This pdf file consists of figures containing photographs, and their captions, scanned from:

STRUCTURAL STUDIES IN THE NORTHERN CHESTER DOME OF EAST-CENTRAL VERMONT

by

Bruce Wallace Nisbet

A Dissertation
Submitted to the State University of New York at Albany
In Partial Fulfillment of
the Requirements for the Degree of
Doctor of Philosophy

College of Arts and Sciences
Department of Geological Sciences

1976

Figure 3.1

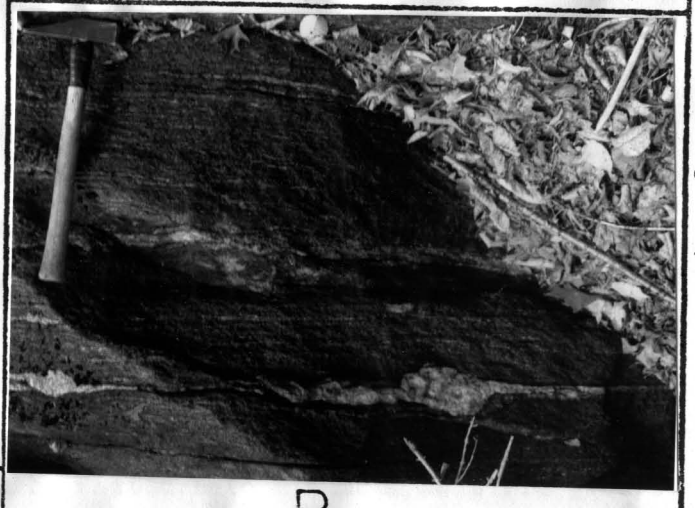
Examples of "coarse-grained" bodies from Keyes Mountain.

A - Coarse-grained quartz-albite vein at a high angle to the foliation in a quartzofeldspathic gneiss. The coarse-grained material is unfoliated.

B - Coarse-grained layer sub-parallel to the foliation in a schistose quartzofeldspathic gneiss. Note how the layer "pinches" and swells. The coarse-grained layer is not internally foliated.

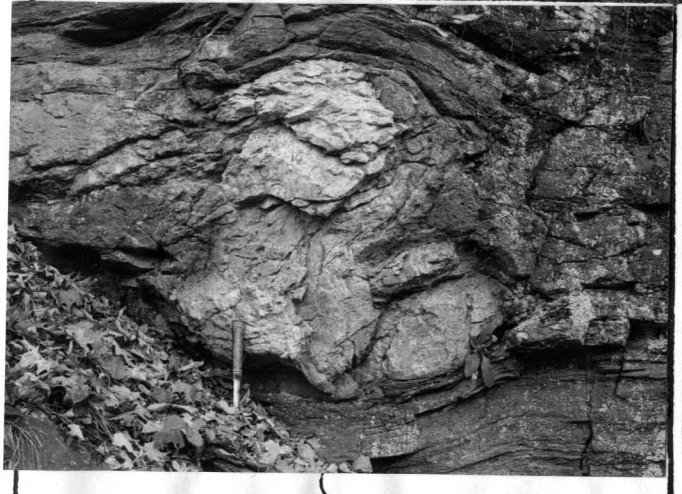
C/D - Coarse-grained quartz-albite body in a quartzofeldspathic gneiss. D is a tracing of C. The body is folded into a sigmoidal fold as shown in D and a weak internal schistosity parallel to the external schistosity is present.

A

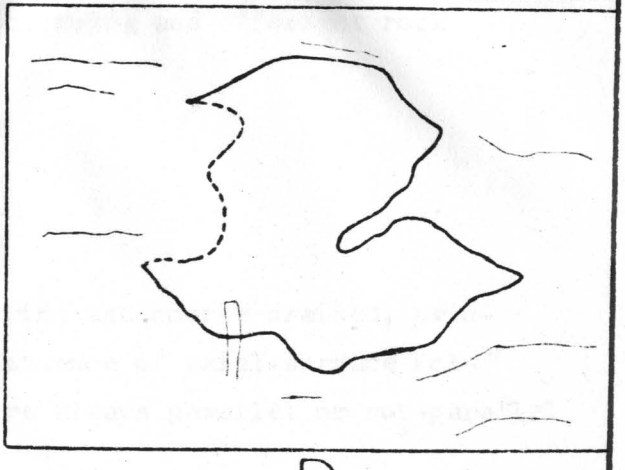


B

3.1



C



D

Figure 4. 1

Profiles of S.G.1 folds from Keyes Mountain, Vermont.

Axial-surface schistosity is absent from quartzofeldspathic layers but present in more micaceous layers in both examples.

A - Fold in coarse grained quartz-rich layer in garnet-chlorite quartzofeldspathic-schistose gneiss. Scale bar is 2 cm long.

B - Fold in quartzofeldspathic rich layer in quartzofeldspathic gneiss. Scale bar is 2.5 cm long.

Figure 4.2

Profiles of S.G.2 folds from Keyes Mountain.

All folds exhibit axial-surface schistosity (S_2) which is generally oriented parallel to the long dimension of the photograph. 4.2 A, B, C, and D are S.G.2.1 folds, the rest are S.G.2.2 folds. S.G.2.2 folds are arranged approximately in order of decreasing tightness. Unless otherwise indicated, the scale bar is 1 cm long.

A - Isoclinal fold in quartzofeldspathic layer in schistose gneiss. Scale bar is 10 cm long. This figure is an enlargement of the box shown in the top-central part of Figure 4.3.

B - Isoclinal fold in quartzofeldspathic layer in schistose gneiss.

C - Isoclinal fold in quartzofeldspathic layer in schistose gneiss. The hinge of the fold is directly above the hammer handle and to the left of the arrow. Hammer is about 30 cm long.

D - Isoclinal fold in quartzofeldspathic gneiss.

E - Tight folds in quartzofeldspathic gneiss. The scale is 2.5 cm long.

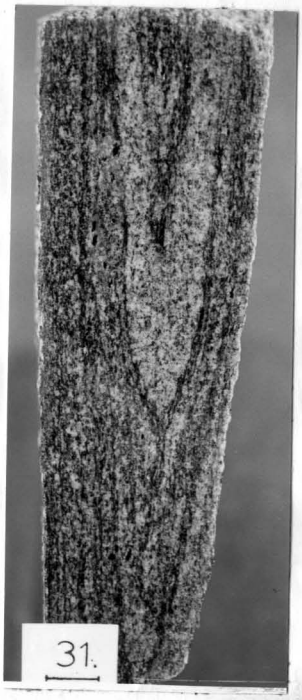
F - Tight fold in schistose gneiss.

G - Tight fold in quartzofeldspathic gneiss.

A

B

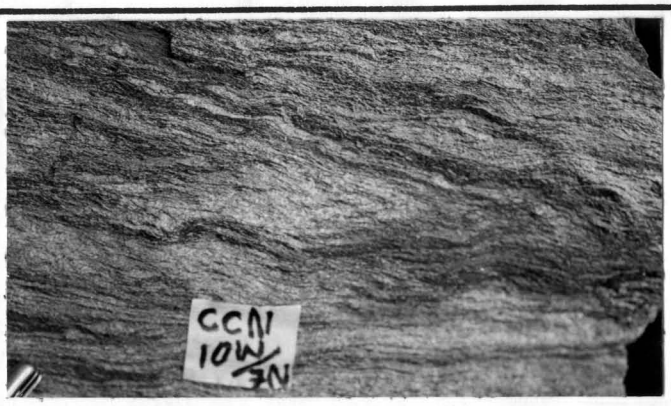
C



D

4.2

E



F

G

Figure 4.2 (cont.)

H - Tight fold in layering in quartzite.

I - Tight fold in quartzofeldspathic gneiss. S_2 is oriented diagonally from top left to bottom right. Hammer is about 30 cm long.

J - Open fold in quartzofeldspathic gneiss. Scale bar is 0.5 m long.

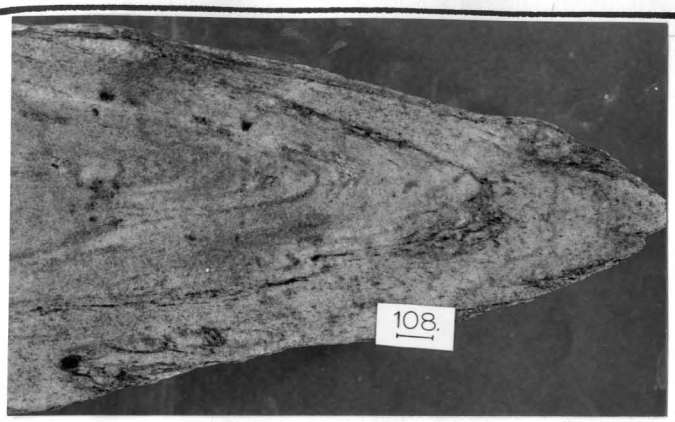
K - Open fold in coarse-grained quartzofeldspathic gneiss. S_2 is parallel to the long dimension of the page.

L - Open fold in garnet-chlorite-quartzofeldspathic-schistose gneiss. Scale bar is 10 cm long.

M - Open fold in quartzofeldspathic gneiss. S_2 is oriented parallel to the bottom left-top right diagonal. Knife is 11 cm long.

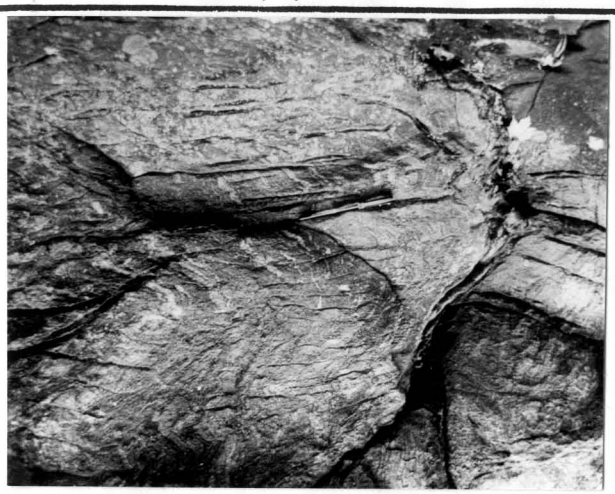
N - Hinge of tight fold in a quartzofeldspathic layer in a biotite-rich garnet-chlorite-quartzofeldspathic-schistose gneiss. Note offsets of layers along surfaces parallel to S_2.

O - Open fold in coarse-grained quartzofeldspathic gneiss. Note offsets of layers along surfaces parallel to S_2.

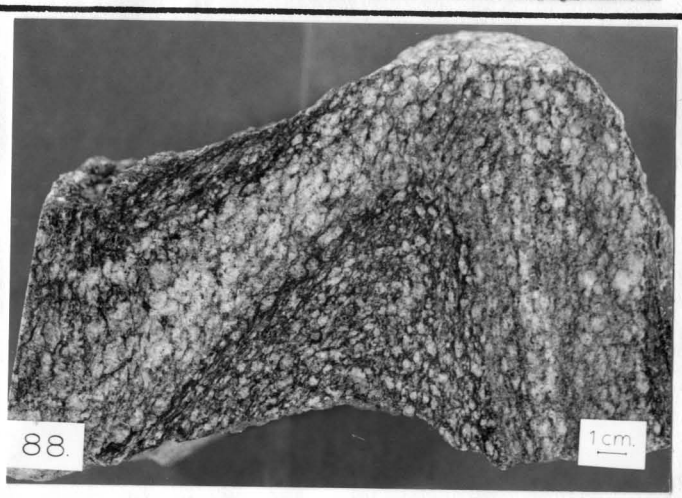


H

I



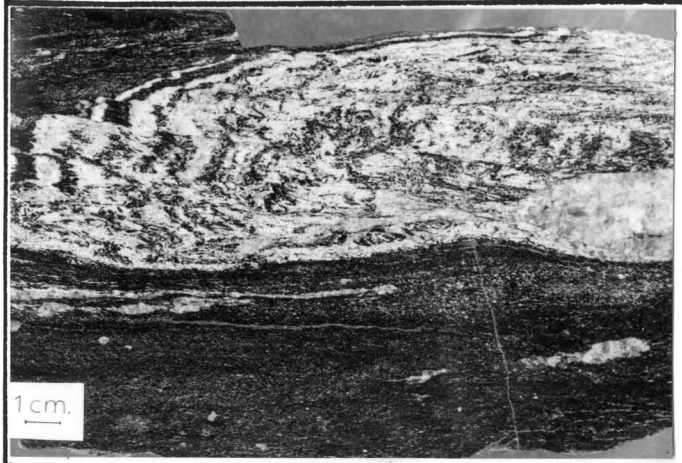
J



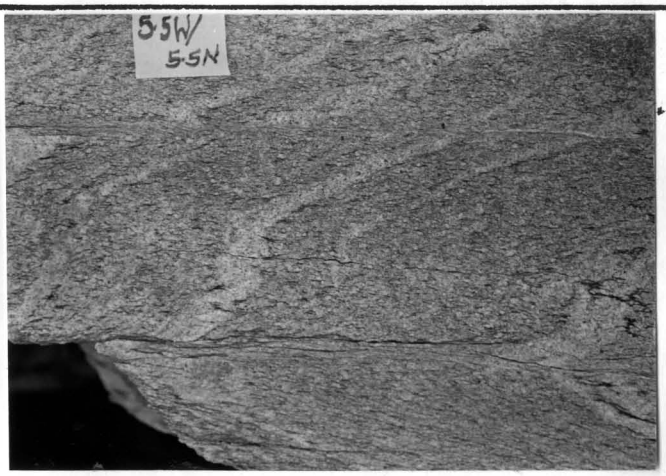
K

L

M



N



O

Figure 4.3

Profiles of S.G.3 folds. Folds shown in A, B, C, D and E are representative of S.G.3.1, those in F, G and H of S.G.3.2. Folds shown in I and J could be assigned to either sub-group. In all cases the photograph is oriented so that a vertical line is parallel to the long edge of the page.

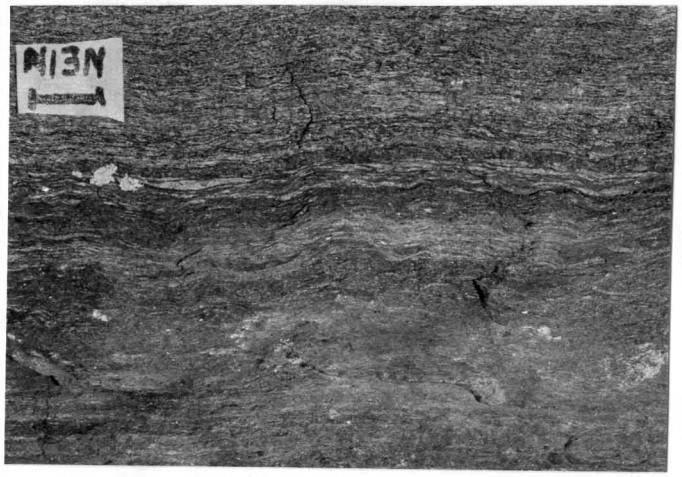
A - Very open folds in quartzofeldspathic-schistose gneiss. Axial surfaces of these folds are very hard to determine but are about vertical in this example. Scale bar is 2.5 cm long.

B - Open fold in quartzofeldspathic-schistose gneiss with steeply-dipping axial surface. Hammer is about 30 cm long.

C - Tighter folds in biotite-rich quartzofeldspathic-schistose gneiss. Note the lenticular nature of the layers. Scale bar is 2 cm long.

