

ANNUAL MEETING - JUNE 1964Fish Egg and larval collections by CGS Baffin and CNAV Sackville off West Greenland,  
1963 (NORWESTLANT II)

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## Introduction

During May and June, Baffin made 132 plankton tows, 70 by Hensen net, 25 by stramin net and 37 by Icelandic High Speed Sampler. Sackville made 12 plankton tows, all by Hensen net. The fish eggs from the plankton collection have been counted, measured and classified according to stages. The fish larvae have been counted and measured.

## Cod Eggs, Redfish and Cod Larvae

The numbers of cod eggs and cod and redfish larvae from the various plankton tows are shown in Tables 1-4 and Fig. 1-4. Those taken by the Hensen net have been expressed as numbers under a square metre, while those from the Icelandic High Speed Sampler and the stramin net have been expressed as numbers per 30-minute tow.

Eggs have been divided into 5 stages of development as follows:

- I. from fertilization to germinal ring at almost equatorial position.
- II. from germinal ring at equatorial position to blastopore almost closed.
- III. from blastopore closed to embryo almost  $3/4$  around yolk.
- IV. from embryo  $3/4$  around yolk to full circle.
- V. embryo with distinct eye pigment.

This grouping appears to follow sufficiently closely Apstein's stages: 1-8; 9-11; 12-15; 16-19; 20-22.

Because of damage to certain eggs, the yolk was scattered throughout the egg capsule and it was difficult to determine the exact stage of development. A number of eggs have therefore been placed into Stages I-II and II-III. A few eggs showed abnormal development and have been put into Stage AB.

All cod eggs except one damaged specimen were measured. As the numbers were so small it was thought that no advantage would be gained by presenting the measurements by each type of net. The diameters below, therefore, comprise all undamaged cod eggs taken by the different nets. They are not corrected to give catch per unit area or per 30-minute tow.

mm	Number of cod eggs
1.25 - 1.29	6
1.30 - 1.34	11
1.35 - 1.39	33
1.40 - 1.44	42
1.45 - 1.49	34
1.50 - 1.54	11
1.55 - 1.59	6

Only a few cod and redfish larvae were present and all undamaged ones were measured. The uncorrected larvae measurements from all nets combined are given below. Three cod larvae and 2 redfish larvae were damaged and thus not measured.

mm	Numbers of cod larvae	Numbers of redfish larvae
4	11	
5	20	1
6	12	3
7	6	11
8	8	14
9		11
10	1	1
11		1

Other Fish Eggs and Larvae

Numbers of American plaice and cusk eggs and American plaice, launce and Greenland halibut larvae taken by the various nets are shown in Tables 5-7

and Fig. 5-7. A number of larvae, because of their very small size, were judged to have been mechanically hatched by contact with the nets. Where these could be identified, they were included in the egg totals.

American plaice eggs ranged from 2.3 to 3.6 mm in diameter with a mean of 3.0 mm. Bigelow and Schroeder (1953), with reference to American plaice, write "During the development of the egg, minute black and yellow pigment cells are scattered over the embryo, not aggregated into any diagnostic clusters. But the pigment gathers in five definite groups very soon after hatching (which takes place when the larvae are 4 to 6 mm long); one on the gastric region, one about the vent, and three behind the vent ..." In the present collection American plaice eggs in advanced development contained embryos whose body pigment had gathered into the diagnostic pattern described above (Fig. 8, left).

Eggs with a yellowish oil globule of 0.2-0.3 mm ranged in diameter from 1.4 to 1.6 mm with a mean of 1.5 mm. One embryo with well-developed body pigment appeared to be quite similar to Ehrenbaum's (1905 and 1909) drawing of a cusk larva (drawing c, page I 294). All eggs of this type were therefore classed as cusk (Fig. 8, right).

Launce larvae ranged from 5 to 23 mm and a fry of 55 mm was taken. The collection included American plaice larvae ranging from 4 to 11 mm in length and Greenland halibut from 13 to 22 mm.

The remainder of the specimens (in uncorrected numbers) consisted of 15 wolffish, 3 Lumpenus, 1 lantern fish, 1 3-spined stickleback, 1 small common halibut (?), 1 Greenland halibut egg (?), 1 grenadier, 8 unidentified larvae and 8 unidentified (and apparently mechanically hatched) eggs.

#### Acknowledgement

Dr. E. H. Grainger separated the fish eggs and larvae from the plankton collections and provided the set details for the various plankton hauls.

References

- Apstein, C. 1911. Die Verbreitung der pelagischen Fischeier und Larven in der Beltsee und den angrenzenden Meeresteilen 1908/09. In Wissenschaftliche Meeresuntersuchungen, N.F. Bd. 13, Abteilung Kiel.
- Bigelow, H. B., and W. C. Schroeder. 1953. Fishes of the Gulf of Maine. U.S. Fish and Wildlife Service, Fishery Bulletin 74, vol. 53, 577 pp. (First Revision).
- Ehrenbaum, E. 1905 and 1909. Eier und Larven von Fischen. Nordisches Plankton, Zoologischer Teil, 414 pp.

Table 1. Baffin. Numbers of cod eggs and cod and redfish larvae (adjusted to number/m<sup>2</sup>) by Hensen net, May-June, 1963.

Station	North West		Date	Cod eggs by stages											Total	Cod larvae	Redfish larvae
	latitude	longitude		I	I-II	II	II-III	III	IV	V	AB						
2	57° 27'	59° 50.3'	May 26														
3	58° 13.5'	57° 04'	"														
4	58° 47'	55° 08'	May 27														
5	59° 25'	53° 09.2'	"														
6	60° 00'	51° 15'	May 28														
7	60° 29'	50° 24.8'	"														4.92
8	60° 25'	49° 50'	"														2.46
9	60° 50.2'	49° 23.5'	"														7.38
10	60° 49'	48° 34.5'	"														
11	61° 57'	50° 02'	May 29														
12	61° 50.9'	50° 36.5'	"										14.76		2.46	17.22	
13	61° 45.8'	51° 10'	"														
14	61° 40.5'	51° 45'	"														4.92
15	61° 35'	52° 30'	"														
16	61° 26'	53° 30.2'	May 30														
17	61° 08'	55° 31'	"														

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(continued over-leaf)

Table 1 (cont.)

