資 料 No. 1 3
昭和38年12月

The Plankton of South Viet-Nam

Fresh Water Plankton

by

Dr. Akihiko SHIROTA

Colombo Plan Expert On Planktology:

1 9 6 3

海 外 技 術 協 力 事 業 団
Overseas Technical Cooperation Agency

The Plankton of South Viet-Nam

by Dr. A. SHIROTA

C O N T E N T S

PART I.

HYDROBIOLOGICAL STUDIES ON THE SOUTH VIET-NAM AREA

No. 1.

SPECIES AND QUANTITY OF PLANKTON

By

Dr. Akihiko SHIROTA

Colombo Plan Expert On Planktology:
Department of Zoology, Faculuty of Science,
University of Saigon

INTRODUCTION

The study on plankton, namely, planktology is the ecology of microscopic animal and plant that found floating or drifting in the ocean or in the bodies of fresh water. As the original purpose of ecology have interdependence relationship between organisms (living things) or between organism and environment that include physiology and chemical analysis, we have to study, in the work on plankton, not only classification but also research.

In recent years, the studies of applied science which plankton is exploited, are prospering. Especially, the utilization of plankton in fishing industry is important.

In view of Trophyic level (food-chain), the fishery resources of fish and crustacean etc, which live in fresh water or in sea water, have intimately related with food of plankton, because the bottom of Trophyic level consists entirely of plankton. Therefore, plankton is very important as food of fish or crustacean and particularly in larval stage of them.

In the Japanese fishing industry which today is the biggest

fishing nation in the world, the fish culture had been developed till the technique of concentration culture of fish. Those are the best of management methods. But fish and crustacean of larval stage are very difficult, because fish and crustacean of larval stage like living foods more than artificial foods. Besides, the culture of living things are not easy.

For instance, the survival rate of Pyllosoma in the culture of shrimp is merely 5-10%, during the time for hatching larva into Pyllosoma. So, in Japan, many workers are studying to solve those problems.

As mentioned above, plankton is important for fisheries, moreover, it must have done almost indefinite expansion.

Now, in this paper, the author hase reported on property of water, species and quantity of plankton, and comparison of results taken from each station in south Viet-Nam as follows.

But this paper is an interim report, because this research will be continued after this.

In future, I hope that the fundamental investigation on plankton will be contributed to fishery in Viet-Nam.

Thanks are due to the Director of Fisheries Bureau Dr. NGO-BA-THANH, Inspector and the head of a section of Fisheries Bureau Mr. LE-VAN-DANG and the Branch manager of Dalat on Fish culture service station Mr. NGUYEN-VAN-NGUON for every kind of plankton sampling. And then, I also thank Dr. HOANG-QUOC-TRUONG Prof. of Saigon University for support and cooperation to promote.

I. MATERIALS AND METHODS (Memo)

1. Plankton net ---------- 2 Sets
   1) Phytoplankton --- Mullergaze Number 5.
      (NBC Number --- NGG. 64.)
   2) Zooplankton ----- Mullergaze Number 25.
      (NBC Number --- Nylon No. 25.)

   Diameter of Plankton net ---------- 25 cm

   Length of Plankton net ---------- 100 cm

2. Medicine of Fixation ----------
   Medicine ---------- Conc. Formalin

   Fixed Concentration of sample --------- 4 to 6 %

3. Pulled distance of Plankton net ---------- 12 m

4. Water Volume of Filtration ---------- about 600 L

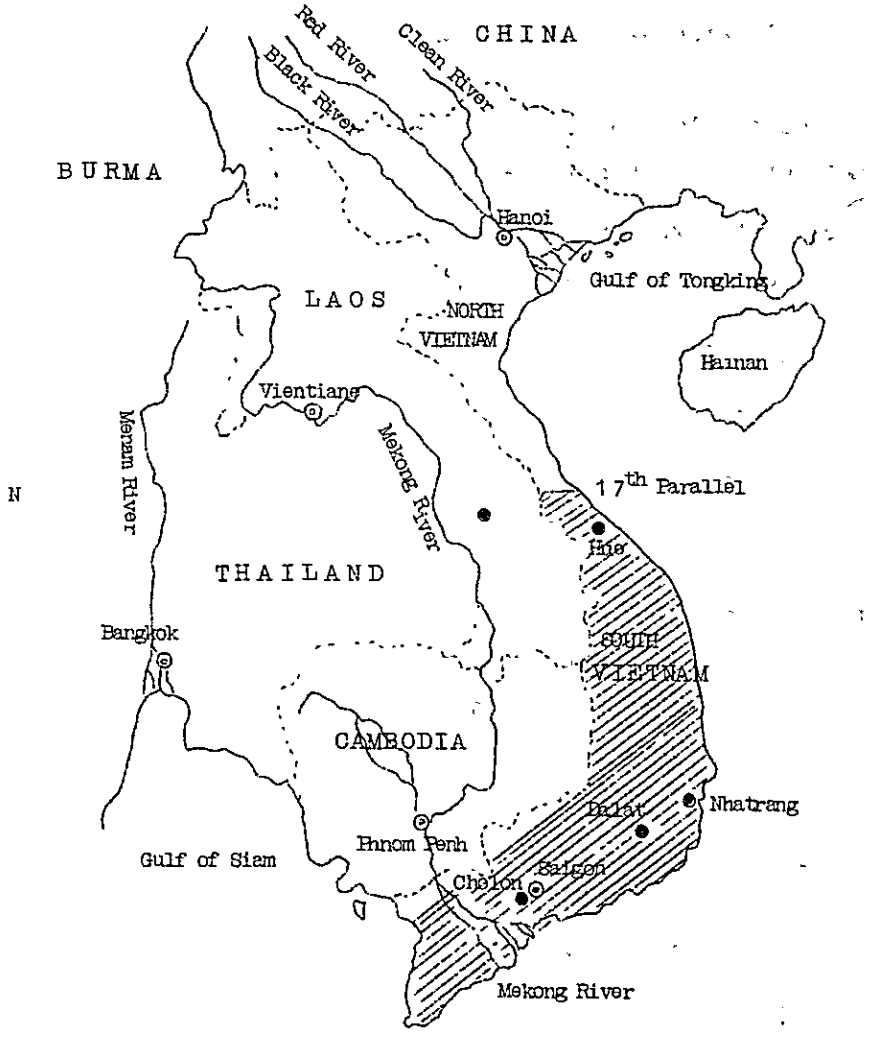
   $(\frac{25}{2})^2 \pi \times 12 = 588.75$ L

5. Note of Sign
   N ----- the Number of Individuals
   N/m^3 ----- the Number of Individuals per Cubic Meter
   TW ----- Total Wet Weight of Plankton
   TW/m^3 ----- Total Wet Weight of Plankton per Cubic Meter

6. Counting of the Number of Individuals
   1) Concentration (Centrifugal Method)
   2) Microscopic Observation

7. Determination of Wet Weight
   1) Centrifugal Method (Centrifugal Separation)
   2) Filtration (Filter Paper)
   3) Measure (Micro-balance)

II. GENERAL DESCRIPTION OF THE AREA



All the Plankton described in the article have been observed in Fresh Water Samlles taken from the each station of south VIET-NAM

1) Saigon-Cholon-Area
2) Dalat Area
3) Natrang Area
4) Hue Area

III. SAMPLING STATION

1. Fisheries Bureau Relations

1) Fish Culture Station of THU-DUC (Saigon-Cholon)
2) Fish Culture Pond of POLICE OFFICE (Saigon-Cholon)
3) Fish Culture Station of DALAT (Dalat)
(Culture Pond for Hatched fish Larva)
4) Fish Culture Station of Dalat (Dalat)
(Culture Pond for Young fish)
5) Fish Culture Station of NHATRANG (Nhatrang)
6) Fish Culture Station of HUE (Hue)

2. River, Lake and Dam

7)	CAM-LY	River	(Dalat)
8)	Pond of PRENN CHUT		(Dalat)
9)	THAN-THO	Lake	(Dalat)
10)	ME-LINH	Lake	(Dalat)
11)	VAN-KIEP	Lake	(Dalat)
12)	XUAN-HUONG	Lake	(Dalat)
13)	DRAN (DA-NHIM) DAM		(Dalat)

IV. RESULTS OF INVESTIGATION ON THE EACH STATION

1. Fish Culture Station of THU-DUC (Saigon-Cholon Area)

1) Date ---------- 9, April. 1963
2) Water Temperature ---------- 28.0 C
3) PH of Water ---------- 5.0
4) Colour or Condition of Water ---- a light Green
5) Wet Weight of Total Plankton per One Net
---
6) Species and Individuals Number of Plankton

Classification

PHYTO-PLANKTON

Phylum or Class	Species	The Number of Individuals per One Net	N/m^3
CYANOPHYTA	Anabaenopsis Elenkinii	17805	29734
	Oscillatoria limosa	6822	11393
	Spirulina princeps	8146	13604
	Symploca muscorum	483	807
EUGLENOPHYTA	Euglena halina	46	80
	" pseudoviridis	136	227
	" velata	49	82
	" clara	50	84
CHRYSOPHYTA	Nitzschia closterium	74	123
CHLOROPHYTA	ECHinosphaerell limnetica	12	20
	Geminella interrupta	8	13
	Volvochrysis globosa	150	250

ZOO-PLANKTON

PROTOZOA	Ctedoctema acanthocrypta	349	583
	Didinim sp.	60	100
	Pleuronema coronatum	502	838
CRUSTACEA	Mesocyclops lenckarti	39	65

2. Fish Culture Pond of POLICE OFFICE (Saigon-Cholon Area)

1) Date ---------- 26, March. 1963
2) Water Temperature ---------- 31.0 C
3) PH of Water ---------- 7.6
4) Colour or Condition of Water ------ a light Green
   Good Condition
5) Wet Weight of Total Plankton per One Net
   ----
6) Species and Individuals Number of Plankton

Classification

PHZOO-PLANKTON

Phylum or Class	Species	The Number of Individuals per One Net	N/m^3
EUGLENOPHYTA	Cryptoglena pigra	5800	9690
	Euglena deses	1300	2170
PYRROPHYTA	Hypnodinum sphaerium	300	500
	Protochrysis phaeophycearum	10600	17700

ZOO-PLANKTON

PROTOZOA	Actinophrys sol	42	72
	Cyclidium glaucoma	390	651

	Euplotes patella	350	585
	Glaucoma scintillans	150	250
	Gastronauta membranacea	90	150
TROCHEIMINTHES	Lepadella patella	31	52
CRUSTACEA	Cyclops strenuus	50	84

3. Fish Culture Station of Dalat

Culture Pond for Hatched Fish Larva (Dalat Area)

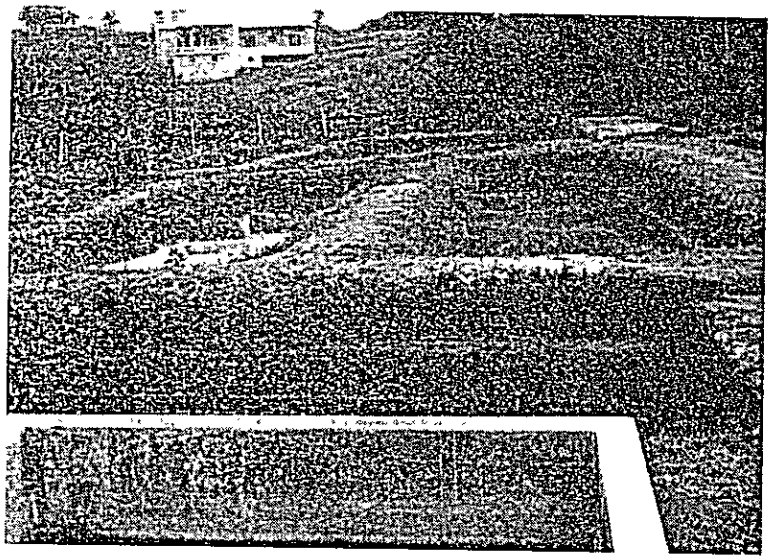
1) Date ---------- 16, April. 1963
2) Water Temperature ---------- 26.0 C
3) PH of Water ---------- 6.0
4) Colour or Condition of Water ------ a light Brown
5) Wet Weight of Total Plankton per One Net
   ---------- 1.6 g
6) Species and Individuals Number of Plankton

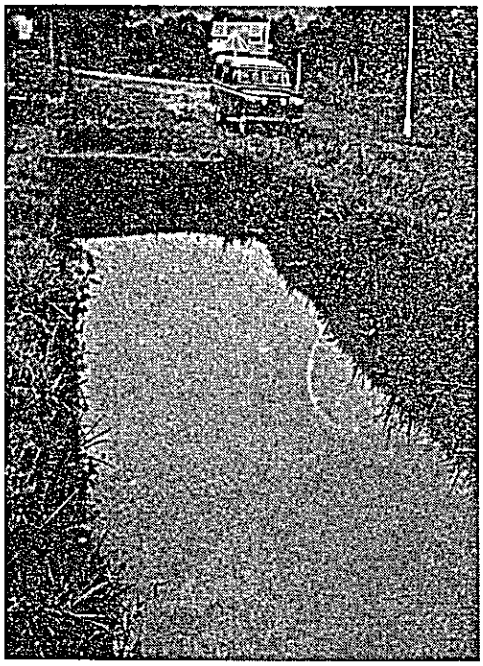
Classification

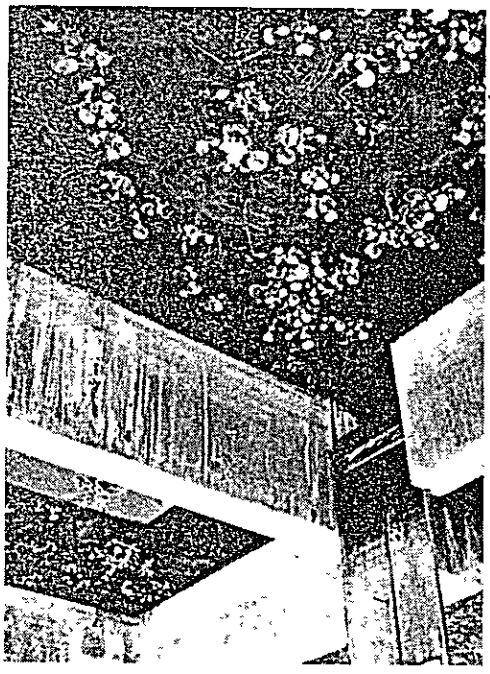
Fish Culture Station of DALAT

Culture pond for the hatching fish larva

16, April. 1963. 9:00 a.m.







PHYTO-PLANKTON

Phylum or Class	Species	The Number of Individuals per One Net	N/m^3
CYANOPHYTA	Anabaena circinalis	4088	6827
CHRYSOPHYTA	Botrydiopsis arrhiza	1120	1870
	Cyclotella Kutzing	120	200
	Dinobryon sertularia	1176	1964
	" divergens	256	427
	Fragilaria capitata	52	89
	Melosira granulata var. valida	1736	2899
	" varians	8	13
	" sp.	58	97
	Hantzschia amphioxys	112	187
	Nitzschia nyassensis	448	748
	" philippinarum	56	94
	" subrostrata	44	73
	Pinnularia sp.	56	94
	Synedra fasciculata	168	280
PYRROPHYTA	Peridinium striolatum	134	184
CHLOROPHYTA	Ankistrodesmus falcatus	4876	8143
	Closteriopsis longissima	260	434
	Cosmarium exasperatum	318	531
	" phaseolus	200	334
	Crucigenia fenestrata	3808	6359
	" quadrata	224	374
	Franceia tuberculata	6835	11414
	Hyalotheca sp.	11	18
	Pachycladon umbrinum	40	67

Pediastrum sp.	142	237
Scenedesmus armatus	280	468
" dimorphus	2016	3367
Slenastrum gracile	5600	9352
Spirogyra ahmedabadensis	392	654
" prolifica	165	276
Staurastrum anatinoides	1792	2993
" corniculatum	30	50
" megacanthum	168	281
" gracile	377	629
" orbiculare	51	85
" pseudopachyrhynchum	56	94
" punctulatum	84	140
Tetraedron lobatum	125	208

ZOO-PLANKTON

Phylum or Class	Species	The Number of Individuals per One Net	N/m^3
PROTOZOA	Trichodina pediculus? (hooks of basal disc)	113680	189846
TROCHELMINTHES	Keratella valga	50	84
	Lepadella patella	47	78
CRUSTACEA	Cyclops vernalis	66	111
	Osphranticum labronectum	19923	33271
	Sida crystallina	89	149

4. Fish Culture Station of DALAT (Dalat Area)

Culture Pond for Young Fish

1) Date ---------- 16, April. 1963
2) Water Temperature ---------- 25.8 C
3) PH of Water ---------- 5.5
4) Colour or Condition of Water ----- a light Green
5) Wet Weight of Total Plankton per One Net

---

6) Species and Individuals Number of Plankton

Classification

PHYTO-PLANKTON

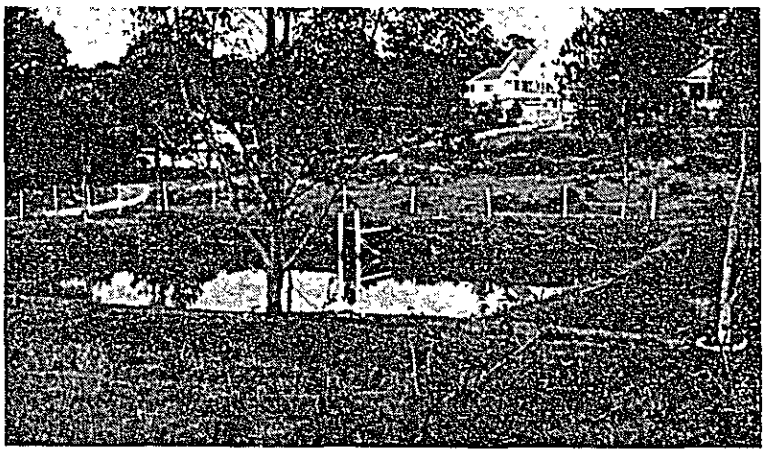
Phylum or Class	Species	The Number of Individuals per One Net	N/m^3
EUGLENOPHYTA	Cryptoglena pigra	407	680
	Euglena geniculata	221	369
	Phacus longicauda	180	300
CHRYSOPHYTA	Fragilaria lanceolata	220	367
	Melosira glanulata	396916	662850
	Navicula placentula	200	334
	Nitzschia phidippinarum	459	752
	Rhopalodia gibba	35	58
	Synedra acus	315	526
	" cunningtoni	442	738
	" fasciculata	218	364
	" lanceolata	210	351

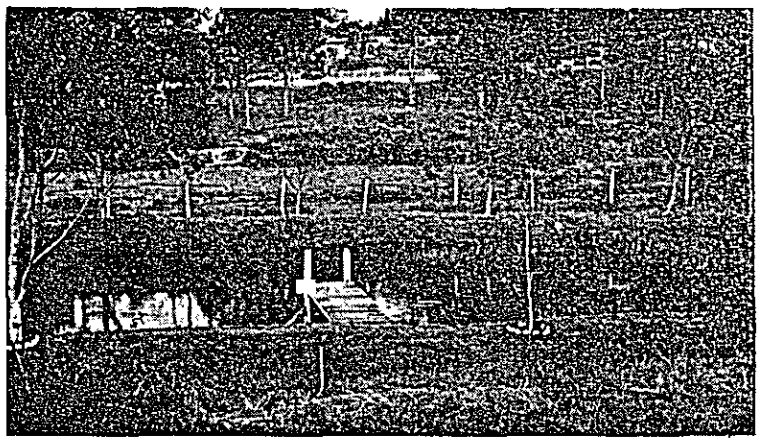
PRROPHYTA	Ceratium hirundinella var. silesiacum	3	5
	Glenodinium steinii	1599	2670
	Hypnodinium sphaericum	12	20
	Peridinium africanum	390	651
	" striolatum	11713	19561
CHLOROPHYTA	Ankistrodesmus falcatus	20719	51300
	Arthrodesmus apiculatus	21437	35800
	" arcuatus	3758	6276
	" curvatus	17680	29530
	Chramydomonus Rodhei	1440	2405
	Closterium moniliforme	1326	2214
	Coela strum cambricum	220	367
	Cosmarium praemorsum	300	501
	Crucigenia fenestrata	6630	11072
	Dictosphaerium pulchellum	57460	95958
	Mougeotia sp.	73372	122531
	Palmella miniata	4420	7381
	Pediastrum biradiatum	210	351
	Scenedesmus armatus	11492	19192
	" dimorphus	10608	17715
	Schroederia setigera	1989	3322
	Selenastrum Bibraianum	7072	11810
	Spirogyra protecta (Zygote)	66	110
	Staurastrum acanthastrum	105	175
	" corniculatum	1326	2214
	" kalimantanum	1326	2214
	" tohopekaligense	5304	8858
	" variabile	1768	2952
	" woltereckii	7293	12179
	Xanthidium burkillii	884	1476

Fish Culture Station of DALAT

Culture pond for the young fish

16, April. 1963. 10:00 a.m.





ZOO-PLANKTON

PROTOZOA	Acanthocystis chaetophora	220	334
TROCHELMINTHES	Keratella valga	182	304
TURBELLARIA	Stenostomum tenuicaudatum	2	3
CRUSTACEA	Diaptomus reighardi	104	174
	Eodiaptomus japonicus	39	65
	Sida crystallina	225	375

5. Fish Culture Station of NHATRANG (Nhatrang Area)

1) Date ---------- 13, May. 1963
2) Water Temperature ---------- 28.0 C
3) PH of Water ---------- 8.0
4) Condition of Water ---------- Brackish Water
5) Wet Weight of Total Plankton Per One Net
   ----
6) Species and Individuals Number of Plankton

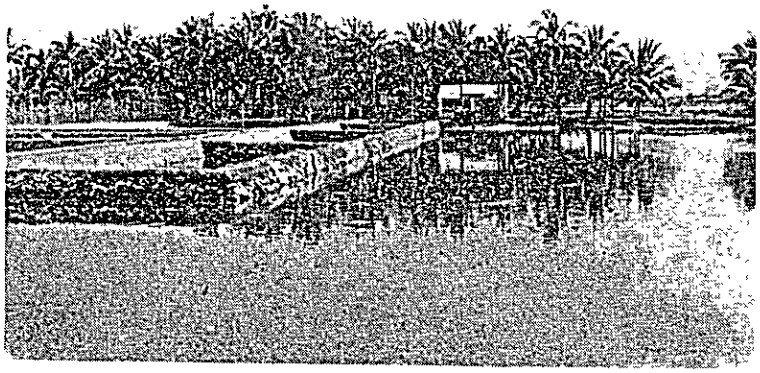
Classification

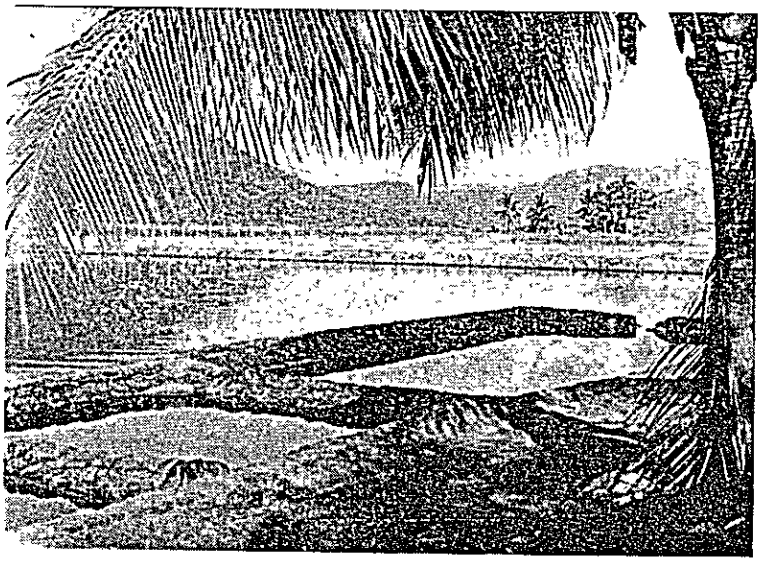
PHYTO-PLANKTON

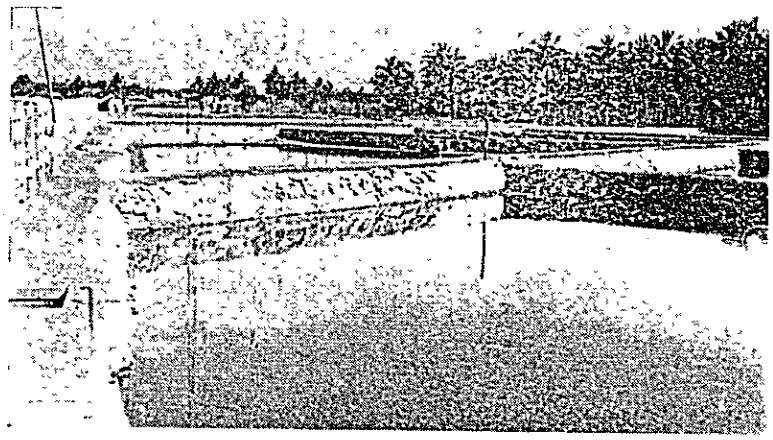
Phylum of Class	Species	The Number of Individuals per One Net	N/m^3
CYANOPHYTA	Chroococcus giganteus	1480	2472
	Coelosphaerium Kuetzingianum	215	359
EUGLENOPHYTA	Euglena velata	70	117
CHRYSOPHYTA	Achnanthes sp.	6304	10528
	Amphora ovalis	474	792
	Chaetoceros muelleri	274	457
	Diatoma linearis	485	810
	Diatomella balfouriana	155	259
	Epithemia sp.	229	382
	Fragilaria construens	643	1074
	" subsalina	142	237
	Frustulia rhomboides	2132	3560
	Gyrosigma kutzingii	418	698
	Navicula lanceolata	3666	6122
	" placentula	1520	2538
	Nitzschia acicularis	3041	5078
	" kutzingiana	288	481
	Rhbdonema adriaticum	2812	4696
	Surirella robusta	9064	15137
	Synedra affinis	1550	2589
PYRROPHYTA	Glenodinum uliginosum	357	596
	Peridinium aciculiferum	146	244
	Peridinium spiniferum	210	351
CHLOROPHYTA	Chlamydomonas inhabilis	288	481
	" kvildensis	1820	3039

Fish Culture Station of NATRANG

13, April. 1963. 9:00 a.m.







