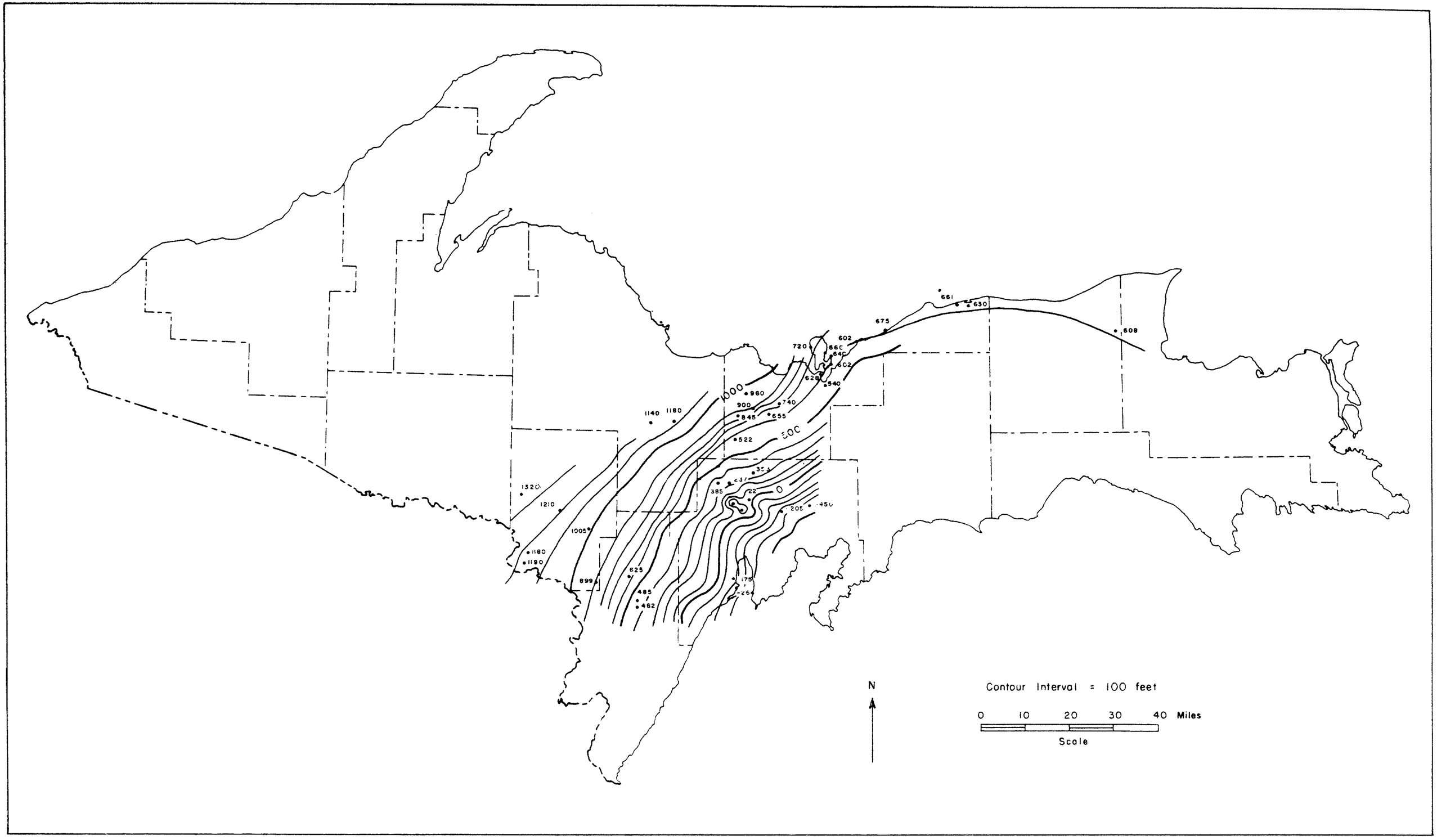

1000
500
0
1140
1180
1320
1210
1005
1180
1190
899
625
485
462
960
900
845
740
655
522
720
602
660
640
602
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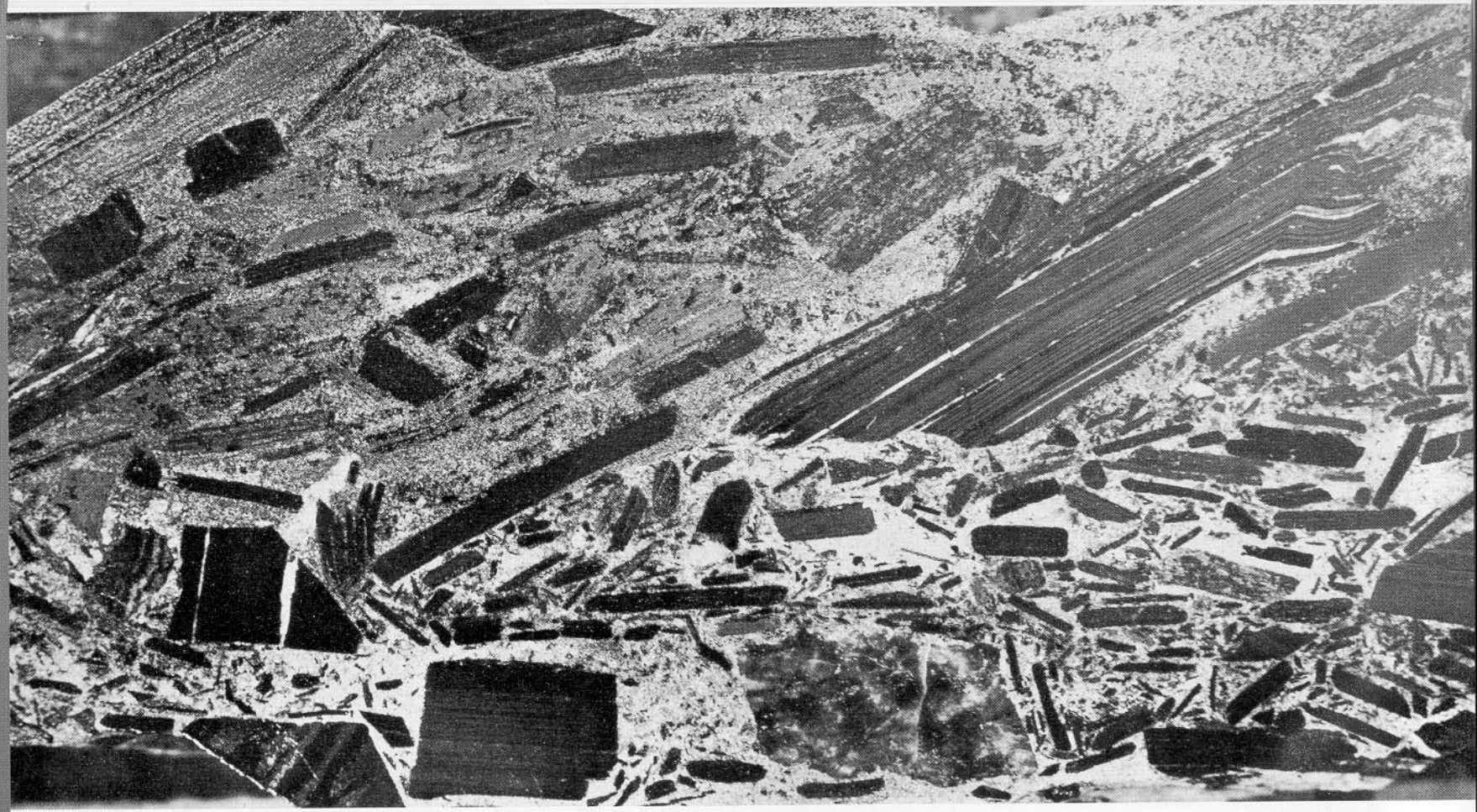
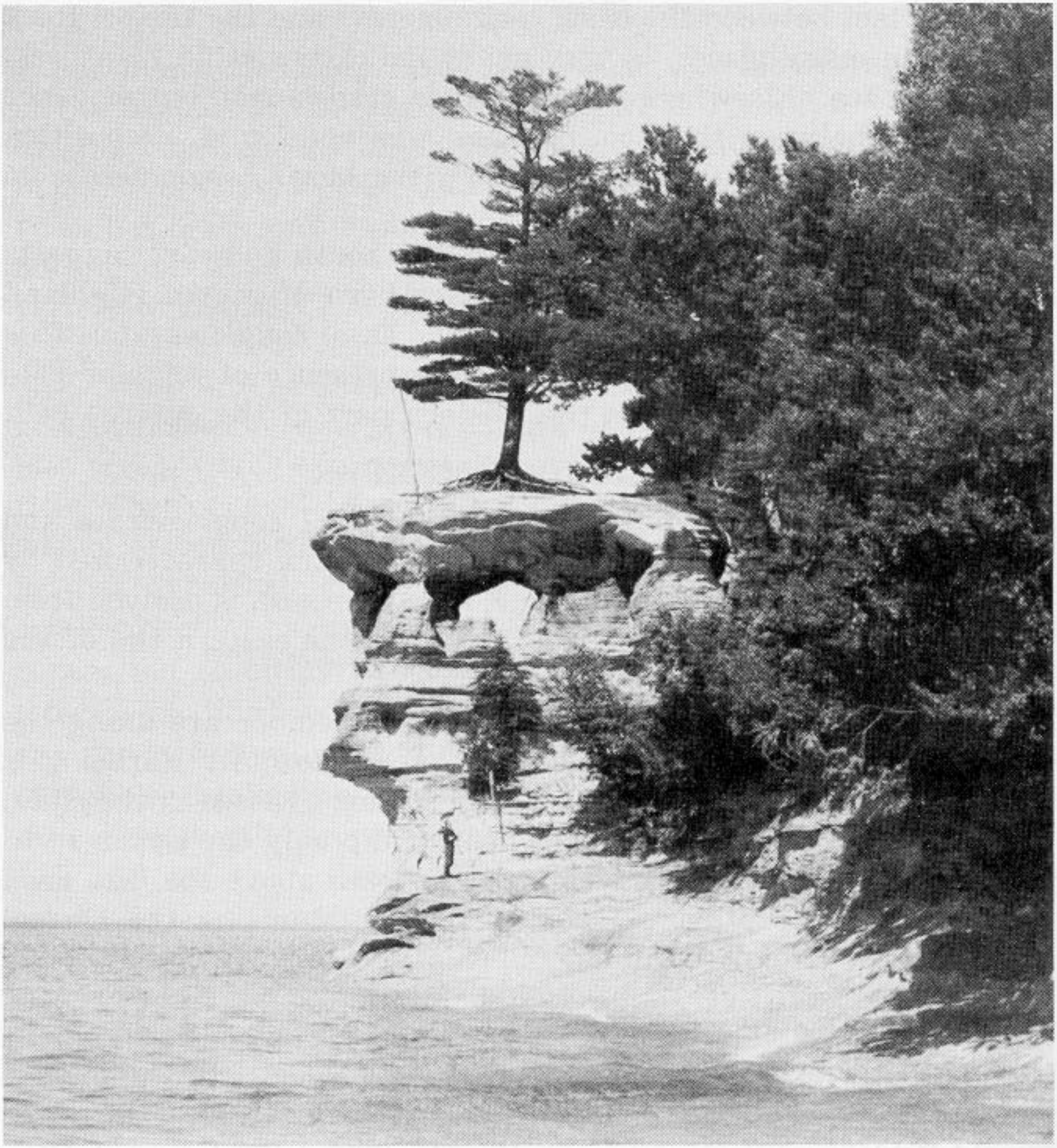
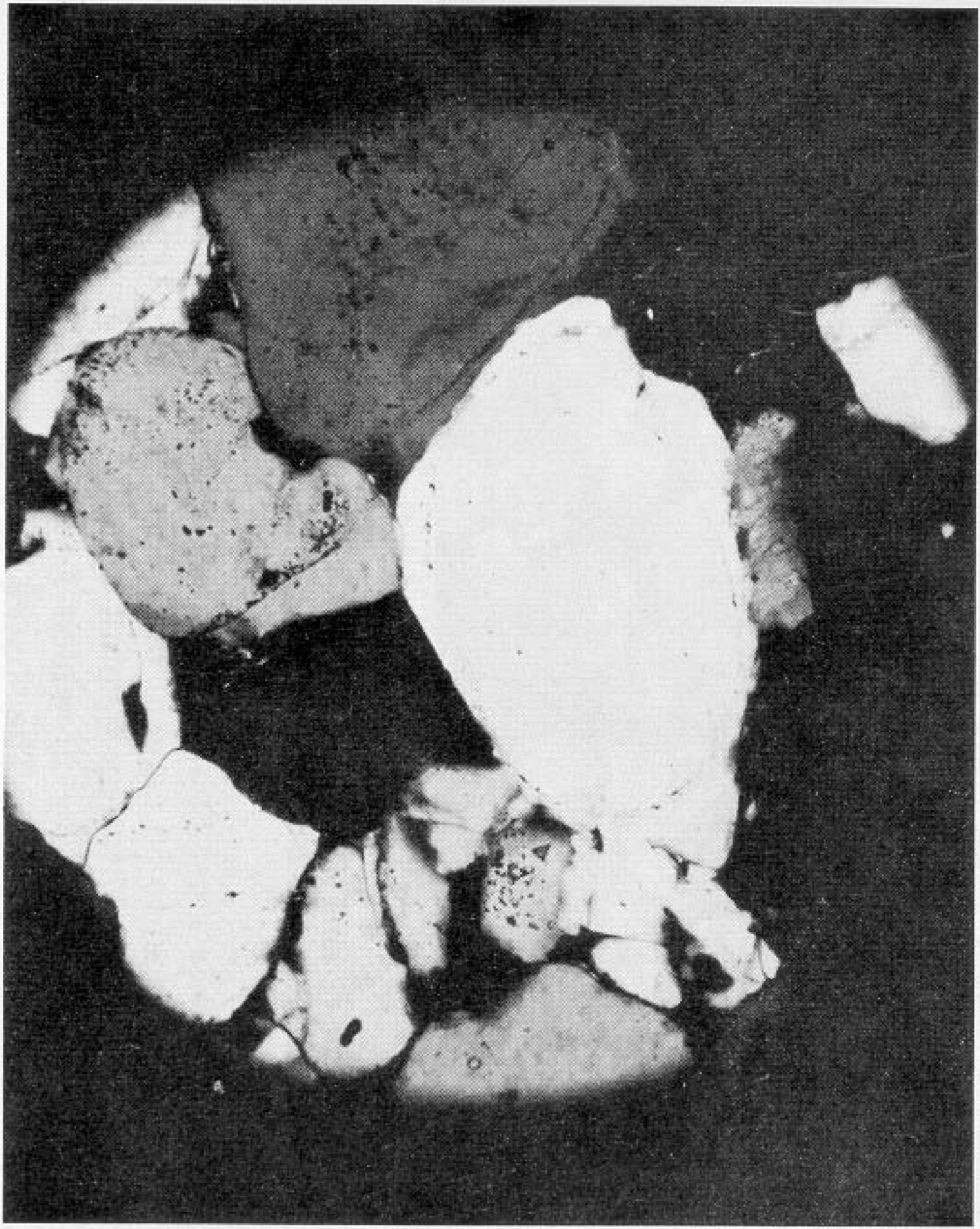
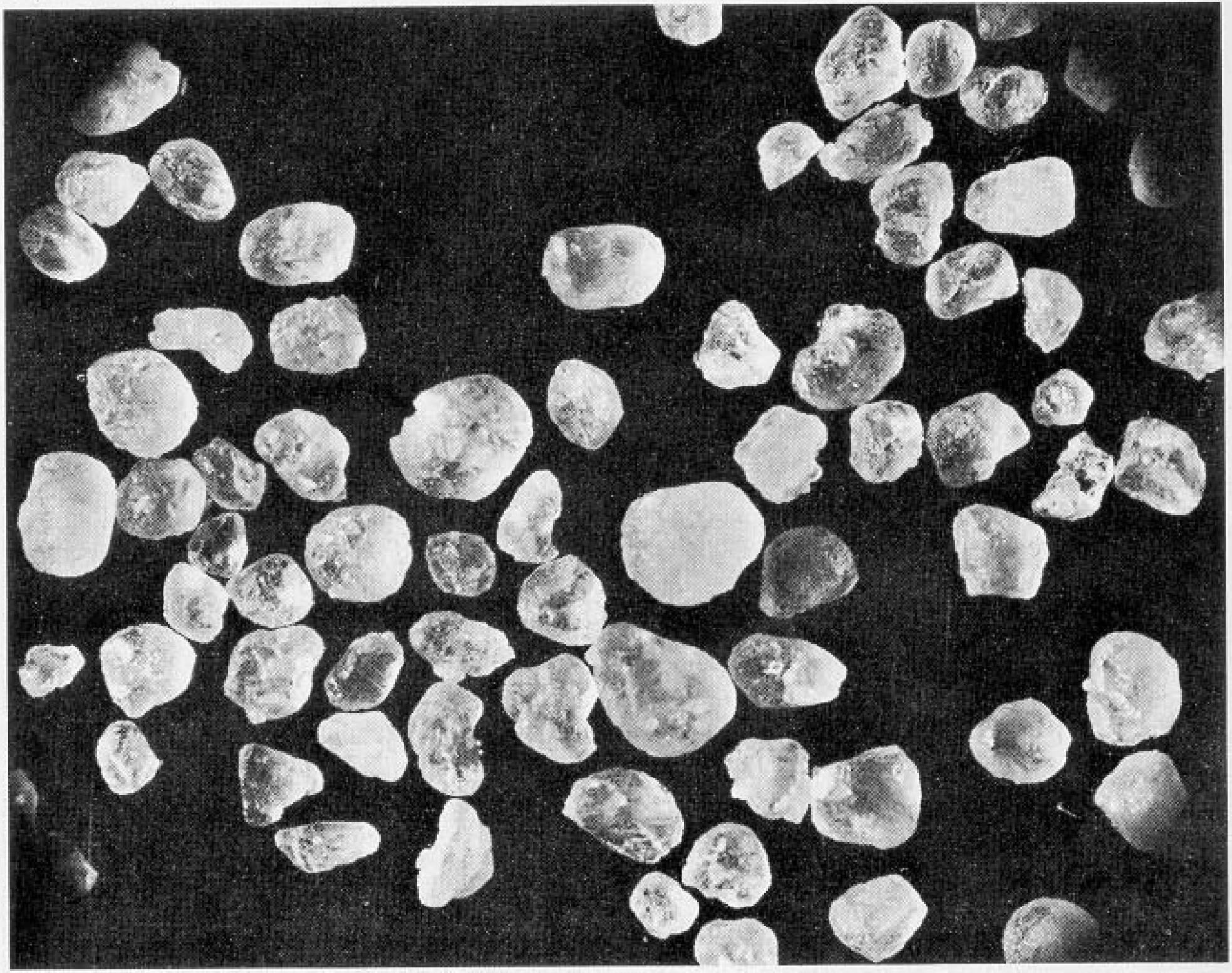
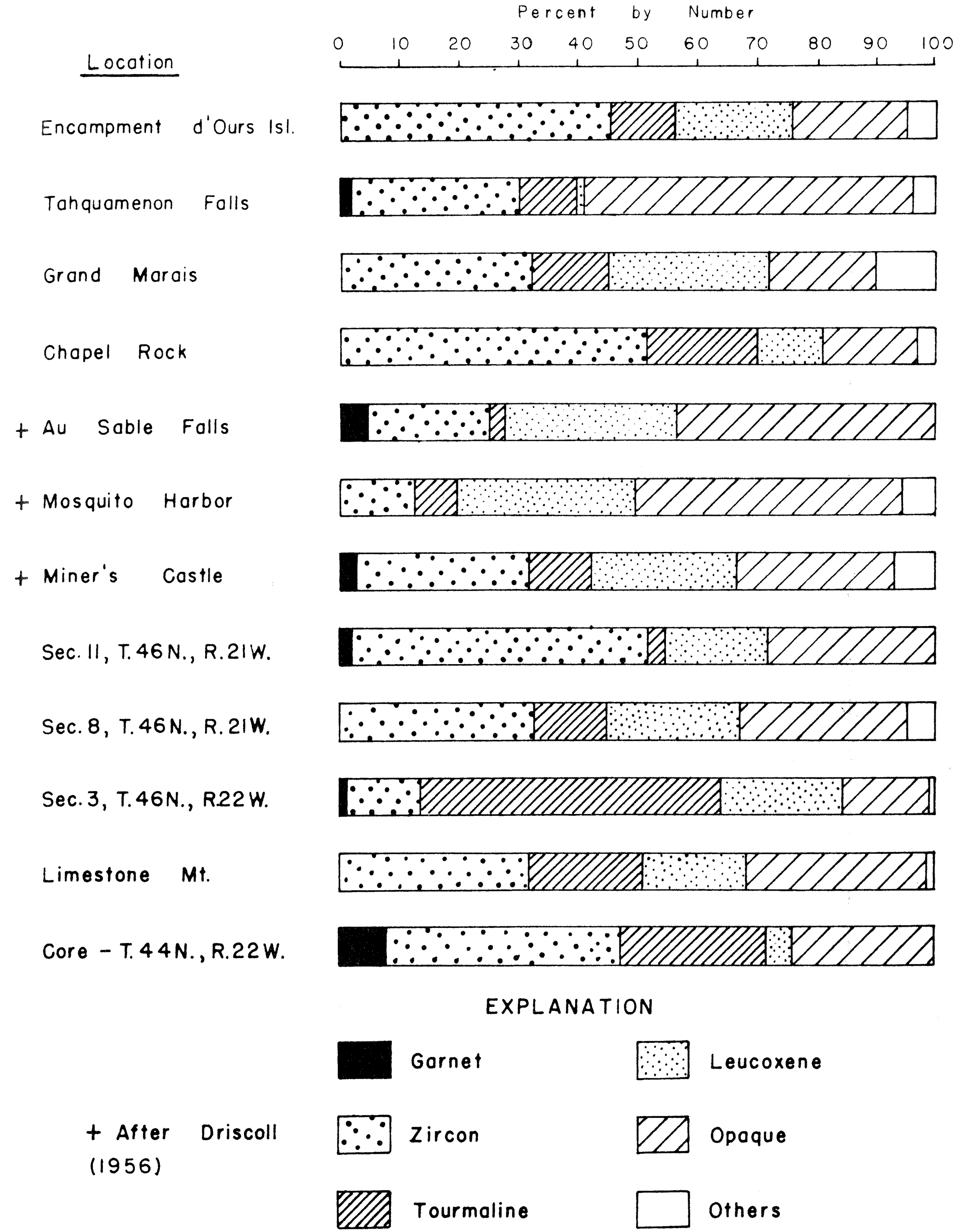
22
205
175
264
N
Contour Interval = 100 feet
0 10 20 30 40 Miles
Scale

