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147, 148, and 149

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Project NR 083 012

Reference M66-2  
January 1966



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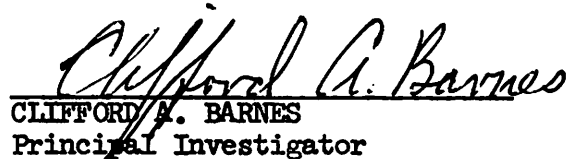
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RICHARD H. FLEMING  
Chairman

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Principal Investigator

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## Technical Report No. 142

BIO-LITHOLOGY OF NORTHEAST PACIFIC SURFACE SEDIMENTS, by Y. R. Nayudu and B. J. Enbysk. *Marine Geology*, 2(4):310-342. 1964. (AEC: RLO-1725-42)

## Technical Report No. 143

THE TINTINNID PARAFAVELLA GIGANTEA (BRANDT), KOFOID & CAMPBELL, 1929, IN THE NORTH PACIFIC OCEAN, by Hsin-Yi Ling. *Journal of Paleontology*, 39(4):721-723. 1965. (AEC: RLO-1725-43)

## Technical Report No. 144

THE CARBONATE CONTENT OF SURFACE SEDIMENTS FROM THE NORTHEAST PACIFIC OCEAN, by M. Grant Gross. *Northwest Science*, 39(3):85-92. 1965. (AEC: RLO-1725-44)

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RADIOACTIVITY OF THE COLUMBIA RIVER EFFLUENT, by M. Grant Gross, Clifford A. Barnes, and Gordon K. Riel. *Science*, 149(3688):1088-1090. 1965. (AEC: RLO-1725-45)

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FRACTIONATION OF PHYTOPLANKTON COMMUNITIES OFF THE WASHINGTON AND OREGON COASTS, by George C. Anderson. *Limnology and Oceanography*, 10(3):477-480. 1965. (AEC: RLO-1725-46)

## Technical Report No. 147

CHLOROPHYLLS IN MARINE PHYTOPLANKTON: CORRELATION WITH CARBON UPTAKE, by G. C. Anderson and K. Banse. *Deep-Sea Research*, 12(4):531-533. 1965. (AEC: RLO-1725-47)

## Technical Report No. 148

GRAPHIC REPRESENTATION OF THE SALINITY DISTRIBUTION NEAR THE COLUMBIA RIVER MOUTH, by Betty-Ann Morse and Noel McGary. Pp. 923-942 in *Ocean Science and Ocean Engineering 1965*, vol. 2. Marine Technology Society, Washington, D. C. 1965. (AEC: RLO-1725-3)