	Chlamydomonas praecox	148	247
	Closterium setaceum	1837	3068
	Hormidium subtile	748	1249
	Microspora amoena	465	776
	Protococcus viridis	103	172
	Schroederia seticera	70	117
	Volvochrysis polyochla	1621	2707
	Westella botryoides	1545	2580

ZOO-PLANKTON

PROTOZOA	Glaucoma scintillans	101	169
	Steinia candeus	294	491
COELENTERATA	Podocoryne carnea	2	3
TROCHELMINTHES	Brachionus urceolaris	1126	1880
CRUSTACEA	Acartia clausi	94	157
	Calanus sp.	78	130
	Cyclops bicolor	98	164
	Pseudodiaptomua marinus	232	387
	Gammarus sp.	185	309

6. Fish Culture Station of HUE (HUE Area)

1) Date ---------- First, August. 1963
2) Water of Temperature ----------
3) PH of Water ----------
4) Condition of Water ----------
5) Wet Weight of Total Plankton per One Net
   ----
6) Species and Individuals Number of Plankton

Classification

PHYTO-PLANKTON

Phylum or Class	Species	The Number of Individuals per One Net	N/m^3
CHRYSOPHYTA	Chrysocapsa planctonica	640	
	Dinobryon sertularia	22	
	Melosira isolandica	113	
	" granulata var. valida	3792	
	" malayensis	13	
	Meridion circulare	4	
	Nitzschia actinastroides	18	
	Phaeogloea mucosa	6	
CHLOROPHYTA	Desmidium bengalicum	3	
	Micrasterias mahabules hwareusis	2	
	Pediastrum biradiatum	20	
	Pleurodiscus purpureus	73	
	Staurastrum anatinoides	20	
	Xanthidium sexmamillatum	30	

Zoo-PLANKTON

PROTOZOA	Holophrya simplex	2051	
	Spasmostoma viride	1864	
TROCHELMINTHES	Colurella obtusa	16	
	Dipleuchlanis propatula	5	
	Keratella cochlearis	10	
	Monostyla quadridentata	4	

7. CAM-LY River (Dalat Area)

1) Date ---------- 16, April. 1963
2) Water Temperature ---------- 24.0 C
3) PH of Water ---------- 5.5
4) Condition of Water ---------- Current 100 cm/sec.
5) Wet Weight of Total Plankton per One net
---
6) Species and Individuals Number of Plankton

Classification

PHYTO-PLANKTON

Phylum or Class	Species	The Number of Individuals per One Net	N/m^3
CYANOPHYTA	Oscillatoria priinceps	123	205
CHRYSOPHYTA	Melosira Agussizii	45	75
CHLOROPHYTA	Mougeotiopsis calospora	284	474
	Pleurodiscus purpureus	196	327
	Spirogyra azygospora	367	613

ZOO-PLANKTON

CRUSTACEA	Alona monocantha	530	885
	Ceriodaphnia rigaudi	9	15
	Cyclops strenus	20	33
	Diaptomus reighardi	10	17
	Simocephalus vetulus	11	18
INSECT	Chironomus dorsalis (Larva)	4	7

8. Pond of PRENN CHUT (Dalat Area)

1) Date ---------- 18, April. 1963
2) Water Temperature ---------- 23.0 C
3) PH of Water ---------- 5.5
4) Condition of Water ---------- Muddiness
5) Wet Weight of Total Plankton per One Net
---
6) Species and Individuals Number of Plankton

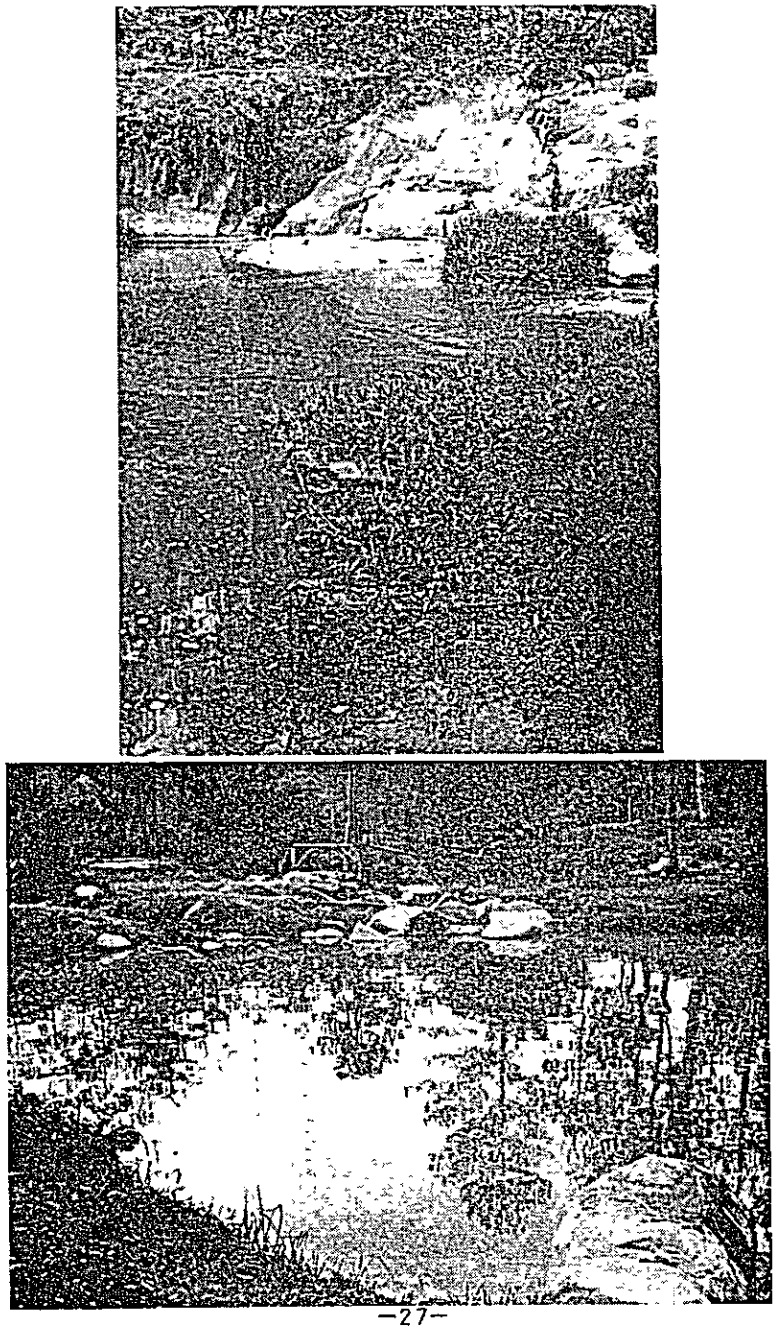
Classification

PHYTO-PLANKTON

Phylum or Class	Species	The Number of Individuals per One Net	N/m^3
CHRYSOPHYTA	Amphora ovalis	100	167
	Bacillaria paradoxa	2850	4759
	" " var. tumidula	38	63
	Diatoma vulgare	62	104
	Fragilaria construens	50	83
	" pinnata	20	33
	" utermohli	600	1000
	" virescens	106	177
	Navicula radiosa	259	432
	" rhynchocephala	200	334
	Nitzschia nyassensis	40	67
	Rhopalodia gibba	50	84
	Surirella splendida	50	84
CHLOROPHYTA	Spirogyra ionia	2524	4215
	" pseudocylindrica	813	1358

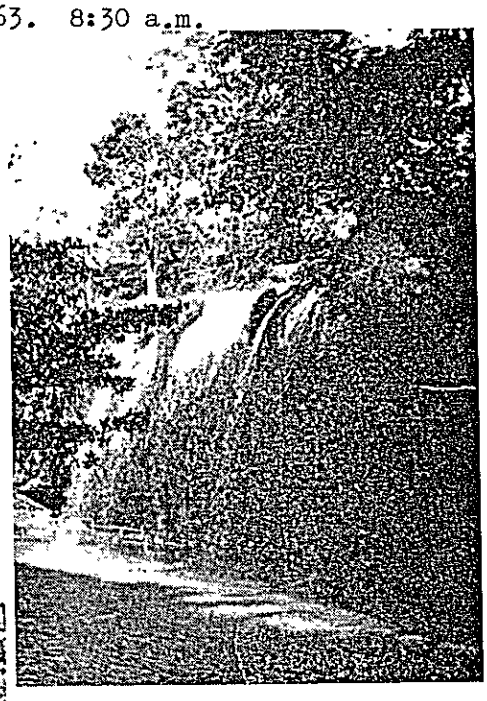
CAM-LY River

18, April. 1963.



Pond of PREN CHUT

18, April. 1963. 8:30 a.m.



9. THAN-THO Lake (Dalat)

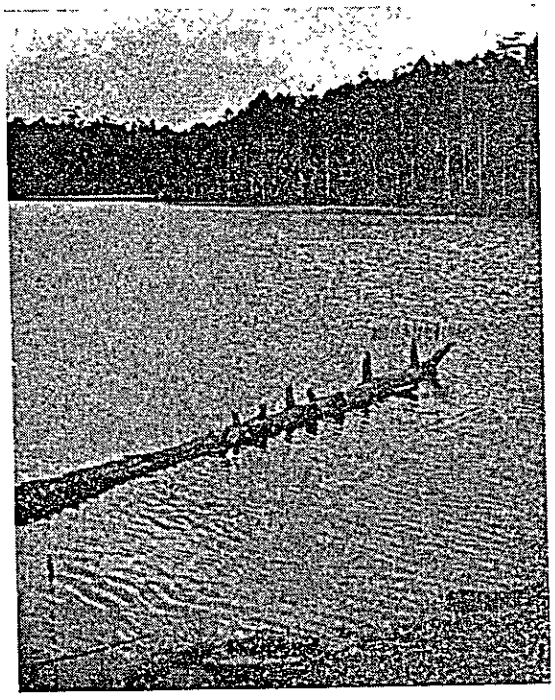
1) Date ---------- 17, April. 1963
2) Water Temperature ---------- 25.0 C
3) PH of Water ---------- 5.5
4) Colour or Condition of Water ------ a light Green
5) Wet Weight of Total Plankton per One Net

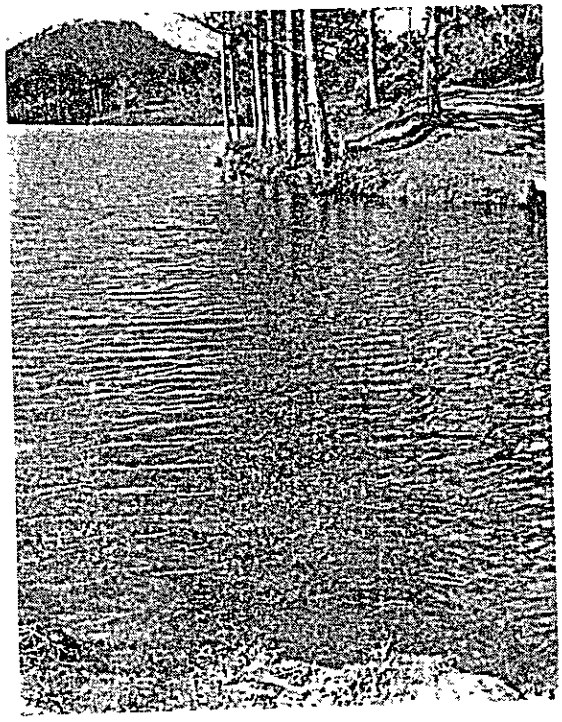
---

6) Species and Individuals Number of Plankton

THAN-THO Lake

17, April. 1963.





Classification

PHYTOPLANKTON

Phylum or Class	Species	The Number of Individuals per One Net	N/m^3
CHRYSOPHYTA	Achnanthes coarctata	328	548
	Amphora ovalis	110	184
	Cymbella parva	924	1536
	" naviculiformis	316	528
	Fragilaria capucina	444	741
	" subsalina	280	468
	Melosira distans	51	85
	" granulata	21040	35137
	" sp.	162	271
	Navicula placentula	200	334
	" " var. rqsirata	430	718
	" radiosa	124	207
	" sp.	43	72
	Nitzschia fonticola	207	346
	" nyassensis	648	1082
	" seriata	323	540
	Rhizosolenia longiseta	39	65
	Synedra fasciculata	30	50
	" Utermohii	29	48
CHLOROPHYTA	Ankistrodesmus falcatus	291	486
	Cosmarium nymannianum	44	73
	" indentatum	20	33
	" phaseolus	73	122
	Chlamydomonas chrysomonadis	480	802
	" completa	320	534

	Echinosphaerella limnetica	10	16
	Mougeotiopsis calospora	660	1102
	Pachycladon nmbrinus	835	1394
	Oedogonium crispum	3	5
	Schizogonium murale	480	802
	Spirogyra profifica	4500	7515
	Staurastrum indentatum	1605	2680
	" smithii	5600	9352

ZOO-PLANKTON

PROTOZOA	Bryometopus sphagni	78	130
	Physomonas vestita	28	47
CRUSTACEA	Diaptomus kenai	1524	2512
	Sida crystallina	184	312

10. ME-LINH Lake (Dalat)

1) Date ---------- 17, April. 1963
2) Water Temperature ---------- 24. C
3) PH of Water ---------- 5.5
4) Condition of Water ---------- Muddiness
5) Wet weight of Total Plankton per One Net
---
6) Species and Individuals Number of Plankton

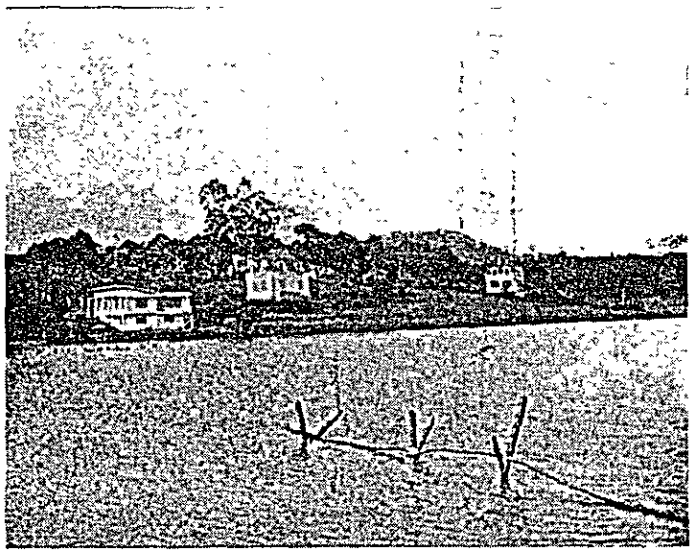
Classification

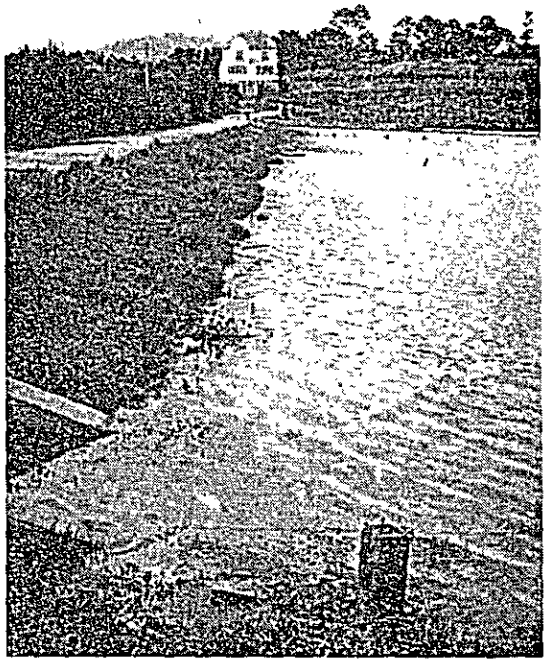
PHYTO-PLANKTON

Phylum or Class	Species	The Number of Individuals per One Net	N/m^3
EUGLENOPHYTA	Euglena acus	10	17

ME-LINH LAKE

17, April 1963. 16:00 p.m.





CHRYSOPHYTA	Fragilaria capucina	15	25
	Merismogloea composita	5	25
	Melosira glanulata	65	109
	Tribonema angustissimum	5	9
CHLOROPHYTA	Chodatella subsalsa	5	8
	Mougeotia viridis	17	28
	Pediastrum biradiatum	8	13
	Rhizoclonium hieroglyphium	62	103

ZOO-PLANKTON

TROCHELMINTHES	Filinia longiseta	7	12
	Notholca sp.	5	8
	Polyarthra sp.	6	10
CRUSTACEA	Moina macrocopa	12	20
	Sinodiaptomus Sarsi	608	1015

II. VAN-KIEP Lake (Dalat Area)

1) Date ---------- 18, April. 1963
2) Water Temperature ---------- 24.2 C
3) PH of Water ---------- 5.6
   (Fish Culture Pond ---------- 5.8)
4) Colour or Condition of Water
   ---------- a light green
5) Wet Weight of Total Plankton per One Net
   ----
6) Species and Individuals Number of Plankton

Classification

PHYTO-PLANKTON

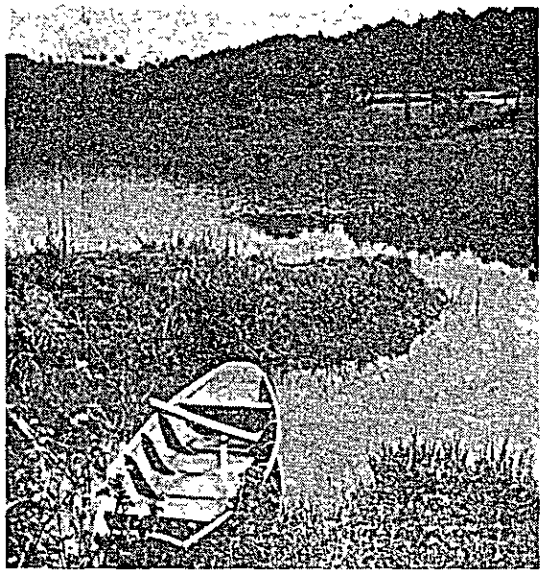
Phylum or Class	Species	The Number of Individuals per One Net	N/m^3
CYANOPHYTA	Spirulina princeps	30	50
EUGLENOPHYTA	Phacus lismorensis	23	38
CHRYSOPHYTA	Fragilaria construens var. subsalina	44	73
PYRROPHYTA	Hemidinium nasutum	92	154
	Peridinium striolatum	115	192
CHLOROPHYTA	Acanthosphaera Zachariasi	21	35
	Mougeotia sp.	106	177
	Sphaerocystis schroeteri	190	317
	Spirogyra prolifica	69	115
	Treubaria crassispina	8	13
	Zygnema insigne	184	307

ZOO-PLANKTON

PROTOZOA	Vorticella campanula	4	7
CRUSTACEA	Megacalanus princeps	8	13
	Mesocyclops Leuckarti	3	5
	Sinodiaptomus Sarsi	5	8

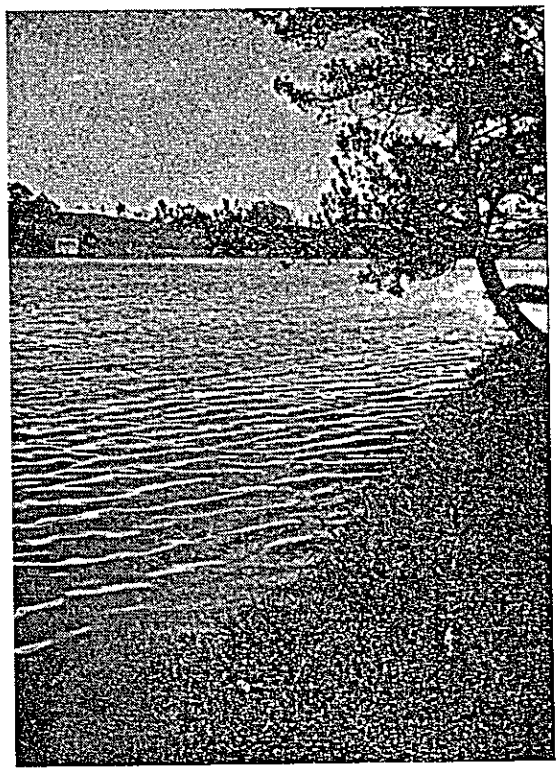
VAN-KIEP Lake

18, April. 1963. 10:00 p.m.



XUAN-HUONG Lake

22, April. 1963. 3:00 p.m.



12. XUAN-HUONG Lake (Dalat)

1) Date ---------- 22, April. 1963
2) Water Temperature ---------- 24.3 C
3) PH of Water ---------- 5.8
4) Colour or Condition of Water ------ a light green
5) Wet Weight of Total Plankton per One Net
---
6) Species and Individuals Number of Plankton

Classification

ZOO-PLANKTON

Phylum or Class	Species	The Number of Individuals per One Net	N/m^3
CRUSTACEA	Daphnia rosea	672	1122
	Mesocyclops lenckarti	1920	3206
	Moina brachiata	4482	7485
	Moina macrocopa	5154	8607
	Oxyurella longicaudis	36	60
	Sinodiaptomus Sarsia	2496	4168

13. DRAN (DA-NHIM) DAM (Dalat)

1) Date ---------- 19, 20, April. 1963
2) Water Temperature ---------- 19 Day ----- 23.0 C
20 Day ----- 25.4 C
3) PH of Water ---------- St. I ----- 5.8
St. II ----- 6.5

4) Colour or Condition of Water

St. I ---------- a light green

St. II ---------- Green, Good condition

5) Wet Weight of total Plankton per One Net

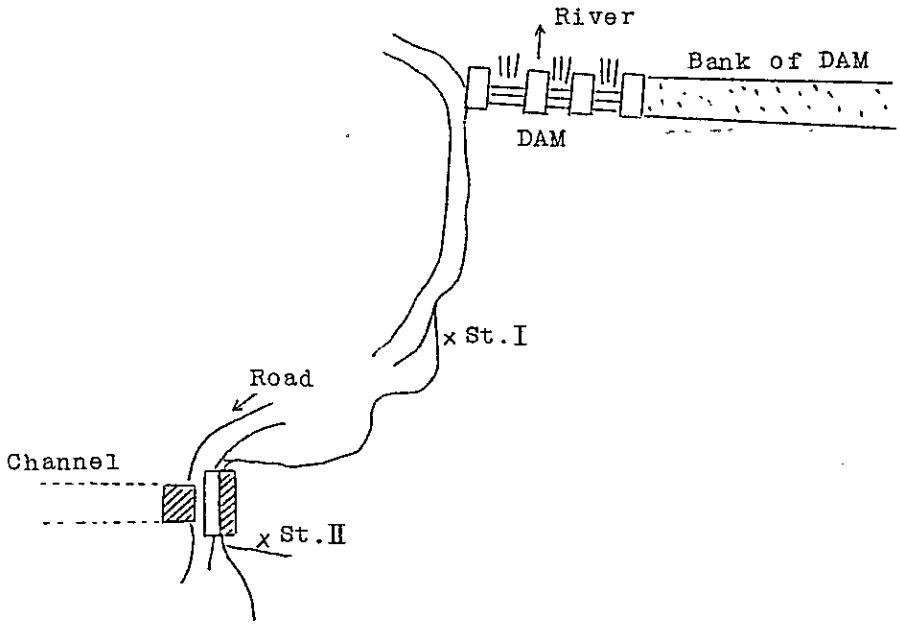
St. I ---------- (19 Day) ----- 2.5 g

St. II ---------- (20 Day) ----- 1.4 g

St. I ---------- (20 Day) ----- 14.3 g

St. II ---------- (20 Day) ----- 14.3 g

6) Map of Sampling Station



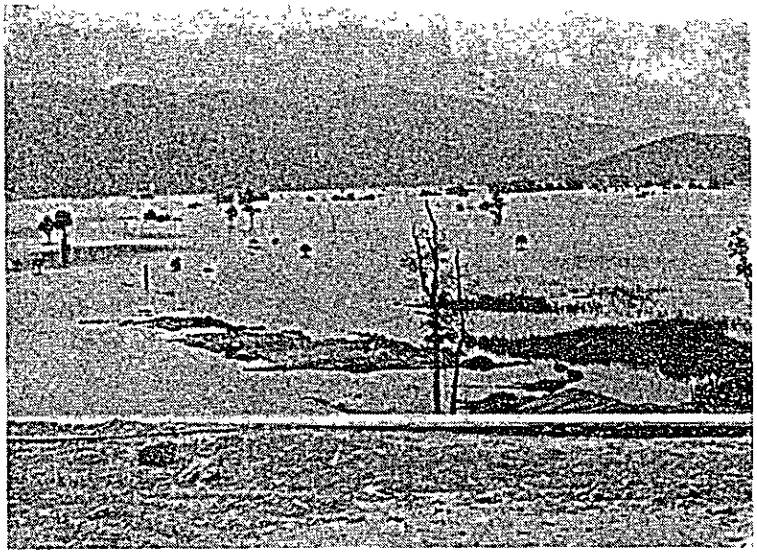
7) Species and Individuals Number of Plankton

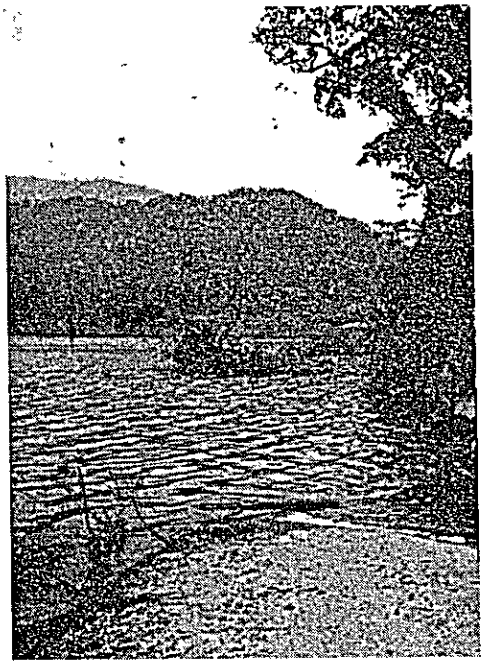
Classification

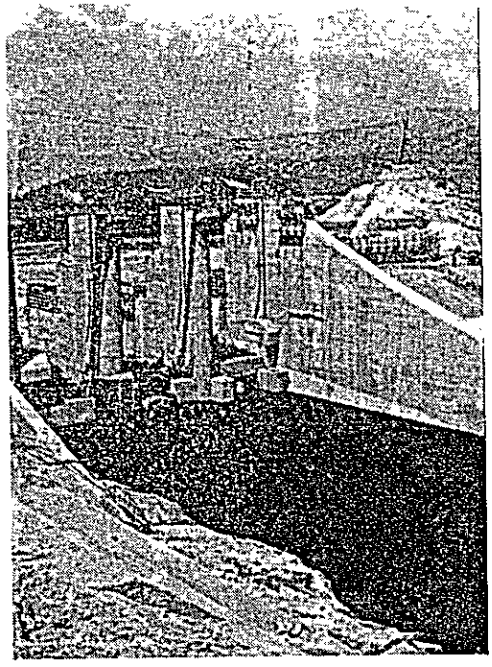
PHYTO-PLANKTON

DRAN (DA-NHIM) DAM St. I

19-20, April. 1963. 18:00 p.m.