Station	North		Date	Cod eggs by stages										Cod larvae	Redfish larvae	
	latitude	West longitude		I	I-II	II	II-III	III	IV	V	AB	Total				
18	60° 48'	57° 30'	May 30													
19	60° 26'	59° 20'	May 31													
21	63° 10'	60° 13'	"													
22	63° 11'	58° 13'	June 1													
23	63° 11.9'	57° 19.5'	"													
24	63° 20'	56° 07'	"													
25	63° 37.2'	55° 23'	"													
26	63° 48.3'	54° 33'	"													
27	63° 54.2'	53° 53.5'	June 2													2.46
28	63° 59.3'	53° 21.9'	"							2.46						2.46
29	64° 02.2'	53° 06'	"													
30	64° 05.3'	52° 46.8'	"								2.46					2.46
31	63° 59.5'	52° 22'	"													
BT 33	62° 41'	51° 43'	June 3							2.46						4.92
BT 34	62° 44'	52° 29.2'	"								2.46					
32	62° 46.8'	53° 11'	"													
BT 37	63° 08'	52° 17'	"													
BT 38	63° 27.9'	51° 50'	June 4													

Table 1 (cont.)

Station	North		Date	Cod eggs by stages										Cod larvae	Redfish larvae	
	Latitude	Longitude		I	I-II	II	II-III	III	IV	V	AB	Total				
BT 41	64° 34.2'	52° 58'	June 6												2.46	
BT 42	64° 40'	53° 55'	"													
BT 43	64° 45'	54° 47.9'	June 7													
BT 44	64° 52'	55° 40'	"													
33	65° 05.5'	57° 45'	"													
34	65° 06'	56° 30'	"													
35	65° 06'	55° 40'	"													2.46
36	65° 06'	54° 55'	"													
37	65° 06'	54° 24'	June 8													
38	65° 06'	53° 57'	"													3.27
39	65° 05.6'	53° 33.5'	"													
40	65° 06.2'	53° 00'	"													
BT 53	65° 15'	53° 55'	"													
BT 54	65° 20'	54° 40'	"													
BT 55	65° 28.2'	55° 32'	"													2.46
BT 56	65° 37.5'	56° 30'	"													
BT 57	65° 42.2'	55° 44'	June 9													

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Table 1 (cont.)

Station	North latitude	West longitude	Date	Cod eggs by stages							Cod larvae	Redfish larvae		
				I	I-II	II	II-III	III	IV	V			AB	Total
BT 58	65° 48'	54° 55'	June 9											
BT 59	65° 52.5'	54° 08'	"											
BT 60	66° 00'	54° 58'	"											
BT 61	66° 05'	55° 50'	"								2.46			
BT 62	66° 08'	56° 35'	"								4.92			
BT 63	66° 15.4'	55° 52.5'	"											
BT 64	66° 24'	55° 04.3'	"											
41	66° 52.6'	54° 13'	June 10											
42	66° 49.5'	54° 40.5'	"											
43	66° 46'	53° 31.5'	"											
44	66° 41.8'	56° 07'	"											
45	66° 33.5'	56° 38'	"											
46	66° 32'	57° 15'	"											2.46
BT 72	67° 27.1'	56° 48.2'	June 10											
47	68° 08'	57° 06'	June 11											
48	68° 05'	56° 45'	"											
49	67° 57.8'	55° 53'	"											
50	67° 53.8'	55° 24'	"											
51	67° 50.9'	55° 02'	"											



Table 3. Baffin. Numbers of cod eggs and cod and redfish larvae (adjusted to 30-minute hauls) by stramin net, June 1963.

Station	North latitude	West longitude	Date 1963	Cod eggs by stages										Total	Cod larvae	Redfish larvae	
				I	I-II	II	II-III	III	IV	V	AB						
27	63° 54.2'	53° 53.5'	June 2														
32	62° 46.8'	53° 11'	June 3			1			2						3		
32	62° 46.8'	53° 11'	"														
BT 37	63° 08'	52° 17'	"	25		8	5	41	9						88	2	11
BT 38	63° 27.9'	51° 50'	June 4	2				1	2						5	7	5
BT 39	63° 52.8'	53° 22.2'	"	2		1	4	6	1	1				15	1	1	1
BT 41	64° 34.2'	52° 58'	June 6														
BT 42	64° 40'	53° 55'	"														
BT 43	64° 45'	54° 47.9'	June 7														
BT 44	64° 52'	55° 40'	"							1				1	1		
33	65° 05.5'	57° 45'	"													1	1
34	65° 06'	56° 30'	"													8	
35	65° 06'	55° 40'	"													1	
36	65° 06'	54° 55'	"														
37	65° 06'	54° 24'	June 8													2	1

Table 2. Sackville. Numbers of cod eggs and cod and redfish larvae adjusted to number/m<sup>2</sup>) by Hensen net, May-June, 1963.

Station	North latitude	West longitude	Date 1963	Cod eggs	Cod larvae	Redfish larvae
1	51° 00'	44° 00'	May 26			
2	52° 24'	44° 00'	"			
3	53° 48'	44° 00'	May 27			
5	56° 36'	40° 00'	May 28			2.46
6	58° 00'	44° 00'	"			2.46
8	58° 45'	44° 02.5'	"			
9	58° 30'	43° 00'	May 29	N I L	N I L	
13	56° 12'	45° 35'	June 2			2.02
16	54° 16'	52° 55'	"			
18	52° 31'	50° 39'	June 11			
19	52° 51'	49° 00'	June 12			
23	50° 37'	47° 36'	June 13			

Table 3 (cont.)

