)* K-Ar
RWT 471-67
Chilliwack composite batholith, main phase quartz diorite (48°44'N, 121°25.0'W; Marblemount 15' quad., Whatcom Co., WA). *Analyzer:* Engels. *Analytical data:* K_2O = .405, .402%; $*Ar^{40}$ = .1820 x 10^{-10} moles/gm (Ar_{rad} = 36%); mesh 140-200.

(hornblende) 30.3±1.4 m.y.

60. *Engels and others (1976)* K-Ar
RWT 211-62
Foam Creek stock, granodiorite (48°03.4'N, 121° 07.4'W; Glacier Peak 15' quad., Chelan Co., WA). *Analyzer:* Engels. *Analytical data:* K_2O = 8.84, 8.80%; $*Ar^{40}$ = 3.712 x 10^{-10} moles/gm (Ar_{rad} = 76%); mesh 45-70.

(biotite) 28.3±0.8 m.y.

61a. *Engels and others (1976)* K-Ar
PM 28
P. Misch (personal commun., 1967)
Chilliwack composite batholith, main phase quartz diorite (48°47.6'N, 121°30'W; Mt. Challenger 15' quad., Whatcom Co., WA). *Analyzer:* Engels. *Analytical data:* (hornblende) K_2O = .50%(c); $*Ar^{40}$ = .197 x 10^{-10} moles/gm(c); mesh 40-80; (biotite) K_2O = 7.51%(c); $*Ar^{40}$ = .978 x 10^{-10} moles/gm(c); mesh 40-60.

(hornblende) 26.5 m.y.
(biotite) 8.8 m.y.

61b. *Engels and others (1976)* K-Ar
PM 28
P. Misch (personal commun., 1967)
Chilliwack composite batholith, main phase quartz diorite (48°47.6'N, 121°30'W; Mt. Challenger 15' quad., Whatcom Co., WA). *Analyzer:* Engels. *Analytical data:* (hornblende) K_2O = .851, .853%; $*Ar^{40}$ = .2364 x 10^{-10} moles/gm (Ar_{rad} = 37%); mesh 40-80; (biotite) K_2O = 7.09, 7.19, 7.23%; $*Ar^{40}$ = .9407, .933, .952 x 10^{-10} moles/gm (Ar_{rad} = 44%); mesh 40-60.

(hornblende) 18.7 m.y.
(biotite) 8.8 m.y.

62. *Engels and others (1976)* K-Ar
RWT 475-67
Chilliwack composite batholith, quartz diorite (48° 59.4'N, 121°28.7'W; Mt. Challenger 15' quad., Whatcom Co., WA). *Analyzer:* Engels. *Analytical data:* (amphibole) K_2O = .368, .362%; $*Ar^{40}$ = .1433 x 10^{-10} moles/gm (Ar_{rad} = 34%); (biotite) K_2O = 8.63, 8.64%; $*Ar^{40}$ = 3.210 x 10^{-10} moles/gm (Ar_{rad} = 86%); mesh 100-140.

(amphibole) 26.4±3.0 m.y.
(biotite) 25.0±0.8 m.y.

63. *Engels and others (1976)* K-Ar
JE 24-67
Dacite (48°04.2'N, 120°50.5'W; Holden 15' quad., Chelan Co., WA). *Analyzer:* Engels. *Analytical data:* K_2O = 1.26, 1.26%; $*Ar^{40}$ = .492 x 10^{-10} moles/gm (Ar_{rad} = 33%); mesh 100-140. *Note:* biotite altered; associated Old Gib Volcano.

(biotite) 26.2±4.5 m.y.

64. *Engels and others (1976)* K-Ar
RWT 501-66
Chilliwack composite batholith, Perry Creek phase, granodiorite (48°57.2'N, 121°10.4'W; Mt. Spickard 7½' quad., Whatcom Co., WA). *Analyzer:* Engels. *Analytical data:* (biotite) K_2O = 8.54, 8.56%; $*Ar^{40}$ = 3.149, 3.127 x 10^{-10} moles/gm (Ar_{rad} = 79, 80%); (hornblende) K_2O = .553, .546%; $*Ar^{40}$ = .1830 x 10^{-10} moles/gm (Ar_{rad} = 35%).

(biotite) 24.7±0.7 m.y.
(hornblende) 22.4±0.7 m.y.

65. *Engels and others (1976)* K-Ar
JE 23a-67
Granodiorite (48°04'N, 120°51.1'W; Trinity mine; Holden 15' quad., Chelan Co., WA). *Analyzer:* Engels. *Analytical data:* K_2O = 10.44, 10.42%; $*Ar^{40}$ = 3.805 x 10^{-10} moles/gm (Ar_{rad} = 93%); mesh 120-140.

(sericite) 24.5±0.7 m.y.

66. *Engels and others (1976)* K-Ar
75R-66
Chilliwack composite batholith, Hozomeen plug, quartz diorite (48°58.9'N, 121°00.5'W; Hozomeen Mtn. 7½' quad., Whatcom Co., WA). *Analyzer:* Engels. *Analytical data:* K_2O = 9.00, 9.03%; $*Ar^{40}$ = 3.106 x 10^{-10} moles/gm (Ar_{rad} = 68%).

(biotite) 23.2±0.7 m.y.

67. *Engels and others (1976)* K-Ar
RWT 474-67
Chilliwack composite batholith, granodiorite (48° 51.6'N, 121°18.4'W; Mt. Challenger 15' quad., Whatcom Co., WA). *Analyzer:* Engels. *Analytical data:* (biotite) K_2O = 8.34, 8.34%; $*Ar^{40}$ = 2.642 x 10^{-10} moles/gm (Ar_{rad} = 82%); mesh 60-80; (hornblende) K_2O = .414, .416%; $*Ar^{40}$ = .1293 x 10^{-10} moles/gm (Ar_{rad} = 35%); mesh 80-100.

(biotite) 21.3±0.7 m.y.
(hornblende) 21.0±2.3 m.y.

68. *Engels and others (1976)* K-Ar
RWT 479-67
Cascade Pass dike, quartz diorite (48°28.7'N, 121° 03.9'W; Cascade Pass 7½' quad., Skagit Co., WA). *Analyzer:* Engels. *Analytical data:* (biotite) K_2O =

8.50, 8.55%; *Ar^{40} = 2.320 x 10^{-10} moles/gm (Ar_{rad} = 78.2%); (hornblende) K_2O = .468, .468%; *Ar^{40} = .1250 x 10^{-10} moles/gm (Ar_{rad} = 23%); mesh 140-200.

(biotite) 18.3±1.5 m.y.
(hornblende) 18.0±1 m.y.

69. *Misch (1963)* K-Ar
Misch (1964)
PM 23
Cascade pass quartz diorite (48°28'N, 121°04'W; W of Cascade Pass at Cascade Pass Trail; Cascade Pass 7½' quad., Skagit Co., WA). *Note:* misprinted in Misch as 10±1 m.y. (Engels and others, 1976).

(biotite) 18±1 m.y.

70. *Armstrong and others (1976)* K-Ar
Silver Creek
Potassic margin of granodiorite porphyry stock (47° 58'N, 121°25'W; Monte Cristo 7½' quad., Snohomish Co., WA). *Analytical data:* K = 1.48%; *Ar^{40} = 1.03 x 10^{-6} cm^3/g STP; (Ar_{rad} = 34%). *Method:* b, f, k, l, t. *Constants:* a, c, d.

(biotite-sericite) 17.3±0.6 m.y.

71. *Engels and others (1976)* K-Ar
JE 17-67
Burch Mountain plug, andesite (47°33.0'N, 120° 22.2'W; Wenatchee Heights 7½' quad., Chelan Co., WA). *Analyzer:* Engels. *Analytical data:* K_2O = .289, .306%; *Ar^{40} = .04891 x 10^{-10} moles/gm (Ar_{rad} = 5%); mesh 100-140.

(hornblende) 11.1±1.7 m.y.

72. *Engels and others (1976)* K-Ar
RWT 500-66
Chilliwack composite batholith, granodiorite (48° 56.4'N, 121°18.1'W; Mt. Challenger 15' quad., Whatcom Co., WA). *Analyzer:* Engels. *Analytical data:* K_2O = .494, .494%; *Ar^{40} = .07645 x 10^{-10} moles/gm (Ar_{rad} = 15%); mesh 140-250.

(hornblende) 10.5±0.9 m.y.

73. *Engels and others (1976)* K-Ar
RWT 480-67
Shuksan metamorphic suite of Misch (1966), hornfels (48°49.6'N, 121°37.8'W; Mt. Shuksan 15' quad., Whatcom Co., WA). *Analyzer:* Engels. *Analytical data:* K_2O = 9.22, 9.21%; *Ar^{40} = .3698 x 10^{-10} moles/gm (Ar_{rad} = 17%); mesh 60-100. *Note:* at contact with Lake Ann stock. [Shuksan metamorphic suite, Laursen and Hammond (1974) p. 10, IVa. 6].

(biotite) 2.7±0.3 m.y.

74. *Engels and others (1976)* K-Ar
DFC 1-69
Shuksan metamorphic suite of Misch (1966), hornfels (48°50'N, 121°38'W; Mt. Shuksan 15' quad., Whatcom Co., WA). *Analyzer:* Engels. *Analytical data:* K_2O = 8.64, 8.64%; *Ar^{40} = .3138 x 10^{-10} moles/gm (Ar_{rad} = 42%); mesh 60-140. *Note:* at contact with Lake Ann stock. [Shuksan metamorphic suite, Laursen and Hammond (1974) p. 10, IVa. 6].

(biotite) 2.5±0.1 m.y.

IVb. SOUTHERN CASCADE RANGE

1. *Denison (written commun., 1976)* K-Ar
No. 1
Council Bluff formation, House Rock Flow, andesite (45°5'30"N, 121°56'30"W; SE¼ SE¼ SE¼ S17,T7N, R7E; resting atop Stevens Ridge Formation, along USFS Road N-832; Burnt Peak 7½' quad., Skamania Co., WA). *Collector:* Hammond. *Analyzer:* Denison, Mobil Research and Development Corp.

(plagioclase) 77.2±5.0 m.y.
(plagioclase) 76.7±5.3 m.y.

2. *Fischer (1976)* K-Ar
CRS-413-H
Stevens Ridge Formation, devitrified ash flow (47° 8.8'N, 121°42.2'W; SW¼ NW¼ SE¼ S7,T19N,R9E; Greenwater 15' quad., Pierce Co., WA). *Collector:* Fischer. *Analyzer:* Geochron Laboratories, Inc. *Analytical data:* K = .508%; *Ar^{40} = .00124 ppm; *Ar^{40}/K^{40} = .00200.

(hornblende) 34.0±1.2 m.y.

3. *Denison (written commun., 1976)* K-Ar
No. 2
Council Bluff formation, basal flow, andesite (46° 11'N, 121°48'W; NE¼ SW¼ NE¼ S16,T8N,R8E; resting atop the Stevens Ridge Formation, along USFS Road N-90 along the Lewis River; Quartz Cr. Butte 7½ quad., Skamania Co., WA). *Collector:* Hammond. *Analyzer:* Denison, Mobil Research and Development Corp. *Note:* an augite andesite porphyry. Council Bluff formation is an informal name.

