SOME SEDIMENTOLOGICAL AND STRUCTURAL STUDIES OF THE OLD RED SANDSTONE HITRA GROUP, HITRA, SØR-TRØNDELAG

VOLUME II

ILLUSTRATIONS

REFERENCES

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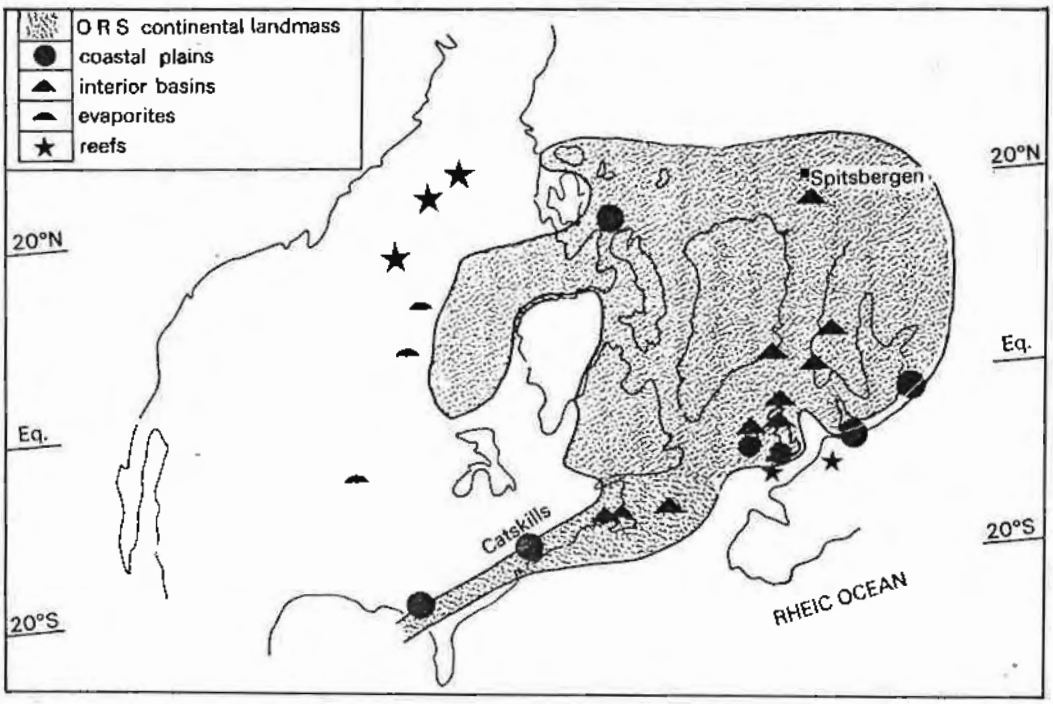

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Fig. 2.2. Locations of the main areas of O.R.S. sediments in Norway (black). The ruled area represents the approximate extent of the Caledonian nappes and autochton. The remaining white areas are Precambrian crystalline basement (after Roberts, 1983).

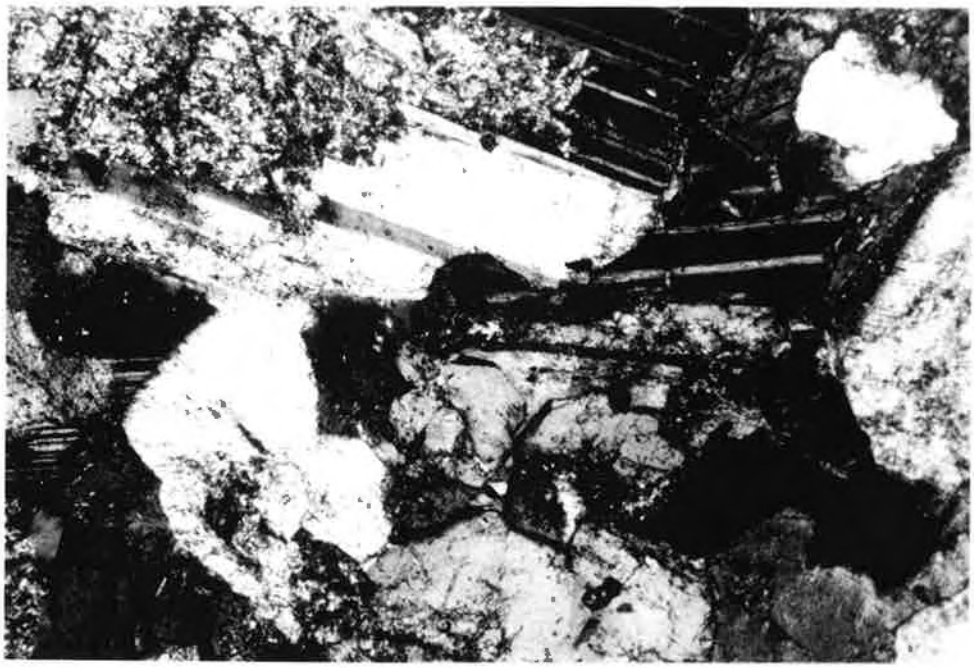

Fig. 3.1. Diorite from Grindvik. 63x, x-nicols.

Fig. 3.2. Diorite with xenoliths along Road 314 to Fillan. Hammer shaft is 35 cm long.

Fig. 3.3. Regolith N of Fløosvann. The green material is a weathering product from the diorite, mainly epidote and chlorite. Hammer shaft is 35 cm long.

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Fig. 3.5. A sandstone-filled crack in the diorite about 0.5 m below the unconformity. Eastern end of Balsneshusvann. Pencil is 14 cm long.

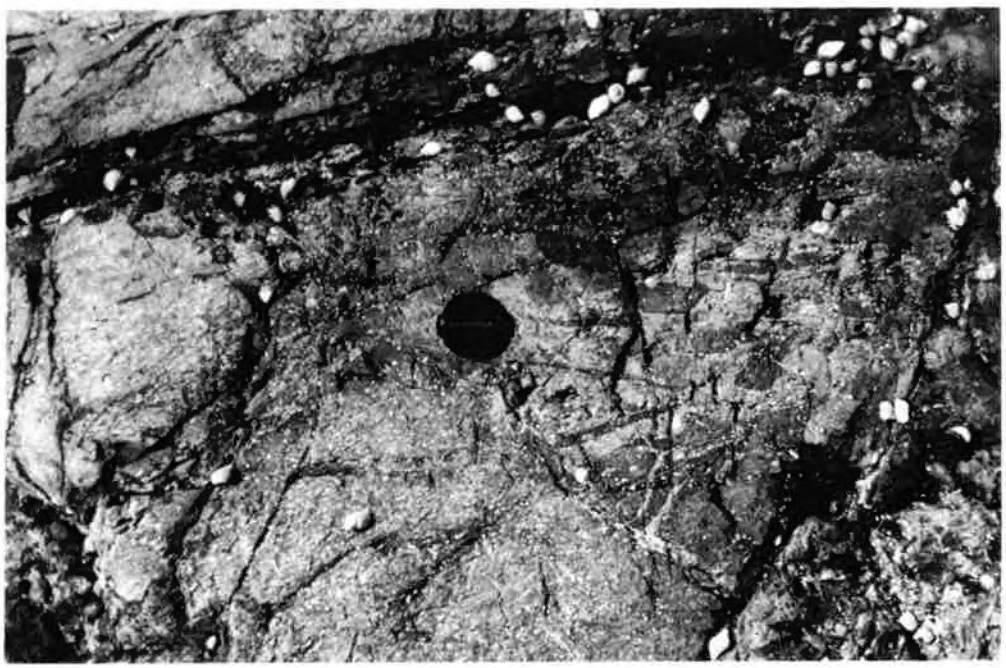

Fig. 3.6. The unconformity between the diorite and Member B at the promontory north of Bekkvikholmen. Diorite in the lower part of the photograph is overlain by a thin horizon of basal breccia (Member A). Lens cap is 6 cm in diameter.

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Fig. 3.10. Mylonitized diorite. Northern coast of Aunøy. 63x, x-nicols.

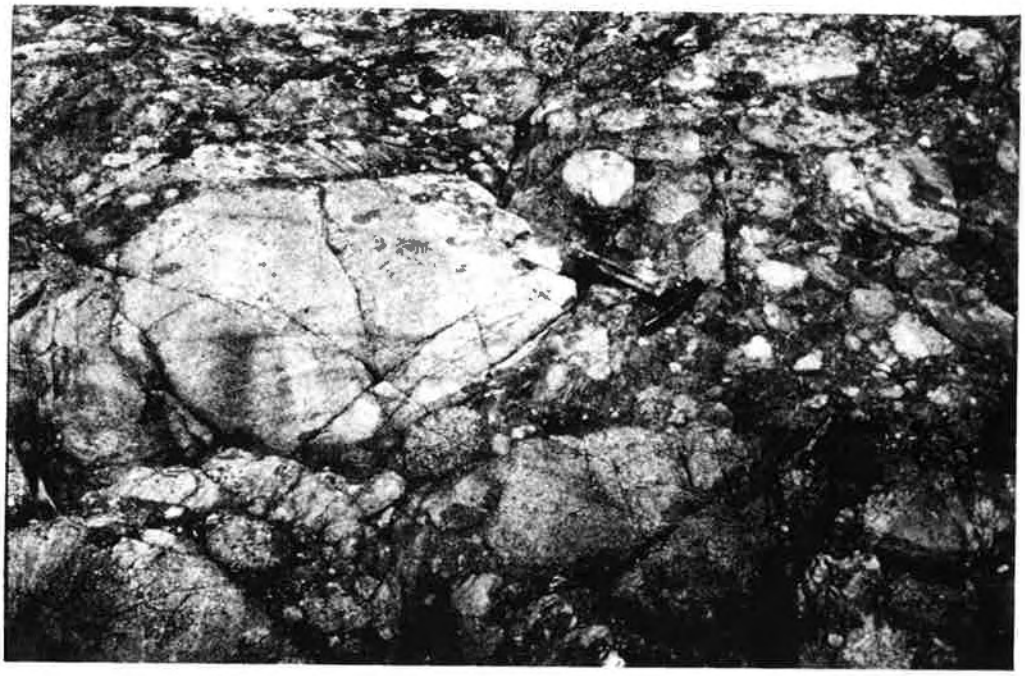


Fig. 4.1. Member A, basal breccia 10 m above the unconformity. East of the mouth of Aunåa. Hammer shaft is 35 cm long.

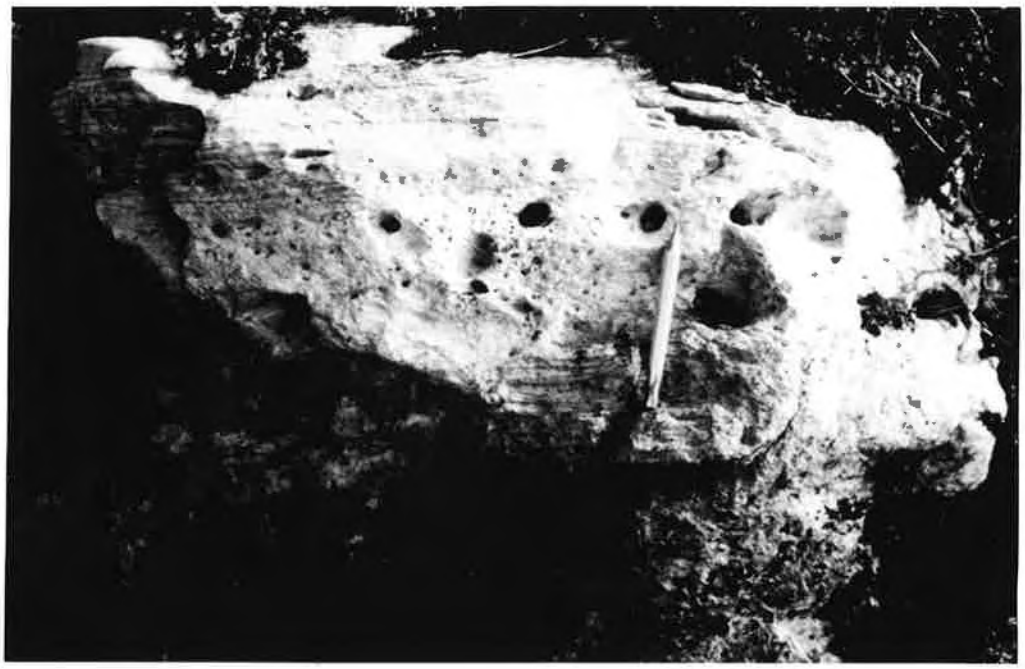


Fig. 4.2. Calcareous concretions in the upper part of Member B. Between Grunnvann and Balsneshusvann. Pencil is 10 cm long.

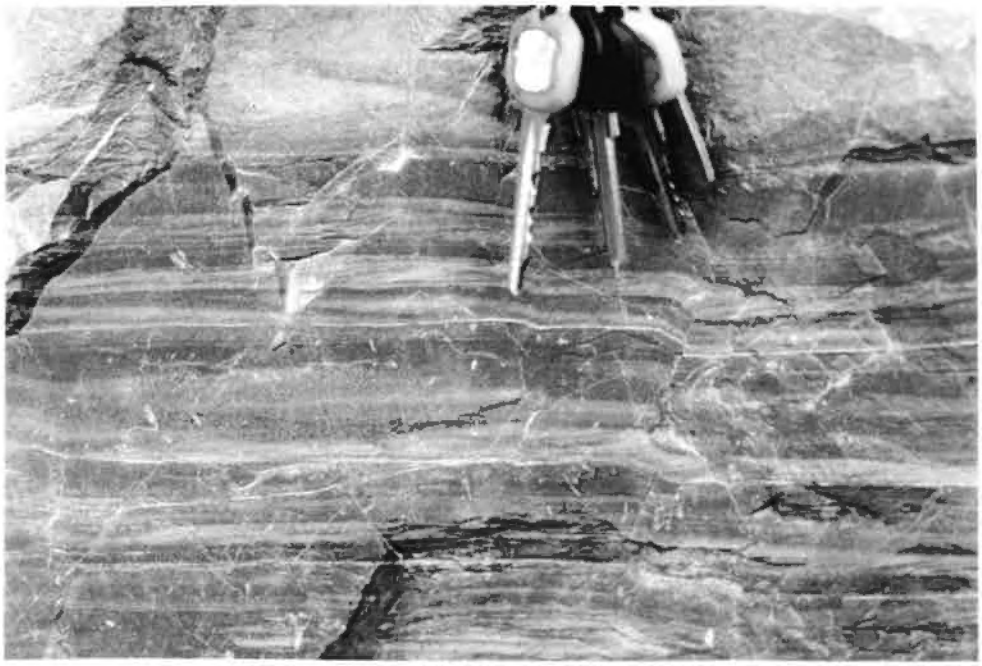


Fig. 4.3. Typical appearance of Member B in a road cut north of Aspvikodden. Keys are 5 cm long.

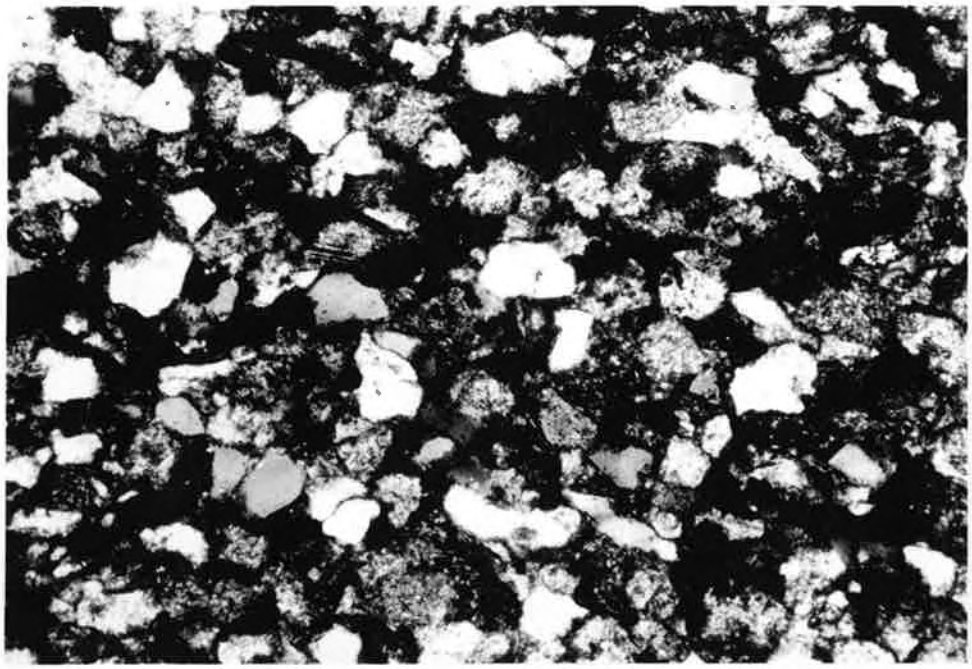


Fig. 4.4. Very fine grained sandstone/siltstone of Member B south of Storvågen. 63x, x-nicols.

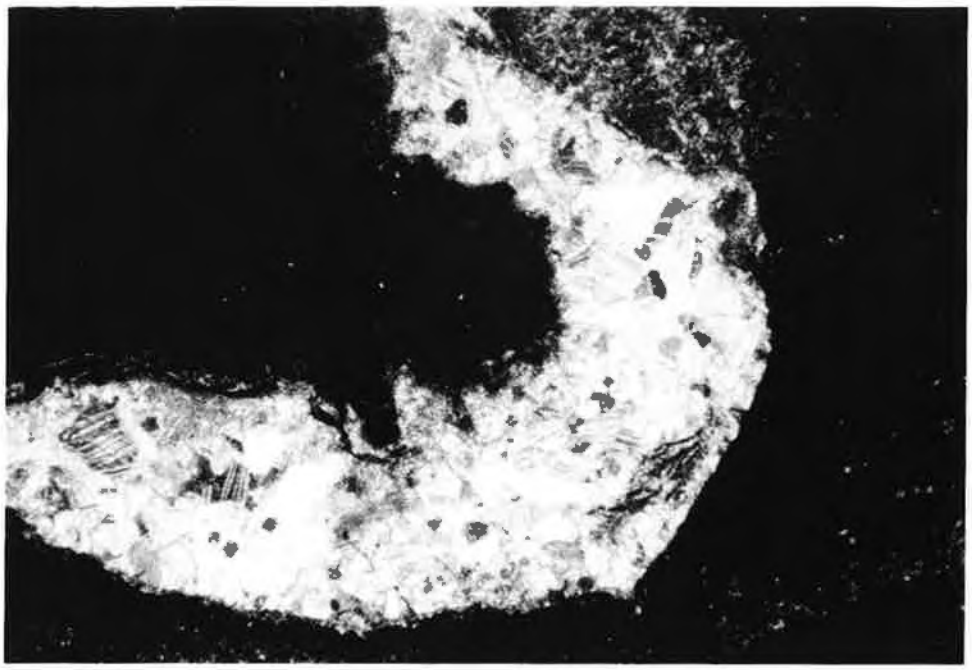


Fig. 4.5. Burrow filled with early calcite cement. North of Grunnvann. x25, x-nicols.

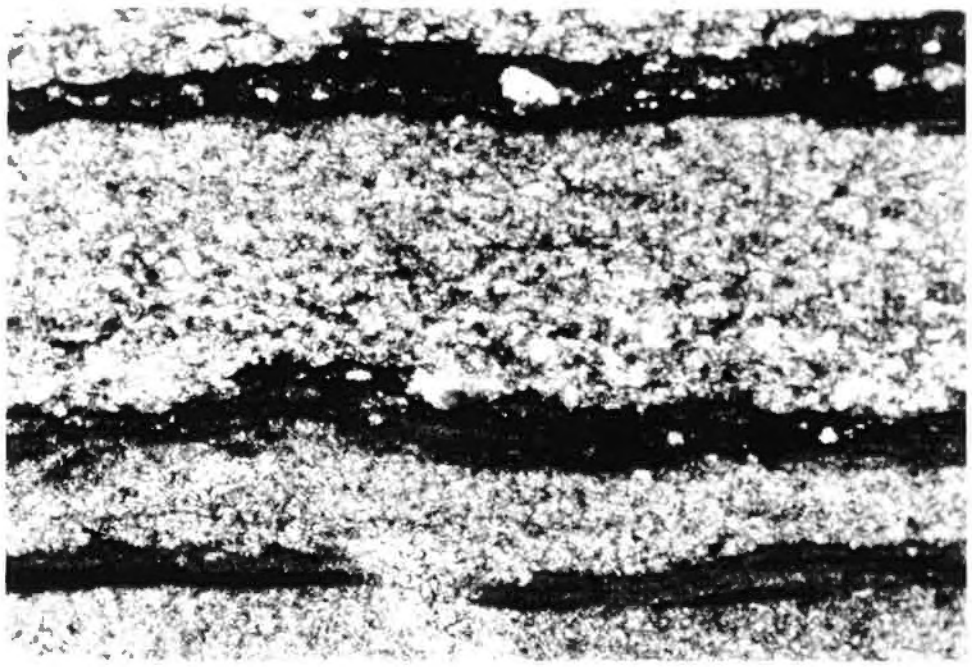


Fig. 4.6. Typical appearance of mudstones belonging to the Vollan Formation. Note normal grading and stylolites. North of Kallarnes. 63x, x-nicols.

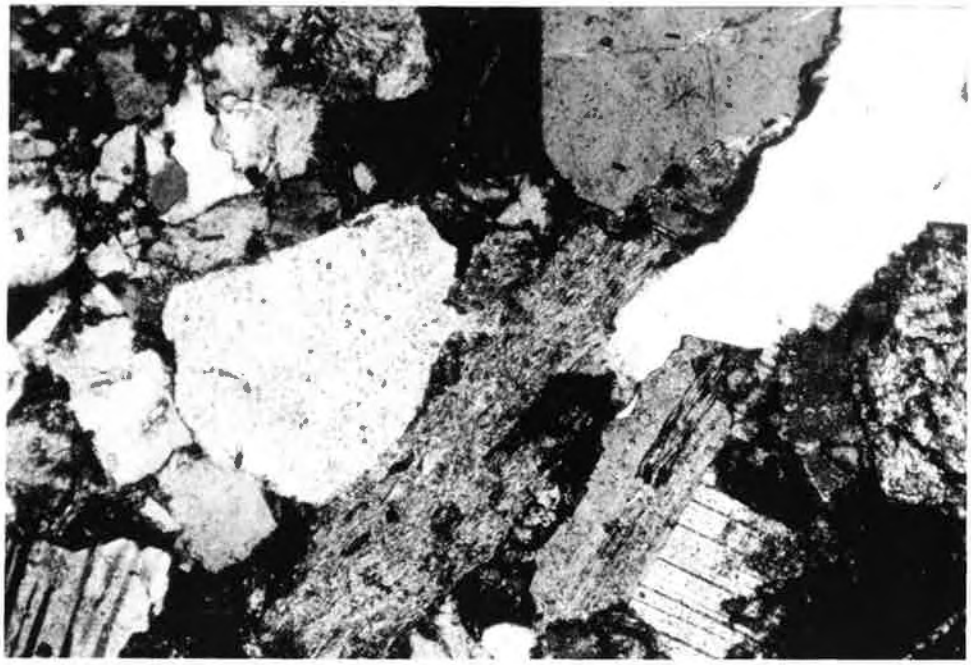


Fig. 4.7. Sandstone from Member K. Sample collected on an island off the coast of Balsnes. x63, x-nicols.

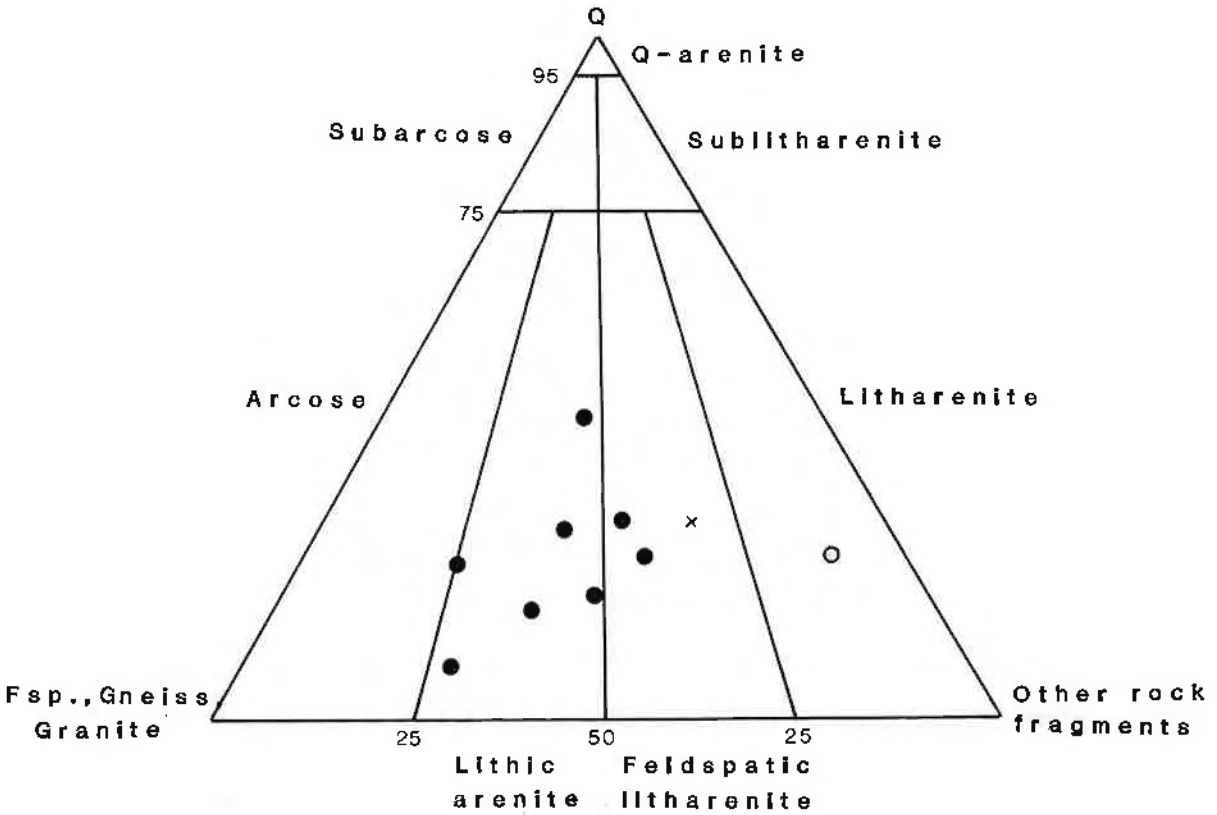


Fig.4.8. Classification of sandstones of the Hitra Group. Aune Formation: circle, Vollan Formation: dots, Balsnes Formation: cross. Samples from the Aune Formation are usually lithic arenites, while samples from the Vollan and Balsnes Formations are feldspatic litharenites and lithic arkoses. Classification after Folk (1968).