Station	North latitude	West longitude	Date	Cod eggs by stages										Total	Cod larvae	Redfish larvae
				I	I-II	II	II-III	III	IV	V	AB					
38	65° 06'	53° 57'	June 8					1							1	
39	65° 05.6'	53° 33.5'	"													
40	65° 06.2'	53° 00'	"													
BT 53	65° 15'	53° 55'	"			1		1							2	1
BT 54	65° 20'	54° 40'	"	1.68		.56		.56							2.80	.56
BT 72	67° 27.1'	56° 48.2'	June 10													
48	68° 05'	56° 45'	June 11													
49	67° 57.8'	55° 53'	"													
50	67° 53.8'	55° 24'	"													
51	67° 50.9'	55° 02'	"													

Table 4. Baffin. Numbers of cod eggs and cod and redfish larvae (adjusted to 30-minute hauls) by Icelandic High Speed Sampler, May-June, 1963.

Station	North		Date	Cod eggs by stages										Total	Cod larvae	Redfish larvae	
	latitude	longitude		I	I-II	II	II-III	III	IV	V	AB						
3	58° 13.5'	57° 04'	May 26														
5	59° 25'	53° 09.2'	May 27														2
7	60° 29'	50° 24.8'	May 28														7
9	60° 50.2'	49° 23.5'	"	3			1	2						6			
12	61° 50.9'	50° 36.5'	May 29	2.22			1.11	2.22						5.55			1.11
14	61° 40.5'	51° 45'	"														
16	61° 26'	53° 30.2'	May 30														
18	60° 48'	57° 30'	"														
22	63° 11'	58° 13'	June 1														1.50
25	63° 37.2'	55° 23'	"													1	
27	63° 54.2'	53° 53.5'	June 2														2
30	64° 05.3'	52° 46.8'	"														
31	63° 59.5'	52° 22'	"										1.43	1.43			1.43
BT 33	62° 41'	51° 43'	June 3														
BT 34	62° 44'	52° 29.2'	"														
32	62° 46.8'	53° 11'	"												1		1

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Table 4 (cont.)

Station	North		Date	Cod eggs by stages							Total	Cod larvae	Redfish larvae	
	Latitude	Longitude		I	I-II	II	II-III	III	IV	V				AB
BT 40	63° 54.2'	53° 53.9'	June 4										2	
BT 40	63° 54.2'	53° 53.9'	"										2	
BT 40	63° 54.2'	53° 53.9'	"										3	
BT 55	65° 28.2'	55° 32'	June 8										1.11	
BT 56	65° 37.5'	56° 30'	"										2	
BT 57	65° 42.2'	55° 44'	June 9										2	
BT 58	65° 48'	54° 55'	"											
BT 59	65° 52.5'	54° 08'	"											
BT 60	66° 00'	54° 58'	"											
BT 61	66° 05'	55° 50'	"											
BT 62	66° 08'	56° 35'	"											
BT 63	66° 15.4'	55° 52.5'	"											
BT 64	66° 24'	55° 04.3'	"											
BT 65	66° 38'	54° 16.5'	"											
41	66° 52.6'	54° 13'	June 10											
42	66° 49.5'	54° 40.5'	"											
43	66° 46'	55° 31.5'	"											
44	66° 41.8'	56° 07'	"											
45	66° 33.5'	56° 38'	"											
46	66° 32'	57° 15'	"											
47	68° 08'	57° 06'	June 11											

Table 5. Baffin. Numbers of American plaice and cusk eggs, and launce, American plaice and Greenland halibut larvae (adjusted to number/m<sup>2</sup>) by Hensen net, May-June, 1963. For station positions see Table 1.

Station	American plaice eggs by stages							Cusk eggs	Larvae		
	I	II	III	IV	V	Art.	Total		Launce	Am.	Greenland
						hatch				plaice	halibut
2	7.38						7.38				
12			2.46				2.46				
27									2.46		
30			4.92	7.38			12.30				
31									39.36		
34										2.46	
38									3.27	9.81	
39									4.92		
40						3.27	3.27				
BT 53						4.92	4.92	NIL		2.46	
BT 55										2.46	
BT 56										2.46	
BT 58			2.46				2.46			2.46	
BT 59				4.92	4.92		9.84		9.84		
BT 60						3.27	3.27				
BT 61									2.46	4.92	
41		12.30									
42									21.11		
44									2.46		

(continued over-leaf)

Table 5 (cont.)

Station	American plaice eggs by stages							Larvae		
	I	II	III	IV	V	Art.	Cusk	Launce	Am.	Greenland
						hatch				
BT 72							1	2.46		
48							1	2.46		

Zero catch at stations 3-11, 13-26, 28-29, 32-33, 35-37, 43, 45-47, 49-51  
and at BT stations 33-44, 54, 57, 62-64.

Table 6. Baffin. Numbers of American plaice and cusk eggs and launce, American plaice and Greenland halibut larvae (adjusted to 30-minute hauls) by stramin net, June 1963. For station positions see Table 3.

Station	American plaice eggs by stages					Art.	Cusk eggs by stages					Larvae					
	I	I-II	II	II-III	III		IV	V	hatch	Total	I	I-II	II-III	III	IV	Total	Launce
27																	
32						1			1								
32									25						10		2
BT 37	3		2		18	1	1	1	25	9			1				
BT 38					5	28	5	38	38	1	1		2	1	5		2
BT 39					15	21	4	40	40	1			2	1	4		
BT 41	1				5	7	2	3	18				1		1	12	
BT 42																	
BT 43																	1
BT 44						2	1	4	4	1			2		3	2	7
33								1	1							7	17
34						12	10	22	22				1		1	2	7

(continued over-leaf)



Table 6 (cont.)

Station	American plaice eggs by stages					Art. hatch Total	Cusk eggs by stages				Larvae	Green-land plaice halibut
	I	II	III	IV	V		I	II-III	III	IV		
35			1	7		1	9					3
36			2	4	3	2	11				1	5
37											2	1
38	2	1	4	4	1	2	14			4	7	4
39	4	1	58	27	3	9	105			21	4	
40	3		12	30	4	7	60	1		48		
BT 53	1		6				7			32	1	
BT 54				2.24	2.24		4.48				1.62	
BT 72			2	1	2		5				5	4
48			1				1					34
49					1		1					20
50												1
51												64

Table 7. Baffin. Numbers of American plaice and cusk eggs, and launce, American plaice and Greenland halibut larvae (adjusted to 30-minute hauls) by Icelandic High Speed Sampler, May-June, 1963. For station positions see Table 4.