(whole rock) 26.5±0.7 m.y.
(whole rock) 26.1±0.5 m.y.

4. *Mattinson (1973)* U-Pb
Engels and others (1976)
JM 71-13
Tatoosh sill, granophyre (46°52.1'N, 121°31.4'W; Chinook Pass 7½' quad., Pierce Co., WA). *Analyzer:* Mattinson. *Note:* age represents time of injection of sills into predominantly volcaniclastic country rock.

(zircon) 26.1 m.y.

5. *Mattinson (1973)* U-Pb
Engels and others (1976)
JM 71-16
Palisades welded tuff, rhyodacite (46°56.9'N, 121° 36.1'W; White River 7½ quad., Pierce Co., WA). *Analyzer:* Mattinson. *Note:* age represents time of explosive eruption of magma to form welded tuff at the Palisades.

(zircon) 25.3 m.y.

6. *Mattinson (1973)* U-Pb
Engels and others (1976)
JM 71-15
Tatoosh pluton (46°55.1'N, 121°35.1'W; White River Park 7½' quad., Pierce Co., WA). *Analyzer:* Mattinson. *Note:* age represents time of crystallization of a roof phase of main pluton at Sunrise Point.
(zircon) 24.3 m.y.

7. *Armstrong and others (1976)* K-Ar
McCoy Creek
Quartz-albite-epidote-calcite zone, center of quartz diorite porphyry stock (46°22'N, 121°47'W; McCoy Peak 7½' quad., Skamania Co., WA). *Analytical data:* K = 1.66%; $^{*}Ar^{40}$ = 1.60 x 10^{-6} cm^3/g STP; (Ar_{rad} = 50%). *Method:* b, f, k, l, t. *Constants:* a, c, d.
(sericite conc.) 24.0±0.9 m.y.

8. *Hartman (1973)* K-Ar
Fifes Peak Formation, porphyritic andesite (47°01'N, 121°29'W; Castle Mountain area; Lester 15' quad., Pierce Co., WA).
(whole rock) 23.4±1.4 m.y.
(whole rock) 21.7±1.9 m.y.

9. *Fischer (1976)* K-Ar
CRS-413-B
Stevens Ridge Formation, devitrified ash flow (47° 8.8'N, 121°42.4'W; SW¼ NW¼ SE¼ S7,T19N,R9E; Greenwater 15' quad., Pierce Co., WA). *Analyzer:* Geochron Laboratories, Inc. *Note:* same unit as Fischer (1976) CRS-413-H [IVb. 2], indicates a reheating event and probably is age of zeolite-facies metamorphism.
(biotite) 23.3±0.9 m.y.

10. *Mattinson (1973)* U-Pb
Engels and others (1976)
JM 71-21A
Tatoosh pluton, eruptive phase, pyroclastic flow (47° 00.9'N, 121°42.2'W; near Clear West Peak; Greenwater 15' quad., Pierce Co., WA). *Analyzer:* Mattinson.
(zircon) 22.4 m.y.

11. *Engels and others (1976)* K-Ar
SH 119-1
Spirit Lake pluton, granodiorite (46°19.8'N, 122° 12.2'W; Spirit Lake 15' quad., Skamania Co., WA). *Analyzer:* Tabor. *Analytical data:* K_2O = .578, .580, .570%; $^{*}Ar^{40}$ = .1830 x 10^{-10} moles/gm (Ar_{rad} = 17.3%); mesh 200-325.
(hornblende) 21.4±0.3 m.y.

12. *Hartman (1973)* K-Ar
Stevens Ridge Formation, ash flow (47°03'N, 121° 34'W; Greenwater 15' quad., Pierce Co., WA). *Note:* from the basal member.
(plagioclase) 20.5±1.5 m.y.
(plagioclase) 19.5±1.8 m.y.

13. *Hartman (1973)* K-Ar
Fifes Peak Formation, porphyritic andesite (46°57'N, 121°53'W; near Mowich Lake; Golden Lakes 7½' quad., Pierce Co., WA).
(plagioclase) 20.3±2.6 m.y.
(plagioclase) 16.7±4.3 m.y.

14. *Hartman (1973)* K-Ar
Clear West Peak rhyodacite (47°01'N, 121°42'W; from outcrops near base of Clear West Peak along West Fork of White River; Greenwater 15' quad., Pierce Co., WA).
(whole rock) 18.6±0.4 m.y.

15. *Mattinson (1973)* U-Pb
Engels and others (1976)
JM 71-18
Tatoosh pluton, granodiorite (46°46.9'N, 121°45.8'W; Mt. Rainer West 7½' quad., Lewis Co., WA). *Analyzer:* Mattinson. *Note:* age represents time of crystallization of the core of the pluton.
(zircon) 17.7 m.y.

16. *Armstrong and others (1976)* K-Ar
Earle
Potassic zone containing secondary biotite-quartz-tourmaline-plagioclase near border of quartz diorite porphyry stock (46°21'N, 122°05'W; Mt. Spirit Lake 15' quad., Skamania Co., WA). *Analytical data:* K = 5.92%; $^{*}Ar^{40}$ = 3.84 x 10^{-6} cm^3/g STP; (Ar_{rad} = 66%); mesh -100; *Method:* b, f, k, l, t. *Constants:* a, c, d.
(biotite) 16.2±0.6 m.y.

17. *Mattinson (1973)* U-Pb
Engels and others (1976)
JM 71-14
Tatoosh pluton, granodiorite (46°53.6'N, 121°36.9'W; White River Park 7½ quad., Pierce Co., WA). *Analyzer:* Mattinson. *Note:* age represents time of crystallization of core of pluton in White River Valley area.
(zircon) 14.2 m.y.

18. *Armstrong and others (1976)* K-Ar
North Fork
Biotite-rich potassic zone in Tertiary andesite, surrounding dacite porphyry pluton of snoqualmie batholith (47°37'N, 121°37'W; Mount Si 15' quad., King Co., WA). *Analytical data:* K = 1.30%; $^{*}Ar^{40}$ = .516 x 10^{-6} cm^3/g STP; (Ar_{rad} = 51%); mesh -100. *Method:* b, f, k, l, t. *Constants:* a, c, d.
(biotite conc.) 9.9±0.4 m.y.

19. *Armstrong and others (1976)* K-Ar
Mesatchee
Quartz-sericite phyllic zone where rhyolite intrudes Bumping Lake quartz diorite (46°50'N, 121°24'W; Bumping Lake 15' quad., Yakima Co., WA). *Analytical data:* K = 1.34%; $^{*}Ar^{40}$ = .339, .334 x 10^{-6} cm^3/g STP; (Ar_{rad} = 36, 38%). *Method:* b, f, l, k, t. *Constants:*

a, c, d.

(sericite-quartz-plagioclase) 6.3±0.2 m.y.

20. *Kienle and Newcomb (1973)* K-Ar
G-3
Simcoe Volcanics, basalt (40°50.5'N, 120°48.9'W; C SW¼ S9,T4N,R16E; excavation for Goldendale Observatory; summit of butte N of Goldendale; Goldendale 15' quad., Klickitat Co., WA). *Analyzer:* Krummenacher, CSU, San Diego. *Analytical data:* K = .938%; $^*Ar^{40}$ = 54%.

(whole rock) 4.5±0.1 m.y.

21. *Kienle and Newcomb (1973)* K-Ar
G-1a
Simcoe Volcanics, andesite (45°54.1'N, 120°45.4'W; NW corner SE¼ S24,T5N,R16E; W rim Pothole Lake, in roadcut on E side Pine Forest School Road; Goldendale 15' quad., Klickitat Co., WA). *Analyzer:* Krummenacher, CSU, San Diego.

(whole rock) 3.5±0.1 m.y.

22. *Engels and others (1976)* K-Ar
SH 414-1
Goat Mountain plug, andesite (46°09.8'N, 122°18.6'W; Couger 15' quad., Cowlitz Co., WA). *Analyzer:* Tabor. *Analytical data:* (hornblende) K = .645, .647, .620%; $^*Ar^{40}$ = .0292 x 10^{-10} moles/gm (Ar_{rad} = 4.5%); (biotite) K = 8.33, 8.33%; $^*Ar^{40}$ = .1272 x 10^{-10} moles/gm (Ar_{rad} = 8.8%); (biotite) K = 8.30, 8.33%; $^*Ar^{40}$ = .0905 x 10^{-10} moles/gm (Ar_{rad} = 10.2%).

(hornblende) 3.1±0.3 m.y.
(biotite) 1.0±.06 m.y.
(biotite) .74±.06 m.y.

23. *Kienle and Newcomb (1973)* K-Ar
G-4
Simcoe Volcanics, basalt (45°49.0'N, 120°51.0'W; SE corner NE¼ S19,T4N,R16E; along Blockhouse Butte road, in quarry ½ mi W of Goldendale, Goldendale 15' quad., Klickitat Co., WA). *Analyzer:* Dyman, Oregon State Univ. *Analytical data:* K = 1.127%; $^*Ar^{40}$ = 27.9%.

(whole rock) 1.95±0.29 m.y.

24a. *Kienle and Newcomb (1973)* K-Ar
PP 383-C
Simcoe Volcanics, basaltic lava (45°40.1'N, 120° 53.4'W; SW corner NE¼ SE¼ S11,T2N,R15E; at low cut on Highway Wash. 14; Wishram 15' quad., Klickitat Co., WA). *Analyzer:* Dyman, Oregon State Univ. *Analytical data:* K = 1.654%; $^*Ar^{40}$ = 38.79%. *Note:* intracanyon flow from Haystack Butte.

(whole rock) 0.91±0.01 m.y.

24b. *Kienle and Newcomb (1973)* K-Ar
PP 383-C
Simcoe Volcanics, basaltic lava (45°40.1'N, 120° 53.4'W; SW corner NE¼ SE¼ S11,T2N,R15E; at low cut on Highway Wash. 14; Wishram 15' quad., Klickitat Co., WA). *Analyzer:* Krummenacher, CSU, San Diego. *Analytical data:* K = 1.689%; $^*Ar^{40}$ = 37%. *Note:* intracanyon flow from Haystack Butte.

(whole rock) 0.9±0.1 m.y.

25. *Kienle and Newcomb (1973)* K-Ar
KM-1
Mount Adams lava, andesite [probably basalt from King Mountain] (46°4.2'N, 121°25.9'W; SW¼ NW¼ S27,T7N,R11E, E side King Mountain along logging road, N718; King Mtn. 7½' quad., Yakima Co., WA). *Analyzer:* Dyman, Oregon State Univ. *Analytical data:* K = .595%; $^*Ar^{40}$ = .14%; mesh 30-50.

(whole rock) 0.3±0.08 m.y.

26. *Kienle and Newcomb (1973)* K-Ar
KM-1
Mount Adams lava, andesite [probably basalt from King Mountain] (46°4.2'N, 121°25.9'W; SW¼ NW¼ S27,T7N,R11E; E side King Mountain along logging road, N718; King Mtn. 7½' quad., Yakima Co., WA). *Analyzer:* Krummenacher, CSU, San Diego. *Analytical data:* K = 577%; $^*Ar^{40}$ = 3%.

(whole rock) 0.3±0.2 m.y.

