Columbia University
in the City of New York

LAMONT GEOLOGICAL OBSERVATORY
PALISADES, NEW YORK

Technical Report No. 1

CU-1-60- Nonr 266 (65)

UNDERWATER PHOTOGRAPHY AND CORE SAMPLING ON PLANTAGENET BANK

by

JOHN EWING AND ARCHIE ROBERTS

January 1960

UNDERWATER PHOTOGRAPHY AND CORE SAMPLING ON PLANTAGENET BANK

by

John Ewing and Archie Roberts

INTRODUCTION

During the second leg of Cruise VEMA-16, three series of underwater photographs and four core samples were taken on the southwestern slope of Plantagenet Bank between the crest and the 500-fathom contour, in the close neighborhood of 31° 57'N; 65° 13'W. The camera employed was the Lamont multiple-shot model. The light source was located about 5 feet above the bottom and the camera about 8 feet. At this distance the camera's field of view is an area approximately 6 ft. x 4 ft. The photographs are mounted on the pages so that the light source is at the bottom.

The Ewing piston corer was used with a 20-ft. sampling tube, 1400 lbs. in weight, with a free fall of 10 ft. With this amount of weight and free fall, this apparatus is capable of taking a core as long as 70-80 ft. in normal ocean sediments. The fact that the longest core obtained in this series was about 11 ft. gives an indication of the type of bottom found on the bank.

BOTTOM PHOTOGRAPHY

The first series of photographs includes numbers 3-1 to 3-5. These were spaced evenly down the slope between the 40 fm. and the 250 fm. contour. The first two show only bare coral, apparently coated with manganese. The others, at greater depth, show some

areas or pockets of sand. The ripples indicate an appreciable current.

The second series, 3-10 to 3-19, was taken while drifting down slope between the 40 fm. and the 150 fm. contours. Only the last two of these show any sand; most of them resemble the first two photographs of the first series.

The third series, 4-1 to 4-37, was taken while drifting down slope between the 200 fm. and the 450 fm. contours. Most of these photographs show sand pockets, or sometimes rather broad sandy areas, between coral outcrops. Except in the last few photographs, the sand is rippled. This would indicate that the strength of the current is somewhat diminished at depths on the order of 400 fathoms unless the last few photographs were made in a locally sheltered area.

CORE SAMPLES

Cores 11-14 were taken at depths of 173 fm., 251 fm. and 435 fm. on the slope and at 34 fm. on the top of the bank near the edge. Cores 11 and 12 brought up 75 and 30 cm. respectively of calcareous sand and coral fragments. In both cases the cutting edge of the sampler was badly damaged, indicating a very hard bottom. Presumably, after penetrating a few centimeters of loose sand and fragments, the coring tube reaches the hard, unweathered coral beneath. Some of the fragments in the samples were obviously broken off by the coring tube.

Core 13, at the 435 fm. level, was longer (180 cm.) than either 11 or 12 and the cutting edge was not as badly damaged. This indicates a thicker cover of debris which absorbed more of the impact before the tube penetrated to the hard material beneath.

Core 14 was taken on top of the bank near the edge. The sample is 350 cm. long, consisting of calcareous sand and fragments becoming coarser toward the bottom. The cutting edge was undamaged indicating that the core did not penetrate to the hard surface.

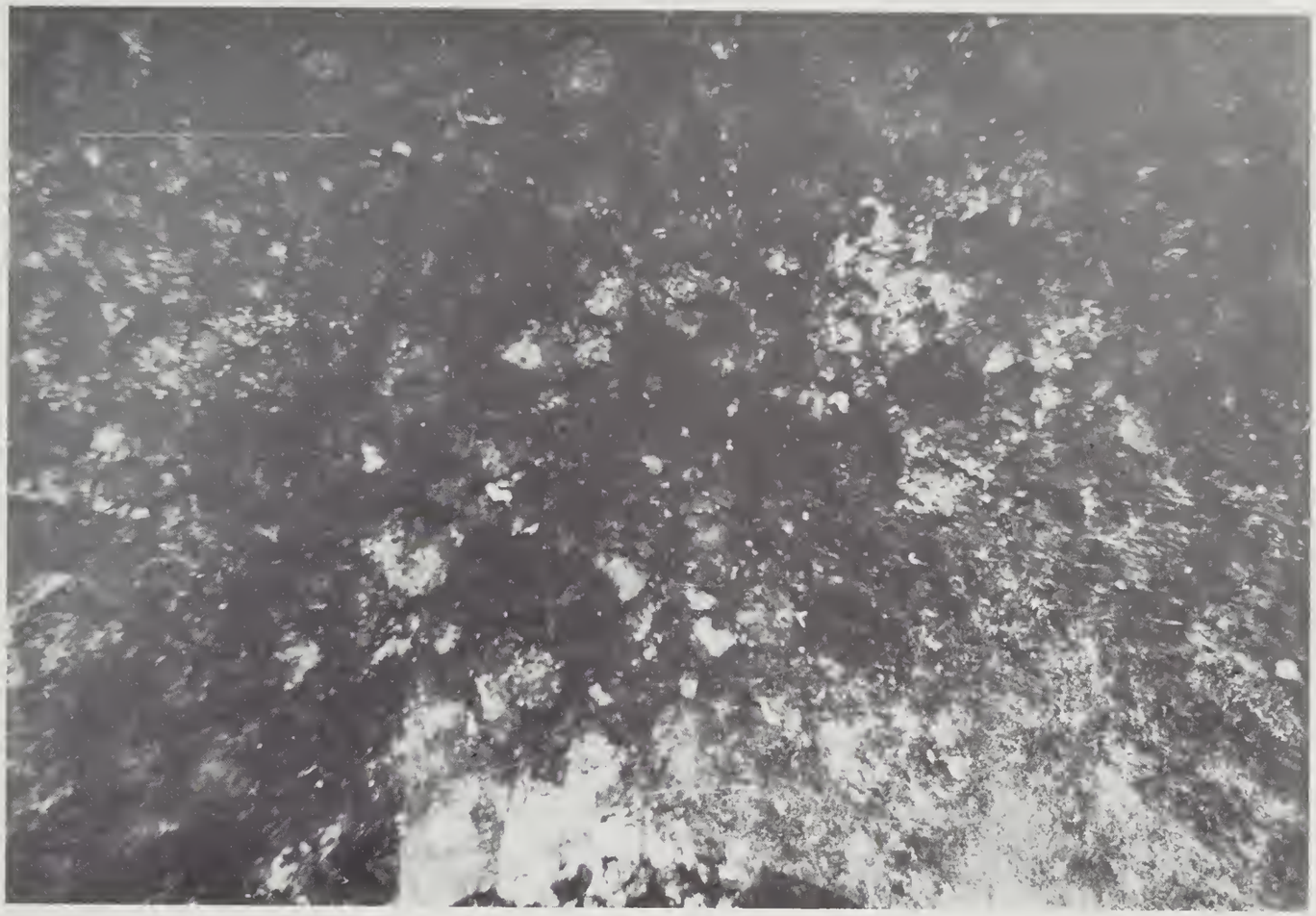
SUMMARY AND CONCLUSIONS

Both the coring and the photographs indicate that the upper part of the slope is bare coral with the exception of a few small pockets of sand and fragments. The slope is somewhat steeper near the top, and the currents are apparently strong enough to keep that part of it scoured. At about 150 fm. the amount of loose material increases, and current ripples are apparent in the photographs down to at least 400 fms. From the three cores obtained on the slope between 150 and 450 fathoms, it is estimated that 1-2 meters of loose material is expectable in pockets. Areas of bare coral exist throughout this portion of the slope.

On top of the bank 350 cm. of sample was obtained. Whether or not this amount of loose material is characteristic is not known. A sub-bottom depth recorder traverse across the bank failed to show any reflecting horizons below the surface; so it is presumed that either the cover of loose material is too thin to be resolved by the recorder (about 4 meters) or else it is unstratified.

Acknowledgments

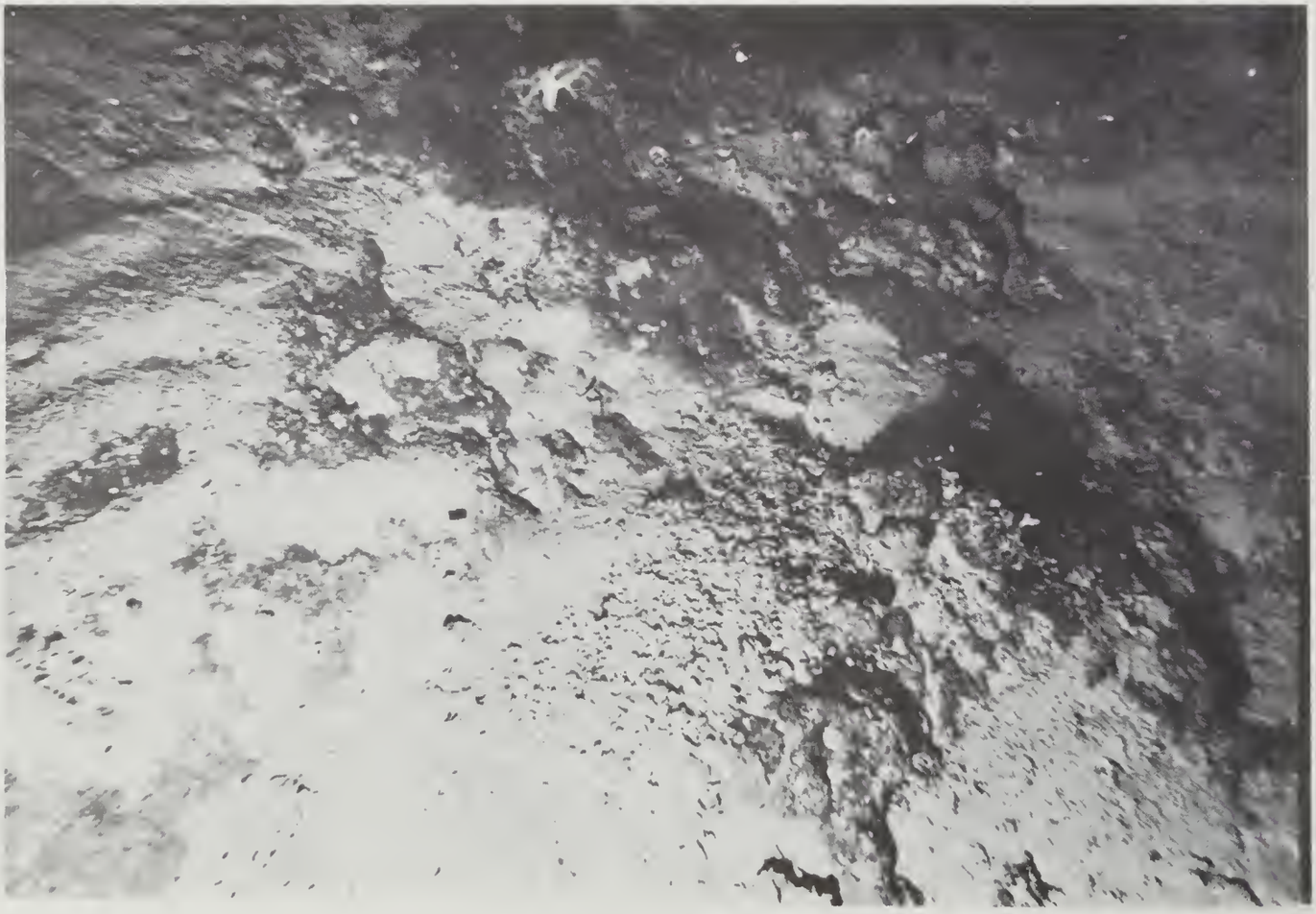
This work was sponsored by the United States Navy under Contract NObsr 64547 with the Bureau of Ships, and Nonr 266 (65) with the Office of Naval Research. This publication is for technical information only and does not represent recommendations or conclusions of the sponsoring agencies. Reproduction of this document in whole or in part is permitted for any purpose of the United States Government.