Station	American plaice eggs by stages							Cusk eggs		Larvae	
	I	II	III	IV	V	Art.		I	Launce	Am.	Greenland
						hatch	Total			plaice	halibut
3											1
12						1.11	1.11				
27			1				1				
31		2.86				1.43	4.29	1.43	1.43		
BT 40			1				1				
BT 40											
BT 40											
BT 55										1.11	
BT 58									7.77		
BT 59	1		1	1		1	4		1		
BT 60				1.11			1.11			1.11	
BT 61									1	3	
BT 62										1	
BT 63									1	1	
BT 65									2		
41									10		

(continued over-leaf)

Table 7 (cont.)

Station	American plaice eggs by stages							Cusk	Larvae		
	I	II	III	IV	V	Art.		I	Launce	Am.	Greenland
						hatch	Total			plaice	halibut
42									6		
43			1				1		4		
44									6		

Zero catch at stations 5-9, 14-25, 30, 32, 45-47 and at BT stations 33-34, 55-57, 64

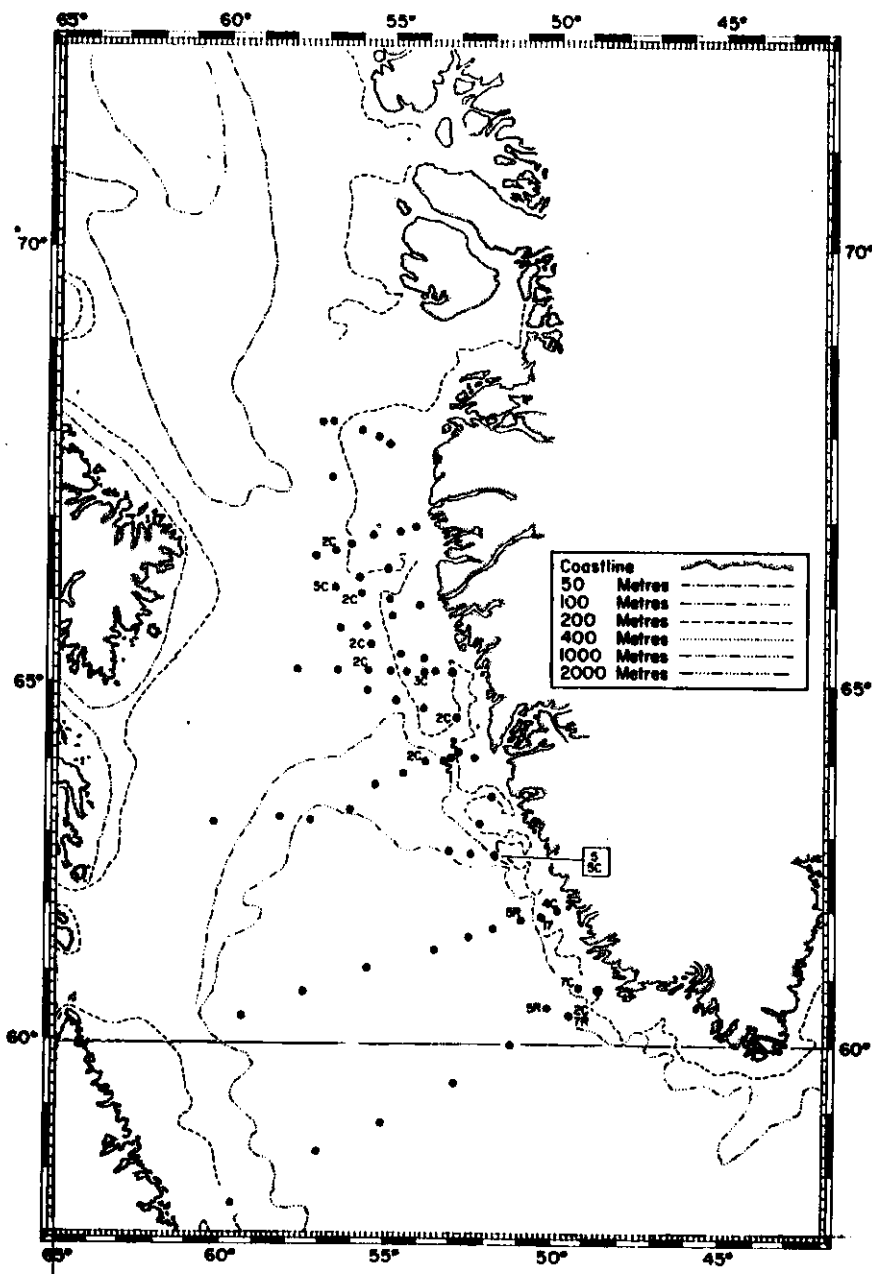


Fig. 1. Baffin. Numbers of cod eggs and cod and redfish larvae (adjusted to number/m<sup>2</sup>) by Hensen net, May-June, 1963. The letters R and C follow the numbers of redfish and cod larvae respectively. Numbers alone indicate cod eggs.