27. *Kienle and Newcomb (1973)* K-Ar
KM-2
Mount Adams lava, andesite [probably basalt from King Mountain] (46°3.4'N, 121°25.6'W; C SW¼ S21, T7N,R11E; along logging road N718; King Mtn. 7½' quad., Yakima Co., WA). *Analyzer:* Krummenacher, CSU, San Diego. *Analytical data:* K = 1.064%; $^*Ar^{40}$ = 2%.

(whole rock) 0.1±0.1 m.y.

V. OKANOGAN HIGHLANDS

1. *Miller and others (1973)* K-Ar
Engels and others (1976)
No. 4
Windermere Group, Huckleberry Formation, greenstone (48°24.8'N, 117°43.3'W; 8 mi N of Chewelah; Cliff Ridge 7½' quad., Stevens Co., WA). *Analyzer:* Miller. *Analytical data:* (plagioclase) K_2O = .119%; $^*Ar^{40}$ = 2.08 x 10^{-10} moles/gm (Ar_{rad} = 51%); (pyroxene) K_2O = .040%; $^*Ar^{40}$ = 4.24 x 10^{-11} moles/gm (Ar_{rad} = 66%); (whole rock) K_2O = .112%; $^*Ar^{40}$ = 8.87 x 10^{-11} moles/gm (Ar_{rad} = 69%). *Constants:* a, c, d.

(plagioclase) 918±37 m.y.
(pyroxene) 603±30 m.y.
(whole rock) 472±24 m.y.

2. *Miller and others (1973)* K-Ar
Engels and others (1976)
No. 1
Windermere Group, Huckleberry Formation, greenstone (48°24.4'N, 117°43.7'W; 8 mi N of Chewelah; Cliff Ridge 7½' quad., Stevens Co., WA). *Analyzer:* Miller. *Analytical data:* (whole rock) K_2O = .060%;

$^*Ar^{40}$ = 9.53 x 10^{-10} moles/gm (Ar_{rad} = 67%); (plagioclase) K_2O = .133%; $^*Ar^{40}$ = 1.60 x 10^{-10} moles/gm (Ar_{rad} = 92%). *Constants:* a, c, d.

(whole rock) 851±45 m.y.
(plagioclase) 678±34 m.y.

3. *Miller (1973)* K-Ar
Miller and others (1973)
Engels and others (1976)
No. 2
Windermere Group, Huckleberry Formation, greenstone (48°24.8'N, 117°43.3'W; 8 mi N of Chewelah; Cliff Ridge 7½' quad., Stevens Co., WA). *Analyzer:* McKee. *Analytical data:* K_2O = .104%; $^*Ar^{40}$ = 1.59 x 10^{-10} moles/gm (Ar_{rad} = 63%). *Constants:* a, c, d.
(whole rock) 827±34 m.y.

4. *Miller and others (1973)* K-Ar
Engels and others (1976)
No. 3
Windermere Group, Huckleberry Formation, greenstone (48°24.9'N, 117°43.2'W; 8 mi N of Chewelah; Cliff Ridge 7½' quad., Stevens Co., WA). *Analyzer:* Miller. *Analytical data:* K_2O = .114%; $^*Ar^{40}$ = 1.45 x 10^{-10} moles/gm (Ar_{rad} = 75%). *Constants:* a, c, d.
(whole rock) 724±29 m.y.

5. *Miller and others (1973)* K-Ar
Engels and others (1976)
No. 5
Windermere Group, Huckleberry Formation, greenstone (48°24.9'N, 117°43.2'W; 8 mi N of Chewelah; Cliff Ridge 7½' quad., Stevens Co., WA). *Analyzer:* McKee. *Analytical data:* K_2O = .093%; $^*Ar^{40}$ = 6.23 x 10^{-11} moles/gm (Ar_{rad} = 30%). *Constants:* a, c, d.
(whole rock) 407±20 m.y.

6. *Miller and others (1973)* K-Ar
Engels and others (1976)
No. 6
Windermere Group, Huckleberry Formation, greenstone (48°24.4'N, 117°43.7'W; 8 mi N of Chewelah; Cliff Ridge 7½' quad., Stevens Co., WA). *Analyzer:* Miller. *Analytical data:* K_2O = .753%; $^*Ar^{40}$ = 2.76 x 10^{-10} moles/gm (Ar_{rad} = 92%). *Constants:* a, c, d.
(whole rock) 233±12 m.y.

7a. *Engels (1975)* K-Ar
Map no. 1
Flowery Trail granodiorite (48°17'N, 117°39'W; NW¼ S9,T32N,R41E, Chewelah Mtn. 7½' quad., Stevens Co., WA). *Analytical data:* (hornblende) K_2O = 1.44%; $^*Ar^{40}$ = 4.348 x 10^{-10} moles/gm (Ar_{rad} = 88.8%); (biotite) K_2O = 8.71%; $^*Ar^{40}$ = 1.283 x 10^{-9} moles/gm (Ar_{rad} = 85%). *Method:* h, k, m. *Constants:* a, c, d.
(hornblende) 194±7 m.y.
(biotite) 98±5 m.y.

7b. *Miller and Engels (1975)* K-Ar
Map no. 85
Granitic (48°17'N, 117°39'W; Chewelah 7½' quad., Stevens Co., WA). *Analytical data:* (hornblende) K_2O = 1.44%; $^*Ar^{40}$ = 4.348 x 10^{-10} moles/gm (Ar_{rad} = 89%); (biotite) K_2O = 8.71%; $^*Ar^{40}$ = 12.83 x 10^{-10} moles/gm (Ar_{rad} = 85%). *Method:* h, k, m. *Constants:* a, b, d.
(hornblende) 194±5 m.y.
(biotite) 98±5 m.y.

8a. *Engels and others (1976)* K-Ar
Map no. 2
Flowery Trail granodiorite (48°18'N, 117°37'W; C S3,T32N,R41E; Goddards Peak 7½' quad., Stevens Co., WA). *Analytical data:* (hornblende) K_2O = 1.41%; $^*Ar^{40}$ = 4.007 x 10^{-10} moles/gm (Ar_{rad} = 90.6%); (biotite) K_2O = 8.175%; $^*Ar^{40}$ = 1.041 x 10^{-9} moles/gm (Ar_{rad} = 77.5%). *Method:* h, k, m. *Constants:* a, c, d.
(hornblende) 183±6 m.y.
(biotite) 84±3 m.y.

8b. *Miller and Engels (1975)* K-Ar
Map no. 86
Granitic (48°18'N, 117°37'W; Goddards Peak 7½' quad., Stevens Co., WA). *Analytical data:* (hornblende) K_2O = 1.41%; $^*Ar^{40}$ = 4.007 x 10^{-10} moles/gm (Ar_{rad} = 91%); (biotite) K_2O = 8.18%; $^*Ar^{40}$ = 10.41 x 10^{-10} moles/gm (Ar_{rad} = 72%). *Method:* h, k, m. *Constants:* a, b, d.
(hornblende) 183±6 m.y.
(biotite) 84±3 m.y.

9. *Miller and Engels (1975)* K-Ar
Map no. 83
Granitic (48°10'N, 117°49'W; Waitts Lake 7½' quad., Stevens Co., WA). *Analytical data:* (hornblende) K_2O = 1.597%; $^*Ar^{40}$ = 3.976 x 10^{-10} moles/gm (Ar_{rad} = 86%); (biotite) K_2O = 9.10%; $^*Ar^{40}$ = 21.28 x 10^{-10} moles/gm (Ar_{rad} = 96%). *Method:* h, k, m. *Constants:* a, b, d.
(hornblende) 161±4.8 m.y.
(biotite) 152±4.6 m.y.

10. *Engels and others (1976)* Pb-alpha
59-y-300
Spirit pluton, granodiorite (48°48'N, 117°32'W; Deep Lake 7½' quad., Pend Oreille Co., WA). *Analyzer:* Stern. *Analytical data:* (zircon) 597 d/gm/hr; Pb = 34 ppm; (monazite) 5363 d/gm/hr; Pb = 309 ppm.
(zircon) 145±20 m.y.
(monazite) 120±15 m.y.

11a. *Engels (1975)* K-Ar
Map no. 3
Flowery Trail granodiorite (48°18'N, 117°34'W; NW¼ S1,T32N,R41E; Goddards Peak 7½' quad., Stevens Co., WA). *Analytical data:* (hornblende) K_2O = 1.39%; $^*Ar^{40}$ = 3.042 x 10^{-10} moles/gm (Ar_{rad} = 88.6%); (biotite) K_2O = 8.825%; $^*Ar^{40}$ = 8.481 x 10^{-10}

moles/gm (Ar_{rad} = 30.1%). *Method:* h, k, m. *Constants:* a, c, d.

(hornblende) 143±5 m.y.
(biotite) 64±3 m.y.

11b. *Miller and Engels (1975)* K-Ar
Map no. 87
Granitic (48°18'N, 117°34'W; Goddards Peak 7½' quad., Stevens Co., WA). *Analytical data:* (hornblende) K_2O = 1.39%; $*Ar^{40}$ = 3.042 x 10^{-10} moles/gm (Ar_{rad} = 89%); (biotite) K_2O = 8.83%; $*Ar^{40}$ = 8.481 x 10^{-10} moles/gm (Ar_{rad} = 30%). *Method:* h, k, m. *Constants:* a, b, d.

(hornblende) 143±5 m.y.
(biotite) 64±3 m.y.

12. *Engels and others (1976)* Pb-alpha
G17C177
Granodiorite (48°52.5'N, 118°41'W; Curlew 15' quad., Ferry Co., WA). *Analyzer:* Stern. *Analytical data:* 56 d/gm/hr; Pb = 2.9 ppm.

(zircon) 130±15 m.y.

13. *Becraft and Weis (1963)* Pb-alpha
8W3
Loon Lake granite, porphyritic quartz monzonite (47° 54.5'N, 118°3.3'W; SW¼ SW¼ S20,T28N,R38E; Turtle Lake 15' quad., Stevens Co., WA). *Analyzer:* Stern. Pb – Sheffey. *Analytical data:* 1089 alpha/mg-hr; Pb = 46 ppm.

(zircon) 105±10 m.y.

14. *Becraft and Weis (1963)* Pb-alpha
8W2
Loon Lake granite, granodiorite (47°51.2'N, 118° 2.2'W; C of border between S8&9,T27N,R38E; Turtle Lake 15' quad., Stevens Co., WA). *Analyzer:* Stern. Pb – Sheffey. *Analytical data:* 392 alpha/mg-hr; Pb = 16.5 ppm.

(zircon) 105±10 m.y.

15. *Miller and Engels (1975)* K-Ar
Map no. 24
Granitic (48°43'N, 117°20'W; Ione 7½' quad., Pend Oreille Co., WA). *Analytical data:* (biotite) K_2O = 9.11%; $*Ar^{40}$ = 13.99 x 10^{-10} moles/gm (Ar_{rad} = 93%); (muscovite) K_2O = 10.58%; $*Ar^{40}$ = 16.28 x 10^{-10} moles/gm (Ar_{rad} = 95%). *Method:* h, k, m. *Constants:* a, b, d.

(biotite) 101±3.0 m.y.
(muscovite) 101±3.0 m.y.