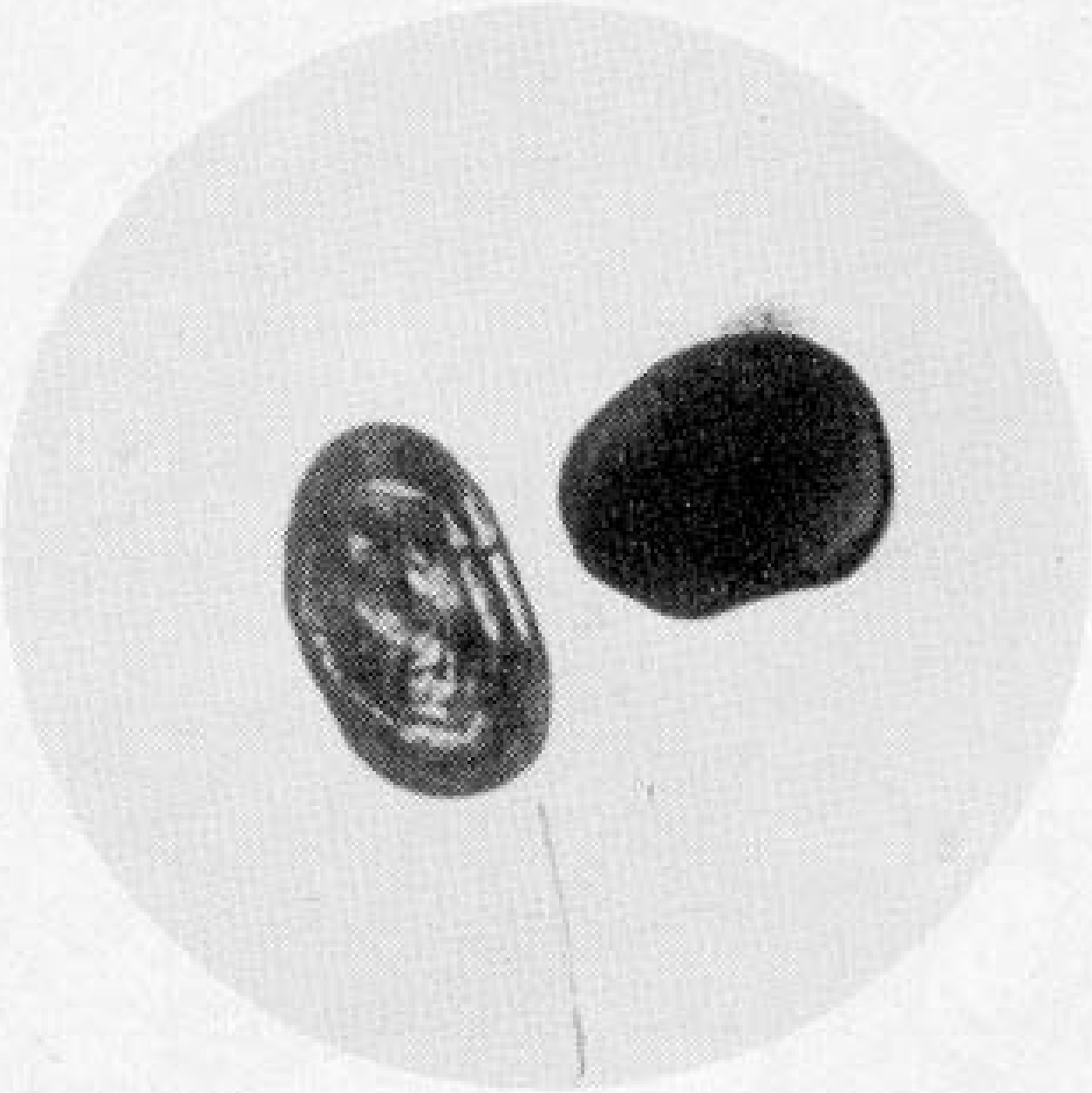


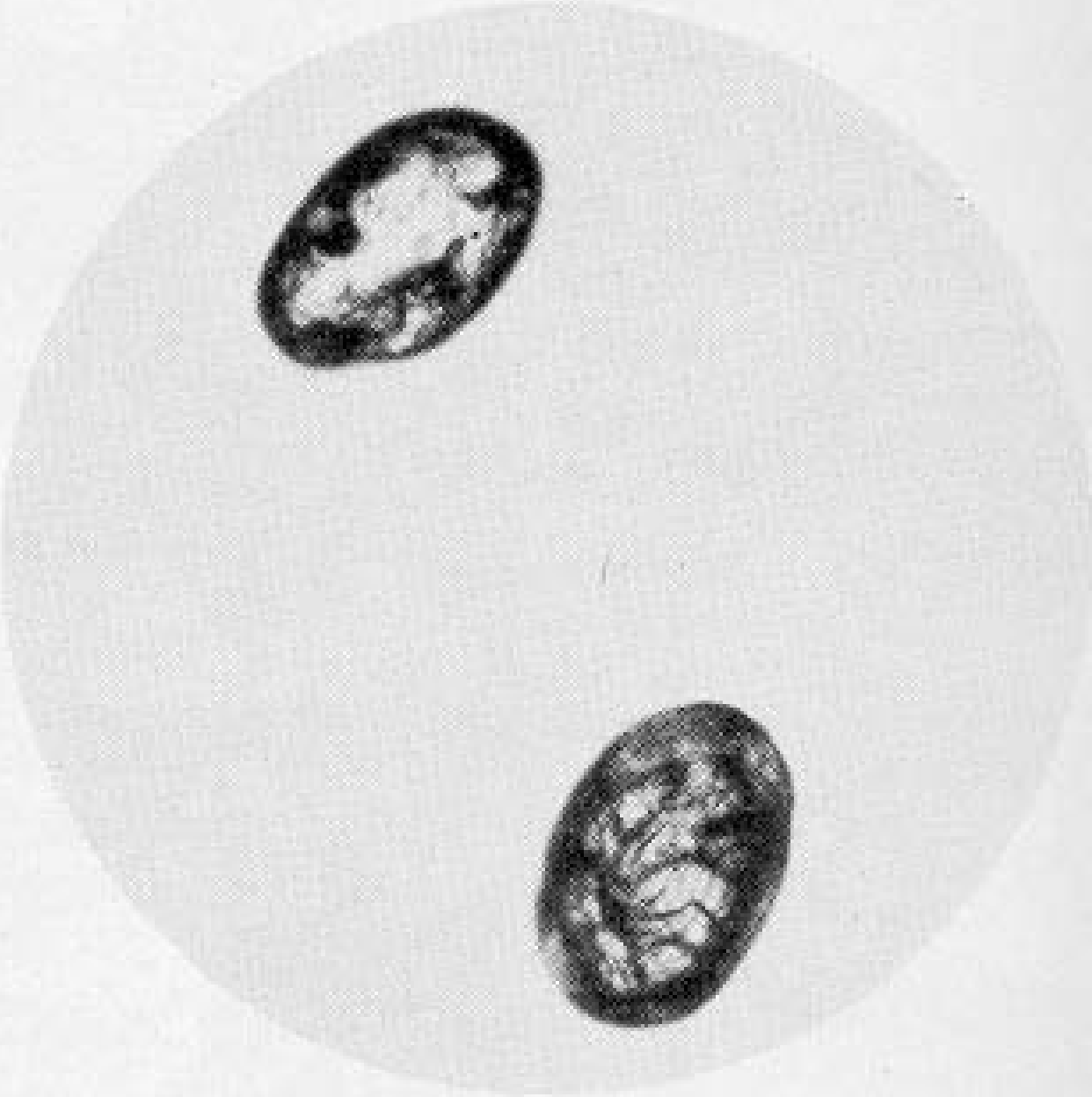


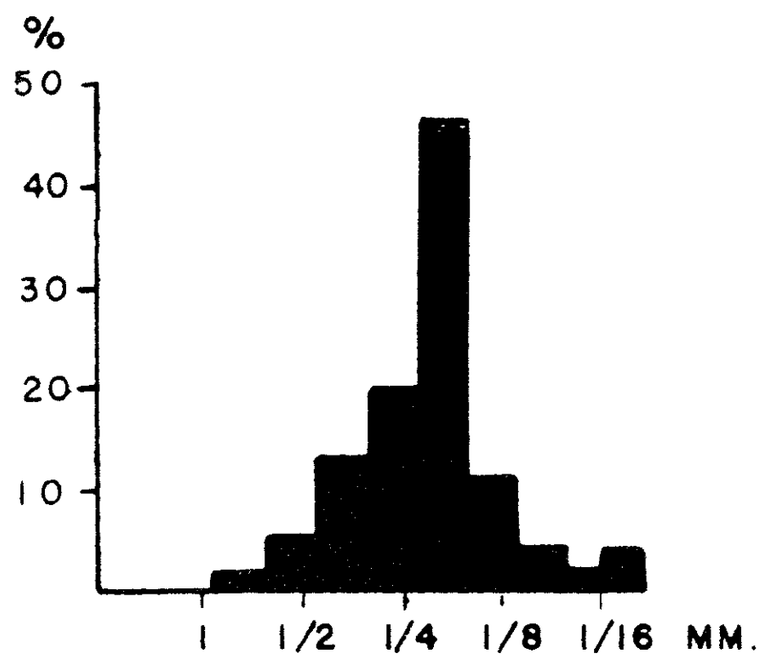




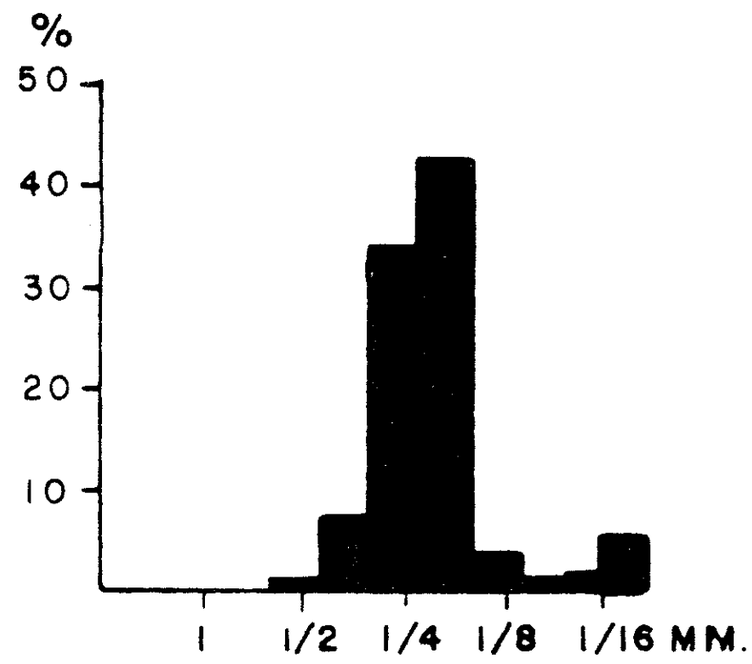

Percent by Number
0 10 20 30 40 50 60 70 80 90 100
Location
Encampment d'Ours Isl.
Tahquamenon Falls
Grand Marais
Chapel Rock
+ Au Sable Falls
+ Mosquito Harbor
+ Miner's Castle
Sec. 11, T. 46 N., R. 21 W.
Sec. 8, T. 46 N., R. 21 W.
Sec. 3, T. 46 N., R. 22 W.
Limestone Mt.
Core - T. 44 N., R. 22 W.
EXPLANATION
Garnet
Leucoxene
Zircon
Opaque
Tourmaline
Others
+ After Driscoll (1956)