Fig. 5.1. Facies 2, siltstone with sandy lamnination, ripples and lenticles. Member J south of Vollan. Pencil is 14 cm long.

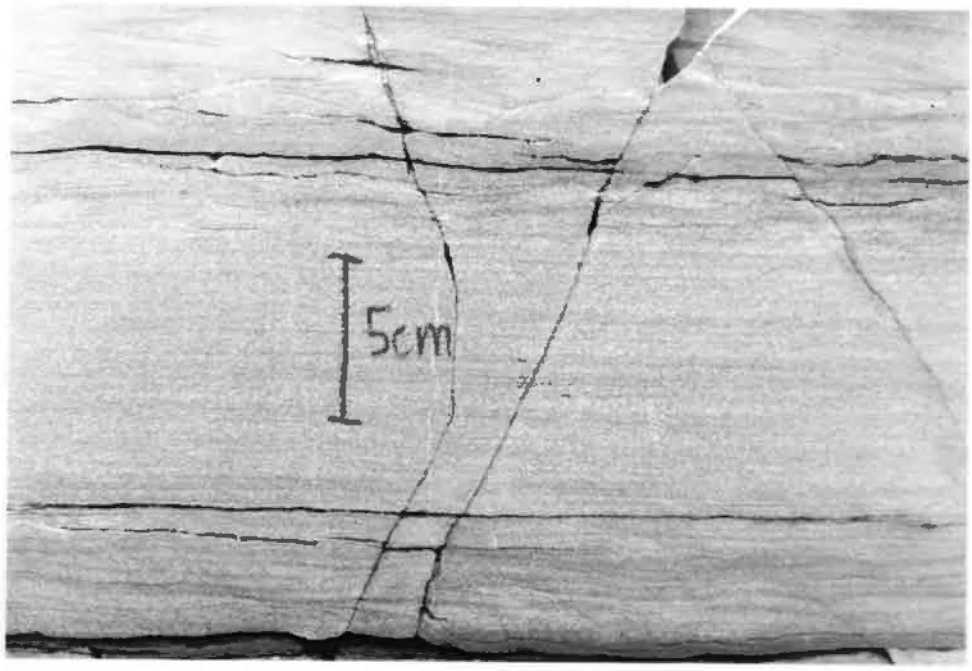


Fig. 5.2. Fine grained sandstone of Member F. Top and bottom consist of Facies 3, ripple laminated sandstone. The top shows a transition into climbing ripple lamination. The middle of the photograph shows Facies 4, parallel laminated sandstone. Southeast of Furuholmen.

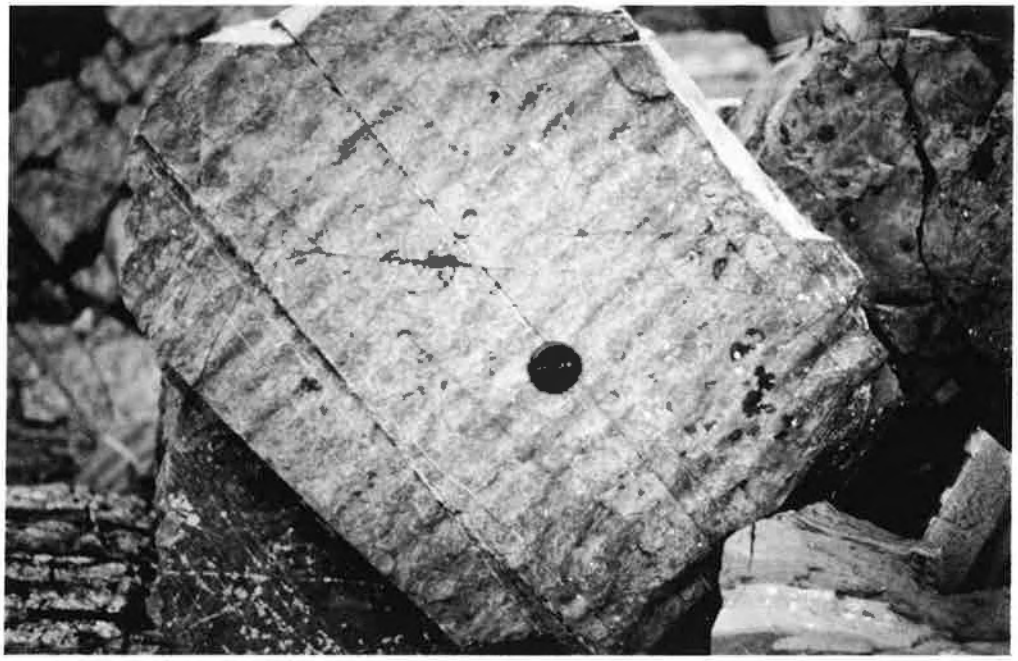


Fig. 5.3. Wave modified, dominantly symmetrical current ripples (sinuos out of phase) on the surface of a bed of Facies 3, ripple laminated sandstone. Member F at the coast southeast of Furuholmen. Lens cap is 6 cm in diameter.

Fig. 5.4. Facies 4, parallel laminated sandstone. Member F southeast of Furuholmen. Lens cap is 6 cm in diameter.

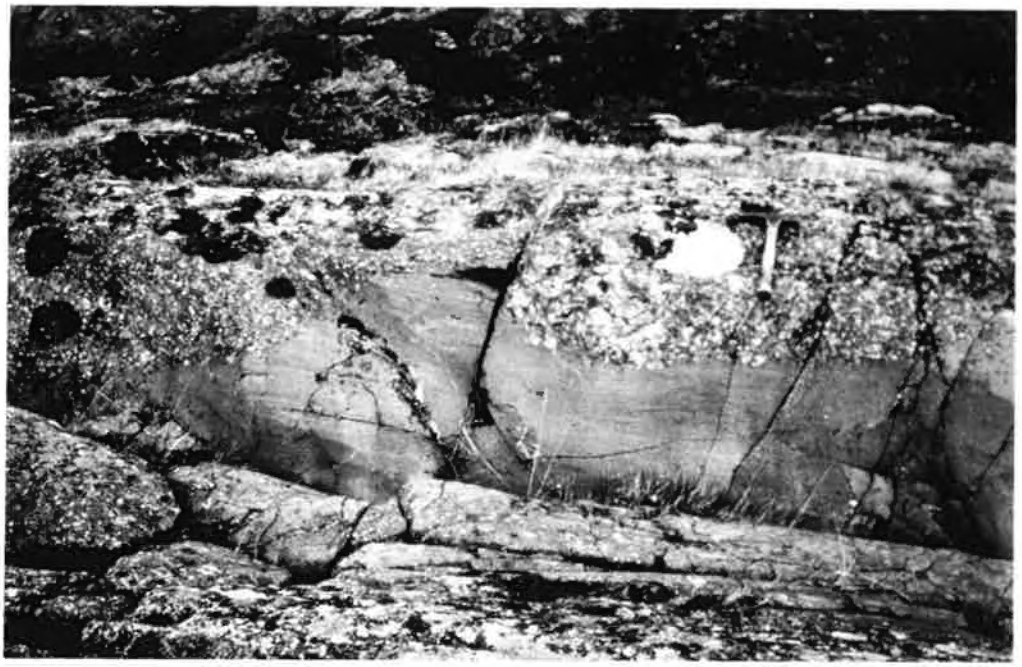


Fig.5.5. Bimodal channel conglomerate (Facies 10) cutting into Facies 5, massive bedded sandstone. Member K west of Balsnes. Hammer shaft is 35 cm long.

Fig. 5.6. Facies 5, massive bedded sandstone passing upwards into Facies 6, horizontal bedded sandstone. Near the bottom there are some ripples belonging to Facies 3, ripple laminated sandstone. A coarsening upwards tendency is seen near the bottom. Member F southeast of Furuholmen. Pencil is 10 cm long.

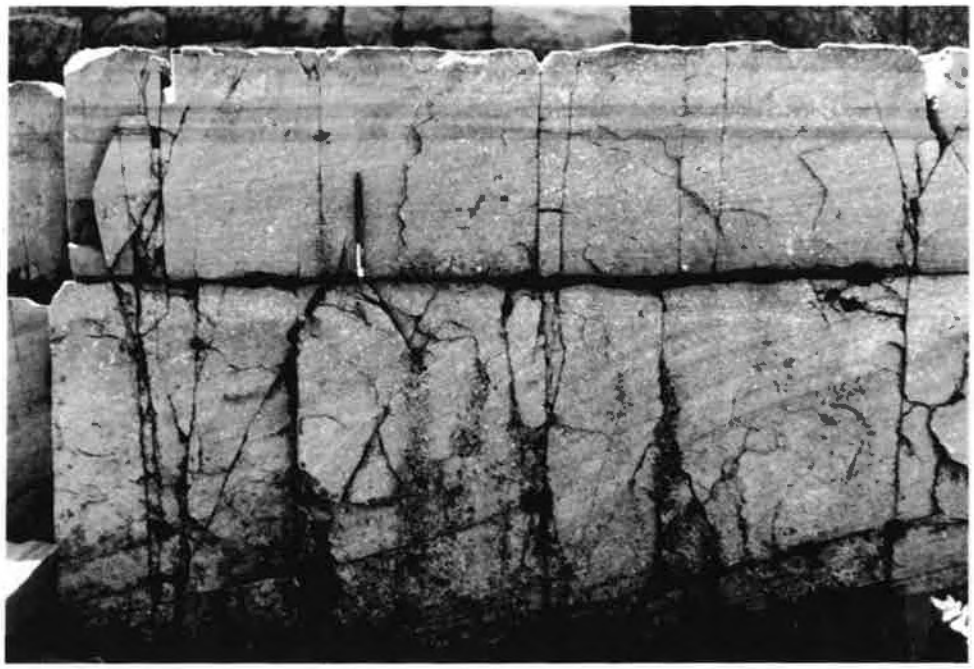


Fig. 5.7. Facies 8, tabular cross-bedded sandstone in alternation with Facies 6, horizontal bedded sandstone. Note sigmoidal foresets in the lower bed of Facies 8, tangential foresets in the upper bed. Facies 6 has eroded Facies 8. Member F southeast of Furuholmen. Pencil is 14 cm long.

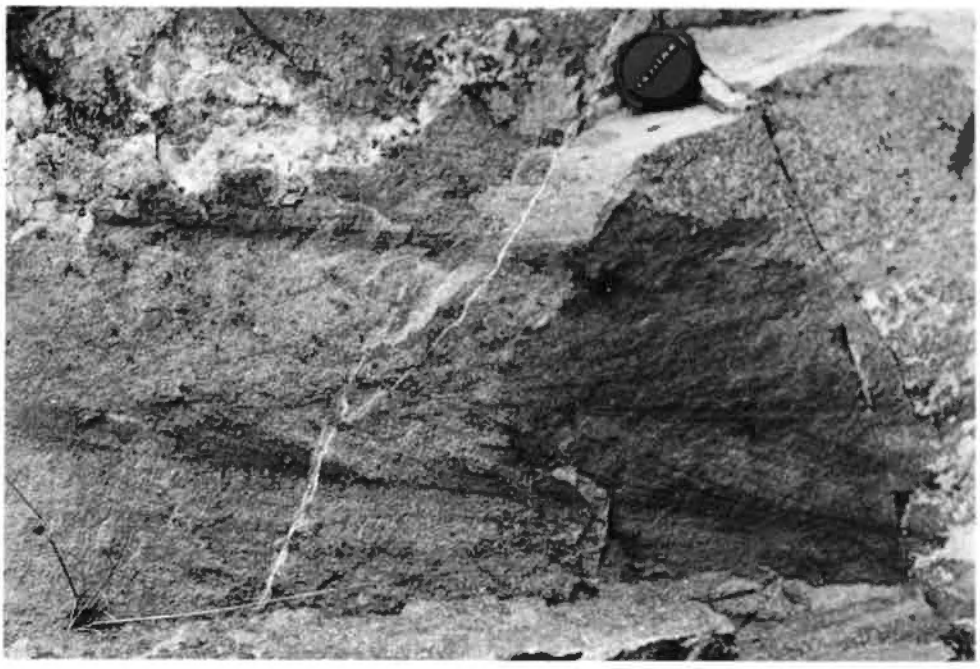


Fig. 5.8. Facies 7, trough cross-bedded sandstone. Member E on Furuholmen. Lens cap is 6 cm in diameter.

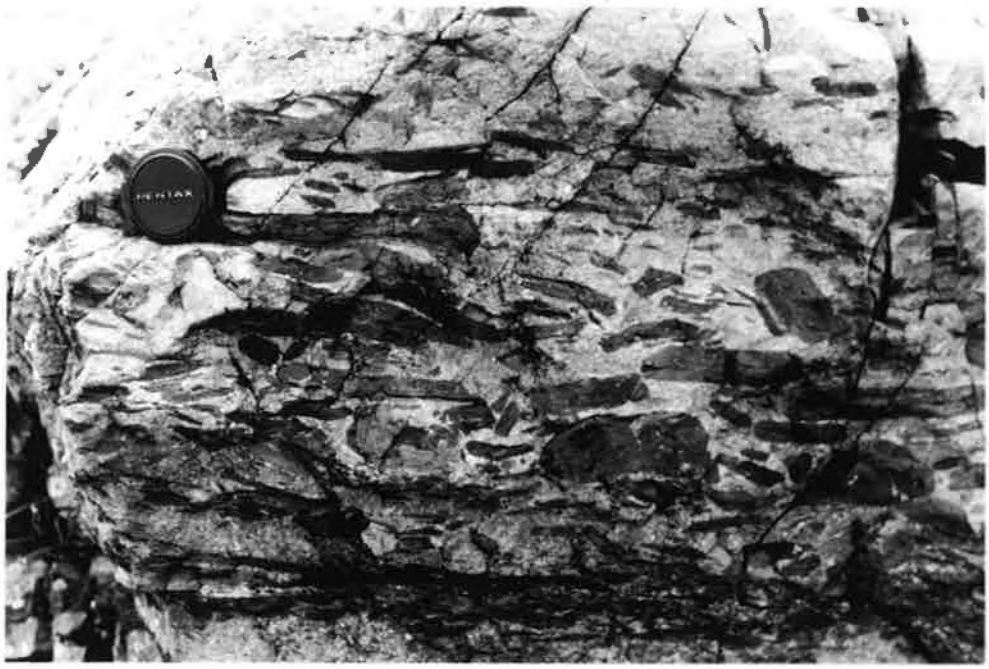


Fig. 5.9. Facies 9, intraformational conglomerate. Lowermost part of Member K at the bottom of a larger channel. Channel floor is seen in the lower part of the photograph. Coast west of Bålsnes. Lens cap is 6 cm in diameter.

Fig. 5.10. Facies 9, intraformational conglomerate. Member F southeast of Furuholmen.

Fig. 5.11. Facies 10, conglomerate. Imbrication denotes palaeocurrents flowing to the left (an easterly direction). Member G, coast southeast of Furuholmen. Bedding is horizontal on photograph. Hammer shaft is 35 cm long.

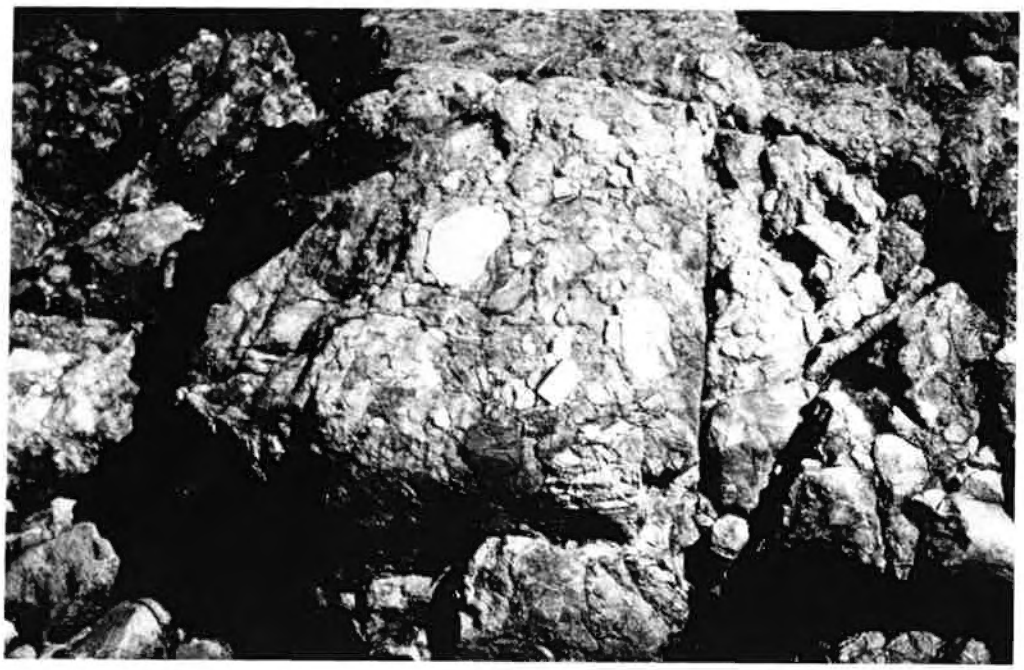


Fig. 5.12. Facies 11, sedimentary breccia. Member A east of the mouth of Aunåa. Note book for scale is 18 cm long.

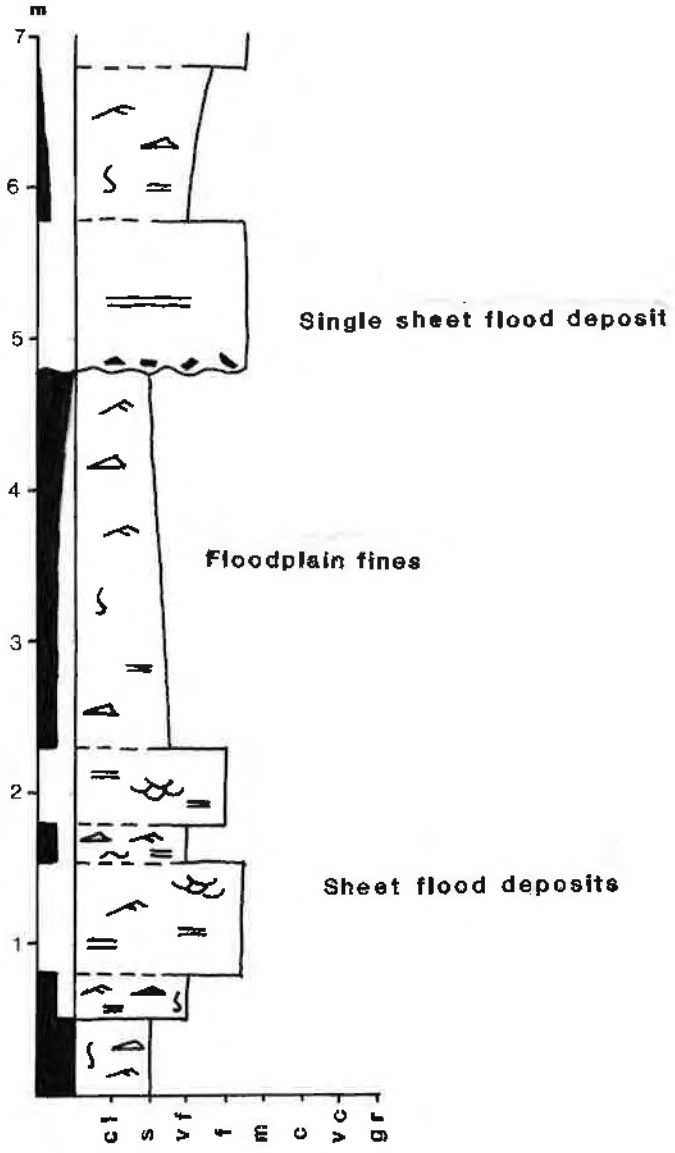


Fig. 6.1. Log through a representative section of Member B. Road section south of Storvågen. See text for discussion.

Fig. 6.2. Erosional surface between Facies 2, siltstone with sandy lamination, ripples and lenticles (lower half of photograph) and Facies 4, parallel laminated sandstone (upper half of photograph) at 4.80 m at the log in Fig. 6.1. Pencil is 14 cm long.

Fig. 6.3. Facies 2, siltstone with sandy lamination, ripples and lenticles in alternation with Facies 4, parallel laminated sandstone at about 6.50 m at the log in Fig. 6.1. Note increase in thickness and abundance of Facies 4 sandbeds upwards.

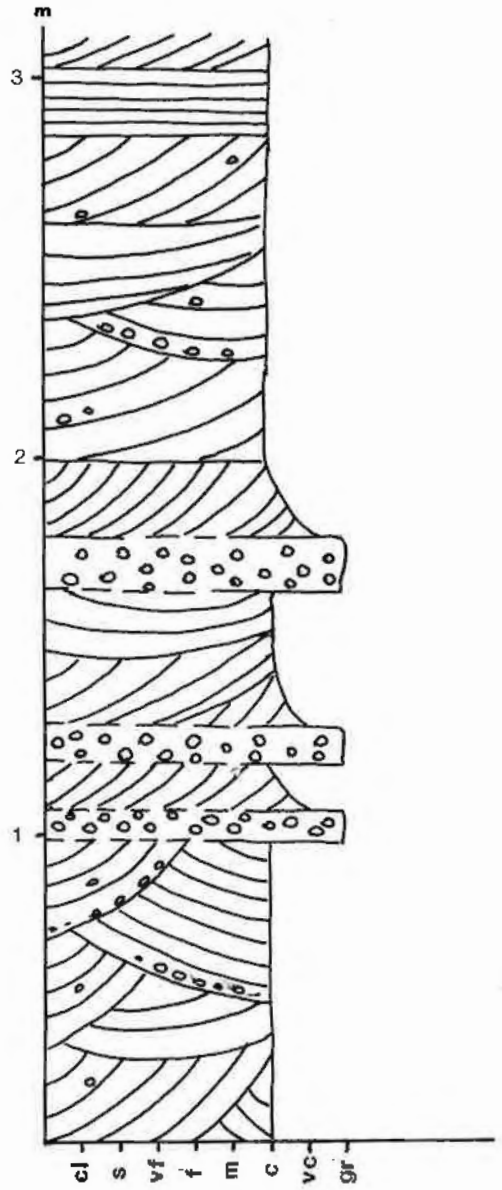


Fig. 6.4. Log through a representative part of Member C at Aspvikodden. Sequence is dominated by braided river channel fills deposited by stream floods. See text for discussion.

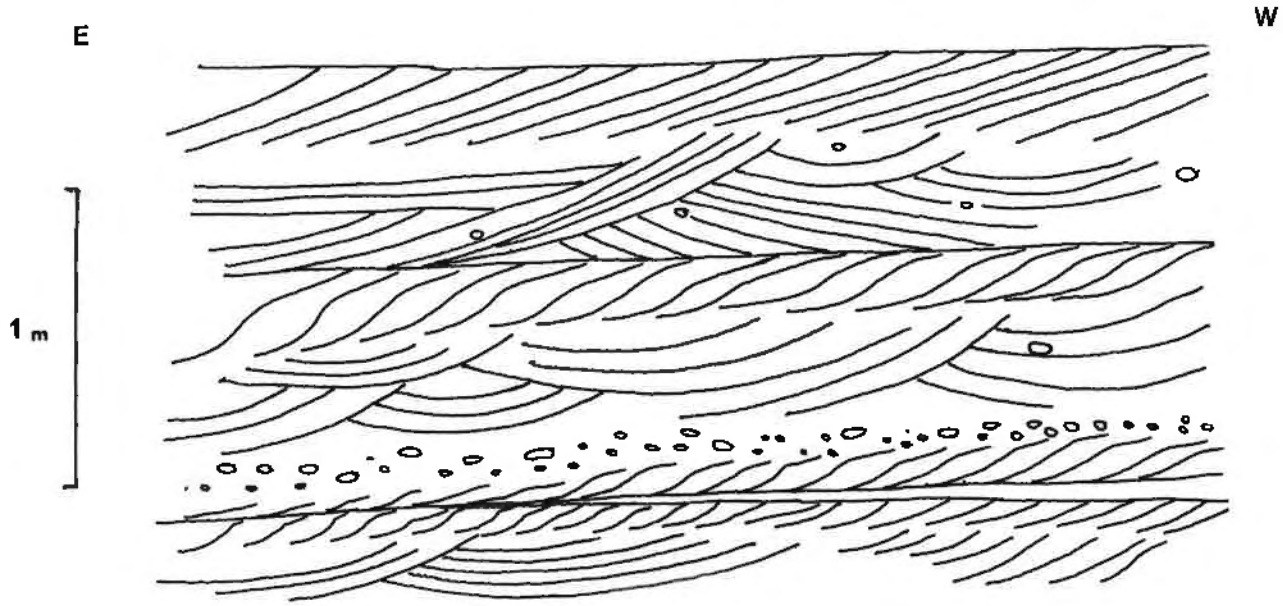


Fig. 6.5. Profile from Member C at Aspvikodden. No vertical exaggeration. Note predominantly eastwards directed currents.