16. *Miller and Engels (1975)* K-Ar
Map no. 73
Granitic (48°28'N, 117°8'W; Browns Lake 7½' quad., Pend Oreille Co., WA). *Analytical data:* (muscovite) K_2O = 10.30%; $*Ar^{40}$ = 15.65 x 10^{-10} moles/gm (Ar_{rad} = 97%); (biotite) K_2O = 9.13%; $*Ar^{40}$ = 13.65 x 10^{-10} moles/gm (Ar_{rad} = 97%). *Method:* h, k, m. *Constants:* a, b, d.

(muscovite) 100.3±2.8 m.y.
(biotite) 98.6±2.8 m.y.

17. *Miller and Engels (1975)* K-Ar
Map no. 29
Granitic (48°44'N, 117°51'W; Addy Mtn. 7½' quad., Stevens Co., WA). *Analytical data:* K_2O = 9.14%; $*Ar^{40}$ = 13.9 x 10^{-10} moles/gm (Ar_{rad} = 75%). *Method:* h, k, m. *Constants:* a, b, d.

(biotite) 100±2.8 m.y.

18. *Becraft and Weis (1963)* Pb-alpha
6B499
Loon Lake granite, granodiorite (47°49.8'N, 118°00'W; NW¼ NE¼ S22,T27N,R38E; Turtle Lake 15' quad., Stevens Co., WA). *Analyzer:* Stern. Pb – Rose, Jr. & Worthing. *Analytical data:* 453 alpha/mg-hr; Pb = 17.7 ppm.

(zircon) 100±10 m.y.

19. *Fox and others (1976)* Pb^{207}/U^{235}
0-176E Pb^{208}/Th^{232}
Pb^{206}/U^{238}
Okanogan gneiss dome, layered paragneiss unit (48° 46.9'N, 119°18.8'W; Oroville 15' quad., Okanogan Co., WA). *Analyzer:* Stern & Newell. *Analytical data:* isotopic composition of lead: Pb^{204} = .813 atom %, Pb^{206} = 50.606 atom %, Pb^{207} = 14.742 atom %, Pb^{208} = 33.893 atom %; isotopic compositions of lead to correct for presence of nonradiometric lead present: Pb^{206}/Pb^{204} = 18.51, Pb^{207}/Pb^{204} = 15.72, Pb^{208}/Pb^{204} = 38.44. *Constants:* g, h, i, j. *Note:* unit called Tonasket Gneiss in Engels and others (1976).

100.0 m.y.
94.0 m.y.
87.3 m.y.

20. *Miller and Engels (1975)* K-Ar
Map no. 74
Granitic (48°28'N, 117°8'W; Browns Lake 7½' quad., Pend Oreille Co., WA). *Analytical data:* K_2O = 9.10%; $*Ar^{40}$ = 13.57 x 10^{-10} moles/gm (Ar_{rad} = 96%). *Method:* h, k, m. *Constants:* a, b, d.

(biotite) 98.2±3.2 m.y.

21. *Miller and Engels (1975)* K-Ar
Map no. 31
Granitic (48°36'N, 117°35'W; Deep Lake 7½' quad., Stevens Co., WA). *Analytical data:* K_2O = 8.63%; $*Ar^{40}$ = 12.82 x 10^{-10} moles/gm (Ar_{rad} = 86%). *Method:* h, k, m. *Constants:* a, b, d.

(biotite) 98.0±2.9 m.y.

22a. *Engels (1975)* K-Ar
Map no. 4
Sarvation Flat quartz monzonite (48°28'N, 117°45'W; SW corner SW¼ S3,T34N,R40E; Addy Mtn. 7½' quad., Stevens Co., WA). *Analytical data:* (biotite) K_2O = 8.405%; $*Ar^{40}$ = 1.254 x 10^{-9} moles/gm (Ar_{rad} = 92.2%); (hornblende) K_2O = .6855%; $*Ar^{40}$ = 1.003 x

10^{-10} moles/gm (Ar_{rad} = 79.9%). *Method:* h, k, m. *Constants:* a, c, d.

(biotite) 98±3 m.y.
(hornblende) 97±3 m.y.

22b. *Miller and Engels (1975)* K-Ar
Map no. 90
Granitic (48°28'N, 117°45'W; Addy Mtn. 7½' quad., Stevens Co., WA). *Analytical data:* (biotite) K_2O = 8.41%; $*Ar^{40}$ = 12.54 x 10^{-10} moles/gm (Ar_{rad} = 92%); (hornblende) K_2O = .686%; $*Ar^{40}$ = 1.003 x 10^{-10} moles/gm (Ar_{rad} = 80%). *Method:* h, k, m. *Constants:* a, b, d.

(biotite) 98±3 m.y.
(hornblende) 97±3 m.y.

23. *Miller and Engels (1975)* K-Ar
Map no. 25
Granitic (48°40'N, 117°17'W; Scotchman Lake 7½' quad., Pend Oreille Co., WA). *Analytical data:* (biotite) K_2O = 8.42%; $*Ar^{40}$ = 12.50 x 10^{-10} moles/gm (Ar_{rad} = 93%); (hornblende) K_2O = .836%; $*Ar^{40}$ = 1.235 x 10^{-10} moles/gm (Ar_{rad} = 81%). *Method:* h, k, m. *Constants:* a, b, d.

(biotite) 97.9±2.9 m.y.
(hornblende) 97.4±2.9 m.y.

24. *Miller and Engels (1975)* K-Ar
Map no. 84
Granitic (48°18'N, 117°57'W; Dunn Mtn. 7½' quad., Stevens Co., WA). *Analytical data:* K_2O = 9.04%; $*Ar^{40}$ = 13.40 x 10^{-10} moles/gm (Ar_{rad} = 86%). *Method:* h, k, m. *Constants:* a, b, d.

(biotite) 97.8±2.9 m.y.

25. *Miller and Engels (1975)* K-Ar
Map no. 32
Granitic (48°37'N, 117°22'W; Ruby 7½' quad., Pend Oreille Co., WA). *Analytical data:* K_2O = 8.64%; $*Ar^{40}$ = 12.66 x 10^{-10} moles/gm (Ar_{rad} = 95%). *Method:* h, k, m. *Constants:* a, b, d.

(biotite) 96.7±2.9 m.y.

26. *Miller and Engels (1975)* K-Ar
Map no. 22
Granitic (48°48'N, 117°13'W; Pass Creek 7½' quad., Pend Oreille Co., WA). *Analytical data:* K_2O = 9.30%; $*Ar^{40}$ = 13.40 x 10^{-10} moles/gm (Ar_{rad} = 96%). *Method:* h, k, m. *Constants:* a, b, d.

(biotite) 96.6±2.9 m.y.

27. *Miller and Engels (1975)* K-Ar
Map no. 23
Granitic (48°48'N, 117°21'W; Metaline Falls 7½' quad., Pend Oreille Co., WA). *Analytical data:* K_2O = 8.86%; $*Ar^{40}$ = 12.93 x 10^{-10} moles/gm (Ar_{rad} = 87%). *Method:* h, k, m. *Constants:* a, b, d.

(biotite) 96.3±2.9 m.y.

28. *Miller and Engels (1975)* K-Ar
Map no. 27
Granitic (48°47'N, 117°31'W; Deep Lake 7½' quad., Stevens Co., WA). *Analytical data:* (muscovite) K_2O = 9.72%; $*Ar^{40}$ = 14.2 x 10^{-10} moles/gm (Ar_{rad} = 92%); (biotite) K_2O = 5.76%; $*Ar^{40}$ = 7.91 x 10^{-10} moles/gm (Ar_{rad} = 92%). *Method:* h, k, m. *Constants:* a, b, d.

(muscovite) 96.0±3.0 m.y.
(biotite) 91.0±3.0 m.y.

29. *Miller and Engels (1975)* K-Ar
Map no. 21
Granitic (48°46'N, 117°4'W; Helmer Mtn. 7½' quad., Pend Oreille Co., WA). *Analytical data:* K_2O = 10.35%; $*Ar^{40}$ = 14.96 x 10^{-10} moles/gm (Ar_{rad} = 92%). *Method:* h, k, m. *Constants:* a, b, d.

(muscovite) 95.4±2.9 m.y.

30. *Miller and Engels (1975)* K-Ar
Map no. 77
Granitic (48°3'N, 117°24'W; Fan Lake 7½' quad., Pend Oreille Co., WA). *Analytical data:* (hornblende) K_2O = .996%; $*Ar^{40}$ = 1.434 x 10^{-10} moles/gm (Ar_{rad} = 83%); (biotite) K_2O = 7.96%; $*Ar^{40}$ = 11.25 x 10^{-10} moles/gm (Ar_{rad} = 81%). *Method:* h, k, m. *Constants:* a, b, d.

(hornblende) 95.1±4.0 m.y.
(biotite) 93.4±2.6 m.y.

31. *Becraft and Weis (1963)* Pb-alpha
8W5
Loon Lake granite, porphyritic quartz monzonite (47°56.3'N, 118°6.0'W; NW¼ SW¼ S12,T28S,R37E; Turtle Lake 15' quad., Stevens Co., WA). *Analyzer:* Stern. Pb – Sheffey. *Analytical data:* 1365 alpha/mg-hr; Pb = 16.3 ppm.

(zircon) 95±10 m.y.

32. *Becraft and Weis (1963)* Pb-alpha
8W1
Loon Lake granite, granodiorite (47°51.1'N, 118° 0.8'W; NW¼ SW¼ S10,T27N,R38E; Turtle Lake 15' quad., Stevens Co., WA). *Analyzer:* Stern. Pb – Sheffey. *Analytical data:* 389 alpha/mg-hr; Pb = 15 ppm.

(zircon) 95±10 m.y.

33. *Miller and Engels (1975)* K-Ar
Map no. 35
Granitic (48°36'N, 117°4'W; Gleason Mtn. 7½' quad., Pend Oreille Co., WA). *Analytical data:* (muscovite) K_2O = 10.72%; $*Ar^{40}$ = 15.32 x 10^{-10} moles/gm (Ar_{rad} = 86%); (biotite) K_2O = 8.64%; $*Ar^{40}$ = 11.98 x 10^{-10} moles/gm (Ar_{rad} = 92%). *Method:* h, k, m. *Constants:* a, b, d.

(muscovite) 94.3±2.8 m.y.
(biotite) 90.9±2.7 m.y.

34. *Engels and others (1976)* K-Ar
12h

Spirit pluton, quartz diorite (48°46.6'N, 117°32.3'W; Deep Lake 7½' quad., Pend Oreille Co., WA). *Analyzer:* Kistler. *Analytical data:* K_2O = .944%; $^*Ar^{40}$ = 1.34 x 10^{-10} moles/gm (Ar_{rad} = 76%).

(hornblende) 94.0±3.0 m.y.

35. *Miller and Engels (1975)* K-Ar
Map no. 28
Granitic (48°44'N, 117°33'W; Aladdin Mtn. 7½' quad., Pend Oreille Co., WA). *Analytical data:* K_2O = 8.72%; $^*Ar^{40}$ = 12.2 x 10^{-10} moles/gm (Ar_{rad} = 93%). *Method:* h, k, m. *Constants:* a, b, d.

(biotite) 92.2±3.0 m.y.