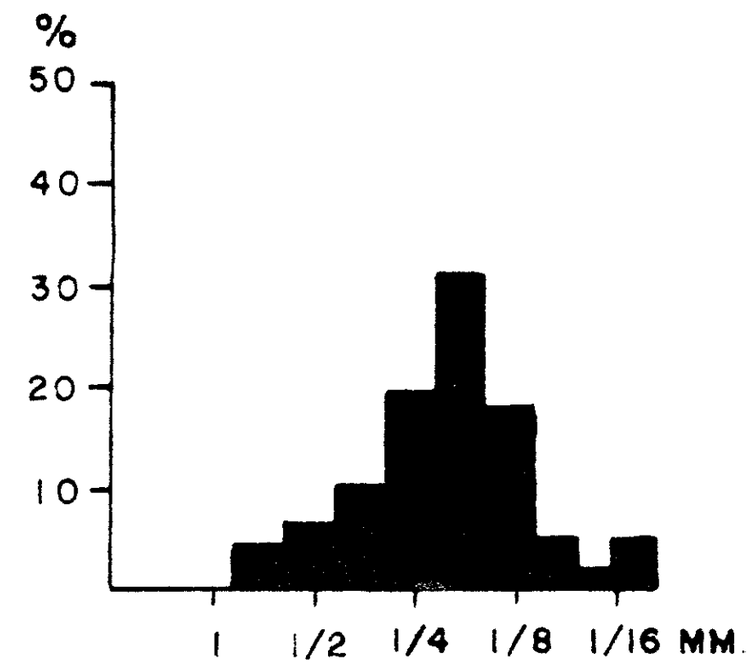




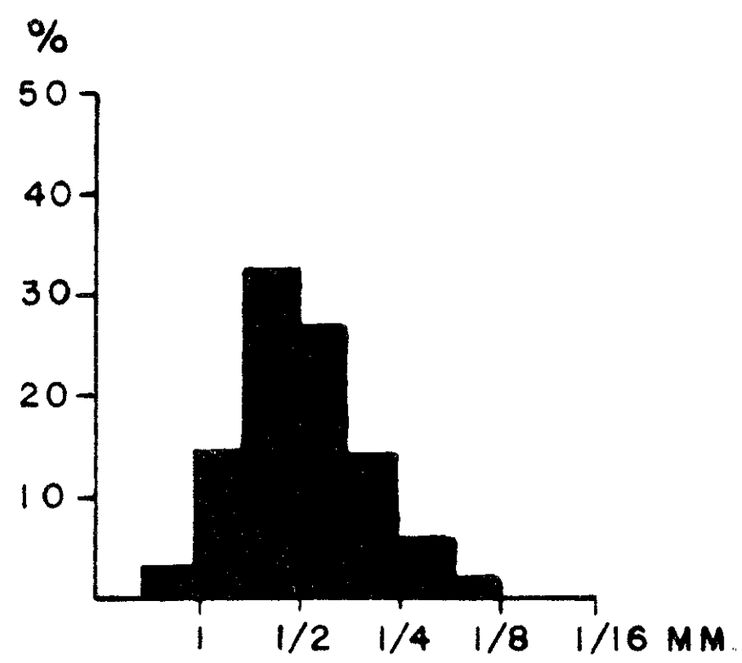
Encampement d'Ours Isl.



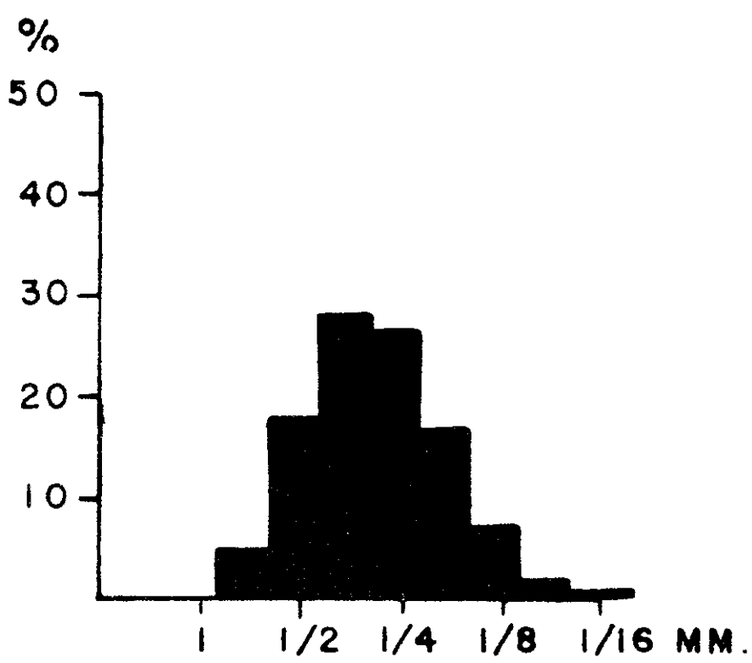
Tahquamenon Falls



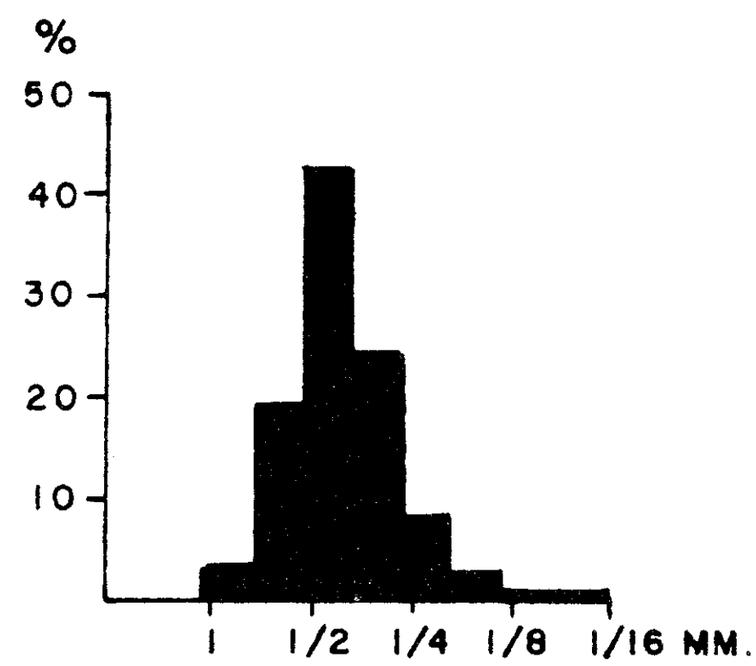
Grand Marais



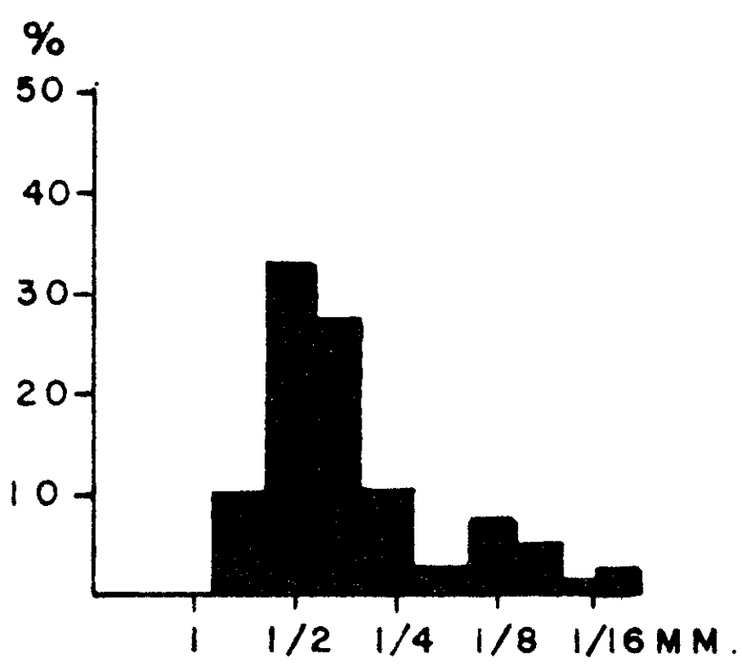
Chapel Rock



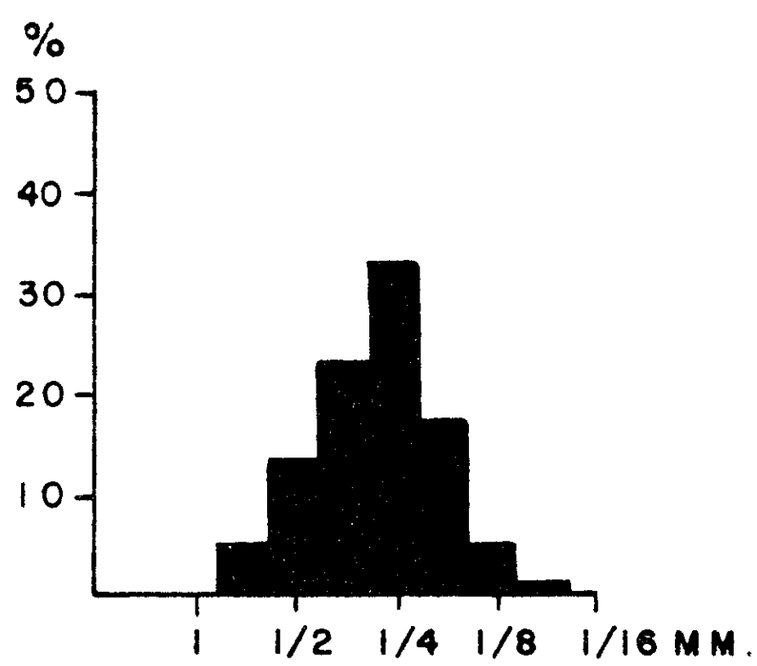
Chapel Rock



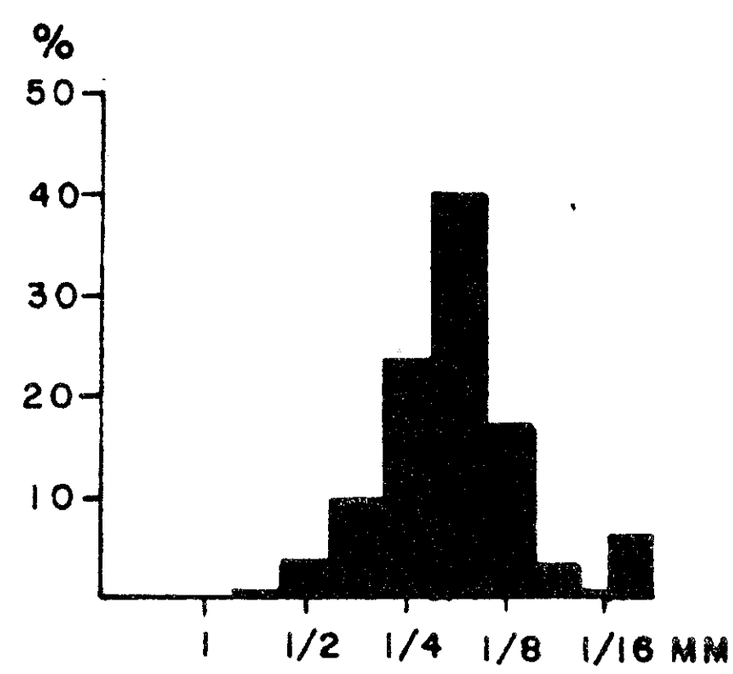
Mosquito Harbor



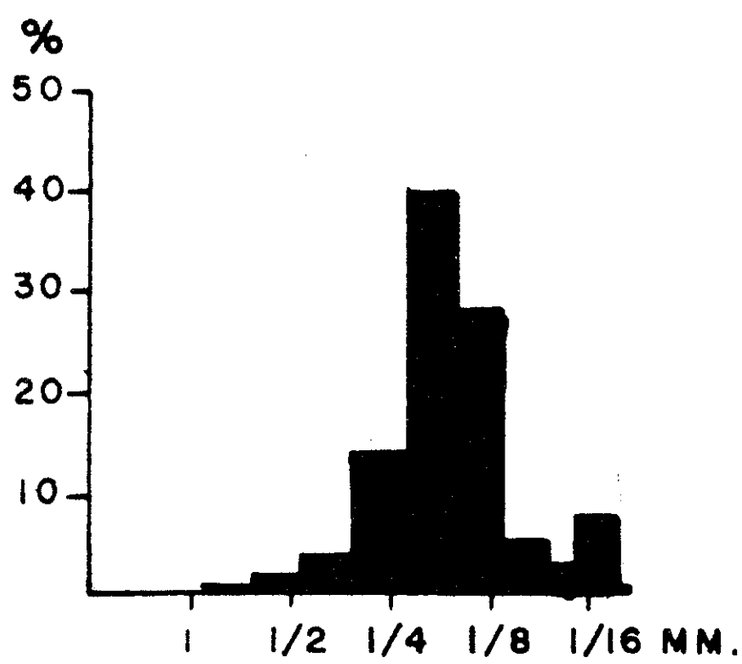
Miner's Castle



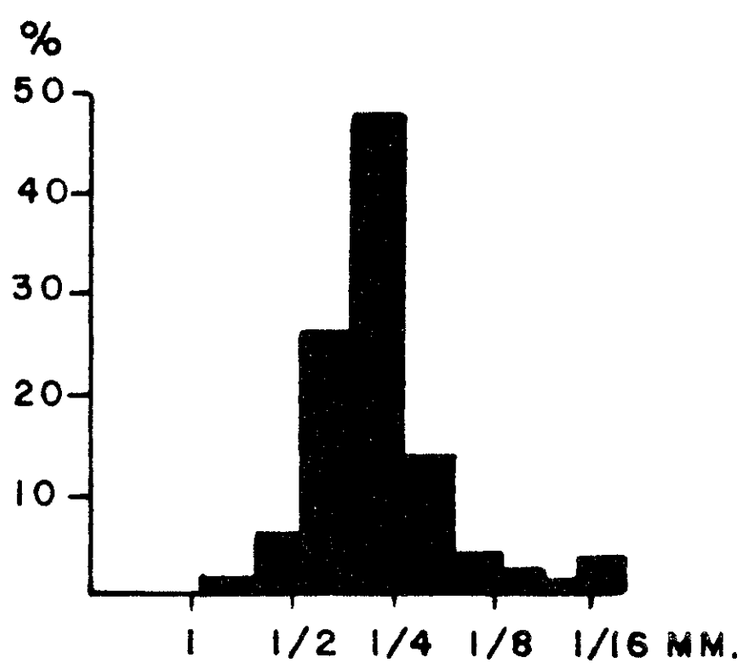
Sec. 1, T. 46. N., R. 21 W.



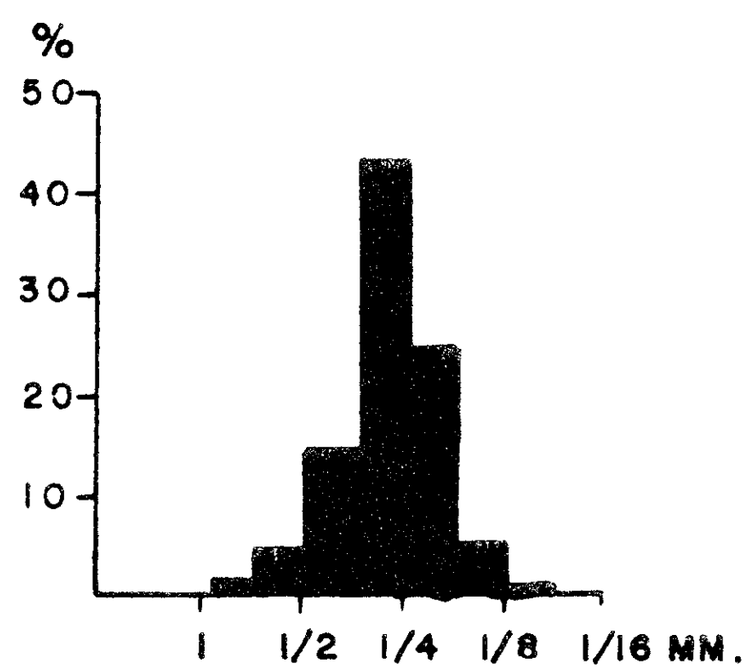
Sec. 6, T. 46 N., R. 21 W.