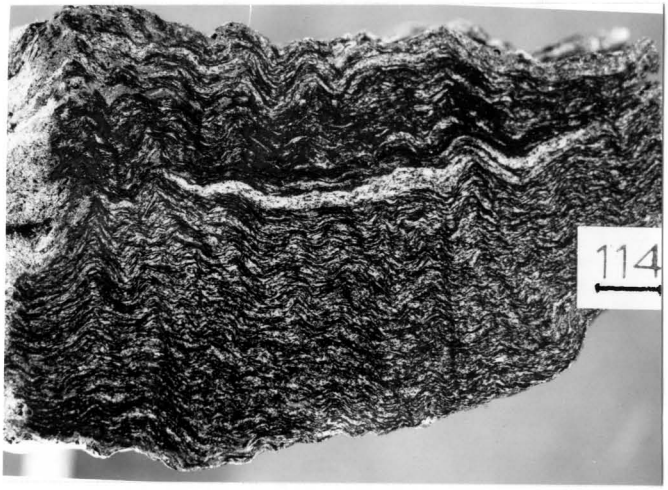
D - Photomicrograph (crossed nicols) of S.G.3.1 fold in a biotite-quartz-albite schist. Folds are open with fairly sharp hinges. Scale bar is 2 mm long.

E - Enlargement of a part of the same thin section from which D was taken. Note the bent biotite grains. Scale bar is 1 mm long (crossed nicols).



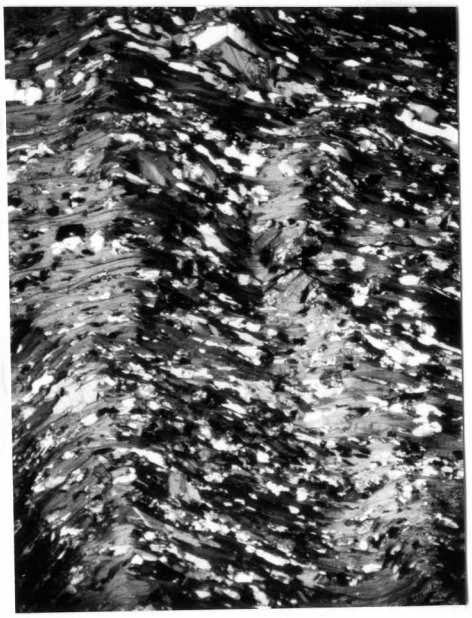
A

B



C

4.3



D

E

Figure 4.3 (cont.)

F - S.G.3.2 folds in a quartzofeldspathic gneiss. Note the conjugate nature of the fold axial surfaces. The trace of one set of axial surfaces on the photograph is about horizontal and is best developed in the lower portion of the potograph. The trace of the other set is about parallel to the top left-lower right hand diagonal.

G - Enlargement of the box shown on the lower right side of F. Note the rounded fold hinges and the obvious lack of an axial-surface schistosity. Knife is 11 cm long.

H - Open folds in quartzofeldspathic-rich layers in quartzofeldspathic-schistose gneiss. Fold axial surfaces are in a conjugate arrangement. The traces of the two sets are parallel to the lines drawn on the photograph. Scale bar is 10 cm long.

I - Open fold in quartzofeldspathic schistose gneiss. Fold axial surface is about parallel to the top left-lower right diagonal. Folds with conjugate axial surfaces could not be seen in this outcrop but the fold closely resembles H in style. Scale bar is 10 cm long.

J - Tighter fold in quartzofeldspathic-schistose gneiss. Scale bar is 3 cm long.

F

G

H

I

J

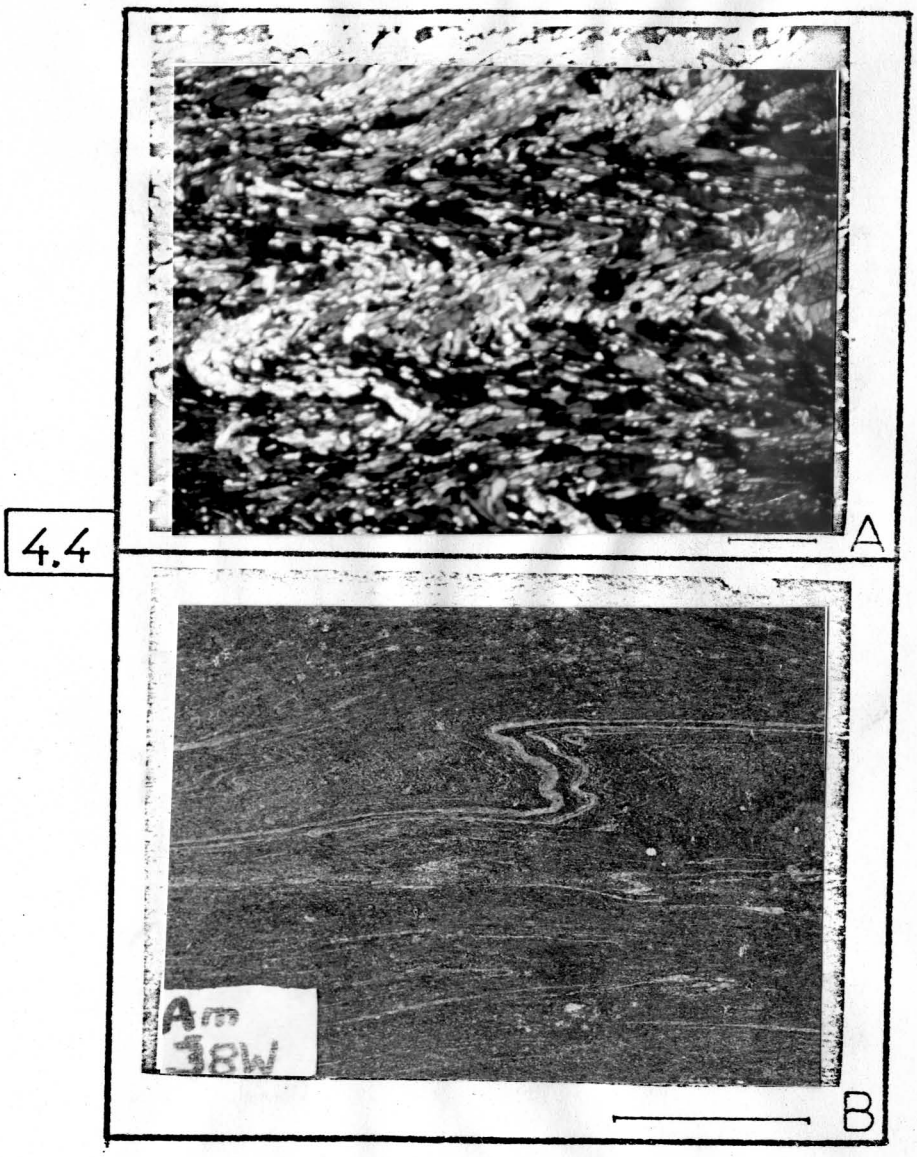


Figure 4.4

S.G.1 folds in layering in the amphibolites from Keyes Mountain, Vermont. Note the absence of axial-surface foliation.

A - Photomicrograph (plane light) of tight folds in thin epidote-rich and amphibole-rich layers. Scale bar is 1 mm long.

B - Tight to fairly open folds in quartz-albite-rich layers. Scale bar is 3 cm long.

Figure 4.5

S.G.2 folds in layering in amphibolites from Keyes Mountain.

A - Tight fold in quartz-albite-rich layers. Axial-surface schistosity can be identified at the outcrop. Scale bar is 2.5 cm long.

B - Open fold in quartz-albite rich layering. Note the coarse grained quartz-albite layer in the lower left of the photograph. Diameter of the coin is 19 mm.

C - Very open fold in quartz-albite layering. Trace of the axial surface (S_2) is parallel to the bottom of the page. S_2 is a weak crenulation cleavage in this example. Scale bar is about 2 cm long.

Figure 4.6

S.G.3.3 fold from Keyes Mountain. The axial surface of this fold is parallel to the bottom of the page. Note the thin layers parallel to this surface. The thick white layer can be seen to be offset across these thin layers in the bottom centre of the photograph. In other examples of S.G.3.3 folds these thin layers are not present and only the offsets are developed. Both the planes of offset and the thin layers may deviate from parallelism with S.G.3.3 fold axial surfaces. Scale bar is 2 cm long.

A

B

C

4.5

4.6

Figure 4.7

Overprinting relations between S.G.3 folds and earlier folds.

A - S.G.3 folds (axial surfaces parallel to long edge of page) refolding an S.G.1 fold (hinge indicated by arrow). Scale bar is 1 cm long.

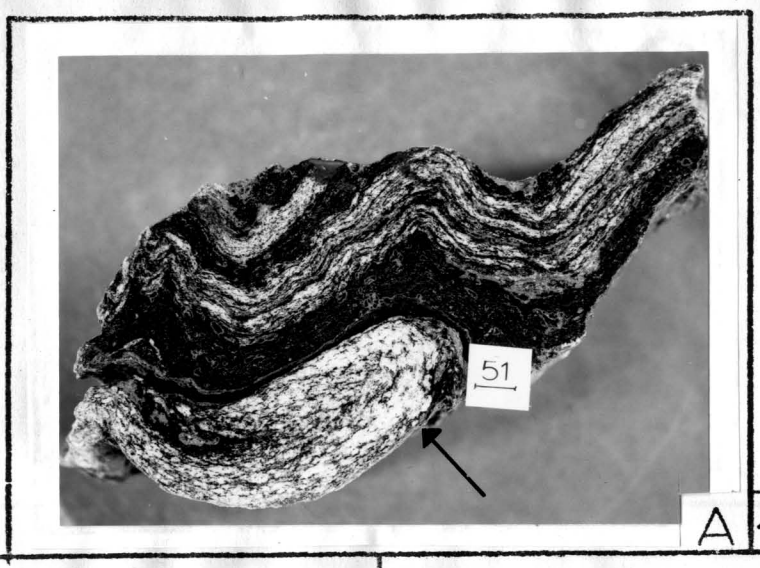
B - S.G.3 fold overprinting S.G.2.1 fold in quartzo-feldspathic gneiss. Scale bar is 10 cm long.

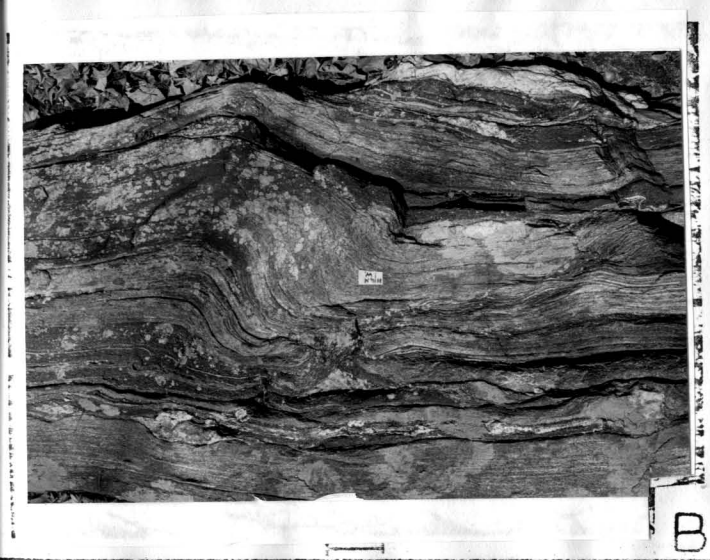
C - Tracing of B. Arrow indicates hinge of early fold, long dashes indicate trace of S.G.3 axial surface.

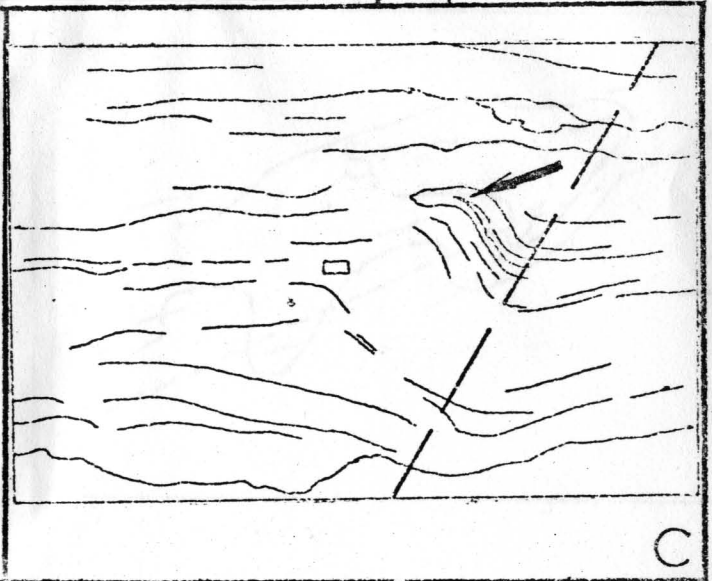
D - S.G.3 folds overprinting tight S.G.2 folds in quartzo-feldspathic gneiss. Scale bar is 15 cm long. This example is from a boulder and the orientation of the structural elements is not known.

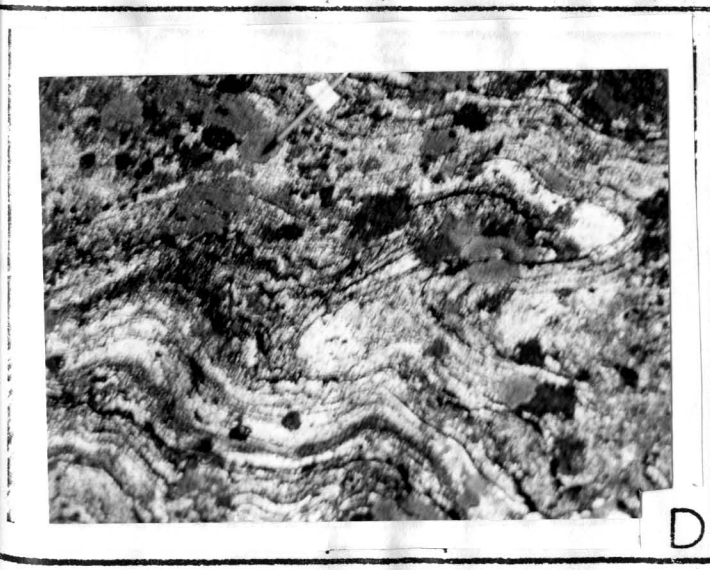
E - Tracing of D. Trace of S.G.3 axial surfaces shown by long dashes, trace of S.G.2.2 axial surfaces by short dashes.

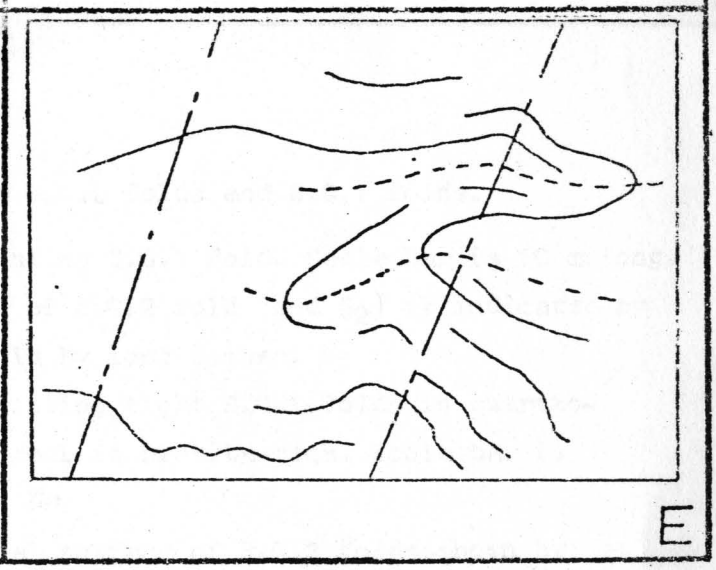
An example of S.G.3.2 folds overprinting an S.G.2.1 fold can be seen by looking at Figure 4.3 F and Figure 4.2 A.