36a. *Engels (1975)* K-Ar
Map no. 9
Leucocratic dike (48°31'N, 117°40'W; SW¼ S21, T35N, R41E; Park Rapids 7½' quad., Stevens Co., WA). *Analytical data:* (muscovite) K_2O = 10.69%; $^*Ar^{40}$ = 1.438 x 10^{-9} moles/gm (Ar_{rad} = 86.2%); (biotite) K_2O = 8.695%; $^*Ar^{40}$ = 9.569 x 10^{-10} moles/gm (Ar_{rad} = 70.2%). *Method:* h, k, m. *Constants:* a, c, d.

(muscovite) 89±6 m.y.
(biotite) 74±2 m.y.

36b. *Miller and Engels (1975)* K-Ar
Map no. 92
Granitic (48°31'N, 117°40'W; Park Rapids 7½' quad., Stevens Co., WA). *Analytical data:* (muscovite) K_2O = 10.68%; $^*Ar^{40}$ = 14.38 x 10^{-10} moles/gm (Ar_{rad} = 86%); (biotite) K_2O = 8.70%; $^*Ar^{40}$ = 9.568 x 10^{-10} moles/gm (Ar_{rad} = 70%). *Method:* h, k, m. *Constants:* a, b, d.

(muscovite) 89±6 m.y.
(biotite) 74±2 m.y.

37. *Miller and Engels (1975)* K-Ar
Map no. 26
Granitic (48°48'N, 117°28'W; Metaline 7½' quad., Pend Oreille Co., WA). *Analytical data:* (muscovite) K_2O = 10.77%; $^*Ar^{40}$ = 13.98 x 10^{-10} moles/gm (Ar_{rad} = 91%); (biotite) K_2O = 8.88%; $^*Ar^{40}$ = 10.51 x 10^{-10} moles/gm (Ar_{rad} = 82%). *Method:* h, k, m. *Constants:* a, b, d.

(muscovite) 85.9±2.6 m.y.
(biotite) 78.5±2.4 m.y.

38. *Miller and Engels (1975)* K-Ar
Map no. 67
Granitic (48°2'N, 117°15'W; Camden 7½' quad., Spokane Co., WA). *Analytical data:* (hornblende) K_2O = 1.165%; $^*Ar^{40}$ = 1.502 x 10^{-10} moles/gm (Ar_{rad} = 79%); (biotite) K_2O = 8.57%; $^*Ar^{40}$ = 6.150 x 10^{-10} moles/gm (Ar_{rad} = 84%). *Method:* h, k, m. *Constants:* a, b, d.

(hornblende) 85.3±2.6 m.y.
(biotite) 48.0±1.5 m.y.

39. *Miller and Engels (1975)* K-Ar
Map no. 20
Granitic (48°43'N, 117°4'W; Orwig Hump 7½' quad., Pend Oreille Co., WA). *Analytical data:* K_2O = 9.27%; $^*Ar^{40}$ = 11.85 x 10^{-10} moles/gm (Ar_{rad} = 96%). *Method:* h, k, m. *Constants:* a, b, d.

(biotite) 84.6±2.5 m.y.

40a. *Engels (1975)* K-Ar
Map no. 8
Leucocratic dike (48°30'N, 117°40'W; NE¼ S32, T35N, R41E; Park Rapids 7½' quad., Stevens Co., WA). *Analytical data:* (muscovite) K_2O = 10.72%; $^*Ar^{40}$ = 1.366 x 10^{-9} moles/gm (Ar_{rad} = 88.9%); (biotite) K_2O = 7.895%; $^*Ar^{40}$ = 6.996 x 10^{-10} moles/gm (Ar_{rad} = 54.5%). *Method:* h, k, m. *Constants:* a, c, d.

(muscovite) 84±2 m.y.
(biotite) 59±2 m.y.

40b. *Miller and Engels (1975)* K-Ar
Map no. 91
Granitic (48°30'N, 117°40'W; Park Rapids 7½' quad., Stevens Co., WA). *Analytical data:* (muscovite) K_2O = 10.72%; $^*Ar^{40}$ = 13.66 x 10^{-10} moles/gm (Ar_{rad} = 89%); (biotite) K_2O = 7.90%; $^*Ar^{40}$ = 6.996 x 10^{-10} moles/gm (Ar_{rad} = 54%). *Method:* h, k, m. *Constants:* a, b, d.

(muscovite) 84±2 m.y.
(biotite) 59±2 m.y.

41a. *Engels (1975)* K-Ar
Map no. 6
Phillips Lake granodiorite (48°39'N, 117°30'W; SW¼ S8, T36N, R42E; Aladdin Mtn. 7½' quad., Stevens Co., WA). *Analytical data:* (muscovite) K_2O = 10.64%; $^*Ar^{40}$ = 1.356 x 10^{-9} moles/gm (Ar_{rad} = 88.9%); (biotite) K_2O = 9.26%; $^*Ar^{40}$ = 1.089 x 10^{-9} moles/gm (Ar_{rad} = 90.5%). *Method:* h, k, m. *Constants:* a, c, d.

(muscovite) 84±4 m.y.
(biotite) 79±3 m.y.

41b. *Miller and Engels (1975)* K-Ar
Map no. 30
Granitic (48°39'N, 117°30'W; Aladdin 7½' quad., Stevens Co., WA). *Analytical data:* (muscovite) K_2O = 10.64%; $^*Ar^{40}$ = 13.56 x 10^{-10} moles/gm (Ar_{rad} = 89%); (biotite) K_2O = 9.26%; $^*Ar^{40}$ = 10.89 x 10^{-10} moles/gm (Ar_{rad} = 90%). *Method:* h, k, m. *Constants:* a, b, d.

(muscovite) 84±4 m.y.
(biotite) 79±3 m.y.

42. *Engels and others (1976)* Pb-alpha
MHS-1-60
Diorite (48°17'N, 118°43'W; Seventeenmile Mtn. 15' quad., Ferry Co., WA). *Analyzer:* Stern. *Analytical data:* 133 d/mg/hr; Pb = 4.2 ppm.

(zircon) 80±10 m.y.

43. *Engels and others (1976)* Pb-alpha
032 M362

Scatter Creek Formation, rhyodacite (48°39'N, 118° 40'W; Republic 15' quad., Ferry Co., WA). *Analyzer:* Stern. *Analytical data:* 89 d/mg/hr; Pb = 2.8 ppm.

(zircon) 80±15 m.y.

44a. *Engels (1975)* K-Ar
Map no. 16
Muscovite quartz monzonite (48°00'N, 117°34'W; NW¼ S25,T30N,R41E; Deer Lake 7½' quad., Stevens Co., WA). *Analytical data:* K_2O = 10.235%; $^*Ar^{40}$ = 1.204 x 10^{-9} moles/gm (Ar_{rad} = 92.0%). *Method:* h, k, m. *Constants:* a, c, d.

(muscovite) 78±2 m.y.

44b. *Miller and Engels (1975)* K-Ar
Map no. 78
Granitic (48°00'N, 117°34'W; Deer Lake 7½' quad., Stevens Co., WA). *Analytical data:* K_2O = 10.24%; $^*Ar^{40}$ = 12.04 x 10^{-10} moles/gm (Ar_{rad} = 92%). *Method:* h, k, m. *Constants:* a, b, d.

(muscovite) 78±2 m.y.

45. *Miller and Engels (1975)* K-Ar
Map no. 82
Granitic (48°1'N, 117°52'W; Forest Center 7½' quad., Stevens Co., WA). *Analytical data:* K_2O = 9.05%; $^*Ar^{40}$ = 10.40 x 10^{-10} moles/gm (Ar_{rad} = 89%). *Method:* h, k, m. *Constants:* a, b, d.

(biotite) 76.2±2.3 m.y.

46. *Becraft and Weis (1963)* Pb-alpha
6W501
Loon Lake granite, porphyritic quartz monzonite (47° 56.2'N, 118°2.1'W; W½ SW¼ S9,T28N,R38E; Turtle Lake 15' quad., Stevens Co., WA). *Analyzer:* Stern. Pb — Rose & Worthing. *Analytical data:* 1097 alpha/mg-hr; Pb = 32.3 ppm.

(zircon) 75±10 m.y.

47. *Engels and others (1976)* Pb-alpha
DA-20
Daybreak Mine, granite (47°57'N, 117°12'W; Mt. Spokane 15' quad., Spokane Co., WA). *Analyzer:* Stern. *Analytical data:* 4077 d/mg/hr; Pb = 150 ppm.

(monazite) 75±10 m.y.

48. *Engels and others (1976)* Pb-alpha
58M-360
Granodiorite (48°37.5'N, 118°50.3'W; Aeneas 15' quad., Ferry Co., WA). *Analyzer:* Stern. *Analytical data:* (zircon) 270 d/mg/hr; Pb = 82 ppm; (monazite) 2860 d/mg/hr; Pb = 80 ppm.

(zircon) 75±10 m.y.
(monazite) 60±10 m.y.

49. *Engels and others (1976)* Pb-alpha
133M202
Sanpoil Volcanics, quartz monzonite (Location unknown, probably in Curlew quad.). *Analyzer:* Stern. *Analytical data:* 158 d/mg/hr; Pb = 4.3 ppm.

(zircon) 70±10 m.y.

50. *Engels and others (1976)* K-Ar
F-2222-55
Amphibolite (48°38'N, 118°22'W; Sherman Peak 15' quad., Ferry Co., WA). *Analyzer:* Obradovich. *Analytical data:* K_2O = .704%; $^*Ar^{40}$ = .710 x 10^{-10} moles/gm (Ar_{rad} = 76.1%). *Note:* minimum age.

(hornblende) 67.2±2.0 m.y.

51a. *Engels (1975)* K-Ar
Map no. 5
Phillips Lake granodiorite (48°24'N, 117°37'W; NE¼ S34,T34N,R41E; Calispell Peak 7½' quad., Stevens Co., WA). *Analytical data:* (muscovite) K_2O = 10.765%; $^*Ar^{40}$ = 1.092 x 10^{-9} moles/gm (Ar_{rad} = 76%); (biotite) K_2O = 9.360%; $^*Ar^{40}$ = 7.922 x 10^{-10} moles/gm (Ar_{rad} = 90%). *Method:* h, k, m. *Constants:* a, c, d.

(muscovite) 67±2 m.y.
(biotite) 56±2 m.y.

51b. *Miller and Engels (1975)* K-Ar
Map no. 89
Granitic (48°24'N, 117°37'W; Calispell Peak 7½' quad., Stevens Co., WA). *Analytical data:* (muscovite) K_2O = 10.76%; $^*Ar^{40}$ = 10.92 x 10^{-10} moles/gm (Ar_{rad} = 76%); (biotite) K_2O = 9.36%; $^*Ar^{40}$ = 7.922 x 10^{-10} moles/gm (Ar_{rad} = 90%). *Method:* h, k, m. *Constants:* a, b, d.

(muscovite) 67±2 m.y.
(biotite) 56±2 m.y.

52. *Engels and others (1976)* Pb-alpha
H4P119
Quartz monzonite (48°54'N, 118°30.5'W; Curlew 15' quad., Ferry Co., WA). *Analyzer:* Stern. *Analytical data:* 465 d/mg/hr; Pb = 11.9 ppm.