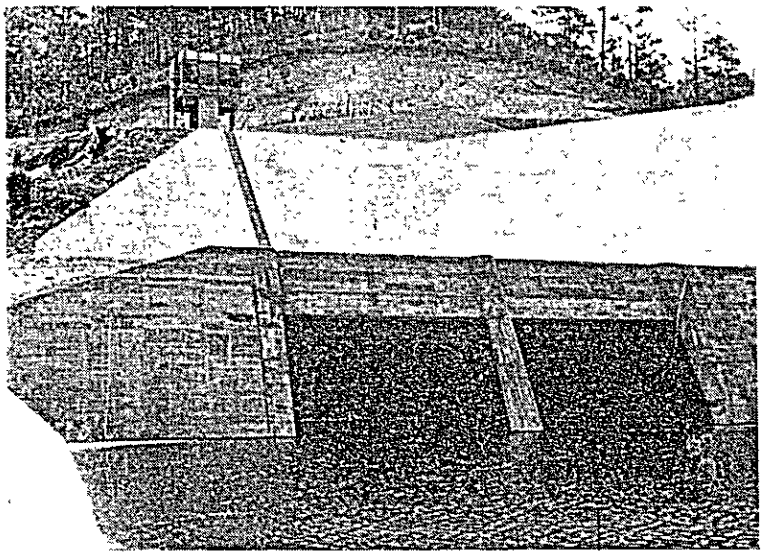




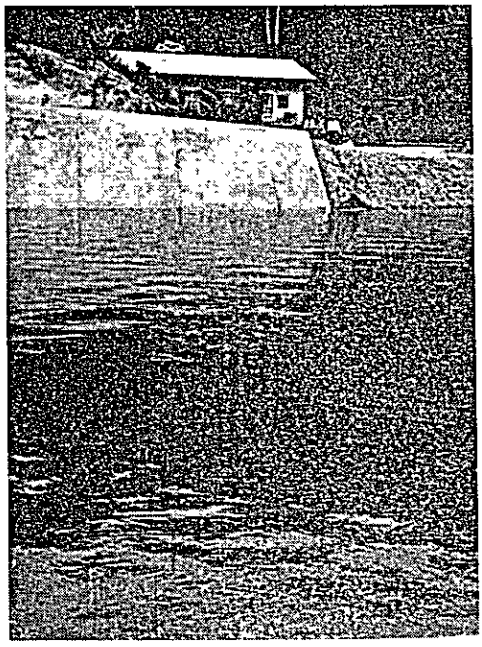


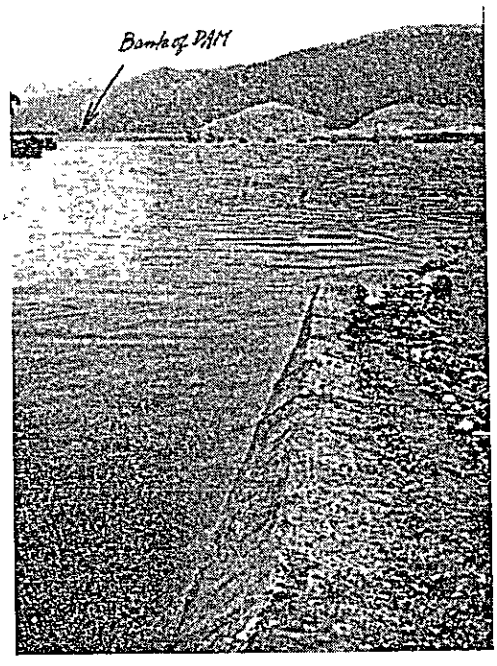
DRAN (DA-NHIM) DAM St. II

19-20, April. 1963. 18:00 p.m.



The entrance of Channel




Bank of Dam

Phylum or Class	Species		The Number of Individuals per One Net	N/m^3
		(19 Day)		
CHRYSOPHYTA	Dinobryon divergens	St.I	-----	-----
		St.II	6	10
CHLOROPHYTA	Pandorina minodi	St.I	620	1035
		St.II	9550	15949
	ZOO-PLANKTON			
TROCHELMINTHES	Platyia quadricornis	St.I	3	5
		St.II	65	108
CRUSTACEA	Ceriodaphnia megops	St.I	-----	-----
		St.II	42	70
	Chydorus sphaericus	St.I	52	87
		St.II	1885	3148
	Cyclops vicinus	St.I	312	521
		St.II	1430	2388
	Cyclops vernalis	St.I	104	174
		St.II	1690	2822
	Diaptomus reighardi	St.I	416	695
		St.II	1820	3039
	Eodiaptomus japonicus	St.I	208	347
		St.II	6500	10855
	Sida crystallina	St.I	156	260
		St.II	7800	13026
		(20 Days)		
	PHYTO-PLANKTON			
CHRYSOPHYTA	Dinobryon divergens	St.I	194	324
		St.II	57	95
CHLOROPHYTA	Pandorina minodi	St.I	12400	20708
		St.II	16100	26887

	Rhizoclonium hieroglyphicum	St.I	78	130
		St.II	42	70
	Sphaeroplea annulina	St.I	163	272
		St.II	90	150

ZOO-PLANKTON

TROCHELMINTHES	Platyia quadricornis	St.I	100	167
		St.II	849	1418
	Ceriodaphnia megops	St.I	94	157
		St.II	880	1470
	Chydorus sphaericus	St.I	244	407
		St.II	2310	3858
	Cyclops vernalis	St.I	789	1318
		St.II	7370	12308
	Cyclops vicinus	St.I	602	1005
		St.II	5610	9369
	Diaptomus reighardi	St.I	2914	4866
		St.II	27280	45558
	Eodiaptomus japonicus	St.I	15980	26687
		St.II	149270	249280
	Sida crystallina	St.I	1880	3140
		St.II	17600	29392

V. GENERALIZATION

1. On the water temperature, PH of water and wet weight of plankton taken off each sampling station.

Sampling Station	Date	Water Temperature (C)	PH	Colour or Condition of Water	N/m^3		TW/m^3
					Phyto-Plankton	Zoo-Plankton	(G^r)
1	9, IV.	28.0	5.0	a light Green	56418	1586	-
2	26, III.	31.0	7.6	a light Green	30060	1844	-
3	16, IV.	26.0	6.0	a light Brown	62554	223539	1.6
4	16, IV.	25.8	5.5	a light Green	1138499	1255	-
5	13, V.	28.0	8.0	Brackish	74013	3720	-
6	I, VIII.	-	-	-	(4756)	(3950)	-
7	16, IV.	24.0	5.5	Current 100 (cm/sec)	1694	975	-
8	18, IV.	23.0	5.5	Muddiness	12960	0	-
9	17, IV.	25.0	5.5	a light Green	67876	3001	-
10	17, IV.	24.0	5.5	Muddiness	337	1065	-
11	18, IV.	24.2	5.6	a light Green	1471	33	-
12	22, IV.	24.3	5.8	a light Green	-	24648	-
13	19, IV. (St.I)	23.0	5.8	a light Green	1035	2089	-
	(St.II)	23.0	5.8	a light Green	15950	35456	-
	20, IV. (St.I)	25.4	5.8	a light Green	21434	37747	1.40
	(St.II)	25.6	6.5	Green (Good condition)	27102	352653	14.29

* n/m^3 ----- The Number of Individuals per Cubic Meter

** TW/m^3 ----- Total Wet Weight per Cubic Meter

2. On the distribution of Plankton

(The number of species taken from the Sampling Station)

Sampling Station	PHYTO-PLANKTON					ZOO-PLANKTON				
	Cyanophyta	Euglenophyta	Chrysophyta	Pyrrophyta	Chlorophyta	Protozoa	Coelenterata	Trochelminthes	Plathelminthes	Arthropoda
1. THU-DUC	4	4	1	-	3	3	-	-	-	1
2. POLICE POND	-	2	-	2	-	5	-	1	-	1
3. DALAT (HATCHED)	1	-	14	1	23	1	-	2	-	3
4. DALAT (YOUNG)	-	3	9	5	25	1	-	1	1	3
5. NHATRANG	2	1	17	3	10	2	1	1	-	5
6. HUE	-	-	8	-	6	2	-	4	-	-
7. CAM-LY	1	-	1	-	3	-	-	-	-	6
8. PRENN	-	-	13	-	2	-	-	-	-	-
9. THAN-THO	-	-	19	-	14	2	-	-	-	2
10. ME-LINH	-	1	4	-	4	-	-	3	-	2
11. VAN-KIEP	1	1	1	2	6	1	-	-	-	3
12. XUAN-HUONG	-	-	-	-	-	-	-	-	-	6
13. DALAT(DA-NHIM)DAM	-	-	1	-	3	-	-	1	-	8

3. Classification of Organisms
(Phyto- and Zoo-plankton)

PHYTO-PLANKTON

PHYLUM CYANOPHYTA

CLASS CYANOPHYCEAE

ORDER CHROOCOCCALES

FAMILY CHROOCOCCACEAE

SPECIES	Aphanocapsa pulchra	1
	Chroococcus giganteus	2
	Coelosphaerium Kuetzingianum	3

ORDER HOLMOGONALES

FAMILY NOSTOCACEAE

	Anabaena circinalis	4
	Anabaenopsis Elenkinii	5

FAMILY OSCILLATORIACEAE

	Oscillatoria limosa	6
	Oscillatoria princeps	7
	Spirulina princeps	8
	Symploca muscorum	9

PHYLUM EUGLENOPHYTA

CLASS EUGLENOPHYCEAE

ORDER EUGLENALES

FAMILY EUGLENACEAE

	Cryptoglena pigra	10
	Euglena acus	11
	" Clara	12
	" Deses	13
	" geniculata	14
	" hyalina	15

Euglena pseudoviridis 16
" velata 17
Phacus lismorensis 18
" longicauda 173

PHYLUM CHRYSOPHYTA
CLASS RACILLARIOPHYCEAE (DIATOMEAE)
SUBCLASS PENNATIPHYTIDAE (PENNATAE)
ORDER MONORAPHIDALES
SUBORDER ACHNANTHINEAE
FAMILY ACHNANTHACEAE
Achnanthes coarctata 19
" sp. 20

ORDER BIRAPHIDALES
SUBORDER BRAPHIDINEAE
FAMILY CYMBELLACEAE
Amphora ovalis 21
Cymbella parva 22
" naviculiformis 23

FAMILY NITZSCHIACEAE
Bacillaria paradoxa 24
" var. tumidula 25

SUBORDER NAVICULINEAE
FAMILY GOMPHONEMATACEAE
Rhopalodia gibba 174
Epithemia sp 26

FAMILY NAVICULACEAE
Frustulia rhomboides 27
Gyrosigma kutzingii 28
Mastogloica Danseii 29
Navicula lanceolata 30

Navicula placentula 31
" var. rosirata 32
" radiosa 33
" rhynchocephala 34
Pinnularia sp. 35

SUBORDER SURIRELLINEAE

FAMILY NITZSCHIACEAE

Nitzschia acicularis 36
" actinastroides 37
" closterium 38
" fonticola 39
" kutzingiana 40
" nyassensis 41
" philippinarum 42
" seriata 43
" subrostrata 44
" sp. 45
Hantzschia amphioxys 46

FAMILY SURIRELLACEAE

Surirella robusta 47
" splendida 48

ORDER ARAPHIDAIES

SUBORDER FRAGILARINEAE

FAMILY DIATOMACEAE

Diatoma linearis 49
" vulgare 50

FAMILY TABELLARIACEAE

Diatomella balfouriana 51
Rhabdonema adriaticum 52

FAMILY FRAGILARIACEAE

Fragilaria capucina 53

Fragilaria construens 54
" var. subsalina 55
" lanceolata 56
" pinnata 57
" Utermohli 58
" virescens 59
Synedra affinis 60
" acus 61
" cunningtoni 62
" fasciculata 63
" lanceolata 64
" utermohli 65

FAMILY MERIDIONACEAE

Meridion circulare 66

SUBCLASS CENTRIPHYTIDAE (CENTRICAE)

ORDER BIDDULPHIALES

SUBORDER BIDDULPHINEAE

FAMILY CHAETOCERACEAE

Chaetoceros muelleri 67

ORDER DISCALES

SUBORDER DISCINEAE

FAMILY COSCINODISCACEAE

Cyclotella kutzingiana 68
Melosira Agussizii 69
" distans 70
" granulata 71
" var. valida 72
" isolandica 73
" malayensis 74
" varians 75
" sp. 76

FAMILY GLENODINIACEAE

Glenodinium steinii 87

" uliginosum 88

Hemidinium nasutum 89

FAMILY PERIDINIACEAE

Peridinium aciculiferum 90

" africanum 91

" spiniferum 92

" striolatum 93

CLASS CRYPTOPHYCEAE

ORDER CRYPTOMONADALES

FAMILY NEPHROSELMIDACEAE

Protochrysis phaeophycearum 94

PHYLUM CHLOROPHYTA

CLASS CHLOROPHYCEAE

ORDER CHLOROCOCCALES

FAMILY MICRACTINIACEAE

Acanthosphaera Zachariasi 95

FAMILY OOCYSTACEAE

Ankistrodesmus falcatus 96

Chodatella subsalsa 97

Closteriopsis longissima 98

Echinosphaerella limnetica 99

Franceia tuberculata 100

Pachycladon umbrinum 101

Tetraedron lobatum 102

Treubaria crassispina 103

Selenastrum Bibraianum 104

" gracile 105

FAMILY COELASTRACEAE

Coelastrum cambricum 106

FAMILY SCENEDESMACEAE

Crucigenia fenestrata 107

" quadrata 108

Scenedesmus armatus 109

" dimorphus 110

FAMILY CHARACIACEAE

Dictyosphaerium pulchellum 111

Schroederia setigera 112

FAMILY HYDRODICTYACEAE

Pediastrum biradiatum 113

" sp. 114

ORDER CLADOPHORALES

FAMILY CLADOPHORACEAE

Rhizoclonium hieroglyphicum 115

ORDER OEDOGONIALES

FAMILY OEDOGONIACEAE

Oedogonium crispum 116

ORDER SCHIZOGONIALES

FAMILY SCHIZOGONIACEAE

Schroederia setigera 117

ORDER TETRASPORALES

FAMILY PALMELLACEAE

Palmella miniate 118

Sphaerocystis schroeteri 119

ORDER ULOTRICHALES

FAMILY ULOTRICHASCEAE

Geminella interrupta 120

Hormidium subtile 121

FAMILY MICROSPORACEAE

Microspora amoena 122

FAMILY PROTOCOCCACEAE

Protococcus viridis 123

FAMILY SPHAEROPLEACEAE

Sphaeroplea annulina 124

ORDER VOLVOCALES

FAMILY CHLAMYDOMONADACEAE

Chlamydomonus chrysomonadis 125

" completa 126

" inhabilis 127

" kvildensis 128

" praecox 129

" Rodhei 130

FAMILY VOLVOCACEAE

Pandorina minodi 131

ORDER ZYGNEMATALES

FAMILY DESMIDIACEAE

Arthrodesmus apiculatus 132

" arcuatus 133

" curvatus 134

Closterium moniliforme 135

" setaceum 136

Cosmarium exasperatum 137

" indentatum 138

" nymannianum 139

" Phaseolus 140

" praemorsum 141

Desmidium bengalicum 142

Hyalotheca sp. 143

Micrasterias mahabules hwarensis 144

Staurastrum acanthastrum 145
" anatinoides 146
" corniculatum 147
" gracile 148
" indentatum 149
" megacanthum 150
" orbiculare 151
" playfairi 152
" pseudopachyrhynchum 153
" punctulatum 154
" kalimantanum 155
" smithii 156
" tohopekaligense 157
" variabile 158
" woltereckii 159
Xanthidium sexmamillatum 160
" burkillii 161

SUBORDER EUCONJUGATAE

FAMILY ZYGNEMATACEAE

Mougeotia viridis 162
" sp. 163
Mougeotiopsis calospora 164
Pleurodiscus purpureus 165
Spirogyra ahmedabadensis 166
" ionia 167
" prolifica 168
" protecta 169
" pseudocylindrica 170
Zygnema insigne 171
Spirogyra azygospora 172

ZOO-PLANKTON

PHYLUM PROTOZOA
SUBPHYLUM PLASMODROMA
CLASS SARCODINA
SUBCLASS ACTINOPODA
ORDER HELIOZOA
SUBORDER APHROTHORACICA
FAMILY ACTINOPHRYSIDAE
Actinophrys sol 1
SUBORDER CALAROTHORACA
FAMILY ACANTHOCYSTIDAE
Acanthocystis chaetophora 2
CLASS MASTIGOPHORA
SUBORDER ZOOFLAGELLATA
ORDER PROTOMONADINA
FAMILY PHYSOMONAIDAE
Physomonas vestita 3
SUBPHYLUM CILIOPHORA
CLASS CILIATA
SUBCLASS EUCILIATA
ORDER SPIROTRICHA
SUBORDER OLIGOTRICHA
FAMILY METOPIDAE
Bryometopus sphagni 4
SUBORDER HYPOTRICHA
FAMILY EUPLOTIDAE
Euplotes patella 5
FAMILY OXYTRICHIDAE
Steinia candens 6
ORDER HOLOTRICHA
SUBORDER HYMENOSTOMATA

FAMILY PLEURONEMATIDAE

Cyclidium glaucoma 7

Ctedoctema acanthocrypta 8

Pleuronema coronatum 9

FAMILY FRONTONIIDAE

Glaucoma scintillans 10

SUBORDER GYMNOSTOMATA

FAMILY DININIIDAE

Didinium sp. 11

FAMILY CHLAMYDODONTIDAE

Gastronauta membranacea 12

FAMILY HOLOPHRYIDAE

Holophrya simplex 13

Spasmostoma viride 14

ORDER PERITRICHA

SUBORDER MOBILIA

FAMILY URCEOLARIIDAE

Trichodina pediculus 15

FAMILY VORTICELLIDAE

Vorticella campanula 16

PHYLUM COELENTERATA

SUBPHYLUM CNIDARIA

CLASS HYDROZOA

ORDER HYDROIDA

SUBORDER ANTHOMEDUSAE

Podocoryne carnea 17

PHYLUM TROCHELMINTHES

CLASS ROTIFERA

ORDER MONOGONONTA

SUBORDER PLOIMA

FAMILY BRACHIONIDAE

Brachionus urceolaris	18
Colurella obtusa	19
Dipleuchlanis propatula	20
Keratella cochlearis	21
" valga	22
Lepadella patella	23
Notholca sp.	24
Platyias quadricornis	25

FAMILY LECANIDAE

Monostyla quadridentata	26

FAMILY SYNCHAETIDAE

Polyarthra sp.	27

SUBORDER FLOSCULARIACEAE

FAMILY TESTUDINELLIDAE

Filinia longiseta	28

PHYLUM PLATHELMINTHES

CLASS TURBELLARIA

ORDER RHABDOCOELA (RHABDOCOELIDA)

SUBORDER NOTANDROPORA (CATENULIDA)

Stenostomum tenuicaudatum	29

PHYLUM ARTHROPODA

SUBPHYLUM MANDIBULATA

CLASS CRUSTACEA

SUBCLASS ENTOMOSTRACA

ORDER COPEPODA

SUBORDER GYMNOPLEA (CALANOIDA)

Acartia clausi	30

FAMILY CALANIDAE

Calanus sp. 31

Megacalanus princeps 32

FAMILY DIAPTOMIDAE

Diaptomus kenai 33

" reighardi 34

Eodiaptomus japonicus 35

Sinodiaptomus Sarsi 36

FAMILY CENTROPAGIDAE

Osphranticum labronectum 37

Pseudodiaptomus marinus 38

SUBORDER PODOPLEA

FAMILY CYCLOPIDAE

Cyclops bicolor 39

" strenus 40

" vernalis 41

" vicinus 42

ORDER PHYLLOPODA (BRANCHIOPODA)

SUBORDER CLADOCERA (ANOMOPODA)

FAMILY CHYDORIDAE

Alona monocantha 43

Chydorus sphaericus 44

Oxyurella longicaudis 45

FAMILY DAPHNIDAE

Ceriodaphnia megops 46

" rigaudi 47

Daphnia rosea 48

Moina brachiata 49

" macrocopa 50

Simocephalus vetulus 51

FAMILY SIDIDAE

Sida crystallina 52

----- (addition) -----
Order Copepoda

Mesocyclops Leuckarti 53

SUBCLASS MALACOSTRACA

ORDER AMPHIPODA

SUBORDER GAMMAROIDEA

FAMILY GAMMARIDAE

Gammarus sp. 54

CLASS INSECTA

SUBCLASS EUENYOMATA

ORDER DIPTERA

SUBORDER NEMATOCERA (OLIGONEURA)

