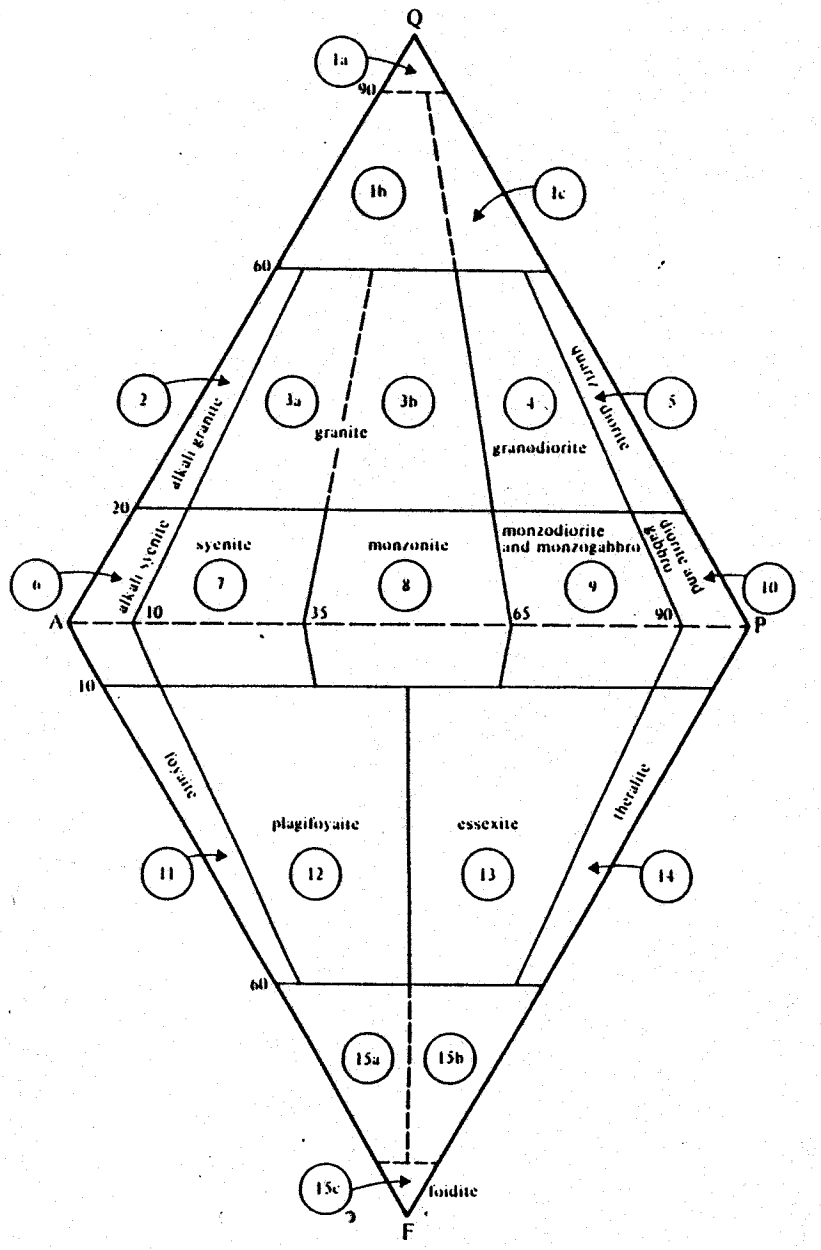


Figure A1.1 The double triangle QAPF showing fields of plutonic rock types (Streckeisen, 1976) as classified by modal mineralogy. For details see Table A1.1.

Table A1.1 Nomenclature of rocks in the Q–A–P and A–P–F triangles (after Streckeisen, 1976)