(zircon) 65±10 m.y.

53. *Engels (1975)* K-Ar
Map no. 18
Aplite (48°24.5'N, 117°37'W; NE¼ S34,T34N,R41E; Chewelah Mtn. 15' quad., Stevens Co., WA). *Analytical data:* K_2O = 11.00%; $^*Ar^{40}$ = 1.033 x 10^{-9} moles/gm (Ar_{rad} = 90.5%). *Method:* h, k, m. *Constants:* a, c, d.

(muscovite) 63±2 m.y.

54a. *Engels (1975)* K-Ar
Map no. 12
Granodiorite (48°2'N, 117°43'W; NE¼ S11,T29N, R40E; Springdale 7½' quad., Stevens Co., WA). *Analytical data:* (hornblende) K_2O = .874%; $^*Ar^{40}$ = 8.231 x 10^{-11} moles/gm (Ar_{rad} = 73.4%); (biotite) K_2O = 8.88%; $^*Ar^{40}$ = 6.493 x 10^{-10} moles/gm (Ar_{rad} = 89.2%). *Method:* h, k, m. *Constants:* a, c, d.

(hornblende) 63±2 m.y.
(biotite) 49±2 m.y.

54b. *Miller and Engels (1975)* K-Ar
Map no. 81
Granitic (48°2'N, 117°43'W; Springdale 7½' quad., Stevens Co., WA). *Analytical data:* (hornblende) K_2O = .874%; $*Ar^{40}$ = .8231 x 10^{-10} moles/gm (Ar_{rad} = 73%); (biotite) K_2O = 8.88%; $*Ar^{40}$ = 6.493 x 10^{-10} moles/gm (Ar_{rad} = 89%). *Method:* h, k, m. *Constants:* a, b, d.

(hornblende) 63±2 m.y.
(biotite) 49±2 m.y.

55. *Engels and others (1976)* Pb-alpha
OIM 364
Quartz monzonite (48°44.3'N, 118°35.3'W; Republic 15' quad., Ferry Co., WA). *Analyzer:* Stern. *Analytical data:* 183 d/mg/hr; Pb = 4.4 ppm.

(zircon) 60±10 m.y.

56. *Engels and others (1976)* Pb-alpha
09M363
O'Brien Creek Formation, tuff (48°43.5'N, 118° 39.2'W; Republic 15' quad., Ferry Co., WA). *Analyzer:* Stern. *Analytical data:* 208 d/gm/hr; Pb = 4.9 ppm.

(zircon) 60±15 m.y.

57a. *Engels (1975)* K-Ar
Map no. 10
Silver Point quartz monzonite (48°2'N, 117°36'W; NW¼ S11,T29N,R41E; Deer Lake 7½' quad., Stevens Co., WA). *Analytical data:* (hornblende) K_2O = .817%; $*Ar^{40}$ = 7.304 x 10^{-11} moles/gm (Ar_{rad} = 67.3%); (biotite) K_2O = 8.70%; $*Ar^{40}$ = 6.502 x 10^{-10} moles/gm (Ar_{rad} = 88%). *Method:* h, k, m. *Constants:* a, c, d.

(hornblende) 60±2 m.y.
(biotite) 50±1 m.y.

57b. *Miller and Engels (1975)* K-Ar
Map no. 79
Granitic (48°2'N, 117°36'W; Deer Lake 7½' quad., Stevens Co., WA). *Analytical data:* (hornblende) K_2O = .817%; $*Ar^{40}$ = .7307 x 10^{-10} moles/gm (Ar_{rad} = 67%); (biotite) K_2O = 8.70%; $*Ar^{40}$ = 6.502 x 10^{-10} moles/gm (Ar_{rad} = 88%). *Method:* h, k, m. *Constants:* a, b, d.

(hornblende) 60±2 m.y.
(biotite) 50±1 m.y.

58. *Fox and others (1976)* K-Ar
O-131
Okanogan gneiss dome, monzonitic gneiss, alkalic border zone (48°56.6'N, 119°18.5'W; Mt. Bonoparte 15' quad., Okanogan Co., WA). *Analyzer:* K – Schlocker, Ar – Engels. *Analytical data:* K_2O = 2.05%; $*Ar^{40}$ = 1.787 x 10^{-10} moles/gm (Ar_{rad} = 85.9%). *Method:* g, k, m. *Constants:* a, c, d. *Note:* unit formerly included with Colville batholith.

(hornblende) 58.1±1.7 m.y.

59a. *Engels (1975)* K-Ar
Map no. 7
Phillips Lake granodiorite (48°23'N, 117°35'W; NE¼ S12,T34N,R41E; Calispell Peak 7½' quad., Stevens Co., WA). *Analytical data:* (muscovite) K_2O = 10.665%; $*Ar^{40}$ = 9.244 x 10^{-10} moles/gm (Ar_{rad} = 90.9%); (biotite) K_2O = 9.448%; $*Ar^{40}$ = 7.259 x 10^{-10} moles/gm (Ar_{rad} = 88.6%). *Method:* h, k, m. *Constants:* a, c, d.

(muscovite) 58±2 m.y.
(biotite) 52±2 m.y.

59b. *Miller and Engels (1975)* K-Ar
Map no. 88
Granitic (48°23'N, 117°35'W; Calispell Peak 7½' quad., Stevens Co., WA). *Analytical data:* (muscovite) K_2O = 10.66%; $*Ar^{40}$ = 9.244 x 10^{-10} moles/gm (Ar_{rad} = 91%); (biotite) K_2O = 9.45%; $*Ar^{40}$ = 7.259 x 10^{-10} moles/gm (Ar_{rad} = 89%). *Method:* h, k, m. *Constants:* a, b, d.

(muscovite) 58±2 m.y.
(biotite) 52±2 m.y.

60a. *Engels (1975)* K-Ar
Map no. 17
Quartz monzonite (48°12'N, 117°30'W; SE¼ S9,T31N, R42E; Nelson Peak 7½' quad., Stevens Co., WA). *Analytical data:* (muscovite) K_2O = 10.745%; $*Ar^{40}$ = 9.042 x 10^{-10} moles/gm (Ar_{rad} = 78.3%); (biotite) K_2O = 9.12%; $*Ar^{40}$ = 7.56 x 10^{-10} moles/gm (Ar_{rad} = 85.6%). *Method:* h, k, m. *Constants:* a, c, d.

(muscovite) 56±2 m.y.
(biotite) 55±2 m.y.

60b. *Miller and Engels (1975)* K-Ar
Map no. 76
Granitic (48°12'N, 117°30'W; Nelson Peak 7½' quad., Stevens Co., WA). *Analytical data:* (muscovite) K_2O = 10.74%; $*Ar^{40}$ = 9.042 x 10^{-10} moles/gm (Ar_{rad} = 78%); (biotite) K_2O = 9.12%; $*Ar^{40}$ = 7.568 x 10^{-10} moles/gm (Ar_{rad} = 86%). *Method:* h, k, m. *Constants:* a, b, d.

(muscovite) 56±2 m.y.
(biotite) 55±2 m.y.

61. *Miller and Engels (1975)* K-Ar
Map no. 34
Granitic (48°35'N, 117°21'W; Ruby 7½' quad., Pend Oreille Co., WA). *Analytical data:* (muscovite) K_2O = 10.72%; $*Ar^{40}$ = 8.988 x 10^{-10} moles/gm (Ar_{rad} = 93%); (biotite) K_2O = 8.65%; $*Ar^{40}$ = 6.384 x 10^{-10} moles/gm (Ar_{rad} = 95%). *Method:* h, k, m. *Constants:* a, b, d.

(muscovite) 55.9±1.7 m.y.
(biotite) 49.3±1.5 m.y.

62. *Engels and others (1976)* Pb-alpha
Q16M259
Quartz monzonite (48°37.5'N, 118°33'W; Republic 15' quad., Ferry Co., WA). *Analyzer:* Stern. *Analytical*

data: 134 d/gm/hr; Pb = 3.0 ppm.

(zircon) 55±15 m.y.

63. *Fox and others (1976)* K-Ar
0-38A
Okanogan gneiss dome, granodiorite (48°54.1'N, 119°18.7'W; Oroville 15' quad., Okanogan Co., WA). *Analyzer:* K – Schlocker, Ar – Engels. *Analytical data:* K_2O = 8.245%; $^*Ar^{40}$ = 6.770 x 10^{-10} moles/gm (Ar_{rad} = 83.8%). *Method:* g, k, m. *Constants:* a, c, d. *Note:* formerly included with Colville batholith.

(biotite) 54.8±1.7 m.y.

64. *Fox and others (1976)* K-Ar
0-296D
Okanogan gneiss dome, monzonite of alkalic border zone (48°51.6'N, 119°01.3'W; Mt. Bonoparte 15' quad., Okanogan Co., WA). *Analyzer:* K – Schlocker, Ar – Engels. *Analytical data:* (hornblende) K_2O = 1.524%; $^*Ar^{40}$ = 1.232 x 10^{-10} moles/gm (Ar_{rad} = 71.7%); (biotite) K_2O = 8.61%; $^*Ar^{40}$ = 6.445 x 10^{-10} moles/gm (Ar_{rad} = 82.2%). *Method:* g, k, m. *Constants:* a, c, d. *Note:* formerly included with Colville batholith.

(hornblende) 53.9±1.6 m.y.
(biotite) 50.0±1.5 m.y.

65. *Fox and others (1976)* K-Ar
0-37A
Crosscutting pegmatite, Okanogan gneiss dome (48° 54.4'N, 119°17.5'W; Oroville 15' quad., Okanogan Co., WA). *Analyzer:* K – Schlocker, Ar – Engels. *Analytical data:* (muscovite -20 mesh) K_2O = 10.415%; $^*Ar^{40}$ = 7.634 x 10^{-10} moles/gm (Ar_{rad} = 63.7%), 8.406 x 10^{-10} moles/gm (Ar_{rad} = 62.3%); (muscovite 5mm disks) K_2O = 10.375%; $^*Ar^{40}$ = 7.955 x 10^{-10} moles/gm (Ar_{rad} = 17.9%), 7.890 x 10^{-10} moles/gm (Ar_{rad} = 16.2%). *Method:* g, k, m. *Constants:* a, c, d. *Note:* formerly included with Colville batholith.

(muscovite 53.8±1.6 m.y.
-20 mesh) 49.0±2.2 m.y.
(muscovite 51.2±1.6 m.y.
5 mm disks) 50.8±1.6 m.y.

66. *Engels and others (1976)* K-Ar
OBP-65-07
Granodiorite (48°52.5'N, 118°40.5'W; Curlew 15' quad., Ferry Co., WA). *Analyzer:* Obradovich. *Analytical data:* (hornblende) K_2O = .850%; $^*Ar^{40}$ = .683 x 10^{-10} moles/gm (Ar_{rad} = 77.3%); mesh +50; (biotite) K_2O = 8.20%; $^*Ar^{40}$ = 6.42 x 10^{-10} moles/gm (Ar_{rad} = 75.6%).

(hornblende) 53.7±2.7 m.y.
(biotite) 52.2±1.7 m.y.

