TABLE 1.—*Chemical analyses, spectrographic analyses, calculated cation percentages, and cell factors* (F_c) *of some rocks and minerals associated with ultramafic rocks in northern Vermont*

[Dashed leaders (--) means not determined. Zero (0) means looked for spectrographically but not detected]

Tabulation No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
Type of Analysis [1]	R	S	S	R	S	R	S	R	R	S	S	R	R	R	R	R	R	R	R
						Sequence		Sequence				Sequence					Sequence		
Description [2]	Dunite	Serpentine from border of cross-fiber vein	Serpentine from typical asbestos "ore"	Massive Serpentinite	Serpentine	Lime-silicate rock	Serpentine-chlorite rock	Fine-grained amphibolite	Serpentine-chlorite rock	Massive picrolite	Picrolite	Serpentinite	Tremolite-chlorite rock	Chlorite-tremolite rock	Coarse amphibolite	Serpentine-chlorite rock	Lime-silicate rock	Lime-silicate rock	Graphitic qtz-ser-ab-chl schist
Laboratory or Serial No.	53-1089	E2131	E2132	53-1094	E2133	53-1098	E2134	53-1100	53-1101	E2135	E2136	53-1104	53-1105	53-1106	53-1107	53-1108	53-1109	53-1110	53-1111
Field No.	AR-13f (VT-1)	AR-13f (VT-2)	AV-81m (VT-4)	AR-73 (VT-6)	AV-127 (VT-8)	TPT-Vt-10 (VT-10)	TPT-Vt-11 (VT-11)	AV-78 (VT-12)	AV-78 (VT-13)	AR-3x (VT-14)	AR-52 (VT-15)	AV-209 (VT-16)	AV-205 (VT-17)	AV-206 (VT-18)	AV-208 (VT-19)	AR-110 (VT-20)	AR-110 (VT-21)	AR-110 (VT-22)	AR-111 (VT-23)
Chemical analysis (weight percent)																			
SiO_2	39.1	39.60	42.47	38.6	42.78	40.6	30.32	53.5	34.9	42.02	38.11	41.7	53.7	32.1	42.6	34.4	50.9	58.2	54.6
Al_2O_3	1.1	.78	1.21	1.8	.92	13.5	15.05	16.7	10.6	.14	4.41	1.2	2.5	13.3	13.9	9.2	15.8	14.8	17.8
Fe_2O_3	2.9	2.29	1.23	5.4	.93	2.2	3.35	2.6	2.4	1.26	2.79	1.4	.5	1.1	1.4	2.3	3.3	3.0	1.9
FeO	3.0	.26	.48	1.6	5.78	10.9	7.46	5.5	.50	.12	.21	5.2	3.9	10.9	12.8	1.0	3.2	3.8	6.6
MgO	47.5	42.35	41.21	40.6	36.90	7.9	30.13	3.9	38.2	42.07	39.05	37.6	24.2	22.4	13.9	37.3	5.1	3.5	3.4
CaO	.04	[5].00	[5].00	.07	[5].00	18.8	.26	9.8	.35	[5].00	1.09	.81	11.4	5.4	6.9	1.1	18.1	13.0	5.2
Na_2O	.00	.00	.00	.00	.00	.19	.00	4.8	.00	.00	.00	.00	.02	.01	1.6	.00	.05	.13	1.7
K_2O	.00	.00	.00	.00	.00	.00	.00	.30	.00	.00	.00	.00	.00	.00	.10	.00	.02	.48	3.8
H_2O^-	--	.57	.24	--	.09	--	.20	--	--	.89	.47	--	--	--	--	--	--	--	--
H_2O^+	7.3	13.44	12.42	12.0	11.82	3.0	11.81	.88	12.6	12.95	12.54	11.4	3.1	9.2	5.0	12.7	2.0	1.8	3.0
TiO_2	.01	.00	.00	.02	.01	1.1	.96	.89	.84	.01	.08	.02	.02	2.7	1.2	.93	.86	.75	.96
CO_2	.15	.24	.15	.15	.02	.05	.13	.05	.12	.25	.99	.92	.10	1.8	<.05	1.0	<.05	<.05	<.05
P_2O_5	.03	.00	.00	.04	.01	.18	.13	.16	.18	.00	.01	.01	.01	.40	.11	.22	.22	.22	.31
F	--	.00	.00	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Cl	.03	.02	.01	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
S	--	--	--	--	--	--	--	--	--	--	--	--	.01	.01	.38	.02	.02	.02	.49
Cr_2O_3	--	.17	.17	--	.29	--	.05	--	--	.02	.02	--	--	--	--	--	--	--	--
NiO	--	.25	.20	--	.28	--	.06	--	--	.15	.11	--	--	--	--	--	--	--	--
MnO	.22	.10	.06	.10	.16	.22	.39	.26	.38	.03	.03	.08	.10	.18	.29	.38	.26	.20	.16
C	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Sum	101.	100.07	99.85	100.	99.99	99.	100.30	99.	10.	99.91	99.91	100.	100.	100.	100.	101.	100.	100.	100.
Less O [7]	.01	.00	.00	--	--	--	--	--	--	--	--	--	.00	.00	.14	.01	.01	.01	.18
Total	101.	100.07	99.85	100.	99.99	99.	100.30	99.	10.	99.91	99.91	100.	100.	100.	100.	101.	100.	100.	100.
Analyst [8]	1, 2	3	3	1	3	1	3	1	1	3	3	1	1	1	1	1	1	1	1
Sp. Gr. Powder Grains	2.89	--	--	2.64	--	3.32	--	3.00	2.62	--	--	2.61	2.98	2.88	3.04	2.62	3.14	3.04	2.92
Spectrographic analysis (weight percent)																			
Cu	--	0.0060	0.013	--	0.013	--	0.0057	--	--	0.0007	0.0013	--	--	--	--	--	--	--	--
Pb	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Zn	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Mn	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Co	--	.0066	.0038	--	.0096	--	.013	--	--	.0040	.0050	--	--	--	--	--	--	--	--
Ni	--	.17	.11	--	.26	--	.056	--	--	.080	.074	--	--	--	--	--	--	--	--