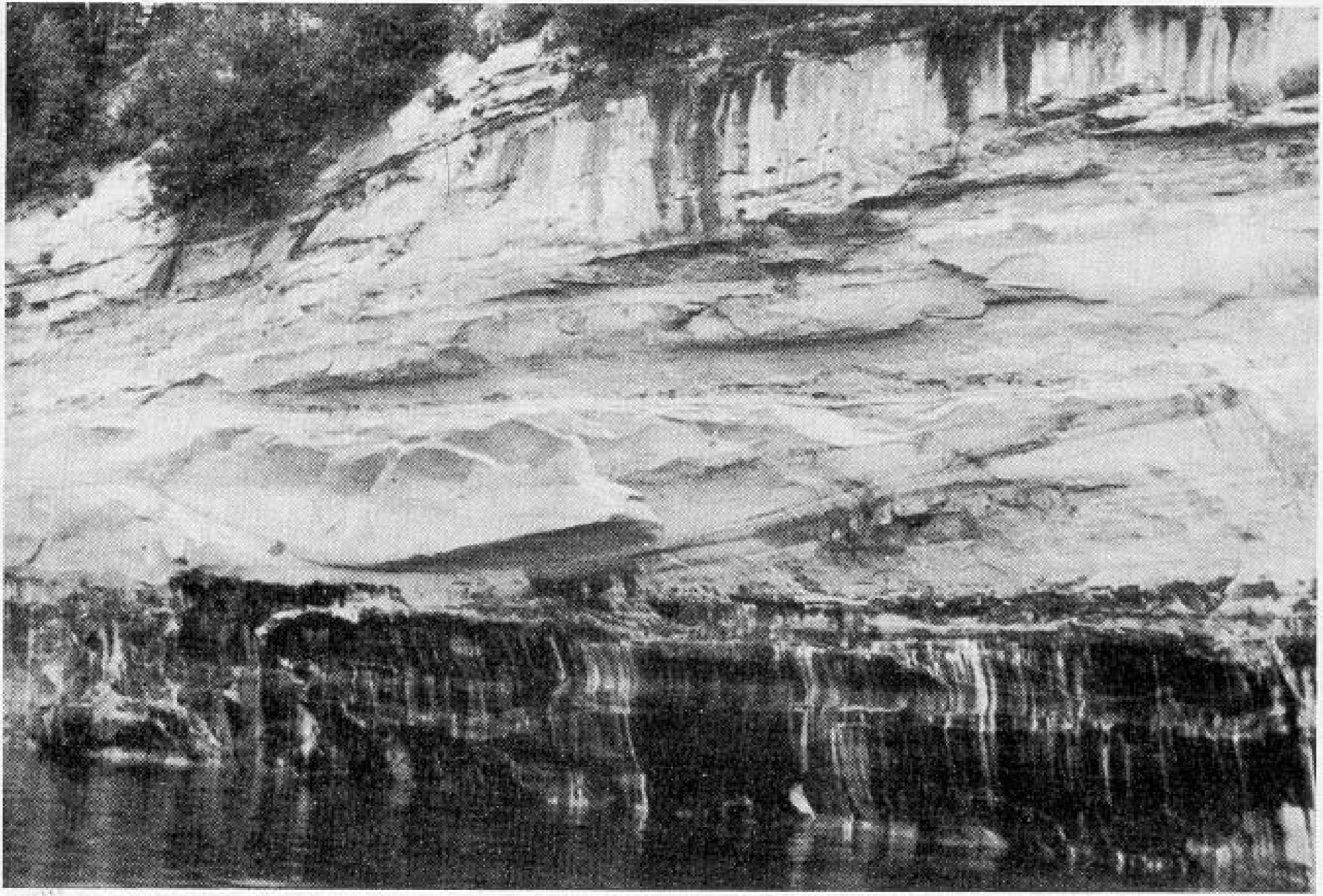
Core - T. 46 N., R. 24 W.