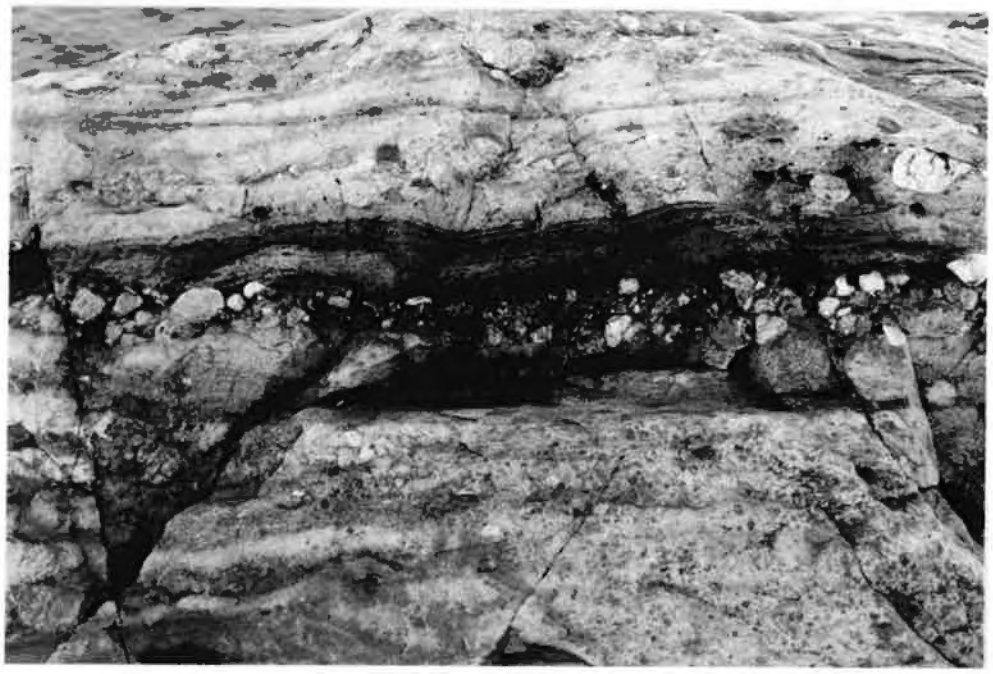


Fig. 6.6. Photograph from Member C at Aspvikodden. Note Facies 10, conglomerate, Facies 8, tabular cross-bedded sandstone and Facies 7, trough cross-bedded sandstone. Height of photograph is approximately 1 m.

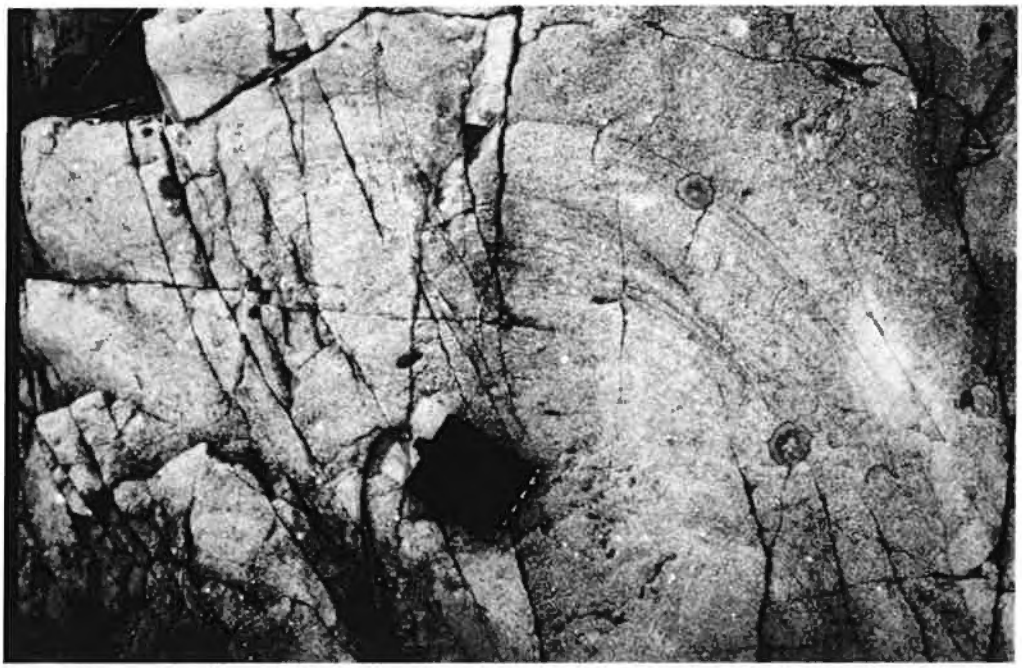


Fig. 6.7. Appearance of Facies 7, trough cross-bedded sandstone on bedding plane surface (rib and furrow structure). Currents were directed down towards the right in the plane of the page. Member E, Furuholmen.

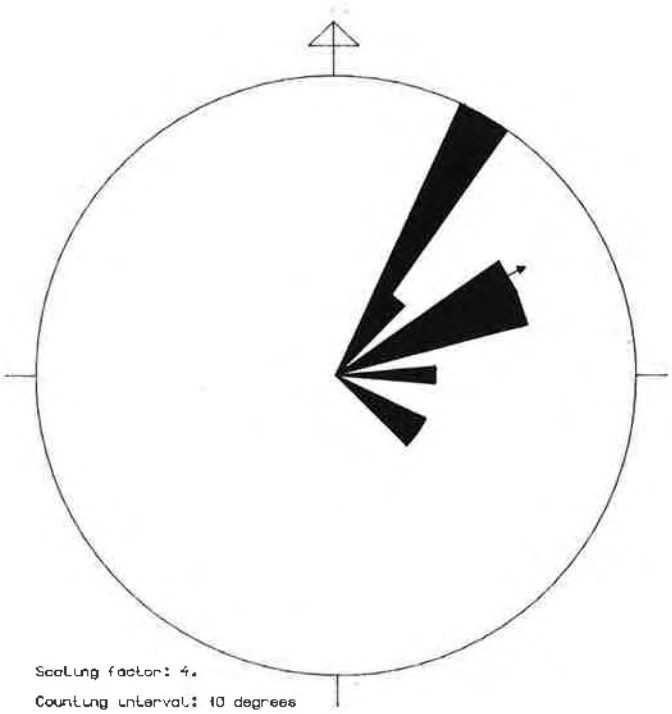


Fig. 6.8. Current directions measured from rib and furrow structures. Number of measurements: 12. Vector mean becomes 60 degrees. Member C at Aspvikodden.

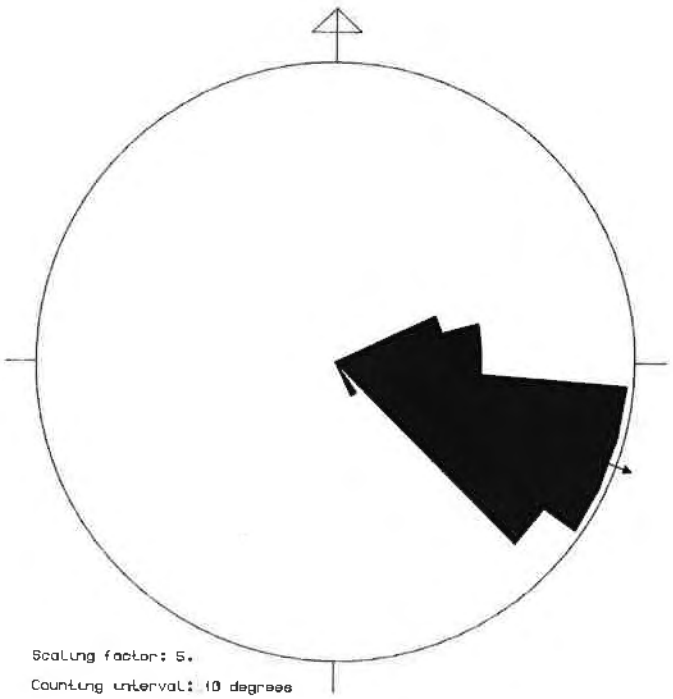


Fig. 6.9. Current directions measured from rib and furrow structures. Number of measurements: 42. Vector mean becomes 110 degrees. Member E at Furuholmen.

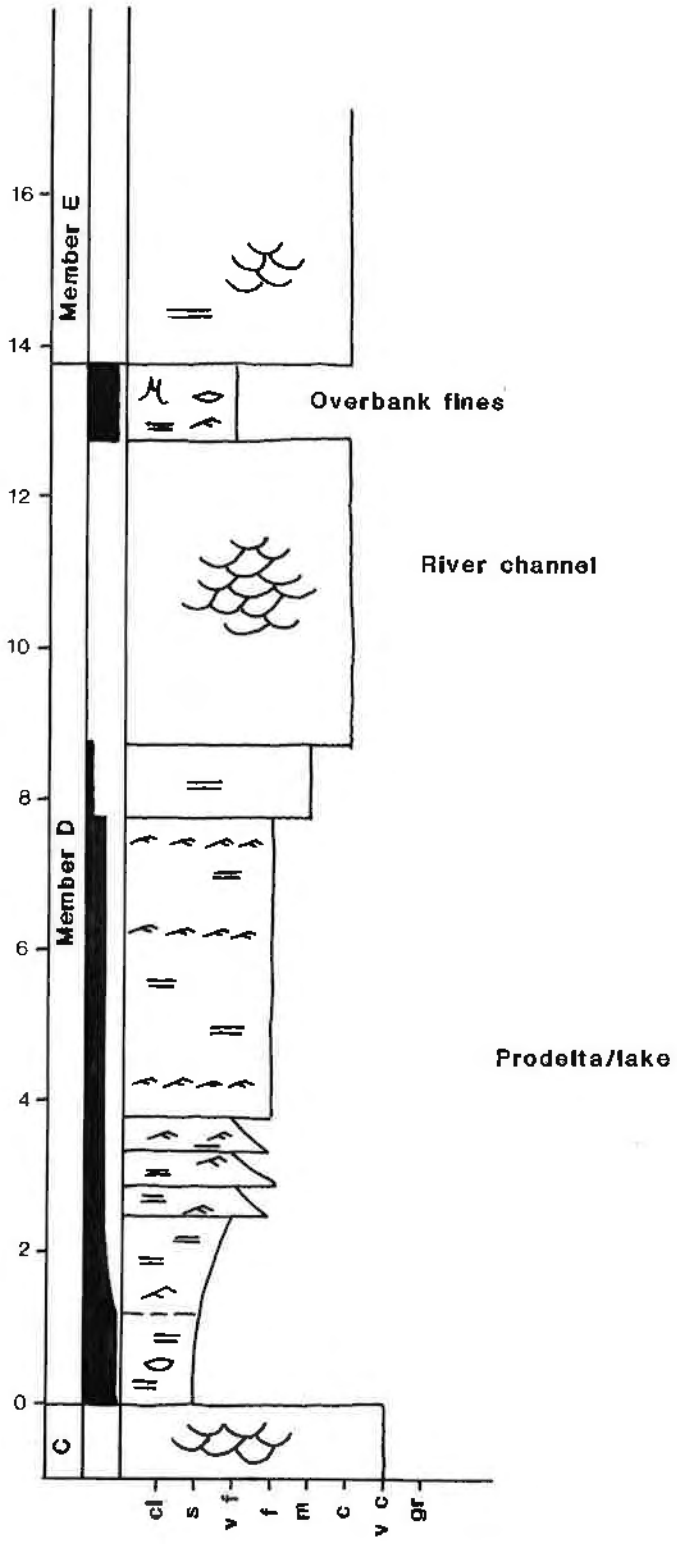


Fig. 6.10. Log throughout Member D at Furuholmen. See text for discussion.

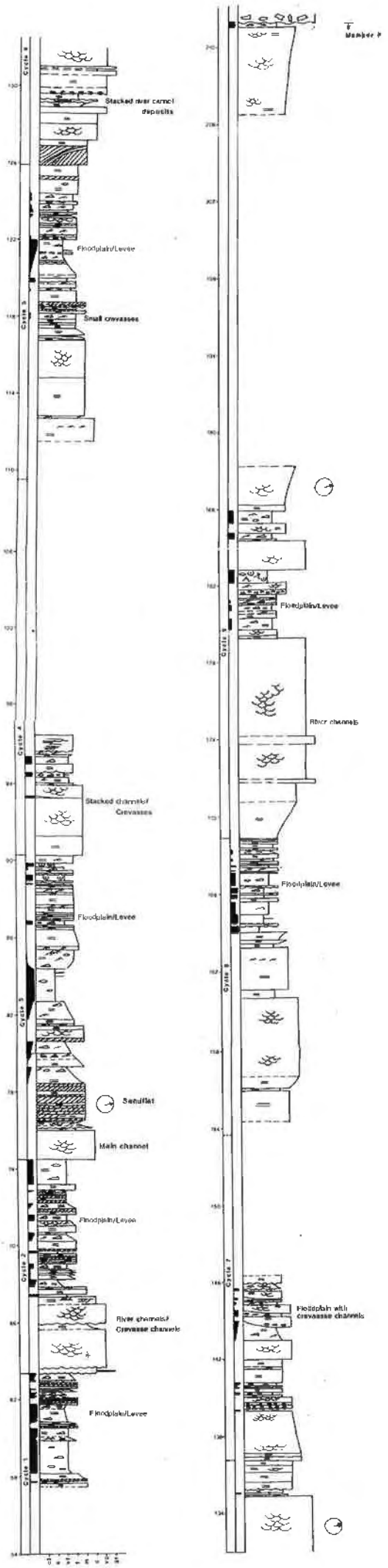


Fig. 6.11. Log throughout Member F at the coast SE of Balsnes. Symbols are explained in the symbol list. See text for discussion.

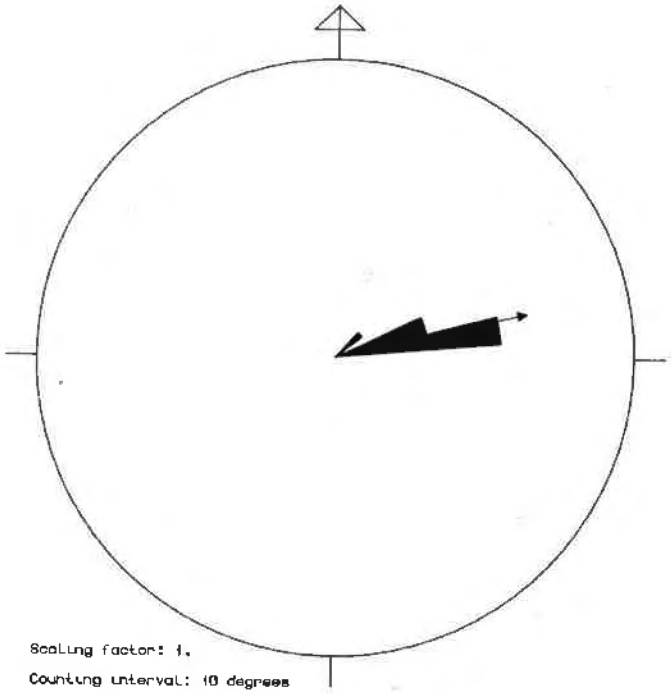


Fig. 6.12. Current directions measured from rib and furrow structures. Number of measurements: 9. Vector mean becomes about 80 degrees. Measured at 77 m - 78 m at the log in Fig. 6.11 (Member F).

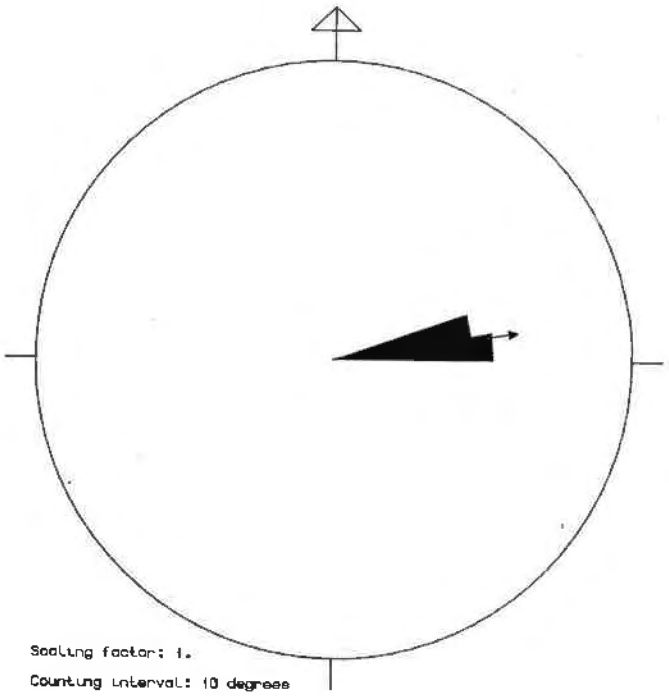


Fig. 6.13. Current directions measured from rib and furrow structures. Number of measurements: 15. Vector mean becomes about 80 degrees. Measured at 131 m - 135 m at the log in Fig. 6.11 (Member F).

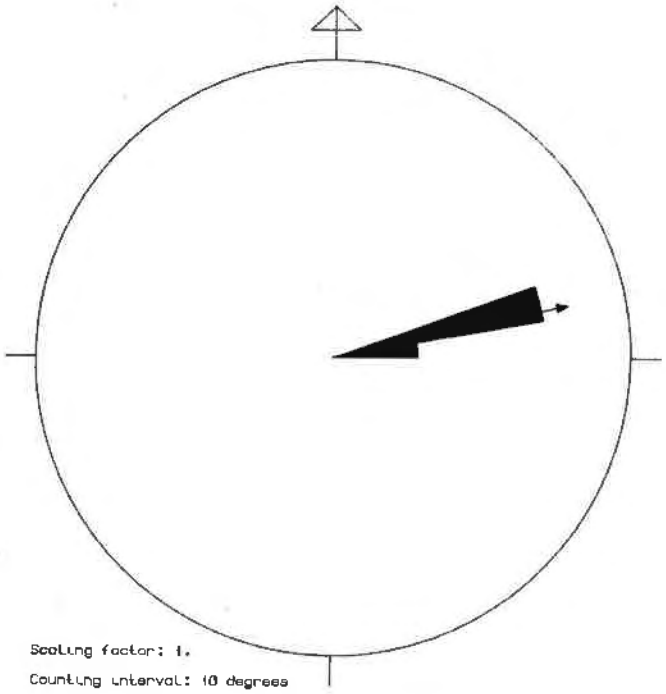


Fig. 6.14. Current directions measured from rib and furrow structures. Number of measurements: 14. Vector mean becomes about 75 degrees. Measured around 187 m at the log in Fig. 6.11 (Member F).

Fig. 6.15. Sandwave (Facies 8) overlain/eroded by horizontal bedded sandstone of Facies 6. Lower part of Cycle 3 (Member F) at the coast SE of Furuholmen. Lens cap for scale is 6 cm in diameter.

Fig. 6.16. Facies 2. Member F southeast of Furuholmen. Height of sample is 10 cm. Middle of Cycle 3, Member F.

Fig. 6.17. Upwards-coarsening levee deposit. Cycle 4 (Member F) southeast of Furuholmen. Vertical height is approximately 40 cm.

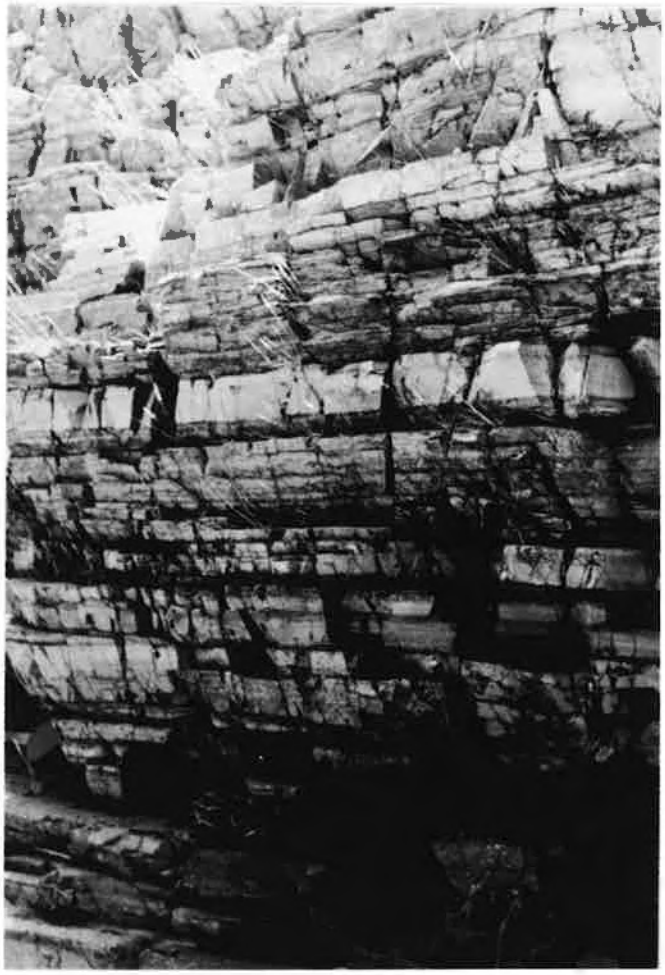


Fig. 6.18. Three coarsening upwards sequences representing levee deposits. Cycle 5 (Member F) southeast of Furuholmen. Height of section is approximately 2 m.

Fig. 6.19. Ball and pillow structures. Cycle 3 (Member F) southeast of Furuholmen. Hammer shaft is 35 cm long.

Fig. 6.20. Flame structures. Upper part of Cycle 3 (Member F) southeast of Furuholmen. Lens cap is 6 cm in diameter.

Fig. 6.21. Levee deposit in the top of Cycle 3 (Member F) at the coast southeast of Furuholmen. Note planar erosive surface at the bottom of Cycle 4. Vertical height of section is approximately 2 m.

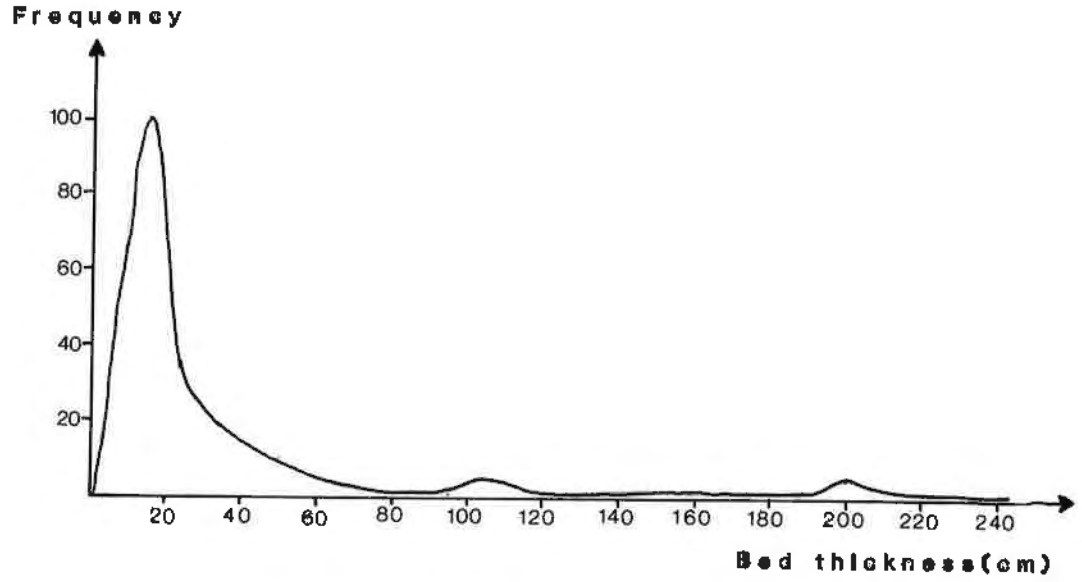


Fig. 6.22. Frequency versus thickness of sand beds. All sand beds thicker than 5 cm with a grain size larger than very fine sandstone are included. Note fairly unimodal distribution. Member F southeast of Furuholmen.

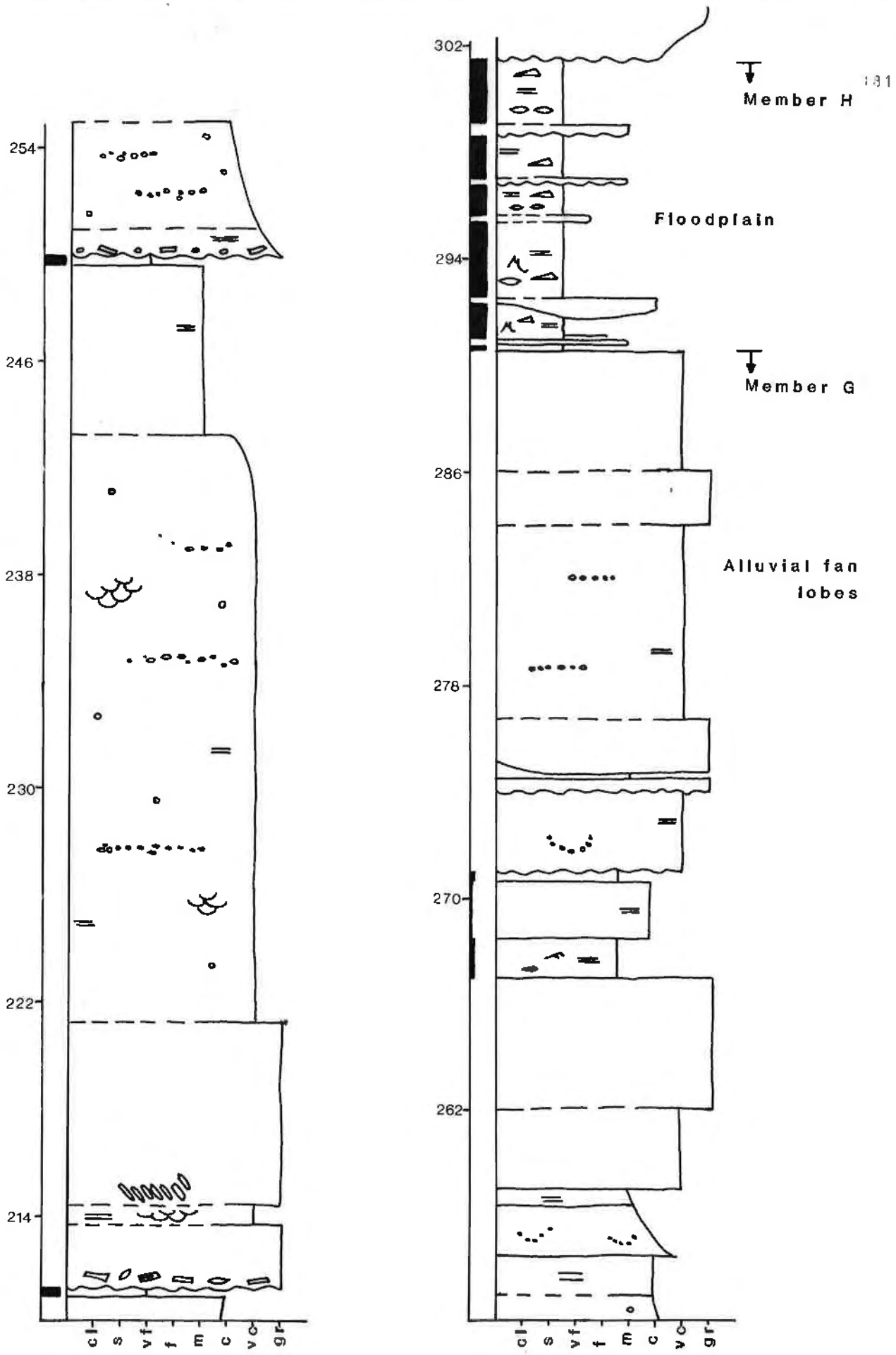


Fig. 6.23. Log throughout Members G and H at the coast northwest of Balsnes. See text for discussion.

