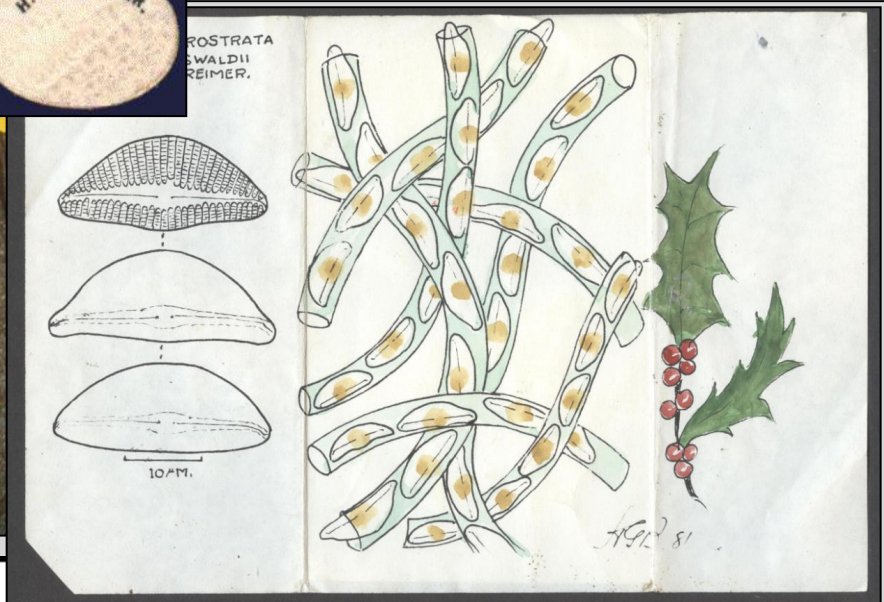
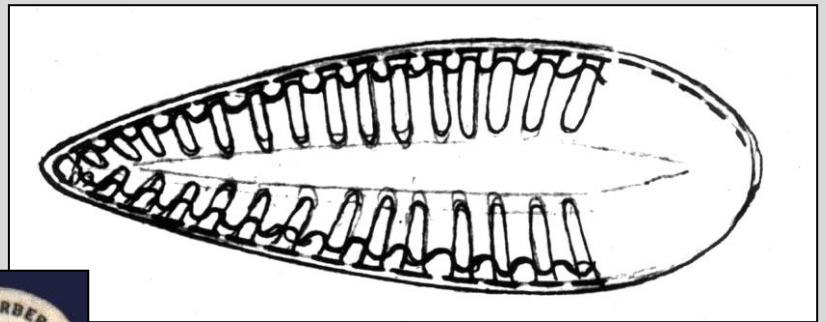


# Some Further Works

by

# Horace George Barber



*Horace G. Barber*

Saved for posterity by Bernard Hartley  
Transcribed and Edited by Steve Gill





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## Introduction

The contents of this publication are something of a mixed bag being notes, illustrations and letters, most previously unpublished, which were found in Bernard Hartley’s archive of correspondence with Horace Barber.

Unlike the previous volumes these ‘papers’ relate to a wide range of sites rather than a single region. There are notes on fossil material from Russia and the States as well as notes on collections made at British Diatomist meetings.

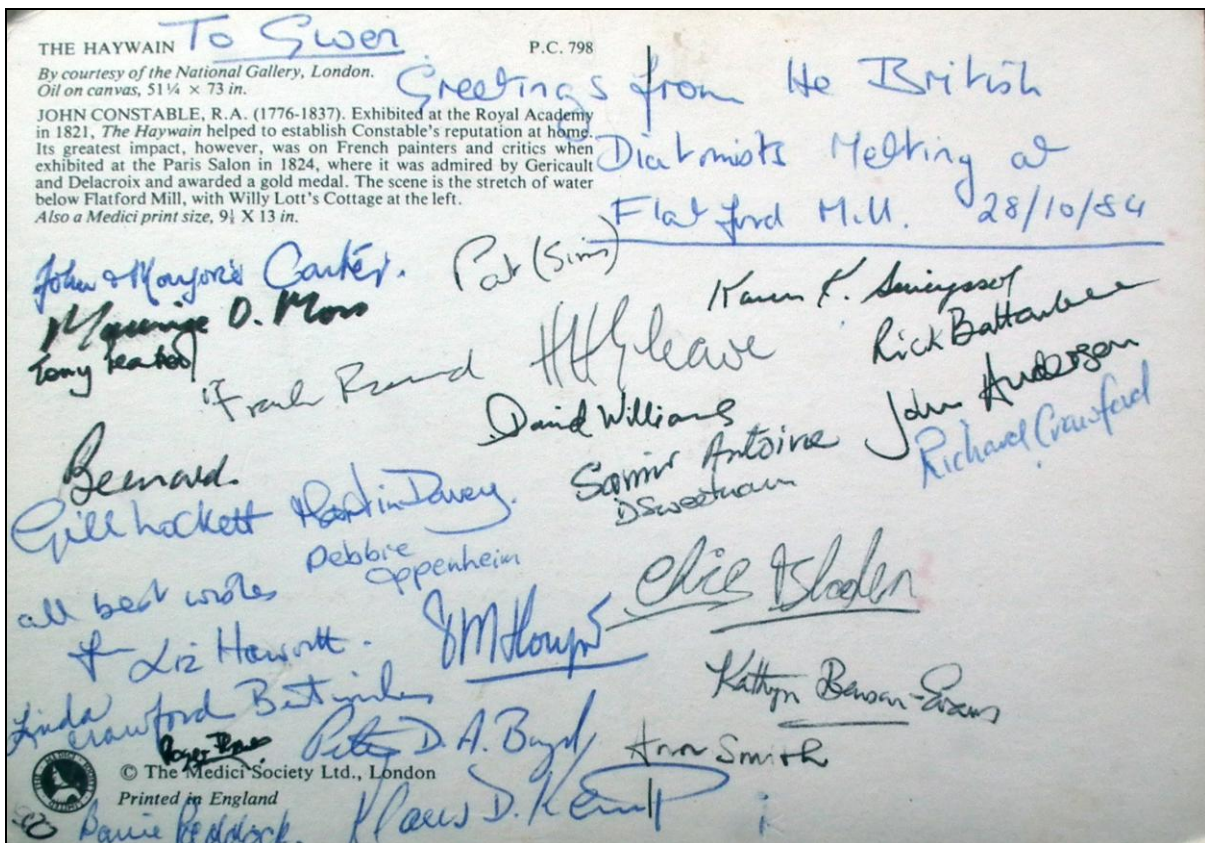
Also of interest are Horace’s opinions on ‘splitters and lumpers’.

The multiple introductions to his “British Diatom Flora” are historically important in that none of these made their way into the publication “An Atlas of British Diatoms” published after his death.

Barber was particularly interested in the variation within a species and nearly all his plates include such, in an effort to illustrate that many ‘described species’ were, in fact, simply a variation of a type. In this respect Horace could be described as a ‘lumper’.

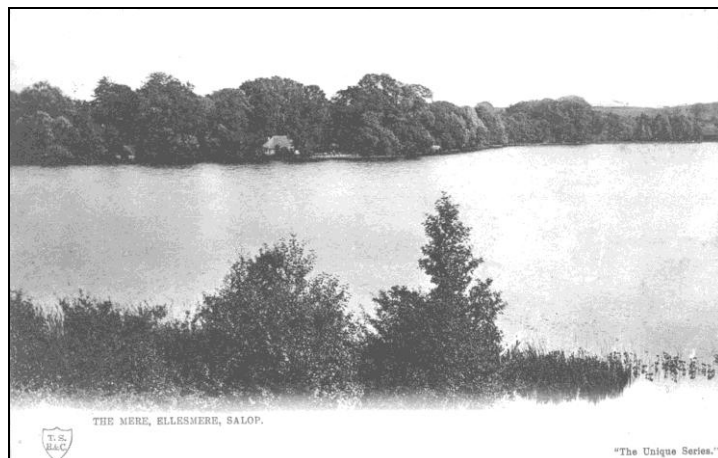
During the pulling together of this volume a large number of Miscellaneous Plates were uncovered and it is hoped that these might form a further volume some time in the future.

Horace attended the British Diatomist meeting up until his demise. In 1984 the British Diatomists attendees at Flatford Mill sent his widow Gwen a postcard, all signed the reverse.



Steve Gill  
July 2014

## An Illustrated Account of the Diatom Flora from a small Dredging – Edge of Crosemere, Shropshire 9<sup>th</sup> November 1980



The accompanying illustrated account was made from about 1.5cc of dredged material some 7 metres from the bank. I would have liked more but had not the means of a suitable container. What was obtained consisted of 95% detritus.

(Plate 1. Fig. 1 is the first occasion to have noted the taxon.)

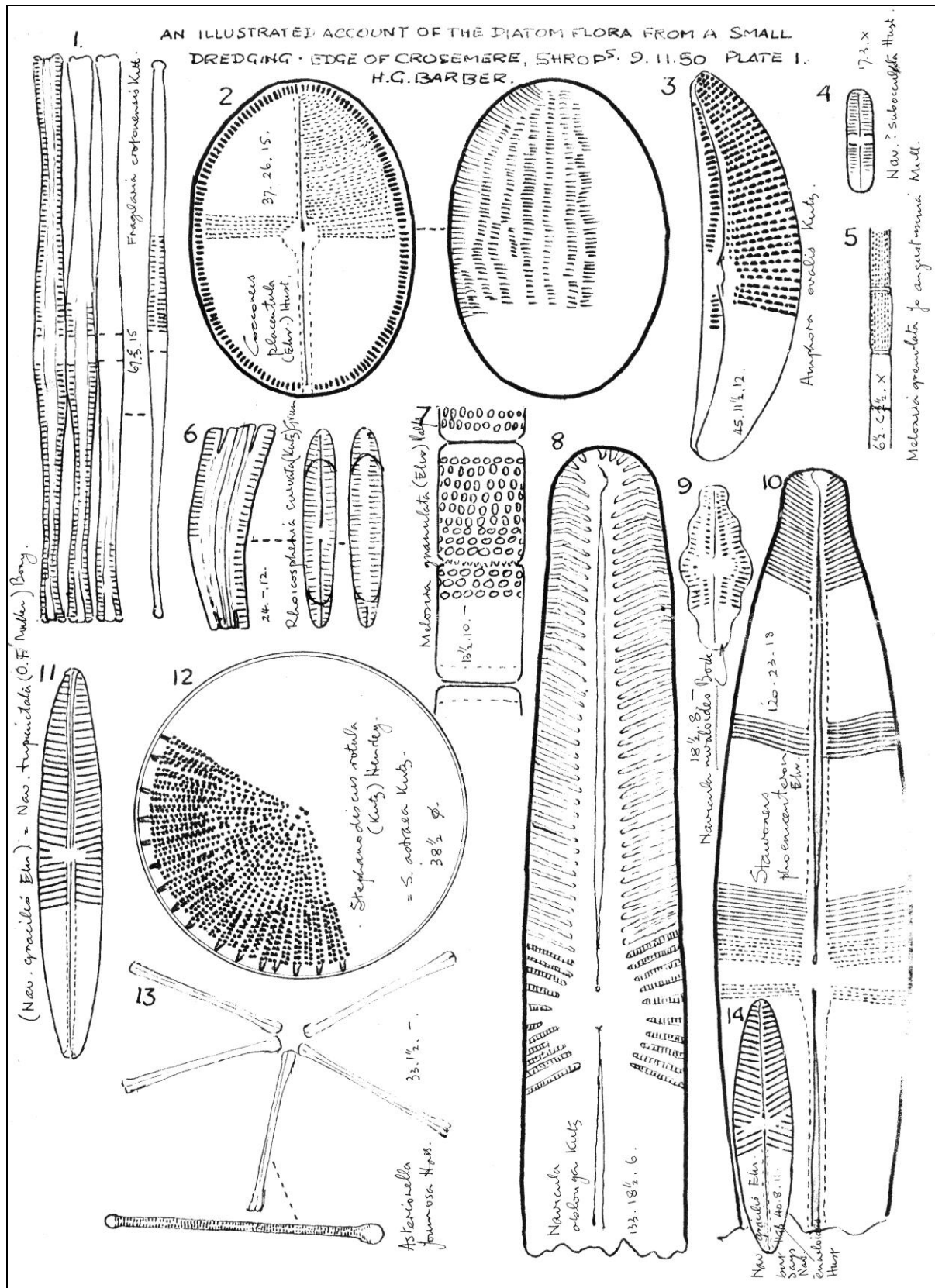
H.G. Barber

Nov. 1980

### Plate 1

Figure/dimensions	Name
1/67.3 <sup>c</sup> .15	<i>Fragilaria crotonensis</i> Kitt.
	Very frequent
2/37.26.15	<i>Cocconeis placentula</i> (Ehrenberg) Hust.
	Frequent
3/45.11½.12	<i>Amphora ovalis</i> Kützing.
	Frequent
4/17.3.x	<i>Navicula ?suboculata</i> Hust.
	Very rare
5/6½.2½ <sup>c</sup> .x	<i>Melosira granulata</i> var. <i>angustissima</i> Mull.
	Fairly frequent
6/24.-.12	<i>Rhoicosphenia curvata</i> (Kützing) Grun.
	Fairly frequent
7/13½.10.-	<i>Melosira granulata</i> (Ehrenberg) Ralfs
	Very rare
8/133.18½.6	<i>Navicula oblonga</i> Kützing.
	Frequent
9/18½.8.-	<i>Navicula nivaloides</i> Bock.
	Very rare
10/120.23.18	<i>Stauroneis phoenicentron</i> Ehrenberg
	Very rare
11/40.8.11	<i>Navicula gracilis</i> Ehrenberg
	Very rare
12/38½ dia.	<i>Stephanodiscus astraea</i> (Ehrenberg) Grun.
	Very frequent
13/33.1½.-	<i>Asterionella formosa</i> Hass.
	Very frequent
14/30.6½.12	<i>Navicula bacillodes</i> Hust.
	Very rare

Plate 1



[Editor's Note - The date of collection on the plate is in error – should be 9.11.80]

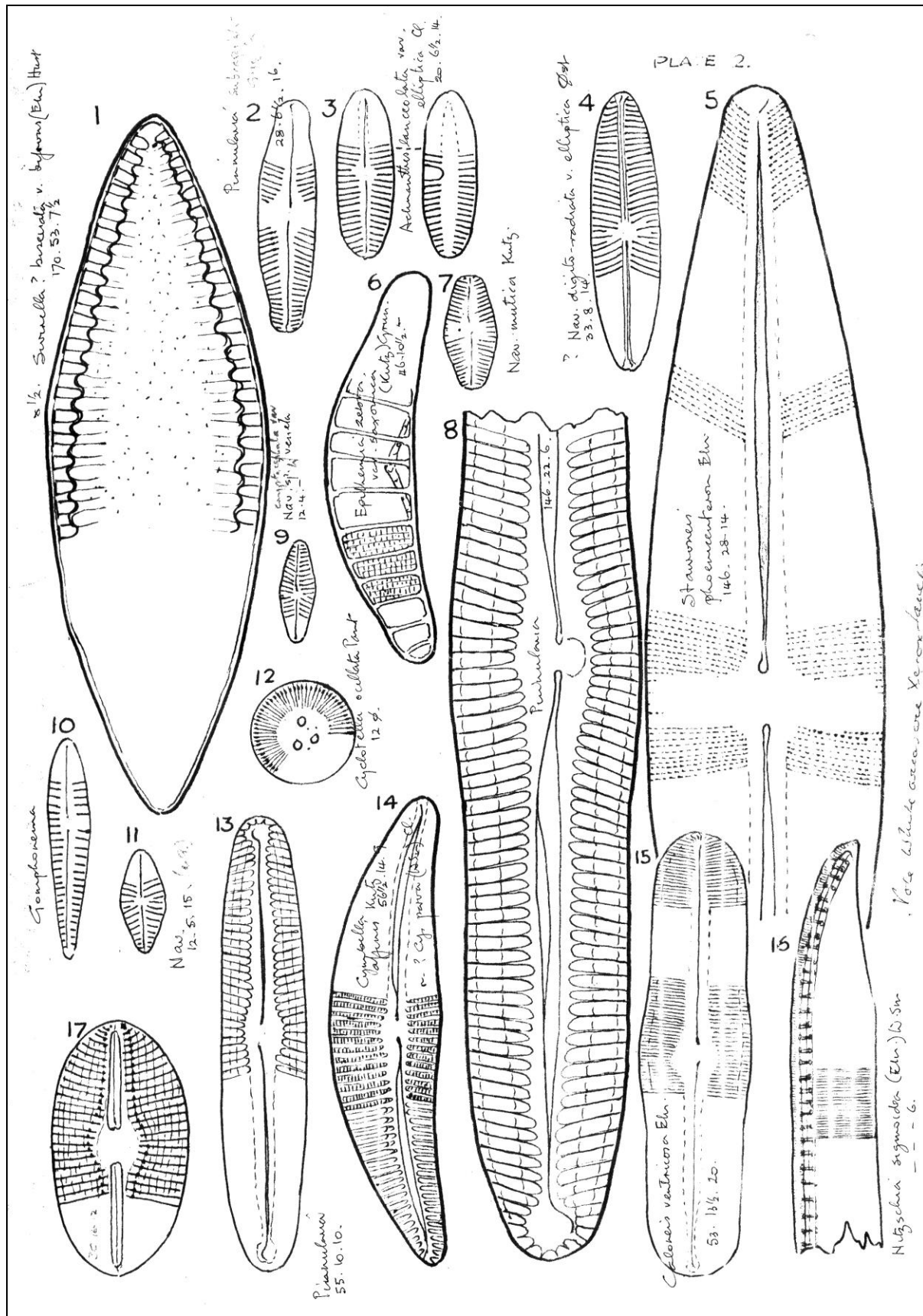
## Plate 2

Figure/dimensions	Name
1/170.53.7½	<i>Surirella ?biseriata</i> var. <i>bifrons</i> (Ehrenberg) Hust.
	Rare (x½ scale)
2/28.6½.16	<i>Pinnularia subcapitata</i> Greg. fa.
	Very rare
3/20.6½.14	<i>Achnanthes lanceolata</i> var. <i>elliptica</i> Cl.
	Very rare
4/33.8.14	<i>Navicula digito-radiata</i> var. <i>elliptica</i> Oes.
	Very rare
5/146.28.14	<i>Stauroneis phoenicentron</i> Ehrenberg
	Very rare
6/46.10½.-	<i>Epithemia zebra</i> var. <i>saxonica</i> (Kützing) Grun.
	Frequent
7/13½.6.-	<i>Navicula mutica</i> Kützing.
	Very rare
8/146.22.6	<i>Pinnularia</i> sp.
	Very rare The nearest I can suggest is <i>P. neglecta</i> (Naeg) It is not <i>P. viridis</i> , <i>P. nobilis</i> . The raphe system is wrong for <i>P. dactylus</i> and <i>P. cuneata</i> is not a good fit.
9/12.4.-	<i>Navicula</i> sp. ? <i>veneta</i>
	Very rare
10/26½.5.10	<i>Gomphonema ?bohemicum</i>
	Very rare
11/12.5.15	<i>Navicula ?anglica</i> Ralfs
	Very rare
12/12 dia	<i>Cyclotella ocellata</i> Pant.
	Rare
13/55.10.10	<i>Pinnularia ?rupestris</i>
	(Near) Very rare
14/56½.14.9	<i>Cymbella affinis</i> Kützing. ? or <i>Cymbella parva</i> (W.Sm.) Cl.
	Very rare
15/53.13½.20	<i>Caloneis ventricosa</i> Ehrenberg
	Very rare
16/-.-.6	<i>Nitzschia sigmoidea</i> (Ehrenberg) Wm.Sm.
	Frequent

Note: The forms marked 'Very rare' are generally one specimen.



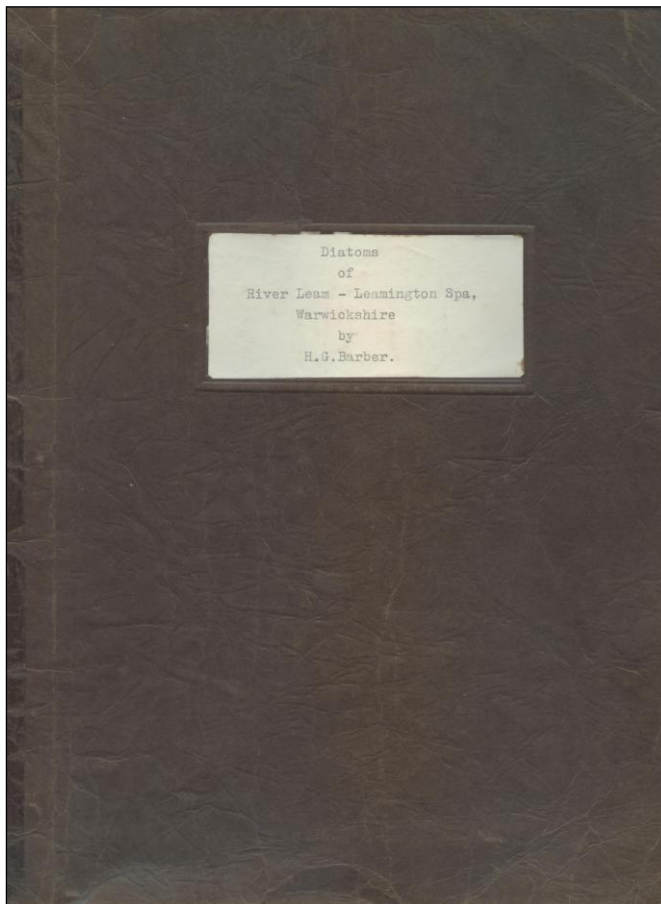
Plate 2



## A Record of Diatoms from the River Leam, Leamington Spa, Warwickshire 1956



H.G. Barber,  
91 Mancetter Road,  
Nuneaton



The following record of diatoms was taken from one Spread slide received from R. Gosden and gathered by M.E. Parker of Leamington Spa.

The record is not a complete one as there are one or two forms of the genera *Navicula* and *Nitzschia* I would sooner leave than hazard fitting a name. To me it was quite noticeable that a few of the forms were of a brackish loving habitat and is no doubt due to alkaline sources possibly arising within the River Leam. Gathered 25<sup>th</sup> March 1956.

[This record forms the original observations for the entry in "An Account of the Diatom Flora of Nuneaton and some Outlying Districts" as below:

**Locality No. 29. River Leam, Leamington [Slide 1032]**

This slide was sent to me in 1955 from M. E. Parker through R. Gosden. The former had gathered same when the river at Leamington was being cleaned out! The material was cleaned by Parker's own method and I think most effective. I believe the river water at this point receives some alkaline drainage hence the reason for one or two unusual forms.

Slide Nos. 1103, 1104, 1105, 1106, 1107, 1108.

All the forms noted in this document do not appear 'attached' to this location in the above document.]

[Note: there is a discrepancy in the 'gathering' date between the original document and the subsequent account. Also this earlier document shows neither the level of sophistication nor fluency found in his later illustrations. Nonetheless, one is clearly able to see the important features and it should be borne in mind that this document, produced in 1956, was not subsequently re-worked as was the case with most of his later drawings.]

1. *Pinnularia borealis* Ehrenberg

(Plate 1 Figure 1)



2. *Navicula kotschy* Grun.

(Plate 1 Figure 2)



This is the first time I have recorded the form.  
Not yet recorded in my Anglesea collection.

3. *Navicula radiosa* Kützing

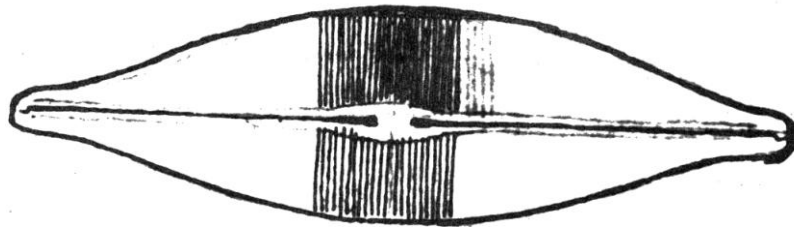
(Plate 1 Figure 3)



A very common form found in nearly all F.W. gatherings.

4. *Navicula cuspidata* Kützing

(Plate 1 Figure 4)



A form quite close to the variety ambigua by the produced ends.

5. *Navicula cryptocephala* Kützing

(Plate 1 Figure 5)



6. *Achnanthes lanceolata* deBreb

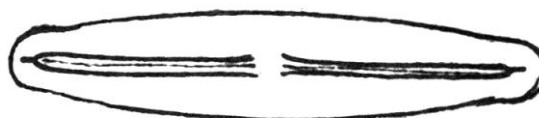
(Plate 1 Figure 6)



\*Note the mark on one side of the form.

7. *Frustulia vulgaris* Thwaites

(Plate 1 Figure 7)



8. *Pinnularia microstauron* var. *Breissonii*

(Plate 1 Figure 8)



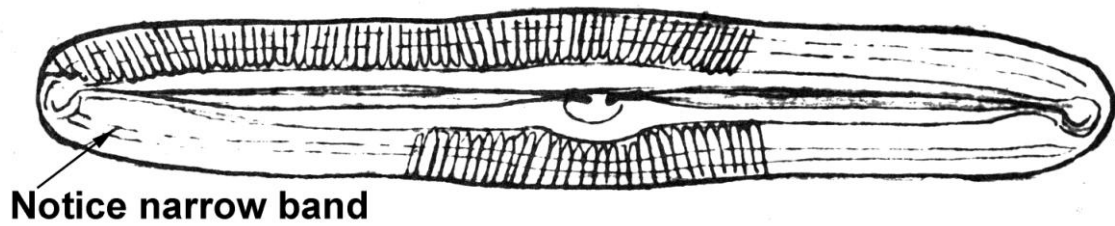
9. *Cymbella cistula*

(Plate 1 Figure 9)



10. *Pinnularia major*

(Plate 1 Figure 10)



Notice narrow band

11. *Pleurosigma strigile?*

(Plate 2 Figure 1)



12. *Diatoma vulgare* var. *grandis* (W.Sm) Grun

(Plate 2 Figure 2)



13. *Rhoicosphenia curvata* (Kütz) Grun

(Plate 2 Figure 3)



14. *Rhoicosphenia curvata* (Kützing) Grun

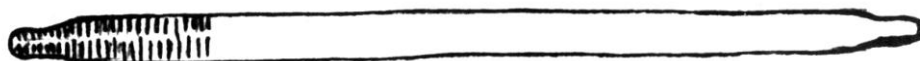
(Plate 2 Figure 4)



Face of valve

15. *Synedra ulna* (Type)

(Plate 2 Figure 5)



16. *Synedra affinis* Kützing

(Plate 2 Figure 6)





17. *Diatoma vulgare*

(Plate 2 Figure 7)



18. *Synedra parasitica* ?