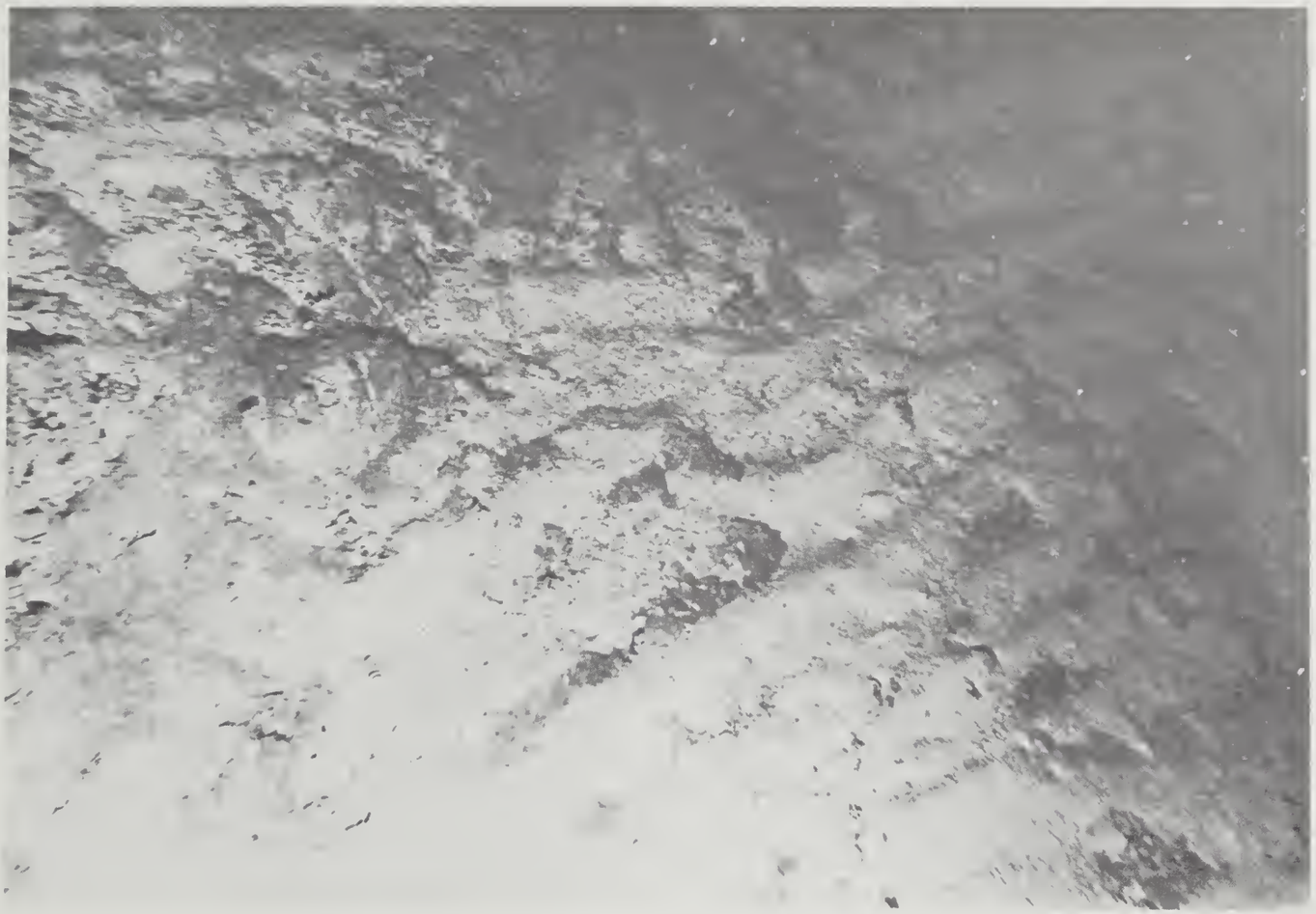
V 16 – 3 – 1

V 16 – 3 – 2

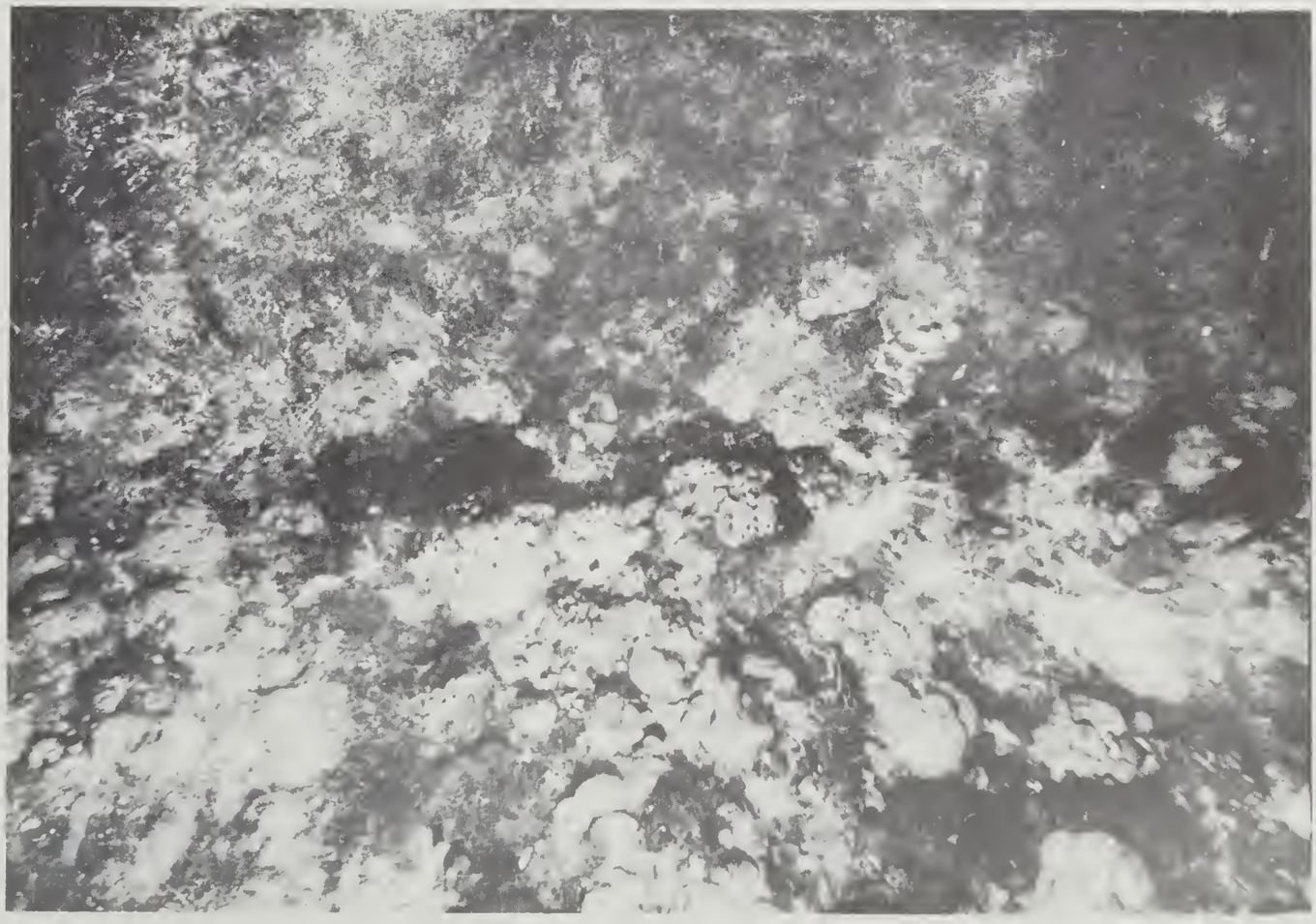
V16-3-3



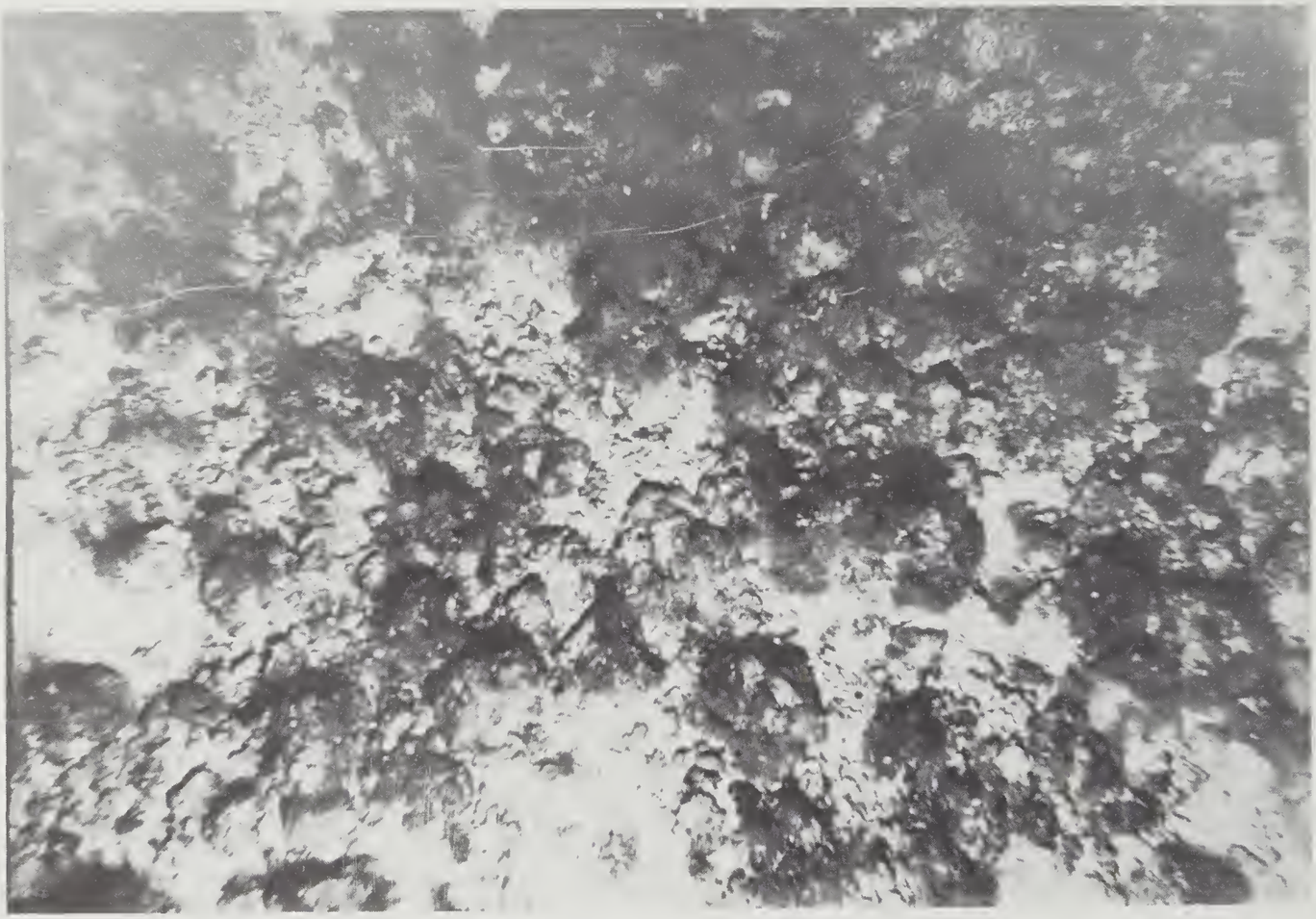
V16-3-4



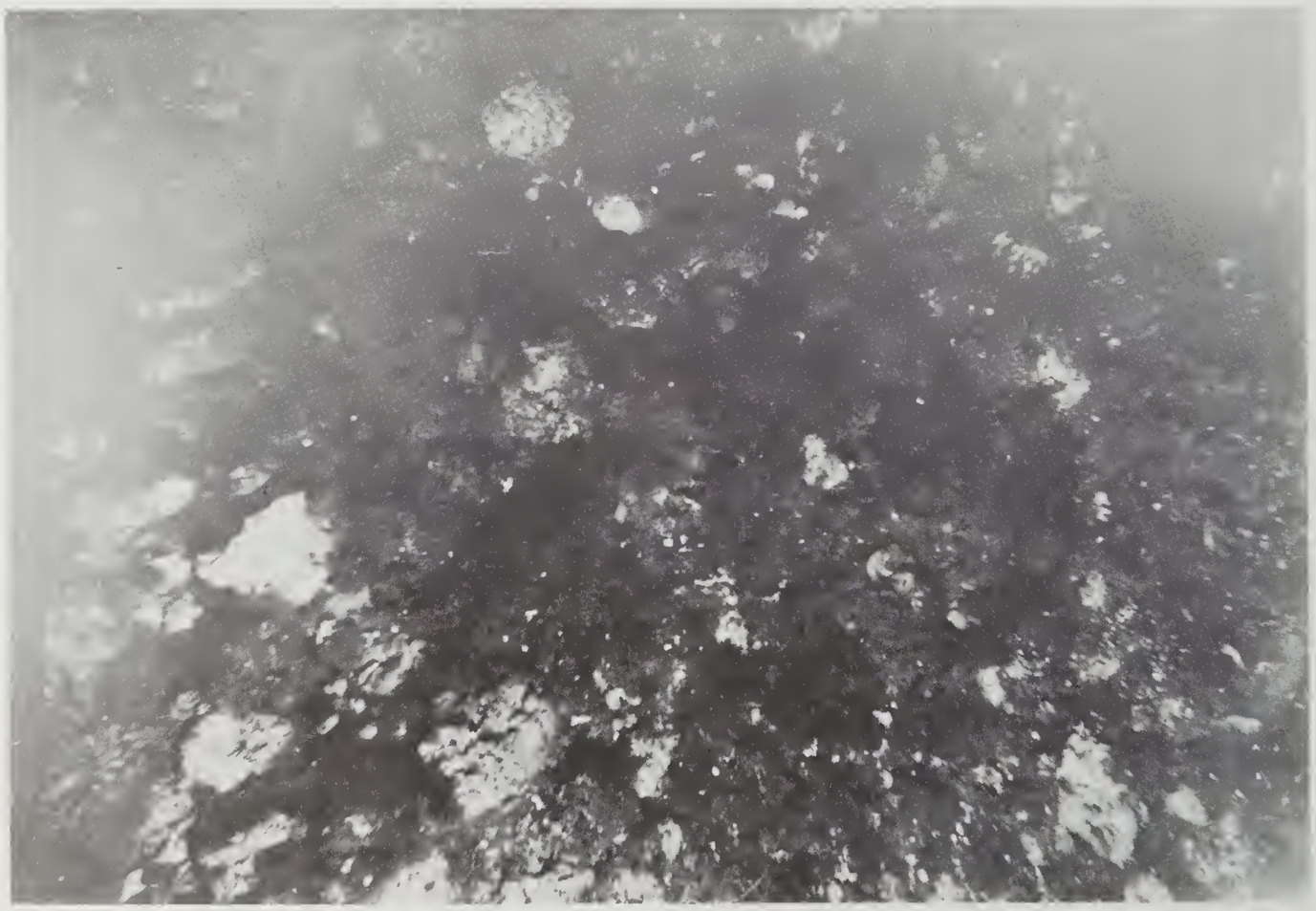
V16-3-5



V16-3-10



V16-3-11