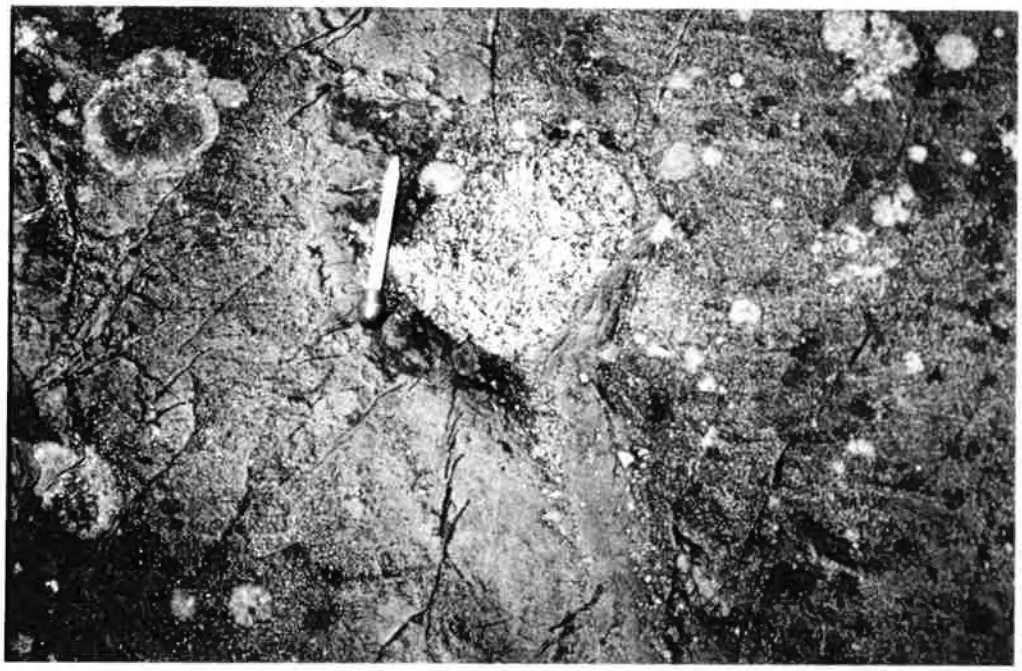


Fig. 6.24. Sand trail behind a cobble giving current direction to the SSE (down to the right). Lower part of Member I southeast of Furuholmen.

Fig. 6.25. Sand diapir in Member H at the coast northwest of Balsnes. Note enrichment of clay particles along the margins. Fines have been washed out from the middle of the diapir during fluid movement.

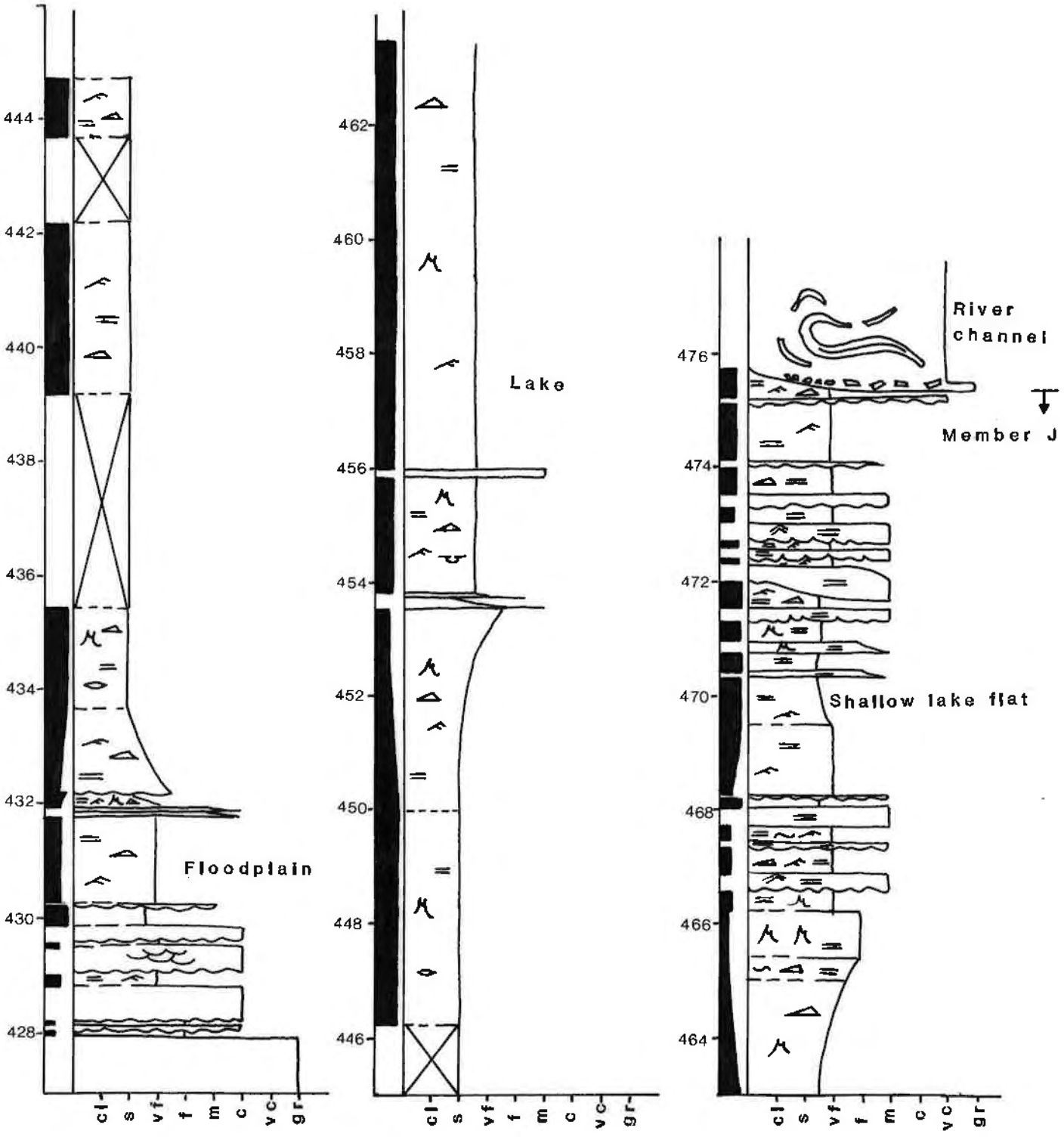


Fig. 6.26. Log throughout Member J at the coast northwest of Balsnes. See text for discussion.

Fig. 6.27. The fining upwards sequence at the bottom of Member J. Coast northwest of Balsnes. Hammer shaft is 35 cm long.

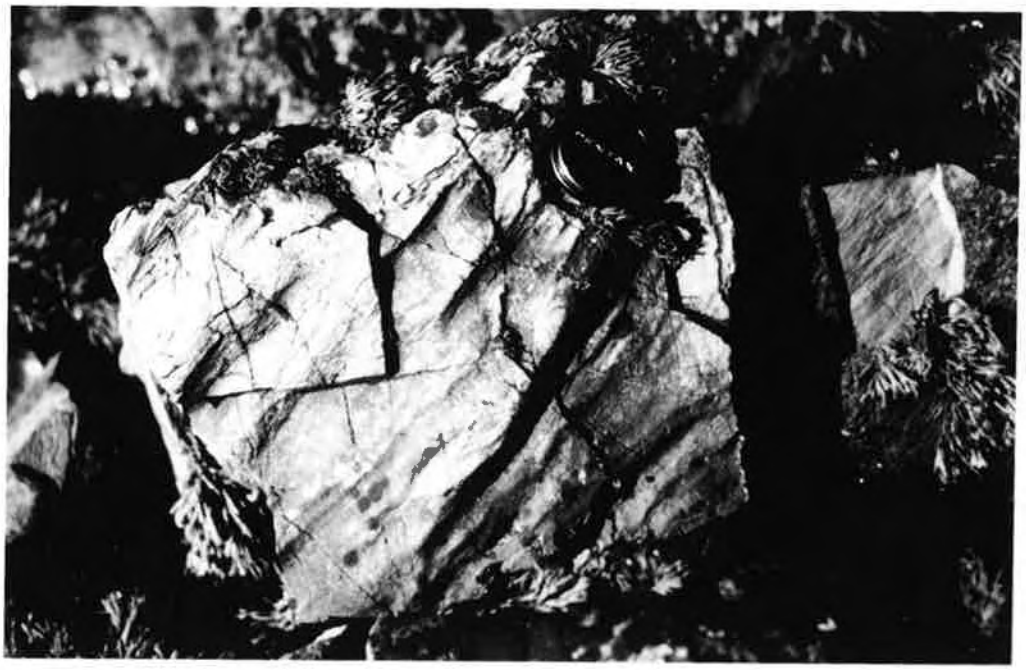


Fig. 6.28. Tectonically modified current ripples. Member J at the coast NW of Balsnes. Lens cap is 6 cm in diameter. See text for discussion.

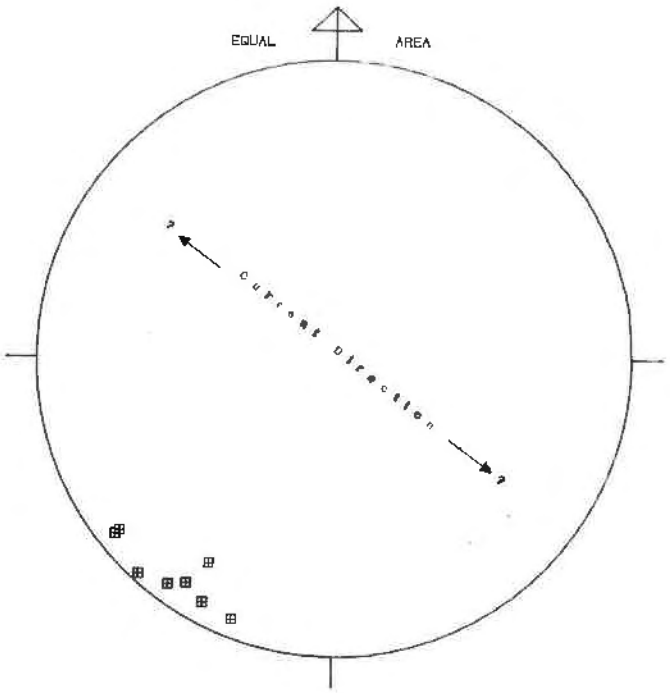


Fig. 6.29. Direction of ridges of tectonically modified current ripples. Current direction has been at approximately 90 degrees to the ridges. Member J northwest of Balsnes. See text for discussion.

Fig. 6.30. Small scale, syn-sedimentary, listric, normal faults with downthrow to the east. Traced eastwards (left), the extensional faulting is compensated by compressional convolution. Member J northwest of Balsnes. Pencil is 8 cm long.

Fig. 6.31. A convoluted horizon which can be traced about 10 m laterally. All folds are overturned to the west, probably as a result of later compaction/deformation. Member J northwest of Ålsnes. Lens cap for scale is 6 cm in diameter.

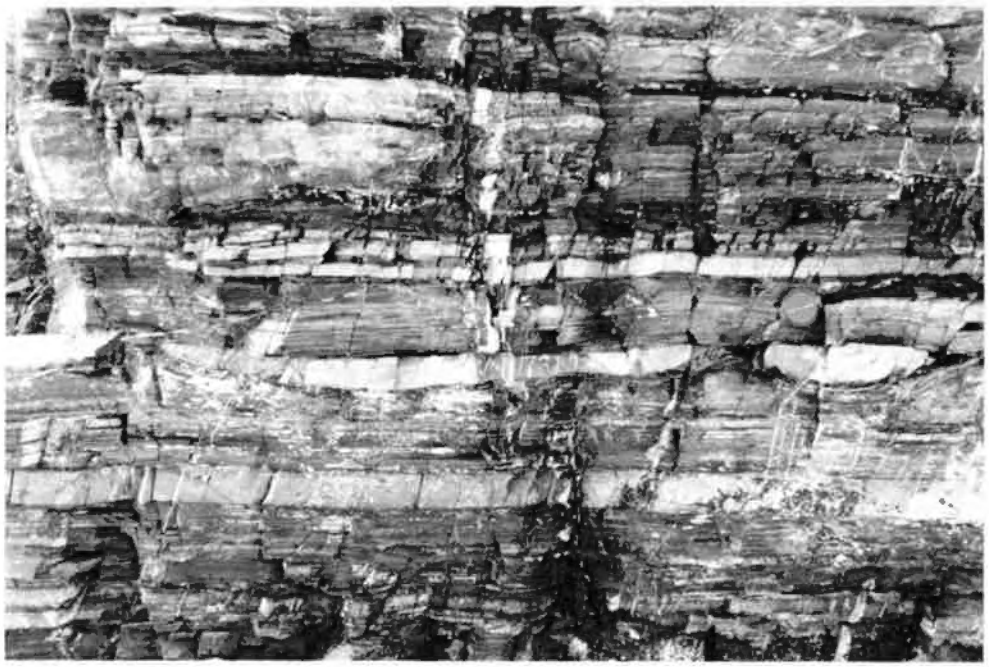


Fig. 6.32. Small mud diapirs "boudinaging" a sandstone layer. Member J northwest of Ålsnes. Height of photograph is about 1 m.

Fig. 6.33. Floodplain sediments of Member K at Balsnes. Note flame structures, predominance of horizontal lamination in the mud layers and sharp, erosive based crevasse splays with mud clasts. Lens cap is 6 cm in diameter.

Fig. 6.34. An at least 2 m deep channel (right-hand corner) is overlain by overbank mudstones, which, again, have been eroded by the next channel (top). Height of cliff is about 5 m. Member K on an island west of Balsnes.

Fig. 6.35. An at least 11 m deep channel which has cut into overbank mudstones (right). The channel margin dips approximately 45 degrees to the northeast (left), but the dip is reduced downwards. Member K southwest of Balsnes. Hammer shaft is 35 cm long.

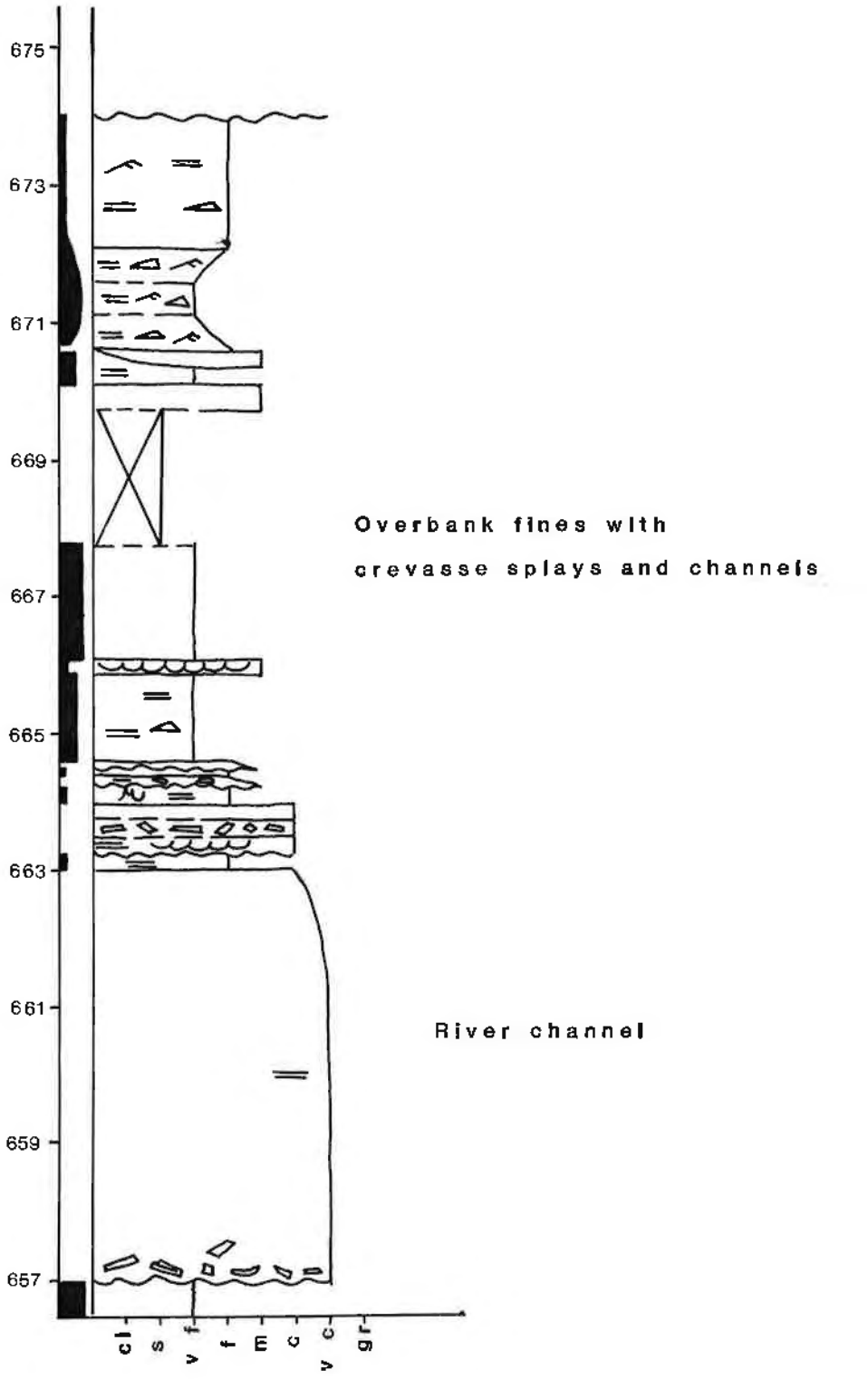


Fig. 6.36. Log through a point bar sequence in Member K. Southwest of Balsnes.

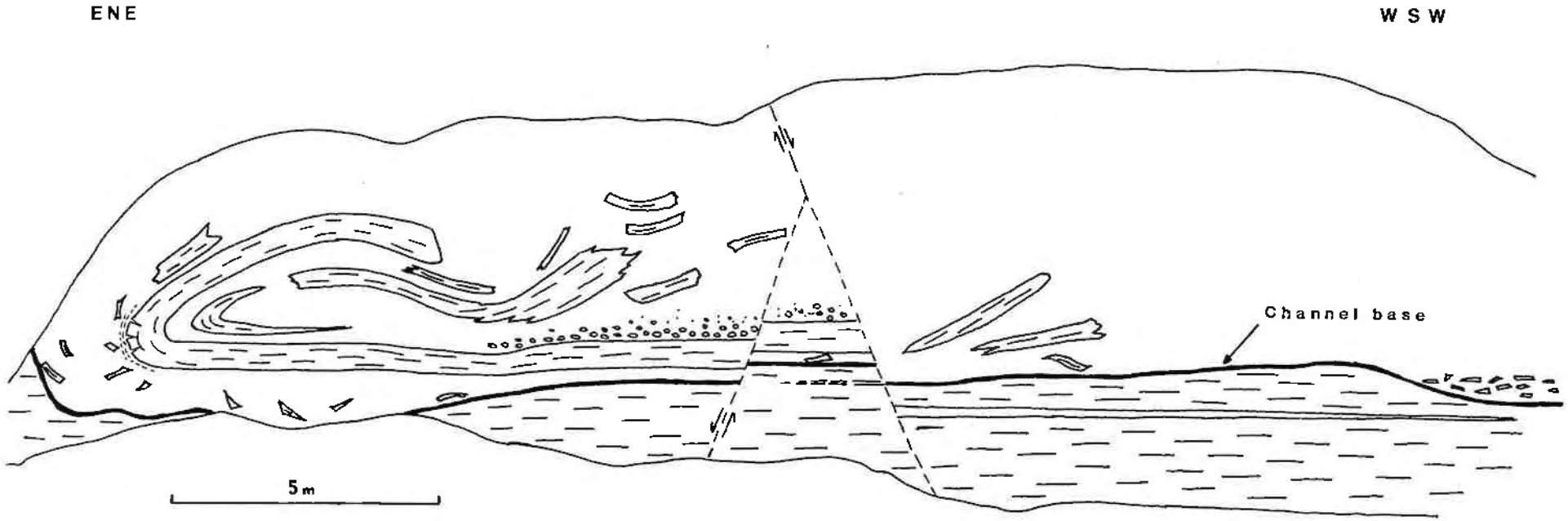


Fig. 6.37. Slump within a channel. The channel base represents the boundary between Members J (below) and K (above). The view is approximately parallel to bedding (072^{0}/40S) towards the SSE. Stippled: mudstone. Blank: conglomeratic sandstone. No vertical exaggeration. Coast northwest of Balsnes.

Fig. 6.38. Intraformational mudclast conglomerate above the base of the channel in Fig. 6.37 (western part of outcrop). Vertical height of photograph is approximately 1 m.

Fig. 6.39. Massive and horizontal bedded sandstone beds within conglomerates of the Balsnes Formation. Weakly developed imbrication indicates palaeocurrents towards the left. Roadcut north of Bekkviktjern. Hammer shaft is 35 cm long.

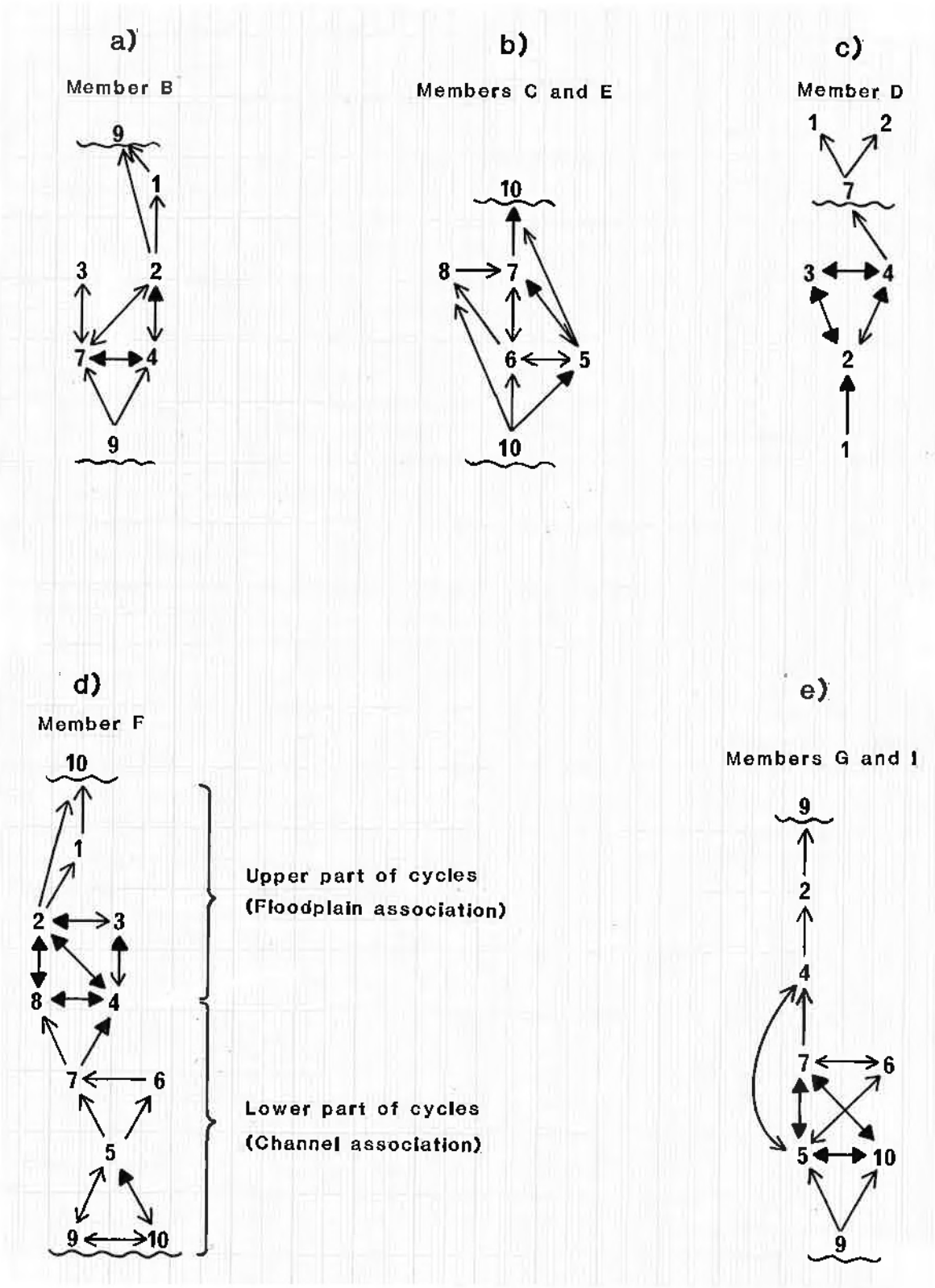


Fig. 6.40. Facies Relationship Diagrams for upwards transitions within different members. Open arrow heads indicate common transitions, filled arrow heads indicate very common transitions. Major erosion surfaces are indicated by undulating lines.