FAMILY CHIRONOMIDAE

Chironomus dorsalis 55

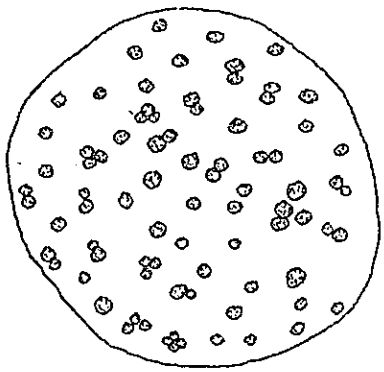
VI. PLATES

PHYTO-PLANKTON ---------- 174 species

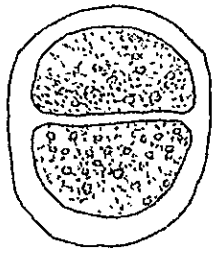
ZOO-PLANKTON ---------- 55 species

PHYTO-PLANKTON

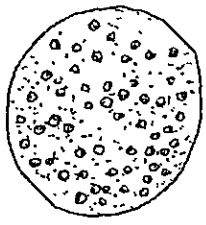
PHYLUM 1. CYANOPHYTA



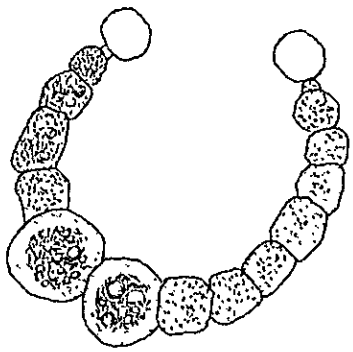
1. *Aphanocapsa pulchra*



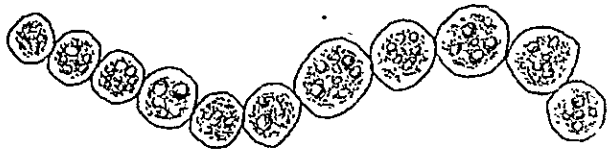
2 *Chroococcus giganteus*



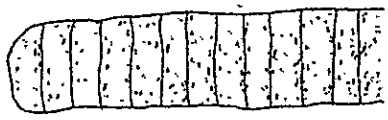
3 *Coelosphaerium kuetzingianum*



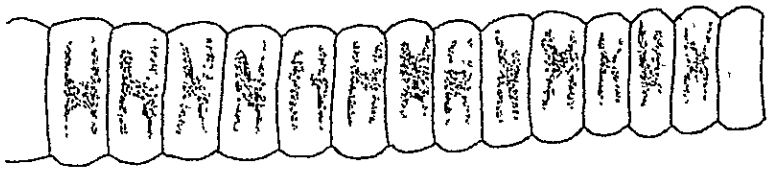
5. *Anabaenopsis Elenkinii*



4 *Anabaenopsis circinalis*

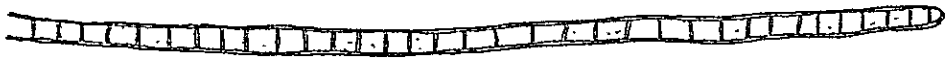


6. *Oscillatoria limosa*



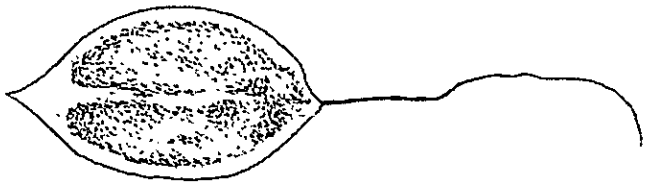
7. *Oscillatoria princeps*

8. *Spirulina princeps*

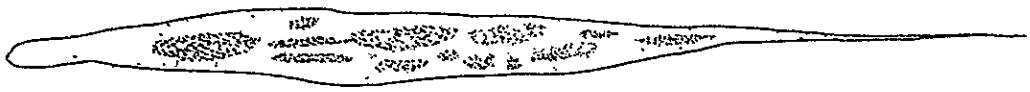


9. *Symploca muscorum*

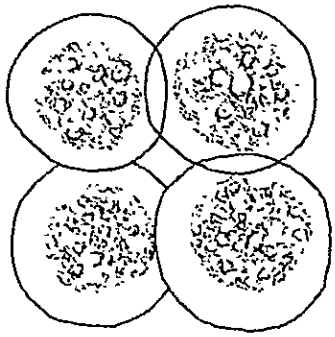
PHYLUM 2. EUGLENOPHYTA



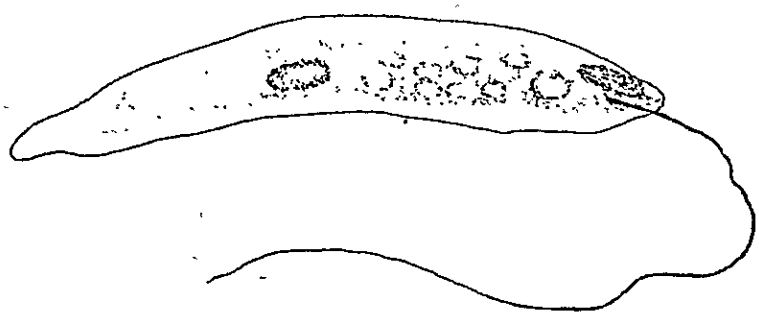
10. *Cryptoglena pigra*



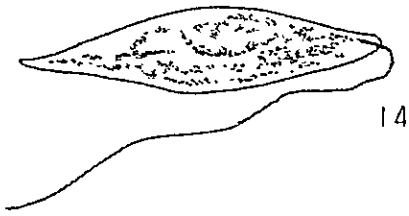
11 *Euglena acus*



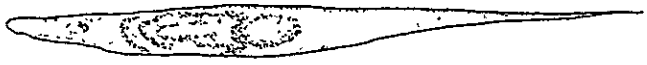
12 *Euglena clara*



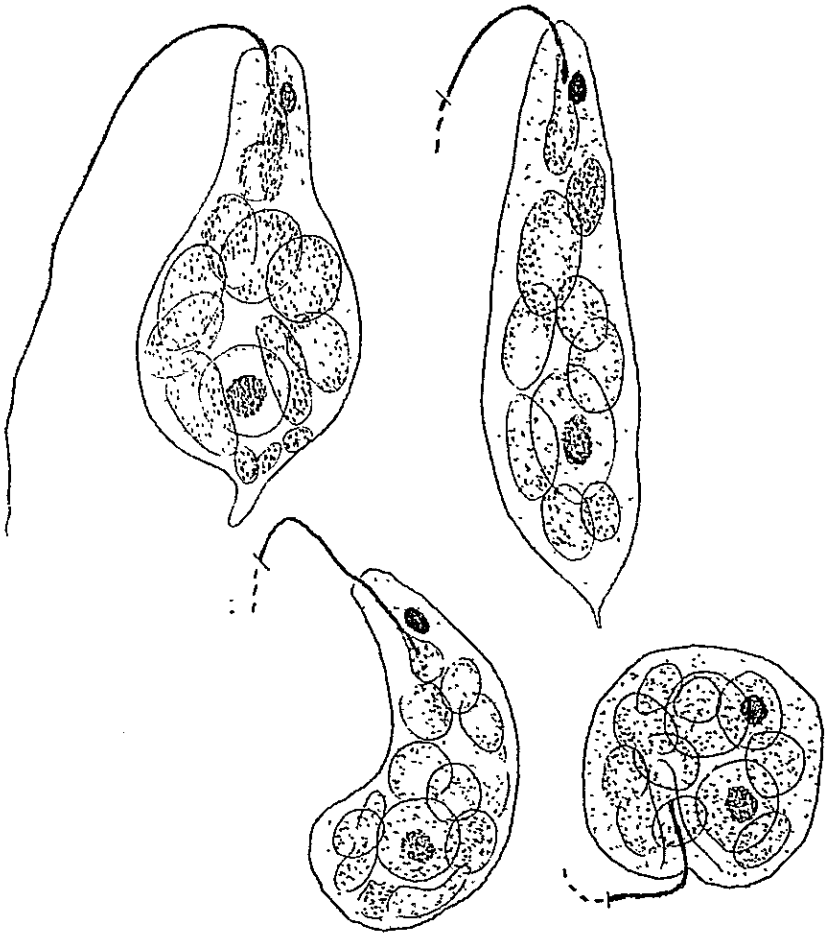
13 *Euglena Deses*



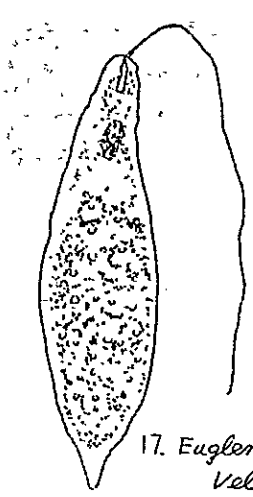
14. *Euglena geniculata*



15. *Euglena hyalina*

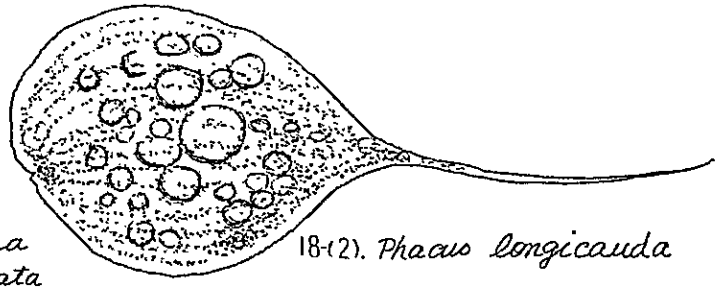


16. *Euglena pseudoviridis*



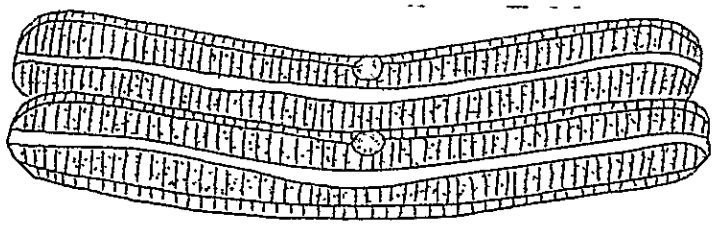
17. *Euglena Velata*

18 *Phacus lismorensis*

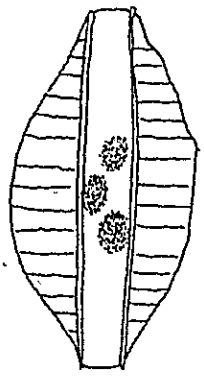


18-(2). *Phacus longicauda*

PHYLUM # 3 CHRYSOPHYTA

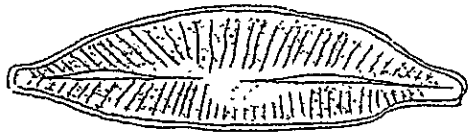


19 *Achnanthes coarctata*

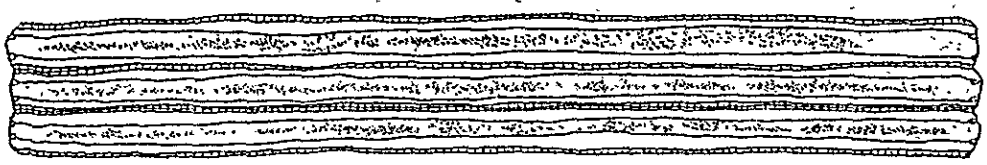


21 *Amphora ovalis*

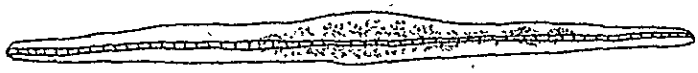
22 *Cymbella parva*



23 *Cymbella naviculiformis*

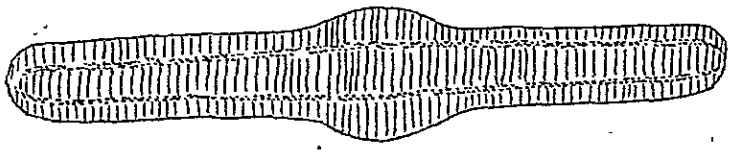


24 *Bacillaria paradoxa*

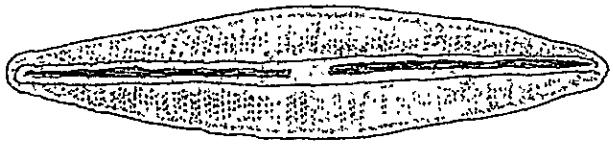


25 *Bacillaria par. var. tumidula*

26 *Epithemia sp.*

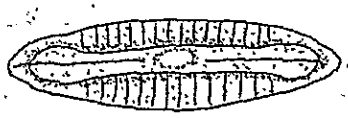


26-(2)-174 *Rhopalodia gibba*



27 *Frustulia rhomboides*

28. *Gyrosigma kutzingii*



29. *Mastogloica Dansii*

33. *Navicula radiosa*

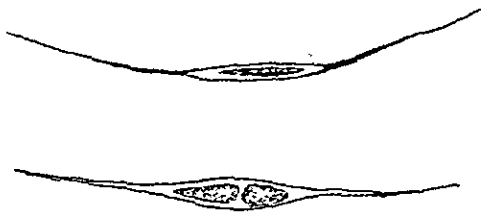
30. *Navicula lanceolata*

34. *Navicula rhynchocephala*

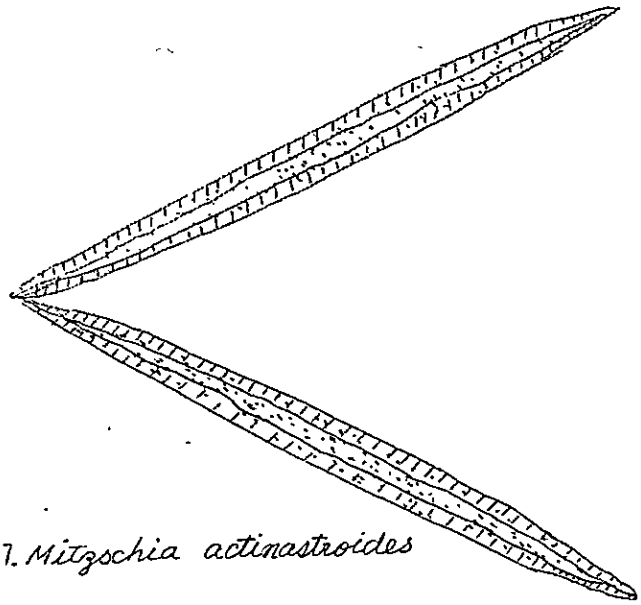
31. *Navicula placentula*

35. *Pinnularia sp.*

32. *Navicula pla. var. rostrata*

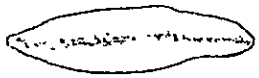


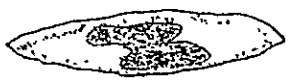
36 *Nitzschia acicularis*



37. *Mitzschia actinastroides*

38. *Mitzschia closterrium*



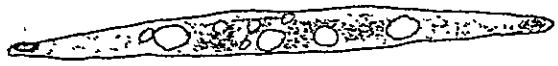


40. *Mitzschia kutzingiana*

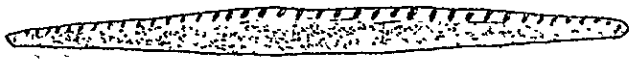
39. *Mitzschia fonticola*

41. *Nitzschia nyassensis*

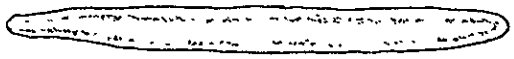
42. *Nitzschia philippinarum*



43. *Nitzschia seriata*

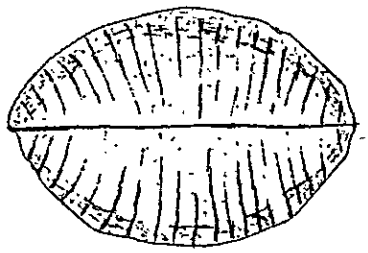


44. *Nitzschia subrostrata*

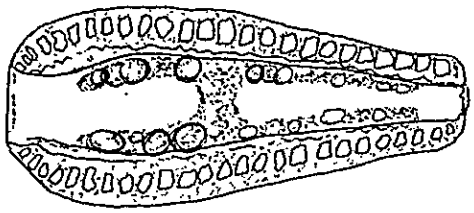


45. *Nitzschia sp.*

46. *Hantzschia amphioxys*

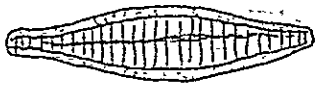


47. *Surirella robusta*

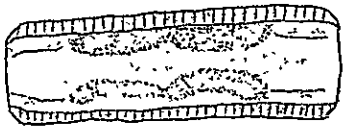


48. *Surirella splendida*

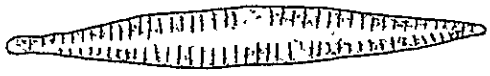
49. *Dialoma linearis*



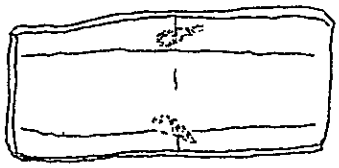
54. *Fragilaria construens*



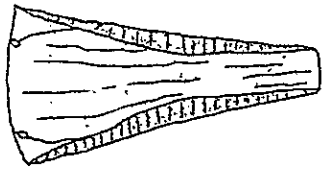
50. *Diatoma vulgare*



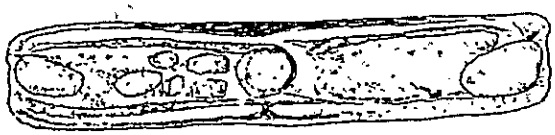
56 *Fragilaria lanceolata*



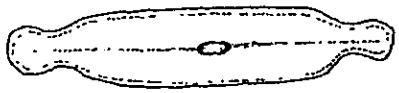
51. *Diatomella balfouriana*



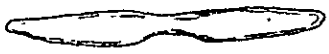
57. *Fragiralia pinnata*



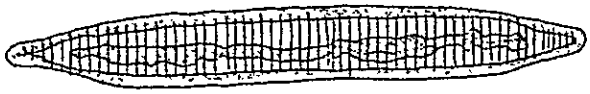
52. *Rhabdonema adriaticum*



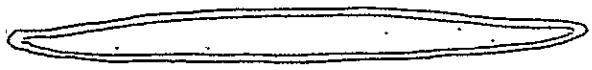
58. *Fragilaria vir. var. capitata*



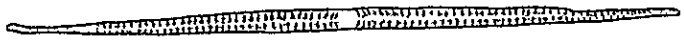
53. *Fragilaria capucina*



59 *Fragilaria virescens*

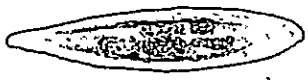


60. *Synedra affinis*



61. *Synedra acus*

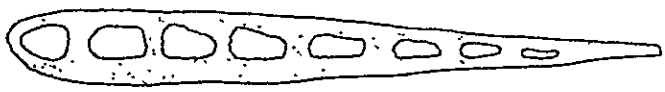
62. *Synedra cunningtoni*



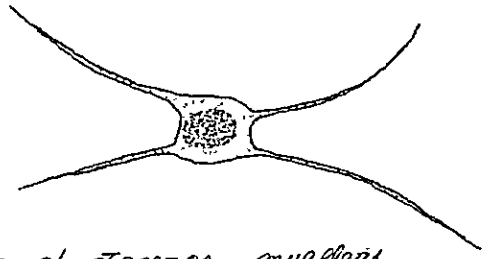
63. *Synedra fasciculate*

64. *Synedra lanceolata*

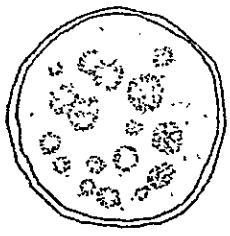
65 *Synedra utermohli*



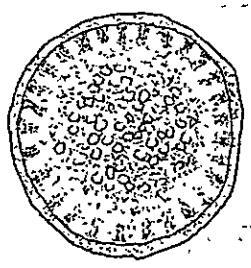
66. *Meridion circulare*



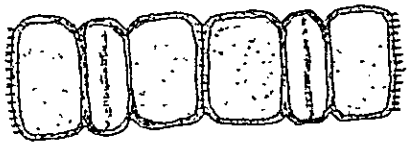
67. *Chaetoceros muelleri*



68. *Cyclotella kutzingiana*

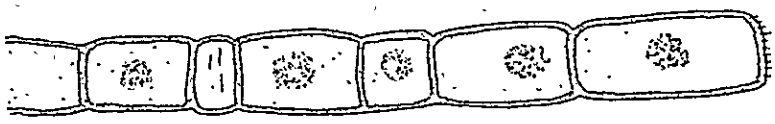


69. *Melosira Agassizii*

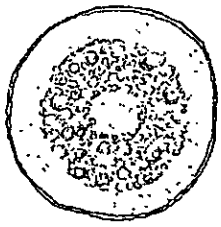


70. *Melosira distans*

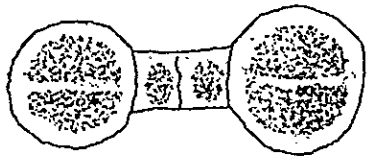
71. *Melosira granulata*



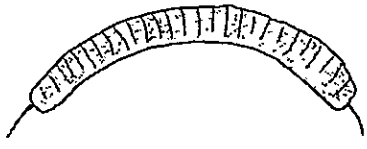
73. *Melosira isolandica*



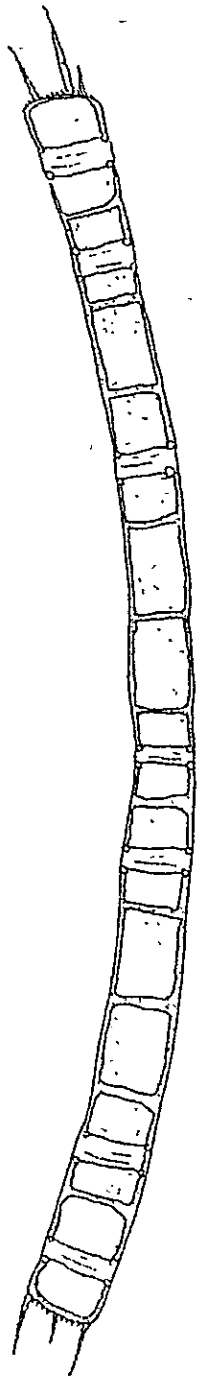
74. *Melosira malayensis*



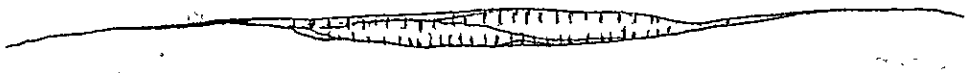
75. *Melosira varians*



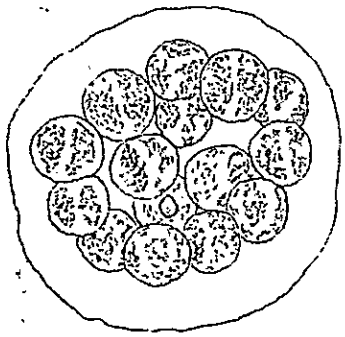
76 *Melosira sp.*

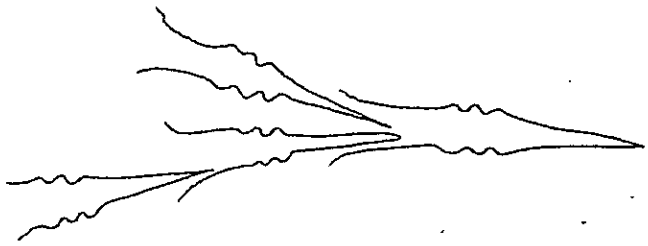


72 *Melosira gra. var valida*



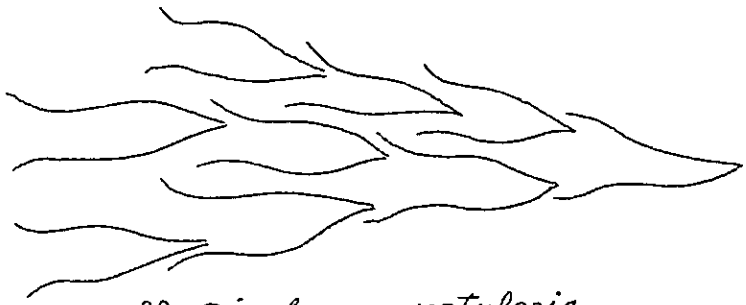
77. Rhizosalenia longiseta



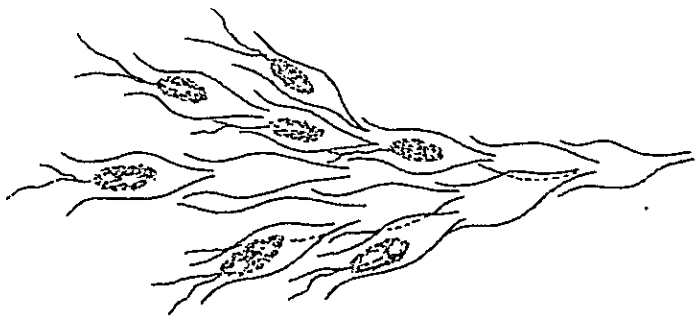


79. Dinobryon divergens

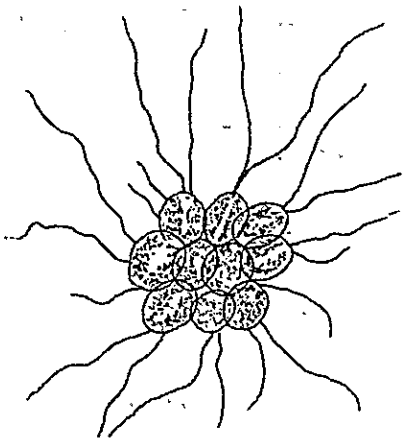
78. Chrysocapsa planctonica



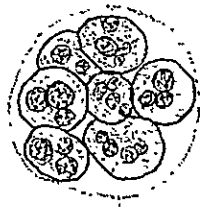
80. Dinobryon sertularia



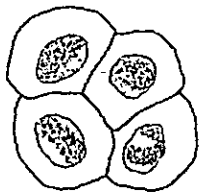
80 "



