Terénní výzkum a jeho vliv na interpretaci analytických dat

Nejdůležitější, nejkomplikovanější a nejrizikovější část studia magmatických hornin

1) Vztahy k okolí – kontaktní metamorfóza, chlazené okraje, pillow lávy, sheeted dikes, migmatity, tektonikcké okraje

2) Dvoufázové struktury – vývoj magmatu

3) Enklávy – zdroj magmatu, granity vs. basalty

4) Míšení magmatu – zdroje magmatu, pt podmínky

5) Alterace a deformace – post-solidus vývoj, barva, sekundární minerály, vztah krystalizace a deformace

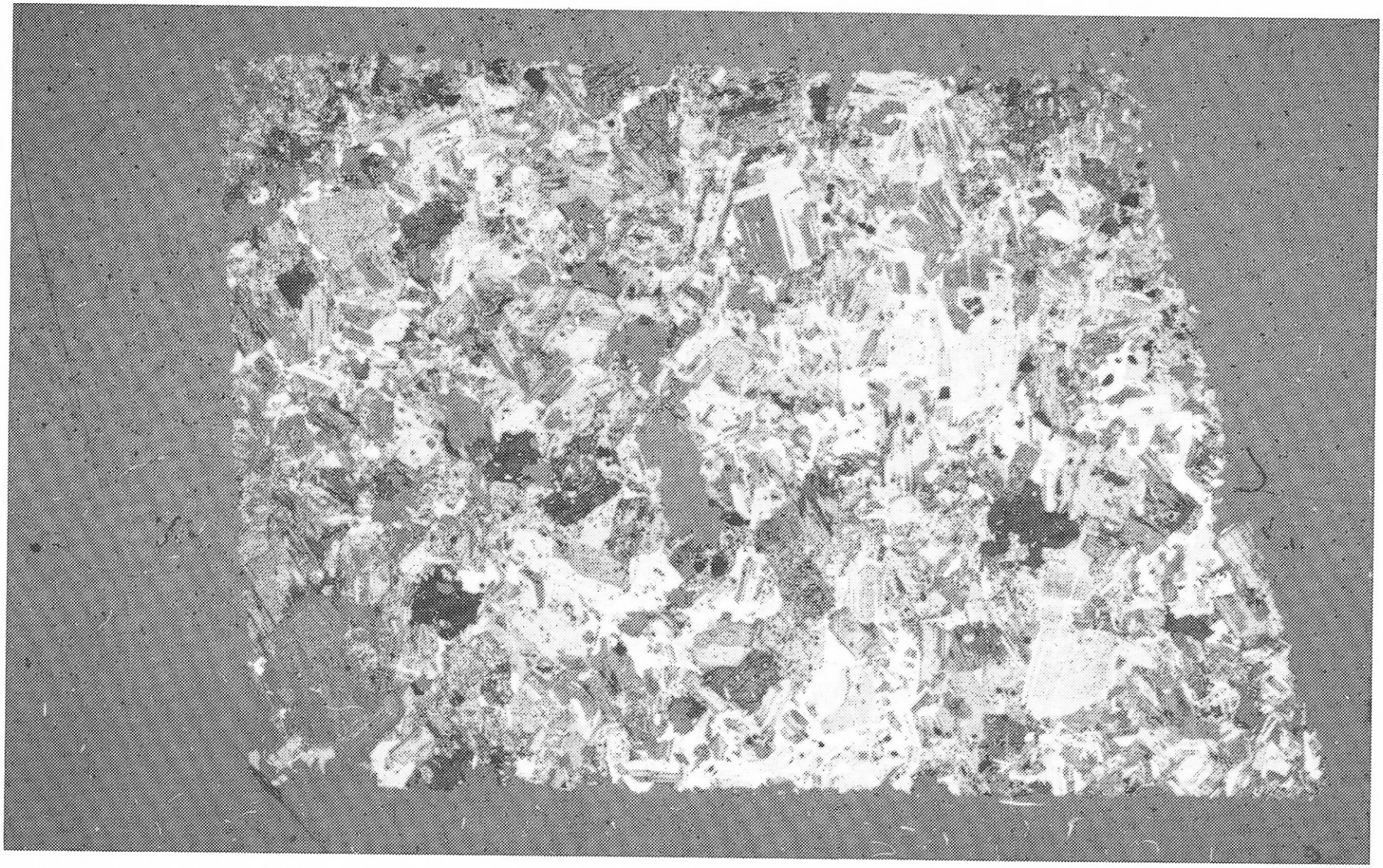
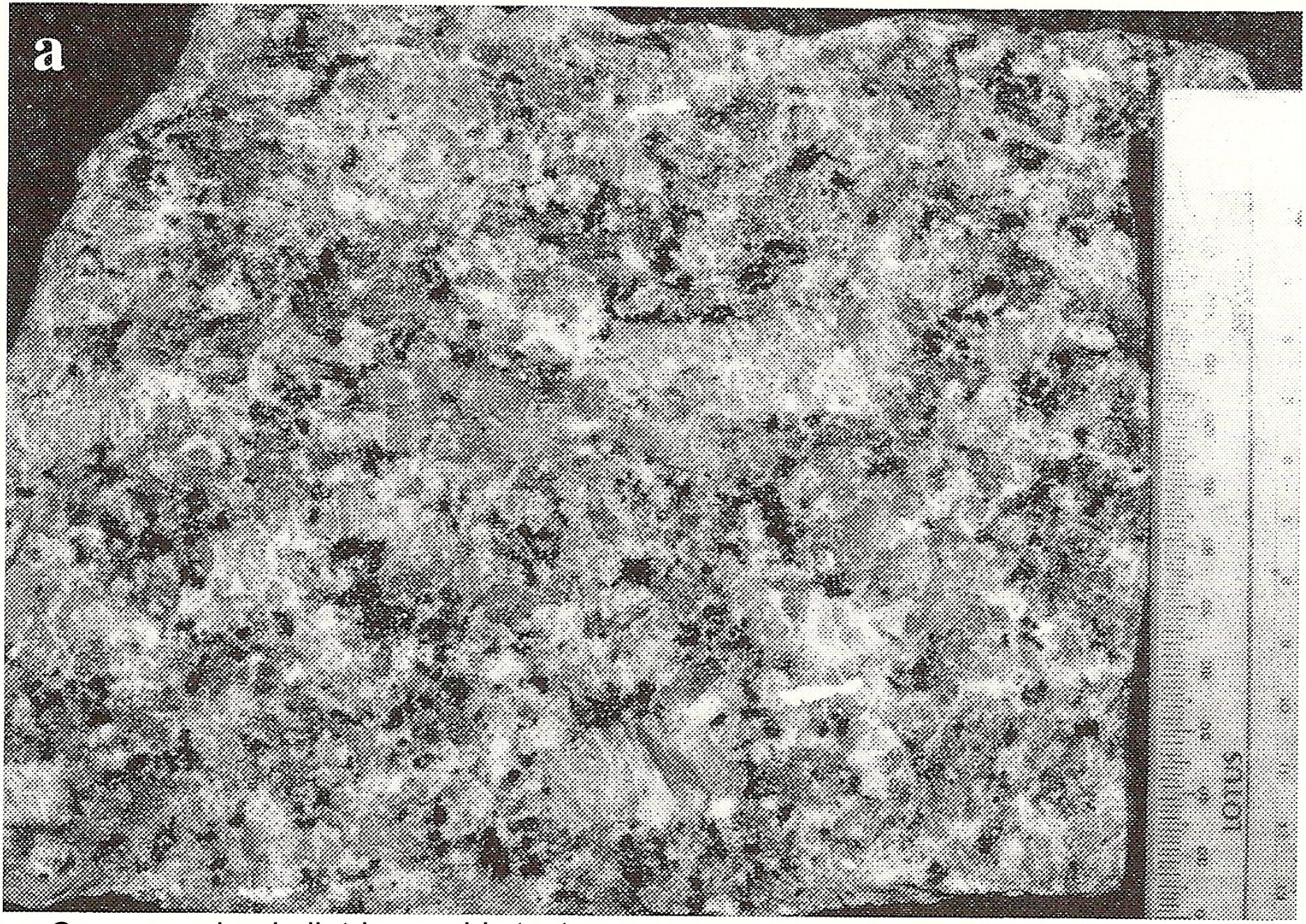
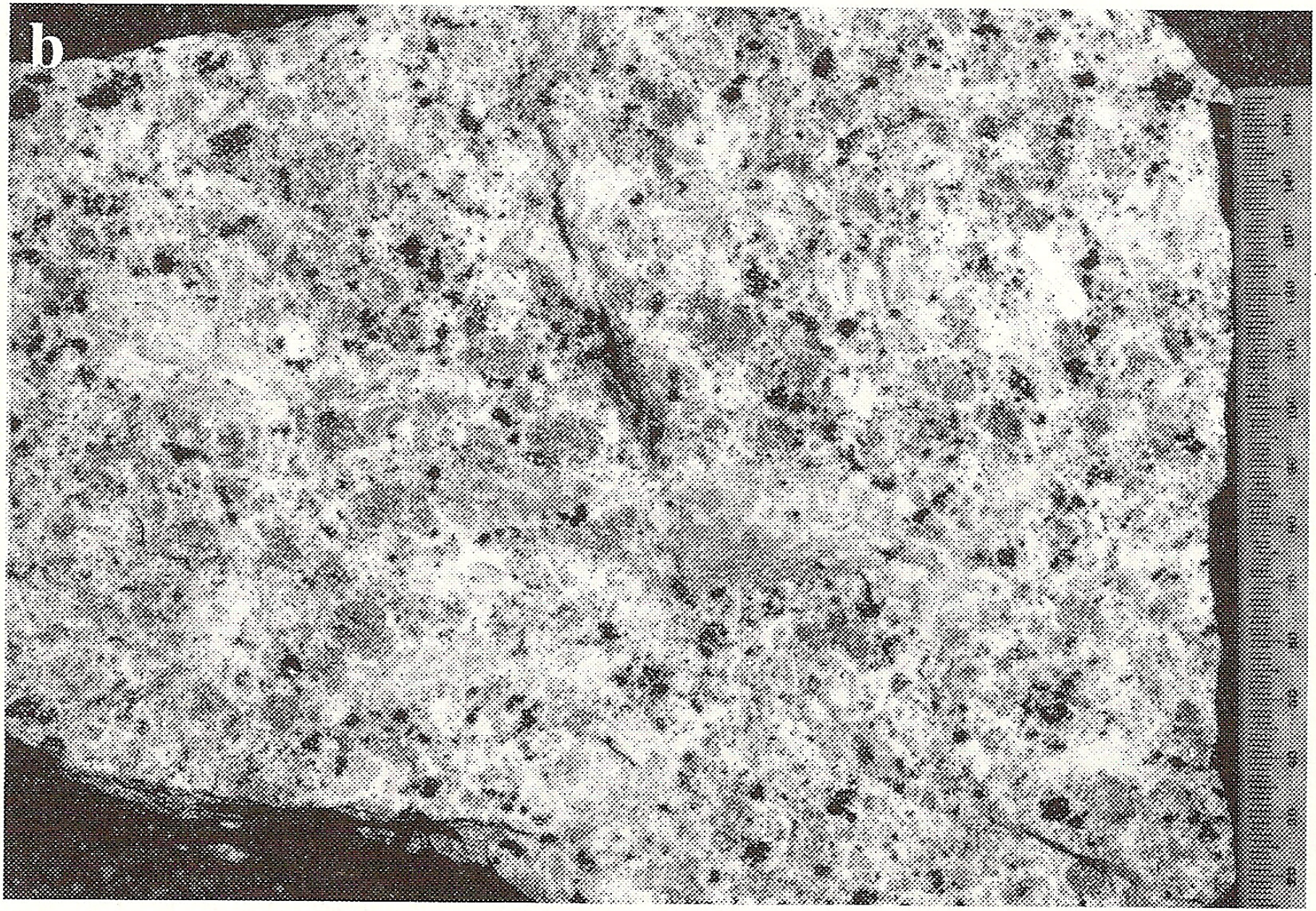


Fig. 10. Hypidiomorphic granular texture in photomicrograph of the Santa Rosa Tonalite, Rio Lurin, Peru