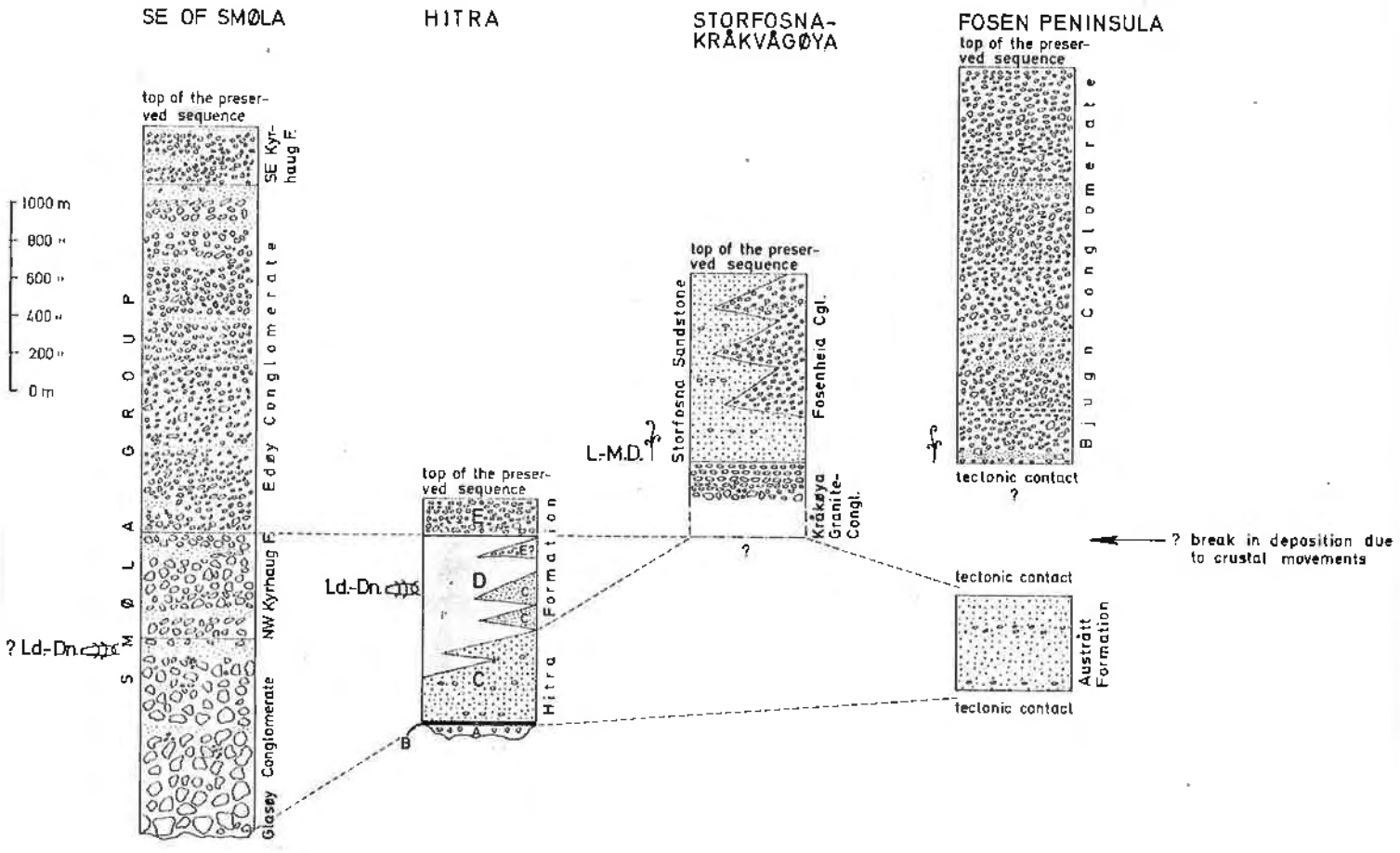


Fig. 7.1. Correlation of the O.R.S. deposits in the Outer Trøndelag Region (Siedlecka, 1975). For revised names in the Hitra Group, see Table 4.1.

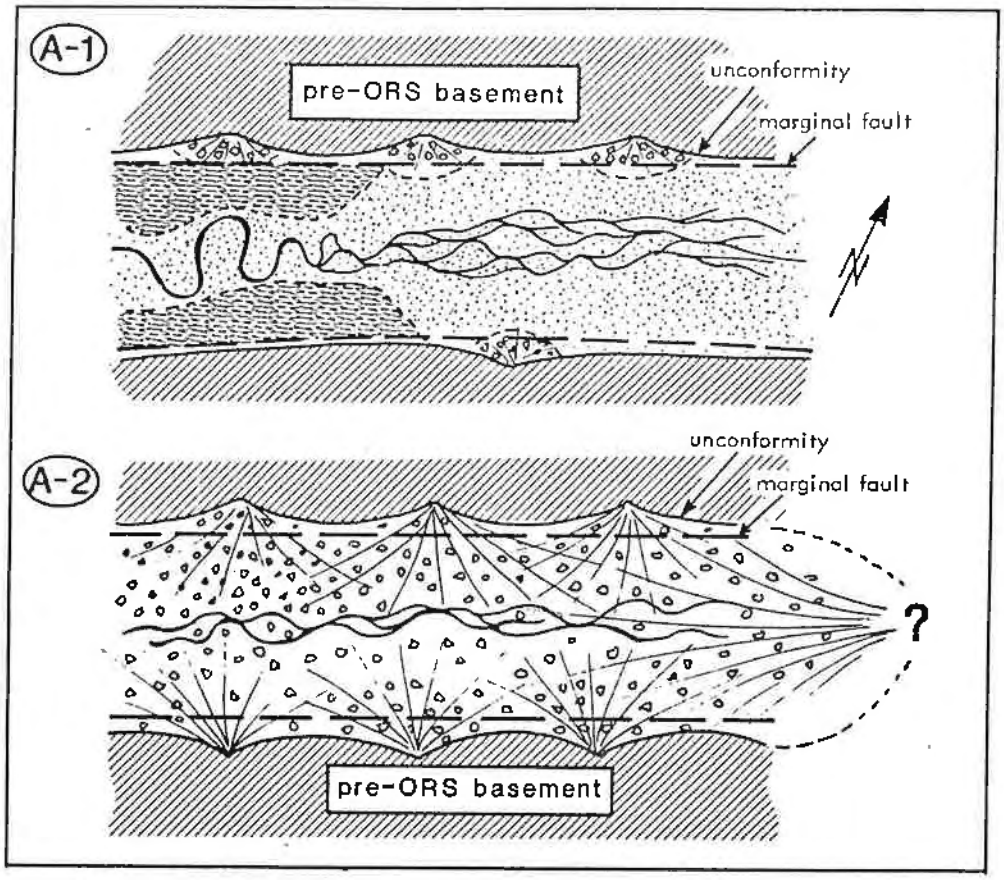
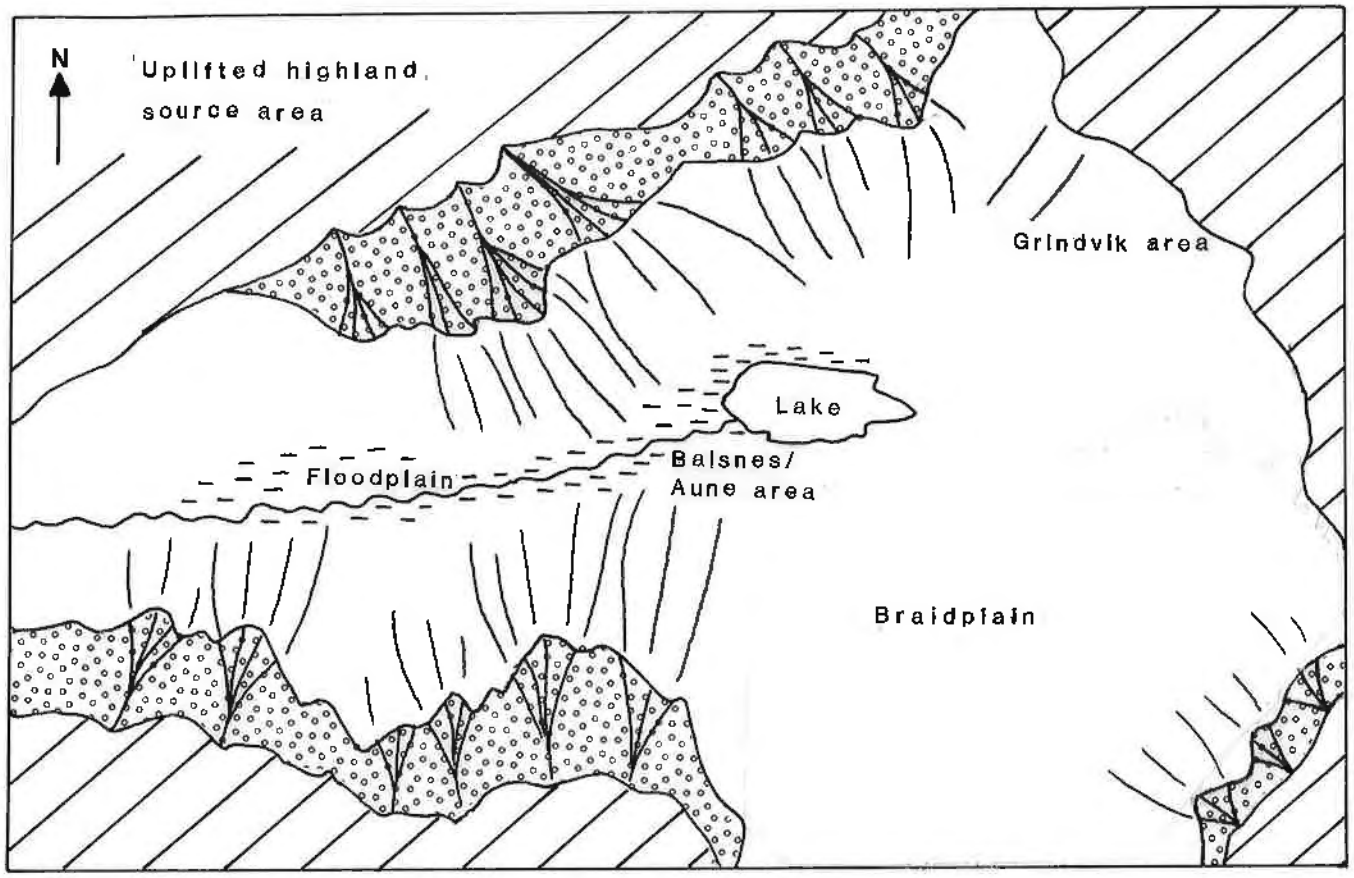
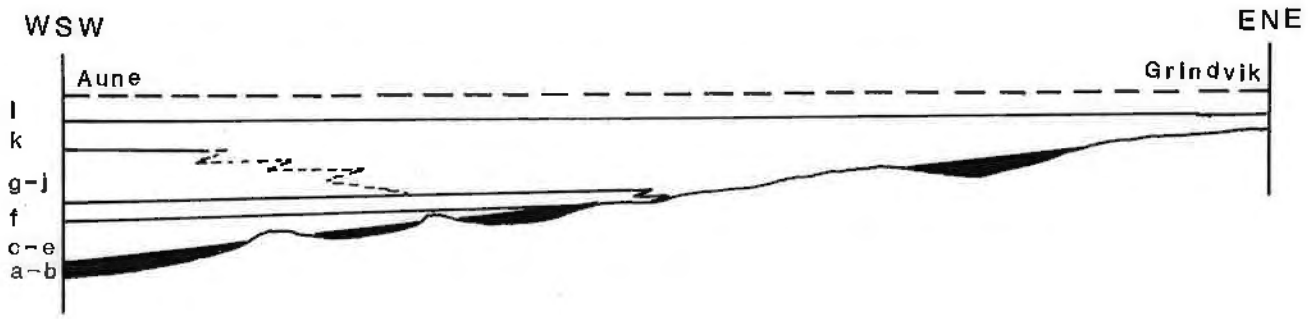


Fig. 7.2. Palaeogeography as reconstructed by Steel, Roberts and Siedlecka (1985). A-1: Prior to deposition of the Balsnes Formation. A-2: During deposition of the Balsnes Formation.



a)



b)

Fig. 7.3 a) Suggested palaeogeography during deposition of Member F (Vollan Formation). See text for discussion.

b) Length profile from Aunåa to Grindvik showing eastwards onlapping and interfingering relationship between the members of the Vollan Formation. Note also eastwards thinning of Vollan Formation. Vertical exaggeration is approximately x6.5.

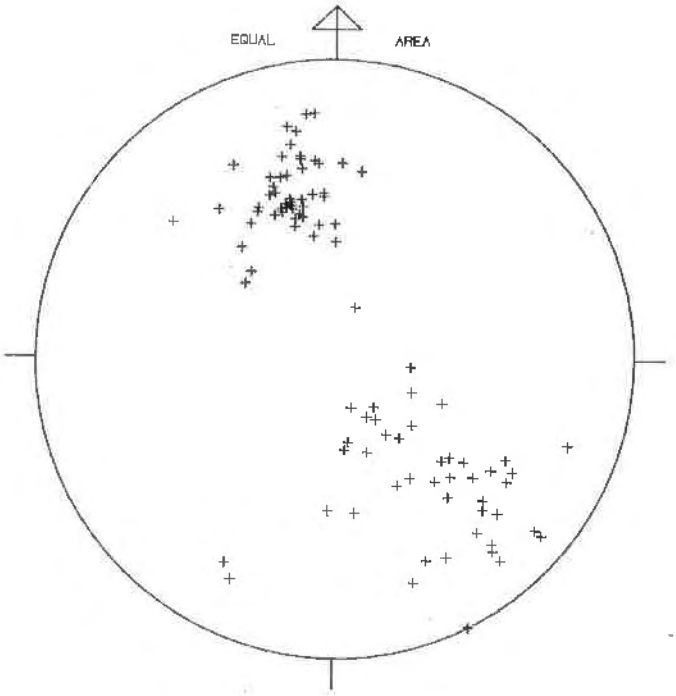


Fig. 8.1. Poles to bedding planes in the area from Aunåa to Langnes. The plot gives an almost horizontal axes.

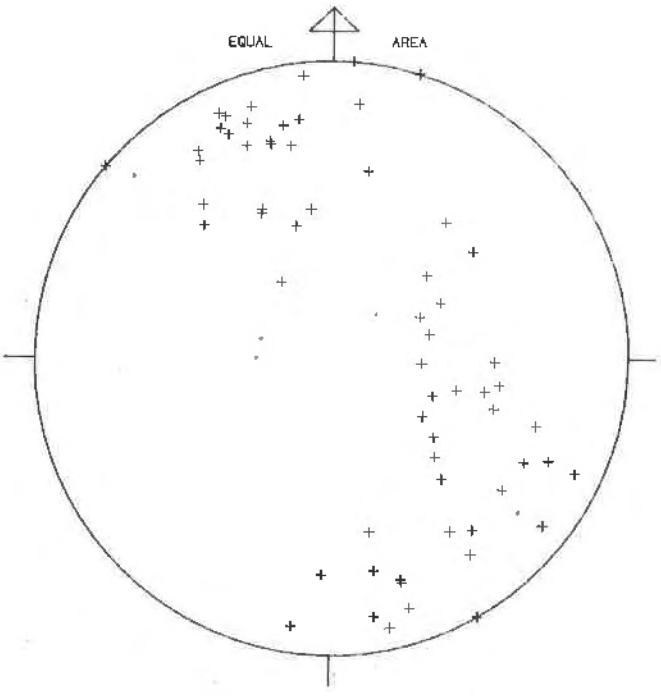


Fig. 8.2. Poles to bedding planes in the Akset area. The plot gives an axes which plunges about 35 degrees to the WSW.

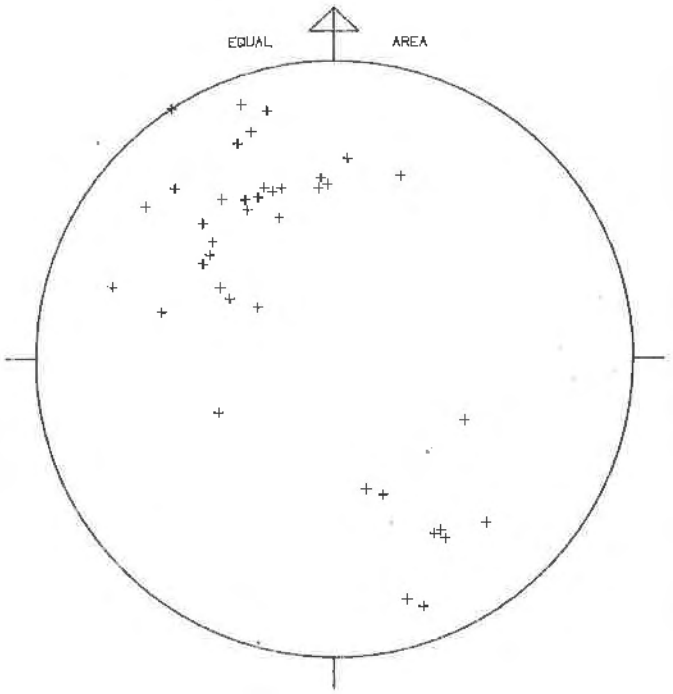


Fig. 8.3. Poles to bedding planes in the area from Sandstad to Litlvatnet. The plot gives an axes plunging gently to the NE.

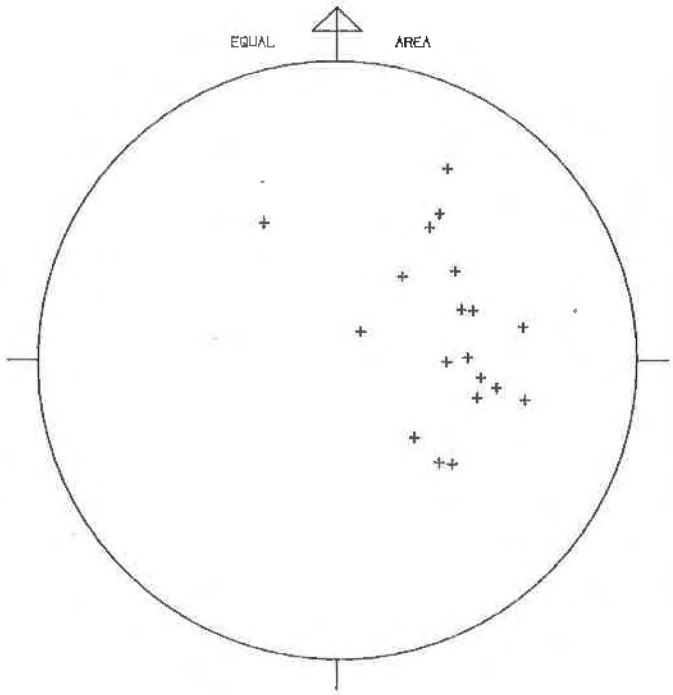


Fig. 8.4. Poles to bedding planes in the easternmost part of the area. The plot gives an axes plunging about 30 degrees to the WSW.

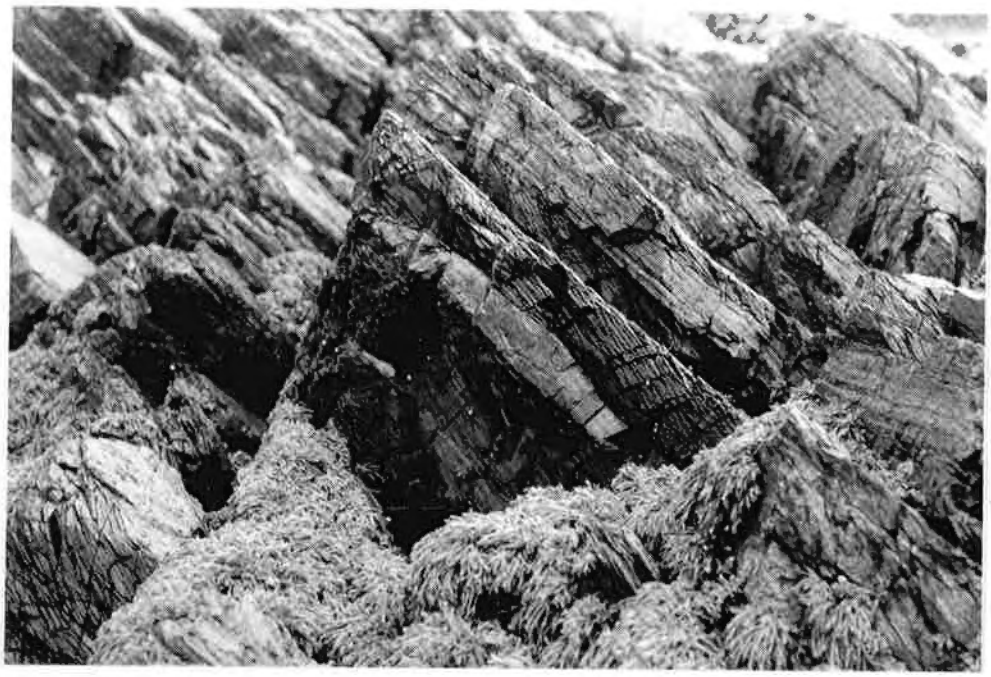


Fig. 8.5. Cleavage development in Member F southeast of Furuholmen. Height of photograph is 1 m.

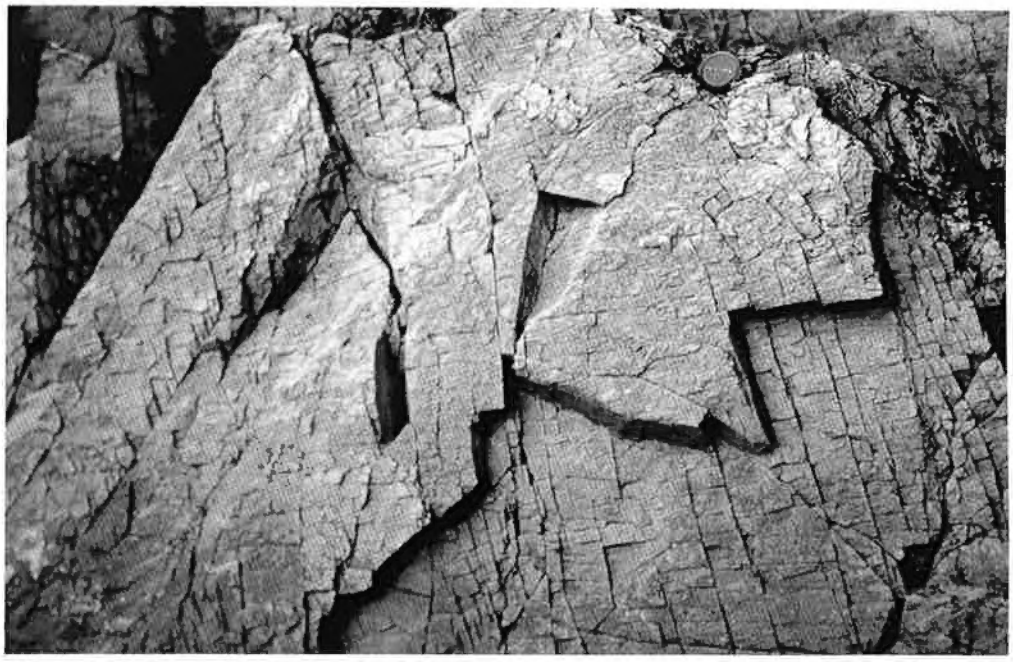


Fig. 8.6. Cleavage trending ENE-WSW (left to right)on a bedding plane surface. Joints trend NNW-SSE. Member F southeast of Furuholmen. Lens cap for scale is 6 cm in diameter.

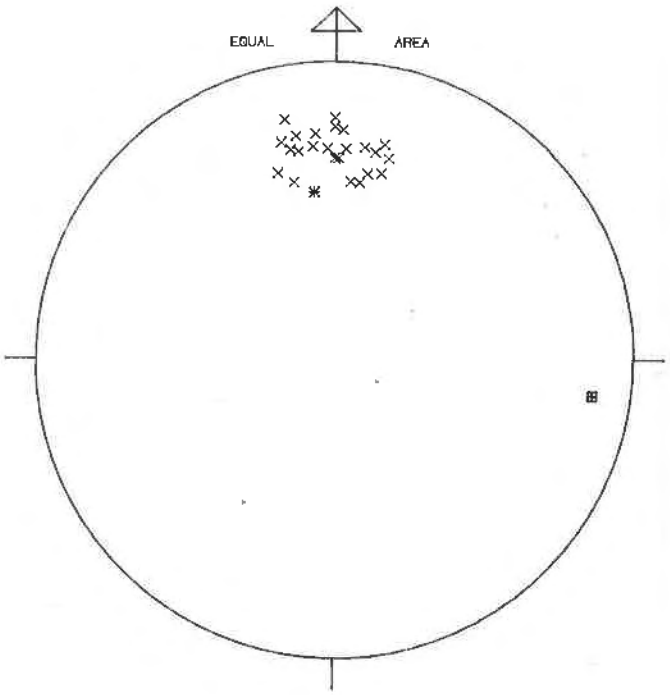


Fig. 8.7. Bedding cleavage intersection lineation (square with plus) constructed from the average of cleavages (crosses) and the bedding (asterix). The lineation trends $098^{0}/14$, and gives the average orientation of the fold axes in the area. Member F southeast of Furuholmen.

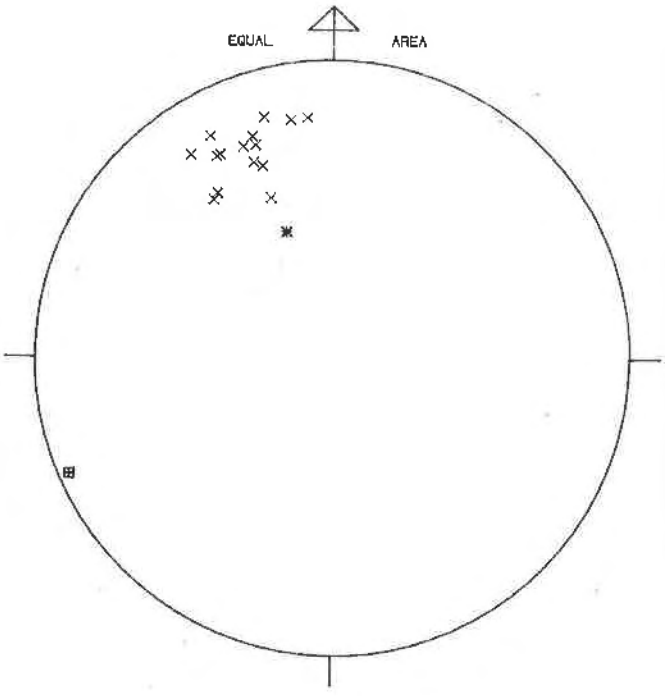


Fig. 8.8. Bedding cleavage intersection lineation (square with plus) constructed from the average of cleavages (crosses) and the bedding (asterix). The lineation trends $246^{0}/04$. Member D on Furuholmen.

