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Kenneth Hooper

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Benthonic Foraminiferal Depth-Assemblages of the
Continental Shelf off Eastern Canada*

KENNETH HOOPER

Department of Geology, Carleton University, Ottawa, Ontario.

Factor-vector analysis of 40 bottom sediment samples from stations ranging from English Point, P. Q. to the Flemish Cap off Newfoundland, is interpreted as indicating seven benthonic foraminiferal depth-assemblages. These are correlated with the main water mass layers of the region. Locations are given in Figure 1.

Raw data was processed by a Control Data G. 20 computer according to a program described by Hooper (1967) for the production of data matrices. The data of the benthonic foraminiferal percentage matrix was processed by the IBM 7094 computer in a program of factor-vector analysis, essentially as described by Manson & Imbrie (1964), but with some modifications in the QQ mode.

Particle size analysis of the sediments indicated only a weak correlation of mean grain diameter with depth of occurrence. However, there is a general trend of decreasing grain size with depth. Also, values of the average mean grain size and its range tend to be characteristics of the depth-assemblages.

In all, 318 species and varieties of foraminifera were recognized. Many of these were probably only variant specimens which did not merit the distinction of separation from the species population. However, in order not to miss the possibility of their being of ecological significance, they were given a number and hence treated as species by the computer program.

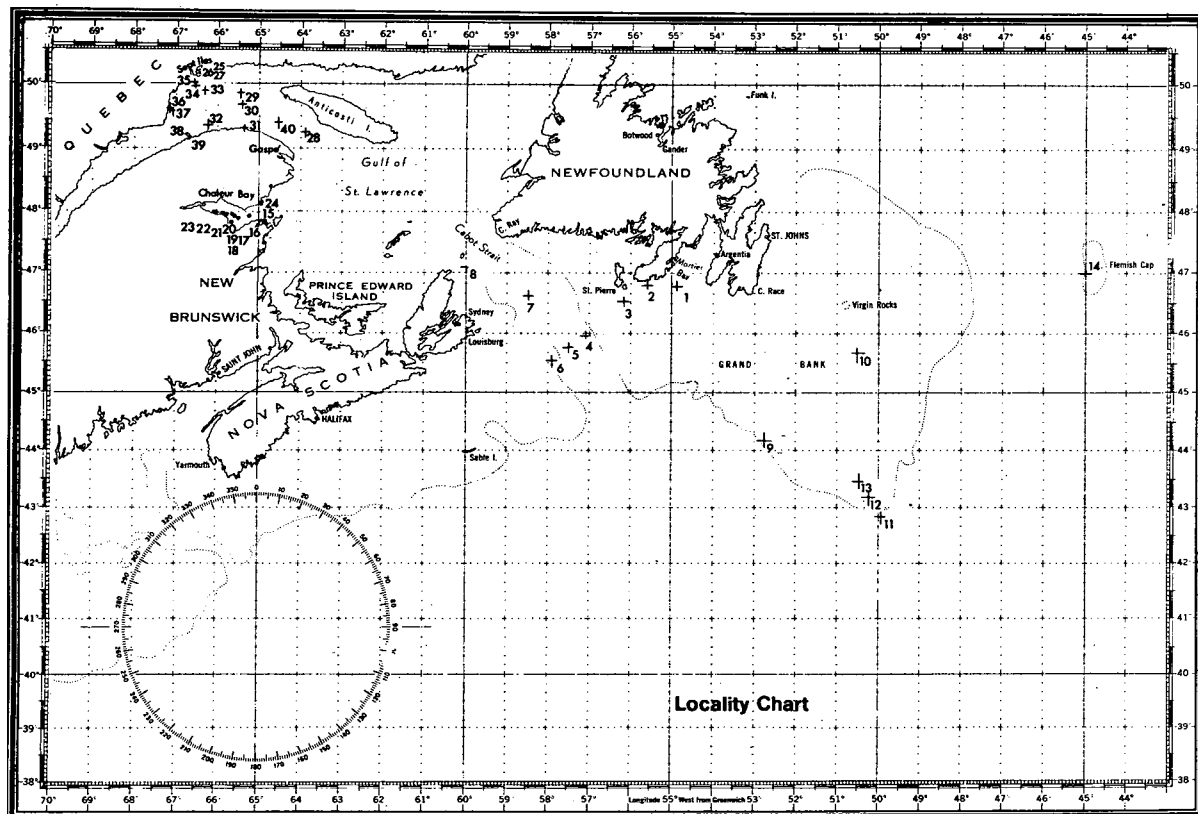


Fig. 1 - Location of sampling stations

*Manuscript received July 5, 1968.