## Technical Report No. 149

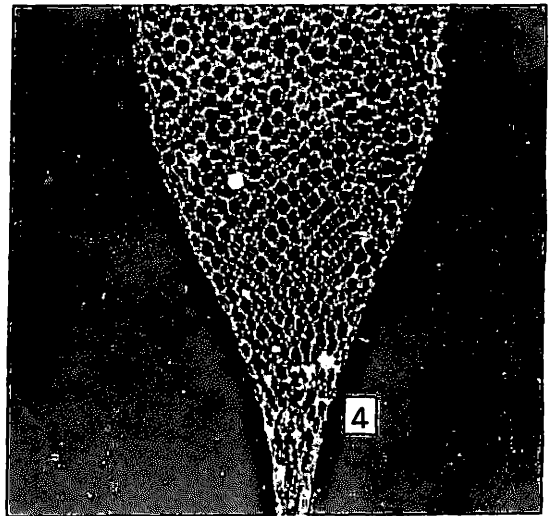
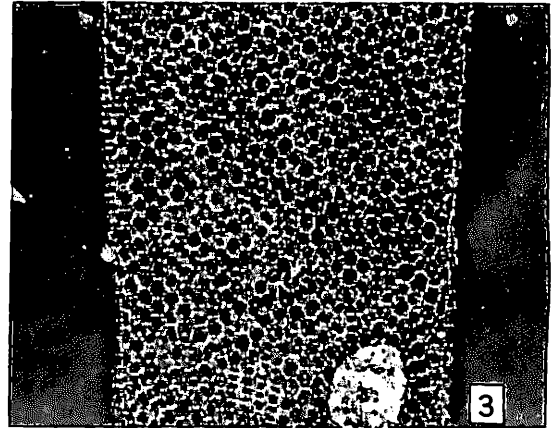
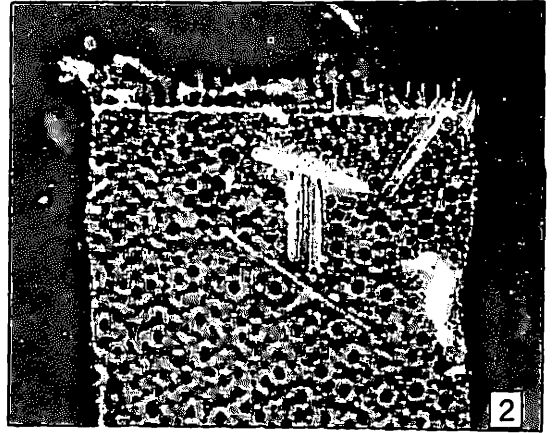
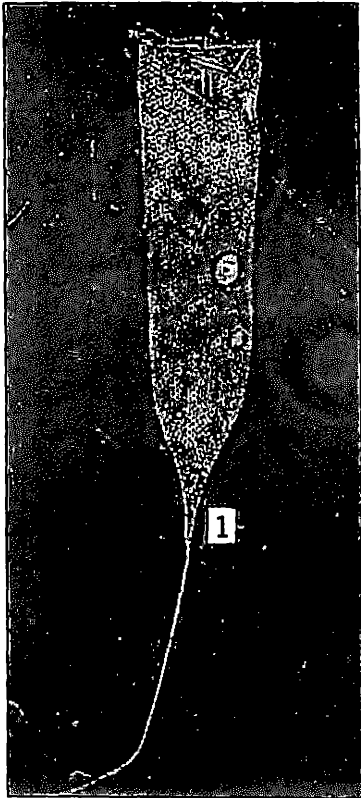
THE UNION OF THE COLUMBIA RIVER AND THE PACIFIC OCEAN -- GENERAL FEATURES, by Alyn C. Duxbury. Pp. 914-922 in *Ocean Science and Ocean Engineering 1965*, vol. 2. Marine Technology Society, Washington D. C. 1965. (AEC: RLO -1725-5)

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TECHNICAL REPORT NO. 143

THE TINTINNID *PARAFVELLA GIGANTEA* (BRANDT),  
KOFOID & CAMPBELL, 1929, IN THE  
NORTH PACIFIC OCEAN

BY  
HSIN-YI LING

Reprinted from  
JOURNAL OF PALEONTOLOGY  
Vol. 39, No. 4, July, 1965



THE TINTINNID *PARAFAVELLA GIGANTEA* (BRANDT), KOFOID &  
CAMPBELL, 1929, IN THE NORTH PACIFIC OCEAN

HSIN-YI LING

University of Washington, Seattle

INTRODUCTION

During the preparation of planktonic radiolarians from the northeast part of the Pacific Ocean, an interesting tintinnid specimen was recovered. The presence of an uncommonly elongate aboral horn, which makes up a high proportion of the total length of the lorica, led the writer to study the detailed morphology of the specimen and to make comparisons with related forms previously recorded from the North Pacific Ocean.

The sample from which the tintinnid was recovered was obtained aboard the University of Washington's Department of Oceanography research vessel, the *M. V. Brown Bear*, on Cruise 144, August 23, 1956. The sample was collected with a Clarke-Bumpus sampler (Clarke & Bumpus, 1950) using a nylon net of 0.239-mm. aperture size, from depths between 200 meters and the surface at station 34 (lat. 44°00' N., long. 128°29' W.) (Text-fig. 1). The slide on which the specimen is mounted is deposited in the collection of the Department of Oceanography, University of Washington, Seattle.

DESCRIPTION OF SPECIMEN

Pl. 90, figs. 1-4

Lorica large, elongate, chalice-shaped, seven oral diameters in total length; oral margin denticulate, bearing 48 slender, slightly outward-flaring (15°) conical teeth 4 microns in length; long cylindrical portion of the bowl about three oral diameters in length, smoothly and barely tapering aborally; aboral region of the bowl is slightly convex conical (40°), about one oral

diameter in length, and has an acute tip; aboral horn slender, elongate, nearly three oral diameters in length, which is 0.4 of the total length of the lorica; wall of the lorica has well-developed hexagonal meshwork of nearly uniform size except in the aboral horn, from which the meshwork is completely absent.