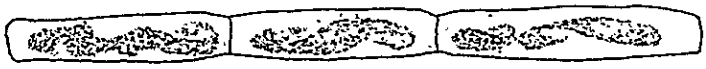
81. *Volvochrysis globosa*



82. *Botrydiopsis arrhiza*

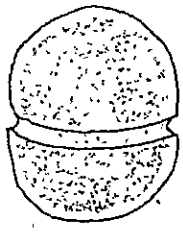


83. *Merismogloca composita*

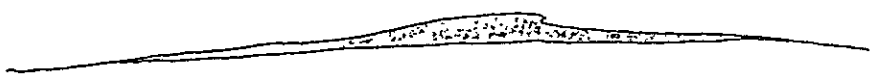


84. *Fribonema angustissimum*

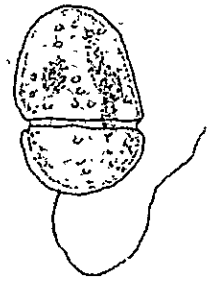
PHYLUM 4. PYRROPHYTA



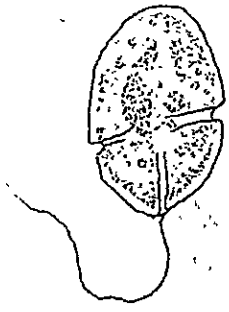
85. *Hypnodinum sphaericum*



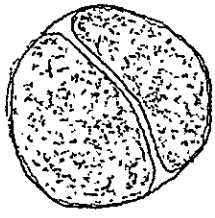
86. *Ceratium hirundinella*



87. *Glenodinium steinii*

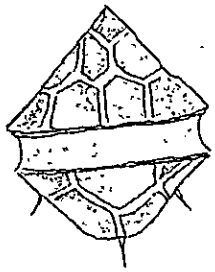


88. *Glenodinium uliginosum*

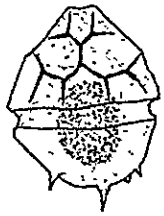


89. *Hemidinium nasutum*

91. *Peridinium africaum*

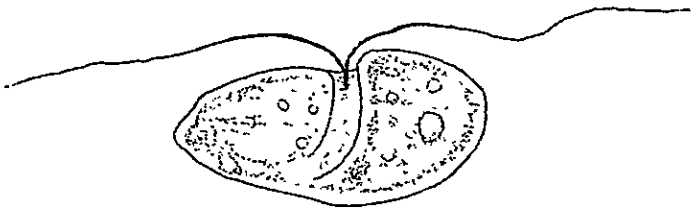


90. *Peridinium aciculiferum*



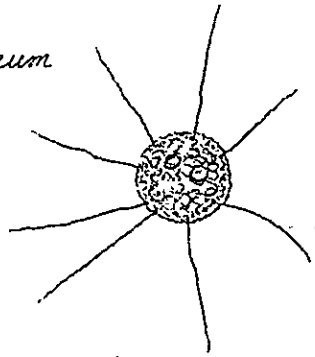
92. *Peridinium spiniferum*

93. *Peridinium striolatum*

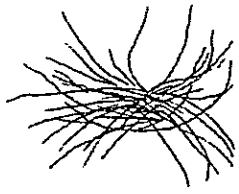


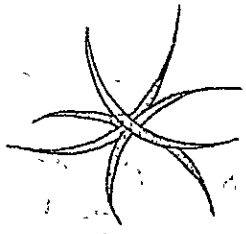
94. *Protochrysis phaeophycearum*

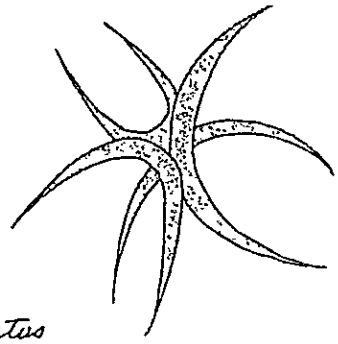
PHYLUM 5. CHLOROPHYTA



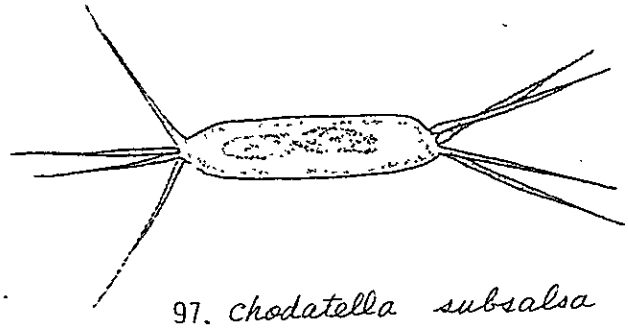
95. *Acanthosphaera Zachariasi*



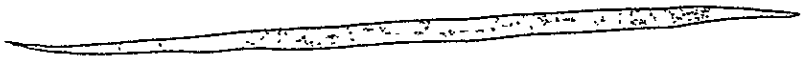




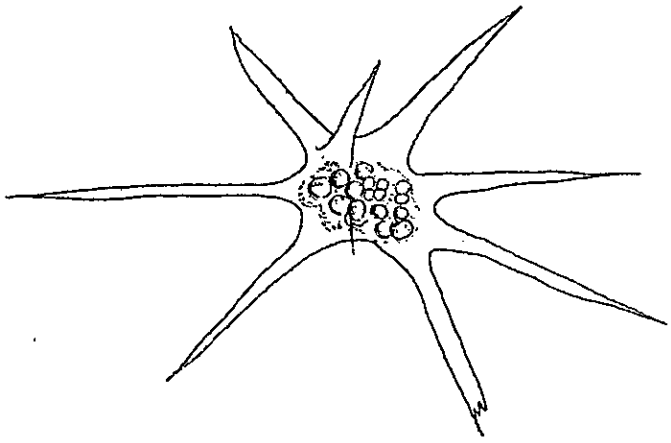
96. *Ankistrodesmus falcatus*



97. *Chodatella subsalsa*

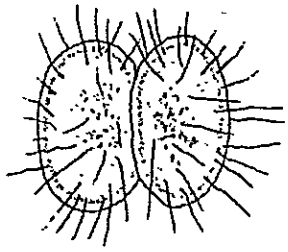


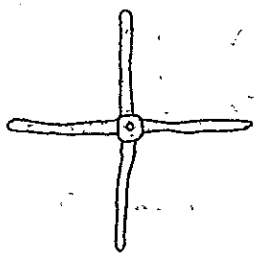
98. *Closteriopsis longissima*



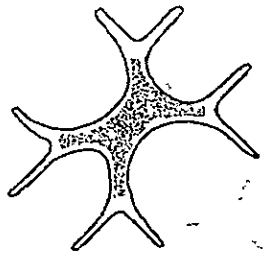
99. *Echinosphaerella limnetica*

100. *Franceia tuberculata*

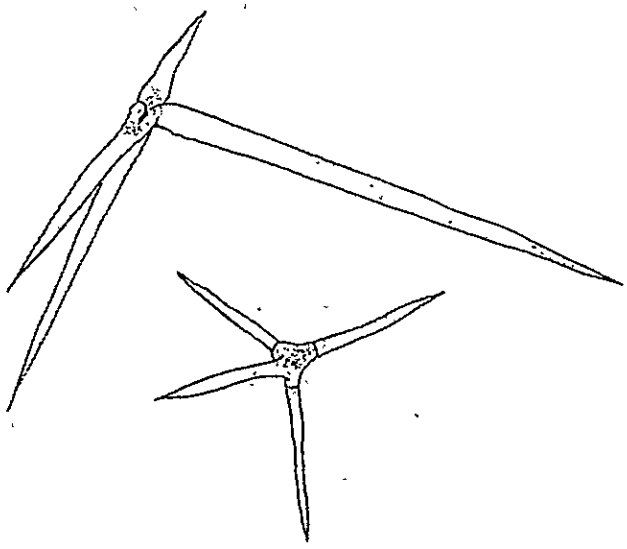




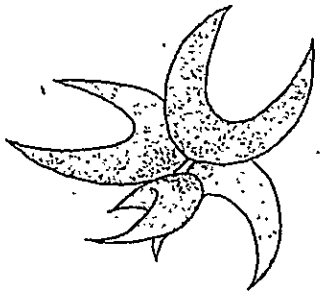
101. *Pachycladon umbrinum*



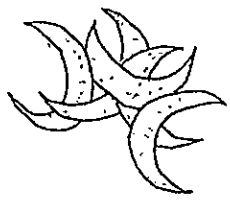
102. *Tetraedron lobatum*



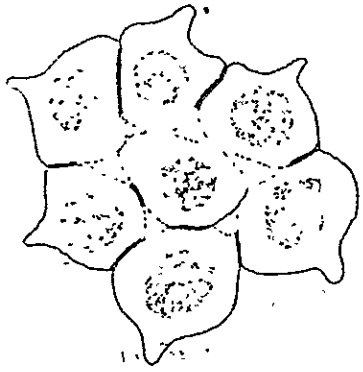
103. *Treubaria crassispina*



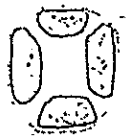
104. *Selenastrum Bibraianum*



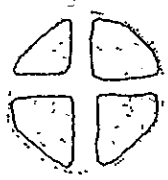
105. *Selenastrum gracile*



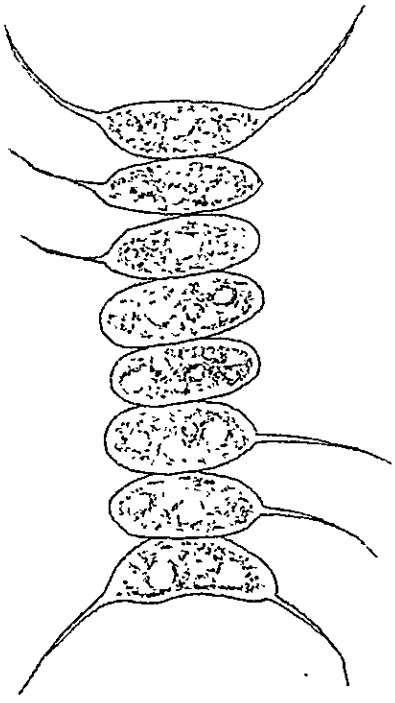
106. *Coelastrum cambricum*



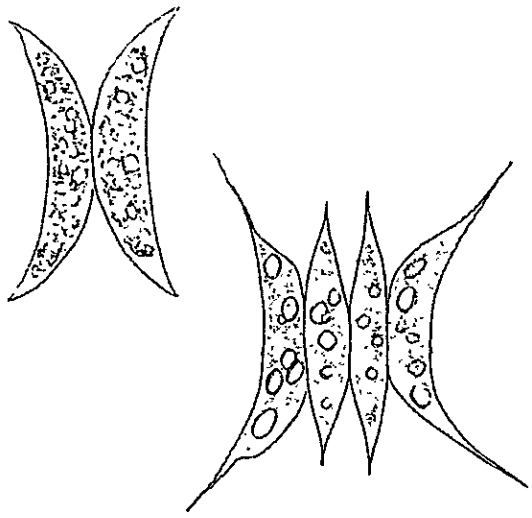
107. *Crucigenia fenestrata*



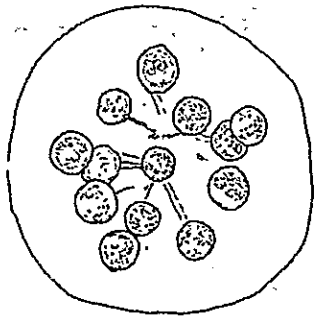
108. *Crucigenia quadrata*



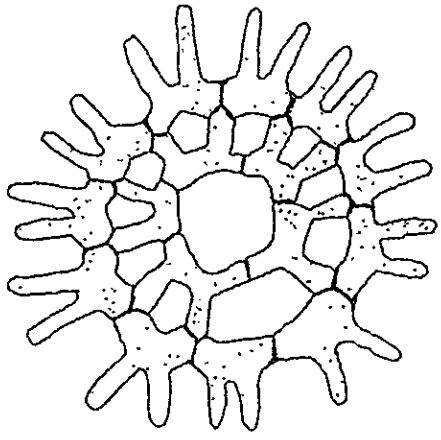
109. *Scenedesmus armatus*



110. *Scenedesmus dimorphus*

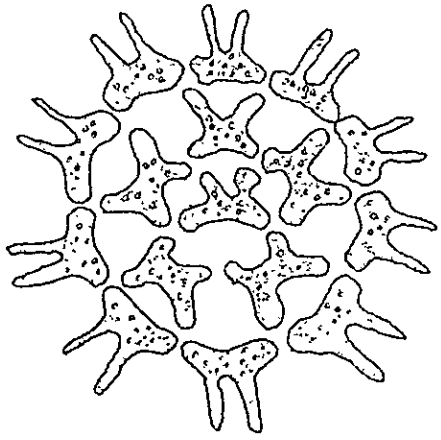


111. *Dictyosphaerium pulchellum*



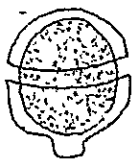
113. *Pediastrum biradiatum*

112. *Schroederia setigera*

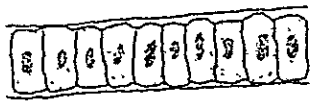


114. *Pediastrum* sp.

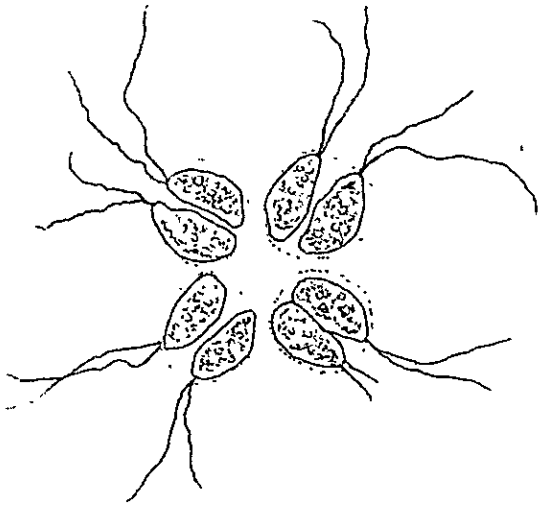
115. *Rhizoclonium hieroglyphicum*



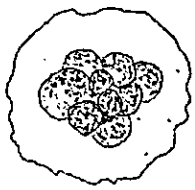
116. *Oedogonium crispum*



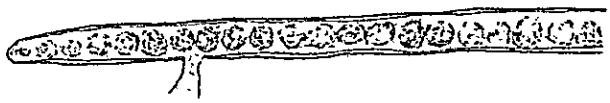
117. *Schizogonium murale*



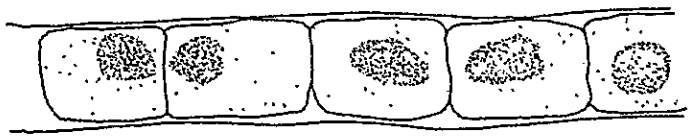
118. *Palmella miniata*



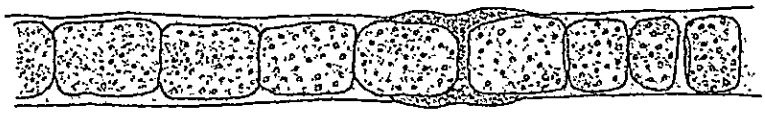
119. *Sphaerocystis schroeteri*



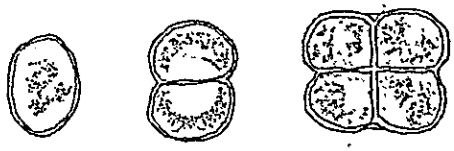
120. *Geminella interrupta*



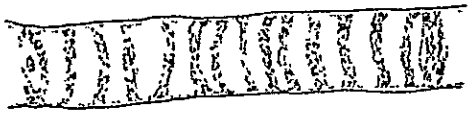
121. *Hormidium subtile*



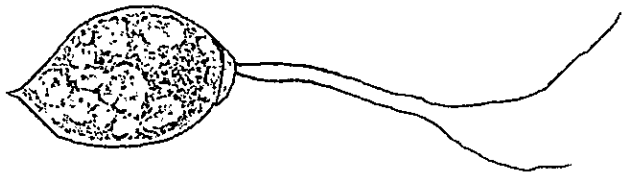
122. *Microspora amoena*



123. *Protococcus viridis*

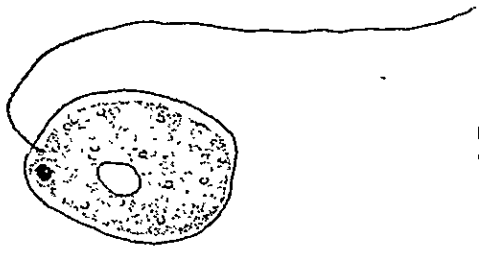


124. *Sphaeroplea annulina*

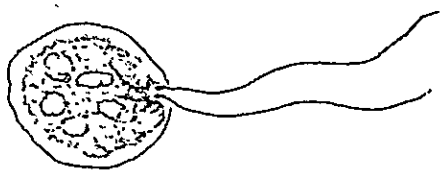


126. *Chlamydomonas completa*

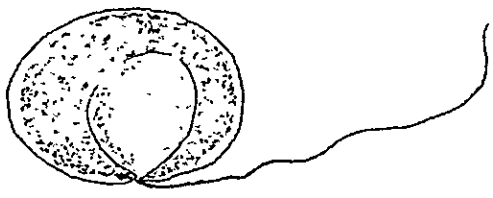
125. *Chlamydomonas chrysomonadis*



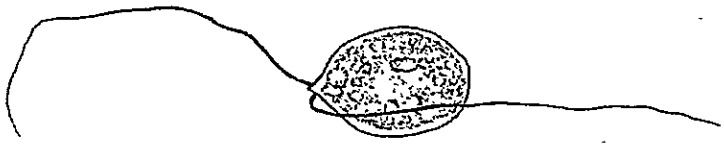
127. *Chlamydomonus inhabilus*



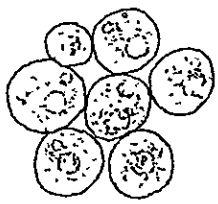
128. *Clamydomonus kuildensis*



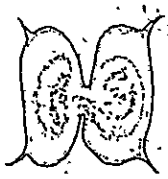
129 *Chlamydomonus praecox*



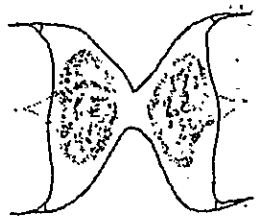
130. *Chlamydomonus Rodhai*



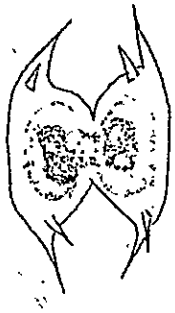
131 *Pandorina minodi*



132. *Arthrodesmus apiculatus*



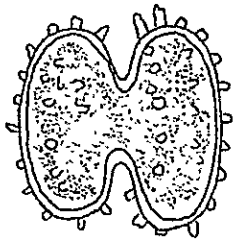
133. *Arthrodesmus arcuatus*



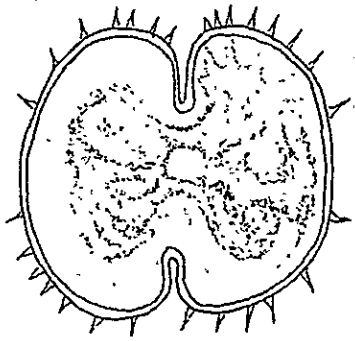
134. *Arthrodesmus curvatus*

135. *Closterium moniliforme*

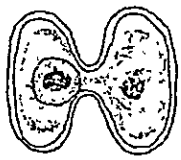
136. *Closterium setaceum*



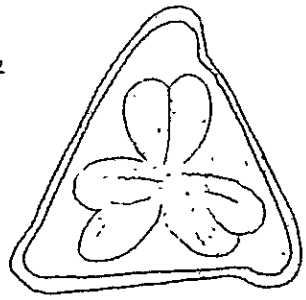
137. *Cosmarium exasperatum*



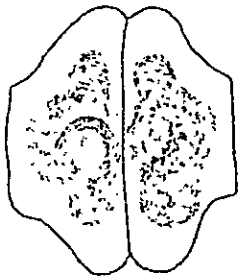
141. *Cosmarium praemorsum*



138. *Cosmarium indentatum*

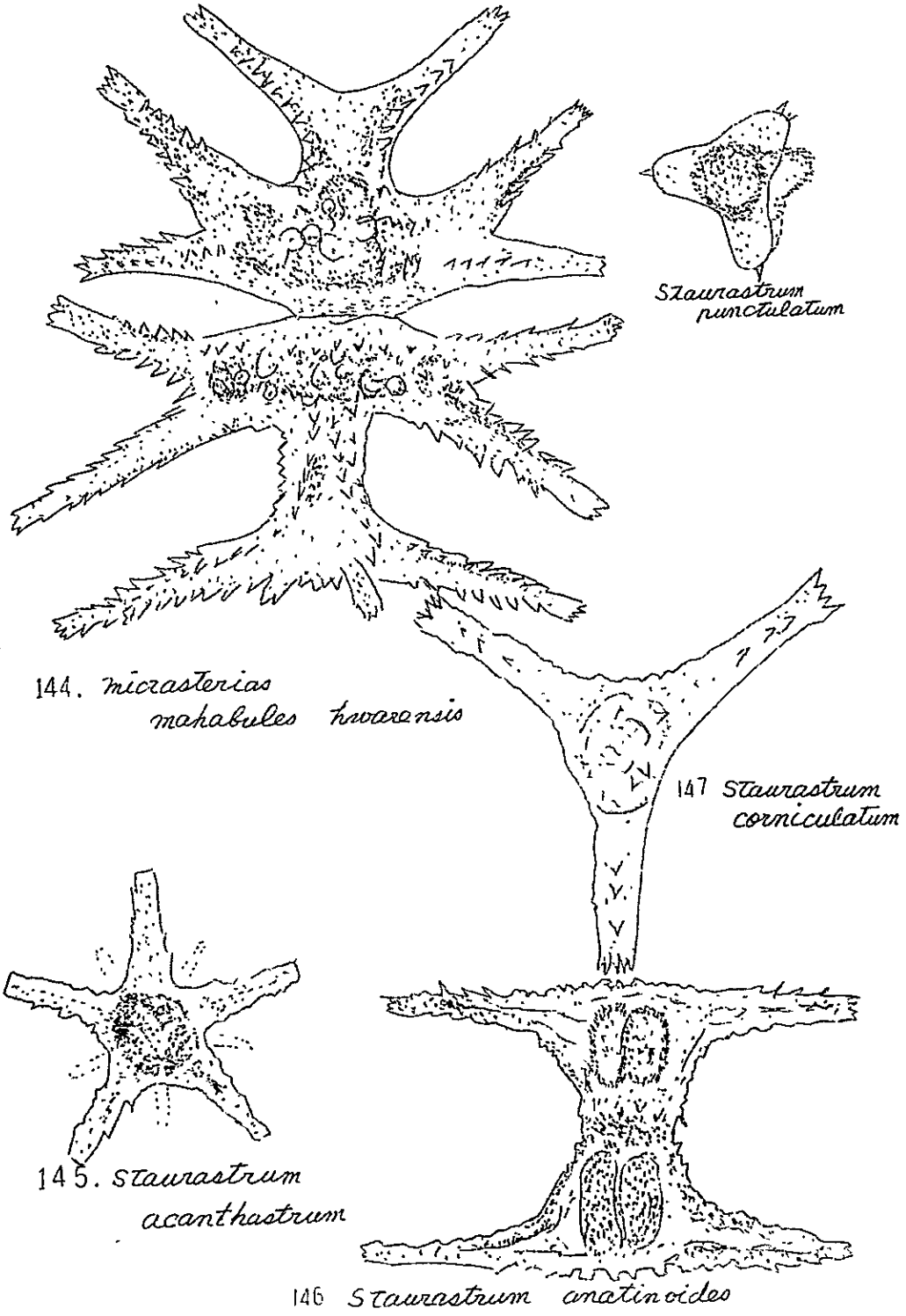


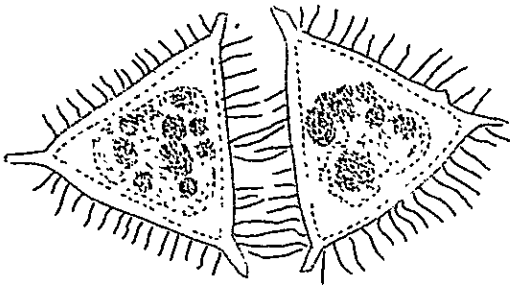
142. *Desmidium bengalicum*



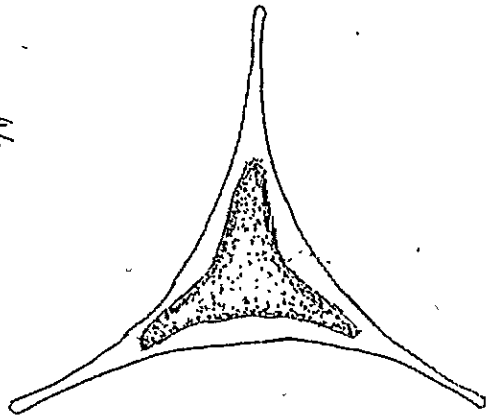
139. *Cosmarium nymannianum*

140. *Cosmarium phaseolus*

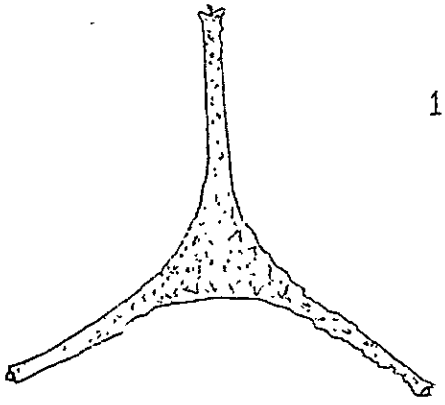

Staurastrum punctulatum
144. micrasterias mahabules hwaransis
147 Staurastrum corniculatum
145. Staurastrum acanthastrum
146 Staurastrum anatinoides



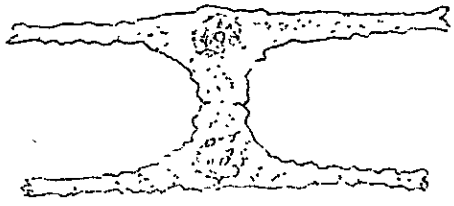
147. Staurastrum wildemanii



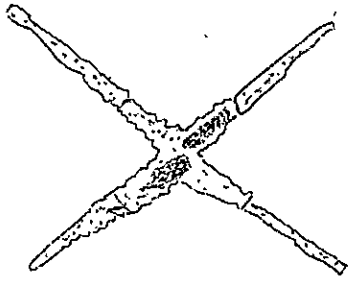
150. Staurastrum megacanthum



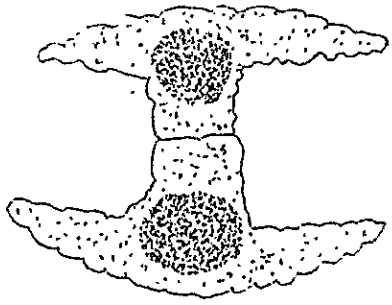
151. Staurastrum orbiculare



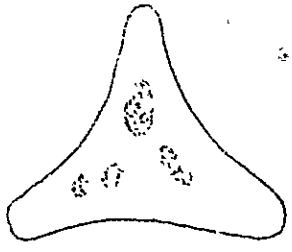
148. Staurastrum gracile



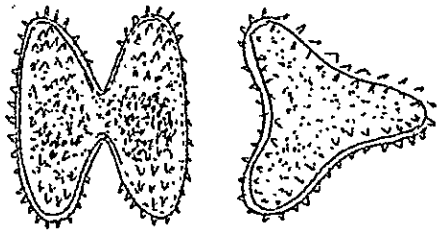
152. Staurastrum playfairi



149. Staurastrum indentatum

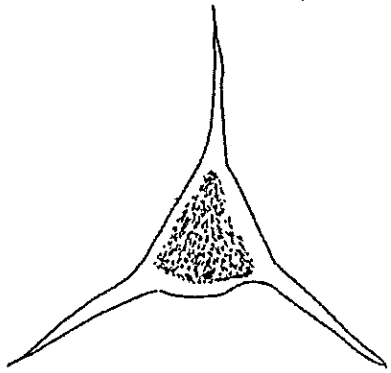


153. Staurastrum pseudopachyrhynchum

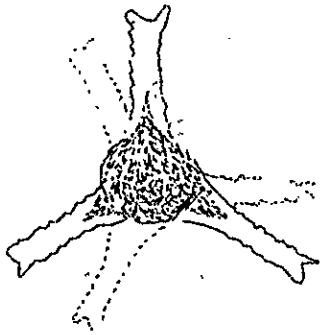


154. Staurastrum punctulatum

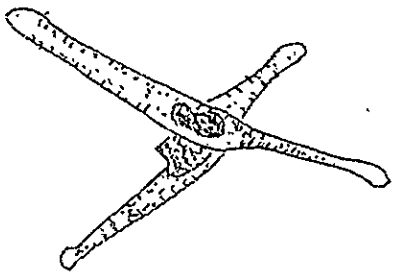
158. Staurastrum variabile



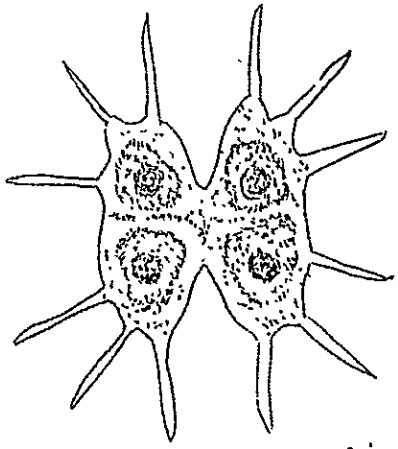
155. Staurastrum kaiimantanum



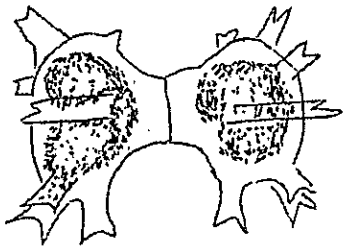
159. Staurastrum wolterreckii



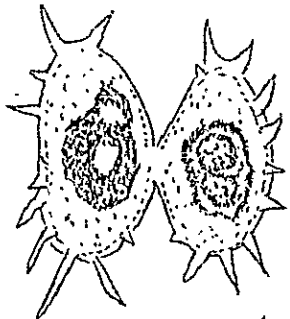
156. Staurastrum smithii



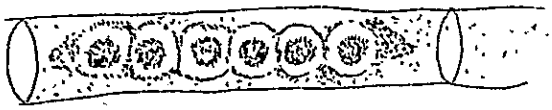
160. Xanthidium sexmamillatum



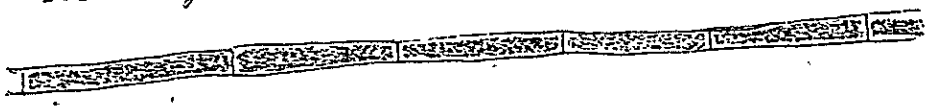
157. Staurastrum tohopekaligense



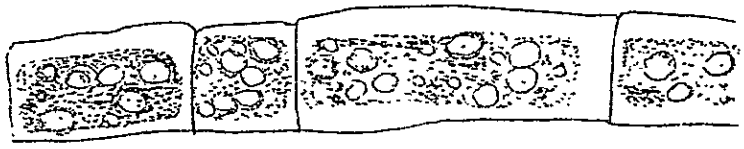
161. Xanthidium burkillii



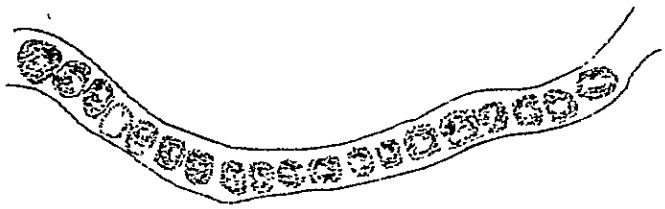
162. *Mougeotia viridis*



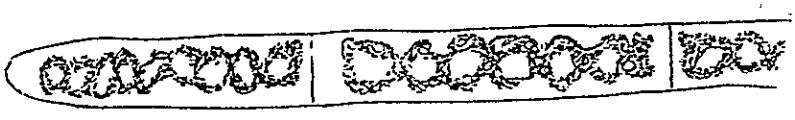
163. *Mougeotia sp.*



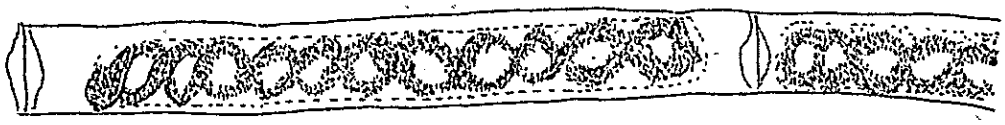
164. *Mougeotiopsis calospora*



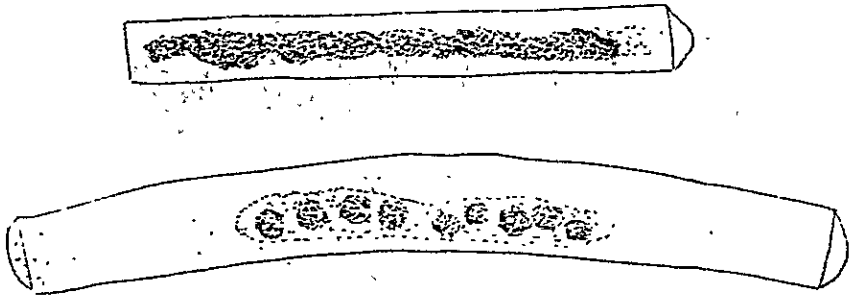
165. *Pleurodiscus purpureus*



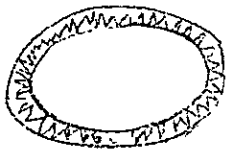
166. *Spirogyra ahmadabadensis*



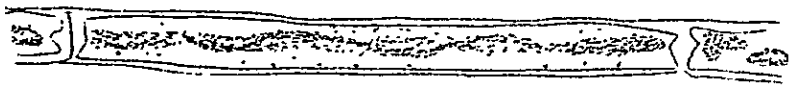
167. *Spirogyra ionia*



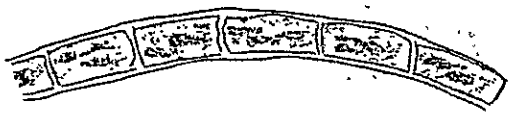
168. *Spirogyra prolifica*



169. *Spirogyra protecta* (Zygote)