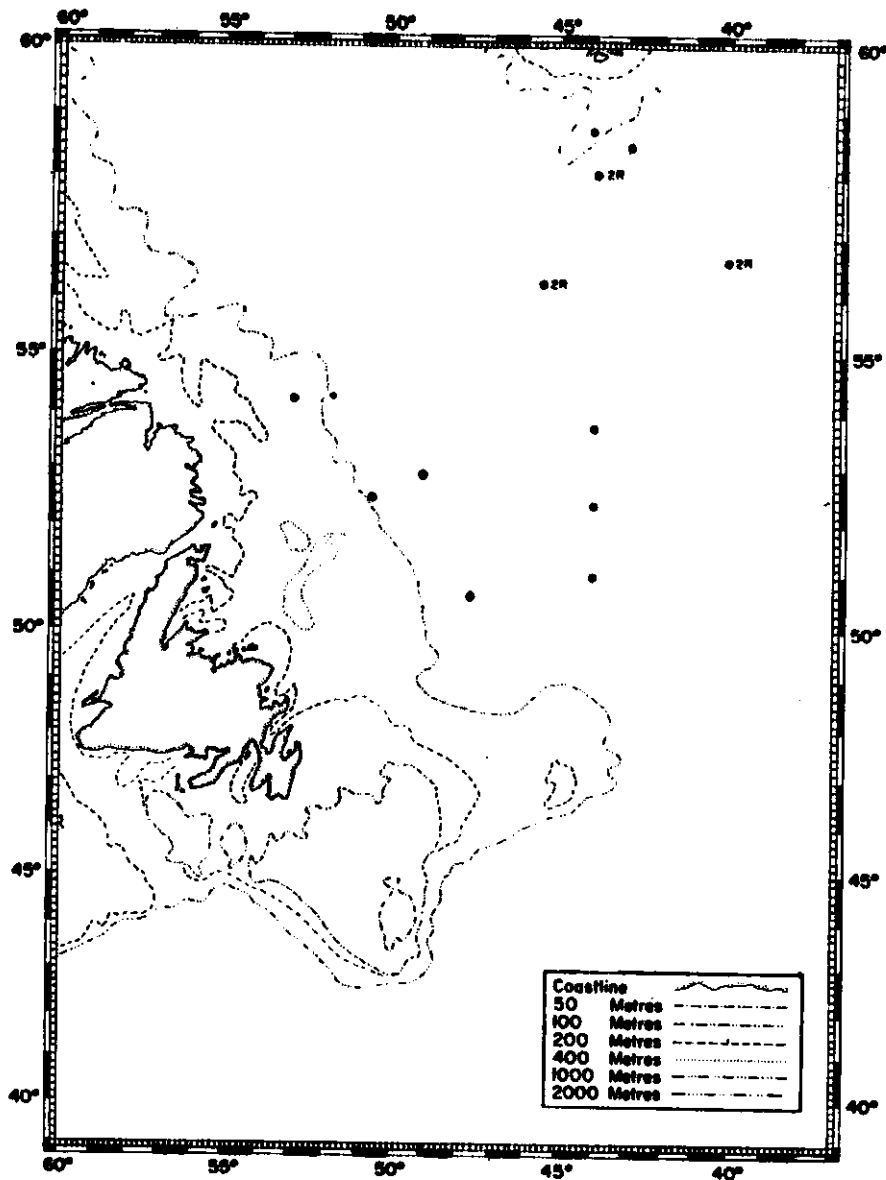


Fig. 2. Sackville. Numbers of cod eggs and cod and redfish larvae (adjusted to number/m<sup>2</sup>) by Hensen net, May-June, 1963. The letter R follows the numbers of redfish larvae.

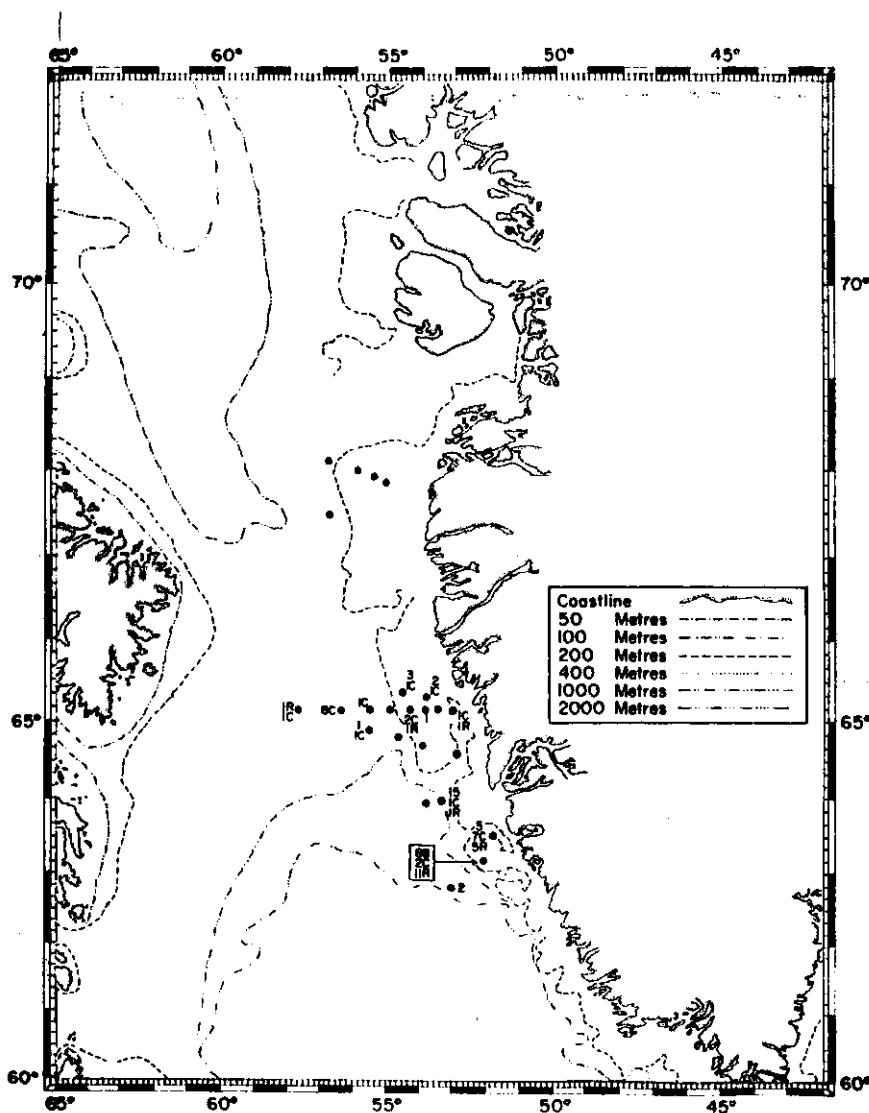


Fig. 3. Baffin. Numbers of cod eggs and cod and redfish larvae (adjusted to number/30-minute tow) by stramin net, June, 1963. The letters R and C follow the numbers of redfish and cod larvae respectively. Numbers alone indicate cod eggs.