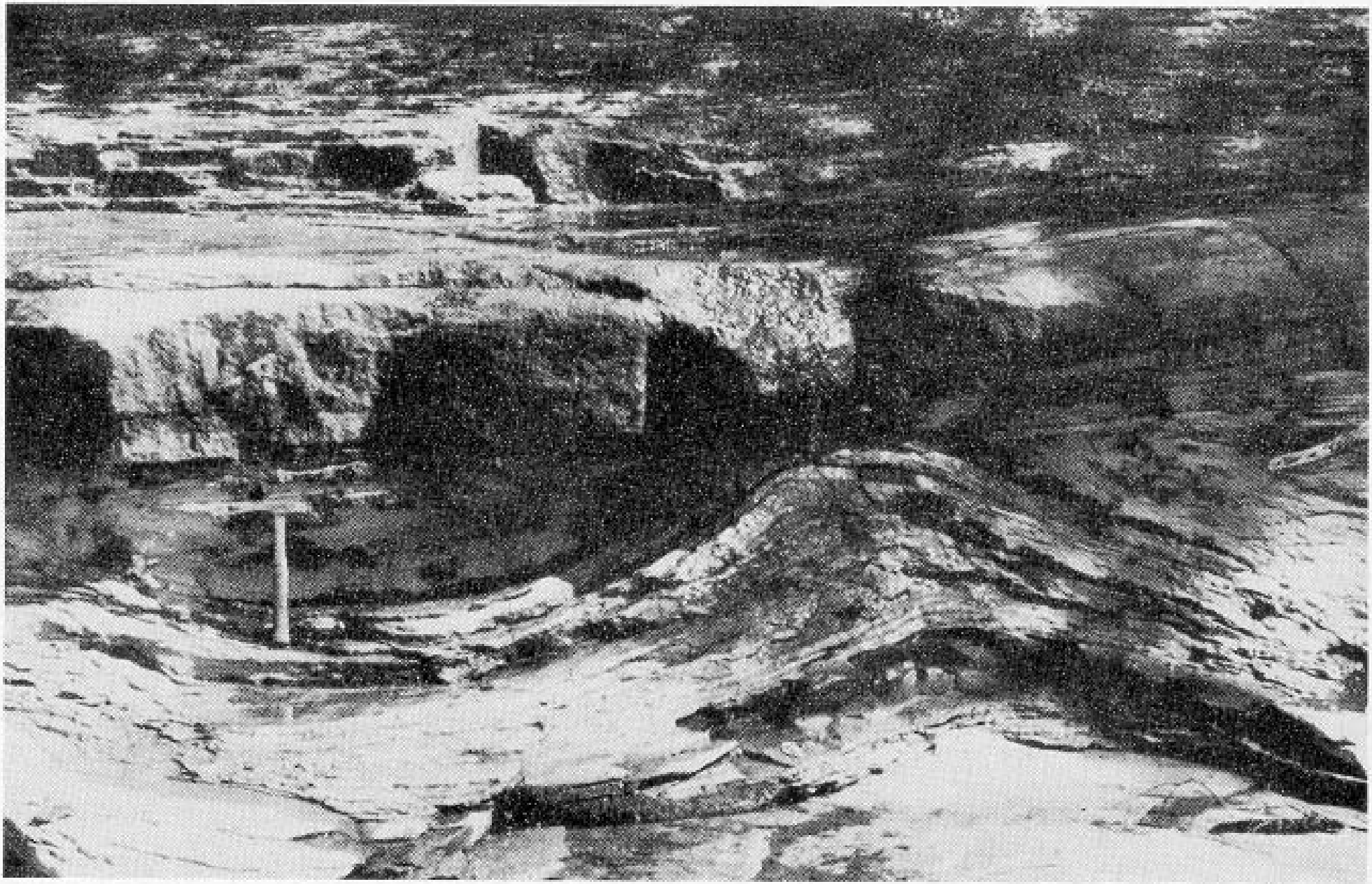


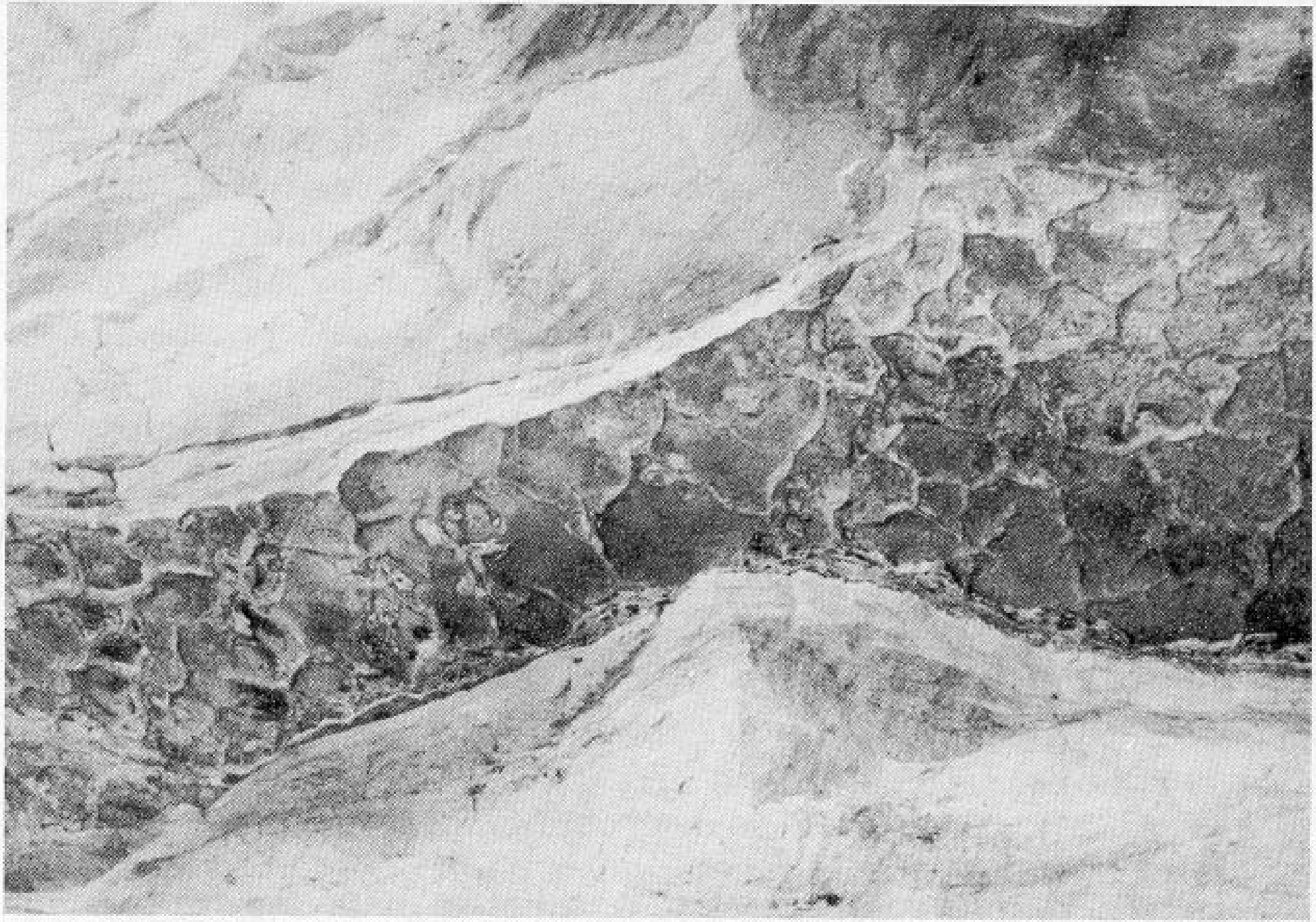
Laughing Whitefish River

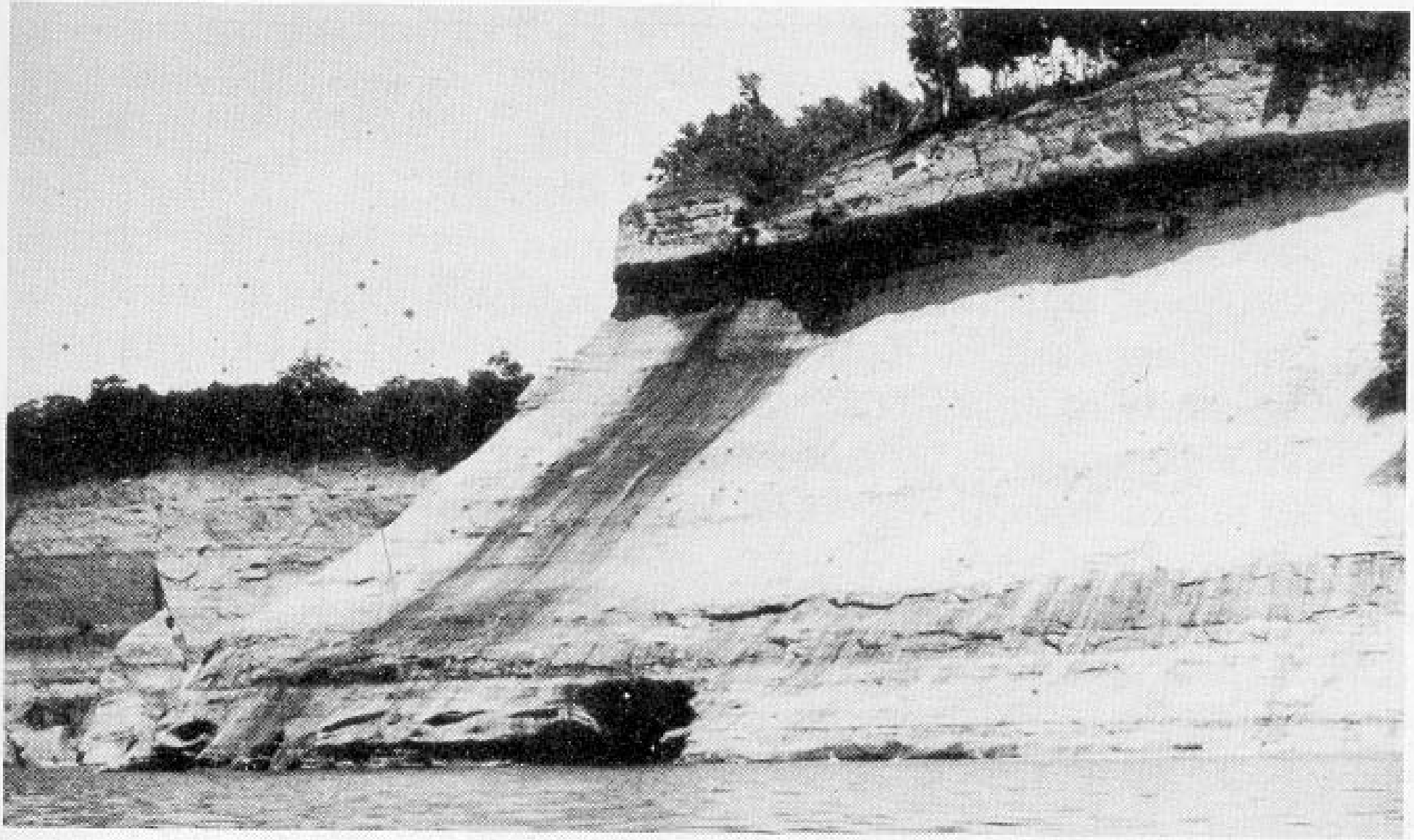


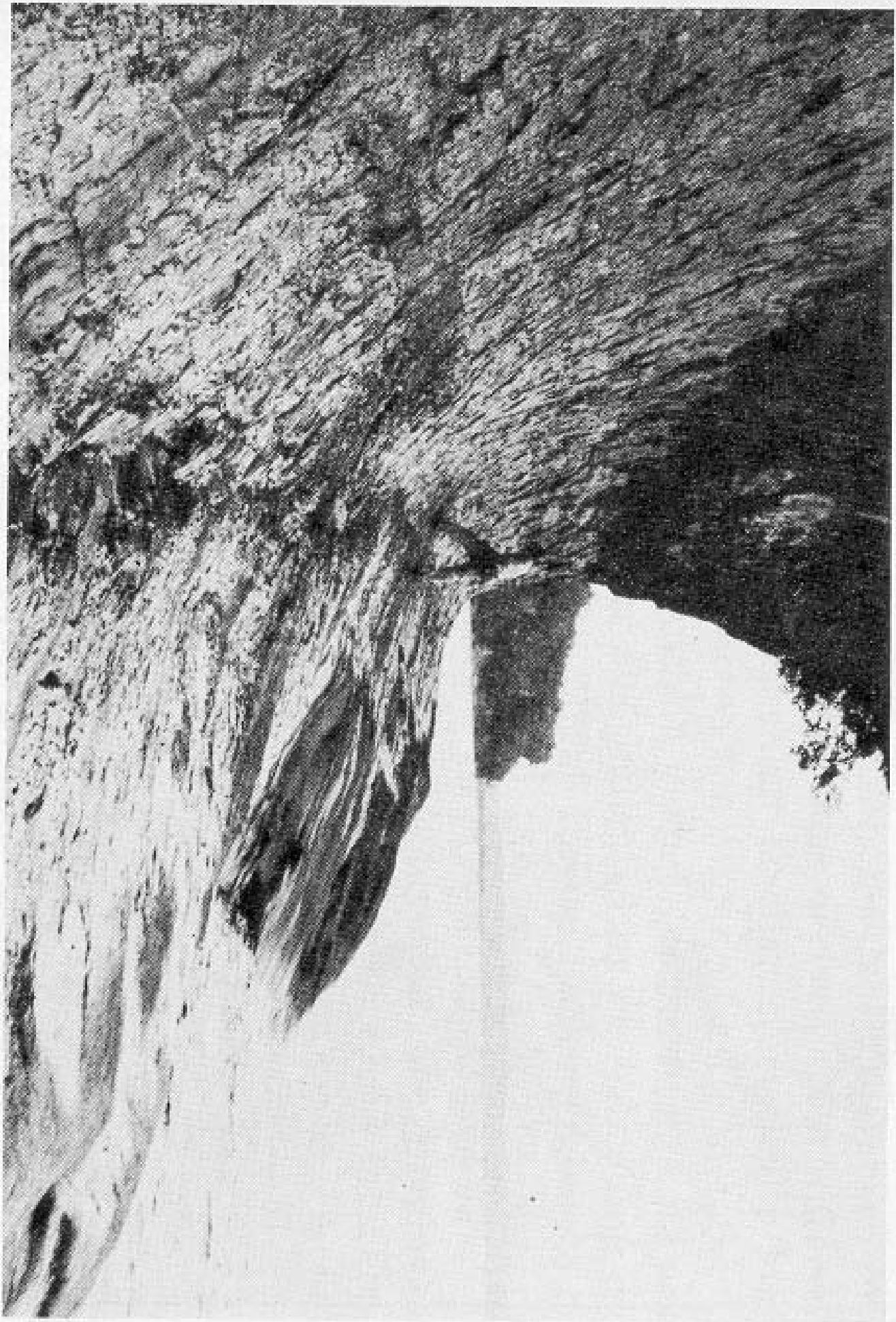
Limestone Mountain

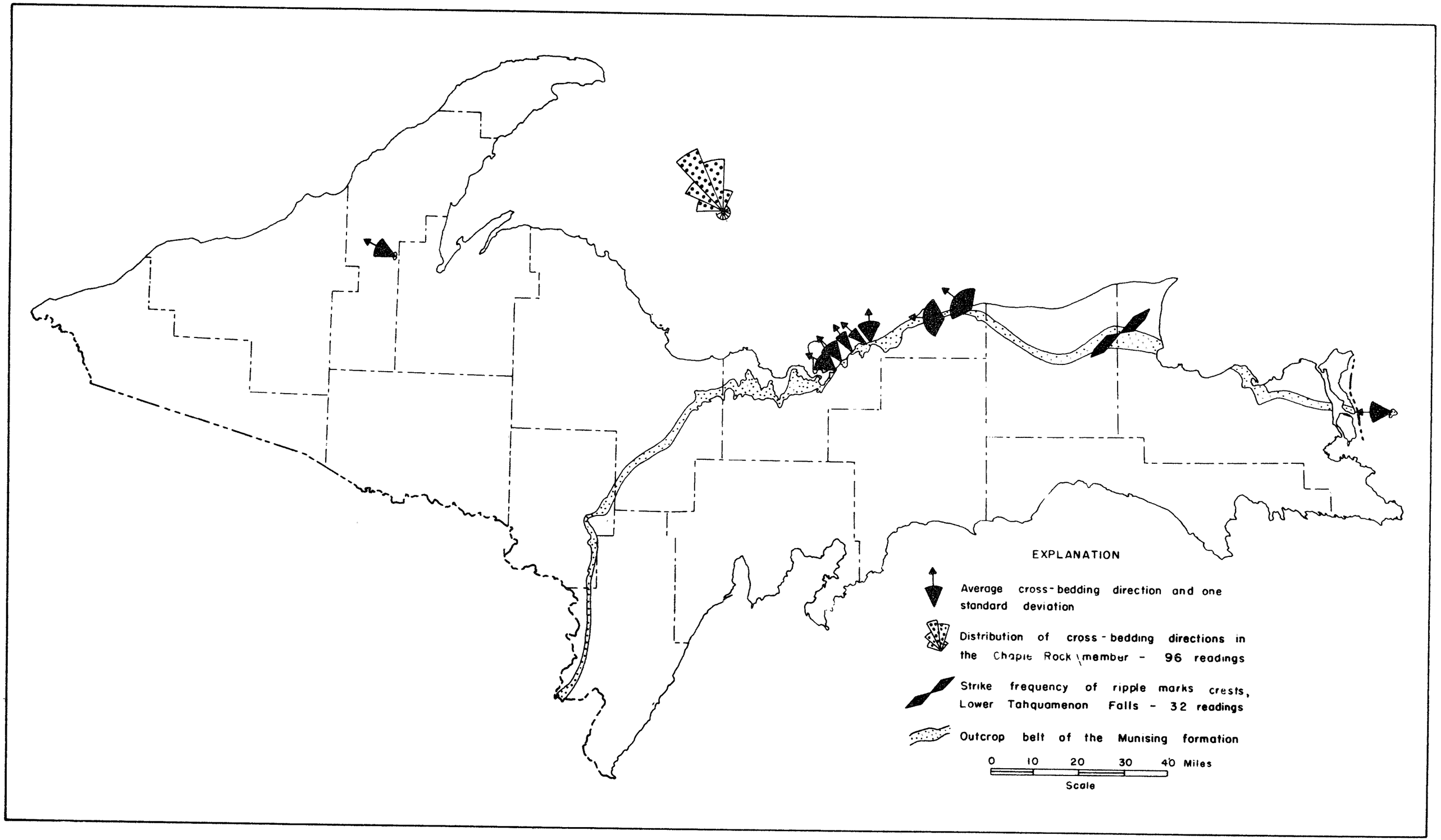


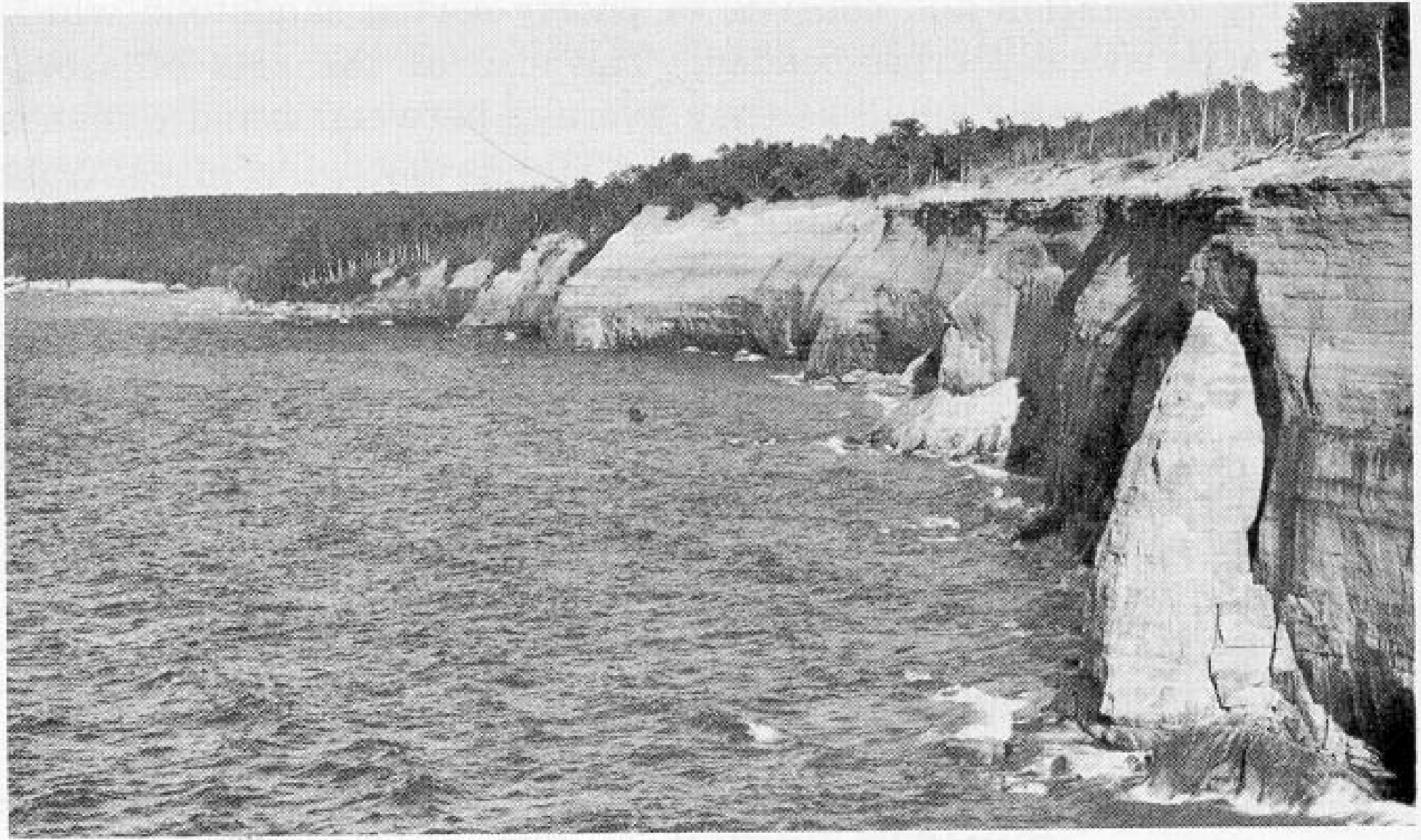


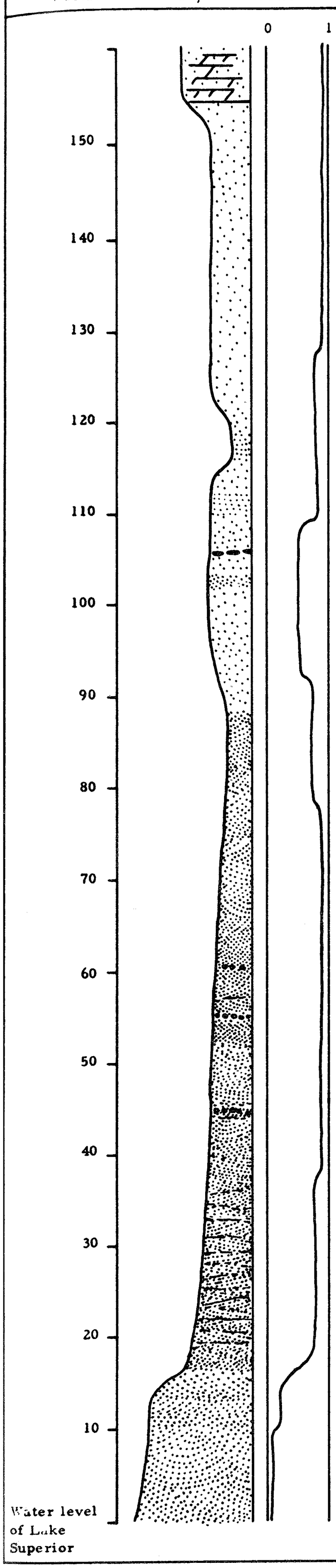







EXPLANATION
Average cross-bedding direction and one standard deviation
Distribution of cross-bedding directions in the Chapie Rock member - 96 readings
Strike frequency of ripple marks crests, Lower Tahquamenon Falls - 32 readings
Outcrop belt of the Munising formation
0 10 20 30 40 Miles
Scale





Description of lithology

Dolomitic sandstone, light brown, very resistant

Base of AU TRAIN formation unconformity

Top of MUNISING formation - Miner's Castle member

Sandstone - white, medium-grained, friable, massive bedding (1' to 4' thick), forms vertical cliffs

Details of sedimentary structures obscured by weathering; many units appear to be cross-bedded

Sandstone - white, medium-grained, well sorted, massive bedding (1' to 2' thick), small caves and arches, friable

Numerous large concretions along bedding plane

Small-scale cross bedding

Red stains along certain horizons

Small-scale cross bedding

6" bed, very resistant, contains abundant matrix

Sandstone, predominantly white to gray, minor streaks of red, blue and green, poorly sorted

Base of Miner's Castle pinnacle

Coarse sandstone concentrated along certain bedding planes

Abundant clay pellets deposited parallel to the cross bedding

Channels and lenses of fine conglomerate

Small conglomerate lenses

Coarse sand and conglomerate lenses

Blue, green, red, and yellow coloration following bedding planes

Sandstone, gray to grayish-blue, medium-grained, poorly sorted, small-scale cross bedding 4"-6" thick separated by thin blue shale lenses 1/4"-1" thick (approximately 20-30 percent shale), some coarse and fine conglomerate

Base of Miner's Castle member unconformity

Top of Chapel Rock member

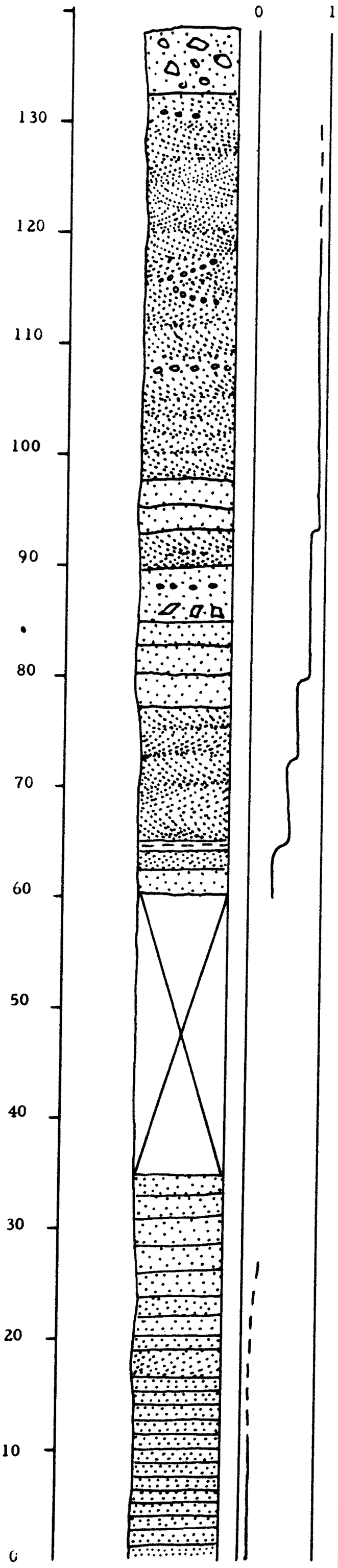
Sandstone, pink, coarse-grained, well sorted, rounded, abundant clay pellets

Mud cracks 4"-8" in diameter developed in beds of blue shale less than 1' thick.

Clay pellets

Sandstone, light brown to buff, well sorted

Large-scale cross bedding 10' thick.