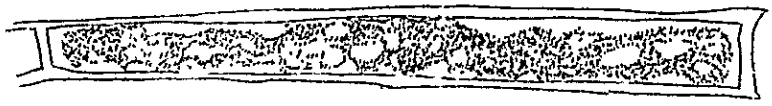


170. *Spirogyra pseudocylindrica*



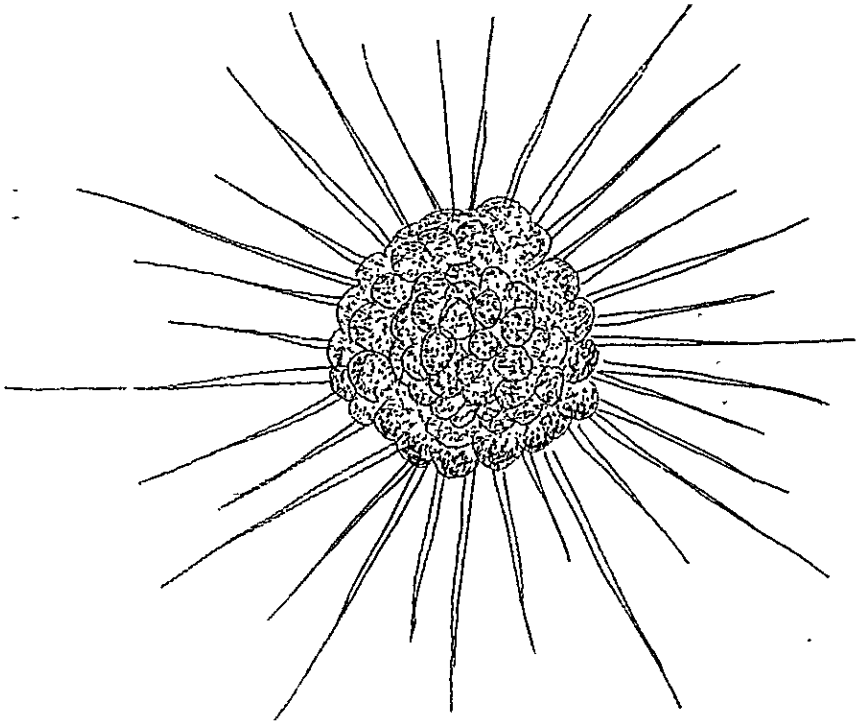
171 *Zygnema insigne*

172. *Spirogyra azygospora*

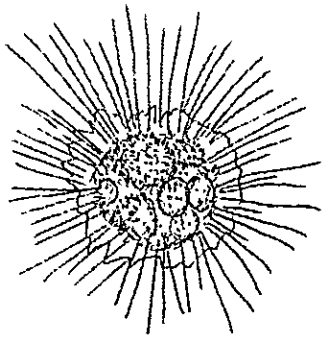


Spirogyra ionia var.

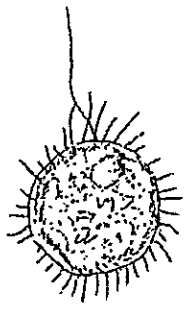
ZOO — PLANKTON



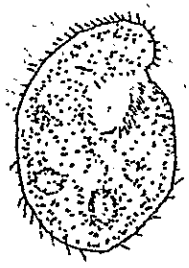
1. *Actinophrys sol*



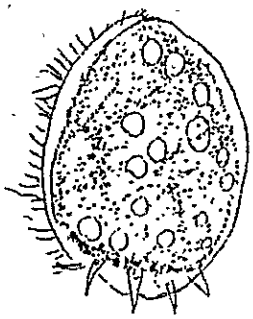
2. *Acanthocystis chaetophora*



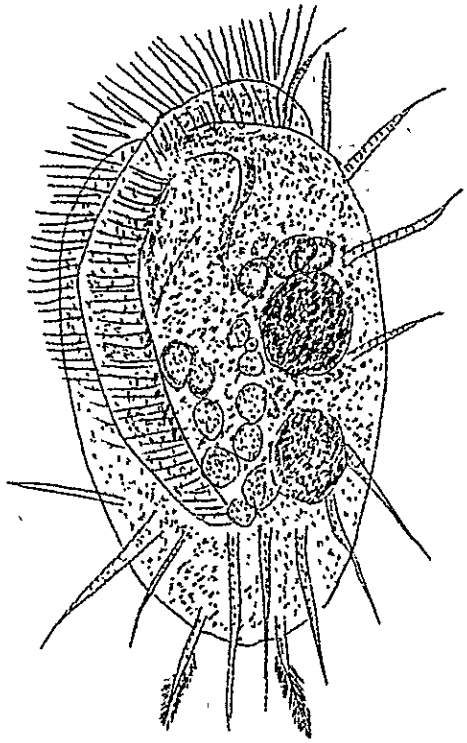
3 *Physomonas vestita*



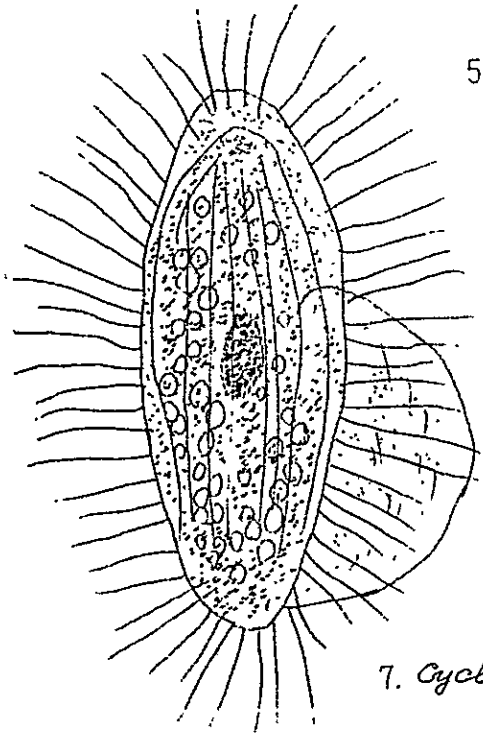
4. *Bryometopus sphagni*



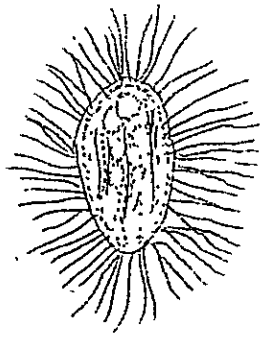
6. *Steinia candence*



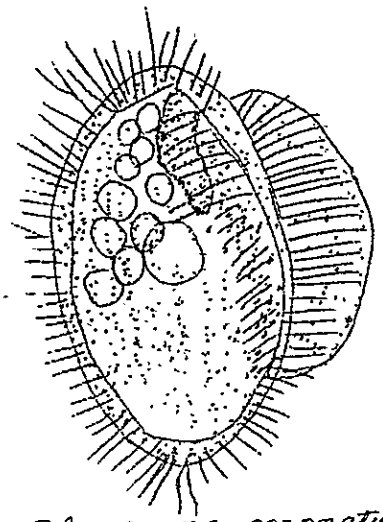
5. *Euplotes patella*



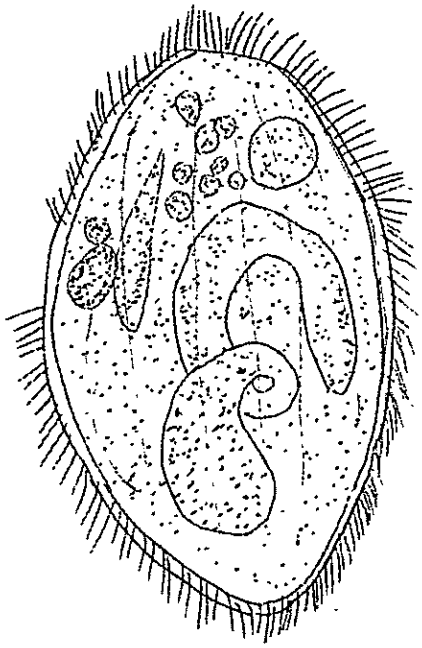
7. *Cyclidium glaucoma*



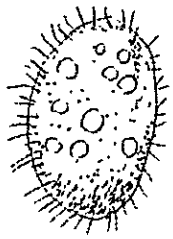
8. *Ctedoctema acanthocrypta*



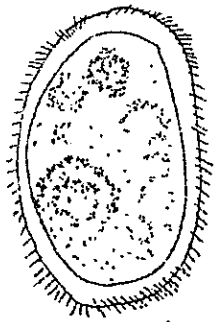
9. *Pleuronema coronatum*



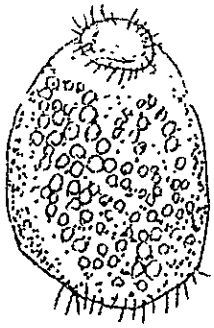
12. *Gastronauta membranacea*



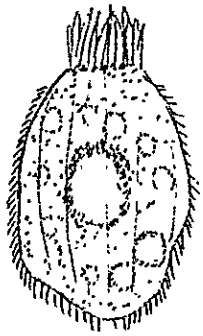
10. *Glaucoma scintillans*



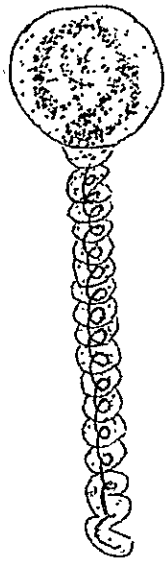
13. *Holophrya simplex*



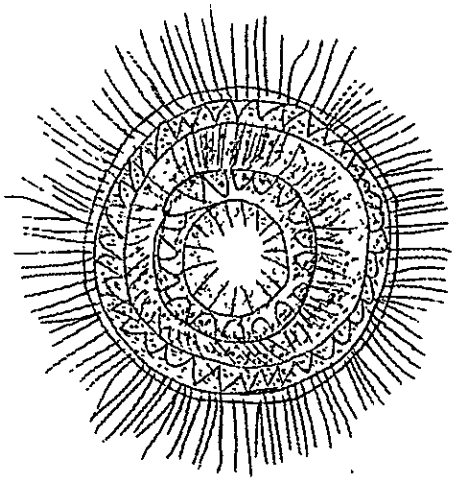
11. *Didinium sp.*

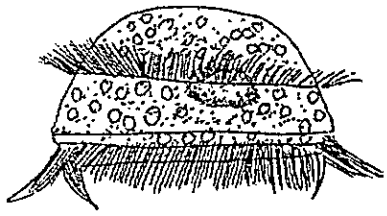


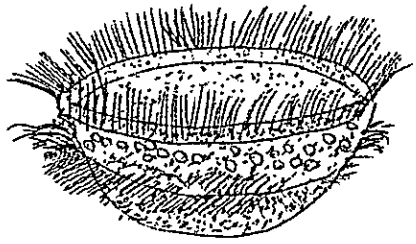
14. *Spasmostoma viride*



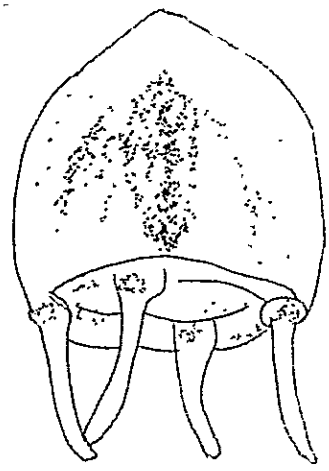
16. *Vorticella campanula*







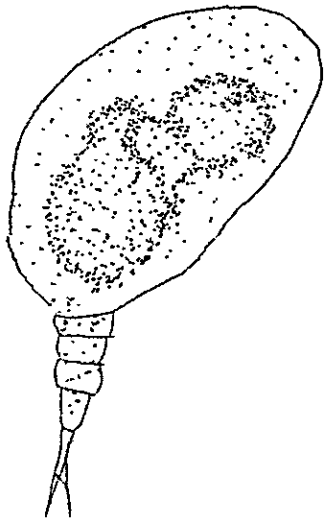
15. *Trichodina pediculus*



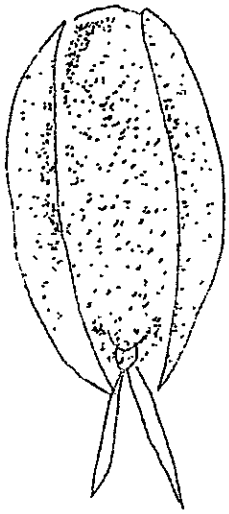
17. *Podocoryne carnea*

PHYLUM 2 COELENTERATA

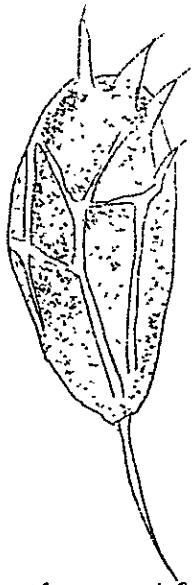
18. *Brachionus urceolaris*



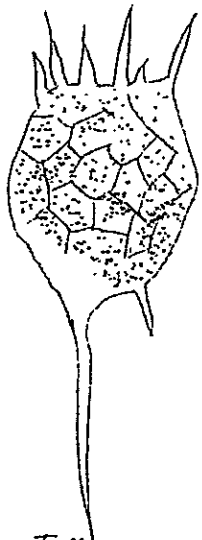
19. *Colurella obtusa*



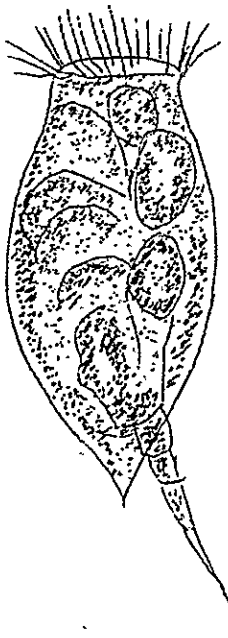
20. *Diplecuchlanis*



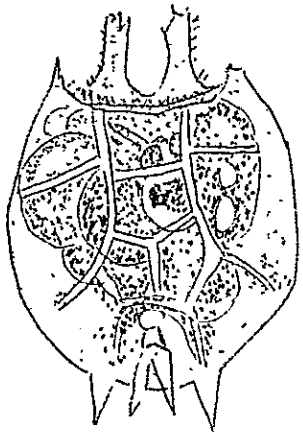
21. *Keratella cochlearis*

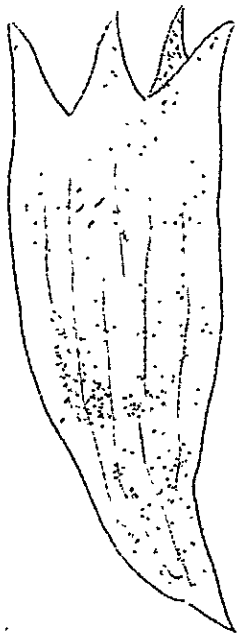


22. *Keratella valga*



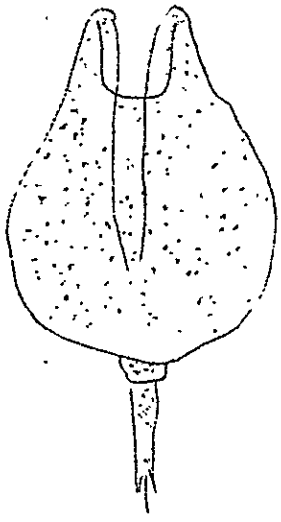
23. *Lepadella patella*





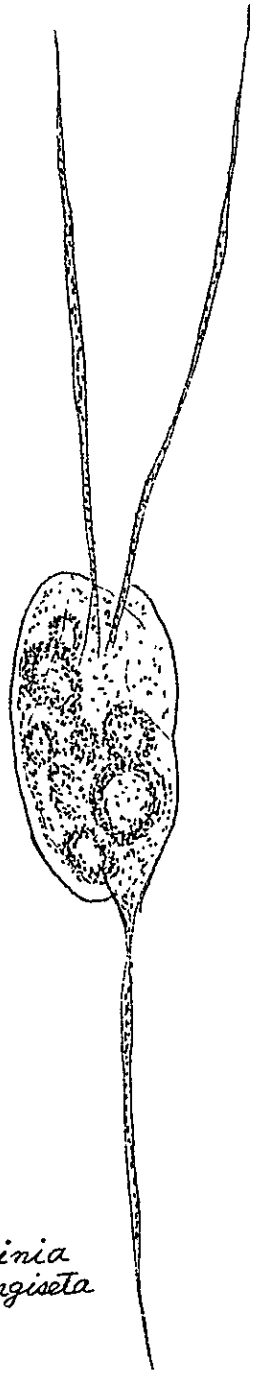
24. *Notholca* sp.

25. *Platyias quadricornis*

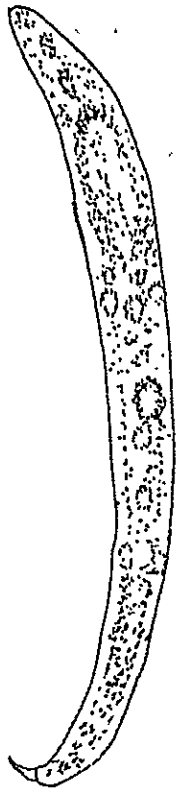


26 *Monostyla quadridentata*

27. *Polyarthra* sp.