Ga	--	<.0005	<.0005	--	<.0005	--	.0005	--	--	<.0005	<.0005	--	--	--	--	--	--	--	--
Cr	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
V	--	.002	.002	--	.002	--	.023	--	--	<.001	.0066	--	--	--	--	--	--	--	--
Sc	--	.001	.002	--	<.0005	--	.0046	--	--	<.0005	.0049	--	--	--	--	--	--	--	--
Y	--	<.001	<.001	--	<.001	--	.003	--	--	<.001	<.001	--	--	--	--	--	--	--	--
Yb	--	<.0002	<.0002	--	<.0002	--	.0003	--	--	<.0002	<.0002	--	--	--	--	--	--	--	--
Ti	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Zr	--	<.002	<.002	--	<.002	--	.0071	--	--	<.002	<.002	--	--	--	--	--	--	--	--
Be	--	0	0	--	0	--	0	--	--	0	0	--	--	--	--	--	--	--	--
Sr	--	0	0	--	0	--	0	--	--	0	0	--	--	--	--	--	--	--	--
Ba	--	0	0	--	0	--	0	--	--	0	0	--	--	--	--	--	--	--	--
Ca	--	<.01	.044	--	.045	--	--	--	--	<.01	--	--	--	--	--	--	--	--	--
Others [10]	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Analyst [11]	--	1	1	--	1	--	1	--	--	1	1	--	--	--	--	--	--	--	--
Cation[11] percent (based on atomic weights of 1955)																			
Si	33.6	37.24	39.59	36.1	40.70	40.3	29.30	50.1	32.3	39.48	35.78	39.0	49.3	31.5	41.2	32.1	49.5	57.0	53.3
Al	1.1	.86	1.33	2.0	1.03	15.8	17.14	18.4	11.5	.16	4.88	1.3	2.7	15.4	15.9	10.1	18.1	17.1	20.5
Fe^{3+}	1.9	1.62	.86	3.8	.67	1.6	2.43	1.8	1.7	.89	1.97	1.0	.4	.8	1.0	1.6	2.4	2.2	1.4
Fe^{2+}	2.2	.20	.37	1.2	4.60	9.0	6.03	4.3	.39	.09	.16	4.1	3.0	8.9	10.4	.78	2.6	3.1	5.4
Mg	60.8	59.35	57.25	56.5	52.32	11.7	43.39	5.5	52.6	58.90	54.64	52.5	33.1	32.8	20.0	51.9	7.4	5.1	5.0
Ca	.04	.00	.06	.07	.06	20.0	.27	9.8	.35	.00	1.10	.81	11.2	5.7	7.2	1.1	18.8	13.7	5.4
Na	.00	.00	--	.00	.00	.37	.00	8.7	.00	.00	.00	.00	.04	.02	3.0	.00	.09	.25	3.2
K	.00	.00	--	.00	.00	.00	.00	.36	.00	.00	.00	.00	.00	.00	.12	.00	.02	.60	4.7
Ti	.01	.00	--	.01	.01	.82	.70	.63	.58	.01	.06	.01	.01	2.0	.87	.65	.63	.55	.71
P	.02	.00	--	.03	.01	.15	.10	.13	.14	.00	.01	.01	.01	.33	.09	.17	.18	.18	.26
Cr	--	.13	.13	--	.22	--	.04	--	--	.02	.01	--	--	--	--	--	--	--	--
Ni	--	.19	.15	--	.21	--	.05	--	--	.11	.08	--	--	--	--	--	--	--	--
Co	--	.0062	.004	--	.0091	--	.013	--	--	.004	.0057	--	--	--	--	--	--	--	--
Mn	.16	.08	.05	.08	.13	.18	.32	.21	.30	.02	.02	.06	.08	.15	.24	.30	.21	.17	.13
Cu	--	.0051	.01	--	.011	--	.0052	--	--	.0006	.0011	--	--	--	--	--	--	--	--
Pb	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Zn	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Ga	--	<.0006	<.0006	--	<.0006	--	.0006	--	--	<.0004	<.0004	--	--	--	--	--	--	--	--
V	--	.002	.002	--	.002	--	.026	--	--	<.001	.0073	--	--	--	--	--	--	--	--
Sc	--	.002	.002	--	<.0006	--	.0058	--	--	<.0006	.0062	--	--	--	--	--	--	--	--
Y	--	<.0005	<.0005	--	<.0005	--	.002	--	--	<.0005	<.0005	--	--	--	--	--	--	--	--
Yb	--	<.0001	<.0001	--	<.0001	--	.0001	--	--	<.0001	<.0001	--	--	--	--	--	--	--	--
Zr	--	<.001	<.001	--	<.001	--	.0046	--	--	<.001	<.001	--	--	--	--	--	--	--	--
Be	--	0	0	--	0	--	0	--	--	0	0	--	--	--	--	--	--	--	--
Sr	--	0	0	--	0	--	0	--	--	0	0	--	--	--	--	--	--	--	--
Ba	--	0	0	--	0	--	0	--	--	0	0	--	--	--	--	--	--	--	--
C	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
C^{4+}	.18	.31	.19	.19	.02	.07	.17	.06	.15	.32	1.27	1.18	.13	2.4	<.07	1.3	<.07	<.07	<.07
Total	100.0	100.00	100.00	100.00	100.00	100.0	100.00	100.0	100.0	100.00	100.00	100.00	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Associated elements																			
H	41.8	84.31	77.23	74.8	75.01	19.9	76.13	5.5	77.7	81.15	78.53	71.2	19.0	60.2	32.3	79.1	13.0	5.9	19.5
F	--	.00	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Cl	.04	.03	.02	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
S	--	--	--	--	--	--	--	--	--	--	--	--	.02	.02	.69	.03	.04	.04	.90
O_t [14]	156.3	181.00	179.55	176.6	179.22	159.9	178.22	159.3	178.7	180.93	179.85	177.0	160.4	174.6	164.7	179.8	167.1	169.9	170.6
O not in OH and CO_2	114.1	96.07	101.94	101.4	104.17	139.9	101.75	153.7	100.7	99.14	98.78	103.4	141.1	109.6	132.4	98.1	154.1	164.0	151.1
F_c [15]	1.1394	[16]0.9620	--	0.9672	--	1.1663	[16]0.9300	1.1091	0.9635	--	--	0.9547	1.1191	1.0134	1.0798	0.9599	1.1120	1.0667	0.9599