51
A
4.7


B


C


D


E

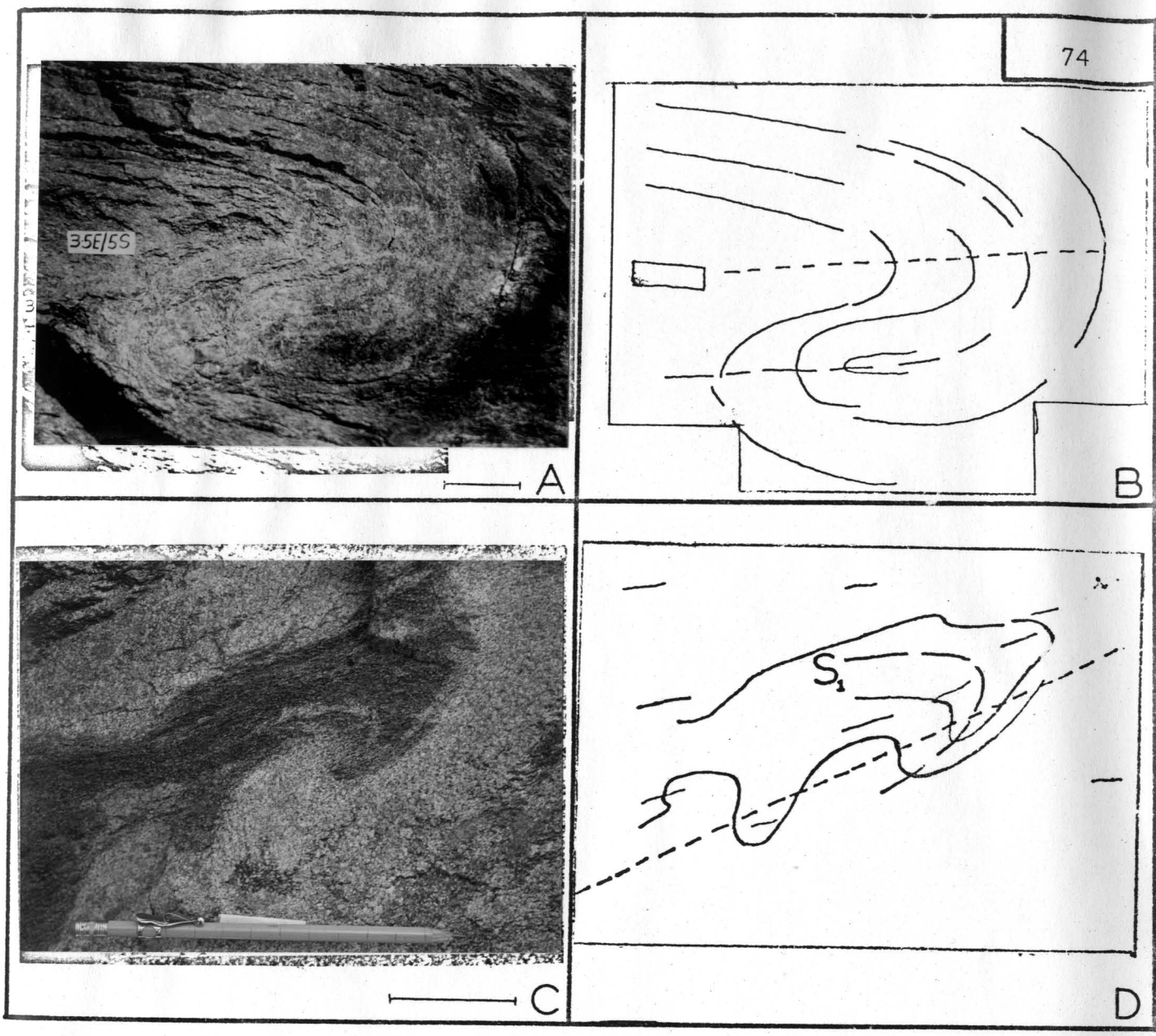


Figure 4.8

Overprinting relations between S.G.2 folds and S.G.1 folds.

A - Tight S.G.2.2 fold overprinting S.G.1 fold. Scale bar is 10 cm long.

B - Tracing of A. Axial trace of S.G.2 fold (and S_2) is indicated by short dashes, axial trace of S.G.1 fold by long dashes.

C - Tight S.G.2.2 folds overprinting tight S.G.1 folds in quartzo-feldspathic gneiss. The dark-coloured rock is biotite-rich. Scale bar is 10 cm long.

D - Tracing of C. Trace of axial surface of S.G.2 folds shown by short dashes, axial trace of S.G.1 fold by long dashes.

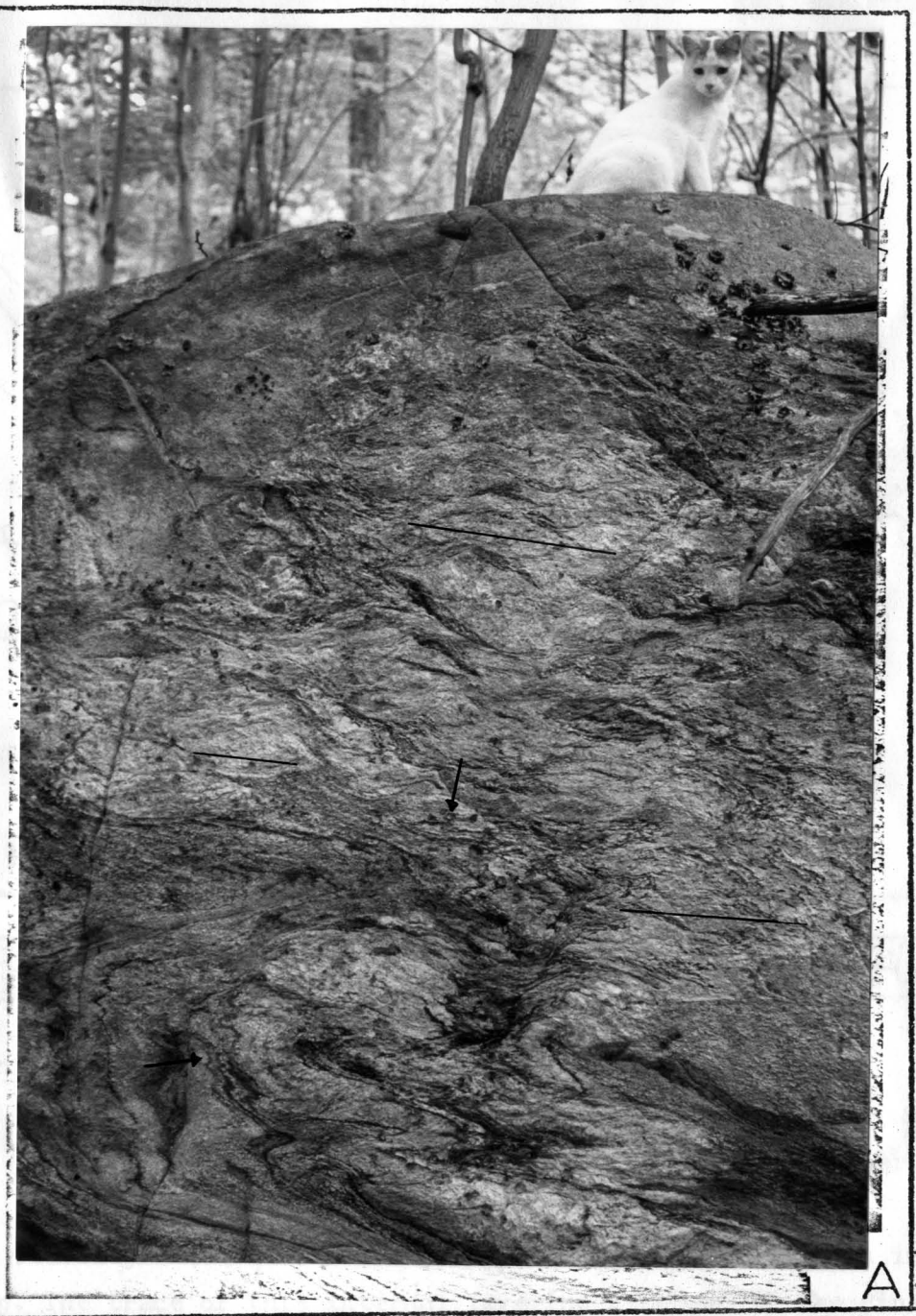
Figure 4.9

Demonstration of three generations of fold at two localities by overprinting relationships. A, B and C are from one outcrop of quartzofeldspathic gneiss about 20 m long and 5 m wide located at (36S ,25E) in Plate II. Unfortunately all three generations cannot be conveniently shown in one photograph, although in a number of places in the outcrop they could be seen in an area the size of this page. S_2 is fairly constant in orientation through the outcrop and can be used as a reference. D is from a tracing made in the field in garnet-chlorite-schistose-quartzofeldspathic gneiss at (15S,10E) in Plate II.

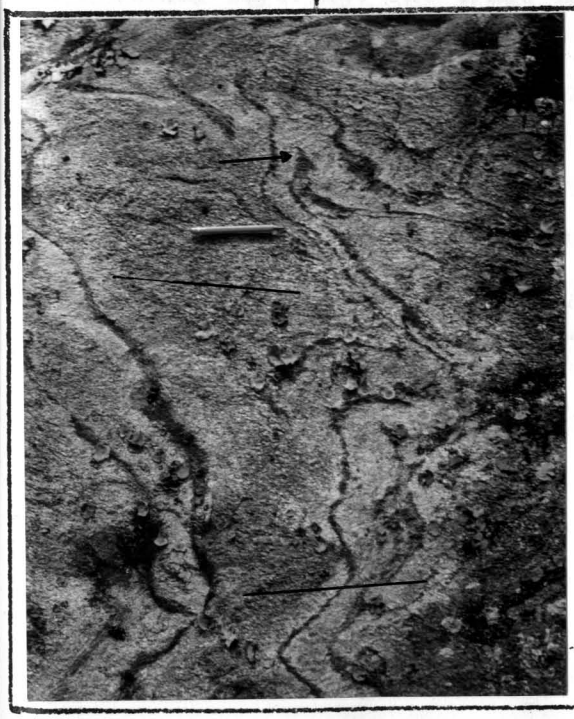
A - Style of S.G.2 (B_2) folds in the outcrop. S_2 is fairly prominent and is indicated by the lines. S.G.1 (B_1) fold hinges can be identified in this photograph (see arrows) but cannot be illustrated convincingly enough.

B - Close up of S.G.1 (B_1) fold overprinted by S.G.2 (B_2) folds. B_1 hinge is indicated by arrow. S_2 is parallel to the pencil (about 13 cm long) and the black lines.

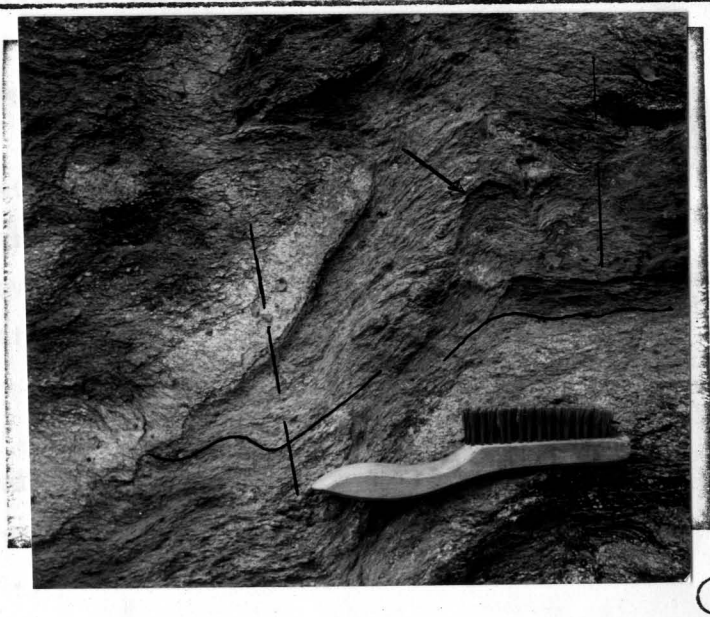
C - S.G.3 (B_3) folds of S_2. Axial surfaces of B_3 folds are about parallel to the long edge of the page and are almost vertical in the outcrop. Early layering can be seen trending approximatively parallel to the lower left-upper right diagonal of the photograph. The wire brush is 25 cm long.



A 4.9



B



C

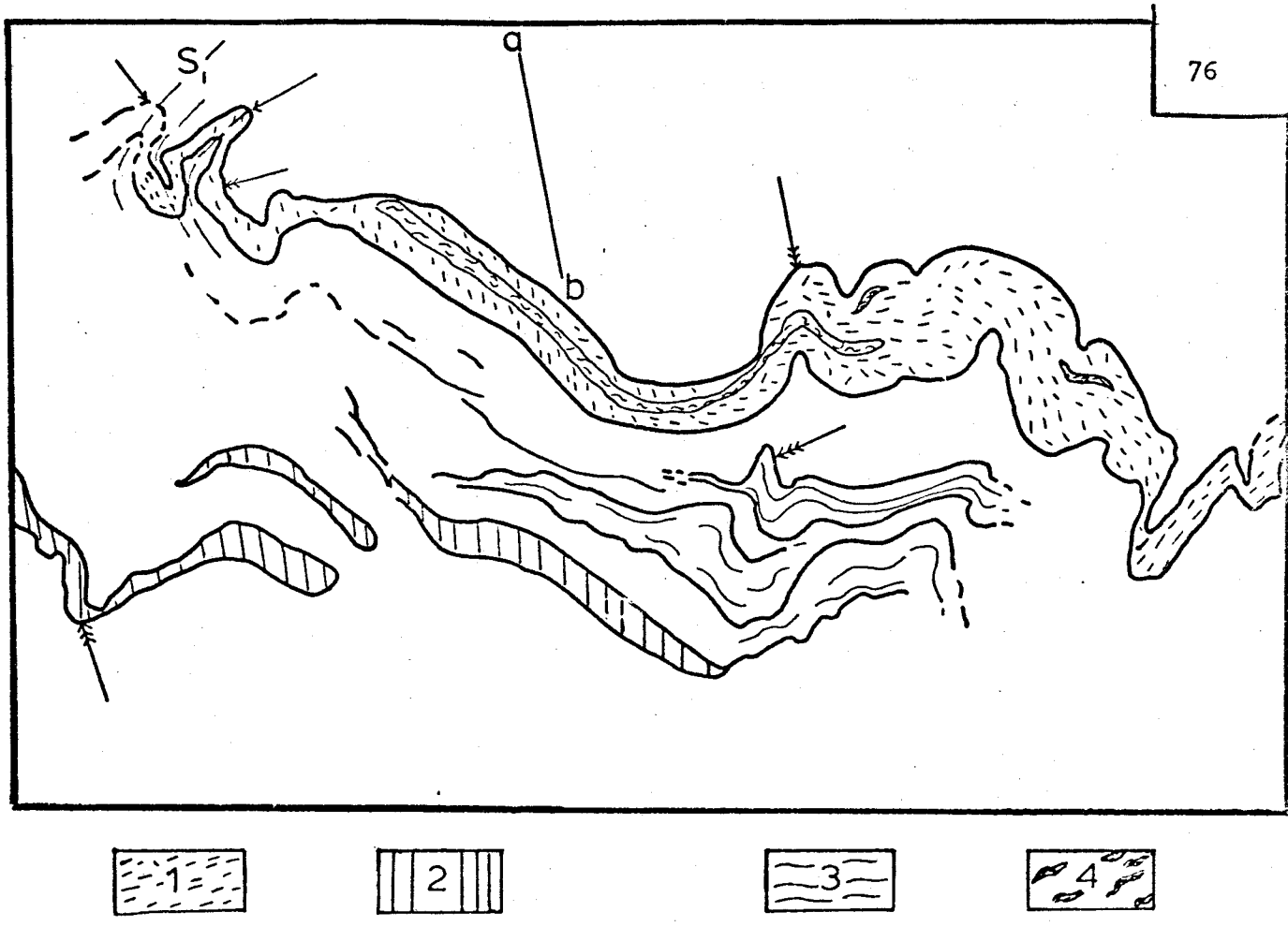


Figure 4.9 (cont.)

D - 1. Fine grained (0.5 mm diameter) garnet-rich layers (coticule).

2. Coarse grained (1,5 mm diameter) aggregate of equant quartz grains.

3. Coarse-grained quartz-rich layers similar to 2 but with internal layering. The trace of this internal layering is shown by the finer lines within these layers.

4. Chlorite-biotite aggregates.

Matrix. Garnet-chlorite-schistose-quartzofeldspathic gneiss.