67. *Engels and others (1976)* K-Ar
OBP-65-06
Scatter Creek Formation, rhyodacite porphyry intrusive (48°57.5'N, 118°34'W; Curlew 15' quad., Ferry Co., WA). *Analyzer:* Obradovich. *Analytical data:* (biotite) K_2O = 6.28%; $^*Ar^{40}$ = 5.02 x 10^{-10} moles/gm (Ar_{rad} = 85.2%); (hornblende) K_2O = 1.10%; $^*Ar^{40}$ = .865 x 10^{-10} moles/gm (Ar_{rad} = 75.3%); mesh 80-100.

(biotite) 53.4±2.0 m.y.
(hornblende) 52.6±2.1 m.y.

68. *Engels and others (1976)* K-Ar
60N7
O'Brien Creek Formation, tuff (48°23'N, 117°15'W; Browns Lake 7½' quad., Pend Oreille Co., WA). *Analyzer:* Obradovich. *Analytical data:* K_2O = 8.74%; $^*Ar^{40}$ = 6.94 x 10^{-10} moles/gm (Ar_{rad} = 94.0%).

(biotite) 53.1±1.5 m.y.

69. *Miller and Engels (1975)* K-Ar
Map no. 66
Granitic (47°47'N, 117°28'W; Deer Park 15' quad., Pend Oreille Co., WA). *Analytical data:* (muscovite) K_2O = 10.74%; $^*Ar^{40}$ = 8.504 x 10^{-10} moles/gm (Ar_{rad} = 75%); (biotite) K_2O = 9.17%; $^*Ar^{40}$ = 6.56 x 10^{-10} moles/gm (Ar_{rad} = 24%). *Method:* h, k, m. *Constants:* a, b, d.

(muscovite) 52.9±1.6 m.y.
(biotite) 47.9±1.6 m.y.

70. *Engels and others (1976)* K-Ar
OBP-65-03
Sanpoil Volcanics, rhyodacite lava (48°34.5'N, 118° 37.5'W; Republic 15' quad., Ferry Co., WA). *Analyzer:* Obradovich. *Analytical data:* (biotite) K_2O = 7.51%; $^*Ar^{40}$ = 5.88 x 10^{-10} moles/gm (Ar_{rad} = 83.1%); mesh 50-100; (plagioclase) K_2O = .731%; $^*Ar^{40}$ = .551 x 10^{-10} moles/gm (Ar_{rad} = 47.9%); mesh 100-150; (plagioclase) K_2O = .715; $^*Ar^{40}$ = .517 x 10^{-10} moles/gm (Ar_{rad} = 68.2%); mesh 80-100.

(biotite) 52.4±1.8 m.y.
(plagioclase) 50.4±2.5 m.y.
(plagioclase) 48.4±3.0 m.y.

71. *Engels and others (1976)* K-Ar
OBP-65-02
Sanpoil Volcanics, rhyodacite (48°31'N, 118°44'W; Republic 15' quad., Ferry Co., WA). *Analyzer:* Obradovich. *Analytical data:* (biotite) K_2O = 8.16%; $^*Ar^{40}$ = 6.36 x 10^{-10} moles/gm (Ar_{rad} = 94.1%).; (plagioclase) K_2O = .850%; $^*Ar^{40}$ = .574 x 10^{-10} moles/gm (Ar_{rad} = 79.8%); mesh 100; (plagioclase) K_2O = .820%; $^*Ar^{40}$ = .548 x 10^{-10} moles/gm (Ar_{rad} = 92.5%); mesh 50-100.

(biotite) 52.1±1.7 m.y.
(plagioclase) 45.2±1.6 m.y.
(plagioclase) 44.8±2.2 m.y.

72. *Engels and others (1976)* K-Ar
OBP-65-08
Quartz monzonite of Long Alec Creek (48°51'N, 118°30'W; Curlew 15' quad., Ferry Co., WA). *Analyzer:* Obradovich. *Analytical data:* K_2O = 8.54%;

$*Ar^{40}$ = 6.60 x 10^{-10} moles/gm (Ar_{rad} = 91.8%); mesh +50.

(biotite) 51.7±1.6 m.y.

73. *Miller and Engels (1975)* K-Ar
Map no. 33
Granitic (48°36′N, 117°22′W; Ruby 7½′ quad., Pend Oreille Co., WA). *Analytical data:* K_2O = 8.96%; $*Ar^{40}$ = 6.861 x 10^{-10} moles/gm (Ar_{rad} = 90%). *Methods:* h, k, m. *Constants:* a, b, d.

(biotite) 51.2±1.5 m.y.

74. *Engels and others (1976)* K-Ar
OBP-65-04
Quartz monzonite (48°37′N, 118°32.5′W; Republic 15′ quad., Ferry Co., WA). *Analyzer:* Obradovich. *Analytical data:* K_2O = 9.16%; $*Ar^{40}$ = 6.99 x 10^{-10} moles/gm (Ar_{rad} = 89.5%).

(biotite) 51.1±1.6 m.y.

75. *Engels and others (1976)* K-Ar
OBP-65-01
Sanpoil Volcanics, dacite (48°52′N, 118°55′W; Bodie Mtn. 15′ quad., Okanogan Co., WA). *Analyzer:* Obradovich. *Analytical data:* K_2O = .580%; $*Ar^{40}$ = .444 x 10^{-10} moles/gm (Ar_{rad} = 66.3%).

(plagioclase) 51.1±3.0 m.y.

76. *Engels and others (1976)* K-Ar
P-6-1
Sanpoil Formation, rhyodacite (48°20′N, 117°12′W; Skookum Creek 7½′ quad., Pend Oreille Co., WA). *Analyzer:* Obradovich. *Analytical data:* (hornblende) K_2O = 1.05%; $*Ar^{40}$ = .803 x 10^{-10} moles/gm (Ar_{rad} = 67.2%); (biotite) K_2O = 8.32%; $*Ar^{40}$ = 6.28 x 10^{-10} moles/gm (Ar_{rad} = 94.0%).

(hornblende) 51.0±1.8 m.y.
(biotite) 50.4±1.3 m.y.

77a. *Engels (1975)* K-Ar
Map no. 11
Silver Point quartz monzonite (48°8′N, 117°17′W; NW¼ S5,T30N,R44E; Sacheen Lake 7½′ quad., Pend Oreille Co., WA). *Analytical data:* (hornblende) K_2O = .6078%; $*Ar^{40}$ = 4.642 x 10^{-11} moles/gm (Ar_{rad} = 62.5%); (biotite) K_2O = 8.45%; $*Ar^{40}$ = 6.016 x 10^{-10} moles/gm (Ar_{rad} = 78.2%). *Method:* h, k, m. *Constants:* a, c, d.

(hornblende) 51±5 m.y.
(biotite) 48±1 m.y.

77b. *Miller and Engels (1975)* K-Ar
Map no. 68
Granitic (48°8′N, 117°17′W; Sacheen Lake 7½′ quad., Pend Oreille Co., WA). *Analytical data:* (hornblende) K_2O = .6078%; $*Ar^{40}$ = .4642 x 10^{-10} moles/gm (Ar_{rad} = 62%); (biotite) K_2O = 8.45%; $*Ar^{40}$ = 6.016 x 10^{-10} moles/gm (Ar_{rad} = 78%). *Method:* h, k, m. *Constants:* a, b, d.

(hornblende) 51±5 m.y.
(biotite) 48±1 m.y.

78. *Engels and others (1976)* K-Ar
F-2411-68
Amphibolite (48°38′N, 118°22′W; Sherman Peak 15′ quad., Ferry Co., WA). *Analyzer:* Obradovich. *Analytical data:* K_2O = 8.50%; $*Ar^{40}$ = 6.41 x 10^{-10} moles/gm (Ar_{rad} = 94.2%). *Note:* minimum age.

(biotite) 50.4±1.4 m.y.

79. *Engels and others (1976)* K-Ar
37TL7
Sanpoil Volcanics, rhyodacite (47°56′N, 118°10′W; Turtle Lake 15′ quad., Stevens Co., WA). *Analyzer:* Obradovich. *Analytical data:* K_2O = .983%; $*Ar^{40}$ = .739 x 10^{-10} moles/gm (Ar_{rad} = 89%).

(hornblende) 50.3±1.4 m.y.

80. *Engels and others (1976)* K-Ar
P-6-2
Sanpoil Volcanics, rhyodacite (48°34.4′N, 118°0.8′W; Kettle Falls 7½′ quad., Stevens Co., WA). *Analyzer:* Obradovich. *Analytical data:* K_2O = 7.27%; $*Ar^{40}$ = 5.46 x 10^{-10} moles/gm (Ar_{rad} = 90.2%).

(biotite) 50.2±1.3 m.y.

81a. *Miller and Engels (1975)* K-Ar
Map no. 80
Granitic (48°4′N, 117°40′W; Springdale 7½′ quad., Stevens Co., WA). *Analytical data:* K_2O = 8.82%; $*Ar^{40}$ = 6.657 x 10^{-10} moles/gm (Ar_{rad} = 88%). *Method:* h, k, m. *Constants:* a, b, d.

(biotite) 50±2 m.y.

81b. *Engels (1975)* K-Ar
Map no. 13
Map no. 14
Map no. 15
Quartz monzonite (48°4′N, 117°40′W; NW¼ S32, T30N,R41E; Springdale 7½′ quad., Stevens Co., WA). *Analytical data:* (biotite no. 13) K_2O = 8.825%; $*Ar^{40}$ = 6.657 x 10^{-10} moles/gm (Ar_{rad} = 88.2%); (hornblende no. 13) K_2O = .338%; $*Ar^{40}$ = 1.745 x 10^{-10} moles/gm (Ar_{rad} = 82.5%); (hornblende no. 14) K_2O = .3555%; $*Ar^{40}$ = 1.671 x 10^{-10} moles/gm (Ar_{rad} = 65.0%); (biotite no. 15) K_2O = 8.455%; $*Ar^{40}$ = 6.445 x 10^{-10} moles/gm (Ar_{rad} = 51.7%); (hornblende no. 15) K_2O = .374%; $*Ar^{40}$ = 1.136 x 10^{-10} moles/gm (Ar_{rad} = 61.3%). *Method:* h, k, m. *Constants:* a, c, d.

(biotite no. 13) 50±2 m.y.
(hornblende no. 13) 320±23 m.y.
(hornblende no. 14) 294±15 m.y.
(biotite no. 15) 51±2 m.y.
(hornblende no. 15) 195±8 m.y.

82. *Miller and Engels (1975)* K-Ar
Map no. 75

Granitic (48°26'N, 117°23'W; Tacoma Peak 7½' quad., Pend Oreille Co., WA). *Analytical data:* (biotite) K_2O = 10.80%; $*Ar^{40}$ = 8.653 x 10^{-10} moles/gm (Ar_{rad} = 79%); (hornblende) K_2O = 8.28%; $*Ar^{40}$ = 5.993 x 10^{-10} moles/gm (Ar_{rad} = 86%). *Method:* h, k, m. *Constants:* a, b, d.

(biotite) 49.8±1.5 m.y.
(hornblende) 48.4±1.5 m.y.

