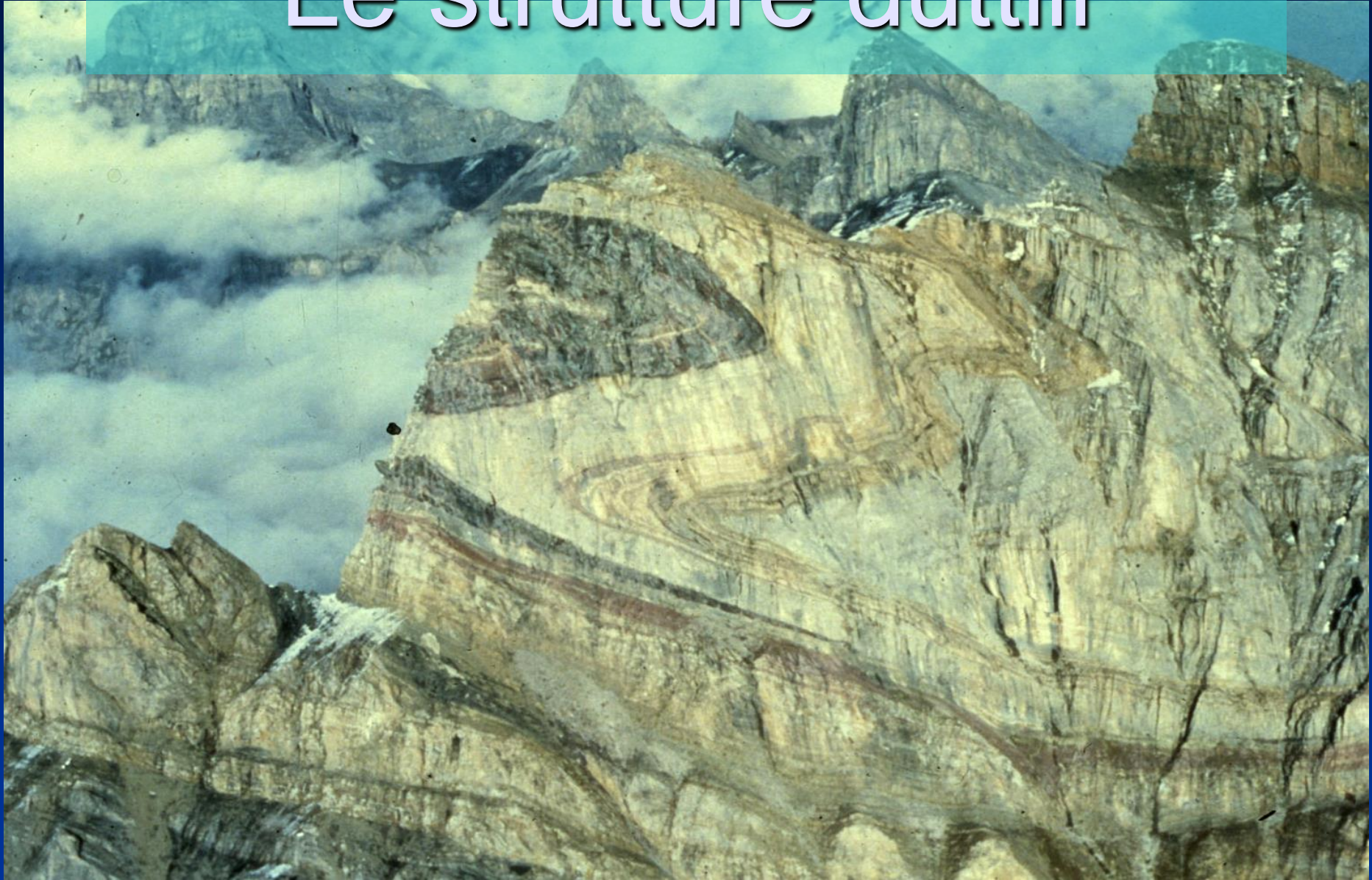


# Le strutture duttili



Da Ramsay and Huber, 1987

Immagini e fotografie tratte da:

- Barker A.J., 1990. Introduction to Metamorphic Structures and Microstructures. Chapman & Hall.
- Mercier J., Vergely P., 1996. Tettonica. Pitagora Editore.
- Mercier J., Vergely P., 1995. Tectonique, 2ème edition, Dunod.
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- Pini, materiale inedito.
- Price N.J., Cosgrove J.W., 1990. Analysis of Geological Structures. Cambridge University Press
- Ramsay J.G., 1967. Folding and Fracturing of Rocks. McGraw Hill.
- Ramsay J. G., Huber M. I., 1984. The Techniques of Modern Structural Geology. Volume 1: Strain analysis. Academic Press Inc.
- Ramsay J. G., Huber M. I., 1987. The Techniques of Modern Structural Geology. Volume 2: Folds and Fractures. Academic Press Inc.
- Suppe J., 1985. Principles of Structural Geology. Prentice-Hall Inc.
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Da Ramsay and Huber, 1987

# Le strutture duttili

## CARATTERISTICHE:

- 1) Deformazione continua
- 2) Comportamento duttile della roccia

## TIPICI:

- 1) Strutture da deformazione omogenea (*variazione forma oggetti, boudinage*)
- 2) Fabric (*foliazione, scistosità, clivaggio da crenulazione, lineazioni*)
- 3) Strutture da deformazione disomogenea (eterogenea) (*interazioni oggetti-matrice, zone di taglio duttile*)

# Deformazione di oggetti

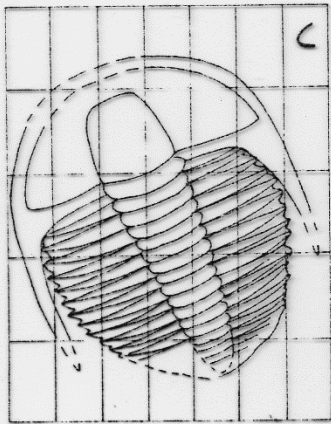


FIG. 3.66  
DEFORMAZIONE DI  
FOSSILI. C= STATO  
INDEFORMATO  
DA RAJSAJ E HUBER, 1984

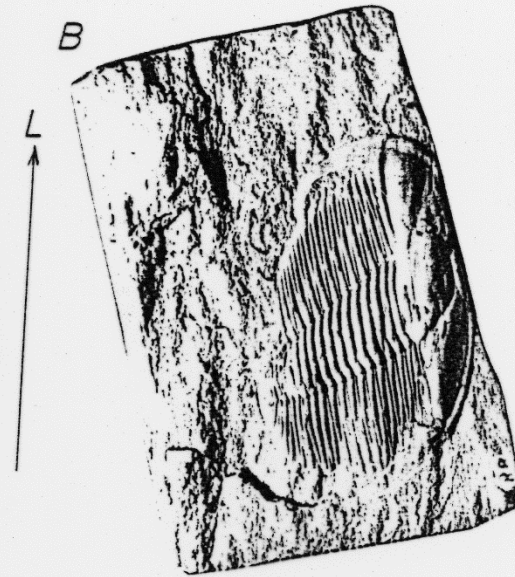
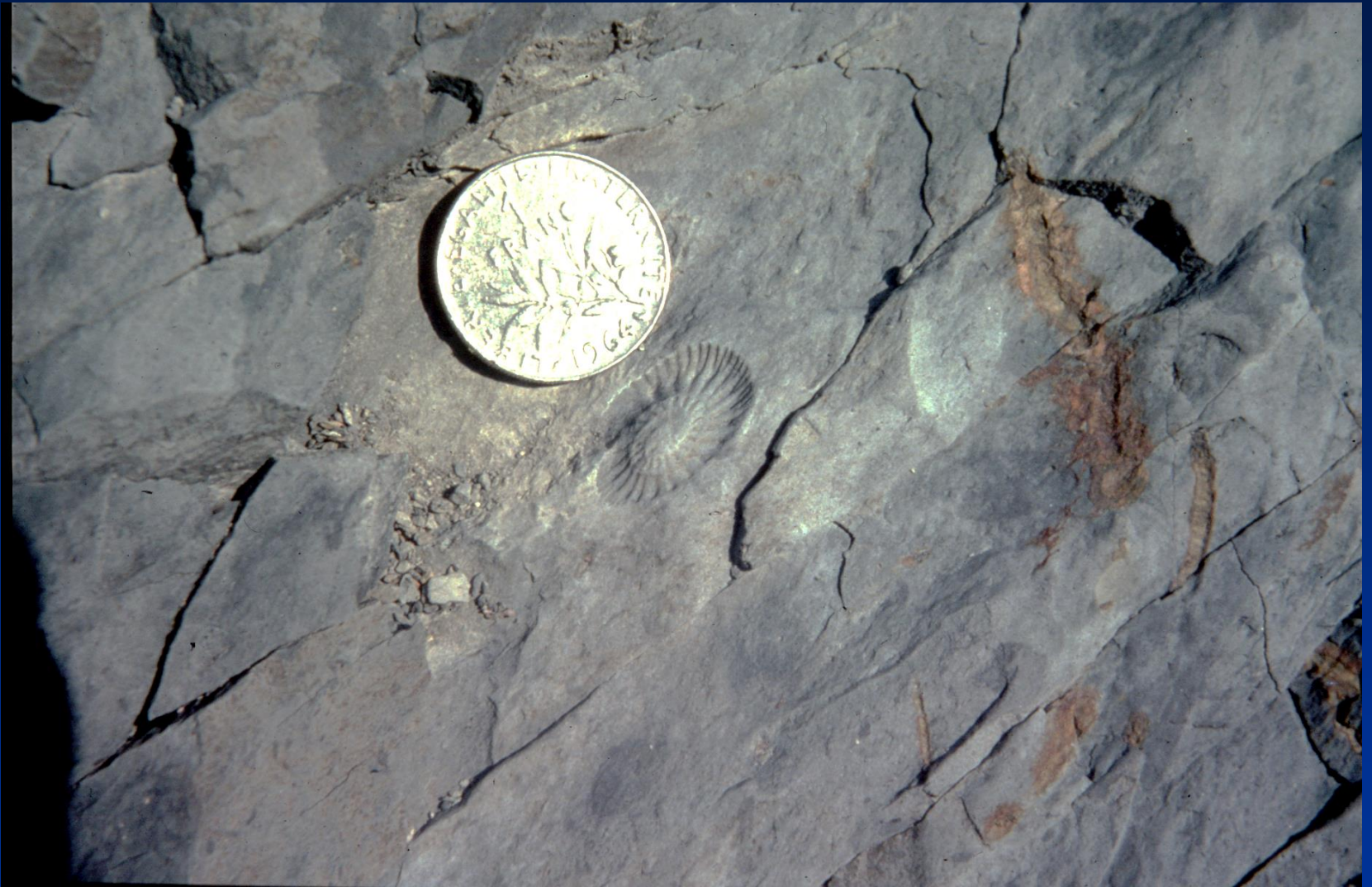
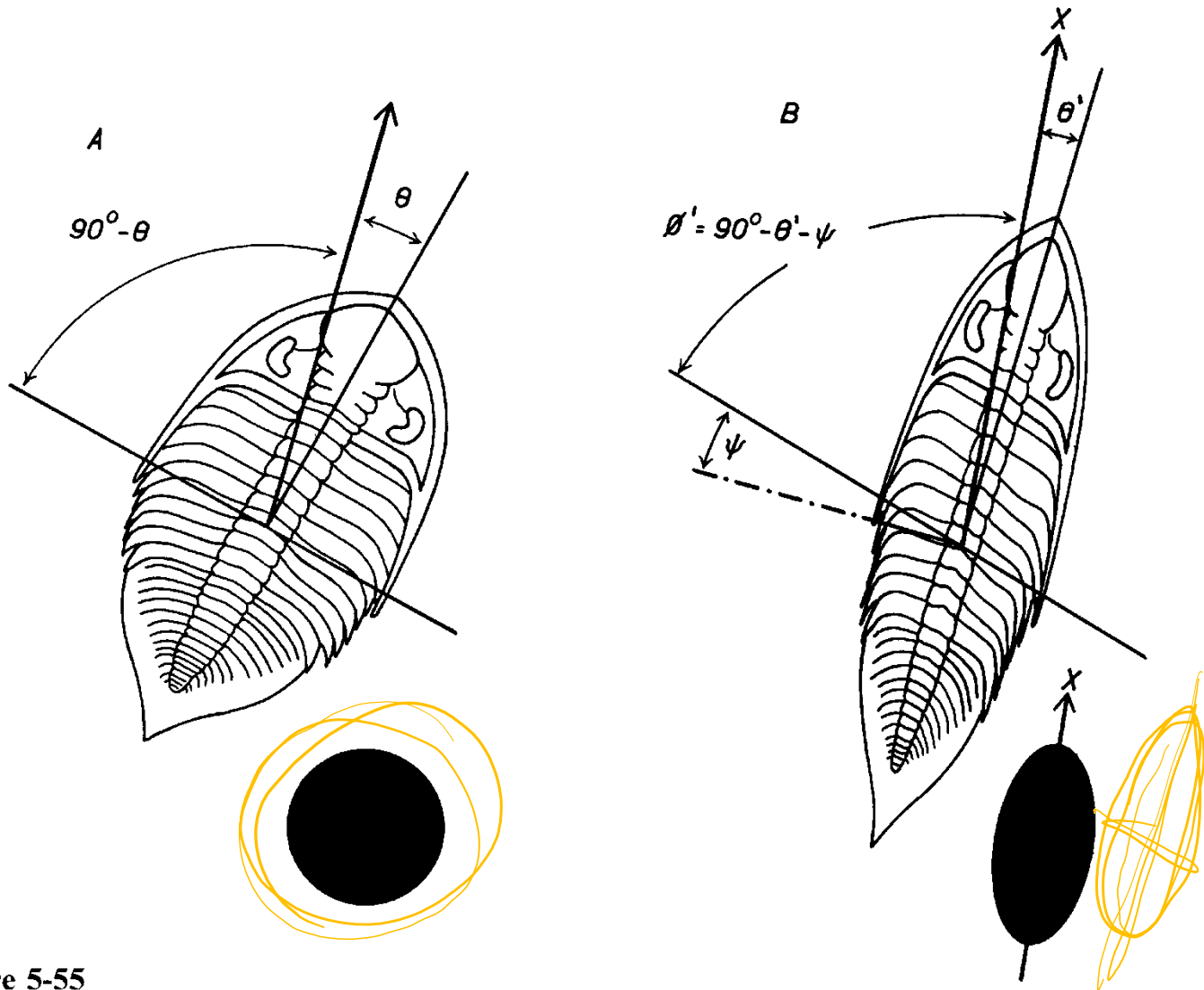