Tabulation No.	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
Type of Analysis [1]	S	S	S	S	S	S	S	S	S	S	S	S	S	R	R	R	R	R	R	S	S
Description [2]	Magnetite from tramp-iron magnet in mill	Flaky serpentine	Amphibole	Amphibole	Epidote	Serpentinite	Serpentinite	Graphitic fine amphibolite	Graphitic fine amphibolite	Graphitic fine amphibolite	Serpentinite	Coarse amphibolite	Fine amphibolite	Coarse amphibolite	Fine amphibolite	Fine amphibolite	Albitic fine amphibolite	Coarse amphibolite	Graphitic fine amphibolite	Graphitic amphibolite	Graphitic amphibole asbestos
Laboratory or Serial No.	E1947A	143378	143379	143380a	143380b	143381	143382	143383	143384	143385	143386 B464	143387 B465	143388 B466	143389	143390	143391	143392	143393	143394	143395a	143395b
Field No.	(VT-24)	A-BM-53-12	A-BM-53-100	A-BM-53-139a	A-BM-53-139a	A-BM-53-18	A-BM-53-20	A-BM-53-112	A-BM-53-114	A-BM-53-115	A-BM-53-1	A-BM-53-139	A-BM-53-140	A-BM-34	A-BM-64	A-BM-53-63	A-BM-53-84	A-BM-53-98	A-BM-53-57	A-BM-53-111	A-BM-53-111
Chemical analysis (weight percent)																					
SiO_2	3.02	44.30	55.54	44.86	38.18	--	--	--	--	--	42.02	42.60	48.93	45.7	48.4	48.9	51.0	45.0	46.6	55.25	55.66
Al_2O_3	1.24	1.37	3.36	12.15	25.65	--	--	--	--	--	1.00	15.40	14.88	14.0	15.2	14.3	14.2	13.5	4.8	1.10	.72
Fe_2O_3	61.47	.36	1.92	3.58	9.37	--	--	--	--	--	3.54	4.11	2.10	4.4	3.7	2.9	2.9	4.9	2.9	.86	.72
FeO	26.44	4.64	3.98	11.61	.91	--	--	--	--	--	2.17	10.94	8.55	8.1	6.6	8.1	6.9	8.4	6.3	4.98	6.06
MgO	3.96	36.88	20.42	11.65	.49	--	--	--	--	--	37.47	9.30	7.99	10.4	7.0	8.9	8.4	10.9	22.0	20.59	19.22
CaO	.00	.12	11.16	9.62	23.28	--	--	--	--	--	[5].00	10.57	11.51	11.9	13.2	10.0	10.7	11.3	8.1	13.25	14.00
Na_2O	.00	.28	1.50	2.90	.32	--	--	--	--	--	.00	2.11	2.02	1.7	2.3	2.9	2.9	1.9	.11	.14	.44
K_2O	.00	.08	.17	.74	.08	--	--	--	--	--	.00	.60	.15	.51	.07	.08	.09	.25	.06	.10	.38
H_2O^-	.06	.00	.00	.00	.00	--	--	--	--	--	.13	.04	.03	--	--	--	--	--	--	.27	.20 }
H_2O^+	1.04	10.66	1.18	1.26	.56	--	--	--	--	--	11.64	2.76	2.48	1.7	1.8	2.7	2.2	2.2	4.2	1.49	2.10 }
TiO_2	.01	.11	.01	.83	.63	--	--	--	--	--	.01	1.15	.99	.76	1.0	1.0	.89	1.0	.08	.04	.07
CO_2	--	--	--	--	--	--	--	--	--	--	.10	.01	.01	<.05	<.05	<.05	<.05	<.05	<.05	--	--
P_2O_5	.00	.11	.15	.17	.17	--	--	--	--	--	.00	.01	.08	.11	.15	.13	.12	.16	.06	.06	--
F	--	.00	.08	.02	.01	--	--	--	--	--	.00	.03	.01	.01	.00	.00	.01	.03	.01	.01	.00
Cl	--	.00	--	--	--	--	--	--	--	--	.00	--	--	--	--	--	--	--	--	--	--
S	--	--	--	--	--	--	--	--	--	--	.35	--	--	--	--	--	--	--	--	--	--
Cr_2O_3	1.25	.35	--	--	--	--	--	--	--	--	.30	--	--	--	--	--	--	--	--	--	--
NiO	.83	.28	--	--	--	--	--	--	--	--	.20	--	--	--	--	--	--	--	--	--	--
MnO	.43	.06	.21	.23	.04	--	--	--	--	--	.15	.28	.21	.20	.20	.29	.20	.24	.20	.12	.26
