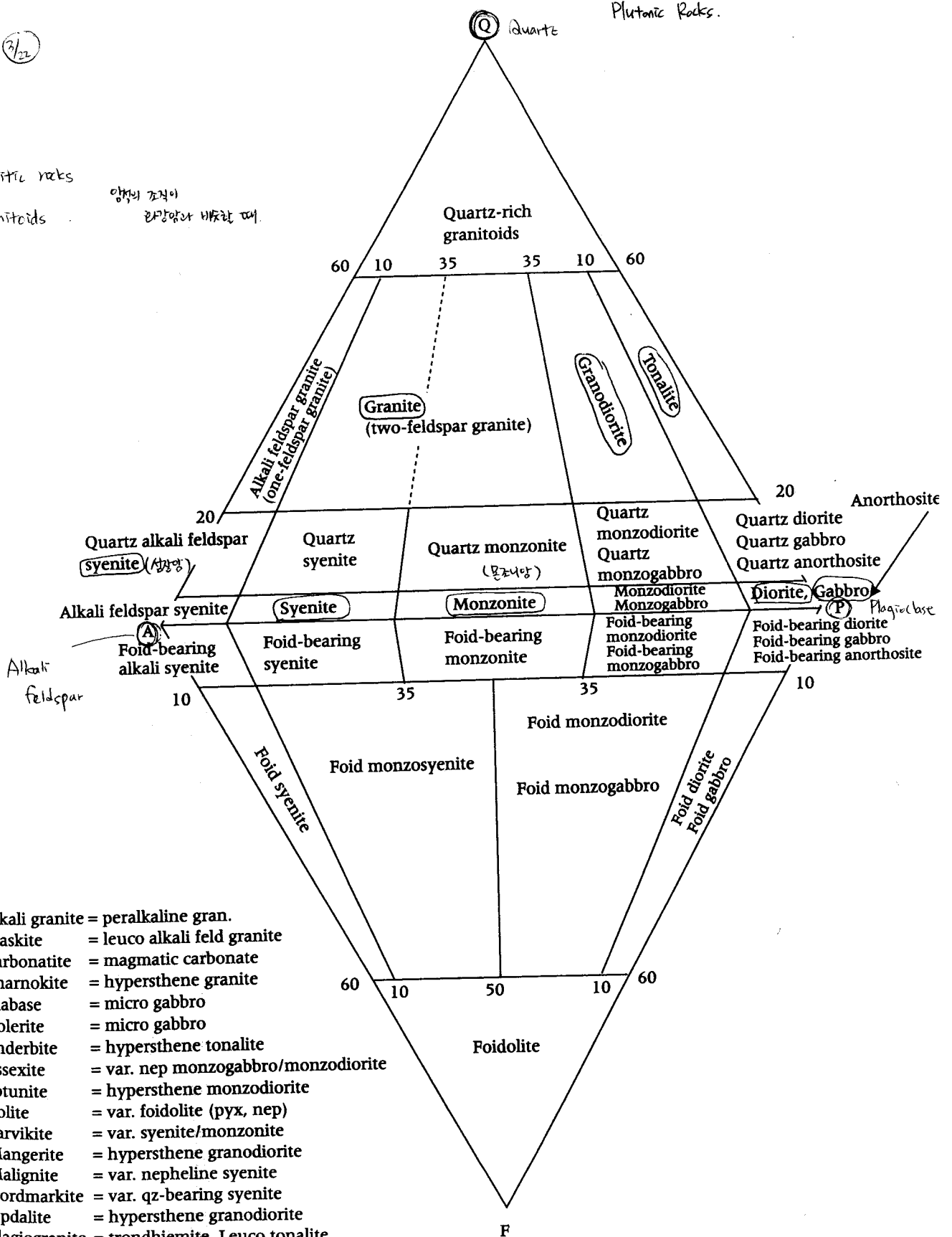


Plutonic Rocks.