Figure 8.7. Two specimens of Angelina for the determination of principal strain ratio  $R$  (Question 8.1).  $L$  is the stretching lineation for both specimens.

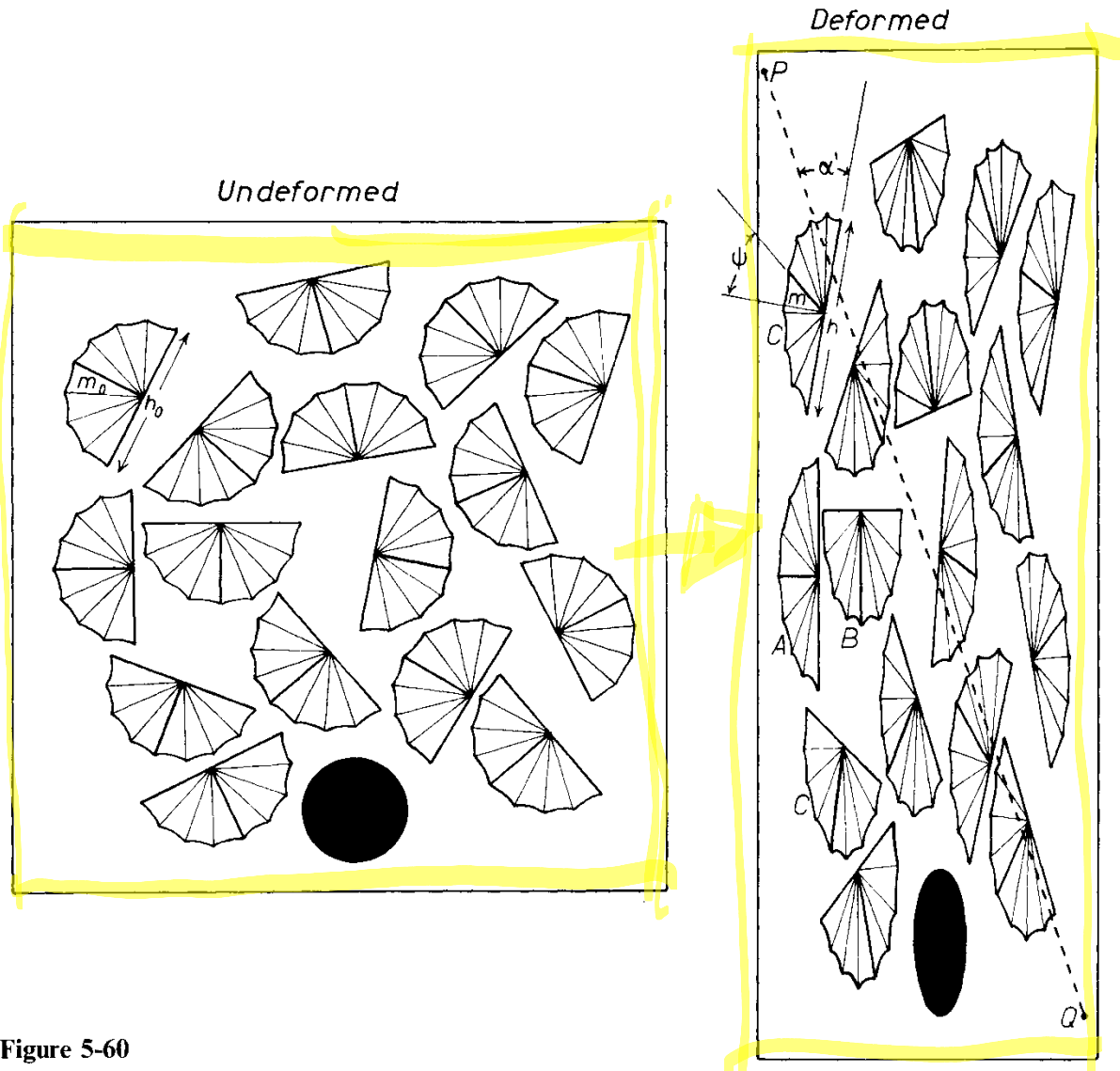


Da Ramsay and Huber, 1987



**Figure 5-55**

*Changes in angle within an originally bilaterally symmetric fossil (A) as a result of strain (B). X is the direction of principal extensive strain, and  $\psi$  the angular shearing strain.*