C	--	--	--	--	--	14.4	11.2	2.9	5.9	4.3	1.42	--	--	--	--	--	--	--	6.9	1.32	.66
Sum	99.75	99.60	99.68	99.62	99.69	--	--	--	--	--	100.50	99.91	99.94	100.	100.	100.	100.	100.	102.	99.58	100.49
Less O [7]	--	.00	.03	.01	.00	--	--	--	--	--	.13	.01	.00	.00	.00	.00	.00	.01	.00	.00	.00
Total	99.75	99.60	99.65	99.61	99.69	--	--	--	--	--	100.37	99.90	99.94	100.	100.	100.	100.	100.	102.	99.58	100.49
Analyst [8]	4	5,2,6	5,6	5,6	5,6	7	7	7	7	7	8,2	8	8	9,10	9,10	9,10	9,10	9,10	9,11	12,6	12,6
Sp. Gr. Powder Grains	4.83	2.56	2.99	3.10	3.44	--	--	--	--	--	2.65	3.23	3.11	2.93	3.04	3.00	2.95	3.13	2.92	3.02	3.07
Spectrographic analysis (weight percent)																					
Cu	0.0034	0.0007	0.0009	0.02	0.005	--	--	--	--	--	0.005	0.02	0.004	0.003	0.003	0.01	0.003	0.006	0.007	0.004	0.003
Pb	--	0	0	0	0	--	--	--	--	--	0	0	0	0	0	0	.03	0	0	0	0
Zn	0	0	0	0	0	--	--	--	--	--	0	0	0	0	0	0	0	0	0	0	0
Mn	--	.05	.1	.1	.03	--	--	--	--	--	.1	.2	.2	.1	.04	.07	.2	.2	.1	.09	.3
Co	.061	.005	.004	.01	0	--	--	--	--	--	.007	.007	.003	.004	.003	.002	.003	.004	.002	.002	.002
Ni	.69	.2	.1	.03	.002	--	--	--	--	--	.1	.02	.008	.02	.009	.006	.01	.01	.07	.08	.09
Ga	0	0	0	.001	.003	--	--	--	--	--	0	.002	.002	.002	.002	.002	.002	.002	0	0	0
Cr	--	.2	.1	.03	.07	--	--	--	--	--	.2	.06	.02	.05	.03	.02	.02	.02	.2	.2	.1
V	.0096	.002	.002	.02	.02	--	--	--	--	--	.001	.02	.02	.02	.01	.009	.02	.02	.002	.003	.01
Sc	0	[9].0001	0	.008	.009	--	--	--	--	--	[9].0001	.009	.007	.007	.006	.006	.006	.006	0	0	0
Y	0	0	0	0	.006	--	--	--	--	--	0	.005	.005	.004	.005	.004	.004	.005	0	0	0
Yb	0	0	0	.0003	.0004	--	--	--	--	--	0	.0005	.0004	.0004	.0005	.0004	.0004	.0005	0	0	0
Ti	--	.006	.01	.4	.3	--	--	--	--	--	.006	.8	.7	.4	.5	.4	.7	.8	.02	.009	.01
Zr	0	0	0	.001	.003	--	--	--	--	--	0	.002	.004	.001	.004	.003	.003	.003	0	0	0
Be	0	0	0	0	0	--	--	--	--	--	0	0	0	0	0	0	0	0	0	.0002	.0002
Sr	.0004	0	0	0	.1	--	--	--	--	--	0	.006	.02	.02	.06	.02	.02	.007	0	0	0
Ba	.0002	0	0	.001	0	--	--	--	--	--	0	.001	.001	.002	.001	.02	.02	.007	0	0	0
Ca	.11	--	--	--	--	--	--	--	--	--	1	1	1	1	1	.001	.001	0	0	0	--
Others [10]	--	1	1	1	1	--	--	--	--	--	--	--	--	--	--	1	1	1	1	1	1
Analyst [11]	1	2	2	2	2	--	--	--	--	--	2	2	2	2	2	2	2	2	2	2	2
Cation[11] percent (based on atomic weights of 1955)																					
Si	3.73	41.58	50.34	41.96	36.90	--	--	--	--	--	37.75	40.83	46.76	43.3	46.1	46.3	47.9	42.8	34.1	48.57	50.19
Al	1.80	1.51	3.59	13.40	29.22	--	--	--	--	--	1.06	17.40	16.76	15.7	17.1	16.0	15.7	15.1	4.1	1.14	.76
Fe^{3+}	57.10	.25	1.31	2.52	6.81	--	--	--	--	--	2.39	2.96	1.51	3.2	2.7	2.1	2.0	3.5	1.6	.57	.49
Fe^{2+}	27.29	3.64	3.02	9.08	.73	--	--	--	--	--	1.63	8.77	6.84	6.4	5.2	6.4	5.4	6.7	3.9	3.66	4.57
Mg	7.28	51.59	27.58	16.24	.70	--	--	--	--	--	50.17	13.29	11.38	14.7	9.9	12.6	11.8	15.4	24.0	26.98	25.83