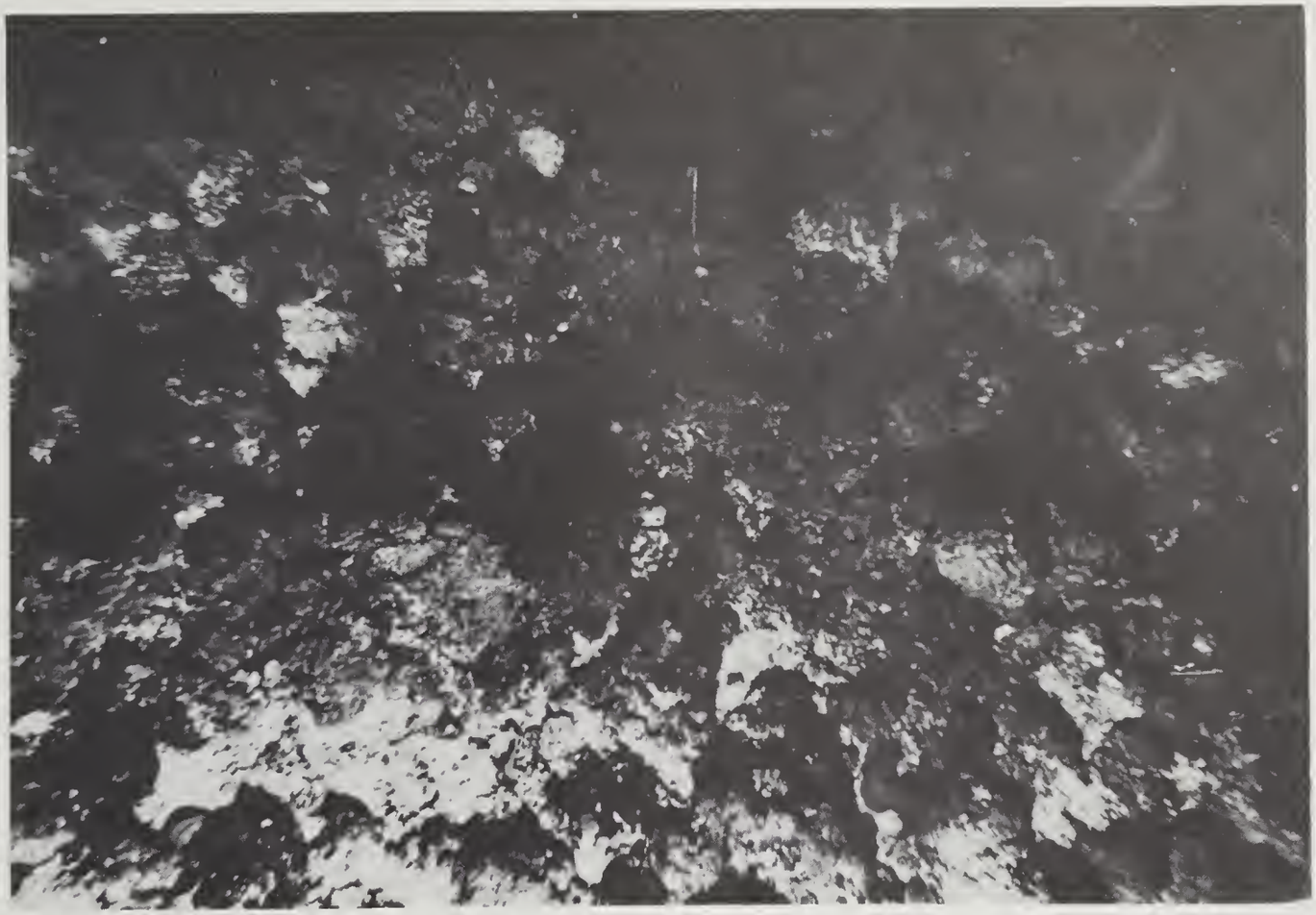
V16-3-12

V16-3-13

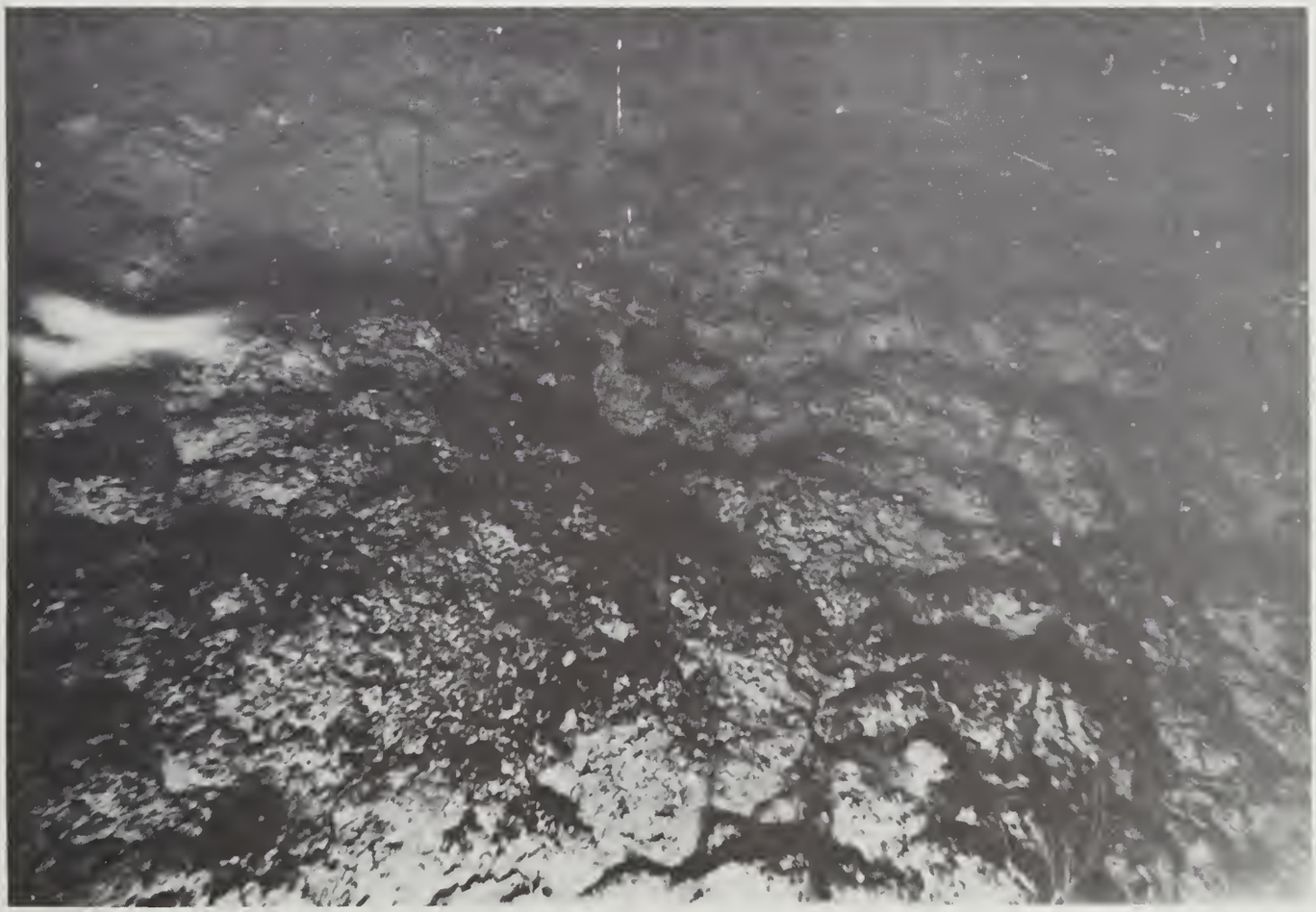
V16-3-14

V16-3-15

V16-3-16

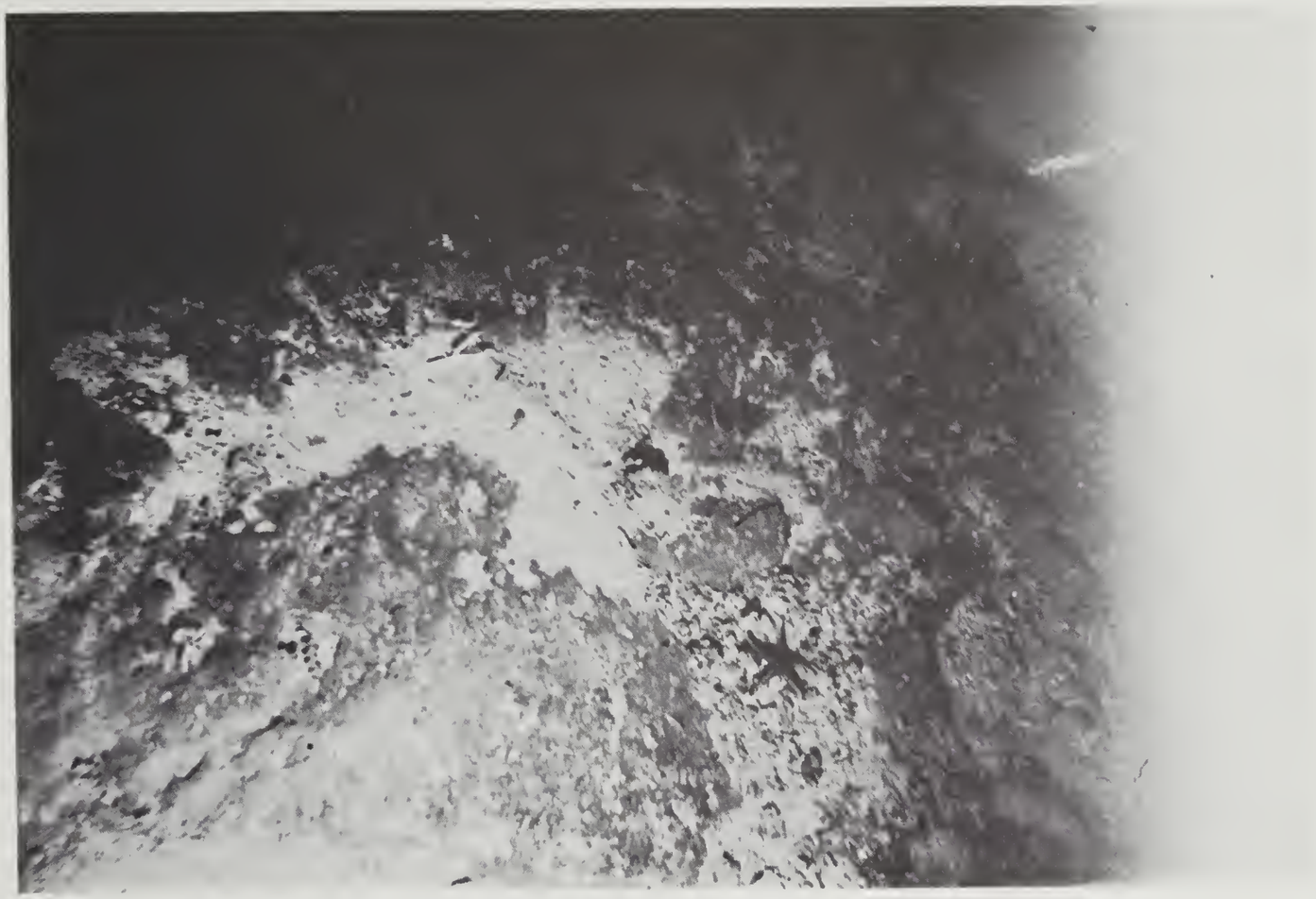


V16-3-17

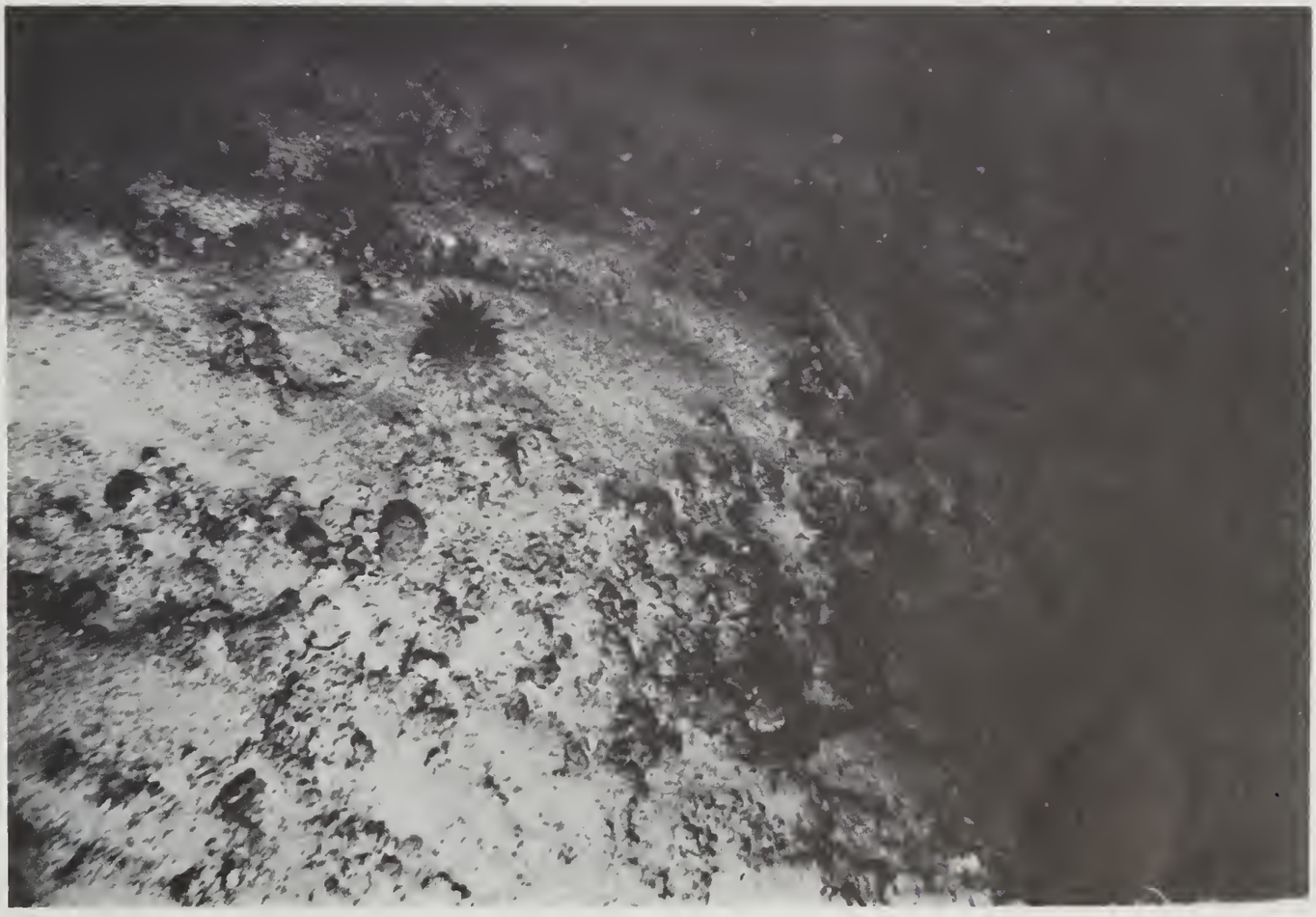


V16-3-18