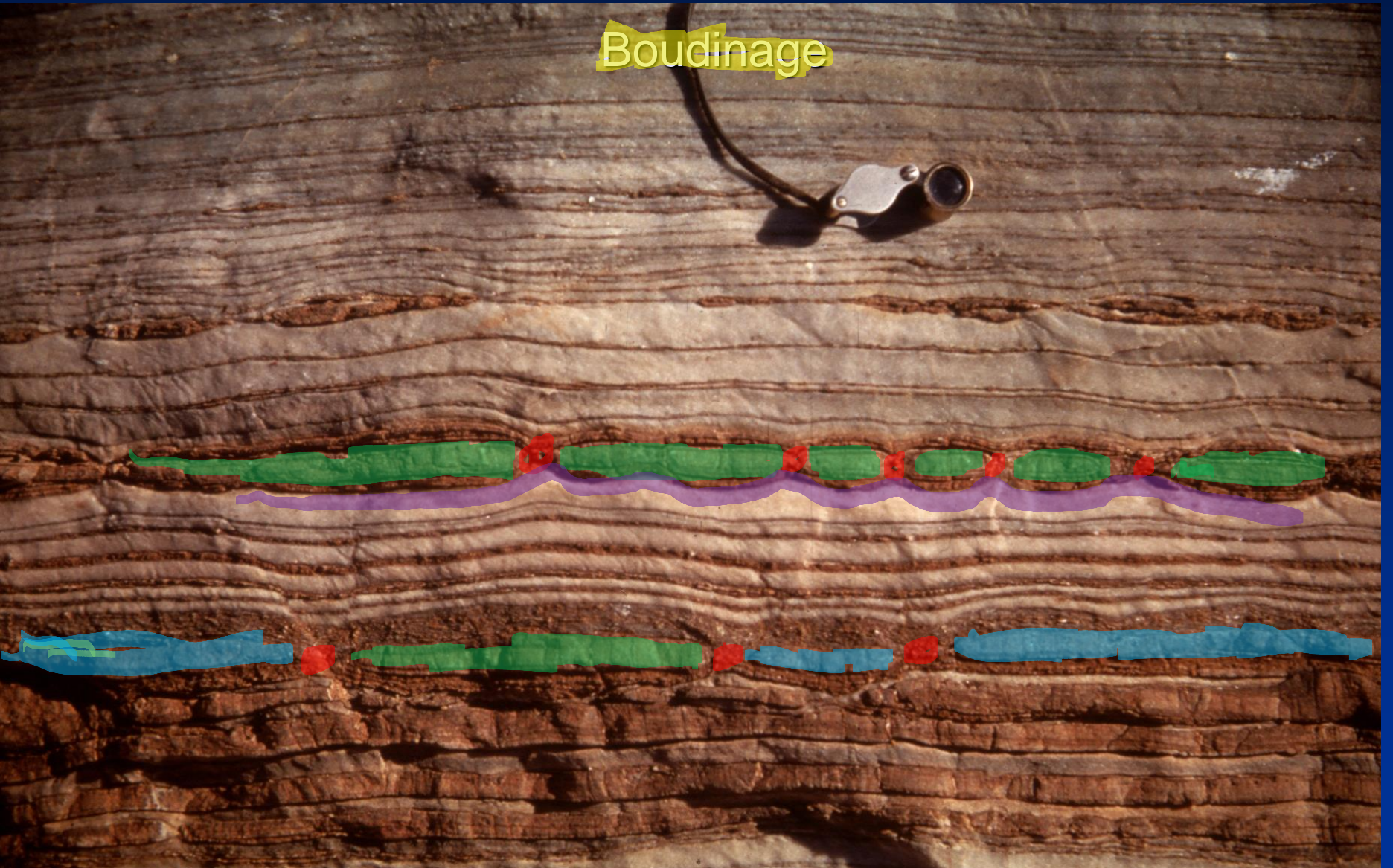


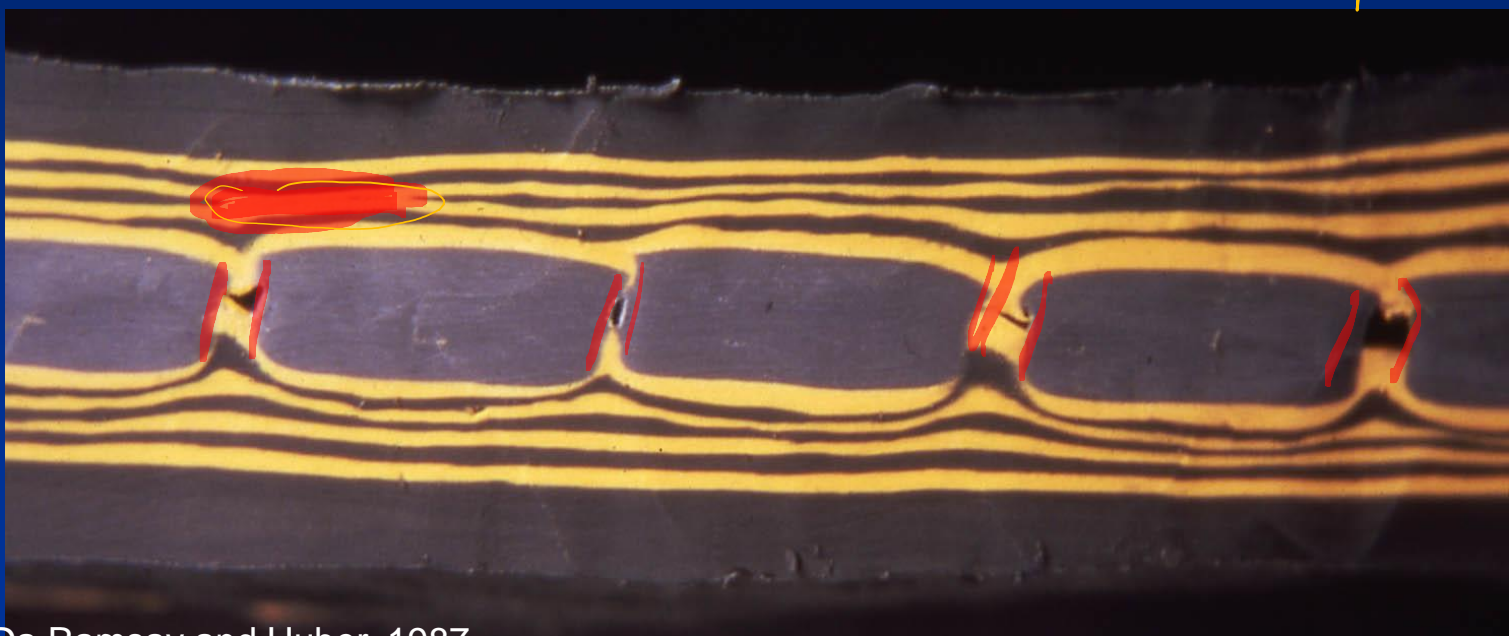
**Figure 5-60**

*The shape changes in an assemblage of equal-sized, bilaterally symmetric fossils as a result of homogeneous strain. A is in the broad form, B the narrow form, and C the oblique form.*



# Boudinage



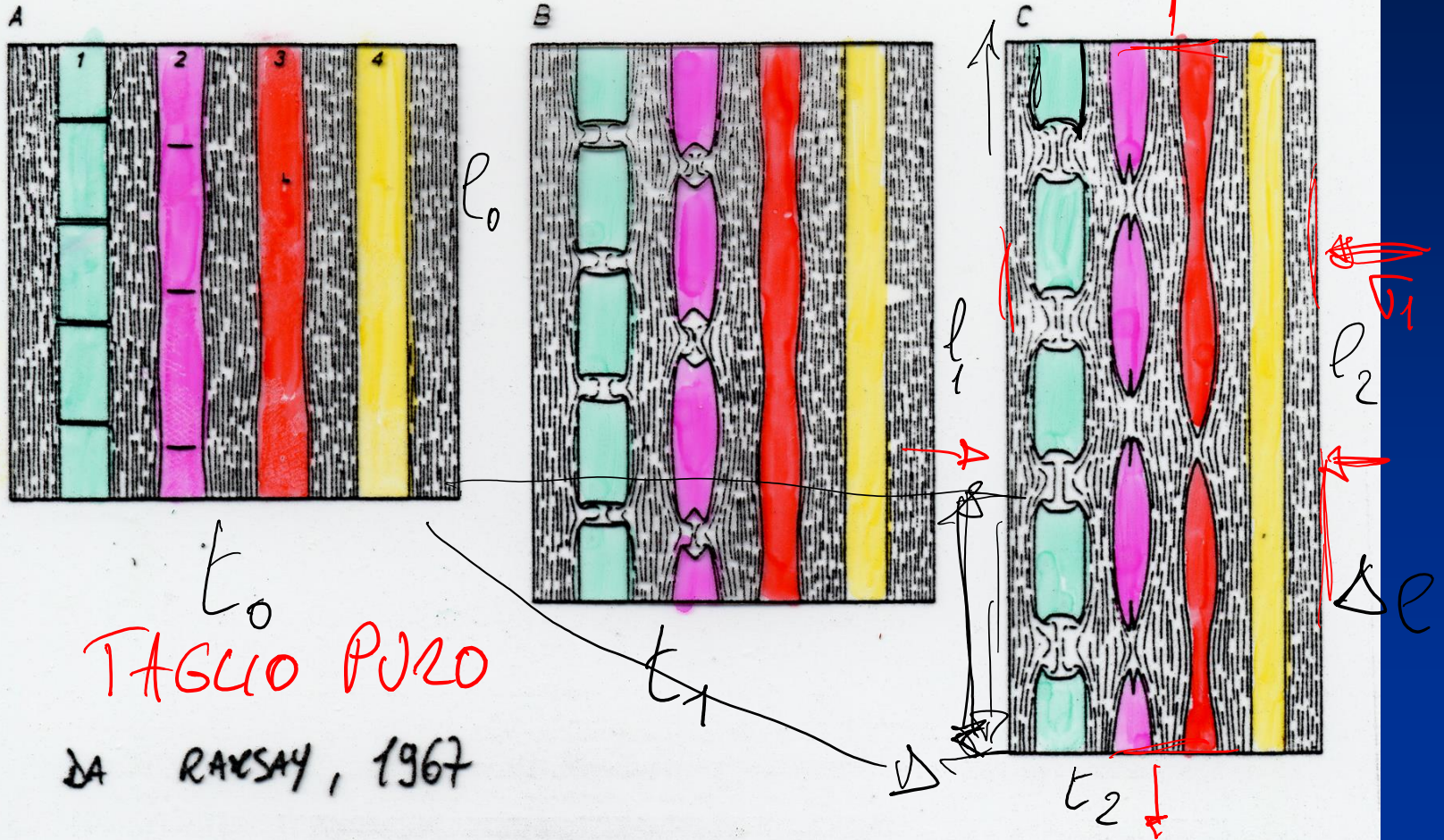


Da Ramsay and Huber, 1987

Da Ramsay and Huber, 1987



# Boudinage





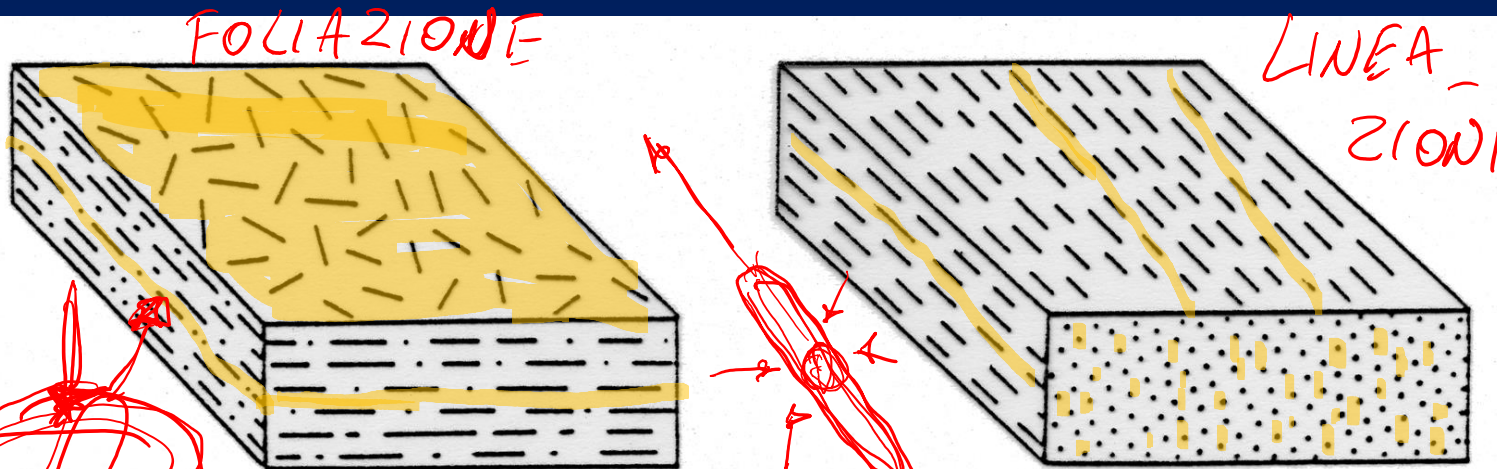
TAGLIO  
SEMPLICE

Boudinage asimmetrico

# Chocolate boudinage



# Fabric, foliazione, lineazione

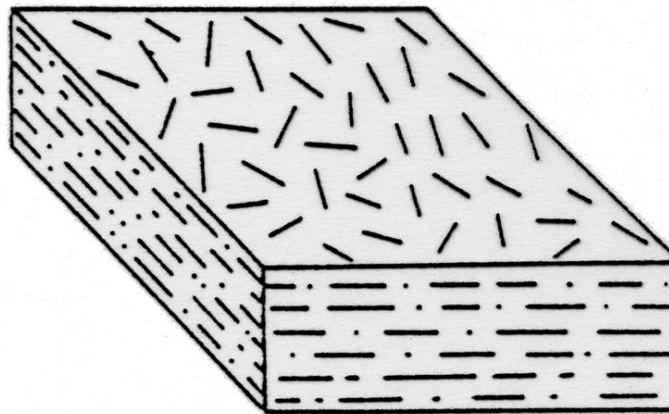


Schematic block diagrams to illustrate the difference between S-tectonites (a) with a pronounced foliation (planar texture), and L-tectonites (b) with a pronounced lineation (linear texture). Metamorphic rocks such as schists and mylonites are generally L-S-tectonites, and have both a linear and planar component.