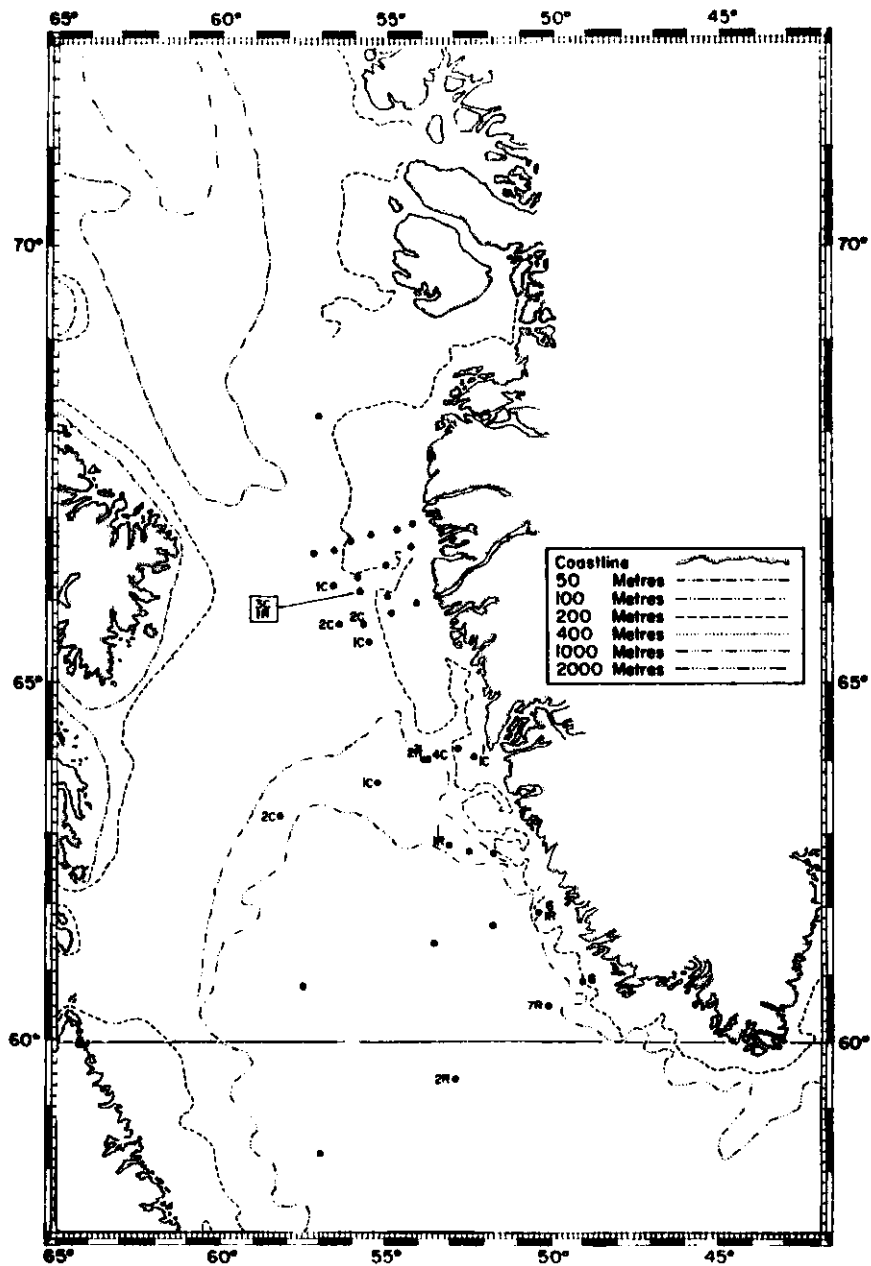


Fig. 4. Baffin. Numbers of cod eggs and cod and redfish larvae (adjusted to number/30-minute tow) by Icelandic High Speed Sampler, May-June, 1963. The letters R and C follow the numbers of redfish and cod larvae respectively. Numbers alone indicate cod eggs.