Approximate level of Lake Superior

Description of lithology

Drift

Munising formation, Miner's Castle member

Sandstone, fine- to coarse-grained, containing numerous lenses of fine conglomerate, extremely friable, well rounded; minor blue shale lenses separating lower units; small-scale cross bedding

Poorly sorted, abundant coarse sand and fine conglomerate and blue shale and silt lenses

Crest of Upper Tahquamenon Falls

Blue shale lenses separate essentially every cross-bedded unit

Extremely friable

Fine conglomerate lenses
Intraformational conglomerate

Hard, weathers in blocks

Planar cross-bedding, approximately 20 percent clay- and silt-size particles

Shale, red, abundant mica, thin sandstone lenses interbedded near base
Sandstone, white, medium- to fine-grained, well rounded and frosted, extremely friable
Sandstone interbedded with thin blue shale beds 2"-4" thick; several horizons show oscillation ripple marks
Base of Upper Tahquamenon Falls

Covered area between Upper and Lower Tahquamenon Falls

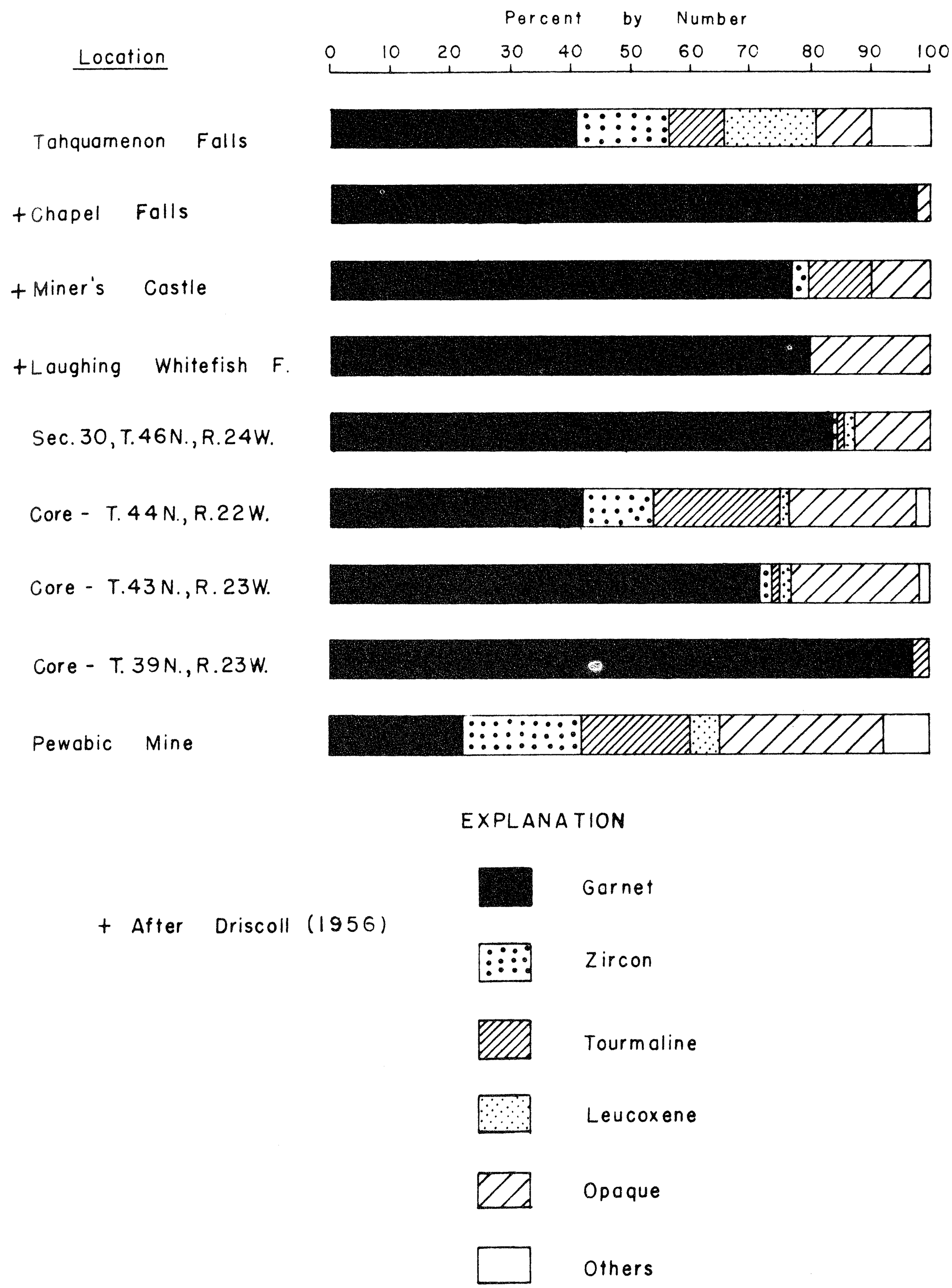
Top of highest rapid in Lower Tahquamenon Falls
Munising formation, Chapel Rock member

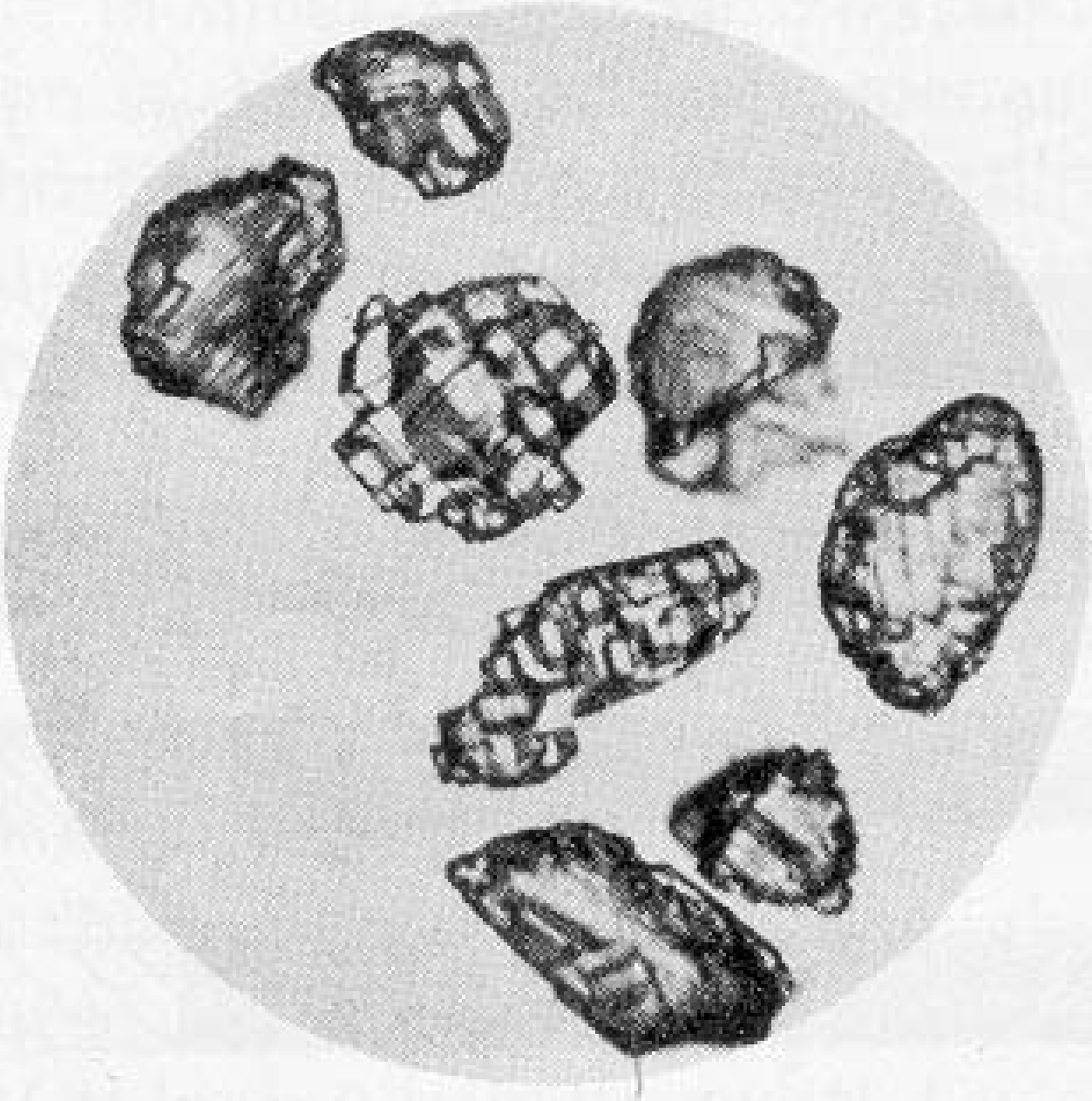
Sandstone, white to gray, weathers dark gray to black, medium- to fine-grained, extremely hard and well cemented by secondary quartz overgrowths; individual beds are between 8"-10" thick.

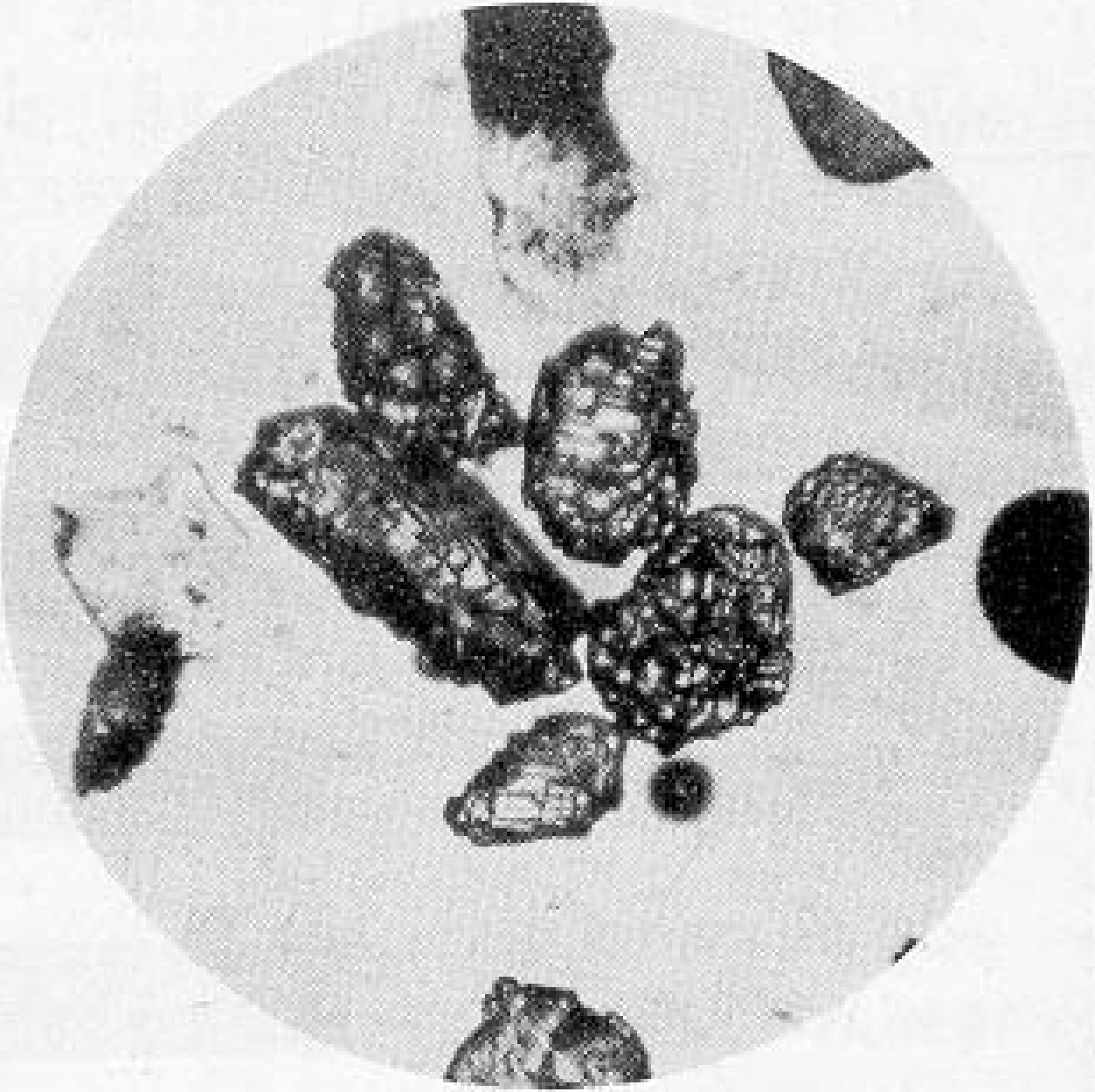
Top of major rapids
Planar cross bedding

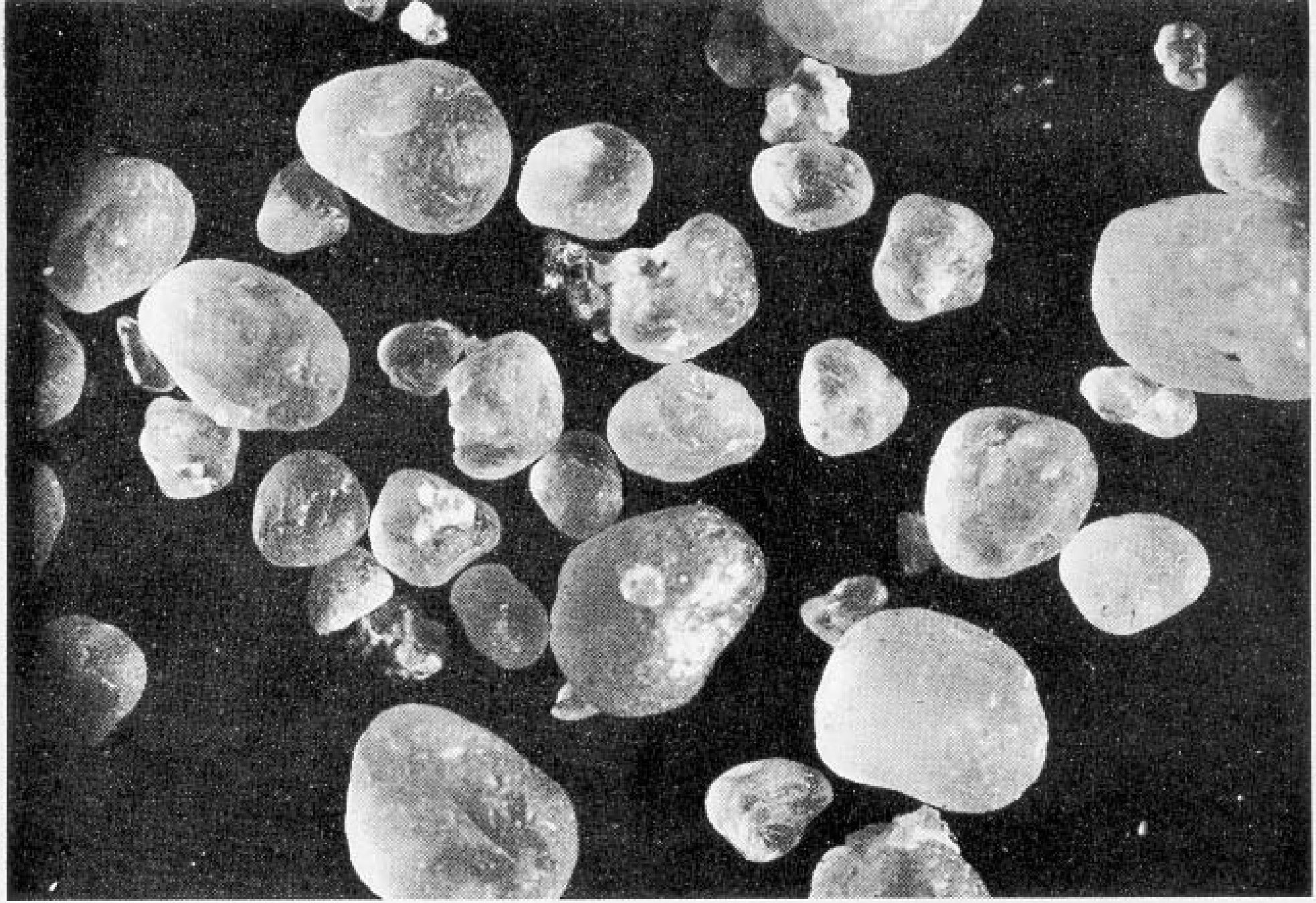
Sandstone, white, medium- to fine-grained, well cemented with quartz overgrowths; horizontal bedding planes are continuous laterally, beds 4"-6" thick, abundant current ripple marks