(Plate 2 Figure 8)



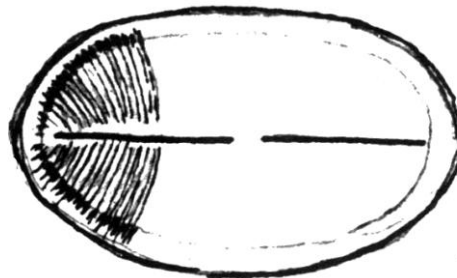
19. *Synedra vaucheriae* Kützing

(Plate 2 Figure 9)



20. *Cocconeis placentula* Ehrenberg

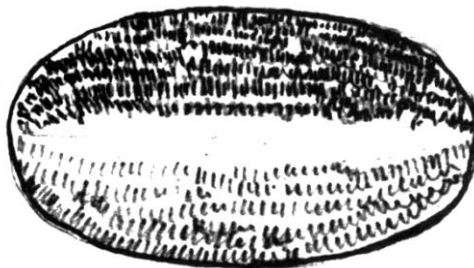
(Plate 2 Figure 10)



Raphe side

21. *Cocconeis placentula* Ehrenberg

(Plate 2 Figure 11)



Reverse side

22. *Fragilaria construens* var. *venter* (Ehrenberg) Grun

(Plate 2 Figure 12)



23. *Synedra parasitica* var. *subconstricta*

(Plate 2 Figure 13)





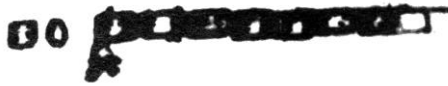
24. *Gomphonema augur* Ehrenberg

(Plate 2 Figure 14)



25. *Fragilaria construens* var. *venter*

(Plate 2 Figure 15)



26. *Cymatopleura solea* (Breb.) W.Sm

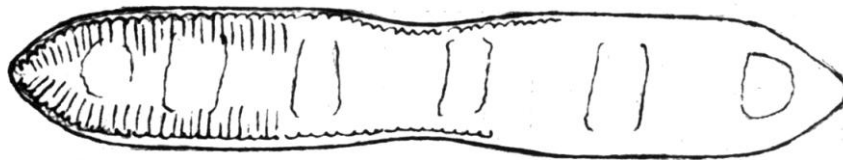
(Plate 3 Figure 1)



Side view showing the undulations

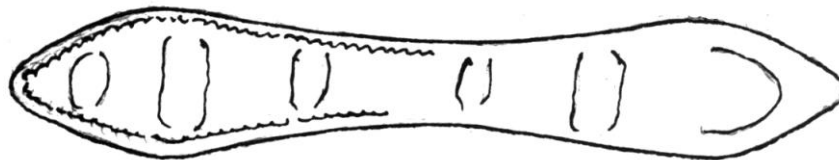
27. *Cymatopleura solea* variation

(Plate 3 Figure 2)



28. *Cymatopleura solea* variation

(Plate 3 Figure 3)



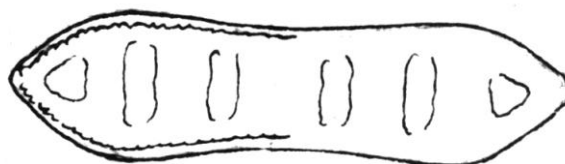
29. *Cymatopleura* variety. *apiculata* (W.Sm.) Ralfs

(Plate 3 Figure 4)



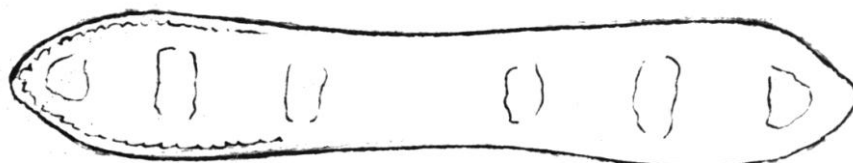
30. *Cymatopleura solea* variation

(Plate 3 Figure 5)



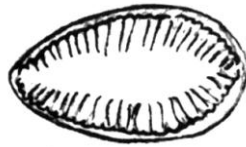
31. *Cymatopleura solea* variation

(Plate 3 Figure 6)



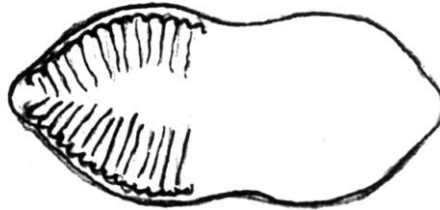
32. *Surirella ovalis* deBreb

(Plate 3 Figure 7)



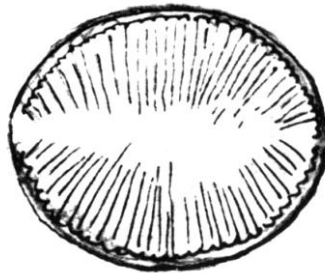
33. *Surirella smithii* Ralfs

(Plate 3 Figure 8)



34. *Surirella ovalis* var. *crumena* (Breb.) H.V.Heurck

(Plate 3 Figure 9)



35. *Gomphonema intricatum* Kützing

(Plate 4 Figure 1)



36. *Gomphonema olivaceum* (Lyng.) Kützing

(Plate 4 Figure 2)



37. *Gomphonema olivaceum* (Lyng.) Kützing

(Plate 4 Figure 3)



38. *Gomphonema constrictum* Ehrenberg

(Plate 4 Figure 4)



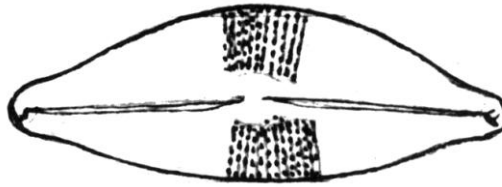
39. *Gomphonema parvulum*

(Plate 4 Figure 5)



40. *Cymbella Ehrenbergii*

(Plate 4 Figure 6)



41. *Cymbella lanceolata* (Ehrenberg) H.Van Heurck

(Plate 4 Figure 7)



42. *Cymbella prostrata* (Berk.) Cleve

(Plate 4 Figure 8)



43. *Amphora ovalis*

(Plate 4 Figure 9)



44. *Cymbella ventricosa* Kützing

(Plate 4 Figure 10)



45. *Amphora ovalis* var. *pediculus*

(Plate 4 Figure 11)



46. *Cymbella* ?

(Plate 4 Figure 12)



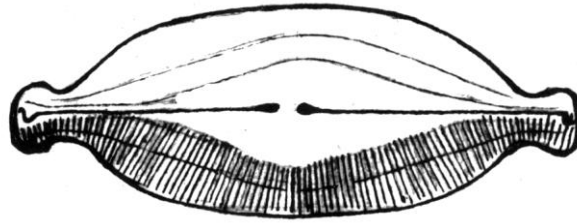
47. *Cymbella tumida* (Breb.) H.V.Heurck

(Plate 4 Figure 13)



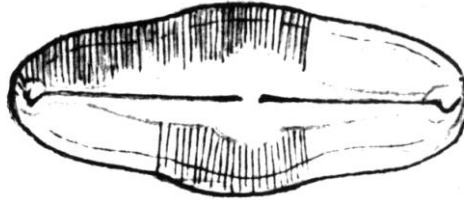
48. *Caloneis amphisbaena* (Bory) Cleve

(Plate 5 Figure 1)



49. *Caloneis silicula* var. *truncatula* Grun

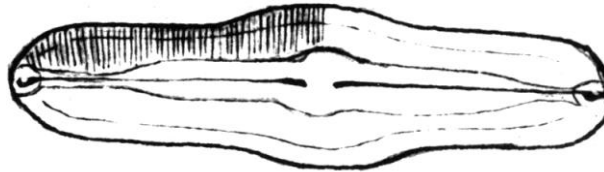
(Plate 5 Figure 2)



(see Plate 5 fig 8 (55) for oval form)

50. *Caloneis silicula* (Ehrenberg) Cleve

(Plate 5 Figure 3)



The type form

51. *Stauroneis Smithii* Grun

(Plate 5 Figure 4)



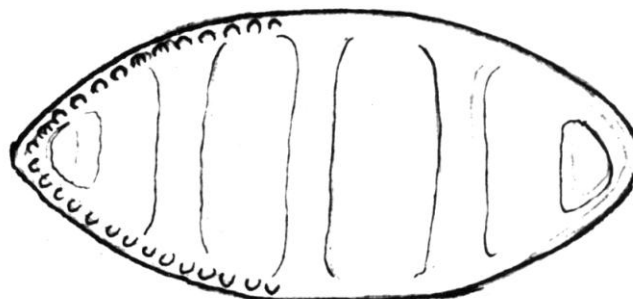
52. *Pinnularia viridis* (Nitz.) Ehrenberg

(Plate 5 Figure 5)



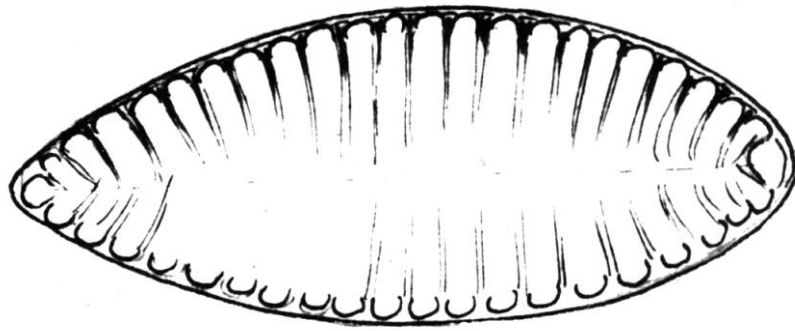
53. *Cymatopleura elliptica* (Breb.) W.Sm.

(Plate 5 Figure 6)



**54. *Surirella elegans* Ehrenberg**

(Plate 5 Figure 7)



A form I have not yet found in Anglesey

**55. *Caloneis silicula* var. *truncatula* ?**

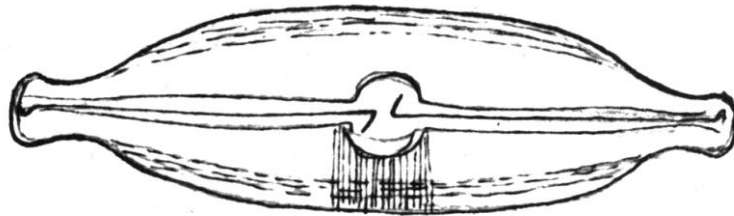
(Plate 5 Figure 8)



The oval form of Plate 5 fig.2 (49)

**56. *Neidium productum* (W.Sm.) Cleve**

(Plate 6 Figure 1)



Capitate form

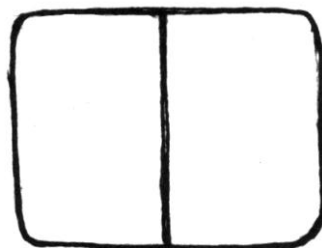
**57. *Cyclotella menhiniana* Kützing**

(Plate 6 Figure 2)



**58. *Melosira varians* C.Agardh**

(Plate 6 Figure 3)





59. *Navicula pygmaea* Kützing.

(Plate 6 Figure 4)



60. *Navicula ramosissima* (Ag.) Cleve

(Plate 6 Figure 5)



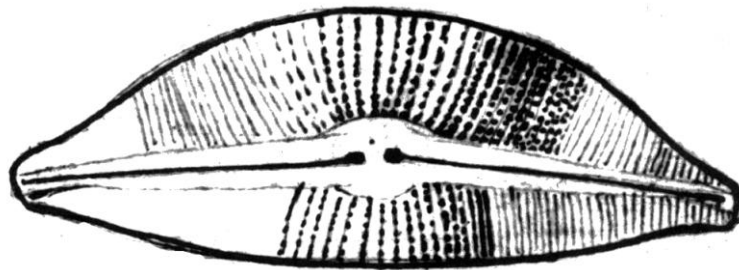
61. *Navicula hungarica* var. *capitata* (Ehrenberg) Cleve

(Plate 6 Figure 6)



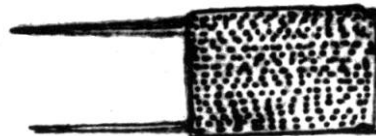
62. *Cymbella cuspidata* Kützing

(Plate 6 Figure 7)



63. *Melosira granulata*

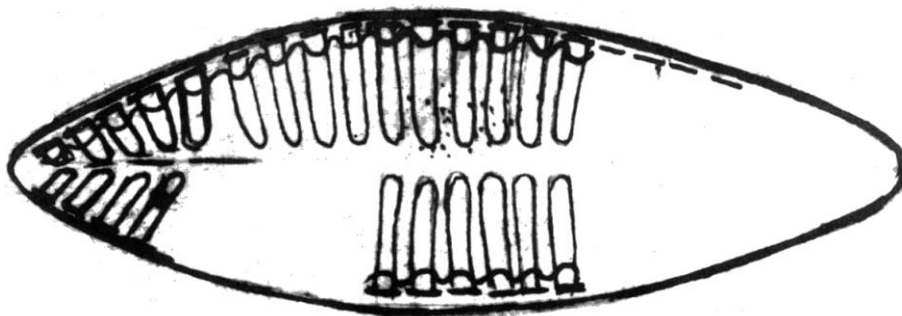
(Plate 6 Figure 8)



I would not like to say what variety

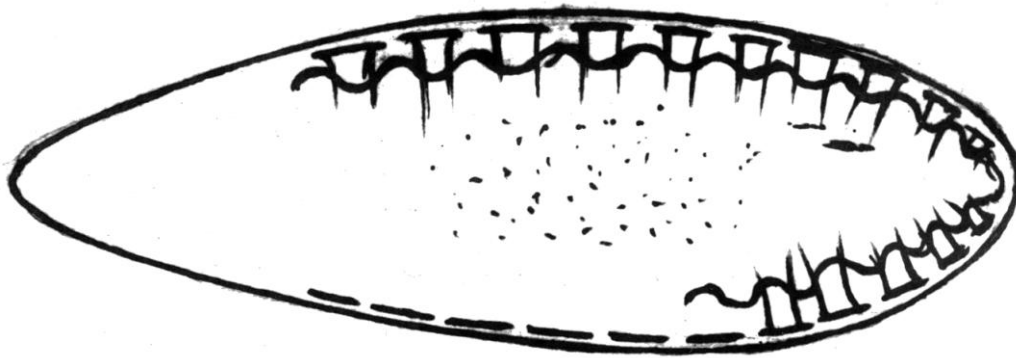
64. *Surirella biseriata* Cleve

(Plate 7 Figure 1)



65. *Surirella splendida* Kützing.

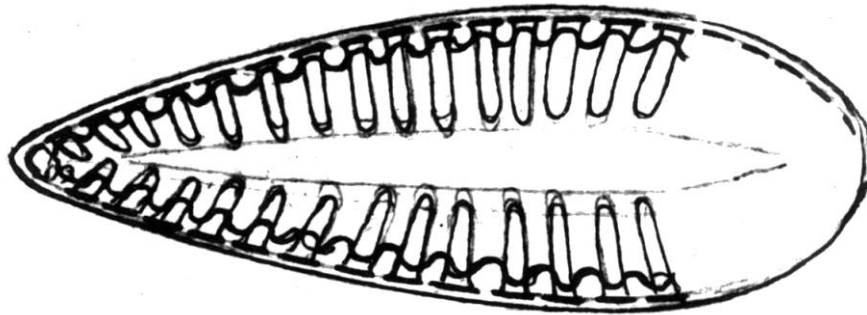
(Plate 7 Figure 2)



See Schmidt's Atlas Plate 22 Fig.15

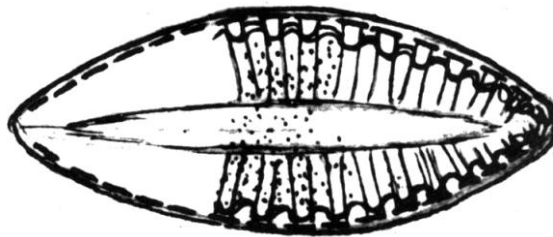
66. *Surirella biseriata*

(Plate 7 Figure 3)



67.

(Plate 7 Figure 4)



I don't think this form is *S. turgida*

68. *Surirella helvetica* var. *tibetica* Meresch.

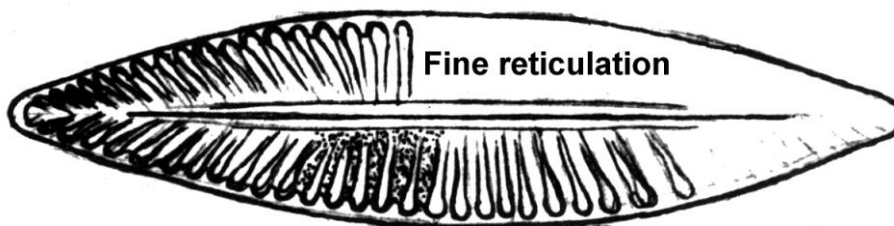
(Plate 7 Figure 5)



I was rather surprised to find this little form. Previously noted Llangloed, Anglesey

69. *Surirella saxonica* Auersw.

(Plate 7 Figure 6)

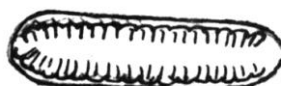


See Schmidt's Atlas Plate 22 Fig.2

This is a new form to me and is very finely marked

70. *Surirella angusta* Kützing

(Plate 7 Figure 7)



71. *Surirella gracilis* (W.Sm.) Grun.

(Plate 7 Figure 8)



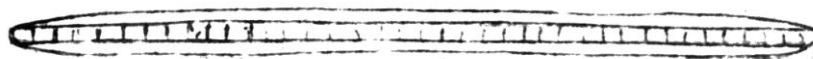
72. *Nitzschia tryblionella* Hantz.

(Plate 8 Figure 1)



73. *Bacillaria paradoxa* Gmelin

(Plate 8 Figure 2)



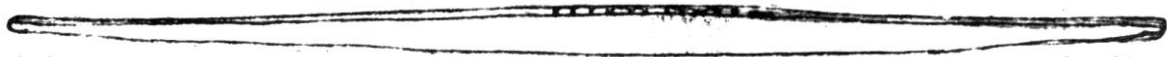
74. Un-named

(Plate 8 Figure 3)



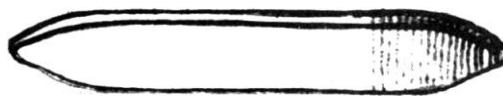
75. *Nitzschia sigma* (Kützing) W.Sm.

(Plate 8 Figure 4)



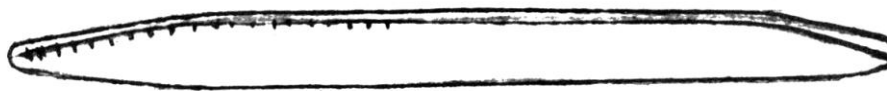
76. *Nitzschia angustata* (W.Sm.) Grun.

(Plate 8 Figure 5)



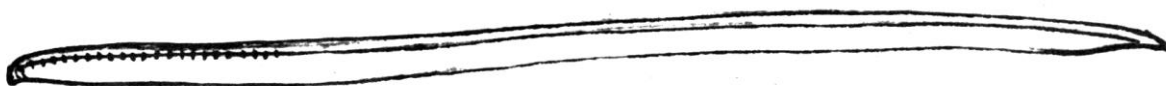
77. *Nitzschia thermalis* Kützing.

(Plate 8 Figure 6)



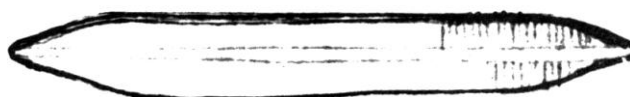
78. *Nitzschia sigmoidea* (Ehrenberg) W.Sm.

(Plate 8 Figure 7)



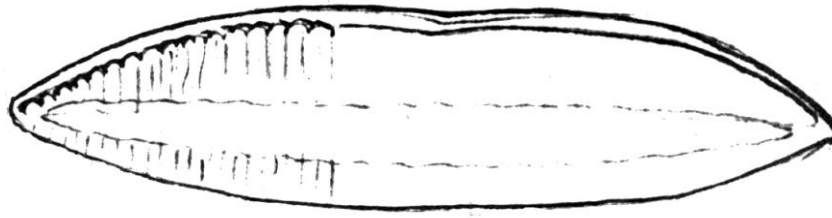
79. *Nitzschia hungarica* Grun.

(Plate 8 Figure 8)



80. *Nitzschia accuminata* (W.Sm.) Grun.

(Plate 8 Figure 9)

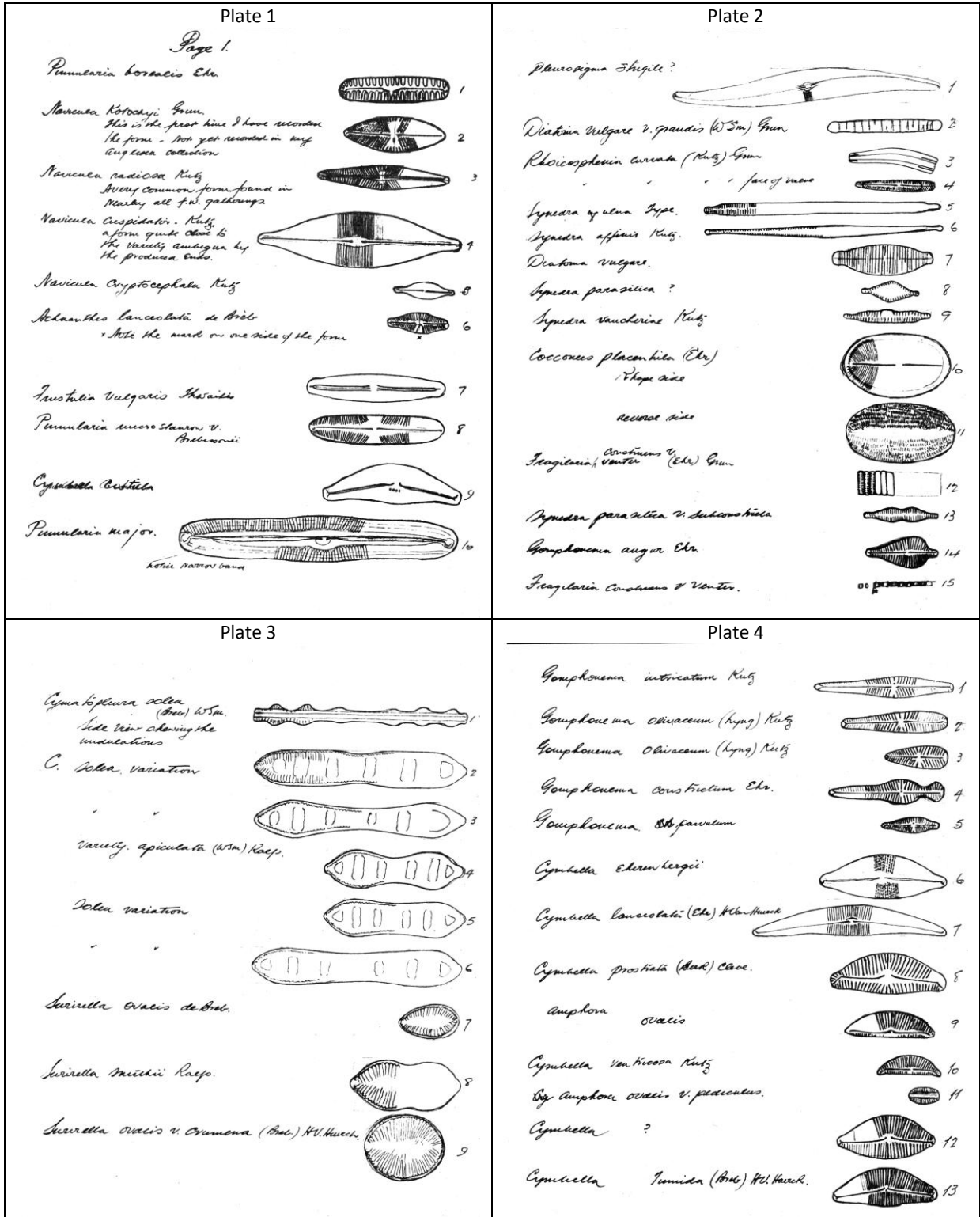


81. *Rhopalodia gibberula* (Ehrenberg) O.Mull.

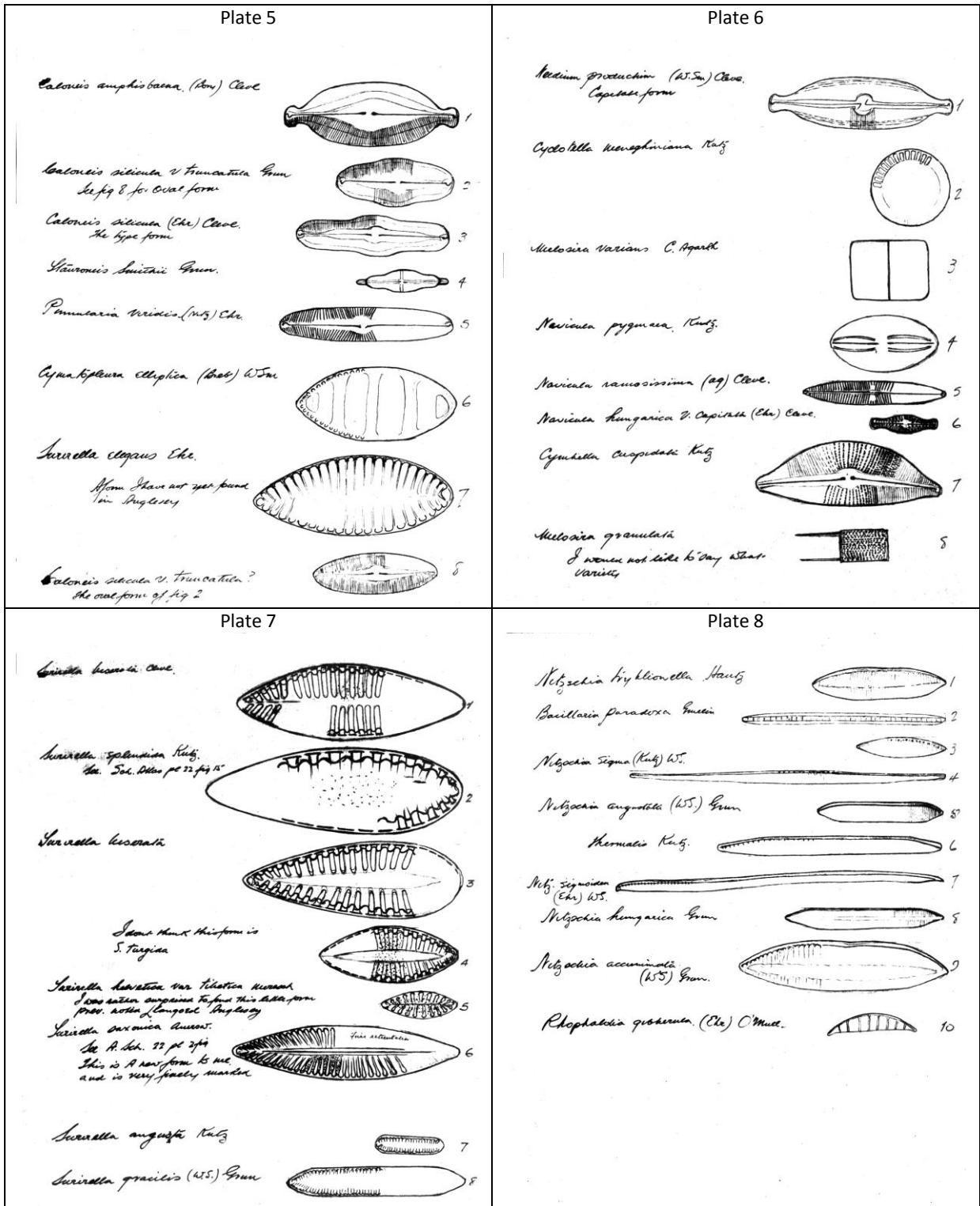
(Plate 8 Figure 10)



# The Original Plates







## ***Pinnularia hemiptera* and *Pinnularia brevicostata***

For some considerable time I have been interested in the two forms known by some diatomists as *Pinnularia hemiptera* (Kützing) Cleve and *Pinnularia brevicostata* Cleve, both figured by Hustedt in his 1930 Middle Europe page 330. In his naming of the figures he states:

“(Nach Hustedt)”

which I understand means “according to Hustedt”. Note, he does not use the term (original) which I understand means that he depicted from the type slide (or material).

Now I find forms in the British Isles Flora which correspond quite well with his illustrations (see my Flora plates 130 Figs. 1, 2, 8, 9, 10 for *P. brevicostata*.) [Editor’s note:- This flora – as originally conceived was not published.] Note particularly the raphe systems of both Hustedt’s illustration and my own are of a particular style and as far as I am aware specific to this taxon.

--ooOoo--

Through the generosity of the British Museum I have been able to examine BM Slide 14803 (Coll. Deby) by J. Tempere and H. Pergallo, Paris – locality ‘Pitramo grane, Mexique’ No.549 DF, indexed as having *P. brevicostata* present.

What I accept to be the intended form of *P. brevicostata* and frequent on the slide is figured on 368 Misc. Sheet [reproduced as part of this section]

	<b>Length</b>	<b>Breadth</b>	<b>Striae in 10μ</b>
<b>Form A</b>	73	14	7½
<b>Form B</b>	113	16½	8
<b>Form C</b>	93	12	8

Outlines variable and stria gently radiate to convergent. Raphe system a fine oblique slit and not as Hustedt figures, also stria not parallel as depicted and stated by Hustedt.

Consequently I am unable to equate the forms in accordance with Hustedt’s views.

Note if one refers to A.Cl-Eu.’s illustration in her Diatoms of Sweden and Finland she uses Hustedt’s 1930 illustration for her 1044f and names as *P. crucifera* var. *elongata* A.Cl-Eu. I am of the opinion that A.Cl.Eu. was wrong to include as such.

I do agree however the A.Cl-Euler figs. 1045 A-D are very reasonable for *P. brevicostata* Cl.

The figure in R. Patrick’s work and literary description (Pl.60 Fig.1) agree reasonably well with *P. brevicostata* forms I have illustrated.

Cleve and Moller Diat. 300 slide for (*Navicula*) *Pinnularia legumen* Ehrenberg – site New Zealand, Collec. Deby, BM No.13035. Examined by Grunow and listed as containing *Pinnularia hemiptera*.