The plane of the figure is vertical and ab is a vertical line. The trace of S_2 is parallel to the layering. The trace of S_1 is indicated by long dashes. Single-headed arrows point to B_1 hinges, double-headed arrows to B_2 hinges.

These early folds are refolded by B_3 folds which have sub-vertical axial surfaces and no axial-surface schistosity. B_3 hinges are indicated by triple-headed arrows.

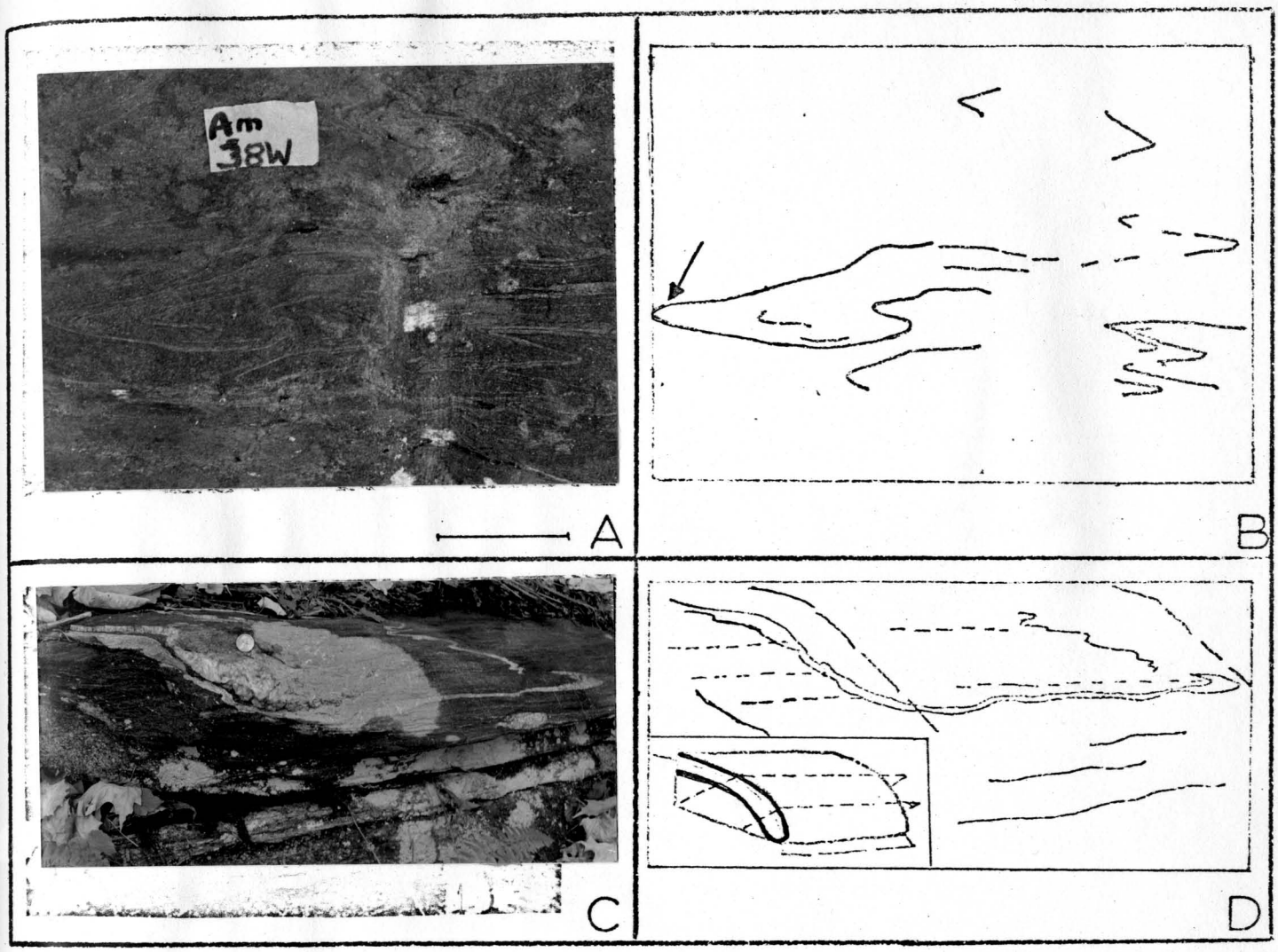


Figure 4.10

Overprinting relations in amphibolites from Keyes Mountain.

A - Folds in quartz-albite layers. Scale bar is 2.5 cm long.

B - Tracing of A. S_2 is parallel to the short edge of the page. B_1 hinge is indicated by the arrow.

C - Refolded fold in quartz-albite rich layer. Figure 4.5 C is from the left central part of 4.10 C. Diameter of the coin : 19 mm.

D - Tracing of C. Trace of S_2 is shown by short dashes, S_1 by long dashes. The inset is a schematic block diagram illustrating the geometry of this fold.

Figure 4.13

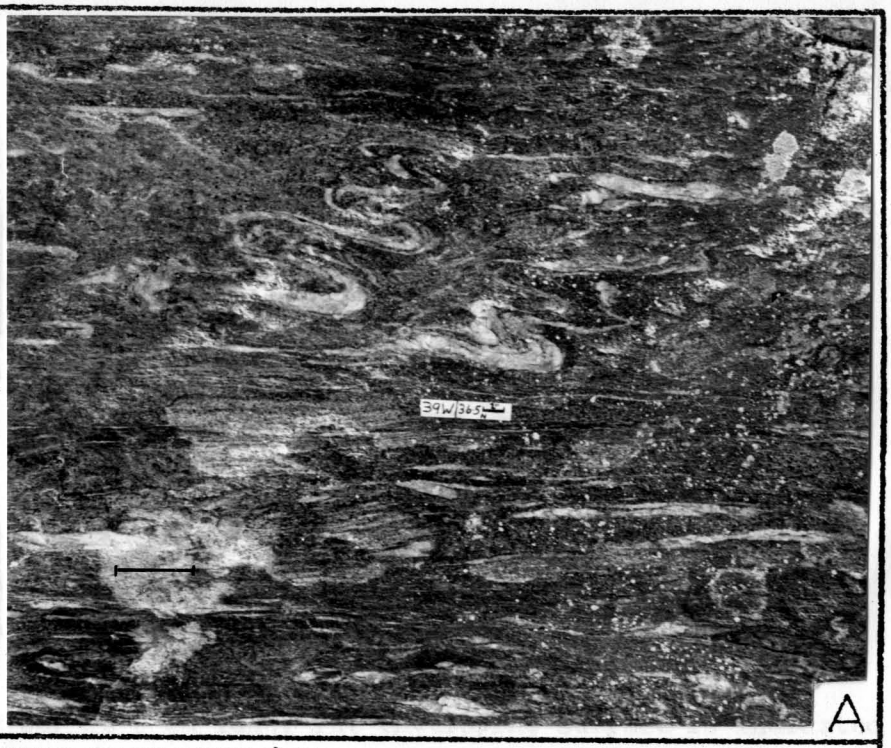
Examples of partial transposition from Keyes Mountain. In all cases the trend of early layering may be approximated in some parts of the figure by drawing an enveloping surface.

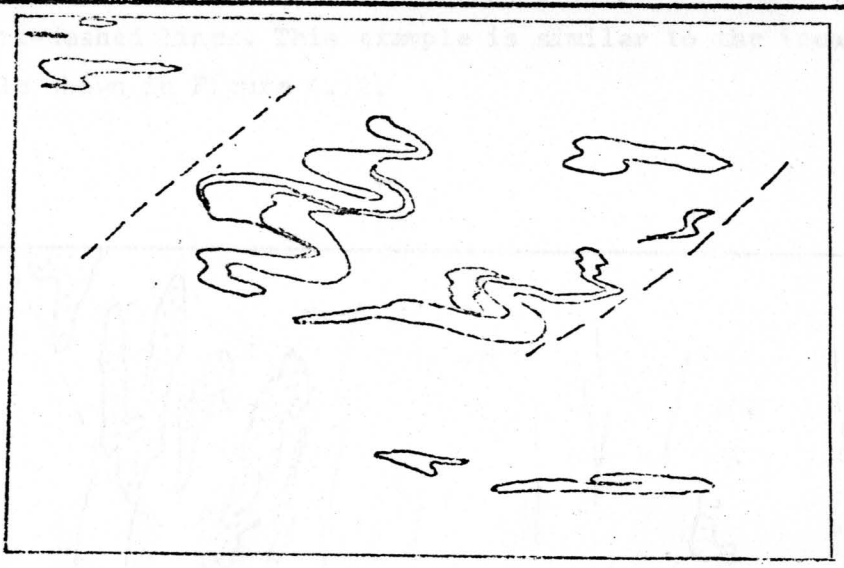
A - Quartzofeldspathic gneiss from Keyes Mountain. The white layers are quartz and albite-rich relative to the rest of the rock. Scale bar is 10 cm long. This photograph was taken at (14E ,10S) in Plate II.

B - Tracing of A. In the central parts of the photograph an enveloping surface can be drawn trending about parallel to the lower left-upper right diagonal. In the upper and lower parts of the photograph, however, complete transposition has occured and only isolated fold hooks and lenticular layers can be recognized.

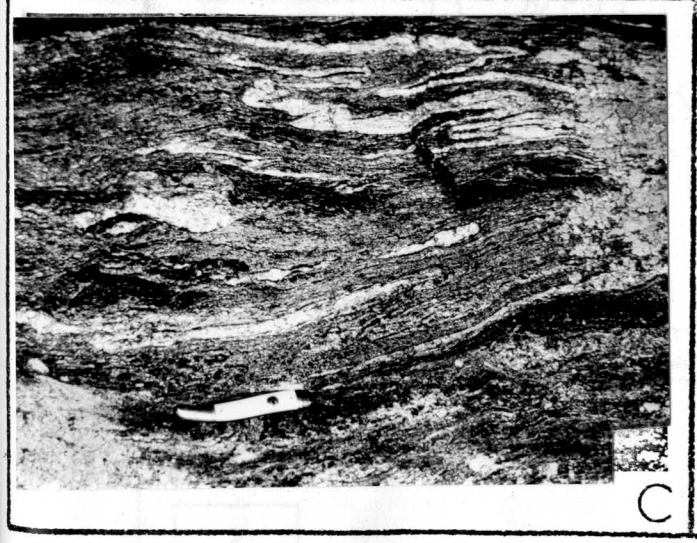
C - Quartzofeldspathic gneiss from Keyes Mountain similar to A. Knife is 11 cm long.

D - Tracing of C. An enveloping surface can be drawn (parallel to the dashed line) in the upper parts of the photographs but complete transposition has occured in the lower parts. Note the lenticular nature of layers in the lower part of this figure.





4.13



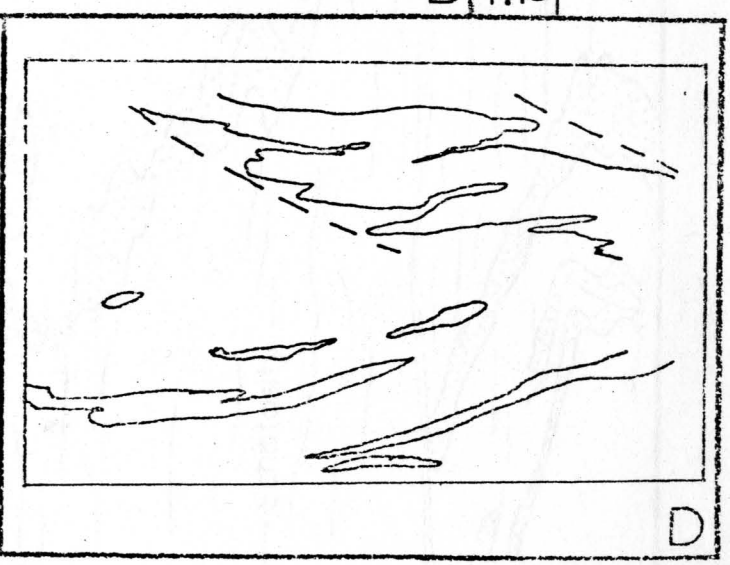


Figure 4.13 (cont.)

E - Tracing (subsequently reduced in size) from an outcrop of partial transposition :

1. white albite-rich rock with 5-10 % amphibole.

2. Dark-green amphibolite.

Scale bar is 2 cm long. The enveloping surface is indicated by the short-dashed lines. This example is similar to the idealized example shown in Figure 4.12.

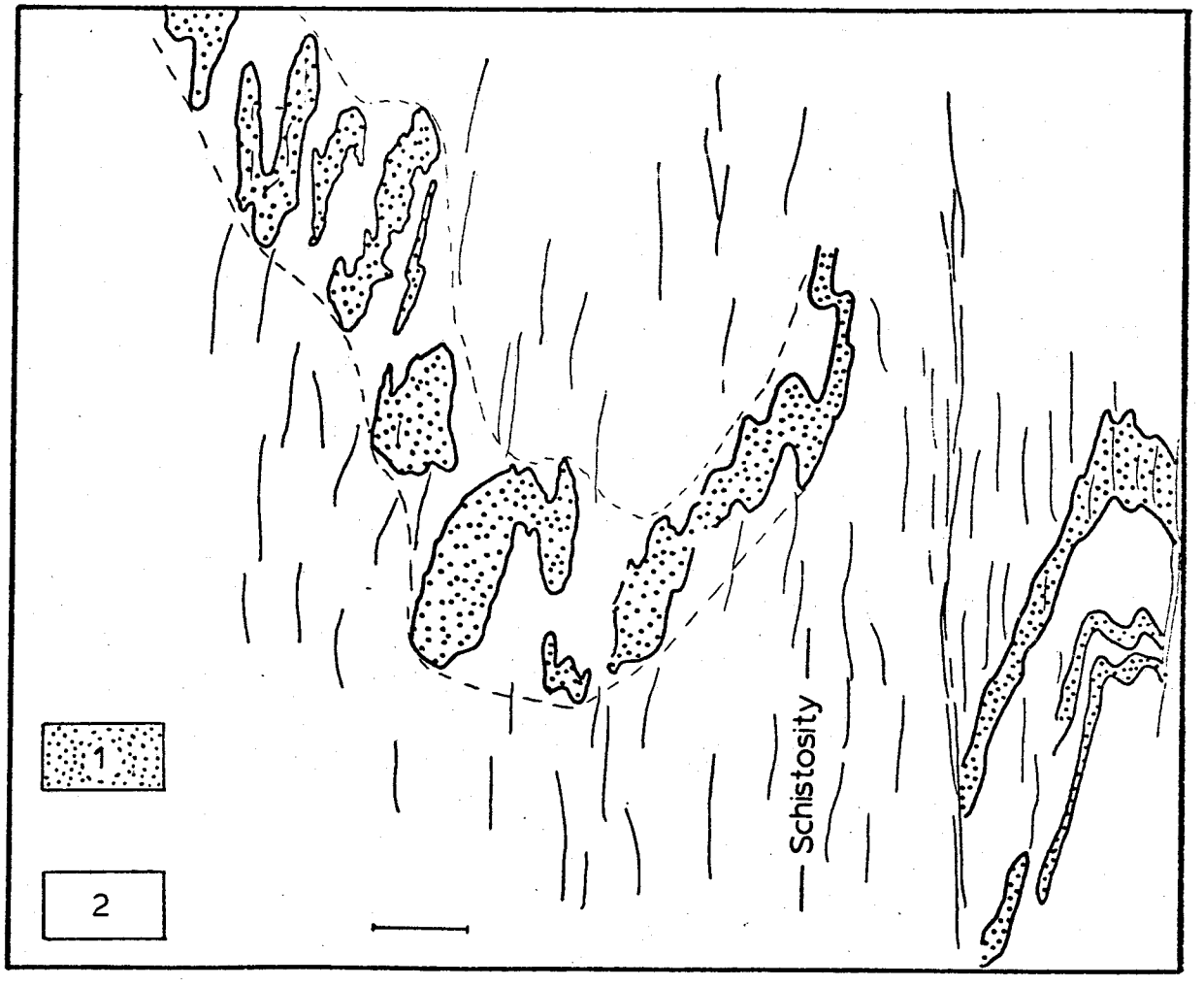


Figure 4.14

Complete transposition in gneisses from Keyes Mountain. In all cases below layering is lenticular and discontinuous. Numerous isolated isoclinal fold hooks can be recognized in each example ; a few are indicated by arrows. Trend of early layering in each case is unknown.