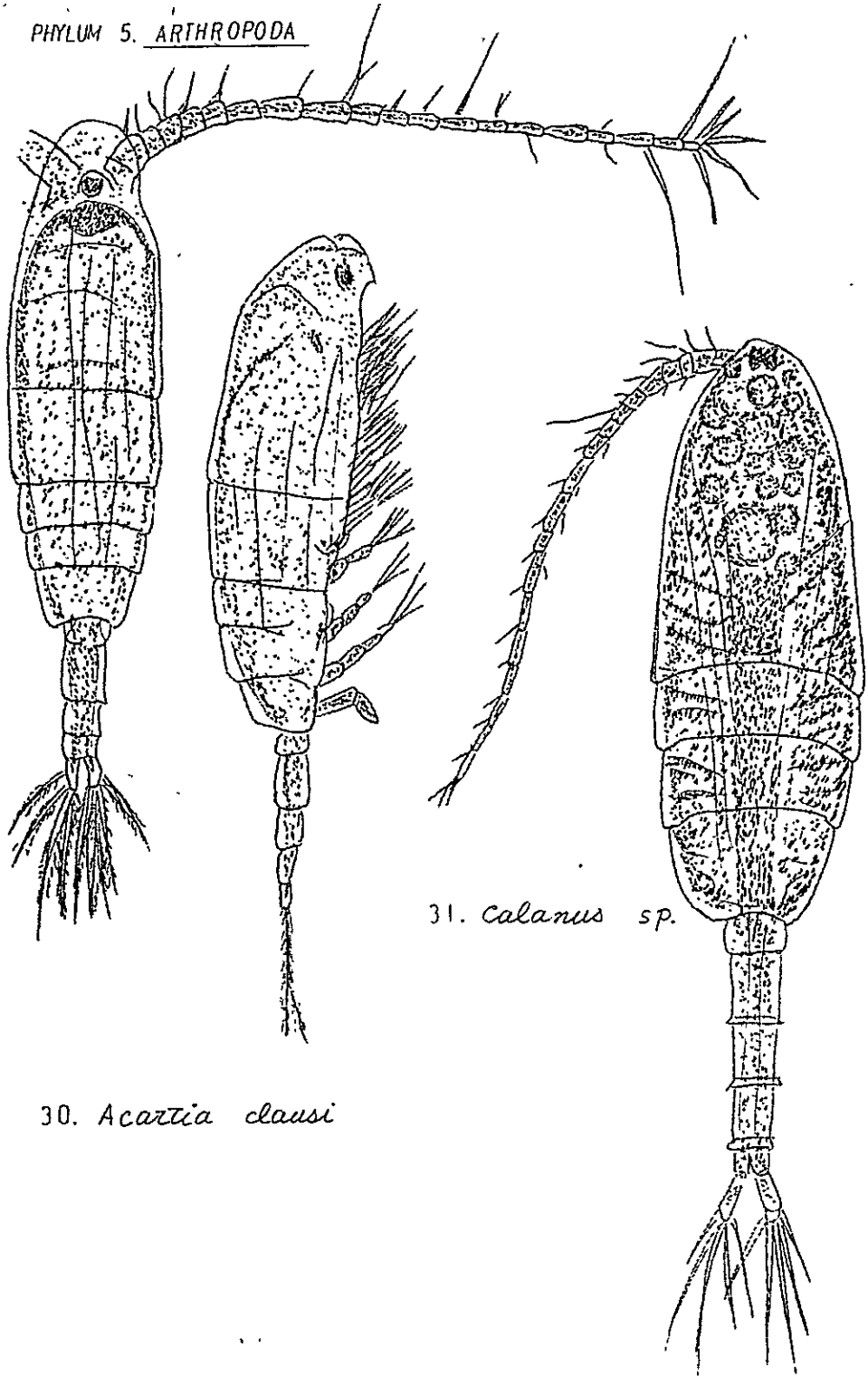


28. *Filinia longiseta*



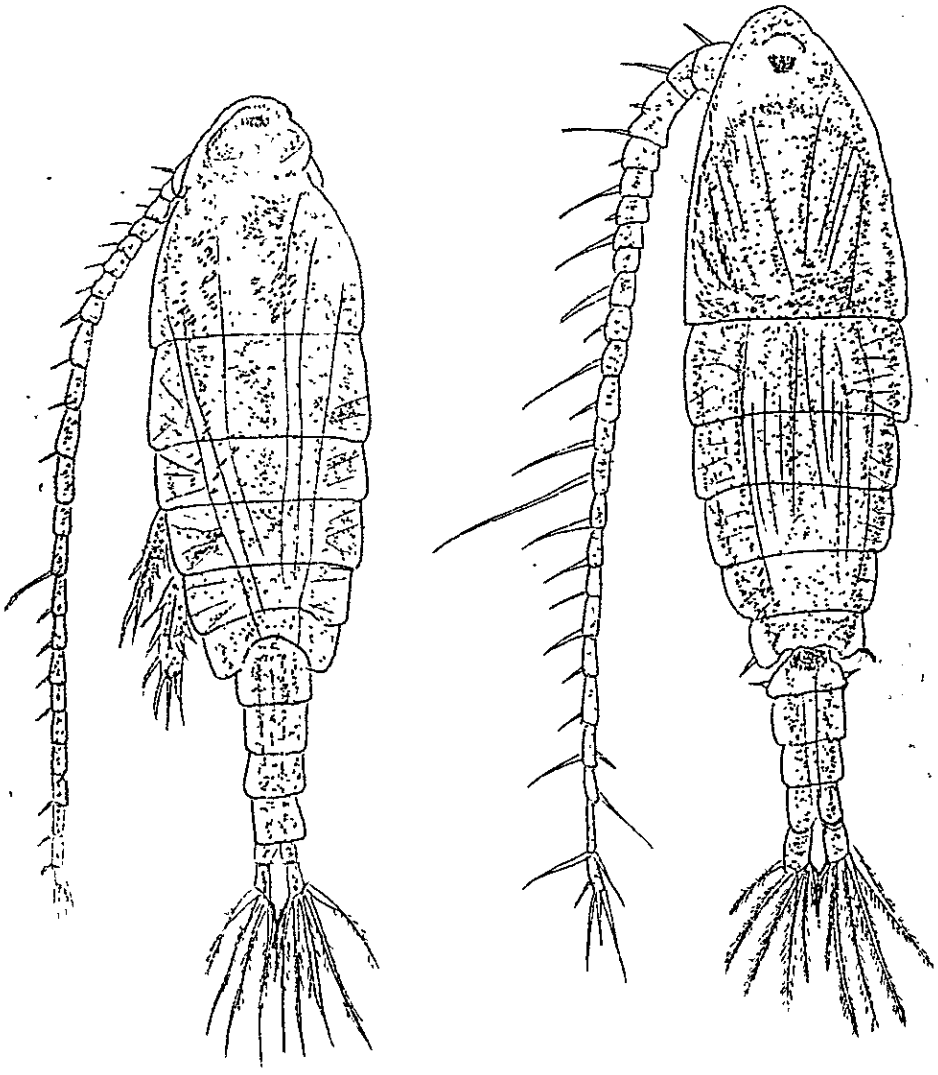
29. *Stenostomum tenuicaudatum*

PHYLUM 5. ARTHROPODA

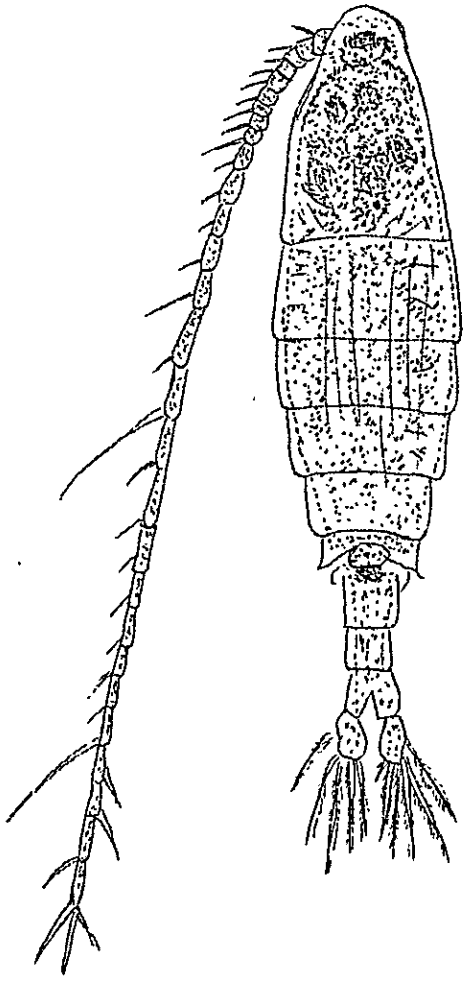


30. *Acartia clausi*

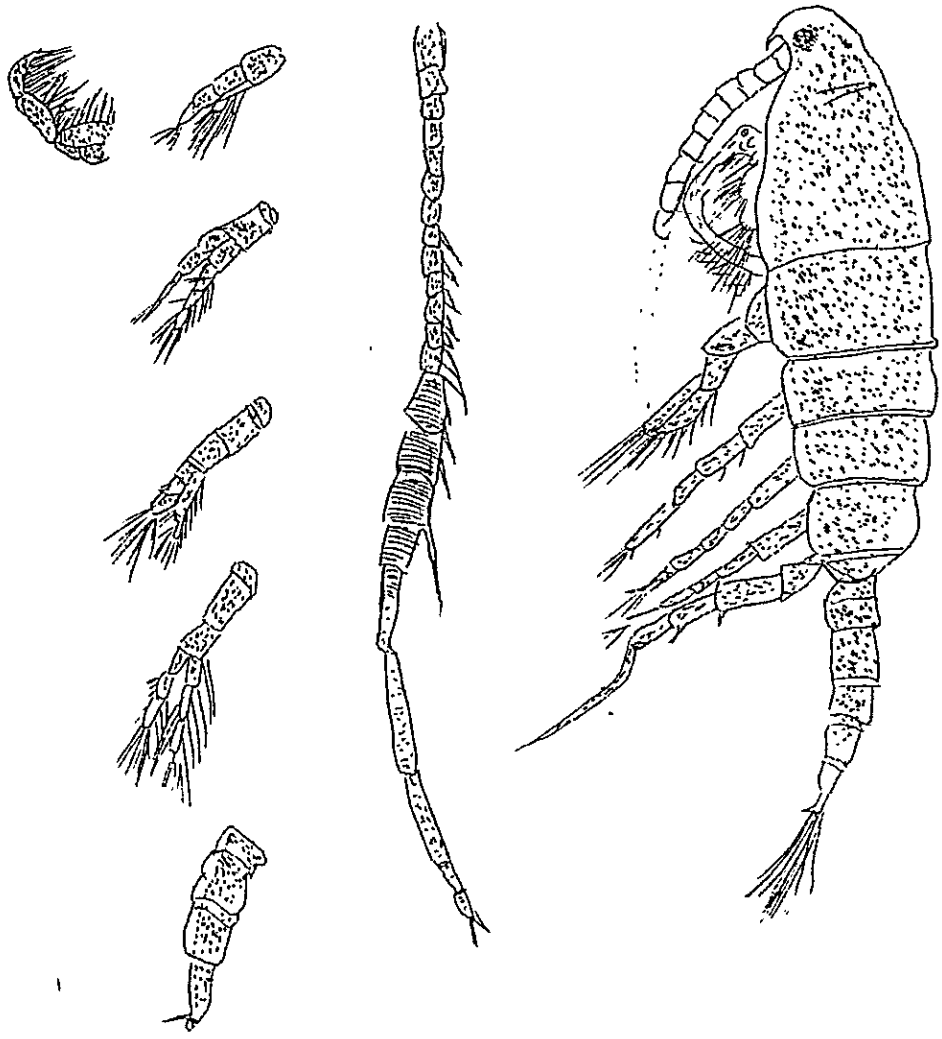
31. *Calanus sp.*



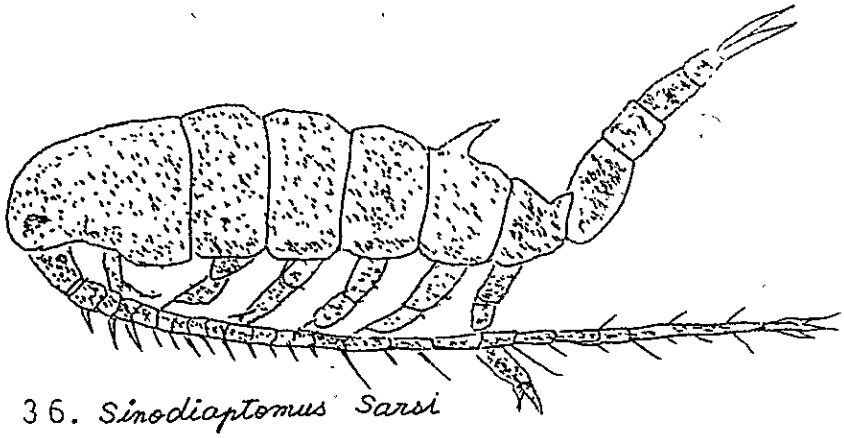
32 *Megacalanus princeps* 33. *Diaptomus kenai*



