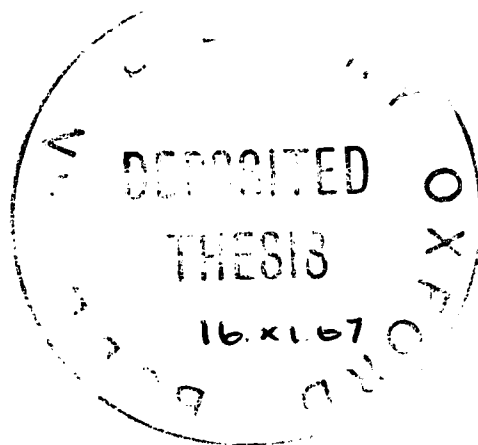




SEDIMENTATION OF THE SOUTHERN PART OF THE GRINDSLOW SHALES
AND THE KINDERSCOUT GRIT.

Volume 2, Photographs.

The locations of photographs are indicated either by a grid reference or by their level within one of the sections presented on the charts of the Sub-Areas, in Volume 3.

Abbreviations:-

- G.S. Grindslow Shales.
- L.K.G. Lower Kinderscout Grit.
- U.K.G. Upper Kinderscout Grit.

INDEX OF PHOTOGRAPHS.

1. Edge exposure of Facies 12, Large Scale Cross-Bedding.
2. Isolated top exposure of Facies 12, Large Scale Cross-Bedding.
3. Facies 2, Siltstone with Seat Earth and thin Coal seam.
4. Cut surface of specimen of Facies 3, Striped Siltstone.
5. Small channel within Facies 3, Striped Siltstone.
6. Vertically burrowed Facies 4, Silty Sandstone.
7. Facies 5, Siltstone with Sandy Lamination and Ripples.
8. Cut surface of specimen of Facies 5, slightly burrowed.
9. Cut surface of specimen of Facies 5, with deformed bedding.
10. Sandstone dune floating in siltstone with burrowed surface.
11. Large sandstone dunes floating in siltstone.
12. Primary current lineation and 'rib and furrow' on sandstone surfaces.
13. Polished surface of Facies 6, Ripple Laminated Fine sandstone.
14. Ripple morphology on the top surface of a sandstone bed.
15. Erosive and irregular ripple lamination.
16. Ripple laminated fine sandstone and parallel laminated fine sandstone.
17. Siltstone blocks within Massive Bedded Coarse Sandstone.

18. Contorted Siltstone blocks within Massive Bedded Coarse Sandstone.
19. Facies 8, Massive Bedded Coarse Sandstone.
20. Massive bedded fill to Major Channel III, Nether Tor, Grindsbrook.
21. Steeply dipping weathering surfaces in massive coarse sandstone.
22. Extreme weathering condition of massive coarse sandstone.
23. Facies 9, Parallel Bedded Coarse Sandstone.
24. Facies 9, Parallel Bedded Coarse Sandstone.
25. Minor Channel within Facies 9, Parallel Bedded Coarse Sandstone.
26. Primary current lineation in Facies 9, Parallel Bedded Sandstone.
27. Tabular sets of Facies 10, Medium Scale Cross-Bedded Coarse Sandstone.
28. Lineation on the upper surface of planar foresets.
29. Thick tabular set at the base of a Fluvial Channel Association unit.
30. Tabular set of cross-bedding with very steep 'foresets'.
31. Lineation on the surface of the steep 'foresets'.
32. Medium scale trough cross-bedding with tangential foresets.
33. Plan view of medium scale trough cross-bedding.

34. Medium scale cross-bedding with planar and asymptotic foresets.
35. Apparent large scale cross-bedding, given by stoss-side erosion surfaces.
36. Small cross-bedded sets giving apparent large scale cross-bedding.
37. Low angle cross-bedding and apparent large cross-bedding.
38. Internal structure of modern fluviatile sand wave.
39. Penecontemporaneous deformation of coarse sandstone.
40. Penecontemporaneous folding of coarse sandstone.
41. Tabular sets of Facies 11, Cross-Bedded Fine Sandstone.
42. Facies 12, Large Scale Cross-Bedded set forming edge exposure.
43. Facies 12, Large Scale set overlain by medium scale troughs
44. Kinder Downfall Panorama. Large Scale Cross-Bedding Association.
45. Angular base of planar, large scale foresets.
46. Planar foresets of large scale set and overlying medium scale troughs.
47. Close up of foresets of large scale set.
48. Intraset cross-bedding within a large scale set.
49. Tangentially based foresets of a large scale set.
50. Erosion surface within a large scale cross-bedded set.

51. Erosion surfaces within a large scale cross-bedded set.
52. Large scale cross-bedded set with slack feature in edge exposure.
53. Facies 13, Sharp Based Clean Sandstone Beds interbedded with siltstone.
54. Large flute casts on the base of a Facies 13, sandstone bed.
55. Cut section through a Facies 13, sandstone bed.
56. Sinusoidal trails on the top of a Facies 13, sandstone bed.
57. Upright plant trunk in siltstone.
58. Facies 15, Orthoconglomerate.
59. Facies 17, Turbidite-like Sandstones.
60. Silty sandstone lower bedding plane disturbed by vertical burrows.
61. Apparent channel in silty sandstone, due to limits of burrowing.
62. Radiating clusters of depressions around the tops of vertical burrows.
63. Close up of radiating burrow depressions.
64. Vertical section through a vertically burrowed silty sandstone.
65. Grooved erosion surface of a Major Channel.
66. Overhanging, grooved erosion surface at the base of a Major Channel.

67. Horizontal erosion surface at the top of a large scale cross-bedded set.
68. 'En echelon' overstepping of large scale cross-bedding sets.
69. Section through Recent delta cone in the Ladybower Reservoir.
70. Lower part of a unit of the Fluvial Channel Association.
71. Low angle cross-bedded set with sandstone and siltstone foresets.
72. Low angle cross-bedding in a parallel laminated sandstone channel fill.

PHOTO. 1.

Northern 'Edge' of Kinderscout Plateau, west of Fairbrook Naze. A single set of Facies 12, Large Scale Cross-Bedding, at least 30 m. thick forms the 'edge' exposure. L.K.G.



PHOTO. 2.

Wheel Stones, Derwent Edge. Isolated tors protrude through the peat. The dip is depositional within a unit of Facies 12, Large Scale Cross-Bedding. L.H.G.

PHOTO. 3.

Northern bank of Laund Clough. The bedding plane in the stream bed is the top of the Upper Kinderscout Grit. It is sharply overlain by Facies 2, Siltstone passing upwards into a siltstone seat earth with a thin coal seam (at the hammer head). The 'Gracile' Marine Band is in the overlying Siltstone unit. U.K.G.



PHOTO. 4.

Cut surface of a specimen of Facies 3, Striped Siltstone, about 10 cm. high. The striped appearance is due to slight grain size changes. Specimen K.42. Blackden Brook, South Tributary, level 60 m.. G.S.

PHOTO. 5.

Blackden Brook, Main Stream, Level 17 m.

Channel cut into and filled by Facies 3, Striped Siltstone. Slightly coarser sediment is found on the lip of the erosion surface at the left hand side of the photograph. Channel is 90 cm. deep. G.S.



PHOTO. 6.

Blackden Brook, Main Stream, Level 45 m..

Facies 4, Silty Sandstone, intensively disturbed by vertical burrows at the top of a small coarsening upwards unit. G.S.

PHOTO. 7.

Heyden Clough, Lower Section, Level 11 m.

Facies 5, Siltstone with Sandy Ripples. Irregularly and lenticularly laminated sandstone and siltstone. The light patches are due to reflection from water on the surface. The Stellate burrows shown in Photos 62 and 63 occur on the top of this bed. L.K.G.