A - Garnet-chlorite-schistose-quartzofeldspathic gneiss. Scale bar is 2.5 cm long. The darker layers and lenses are chlorite-rich. About 1 cm from the bottom of the photograph, the contact between the gneiss and an amphibolite layer can be seen. In this case it is parallel to the transposed layering and schistosity in both rocks.

B - Garnet-chlorite-schistose-quartzofeldspathic gneiss. Scale bar is 2.5 cm long. The identifiable lenticles and hooks are composed mostly of coarse-grained quartz.

C - Enlargement and extension of the lower part of Figure 4.13 A.

D - Fine-layered quartzofeldspathic gneiss. The pen is 15 cm long.

E - Garnet-chlorite-schistose-quartzofeldspathic gneiss. The knife is 11 cm long. The hinge of a large isoclinal fold in a coarse-grained quartz layer can be seen slightly to the right of the centre of the photograph. The upper limb of this fold is attenuated in the vicinity of the knife.

F - Isolated isoclinal fold in quartzofeldspathic gneiss. Scale bar is 2.5 cm long.

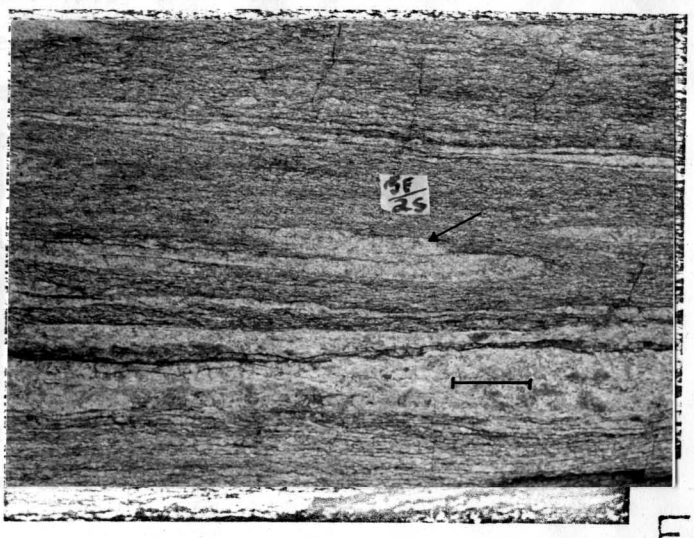
A

B

C

D

E



F

4.14

Figure 4.15

Example of "anastomosing" schistosity in quartzofeldspathic gneiss. Schistosity is parallel to the long edge of the photograph. Note how the schistosity bends around white albite "augen".

Scale bar is 1 cm long.

Figure 4.16

Photomicrograph of types of albite porphyroblasts in gneissic rocks from Keyes Mountain (crossed polars). In all cases, the right hand figure is a direct tracing from the left hand figure. In the tracing the albite porphyroblast is outlined in a slightly heavier line. This figure illustrated most of the features discussed in the text except for the concentrations of mica on either side of the porphyroblast. In all elongate grains, however, the augen is bounded on its sides by mica. S_e : external foliation ; S_i : internal foliation ; M : mica ; Q : quartz ; E : epidote. In all figures the scale bar is 0.5 mm long and S_e is parallel to the long edge of the photograph.

A/B - Equidimensional porphyroblast with well developed S_i parallel to albite twin lamellae. Note the difference in grain size between inclusions in the albite and grains outside the porphyroblast.

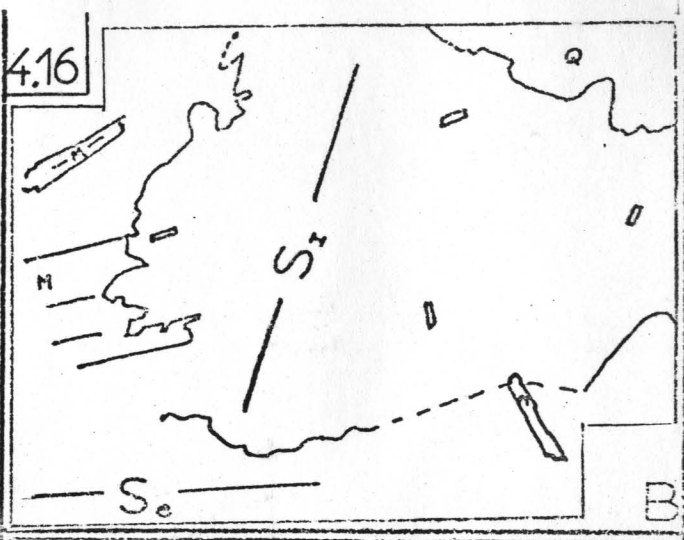
C/D - Slightly elongate porphyroblast with no internal foliation. In this case the porphyroblast is made up of a number of smaller albite grains. Note how S_e anastomoses around the porphyroblast.

E/F - Elongate porphyroblast with no internal foliation. S_e anastomoses around the porphyroblast.

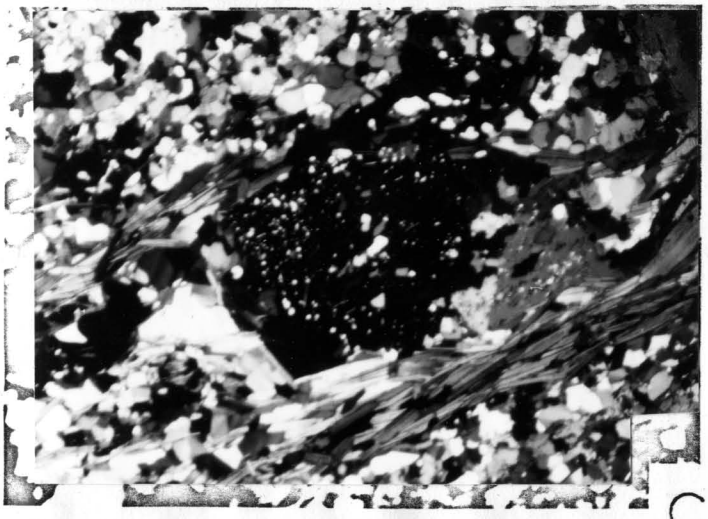
G/H - Elongate porphyroblast with no internal foliation. S_e is almost undeflected as it passes the porphyroblast. Note the concentration of mica below the porphyroblast.

A

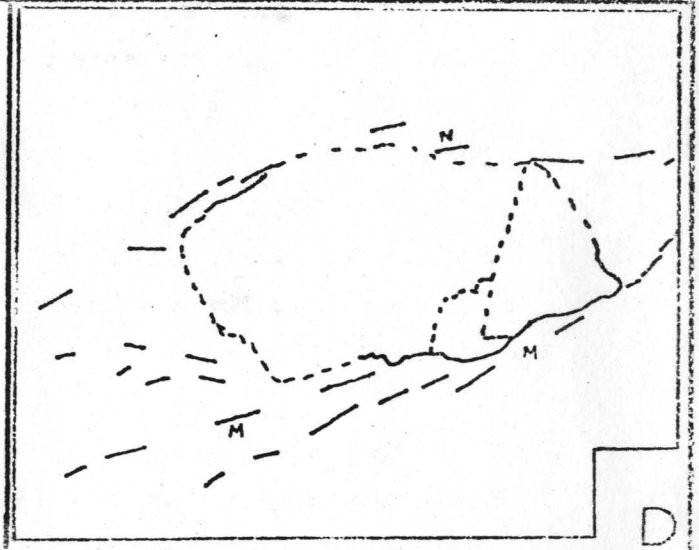
4.16



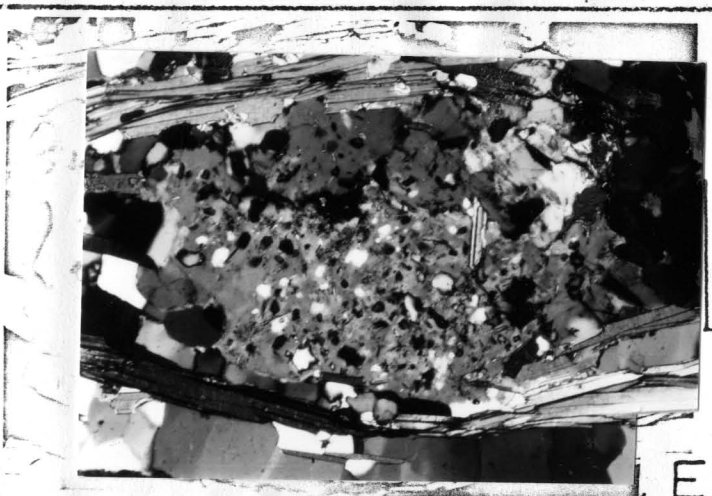
B



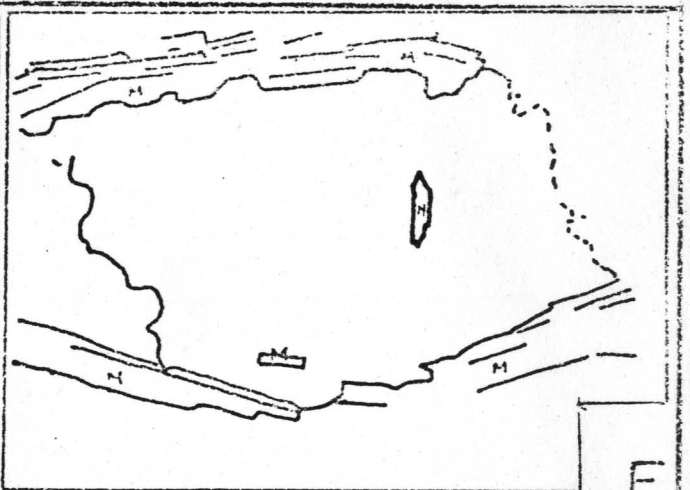
C



D

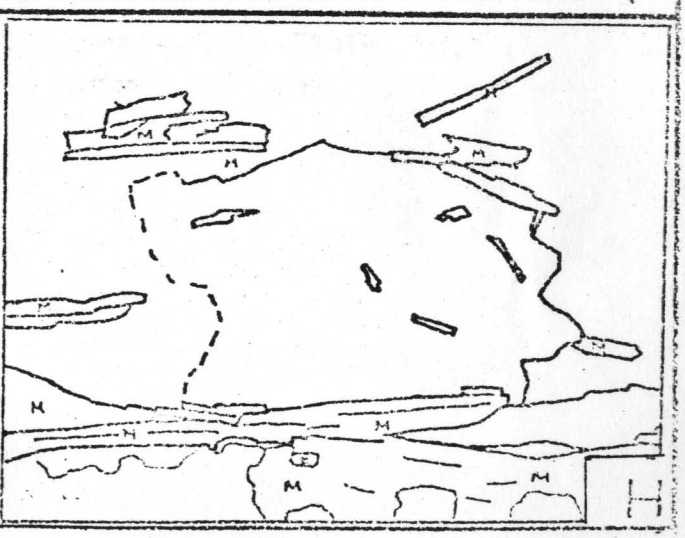


E



F

G



H

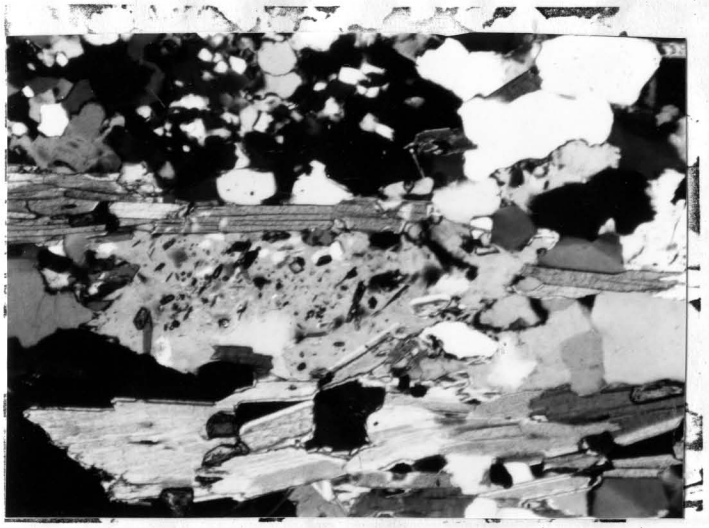
Figure 4.16 (cont.)

I/J - Elongate porphyroblast with S_i at an angle to S_e. Note that S_e is not deflected around the porphyroblast.

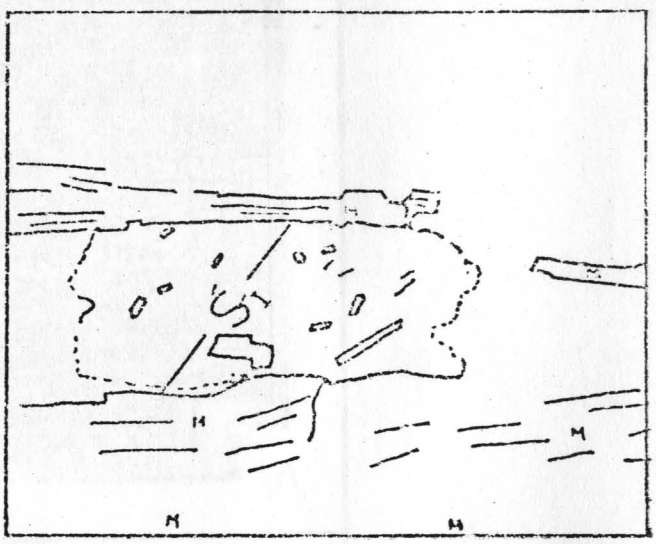
K/L - Elongate porphyroblast with no internal foliation. Although not demonstrated in this photograph, there is a strong concentration of mica on either side of this porphyroblast.

M/N - Very elongate porphyroblast with S_i parallel to S_e.