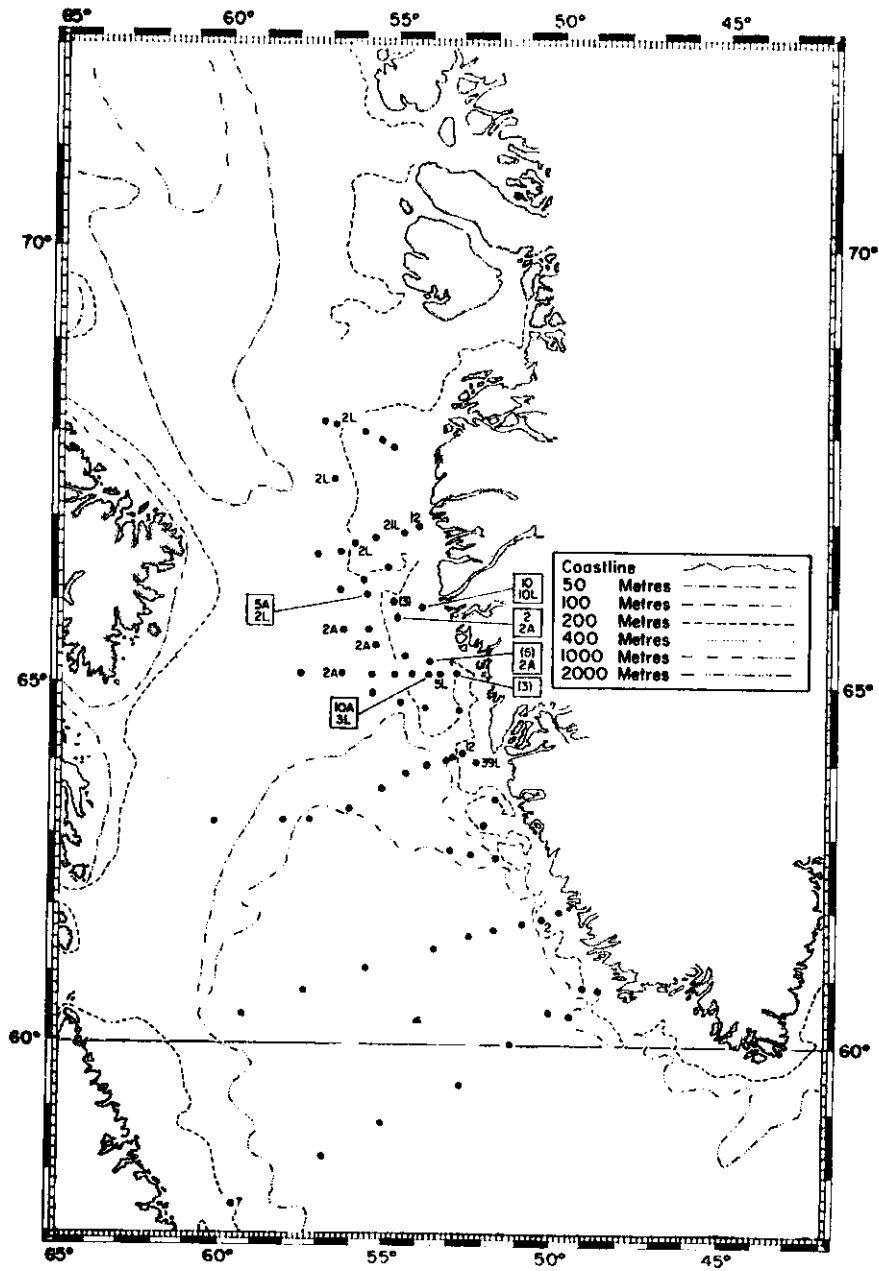


Fig. 5. Baffin. Numbers of American plaice and cusk eggs, and American plaice, launce and Greenland halibut larvae (adjusted to number/m<sup>2</sup>) by Hensen net, May-June, 1963. The letters B, A, L and G follow the numbers of cusk eggs and American plaice, launce and Greenland halibut larvae respectively. Numbers alone indicate American plaice eggs. Numbers in brackets indicate American plaice eggs mechanically hatched.



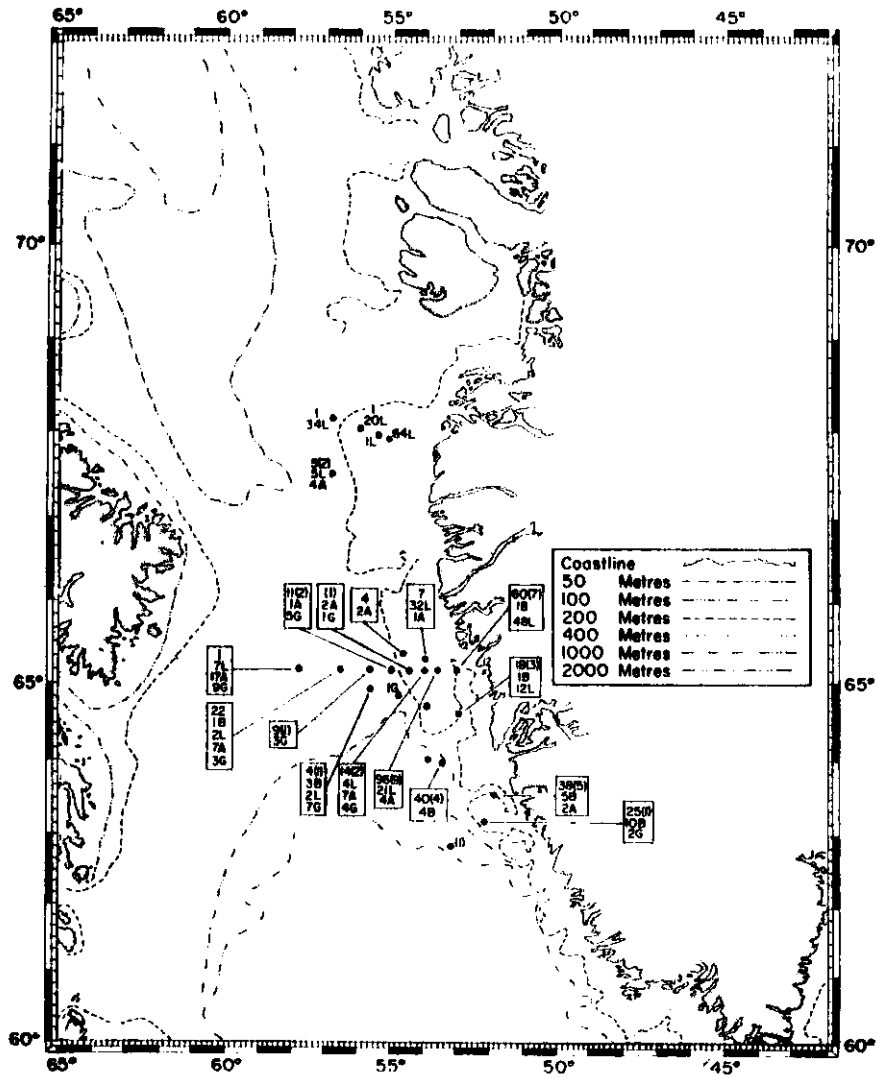


Fig. 6. Baffin. Numbers of American plaice and cusk eggs, and American plaice, launce and Greenland halibut larvae (adjusted to number/30-minute tow) by stramin net, June, 1963. The letters B, A, L and G follow the numbers of cusk eggs, and American plaice, launce and Greenland halibut larvae respectively. Numbers alone indicate American plaice eggs. Numbers in brackets indicate American plaice eggs mechanically hatched.