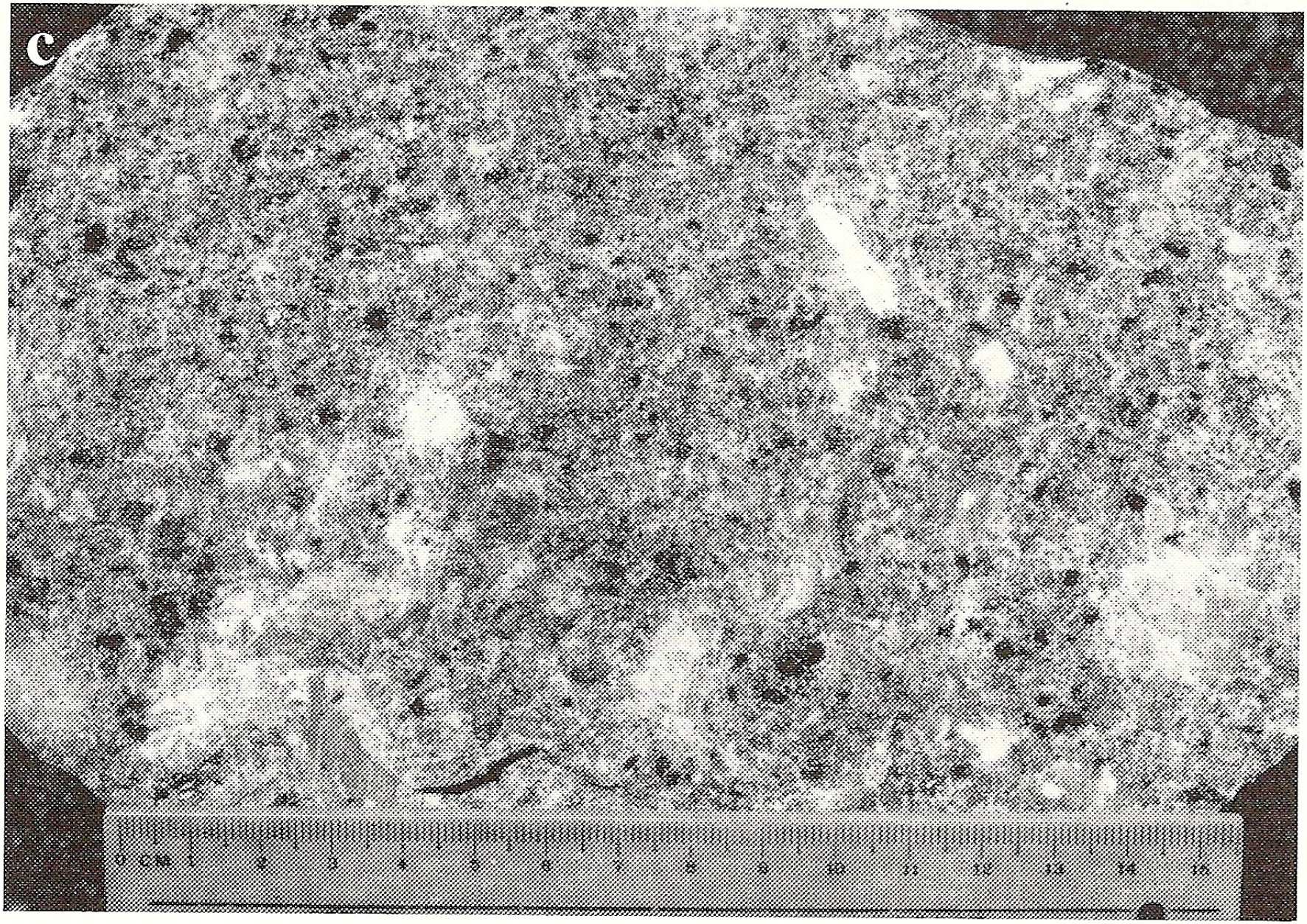
1 cm



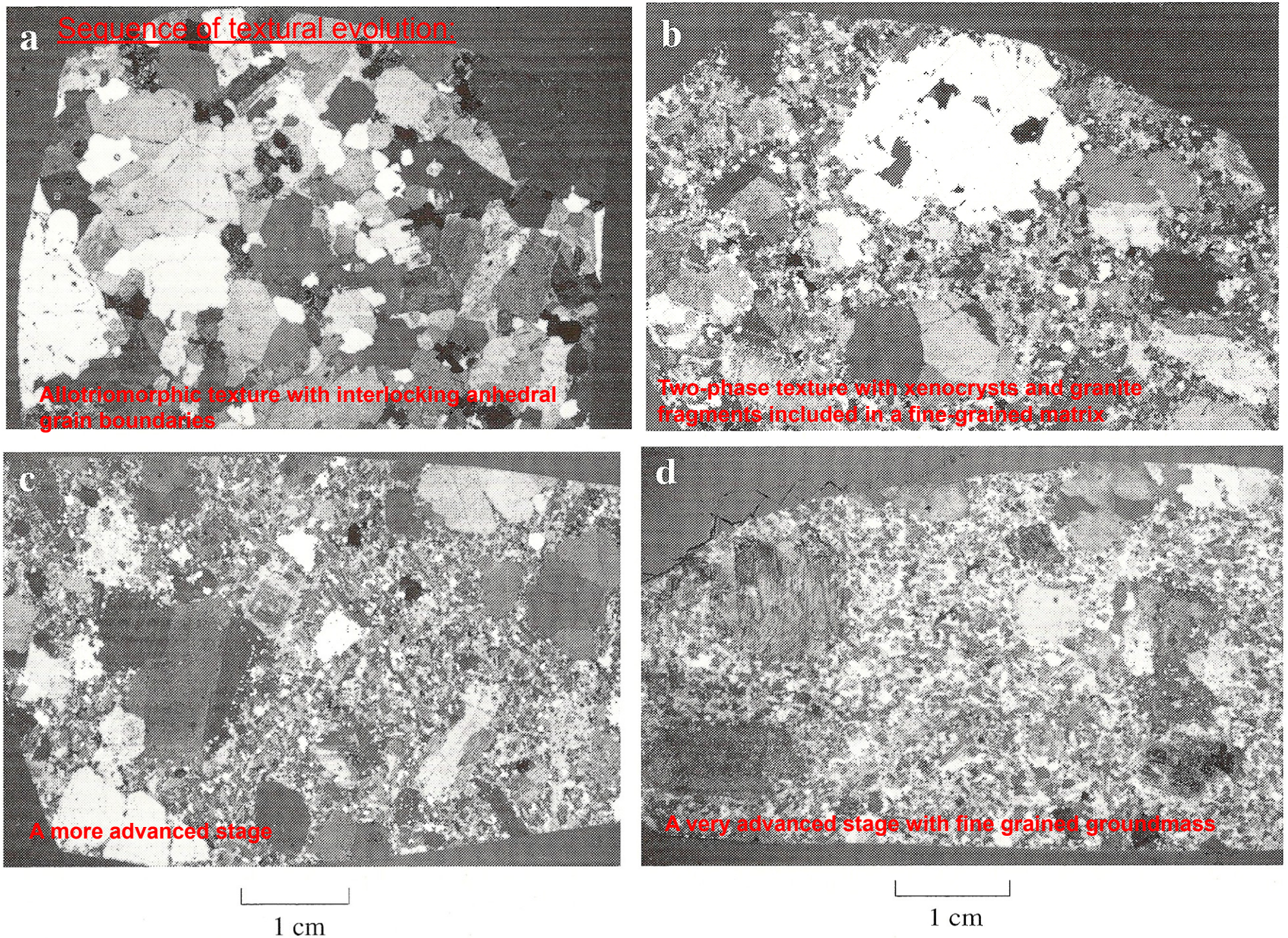
Coarse-grained allotriomorphic texture



Coarse-two phase texture with abundant granitic megacrysts and lithic clasts in a relatively sparse fine-grained matrix



Advanced two-phase texture with a smaller proportion of granitic relics set in a fine-grained matrix


a
Sequence of textural evolution:
