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Net phytoplankton of the Admiralty Bay (King George Island, South Shetland Islands) in 1983*

ABSTRACT: Phytoplankton sampling from 13 stations situated in Admiralty Bay was carried out in March, April, May, October and November 1983. Wet settling volume of seston, its dry weight, number of cells under 1 m^2, and qualitative composition of phytoplankton were determined. It was found that amount of phytoplankton was decreasing in April and increasing again in November after the winter season. The share of benthic and periphyton species in the qualitative composition of phytoplankton was quite significant, whereas their quantitative share was rather small. 163 taxa of algae were identified in the net phytoplankton; among these 107 taxa were reported for the first time from the Admiralty Bay. Most abundantly met throughout the entire study period were: *Corethron criophilum* and *Thalassiothrix antarctica*.

Key words: Antarctic, King George Island, phytoplankton, distribution of diatoms

1. Introduction

A sample of phytoplankton supposedly taken from Admiralty Bay was examined by Mangin (1915), although geographical co-ordinates do not confirm this localization. Phytoplankton of the Admiralty Bay was studied at one station located in Ezcurra Inlet during four summer months (Kopczyńska 1980, 1981). Net-haul phytoplankton sample was taken from Admiralty Bay in March 1981 (Kopczyńska and Ligowski 1982).

Elsewhere in West Antarctic bays phytoplankton studies were carried out in Marguerite Bay at Antarctic Peninsula (Mangin 1915), in Scotia

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Bay at the South Orkney Islands (Mangin 1922, Frenguelli and Orlando 1958), in East Cumberland Bay at South Georgia (Hart 1934, Hendey 1937), in Port Foster at Deception Island, in Urugway Bay at the South Orkney Islands, in Esperanza Bay at Antarctic Peninsula (Frenguelli and Orlando 1958), as well as in Breid Bay situated at

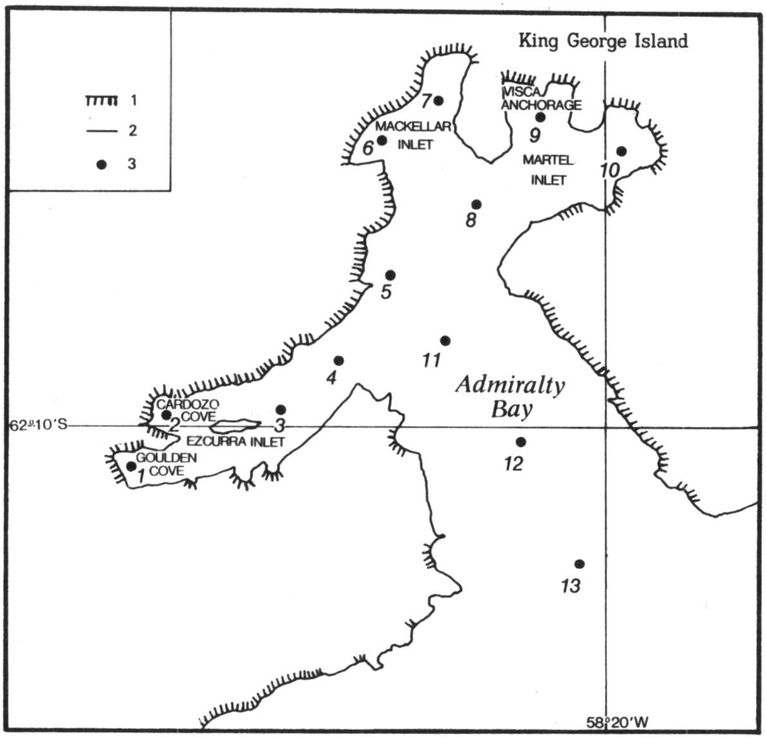

Fig. 1. Location of net phytoplankton sampling stations in Admiralty Bay. 1 — ice coast line, 2 — rocky and sandy line, 3 — position of stations.

the limit between the Atlantic and Indian Ocean sectors (Steyaert 1973) and in Olaf Prydz Bay in the Indian Ocean sector of the Antarctic (Beklemišev 1958, Kozlova 1962, 1964, Ligowski 1983).

Phytoplankton studies in the West Antarctic were carried out mostly in summer season. In Drake Passage and in the Bransfield Strait near the South Shetland Islands such studies were done mainly in late summer (Hart 1934, Fukase 1964, Fukase and El-Sayed 1965, Kopczyńska and Ligowski 1982, Uribe 1982, Witek et al. 1982) and only seldom in early summer (Hart 1934, Kopczyńska and Ligowski 1985).

Well mixed waters of the Admiralty Bay can be quickly exchanged with waters of the Bransfield Strait (Pruszak 1980, Szafrański and

Lipski 1982). The composition of phytoplankton in Admiralty Bay may reflect, to some extent, the phytoplankton composition in the northern part of the Bransfield Strait.

Admiralty Bay is the largest bay of the King George Island, its area amounts to about 130 km^2. It is connected with the Bransfield Strait through a wide entrance over 500 meters deep. The shore line of Admiralty Bay is 85 km long and it is formed in 46.5% by ice cliffs and in 53.5% by beaches and rocks (Rakusa-Suszczewski 1980).

Waters of Admiralty Bay are well oxygenated and rich in phosphorus and nitrogen compounds, with concentrations approximating those recorded in the Antarctic open waters (Samp 1980, Lipski 1985).

On the basis of the analysis of T-S diagrams Grelowski and Tokarczyk (1985) reported that relatively warm waters of lower salinity coming from Bellingshausen Sea were found in the Bransfield Strait along the southern shore of King George Island in December 1983 and January 1984.

The aim of the present studies carried out during the 7th Antarctic Expedition of the Polish Academy of Sciences was to examine the qualitative and quantitative composition of net phytoplankton and to determine the phytoplankton biomass in different seasons of 1983 on the basis of samples taken from the entire area of Admiralty Bay.

2. Material and methods

Net phytoplankton samples were taken in the Admiralty Bay of King George Island during the 7th Polish Antarctic Expedition. Using a Copenhagen-type net with a mesh size of 55 μm and an opening area of 0.19625 m^2 phytoplankton samples were taken from 13 stations (Fig. 1) in the period between 27 March and 24 November, with a break from the begining of June till 8 October. A total number of 43 samples were taken from the area of the entire bay (Table I). The samples were collected mainly from 100 m depth to the surface. At more shallow stations the samples were taken from lesser depths (Table I).