TAGLIO PURO

Da Barker, 1990

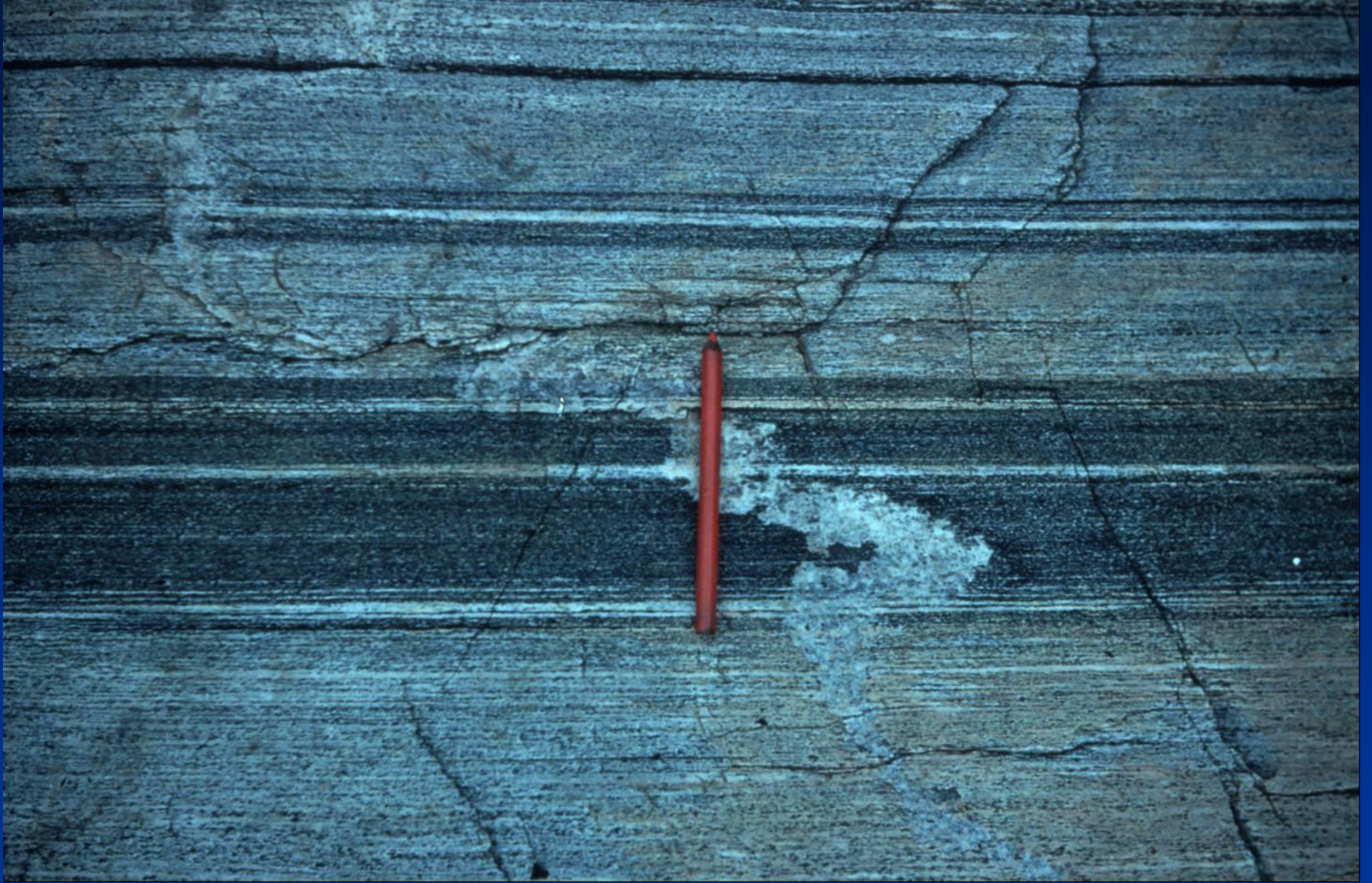
# Fabric, foliazione



Schematic block diagrams to illustrate pronounced foliation (planar texture), and L-structure (L-structure texture). Metamorphic rocks such as schists and gneisses exhibit both a linear and planar component.