V16-3-19

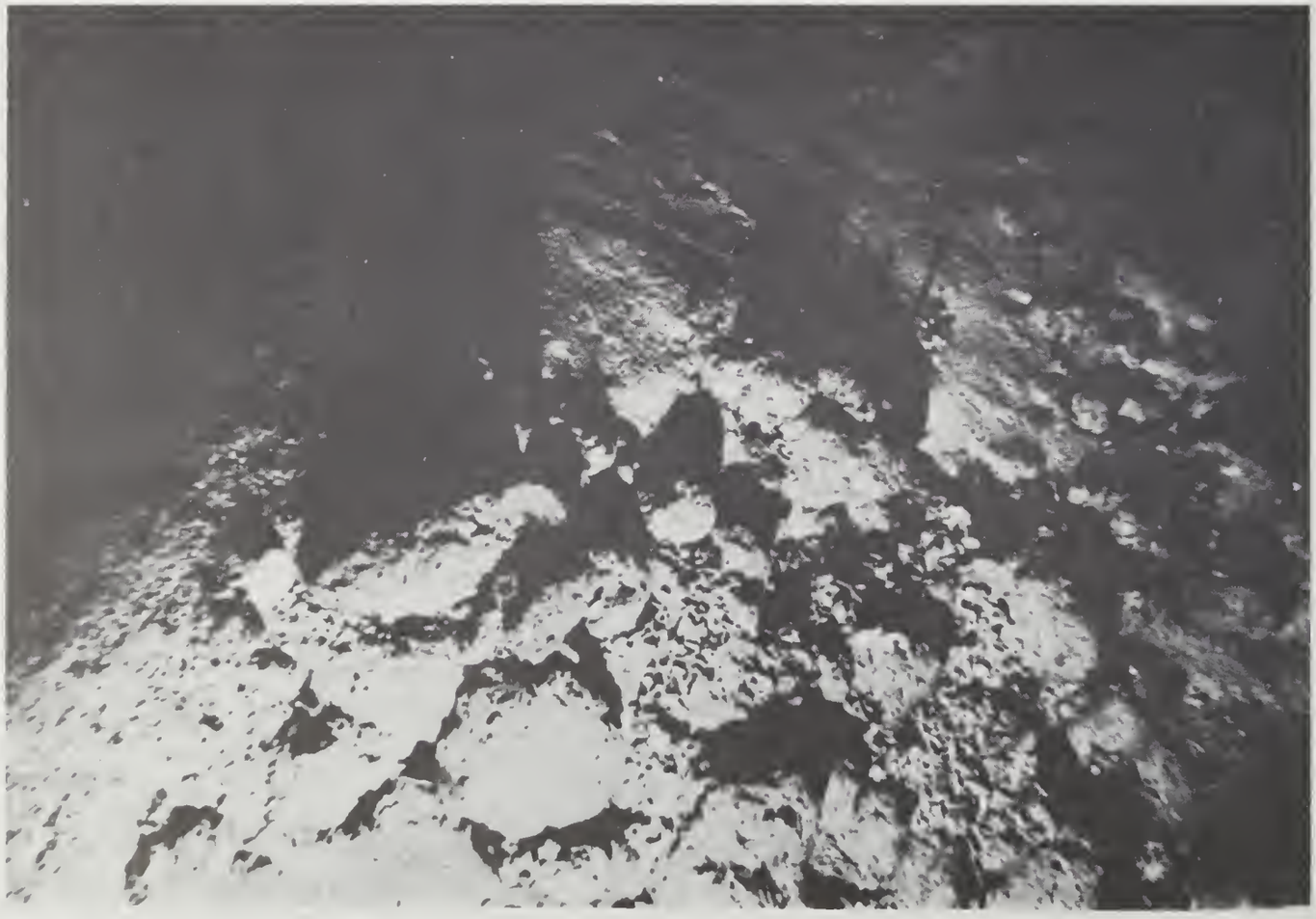


V16-4-1



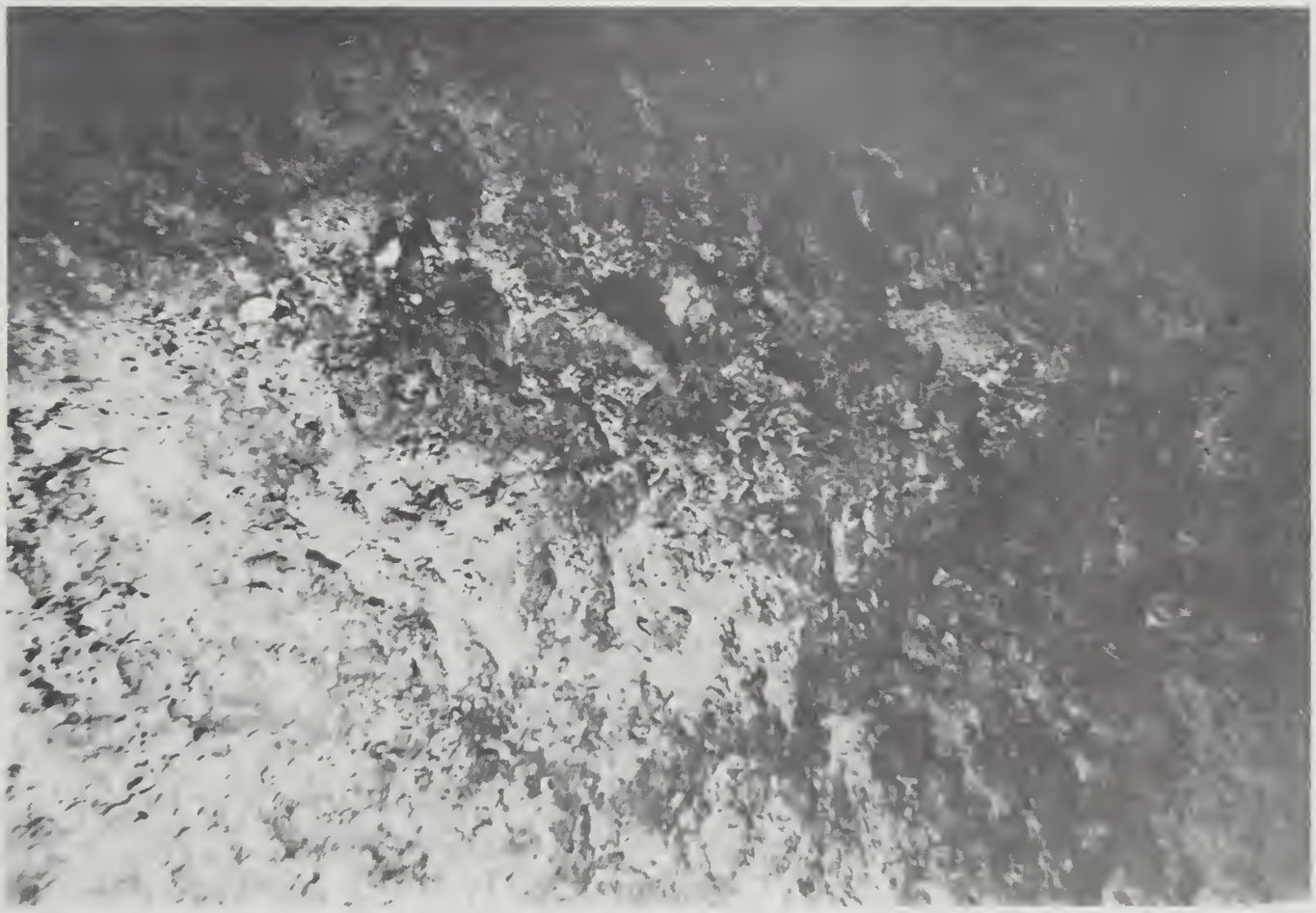
V16-4-2

V16-4-3

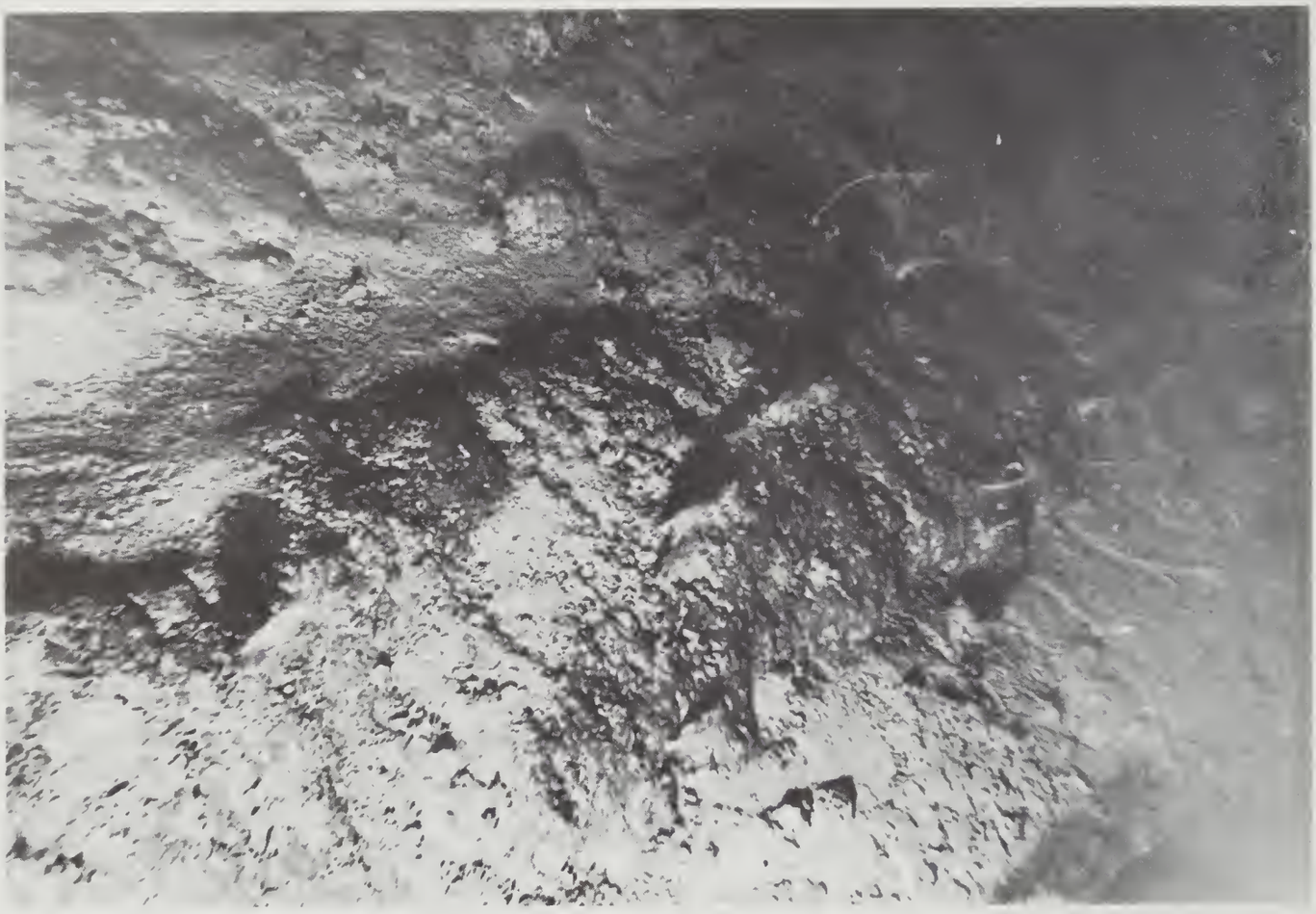


V16-4-4

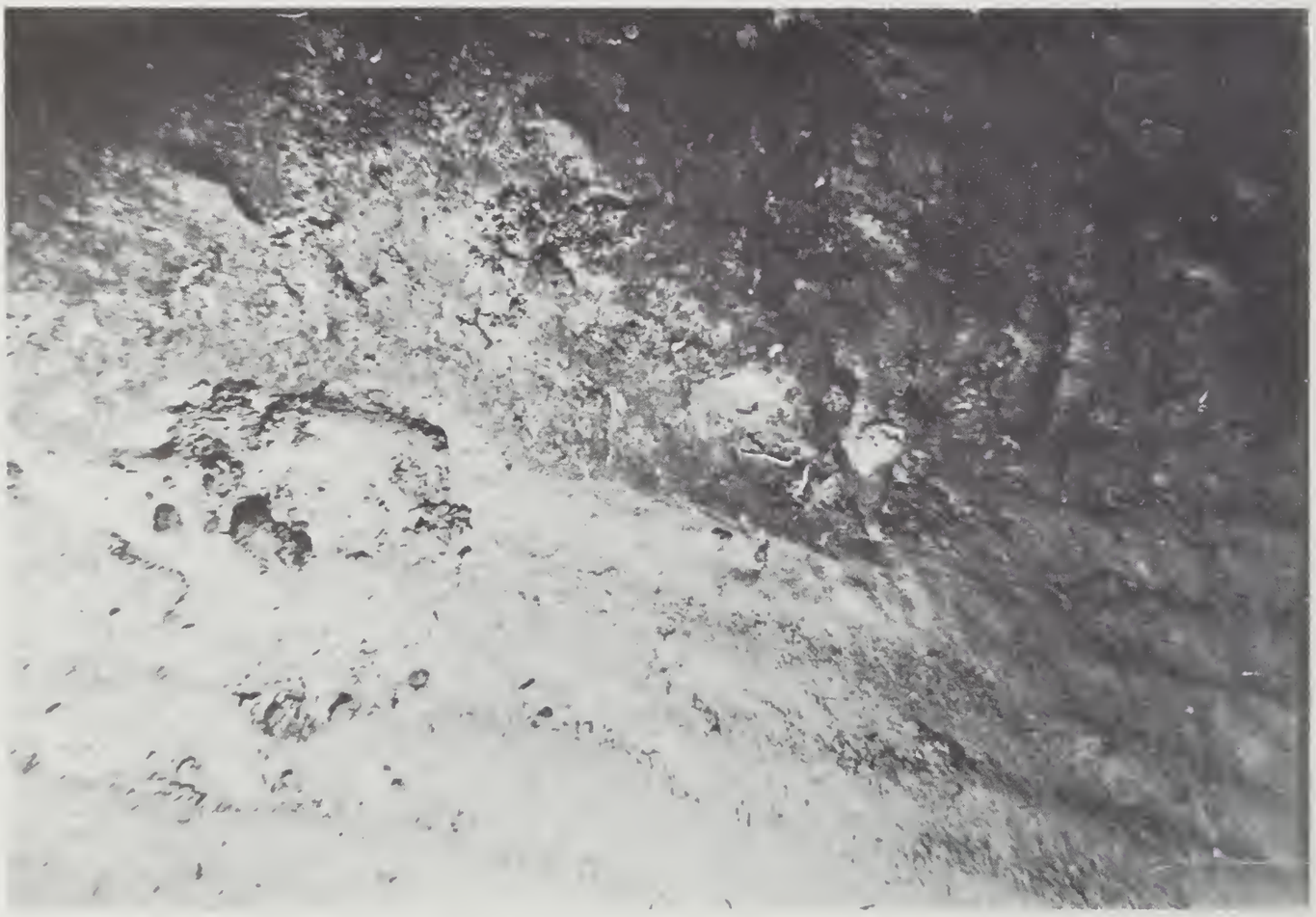
V16-4-5



V16-4-6