Ca	.20	.12	10.84	9.64	24.11	--	--	--	--	--	.00	10.86	11.79	12.1	13.5	10.1	10.8	11.5	6.3	12.48	13.52
Na	.00	.51	2.63	5.26	.60	--	--	--	--	--	.00	3.92	3.74	3.1	4.3	5.3	5.3	3.5	.16	.24	.77
K	.00	.10	.20	.88	.10	--	--	--	--	--	.00	.73	.18	.62	.09	.10	.11	.30	.06	.11	.44
Ti	.01	.08	.01	.58	.46	--	--	--	--	--	.01	.83	.71	.54	.7	.7	.63	.7	.04	.03	.05
P	.00	.09	.11	.14	.14	--	--	--	--	--	.00	.01	.07	.09	.12	.10	.10	.13	.04	.04	--
Cr	1.22	.26	.11	.02	.02	--	--	--	--	--	.21	.07	.02	.05	.03	.02	.02	.02	.17	.20	.10
Ni	.82	.21	.09	.03	.002	--	--	--	--	--	.15	.02	.007	.02	.009	.006	.007	.007	.05	.07	.08
Co	.077	.005	.004	.01	0	--	--	--	--	--	.006	.007	.003	.004	.003	.002	.003	.004	.002	.002	.002
Mn	.45	.05	.16	.18	.03	--	--	--	--	--	.12	.23	.17	.16	.16	.23	.16	.19	.12	.09	.20
Cu	.0037	.0006	.0007	.02	.005	--	--	--	--	--	.004	.02	.003	.003	.003	.007	.003	.006	.005	.003	.003
Pb	--	0	0	0	0	--	--	--	--	--	0	0	0	0	0	0	.0006	0	0	0	0
Zn	0	0	0	0	0	--	--	--	--	--	0	0	0	0	0	0	0	0	0	0	0
Ga	0	0	0	.001	.002	--	--	--	--	--	0	.002	.002	.002	.002	.002	.002	.002	0	0	0
V	.0141	.002	.002	.02	.02	--	--	--	--	--	.001	.02	.02	.02	.01	.010	.02	.02	.002	.003	.01
Sc	0	0	0	.010	.012	--	--	--	--	--	0	.012	.009	.009	.007	.007	.007	.007	0	0	0
Y	0	0	0	0	.004	--	--	--	--	--	0	.003	.003	.002	.003	.002	.002	.003	0	0	0
Yb	0	0	0	.0001	.0001	--	--	--	--	--	0	.0002	.0001	.0001	.0002	.0001	.0001	.0002	0	0	0
Zr	0	0	0	.0005	.002	--	--	--	--	--	0	.001	.002	.0005	.002	.002	.002	.002	0	0	0
Be	0	0	0	0	0	--	--	--	--	--	0	0	0	0	0	0	0	0	0	.0011	.0011
Sr	.0003	0	0	0	.07	--	--	--	--	--	--	.004	.01	.01	.04	.01	.01	.005	0	0	0
Ba	.0001	0	0	.0004	0	--	--	--	--	--	0	.0004	.0004	.0007	.0004	.0004	.0004	0	0	0	0
C	--	--	--	--	--	--	--	--	--	--	6.38	--	--	--	--	--	--	--	25.3	5.81	2.98
C^{4+}	--	--	--	--	--	--	--	--	--	--	.12	.01	.01	<.06	<.07	<.06	<.06	<.06	<.05	--	--
Total	100.00	100.00	100.00	100.00	100.00	--	--	--	--	--	100.00	100.00	100.00	100.0	100.0	100.0	100.0	100.0	100.0	100.00	100.00
Associated elements																					
H	8.56	66.75	7.13	7.86	3.61	--	--	--	--	--	69.76	17.63	15.81	10.8	11.4	17.1	13.8	14.0	20.5	8.74	12.63
F	--	.00	.23	.06	.03	--	--	--	--	--	.00	.09	.03	.03	.00	.00	.03	.09	.02	.03	.00
Cl	--	.00	--	--	--	--	--	--	--	--	.00	--	--	--	--	--	--	--	--	--	--
S	--	--	--	--	--	--	--	--	--	--	.59	--	--	--	--	--	--	--	--	--	--
O_t [14]	138.09	176.26	155.06	151.54	157.10	--	--	--	--	--	167.76	158.37	162.69	157.0	160.4	162.1	161.8	158.0	121.9	147.99	153.65
O not in OH and CO_2	129.53	109.51	147.93	143.68	153.49	--	--	--	--	--	97.76	140.72	146.86	146.2	149.0	145.0	148.0	144.0	101.4	139.25	141.02
F_c [15]	1.3455	0.9409	1.1343	1.1414	1.2234	--	--	--	--	--	1.0109	1.1570	1.1178	1.0649	1.0981	1.0853	1.0732	1.1321	1.3343	1.1838	1.1632