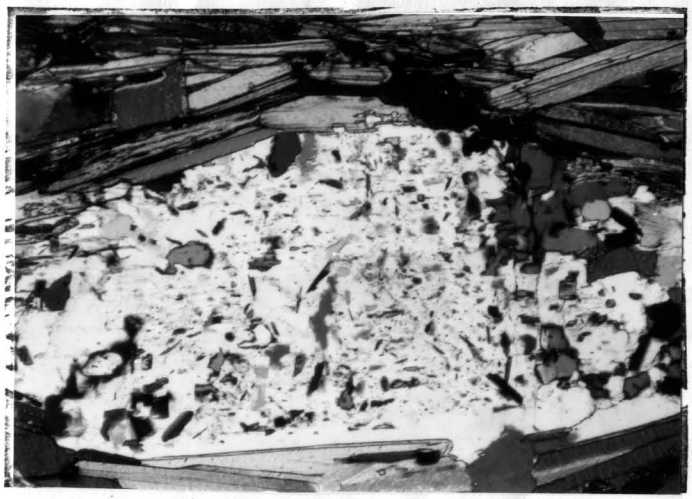
416



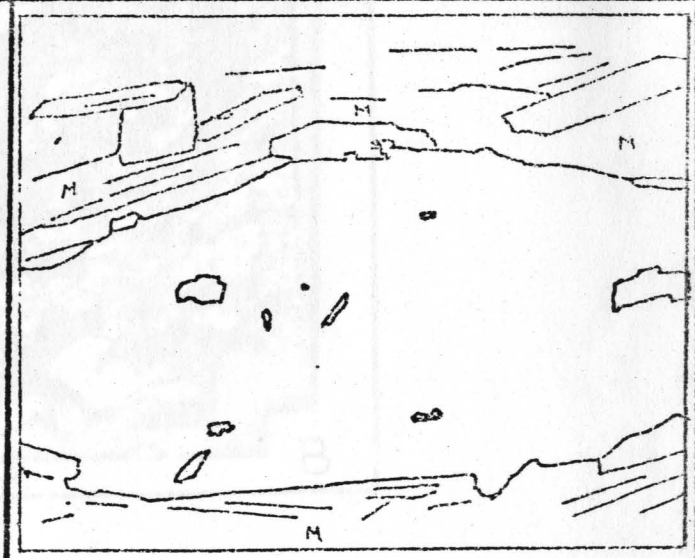
I



J

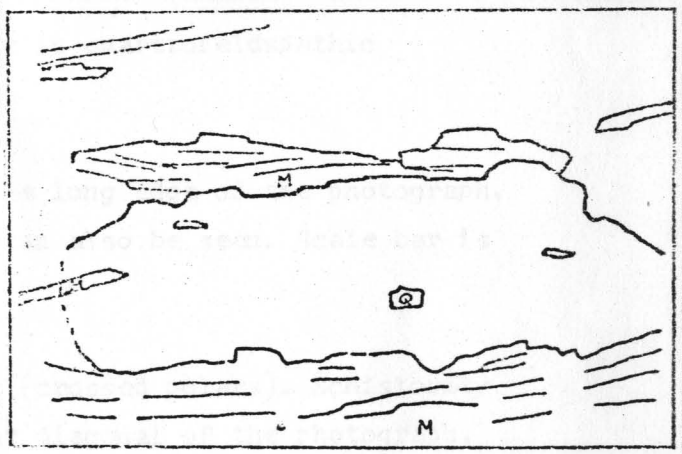


K



L

M



N

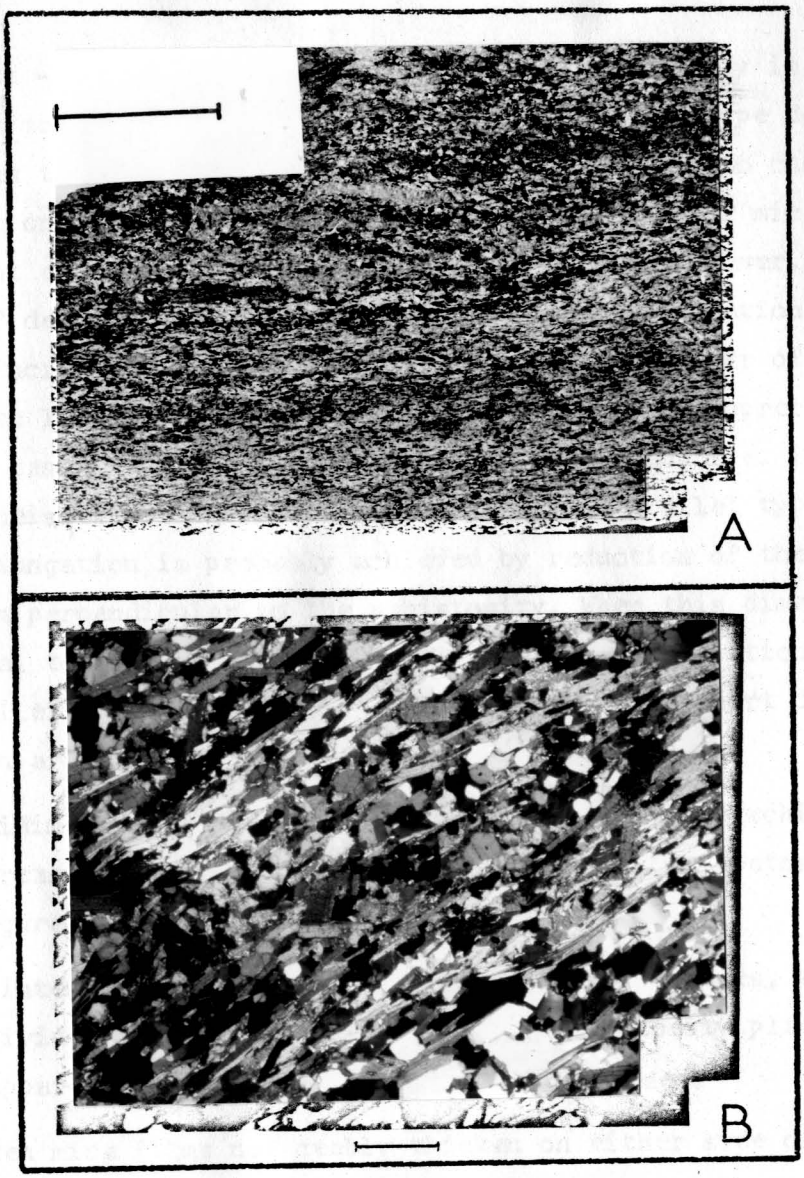


Figure 4.17

Example of "parallel" schistosity in quartzofeldspathic gneiss.

A - Schistosity is parallel to the long edge of the photograph. Micas at high angles to the schistosity can also be seen. Scale bar is 1 cm long.

B - Photomicrograph of rock in A (crossed polars). Schistosity is parallel to the lower left-upper right diagonal of the photograph. Scale bar is about 1 mm long.

Figure 4.18

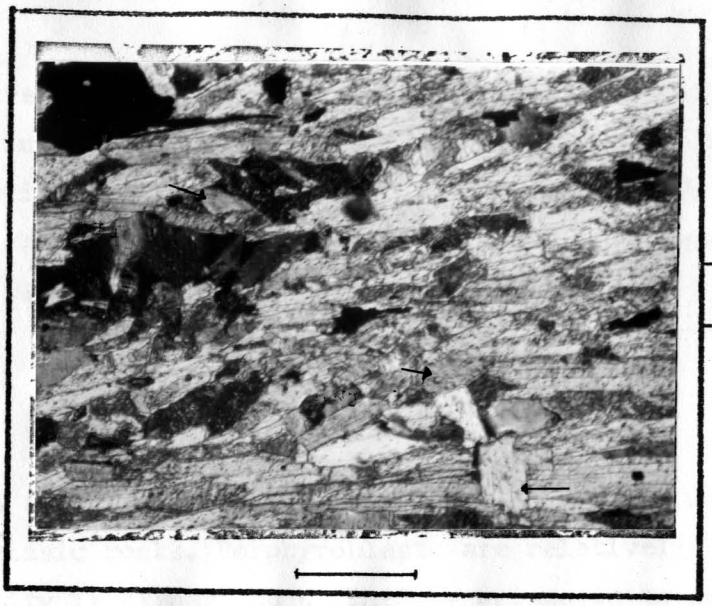
Photomicrograph of muscovite-rich layer in garnet-chlorite-schistose-quartzofeldspathic gneiss (plane light). Schistosity is defined by platy micas parallel to the long edge of the photograph, but many squat equidemensional micas are at high angles to the schistosity (see arrow). Scale bar is 0.5 mm long.

Figure 4.19

Photomicrograph of garnet grain in garnet-chlorite-schistose-quartzofeldspathic gneiss (crossed polars). Note how the grain is apparently split by schistosity planes into three tabular pieces, the long dimensions of which are parallel to the long dimension of the photograph. Equidimensional garnet grains with diameters similar to the long dimension of the tabular grains shown in this figure are common in this rock.

Figure 4.20

Photomicrograph of schistosity in garnet-chlorite-schistose-quartzofeldspathic gneiss (plane light). Chl : chlorite ; g : garnet ; mt : magnetite. Schistosity defined by platy magnetite grains and micas is parallel to the long dimension of the photograph. Note how the schistosity passes undeflected through the large chlorite grain in the centre of the photograph. Scale bar is 1 mm long.



4.18

4.19

4.20

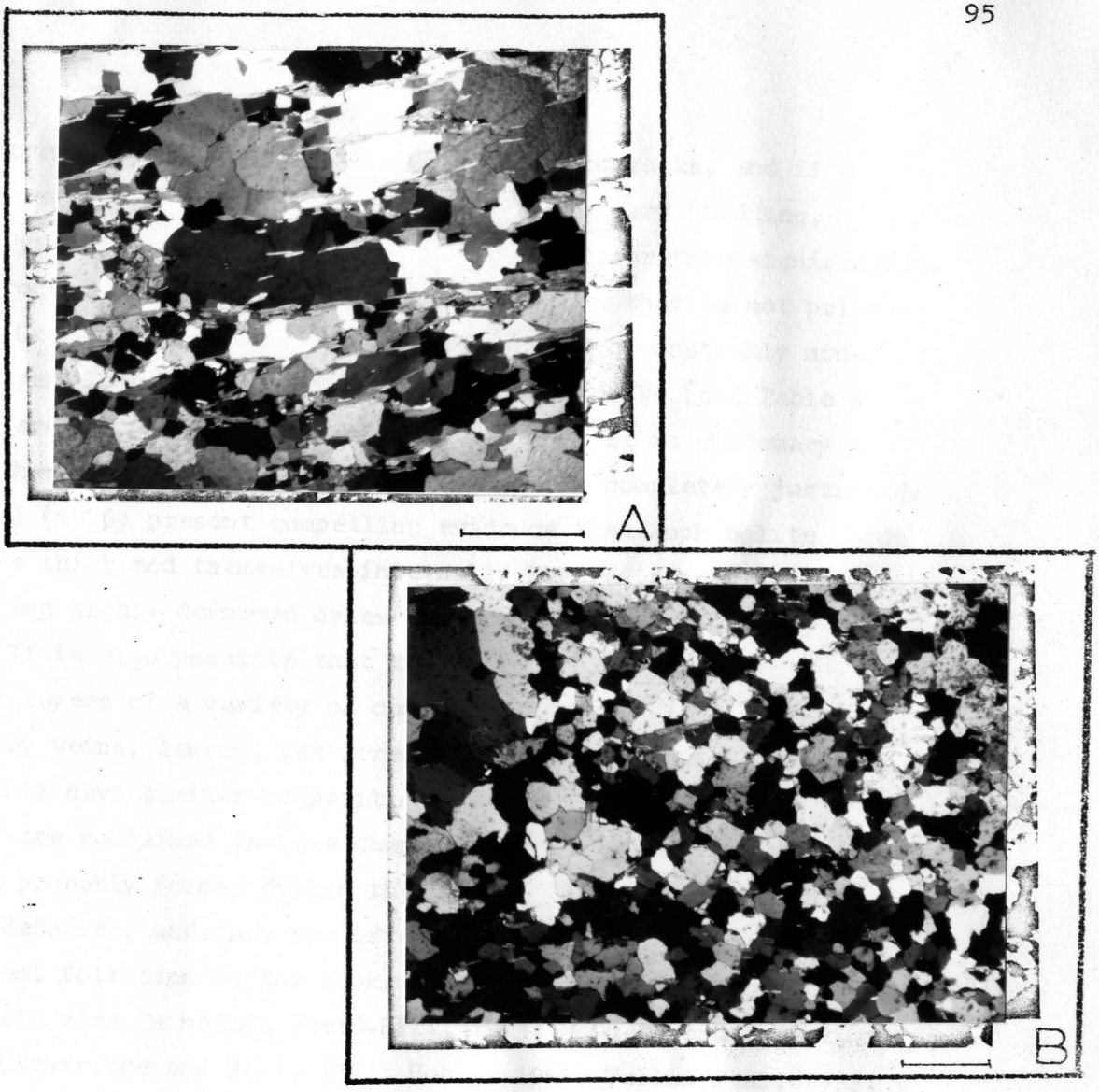


Figure 4.21

Examples of schistosity in quartzites from Keyes Mountain. In both cases schistosity is about parallel to the long dimension of the photomicrograph (crossed polars).

A - Schistosity defined by preferred orientation of micas. Some quartz grains are elongate parallel to schistosity but most are equidimensional. Micas occur both at quartz-quartz grain boundaries and within quartz grains. Scale bar is about 1 mm long.

B - Similar to A except that all micas are found along quartz-quartz grain boundaries. Scale bar is about 1 mm long.

Figure 4.22

Secondary layering from gneissic rocks on Keyes Mountain. In each pair the right hand figure is a tracing prepared from the photograph on the left. Trend of secondary layering is indicated by solid lines in the tracings, trend of early layering by short dashed lines. S_{ea} : early layering ; S_s : secondary layering.

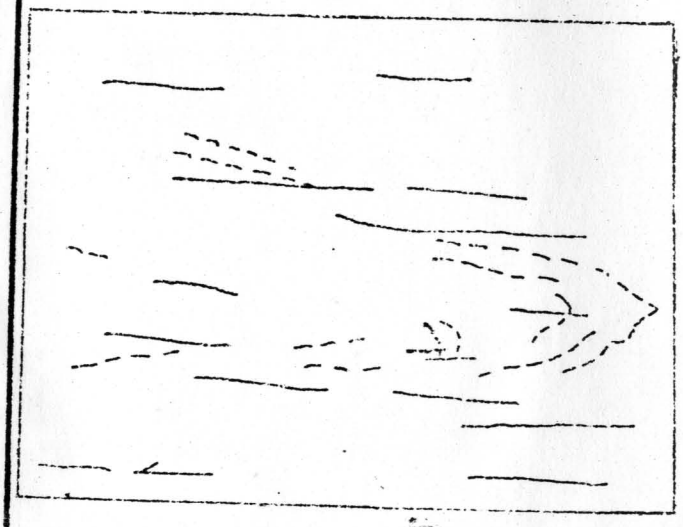
A - Quartzofeldspathic gneiss. Secondary layering is developed in the lower half of the photograph and is parallel to the long dimension of the latter. Early layering can be seen in the upper half of the photograph trending parallel to the lower left-upper right diagonal. Schistosity in the upper half is parallel to secondary layering and schistosity in the lower half of the photograph. Both early and secondary layering are defined by alternating quartzofeldspathic and micaceous layers. Knife is 11 cm long.

B/C - Early and secondary layering in quartzofeldspathic gneiss. Early layering can be identified in the central parts of the photograph and is truncated by secondary layering. Both early and late layering are defined by alternating quartzofeldspathic and micaceous layers. The coin is 19 mm in diameter.

D/E - Early and secondary layering in garnet-chlorite-schistose-quartzofeldspathic gneiss. This example was taken from the same rock shown in Figure 4.15 and both S_s and Sea are defined by alternating quartzofeldspathic and micaceous layers. S_s is parallel to the schistosity shown in 4.15 A and B. S_{ea} can only be identified in a few small areas in this specimen but is identical in nature to the prominent layering in the rock (i.e. S_s).