The collected materials were analyzed in the biological laboratory of Arctowski Station. The samples were centrifuged for 15 minutes at 2500 r.p.m. ($\approx$1000 g), and wet settling volume of seston was estimated. The results were given in cm^3 in 100 m water column under 1 m^2 of sea surface. Next, the samples were divided volumetrically into two equal parts. One of them was used to obtain the dry weight value of seston. For this purpose, subsamples were filtered through Millipore membrane filters with pore diameter of 1.2 μm preweighed with an accuracy to 0.0001 g. Filters with precipitate were dried in a vacuum drier at 40°C

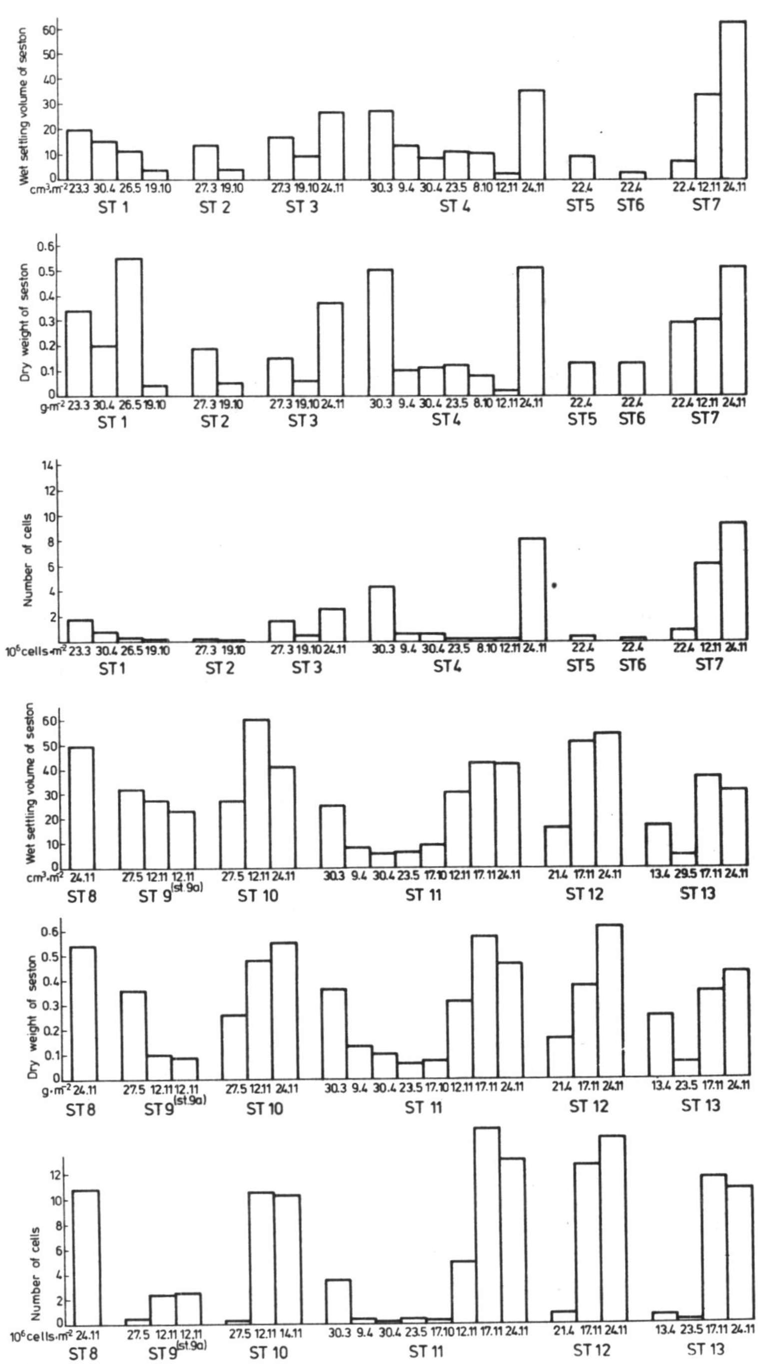

Fig. 2. Wet settling volume of seston (cm³), dry weight of seston (g) and number of cells (10^6) in 100 m water column under 1 m² sea surface in Admiralty Bay.

and -0.9 kg/cm^2 pressure until a constant weight was obtained. The values are calculated in grammes in 100 m water column under 1 m^2 of sea surface. The remaining part of the sample was used for making microscopical slides for identification of diatoms and estimation of phytoplankton quantity. In order to estimate the quantitative composition, a part of the sample amounting to 1/40 and representing 0.5 m^3 of water was taken with a pipette and filtered with a vacuum pump through Synpor membrane filters (pore diameter of 0.3 μm). This method allows to spread cells evenly on the surface of a filter with a diameter of 20 mm. The precipitates were washed with distilled water and dried. Dry filters were made translucent with few drops of xylene and mounted in Canada balsam (Kozlova 1964). Cells were counted and algae identified in 1/10 part of the slide under the immersion objective. The obtained number of cells was calculated into numbers under 1 m^2 of sea surface in 100 m water column. The species exceeding 5 per cent of the numbers were regarded as dominant in the sample. For precise identification of diatoms to species permanent slides with pleurax, an artificial resin composed according to Fott's prescription (Siemińska 1964), were made. Before mounting in pleurax diatom cells were placed in a mixture of chromic acid and sulfuric acid. However, this method requiring repeated washing and centrifuging causes to the damages delicate cells of planktonic diatoms. Therefore a method involving the use of H_2O_2 and ultraviolet radiation (Swift 1967) was applied. The remaining part of the sample was fixed with 2% formaline und utilized for observations in water mounts.

Wet settling volume of seston, its dry weight and number of phytoplankton cells were related to corresponding values in 100 m water column under 1 m^2 of sea surface even when the depths at the sampling stations were shallower than 100 m.

3. Results and discussion

3.1. Wet settling volume of seston

The values observed in Admiralty Bay ranged from 3 to 63 cm^3 in 100 m water column under 1 m^2 of sea surface. The lowest volumes of seston were observed at the end of Ezcurra Inlet in station 1 in Goulden Cove and in station 2 in Cardozo Cove in the first samples collected after the winter period on 19 October; they were also observed in a sample taken on 12 November at the entrance to Ezcurra Inlet. Very low volumes of seston were found in samples from the end of April and May taken in the middle of Admiralty Bay (sta 11); and in the sample from 23 May taken in station 13 situated at the entrance from Bransfield Strait to Admiralty Bay (Table I). The highest values were recorded in the samples from 12, 17 and 24 November in all the samples with the exception of those collected in Ezcurra Inlet (Table I).

Seasonal changes in volume of seston may be observed only in some stations, where more samples were taken (Fig. 2).

The stations situated at the end of Ezcurra Inlet were characterized by low values of wet settling volume of seston, and these values tended to decrease during the period of studies. At the end of summer in March its volume in these stations amounted to 15—20 cm^3 under 1 m^2, while in the samples taken after winter period in October — it amounted to about 5 cm^3 under 1 m^2 in 100 m water column.

In stations 3 and 4 located between Dufayel Island and the entrance to Ezcurra Inlet (Fig. 1), the volume of seston was largest in March and late November, while small values were observed before and after the winter break. An increase in seston volume was observed on 24 November (Table I).

In station 11 situated in the middle of Admiralty Bay, there was observed, in comparison with March, a decrease in seston volume during April, May and October and its increase in samples taken in November (Table I). Meanwhile, in the samples collected in MacKellar Inlet, Martel Inlet and from stations situated near the mouth of Admiralty Bay, the values of seston were higher also from 12 till 17 November.

Analysis of data shows that in Ezcurra Inlet an increase in the volume of seston was delayed by ca. 2 weeks in comparison with the remaining part of the Admiralty Bay (Fig. 2).

In the whole Admiralty Bay the volume of seston during the late Antarctic summer (in March) ranged from 15 to 30 cm^3 under 1 m^2, and only in MacKellar Inlet it was smaller. These values were decreasing to 5—10 cm^3 in April and May, with the exception of Martel Inlet, where they were higher (Table I). A similar decrease of phytoplankton wet volume was observed by Kanaeva (1969) in the Scotia Sea in March. In the present work an increase in the volume of seston to 30—60 cm^3 was observed in Admiralty Bay after winter in November, with a similar increase in Ezcurra Inlet observed two weeks late.