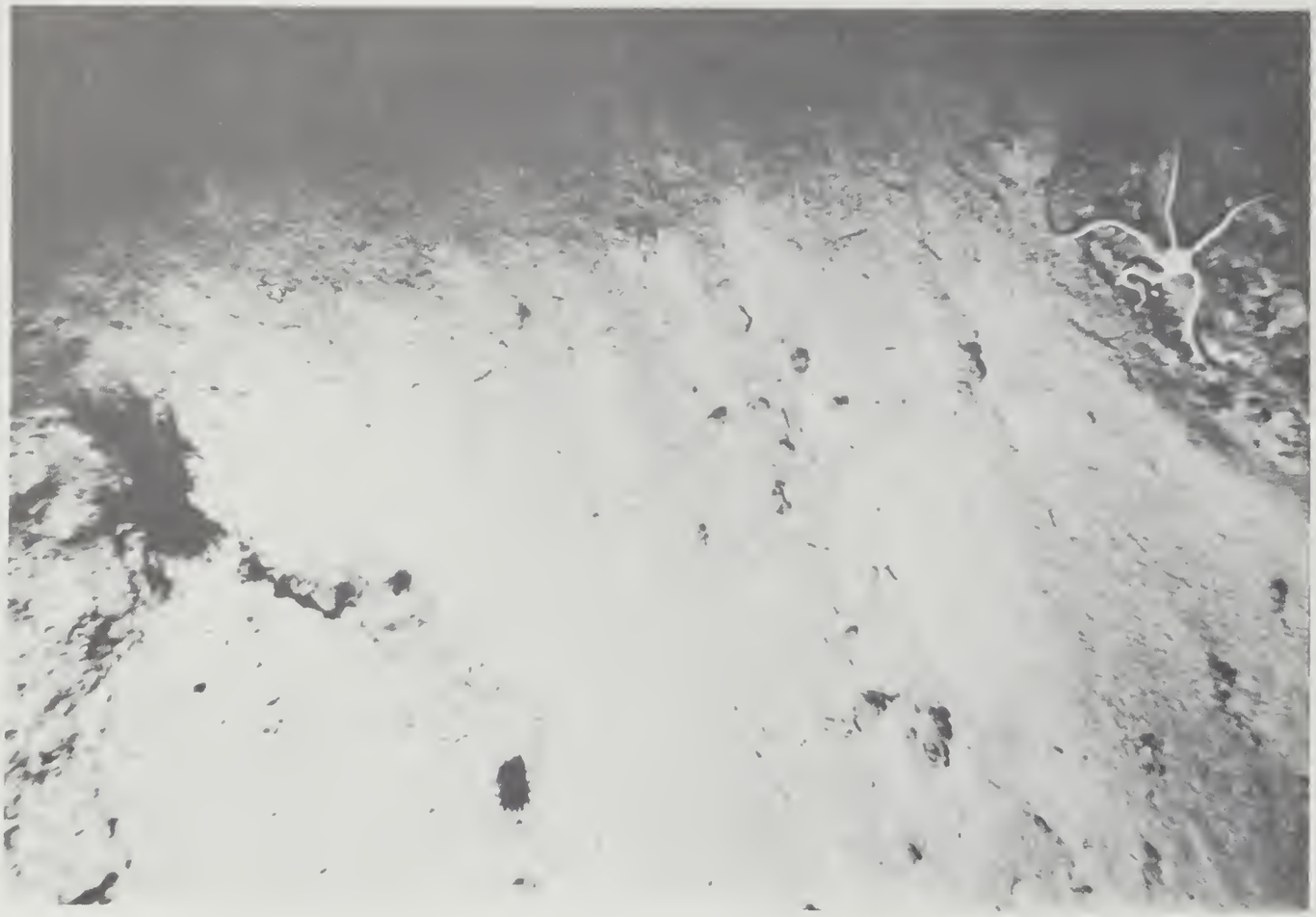
V16-4-7



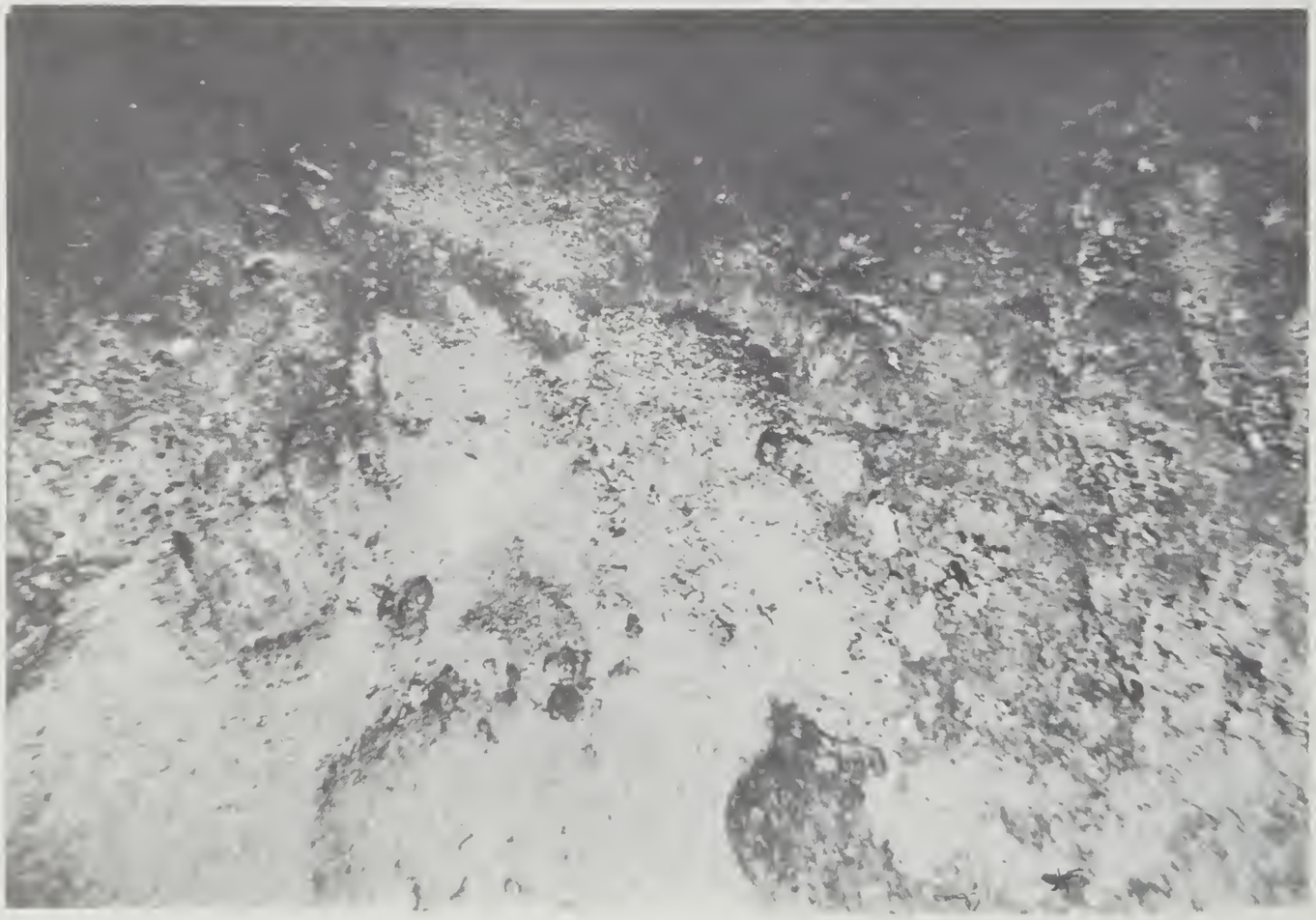
V16-4-8

V16-4-11

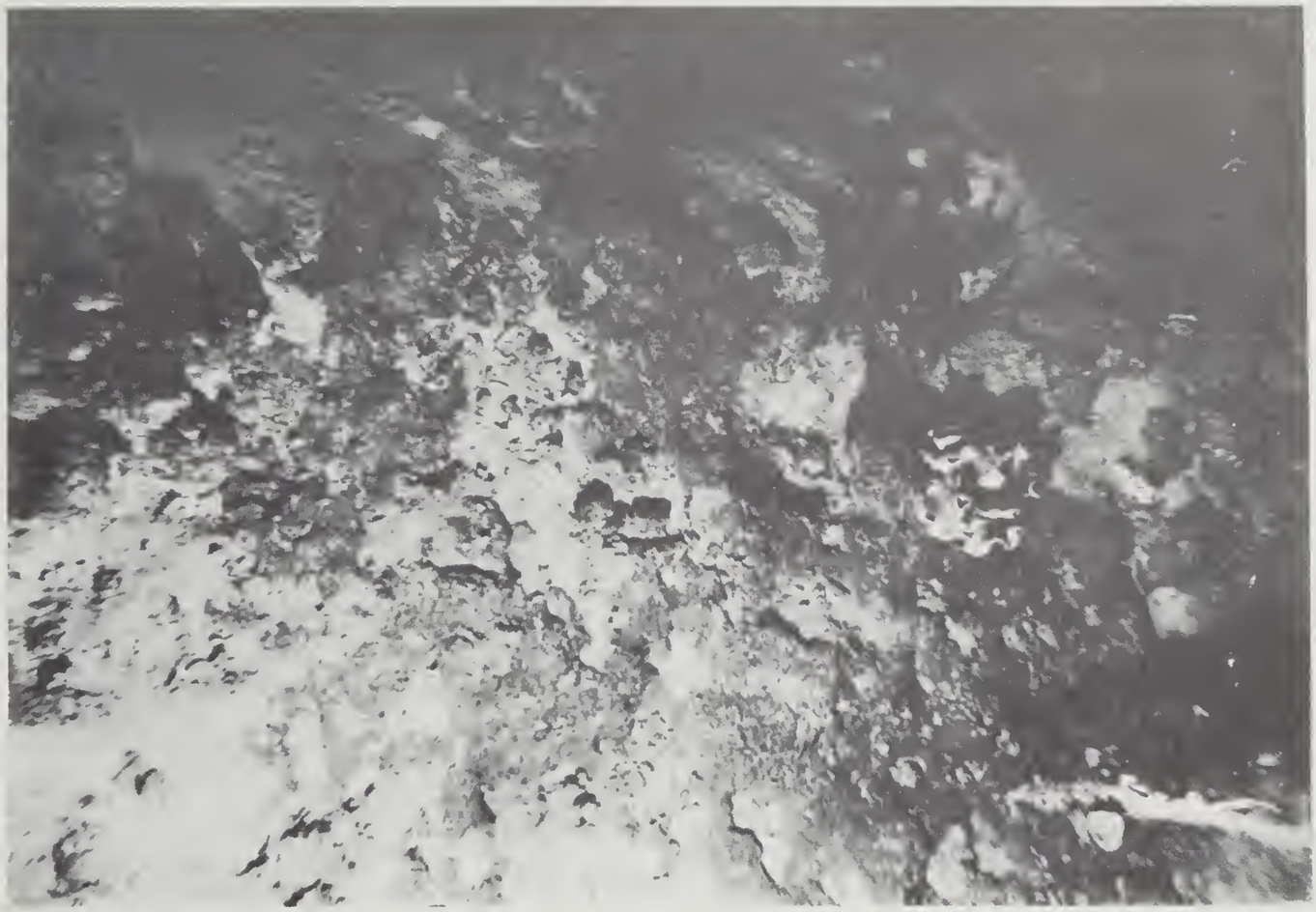
V16-4-12



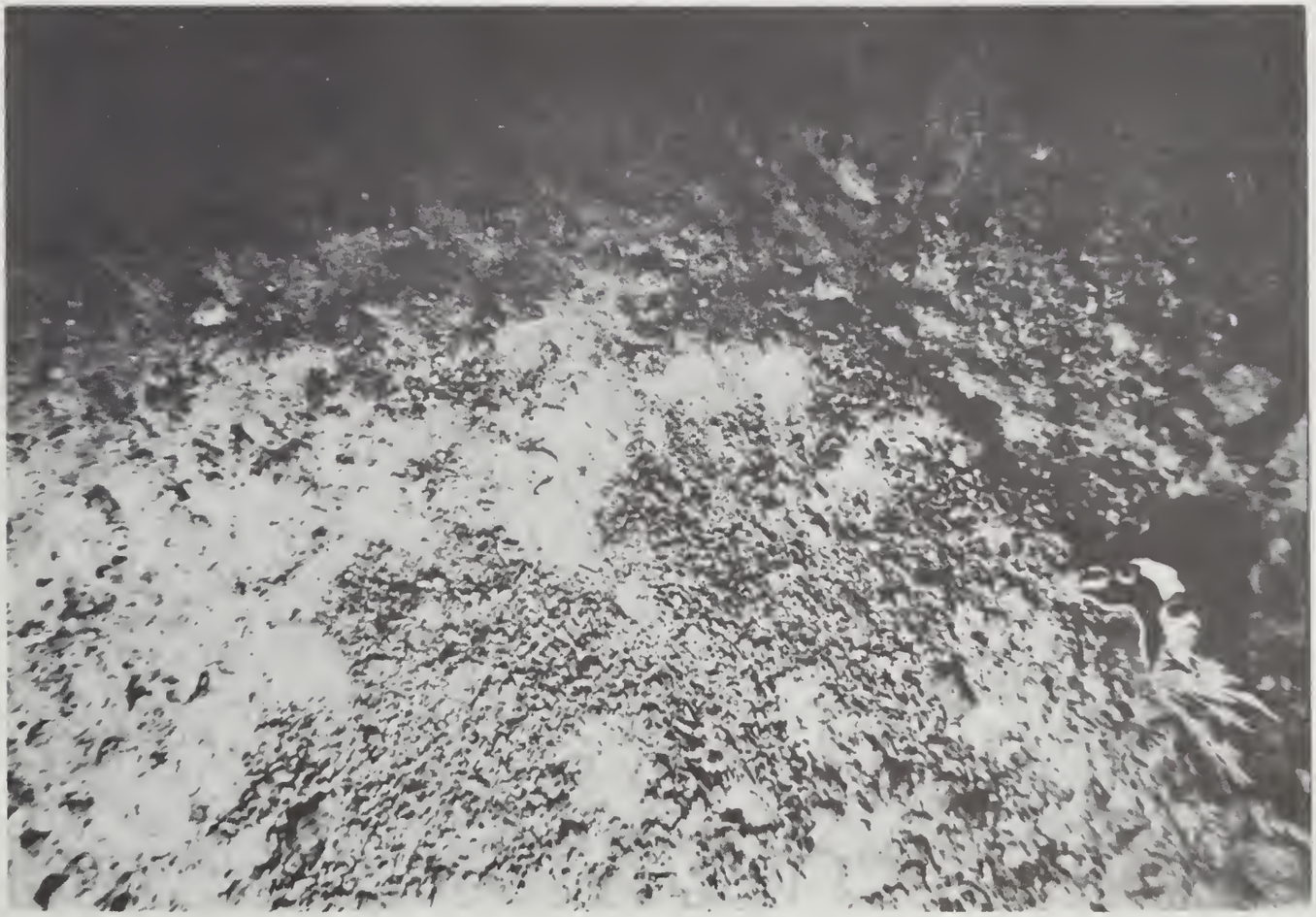
V16-4-13



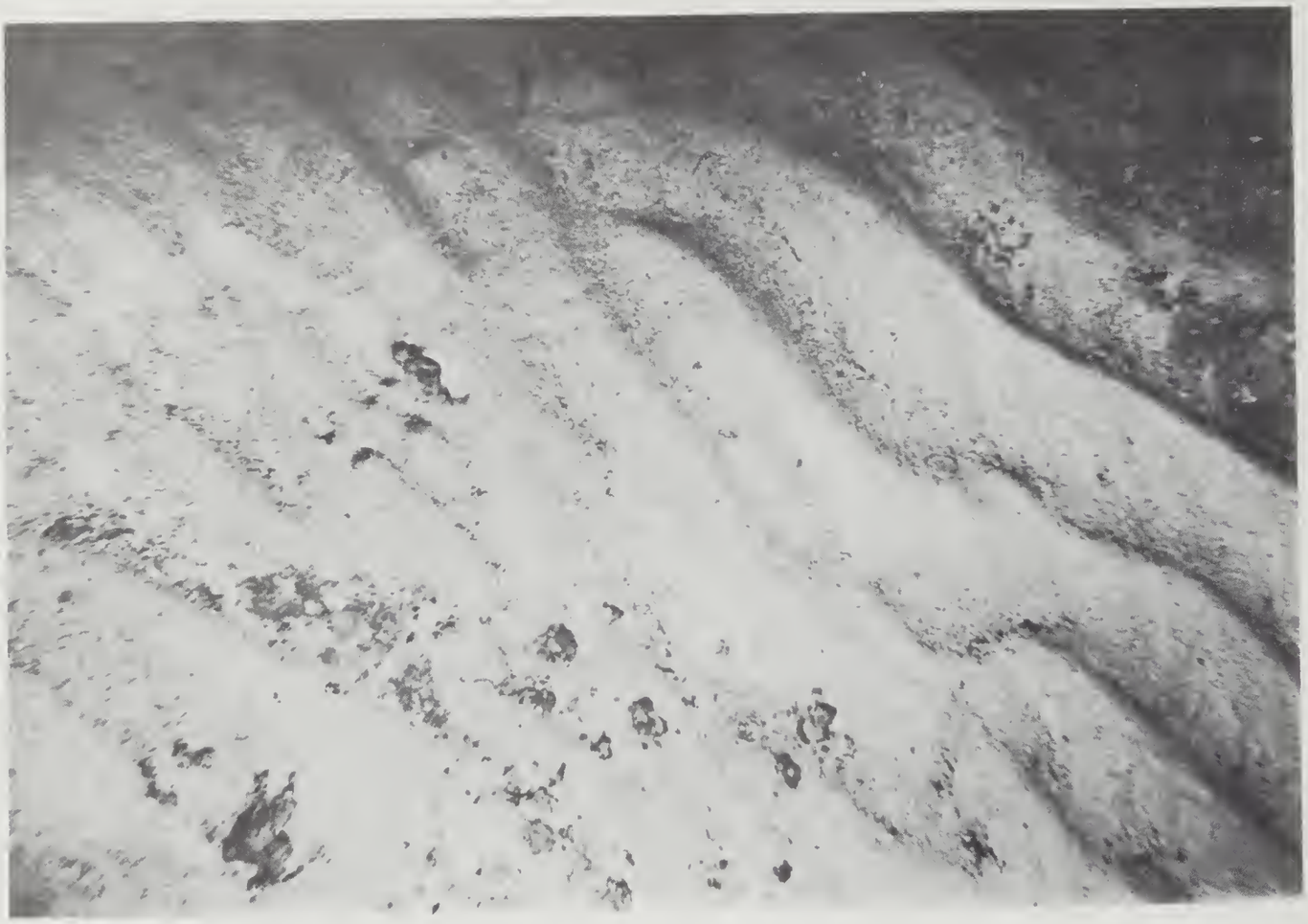