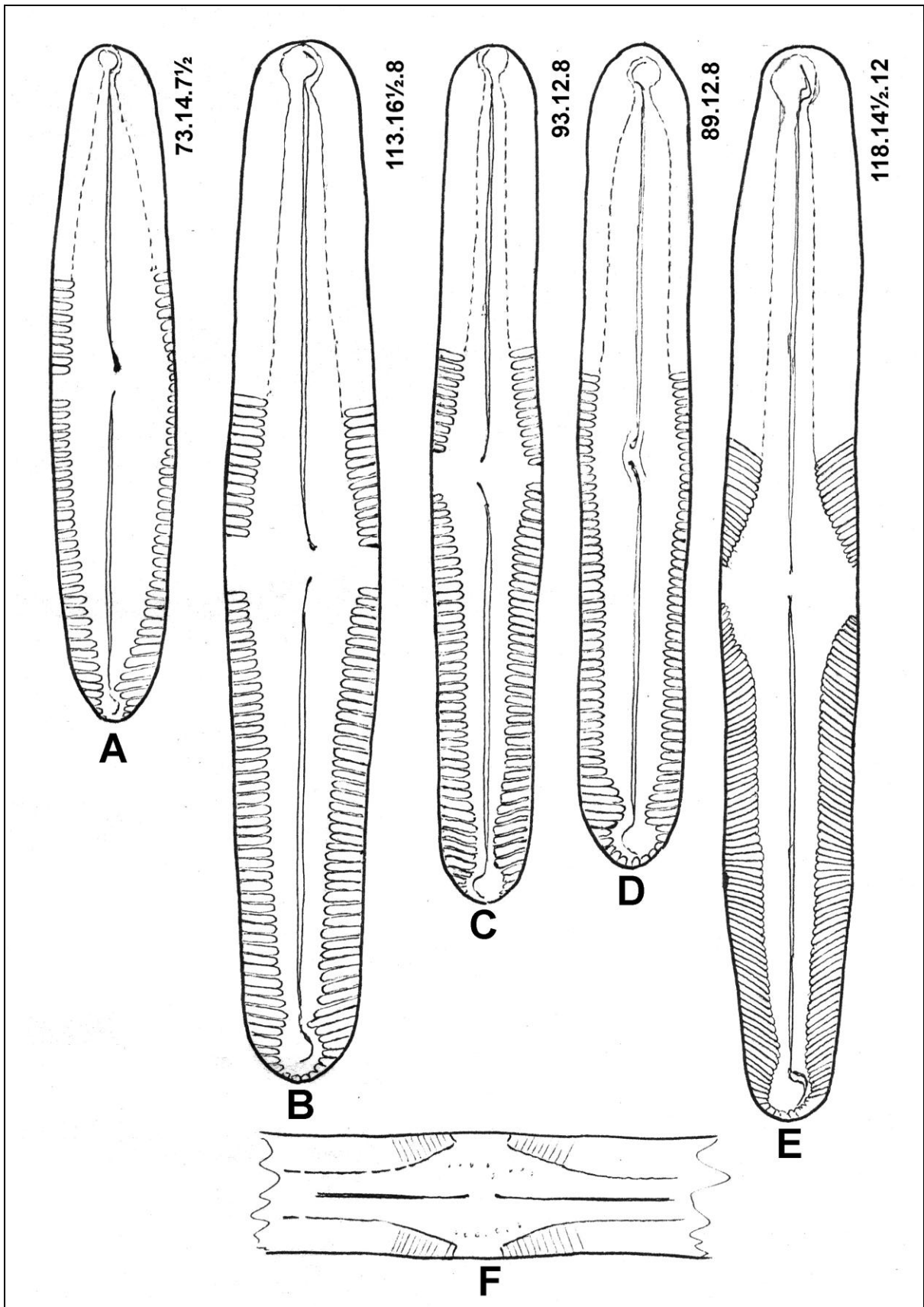
As far as I am able to ascertain from a search of this slide there are but 2 or 3 forms of *P. hemiptera* present, one of which I have figured as form D. L89 Br12 Str8. This is nearer to that figured by Hustedt 1930 Fig. 608 and with some small reservations such as variation of outline and stria directions is acceptable. The feature central stria interruption not always present. See my Flora plate 120 Figs 1, 2 and 3 for *P. hemiptera*.

Whilst examining slide 13035, noted to be the type for *P. legumen* the forms did not appear to me as correct as I understand *P. legumen*. See D. 118.14½.12, all ends being broadly capitate or sub-capitate. A close examination of many of the forms revealed many at least shewed faintly, features of *P. stomatophoroides* (due to low RI mountant?) See Cl-Euler’s figures 1053 particularly form ‘d’ and I accept as such and not as the slide is labelled.

The central markings are faint (ink as in D is too distinct, they need looking for!)

H. G. Barber

III 78



## Some *Pinnularia* from Charlwood Rectory Pond in Wood, Charlwood R.P.

### *Pinnularia* 103.20.6½

This form is near to type *viridis* except for the langsbands which are rather narrow. Should be about ⅓ width of aereole and the raphe fold is rather short, should be longer.

### *Pinnularia* 121.21.5

This may be *P. biclavata*. If one refers to A.Cl-Eu., her illustrations 1111 A-C are not much use and there is only one form. I have sketched an example which agrees somewhat i.e. 200.20.6½ on Plate 2, but nowhere does she give any indication of langsbands or their positions. The question of central striae interruption is not a fixed feature. May or may not be present. If you search the material you will find so.

Forms 180.74.6½ and 121.21.5. Note the langsbands positions. These are very similar, but differing raphes.

### *Pinnularia* 96.16½.7 and 100.18½.6½

Have similar type langsbands, the former just visible at the striae ends for part of the valve. 100.18.6½ not visible at striae ends. The raphe systems here are different. 100.18.5½ is not strongly complex.

### *Pinnularia* 180.24.6½

This form can be found with the odd central stria missing, basically the same as 200.20.6½.

The smaller forms 60.9½.10, 53.9.10, 50.9.9 are all of the same taxon, differing only in minor ways. Even 50.9.9, a case of interrupted central striae. The raphe systems are very fine and iddificult to follow the complexities. Could be one of the *P. viridis* group, possibly “*sub-viridis*”, “near to *sudetica*” and 53.9.10 “near *P. rupestris*”.

60.9½.10 has the same striae radiation etc. as 53.9.10 but a raphe now close to *viridis* type.

### *Pinnularia* 31.5½.12

In spite of what Euler says I would accept this as *P. brebissonii* var. *diminuta*.

### *Pinnularia* 42.9.13

Although the form looks like A.Cl-Eu. 1108C *P. bipectinalis* there are some points which don't tie up! The form is fairly frequent in the gathering and fairly constant. I wouldn't like to say what.

Apart from the *S. ovalis* the other two forms are from Littoral marine sites.

I have not depicted all the *Pinnularia* present in the gathering for certain reasons but I can assure you “it is not 95% pure growth of *P. biclavata*”! as you (Bernard Hartley) suggest.

So sorry not to be more conclusive naming the forms but believe me, every gathering one makes of *Pinnularias* begins a host of troubles. Often because of poor illustrations to work to, everybody has different ideas, particular specimens do vary and habitat plays a big part in variation.

There are some features I've slowly got to understand in the *Pinnularias* and there are others I would like to know of but who can say with confidence. A fine admission after 40 years and many hundreds of drawings of the particular genus.

Horace.

Plate 1

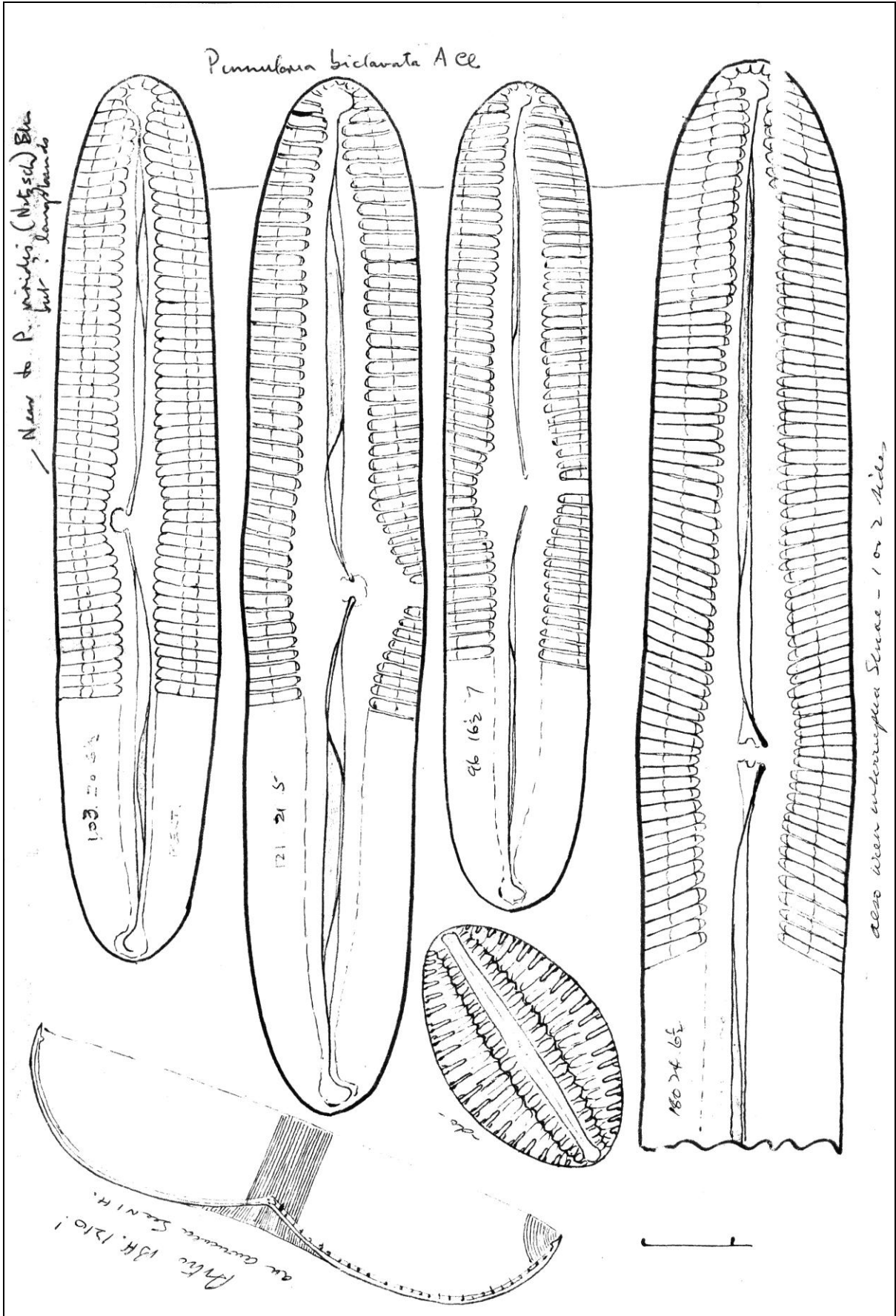
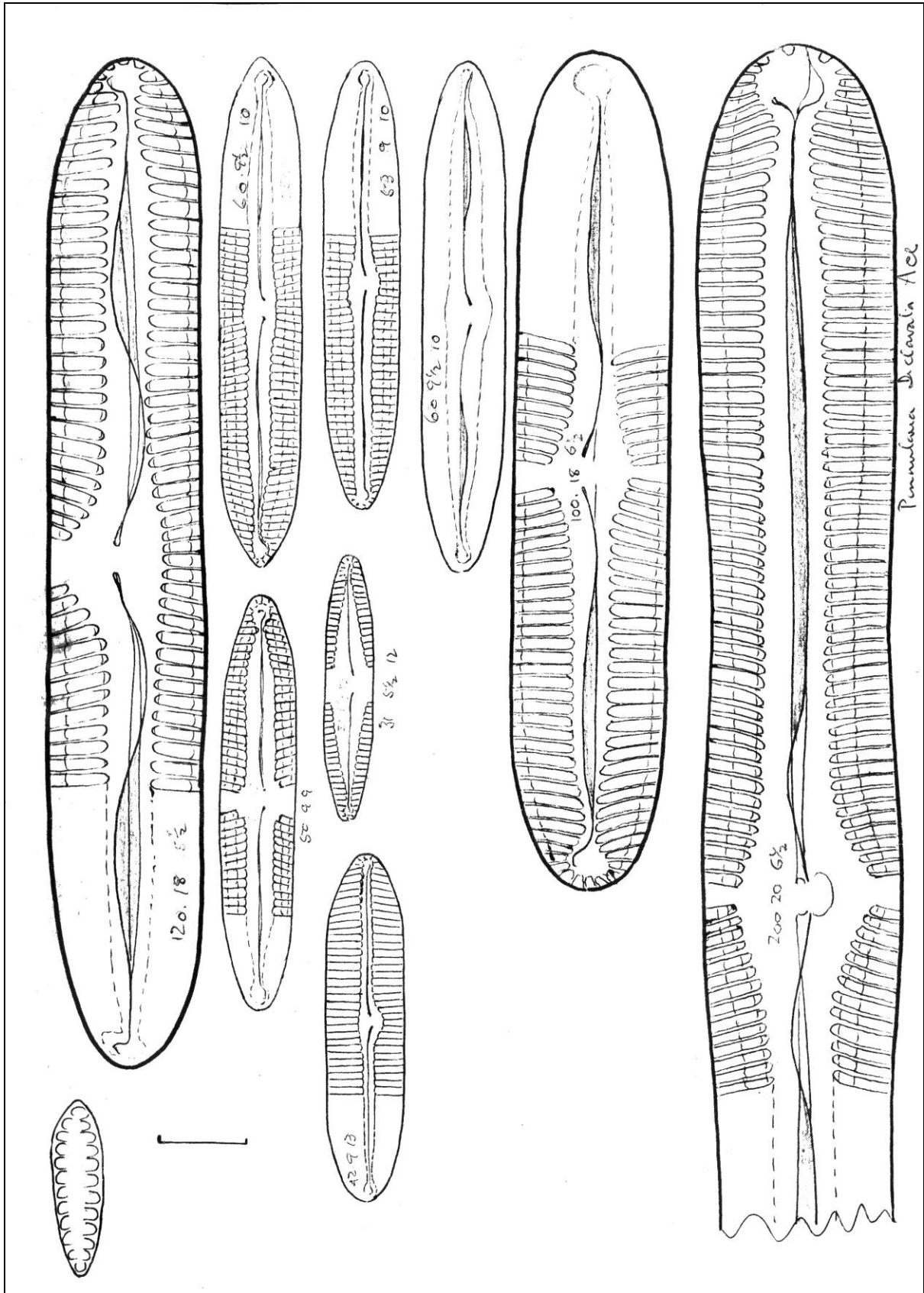




Plate 2



## A Record of Diatoms from Parsonage Pond, Nettlecombe Court, Sussex Annual Meeting of British Diatomists – 1982



The annual meeting this year was held at The Leonard Wills Field Centre, Nettlecombe Court, Williton, Sussex.

Attendance comprised some forty-four persons including diatomists from overseas.

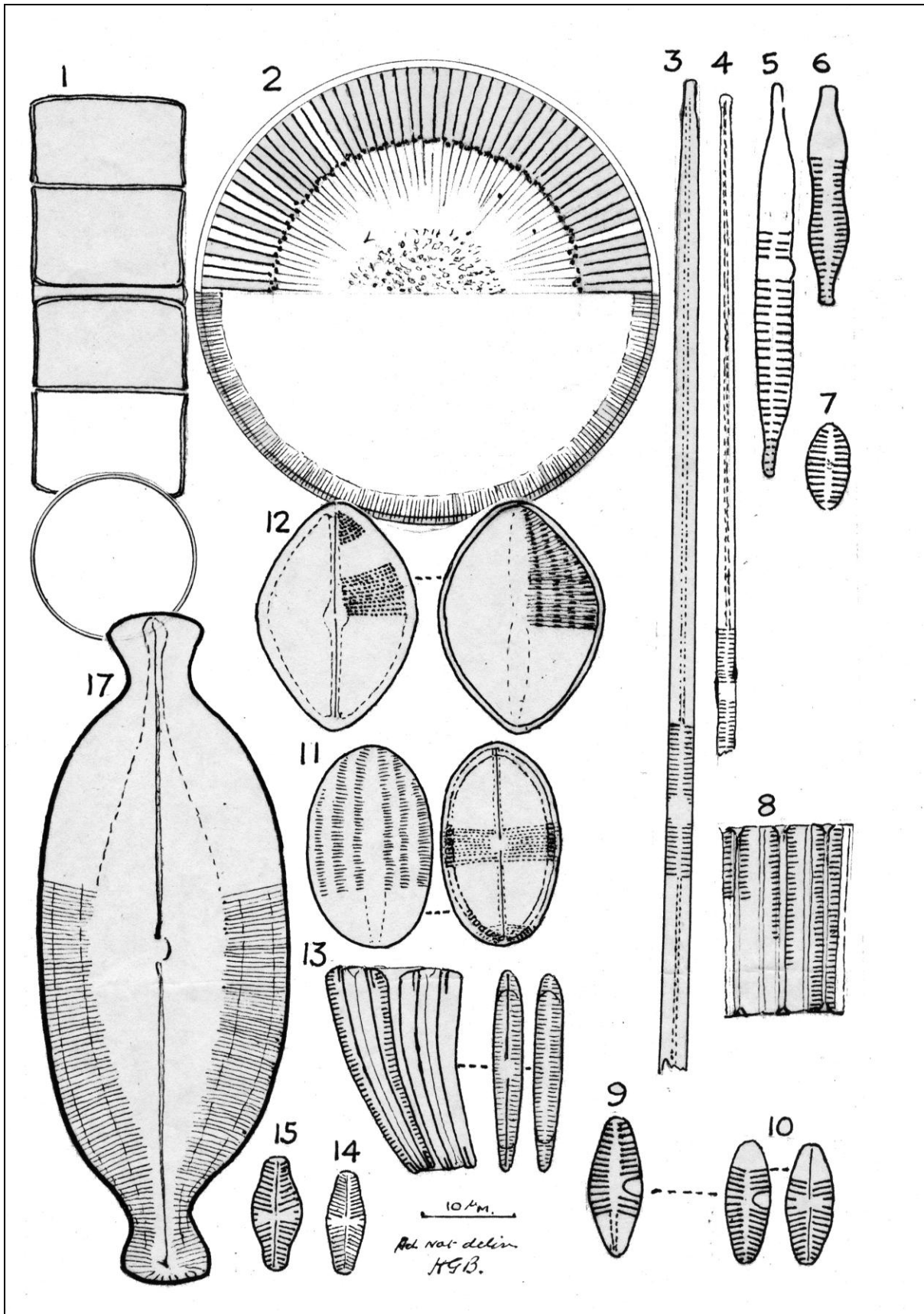
During the weekend opportunity was taken to make a gathering of diatoms from a stretch of water known as Parsonage Pond, within the grounds. Following is an illustrated account of the flora from filamentous algae. There is a preponderance of epiphytic forms, particularly *Gomphonema*, *Cocconeis* and *Achnanthes*.

A number of very small forms have not been recorded due to difficult identification, a size range of from 6-10 $\mu$ , but suspected of being minute *Achnanthes*. I would, however, like to thank my colleague John Carter for his able assistance with the very fine lanceolate *Nitzschia* group, also the two members of Bristol University, Dr. R. M. Crawford and Gill Lockett for organising a most pleasant weekend.

[Note: Bernard Hartley's slide BH1526 also relates to this collection]

**Plate 1**

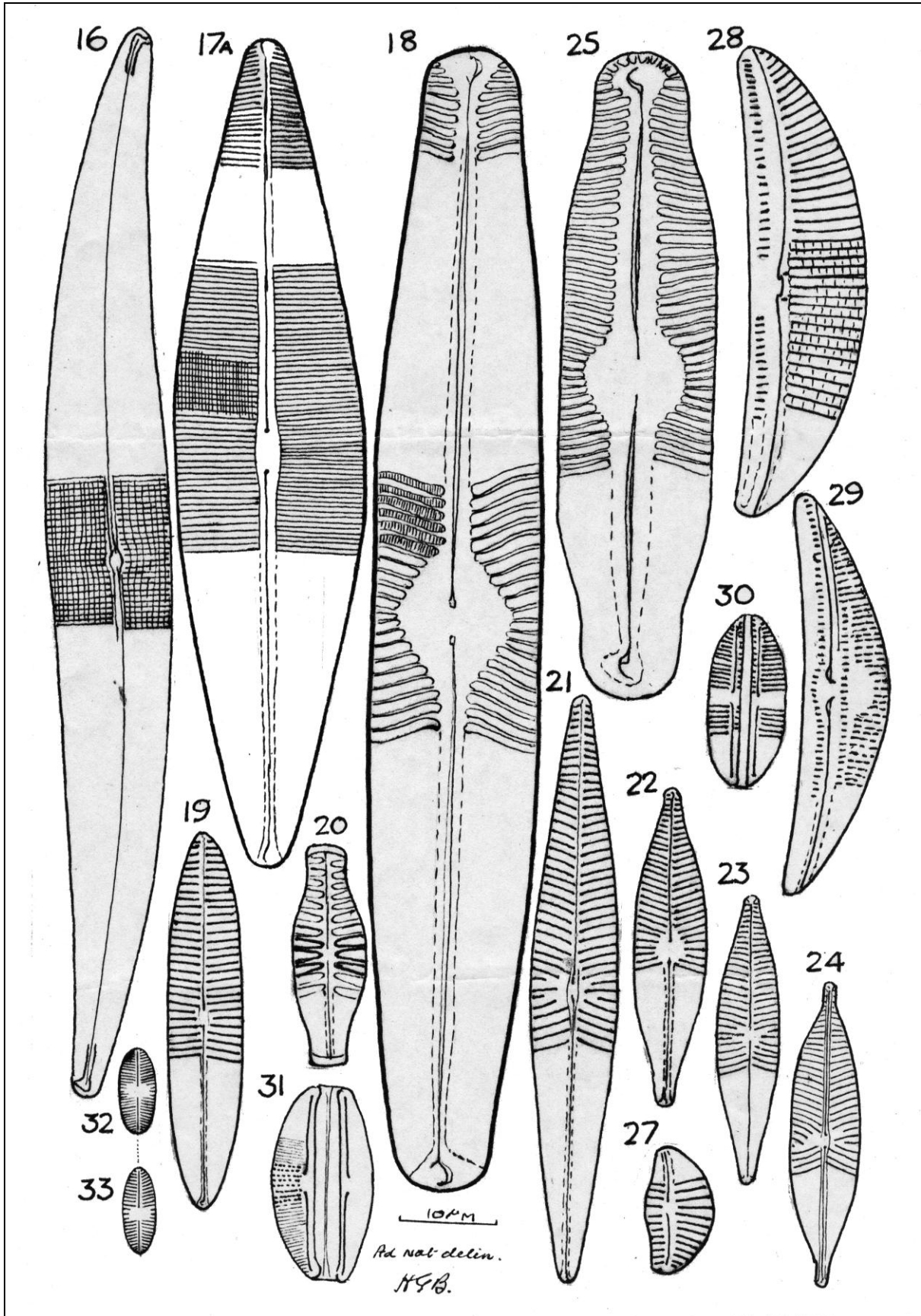
Figure/dimensions	Name
<b>1</b>	<i>Melosira varians</i> Aghard
	Girdle view 16½ dia. Valvar view 18 dia.
<b>2/50½.7</b>	<i>Melosira arenaria</i> Moore
	Note: The valve here shewing upper and lower foci levels
<b>3/160.3.12</b>	<i>Synedra ulna</i> (Nitz.) Ehrenberg
<b>4/130.2.15</b>	<i>Synedra ulna</i> (Nitz.) Ehrenberg
<b>5/66.5.10</b>	<i>Fragilaria vaucheria</i> (Kützing) Pet.
<b>6/24.4.13</b>	<i>Fragilaria construens</i> var. <i>binodis</i> (Ehrenberg) Grunow
<b>7/9½.4.15</b>	<i>Fragilaria construens</i> var. <i>venter</i> (Ehrenberg) Grunow
<b>8/20.4.13</b>	<i>Fragilaria construens</i> var. <i>binodis</i> (Ehrenberg) Grunow
	Valvar view of band of frustules
<b>9/15½.5½.15</b>	<i>Achnanthes lanceolata</i> (Brébisson) Grunow
	Hypo valve
<b>10/13½.5.15</b>	<i>Achnanthes lanceolata</i> (Brébisson) Grunow
	Hypo valve & epivalve
<b>11/22.13½.21</b>	<i>Cocconeis placentula</i> Ehrenberg
	Hypo valve & epivalve
<b>12/24½.18.21</b>	<i>Cocconeis pediculus</i> Ehrenberg
	Hypo valve & epivalve
<b>13/24½.6½.15</b>	<i>Rhoicosphenia curvata</i> (Kützing) Grunow
	Two frustules in girdle view. Epivalve and hypo valve.
<b>14/12.5.22</b>	<i>Navicula seminulum</i> Grunow
<b>15/11½.5.20</b>	<i>Navicula seminulum</i> Grunow



**Plate 2**

Figure/dimensions	Name
16/223.25.14	<i>Gyrosigma attenuatum</i> (Kützing) Rab.
	x½
17/73.27.16	<i>Caloneis amphisbaena</i> (Bory) Cleve
17A/88.20.16	<i>Navicula cuspidata</i> Kützing.
18/120.18.7	<i>Navicula oblonga</i> Kützing.
19/40.8.10	<i>Navicula tripunctata</i> (O.Mull.) Bory
20/24.5.7	<i>Navicula capitata</i> var. <i>hungarica</i> (Grunow) Ross
21/62.9.10	<i>Navicula radiosa</i> Kützing.
22/30.8.14	<i>Navicula cryptocephala</i> Kützing.
23/30½.6.15	<i>Navicula radiosa</i> var. <i>tenella</i> (Breb.) Cl. & Moll.
24/34.7½.15	<i>Navicula intermedia</i> Grunow
25/68.16.9	<i>Pinnularia</i> (var. <i>mesogongyla</i> ?) Ehrenberg
26/133.26.7	<i>Pibbularia major</i> (Kützing) Rab.
27/13½.7½.10	<i>Cymbella minuta</i> Hilse
28/50.12.10	<i>Amphora ovalis</i> Kützing.
29/42.9½.13	<i>Amphora ovalis</i> var. <i>affinis</i> (Kützing) H.v.H.
30/18.8.18	<i>Anphora pediculus</i> (Kützing) H.v.H.
	Frustule
31/20.10½.18/25	<i>Amphora veneta</i> Kützing.
32/8.3½.30	<i>Navicula minima</i> Grunow
33/8.3.29	<i>Navicula minima</i> Grunow
34/26.8½.10	<i>Gomphonema constrictum</i> Ehrenberg
35/53.14.10	<i>Gomphonema acuminatum</i> var. <i>coronata</i> (Ehrenberg) Rab.



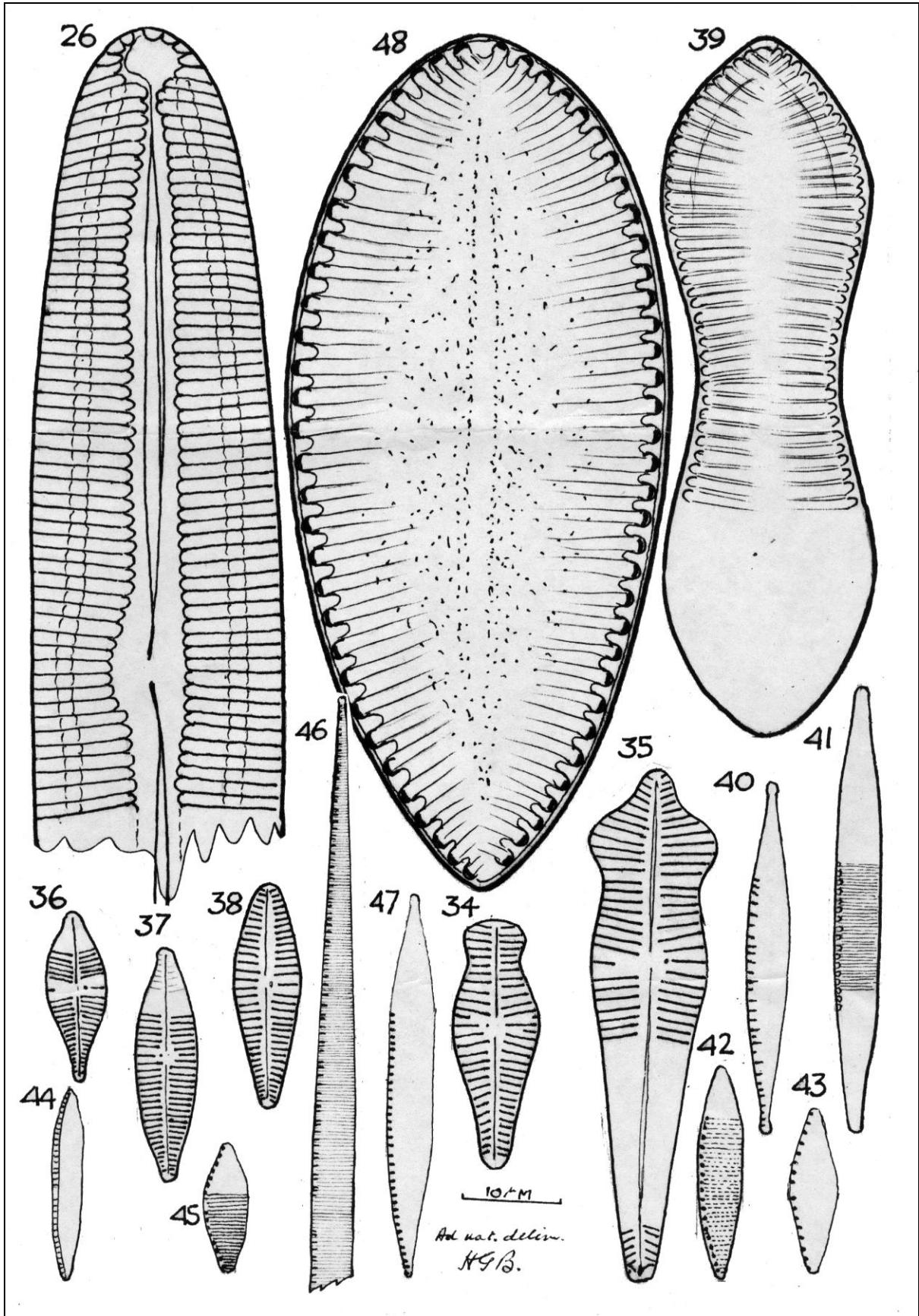


**Plate 3**

Figure/dimensions	Name
36/18.6.15	<i>Gomphonema parvulum</i> Kützing.
37/24.6.14	<i>Gomphonema parvulum</i> var. <i>micropus</i> (Kützing) Cleve
38/24.6½.12	<i>Gomphonema lanceolatum</i> fa.
39/73½.22.7	<i>Cymatopleura librile</i> (Ehrenberg) Pantocsek
40/36½.4.x.7/9	<i>Nitzschia recta</i> fa.
41/46½.4.22.10½	<i>Nitzschia romana</i> ? Grunow
42/22.5.18.9	<i>Nitzschia amphibia</i> Grunow
43/17.4½.x.9	<i>Nitzschia</i> sp.?
44/19.2½.17.45	<i>Nitzschia paleacea</i> (Grunow) Lange-Bertalot
45/13.3½.14.28	<i>Nitzschia frustulum</i>
46/140.4½.12.34	<i>Nitzschia tenuis</i> Wm.Sm
	x¾
47/40.4.12.44	<i>Nitzschia palea</i> var. <i>debilis</i> ?
48/89½.40.30	<i>Surirella turgida</i> ? Wm.Sm.
	A more lanceolate form occurred nearer the type.