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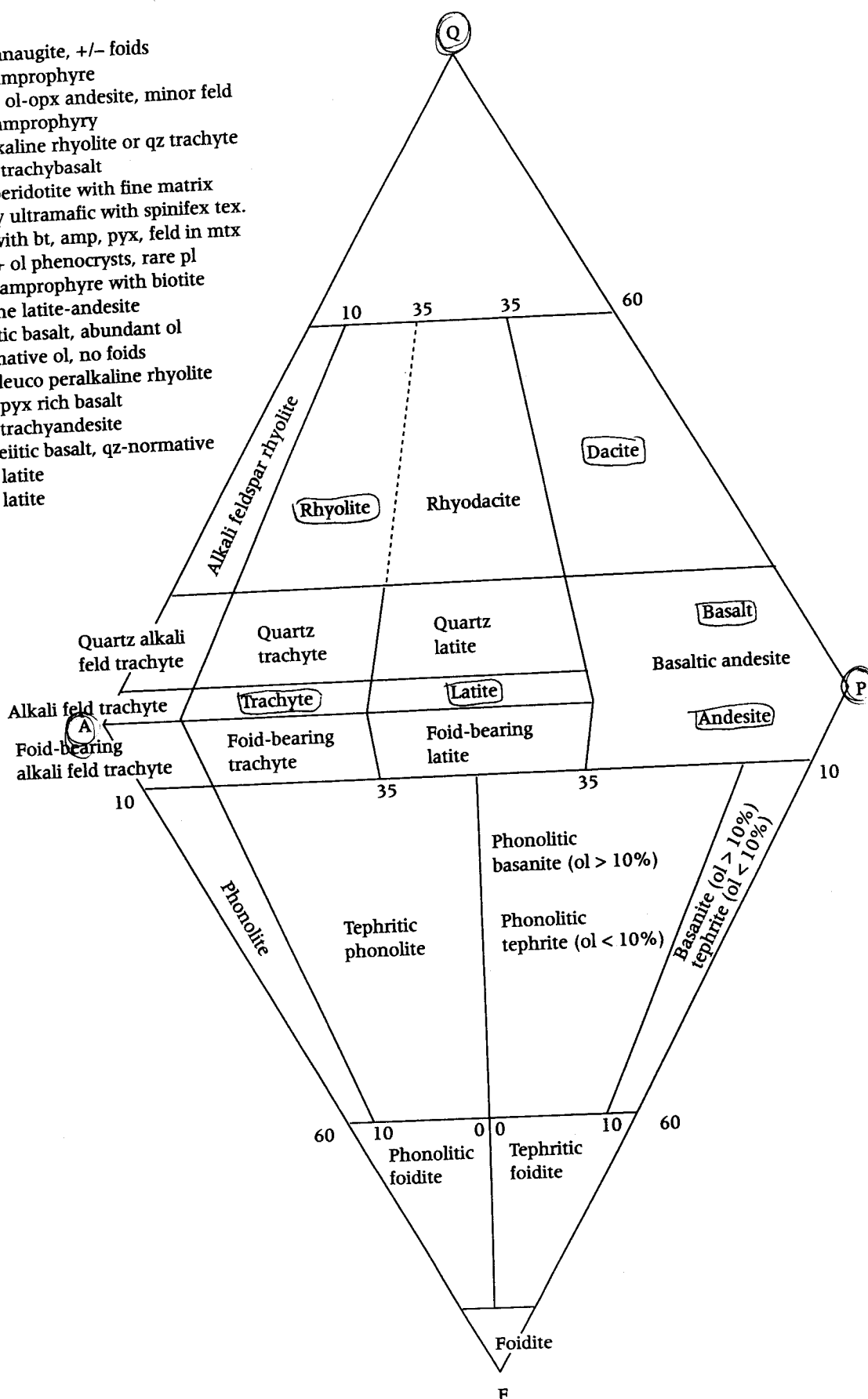
Granitic rocks

Granitoids

암석의 조성이  
과장암과 비슷할 때.

- Alkali granite = peralkaline gran.  
 Alaskite = leuco alkali feld granite  
 Carbonatite = magmatic carbonate  
 Charnokite = hypersthene granite  
 Diabase = micro gabbro  
 Dolerite = micro gabbro  
 Enderbite = hypersthene tonalite  
 Essexite = var. nep monzogabbro/monzodiorite  
 Jotunite = hypersthene monzodiorite  
 Ijolite = var. foidolite (pyx, nep)  
 Larvikite = var. syenite/monzonite  
 Mangerite = hypersthene granodiorite  
 Malignite = var. nepheline syenite  
 Nordmarkite = var. qz-bearing syenite  
 Opdalite = hypersthene granodiorite  
 Plagiogranite = trondhjemite, Leuco tonalite  
 Shonkinite = var. syenite, mainly augite + alk feld  
 Theralite = var. nepeline gabbro  
 Trondhjemite = leuco granodiorite/tonalite