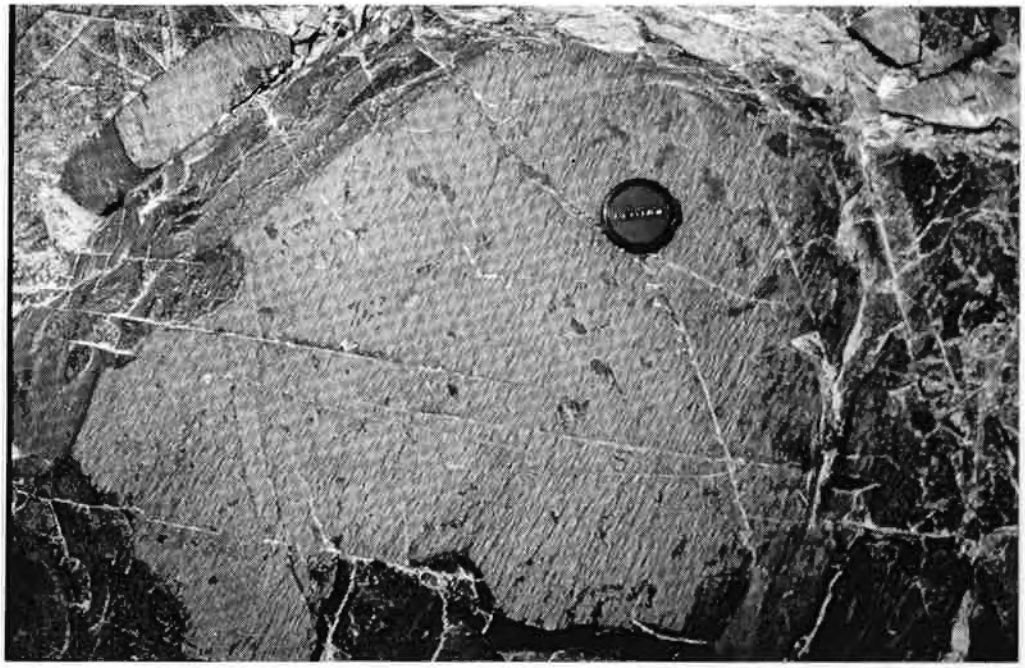


Fig. 8.9. Bedding cleavage intersection lineation (NNE-WSW on photograph) in Member J east of Vollan. Lens cap is 6 cm in diameter.

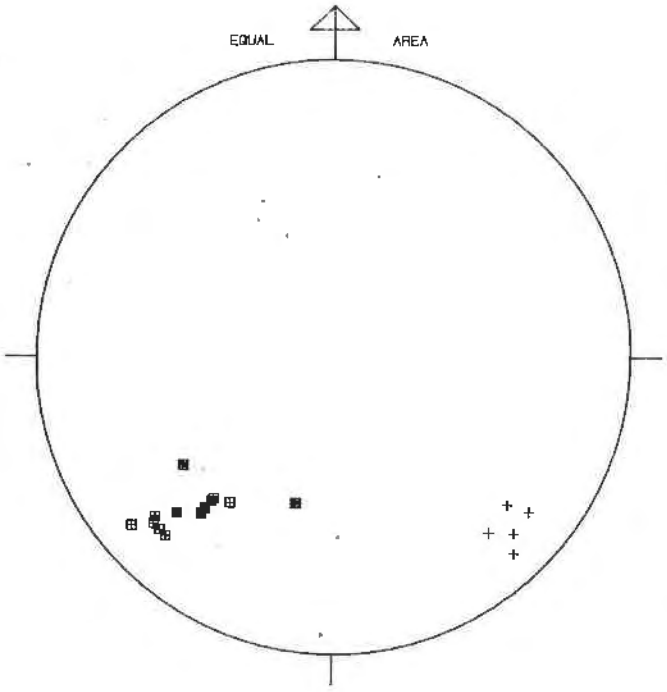


Fig. 8.10. Measured bedding cleavage intersection lineation (squares with plus) and fold axes (squares with asterix) give an average fold axes direction of $230^{0}/30$. Poles to D2-kink bands are denoted by a plus. Member J northwest of Balsnes.

Fig. 8.11. Spaced slaty cleavage trending sub-parallel to axial planes of parasitic folds (top to bottom of photograph). Selnes. Hammer shaft is 35 cm long.

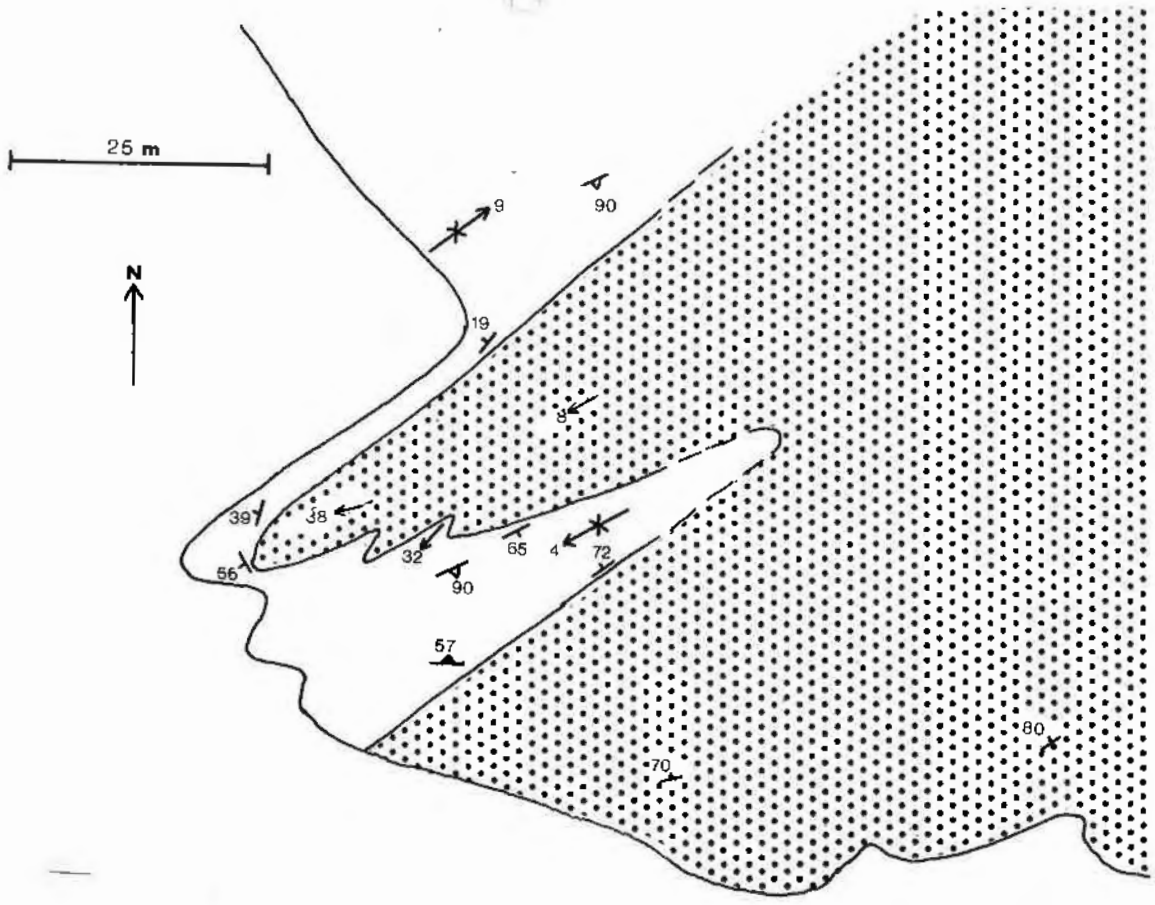


Fig. 8.12. The structural pattern at Selnes. Dots: sandstone and conglomerate. Undifferentiated: mudstone. Symbols as for Plate 1A.

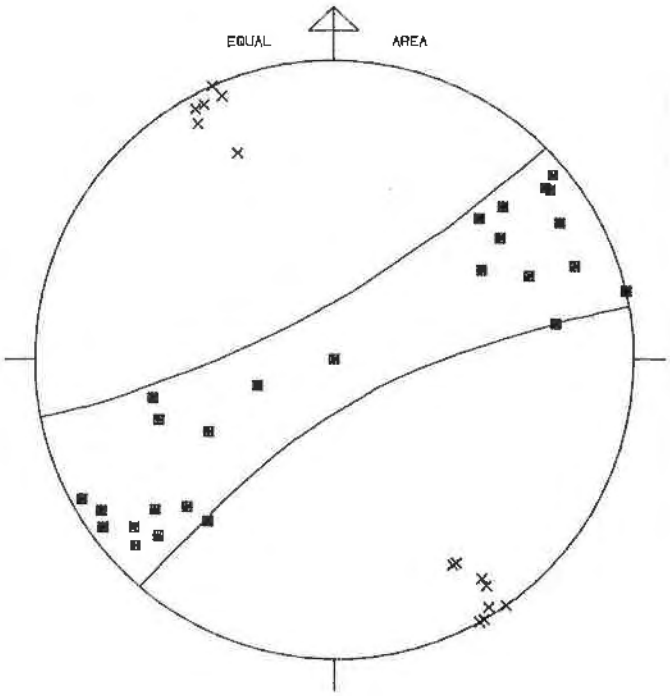


Fig. 8.13. Fold axes (squares with asterix) and poles to axial planes (crosses) at Selnes. Spaced slaty cleavage has approximately the same orientation as the axial planes. All fold axes on Selnes fall within the girdle outlined by the two small circles.

Fig. 8.14. Noncylindrical fold. When traced along the axial surface, the plunge of the axes changes gradually. Southern second order syncline on Selnes. Pencil is 10 cm long.

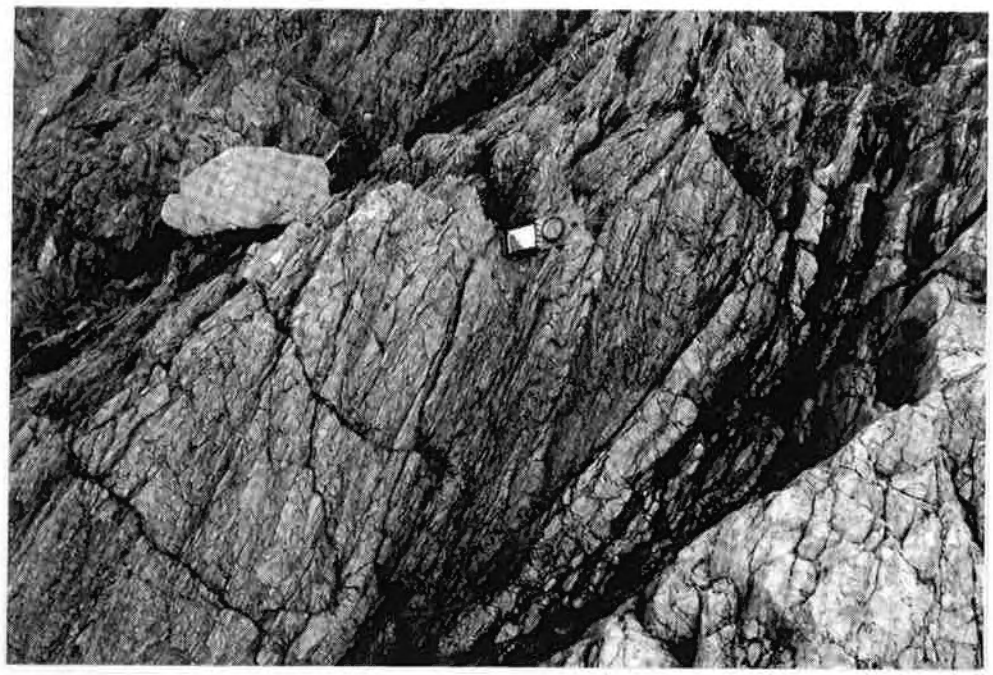


Fig. 8.15. D1-kink bands on the southern limb of the southernmost second order syncline on Selnes. Folds climb towards the anticline to the right (south). Note spaced slaty cleavage sub-parallel to the long limbs of the kink folds. Compass is 10 cm long.

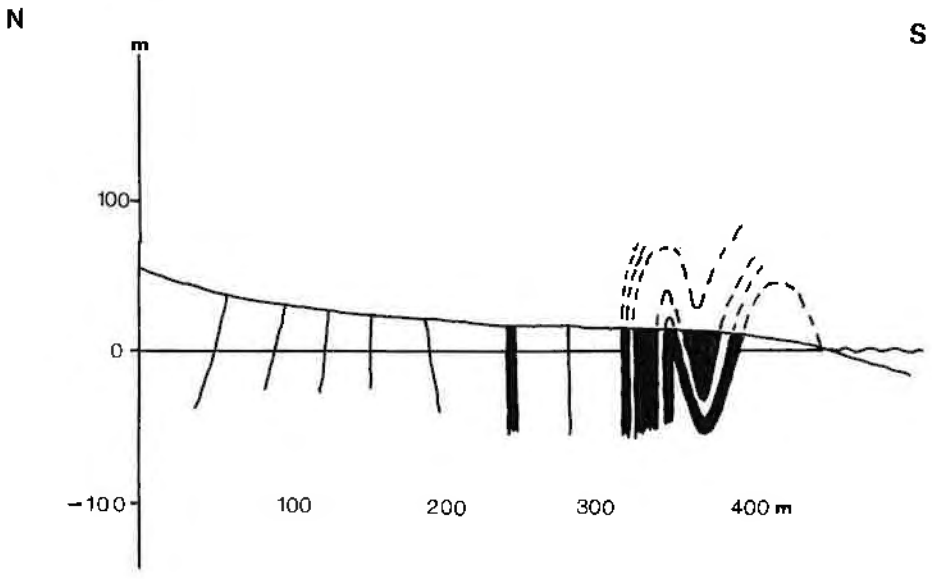


Fig. 8.16. The structural pattern at Hamnavollen. See also Plates 1A, 1B, 2A and 2B.

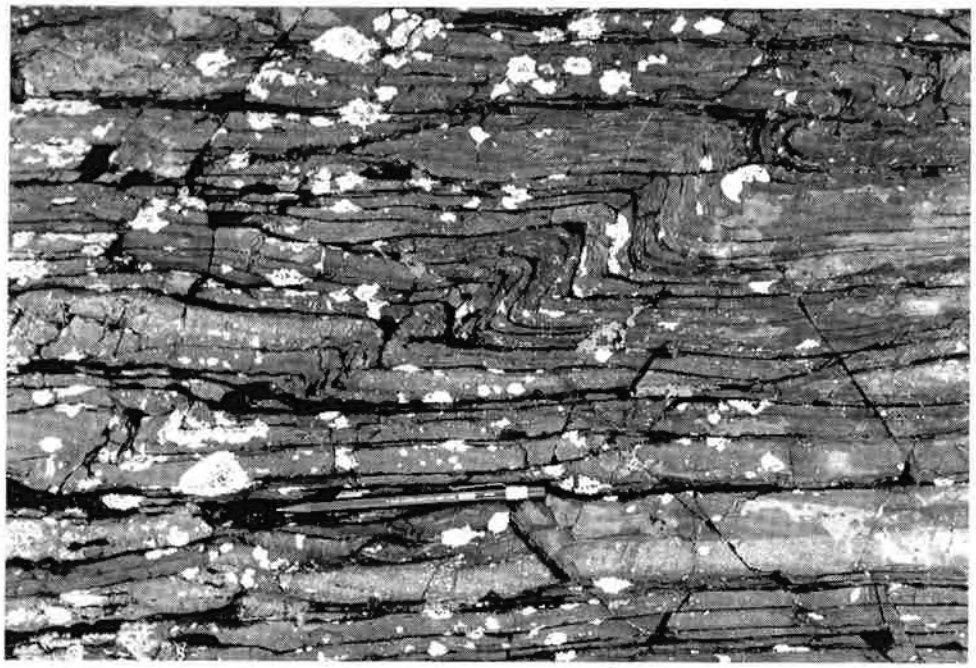


Fig. 8.17. D1-kink band at Hamnavollen. Pencil for scale is 14 cm long.

Fig. 8.18. Fold at Hamnavollen showing Z-, M- and S-folds within the larger third order fold. Pencil is 14 cm long.

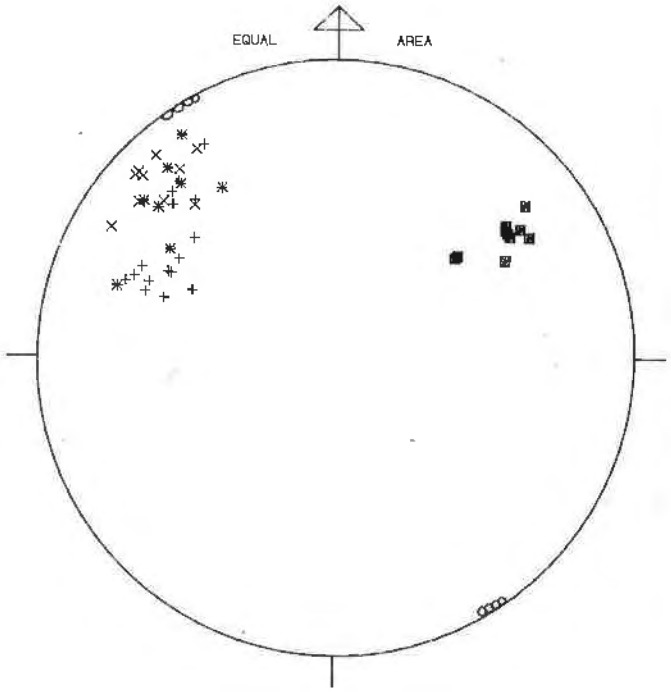


Fig. 8.19. The structural pattern at Hamnavollen. Squares with asterix: fold axes, Circles: poles to slaty cleavage, Plus: poles to kink bands, Asterix: Axial planes to kink folds, Crosses: crenulation cleavage. See text for discussion.

Fig. 8.20. Conjugate fold with fold axes sub-parallel to the axes of the larger fold, plunging steeply to the right (ESE). Western Havnøy. Hammer shaft is 35 cm long.

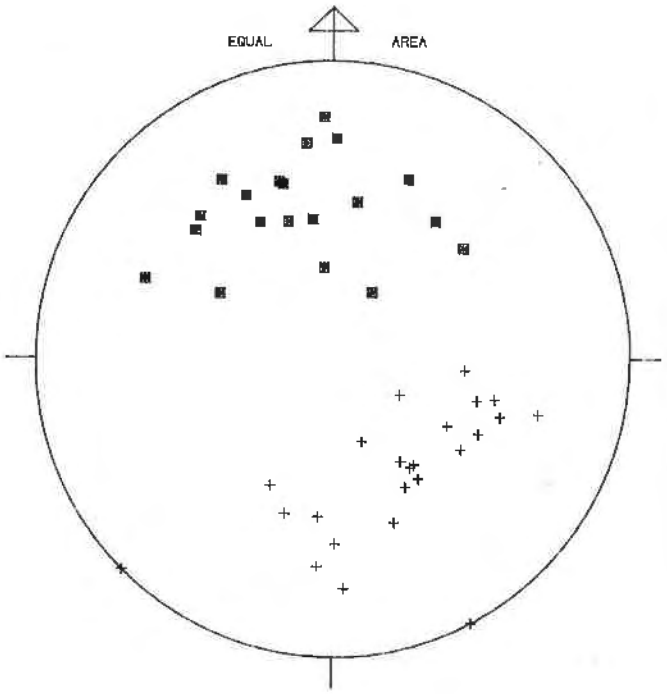


Fig. 8.21. Fold axes (squares with asterix) and poles to axial planes (plusses) at eastern Havnøy. Note the wide spread of measurements.

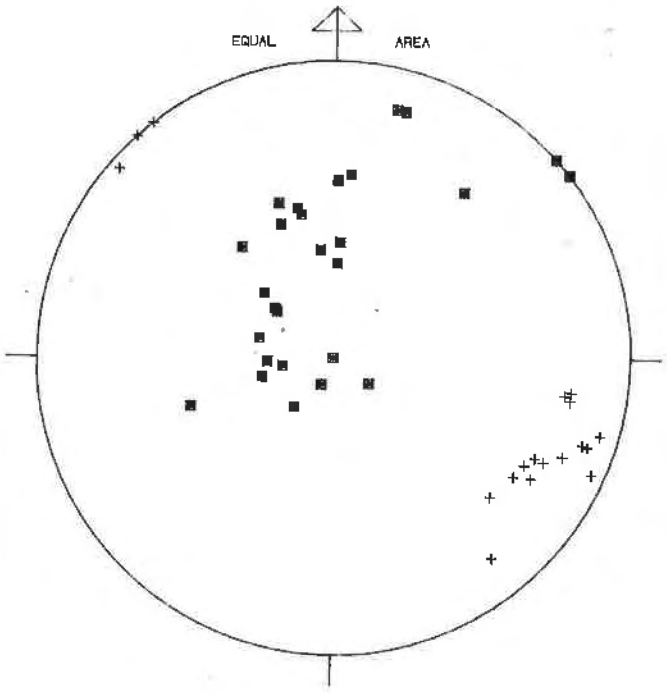


Fig. 8.22. Fold axes (squares with asterix) and poles to axial planes (plusses) at the promontory northeast of Bekkvikholmen. Note the wide spread of measurements.

Fig. 8.23. Microfolds with an axial planar cleavage trending from top to bottom on photograph. Member B, promontory north of Bekkvikholmen. 63x, plane polarized light.

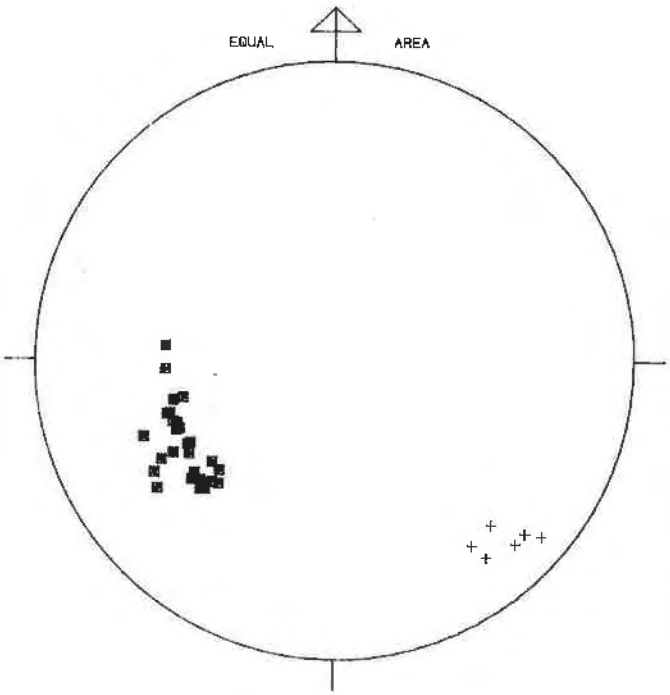


Fig. 8.24. Fold axes orientation (squares with asterix) and poles to kink bands (plusses) at Hamn.

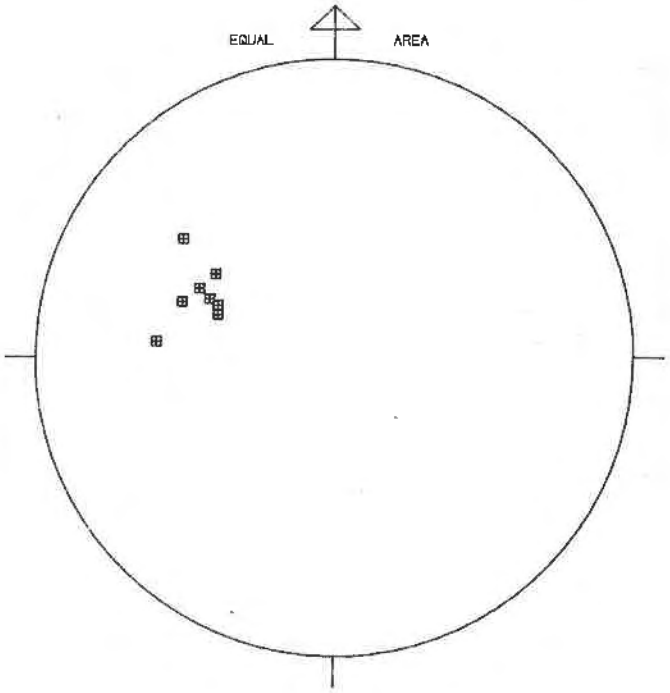


Fig. 8.25. Cleavage bedding intersection lineation at Akset.

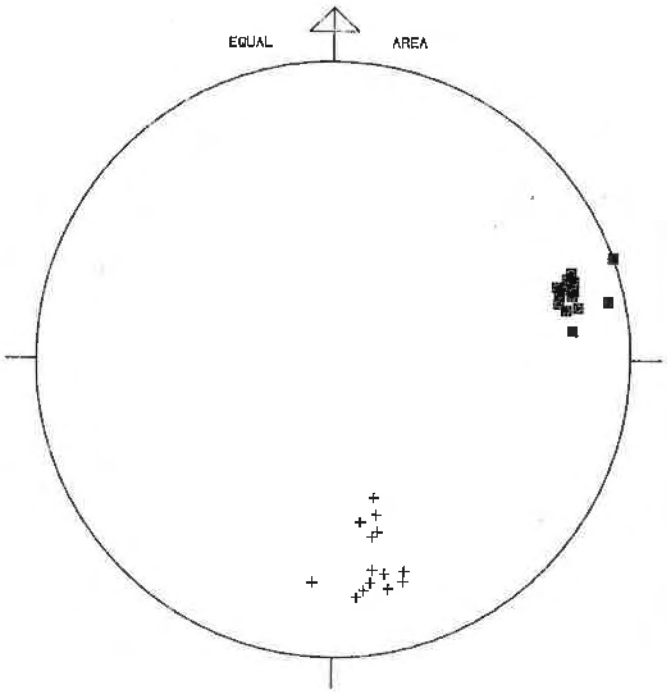


Fig. 8.26. Fold axes orientation (squares with asterix) and poles to axial planes (plusses) at the southern side of Balsneslangvann.