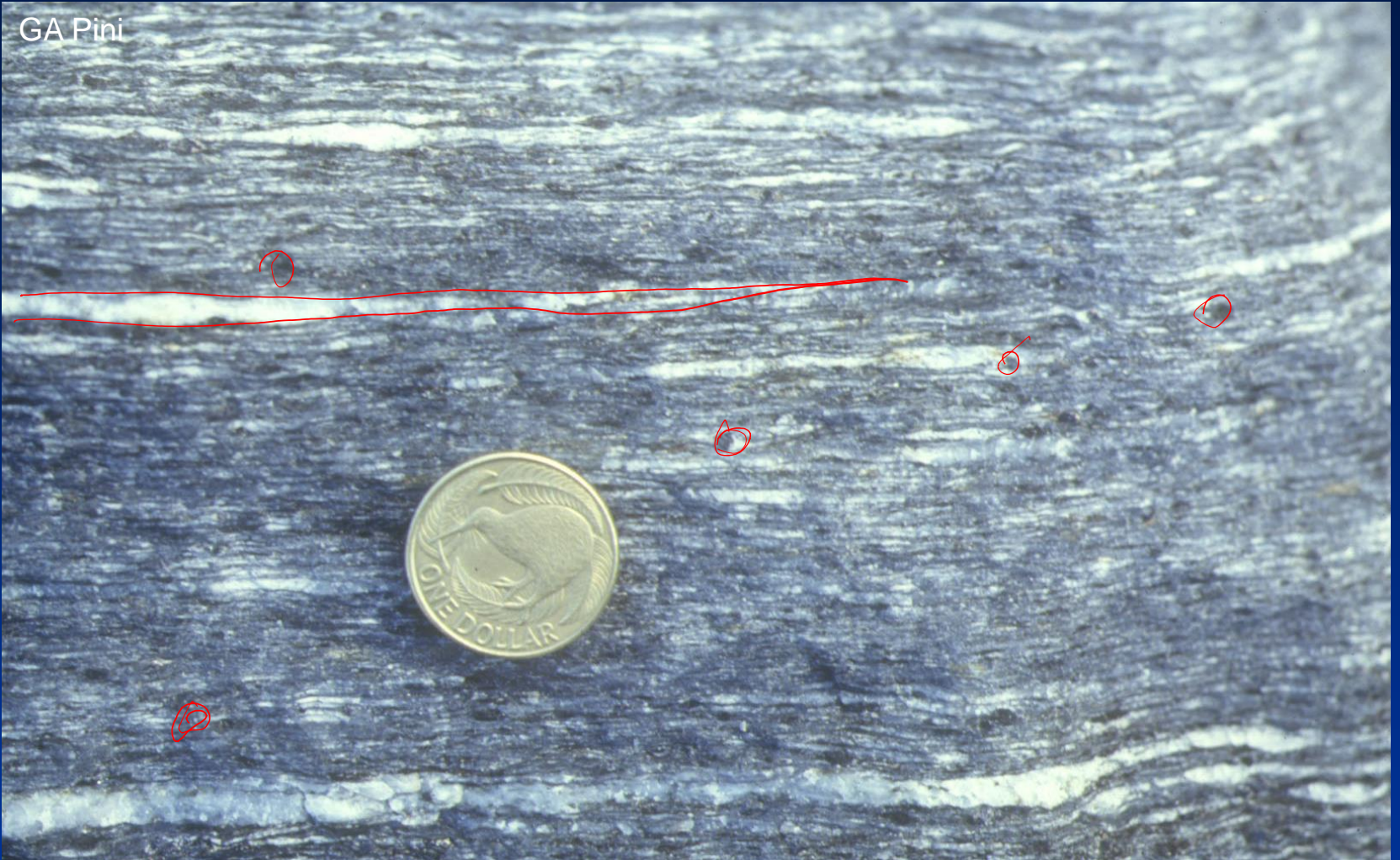
Da Barker, 1990





Da Ramsay & Huber, 1987

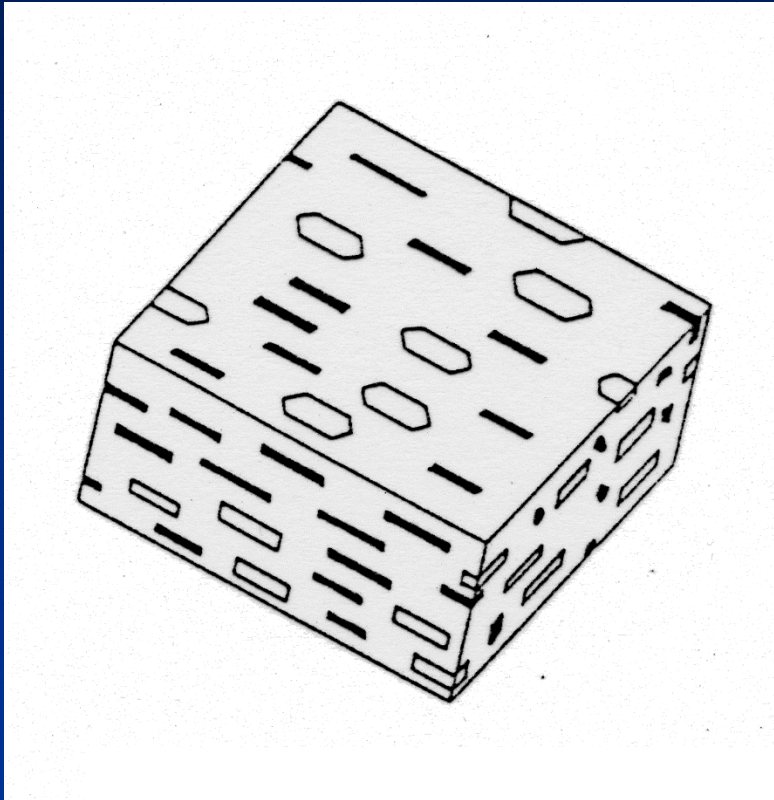
GA Pini



GA Pini



# Foliazione+lineazione (S-L)



Da Nicolas, 1984

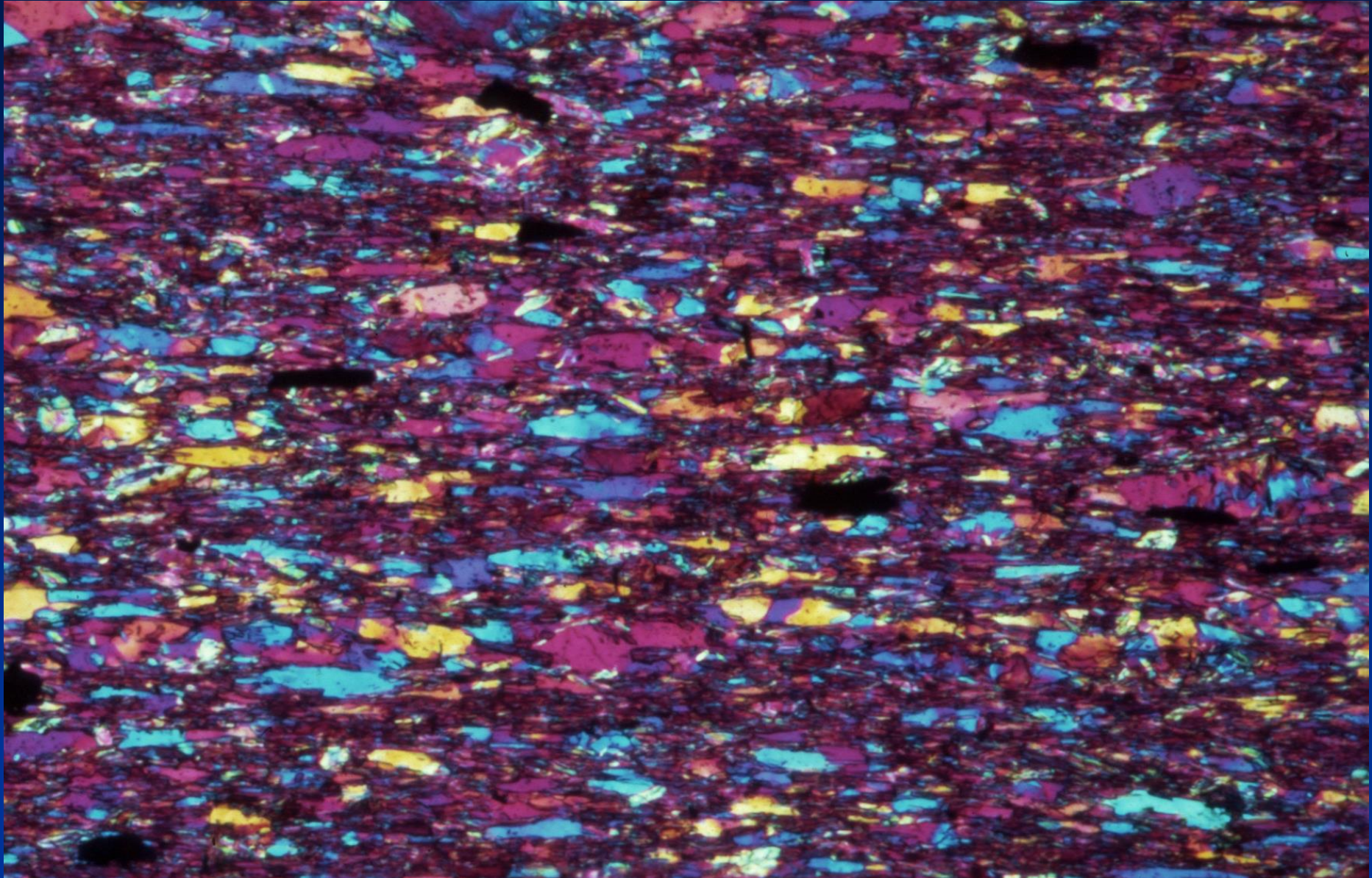


Da Ramsay & Huber, 1984

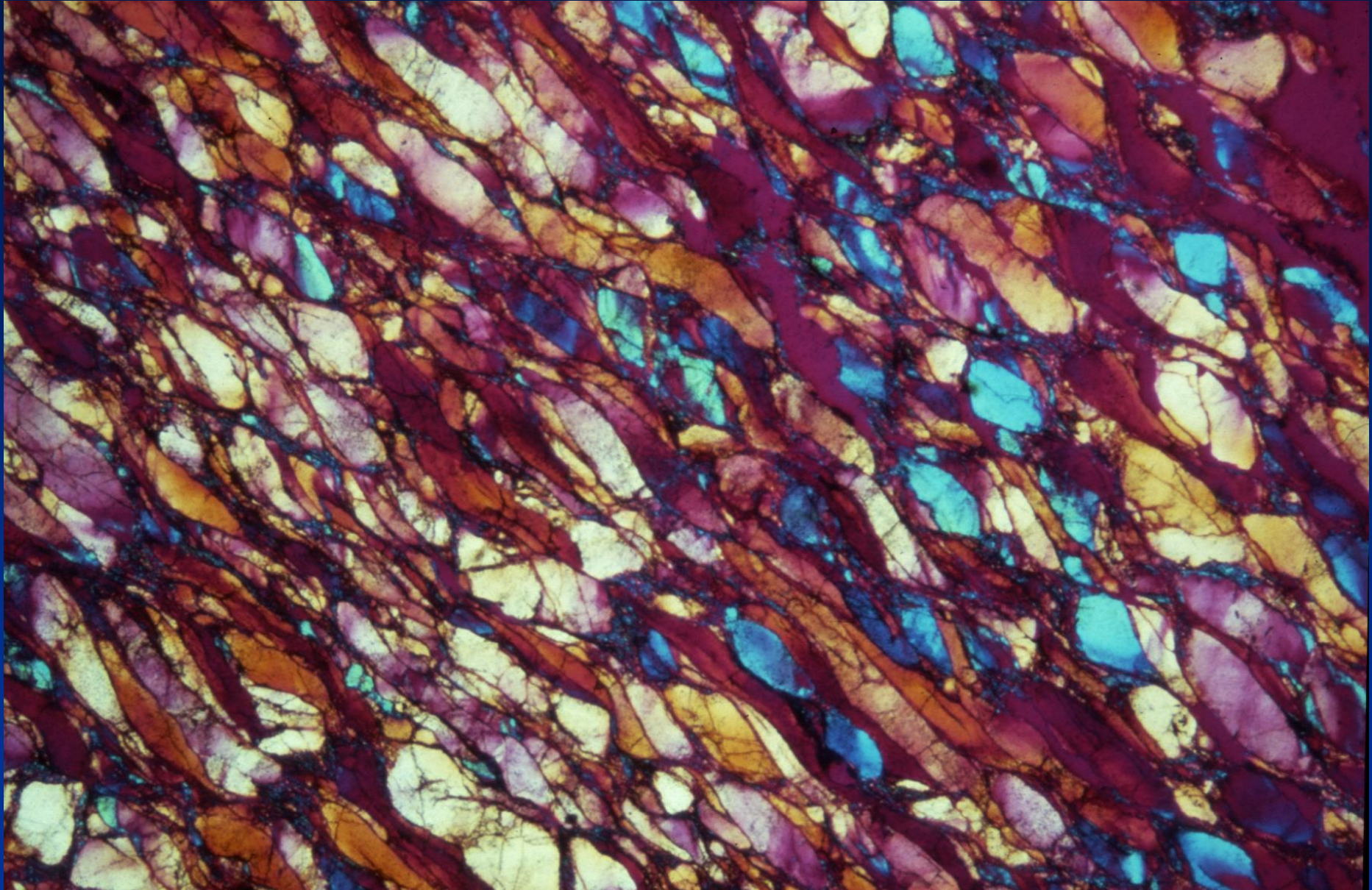


Da Ramsay & Huber, 1984

# Slaty cleavage

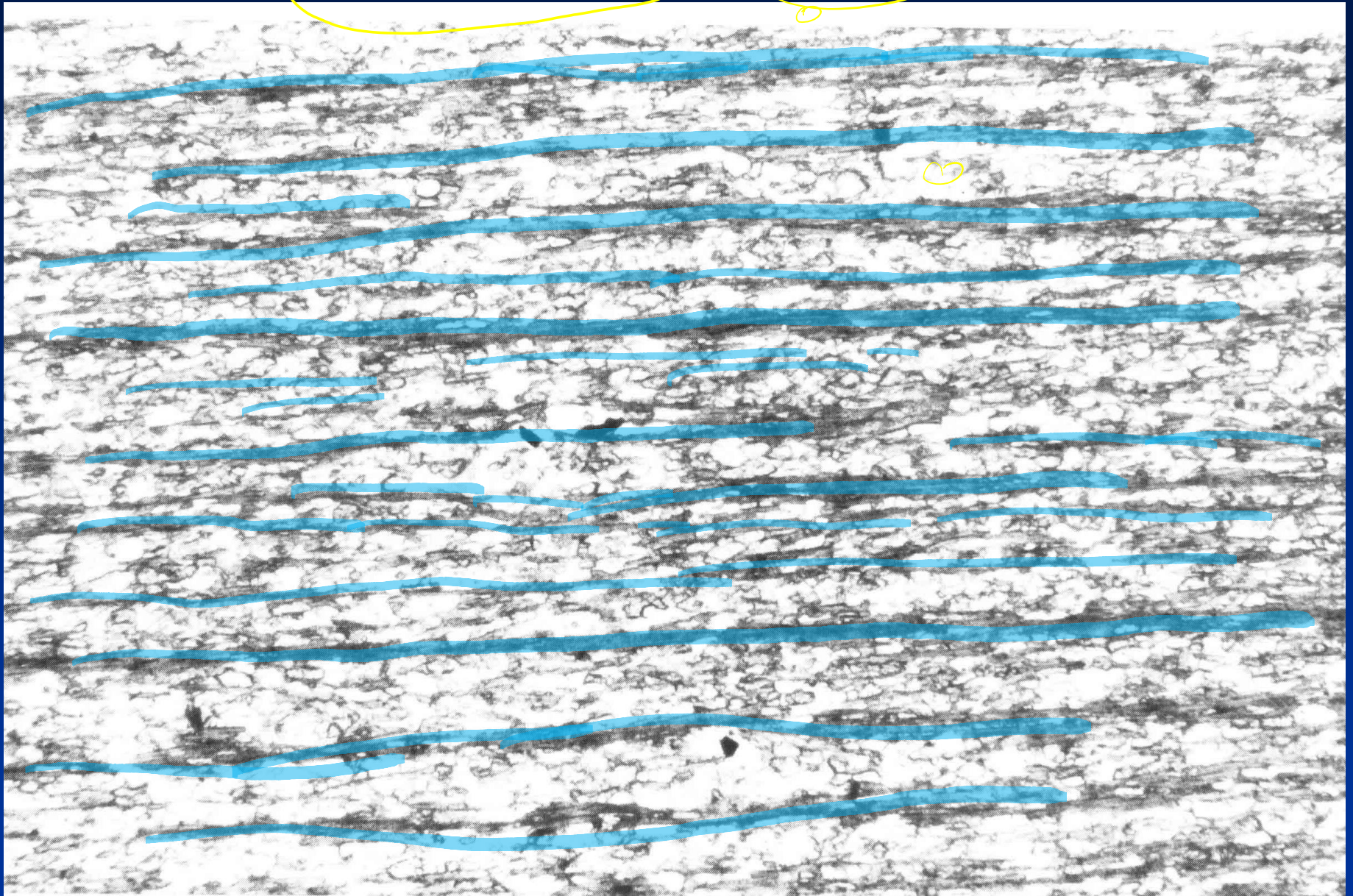