- Alkali basalt = ol, titanite, +/- foids  
 Alnöite = var. lamprophyre  
 Boninite = glassy ol-opx andesite, minor feld  
 Camptonite = var. lamprophyre  
 Comendite = peralkaline rhyolite or qz trachyte  
 Hawaiite = sodic trachybasalt  
 Kimberlite = var. peridotite with fine matrix  
 Komatiite = glassy ultramafic with spinifex tex.  
 Lamprophyre = por with bt, amp, pyx, feld in mtx  
 Limburgite = pyx + ol phenocrysts, rare pl  
 Minette = var. lamprophyre with biotite  
 Mugearite = olivine latite-andesite  
 Oceanite = picritic basalt, abundant ol  
 Olivine basalt = normative ol, no foids  
 Pantellerite = var. leuco peralkaline rhyolite  
 Picrite = ol + pyx rich basalt  
 Shoshonite = var. trachyandesite  
 Tholeiite = tholeiitic basalt, qz-normative  
 Trachyandesite = var. latite  
 Trachybasalt = var. latite





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# Granite

## \* Essential mineral

Quartz

Orthoclase - Microcline (Or)

Plagioclase - Albite (Pl)

Or > Pl 이어야  
정확하다.  
Or < Pl 이면 석조암이다.

## \* Characteristic mineral

Biotite

Muscovite

Hornblende

Taumatine

## \* Accessories

Zircon  $ZrSiO_4$

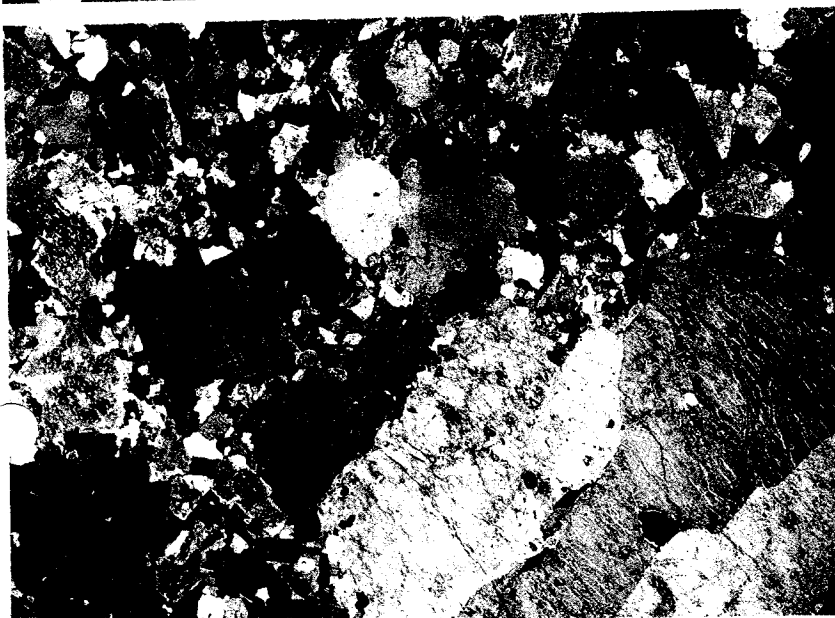
Rutile  $TiO_2$

Fluorite  $CaF_2$

Sulfides (Pyrite  $FeS_2$ )

Ilmenite  $FeO \cdot FeO_2$

Magnetite  $FeO \cdot Fe_2O_3$



Granite is the name used for leucocratic coarse-grained rocks containing mainly quartz and feldspar, alkali feldspar constituting between 90% and 35% of the total feldspar. Accessory hornblende or biotite are the commonest mafic minerals. Muscovite may be present. *Rhyolite* is the fine-grained equivalent. A microgranite with micrographic quartz-alkali feldspar intergrowth is known as a *granophyre* (77). A leucocratic microgranite occurring as dykes or veins is known as *aplite*. Granites in which more than 90% of the feldspar is an alkali feldspar are known as *alkali granites* (see 145). When alkali feldspar is between 35% and 65% of the total feldspar the names *adamellite* and *quartz monzonite* have been used for rocks with quartz content between 5% and 20%.

The first and second photographs are of the Westerly granite, a rock which has been used as a standard granite for a variety of studies. From the photographs it can be seen to consist mainly of a granular mixture of quartz and feldspar, with biotite and a few crystals of muscovite. Sodium plagioclase and potassic feldspar are present: more than half of the feldspar in this rock is potassic feldspar. Much of it does not show microcline-type twinning which appears only in patches in some of the crystals, e.g. just above the centre of the field and slightly to the right is a crystal showing vague cross-hatched twinning. At the left edge of the photograph one potassium feldspar crystal shows a simple twin.