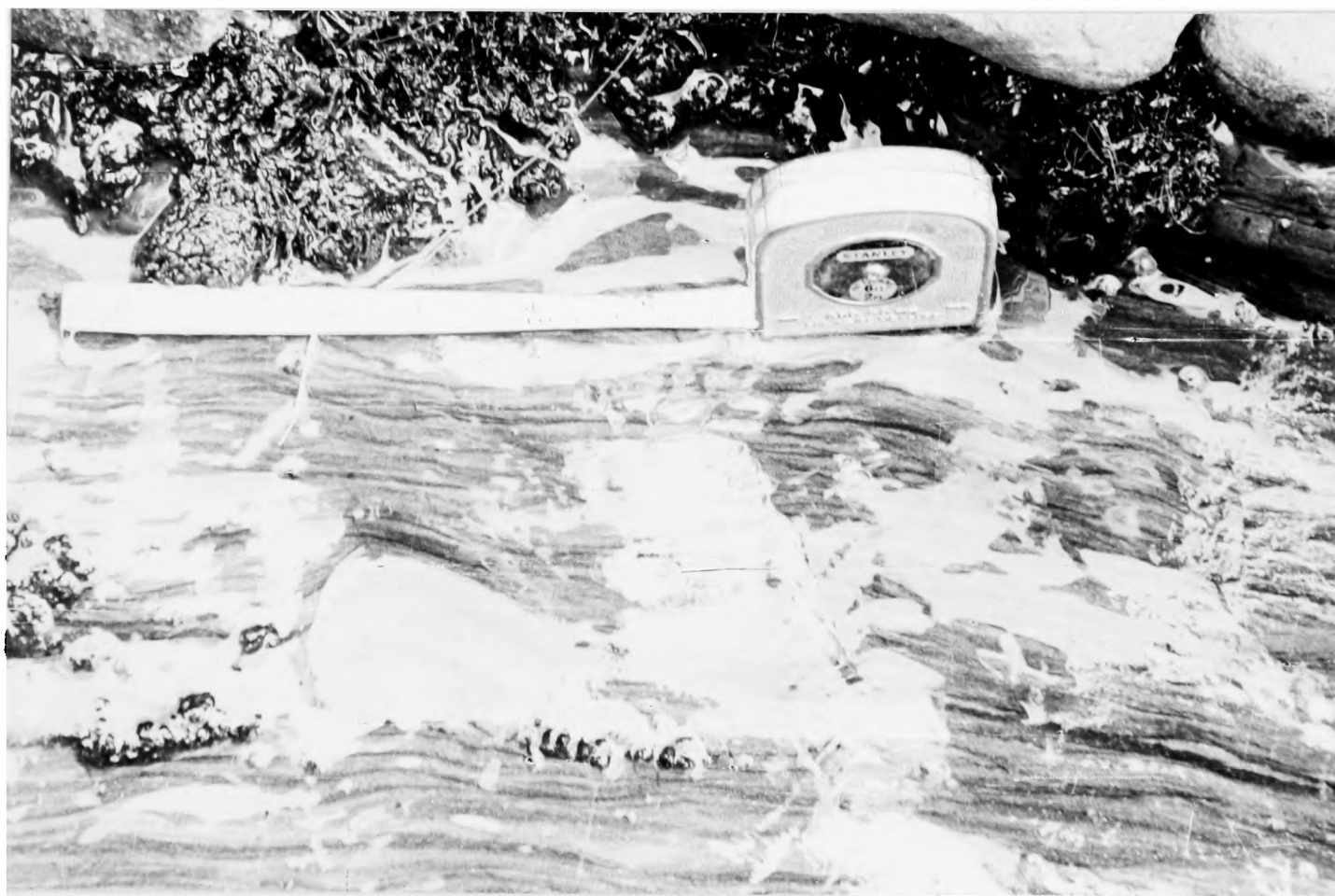


PHOTO. 8.

Vertically cut surface through a specimen of Facies 5, Siltstone with Sandy Lamination and Ripples. A thicker, predominantly sandstone unit is overlain by more silty sediment with isolated ripples which are slightly loaded. The whole is slightly disturbed by horizontal burrows. The specimen is 10 cm. high. Specimen K 19. Crowden Brook, Edale. level 123 m. L.K.G.

PHOTO. 9.

Vertically cut section through a specimen of Facies 5, Siltstone with Sandy Lamination and Ripples. The specimen is slightly disturbed by horizontal burrows. The lowest beds are buckled down, due to the collapse of a small log seen on the lower bedding surface. The specimen is 6 cm. high. Specimen K 18. Crowden Brook, Edale. Level 123 m. L.K.G.

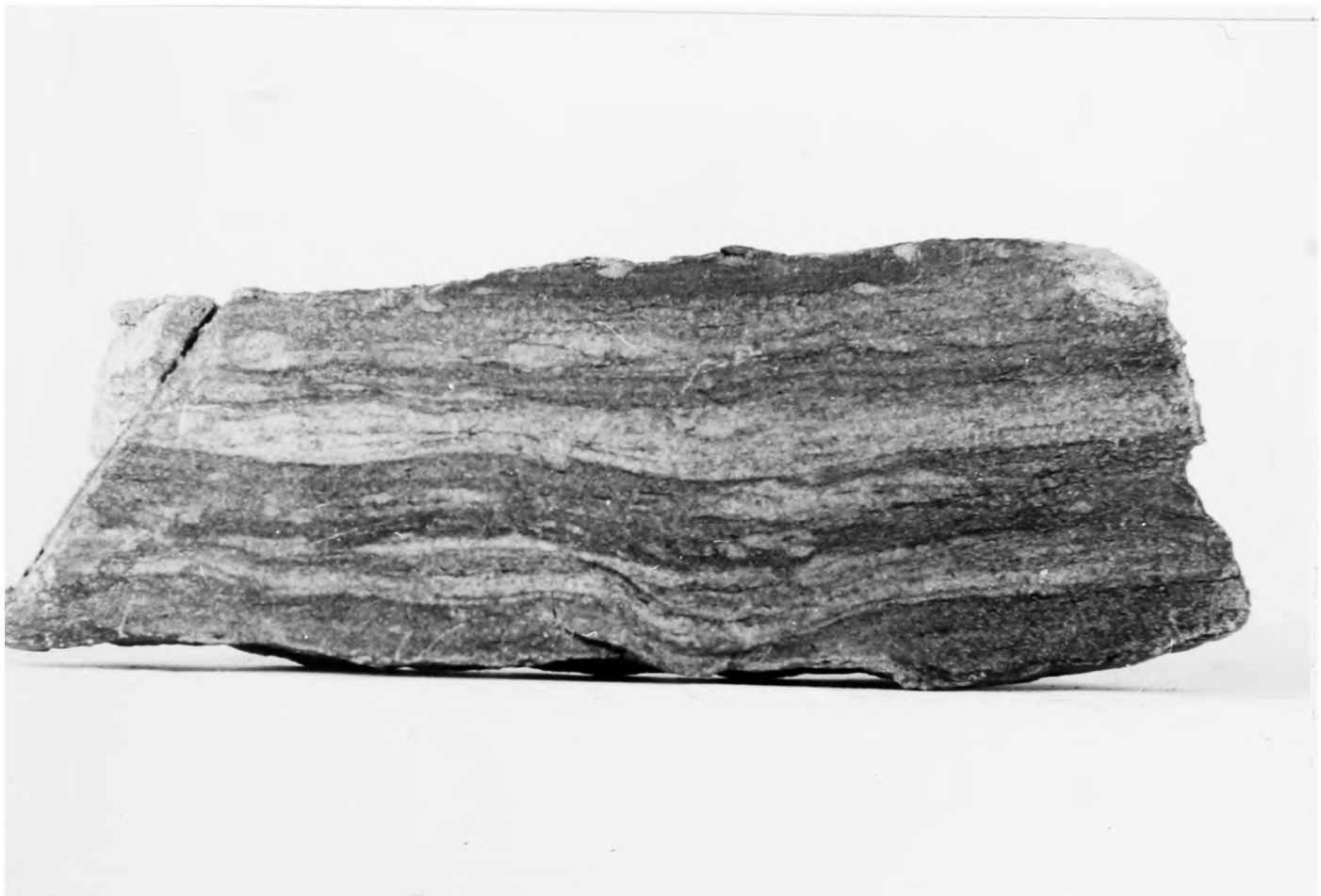


PHOTO. 10.

Crowden Brook, Edale. Level 75 m. Rear half of a sandstone dune, floating in siltstone. Wavelength of dune is 1 m.. A vertical burrow penetrates the stoss side surface and is filled with siltstone. L.K.G.

PHOTO. 11.

North bank of the River Etherow east of Woodhead. N.G.R. SK 117996. Large dune forms, of up to 20 m. wavelength, float in siltstone. Scale is 1 m. long. L.K.G.