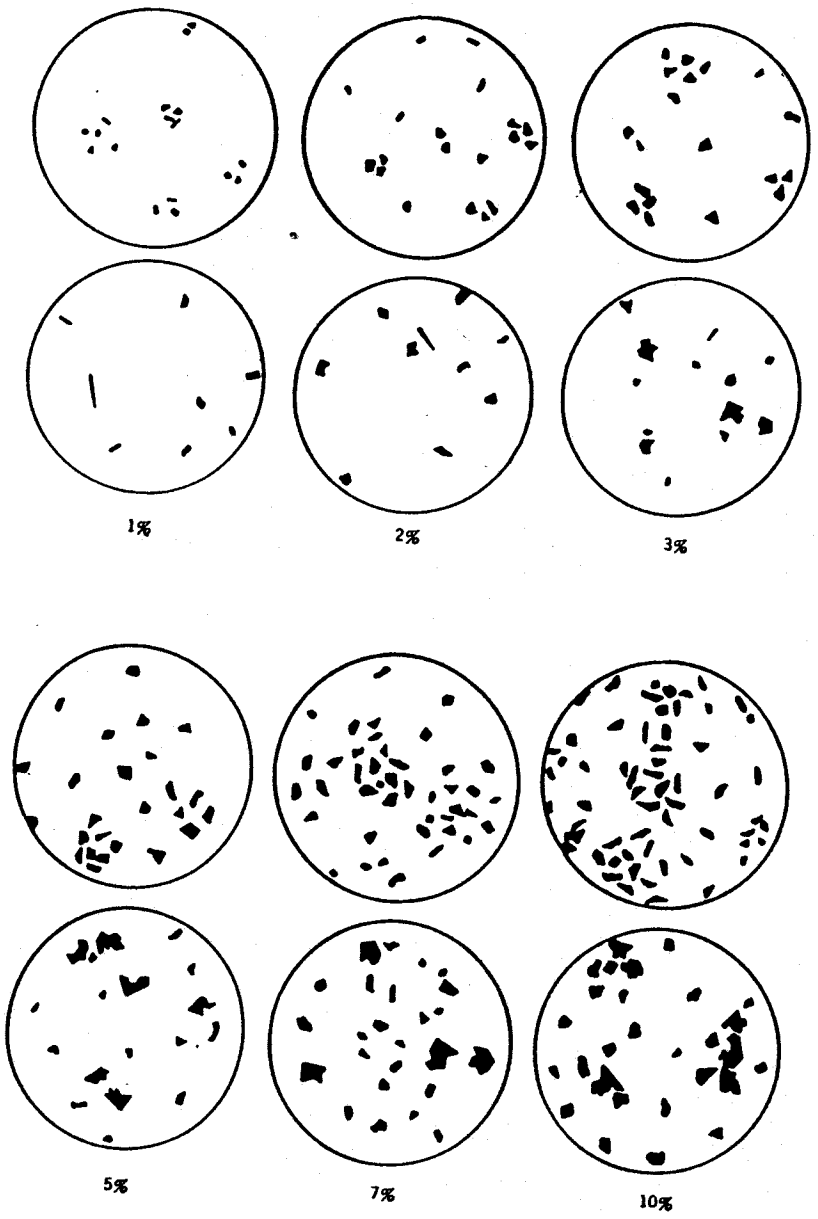
Field	*Plutonic rocks*	*Volcanic rocks*
1a	quartz rocks *sensu stricto*	–
1b	quartz–granite	–
1c	quartz–granodiorite	–
2	alkali granite	alkali rhyolite
3	granite	rhyolite
3a	syenogranite	rhyodacite
3b	monzogranite	dacite
4	granodiorite	quartz–andesite
5	quartz–diorite	alkali trachyte
6	alkali syenite	trachyte
7	syenite	trachyandesite and trachybasalt
8	monzonite (≡ syenodiorite)	
9	monzodiorite and monzogabbro (≡ syenodiorite and syenogabbro)	
10	diorite, gabbro, anorthosite[a]	andesite, basalt
11	foyaite[b]	phonolite[c]
12	plagifoyaite	tephritic phonolite
13	essexite	phonolitic tephrite
14	theralite	tephrite
15a	foyaitic foidite	phonolitic foidite
15b	theralitic foidite	tepritic foidite
15c	foidite[d] *sensu stricto*	extrusive foidite *sensu stricto*

[a]The distinction between diorite and gabbro is based on plagioclase composition (gabbro has plagioclase more calcic than An_{50}). Anorthosites have M < 10.
[b]Many plutonic rocks in fields 11 and 12 would normally be termed nepheline syenites.
[c]Most volcanic rocks in fields 11–15 have potassic equivalents (see Table 2.1).
[d]The commonest rocks in this group are the clinopyroxene–nepheline rocks, Urtite (M = 0–30), ijolite (M = 30–70) and Melteigite (M = 70–90). The approximate volcanic equivalent of ijolite is nephelinite (though most nephelinites contain appreciable normative feldspar).