Tabulation No.	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56
Type of Analysis [1]	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S
Description [2]	Massive chromite from vein	Chromite from small vein	Magnetite from irregular pod	Magnetite from irregular pod	Dunite	Magnetite from chl-calc-mt vein in amphib	Magnetite from shear surfaces in serpentinite	Calcite from chl-calc-mt vein in amphib	Chlorite from chl-calc-mt vein in amphib	Chrysotile asbestos Mill sample of 3-T fiber	Serpentinite typical "ore"	Serpentinite bordering cross-fiber vein in dunite	Antigorite-chlorite rock	Picrolite	Serpentinite	Chrysotile and fibrous calcite intergrown
Laboratory or Serial No.	148091	148092	148093	148094	148095 C636	149991	149992	149993	149994	152564 E1941	152565 E1942	152566 E1943	152567 E1944	152568 E1945	152569 E1946	152570 E1947
Field No.	A-BM-29	A-BM-53-116	AR-9c	AR-9e	AV-248	A-BM-56-5	A-BM-56-6	A-BM-56-4a	A-BM-56-4b	A-BM-57-1	A-BM-57-2	A-BM-57-3	A-BM-57-4	AR-64	AV-127	AR-55
Chemical analysis (weight percent)																
SiO_2	5.1	3.1	--	--	40.25	0.20	0.50	--	32.18	39.48	38.76	37.83	32.92	43.62	42.90	7.66
Al_2O_3	5.2	--	--	--	.15	1.24	2.10 }		{ 16.07	.98	1.04	1.39	10.77	.69	.88	.15
Fe_2O_3	6.4	--	--	--	1.77	67.58	65.44 }	[3].08	{ .89	1.85	6.10	3.99	3.71	.82	.83	.30
FeO	14.5	[4]43.0	[4]80.8	[4]83.0	4.02	29.16	28.90 }		{ 1.38	.53	1.96	.55	5.58	.60	5.75	.16
MgO	13.1	--	--	--	49.54	.43	1.30	.06	33.88	41.40	39.25	41.79	32.69	41.48	37.23	8.30
CaO	--	--	--	--	[5].00	--	--	56.28	.62	.23	[5].00	[5].00	.03	[5].00	[5].00	44.87
Na_2O	--	--	--	--	.00	--	--	--	.06	.01	.01	.01	.00	.00	.00	.00
K_2O	--	--	--	--	.00	--	--	--	.03	.02	.03	.01	.01	.00	.00	.00
H_2O^-					{ .10	--	--	--	.70	1.00	.19	.43	.52	.07	.06	.26
H_2O^+	3.0	--	--	--	{ 3.46	--	--	--	13.94	13.39	11.99	13.25	11.99	12.29	11.88	2.70
TiO_2	.21	--	2.1	2.1	.00	1.32	.10	--	.02	.01	.00	.01	.99	.01	.00	.01
CO_2	.2	--	--	--	.07	--	--	--	.35	.47	.12	.21	.14	.04	.03	35.54
P_2O_5	[6]2.0	--	--	--	.00	--	--	--	.03	.01	.00	.00	.09	.10	.00	.00
F	--	--	--	--	--	--	--	--	.01	.00	.00	.00	.00	.01	.02	.00
Cl	--	--	--	--	.01	--	--	--	--	.02	.01	.01	.01	.00	.01	.01
S	<.1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Cr_2O_3	47.1	34.3	--	--	.25	.67	2.00	--	--	.19	.39	.36	.06	.04	.22	.03
NiO	--	--	--	--	.29	--	--	--	--	.24	.38	.32	.08	.09	.32	.03
MnO	--	--	--	--	.15	.35	.24	.01	.06	.08	.11	.10	.56	.07	.16	.15
C	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Sum	96.8	--	--	--	100.06	100.95	100.58	--	100.22	99.91	100.34	100.26	100.15	99.93	100.29	100.17
Less O [7]	<.1	--	--	--	.00	--	--	--	.00	.00	.00	.00	.00	.00	.01	.00
Total	96.8	--	--	--	100.06	100.95	100.58	--	100.22	99.91	100.34	100.26	100.15	99.93	100.28	100.17
Analyst [8]	13,6	13,6	13,6	13,6	14	15	15	12	12	4,6	4,6	4,6	4,6	4,6	4,6	4,6
Sp. Gr. Powder Grains	3.90	4.99	4.58	4.62	3.01	5.02 5.19	4.81 5.21	2.73	2.45	2.38	2.70	2.62	2.74	2.60	2.68	2.89
Spectrographic analysis (weight percent)																
Cu	0.002	--	--	--	0.0009	0.02	0.02	0	0.006	0.0026	0.00009	0.00064	0.0065	0.00077	0.0046	0.0019
Pb	0	--	--	--	0	--	--	0	--	--	--	--	--	--	--	--
Zn	.5	--	--	--	0	--	--	0	--	--	--	--	--	--	--	--
Mn	1	--	--	--	.1	--	--	--	--	--	--	--	--	--	--	--
Co	.2	--	--	--	.02	.03	.05	0	.01	.0057	.084	.0076	.011	.0058	.0068	.0024