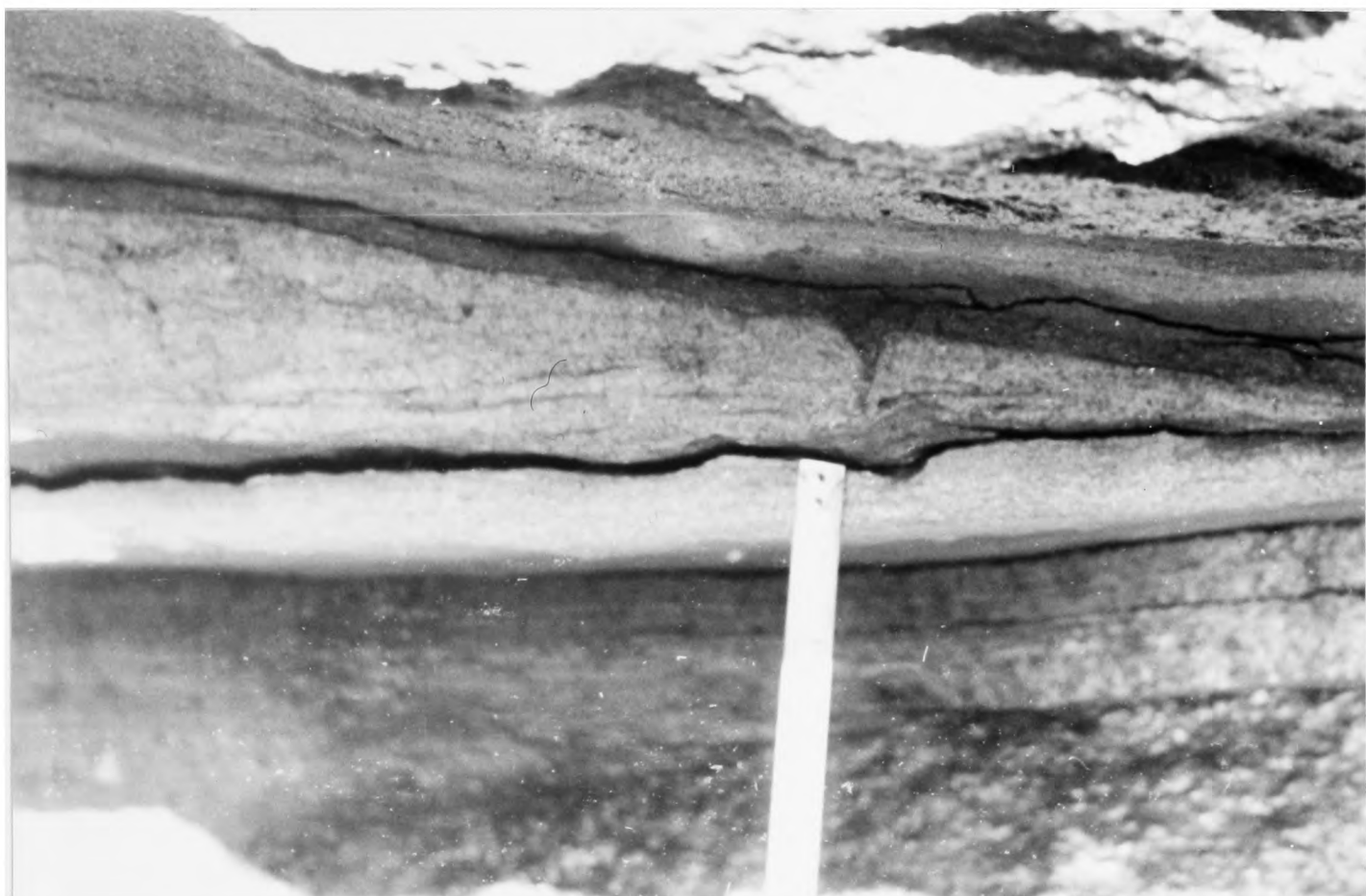


PHOTO. 12.

Upper surface of a loose sandstone block, probably a Facies 13, Sharp based Clean Sandstone Bed, in Heyden Brook. The lower surface on the left shows primary current lineation and the higher surface on the right shows 'rib and furrow'. L.K.G.

PHOTO. 13.

Polished surface of a specimen of Facies 6, Ripple Laminated Fine Sandstone. The concave upwards nature of the erosion surfaces between sets and of the cross-laminae are seen. Specimen is 3 cm. high. Specimen K 5. Bole Hill. U.K.G.

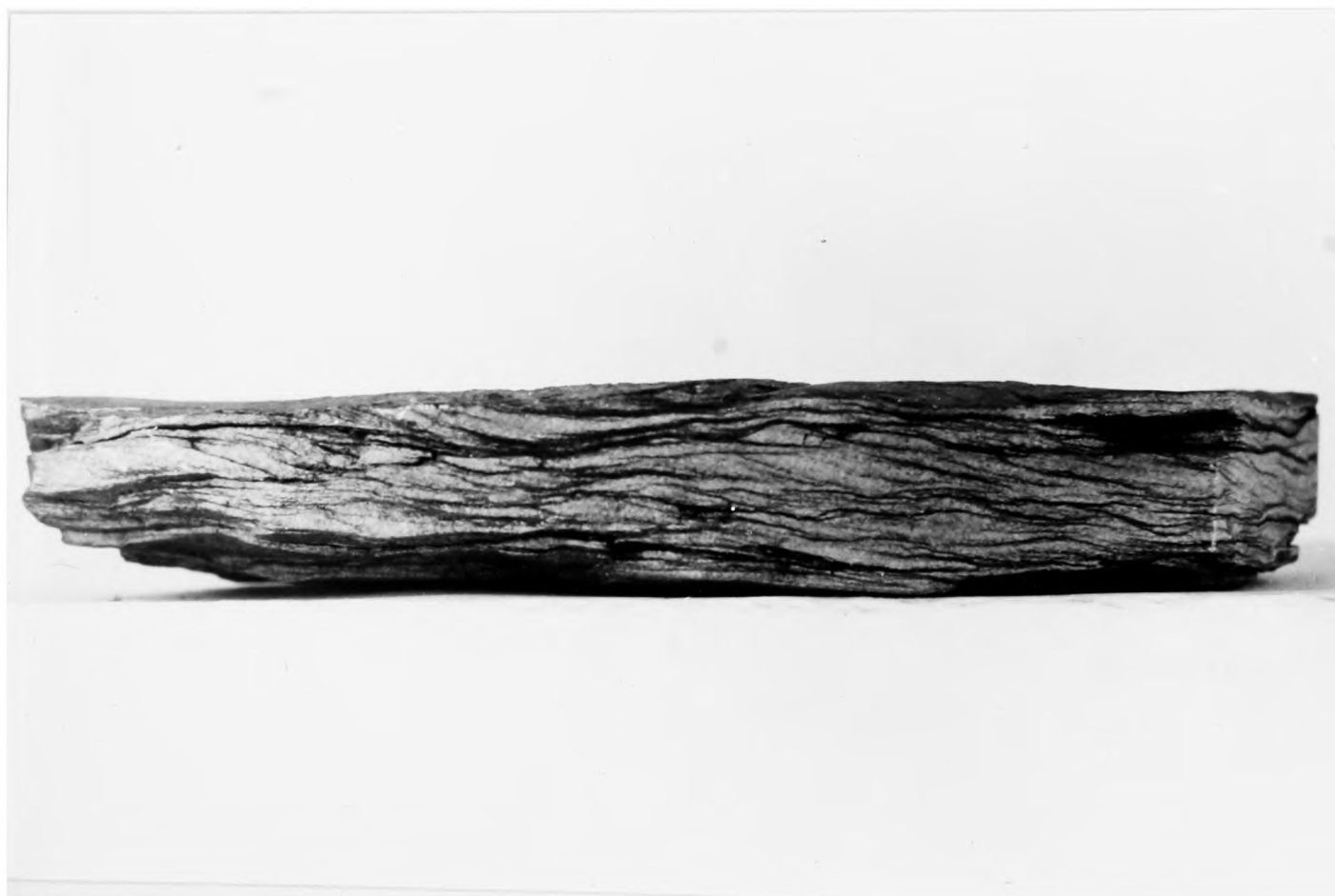


PHOTO. 14.

Oaksike Clough, Longendale. Level 2 m. Small scale, irregular ripple morphology on the top surface of a unit of Facies 11, Cross-Bedded Fine Sandstone. Current flowed towards the camera, parallel to the hammer handle. L.K.G.

PHOTO. 15.

Woodhead Roadside Quarry. Irregular and erosive ripple lamination with thin silty partings, in fine sandstone, comparable to the 'Sandy Streak' of De Raaf et al., (1965). L.K.G.



PHOTO. 16.

Heyden Brook, between measured sections. Ripple laminated fine sandstone overlain by parallel laminated fine sandstone. L.K.G.

PHOTO. 17.

Shining Clough, Longendale. Level 47 m. Large siltstone block within extremely coarse and pebbly Facies 8, Massive Bedded Sandstone, just above a Major Channel erosion surface. The scale is 1 m. long. L.K.G.



PHOTO. 18.

Eddale Head, Level 32 m. Rather contorted blocks of siltstone within Facies 8, Massive Bedded Coarse Sandstone. L.K.G.

PHOTO. 19.

Nether Tor, Channel II, Level 25 m. Facies 8, Massive Bedded Coarse Sandstone showing a particularly massive aspect. 1 m. tape. L.K.G.



PHOTO. 20.

Nether Tor, Grinasbrook. Channel III at the western side of the tor. The erosion surface is about at the base of the main cliff which is about 35 m. high. The smaller unit below is part of Channel I. Channel III shows Facies 8, Massive Bedded Coarse Sandstone which has irregular, erosive and sub-horizontal bedding. The steeper partings at the left are thought to reflect bedding, dipping parallel to the main erosion surface. L.K.G.

PHOTO. 21.

Tor on the hillside south of the Ladybower Brook. Steeply dipping surfaces are roughly parallel to the slope of the hillside and are interpreted as tensional release features. L.K.G.



PHOTO. 22.