The important ultramafic rocks (not shown in the QAPF diagram) are dunite (90–100% olivine), peridotite (30–90% olivine) and pyroxenite and hornblendite (0–30% olivine). The peridotites are divided into harzburgite (olivine + hypersthene), lherzolite (olivine + orthopyroxene + clinopyroxene) and wehrlite (olivine + clinopyroxene).

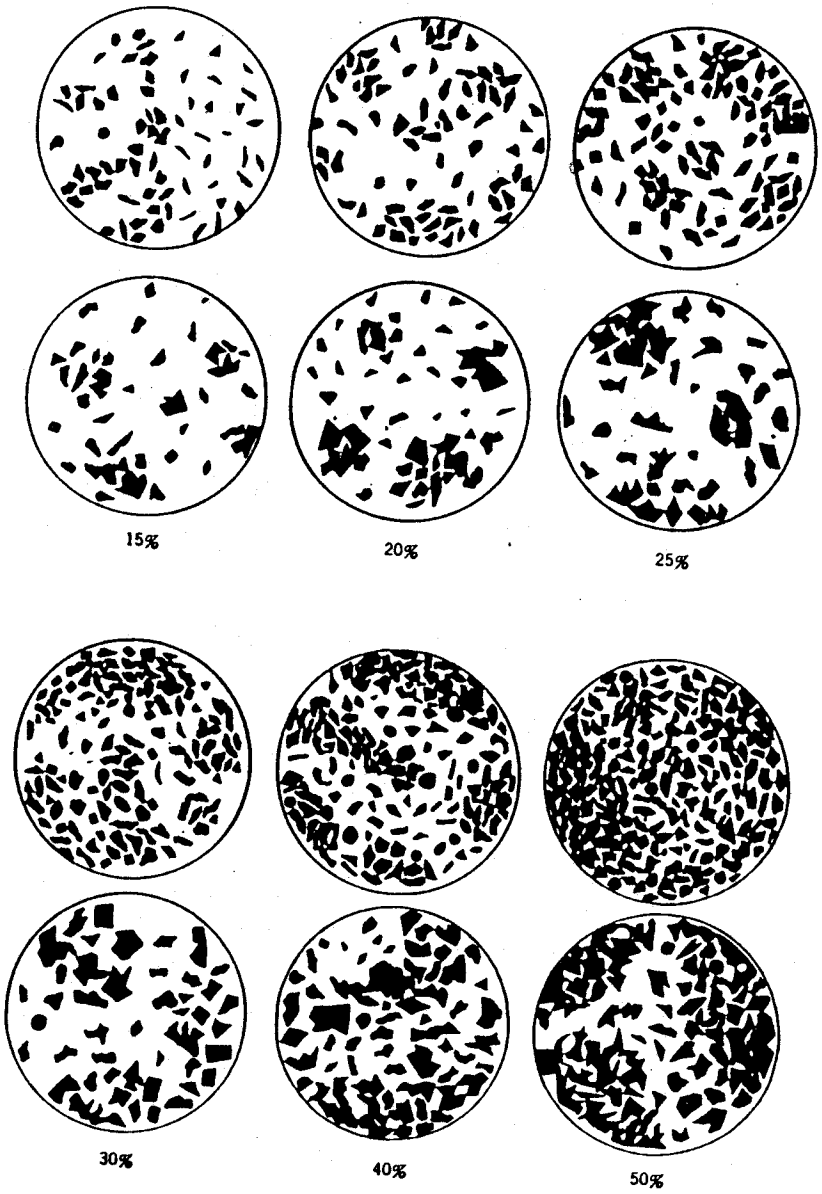
From Cox et al 1979

APPENDIX 3. CHARTS FOR ESTIMATING PERCENTAGE COMPOSITION OF ROCKS AND SEDIMENTS



Prepared by R. D. Terry and G. V. Chilingar for *Journal of Sedimentary Petrology* (v. 25, pp. 229–234, 1955); reprinted as *Data Sheet 6* of *Geotimes*, available from the American Geological Institute,