The third photograph is an XPL view of the granite from Shap. In this view the right lower part of the field is occupied by a group of fairly large phenocrysts of alkali feldspar showing a micropertitic texture. Most of the plagioclase crystals show some alteration and can be recognized in the photograph by the presence of multiple twinning and zoning. The quartz crystals can be recognized as free from alteration and the two areas which appear black in this photograph, to the left of the centre and at the left bottom corner, are quartz crystals at extinction. The only other mineral present in a significant amount in this field of view is biotite. (See also the hand specimen photograph in 10.)

First and second photographs: Granite from Westerly, Rhode Island, USA; magnification  $\times 14$ , PPL and XPL. Third photograph: Granite from Shap, England; magnification  $\times 7$ , XPL.

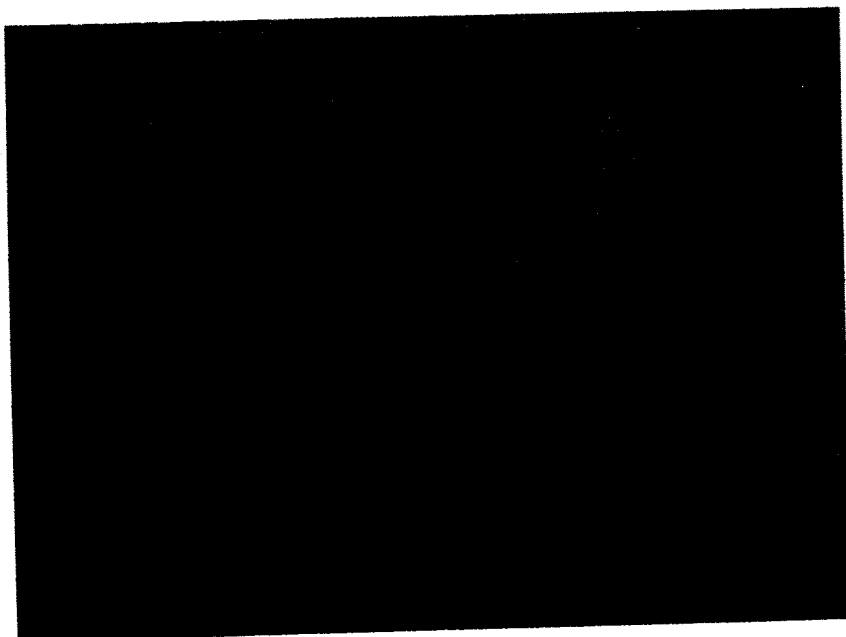
## Granite

(continued)

The granular textured specimen illustrated here shows mainly quartz and two feldspars. The quartz is recognized in the PPL view by the lack of alteration, and in the XPL view, by its interference colours which are slightly higher than that of the feldspar, and by the non-uniform extinction shown by one crystal at the top right of the view. Microcline is clearly identified by the typical cross-hatched twinning and there are slight signs of micro-perthitic texture also. In this field of view there are only a few plagioclase crystals visible; one, near the top left corner of the field is a simple twinned crystal showing very dark grey interference colours; vague signs of albite twin lamellae can just be seen in this crystal. Another crystal just to the right of the centre of the field and showing a brown grey colour is also plagioclase. To the left of the biotite crystal at middle left is a small patch of myrmekite. From the relative proportions of the two feldspars visible in this field of view this sample could be close to the boundary between alkali granite and granite.

*Granite from South Dakota, USA; magnification  $\times 12$ , PPL and XPL.*

*Additional views of granites are shown in 2, 10, 42, 76, 94, 105 and 109.*



microcline .