Edge exposure on Rowland Cote Moor, Edale.

Extreme weathering of very coarse and pebbly sandstone.

Tape 1 m. L.K.G.

PHOTO. 23.

Nether Tor, Grindsbrook, Channels II and III.

The thick unit on the right is Facies 9, Parallel Bedded Coarse Sandstone within Channel II. In the top left hand corner, the Facies 8, Massive Bedded Sandstone of Channel III erosively overlies these beds. The height of the main buttress on the right is about 10 m. L.K.G.



PHOTO. 24.

Nether Tor, Grindsbrook. Channel II, level 30 m.
Typical development of Facies 9, Parallel Bedded Coarse
Sandstone. Tape 1 m. L.K.G.

PHOTO. 25.

Nether Tor, Grindsbrook. Channel II. Level 39 m.
Minor channel within Facies 9, Parallel Bedded Coarse
Sandstone. The bedding tends to parallel the erosion
surface in the base but reverts upwards to a more
horizontal attitude. Tape 1 m. L.K.G.



PHOTO. 26.

Bottom of Black Cloughs, Longendale, Level 31 m.
Primary current lineation on the upper bedding plane
of a unit of Facies 9, Parallel Bedded Coarse Sandstone.
L.K.G.

PHOTO. 27.

Carhead Rocks, above Hathersage. Tabular sets of
medium scale cross-bedding forming a coset of Facies 10,
Coarse Sandstone. The foresets have angular bases and
are planar. U.K.G.

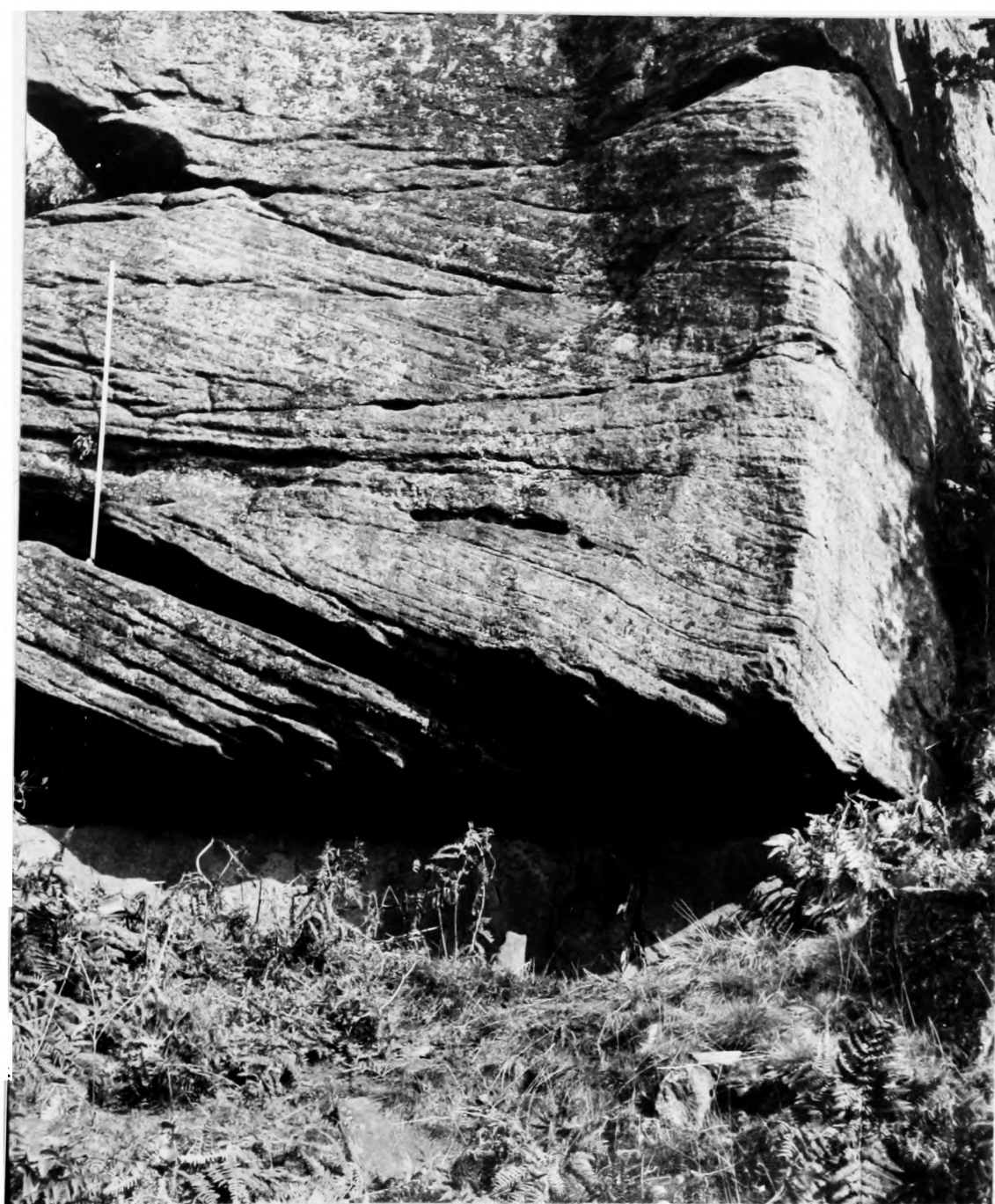


PHOTO. 28.

Harden Clough. Upper surfaces of the planar foresets of a tabular set of medium scale cross-bedding. The surfaces show a strong lineation parallel to the dip of the foresets. L.K.G.

PHOTO. 29.

Crowden Little Brook, Level 126 m.

The erosion surface at the base of a unit of the Fluvial Channel Association is overlain by a 2.4 m. thick tabular set of cross-bedding. The foresets, which are planar, dip to the right at the left hand side of the photograph and to the left at the right hand side. Both dips have components away from the camera, suggesting that, in plan, the foresets are concave in the direction of the dip. Tape 1 m. L.K.G.



PHOTO. 30.

Glossop Low Quarries. A tabular set of apparently cross-bedded sandstone overlies a planar erosion surface and is overlain by trough cross-bedded sandstone, with foresets dipping to the right. The 'foresets' of the lower set, which is some 1.7 m. thick, dip to the left at angles of up to 70° .

PHOTO. 31.

Glossop Low Quarries. Pattern of lineation on the surface of one of the 'foresets' of the set seen in Photo. 30.



PHOTO. 32.

Section IIc, Level 80 m. East of Fairbrook.
Medium scale trough cross-bedding, showing concave upwards basal scours and the tangential nature of the foresets.

PHOTO. 33.

Kinderscout North Edge. Locality marked on Photo. 52. Plan view of trough cross-bedding, showing the discordant relationship between the foresets and the sides of the troughs. The current flowed almost directly away from the camera. Rucksack is about 50 cm. wide.