Also in the sample – *Cymatopleura elliptica* Wm.Sm.

H.G. Barber  
Nov. 1982







Key to the individuals in the photograph above.

<b>A</b>	Anne-Marie Schmid
<b>B</b>	Debbie Oppenheim
<b>C</b>	Paul Smith (who kindly identified/confirmed the names of the individuals)
<b>D</b>	David George Mann
<b>E</b>	Roger Flowers
<b>A</b>	Maurice O. Moss
<b>B</b>	Klaus-Dieter Kemp
<b>C</b>	Patricia (Pat) Simms
<b>D</b>	Ann Smith
<b>E</b>	Marjorie Carter (wife of John R. Carter)
<b>F</b>	Theresa Gow

A Record of Diatoms from Parsonage Pond, Nettlecombe Court , Sussex – Horace G. Barber

<b>G</b>	Mary Mitchell
<b>H</b>	Gill Lockett
<b>I</b>	Peter Boyd
<b>J</b>	Elizabeth (Liz) Y. Haworth
<b>K</b>	Anthony Peabody
<b>L</b>	Robert Ross (14 <sup>th</sup> August 1912 – 2005)
<b>m</b>	Frank Round (1927 – 2010)
<b>n</b>	Horace George Barber (1 <sup>st</sup> September 1908 – 1982)
<b>a</b>	Robert (Bob) Isaac Firth (8 <sup>th</sup> October 1902 – 1982)
<b>b</b>	Barrie Paddock
<b>c</b>	Roger Flower
<b>d</b>	John R. Carter (1908 – 1993)
<b>e</b>	Martin Davey
<b>f</b>	Neil Roberts
<b>g</b>	Mishka Hogan-Guzowska
	The forehead between g & h belongs to Sarah Metcalfe
<b>h</b>	Roger McLean
<b>i</b>	Gwen Barber
<b>j</b>	Karen Serieyssol
<b>k</b>	Bernard Hartley (1917 – 2007)
<b>l</b>	John Anderson
<b>m</b>	Pieter Houpt
<b>n</b>	Tony Chamberlain
<b>o</b>	Samir Antoine
<b>p</b>	Richard (Dick) Crawford
<b>q</b>	Henry Hardin Gleave (13 <sup>th</sup> April 1909 – 17 <sup>th</sup> March 1990)



## An Account of the Diatom Flora of a Cooling Tower – Central Electricity Generating Board



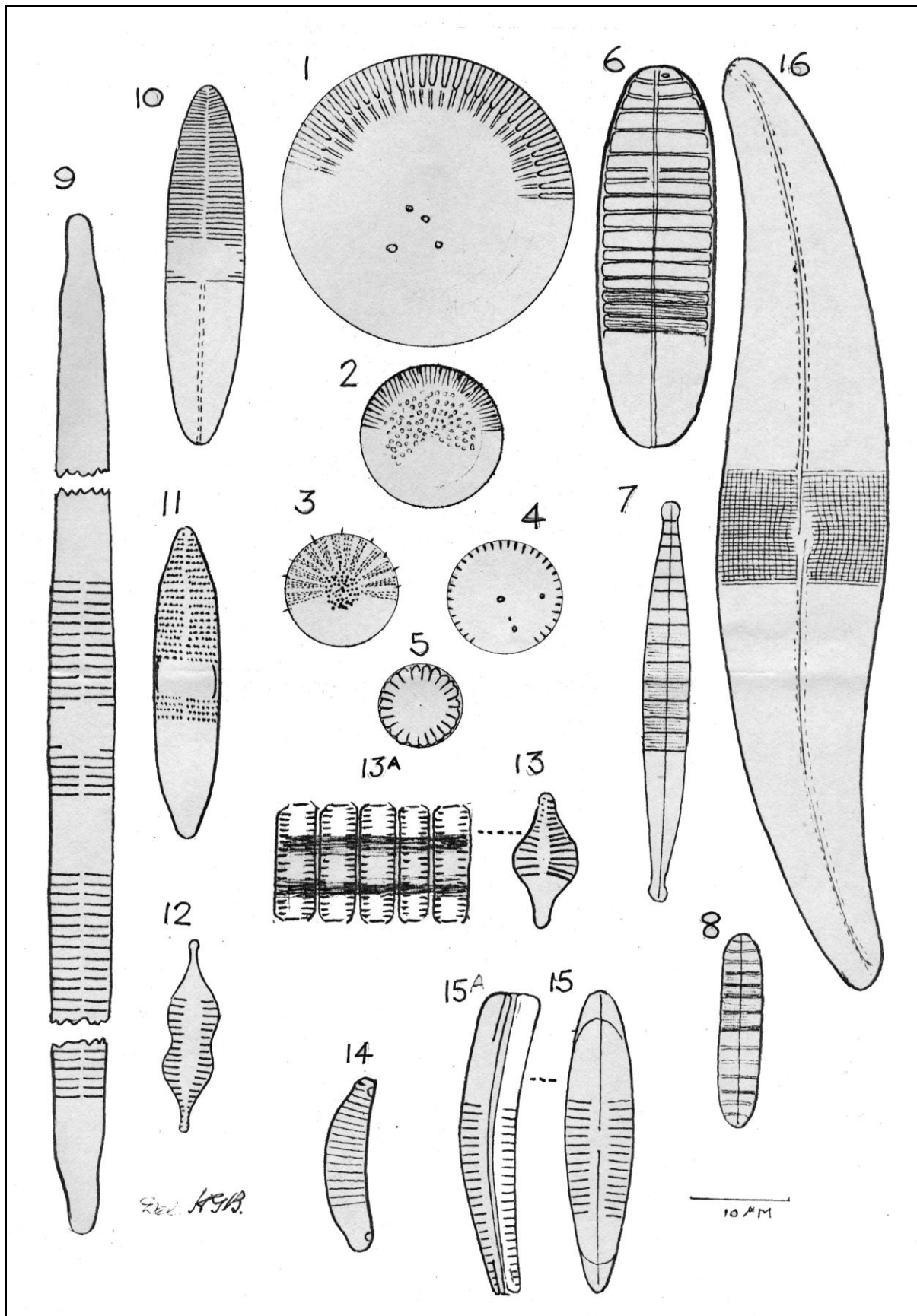
During the course of compiling a flora of the diatoms of Warwickshire, an examination of a black granular deposit was taken from Cooling Tower No.2. at the Hams Hall Power Station by the station supervisor Mr. Stokes.

In view of the fact the water is condensed steam (virtually distilled water) very few diatoms, if any, were expected to be recorded. However, this was not so, as some thirty or so taxa were found. The majority of the forms were fractured but sufficient portions were found to be able to reconstruct and illustrate.

The cleaned material is still heavily adulterated with minerals etc, detritus and the resulting slides are by no means 'elegant'.

### Plate 1

Figure	Name
1	<i>Cyclotella striata</i> (Kützing) Grunow
2	<i>Cyclotella comta</i> (Ehrenberg) Kützing.
3	<i>Stephanodiscus rotula</i> (Hend.)
4	<i>Thalassiosira</i> sp. ?
5	<i>Cyclotella meneghiniana</i> Kützing.
6	<i>Diatoma vulgare</i> Bory
7	<i>Diatoma vulgare</i> fa.
8	<i>Diatoma vulgare</i> fa.
9	<i>Synedra ulna</i> (Nitz.) Ehrenberg
10	<i>Synedra ulna</i> (?) var. <i>impressa</i> Hust.
11	<i>Synedra pulchella</i> var. <i>lanceolata</i> O'Meara
12	<i>Synedra parasitica</i> (Wm.Smith) Hust.
13	<i>Fragilaria construens</i> (Ehrenberg) Grunow
13A	<i>Fragilaria construens</i> (Ehrenberg) Grunow Girdle (side) view of five frustules
14	<i>Eunotia</i> sp.
15	<i>Rhoicosphenia curvata</i> (Kützing) Grunow Valvar view
15A	<i>Rhoicosphenia curvata</i> (Kützing) Grunow Girdle or side view
16	<i>Gyrosigma Kützingiana</i> (Grunow) Cleve



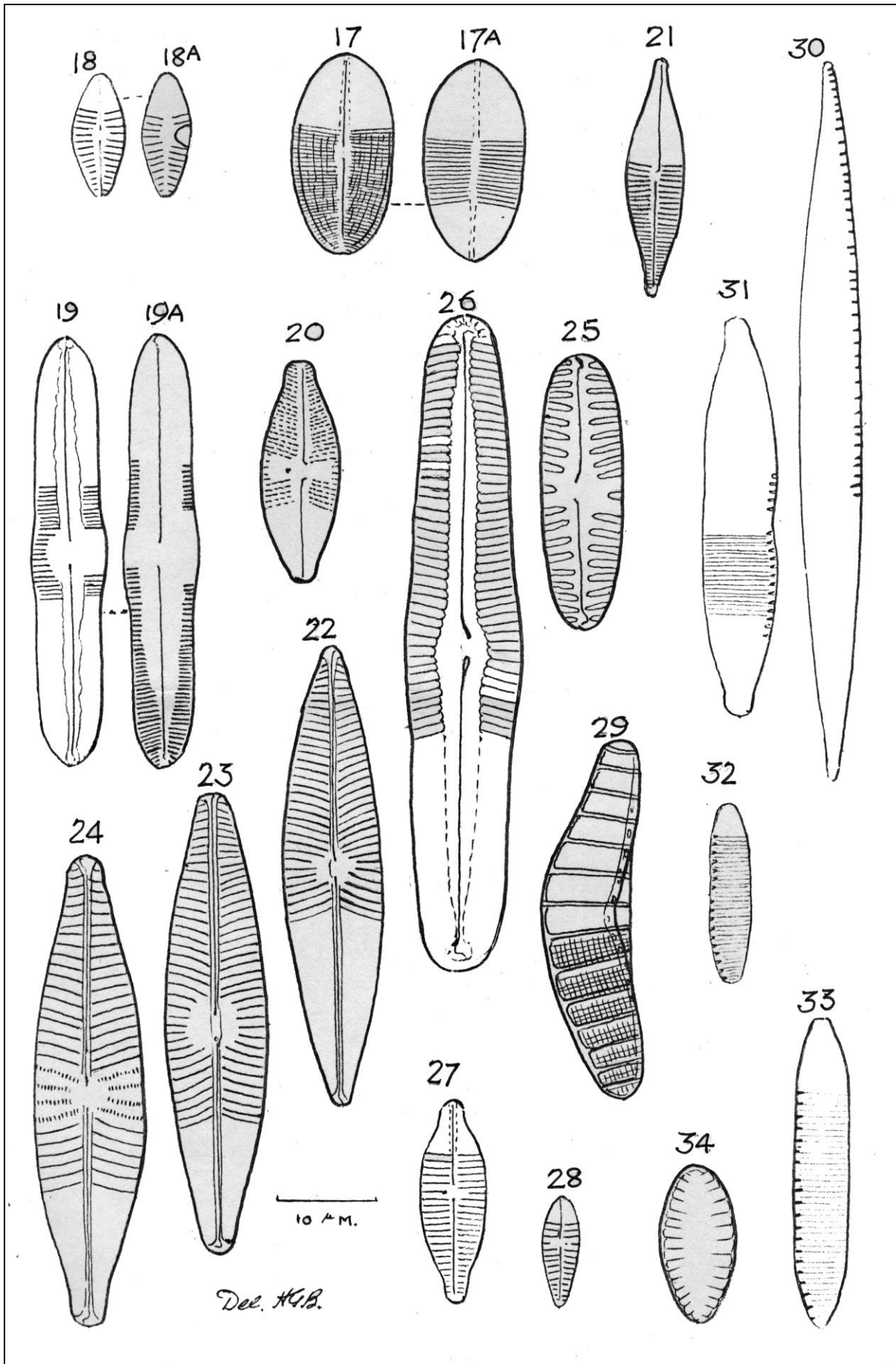
## Plate 2

Figure	Name
17	<i>Cocconeis placentula</i> var. <i>vulgaris</i> (Ehrenberg) Cleve Epivalve
17A	<i>Cocconeis placentula</i> var. <i>vulgaris</i> (Ehrenberg) Cleve Hypo valve
18	<i>Achnanthes lanceolata</i> Breb. Epivalve
18A	<i>Achnanthes lanceolata</i> Breb. Hypo valve
19	<i>Caloneis ventricosa</i> Cleve ?
19A	<i>Caloneis ventricosa</i> Cleve ?
	These two valves (19 & 19A) of the same frustule are an anomaly, for although near to <i>C. ventricosa</i> the central areas are incorrect.
20	<i>Navicula mutica</i> Kützing. fa.
21	<i>Navicula gregaria</i> Donkin
22	<i>Navicula radiosa</i> Kützing. Lanceolate form
23	<i>Navicula avenacea</i> Breb.
24	<i>Navicula slesvicensis</i> Grunow
25	<i>Pinnularia borealis</i> Ehrenberg
26	<i>Pinnularia</i> sp. An indeterminate form
27	<i>Gomphonema parvulum</i> (Kützing) Grunow
28	<i>Gomphonema parvulum</i> var. <i>micropus</i> (Kützing) Cleve
29	<i>Epithemia zebra</i> var. <i>saxonica</i> (Kützing) Grunow
30	<i>Nitzschia recta</i> Hantz. fa. An indeterminate form for the keel puncta are very irregular and set quite close at ends of valve
31	<i>Hantzschia amphioxus</i> (Ehrenberg) Grunow
32	<i>Nitzschia amphibia</i> Grunow
33	<i>Nitzschia amphibia</i> Grunow
34	<i>Surirella ovata</i> Kützing.

The taxonomy in general is that of Hustedt's 1930 work.

#### Acknowledgements.

I am most grateful to Mrs. Copsal of Warwick Museum and Mr. Stokes of C.E.G.B. for their kind help in procuring the material.



## Windermere Sample No. BH752



Ferry House on Lake Windermere  
©Steve Edgar 2014



North from Ferry Nab  
©Steve Edgar 2014

A total of 18 plates were prepared by Horace G. Barber and communicated to Bernard Hartley for comment. Though Bernard Hartley's letter to Horace Barber detailing his findings exists the first 6 plates are missing from the record and the text to Plate 7 is also absent.

Bernard Hartley's comments have been included in each Plate Index and appear in braces {thus}.

Sample BH752 is recorded in Bernard Hartley's sample index as follows:

752	<p>Core from Windermere Taken by the Liverpool University team under Rodger Padgham (upper recent) ex Ron Darby</p> <div style="display: flex; justify-content: space-around;"> <div style="border: 1px solid green; padding: 5px; width: 45%;"> <p><u>PINNULARIA PLATYCEPHALA</u> <u>EPISCOPALIS ETC.</u> 400</p> <p>Windermere: upper end of core taken by University of Liverpool. BH752.</p> <p><i>Handwritten notes:</i> Firth Liverpool</p> </div> <div style="border: 1px solid green; padding: 5px; width: 45%;"> <p><u>WINDERMERE</u> 369</p> <p>"Upper Core" 400</p> <p>BH 752 &gt; 600</p> </div> </div> <p style="text-align: center;"><i>R.I. Firth index card</i></p> <div style="display: flex; justify-content: space-around;"> <div style="border: 1px solid green; padding: 5px; width: 45%;"> <p><u>WINDERMERE</u> (Upper end core taken by Liverpool University). 400</p> <p><i>P. episcopalis, platycephala</i> etc. (BH752)</p> </div> <div style="border: 1px solid green; padding: 5px; width: 45%;"> <p><u>PINNULARIA EPISCOPALIS</u> <u>PLATYCEPHALA ETC.</u> 400</p> <p>Upper end of core taken by Liverpool University in Windermere. BH752.</p> </div> </div> <p style="text-align: center;"><i>R.I. Firth index card</i></p> <p style="color: red;">[Atlas Plate No.227 &amp; 213]</p>
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Bernard Hartley's letter to Horace Barber also includes a list of species to be added to his own listing. The letter – comments on Plates 1 thru 18 and the additional species list is as follows:

"Solden", Howley, Chard,  
Somerset TA20 3DX  
19<sup>th</sup> January 1980

Dear Horace,

I have now had the pleasure of spending some time with your 18 plates of the Windermere sample No. BH752., and I set out my detailed comments below:-

Plate No. 1.

- No. 1. looks very much like the 'teres Brun' valve.
- 2 & 3. I thought were more like *italica* (Ehrenberg) Kütz,



- 4, 8, 9, 10 & 11. agreed.
5. don't know !
- 6 & 7. *Melosira distans* var. *blelhamensis* Evans

Plate No. 2.

- 1, 3, 4, 6, 10, 12 & 13. agreed.
2. also agreed but now called *Hannaea arcus* (Ehrenberg) Patr.
5. *Fragilaria construens* (Ehrenberg) Grun.
7. *Eunotia formica* Ehrenberg
8. *Eunotia valida* Hust.
9. *Eunotia pectinalis* var. *minor* (Kützing) Rabh.
11. *Eunotia diodon* Ehrenberg

Plate No. 3.

- 1 & 2. agreed, but now known as *Eunotia serra* var. *diadema* (Ehrenberg) Patr.
3. *Achnanthes* not *Cocconeis*
- 4, 5, 6, 8, & 11. agreed.
7. I assume that you mean *Cocconeis placentula* var. *euglypta* (Ehrenberg) Cl.
9. I thought that this was nearer to *Achnanthes exilis* Kützing.
10. Could this be *Achnanthes microcephala* (Kützing) Grun.?

Plate No. 4.

1. I think you meant *Frustulia rhomboides* (Breb.) de Toni.
2. The outline looks more like *Frustulia vulgaris* Rabh.
3. Could this be *Gyrosigma acuminatum* (Kützing) Rabh.
- 5, 6, 7, 8 & 9. agreed.

Plate No. 5.

All agreed

Plate No. 6.

- 1, 2, 4, 5, 10, 11 & 12 agreed.
3. fo. *thermalis* (Grun.) Hust.
6. *Navicula bacillum* Ehrenberg as LH. fig. 465c, not 467d.
7. I don't know this but see A.Cl. Eul fig 893c.
8. & 9. Could be a N.sp., but see A.Cl. Eul. fig. 1013 a-g for *P. minuta* (Ost.) Cl.

Plate No. 7.

- 1, 3, 4, & 6. agreed
2. possibly also var. *angusta* Grun.
5. & 7. I too am uncertain.
8. agreed, possibly as A.Cl. Eul. Fig. 816A, but see also fig. 816o.

Plate No. 8.

All agreed, but if you want to give them var. status then :-

1. is var. *elliptica* Grun.
2. is the type.
3. is var. *bacillaris* (M. Perag.) Mills.
4. is var. *parallela* (Brun.) Patr.

Plate No. 9.

- 1, 3, 5, 7, & 8. agreed
2. Could this be *P. debilis* var. *interrupta* A.Cl. See her fig. 1041d
6. Could this be *P. debilis* (Pant.) A.Cl. See her fig. 1041a
4. Don't know.

Plate No. 10.

1. This looks very much like *P. legumen* Ehrenberg with a stauros.
2. *P. stomatophora* var. *triundulata* Font.
- 3, 4, 5 & 6. agreed.;

Plate No. 11.

1. Could this also be *P. debilis* (Pant.) A.Cl.
2. Look at A. Cl. Eul. fig. 1097, *P. angusta-elliptica* A.Cl.
- 3, 4 & 5 agreed.

Plate No. 12.

1. *P. latevittata* Cl.
2. See A.Cl. Eul. fig. 1063b as a var. of *episcopalis*. Alternatively it could be a var. of *bogatensis* (Grun.) Cl.
3. Seems between *P. major* (Kützing) Rabh. and *P. ruttneri* Hust.

Plate No. 13.

- 1, 2 & 3 agreed but with regard to no. 3, what does *P. valida* look like?

Plate No. 14.

All agreed.

Plate No. 15.

1. 2. 3?. 7. 9. 10 & 11 agreed.
4. *Cymbella leptoceros* (Ehrenberg) Kützing.

5. *Cymbella heteropleura* var. *minor* Cl. I think, but where does *C. cuspidata* begin?
6. *Cymbella cymbiformis* (Ag?Kützing.) V.H.
8. I believe that this is a form of *C. turgida*

Plate No. 16.

All agreed.

Plate No. 17.

1. *Epithemia argus* Kützing. as LH. 727a.
- 2, 4, 7, 8 & 10 agreed.
3. *Rhopalodia gibba* (Ehrenberg) O. Muller as A.S.A 255/1.
- 5 & 6. I think that these could both be *Nitz. linearis* (Ag.) W Sm. but I wouldn't argue from these two figures.
9. I think this is *Nitz. angustata* (W.Sm.)Grun., not var. *acuta*.

Plate No. 18.

- 1 & 2 agreed.
3. could possibly be *S. linearis* W.Sm.
4. could possibly be *S. linearis* var. *constricta* (Ehrenberg) Grun.

I have also looked at the list which I prepared a few years ago.

The following should be added to the list :-

- Achnanthes ? linearis* W.Sm.
- Achnanthes coarctata* var. *elliptica* Krasske.
- Anomoeoneis vitrea* (Grun.) Ross.
- Caloneis ventricosa* (Ehrenberg) Meister
- Cymbella aspera* (Ehrenberg) Cl.
- Cymbella cuspidata* Kützing.
- Cymbella lanceolata* (Ehrenberg) V.H.
- Cymbella turgida* (Greg.)Cl. as A.S.A.373/7.
- Cyclotella meneghiniana* Kützing. \_
- Cyclotella pseudo-stelligera* ? brackish
- Diploneis ovalis* Hilse.
- Eunotia arcus* Ehrenberg
- Eunotia gracilis* (Ehrenberg) Rabh.
- Eunotia parallela* Ehrenberg
- Fragilaria capucina* Dez.
- Fragilaria vaucheriae* (Kützing) Boye Pet.
- Fragilaria lapponica* Grun.
- Fragilaria pinnata* Ehrenberg
- Frustulia rhomboides* var. *saxonica* (Rabh.) deToni.
- Gyrosigma acuminatum* (Hantzsch.) Grun.
- Hantzschia elongata* (Hantzsch.) Grun.
- Navicula scutelloides* W.Sm.
- Melosira italica* (Ehrenberg) Kützing.
- Melosira granulata* var. *angustissima* fo. *spiralis* O. Muller.
- Pinnularia acuminatum* W.Sm.
- Pinnularia gentilis* (Donk.) Cl.
- Pinnularia subsolaris* (Grun.) Cl.
- Pinnularia viridis* (Nitzsch.)Ehrenberg
- Stauroneis phoenicentron* fo. *gracilis* (Ehrenberg) Hust.
- Surirella elegans* Ehrenberg
- Surirella robusta* Ehrenberg
- Synedra ulna* var. *danica* (Kützing) Cl. .

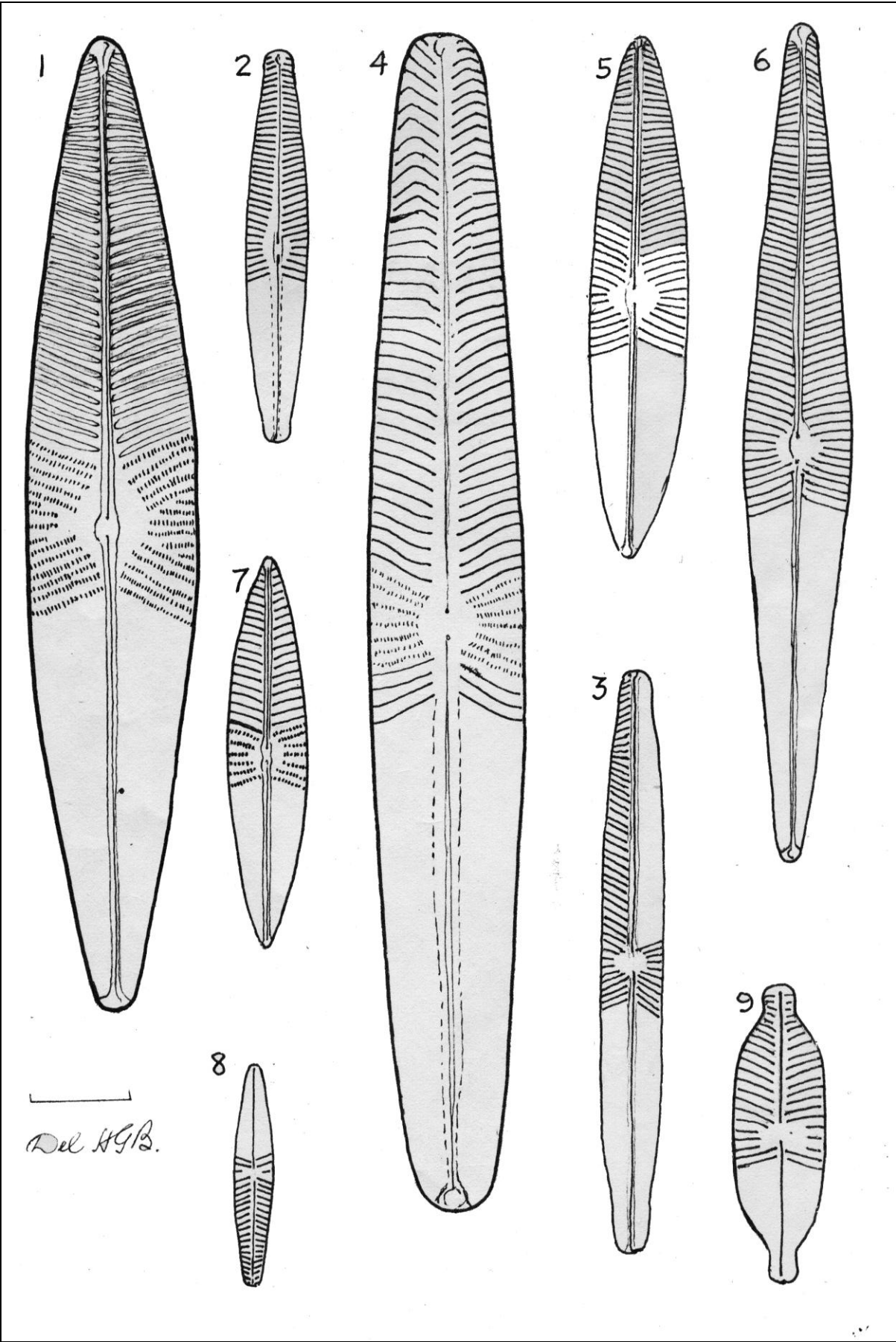
That's the lot.

Bernard.

**Plate 7** (Bernard Hartley's comments only)

Figure/dimensions	Name
1.	?
	{agreed}
2.	?
	{possibly also var. <i>angusta</i> Grun.}
3.	?
	{agreed}
4.	?
	{agreed}
5.	?
	{I too am uncertain}
6.	?
	{agreed}
7.	?
	{I too am uncertain}
8.	?
	{agreed, possibly as A.Cl. Eul. Fig. 816A, but see also Fig. 816o.}
9.	?