Ni	.1	--	--	--	.4	.09	.3	0	.02	.14	.21	.20	.059	.063	.19	.018
Ga	0	--	--	--	0	--	--	0	0	0	0	0	0	0	0	0
Cr	--	--	--	--	.2	--	--	0	x	--	--	--	--	--	--	--
V	.04	--	--	--	0	.1	.008	0	.001	.0034	.0018	.0034	.016	.0013	.0020	0
Sc	.003	--	--	--	0	--	--	0	.0005	.0011	.0009	.001	.0064	0	0	0
Y	0	--	--	--	.001	--	--	0	0	0	0	0	.0035	0	0	0
Yb	0	--	--	--	0	--	--	0	0	0	0	0	.00030	0	0	0
Ti	.1	--	--	--	0	--	--	0	--	--	--	--	--	--	--	--
Zr	.002	--	--	--	0	--	--	0	0	0	0	0	0	0	0	0
Be	0	--	--	--	0	--	--	0	0	0	0	0	0	0	0	0
Sr	0	--	--	--	0	--	--	.001	--	0	0	0	0	0	0	.0004
Ba	0	--	--	--	0	0	0	0	--	.0003	0	0	.0001	.0004	0	0
Ca	.05	--	--	--	.06	.06	.06	--	--	--	.052	.017	--	.16	.026	--
Others [10]	2	--	--	--	3	--	--	4	--	--	--	--	--	--	--	--
Analyst [11]	2	--	--	--	2	3	3	4	3	1	1	1	1	1	1	1
Cation[11] percent (based on atomic weights of 1955)																
Si	5.6	--	--	--	33.62	0.25	0.62	--	30.65	37.41	36.63	35.62	31.81	40.42	40.66	6.53
Al	6.7	--	--	--	.15	1.83	3.07	--	18.04	1.10	1.16	1.54	12.27	.75	.98	.15
Fe^{3+}	5.3	--	--	--	1.11	63.80	61.05	--	.64	1.32	4.34	2.83	2.70	.57	.59	.19
Fe^{2+}	13.3	--	--	--	2.81	30.60	29.97	[12].04	1.10	.42	1.55	.43	4.51	.46	4.56	.11
Mg	21.4	--	--	--	61.67	.80	2.40	.07	48.10	58.46	55.28	58.64	47.08	57.28	52.59	10.54
Ca	.08	--	--	--	.07	.11	.11	49.88	.63	.23	.07	.024	.03	.22	.04	40.97
Na	--	--	--	--	.00	--	--	--	.11	.02	.02	.02	.00	.00	.00	.00
K	--	--	--	--	.00	--	--	--	.04	.02	.04	.01	.01	.00	.00	.00
Ti	.17	--	--	--	.00	1.25	.09	0	.01	.007	.00	.007	.72	.01	.00	.01
P	4.3	--	--	--	.00	--	--	--	.02	.008	.00	.00	.07	.08	.00	.00
Cr	40.8	--	--	--	.17	.66	1.96	0	.11	.14	.29	.27	.05	.03	.16	.02
Ni	.11	--	--	--	.19	.11	.38	0	.02	.18	.29	.24	.06	.07	.24	.02
Co	.22	--	--	--	.02	.04	.06	0	.01	.0057	.083	.0075	.01	.0056	.0063	.0020
Mn	1.20	--	--	--	.11	.37	.25	.007	.05	.06	.09	.08	.46	.05	.13	.11
Cu	.003	--	--	--	.0005	.03	.03	0	.006	.0023	.00008	.00057	.0058	.00067	.0040	.0015
Pb	0	--	--	--	0	--	--	0	--	--	--	--	--	--	--	--
Zn	.50	--	--	--	0	--	--	0	--	--	--	--	--	--	--	--
Ga	0	--	--	--	0	--	--	0	0	0	0	0	0	0	0	0
V	.06	--	--	--	0	.15	.012	0	.001	.0040	.0017	.0040	.018	.0017	.0023	0
Sc	.005	--	--	--	0	--	--	0	.0006	.0011	.0011	.002	.0081	--	0	0
Y	0	--	--	--	.0004	--	--	0	0	0	0	0	.0023	--	0	0
Yb	0	--	--	--	--	--	--	0	0	0	0	0	.00012	--	0	0
Zr	.001	--	--	--	--	--	--	0	0	0	0	0	0	--	0	0
Be	0	--	--	--	--	--	--	0	0	0	0	0	0	--	0	0
Sr	0	--	--	--	--	--	--	.0005	--	0	0	0	0	--	0	.0003
Ba	0	--	--	--	0	0	0	0	--	.0001	0	0	.00004	.0002	0	0
C	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
C^{4+}	.3	--	--	--	.08	--	--	[13]50.00	.46	.61	.15	.27	.19	.05	.04	41.35
Total	100.0	--	--	--	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Associated elements																
H	21.9	--	--	--	19.28	[13].50	[13]1.24	--	88.57	84.63	75.60	83.22	77.29	75.96	75.11	15.35
F	--	--	--	--	--	--	--	--	.03	.00	.00	.00	.00	.03	.06	.00
Cl	--	--	--	--	.01	--	--	--	--	.03	.02	.02	.02	.00	.02	.01
S	<.2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
O_t [14]	142.3	--	--	--	144.05	135.05	134.38	150.00	184.74	181.60	177.44	179.80	178.99	179.24	179.08	155.73
O not in OH and CO_2	119.8	--	--	--	124.61	134.55	133.14	50.00	95.25	95.75	101.54	96.04	101.32	103.18	103.89	57.68
F_c [15]	1.2006	--	--	--	1.2373	--	--	1.1264	0.8863	0.8725	0.9784	0.9574	0.9773	0.9633	0.9691	1.1663