Allotriomorphic texture with interlocking anhedral grain boundaries
b
Two-phase texture with xenocrysts and granite fragments included in a fine-grained matrix
c
A more advanced stage
d
A very advanced stage with fine grained groundmass
1 cm
1 cm

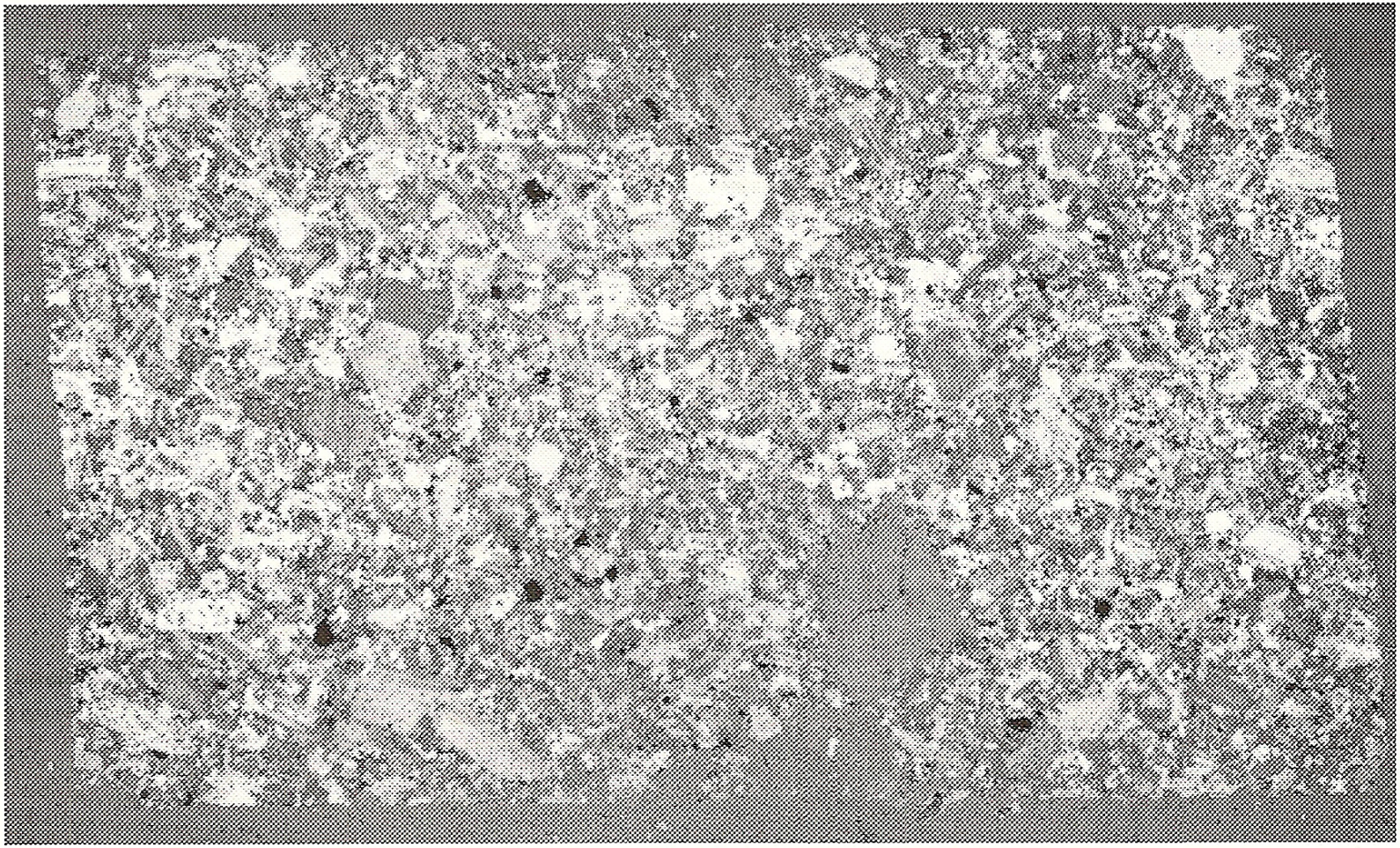


Fig. 14. Tuffisite, Cruz de Laya, Rio Lurin Peru. Photomicrograph showing megacrysts of quartz and plagioclase set in a heterogeneous quartzo–feldspathic base