Plate 7



**Plate 8**

Figure/dimensions	Name
1/113.32.8	<i>Pinnularia divergens</i> Wm.Sm.
	{var. <i>elliptica</i> Grun}
2/86½.16.10	<i>Pinnularia divergens</i> Wm.Sm.
	{Type}
3/84½.16.10	<i>Pinnularia divergens</i> Wm.Sm.
	{var. <i>bacillaris</i> (M.Perag) Mills}
4/93.16.10	<i>Pinnularia divergens</i> Wm.Sm.
	{var. <i>parallela</i> (Brun) Patrick}

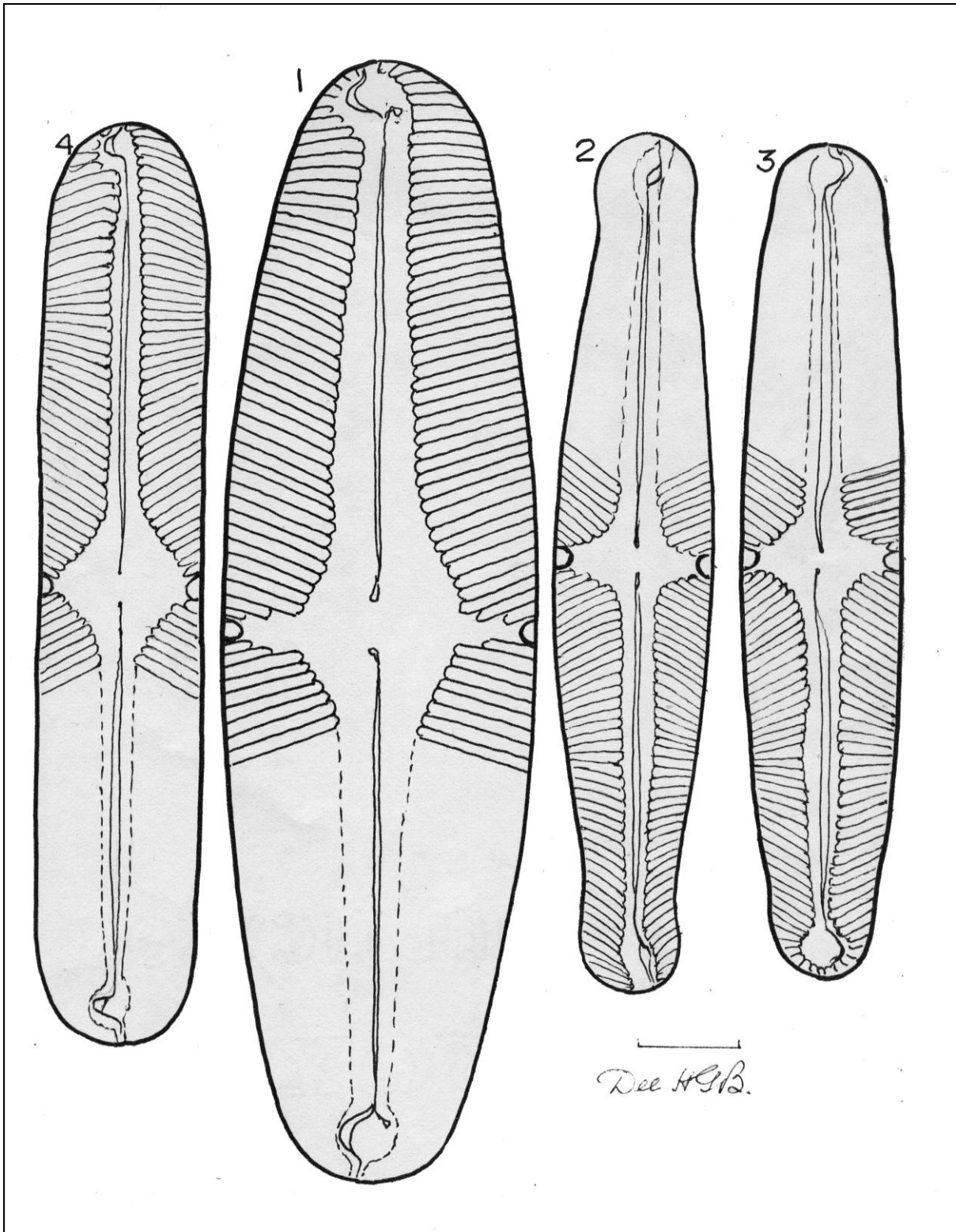
## Note:

The gathering contains many specimens of *P. divergens* and the outlines shew great variation intergrading throughout so that question of names is superfluous.

Many of the forms *P. divergens* and *P. cardinalis* are marked or marred by excrescences (an outgrowth or enlargement) in the axial areas similar to the feature shewn in A. Cl.-Euler's Diatoms of Sweden and Finland for "*P. major* v. *horrida*". I am sure it is not a genetic feature but a parasitic one during initial growth. I have found it also occurs in other genera when in certain sites.

I would also raise the question whether *P. cardinalis* is one phase of *P. divergens*?

Plate 8

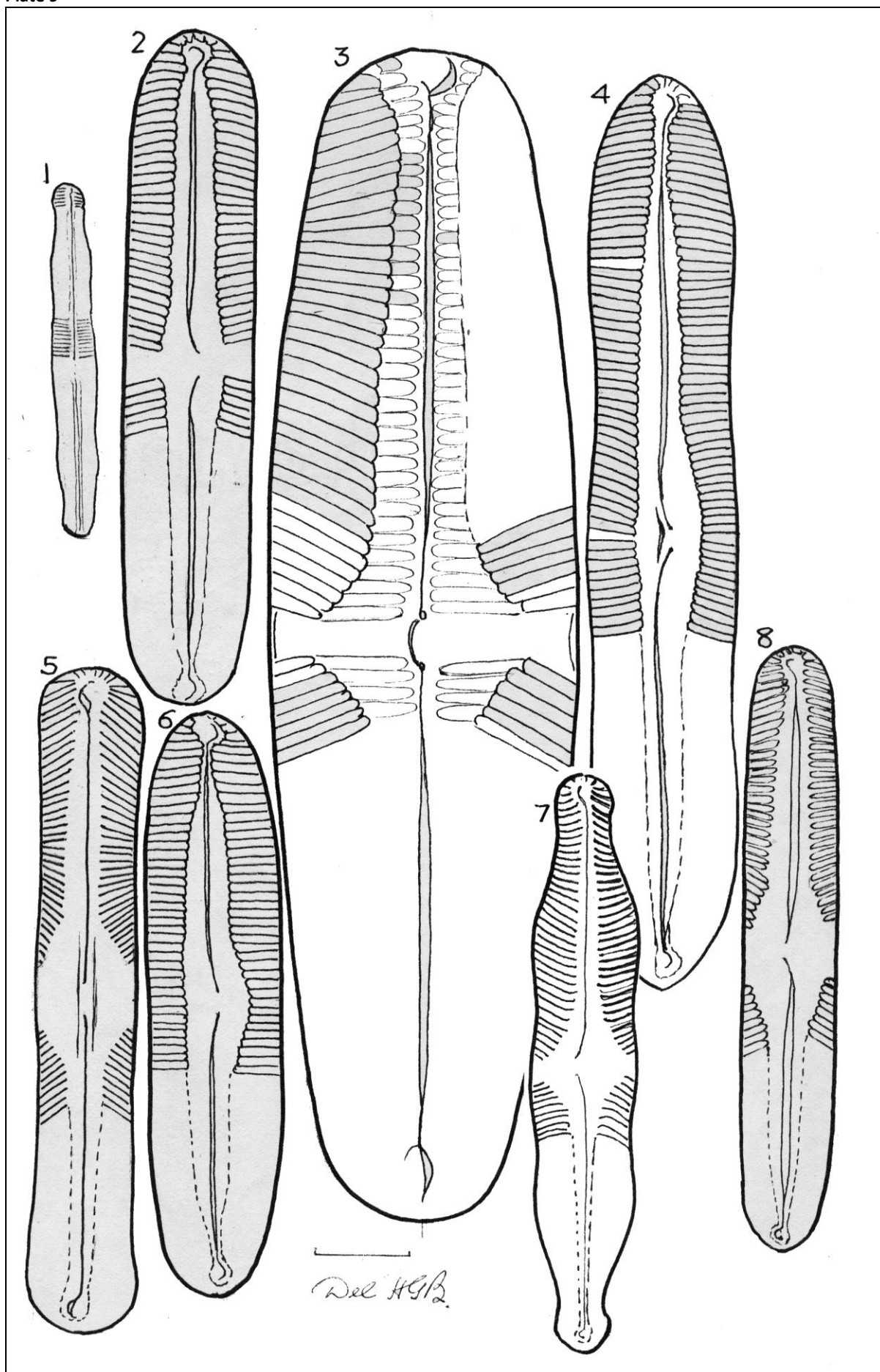




## Plate 9

Figure/dimensions	Name
1/38.5.22	<i>Pinnularia undulata</i> Greg.
	Ross in Canadian Arctic states this is probably <i>P. cleveana</i> {agreed}
2/73.14.9	<i>Pinnularia</i> sp.
	This is close to <i>P. brevicostata</i> (Hust. 609) but the raphe system does not tally. I have 3 or 4 sketches of "Hust. 609" and the raphe is spot on to his illustration. {Could this be <i>P. debilis</i> var. <i>interrupta</i> A.Cl. See her Fig 1041d}
3/126.33.7	<i>Pinnularia episcopalis</i> Cl.
	Note the ghost striae here, they should normally follow the main striae directions and I've never seen like this before. {agreed}
4/100.16.9	<i>Pinnularia</i> sp. ? <i>britannica</i>
	(See Cl.Eu. 1102) {Don't know}
5/72.11.13	<i>Pinnularia branderii</i> Cl.
	{agreed}
6/63.14.9	<i>Pinnularia hemiptera</i> (Kützing) Cl.
	{Could this be <i>P. debilis</i> (Pant.) A.Cl. See her Fig 1041a}
7/62½.11.13	<i>Pinnularia mesolepta</i> (Ehrenberg) Wm.Sm.
	{agreed}
8/64½.10.10	<i>Pinnularia abaujensis</i> var. <i>linearis</i> (Hust) Patr.
	{agreed}

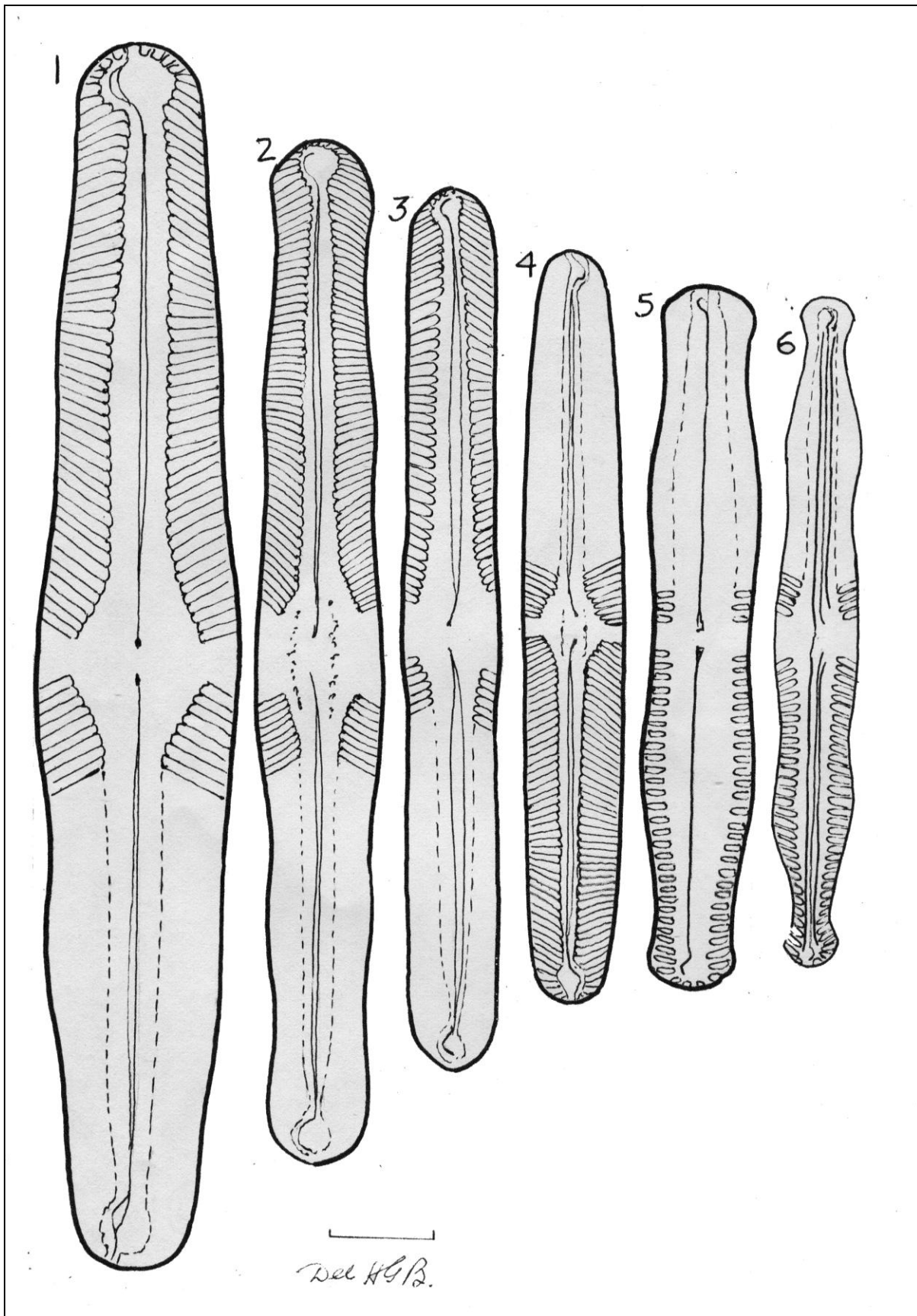
Plate 9



**Plate 10**

<b>Figure/dimensions</b>	<b>Name</b>
<b>1/120.20.10</b>	<i>Pinnularia stauroptera</i> (Rab.) Cl.
	I query this because the BM type slide by Temper & Peragallo 13035 calls the form <i>P. legumen</i> but I have always taken this latter form to be <i>P. stomatophora</i> – <i>P. legumen</i> always has capitate ends, not rostrate. (I do not think the continuous striae as per Hust. 587 is always so.) {This looks very much like <i>P. legumen</i> with a stauros.}
<b>2/100.13.13</b>	<i>Pinnularia</i> ? <i>stauroptera</i> (Rab.) Cl. ? <i>stomatophoroides</i> fo. <i>triundulata</i> (Font.) A.Cl.
	{ <i>P. stomatophora</i> var. <i>triundulata</i> Font.}
<b>3/86½.9½.10</b>	<i>Pinnularia abaujensis</i>
	{agreed}
<b>4/73.10.15</b>	<i>Pinnularia stomatophora</i> Grun.
	{agreed}
<b>5/69.10½.8</b>	<i>Pinnularia subnodosa</i> Hust.
	Two or three forms present. {agreed}
<b>6/65.8.9</b>	<i>Pinnularia nodosa</i> Ehrenberg
	Six or seven forms present. {agreed}

Plate 10

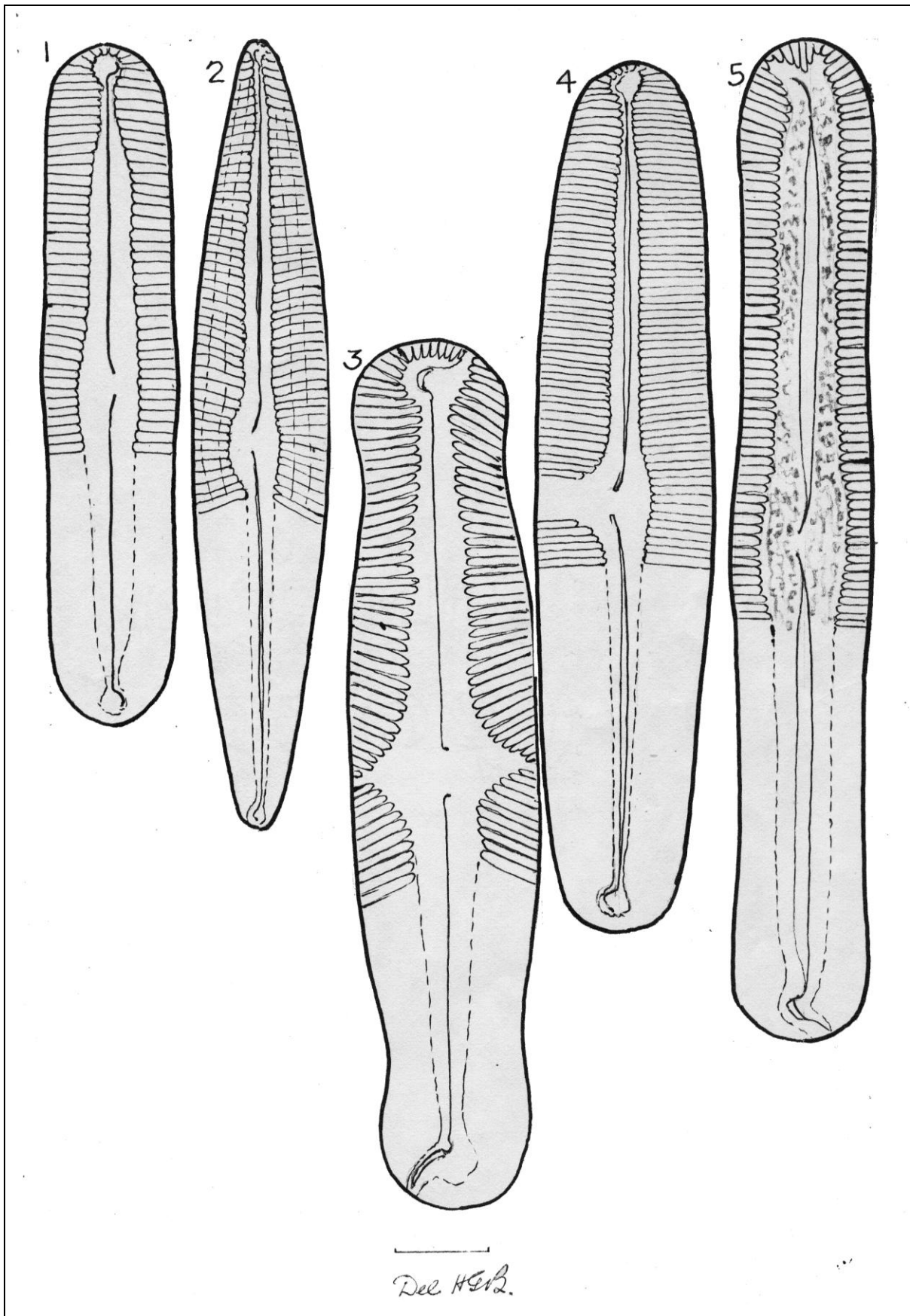


**Plate 11**

Figure/dimensions	Name
1/73.14½.9	<i>Pinnularia hemiptera</i> (Kützing) Cl.
	{Could this also be <i>P. debilis</i> (Pant.) A.Cl.}
2/85.14½.11	<i>Pinnularia</i> sp.
	This is near <i>P. viridis</i> var. <i>sudetica</i> . {Look at A.Cl.Eu. Fig. 1097, <i>P. anguste-elliptica</i> A.Cl.}
3/93.20.11	<i>Pinnularia platycephala</i> (Ehrenberg) Cl.
	{agreed}
4/93.18½.10	<i>Pinnularia semicrucata</i> (A.S.) A.Cl.-Eu.
	Quite frequent as I have only found rarely in the past. {agreed}
5/107.14½.11	<i>Pinnularia acrosphaeria</i> Breb.
	Quite frequent and has some variation of outline together with the occasional form where the axial area has very little markings but have known from elsewhere. {agreed}



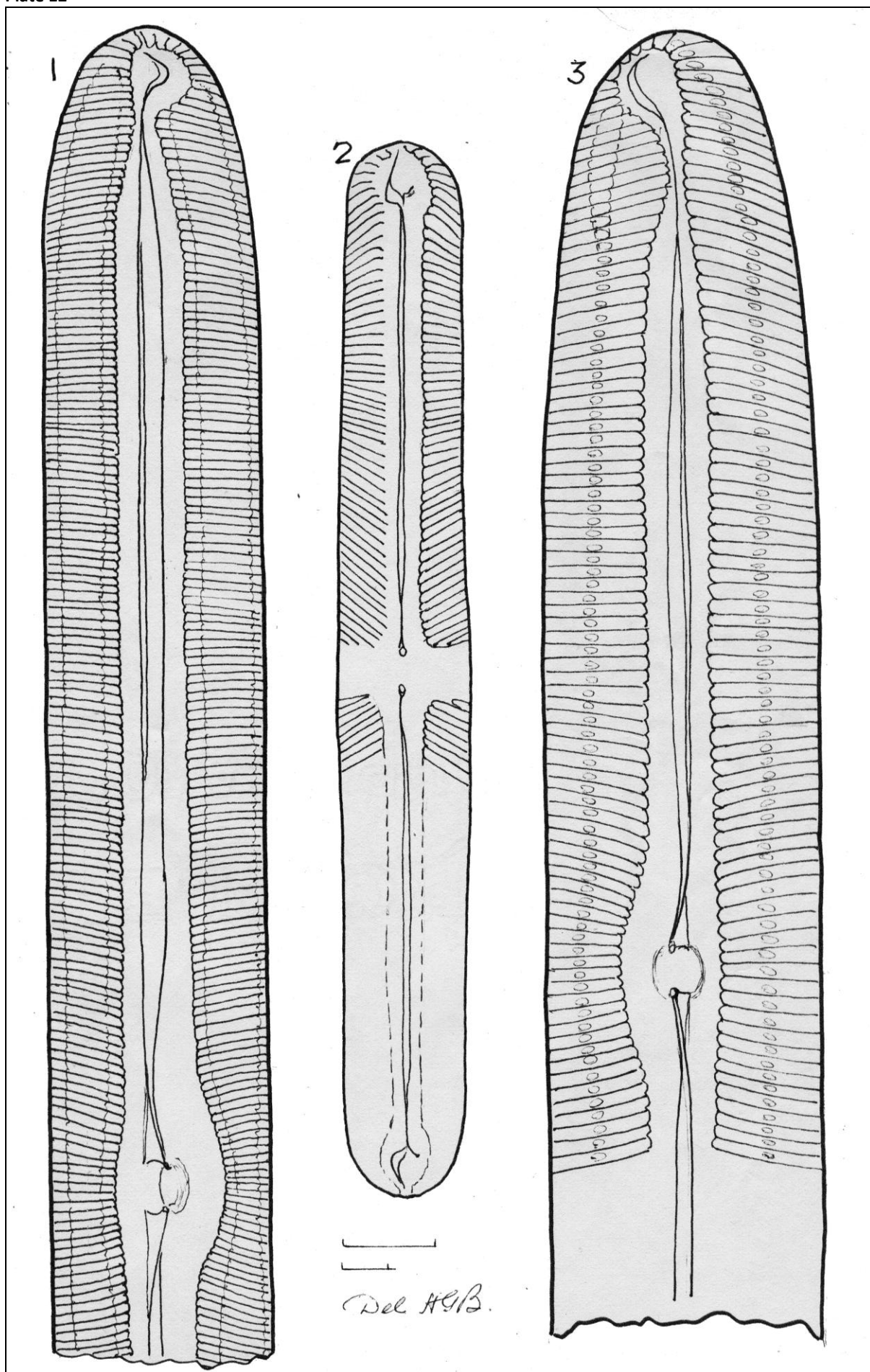
Plate 11



**Plate 12**

Figure/dimensions	Name
1/	<p><i>Pinnularia</i> sp.</p> <p>I cannot say <i>P. nobilis</i>, shape of the valve ends wrong, should be full rounded not cuneate, langsbands OK but the raphe system is wrong. This is a raphe for <i>P. major</i>! but again the form is not <i>P. major</i>. {<i>P. latevittata</i> Cl.}</p>
2/	<p><i>Pinnularia</i> ?<i>abaujensis</i></p> <p>Centre only very slightly gibbous. I can only think possibly a form of <i>abaujensis</i> or <i>bogatensis</i> or even <i>P. stomatophora</i> without central markings. {See A.Cl.Eu. fig. 1063b as a var. of <i>episcopalis</i>. Alternatively it could be a var. of <i>bogatensis</i> (Grun.) Cl.</p>
3/	<p><i>Pinnularia</i> sp.</p> <p>If this a <i>P. major</i> then the langsbands are the narrowest I've seen – just as depicted. I may say I've seen the form elsewhere and I don't like it as <i>P. transversa</i>. {Seems between <i>P. major</i> (Kützing) Rabh. and <i>P. ruttneri</i> Hust.}</p>

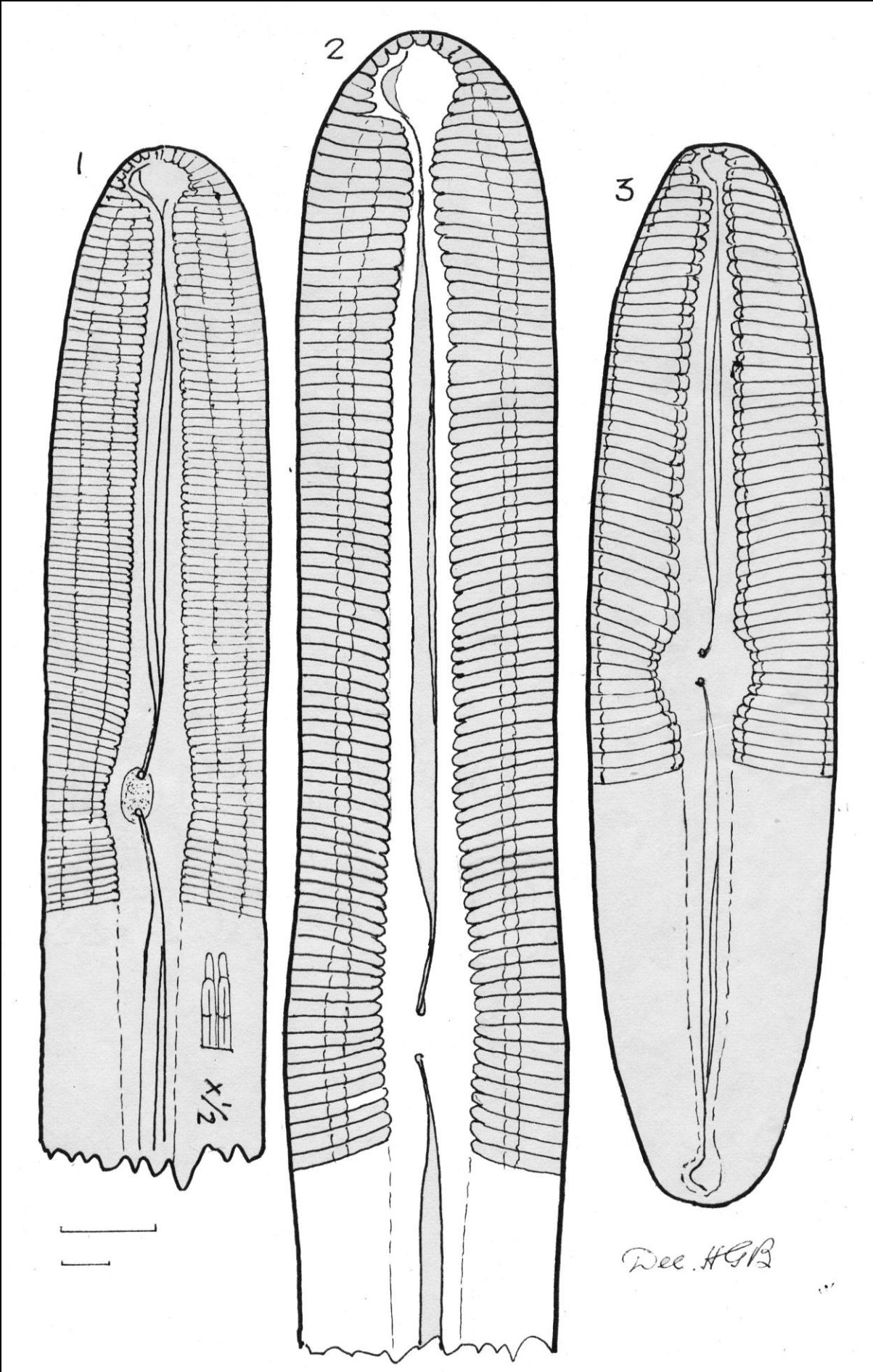
Plate 12



**Plate 13**

Figure/dimensions	Name
1/280.48.5	<p><i>Pinnularia</i> ??<i>dactylus</i> Ehrenberg                      (at ½x)                      Or query <i>P. neglecta</i> which I think is nearer.                      {agreed}</p>
2/213.45.6	<p><i>Pinnularia major</i> (Kützing) Cl.                      {agreed}</p>
3/113.26.6	<p><i>Pinnularia</i> ?<i>dactylus</i> Ehrenberg                      This is more like <i>P. dactylus</i> outline, langsbands and striae rates a better fit – raphe system not quite typical, should be bent, at least my idea of <i>dactylus</i>.</p> <div data-bbox="762 577 1150 714" style="text-align: center;"> </div> <p>{agreed – but what does <i>P. valida</i> look like?}</p>