V16-4-14



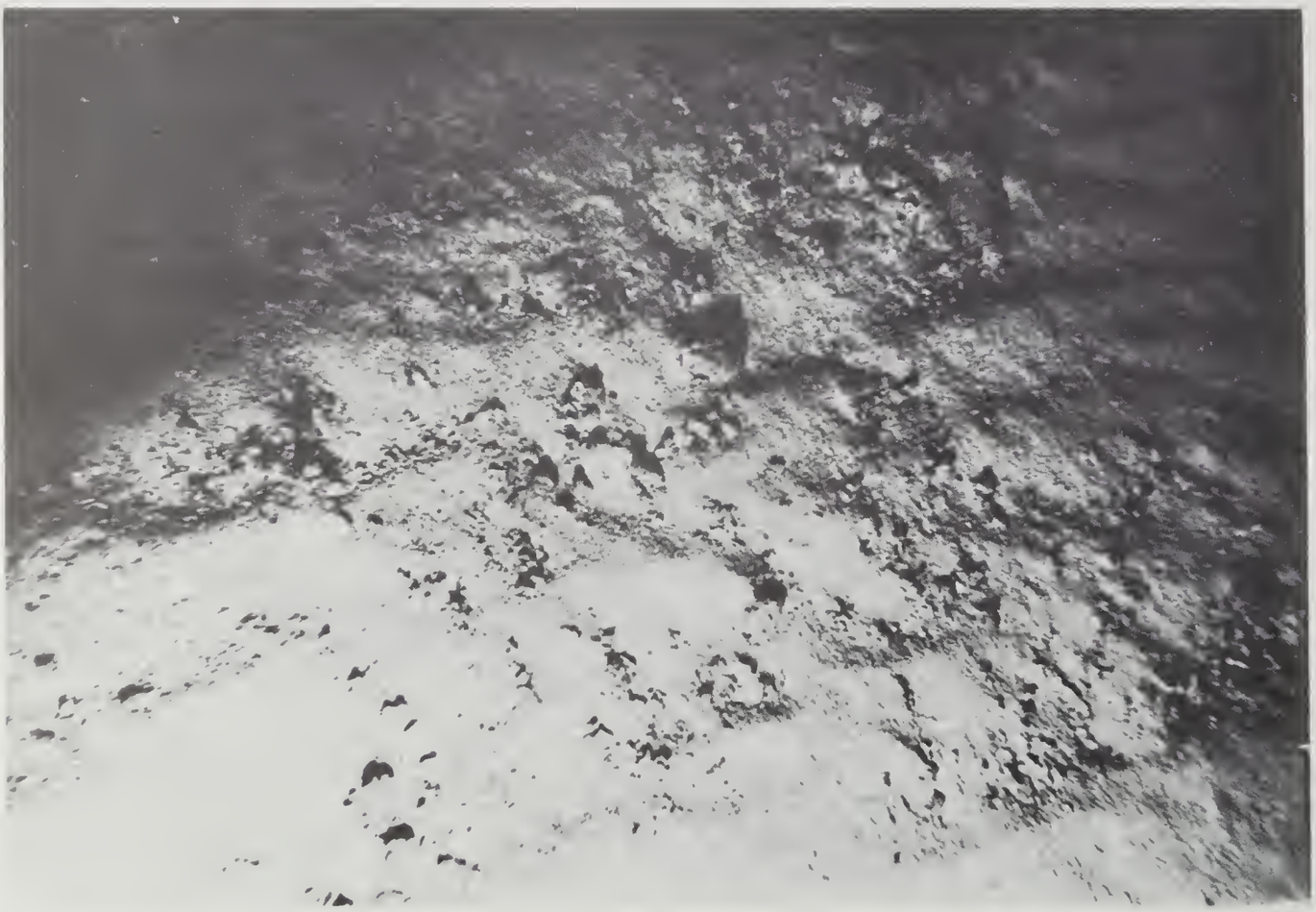
V16-4-15



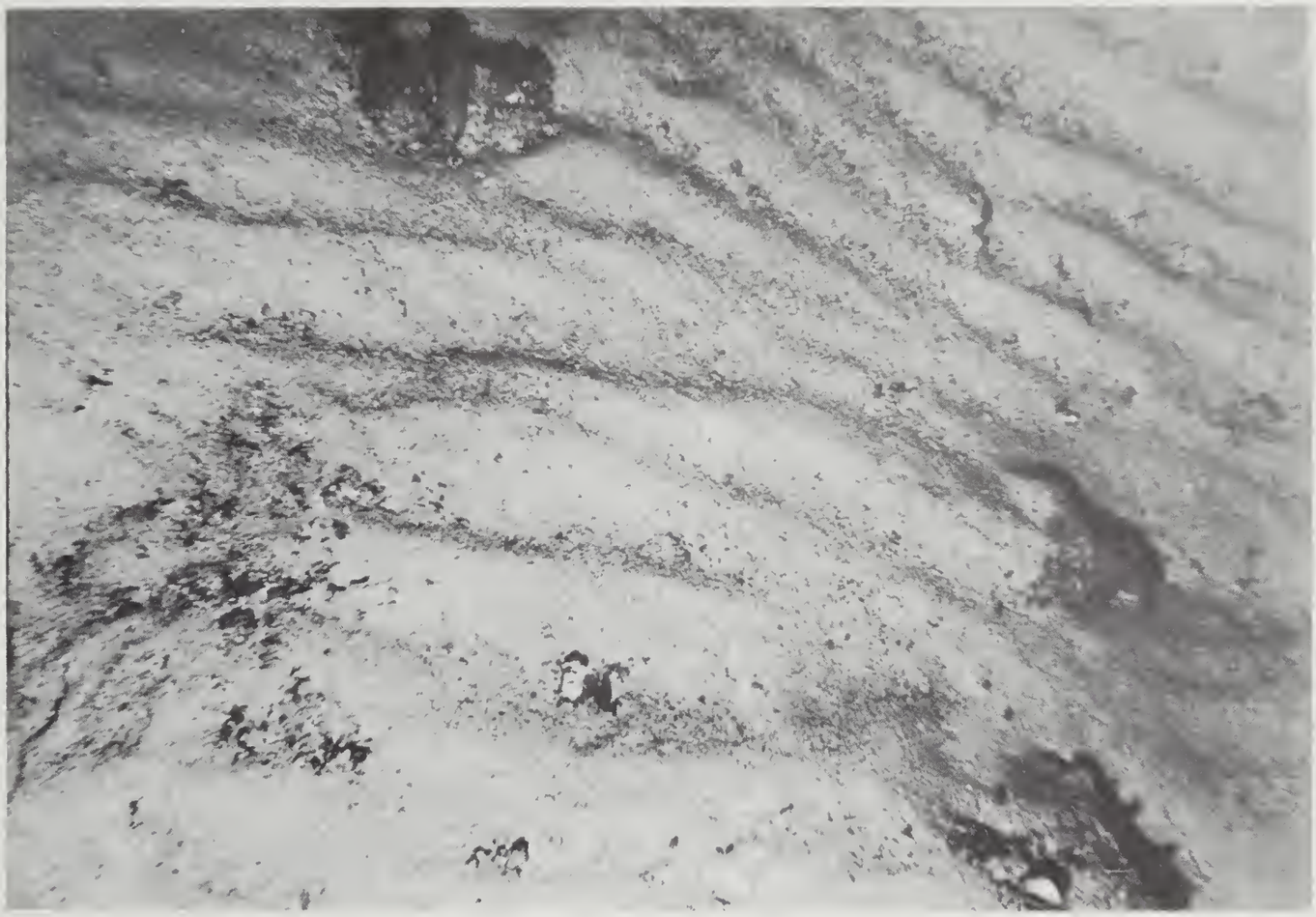
V16-4-16



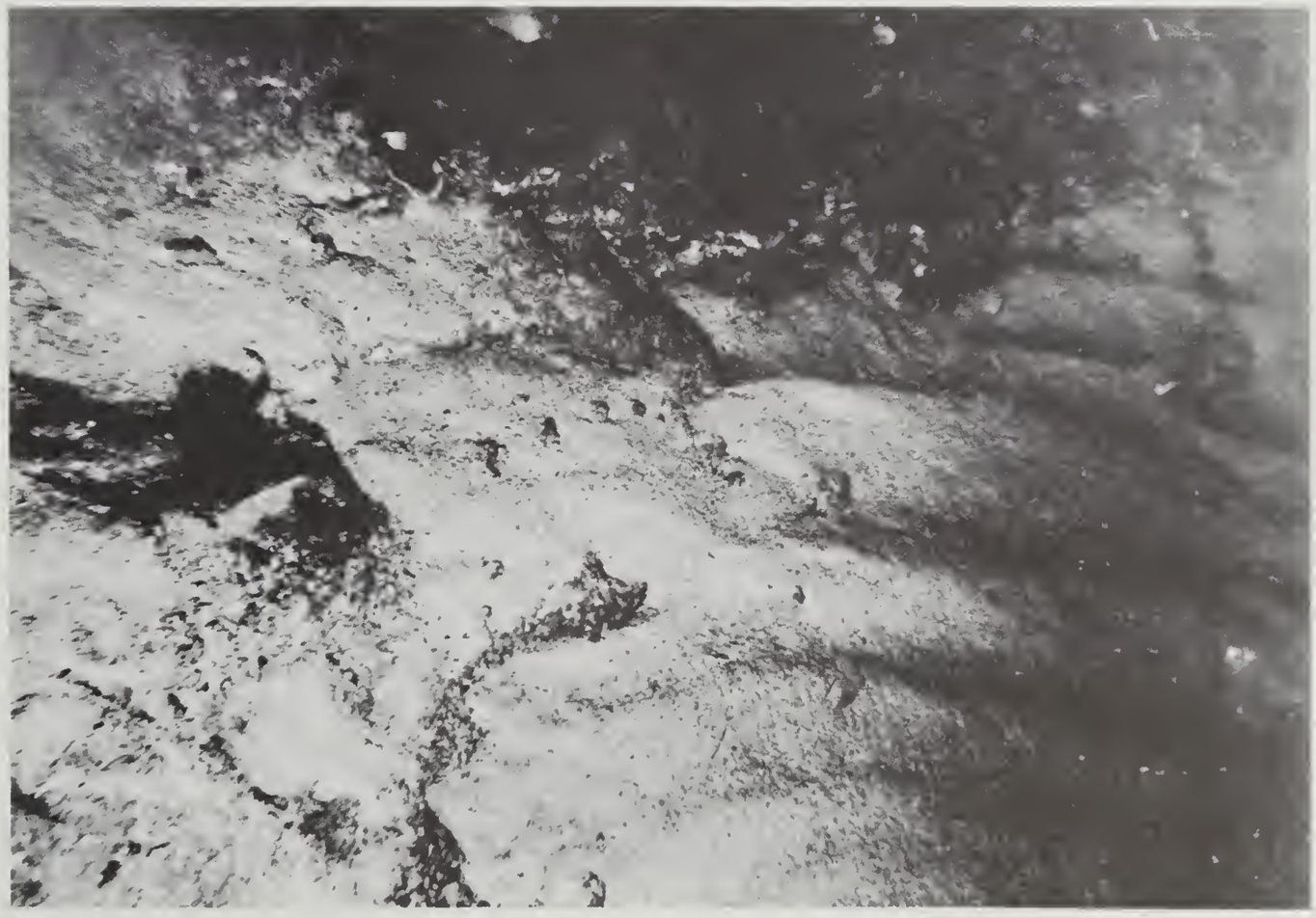
V16-4-17



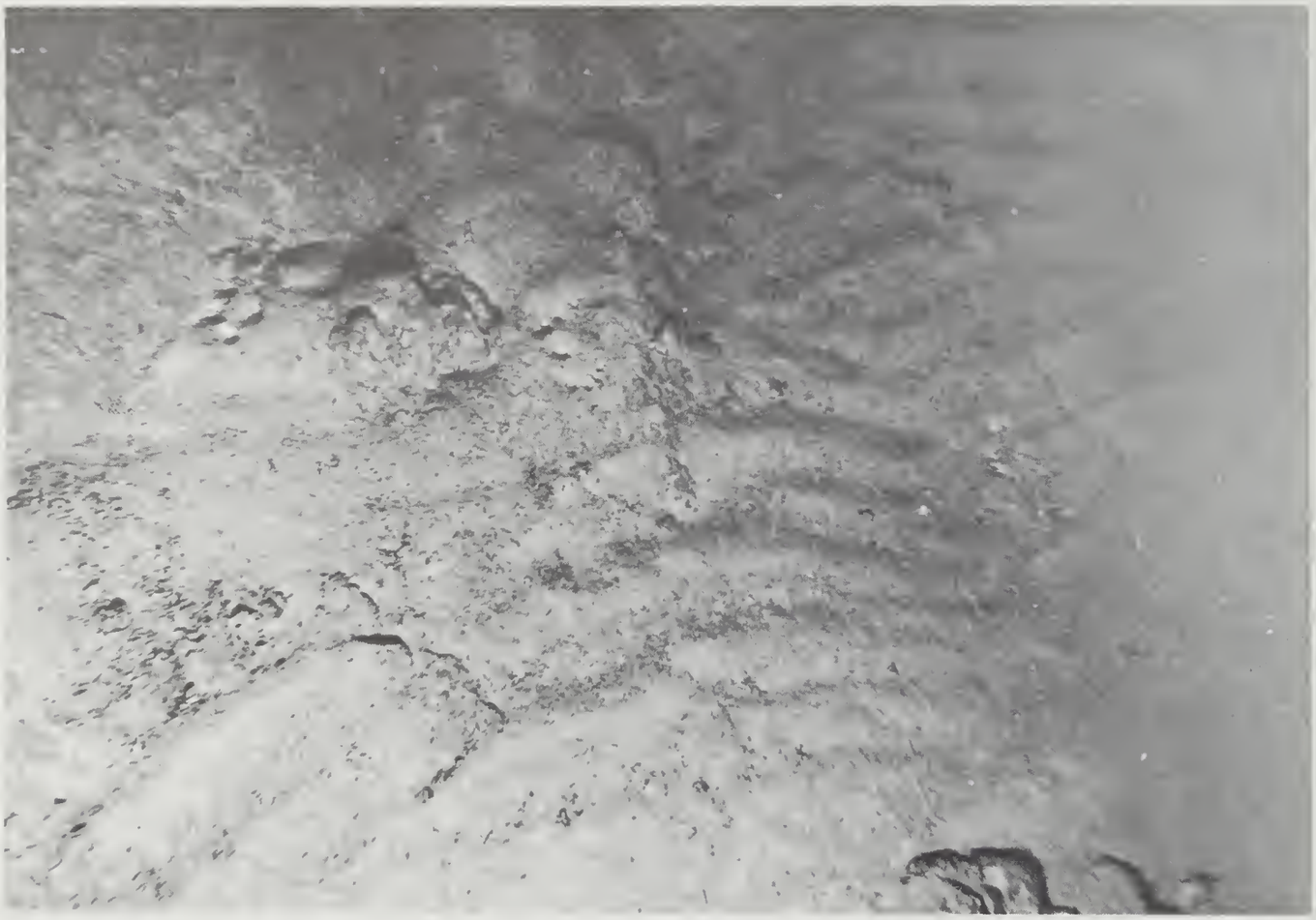
V16-4-18