During the Polish investigations within BIOMASS Programme (Kopczyńska and Ligowski 1982, 1985) measurements of seston were made also around King George Island. During BIOMASS-FIBEX on 7 March 1981 in Admiralty Bay (sta 11), 43 cm^3/m^2 of seston were found, with similar values being also observed in stations in the Bransfield Strait situated close to the southern shore of the island (Kopczyńska and Ligowski 1982). Similar values in the volume of seston were recorded in Admiralty Bay during the present study in samples taken in November 1983, while in March 1983 this volume amounted to 25 cm^3/m^2. During BIOMASS-SIBEX samples were not taken from Admiralty Bay. However in stations situated in the Bransfield Strait close to Admiralty Bay the volume of seston was very high. In December 1983, to the south of the eastern edge of King George Island, the estimated volume was as high as 280 cm^3/m^2, and to the southwest of the island — even 550 cm^3/m^2 (Kopczyńska and Ligowski 1985). In the present study the volume of phytoplankton measured a month earlier in the Admiralty Bay reached 30—60 cm^3 (Table I). It can be supposed that phytoplankton in the central part of Admiralty Bay was in December almost identical with that in the Bransfield Strait along southern shores of the island. Similary low volumes of seston as those recorded in the present study in the end of April and in May were observed in the samples taken around King George Island by Witek et al. (1982) between February and April 1977 and from December 1978 till February 1979. In the remaining months of my studies in 1983 (March, almost whole April, October and November) wet settling volumes of seston in Admiralty Bay were higher.

3.2. Dry weight of seston

The values of dry weight of seston observed in Admiralty Bay ranged from 0.02 g under 1 m^2 in an extremely poor sample taken in mid-November at the entrance to Ezcurra Inlet (sta 4) to 0.61 g under 1 m^2 towards the end of November in the middle of Admiralty Bay (sta 11) (Table I). In most samples, the values of dry weight were changing similarly to wet settling volume of seston (Table I). However, in some samples, the values of dry weight are surprisingly high and not correlated with the remaining measured values (wet settling volume, number of cells) (Fig. 2). These were: sample from 26 May — station 1, sample from 22 April — station 7, and sample from 24 November — station 10. In the course of microscopical observations of these samples a large number of particles of inorganic origin was discovered. All these stations are situated relatively close to the shore and they lie in the zone of fresh water run-off from land. In Ezcurra Inlet most of the suspended particles are found with a size range from 2 to 32 μm (Jonasz 1984). The plankton net used (mesh size ca 55 μm) was evidently retaining such small mineral particles and this was a reason for high values of dry weight recorded in these stations.

Table I

Net phytoplankton cells number and biomass in Admiralty Bay in 1983. Number of cells, wet settling volume and dry weight were calculated as value in 100 m water column

Region	Number of stations	Date	Depth to the bottom (m)	Depth of net sampling (m)	Temperature of surface water (°C)	Number of cells ($10^6 \cdot m^{-2}$)	Wet settling volume ($cm^3 \cdot m^{-2}$)	Dry weight ($g \cdot m^{-2}$)
Goulden Cove	1	27.03.	50	40		1.8	20	0.34
		30.04.	75	70		0.8	15	0.20
		26.05.	70	50	−1.4	0.3	11	0.55
		19.10.	70	50	−1.5	0.2	4	0.04
Cardozo Cove	2	27.03.	140	100		0.2	14	0.19
		19.10.	80	75	−1.5	0.1	4	0.05
	3	27.03.	150	100		1.7	17	0.15
		19.10.	70	50	−1.5	0.5	9	0.06
		24.11.	85	80	−0.1	2.6	26	0.37
Ezcurra Inlet	4	30.03.	250	100		4.3	28	0.50
		9.04.	250	100		0.6	13	0.10
		30.04.	250	100		0.6	9	0.11
		23.05.	250	100	−0.4	0.2	11	0.12
		8.10.	250	100	−1.6	0.2	11	0.08
		12.11.	250	100	−0.5	0.2	3	0.02
		24.11.	250	100	−0.2	8.1	36	0.51
	5	22.04.	150	100		0.4	10	0.13
	6	22.04.	80	75		0.2	3	0.13

MacKellar Inlet	7	22.04.	60	50		0.9	8	0.29
		12.11.	80	75	−0.3	7.1	34	0.30
		24.11.	50	30	−0.3	9.3	63	0.51
	8	13.04.	150	100	−0.5	0.6	15	0.25
		24.11.	400	100	−0.3	10.8	50	0.54
Visca Anchorage	9	27.05.	45	35	−1.7	0.5	32	0.36
		12.11.	45	30	−0.5	2.4	27	0.10
	9a	12.11.	80	75	−0.5	2.6	22	0.09
Martel Inlet	10	27.05.	60	50	−1.8	0.3	27	0.26
		12.11.	35	30	−0.3	10.5	60	0.48
		24.11.	105	100	−0.1	10.3	41	0.55
Open waters of Admiralty Bay	11	30.03.	500	100		3.5	25	0.36
		9.04.	500	100	−0.5	0.4	8	0.13
		30.04.	500	100		0.2	5	0.10
		23.05.	500	100	−0.4	0.4	6	0.06
		17.10.	500	100	−1.5	0.3	8	0.07
		12.11.	500	100	−0.5	4.9	30	0.31
		17.11.	500	100	−0.2	15.5	41	0.57
		24.11.	500	100	−0.3	13.0	41	0.46
	12	21.04.	530	100		0.8	15	0.16
		17.11.	530	100	−0.5	12.5	50	0.37
		24.11.	530	100	−0.4	11.6	61	0.44
Bransfield Strait	13	23.05.	520	100	−0.8	0.2	3	0.06
		17.11.	520	100	−0.1	10.3	41	0.55
		24.11.	520	100	−0.3	10.6	29	0.42

Species composition of net phytoplankton in Admiralty Bay (King George Island, South
A — 27.03., B — 30.03., C — 9.04., D — 13.04., E — 21—22.04., F — 30.04., G — 23.05.,

Taxa	1				2		3			4							5
	A	F	H	J	A	J	A	J	M	B	C	F	G	I	K	M	E
Achnanthes charcotti M. Peragallo	+					+	+	+						+			+
A. groenlandica (Cleve) Grunow	+		+			+				+	+			+	+		+
Achnanthes sp.	+									+							
Actinocyclus actinochilus (Ehrenberg) Simonsen	+	+	+		+			+	+	+		+	+	+		+	
A. curvatulus Janisch					+												
A. divisus (Grunow) Hustedt																	
A. ehrenbergii Ralfs																	
Amphiprora kjelmanii Cleve																	+
A. kjelmanii var. *subtilissima* Van Heurck			+														+
Amphora antarctica Hustedt																	
Amphora sp.	+	+	+		+	+				+			+	+			+
Arachnodiscus ehrenbergii Bailey		+						+			+			+		+	+
A. indicus A. Schmidt																+	
Asteromphalus hookerii Ehrenberg					+				+								
A. hyalinus Karsten			+		+				+				+	+		+	+
A. parvulus Karsten	+																
Chaetoceros atlanticus Cleve	+	+	+				+			+	+	+	+				+
Ch. atlanticus var. *skeleton* (Schütt) Hustedt													+				
Ch. bulbosus (Ehrenberg) Heiden																	
Ch. concavicornis Mangin							+			+	+						+
Ch. criophilum Castracane	+		+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Ch. densus Cleve		+	+				+										+
Ch. dichaeta Ehrenberg																	
Ch. flexuosum Mangin				+													
Ch. neglectum Karsten																	
Ch. tortissimus Gran																	
Cocconeis antiqua var. *tenuistriata* Van Heurck	+	+	+			+	+			+	+					+	+
C. balatonsis Pantocsek (?)																	
C. costata Gregory	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
C. costata var. *hexagona* Grunow	+		+		+		+			+			+	+		+	+
C. costata var. *kerguelensis* Cleve			+														
C. curiosa Hustedt	+	+			+		+	+		+	+		+	+		+	+
C. distans var. *bahusiensis* Cleve Euler																	
C. imperathrix A. Schmidt									+								
C. melchiorii Frenguelli					+		+			+	+			+		+	+
C. orbicularis Frenguelli	+				+					+							+
Cocconeis sp. 1.									+							+	
Cocconeis sp. 2.											+						
Cocconeis sp. 3.										+							+
Cocconeis sp. 4.											+			+			
Cocconeis sp. 5.	+	+					+		+					+		+	+
Corethron criophilum Castracane	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Coscinodiscus bouvet Karsten		+	+		+		+	+	+	+	+	+		+		+	
C. avratus Janisch		+															+