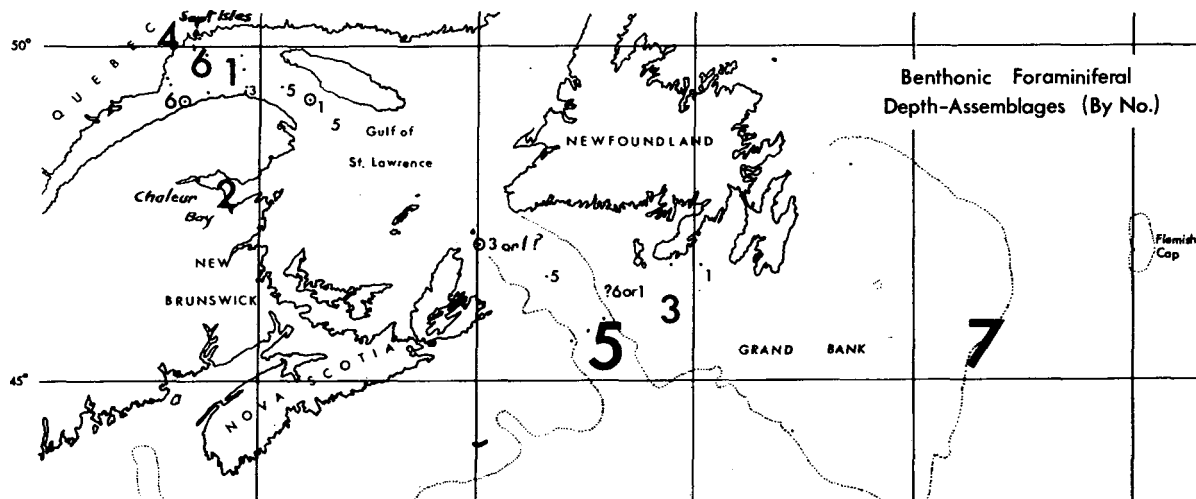


Fig. 2 - Map showing location of depth assemblages

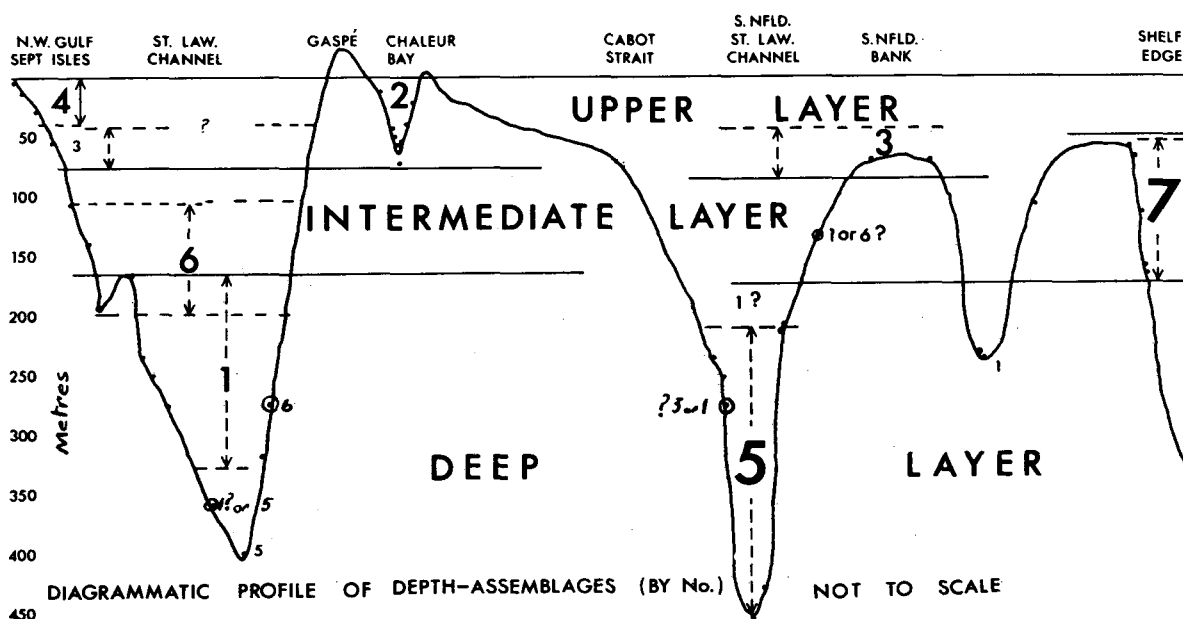


Fig. 3 - Submarine topographic profile showing location of depth assemblages

Depth-assemblages

The re-ordered oblique projection matrix is interpreted as indicating seven assemblages which are related to depth. The depth-assemblages are shown in Figures 2 and 3, and are listed below:

- Depth-assemblage no. 1. The Laurentian channel slope in the N. W. Gulf and south of Newfoundland; deep water; depth range, approximately 166 to 317 metres.
- Depth-assemblage no. 2. Chaleur Bay; shallow water; depth range, approximately 12.5 to 64 metres (or possibly to 82 metres).
- Depth-assemblage no. 3. N. W. Gulf of St. Lawrence and the Bank south of Newfoundland; shallow water; depth range, approximately 56 to 74 metres.
- Depth-assemblage no. 4. Sept Isles Bay; shallow water; depth range, approximately 7 to 36 metres.
- Depth-assemblage no. 5. St. Lawrence Channel; deep water; depth range, approximately 218 to 457 metres.
- Depth-assemblage no. 6. N. W. Gulf of St. Lawrence; intermediate depth; depth range, approximately 106 to 191 metres.
- Depth-assemblage no. 7. S. E. Grand Bank (Tail) and edge of shelf; intermediate depth; depth range, approximately 58 to 165 metres.

Assemblage-ubiquitous Species