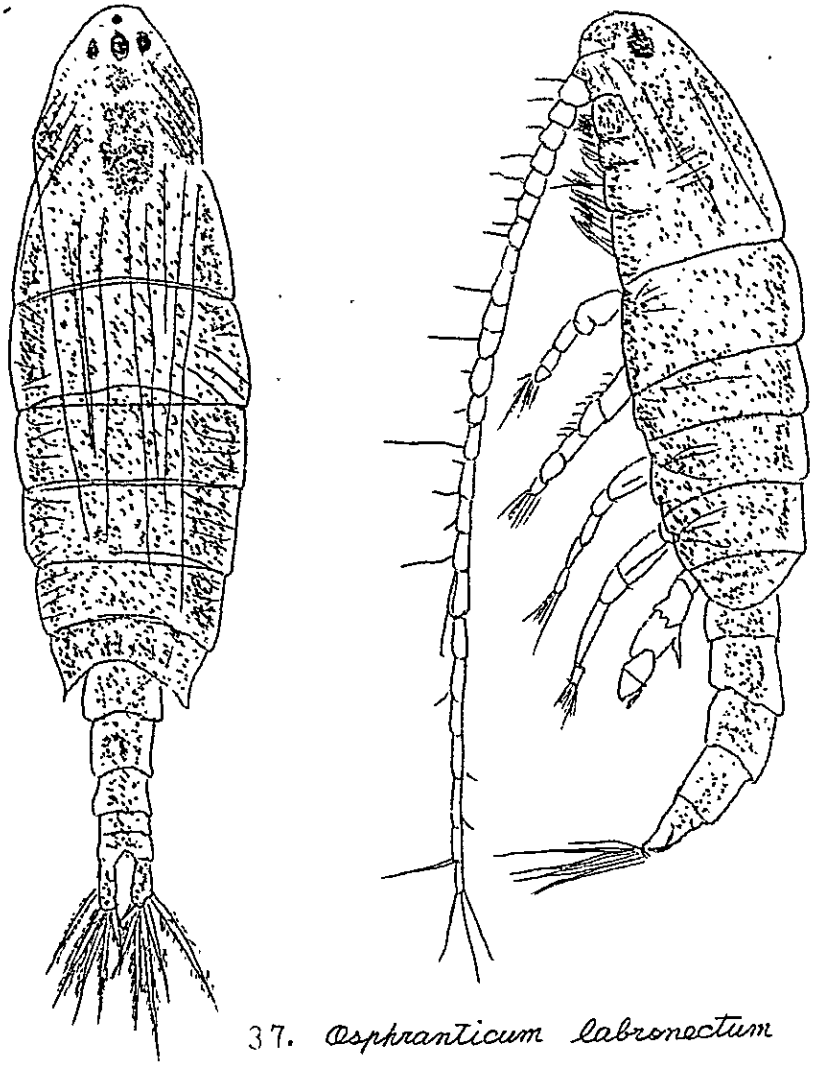
34. *Diaptomus reighardi*



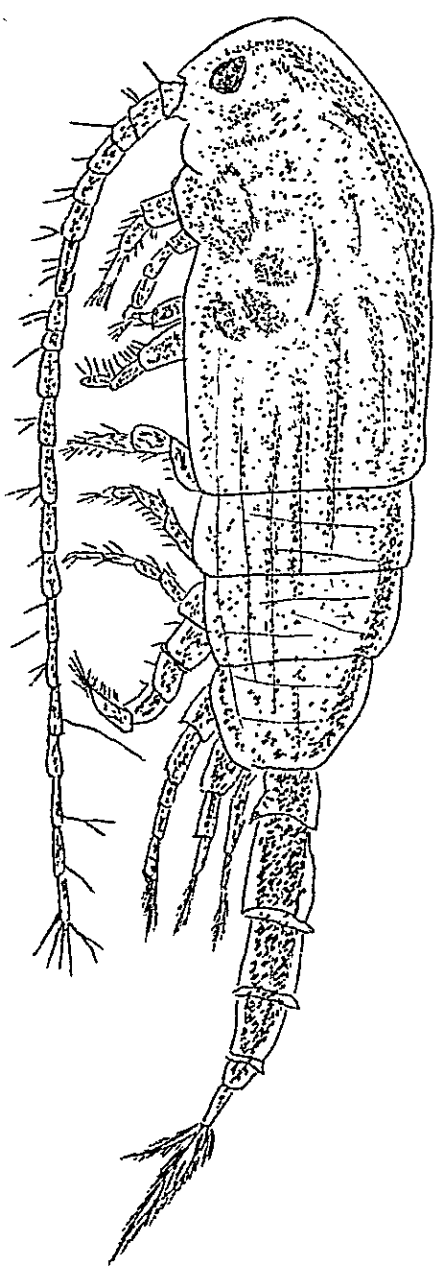
35. *Eodiaptomus japonicus*



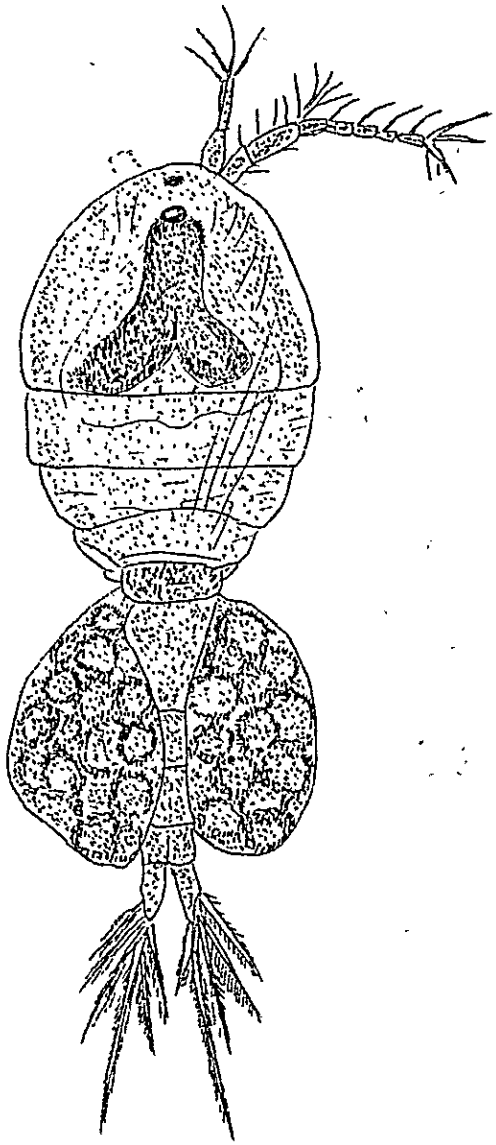
36. *Sinodiaptomus Sarsi*



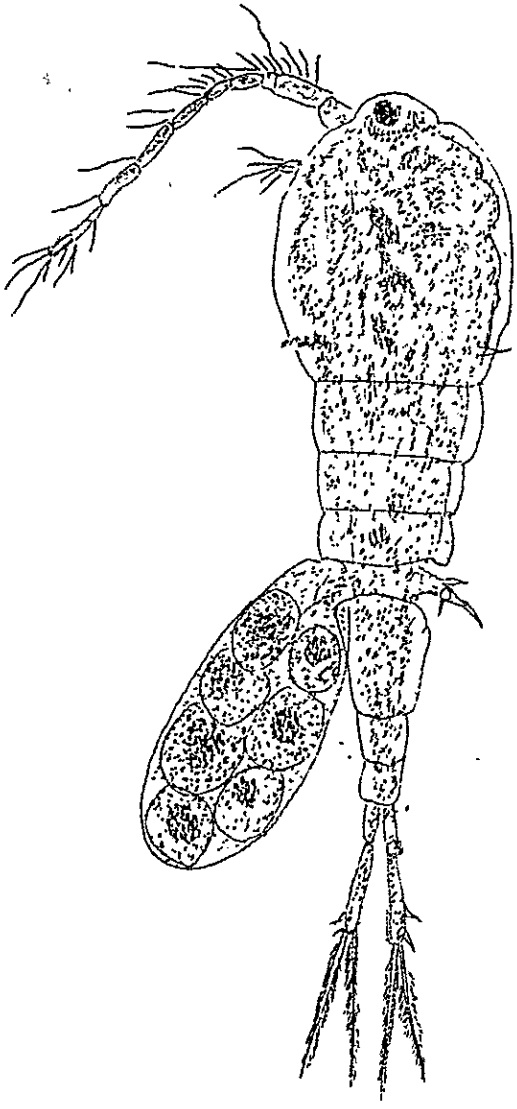
37. *Asplanchnicum labronectum*

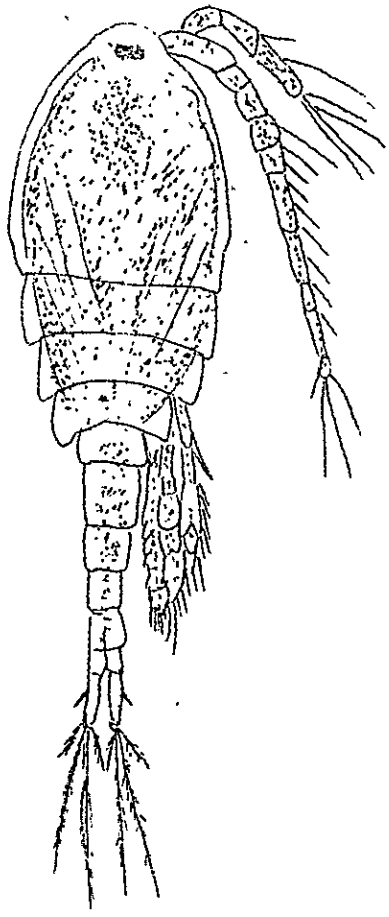


38. *Pseudodiaptomus marinus*



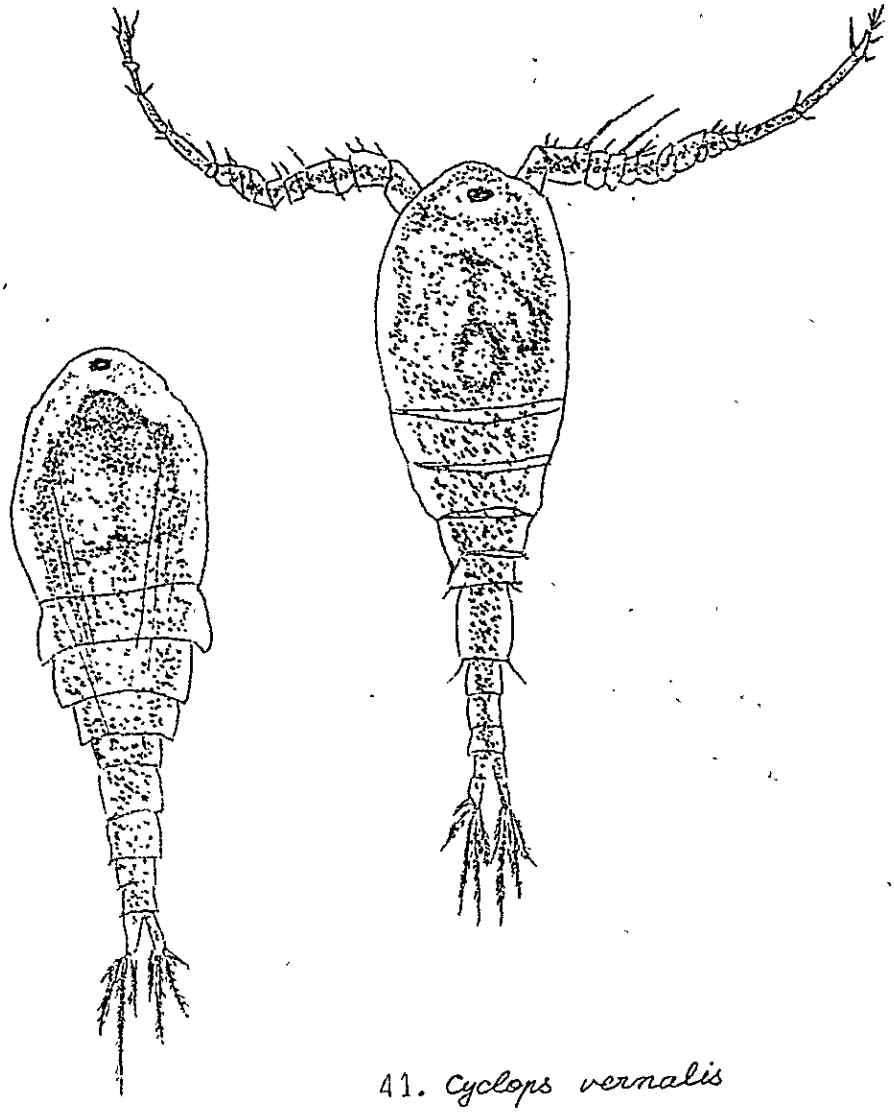
39. *Cyclops bicolor*





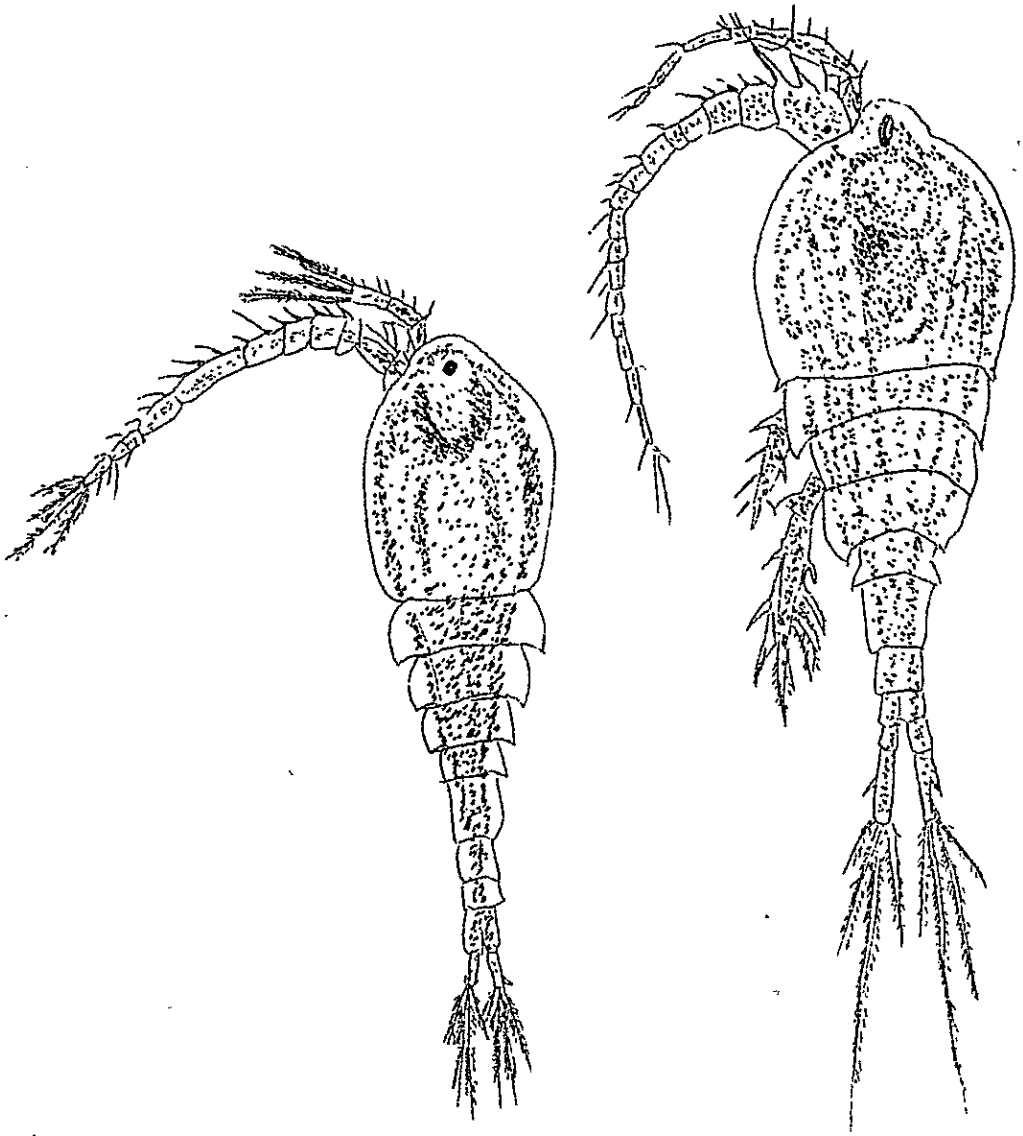
40. *Cyclops strenus*

41. *Cyclops vernalis*



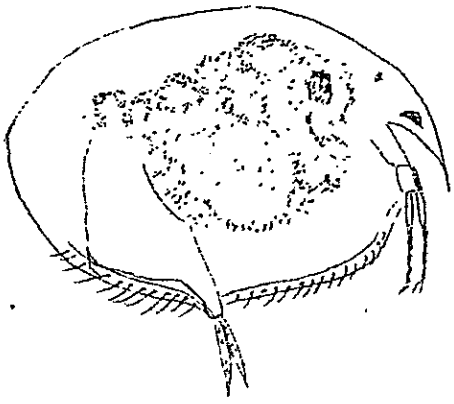
41. Cyclops vernalis

40. Cyclops strenuus

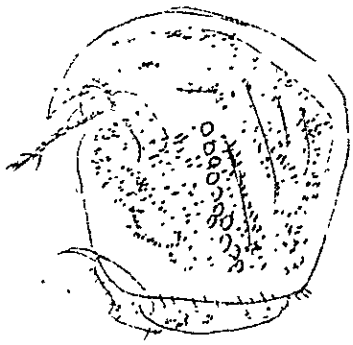


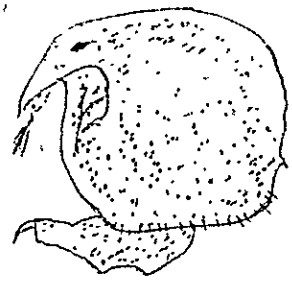
42. Cyclops vicinus

53. Mesocyclops Leuckarti



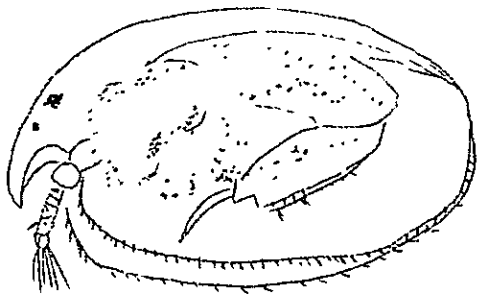
43. *Alona monocantha*



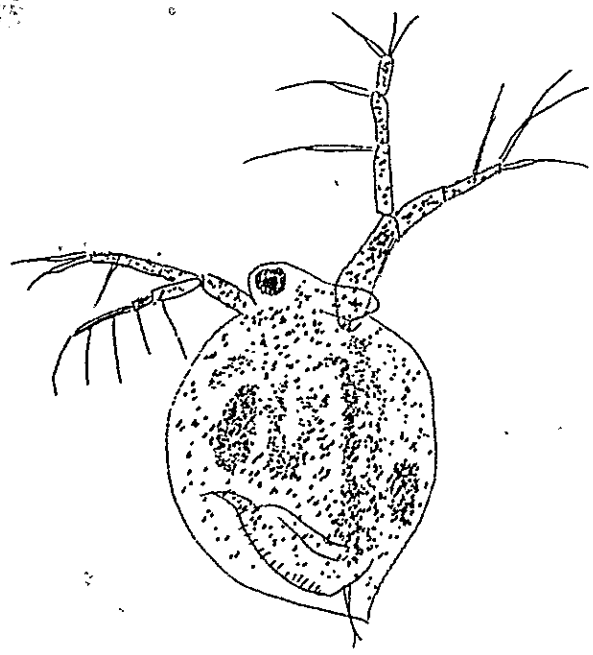


44. *Chydorus sphaericus*

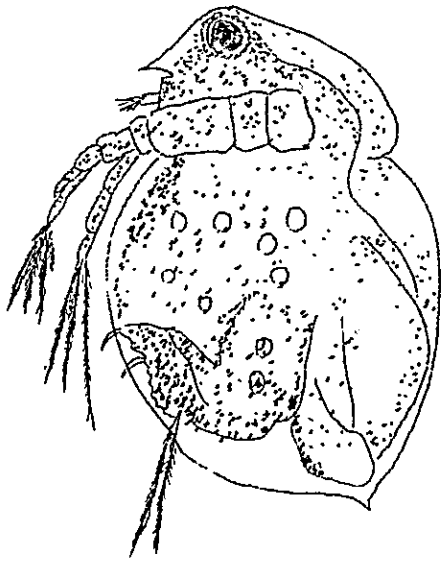
44. *Chydorus sphaericus*



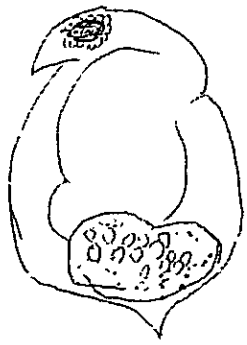
45. *Eurycercus longicaudis*



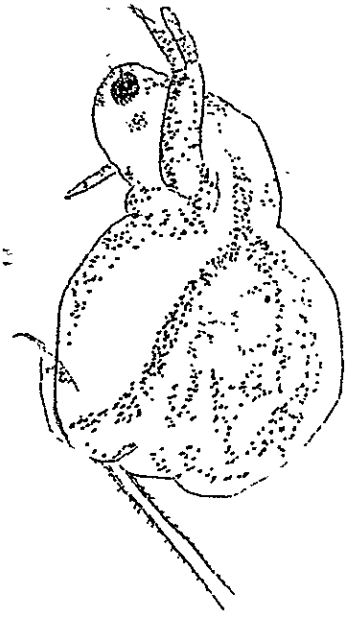
46. *Ceriodaphnia megops*



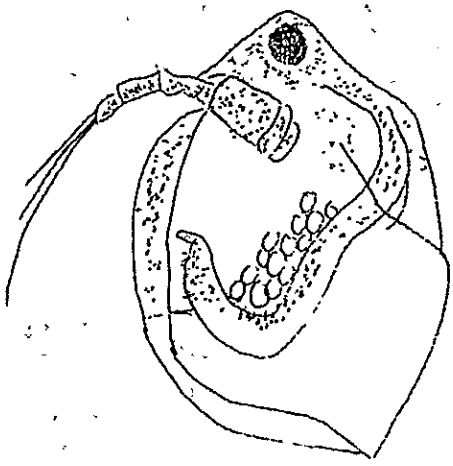
47. *Ceriodaphnia rigaudi*



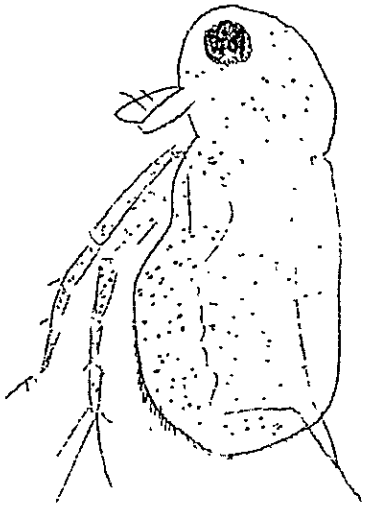
48. *Daphnia rosea*



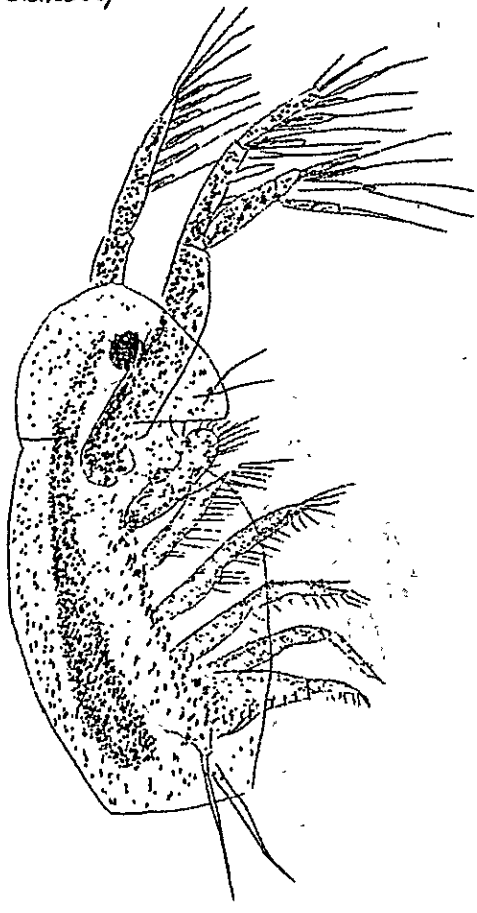
49. *Moina brachiata*



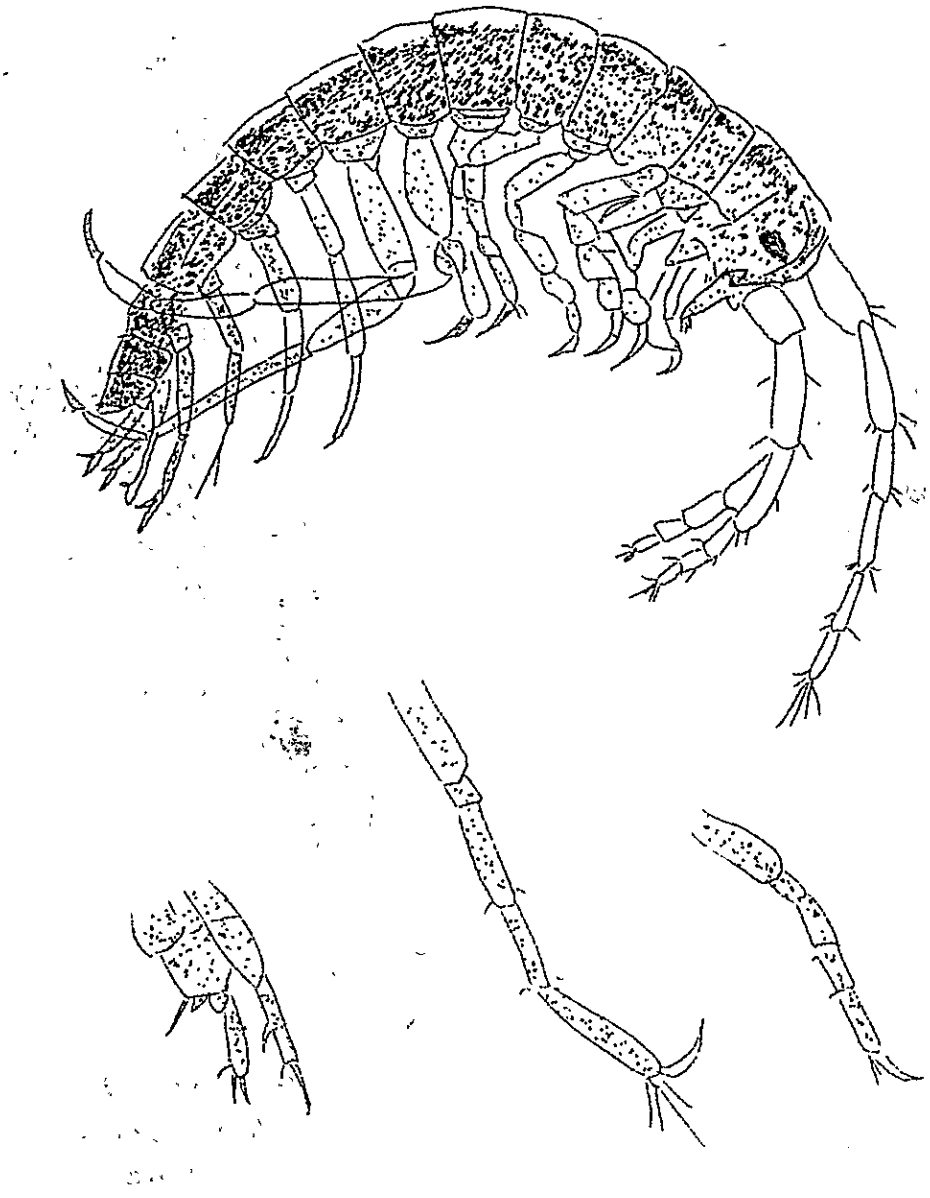
51. *Simocephalus vetulus*



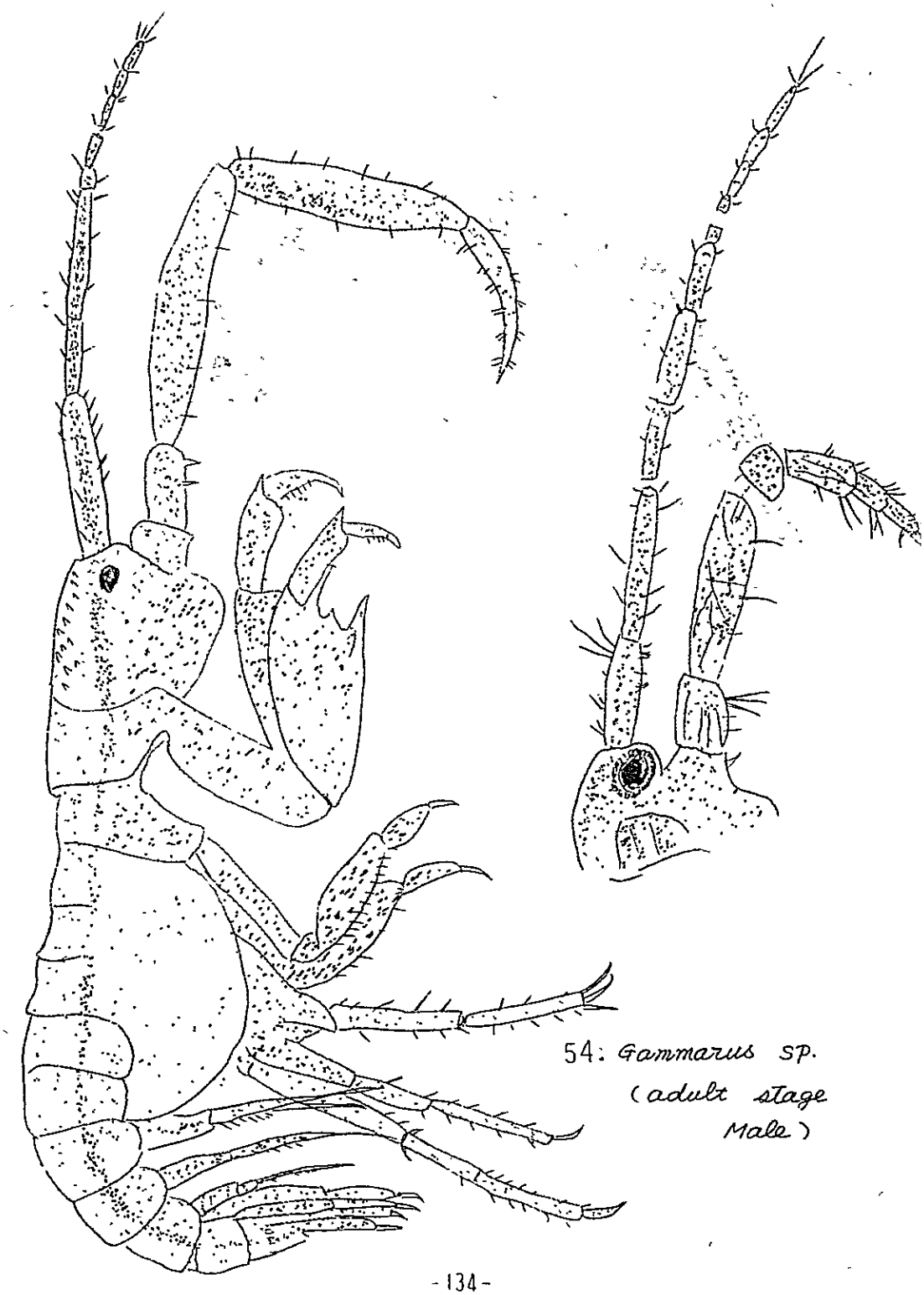
50. *Moina macrocopa*



52. *Sida crystallina*



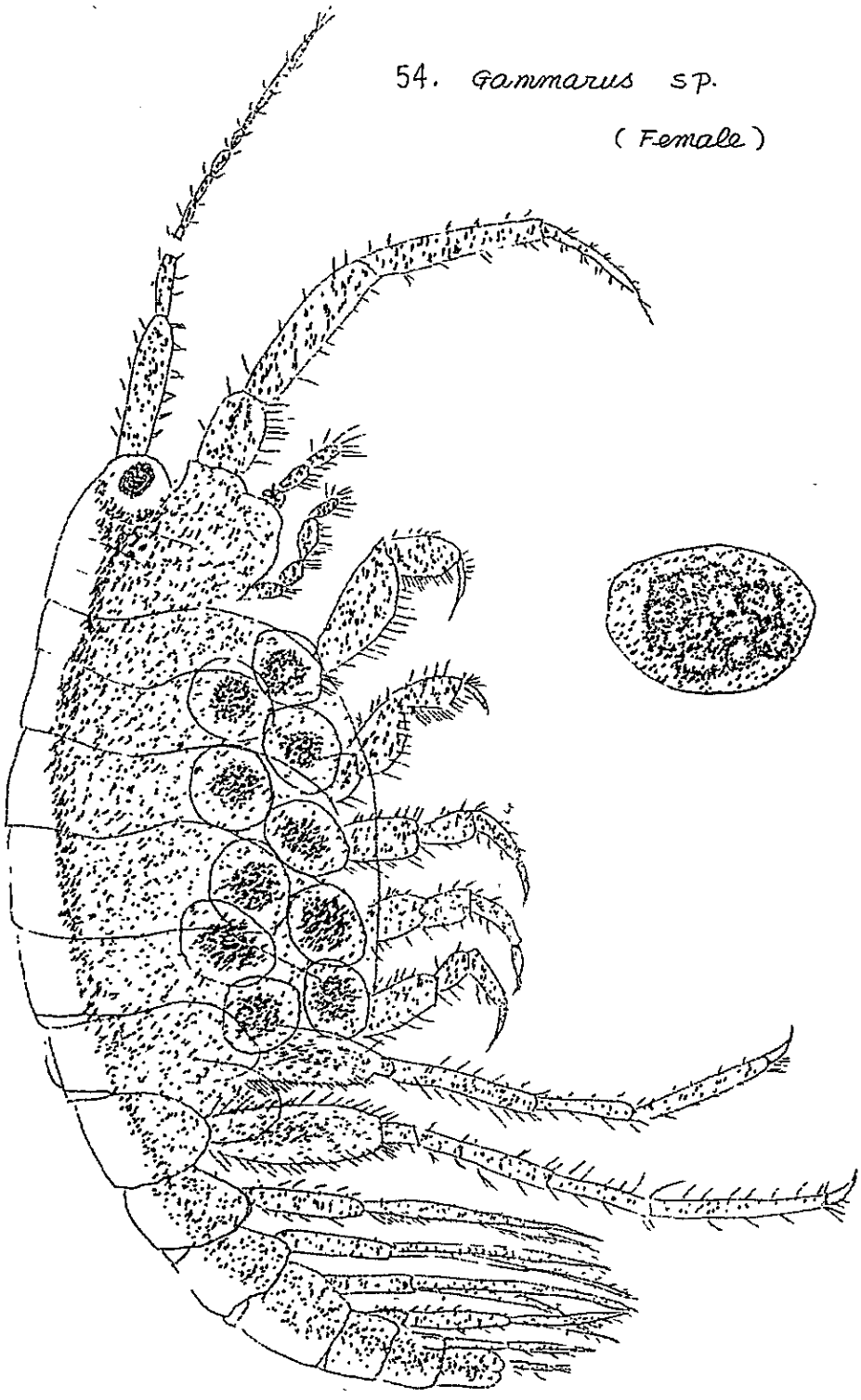
54. *Gammarus sp.* (young stage)

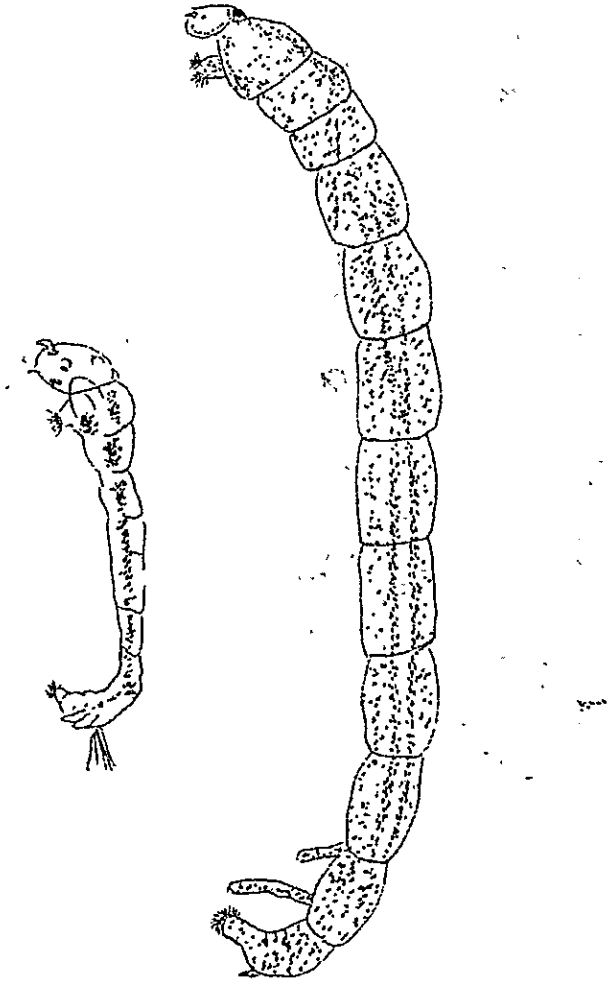


54: *Gammarus* SP.
(adult stage
Male)

54. *Gammarus* sp.

(Female)



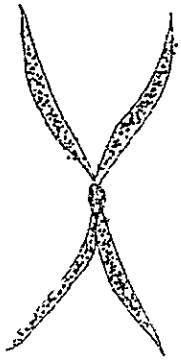


55. *Chironomus dorsalis*

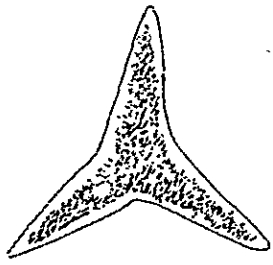
VII. UNDECIDED PLANKTON

PHYTO-PLANKTON .... 4 Species

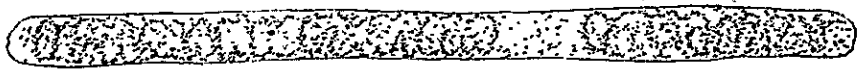
ZOO-PLANKTON ..... 4 Species 137 P



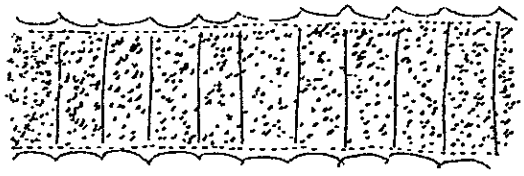
1



2.

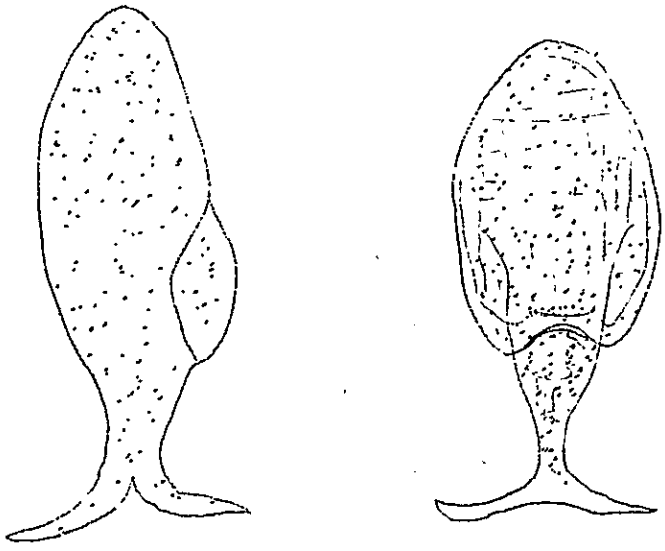


3.

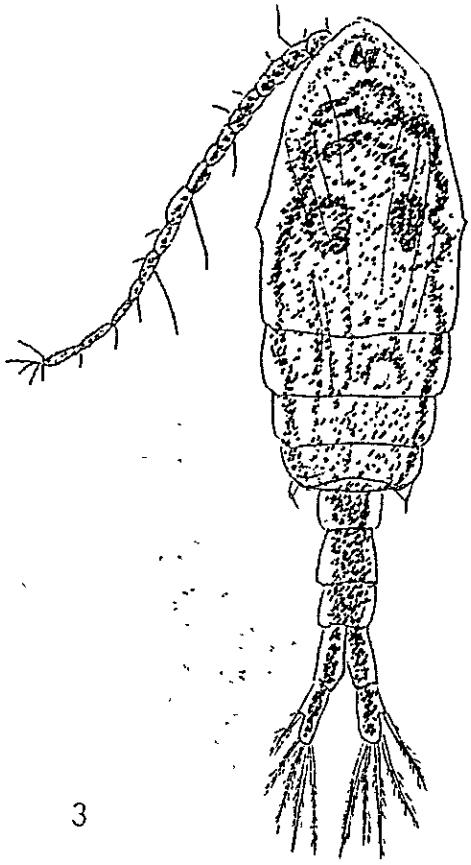


4.

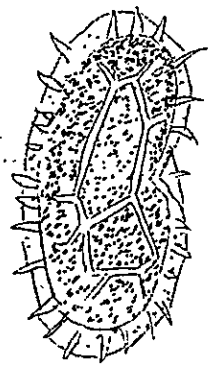
1.



2.



3



4.

VIII. SUMMARY AND DISCUSSION

1. In this research, 174 species of phyto-plankton and 55 species of zoo-plankton were found.

2. In the species of undecided, 4 species of phyto-plankton and 4 species of zoo-plankton were found.

3. The PH of water taken from each stations, generally, are low and 5.5 - 5.8, except Police office pond (PH 7.6) which the water have a good condition for fish culture, and the brackish pond (PH 8.0) of Fish culture station of NHATRANG. And it seems that this value of PH is seriously affected in the growth of plankton.

4. The species and quantity of plankton in the pond of fish culture stations, abound more than lakes and river.

5. In the culture pond for young fish of DALAT, CHRYSOPHYTA, especially, Melosira granulata is rich. This Algae, as well as CYANOPHYTA is very good as food for herbivorous fish.

6. In the culture pond for hatching fish larva of DALAT, the total wet weight of plankton which mainly include Osphranticum, is (COPEPODA) about 1.6 g. per cubic meter. This value is not always rich as fish culture place.

In Japan, the number of individuals and total weight of plankton which mainly include Moina or Daphnia (CLADOCERA), in the culture pond of plankton given as food for hatching fish larva, have each 100000 - 200000 numbers, 10 - 40 g. per cubic meter.

7. The quantity of plankton in (DALAT) DA-NHIM DAM are excellent, exceptionally rich in Copepoda (Zoo-plankton), than another sampling stations. Namely, on the total wet weight of

plankton, St. I has 1.4 g., St. II has 14.3 g. per cubic meter.

In the another sampling stations, the range of the value hase less than 0.5 g. per cubic meter.

8. The plankton of DA-NHIM DAM is rich, and the weight of plankton hase, on the average, about 7 g. per cubic meter. But this sample is not taken from many sampling stations (not random) of DAM, because taken from only 2 stations of them.

But, I hope that this place which the plankton is rich, certainly, will be made a good place as fish rearing DAM.

IX. LITERATURE

LITERATURE CITED FOR INTRODUCTION

SHIROTA, A., (1958). Studies on the life history of MICRO-WORM (Anguilla silusiae). Brief report in Ann. Rev. Bull. Jap. Scien. Fish., P. 42.

----------, (1959). Mass culture of PROTOZOA (Glaucoma sp.) using Agar gel. Brief report in Ann. Rev. Bull, Jap. Scien. Fish., P. 40.

----------, (1959). Studies on the Juvenile fish fed with natural bait. Tohoku regional Rep., Jap. Jour. Ecology., No. 7.

----------, (1961). Studies on the nutritional value of sewage. Brief report in Ann. Rev. Bull. Jap. Scien. Fish.

----------, & MATSUDAIRA, C., (1962). Studies on the utilization of sewage, -VII. Organic acids in sewage. Brief report in Ann. Rev. Bull. Jap. Scien. Fish., P. 19.

----------, (1962). Analysis of development factor in DINOFLAGELLATA. unpublished.

----------, (1962). An artificial culture of COPEPODA Using DIATOM.

----------, (1962). Yield of Artemia salina produced in the culture of Chaetoceros sp.

----------, (1958-1962). Artificial culture of Chironomus dorsalis Meigen. Reserves of Tohoku University. (1962). P. 173.

LITERATURE CONSULTED:

DUSSART, B. (1958). Remarques ser le genre CYCLOPS s. str. Hydrobiologia Vo. X. P. 263-292.

EDMONDSON, W. (1959). Fresh Water Biology. p. 1248.

IWANAMI BOOK Comp. (1960). Dictionary of Biology. P. 1083-1121.

KAMAT, N. (1962). Chlorophyceae of Ahmedabad, INDIA. Hydrobiology Vo. XX. No.3 P. 248-279.

KOKUBO, S. (1959). Taxonomy of Plankton. P. 439.

---------, (1960). Diatoms. P. 330.

SMITH, G., (1950). The Fresh-Water Algae of the UNITED STATES. P. 719

SCOTT, A. & PRESCOTT, G., (1961). Indonesian Desmids. Hydrobiologia Vo. XVII. No. 1-2. P. 132.

TRUONG, H., (1960). Some free living PROTOZOA of the SAIGON-CHOLON area. Ann. Fac. Scien. P. 141-172.

RUTTNER, F. & KOLISKO, A., (1948). Zum Formwechsel und Art problem von Anuraea aculeata (Keratella quadrata). Hydrobiologia Vo. 1. No. 4. P. 425-468.

THIENEMANN, A., (1941). Die Binnengewasser: Das Phytoplankton des Susswassers. Band XVI. Teil 2, 1. Halfte. P. 365.

----------, (1942). Die Binnengewasser: Band XVI. Teil 2, 2. Halfte.

----------, (1950). Die Binnengewasser: Band XVI. Teil 3.

----------, (1955). Die Binnengewasser: Band XVI. Teil 4.

----------, (1961). Die Binnengewasser: Band XVI. Teil 5.

Yamaji, I., (1961). The Plankton of Japanese coastal waters.