Shetland Islands) from March to May and from October to November 1983. Date of samples: H — 26—27.05., I — 8.10., J — 17—19.10., K — 12.11., L — 17.11., M — 24.11.

Stations																										
6	7			8		9		9a	10			11								12			13			Degree of constancy*
E	E	K	M	D	M	H	K	K	H	K	M	B	C	F	G	J	K	L	M	E	L	M	G	L	M	
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						+									+					+			+			I
	+					+									+					+						I
			+			+						+	+		+					+						II
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+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	V
	+	+	+	+	+	+			+		+		+	+			+		+	+	+	+	+		+	IV
																										I

Table II. Continued

	1				2		3			4							5
	A	F	H	J	A	J	A	J	M	B	C	F	G	I	K	M	E
C. oculoides Karsten	+	+	+	+	+		+		+	+	+	+	+	+	+	+	+
C. plicatus Grunow																	
C. tabularis Grunow	+	+	+		+		+	+	+	+	+		+			+	+
Coscinodiscus sp.																	+
Cymbella sp.	+																
Dactyliosolen antarcticus Castracane		+										+	+				
D. tenuijunctus (Manguin) Hasle														+			
Diploneis latefurcata (Font.) Cleve Euler	+																
D. subcincta (A. S.) Cleve																	
Entopyla kerguelensis Karsten																	
Entopyla sp.	+		+		+											+	
Eucampia balaustium Castracane	+	+	+		+		+		+		+	+	+			+	+
Fragilaria californica var. *antarctica* M. Peragallo	+	+	+		+		+		+	+	+		+		+	+	
Gomphonema minusculum Cleve	+									+	+						
Gomphonema sp.	+	+	+		+	+	+	+	+	+	+			+		+	+
Grammatophora angulosa Ehrenberg											+						
G. marina (Lyngb.) Kützing													+			+	
Licmophora abbreviata Agardh	+		+								+						
L. antarctica Carlson	+								+								
L. gracilis (Ehrenberg) Grunow																	+
L. jürgensii Agardh	+				+		+										
Licmophora sp. 1.						+	+				+						+
Licmophora sp. 2.										+			+				
Melosira sol (Ehrenberg) Kützing	+	+	+	+	+	+	+	+	+	+	+	+		+		+	+
M. sulcata (Ehrenberg) Kützing	+																
Navicula antarctica Frenguelli																	
N. complanatoides Hustedt																	
N. concellata Donkin			+														
N. criophila Manguin	+	+	+		+	+	+		+	+	+			+			+
N. diploneiformis Hustedt	+									+			+				
N. directa W. Schmidt	+	+		+	+		+	+	+		+		+	+			+
N. directa var. *cuneata* Østrup		+															
N. directa var. *genuina* Cleve																	
N. glacialis var. *lanceolata* Heiden	+		+							+	+						
N. glaciei Van Heurck					+									+			
N. jejunoides Van Heurck			+							+							
N. muticopsis Van Heurck														+			
N. rhombica Greg	+							+									
N. schuettii Van Heurck	+													+			+
Navicula sp. 1.					+		+									+	+
Navicula sp. 2.														+			
Navicula sp. 3.																	
Navicula sp. 4.	+	+	+														
Nitzschia angulata Hasle	+																
N. compacta Hustedt	+																
N. curta (Van Heurck) Hasle	+	+	+	+	+		+				+		+	+			+

6	7			8		9		9a	10			11								12			13			Degree of constancy*
E	E	K	M	D	M	H	K	K	H	K	M	B	C	F	G	J	K	L	M	E	L	M	G	L	M	
+	+	+	+	+	+	+			+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	V
			+																							I
+	+	+	+	+	+	+	+	+			+	+			+					+			+		+	IV
				+																						I
																										I
	+								+						+					+						I
									+						+			+			+				+	I
																										I
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																				+						I
				+								+														I
+	+		+	+	+	+			+		+	+			+		+			+	+			+		III
		+	+	+	+	+	+	+			+							+	+	+	+	+		+		III
+			+		+							+							+	+		+		+		II
+	+		+	+		+	+	+					+	+	+	+	+		+	+		+			+	IV
	+														+											I
																										I
+			+					+	+		+						+		+			+				II
	+				+	+									+							+				I
											+															I
+		+		+								+	+							+			+			II
	+			+	+							+								+						II
		+		+								+														I
+		+	+	+	+	+	+	+	+	+	+	+	+		+	+	+	+	+	+	+	+	+	+	+	V
																						+				I
					+																					I
																				+						I
								+																		I
+	+	+	+		+			+	+	+	+		+			+		+	+	+		+		+	+	IV
+																										I
+			+	+	+										+			+	+				+			III
																										I
	+																									I
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						+						+														I
+																			+	+						I
																										I
	+			+						+		+					+	+		+	+	+	+			II
																										I
																								+		I
											+				+				+			+				I
+																										I
																	+			+			+			I
																										I
																										I
+	+			+					+			+	+		+			+								III

Table II. Continued

	1				2		3			4							5
	A	F	H	J	A	J	A	J	M	B	C	F	G	I	K	M	E
N. cylindrus (Grunow) Hasle	+	+	+	+						+	+						+
N. dicipiens Hustedt	+																
N. delicatula Hasle		+					+			+				+			
N. distansoides Hustedt																+	
N. kerguelensis (O'Meara) Hasle	+	+	+		+		+	+	+	+	+		+	+			+
N. lecontei Van Heurck	+																
N. lineata Hasle			+														
N. medioconstricta Hustedt					+												+
N. neglecta Hustedt	+																
N. obliquecostata (Van Heurck) Hasle							+										
N. obscurepuncta Hustedt		+	+		+		+										
N. ritscherii (Hustedt) Hasle			+						+								
N. separanda (Hustedt) Hasle	+	+	+		+		+			+	+			+			+
N. sublineata Hasle	+		+		+									+			+
N. turgiduloides Hasle		+			+		+		+							+	+
N. vanheurckii (M. Peragallo) Hasle	+									+	+						
Nitzschia sp. 1.														+			
Nitzschia sp. 2.					+			+				+				+	+
Nitzschia sp. 3.																	+
Odontella litigosa (Van Heurck) Hoban	+	+	+		+	+	+		+	+	+	+		+	+	+	+
O. weissflogii (Janisch) Grunow	+	+	+		+		+		+	+							
Pinnularia borealis Ehrenberg										+							
P. quadratarea var. *bicuneata* Heiden	+				+		+										
P. quadratarea var. *soederlundii* Cleve	+				+												
Pleurosigma directum Grunow		+	+		+				+							+	
Pleurosigma sp. 1.	+	+	+		+	+	+		+	+							
Pleurosigma sp. 2.		+	+					+									
Pleurosigma sp. 3.	+					+			+								
Pleurosigma sp. 4.		+															
Porosira antarctica Kozlova	+	+			+		+			+	+						
P. glacialis (Grunow) Jørgensen							+		+		+				+	+	+
P. pseudodenticulata (Hustedt) Jouse	+	+	+		+		+		+							+	+
Rhabdonema arcuatum (Agardh) Kützing		+	+				+		+							+	+
Rhizosolenia alata Brightwell	+	+	+		+		+		+	+	+	+	+			+	+
Rh. alata f. *inermis* (Castracane) Hustedt		+					+				+	+	+				+
Rh. antarctica Karsten																	
Rh. bidens Karsten												+	+				+
Rh. hebetata f. *hiemalis* Gran																	
Rh. hebetata f. *semispina* (Hensen) Gran	+	+	+		+		+			+	+	+				+	+
Rh. setigera Brightwell																+	
Rh. simplex Karsten																	
Rh. styliformis Brightwell									+								
Rh. truncata Karsten																	
Rhoicosphenia sp.	+	+	+		+		+		+	+	+			+		+	+
Symbolophora furcata (Karsten) Nikolaev		+														+	+
S. microtrias Ehrenberg		+	+			+		+	+	+		+		+	+	+	+