Some species occur in each and every sample present in a depth-assemblage. The assemblage-ubiquitous species are listed.

Assemblage No. 1. Depth range, 166 to 317 metres.

Angulogerina fluens TODD, 1947
Buccella inusitata ANDERSEN, 1952
Cassidulina islandica NORVANG, 1945

Assemblage No. 2. Depth range, 12.5 to 64 (or 82) metres.

Eggerella scabra (WILLIAMSON), 1858

Assemblage No. 3. Depth range, 56 to 74 metres.

Angulogerina fluens TODD, 1947
Buccella inusitata ANDERSEN, 1952
Buccella frigida (CUSHMAN), 1922
Cassidulina islandica NORVANG, 1945
Cassidulina teretis TAPPAN, 1951 = Islandiella
Cibicides lobatulus (WALKER & JACOB), 1798
Elphidium bartletti CUSHMAN, 1933
Elphidium clavatum CUSHMAN, 1930
Elphidium subarcticum CUSHMAN, 1944
Elphidiella arctica (PARKER & JONES), 1864
Fissurina marginata (MONTAGU), 1803
Lagena apiopleura LOEBLICH & TAPPAN, 1953
Oolina melo D'ORBIGNY, 1839

Assemblage No. 4. Depth range, 7 to 36 metres.

Eggerella advena (CUSHMAN), 1922
Psammosphaera sp.

Assemblage No. 5. Depth range, 218 to 457 metres.

Bulimina exilis BRADY, 1884
Buccella inusitata ANDERSEN, 1952
Nonion labradoricum (DAWSON), 1860
Bulimina marginata D'ORBIGNY, 1826
Virgulina complanata EGGER, 1893

Assemblage No. 6. Depth range, 106 to 191 metres.

Adercotryma glomerata (BRADY), 1878
Alveolophragmium jeffreysi (WILLIAMSON), 1858

Assemblage No. 7. Depth range, 58 to 165 metres.