Length of the lorica, 521 microns; oral diameter, 77 microns.

*Comparison.*—The specimen is morphologically similar to *Parafavella gigantea* (Brandt) of Kofoid & Campbell, 1929. In 1929, Kofoid & Campbell established the genus *Parafavella*, listed a complete synonymy of *Parafavella gigantea*, and figured but did not describe the species. Since then, two forms from the North Pacific Ocean have been referred to this species. Hada's (1932, p. 52, fig. 16) figure of a specimen distinctly shows a constriction at the middle of the bowl of the lorica, whereas Campbell's forms (1942, p. 77, figs. 52,53) of this species lack this constriction. In discussing his forms, Campbell stated:

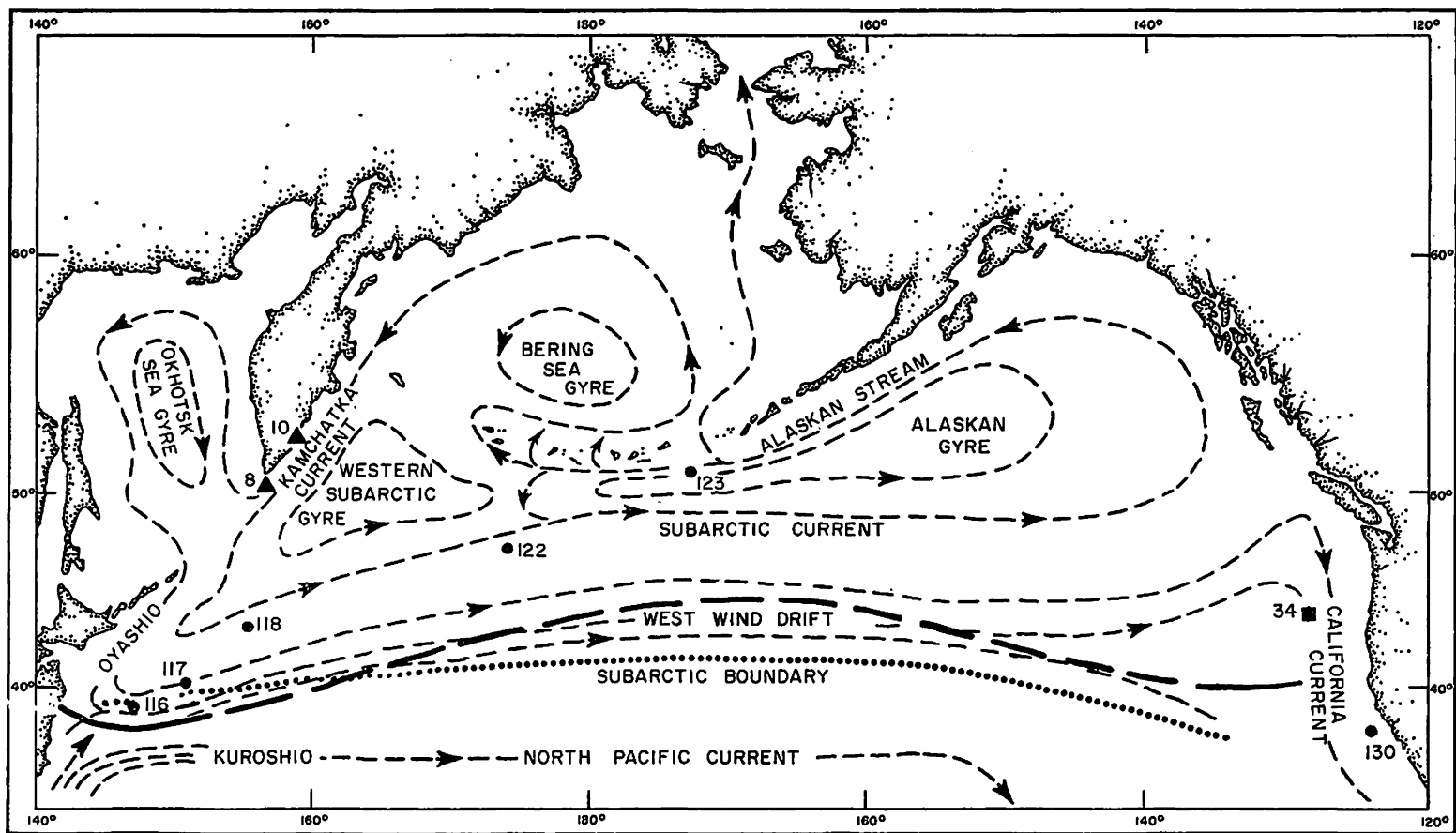
"The *Carnegie* loricae lack contraction in the bowl, being either directly cylindrical or tapering, and are much more like that figured by Kofoid and Campbell than figured by Hada."