6	7			8		9		9a	10			11								12			13			Degree of constancy*
E	E	K	M	D	M	H	K	K	H	K	M	B	C	F	G	J	K	L	M	E	L	M	G	L	M	
+								+							+								+			II
																										I
			+					+												+						I
																										I
+	+	+	+	+		+		+				+	+		+		+		+		+	+	+	+	+	IV
+																										I
						+							+													I
+																+										I
+																				+			+		+	I
				+								+														I
												+								+						I
													+		+											I
+		+		+								+										+				II
+				+		+					+										+		+	+		II
+			+			+					+	+							+	+			+			II
																										I
																+										I
+		+						+														+				II
																										I
+	+	+	+	+	+	+	+	+	+		+	+				+	+	+	+	+	+	+	+	+	+	V
+	+		+								+	+			+											II
																										I
																					+					I
						+	+																			I
													+				+							+		I
																										I
						+				+																I
		+			+			+									+		+							I
			+													+					+	+				I
			+	+							+									+						II
		+	+	+	+			+		+	+	+					+	+	+				+		+	III
+	+		+		+	+					+	+							+			+			+	III
		+						+			+							+						+		II
+	+	+		+	+	+		+	+		+	+	+		+	+	+	+		+	+	+	+	+	+	IV
	+			+		+			+			+			+								+			II
															+											I
																										I
			+																							I
+	+		+	+					+			+	+	+	+		+	+	+	+	+	+	+	+	+	IV
																			+							I
			+																							I
						+						+								+					+	I
									+																	I
+					+						+	+	+		+					+		+				III
+	+	+		+		+				+		+	+							+				+	+	II
	+	+	+	+	+	+		+		+	+	+		+	+	+	+			+		+		+	+	IV

Table II. Continued

	1				2		3			4							5
	A	F	H	J	A	J	A	J	M	B	C	F	G	I	K	M	E
Thalassionema elegans Hustedt							+										
T. nitzschioides Grunow									+								
Thalassionema sp. 1.	+		+		+		+			+		+		+			
Thalassionema sp. 2.	+	+															+
Thalassiosira antarctica Comber	+	+	+		+	+			+		+	+		+		+	
T. gracilis var. *expecta* (Van Land.)Fryxell and Hasle	+	+	+		+		+			+	+			+			+
T. gracilis (Karsten) Hustedt	+	+		+	+							+	+	+			
T. kozlovii (Kozlova) Makarova		+					+				+						
T. lentiginosa (Janisch) G. Fryxell	+	+	+		+		+	+	+	+	+	+	+	+		+	+
T. maculata Fryxell and Johansen																	
T. oliveriana (O. Meara) Makarova et Nikolaev																+	
T. ritscherii (Hustedt) Hasle											+						
T. tumida (Janisch) Hasle	+	+	+		+	+	+	+	+	+	+	+	+	+		+	+
Thalassiosira sp. 1.								+	+						+	+	
Thalassiosira sp. 2.	+	+					+										
Thalassiothrix antarctica (Cleve et Grunow) Schimper	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Trachyneis aspera (Ehrenberg) Cleve	+								+					+			
T. aspera var. *intermedia* (Grunow) Cleve	+				+		+										
Triceratium arcticum Grunow	+	+	+		+	+	+		+							+	+
T. permagnum Janisch	+		+						+	+						+	+
Triceratium sp.								+				+		+			
Tropidoneis belgicae Van Heurck										+							
T. fusiformis Manguin	+																
T. glacialis Heiden																	
Dictyocha speculum Ehrenberg	+	+	+				+			+	+	+	+				+
Protoperidinium antarcticum (Schimper) Balech																	
Peridinium sp.																	

* after Scamoni (1967)

Frequency %	Degree of constancy
100—81	V
80—61	IV
60—41	III
40—21	II
20— 1	I

6	7			8		9		9a	10			11								12			13			Degree of constancy*
E	E	K	M	D	M	H	K	K	H	K	M	B	C	F	G	J	K	L	M	E	L	M	G	L	M	
																										I
			+		+						+								+	+					+	I
	+	+										+									+					II
										+										+						I
+	+	+	+	+	+	+	+	+	+	+	+	+	+	+		+	+	+	+		+	+		+	+	IV
+			+								+			+				+		+		+	+			II
		+	+	+		+			+			+	+			+			+	+			+			III
+	+											+	+							+				+	+	II
+	+	+	+	+	+				+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	V
+											+				+											I
																	+			+						I
+																										I
+	+	+	+	+	+	+			+			+	+	+	+	+	+	+	+	+	+	+	+	+	+	V
		+			+		+	+		+	+					+	+	+	+			+			+	II
+																		+				+		+		I
+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	V
																			+							I
												+						+				+	+		+	I
		+			+							+				+				+		+	+	+	+	III
		+			+					+		+	+	+		+		+	+	+	+	+				III
				+		+											+									I
																										I
																										I
									+																	I
+	+	+		+		+						+	+	+	+		+			+	+		+			III
			+								+								+			+				I
																			+							I

3.3. Qualitative composition

In 43 samples of net phytoplankton collected in 13 stations situated in Admiralty Bay (Fig. 1) a total of 163 taxa of algae were identified, among them 160 taxa of diatoms (*Bacillariophyceae*). The remaining three taxa were: *Dictyocha speculum*, a species of *Silicoflagellatae*, and dinophyceans *Protoperidinium antarcticum* and *Peridinium* sp. (Table II).

Kopczyńska (1981) identified 96 taxa of algae in phytoplankton samples collected by Nansen water bottles between December 1977 and March 1978 in a station situated in Ezcurra Inlet. Of these, 56 were identified in net phytoplankton in the present study, while 107 are reported now for the first time from Admiralty Bay. The sample from Admiralty Bay collected during BIOMASS-FIBEX contained only 10 taxa of algae (Kopczyńska and Ligowski 1982).

The following genera of diatoms were represented by the highest numbers of taxa: *Nitzschia* — 22, *Navicula* — 18, *Cocconeis* — 15, *Chaetoceros* — 10 and *Rhizosolenia* 10.