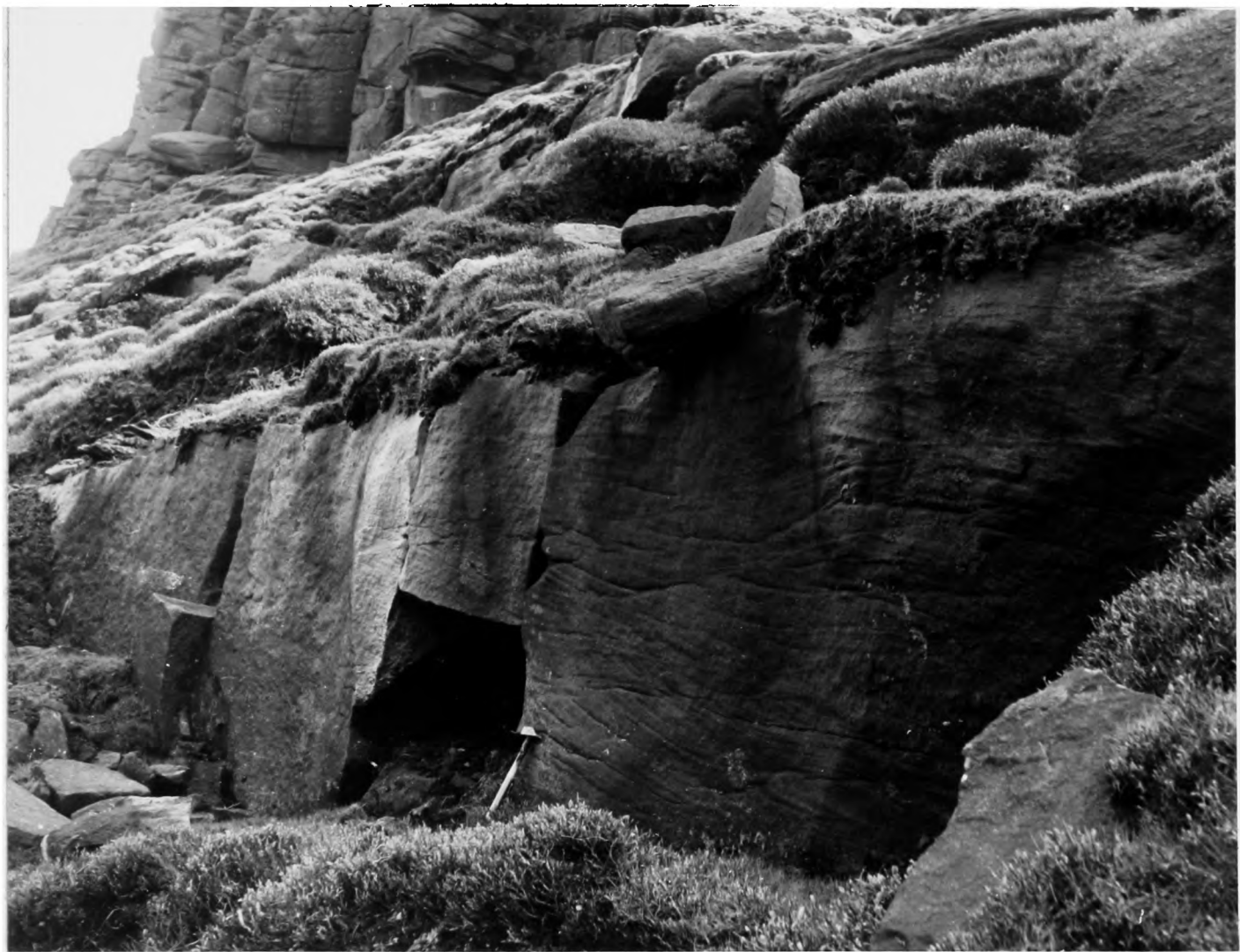


PHOTO. 34.

The edge, south of Ladybower, above Priddock Wood.
N.G.R. SK 208861. A vertical section through a coset of medium scale cross-bedded coarse sandstone, roughly parallel to the current direction. The foresets are mainly planar, though the prominent set in the middle has asymptotic foresets. Tape at the top of the photograph is 1 m. long.

PHOTO. 35.

Woodhead Roadside Quarry. The apparent set of cross-bedding in the lower half of the face is 3.5 m. thick. The apparent foresets are, in fact, the stoss-side erosion surfaces of smaller sets shown in Photo. 36.



PHOTO. 36.

Woodhead Roadside Quarry. Small cross-bedded sets which are clearly graded and whose stoss-side erosion surfaces give the apparent foresets seen in Photo. 35.

L.K.G.

PHOTO. 37.

Loftend Quarry. The top of the face is about 15 m. above the top of the spoil heap. The lowest 6 m. above this level is a set of low angle cross-bedding formed of interbedded siltstones and sandstones. The section seen here is parallel to the strike of the foresets. Above this unit, the apparent cross-bedding to the right is itself internally cross-bedded with smaller sets directed in a similar direction to the large scale dip. L.K.G.



PHOTO. 38.

Tana River, Finnmark, Norway. Trench cut into the downstream surface of a sand wave on the modern river bed. The foresets are eroded back to a lower angle than that at which they were deposited and a thin unit of irregular lamination roughly parallels the erosion surfaces. Tape 1 m.

PHOTO. 39.

Nickleden. N.G.R. SK 190983. Deformed coarse sandstone showing 'Ball and Pillow' structure, interbedded with trough cross-bedded sandstone. Tape 1 m. U.K.G.



PHOTO. 40.

Foulstone Dyke, Strines. N.G.R. SK 219913.

Deformed sandstone unit, showing elongate folds with broad synclines and tight anticlines. This is overlain by parallel laminated sandstone. Tape 1 m. L.K.G.

PHOTO. 41.

Hey Clough. Level 56 m.

Tabular sets of Facies 11, Cross-Bedded Fine Sandstone, with tangential foresets, interbedded with ripple laminated sandstone. Ripple laminated sandstone in the base of the exposure. L.K.G.



PHOTO. 42.

Dovestone Tor, Derwent Edge. A set of Facies 12, Large Scale Cross-Bedding with foresets dipping at up to 23° in the top of the 21 m. high exposure. A slack feature is seen at the right hand side of the photograph. Intrasetts are common, the locality of Photo. 48 being indicated. L.K.G.



PHOTO. 43.

Ewden Beck, N.G.R. SK 213959. The top 5 m. of a Facies 12, Large Scale Cross-Bedded set overlain by a thick unit of Facies 10, Medium Scale Cross-Bedded Sandstone. The erosion surface is not clear but has a relief of 1.5 m. L.K.G.



PHOTO. 44.

Panorama of the south side of Kinder Downfall.

The total height of the exposure is about 75 m., the scale being given by the figure on the skyline at the left hand edge. Massive coarse sandstone in the base passes upwards into parallel and horizontally bedded coarse sandstone. This undergoes a gradual upward increase in dip to form a set of Facies 12, Large Scale Cross-Bedding some 40 m. thick. The top of the set is truncated by a horizontal erosion surface, best seen on the left, overlain by Facies 10, Medium Scale Cross-Bedded Sandstone. An 8.5 m. set in the centre of the photograph overlies this unit and is itself overlain by Medium Scale Cross-Bedded Sandstone. L.K.C.



PHOTO. 45.

Wildboar Clough, Longendale, N.G.R. SK 080980.
Angular base to the planar foresets of a Facies 12,
Large Scale Cross-Bedded set. L.K.G.

PHOTO. 46.

Bamford Edge. The top 8.5 m. of a set of Facies 12,
Large Scale Cross-Bedding. The foresets are planar and
the top of the set is truncated by a horizontal erosion
surface, above which are trough cross-bedded sandstones.
L.K.G.



PHOTO. 47.

Bamford Edge. A close-up of the foresets of the set shown in Photo. 46, weathered out in an iron cemented area. Some of the foresets are conspicuously graded.

L.R.G.

PHOTO. 48.

Dovestone Tor, Derwent Edge. Location of this photograph shown on Photo. 42. Intraset Cross-bedding within a Facies 12, Large Scale set. Tape 1 m. L.R.G.