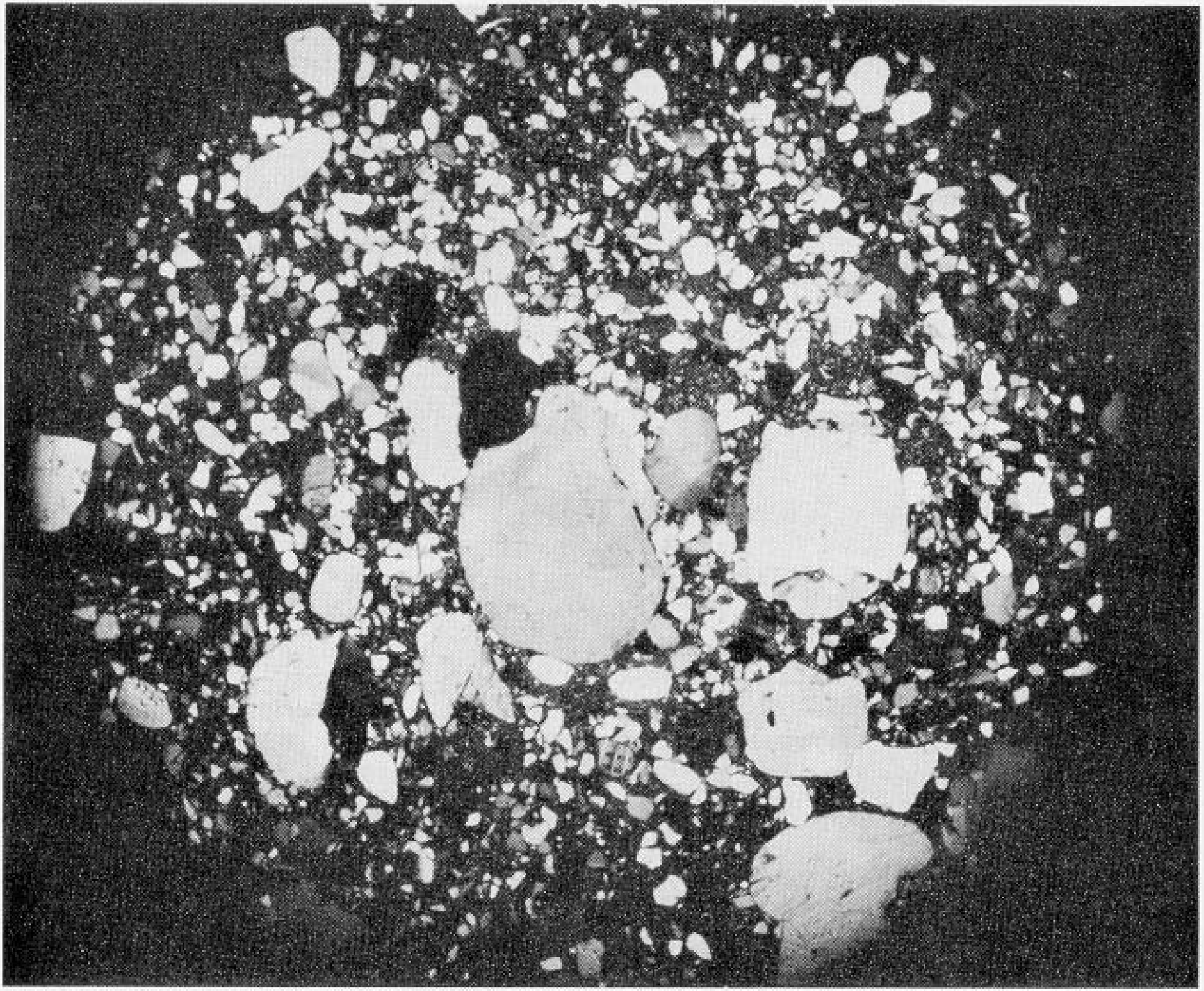
Base of Lower Tahquamenon Falls

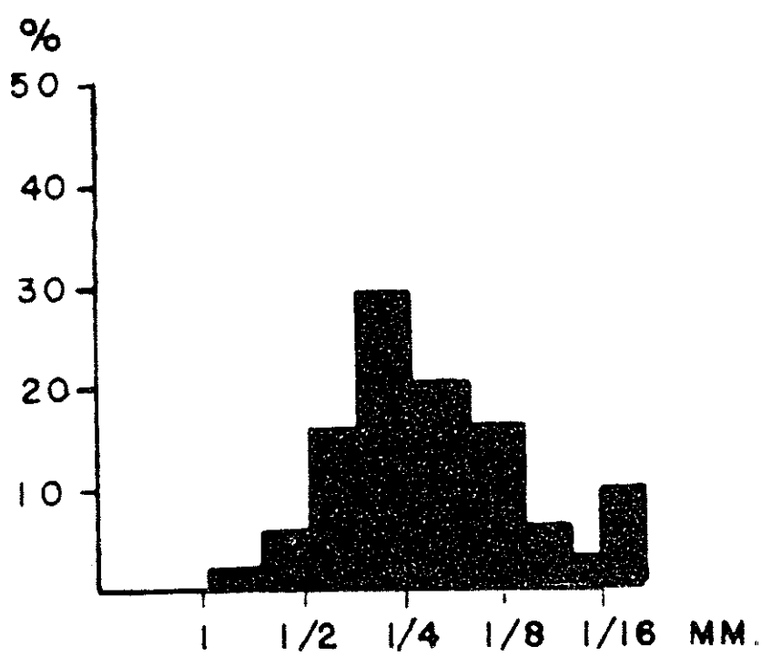

Percent by Number
Location
0 10 20 30 40 50 60 70 80 90 100
Tahquamenon Falls
+Chapel Falls
+Miner's Castle
+Laughing Whitefish F.
Sec. 30, T.46N., R.24W.
Core - T. 44N., R.22W.
Core - T.43N., R.23W.
Core - T. 39N., R.23W.
Pewabic Mine
EXPLANATION
Garnet
Zircon
Tourmaline
Leucoxene
Opaque
Others
+ After Driscoll (1956)



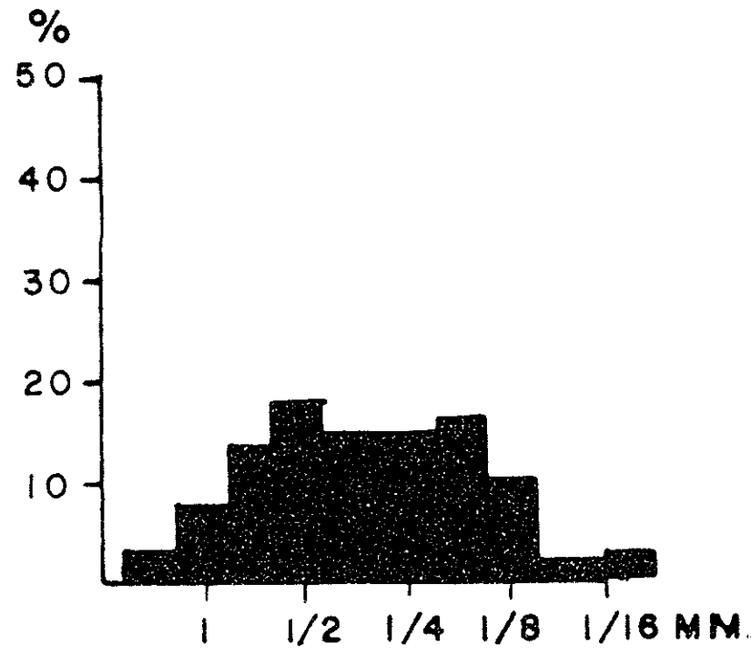




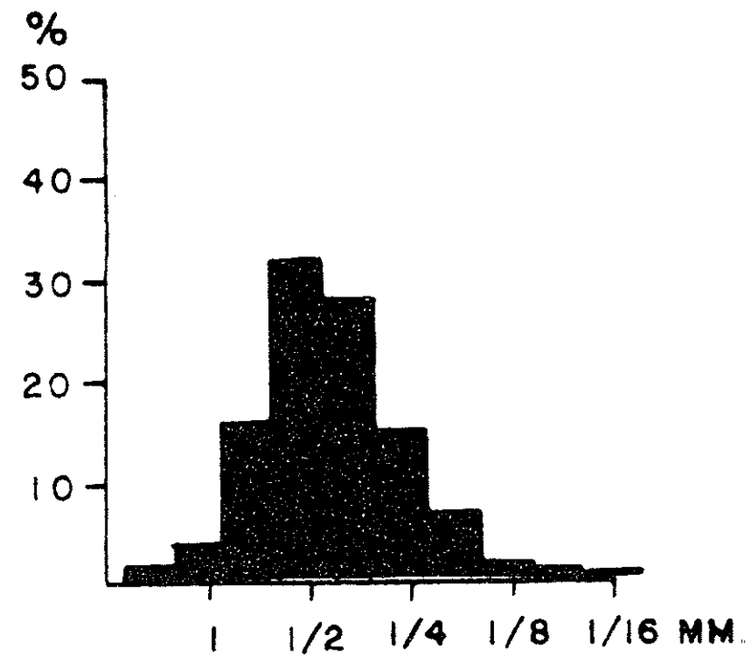




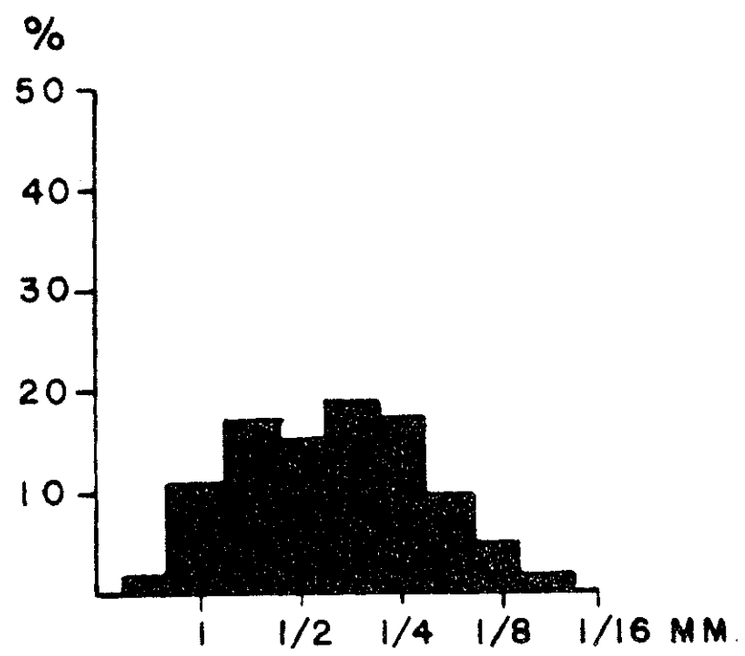
Tahquamenon Falls



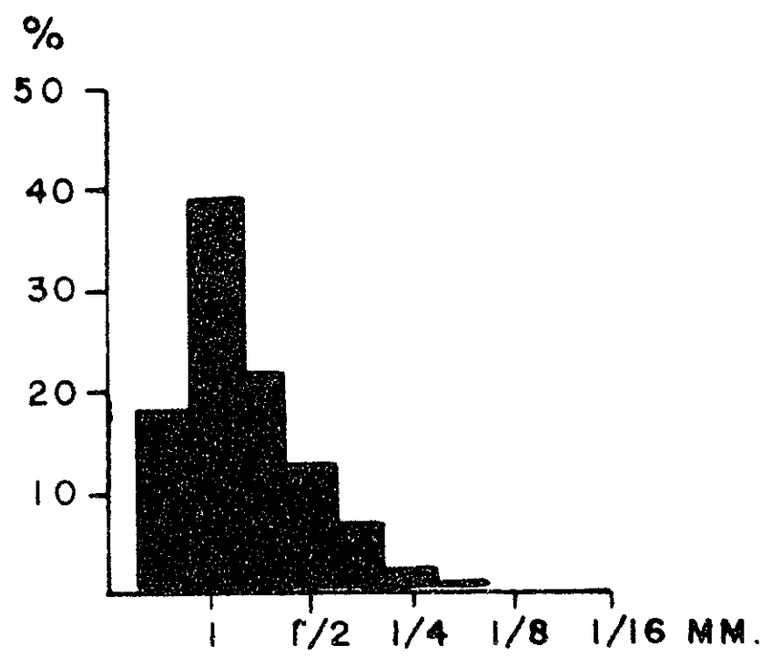
Tahquamenon Falls



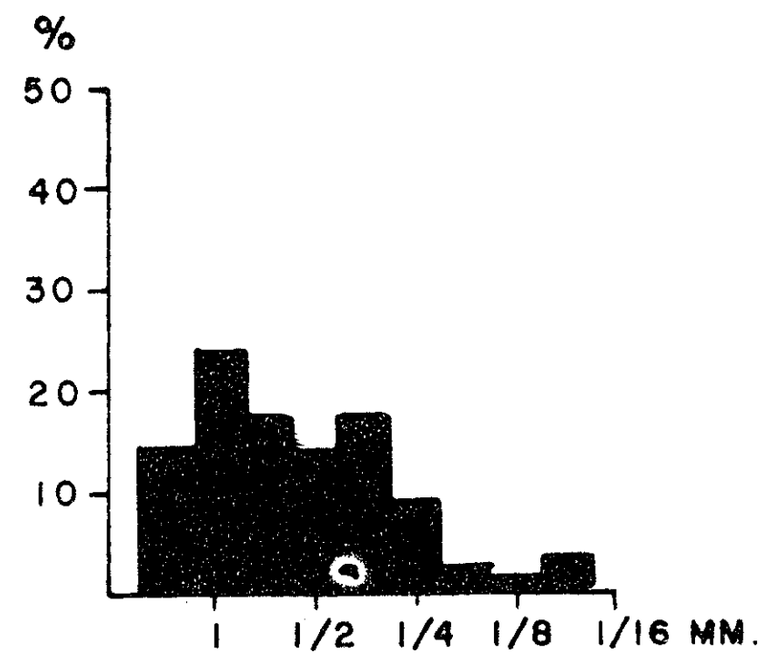
Chapel Falls



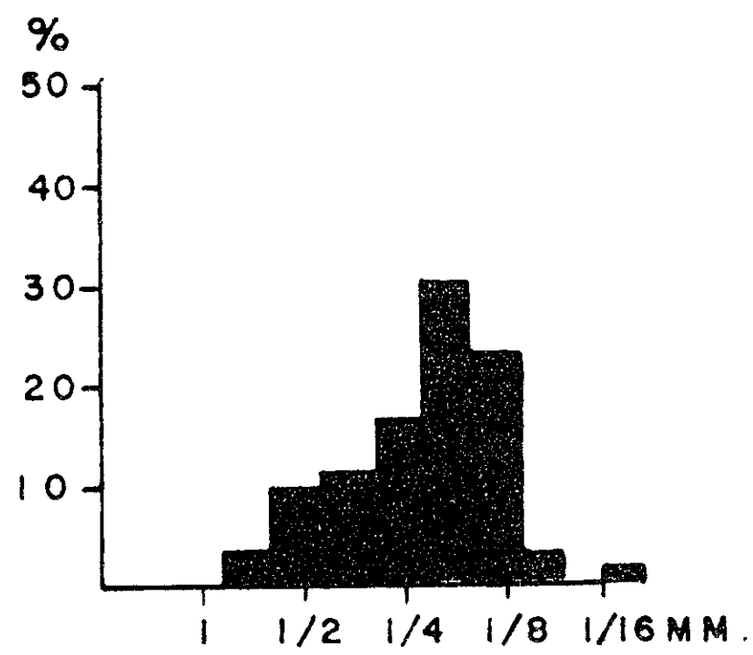
Miner's Castle



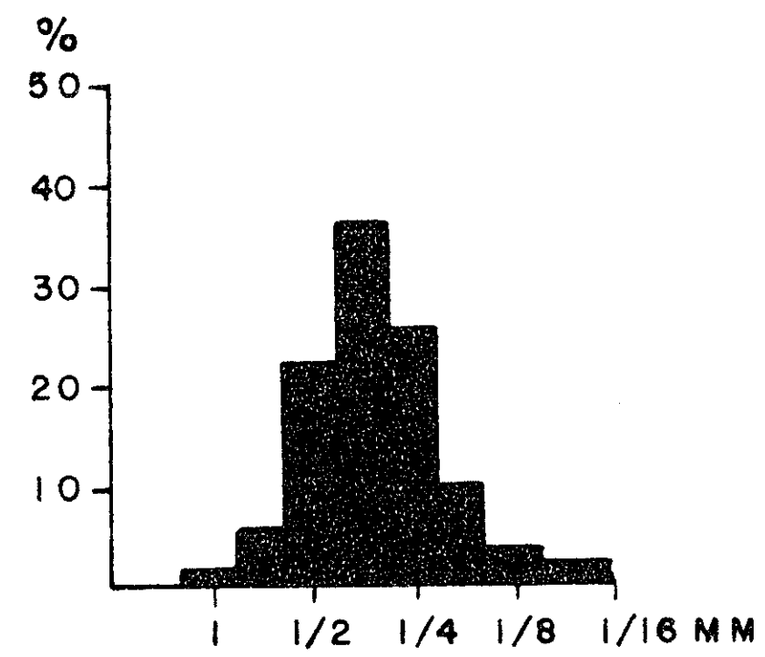
Munising Falls



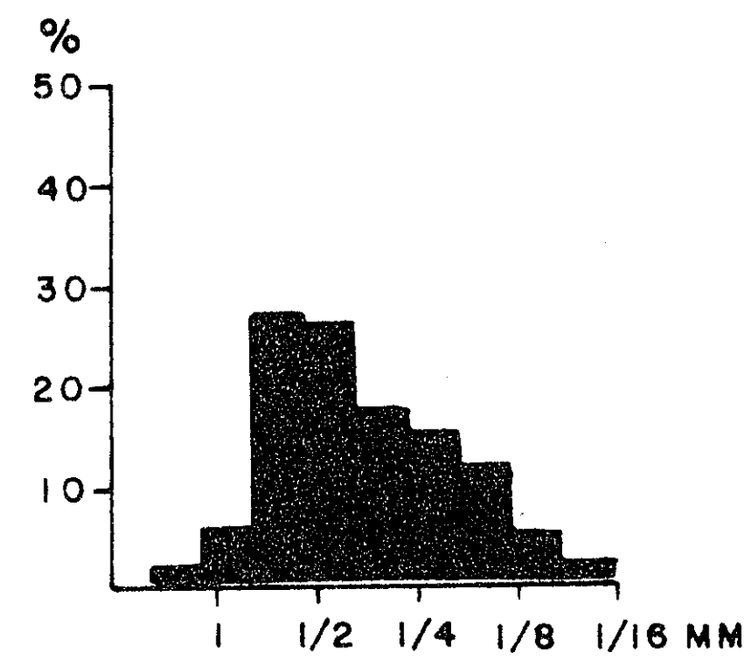
Laughing Whitefish Falls



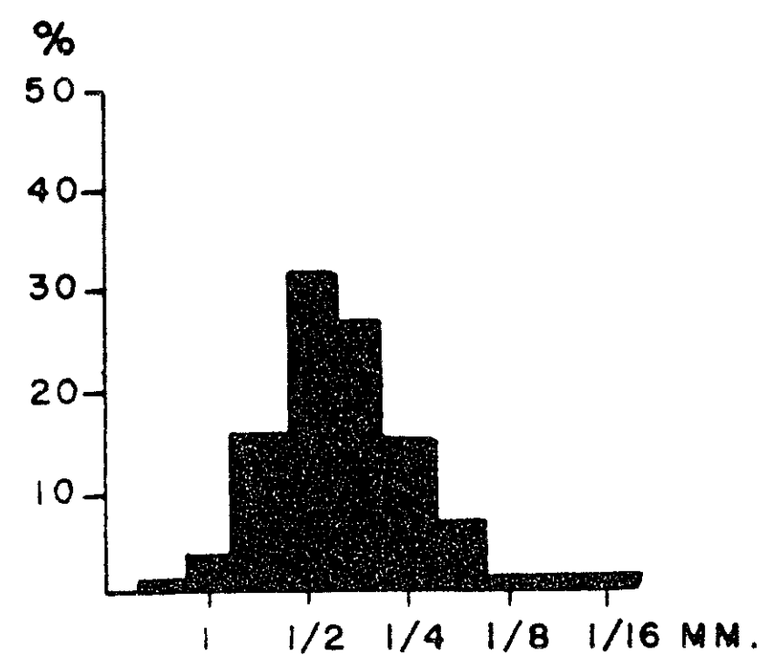
Sec. 30, T.46N., R.24W.