Table 1 summarizes the minor variations in the described forms of *Parafavella gigantea*.

The present specimen seems to be intermediate between Hada's and Campbell's forms, although the aboral horn is much longer and the ratio of the length of the aboral horn to that of the entire lorica is much higher than in any of the forms previously described. It is the writer's

EXPLANATION OF PLATE 90

FIGS. 1-4—*Parafavella gigantea* from station 34 of *Brown Bear* Cruise 144, North Pacific Ocean (Text-fig. 1). 1, Lorica,  $\times 207$ ; 2-4, same specimen,  $\times 662$ , showing oral margin and its dentition, cylindrical portion of bowl and hexagonal meshwork of the wall, and aboral portion of the bowl.



TEXT-FIG. 1.—Map of the North Pacific Ocean showing the occurrences of *Parafavella gigantea* (Brandt), Kofoed & Campbell, 1929. Surface circulation, dashed lines, and Subarctic Pacific boundary, dotted line, from Dodimead and others (1962); boundary of Cold North Pacific Region, heavy dashed line, from Graham & Bronikovsky (1944); Hada's (1932) stations, solid triangles; Campbell's (1942) *Carnegie* stations, solid circles; and station 34 of *Brown Bear* cruise 144, solid square.

TABLE 1. CHARACTERS OF NORTH PACIFIC FORMS OF *PARAFAVELLA GIGANTEA*

Character	Hada (1962)	Campbell (1942)	This paper
Oral diameter			
Microns	63 to 71	61 to 72*	77
Total length			
Microns	340 to 576	337 to 576	521
Oral diameters	5.3 to 8.1	5.9 to 6.9	7.0
Length of aboral horn			
Oral diameters	1.56*	1.17	3.0
Aboral horn length/total length	0.25 to 0.33	0.17 to 0.2* (maximum)	0.4
Teeth	slightly outflared	distinctly outflared (45°)	slightly outflared (15°)
Constriction in bowl	present	absent	absent
Convexity of aboral region	45° to 60°	40° to 45°	40°

\* Data taken from illustrations.

opinion that it may be assigned to *Parafavella gigantea* s. l. until more specimens are obtained.

#### PARAFAVELLA GIGANTEA IN THE NORTH PACIFIC OCEAN

Hada (1932) first reported the occurrence of the species in the North Pacific Ocean. His specimens came from six stations, two of which were located south of the Kamchatka Peninsula and others in the Sea of Okhotsk. Through the *Carnegie* cruise, Campbell (1942) found the species at six stations in the Pacific Ocean, two (116, 117) in the middle northern latitudes, three (119, 122, 123) in the east Asiatic marginal sea, and one (130) in the California region.

All these occurrences of *Parafavella gigantea*, with the exception of *Carnegie* station 130, are within the Cold North Pacific Region, which was delineated by Graham & Bronikovsky (1944) on the basis of distribution of *Ceratium*, a dinoflagellate, observed during the *Carnegie* cruise. Using a more recent oceanographic interpretation, almost all the reported occurrences of the species are within the area defined as the Subarctic Pacific Region by Dodimead and others (1962).

This preliminary information on occurrence indicates that surface circulation plays an important role in the distribution of these plankton. In addition, the absence of the species from the subtropical or tropical regions of the Pacific suggests that *Parafavella gigantea* might be useful as a cold water or cold current indicator.

#### ACKNOWLEDGMENTS

Thanks are due Betty J. Enbysk, University of Washington, Dorothy Jung Echols, Washing-

ton University, St. Louis, and Arthur S. Campbell, St. Mary's College, Contra Costa, California, for their advice and reading of the manuscript. This work was supported in part by Atomic Energy Commission Contract No. AT(45-1)-1725 and Office of Naval Research Contract No. 477(10), Project No. NR 083 012, and Contract No. 477(37), Project No. RR 044-03-01. This paper constitutes Contribution No. 329 of the Department of Oceanography, University of Washington.

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