Plate 13



**Plate 14**

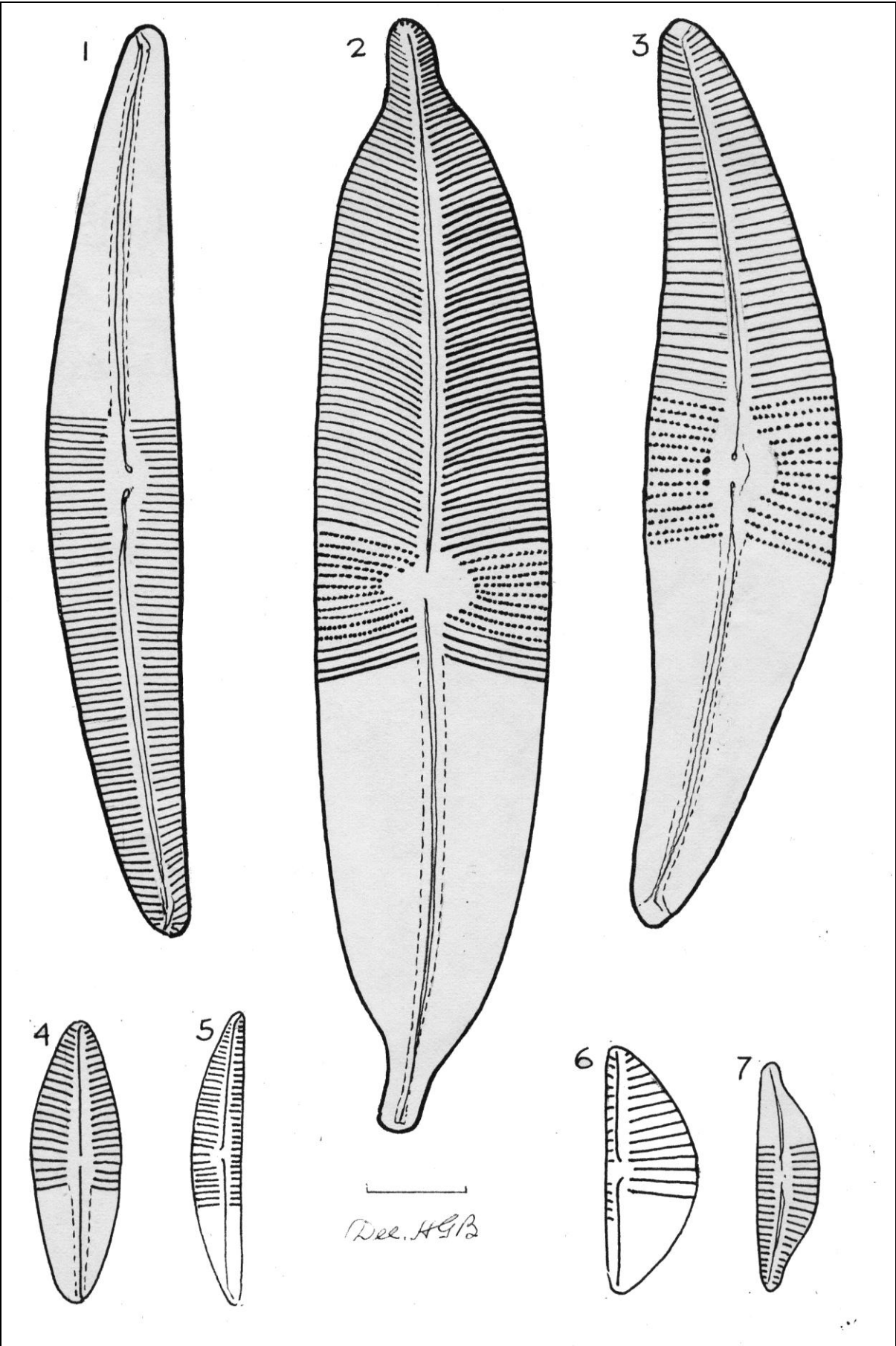
Figure/dimensions	Name
1/93.13.10½	<i>Cymbella helvetica</i> Kützing.
	{agreed}
2/114.24.10	<i>Cymbella hetropleura</i> Ehrenberg
	{agreed}
3/93.20.8/9	<i>Cymbella cymbiformis</i> (Ag.?) Kützing.
	{agreed}
4/28½.9.11	<i>Cymbella leptoceros</i> (Ehrenberg?) Kützing.
	{agreed}
5/30.4½.14	<i>Cymbella gracilis</i> (Rab.) Cl.
	= <i>C. rabenhorstii</i> Ross 1947
	{agreed}
6/24½.9½.9	<i>Cymbella ventricosa</i> Kützing.
	{agreed}
7/23.6.12	<i>Cymbella ?affinis</i> Kützing.
	(small form) {agreed}

Note:

Regarding the identification of some of the *Cymbella* I have had to resort to A.Cl-Eu. & I do not put too much faith in her illustrations.



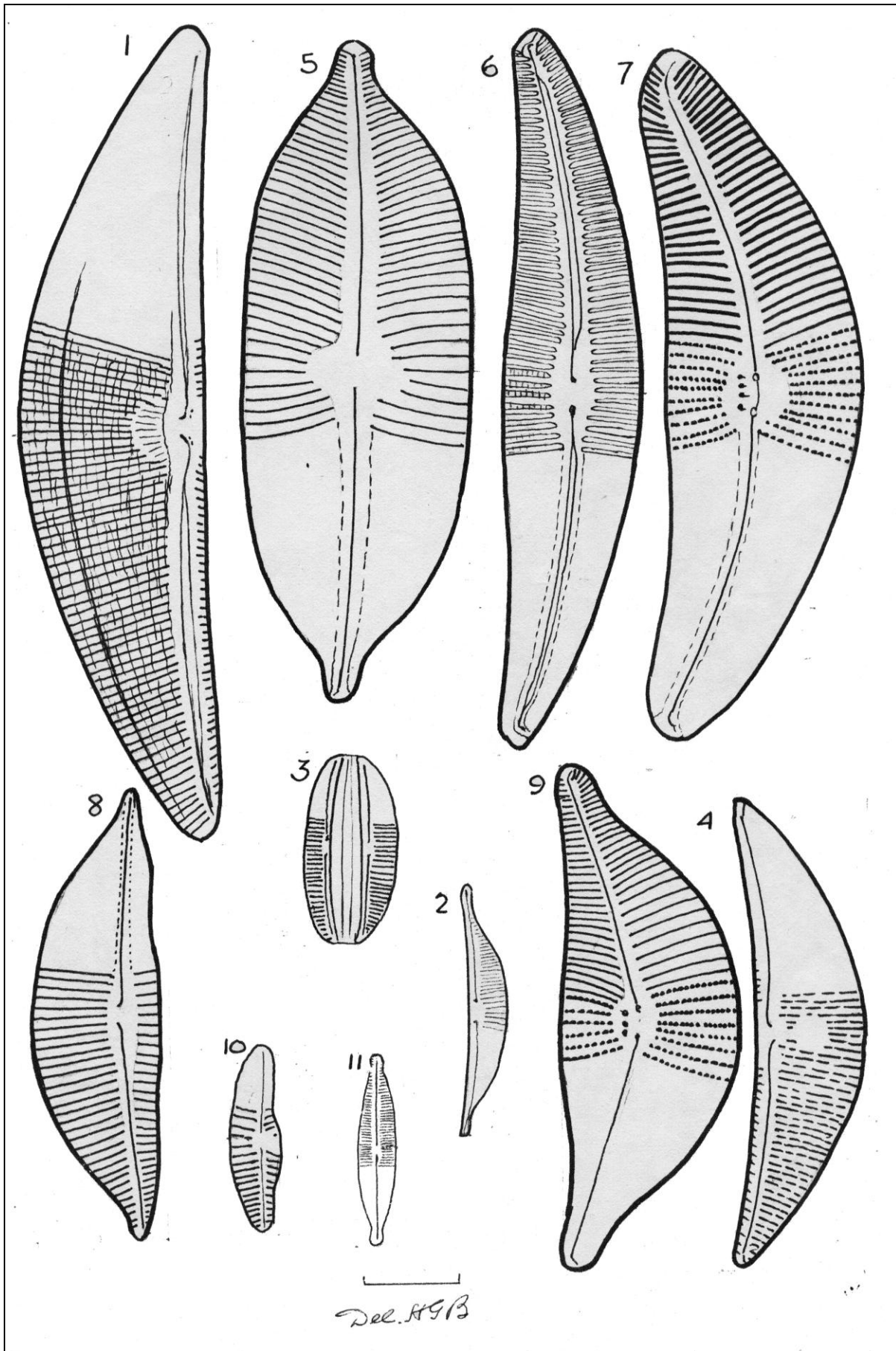
Plate 14



## Plate 15

Figure/dimensions	Name
1/86.18½.10	<i>Amphora ovalis</i> Kützing.
	{agreed}
2/26½.4.16/30	<i>Amphora veneta</i> (Kützing) Hust.
	{agreed}
3/13.10.18	<i>Amphora ?cymbifera</i> Greg.
	Normally a littoral marine form and I have doubts in F.W. {agreed}
4/50.11.13	<i>Amphora ovalis</i> var. <i>libyca</i> (Ehrenberg) Cl.
	This thing varies no end and I recorded many small variations. { <i>leptoceros</i> (Ehrenberg) Kützing.}
5/69.24.8/9	<i>Cymbella heteropleura</i> (Ehrenberg) Cl.
	According to A. Cl.-Eu. { <i>Cymbella heteropleura</i> var. <i>minor</i> Cl. I think, but where does <i>C. cuspidata</i> begin?}
6/75.14½.9	<i>Cymbella afinis</i> Kützing.
	{ <i>Cymbella cymbiformis</i> (Ag. ?Kützing.) V.H.}
7/72½.21.8	<i>Cymbella cistula</i> (Hemp.) Grun.
	{agreed}
8/48.13½.10/8	<i>Cymbella ?caespitosa</i> fa.
	{I believe this is a form of <i>C. turgida</i> }
9/53.18½.8/9	<i>Cymbella cistula</i> (Hemp.) Grun fa. <i>rostrata</i>
	{agreed}
10/20.4½.12	<i>Cymbella sinuata</i> Greg.
	{agreed}
11/20.4	<i>Cymbella microcephala</i> Grun.
	{agreed}

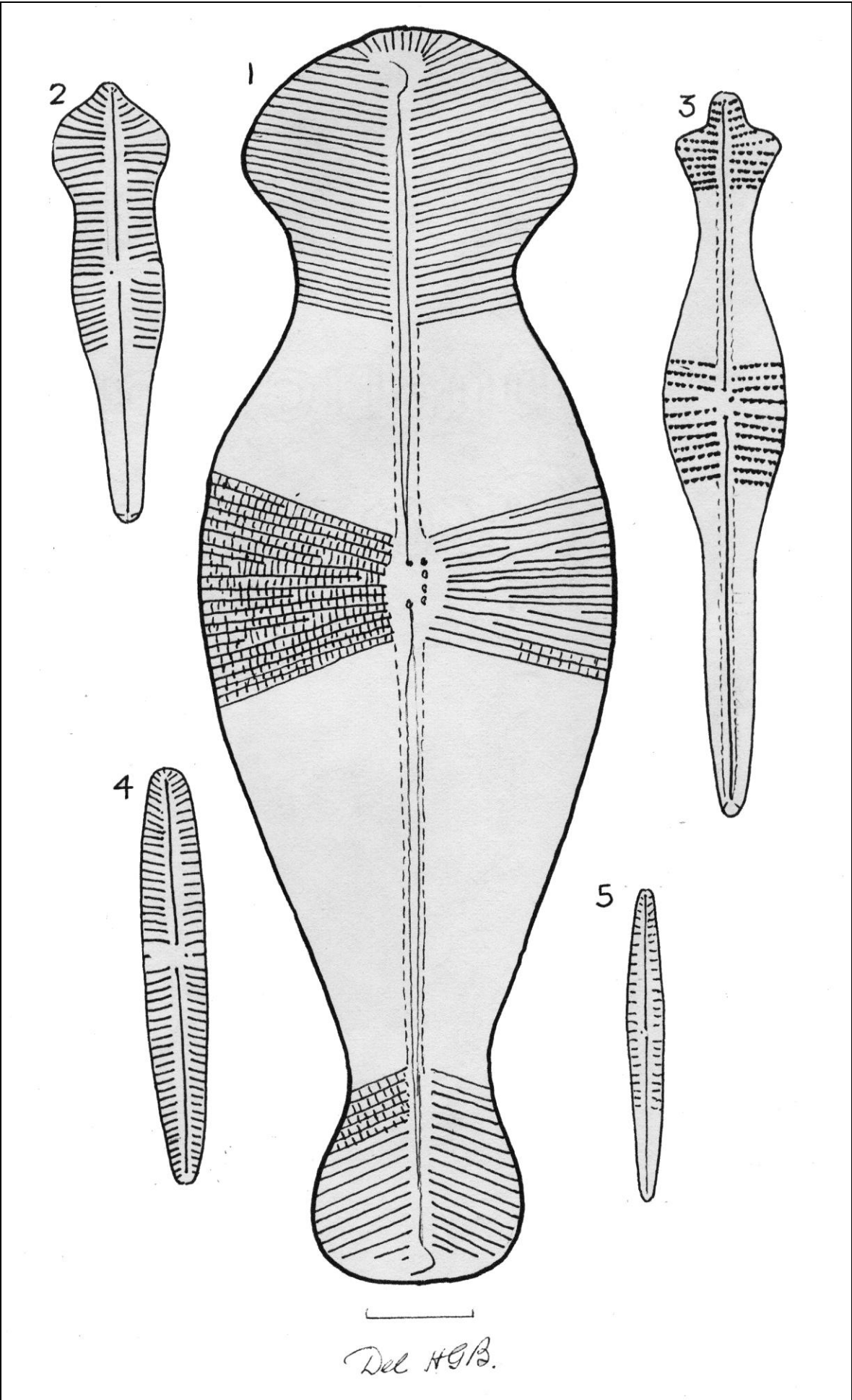
Plate 15



**Plate 15**

Figure/dimensions	Name
1/120.40.9	<i>Didymosphenia geminata</i> (Lyngb.) Schum.
	{agreed}
2/42½.10½.10½	<i>Gomphonema acuminatum</i> Ehrenberg
	{agreed}
3/69.11.10	<i>Gomphonema acuminatum</i> var. <i>coronata</i> (Ehrenberg) Wm.Sm.
	{agreed}
4/40.6.10	<i>Gomphonema angustatum</i> (Kützing) Rab.
	{agreed}
5/30.2.10	<i>Gomphonema bohemicum</i> Reich & Frick.
	{agreed}

Plate 16

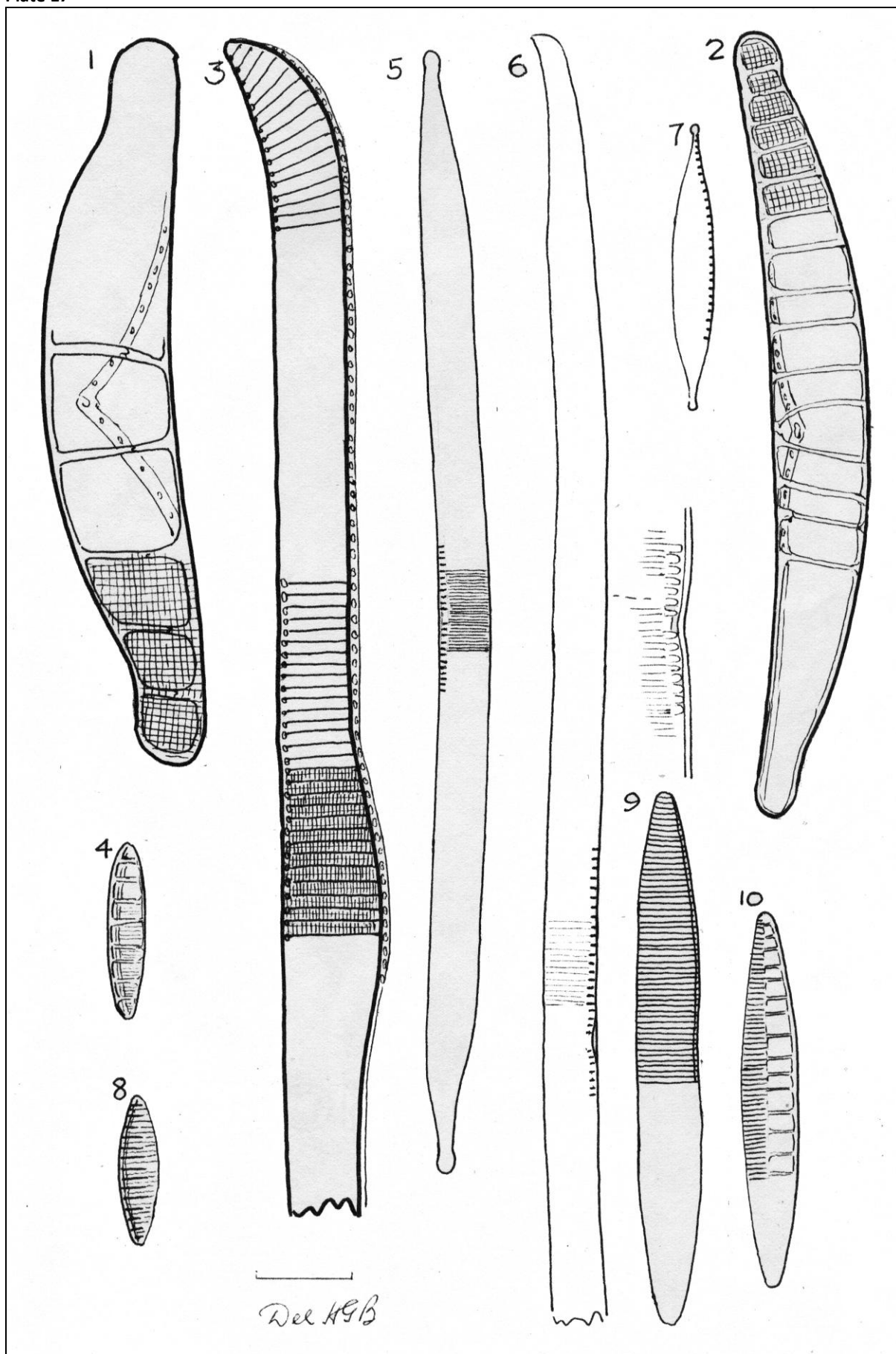


**Plate 17**

Figure/dimensions	Name
1/76½.14.-	<i>Epithemia sorex</i> Kützing.
	Notes for 1 and 2. The only consistent features I find in this genus is the centre position of the raphe system and the aveoli between the transparent costae. So far as outline in concerned by no means reliable. { <i>Epithemia argus</i> Kützing. As L.H. 727a.}
2/86½.10.-	<i>Epithemia zebra</i> (Ehrenberg) Kützing.
	{agreed}
3/187.11.7½	<i>Rhopalodia parallela</i> (Grun.) O.Mull.
	No dorsal nick! { <i>Rhopalodia gibba</i> (Ehrenberg) O.Muller as A.S.A. 253/1}
4/18½.4.4.	<i>Denticula tenuis</i> var. <i>crassula</i> (Naeg.) Hust.
	{agreed}
5/119.5.16.8	<i>Nitzschia elongata</i> (Hantz.) Grun.
	I am pretty sure this is <i>N. elongata</i> in spite of Kp (keel puncta) rate. I have illustrated too high! {Figs 5 and 6 – I think that these could both be <i>Nitz. linearis</i> (Ag.) W.Sm. but I wouldn't argue from these two figures.}
6/300 <sup>c</sup> .14.15.9	<i>Nitzschia ?vermicularis</i> (Kützing) Grun.
	Or could be <i>spectabilis</i> (Ehrenberg) Ralfs. The form is sigmoid but note, has a central gap in the raphe canal and the striae rates and Kp (keel puncta) rates are not at all a good fit. {see my comments Fig. 5}
7/30.4.x.9	<i>Nitzschia Kützingiana</i> Hilse
	{agreed}
8/16.4.18.9	<i>Nitzschia denticula</i> Grun.
	{agreed}
9/56½.6½.16.16	<i>Nitzschia angustata</i> var. <i>acuta</i> Grun
	{I think this is <i>Nitz. angusta</i> fa. (W.Sm.) Grun, not var. <i>acuta</i> .
10/40.6.18.5	<i>Nitzschia sinuata</i> fa.
	{agreed}



Plate 17

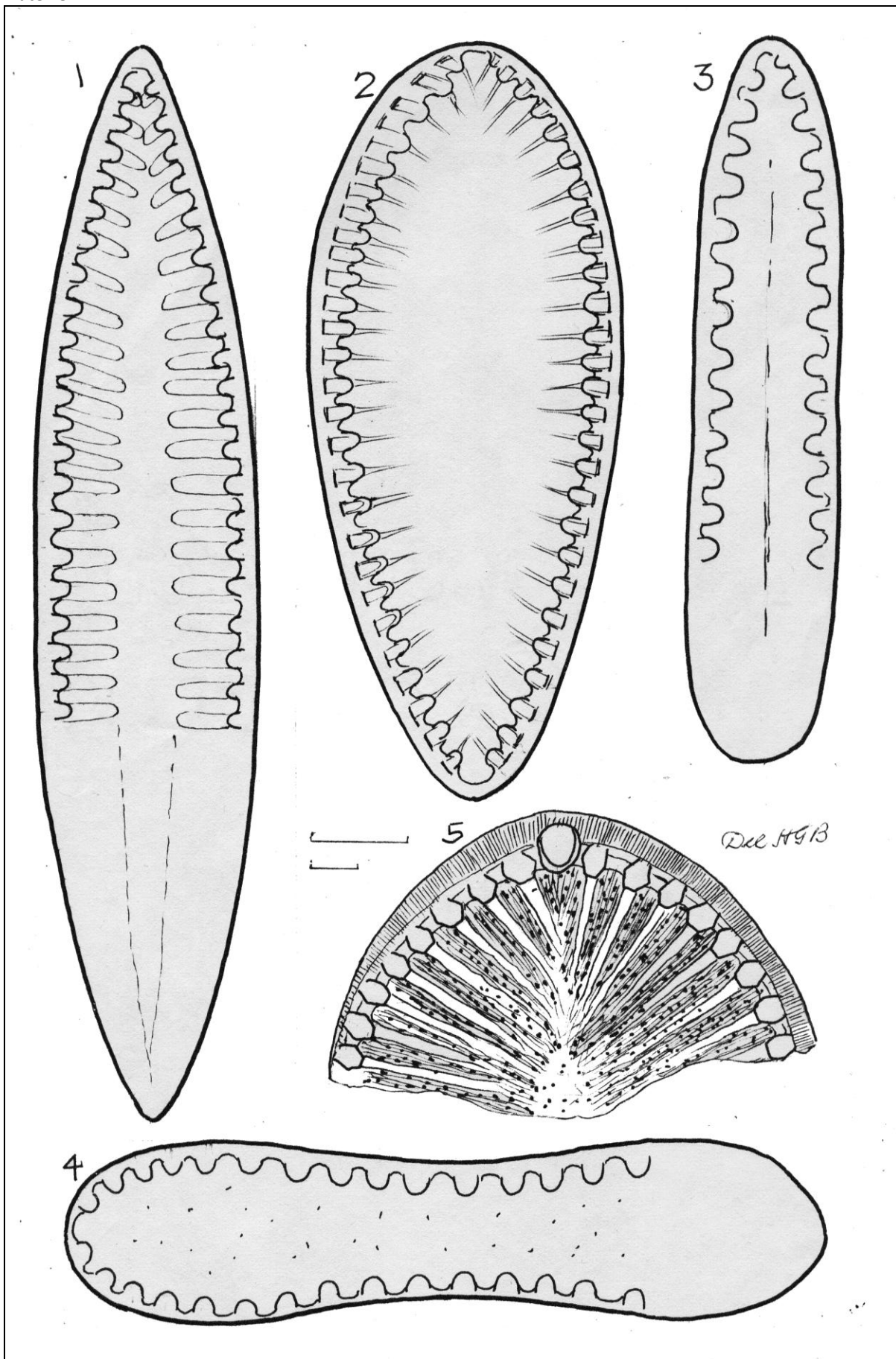


**Plate 18**

Figure/dimensions	Name
1/227.46½.15in100μ	<i>Surirella biseriata</i> DeBreb. (½x) Figs. 1 and 2 do not have any central line as per usual illustrations and <i>S. biseriata</i> is as near as I can suggest. {agreed}
2/60.66½.15 in 100μ	<i>Surirella biseriata</i> var. <i>bifrons</i> (Ehrenberg) Hust. (½x) See notes Fig. 1. {agreed}
3/76½.16.22 in 100μ	<i>Surirella</i> sp. Figs. 3 and 4 are of the same taxon and may be a form of <i>S. linearis</i> . I find the whole of <i>Surirella</i> both freshwater and marine forms to be most variable and difficult to identify from literature. {Could possibly be <i>S. linearis</i> W.Sm.}
4/80.8½.20 in 100μ	<i>Surirella</i> sp. var. <i>constricta</i> See notes Fig. 3. {Could possibly be <i>S. linearis</i> var. <i>constricta</i> (Ehrenberg) Grun.}
5/--.8 in 100μ	<i>Campylodiscus hibernica</i> (Ehrenberg) Grun. Fragment (½x) I found one fragment of this and can only suggest a form of <i>C. hibernicus</i> .

There are very few complete valves of both taxa in the gathering but many fractured pieces and practically all of large forms such as Figs. 1 & 2.

Plate 18



## An Illustrated Account of the Diatom Flora from an amount of Silt collected at Coniston Water, Cumbria on 31<sup>st</sup> May 1981



*Coniston Water from Torver Road*

©Steve Edgar 2014



*Coniston Water SW*

©Steve Edgar 2014

Hafan  
91 Mancetter Road  
Nuneaton  
February 1982

- Plate 1. Melosira, Cyclotella, Stephanodiscus, Tabellaria, Ceratoneis, Fragilaria, Synedra, Eunotia
- Plate 2. Eunotia, Cocconeis, Achnanthes, Diploneis, Anomoeoneis
- Plate 3. Neidium, Frustulia, Caloneis, Navicula
- Plate 4. Navicula, Pinnularia
- Plate 5. Pinnularia
- Plate 6. Amphora, Cymbella
- Plate 7. Didymosphenia, Gomphonema
- Plate 8. Denticula, Epithemia, Rhopalodia, Nitzschia
- Plate 9. Surirella
- Plate 10. Cymbella, Amphipleura, Pinnularia, Cyclotella, Navicula, Brachysira
- Plate 11. Eunotia, Achnanthes, Synedra, Cymbella, Stauroneis

Generally the flora when compared with one recorded from Lake Windermere (December 1979) reveals quite a difference both in genera and of particular species. In certain instances I have noted the frequency but of course both accounts were from two or three slides and may not by any means be a true picture of either lake's flora. I would suggest the water is of an acid nature but less polluted than Windermere.

H.G. Barber February 1982.