[1] R, rapid analysis (colorimetric methods). S, standard analysis (conventional methods).

[2] Mineral abbreviations: ab, albite; amphib, amphibole; calc, calcite; chl, chlorite; mt, magnetite; qtz, quartz; ser, sericite.

[3] Reported as R_2O_3, which includes any or all of the following: Al_2O_3, total Fe as Fe_2O_3, TiO_2, P_2O_5, MnO.

[4] Total Fe calculated as FeO.

[5] Because of the unfavorable ratio of MgO to CaO, as much as 0.1 percent of CaO may have been missed.

[6] Percent P, calculated as elemental phosphorus.

[7] "Less O" is a correction for oxygen reported in oxides but actually displaced by S (assumed to be in pyrite), F, and Cl, as follows:

O for S $\cong \frac{3}{8} W_S$,
O for F $\cong .4\, W_F$,
O for Cl $\cong \frac{1}{4} W_{Cl}$,

where W_S, W_F, and W_{Cl} stand for weight percentage of S, Cl, and F, respectively. Fe in pyrite is assumed to have been reported as Fe_2O_3.

[8] Analysts are keyed to chemical analyses by the following numbers:
1. Rapid Rock Analysis Project, B. W. Brannock, project leader.
2. Chlorine by S. M. Berthold.
3. M. Seerveld, analyst.
4. Faye H. Neuerberg, analyst.
5. M. K. Carron, analyst. Alkalies by B. W. Brannock. Fluorine by S. M. Berthold.
6. Mineral separations by W. F. Ottenbridge.
7. Laura E. Reichen, analyst.
8. E. J. Tomasi and Faye H. Neuerburg, analysts.
9. Paul L. D. Elmore, Katrine E. White and Samuel D. Botts, analysts.
10. Fluorine by L. E. Reichen and S. M. Berthold.
11. Fluorine and free carbon by L. E. Reichen and S. M. Berthold.
12. S. M. Berthold, analyst.
13. Joseph I. Dinnin, analyst.
14. M. Balazs, analyst.
15. M. K. Carron, analyst.

[9] Value near limit of sensitivity; reported upon re-examination of plates by Harry Bastron.

[10] Other elements determined spectrographically are keyed as follows:
1. Looked for but not found (IWS-652): Ag, Au, Hg, Ru, Rh, Pd, Ce, Nd, Sm, Os, Ir, Pt, Mo, W, Re, Ge, Sn, As, Sb, Bi, Cd, Tl, In, La, Hf, Th, Nb, Ta, U, Li, Cs, P, B.
2. Looked for but not found (IWS-699): Ag, Au, Hg, Ru, Rh, Pd, Ir, Pt, Mo, W, Re, Ge, Sn, As, Sb, Bi, Te, Od, Tl, In, La, Ce, Hf, Th, Nb, Ta, U, P, B.
3. Looked for but not found (IWS-664): Ag, Au, Hg, Ru, Rh, Pd, Ce, Ir, Pt, Mo, W, Re, Ge, Sn, As, Sb, Bi, Cd, Tl, In, La, Hf, Th, Nb, Ta, P, B.
4. Looked for but not found (IWS-737): Ag, Au, Hg, Pd, Os, Ir, Pt, Mo, W, Ge, Sn, As, Sb, Bi, Cd, Tl, La, Th, Nb, Ta, U, P, B.

[11] Analysts are keyed to spectrographic analyses by the following numbers:
1. Raymond G. Havens, analyst.
2. Harry Bastrom, analyst.
3. Harry J. Rosé, analyst.
4. Janet D. Fletcher, analyst.

[12] Derived from weight percent value reported for "R_2O_3 [, which] contains any or all of the following: Al_2O_3, total Fe as Fe_2O_3, TiO_2, P_2O_5, MnO" as follows: From R_2O_3=0.08, the value Mn=0.01 was subtracted; the remaining R_2O_3 (=0.07) was assumed to be all FeO, calculated as Fe_2O_3.

[13] Calculated, based upon ideal value.

[14] O_t=total oxygen, including O associated with metallic ions and O in OH and CO_2.

[15] F_c=cell factor. Cation percentages, when multiplied by the cell factor, yield values that denote the contents of equal volumes of rock (the modified standard cell); the values are in terms of atoms per cell.

[16] Based on an assumed Sp.Gr. of 2.62.