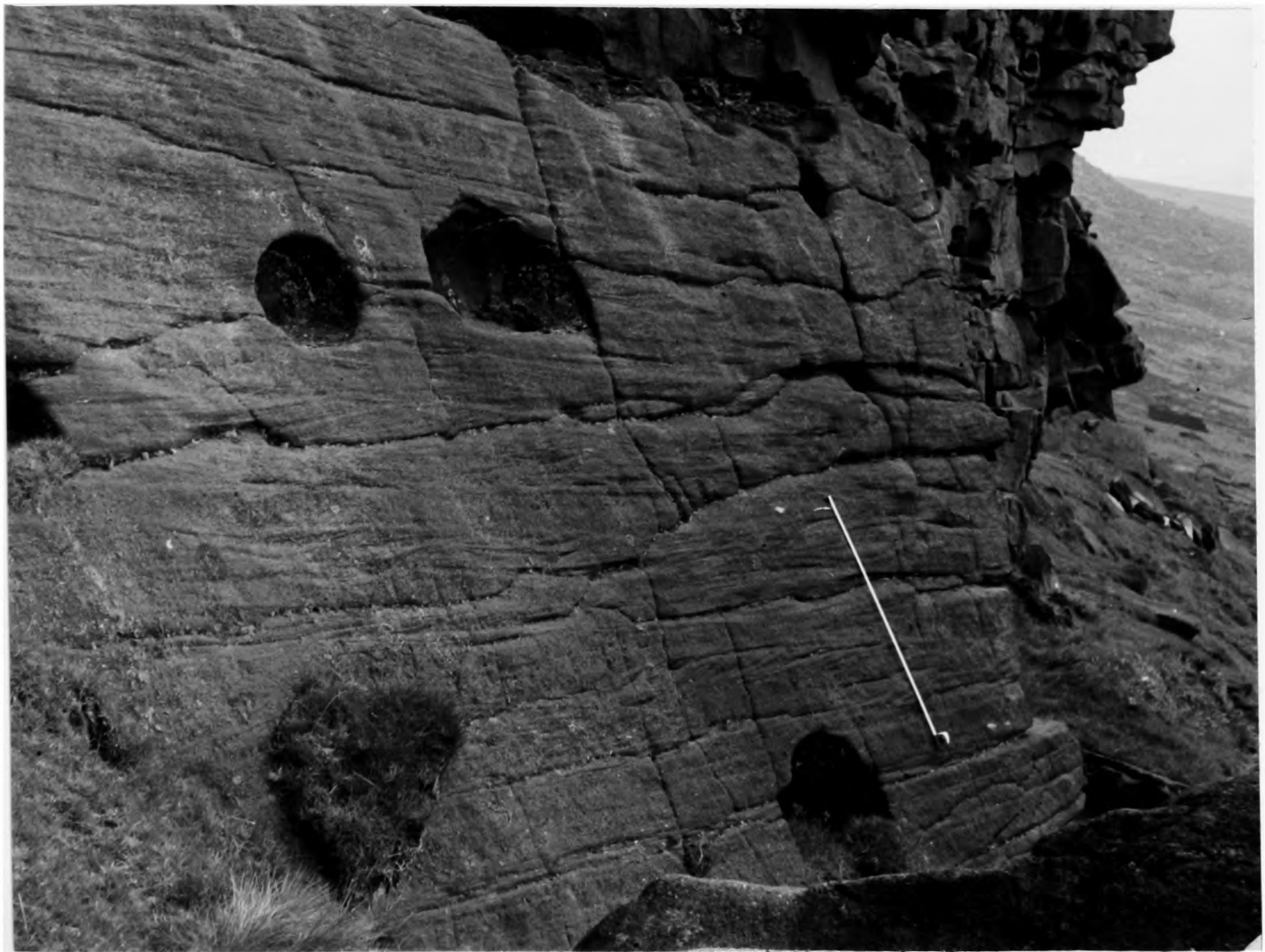
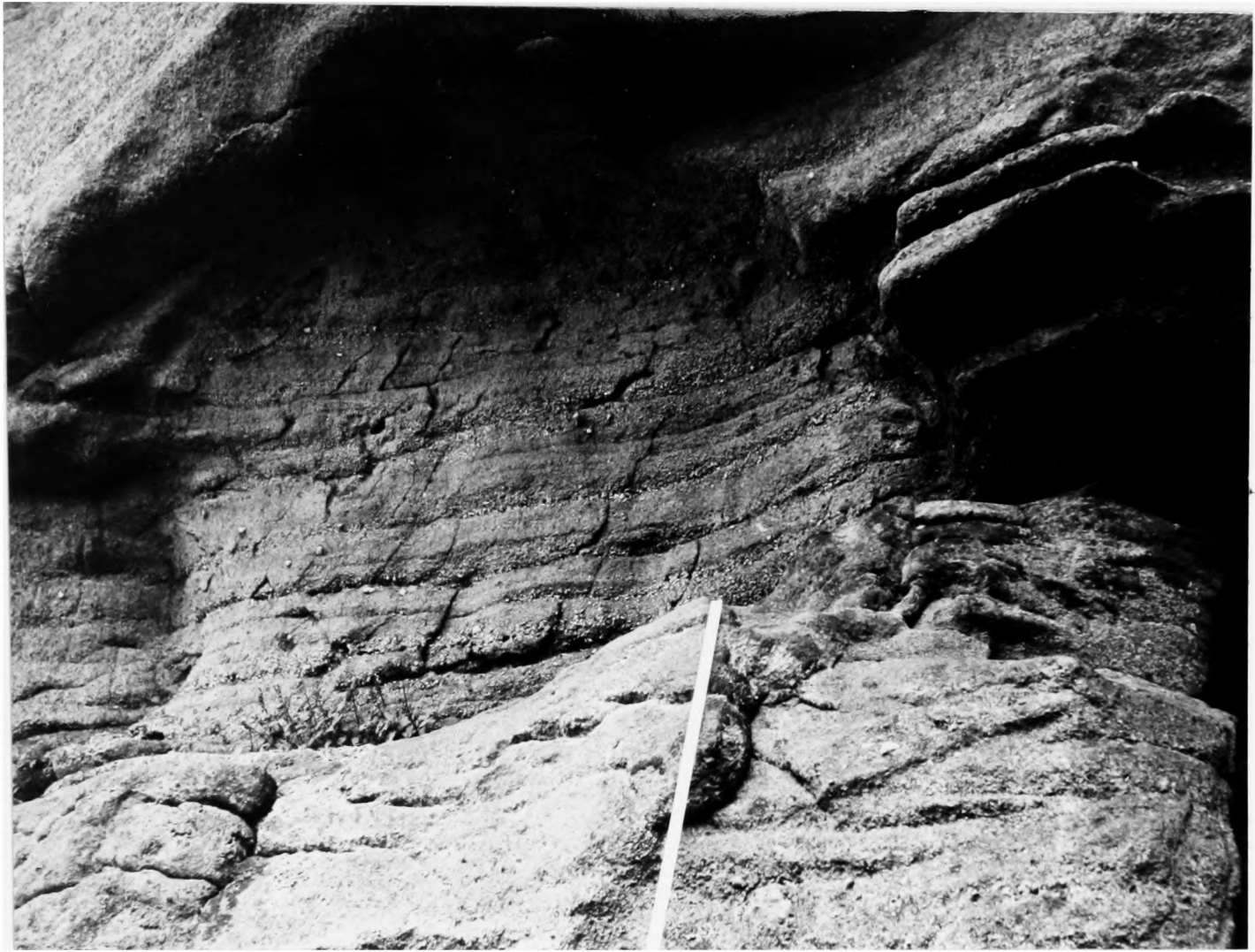


PHOTO. 49.

Woodhead Tunnel, Longendale. A 12.5 m. set of Facies 12, Large Scale Cross-Bedding, with tangentially based foresets, overlain by horizontally lying trough cross-bedding, above an erosion surface. Intrasetts in the base of the set indicate a current up the foreset slope. L.K.G.

PHOTO. 50.

Section IIc, East of Fairbrook, Kinderscout, Level 118 m. An erosion surface within a large scale cross-bedded set. The foresets below the surface have a marked component of dip to the right, while those above the erosion surface dip almost directly into the face. L.K.G.