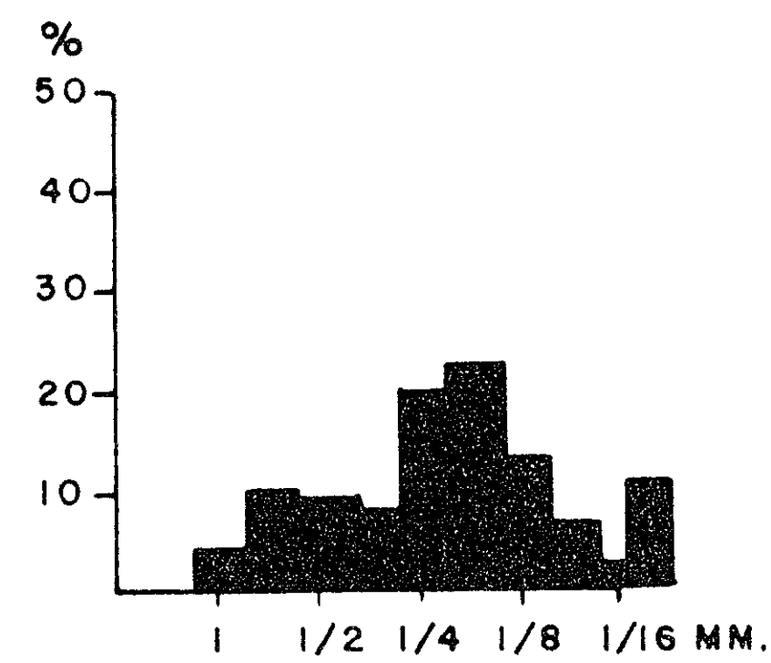
Core - T.44N., R.22W.



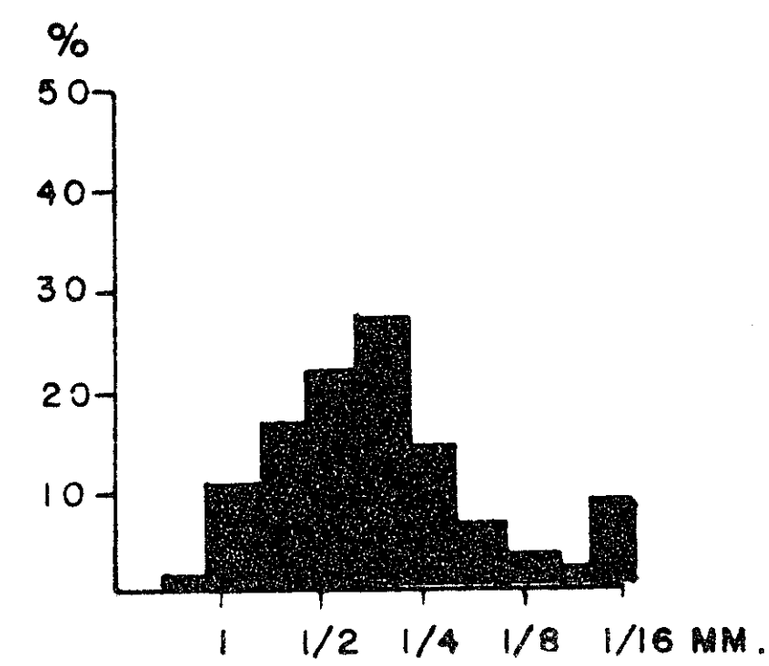
Core - T.43N., R.23W



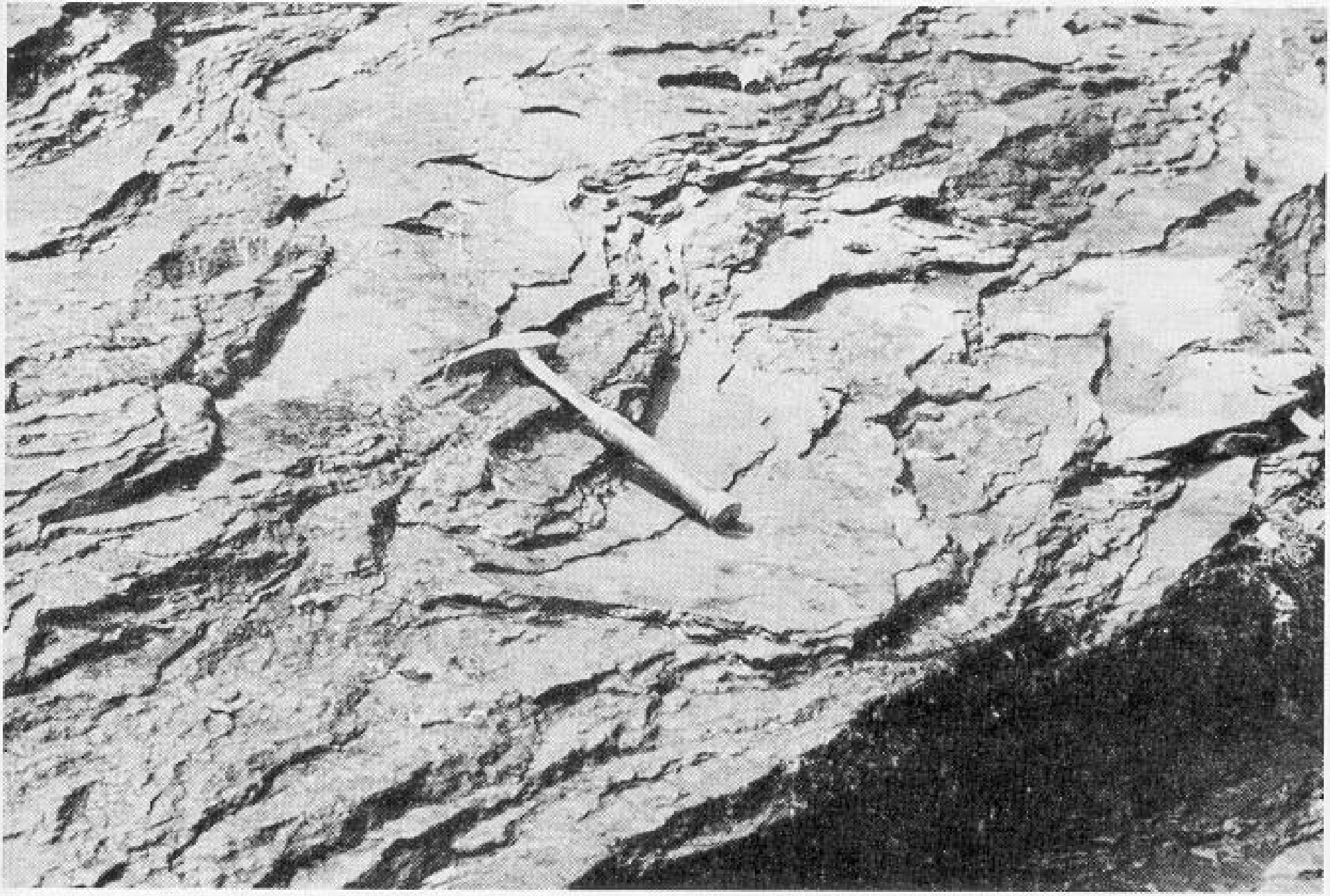
Core - T.39N., R.26W.

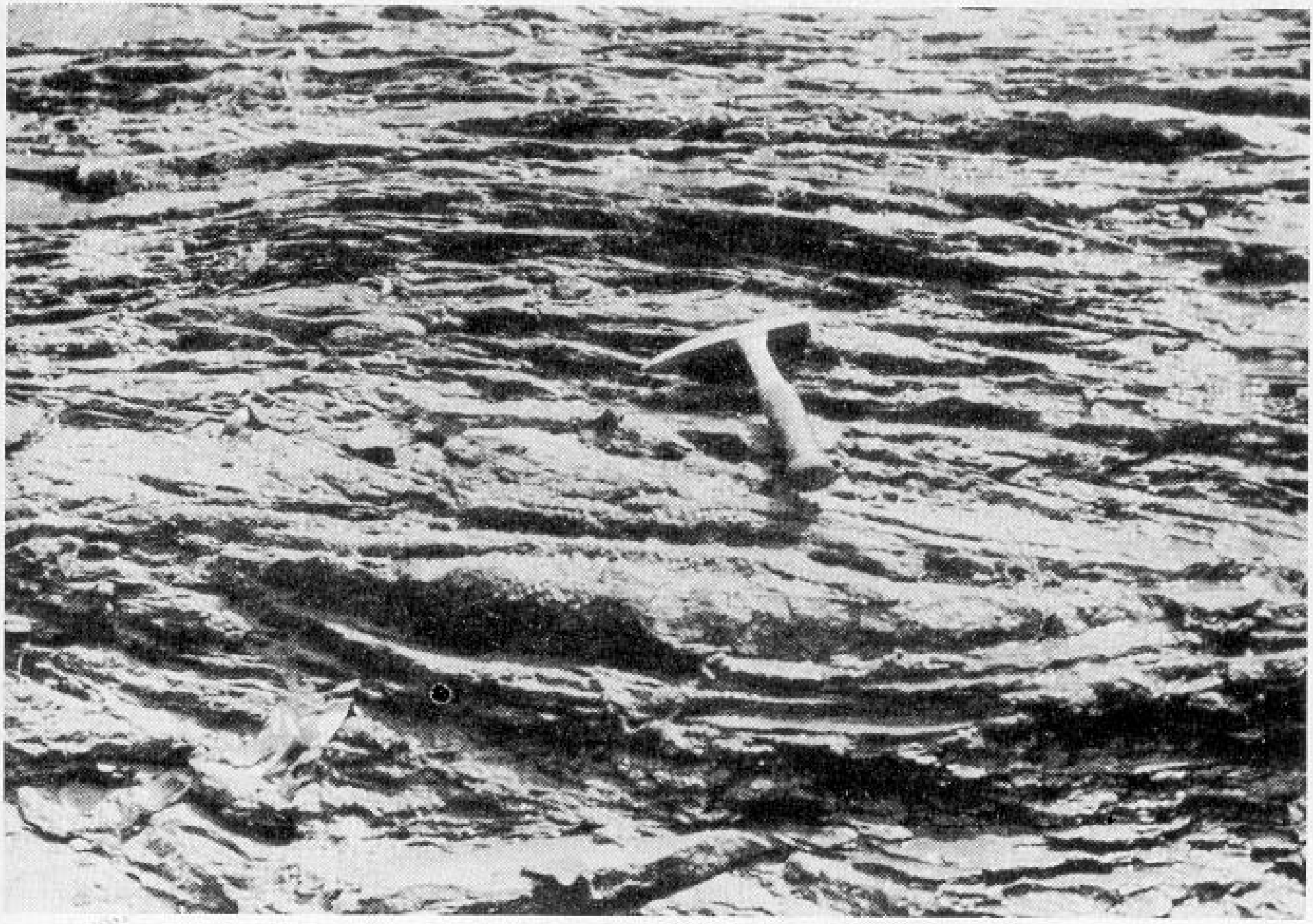


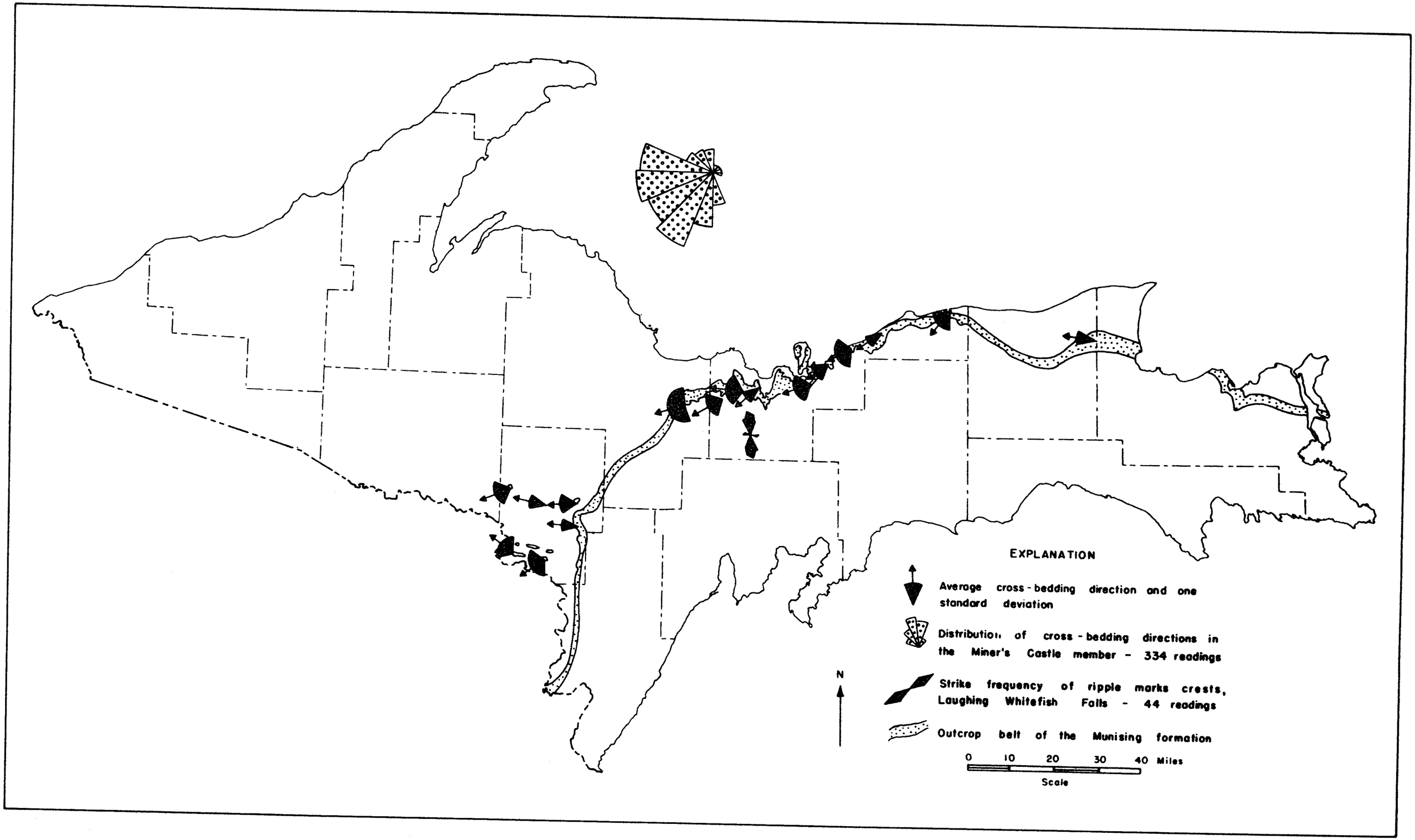
Pewabic Mine



Outlier - T.42N., R.30W.






EXPLANATION
Average cross-bedding direction and one standard deviation
Distribution of cross-bedding directions in the Miner's Castle member - 334 readings
Strike frequency of ripple marks crests, Laughing Whitefish Falls - 44 readings
Outcrop belt of the Munising formation
N
0 10 20 30 40 Miles
Scale