An interesting feature of the qualitative composition of phytoplankton is a considerable share (about 30 taxa) of diatoms characteristic of benthic and periphyton communities. These genera are: *Cocconeis, Gomphonema, Rhoicosphenia, Licmophora, Trachyneis, Achnanthes* and *Amphora. Achnanthes* sp. were recorded in plankton from Admiralty Bay by Mangin (1915); some of these diatoms were found in phytoplankton of Admiralty by Kopczyńska (1981). In other bays in West Antarctic benthic and periphyton diatoms were also recorded in plankton (Mangin 1915, 1922, Hart 1934, Hendey 1937, Frenguelli and Orlando 1958) whereas in the bays of Antarctic Continent they were not found (Steyaert 1973, Ligowski 1983).

In the samples collected in Ezcurra Inlet freshwater diatoms were occasionally found: *Pinnularia borealis, Cymbella* sp. and *Navicula muticopsis*. These diatoms were found in large numbers in streams at King George Island (Ligowski, unpublished data). This confirms data about a considerable run-off of particles from the the land into Ezcurra Inlet and their maintenance in water of the inlet.

The constancy of taxa determined on the basis of their frequency (Scamoni 1967) in Admiralty Bay indicates that among 163 taxa only 9 belong to a class with the highest degree of constancy (81%—100%), 11 taxa were found in 61—80 per cent of samples, 15 taxa in 41—60 per cent of samples, and 27 taxa in 21—40 per cent of samples (Table II). The highest number of taxa — 101 were present in less than 21 per cent of samples. The species of the highest degree of constancy are: *Corethron criophilum, Thalassiothrix antarctica, Chaetoceros criophilum, Cocconeis costata,* *Coscinodiscus oculoides, Melosira sol, Thalassiosira lentiginosa, Thalassiosira tumida* and *Odontella litigosa.* Only two species were present in all samples: *Corethron criophilum* and *Thalassiothrix antarctica.* Among species with the highest degree of constancy, only two, i.e. *Cocconeis costata* and *Melosira sol,* can be treated as accidental species in plankton.

3.4. Quantitative composition

The numbers of cells in Admiralty Bay ranged from 0.1—0.2×10^6 to 15.5×10^6 cells under 1 m^2. The lowest numbers of cells were found in Goulden Cove (sta 1) and Cardozo Cove (sta 2) (Table I) situated at the end of Ezcurra Inlet (Fig. 1). The number of cells lower than in other stations was also observed in station 9 in Visca Anchorage. Goulden Cove, Cardozo Cove and Visca Anchorage are separated from the remaining part of Admiralty Bay by the elevated bottom, and the poorer quantitative composition of phytoplankton is probably due to the limited water exchange with the open waters of Admiralty Bay.

At the end of March there was observed a higher number of cells in station 4 (entrance to Ezcurra Inlet) and station 11 (centre of Admiralty Bay). From the beginning of April till the end of May and in October (in Ezcurra Inlet till mid-November), the number of phytoplankton cells in Admiralty Bay was very small in all stations and amounted from 0.1×10^6 to 0.9×10^6 cells under 1 m^2 (Fig. 2). It can be assumed that these numbers of cells prevailed also during winter when it was impossible to collect samples from the bay for technical reasons.

An increase in the number of cells during spring was observed on 12 November. On this day there were 7.1×10^6 cells/m^2 in station 7, 10.5×10^6 cells/m^2 in station 10 and 4.9×10^6 cells/m^2 in station 11 (Table I). During this period the temperature of surface waters increased to $-0,5$°C. On the same day in Ezcurra Inlet, where the temperature was the same (-0.5°C), the number of cells observed under 1 m^2 was only 0.2×10^6 with an exceptionally high Secchi disc reading — 12 meters. An increase in the number of cells in Ezcurra Inlet was not observed until 24 November, when the temperature of surface waters rose to -0.2°C and the number of cells under m^2 in station 4 was found to be 8.1×10^6 while at station 3—2.6×10^6 (Fig. 2).

Worth mentioning is however that Uno (1983) reported in Antarctic Ocean the presence of high amounts of phytoplankton within the temperature range from -1.4°C to -0.03°C. Somewhat later increase of phytoplankton in Ezcurra Inlet may be due to a small depth (23—24 m) of the euphotic zone (Woźniak et al. 1984, Olszewski 1984) or to a limited exchange

Per cent of dominant phytoplankton species in Admiralty Bay in 1983. Date of samples: H — 26—27.05., I — 8.10., J — 17—19.10.,

TAXA	1				2		3			4						
	A	F	H	J	A	J	A	J	M	B	C	F	G	I	K	M
Corethron criophilum	25	52	21	82	18	41	84	78	69	82	62	62	18	53	73	87
Thalassiothrix antarctica	+	7	18	5	+	+	+	7	25	+	7	9	7	12	+	12
Chaetoceros criophilum	8		+	+	19	+	+	+	+	+	7	9	+	7	+	+
Cocconeis costata	5	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Melosira sol	+	+	9	+	+	+	+	+	+	+	+	+		+		+
Rhizosolenia alata	12	15	+		10		+		+	+	9	+	+			+
Symbolophora microtrias		+	+			+		+	+	+		+		9	+	+
Gomphonema sp.	+	+	+		+	15	+	+	+	+	+			+		+
Rhizosolenia hebetata f. *semispina*	+	+	+		+		+			+	+	+				+
Thalassiosira antarctica	+	+	+		+	+			+		+	+		+		+
Coscinodiscus tabularis	6	+	13		+		+	+	+	+	+		+			+
Achnanthes groenlandica	+		+			16				+	+			+	+	
Fragilaria californica var. *antarctica*	15	+	+		+		+		+	+	+		+		+	+
Chaetoceros atlanticus	+	10	+				+			+	+	13	49			
Nitzschia curta	+	+	+	+	6		+				+		+	+		
Dactyliosolen antarcticus		+										+	+			
Chaetoceros atlanticus var. *skeleton*													+			

of waters between Ezcurra Inlet and the Bransfield Strait caused by the presence of an underwater sill (Rakusa-Suszczewski 1980). A dominating role in light attenuation in Ezcurra Inlet is played by suspended matter (Woźniak et al. 1984). On the other hand Uno (1982) supposes that the absence of land-derived particles of organic origin has unfavourable influence on the increase of phytoplankton. However in Ezcurra Inlet the most part of particles coming from the shore are of inorganic origin (Jonasz 1984). A decrease of the penetration of light by inorganic particles was also observed in bays of South Georgia (Hart 1934). In comparison with open waters of Admiralty Bay Ezcurra Inlet is characterized by the presence of a higher quantity of suspended matter (Pęcherzewski 1980). This author states that the average quantity of suspended matter in Admiralty Bay during Antarctic summer is about five times higher than the average quantities in the open Antarctic waters.

In March 1981 the number of cells observed in Admiralty Bay under 1 m^2 amounted to 10×10^6 (Kopczyńska and Ligowski 1982). Similar amount of cells was observed in Admiralty Bay in November 1983. The number of cells in the northern part of the Bransfield Strait in the period December 1983 — January 1984 (Kopczyńska and Ligowski 1985) exceeded several times the numbers found in the Admiralty Bay in November 1983.

Table III

A — 27.03., B — 30.03., C — 9.04., D — 13.04., E — 21—22.04., F — 30.04., G — 23.05., K — 12.11., L — 17.11., M — 24.11.