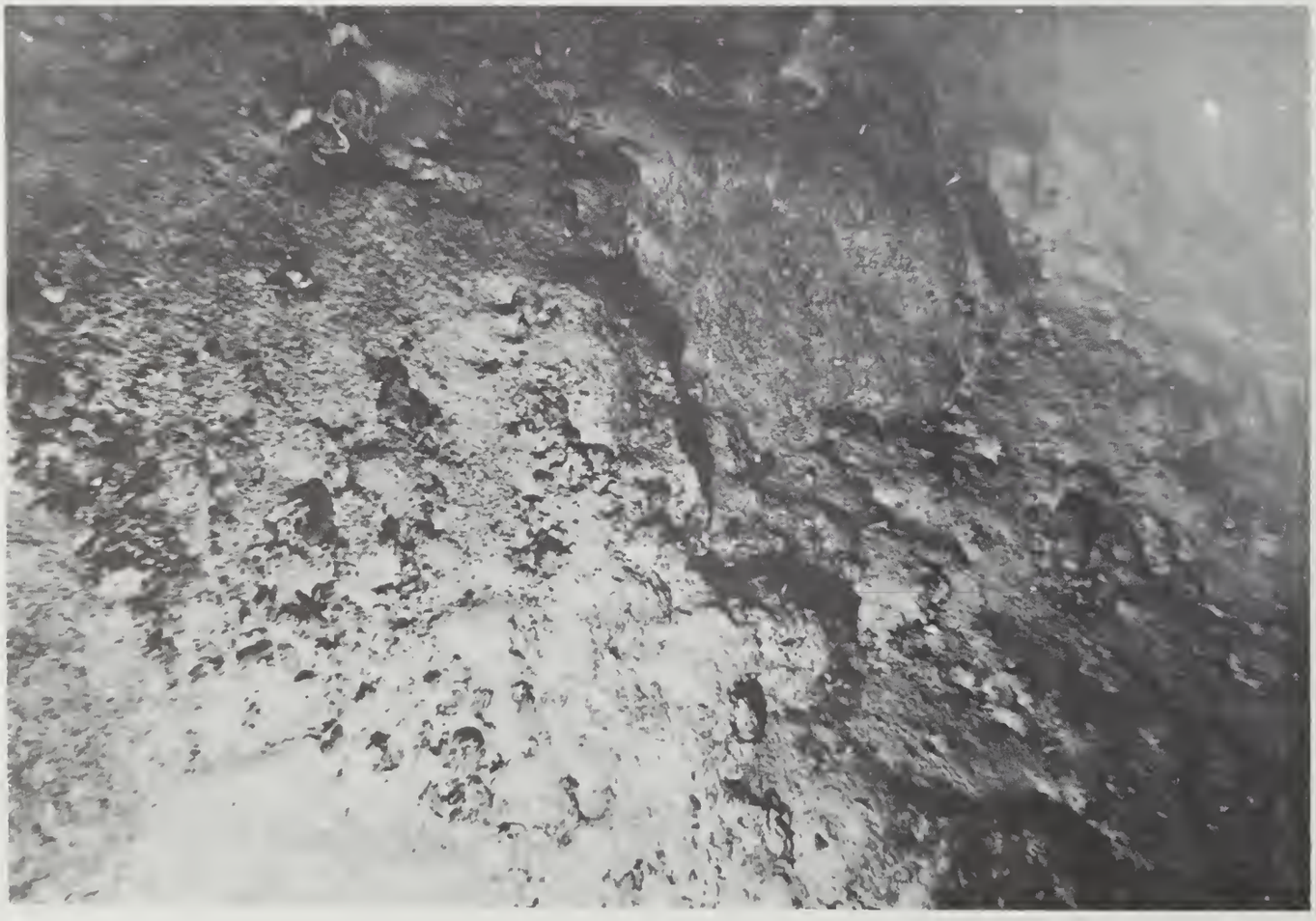
V16-4-19



V16-4-20



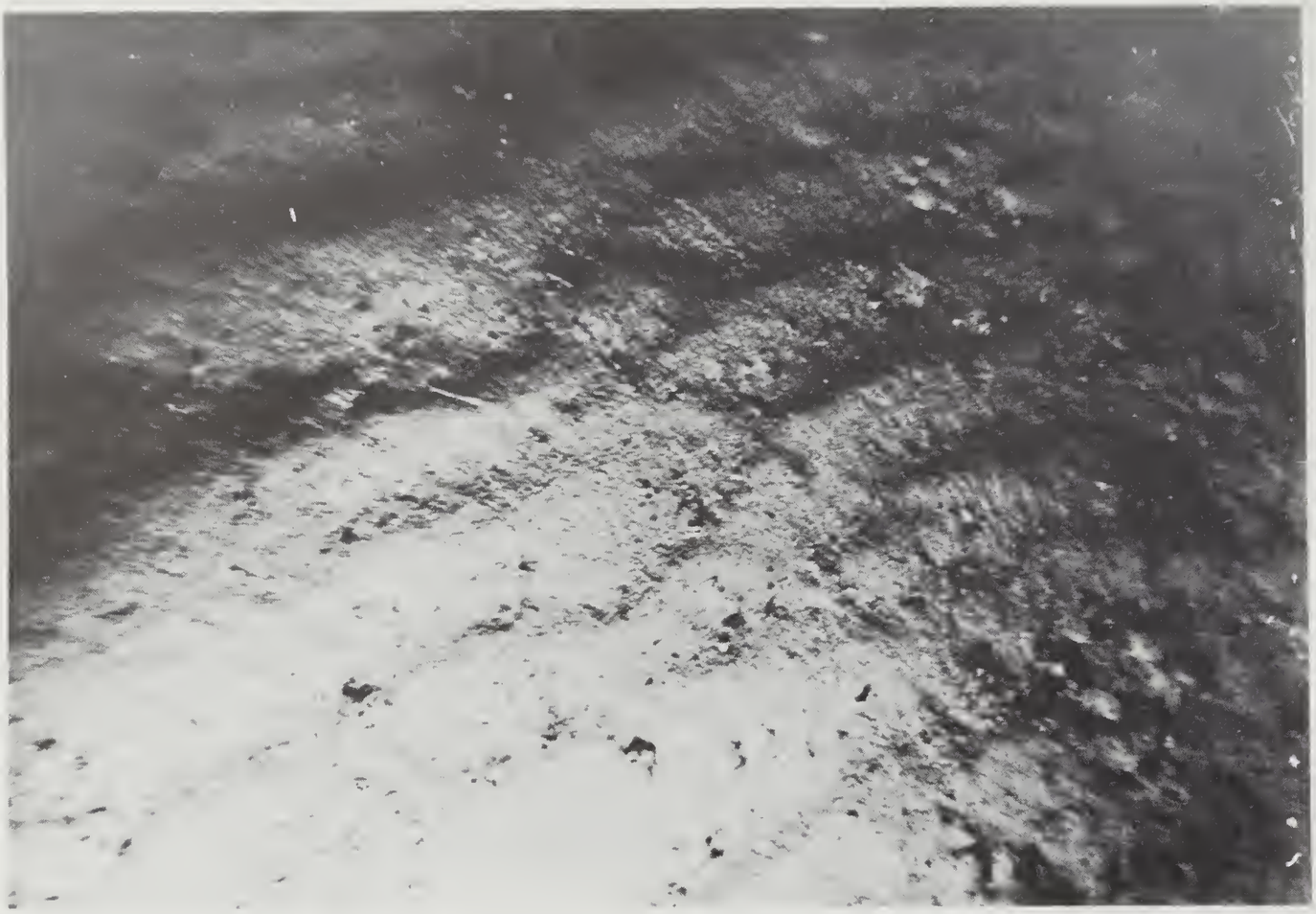
V16-4-20a



V16-4-21

V16-4-22

V16-4-23



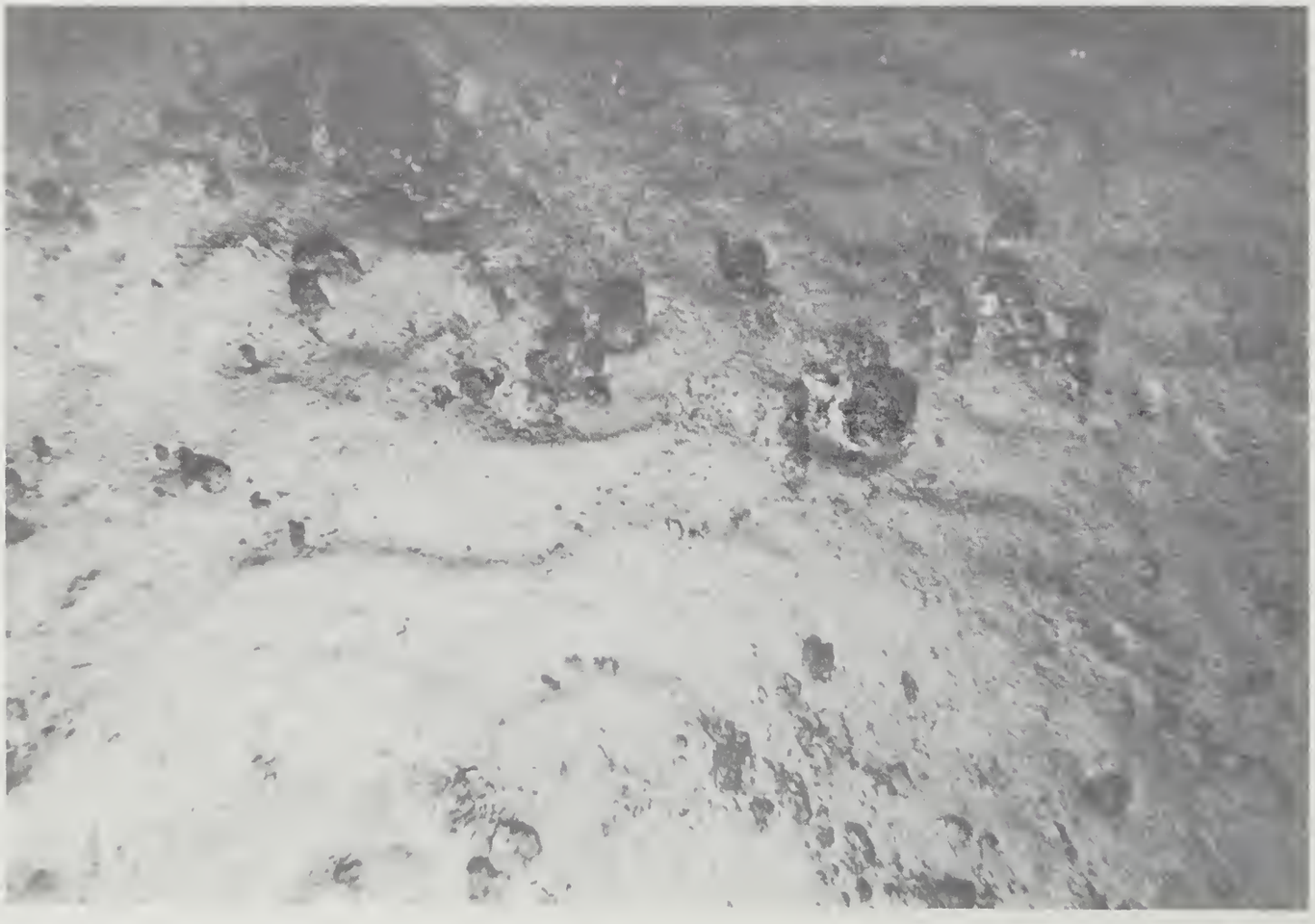
V16-4-24

V16-4-25

V16-4-26

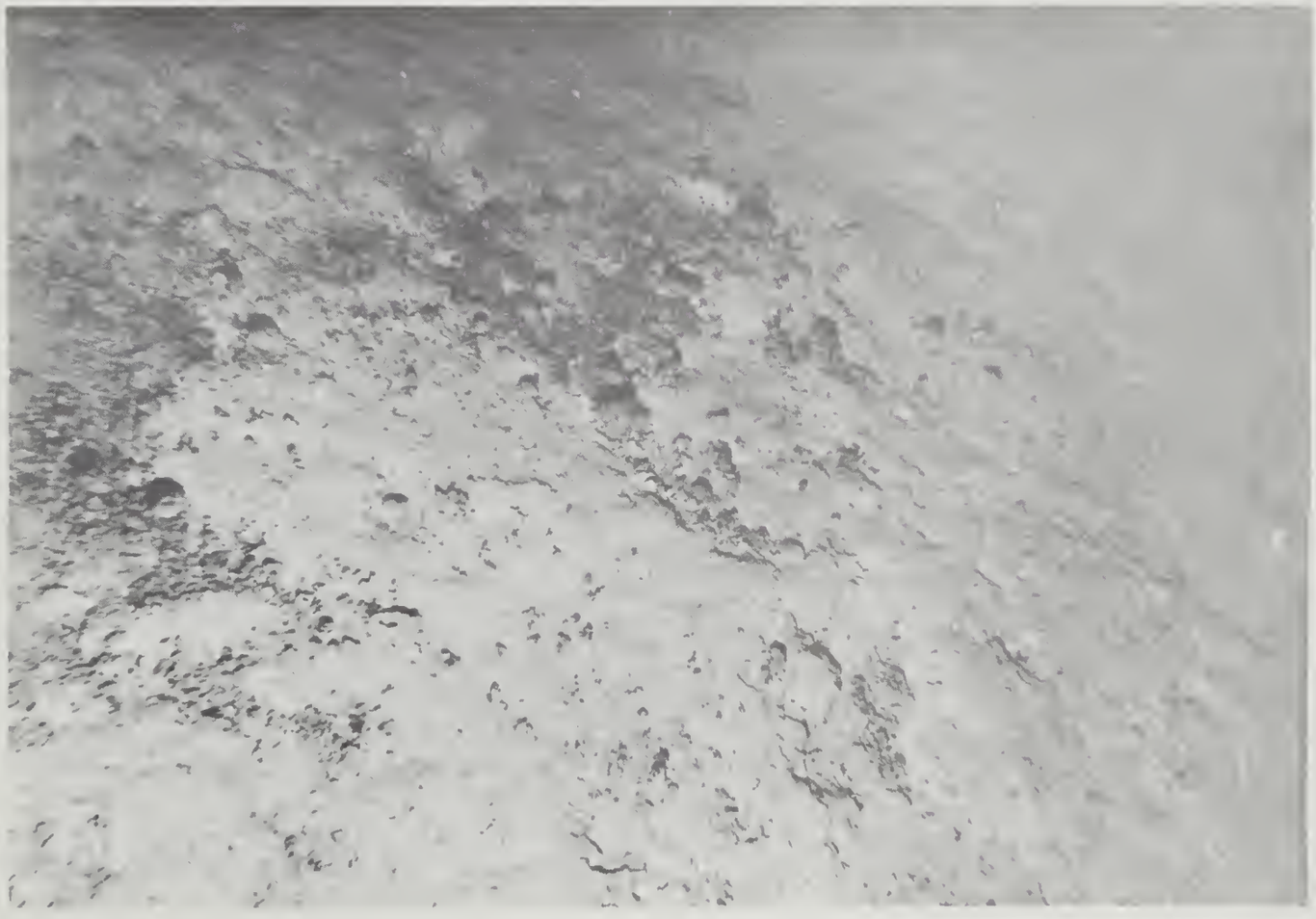