# Gneis foliation (o scistosità)

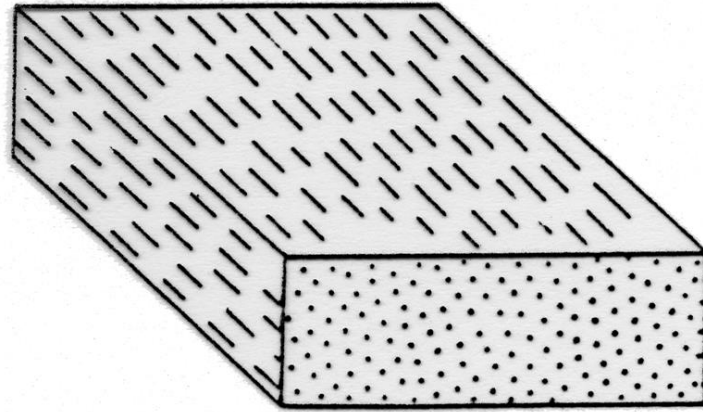




# Cleavage domains e microlithons



# Fabric, lineazione

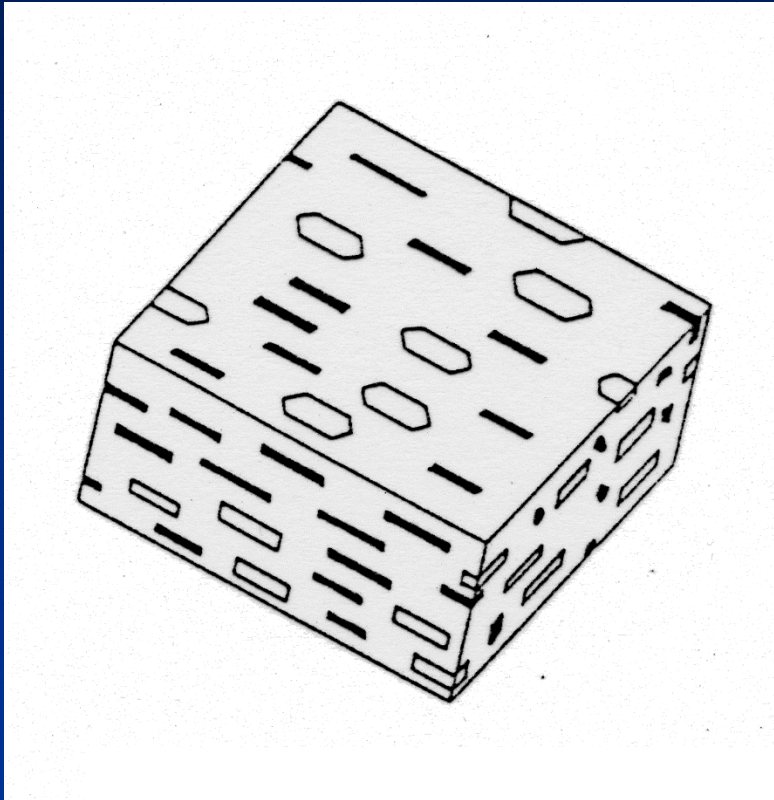


strate the difference between S-tectonites (a) with a  
-tectonites (b) with a pronounced lineation (linear  
and mylonites are generally L-S-tectonites, and have