1 cm

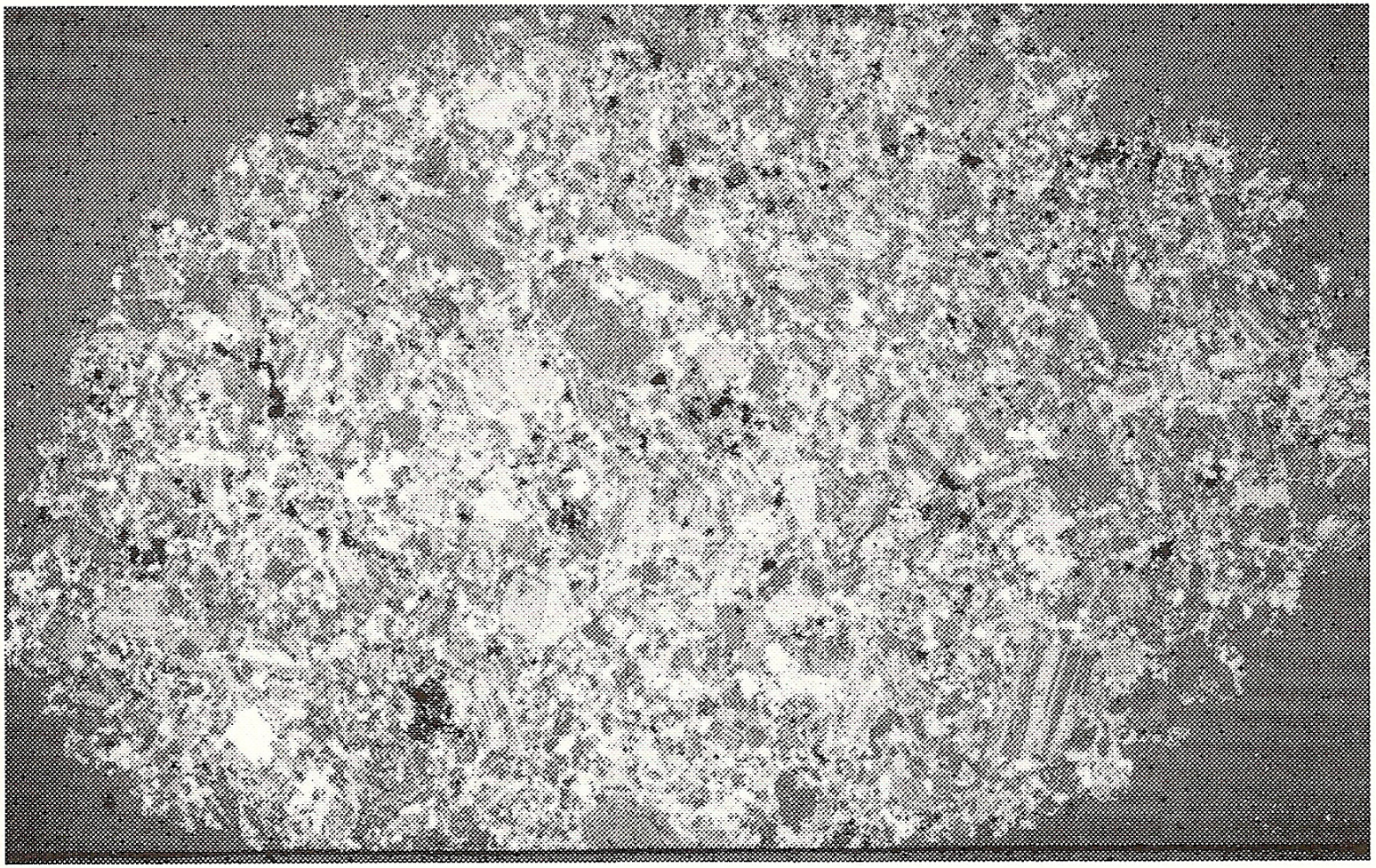


Fig. 15. Porphyry stock. Acos Upper, Rio Chancay, Peru. Photomicrograph showing two-phase texture with crystals and lithic fragments set in a fine-grained quartzo–feldspathic matrix

1 cm

Fig. 17. Schlieren with enclaves, whirlpool structure, Mt Givens granodiorite Sierra Nevada Batholith. Hammer 30 cm

Fig. 18. Schlieren and enclaves within the Mt Givens granodiorite, Sierra Nevada. Hammer 40 cm

Fig. 23. Coarse K-feldspar megacrystic granite intruding earlier gabbro. The granite exploited a joint in the gabbro. However the entrance to the fissure was blocked by a large megacryst. Residual fluids percolated around the obstruction into the crack where they crystallised as fine-grained granite. Note also the development of quartz ocelli in the gabbro. Lisa Aragabo pluton Kola Peninsula, Russia. Lens cap 4 cm