STATIONS																										
5	6	7			8		9		9a	10			11								12			13		
E	E	E	K	M	D	M	H	K	K	H	K	M	B	C	F	G	J	K	L	M	E	L	M	G	L	M
39	18	19	89	74	39	81	13	93	97	34	94	77	84	58	60	7	62	95	83	68	44	80	83	8	84	75
+	+	19	+	14	10	13	9	+	+	9	+	17	+	+	10	10	8	+	8	29	11	11	16	16	5	24
6	7	+	+	+	+	+	9	+	+	12	+		+	24	+	+	+	+	+	+	8	+	+	36	+	+
+	+	+	+	+	+	+	+		+		+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
+	+		+	+	+	+	+	+	+	+	+	+	+	+		+	12	+	+	+	+	+	+	+	+	+
34	44	30	+		12	+	+		+	+		+	+	+		+	+	+	+		18	+	+	+	+	+
+		+	+	+	+	+	+		+		+	+	+		+	+	+	+			+		+		+	+
+	+	+		+	+		+	+	+					+	+	+	+	+		+	+		+			+
5	+	+		+	14					+			+	+	+	+		+	+	+	+	+	+	+	+	+
	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+		5	+	7	+		6	+		+	+
+	+	+	+	+	+	+	+	+	+			+	+			+					+			+		+
+	+		+	+	+	+	+	+	+		+		+		+		+	+	+	+	+	+	+			+
			+	+	+	+	+	+	+			+							+	+	+	+	+		+	
+	+	+			7		56			28			+	+	5	53	+				7			19	+	
+	+	6			+					+			+	+		+			+							
		+								5						+					+					
							+									+					+			8		

3.5. Dominant species

Among the algae identified in net phytoplankton of Admiralty Bay, 17 species dominated in at least one sample (Table III).

Corethorn criophilum was a species always dominating. Its percentage share in the samples ranged from 7 to 97 (Table III). The smallest share of this species was observed in samples with the lowest total number of cells. Along with a decrease in the percentage share of *Corethron criophilum,* the shares of *Thalassiothrix antarctica,* and more seldom — *Rhizosolenia alata, Chaetoceros atlanticus* and *Chaetoceros criophilum* increased. *Thalassiothrix antarctica* was after *Corethron criophilum,* the most frequently found dominant species both in the samples with large and those with small numbers of cells. *Rhizosolenia alata* belonged to species, which dominated only in March and April in the samples with a small number of cells. At the end of April and in May *Chaetoceros atlanticus* had a higher share in quantitatively poor samples.

Several species were found to dominate sporadically (Table III). Among such species dominating in plankton of stations situated at the end of Ezcurra Inlet, there were some benthic or periphyton species. In station 1 in Goulden Cove, such dominant species in individual samples were: *Fragilaria californica* var. *antarctica, Melosira sol* and *Cocconeis costata,* while in station 2 in Cardozo Cove the genera of *Achnanthes* and *Gomphonema* were dominant.

In the Admiralty Bay, among species dominant in phytoplankton, the most significant role is played by *Corethron criophilum, Thalassiothrix antarctica, Chaetoceros criophilum, Rhizosolenia alata* and *Chaetoceros atlanticus* (Table III). *Corethron criophilum* is classified among wide neritic or eurychoric neritic algae, whereas the remaining species are typical for the oceanic phytoplankton Kozlova 1964, Abbott 1974).

The species dominating mainly in the phytoplankton of Admiralty Bay differ with regard to their spatial and seasonal distribution.

Corethron criophilum is a species contributing mainly to the numerical abundance of net phytoplankton in Admiralty Bay. It proved to be dominant in all samples (Table III). This species was found in Admiralty Bay in quite significant quantities also in December 1909 (Mangin 1915), in the summer season 1977/1978 (Kopczyńska 1980, 1981) and in March 1981 (Kopczyńska and Ligowski 1982).

Kopczyńska (1981) suggested that summer growth of diatoms and mainly of *Corethron criophilum* was due to the liberation of diatoms from sea ice in Admiralty Bay. However the present author recorded sea ice algae in Admiralty Bay until September 1983 but *Corethron criophilum* at the end of winter was nearly absent in the sea ice (Ligowski, in prep.) and post-winter increase in abundance of phytoplankton was registered only in November.

Mangin (1915) and Hendey (1937) consider *Corethron criophilum* to be the most important component of Antarctic phytoplankton. It is a cosmopolitan species (Hasle 1969, El-Sayed et al. 1979, Semina et al. 1982) thriving best in the Antarctic coastal waters (Hasle 1969). Hart (1942) found *C. criophilum* mainly in the neritic waters. On the other hand Sanina (1973) has not found this species to be especially abundant around South Orkney Islands in the period of January — March, although it belonged to dominant species in southeastern part of the Scotia Sea. Fryxell and Hasle (1971) point out that open waters of the Weddell Sea with a small ice cover are richer in *Corethron criophilum*. This species was also found abundant in the Australian sector of the Southern Ocean between 43°S and 65°S (Ioriya and Kato 1982). In the Southern Atlantic *C. criophilum* was found in large quantities between 59°S and 69°S (Hustedt 1958), and between 52°S and 71°S (Mangin 1922). It is especially abundant in the Bransfield Strait (Mangin 1915, Hart 1934, 1942, Hendey 1937, Frenguelli and Orlando 1958, Fukase and El-Sayed 1965, Kopczyńska and Ligowski 1982, 1985, Uribe 1982).

Maximal development of *C. criophilum* was observed by Hart (1934) in the Atlantic Ocean in spring. According to Hasle (1969) *C. criophilum* develops in the subantarctic waters of the Eastern Pacific in December, and more to the south — in January and early February. In the Scotia Sea it was fiund to be most abundant in March and April (Movčan 1973). Around South Georgia *Corethron criophilum* (= *C. valdiviae*) was absent in March and present in every station and in most of them in large quantities in December and January (Hardy 1935). Mangin (1915) reported that *Corethron criophilum* (= *C. valdiviae*) can be found in large quantities from December till April, decreasing in number at the end of April and then very seldom is to be found from May till October. Similary in Admiralty Bay in 1983 large numbers of *C. criophilum* were found in March, and in post-winter period — in November, whereas low numbers of cells of this species were recorded in April, May and October.

In the Bransfield Strait dominance of *Corethron criophilum* was observed both in quantitatively poor phytoplankton (Hart 1934, Hasle 1969, Kopczyńska and Ligowski 1982) and at the time when phytoplankton was abundant (Kopczyńska and Ligowski 1985). In Admiralty Bay predominance of *Corethron criophilum* was most pronounced when phytoplankton was relatively abundant in late summer (March) and in November (Table III).

Thalassiothrix antarctica is the second species, after *Corethron criophilum*, which is present in all samples often in considerable numbers (Table III). Development of *Thalassiothrix antarctica* in the Antarctic part of the Atlantic was observed between 51°S and 69°S by Hustedt (1958). In the Indian Ocean, Jousé et al. (1962) observed high concentration of this species in sediments of the subantarctic zone, mainly to the north of 60°S. Kozlova (1964), Semina (1974) and Rat'kova (1978) found that the quantity of *Thalassiothrix antarctica* decreased in the southern regions of Antarctica. However this species belonged to the dominant species along the shore of the Antarctic Continent in the Indian Ocean sector in Olaf Prydz Bay (Ligowski 1983).