Buccella inusitata ANDERSEN, 1952
Cassidulina islandica NORVANG, 1945
Cibicides lobatulus (WALKER & JACOB), 1798
Elphidium clavatum CUSHMAN, 1930

Assemblage-indicator Species

Some forms are restricted to one assemblage. They are assemblage-indicator species. The most important of these forms are listed.

Assemblage No. 1. Depth range, 166 to 317 metres.

Trochammina lobata CUSHMAN, 1944
Trochammina squamata JONES & PARKER, 1860
Lagena parri LOEBLICH & TAPPAN, 1953
Dentalina pauperata D'ORBIGNY, 1846
Rectoglandulina rotundata (REUSS), 1850

Assemblage No. 2. Depth range 12.5 to 64 (or 82) metres.

Reophax fusiformis WILLIAMSON, 1858
Gyroidina quinqueloba UCHIO, 1960

Assemblage No. 3. Depth range, 56 to 74 metres.

Astacolus hyalacrulus LOEBLICH & TAPPAN, 1953
Dentalina baggi GALLOWAY & WISSLER, 1927
Glabratella wrightii (BRADY), 1881
Guttulina lactea (WALKER & JACOB), 1798
Guttulina earlandi CUSHMAN & OZAWA, 1930

- Laryngosigma hyalascidia LOEBLICH & TAPPAN, 1953
Lamarckina haliotidea HERON-ALLEN & EARLAND, 1911
Nonion scaphum (TICHTEL & MOLL), 1798
Quinqueloculina arctica CUSHMAN, 1933
Quinqueloculina agglutinata CUSHMAN, 1917
Quinqueloculina nitida NORVANG, 1945
Triloculina trihedra LOEBLICH & TAPPAN, 1953
Trochammina nana (BRADY), 1881
Oolina striatopunctata (PARKER & JONES), 1865
Planorbulina mediterraneensis D'ORBIGNY, 1826
Robertinoides charlottensis (CUSHMAN), 1925
Quinqueloculina akneriana D'ORBIGNY, 1846
Tholosina bulla (BRADY), 1881
Turrispirillina arctica (CUSHMAN), 1933
Oolina squamosa (MONTAGU), 1893
- Assemblage No. 4. Depth range, 7 to 36 metres.
- Miliammina fusca (BRADY), 1870
- Assemblage No. 5. Depth range, 218 to 457 metres.
- Discorbis chasteri (HERON-ALLEN & EARLAND), 1913
Discorbis obtusa CUSHMAN, 1931
Lagena gracilis (WILLIAMSON), 1848
Lagena hispida REUSS, 1863
Oolina hexagona (WILLIAMSON), 1848
Parafissurina tectulostoma LOEBLICH & TAPPAN, 1953
Parafissurina follicula LOEBLICH & TAPPAN, 1953
Pninaella pulchella PARKER, 1952
Siphogenerina annulata BRADY, 1884
Fissurina lucida (WILLIAMSON), 1848
Globobulimina turgida (BAILEY), 1851
Buliminella convoluta (WILLIAMSON), 1858
Gyroidina umbonata (SILVESTRI), 1898
Cyclammina cancellata BRADY, 1879
Trochammina quadriloba HOGLUND, 1948
- Assemblage No. 6. Depth range, 106 to 191 metres.
- Hyperammina subnodosa BRADY, 1884
Marsipella elongata RHUMBLER, 1913
Nonion pompilioides (FICHTEL & MOLL), 1798
Robertina arctica D'ORBIGNY, 1846
Reophax subfusiformis EARLAND, 1933
- Assemblage No. 7. Depth range, 58 to 165 metres.
- Guttulina dawsoni CUSHMAN & OZAWA, 1930
Psammosphaera fusca SCHULZE, 1875
Virgulina fusiformis WILLIAMSON, 1858
Trochammina globigeriniformis (PARKER & JONES), 1865
Scutuloris tegminis LOEBLICH & TAPPAN, 1953
Rosalina columbiensis (CUSHMAN), 1925
Trochammina conica EARLAND, 1934
Quinqueloculina seminula (LINNAEUS), 1767
Dentalina melvillensis LOEBLICH & TAPPAN, 1953

Acknowledgements

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