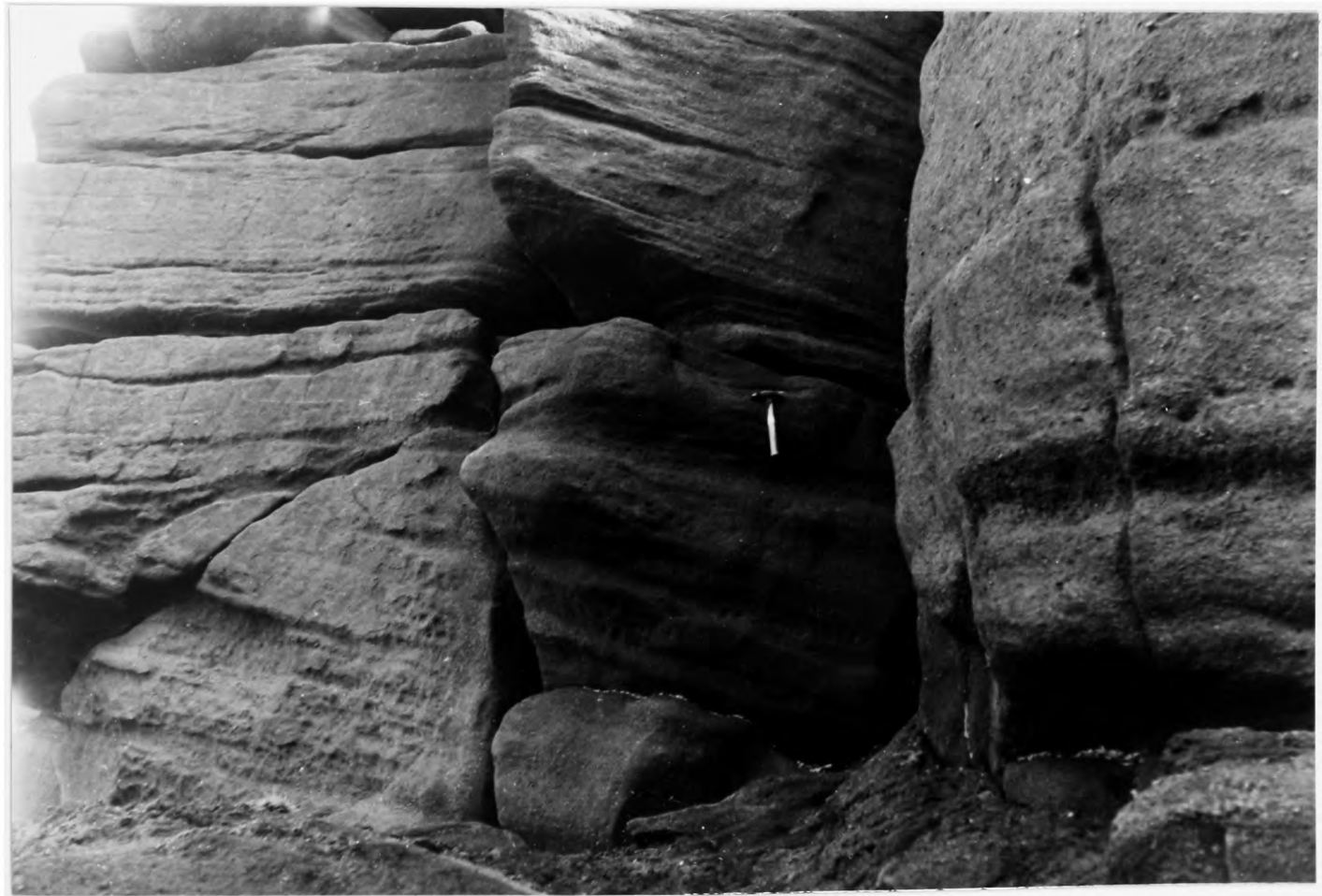
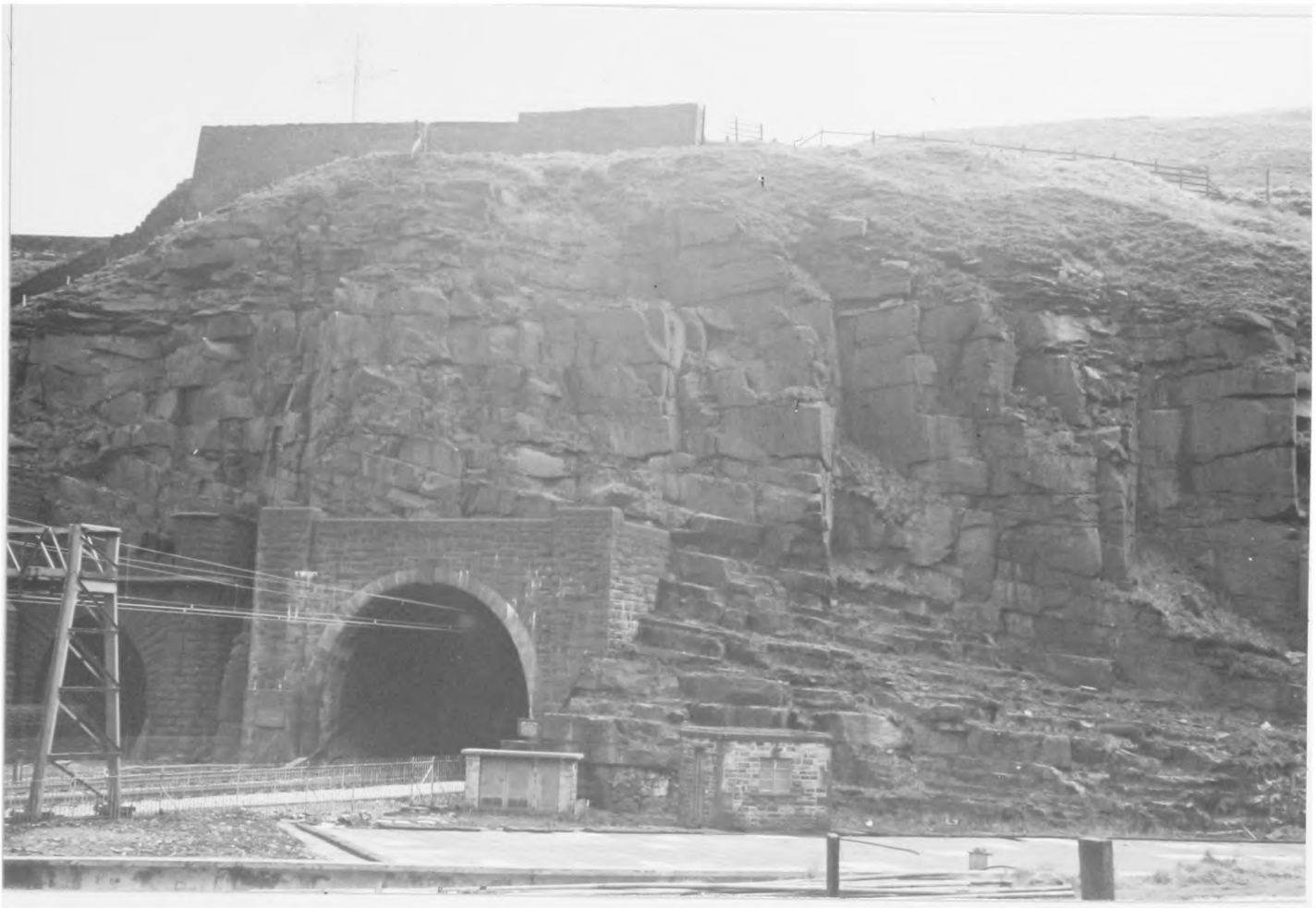


PHOTO. 51.

Mouselden Quarry. N.G.R. SK 208868. The face is about 25 m. high. Erosion surfaces within Large Scale Cross-Bedding. The lowest unit of foresets has components of dip to the right and towards the camera. The foresets are truncated by a surface dipping to the left, overlain by foresets parallel to it. These are then eroded by a surface, not clear on the photograph, dipping towards the camera, again with overlying foresets parallel to it. Horizontally lying trough cross-bedding is found in the top 2-3 m. of the face. L.K.G.



PHOTO. 52.

Kinderscout North Edge. The gulley is Upper Red Brook and Kinder Downfall is behind the first skyline. Length of edge shown in the photograph is about 700 m. A fine grained unit dipping with the coarser foresets of the large scale set is seen in Upper Red Brook, near the base of the set. It appears to be related to the prominent slack feature to the left of the gulley. The localities of Photos 33 and 67 are indicated at the right hand side of the photograph, where horizontally lying trough cross bedding overlies the large scale set. L.K.G.



PHOTO. 53.

North-west Corner of Kinderscout Plateau, level 36 m.
Facies 13, Sharp Based Clean Sandstone Beds, interbedded
with thinly bedded siltstones. The bedding plane in the
foreground has the trails shown in Photo. 56. L.K.G.

PHOTO. 54.

Edale Head. Level 56 m. Large flutes on the base
of a Facies 13, Sharp Based Clean Sandstone Bed. L.K.G.



PHOTO. 55.

Vertical section through a specimen of Facies 13, Sharp Based Sandstone, showing a rather divergent lamination. The specimen is 17 cm. high. Specimen K 17. Crowden Brook, Edale. Level 123 m. L.K.G.

PHOTO. 56.

North-west Corner of Kinderscout Plateau. Level 36 m. Sinusoidal trails on the top surface of a Facies 13, Sharp Based Clean Sandstone Bed. L.K.G.



PHOTO. 57.

Crowden Little Brook, level 164 m. Hollow trunk of plant in the position of growth, surrounded and filled by siltstone. The surface seen is a steeply dipping oblique section. L.K.G.

PHOTO. 58.

Crowden Little Brook, level 95 m. Facies 15, Orthoconglomerate. A winnowed concentration of rounded quartz pebbles, overlying an erosion surface. L.K.G.



PHOTO. 59.

Crowden Great Brook, lower section, level 0-10 m.
Facies 17, Turbidite-like Sandstones. In the base of the exposure, behind the figure, the sandstones are interbedded with siltstones. Above they are thicker, more erosive, have less siltstone and appear to be in a channel. L.K.G.

PHOTO. 60.

Crowden Little Brook. Loose block found at level 28 m. The lower surface of a bed of silty sandstone, intensively reworked by vertically burrowing organisms, showing the characteristically ellipsoidal shape of the burrows. G.S.