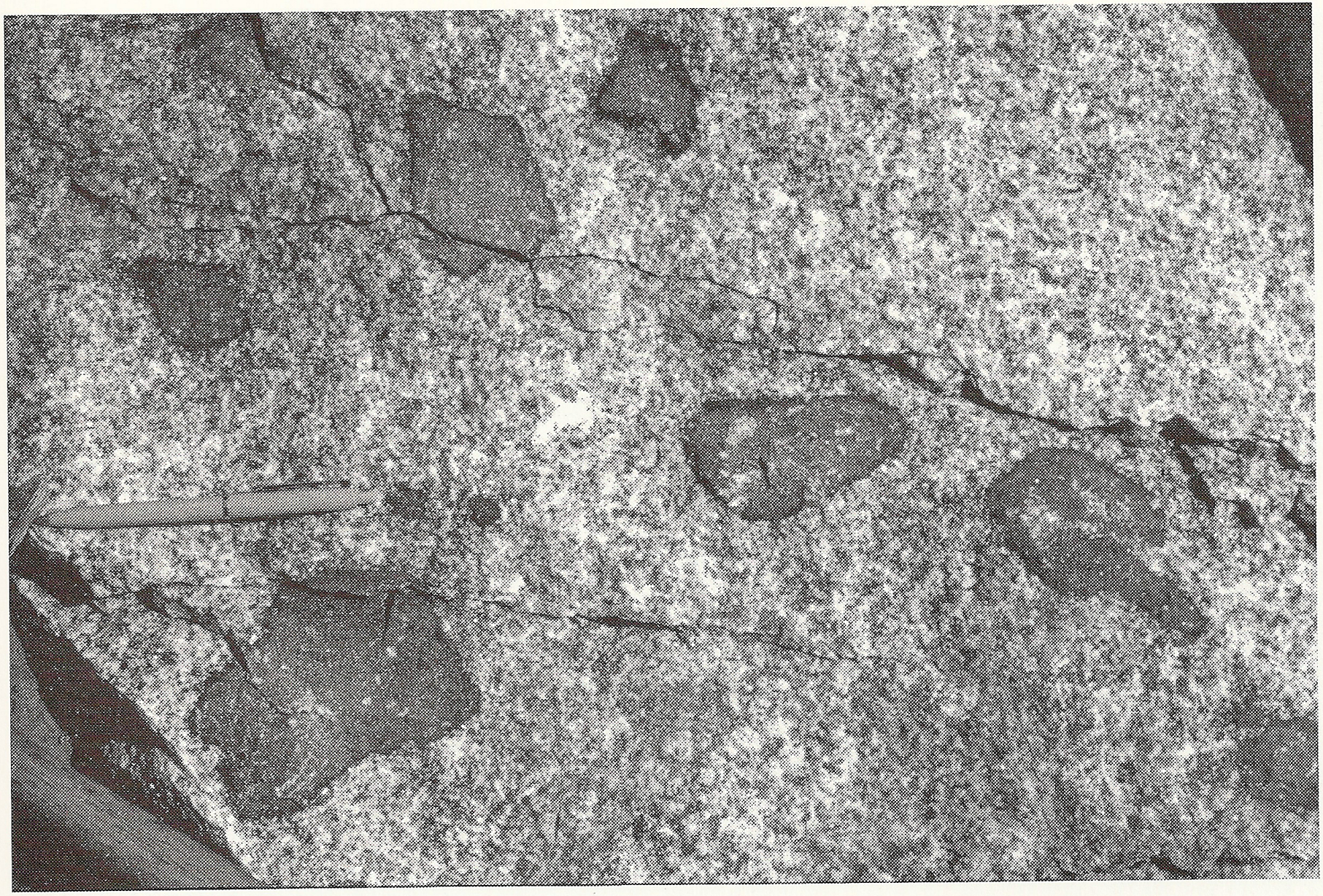


Fig. 24. Mafic enclaves with dark margins. Jerong pluton, Eastern Province Peninsular Malaysia. Pen 12 cm

Fig. 37. Deformed anatexitic S–type granite with folded relic of metasedimentary material. St Cast Plage, Brittany. Hammer 30 cm

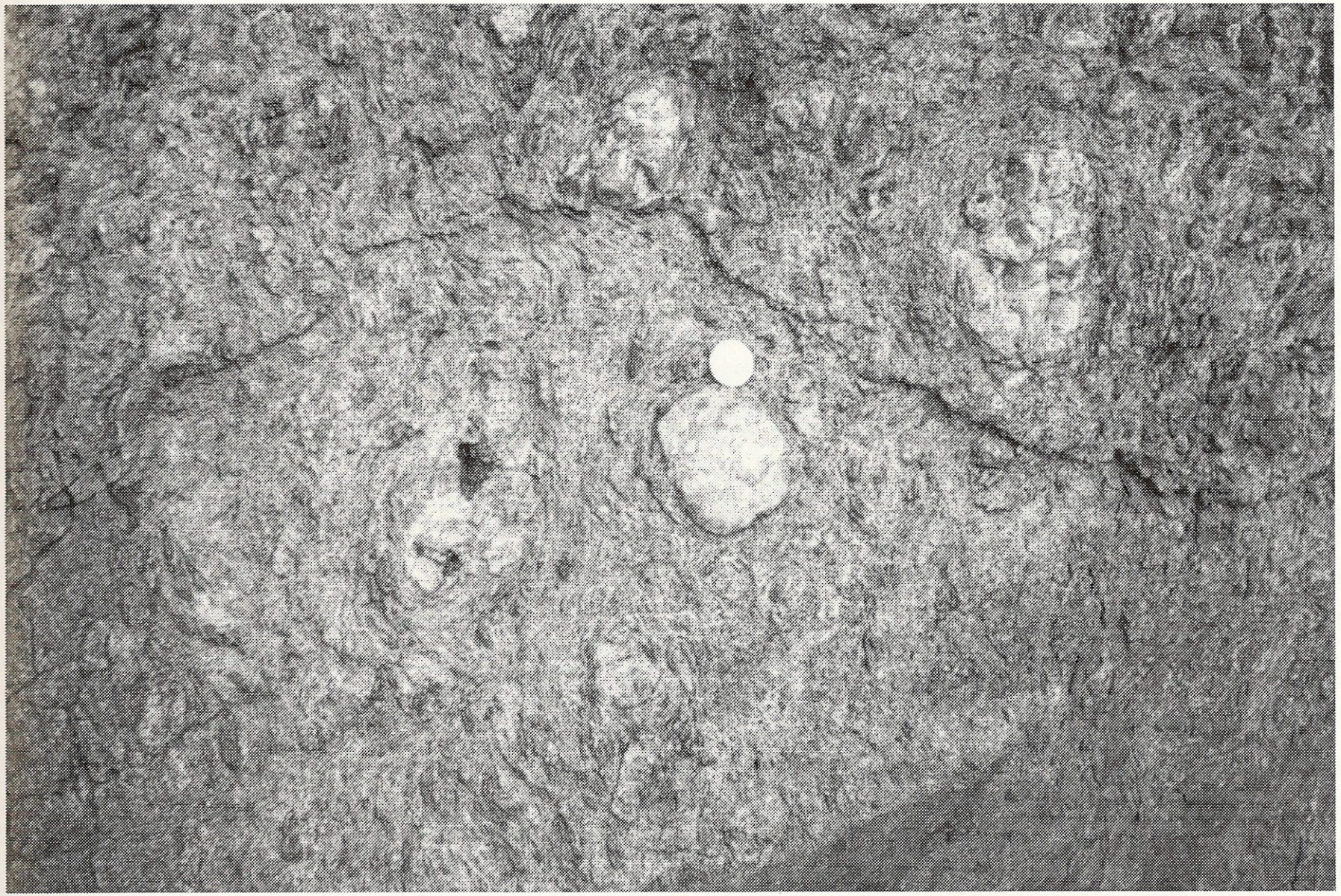


Fig. 38. Foliated anatexitic S–type granite with quartz lumps derived from metasedimentary source rock. St Cast Plage, Brittany. Coin 2 cm

Fig. 39. Relatively undeformed S–type granite with enclaves of predominantly pelitic source material. Beach 2 km west of St Cast, Brittany. Hammer 30 cm

Sample No	Locality
Rock Type	Granite Unit
Distinguishing features	

Texture and grain size	Primary	Modified	Cataclastic	Incipient	2-phase	Microgranite
	V.coarse Coarse Medium Fine			Porphyritic	Equigranular	Inequigranular