83. *Fox and others (1976)* K-Ar
0-36A
Okanogan gneiss dome, granodiorite (48°53.3'N, 119° 17.0'W; Oroville 15' quad., Okanogan Co., WA). *Analyzer:* K – Schlocker, Ar – Engels. *Analytical data:* (muscovite) K_2O = 10.395%; $*Ar^{40}$ = 7.751 x 10^{-10} moles/gm (Ar_{rad} = 87.1%); (biotite) K_2O = 9.025%; $*Ar^{40}$ = 6.663 x 10^{-10} moles/gm (Ar_{rad} = 84.7%). *Methods:* g, k, m. *Constants:* a, c, d. *Note:* formerly included with Colville batholith.

(muscovite) 49.8±1.6 m.y.
(biotite) 49.3±1.6 m.y.

84. *Fox and others (1976)* K-Ar
0-176D
Okanogan gneiss dome, layered paragneiss (48°46.9'N, 119°18.8'W; Oroville 15' quad., Okanogan Co., WA). *Analyzer:* K – Schlocker, Ar – Engels. *Analytical data:* K_2O = 1.63%; $*Ar^{40}$ = 1.203 x 10^{-10} moles/gm (Ar_{rad} = 54.4%). *Method:* g, k, m. *Constants:* a, c, d. *Note:* referred to as Tonasket gneiss in Engels and others (1976).

(hornblende) 49.3±1.7 m.y.

85. *Engels and others (1976)* K-Ar
A32-4-81
Klondike Mountain, quartz latite (48°55'N, 118°48'W; Bodie Mtn. 15' quad., Ferry Co., WA). *Analyzer:* Obradovich. *Analytical data:* K_2O = 8.24%; $*Ar^{40}$ = 6.05 x 10^{-10} moles/gm (Ar_{rad} = 86.5%).

(biotite) 49.1±1.7 m.y.

86. *Fox and others (1976)* K-Ar
0-424B
Coyote Creek pluton, quartz monzonite (48°16.8'N, 119°08.5'W; Disautel 15' quad., Okanogan Co., WA). *Analyzer:* K – Schlocker, Ar – Engels. *Analytical data:* K_2O = 9.015%; $*Ar^{40}$ = 6.626 x 10^{-10} moles/gm (Ar_{rad} = 87.8%). *Method:* g, k, m. *Constants:* a, c, d.

(biotite) 49.1±1.5 m.y.

87. *Miller and Engels (1975)* K-Ar
Map no. 64
Granitic (47°51'N, 117°10'W; Mt. Spokane 15' quad., Pend Oreille Co., WA). *Analytical data:* (muscovite) K_2O = 10.74%; $*Ar^{40}$ = 7.829 x 10^{-10} moles/gm (Ar_{rad} = 57%); (biotite) K_2O = 9.50%; $*Ar^{40}$ = 6.680 x 10^{-10} moles/gm (Ar_{rad} = 72%). *Method:* h, k, m. *Constants:* a, b, d.

(muscovite) 48.7±1.7 m.y.
(biotite) 47.1±1.4 m.y.

88. *Fox and others (1976)* K-Ar
0-419
Swimptkin Creek pluton, quartz monzonite (48° 25.6'N, 119°09.1'W; Disautel 15' quad., Okanogan Co., WA). *Analyzer:* K – Schlocker, Ar – Engels. *Analytical data:* (hornblende) K_2O = .8645%; $*Ar^{40}$ = 6.234 x 10^{-11} moles/gm (Ar_{rad} = 57.8%); (biotite) K_2O = 8.89%; $*Ar^{40}$ = 6.390 x 10^{-10} moles/gm (Ar_{rad} = 77.7%). *Method:* g, k, m. *Constants:* a, c, d.

(hornblende) 48.2±1.5 m.y.
(biotite) 48.0±1.5 m.y.

89. *Miller and Engels (1975)* K-Ar
Map no. 65
Granitic (47°51'N, 117°11'W; Mt. Spokane 15' quad., Pend Oreille Co., WA). *Analytical data:* (muscovite) K_2O = 10.66%; $*Ar^{40}$ = 7.568 x 10^{-10} moles/gm (Ar_{rad} = 70%); (biotite) K_2O = 9.42%; $*Ar^{40}$ = 6.655 x 10^{-10} moles/gm (Ar_{rad} = 66%). *Method:* h, k, m. *Constants:* a, b, d.

(muscovite) 47.5±1.9 m.y.
(biotite) 47.3±1.6 m.y.

90. *Miller and Engels (1975)* K-Ar
Map no. 68
Granitic (48°12'N, 117°17'W; Sacheen Lake 7½' quad., Pend Oreille Co., WA). *Analytical data:* (hornblende) K_2O = .689%; $*Ar^{40}$ = .4824 x 10^{-10} moles/gm (Ar_{rad} = 49%); (biotite) K_2O = 8.88%; $*Ar^{40}$ = 6.197 x 10^{-10} moles/gm (Ar_{rad} = 70%). *Method:* h, k, m. *Constants:* a, b, d.

(hornblende) 46.8±1.7 m.y.
(biotite) 46.7±1.3 m.y.

91. *Engels and others (1975)* K-Ar
8a-BM-7
Klondike Mountain, rhyodacite (48°55'N, 118°49'W; Bodie Mtn. 15' quad., Okanogan Co., WA). *Analyzer:* Obradovich. *Analytical data:* K_2O = .656%; $*Ar^{40}$ = .454 x 10^{-10} moles/gm (Ar_{rad} = 72.5%).

(hornblende) 46.3±1.7 m.y.

92. *Fox and others (1976)* K-Ar
0-425
Okanogan gneiss dome, granodiorite (48°23.4'N, 119° 26.5'W; Omak Lake 15' quad., Okanogan Co., WA). *Analyzer:* K – Schlocker, Ar – Engels. *Analytical data:* K_2O = 9.455%; $*Ar^{40}$ = 6.500 x 10^{-10} moles/gm (Ar_{rad} = 82.9%). *Method:* g, k, m. *Constants:* a, c, d.

(biotite) 46.0±1.4 m.y.

93. *Engels and others (1976)* K-Ar
OBP-65-05
Klondike Mountain, quartz latite (48°55'N, 118°48'W; Bodie Mtn. 15' quad., Ferry Co., WA). *Analyzer:* Obradovich. *Analytical data:* K_2O = .713%; $*Ar^{40}$ =

440 x 10^{-10} moles/gm (Ar_{rad} = 76.4%); mesh -100.
(hornblende) 41.4±1.5 m.y.

VIa. COLUMBIA PLATEAU – UPPER COLUMBIA PLATEAU

1. *Engels and others (1976)* K-Ar
OJW-64-02
Basalt (47°38.3'N, 117°29.3'W; Spokane NW 7½' quad., Spokane Co., WA). *Analyzer:* Obradovich. *Analytical data:* (plagioclase) K_2O = .395%; $^*Ar^{40}$ = .0906 x 10^{-10} moles/gm (Ar_{rad} = 65.7%); (plagioclase) K_2O = .395%; $^*Ar^{40}$ = .0881 x 10^{-10} moles/gm (Ar_{rad} = 63.3%). *Note:* flow postdates Latah flora at Spokane.
(plagioclase) 15.5±0.8 m.y.
(plagioclase) 15.0±0.9 m.y.

2. *Engels and others (1976)* K-Ar
OJW-64-01
Basalt (47°39.9'N, 117°28.3'W; Spokane NW 7½' quad., Spokane Co., WA). *Analyzer:* Obradovich. *Analytical data:* K_2O = .467%; $^*Ar^{40}$ = .986 x 10^{-10} moles/gm (Ar_{rad} = 42.5%). *Note:* flow postdates Latah flora at Spokane.
(plagioclase) 14.2±1 m.y.

VIc. COLUMBIA PLATEAU – PALOUSE HILLS

1a. *Baksi and Watkins (1973)* K-Ar
9-2(i)
Grande Ronde, flow 9, basalt (46°05'N, 117°12'W; Anatone 15' quad., Asotin Co., WA). *Analyzer:* Baksi & Watkins. *Analytical data:* K = 1.41%; $^*Ar^{40}$ = 8.13 x 10^7 cm^3/g STP. *Constants:* a, b, d.
(whole rock) 15.0 m.y.

1b. *Watkins and Baksi (1974)* K-Ar
9-2(i)
Grande Ronde, flow 9, basalt (46°05'N, 117°12'W; Anatone 15' quad., Asotin Co., WA). *Analyzer:* Baksi & Watkins. *Analytical data:* K = 1.41%; $^*Ar^{40}$ = 8.16 x 10^7 cm^3/g STP (Ar_{rad} = 25.2%), 8.09 x $10^7 cm^3/g$ STP (Ar_{rad} = 25.0%). *Method:* g, p. *Constants:* a, b, d.
(whole rock) 14.4±0.4 m.y.

2. *Baksi and Watkins (1973)* K-Ar
Watkins and Baksi (1974)
16-3-2(ii)
Snake River Bend, flow 16, basalt (46°31'N, 117° 15'W; edge of Uniontown Plateau, Colton 7½' quad., Asotin Co., WA). *Analyzer:* Baksi and Watkins. *Analytical data:* K = .694%; $^*Ar^{40}$ = 4.05 x 10^7 cm^3/g STP. *Method:* g, p. *Constants:* a, b, d.
(whole rock) 14.6±0.3 m.y.

3a. *Baksi and Watkins (1973)* K-Ar
7-12-1(ii)
Snake River Bend, flow 7, basalt (46°31'N, 117° 15'W; edge of Uniontown Plateau; Colton 7½' quad., Asotin Co., WA). *Analyzer:* Baksi & Watkins. *Analytical data:* K = 1.37%; $^*Ar^{40}$ = 7.92 x 10^7 cm^3/g STP. *Constants:* a, b, d.
(whole rock) 14.3 m.y.

3b. *Watkins and Baksi (1974)* K-Ar
7-12-1(ii)
Snake River Bend, flow 7, basalt (46°31'N, 117° 15'W; edge of Uniontown Plateau; Colton 7½' quad., Asotin Co., WA). *Analyzer:* Baksi & Watkins. *Analytical data:* K = 1.37%; $^*Ar^{40}$ = 7.92 x 10^7 cm^3/g STP (Ar_{rad} = 51%). *Method:* g, p. *Constants:* a, b, d.
(whole rock) 14.5±0.3 m.y.

4. *Baksi and Watkins (1973)* K-Ar
Watkins and Baksi (1974)
27-2(i)
Grande Ronde, flow 27, basalt (46°05'N, 117°12'W; Anatone 15' quad., Asotin Co., WA). *Analyzer:* Baksi & Watkins. *Analytical data:* K = 1.48%; $^*Ar^{40}$ = 8.41 x 10^7 cm^3/g STP. *Method:* g, p. *Constants:* a, b, d.
(whole rock) 14.2±0.4 m.y.

5. *Baksi and Watkins (1973)* K-Ar
Watkins and Baksi (1974)
4-9-2(i)
Snake River Bend, flow 4, basalt (46°31'N, 117°15'W; edge of Uniontown Plateau; Colton 7½' quad., Asotin Co., WA). *Analyzer:* Baksi & Watkins. *Analytical data:* K = .733%; $^*Ar^{40}$ = 4.14 x 10^7 cm^3/g STP. *Method:* g, p. *Constants:* a, b, d.
(whole rock) 14.1±0.3 m.y.

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