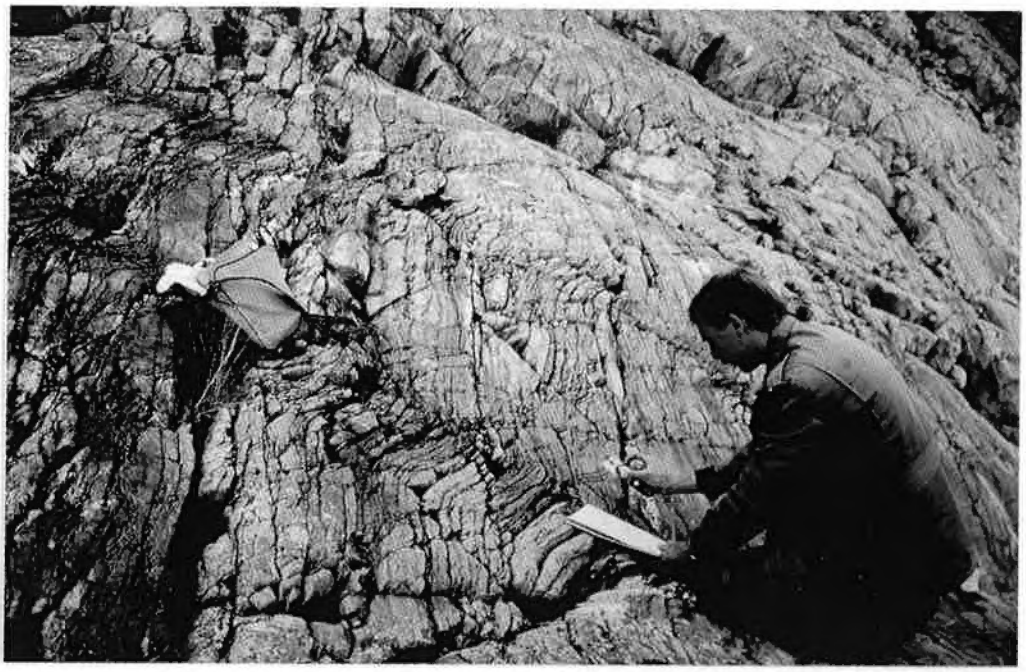


Fig. 8.27. D2-kink bands on the coast north of Steinbitholmen.

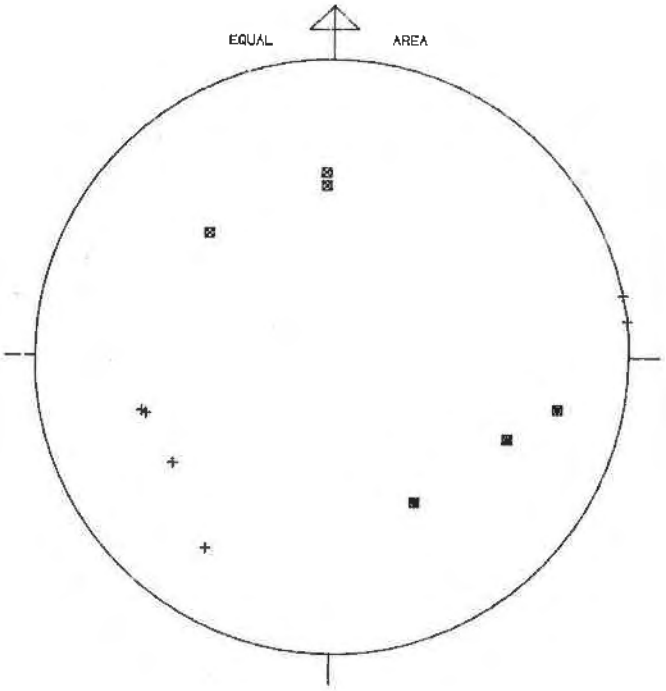


Fig. 8.28. Axes of D2-kink band folds at Furuholmen (squares with asterix) and at the coast north of Steinbitholmen (squares with cross). Poles to kink bands are denoted by a plus.

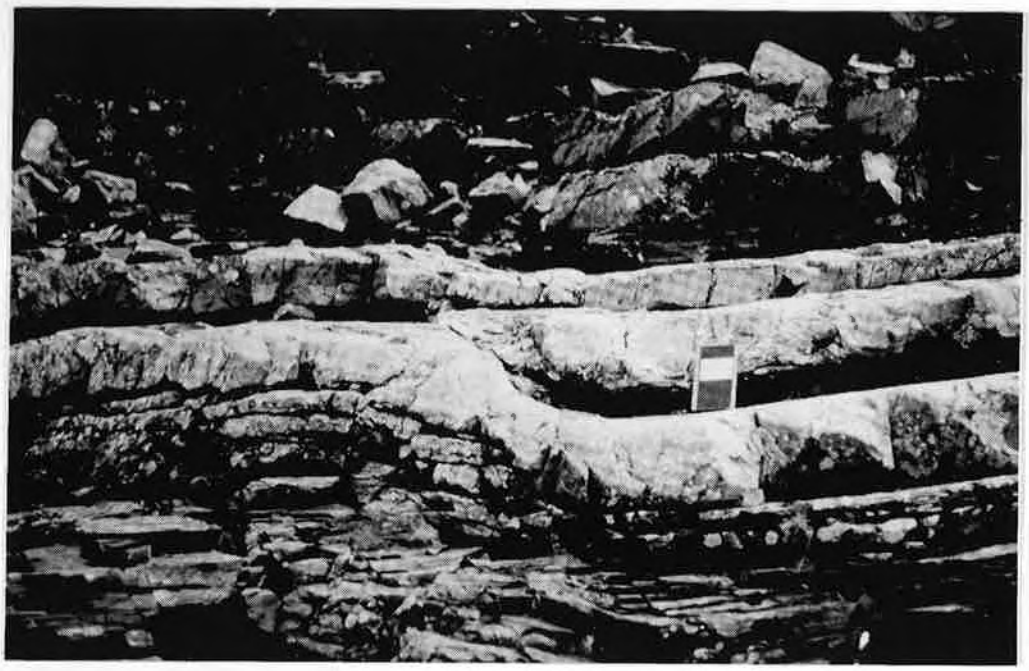


Fig. 8.29. Monoclines with consistent westerly downstep. Member J northwest of Balsnes. Note book for scale is 18 cm long.

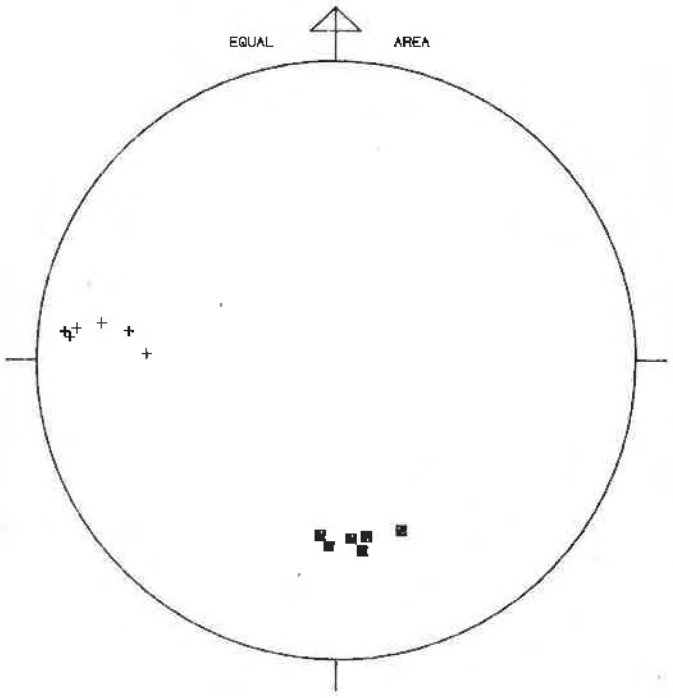


Fig. 8.30. Orientation of monoclinal fold axes (squares with asterix) and axial planes of the monoclines (plusses). Member J northwest of Balsnes.

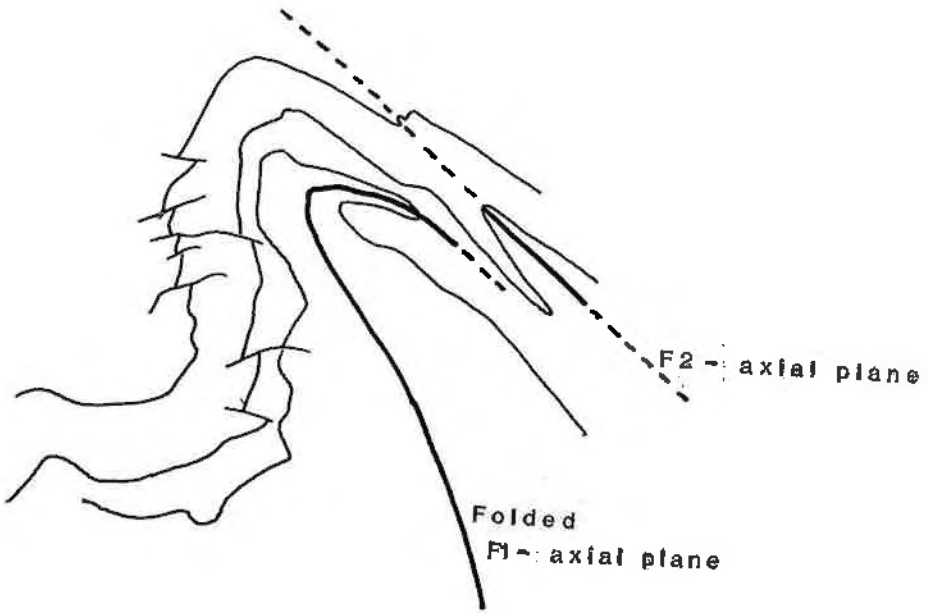


Fig. 8.31. Refolded fold at Selnes. Pencil is 10 cm long. See text for discussion.

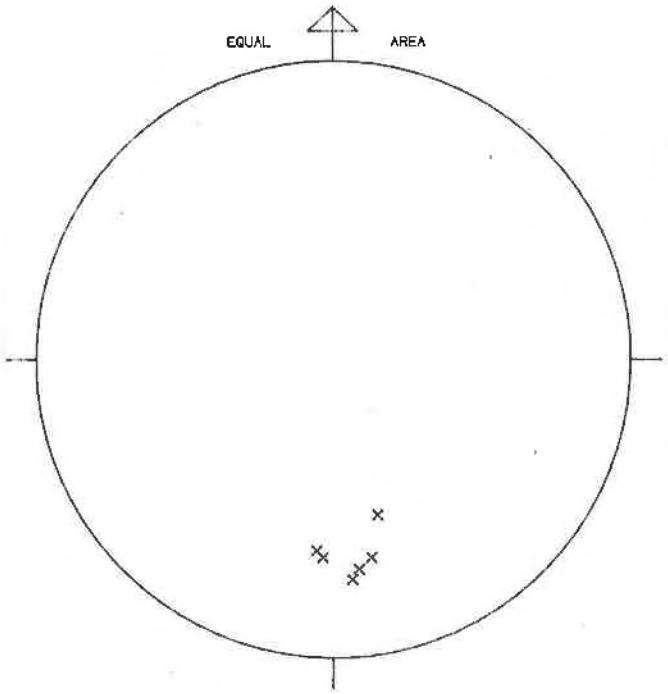


Fig. 8.32. Orientation of poles to crenulation cleavage planes at Selnes.

Fig. 8.33. A new crenulation cleavage (trending NW-SE on photograph) has affected the earlier S1 axial planar cleavage (E-W on photograph). Selnes. 63x, plane polarized light.

Fig. 8.34. Crenulation (E-W on photograph) of the older S1 axial planar cleavage (NE-SW on photograph). Selnes. 200x, plane polarized light. See also Fig. 9.5.

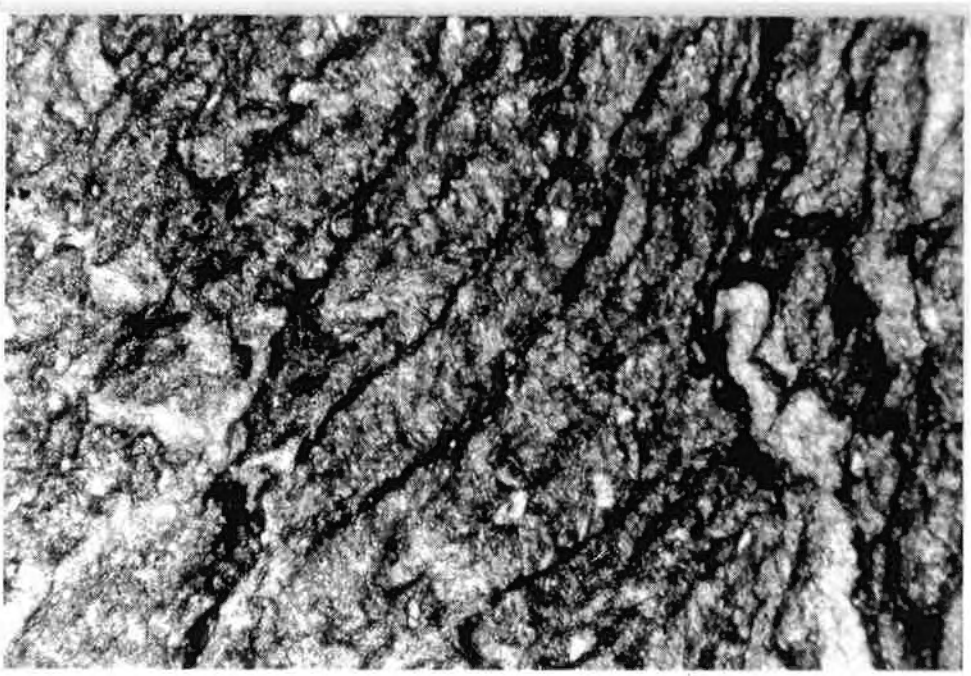


Fig. 8.35. An old cleavage (trending NNW-SSE on photograph) has been crenulated. The new cleavage trends NE-SW on photograph. Note refolding of the limb of an earlier fold (right), the new cleavage being axial planar to these folds. Selnes. 63x, plane polarized light.

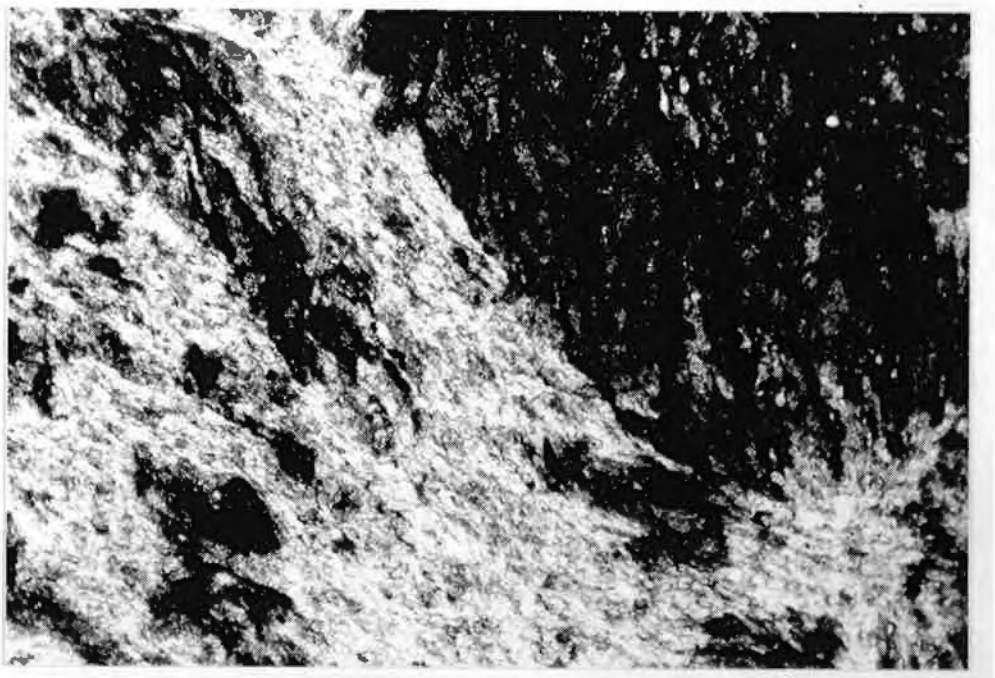


Fig. 8.36. Brecciated mudstone in the centre of a syncline at Hamnavollen. A new cleavage (NW-SE on photograph) is represented by a preferred orientation of the long axes of calcite grains. S1 trends N-S on photograph. 63x, x-nicols.

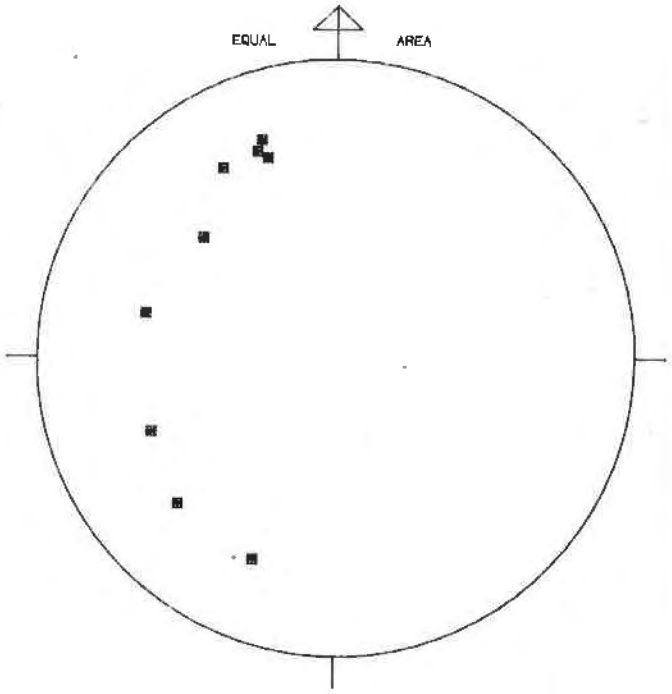


Fig. 8.37. Fold axes constructed from strike and dip of bedding in the easternmost part of the area. The strike of fold axes varies from 203 degrees to 342 degrees, plunges varies from 20 degrees to 35 degrees. Note the distribution along a great circle.

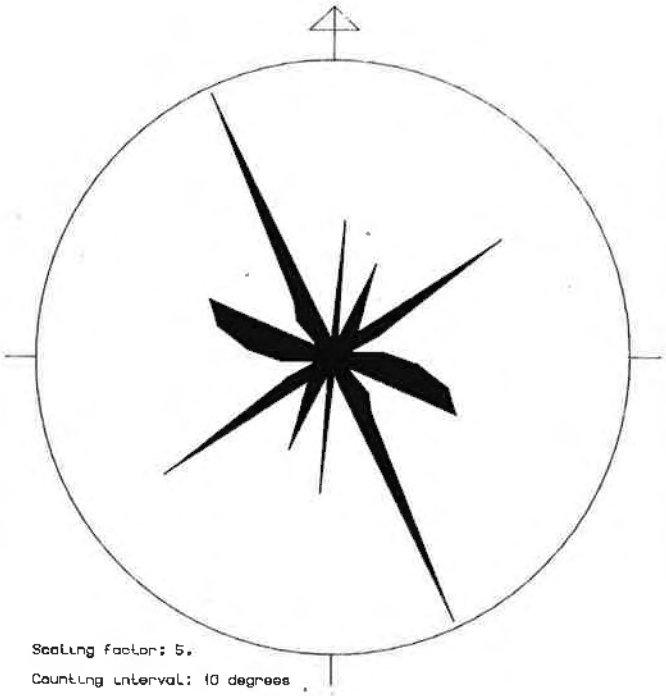


Fig. 8.38. Diagram showing the orientation of major, sub-vertical faults in the Hitra Group. Number of measurements: 86.

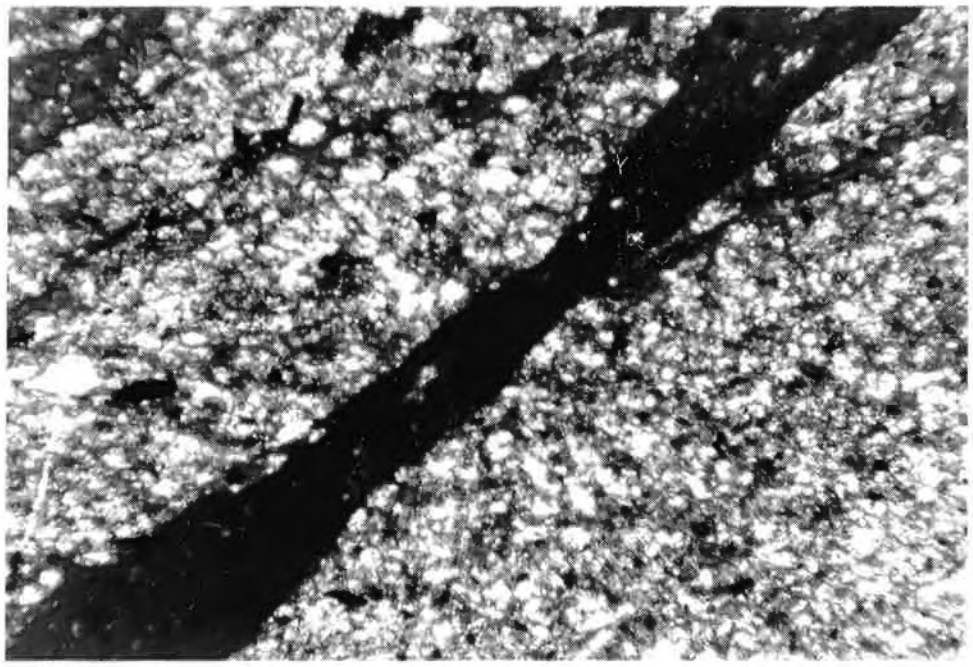


Fig. 8.39. Siltstone with pseudotachylitic vein 5 cm below the bedding-parallel, reverse fault west of Litlvann. 63x, x-nicols.

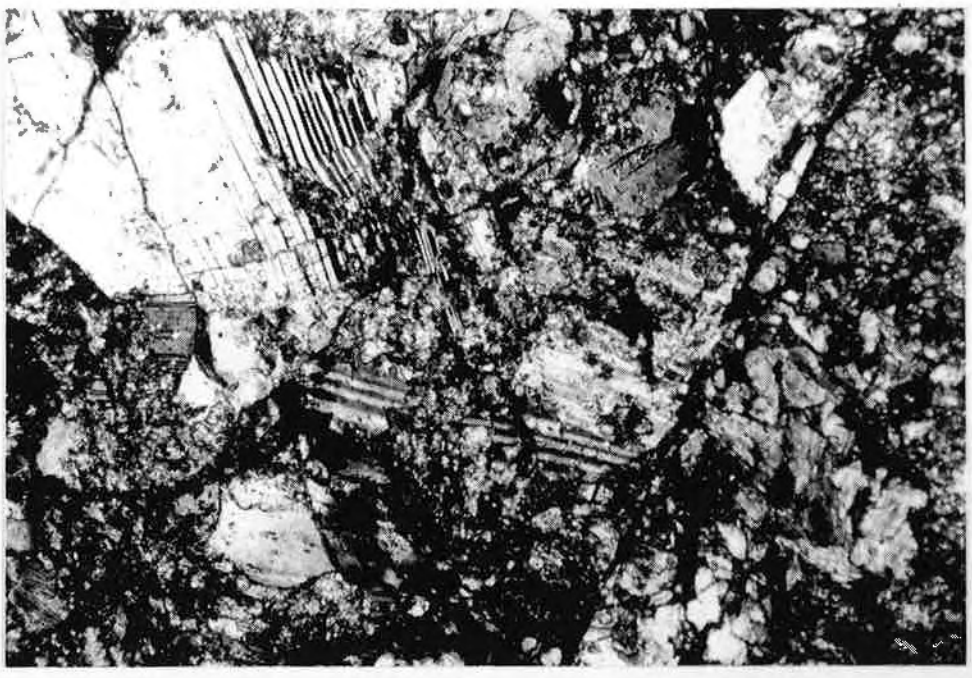


Fig. 8.40. Brecciated diorite 5 cm above the bedding-parallel, reverse fault west of Litlvann. 63x, x-nicols.

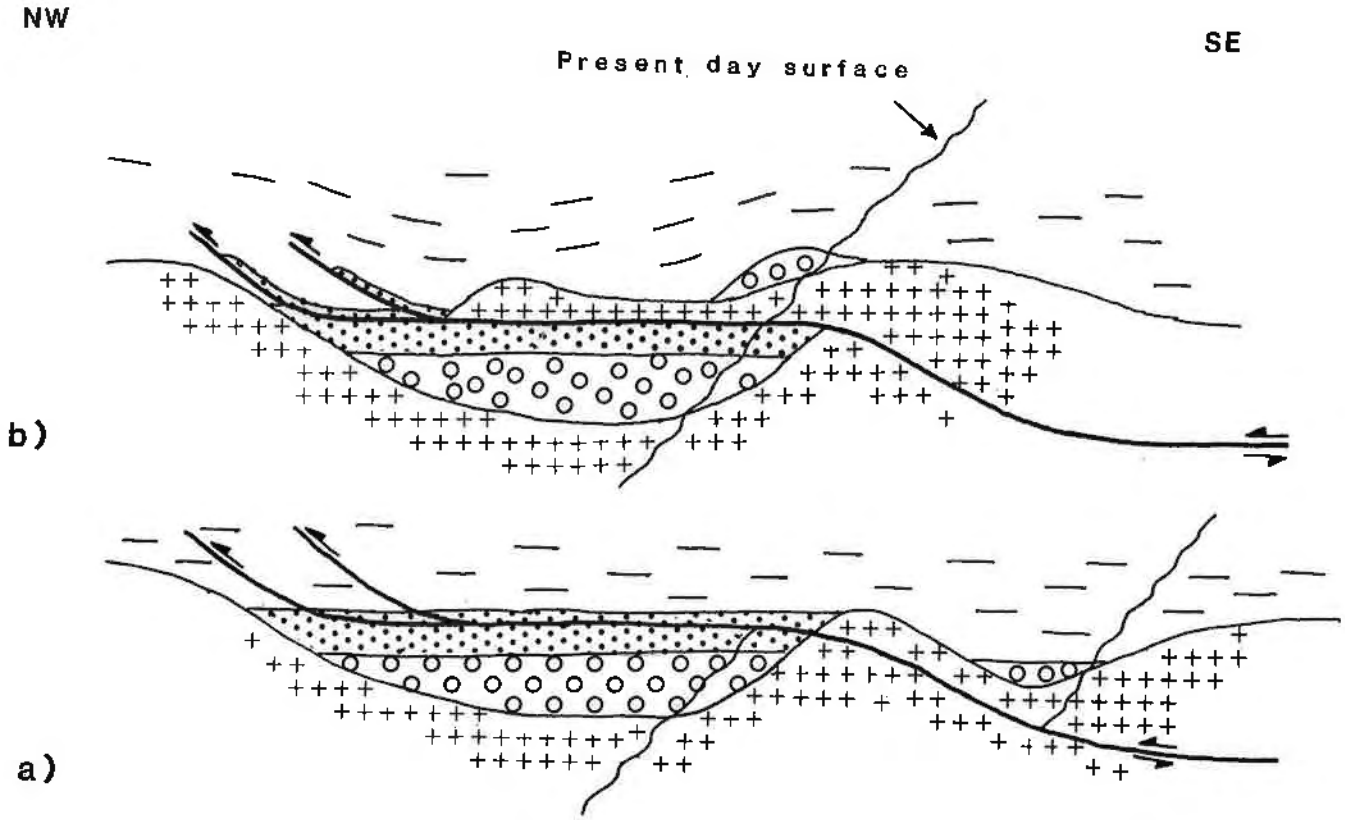


Fig. 8.41. Possible thrust-related origin of the basement wedge SW of Litlvann. a) Pre-thrusting relationship. b) Post-thrusting pre-folding relationship. Crosses: basement, circles: Member A, dots: Member B, stippled: Vollan formation. Not to scale.