# Lineazioni



## Foliazione+lineazione (S-L)



Da Nicolas, 1984

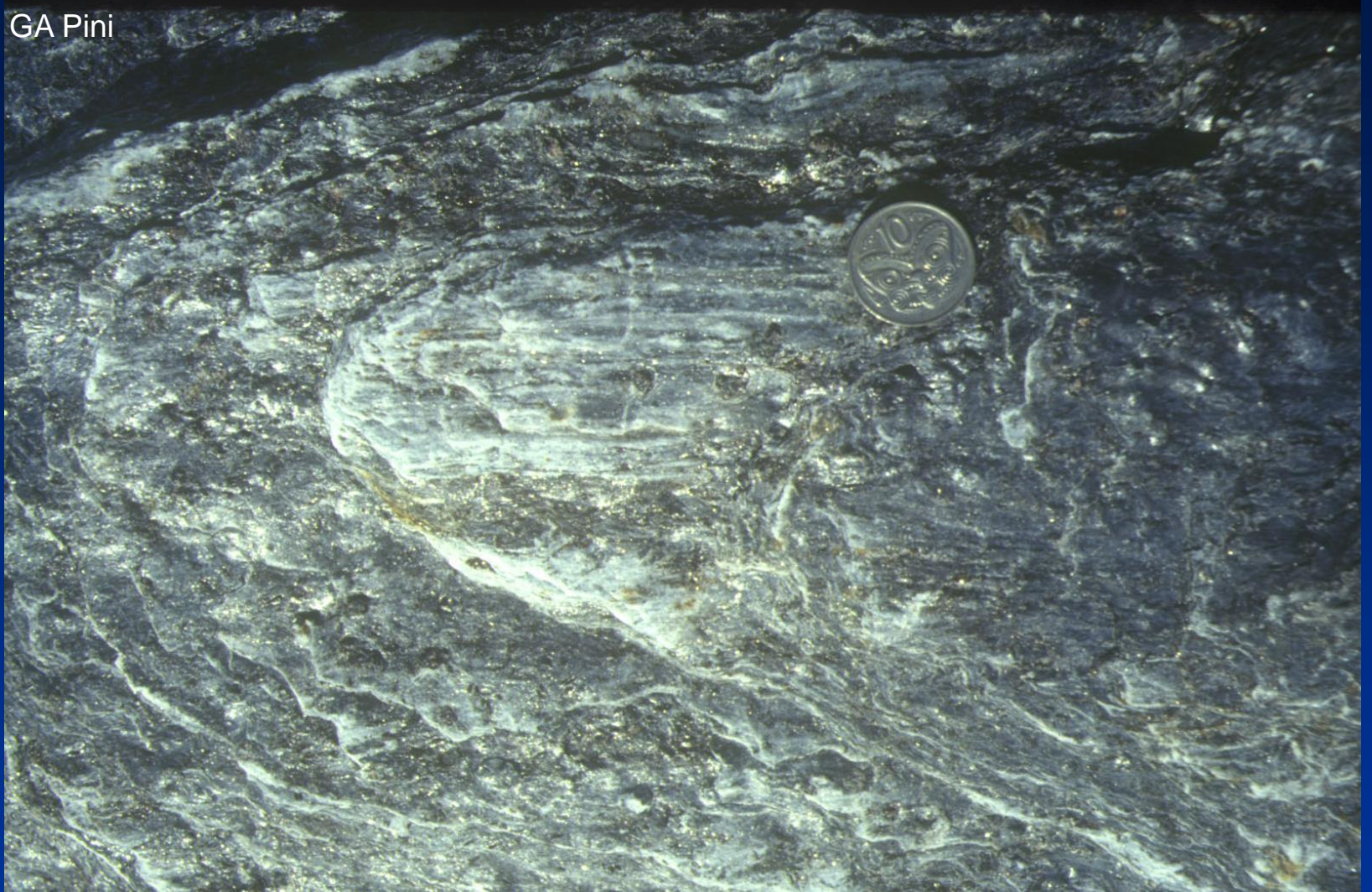
GA Pini



GRANATI  
CUBICO

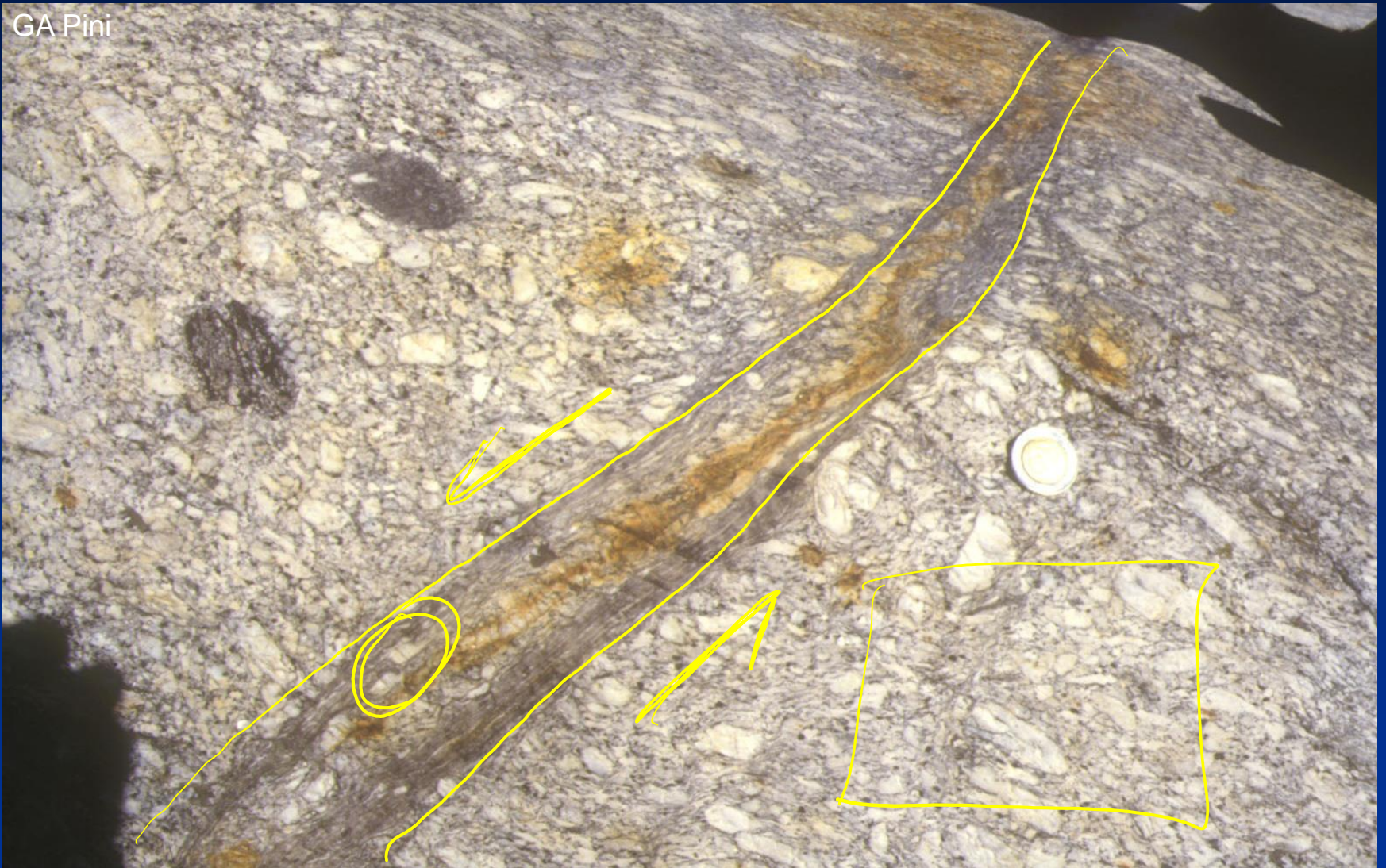
NEOFORMAZIONE  
BLASTESI → METAMORFISMO

GA Pini



# Strutture da deformazione disomogenea

GA Pini

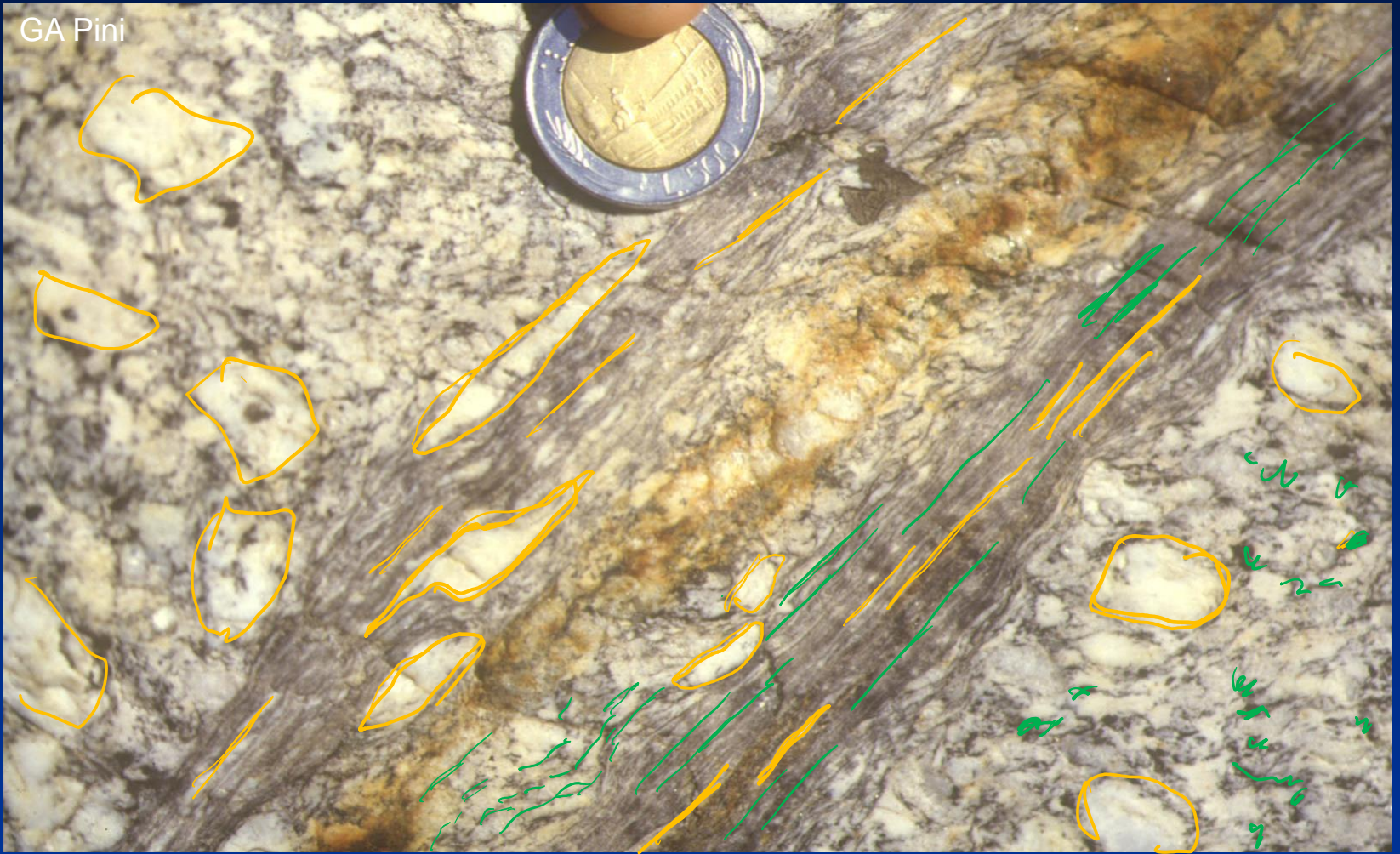


GA Pini



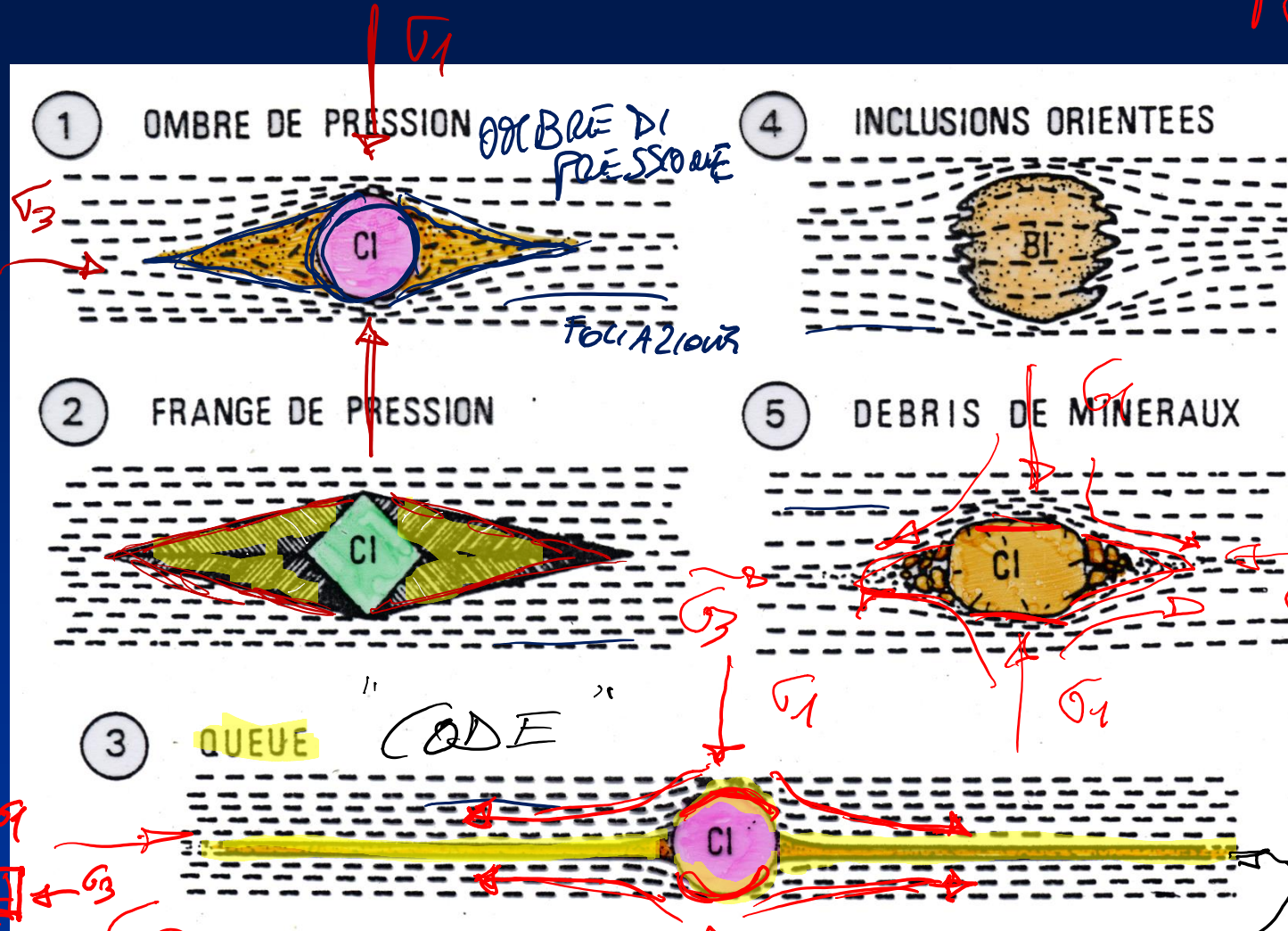


GA Pini



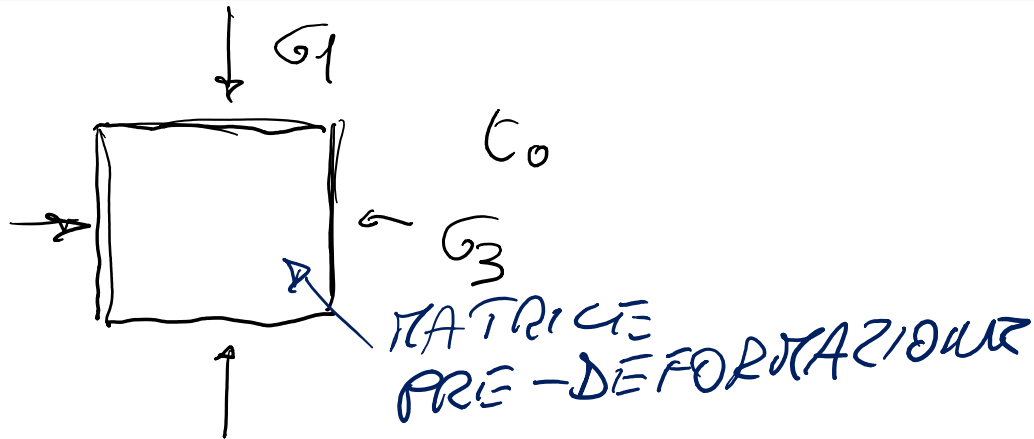
# Strutture da deformazione disomogenea

TAGLIO  
PIRO

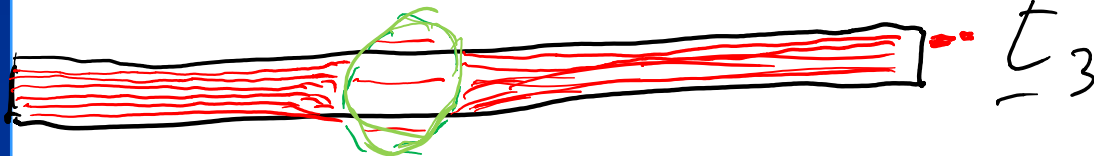
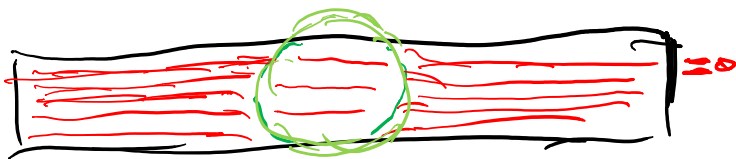
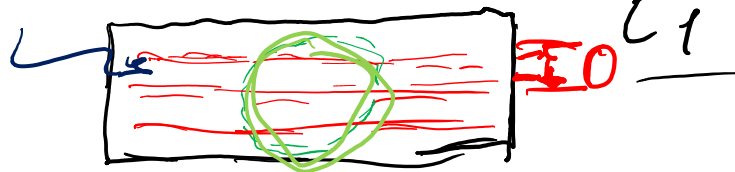