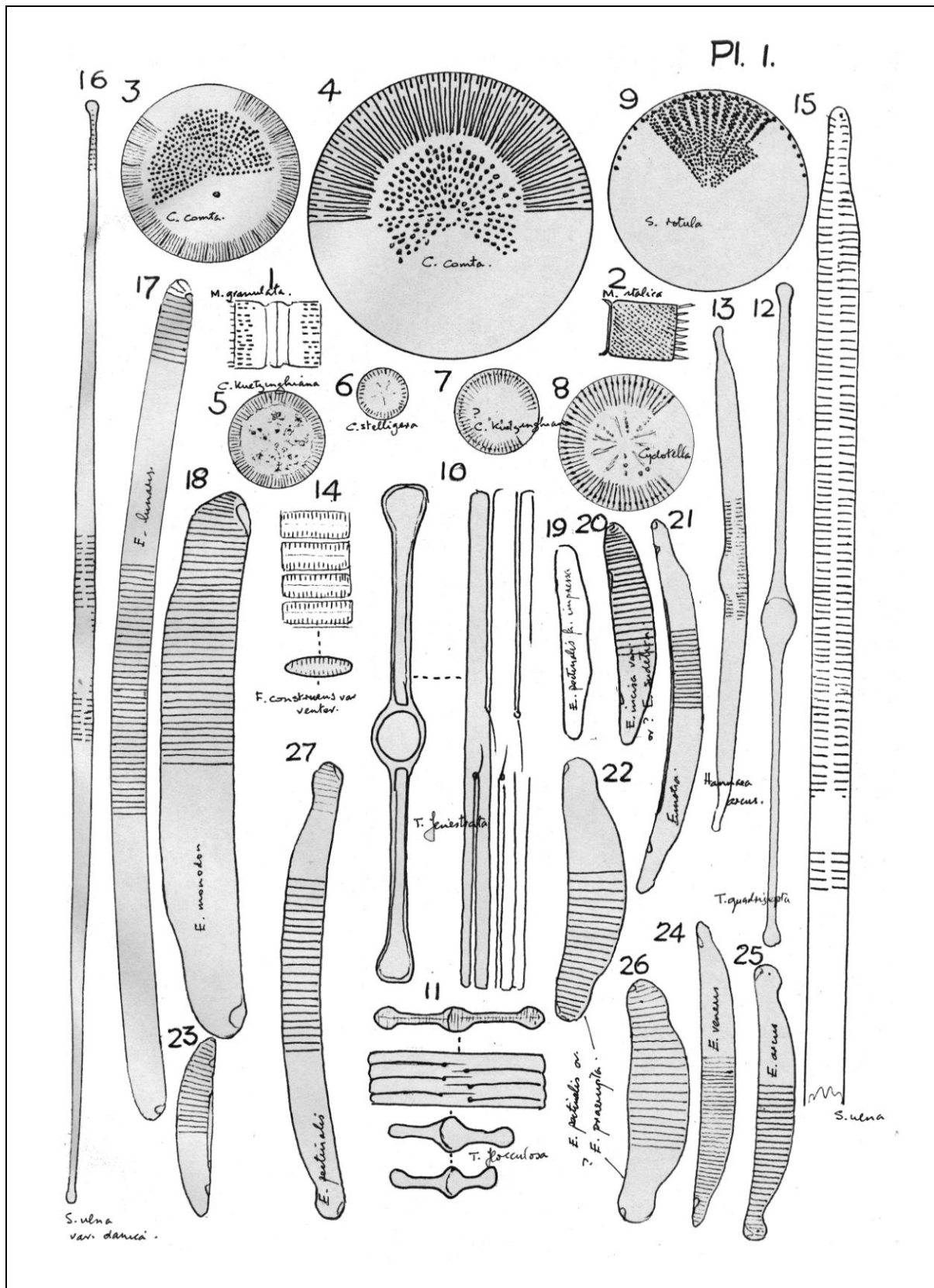
## Plate 1

Figure/dimensions	Name
1/10.8	<i>Melosira granulata</i> (Ehrenberg) Ralfs
	Very few
2/9.8	<i>Melosira italica</i> (Ehrenberg) Kützing.
	One only
3/21½ dia.	<i>Cyclotella comta</i> (Ehrenberg) Kützing.
	One only
4/34 dia.	<i>Cyclotella comta</i> (Ehrenberg) Kützing.
	Very frequent
5	<i>Cyclotella Kützingiana</i> (Thwaites)
	See also figures 6-8
6-8	<i>Cyclotella stelligera</i> (Cl. & Grun)
	Identified by Bernard Hartley Original notes by Horace Barber – Forms 6-8 are a problem and the nearest I can say is “ <i>v. radiosa</i> ”. The central patterns vary quite a bit. On some I think I can detect fultoprotules within the central area. I remember you ( <i>Bernard Hartley</i> ) exhibiting a form in the laboratory (small centric) and the caption “What is it?”. Have a look at some of these and see if the same form.
9/24 dia.	<i>Stephanodiscus rotula</i> (Kützing) Hende
	Frequent At least I think this species – from Round 1981
10/60.6½	<i>Tabellaria fenestrata</i> (Lyng.) Kützing.
	Few (and girdle view)
11/21.3	<i>Tabellaria flocculosa</i> (Roth.) Kützing.
	Frequent (and girdle view)
12/80.4	<i>Tabellaria quadrisepata</i> (Knud.)
	Frequent
13/60.4.16	<i>Ceratoneis arcus</i> Kützing. [ <i>Hannaea arcus</i> (Ehrenberg) Patrick]]
	One only
14/8.2	<i>Fragilaria construens</i> var. <i>venter</i>
	Few
15/172.6.9	<i>Synedra ulna</i> (Nitzsch.) Ehrenberg
	Rare
16/133.2½	<i>Synedra ulna</i> var. <i>danica</i> (Kützing) Grunow
	Few
17/14.4.13½	<i>Eunotia lunaris</i> (Ehrenberg) Grun
	Frequent The genus <i>Eunotia</i> is common in the gathering and many of the forms I find to be indeterminate. A deal of variation in size and shape and I am sure a lot of overlap.
18/64½. 18½.13	<i>Eunotia monodon</i> fa.
	Few
19/20.3½	<i>Eunotia pectinalis</i> fa. <i>impressa</i> (Ehrenberg) Hust.
	Few
20/20½.5.10/15	<i>Eunotia</i> sp.
21/44½.3½.16	<i>Eunotia veneris</i> (Kützing) O.Muller
	Frequent
22/32.6½.12/15	<i>Eunotia pectinalis</i> (Kützing) Rab.
	Frequent
23/21½.4.15	<i>Eunotia veneris</i> (Kützing) O.Muller
	Frequent

Figure/dimensions	Name
24/31.4.18	<i>Eunotia veneris</i> (Kützing) O.Muller
	Frequent
25/33.6.13	<i>Eunotia arcus</i> var. <i>fallax</i> (or type ?)
	Frequent
26	<i>Eunotia ?pectinalis</i> var. <i>minor</i> (Kützing) Rab.
	Few
27	<i>Eunotia pectinalis</i> (Dillw.) Rabh.
	Few

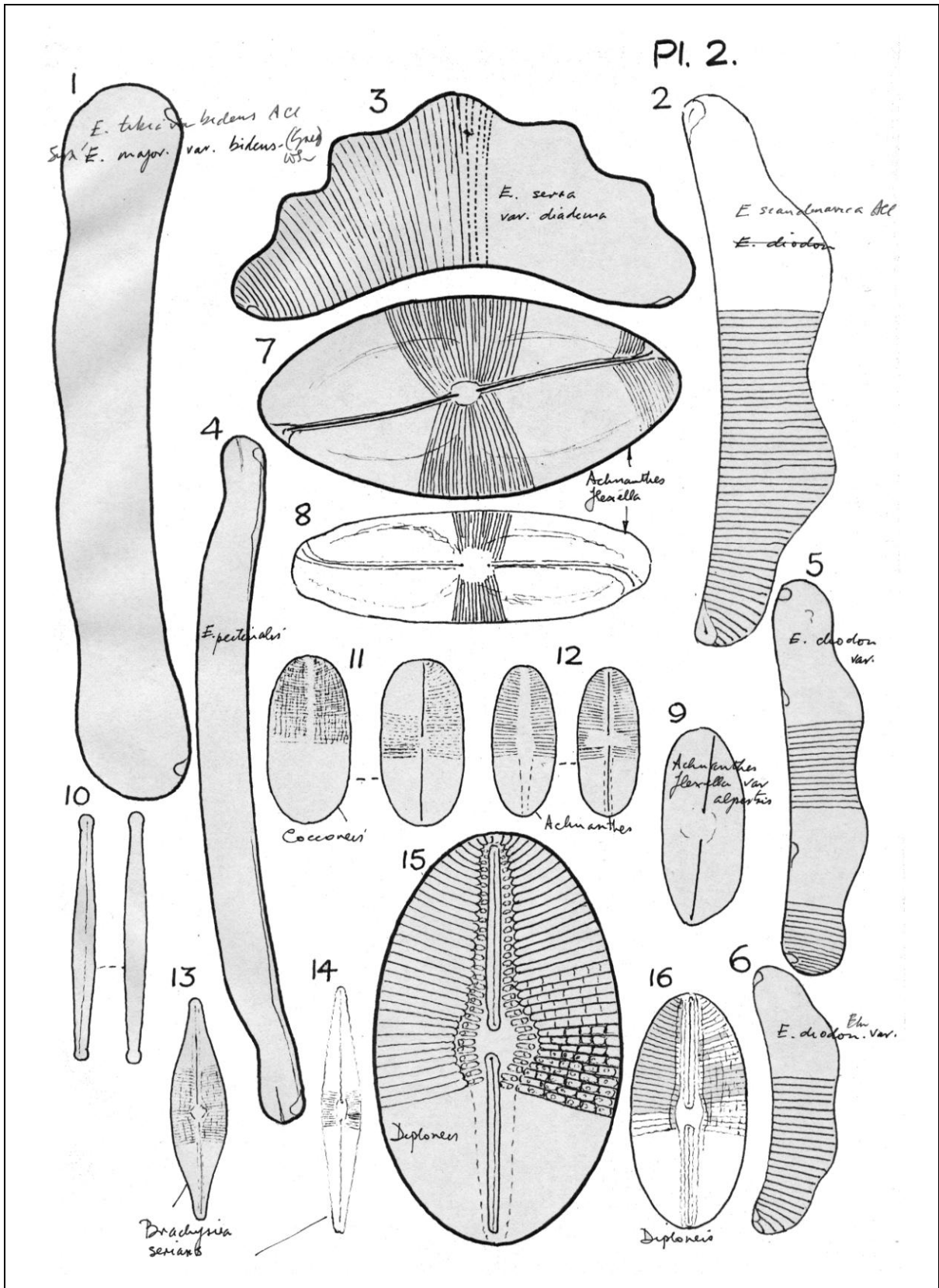
If one is fortunate enough to find a reasonable pure growth of a particular species then it is surprising to see the degree of variation which does take place. I have on many occasions recorded such variations the majority of which are not illustrated in literature. There are cases where the variations have been given specific names.





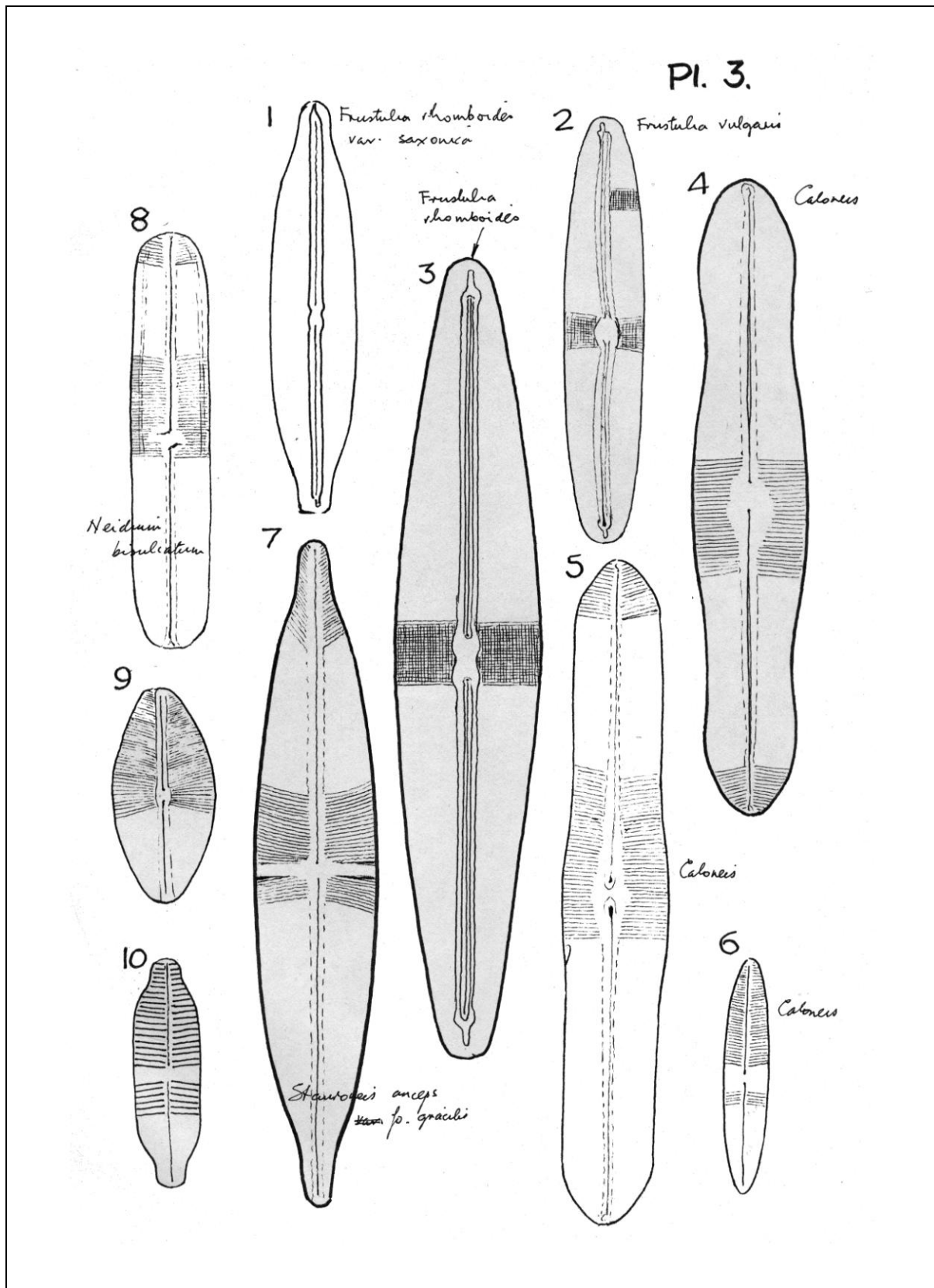
## Plate 2

Figure/dimensions	Name
1/86½.13.15	<i>Eunotia libra</i> var. <i>bidens</i> A.Cl.
	Few
2/66½.14.12	<i>Eunotia diodon</i>
	Few
3/55.20.8½	<i>Eunotia serra</i> var. <i>diadema</i> (Ehrenberg) Ralfs
	Fragment only
4/83.6.11	<i>Eunotia pectinalis</i>
	Frequent
5/46½.10.15	<i>Eunotia diodon</i> var.
	Frequent
6/32.9.12	<i>Eunotia</i> ? <i>diodon</i> var.
	Few
7/51.24.24	<i>Cocconeis flexella</i> (Kützing) Hilse [ <i>Achnanthes flexella</i> (Kützing. Brun)]
	Few
8/	<i>Cocconeis flexella</i> (Kützing) Hilse [ <i>Achnanthes flexella</i> (Kützing. Brun)]
	Few
	There is a range of forms between Fis. 7 and 8.
9/23½.10.30	<i>Cocconeis flexella</i> var. <i>alpestris</i> Brun
	One
10/30.3.x	<i>Achnanthes microcephala</i> (Kützing) Cleve
	Few
11/20.10.20 <sup>c</sup>	<i>Cocconeis placentula</i> (Ehrenberg)
	Very few
12/18.7½.25	<i>Achnanthes kryophyla</i> Pet.
	One
13/26½.6½.x	<i>Anomoeoneis serians</i> var. <i>brachysira</i> fa. [ <i>Brachysira serians</i> (Breb. ex Kützing.) Round and Mann 1981]
	Very few
14/30.4½.x	<i>Anomoeoneis serians</i> var. <i>brachysira</i> fa.
	One
15/50.29½.9	<i>Diploneis</i>
	One
16/28.14.15	<i>Diploneis</i>
	Very few



## Plate 3

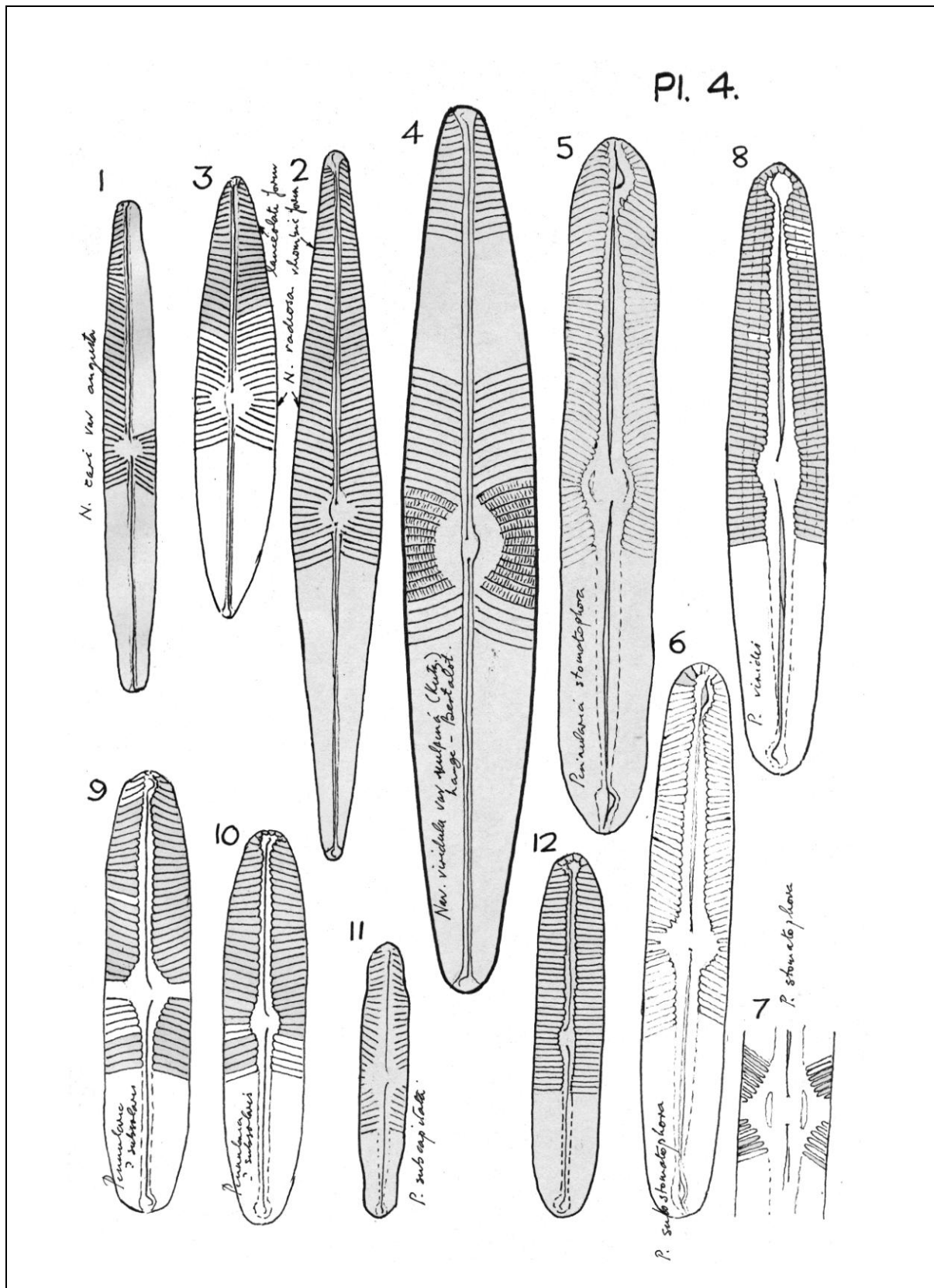
Figure/dimensions	Name
1/50.10.30+	<i>Frustulia rhomboides</i> var. <i>saxonica</i> (Rab.) deToni
	Few
2/49.9½.30 <sup>c</sup>	<i>Frustulia vulgaris</i> (Thwaites) deToni
	Few
3/96½.17.25	<i>Frustulia rhomboides</i> (Ehrenberg) deToni
	Frequent
4/76½.14.18	<i>Caloneis ventricosa</i> var. <i>gibberula</i> Grunow ?
	Rare
5/80.12½.20	<i>Caloneis pulchra</i> Messikomer
	Rare
	? axial area rather narrow
6/28.5.24	<i>Caloneis bacillum</i> var. <i>lancettula</i> (Schulz) Hustedt
	Rare
7/80.14½.18	<i>Stauroneis anceps</i> fa. ? <i>gracilis</i> Rabh.
	One
8/50.9½.26 <sup>c</sup>	<i>Neidium bisulcatum</i> (Lagerst) Cleve
	Few
9/26.12.28 <sup>c</sup>	<i>Navicula cocconeiformis</i> Greg.
	One
10/28.8.15	<i>Navicula</i> sp.
	One



## Plate 4

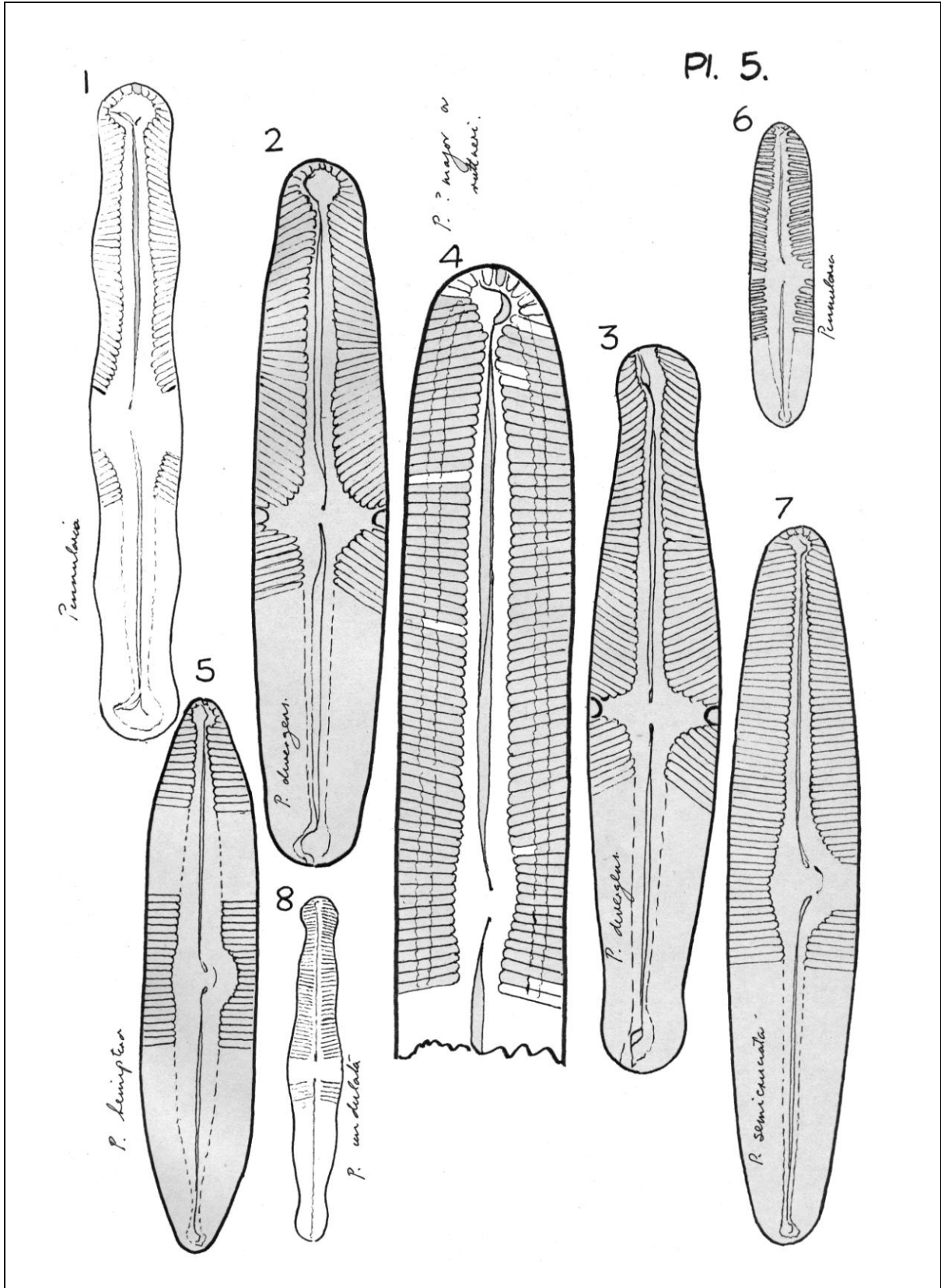
Figure/dimensions	Name
1/59.6.12	<i>Navicula cari</i> var. <i>angusta</i> (Grun.) Grun.
	Two
2/85.11.10	<i>Navicula radiosa</i> Kützing.
	Very Frequent (Rhombic form)
3/52.10.12	<i>Navicula radiosa</i> Kützing.
	Frequent (Lanceolate form)
4/104.16.9	<i>Navicula vulpina</i> (Kützing) Lange-Bertalot
	Fragment Reconstructed from $\frac{3}{4}$ of a valve
5/84.12.12	<i>Pinnularia stomatophora</i> (Grun.) Cl.
	Few There are forms where the outline is more undulate and ends slightly capitate.
6/66½.10.11	<i>Pinnularia (subcapitata) (stomatophora)</i>
	It would appear the fascia is variable. Not at all stable.
7	Not figured
8/73.12.11	<i>Pinnularia viridis</i> (Nitz.) Ehrenberg
	One or two About the nearest to the type I have seen.
9/54.10.12	<i>Pinnularia</i> sp.
	Note Figs 9, 10 & 12: There are a number of forms like 9, 10 and 12 which I find difficult to identify. Their features are variable – outline, axial area widths, interrupted or continuous central stria. I would suggest <i>P. microstauron</i> for Fig. 9 but is not typical in my view.
10/48.10.11	<i>Pinnularia</i> sp.
	See note Fig. 9.
11/33.5.12	<i>Pinnularia subcapitata</i> Greg.
	Rare
12/44.8.12	<i>Pinnularia</i> sp.
	Rare See note Fig. 9. Rather close to <i>P. rupestris</i>





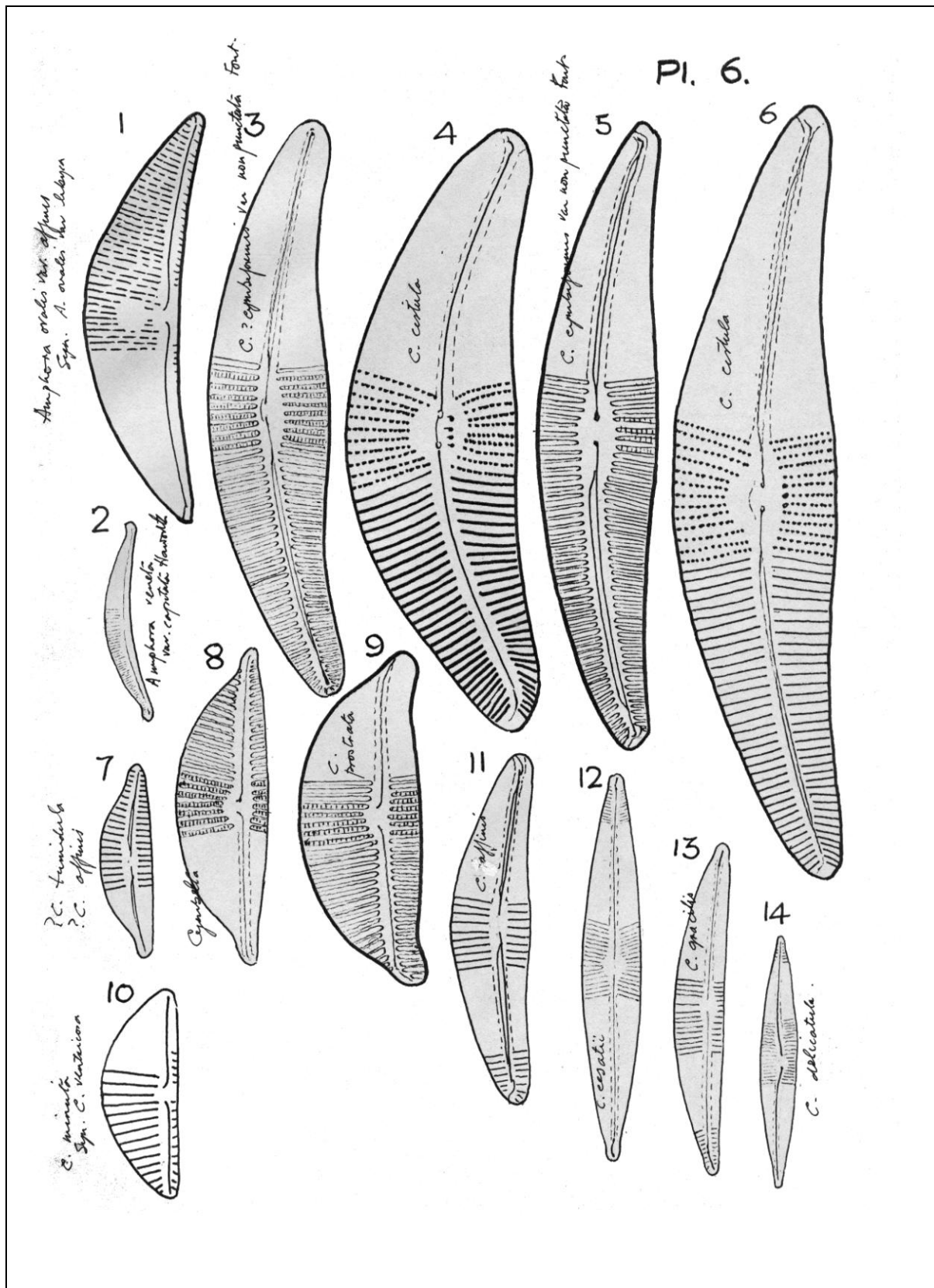
## Plate 5

Figure/dimensions	Name
1/80.10½.9	<i>Pinnularia mesolepta</i> (Ehrenberg)W.Sm.
	Few
2/84½.16.10	<i>Pinnularia divergens</i> Wm.Sm.
	Frequent
3/86½.16.10	<i>Pinnularia divergens</i> Wm.Sm.
	Frequent There is variation in the outline of this form but not as much as those found in the Windermere account where the outline is very variable.
4/154.20.8	<i>Pinnularia</i> sp.
	One In my view this nearer to <i>P. ruttneri</i> than <i>P. major</i> because of the raphe system. There are a number of fragments of the large <i>Pinnularia</i> but none sufficient to reconstruct a form.
5/66½.13½.9	<i>Pinnularia hemiptera</i> (Kützing) Cl.
	One
6/36½.7½.11	<i>Pinnularia</i> sp.
	See remarks Fig. 9. Plate 4 etc.
7/87.16.11	<i>Pinnularia semicrucata</i> (R.S.) A.Cl-Eu.
	Rare
8/41½.6½.19	<i>Pinnularia undulata</i> Greg.
	Few