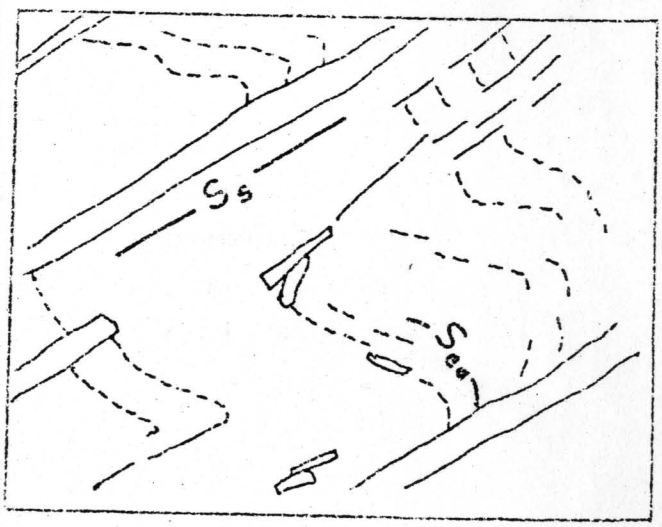
A 4.22

B



C

D

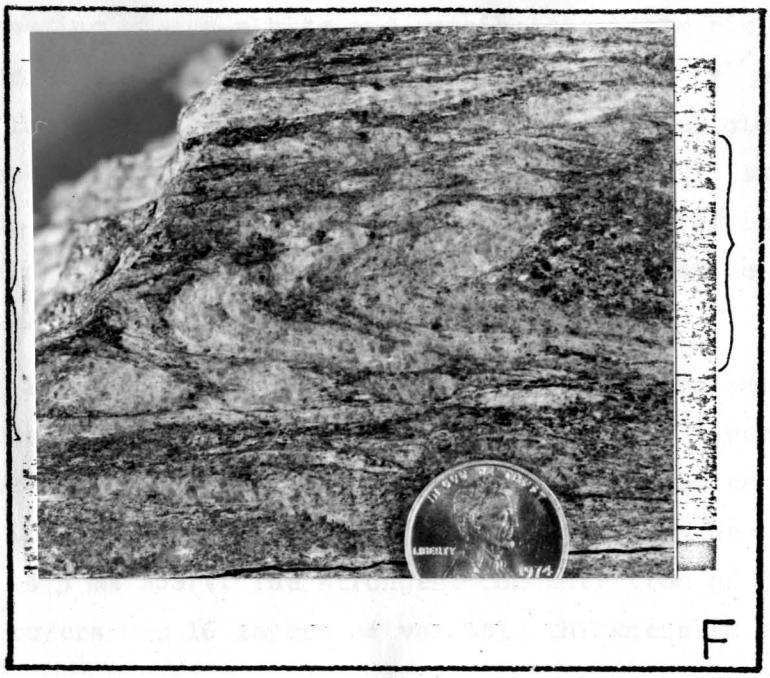


E

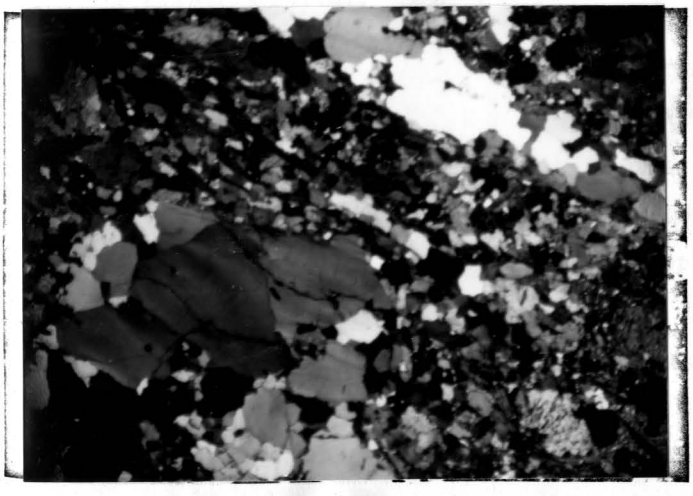
Figure 4.22 (cont.)

F - Hinge region of a Z shaped isoclinal fold in early layering in a micaceous quartzofeldspathic gneiss from Keyes Mountain. The coin is about 16 mm across its base. A secondary layering can be seen developed parallel to the axial surface of the fold in the E-W trending region bracketed in the figure. New layers are similar to the mica rich layers of the earlier layering.

G/H - This photomicrograph (crossed polars) is taken from the top left hand side of the surface of the rock shown in Figure 4.2. S_s is parallel to S2, S_{ea} to the early layering which is almost perpendicular to the secondary layering. S_s and S_{ea} are both defined by alternating mica-amphibole and quartzofeldspathic layers. Scale bar is 1 mm long.



4.22



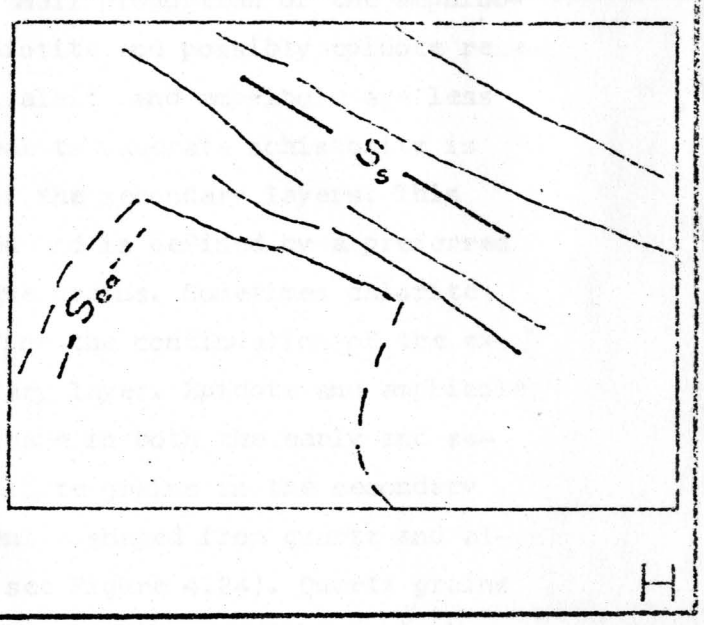


Figure 4.23

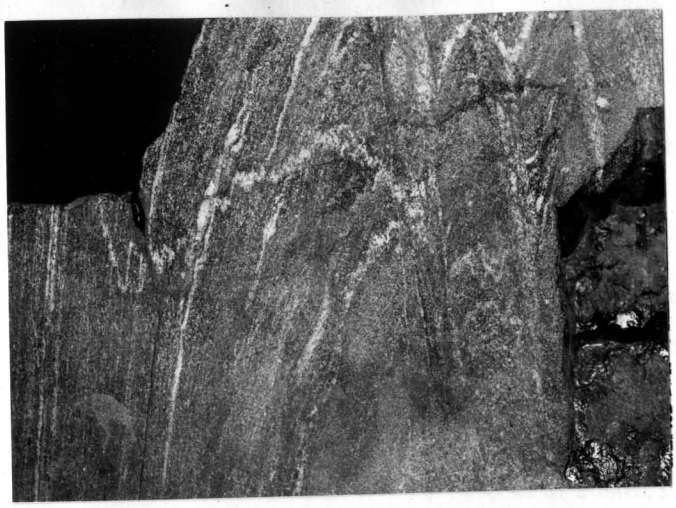
Albite rich secondary layers in amphibolites from Keyes Mountain.

A/B - Early layering (parallel to dashed lines) and secondary layering (parallel to full lines) in amphibolite from Keyes Mountain. White layers are quartz-albite rich, dark layers amphibole-epidote rich. Scale bar is 3 cm long.

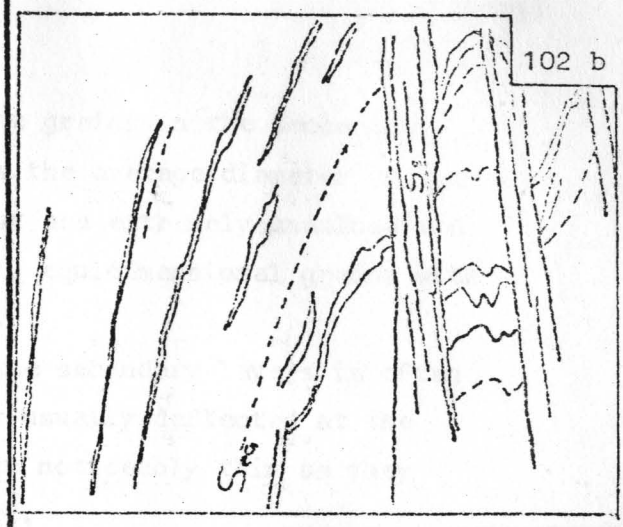
C/D - Photomicrograph of part of same rock shown in A/B (crossed polars). Secondary layering is parallel to the long edge of the photograph. The right hand side of the photograph is a secondary layer and is more albite rich than the left hand side (indicated by parentheses). In the left hand side, early layering is indicated both by the dashed line and the quartz-albite layer (q-a) which is bent at the contact with the secondary layer and pinches out just inside the secondary layer domain. All S surfaces in the secondary layers are parallel to the margins of the layers. Note that it is impossible to distinguish early and secondary layers on the basis of grain sizes or shapes. Scale bar is 1 mm long.

E - Sketch of relationships observed at an outcrop on Keyes Mountain. 1 : garnet-chlorite-schistose-quartzofeldspathic gneiss ; 2 : amphibolite ; ▬▬ : albite rich layer or lens. Layering and schistosity in the gneiss are parallel to each other but discordant to the gneiss-amphibolite contact. The amphibolite layer possesses internal layering (defined by alternating quartz-albite and amphibole-rich layers) and schistosity parallel to its boundaries as well as a weak schistosity and secondary layering (defined by lensoid quartz-albite rich layers) parallel to the foliation in the gneiss. The more weakly developed foliation offsets and overprints the more strongly developed foliation and is interpreted as a later feature. Thus 1) the prominent foliation in the gneissic rock is secondary, 2) the more weakly developed foliation in the amphibolite is secondary.

F - Photograph of the box drawn in Figure 4.23 F showing S_{ea} and S_s in the amphibolite layer. Scale bar is 1 cm long.

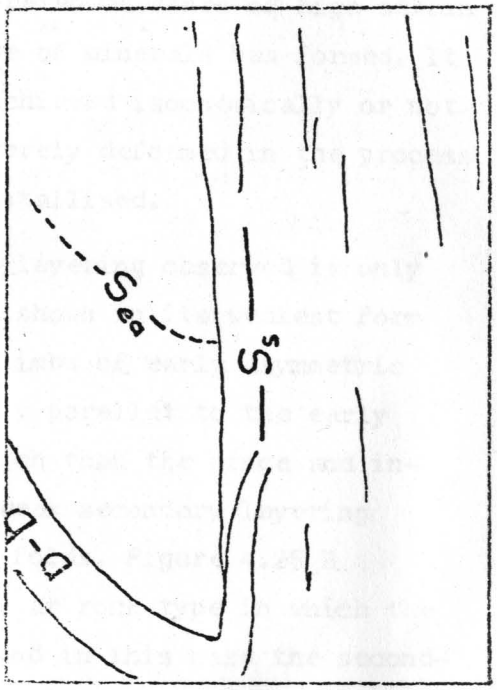


A



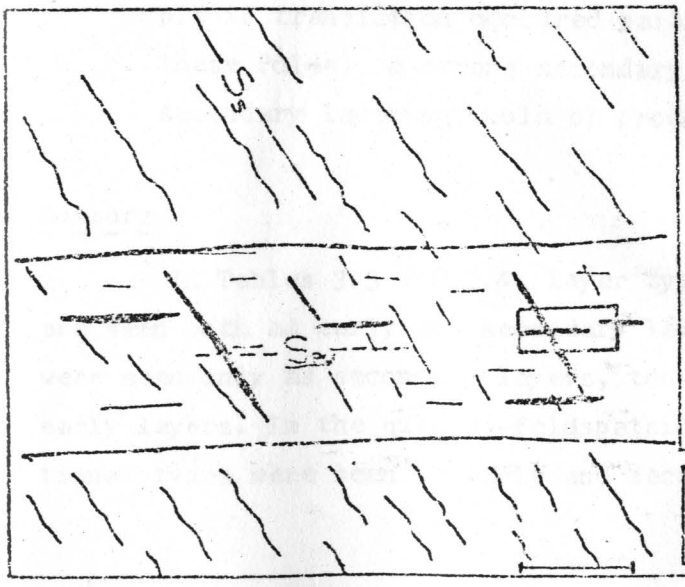
B

C

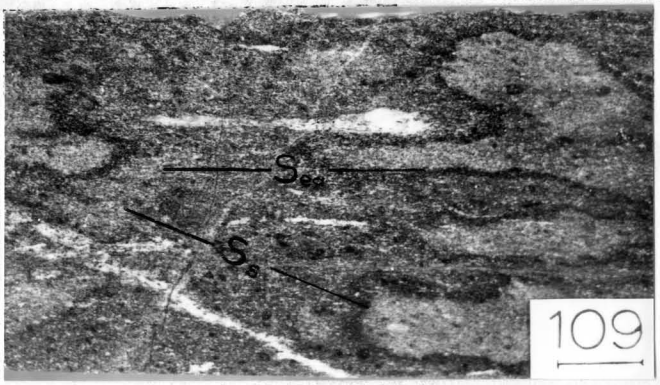


D

4.2.3



E



F

Figure 4.24

Chlorite rich secondary layers in an amphibolite. See Figure 4.6 for a macroscopic view of the chlorite rich secondary layers. The above figure is a photomicrograph (crossed polars) of a thin section of part of this rock. A chlorite-rich secondary layer is oriented about parallel to the long dimension of this photograph and occupies the portion of the photograph between parentheses. Note well that these layers are very difficult to identify in thin section. Quartz-albite grains tend to be smaller and more elongate in the secondary layer than outside it. Scale bar is 1 mm long.

Figure 4.25

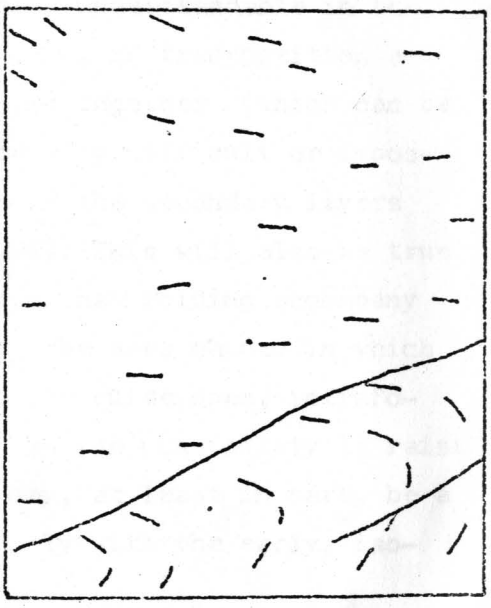
Photomicrograph of "crenulation type" secondary layering in the amphibolites. Both examples are in plane light ; white areas represent quartz and albite, dark areas amphibole and epidote. The right hand figure in each pair is a tracing of the left hand figure. Full lines are parallel to secondary layering, dashed lines to early layering. In both cases the hinge region of the folds in early layering is more quartz-albite rich than the limbs, producing a new layering parallel to the axial surfaces of the folds.

A/B - Secondary layering parallel to the axial surfaces of open folds. The thin section from which this figure was prepared was taken from a portion of the rock shown in Figure 4.5 Scale bar is 1 mm long.

C/D - Secondary layering parallel to the axial surface of tight to isoclinal folds. Scale bar is 1 mm long.

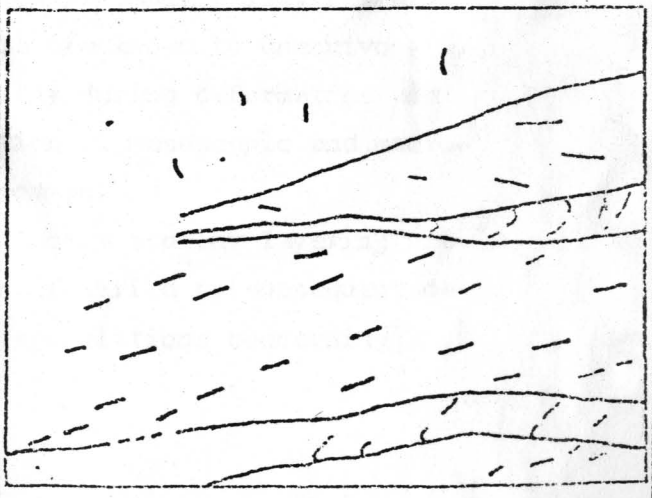
4.24

A



B 4.25

C



D

Figure 4.27

B_3 lineations on a schistosity plane in schistose quartzo-feldspathic gneiss. This lineation is quite strong despite the fact that B_3 folds associated with it are very open and similar in style to those in Figure 4.3 A.

Scale bar is 10 cm long.

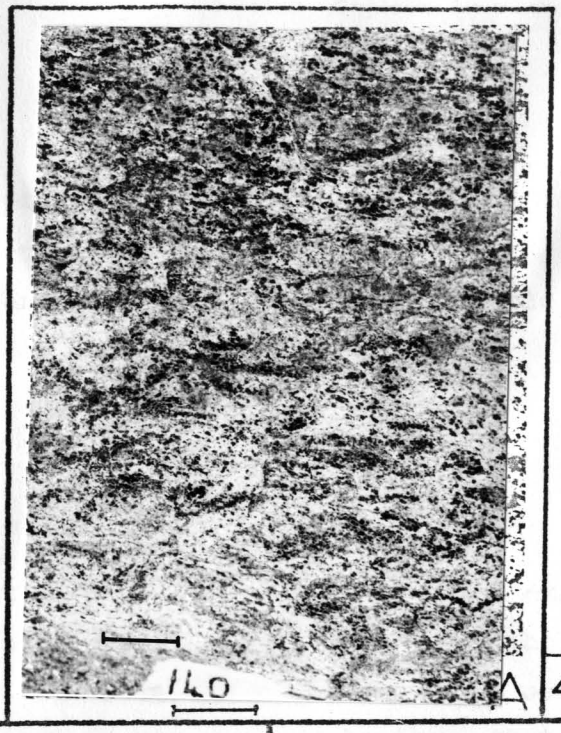
Figure 4.29

Various lineations from rocks on Keyes Mountain.