Dominance of *Corethron criophilum* and *Thalassiothrix antarctica* similar to that observed in Admiralty Bay was reported by Hart (1934) around South Georgia in January — February 1930. During the study of Fukase (1964) *Corethron criophilum* dominated in the southwestern part of the Bransfield Strait, followed by *Chaetoceros criophilum* and *Thalassiothrix antarctica*. On the other hand Makarov (1983) observed in Lazarev Sea the development of *Thalassiothrix antarctica* in oceanic waters and that of *Corethron criophilum* in coastal zone. Predominance of these two species was recorded in the present work in Admiralty Bay both when phytoplankton was quite abundant in November and rather scarse in April, May and October.

Many authors indicate that *Chaetoceros criophilum* is a very common Antarctic species most abundant at high latitudes (Hart 1934, 1942, Hendey 1937, Zernova 1970). Sournia et al. (1979) found it only south of the Antarctic Convergence zone, while Hustedt (1958) and Steyaert (1974) observed it between the Antarctic Convergence and the Antarctic Divergence. On the other hand Semina (1974) found it between the coast of Antarctica and 50°S in the Indian Ocean. Frenguelli (1960) considers it to be a neritic species. *Chaetoceros criophilum* was present in high numbers in the Olaf Prydz Bay (Indian Ocean) on the continental slope at ca 66.5°S (Ligowski 1983). However, Steyaert (1974) has not found it in the inshore waters of the Indian Ocean sector of the Antarctic. In Admiralty Bay the dominance of *Chaetoceros criophilum* was observed mainly during April and May (Table III), at the time of a general decline in the total cell numbers of phytoplankton (Table I). A similar correlation between development of *Ch. criophilum* and decrease in the total number of phytoplankton cells was observed in the Indian Ocean by Steyaert (1974) in early summer.

Rhizosolenia alata is considered a cosmopolitan species (Wood 1964, Semina 1974, Semina et al. 1982, Ioriya and Kato 1982). Wood (1964) believes that *Rh. alata* together with its different forms has a separate Antarctic population. *Rh. alata* can flourish both in the open ocean and in the inshore waters (Hasle 1969). Fenner et al. (1976) found the most abundant development of *Rh. alata* in the Antarctic Convergence region and to the south of this zone in the Pacific Ocean. On the other hand Sournia et al. (1979) reported that in the Indian Ocean sector this species can be found to the north of the Antarctic Convergence. Kopczyńska et al. (1985) found *Rhizosolenia alata* and its variations in March 1980 both north and south of the Antarctic Convergence in the southwestern Indian Ocean between Africa and Antarctica. Dominance of *Rhizosolenia alata* in the Admiralty Bay was observed only in March and April.

Chaetoceros atlanticus is a cosmopolitan species, which seems to be particulary associated with northern Antarctic waters (Hart 1942, Semina et al. 1982). In the Indian Ocean sector of the Antarctic it was reported both to the north and to the south of the Antarctic Convergence zone (Sournia et al. 1979, Kopczyńska et al. 1985). Steyaert (1974) is of the opinion that the cell numbers of this species decrease in the summer season. Hasle (1969) reported maximal development of *Ch. atlanticus* in the Pacific sector from mid-December till late January. On the other hand Hart (1942) found it to be most abundant in the period of post-maximum decrease of the amount phytoplankton. Polish studies within the BIOMASS Programme seem to point to a late-summer development of *Ch. atlanticus*. In February and March of 1981 *Ch. atlanticus* prevailed (together with *Chaetoceros dichaeta*) in the open waters of Drake Passage (Kopczyńska and Ligowski 1982), while in December 1983 and January 1984 in Drake

Passage and in Bransfield Strait it was present in only insignificant quantities (Kopczyńska and Ligowski 1985). The above data on the late summer development of *Ch. atlanticus* were confirmed by the present results from Admiralty Bay. This species belonged to the dominant diatoms before the winter season (March and April) when the total number of cells was decreasing. *Chaetoceros atlanticus* was found several times in high quantities (Table III), whereas its frequency in Admiralty Bay was found to be relatively low (degree of constancy — III) (Table I).

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4. Резюме

В 43 пробах сетяного фитопланктона, собранных на 13 различных станциях (Табл. I), расположенных во всей бухте Адмиральти (рис. 1), исследовано мокрый объем сестона, его сухой вес, а также качественный (Табл. II) и количественный (Табл. I) состав фитопланктона. Было определено 163 таксона водорослей в фитопланктоне, из которых 160 принадлежало к *Bacillariophyceae* (диатомеи) (Табл. II). В видовом составе выступало значительное число бентосных и перифитоновых таксонов диатомеи (около 20%). К наивысшему классу частоты встречаемости (наличие 81—100%) принадлежало 9 видов, из которых 7 принадлежало к планктонным видам, а 2 — бентосным и перифитоновым. Только 17 таксонов доминировало по меньшей мере в I пробе (Табл. III). В количественном составе доминировали океанические, планктонные диатомеи. Наиболее часто преобладали: *Corethron criophilum, Thalassiothrix antarctica, Chaetoceros atlanticus, Rhizosolenia alata* и *Chaetoceros criophilum* (Табл. III). Количество фитопланктона (выраженное в мокром объеме сестона, его сухом весе и числе клеток) уменьшалось в апреле и увеличивалось после зимнего периода в ноябре (фиг. 2). Весеннее увеличение количества фитопланктона в фиорде Эзкурра опаздывало почти на 2 недели по сравнению с другими частями бухты Адмиральти (Табл. I). Развитие фитопланктона в открытых водах бухты Адмиральти наблюдалось при росте температуры поверхностных слоев воды с $-1,5°C$ до $-0,5°C$, а в фиорде Эзкурра при росте температуры с $-0,5°C$ до $-0,2°C$.

5. Streszczenie

W 43 próbach fitoplanktonu sieciowego pobranych w 13 terminach na 13 stacjach (tabela I) rozmieszczonych na całym obszarze Zatoki Admiralicji (ryc. 1) określono mokrą objętość sestonu, jego suchą masę oraz skład ilościowy (tabela I) i jakościowy (tabela II).

Spośród 163 taksonów glonów zidentyfikowanych w fitoplanktonie, aż 160 należało do *Bacillariophyceae* (okrzemki). W składzie gatunkowym znaczny udział (około 20%) mają okrzemki przystosowane do osiadłego trybu życia (tabela II). Stwierdzono 9 gatunków o najwyższej stałości (występujących w 81%—100% ogólnej liczby prób), z czego 7 należało do gatunków planktonowych, a 2 do glonów osiadłych. Tylko 17 taksonów było dominantami przynajmniej na 1 stanowisku (tabela III). W składzie ilościowym główny udział mają okrzemki planktonowe oceaniczne. Najczęściej dominowały: *Corethron criophilum, Thalassiothrix antarctica, Chaetoceros atlanticus, Rhizosolenia alata* i *Chaetoceros criophilum* (tabela III). Obserwowano spadek ilości fitoplanktonu (wyrażonej w mokrej objętości, suchej masie i liczbie komórek) w kwietniu i jego ponowny wzrost w listopadzie (tabela I). Wiosenny wzrost ilości fitoplanktonu w Ezcurra Inlet był opóźniony o około 2 tygodnie w porównaniu do pozostałych części Zatoki Admiralicji. Wzrost ilości fitoplanktonu w otwartych wodach Zatoki Admiralicji występował przy wzroście temperatury powierzchniowej wody z $-1{,}5°C$ do $-0{,}5°C$, natomiast w Ezcurra Inlet przy wzroście temperatury wody z $-0{,}5°C$ do $-0{,}2°C$.

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