Da Mercier & Vergely, 1995

STANTELLI



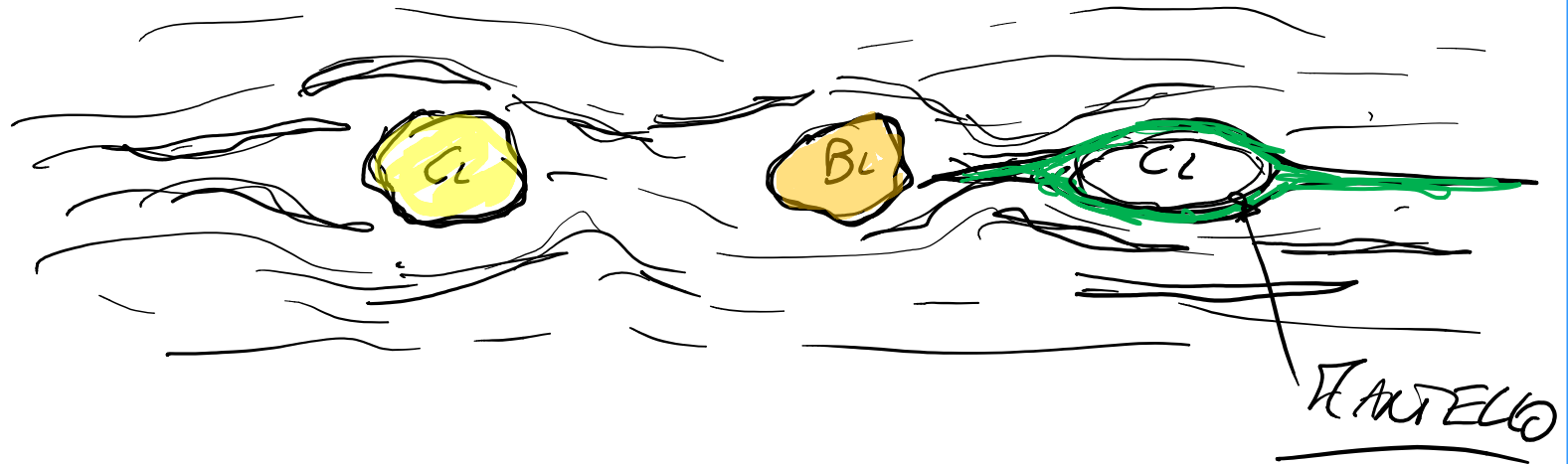
FOLIAZIONI BL



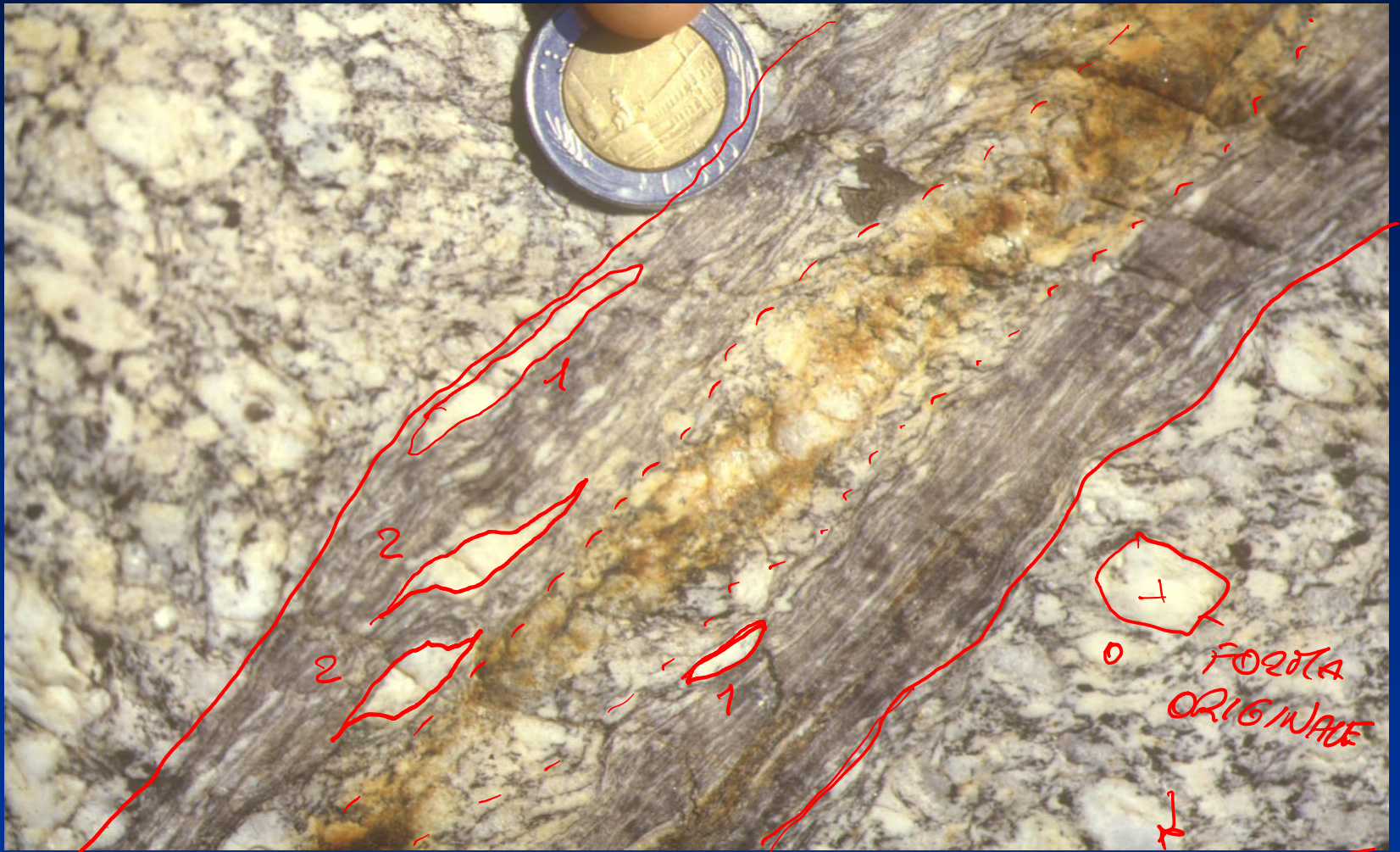
STRESS

DEFORMAZIONE  
 NE  
 PROGRESSIVA

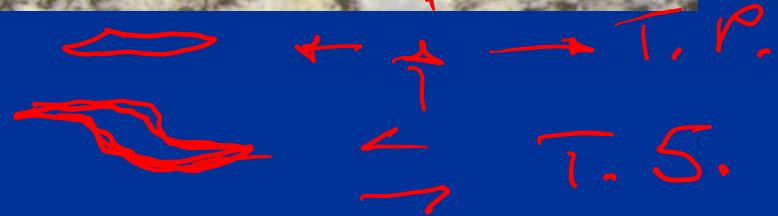
## 2/3 COMPONENTI



- BLASIO = PINERACE DI DEFORMAZIONE
- CLASIO = PINERACE /  
• NON DEFORMABILE DUTTILE.
- MATRICE = PINERACI + FACILMENTE DEF.  
DUTTILE
- MANTELLO = PARTE ESTERNA DI PINERACI  
• NON DEF. DUTTILE  
DELLA MATRICE?



1 = SIMMETRICO  
 2 = ASIMMETRICO



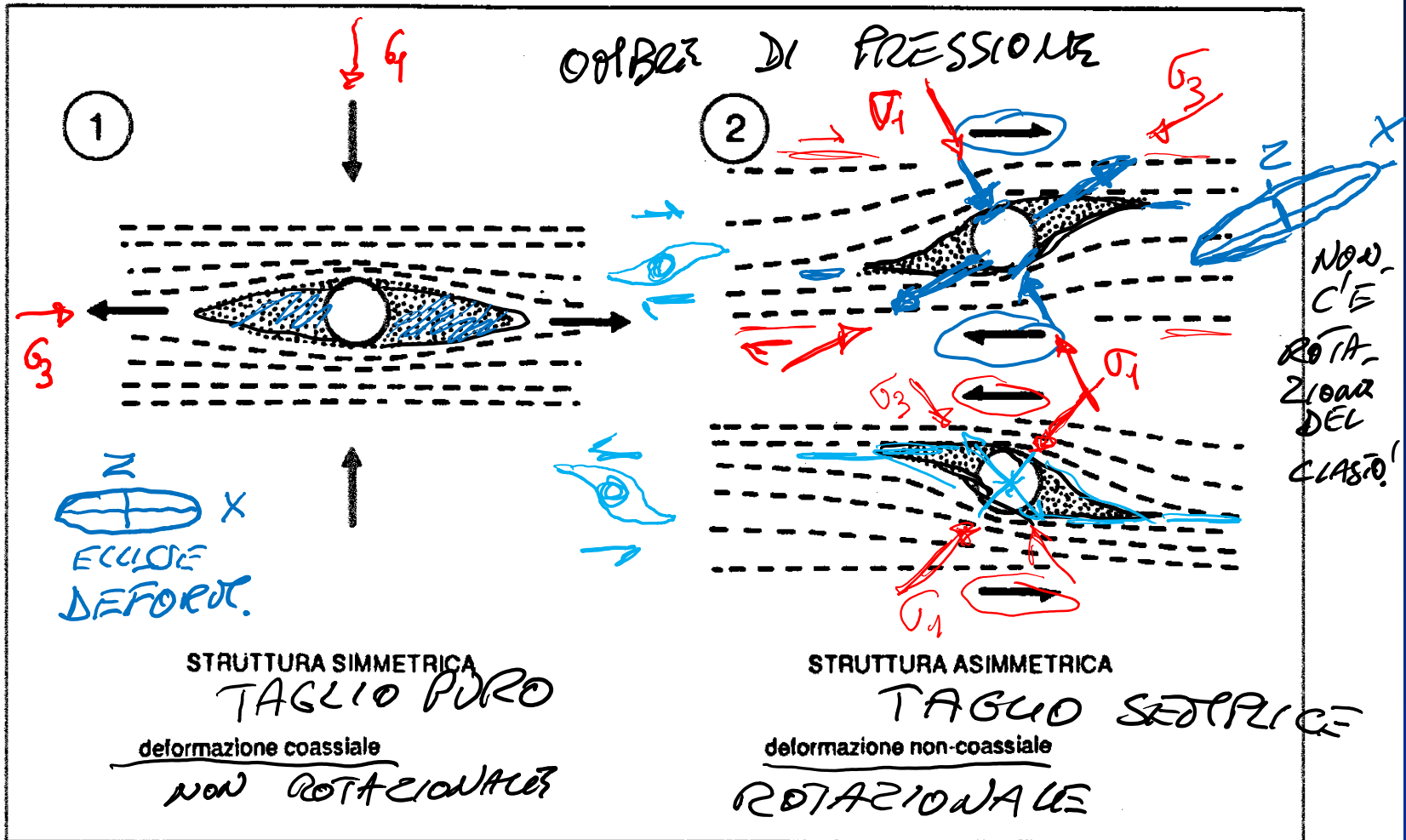
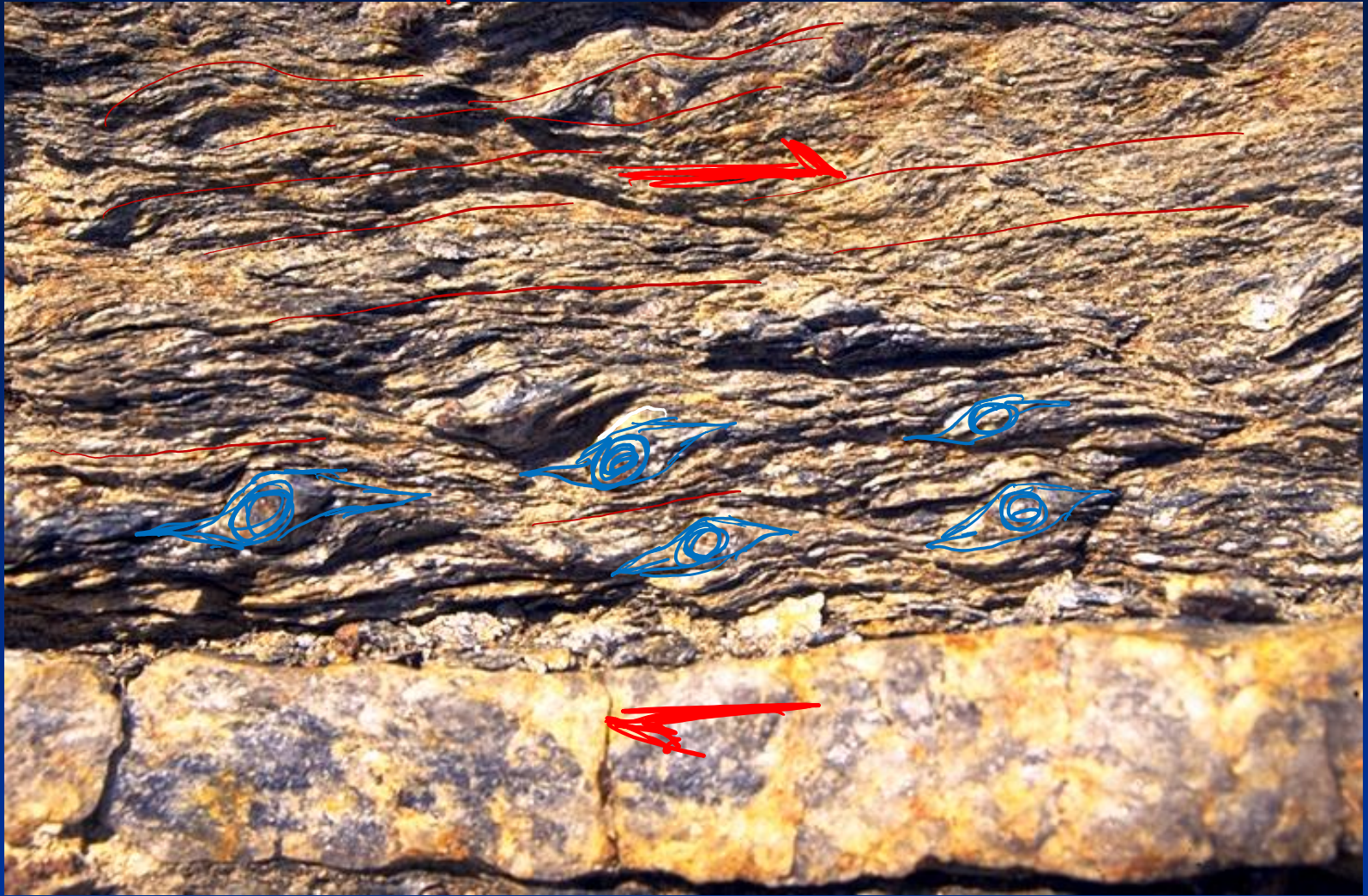


Figura 7.20. Relazioni tra simmetria delle strutture e modalità deformativa.



Passchier & Trouw, 2006