A - Prominent lineations defined by very elongate aggregates of biotite grains on a schistosity plane in a quartzofeldspathic gneiss. Figure 4.17 and 4.20 D were also taken from this sample and the lineation is parallel to the early layering (schistosity) intersection. Scale bar is 1 cm long.

B/C - Elongate chlorite bodies on schistosity planes in garnet-chlorite-schistose-quartzofeldspathic gneiss. In B these bodies have a preferred orientation parallel to the short dimension of the photograph, in C they have no preferred orientation. The scale bar is 2 cm long in both cases.

D - View looking along a lineation defined by elongate albite-epidote aggregates in an amphibolite from Keyes Mountain. These aggregates are usually fairly equidimensional in such a view but, as described in the text, may be very elongate when viewed perpendicular to the lineation.



4.29

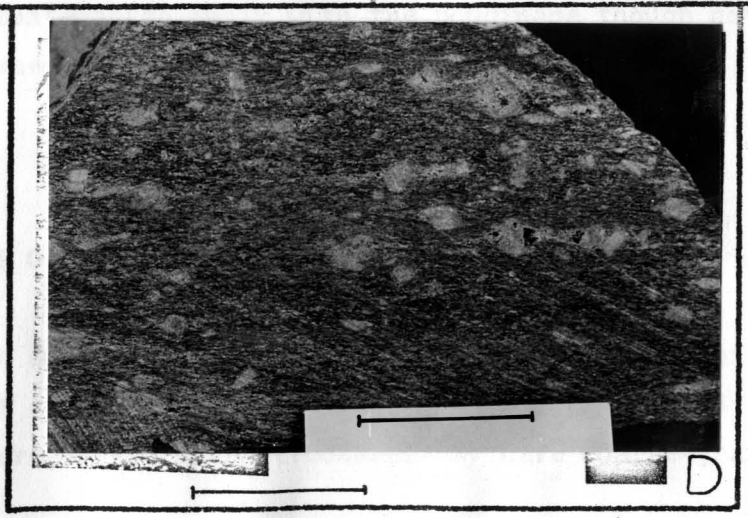


Figure 4.30

Boudinage from rocks on Keyes Mountain.

A/B - Boudinage in quartzofeldspathic gneiss. B is a field sketch made where photograph A was taken :

1. quartzofeldspathic gneiss
2. coarse-grained quartz
3. micaceous quartzofeldspathic gneiss.

The arrow points to S.G.3 folds with axial surfaces at high angles to the boudined layer. Scale bar is 10 cm long.

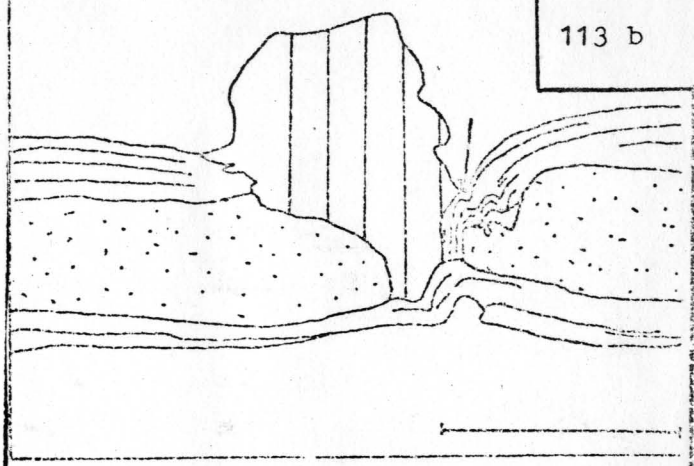
C/D - Boudinage of relatively coarse-grained amphibolite layer in amphibolite from Keyes Mountain. D is a field sketch of the same feature. Grain size in the axis of the boudin is of the order of five times greater than that in the surrounding rock. The scale bar is 5 cm long in each case :

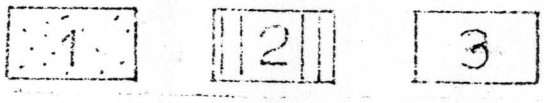
1. epidote-rich area, 40-70 % epidote,
2. albite-rich area,
3. biotite-chlorite-rich area. The dashes are about parallel to basal planes of biotite-chlorite grains in the area,
4. coarse-grained quartz-albite-rich area.

Note that the assemblage in the area between the boudined layers is identical to the assemblage in the surrounding amphibolite.

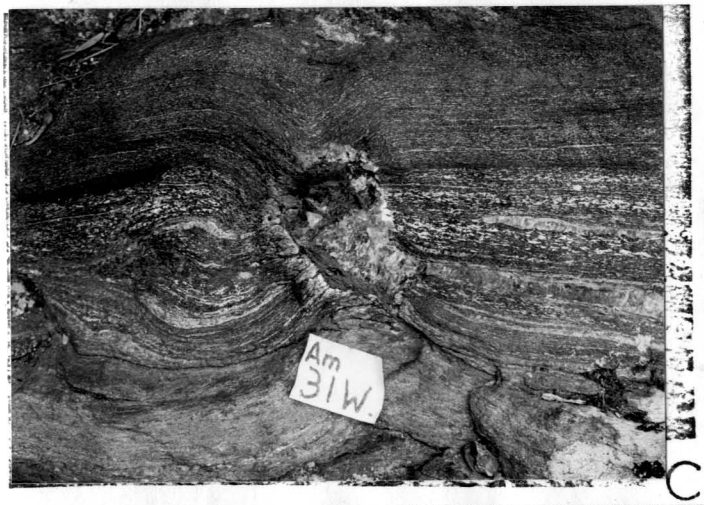
A

113 b



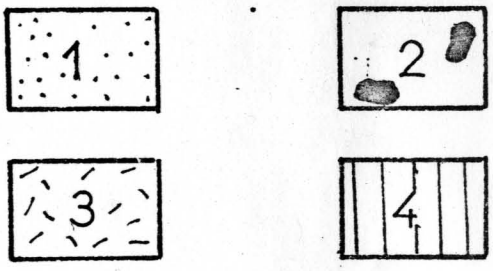


B

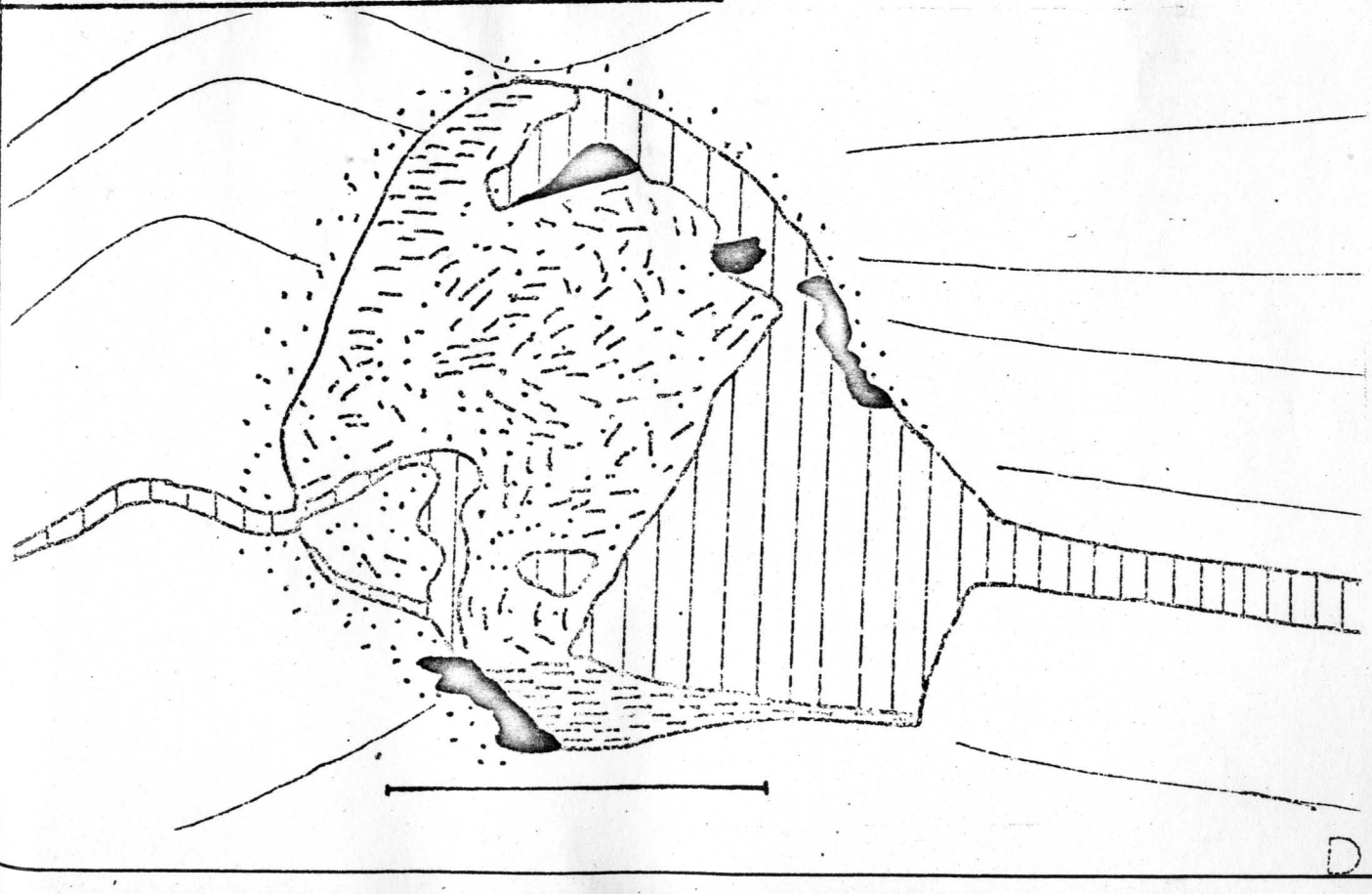


C

4.30



D



D

Figure 4.31

Low angle dislocations in rocks from Keyes Mountain.

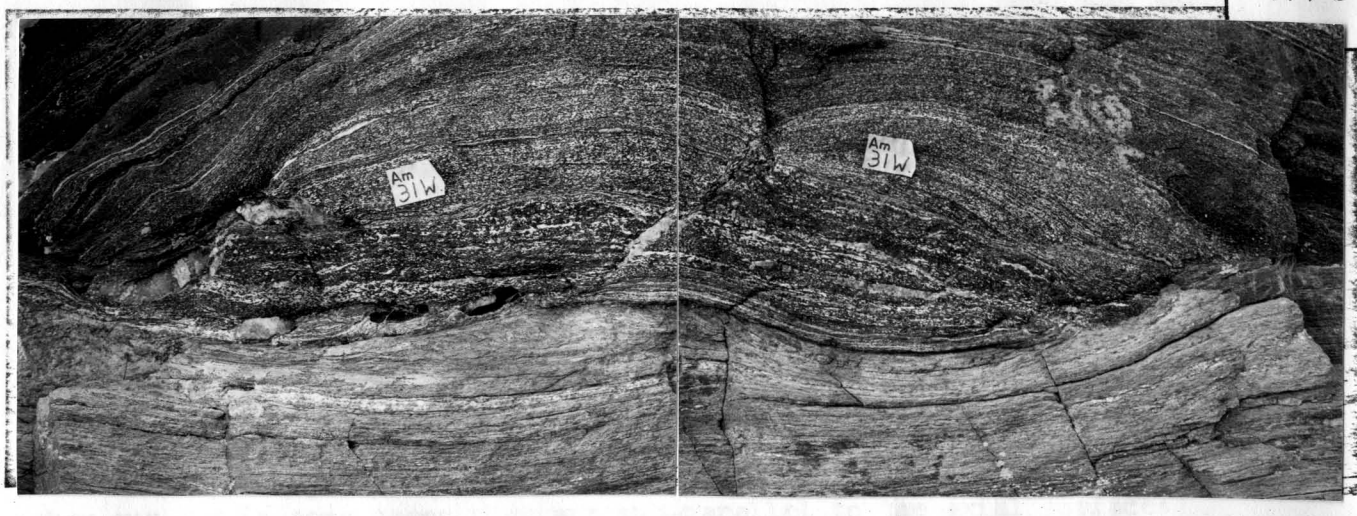
In the examples below, a layering is terminated abruptly at a surface, suggesting either that relative motion has occured or that material has been removed from between the two masses on either side of the surface.

In A and B, coarse-grained material is concentrated at or near this surface.

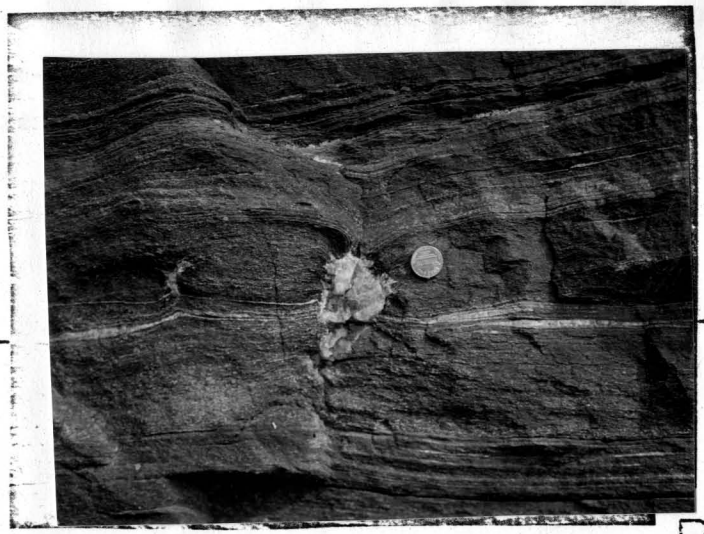
A - Contact between garnet-chlorite-schistose-quartzofeldspathic gneiss (lower) and amphibolite (upper). Scale bar is 10 cm long.

B - Layering in the amphibolite on the upper part of the photograph is at a small angle (about 10°) to layering in the lower part. The discontinuity surface is indicated by marks on either side of the photograph. Also note the boudinage in the centre of the figure. Coin is 19 mm in diameter.

C/D - Low angle dislocation in quartzofeldspathic gneiss. D is a tracing prepared from C and in D the 'fault' is indicated by a heavier line. Scale bar is 30 cm long.

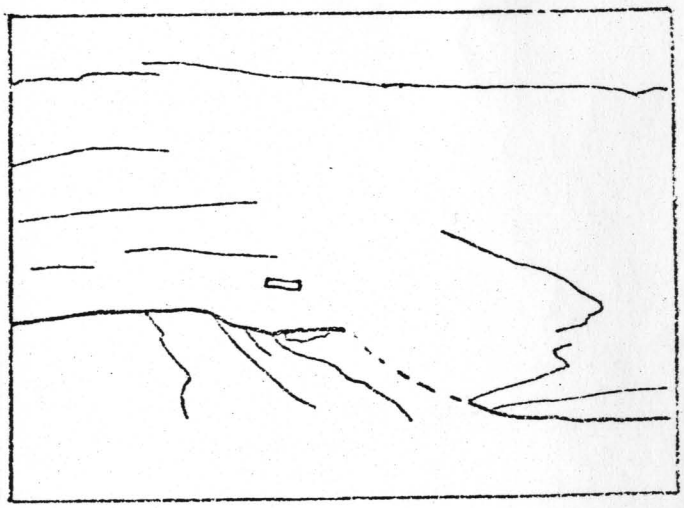


A



B 4.31

C



D