Amorphoblastic  
type

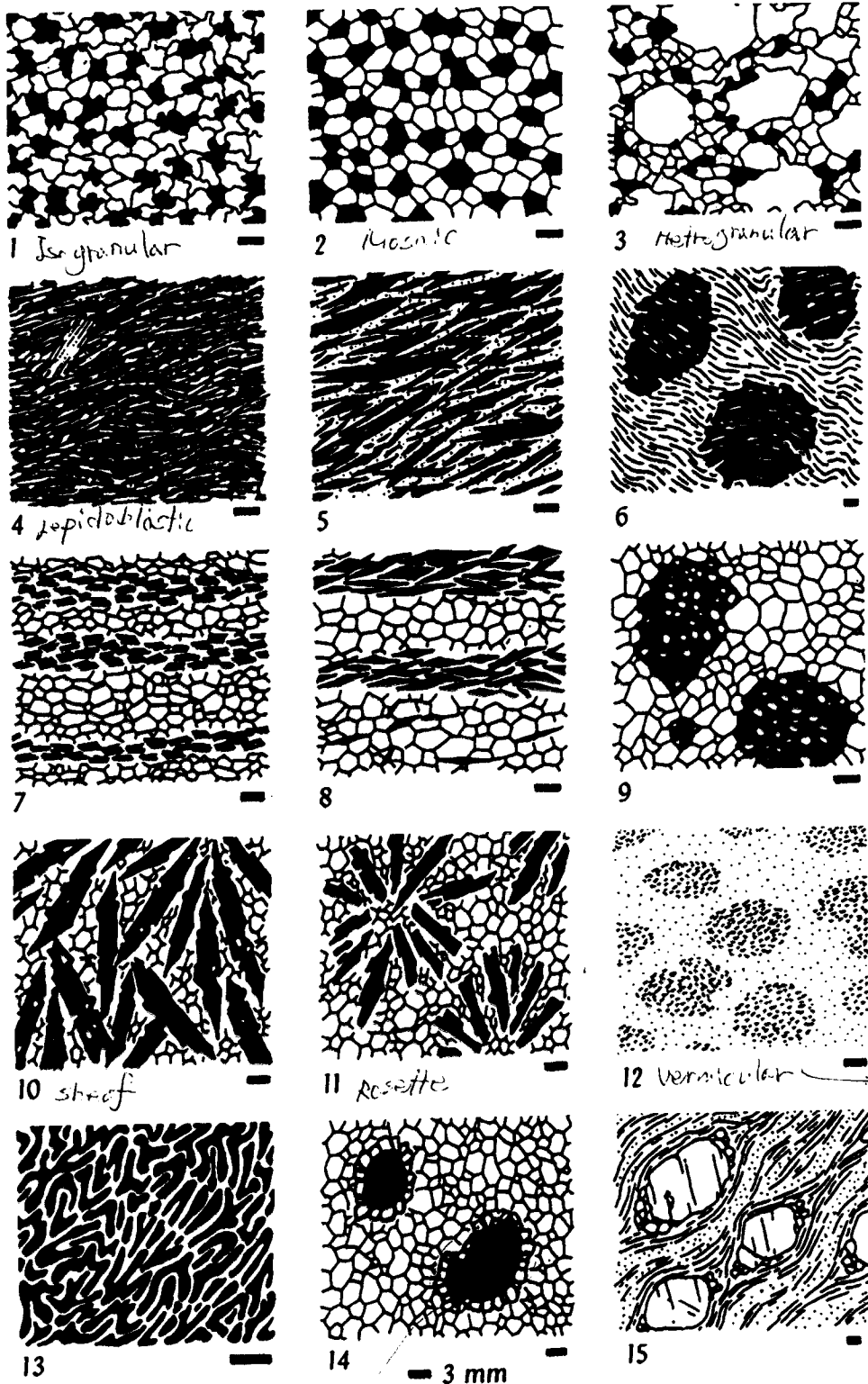


FIGURE 15.5 Common metamorphic textures. (a) Sketches of several common textural features of metamorphic rocks (scale: same as in Figure 15.5b). (b) Principal metamorphic textural types. (Reprinted with permission from Bard, 1986)

A. Granoblastic types 1. Isogrannular texture (equal size xenomorphic/xenoblastic crystals).

2. Mosaic texture (with more triple junctions). 3. Heterogrannular texture (different grain sizes).

B. Rock textures dependent on the habit of constituent minerals 4. Lepidoblastic texture (foliation defined by mica-type platy minerals).

5. Nematoblastic texture (foliation defined by needle-like or prismatic (e.g., amphiboles) minerals). 6. Porphyroblastic texture. 10. Sheaf texture. 11. Rosette texture. 12. Vermicular texture.

C. Combinations of A and B 7, 8, 9 are combinations of textural types A and B.

D. Rocks with spheroidal type minerals or groups of minerals 12. Nodular texture. 14. Reaction coronas (explained in Chapter 7). 15. Augen (tear-like) texture.