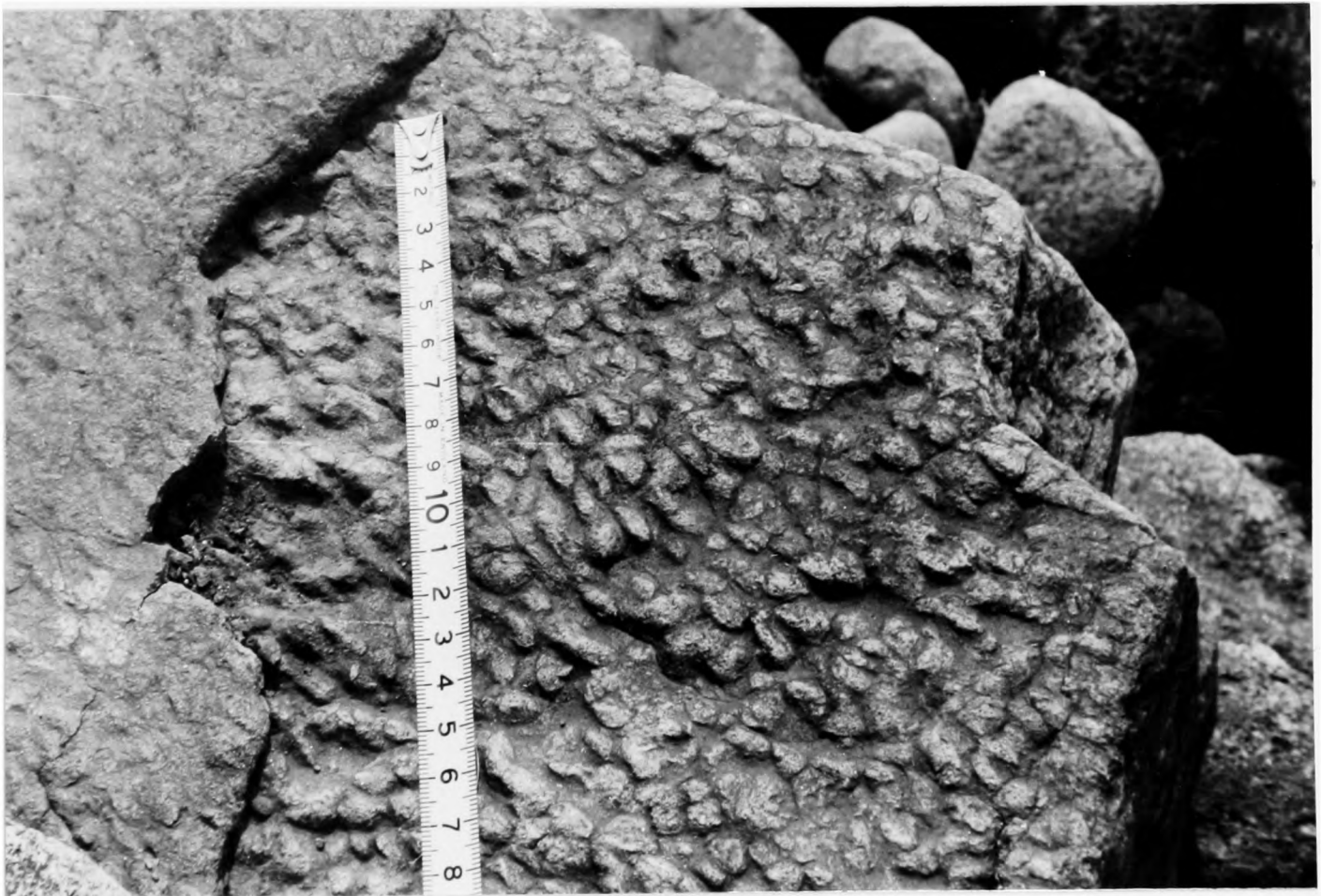


PHOTO. 61.

Crowden Great Brook, lower section. Level 20 m.

An apparent channel in silty sandstone. The material outside the 'channel' is very silty and free of burrows. Within the 'channel' an identical lithology is intensively burrowed and no erosion surface is seen between the units.
L.K.G.

PHOTO. 62.

Heyden Brook, lower section, Level 12 m. the top bedding plane of the unit shown in Photo. 7, covered with small radiating clusters of mud-filled depressions, thought to represent the feeding traces around the mouths of vertical burrows. L.K.G.



PHOTO. 63.

A close-up of the pattern of mud-filled depressions seen in Photo. 62. L.K.G.

PHOTO. 64.

A vertically cut section through a specimen of vertically burrowed silty sandstone. Poorly defined vertical zones of disturbance are related to protrusions on the lower bedding surface. Specimen is 7 cm. high. Specimen K 35. Nether Tor, Grindsbrook, above channel I, Level 31 m. L.K.G.

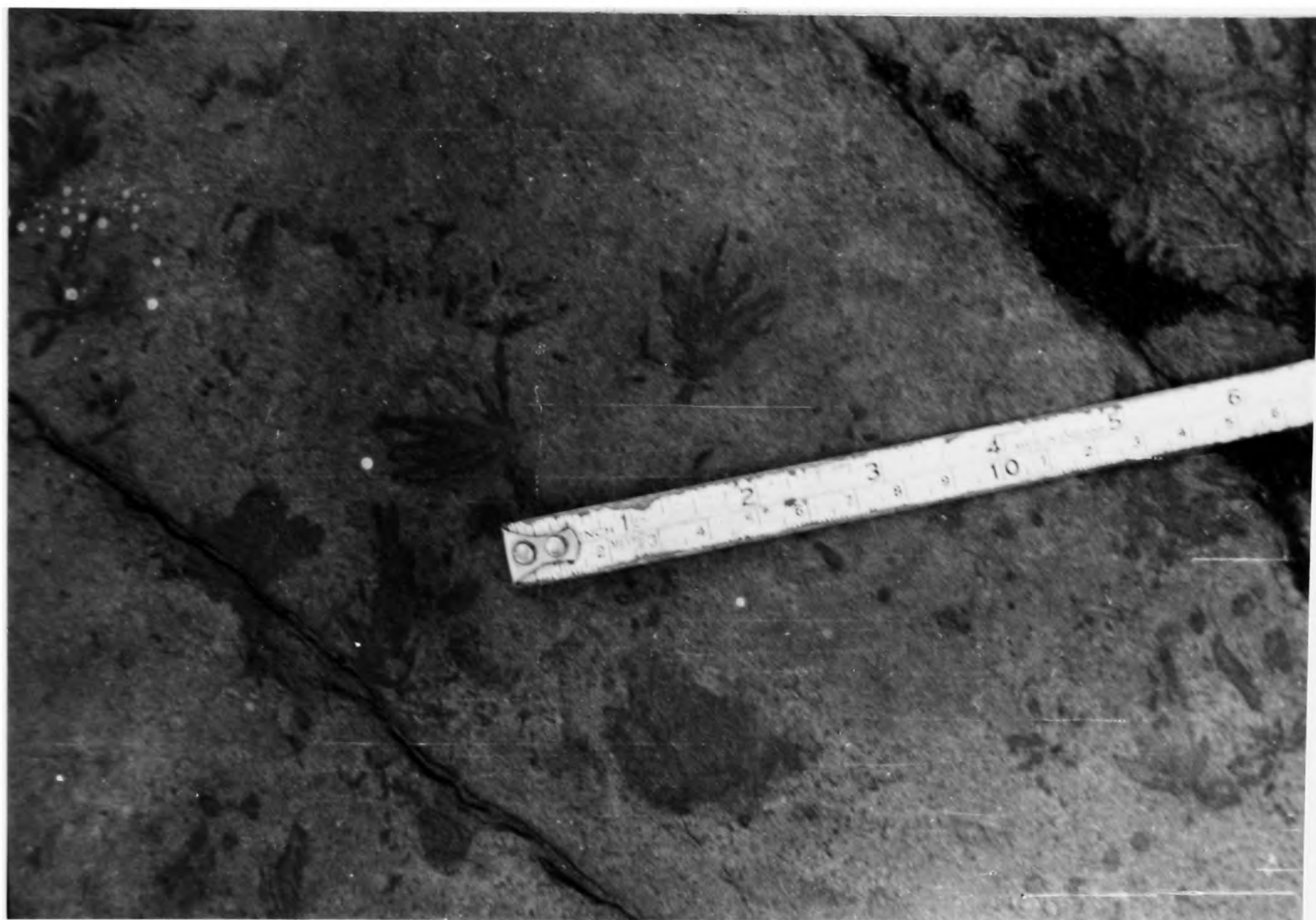


PHOTO. 65.

Heyden Brook, lower section, Level 17 m.

Grooves on the basal erosion surface of a Major Channel. The erosion surface is cut into fine siltstone, and is overlain by massive coarse sandstone. L.K.G.

PHOTO. 66.

Crowden Great Brook, upper section, Level 2 m.

Overhanging erosion surface on the base of a Major Channel. There are clear grooves on the vertical and upper surfaces. Siltstone overlies the horizontal surface while the vertical wall is cut into silty sandstone.



PHOTO. 67.

Kinderscout North Edge, west of Upper Red Brook.
For locality see Photo 52. A horizontal erosion surface truncates the top of a Facies 12, Large Scale Cross-Bedded set and is overlain by a 2 m. tabular set. The tabular set itself is overlain by trough cross-bedding which on its top surface shows the pattern seen in Photo. 33.

L.K.G.



PHOTO. 68.

Bamford Edge. The Large Scale set at the right is about 8 m. thick. 'En echelon' overstepping of Facies 12, Large Scale sets. The right hand set thins up dip to form one of the horizontal beds overlying the large set on the left. L.K.G.



PHOTO. 69.

Ladybower Reservoir at the base of Ladybower Brook. Section through a small delta cone built into the reservoir by the stream and eroded into during a low stand of the reservoir. The tabular set is erosively overlain by horizontally lying thinner units of small scale cross-bedding. cf. Photos. 46 and 67.

PHOTO. 70.

Harden Clough. N.G.R. SK 177991.

Planar horizontal erosion surface, cut into siltstones, and overlain by medium scale trough cross-bedded sandstone at the base of a unit of the Fluvial Channel Association. The sandstone exposure is up to about 3 m. high. U.K.G.



PHOTO. 71.

Loftend Quarry. The face is about 24 m. high. The low angle cross-bedded unit in the middle of the face is 6 m. thick and has foresets of alternating sandstone and siltstone, dipping at about 4° . A continuous siltstone horizon underlies the basal, horizontal erosion surface. L.K.G.

PHOTO. 72.

Stream Iib, level 72 m. East of Blackden Brook. Low angle cross-bedded set of parallel laminated sandstone filling a small channel. Basal erosion surface at the hammer head. G.S.