MAFIC MINERALS	%	Size (mm) Range	Size (mm) Av.	Mode of occurrence: singles	clusters	2-min plots	Aligned	Outline	Shape	Colour/Relationships
Hornblende									Needles Prisms Stubby Equant	
Biotite									Barrels Books Flakes Sheets	
Muscovite									Books Flakes Sheets	

FELSIC MINERALS MEGACRYSTS	%	Size (mm) Range	Size (mm) Av.	Colour	Aligned	Outline	Incl.	Shape/Relationships
K-feldspar								
Plagioclase								
Quartz								
GROUNDMASS								
K-feldspar								
Plagioclase								
Quartz -singles								
Quartz -clusters								

Accessories	Tourmaline Sphene				
Foliation/alignment	Yes No	Weak Moderate Strong	Dip	Strike	
Magnetic Susceptibility		Ratemeter Count			

Xenoliths Enclaves	%	Size range	Mafic Yes No	Cognate Accidental	Megacrysts Yes No
	Lithology				
	Shape: Angular Round Oval Lenticular Flattened				
Dykes & veins	Lithology		Width	Dip	Strike

REMARKS:

Fig. 40. Field description sheet for granites

The various types of enclaves: their nature and main petrographic features

	Term	Nature	Contact	Shape	Features
ENCLAVE	Xenolith	Piece of country rocks (hornfels)	Sharp	Angular	Contact-metam. texture & minerals
	Xenocryst	Isolated foreign crystal	Sharp	Globular	Corrosion Reactional aureole
	Surmicaceous enclave	Residue of melting (restite)	Sharp with biotitic crust	Lenticular	Metamorphic texture Micas & Al-rich minerals
	Schlieren	Disrupted enclave	Gradual	Oblate	Planar orientation
	Felsic microgranular enclave	Disrupted fine-grained margin	Sharp or gradual	Ovoid	Fine-grained Igneous texture
	Mafic microgranular enclave	Blob of coeval magma	Mostly sharp	Ovoid	Fine-grained Igneous texture
	Cumulate enclave (Autolith)	Disrupted cumulate	Mostly gradual	Ovoid	Large-grained Cumulate texture

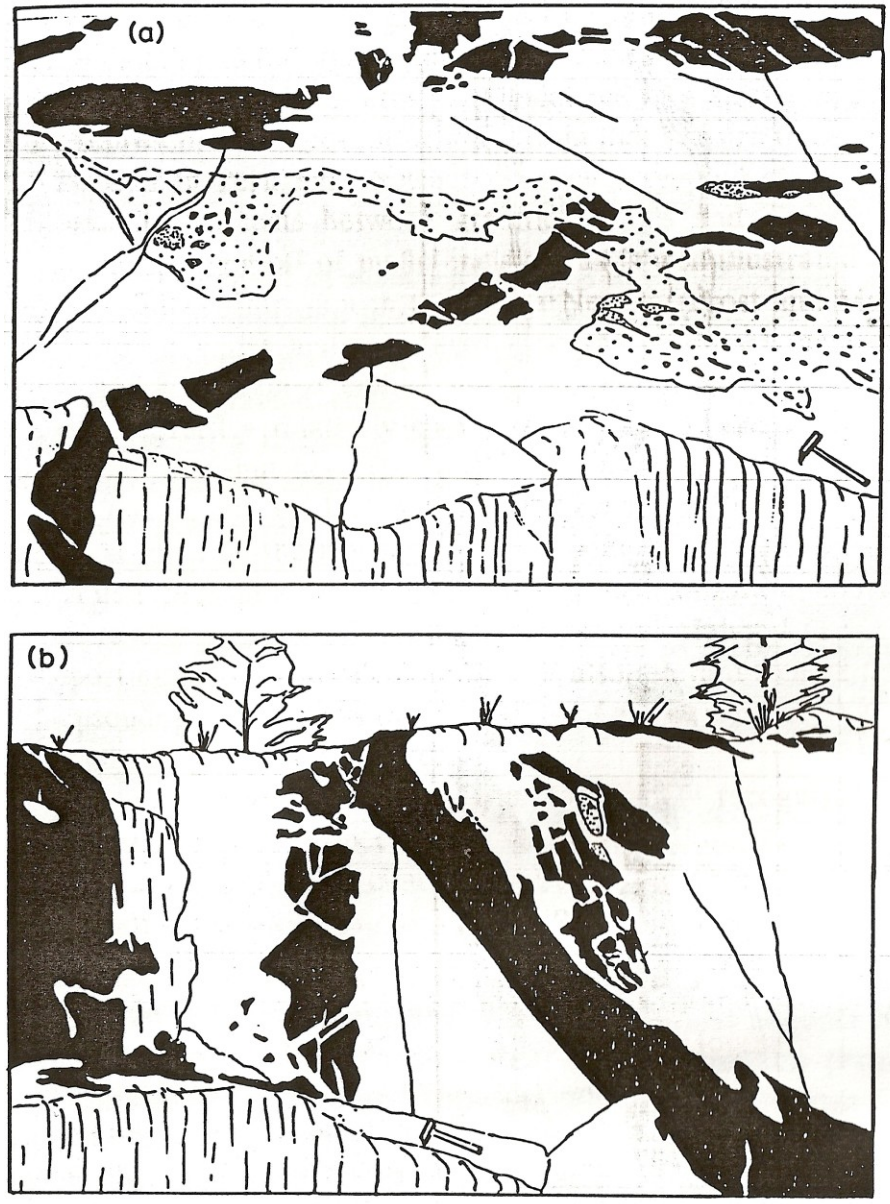


Fig. 1. Synplutonic mafic dykes exposed on the southern shore of Cortes Island, opposite George Harbour, Queen Charlotte Strait, British Columbia, Canada. (a) Oblique view on edge of cliff of two members of the swarm (shown in black) within a granodioritic host (white). The one in the foreground cuts across a fluxioned zone of more dioritic composition (stippled) replete with half digested mafic enclaves. (b) View on the cliff face of a less disrupted member cutting a more disrupted, earlier member of the swarm—apparently along a healed zone of displacement.