APPENDIX 3 (*Continued*)



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Periodic Table of the Elements

1A												3A	4A	5A	6A	7A	Noble gases 8A
1 H 1.008	Alkaline earth metals 2A															Halogens	2 He 4.003
3 Li 6.941	4 Be 9.012											5 B 10.81	6 C 12.01	7 N 14.01	8 O 16.00	9 F 19.00	10 Ne 20.18
11 Na 22.99	12 Mg 24.31	Transition metals										13 Al 26.98	14 Si 28.09	15 P 30.97	16 S 32.06	17 Cl 35.45	18 Ar 39.95
19 K 39.10	20 Ca 40.08	21 Sc 44.96	22 Ti 47.90	23 V 50.94	24 Cr 52.00	25 Mn 54.94	26 Fe 55.85	27 Co 58.93	28 Ni 58.70	29 Cu 63.55	30 Zn 65.38	31 Ga 69.72	32 Ge 72.59	33 As 74.92	34 Se 78.96	35 Br 79.90	36 Kr 83.80
37 Rb 85.47	38 Sr 87.62	39 Y 88.91	40 Zr 91.22	41 Nb 92.91	42 Mo 95.94	43 Tc (98)	44 Ru 101.1	45 Rh 102.9	46 Pd 106.4	47 Ag 107.9	48 Cd 112.4	49 In 114.8	50 Sn 118.7	51 Sb 121.8	52 Te 127.6	53 I 126.9	54 Xe 131.3
55 Cs 132.9	56 Ba 137.3	57 La* 138.9	72 Hf 178.5	73 Ta 180.9	74 W 183.9	75 Re 186.2	76 Os 190.2	77 Ir 192.2	78 Pt 195.1	79 Au 197.0	80 Hg 200.6	81 Tl 204.4	82 Pb 207.2	83 Bi 209.0	84 Po (209)	85 At (210)	86 Rn (222)
87 Fr (223)	88 Ra (226.0)	89 Ac† (227)	104 Rf	105 Ha	106 Unh	107 Uns	108	109 Une									

Alkali metals

*Lanthanides	58 Ce 140.1	59 Pr 140.9	60 Nd 144.2	61 Pm (145)	62 Sm 150.4	63 Eu 152.0	64 Gd 157.3	65 Tb 158.9	66 Dy 162.5	67 Ho 164.9	68 Er 167.3	69 Tm 168.9	70 Yb 173.0	71 Lu 175.0
†Actinides	90 Th 232.0	91 Pa (231)	92 U 238.0	93 Np (244)	94 Pu (242)	95 Am (243)	96 Cm (247)	97 Bk (247)	98 Cf (251)	99 Es (252)	100 Fm (257)	101 Md (258)	102 No (259)	103 Lr (260)

Some Important Geochemical Compositions of Rocks and Minerals

element	granite	granodiorite	tonalite	diorite	basalt	plagioclase	auth K-spar*
SiO_2	71.30	66.09	61.52	57.48	49.20	64.10	65.78
TiO_2	0.31	0.54	0.73	0.95	1.84	---	---
Al_2O_3	14.32	15.73	16.48	16.67	15.74	22.66	17.43
Fe_2O_3	1.21	1.38	1.83	2.50	3.79	0.14	---
FeO	1.64	2.73	3.82	4.92	7.13	0.17	---
MnO	0.05	0.08	0.08	0.12	0.20	---	---
MgO	0.71	1.74	2.80	3.71	6.73	0.25	0.03
CaO	1.84	3.83	5.42	6.58	9.47	3.26	---
Na_2O	3.68	3.75	3.63	3.54	2.91	9.89	---
K_2O	4.07	2.73	2.07	1.76	1.10	0.05	16.35
P_2O_5	0.12	0.18	0.25	0.29	0.35	---	---
CO_2	0.05	0.08	0.14	0.10	0.11	---	---
H_2O	0.77	1.04	1.24	1.36	1.38	0.23	---
sum	100.07	99.90	100.01	99.98	99.95	100.75	99.59

* analysis for authigenic K-feldspar from De Ros et al. (1994: JSR, v. A64, p. 778). All other analyses from Cox et al. (1979:The Interpretation of Igneous Rocks, Allen and Unwin,430 p.)