V16-4-27

V16-4-28

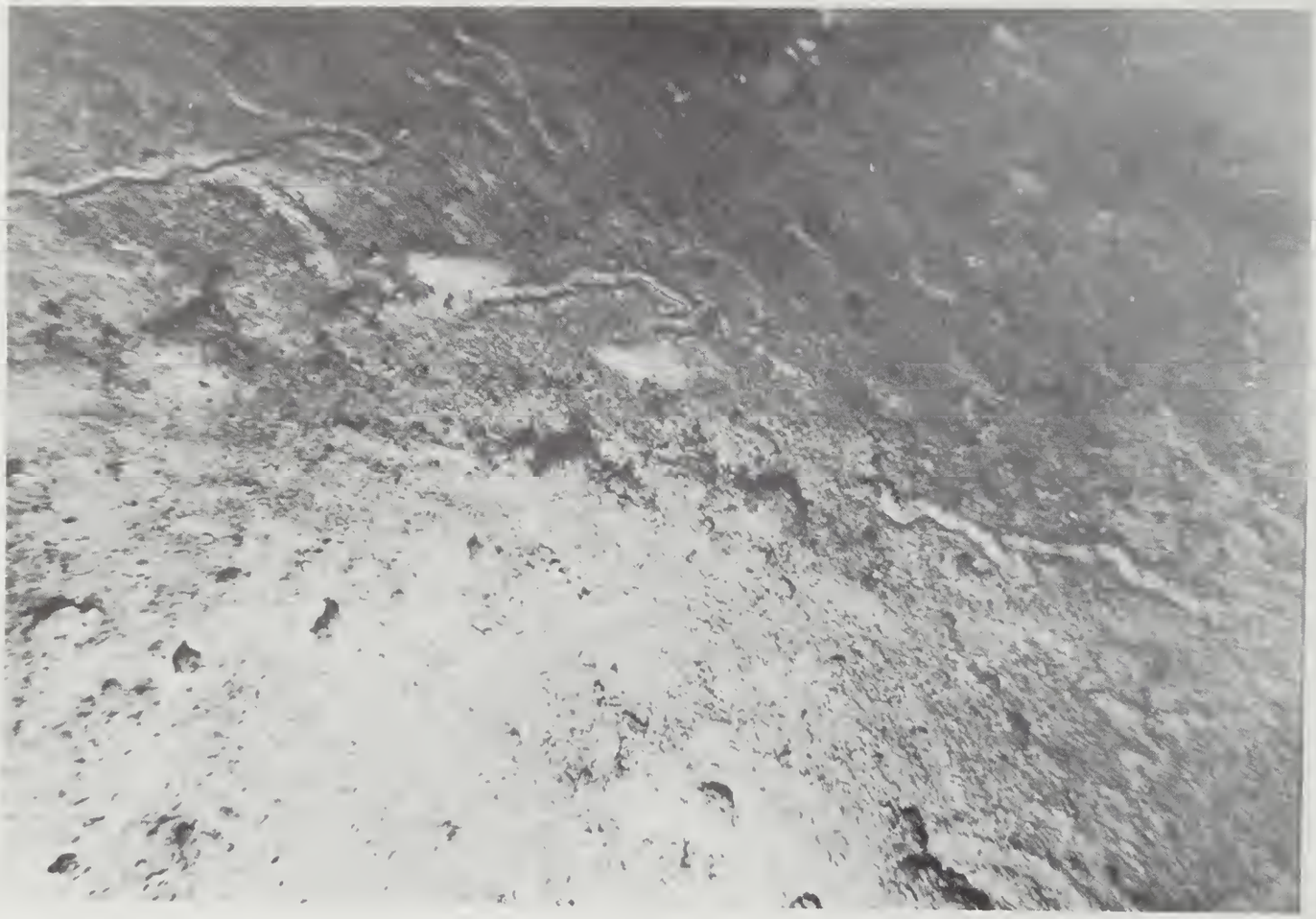


V16-4-29

V16-4-30

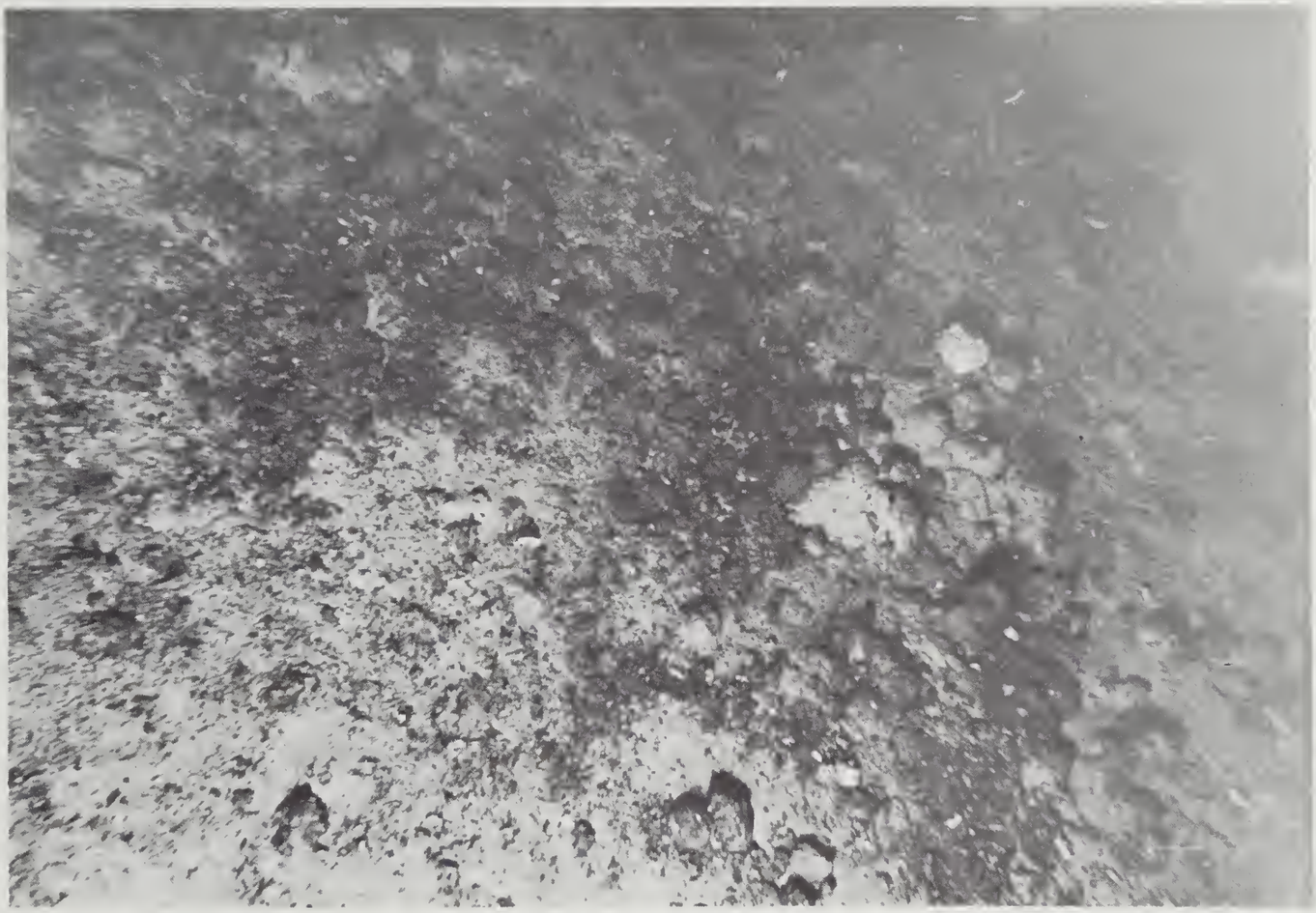


V16-4-31



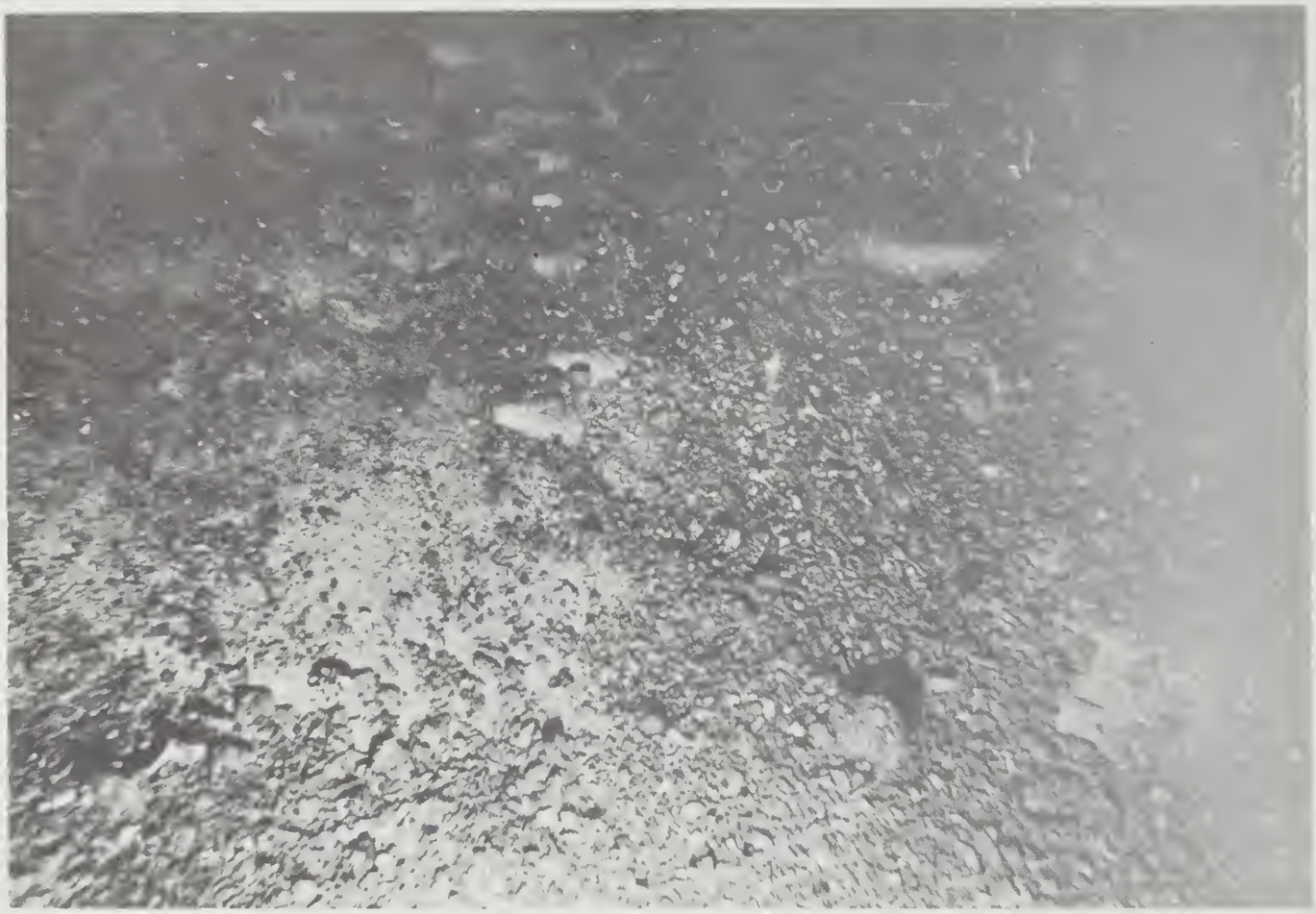
V16-4-32

V16-4-33



V16-4-34

V16-4-35



V16-4-36

V16-4-37