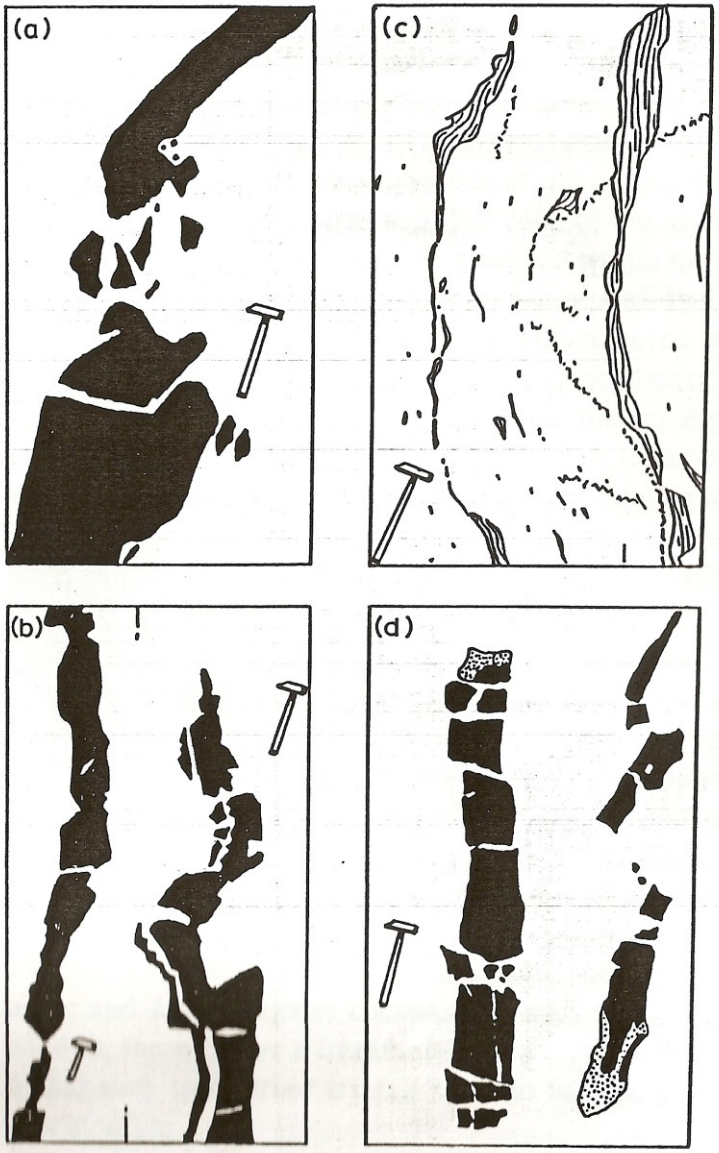
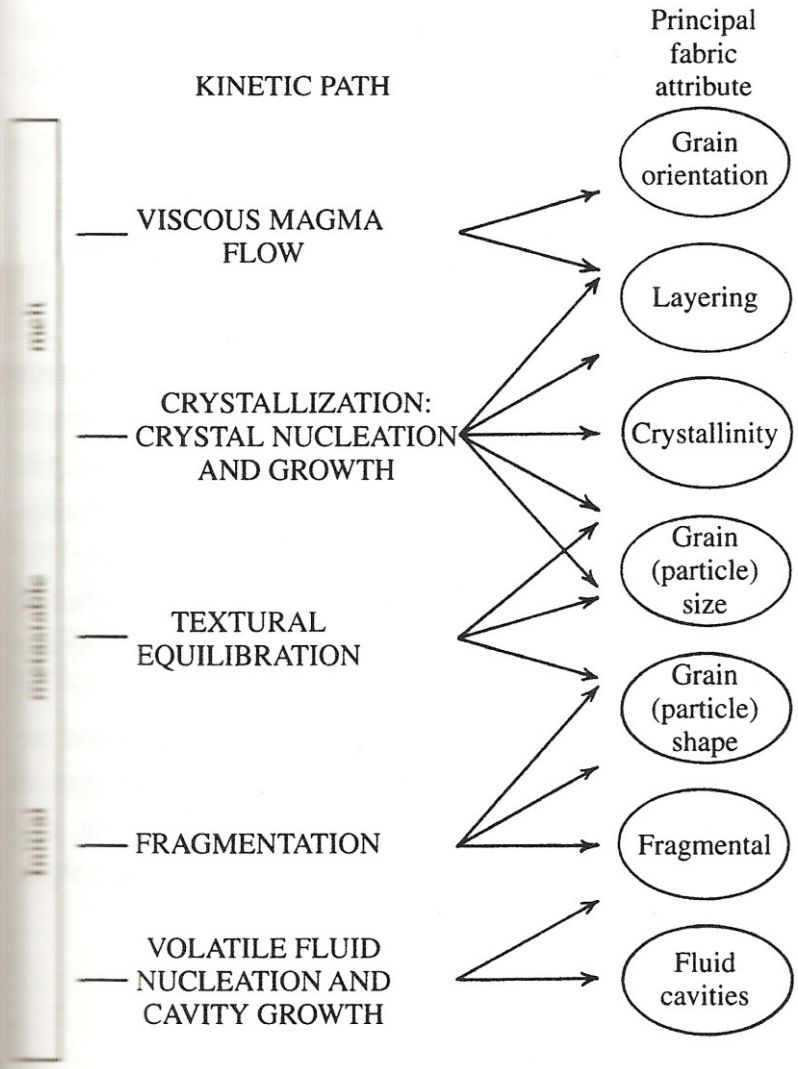


Fig. 2. Comparison of the detail of synplutonic dyke relationships. (a) Microdiorite dyke disrupted within a monzogranite host, Quebrada Huamilache, south of Sayan, Peru. (b) Two examples of disrupted microdiorite dykes in monzogranite host. (c) Disrupted and strongly deformed microdiorite dykes within a monzogranite host. Both (b) and (c) from Quebrada El Carmen, WNW of Sayan, Peru. (d) Disrupted microdiorite dykes in undeformed granodioritic host, Cortes Island, opposite George Harbour, British Columbia: note variation in degree of alteration in adjacent fragments. Dykes (black), granitic host (white), dioritic hybrid (stippled), foliated dykes (lined), pegmatite (zig-zag).



Generalized kinetic paths involved in the creation of magmatic fabric as a metastable melt transforms to a solid magmatic rock. Most fabric attributes evolve along multiple paths. For example, layering can develop by magma flow or by crystallization processes.