Fig. 8.42. Fault breccia in the 10 m wide shear zone in Grindvik. Diorite fragments are embedded in red siltstone and sandstone. The sedimentary rocks have behaved in a more plastic way during shearing. Height of photograph is 1 m.

Fig. 8.43. Small horst produced by normal faulting. Member J northwest of Balsnes. Note book for scale is 18 cm long.

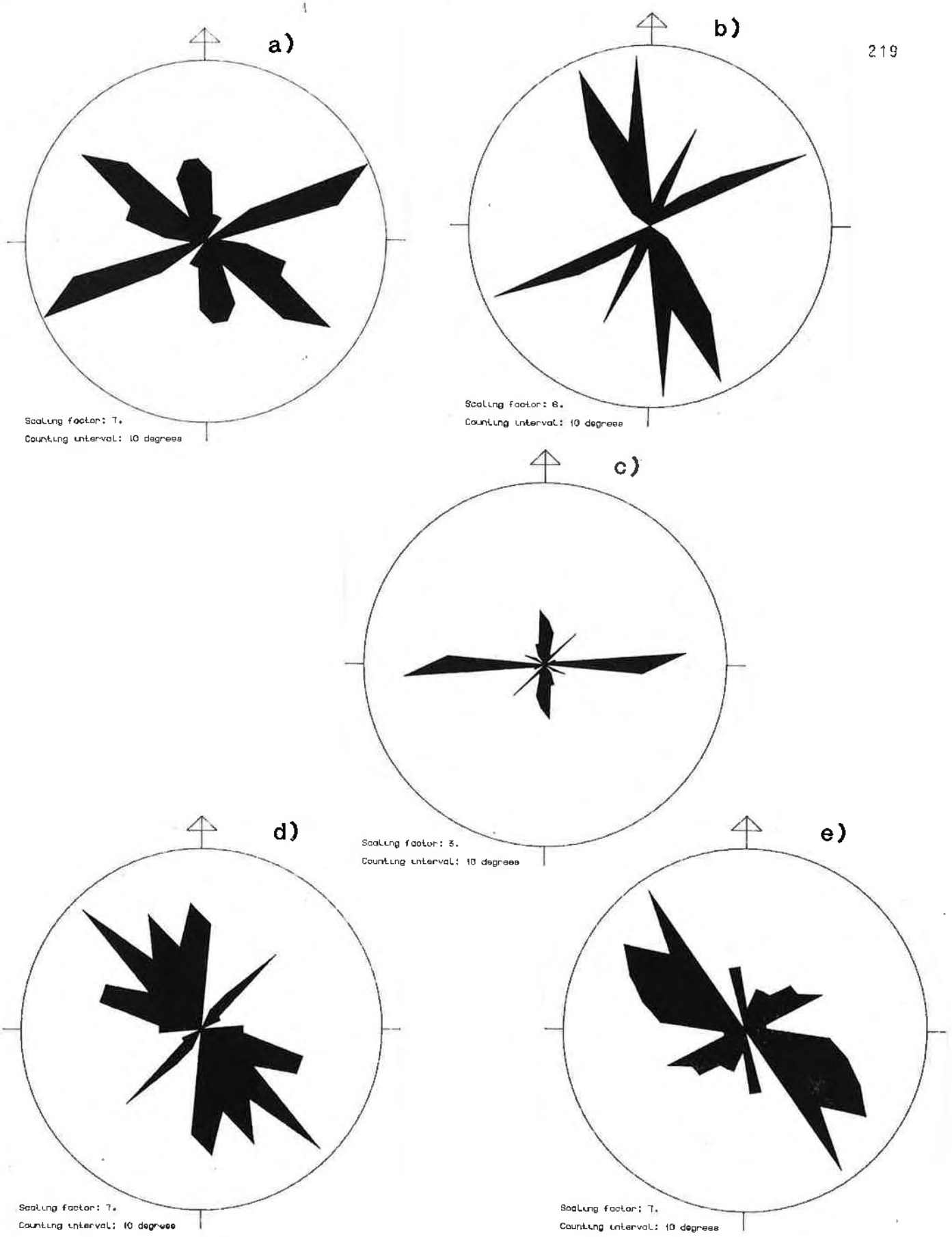


Fig. 8.44. Mesoscopic joint pattern in the Hitra Group. Number of measurements are given in parantheses. a) Grindvik (92), b) Sandstad (50), c) 1 km east of Akset (50), d) Hamnavollen (60), e) Havnøy (60).

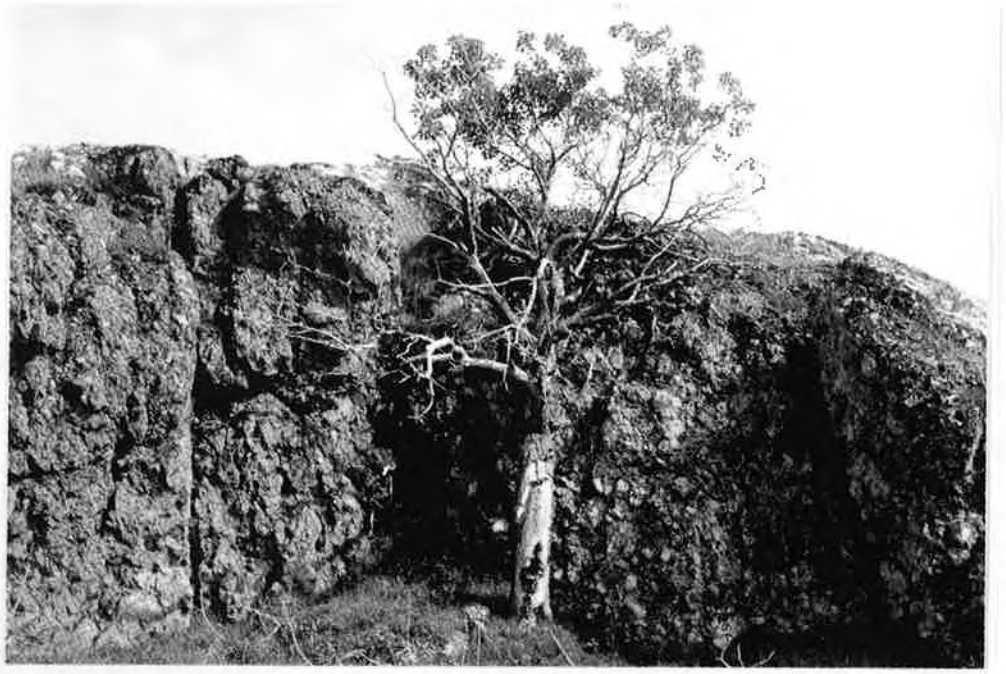


Fig. 8.45. Sub-vertical, strike-parallel joints in the centre of the main syncline. Akset. Cliff is approximately 5 m heigh.

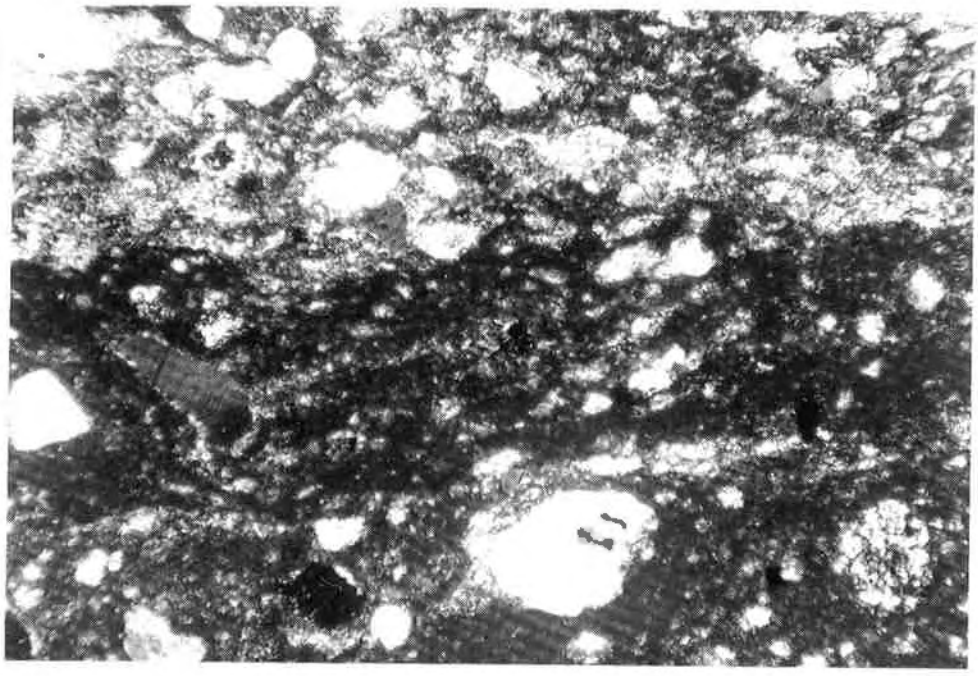


Fig. 8.46. Bedding-parallel, pseudotachylitic zone in the Balsnes Formation north of Bekkviktjern. Bedding trends from left to right on photograph. 63x, x-nicols.

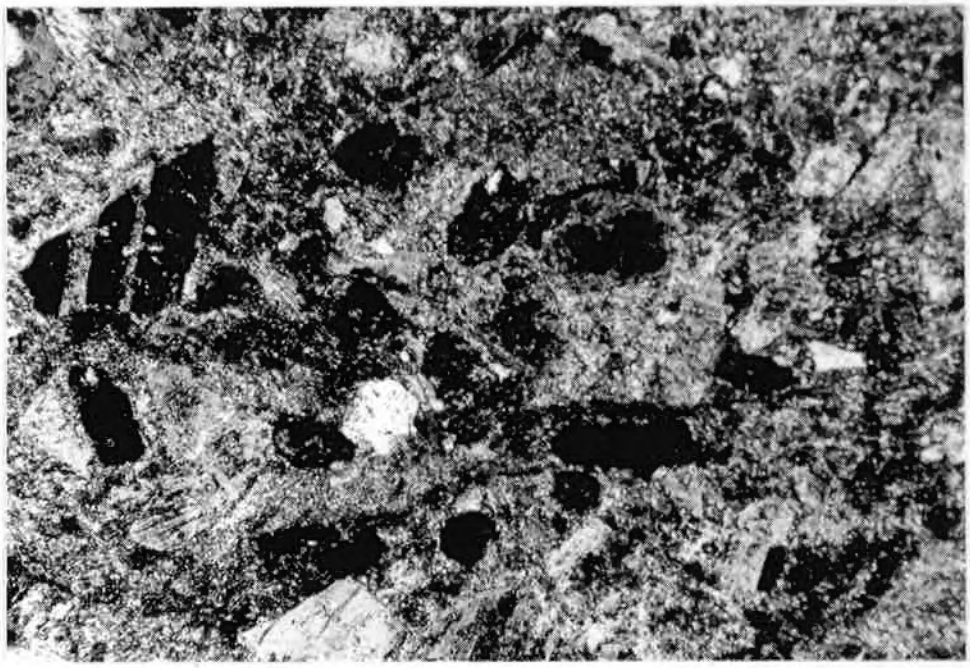


Fig. 8.47. Cataclasite in a bedding-parallel shear zone. Member K west of Balsnes. 63x, x-nicols.

Fig. 9.1. Bedding-parallel stylolites. Note the anastomosing nature of the stylolites, especially near the top of the photograph. Member J at the coast northwest of Balsnes. 63x, x-nicols.

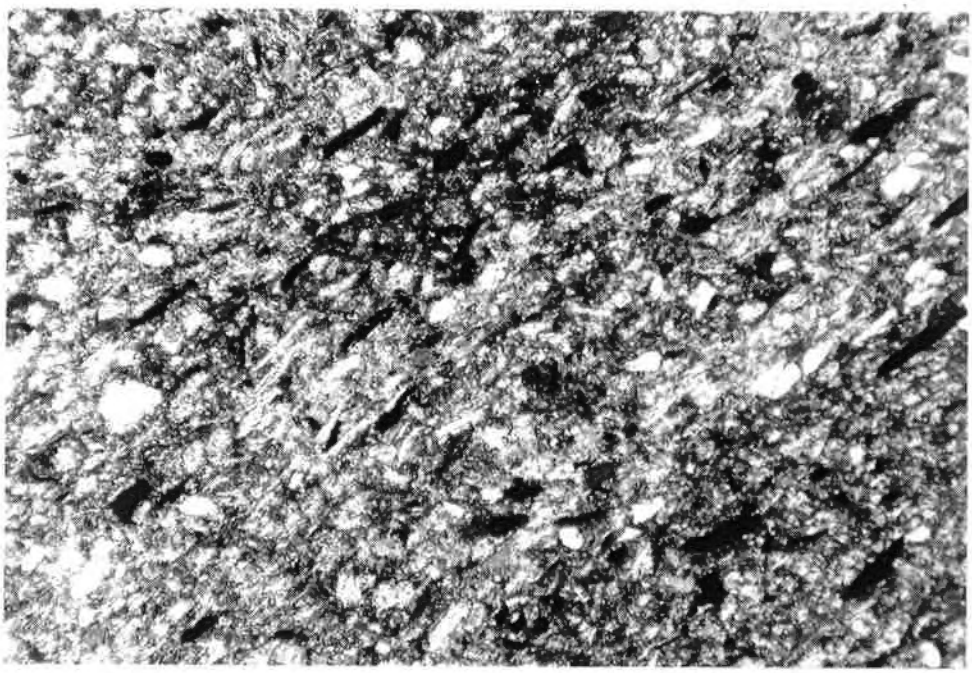


Fig. 9.2. Bedding-parallel, preferred orientation of white mica and quartz grains due to compaction before deformation. Member B, Grunnvann. 63x, x-nicols.

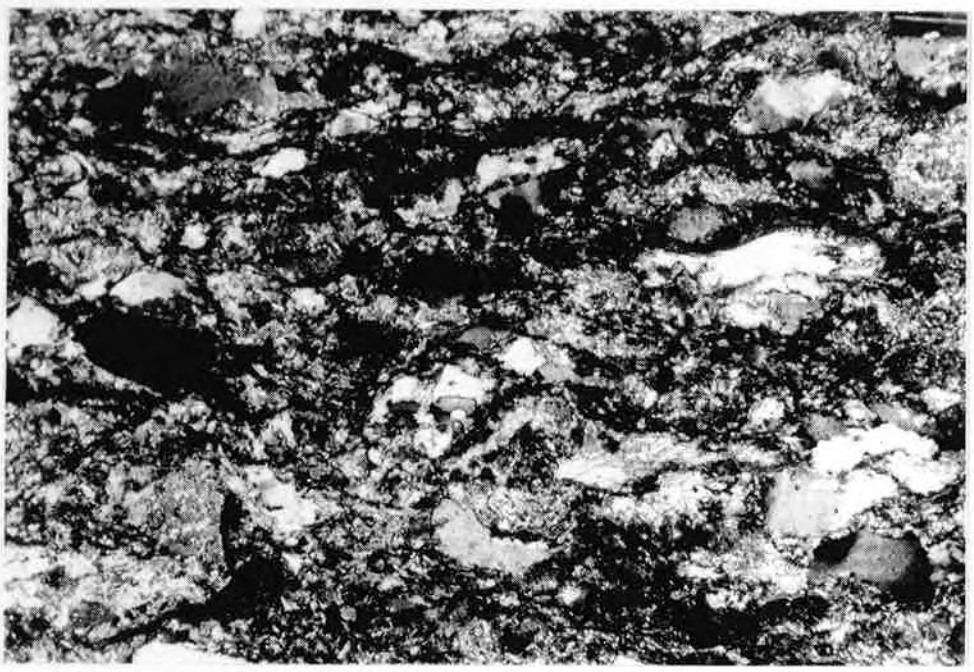


Fig. 9.3. Elongation of mineral grains parallel to F1-axial planes and sub-parallel to bedding (both trend E-W on photograph) as a result of pressure solution during deformation. Vollan Formation, close to the main shear zone north of Kallarnes. 63x, x-nicols.

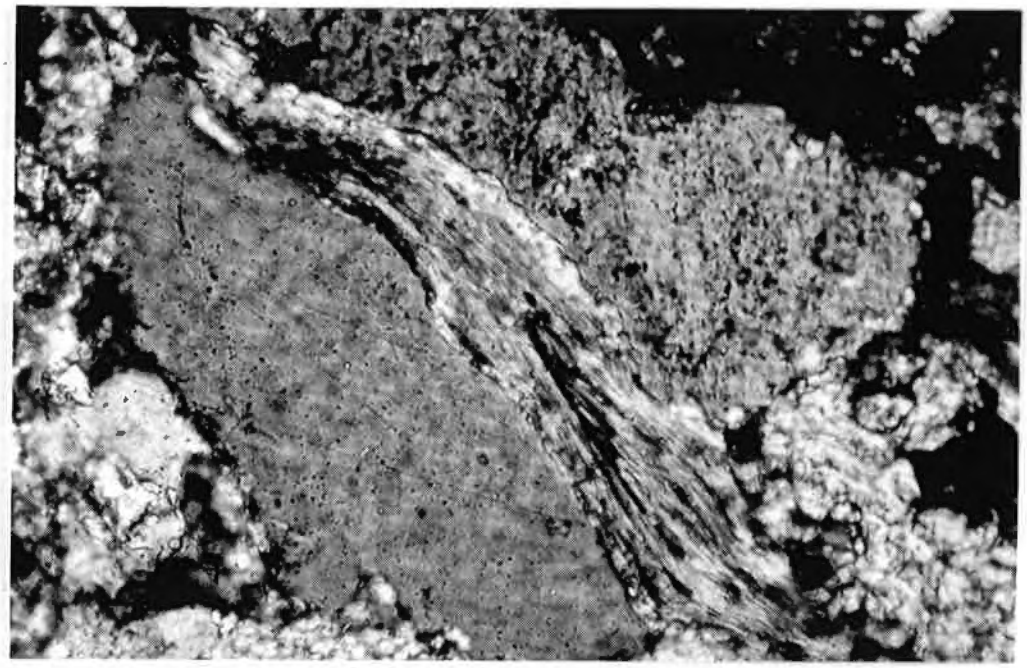


Fig. 9.4. Pressure solution of quartz (left) and feldspar (right) at the contact with white mica. The mica has deformed during compaction/deformation. 250x, x-nicols.

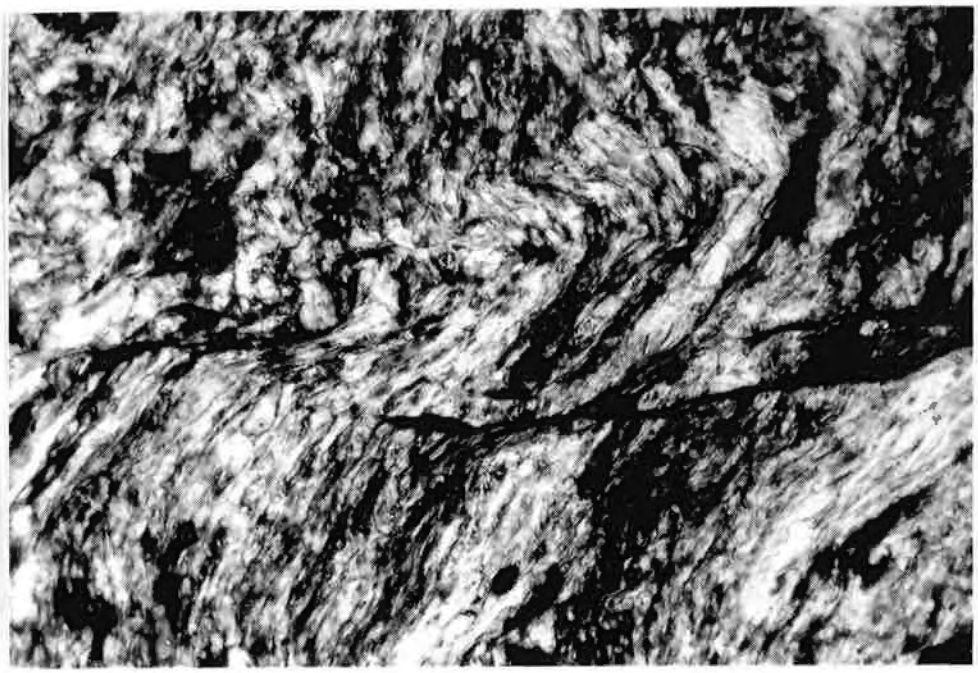


Fig. 9.5. Same as Fig. 8.34. Note the occurrence of chlorite-white mica aggregates and strong elongation of quartz grains parallel to S1. 200x, x-nicols.

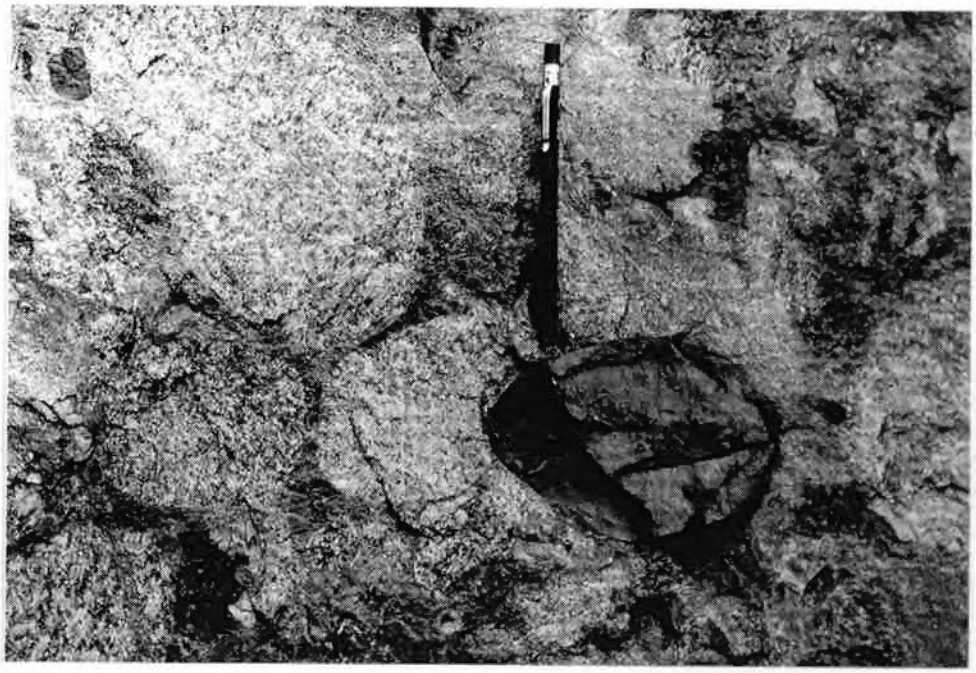


Fig. 9.6. Pressure solution in the Balsnes Formation north of Bekkviktjern. Note sutured contact. Pencil is 14 cm long.

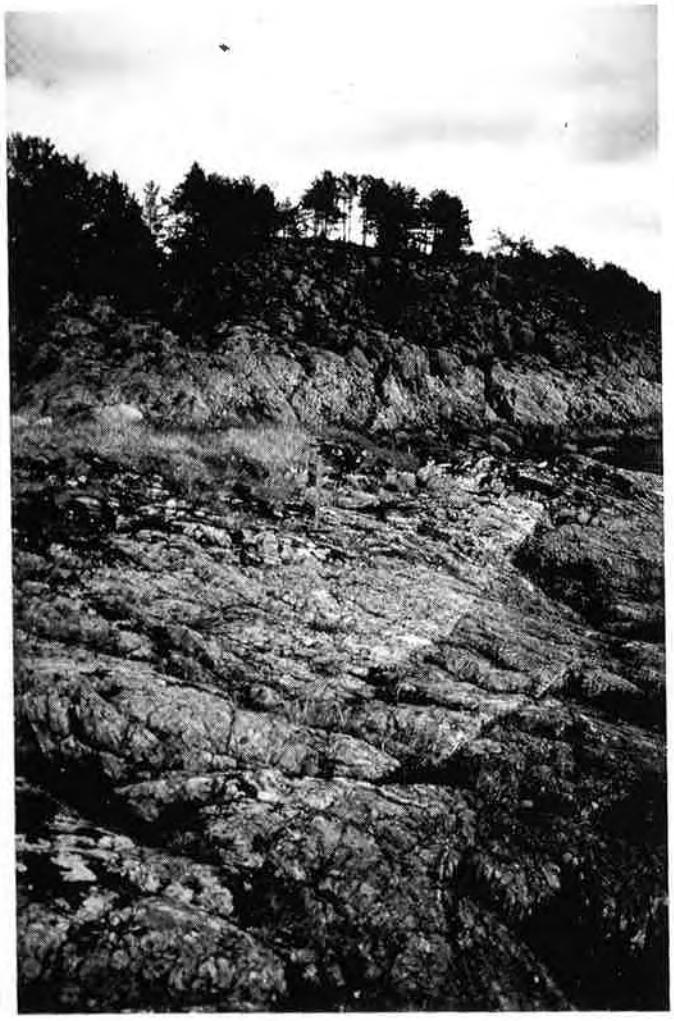


Fig. 10.1. Granite intrusion at the promontory north of Bekkviktjern. Note chilled margin and contact cutting straight through deformed sediments of Member B. Hammer shaft is 40 cm long.

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