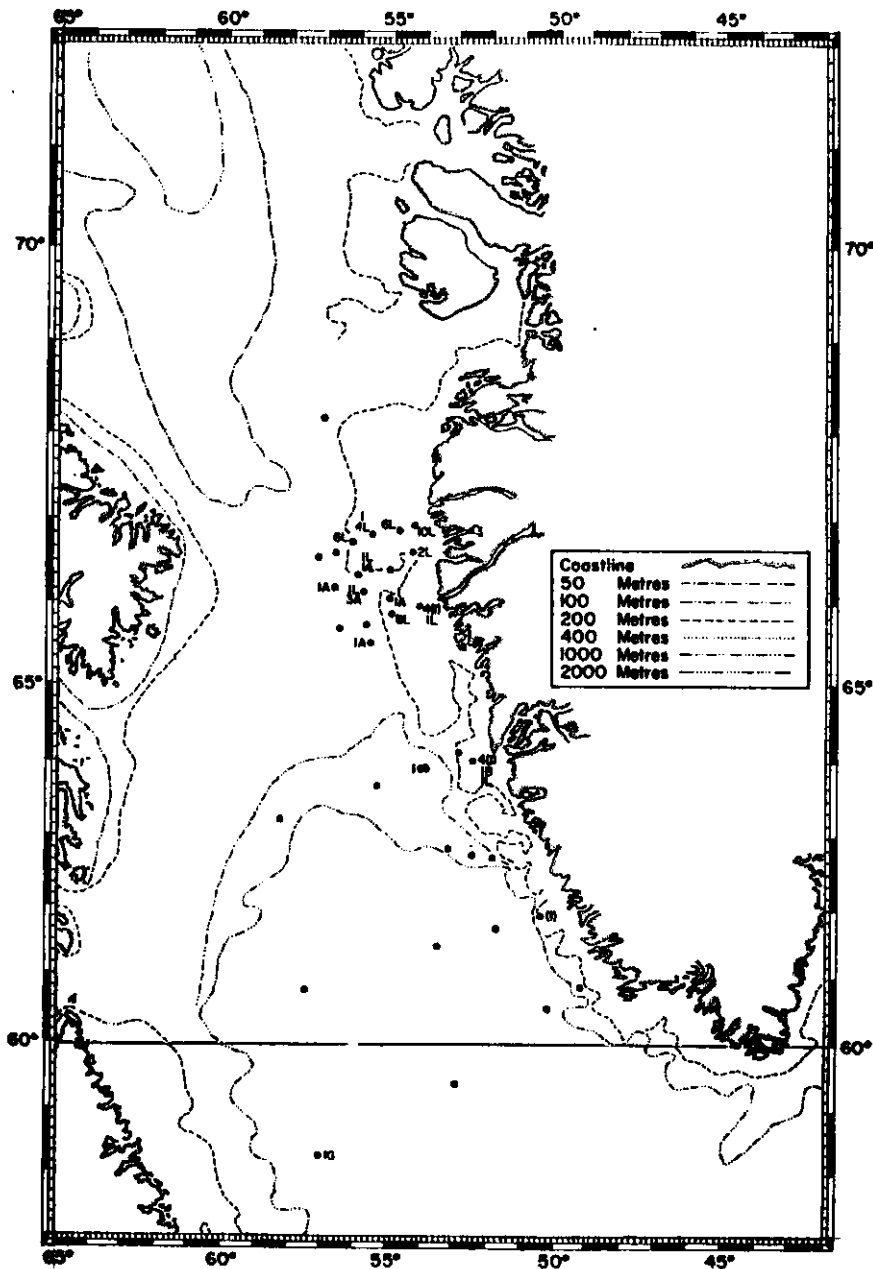


Fig. 7. Baffin. Numbers of American plaice and cusk eggs, and American plaice, launce and Greenland halibut larvae (adjusted to number/30-minute tow) by Icelandic High Speed Sampler, May-June, 1963. The letters B, A, L and G follow the numbers of cusk eggs, and American plaice, launce and Greenland halibut larvae respectively. Numbers alone indicate American plaice eggs. Numbers in brackets indicate American plaice eggs mechanically hatched.

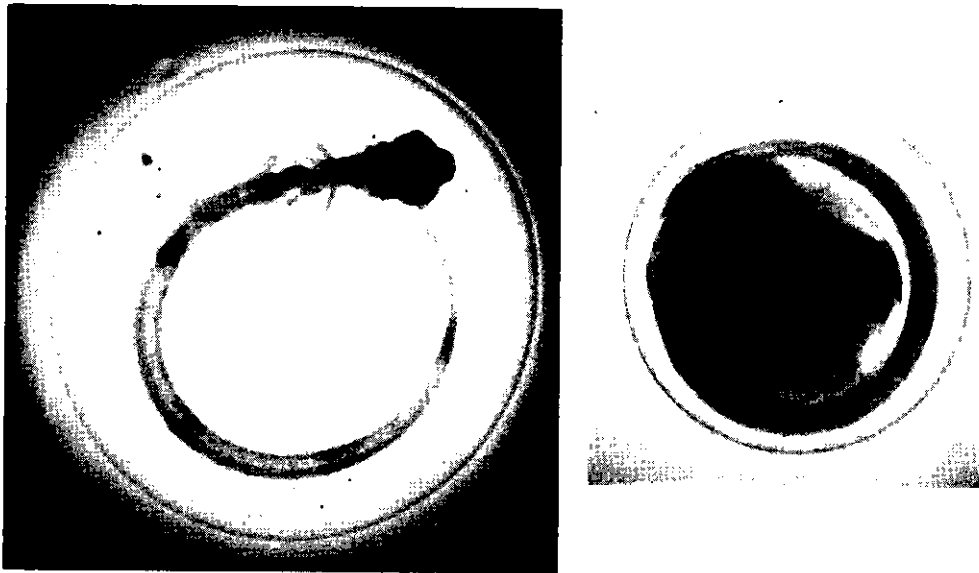


Fig. 8. American plaice egg (X 20) showing diagnostic pigment grouping and egg (X 30) with embryo similar to Ehrenbaum's drawing C of cusk larva.