## Plate 6

Figure/dimensions	Name
1/50.11.13	<i>Amphora ovalis</i> var. <del><i>hibyca</i></del> <i>affinis</i> (Kützing) VH 1891
	One
2	<i>Amphora veneta</i> var. <i>capitata</i> Haworth
	One
3/69.14½.8½	<i>Cymbella</i> ? <i>cymbiformis non-punctata</i> Fort.
4/72½.21.8	<i>Cymbella cistula</i> (Ehrenberg In Hemp. & Ehrenberg) Kirchner
	Few
5/75.14½.9	<i>Cymbella cymbiformis</i> var. <i>non-punctata</i> ?
	Few
	Terminal fissures wrong
6/93.20.8/9	<i>Cymbella</i> ? <i>cistula</i> ? <i>cymbiformis</i>
7/23.6.12	<i>Cymbella tumidula</i> Grun.
	Few (Small form)
8/38.11.9	<i>Cymbella</i> ? <i>caespitosa</i> ? <i>hillardii</i>
9/40.14½.10	<i>Cymbella prostrata</i> (Berk.) Cl.
	Rare Note: Stria usually more radiate
10/24½.9½.9	<i>Cymbella ventricosa</i> Kützing. ( <i>C. minuta</i> Hilse ex. Rabh. – Bernard Hartley identification)
	Very few
11/42.10.10	<i>Cymbella affinis</i> Kützing.
	Very few
12/46½.7½.18	<i>Cymbella cesatii</i> (Rab.) Grun.
	Very few
13/40.6.13	<i>Cymbella gracilis</i> (Rab.) Cl.
	One
14/30.4.20 <sup>c</sup>	<i>Cymbella delicatula</i> Kützing.
	One



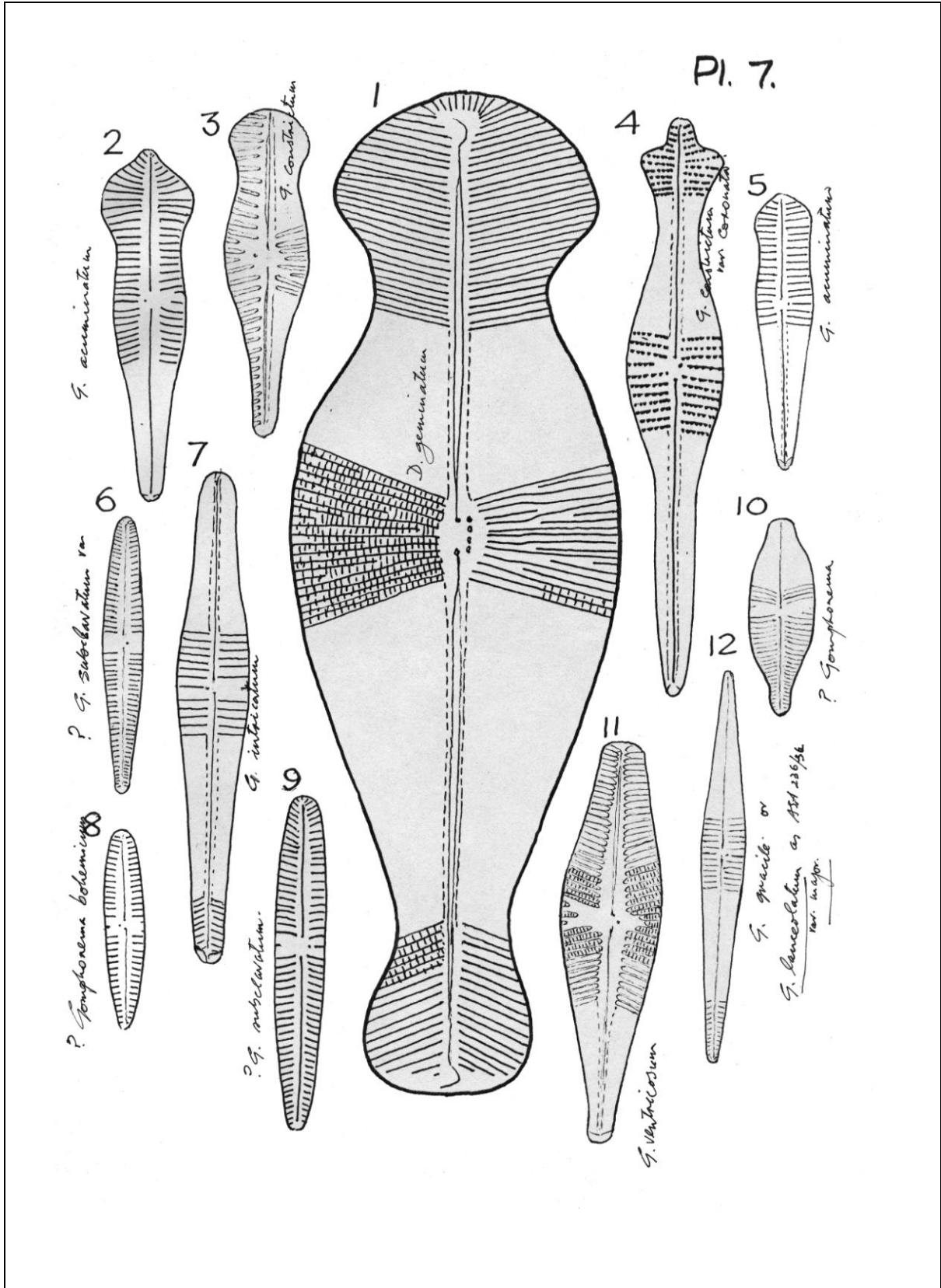
Pl. 6.

## Plate 7

Figure/dimensions	Name
1/120.40.9	<i>Didymosphenia geminatum</i> (Lyngb.) Schum.
	One
2/42½.10½.10½	<i>Gomphonema acuminatum</i> Ehrenberg
	Frequent
3/40.10.9	<i>Gomphonema constrictum</i> Ehrenberg
	Few
4/70.11.10	<i>Gomphonema acuminatum</i> var. <i>coronata</i> (Ehrenberg) Wm.Sm.
	Few
5/33.6½.10	<i>Gomphonema acuminatum</i> fa.
	Few
6/33.5	<i>Gomphonema angustatum</i> (Kützing) Rab.
	Very frequent
7/60.8½.9	<i>Gomphonema intricatum</i> Kützing.
	Rare
8/24.5.12	<i>Gomphonema longiceps</i> var. <del><i>subclavata</i></del> <i>auritum</i> Brun ex. Kützing.
9/40.6.9	<i>Gomphonema angustatum</i> (Kützing) Rab.
	Few
10/24.18.13	<i>Gomphonema</i> ?sp. ? <i>parvulum</i>
	One
	Note: No stigma visible
11/48.12.9	<i>Gomphonema ventricosum</i> Greg.
	Rare
12/46½.5.13	<i>Gomphonema gracile</i> Ehrenberg
	Frequent

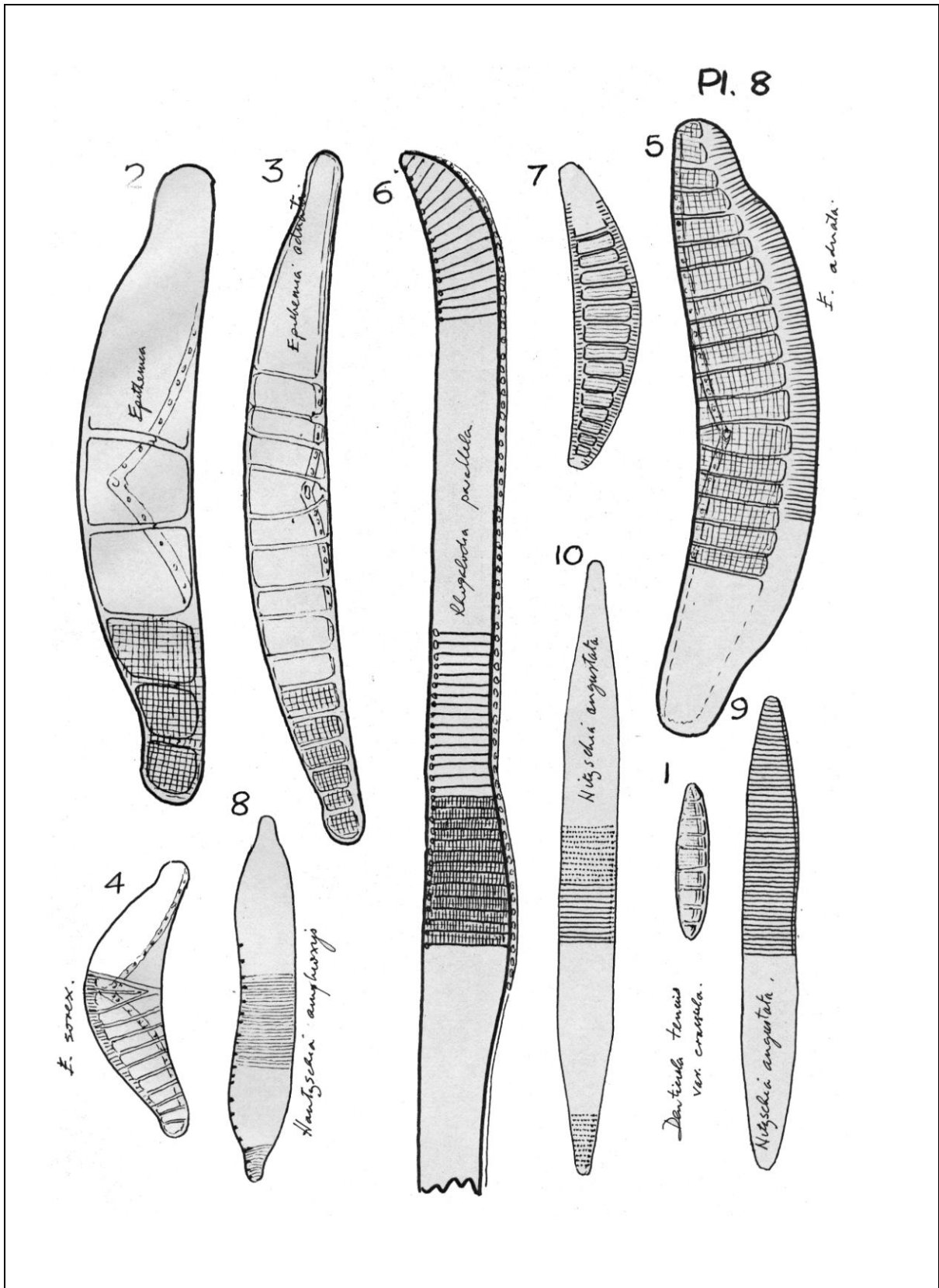
The *Gomphonema* are very prevalent in the material and some I have difficult in identification.





## Plate 8

Figure/dimensions	Name
1/18.4.4	<i>Denticula tenuis</i> var. <i>crassula</i> (Naeg.) Hust.
	Few
2/76½.14	<i>Epithemia zebra</i> (Ehrenberg) Kützing. [ <i>E. adnata</i> – identification by Bernard Hartley]
	? Raphe system more like <i>E. argus</i>
3/86½.10	<del><i>Epithemia zebra</i></del> var. <del><i>saxonica</i></del> (Kützing) Grun. <i>adnata</i> var. <i>porcellus</i> (Kützing) Ross 1950
4/33.8½	<i>Epithemia sorex</i> Kützing.
5/74½.14½	<del><i>Epithemia zebra</i></del> (Ehrenberg) Kützing. <i>adnata</i> (Kützing) Breb.
	One
6/187.11.7½	<i>Rhopalodia parallela</i> (Grun.) O.Mull.
	Rare
7	<i>Rhopalodia giberula</i> (Ehrenberg) O.Mull. fa.
	One
8/44.6½.16	<del><i>Nitzschia</i></del> <i>Hantzschia amphioxys</i> (Ehrenberg) Grun.
	One
9/56½.6½.16.16	<i>Nitzschia angustata</i> (Wm.Sm.) Grun.
	Frequent
10/73.6.15.15	<i>Nitzschia angustata</i> var. <i>acuta</i> ?

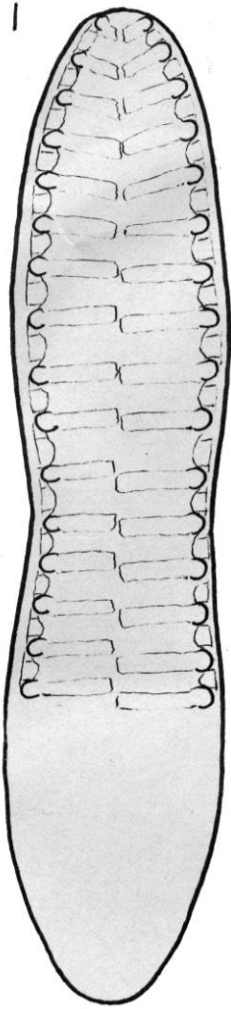


**Plate 9**

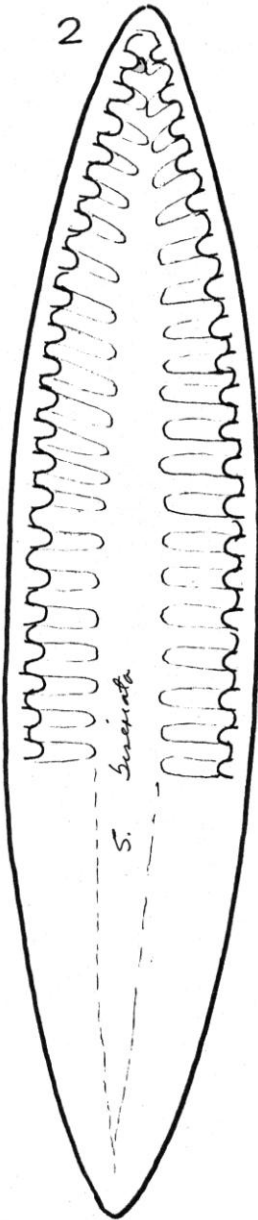
Figure/dimensions	Name
1/93.20.22	<i>Surirella linearis</i> Wm.Sm. [var. <i>constricta</i> Grun.]
	Few. Often fragments
2/227.46½.15	<i>Surirella biseriata</i> Breb.
	One (at ½x)
3/53.19.20	<i>Surirella</i> sp. (? fa. of <i>linearis</i> )
	One
4/47.12.60	<i>Surirella angusta</i> Kützing.
	One
5	<i>Surirella <del>delicatissima</del> gracilis</i> (W.Sm.) Grun.
	Fragment

Pl. 9.

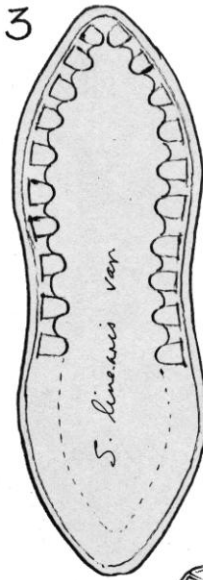
*Suanella linearis* var. *constricta*.



2



3



4



*S. angusta* (*angustata*).

5

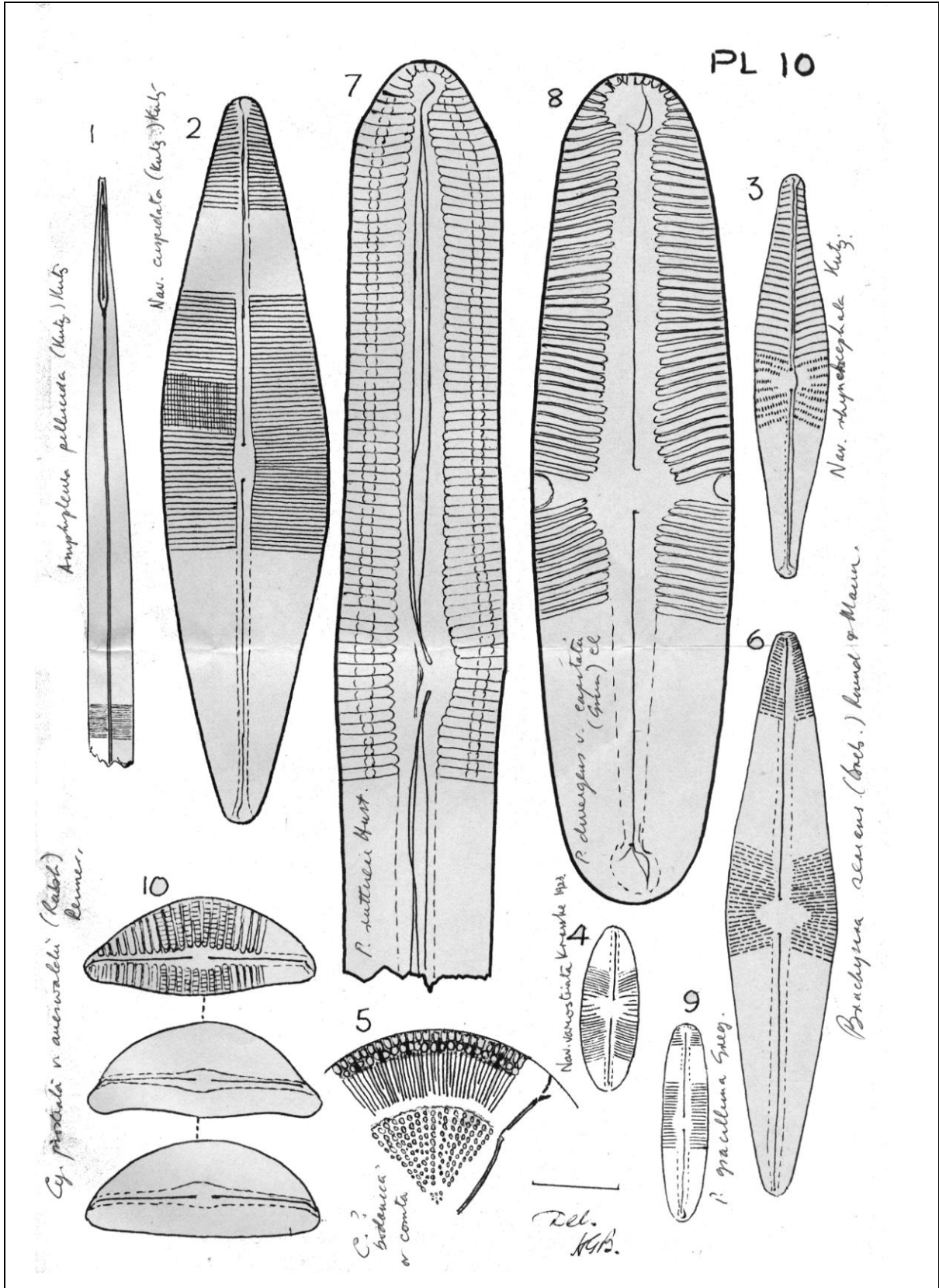


*S. gracilis*.

## Plate 10

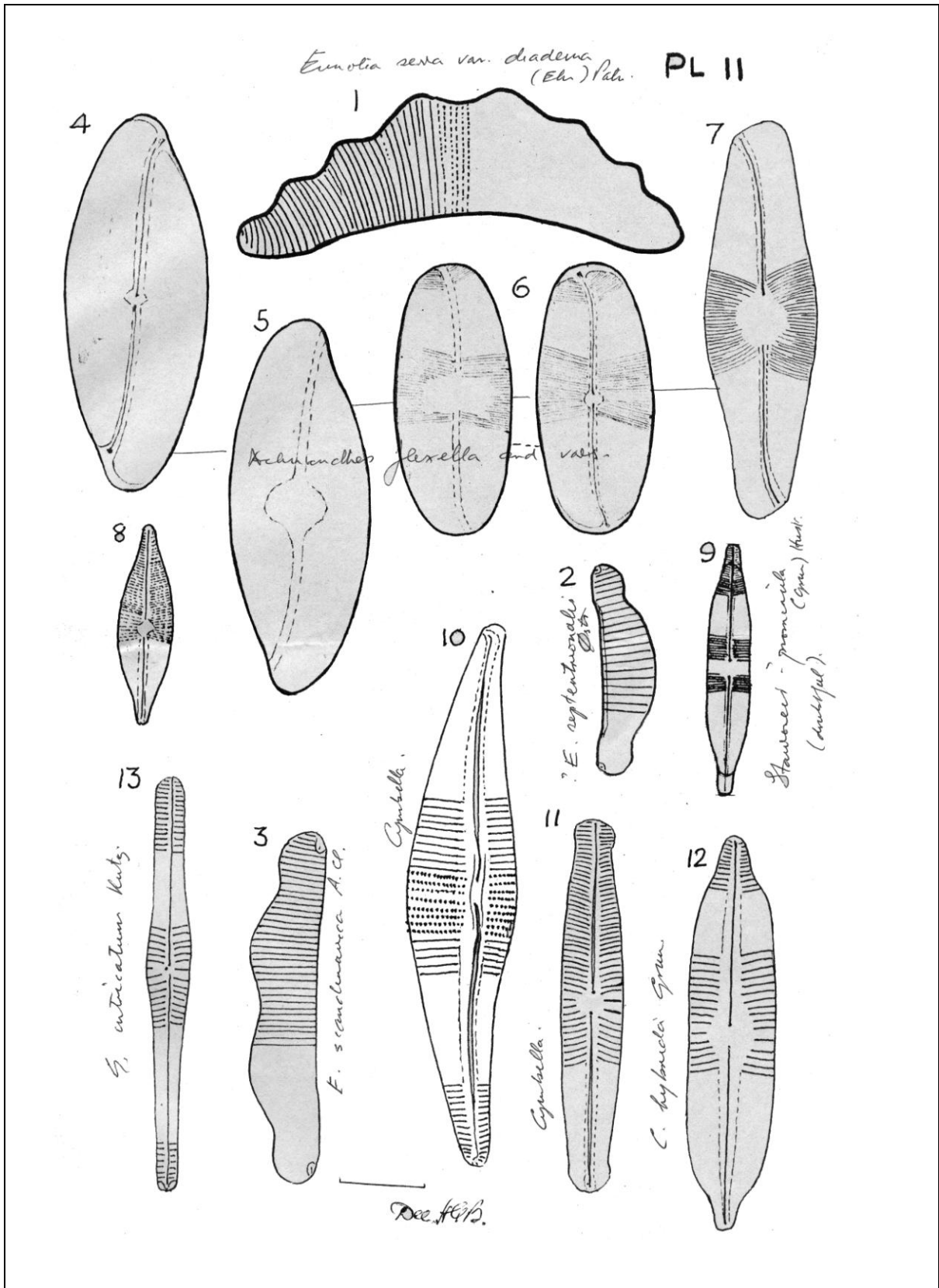
Figure/dimensions	Name
1/180 <sup>c</sup> .5.35 <sup>c</sup>	<i>Amphipleura pellicida</i> (Kützing) Kützing.
	Fragments
2/88.20.16	<i>Navicula cuspidata</i> fa. (Kützing) Kützing.
	One
3/48.14½.10	<i>Navicula rhyncephala</i> Kützing.
	One
4/20.6½.25	<i>Navicula ?variostrata</i> Krasske
	One
5	? <i>Cylotella bodanica</i> or <i>comta</i>
	Note: The species is very common in the gathering and from a good specimen I have attempted to sketch a section but the peripheral area is difficult – ink is not a good medium.
6/68.13½.23	<del>Anomoeoneis</del> <i>Brachysira seriens</i> (Breb) Round & Mann 1981
	One
7/149.20.7	<i>Pinnularia ruttnerii</i> Hust.
8/100.24.7½	<i>Pinnularia divergens</i> var. <i>elliptica</i> (Grun.) Cl.
	One
9/24.5½.21	<i>Pinnularia gracillima</i> Greg.
	One
10/28.11.11	<i>Cymbella prostrata</i> var. <i>auerswaldii</i> (Rabh.) Reim.
	Frequent Note some of the variation in outline which occurs in this taxon.





## Plate 11

Figure/dimensions	Name
1/53.15.12	<del><i>Eunotia robusta</i></del> Ralfs <i>serra</i> var. <i>diadema</i> (Ehrenberg) Patr.
	Fragment
2/25.6½.9	<i>Eunotia ?sudetica</i> ? O.Mull. <i>septentrionalis</i> Ostr.
3/13½	<del><i>Eunotia monodon</i></del> var. <i>bidens</i> (Grev.) W.Sm. <i>Eunotia scandinaviana</i> A.Cl.
4-7	<i>Cocconeis</i> forms? <i>Achnanthes flexella</i> and vars.
	I have depicted figures 4-7 in order to shew some of the outline variation present in the Coniston forms.
8/24.6.25 <sup>c</sup>	<i>Anomoeoneis vitrea</i> (Grun.) Ross
	Rare
9/28.2.28	<i>Stauroneis ?prominula</i> (Grun.) Hust.
	One
10/66.13½.10	<i>Cymbella</i> sp.?
	Few
11/42.7½.13½	<i>Cymbella</i> sp. ?n.sp. ? <i>platycephala</i> fa.
	One
12/48.10.10	<i>Cymbella hybrida</i> Grun.
	One
13/50.5.11	<i>Gomphonema intricatum</i> Kützing.



## Some Freshwater Diatoms from Malham Tarn

**[Editor's Notes:** Malham Tarn lies approximately 25 miles (40km) northwest of Bradford, at an altitude of 1236 feet (377 metres). The Tarn surface area is about 153 acres (61 hectares) and the average depth is about 8 feet (2.4 metres). The maximum depth is about 14½ feet (4.4 metres). The Malham Tarn catchment area covers about 2.3 miles<sup>2</sup> (6 km<sup>2</sup>). The Tarn is frozen for most of the winter but in summer the water temperature reaches as high as 20 degrees Celsius (68°F). This is still quite cold as anyone who has fallen in will testify. The inflow to the Tarn consists of a small stream entering at the north-western corner and to a lesser extent the small springs that issue from close to the limestone/shale boundary at the base of the limestone scar on the eastern shore. There is one outflow at the southern end of the Tarn, called Tarn Foot. The outflow stream flows for only a short distance - depending on outflow strength - before sinking into the limestone. This is the embryonic River Aire. To the west is a raised bog called "Tarn Moss". A 'cliff' has formed as a result of erosion by the Tarn water subsequent to the raising of the water level in 1771.

Small beds of Bottle Sedge (*Carex rostrata*) grow in the north-west corner and the sheltered east bay. The north and north-east shores are of limestone with glacial drift covering and variable sized boulders and pebbles of limestone. The Tarn lies largely over Silurian slates covered with thick glacial drift and marl deposits. Surrounding the Tarn is a karstic limestone landscape of predominately Carboniferous age.]



During the meeting of the British Diatomists held this year (1981) November 5<sup>th</sup>-7<sup>th</sup> (recorded elsewhere as 6<sup>th</sup>-8<sup>th</sup>) at Malham Tarn Field Centre opportunity was taken to gather from the shore of the tarn.



*Tarn House, Malham Tarn Field Centre by Horace G. Barber (November 1981)*

The gathering generally was made from coating on underwater stones and boulders, and a small spring on the bank of the tarn. The geology of the side nearest the centre is limestone but the opposite, that of old peat bog (not visited). The flora of the gatherings made was principally of *Fragilaria* and *Cymbella* as will be seen from the appended list. Plates 1 & 2 will give an idea but naturally are not exhaustive, a few of the very smaller naviculoid forms need much study.





*The eastern shore of Malham Tarn*

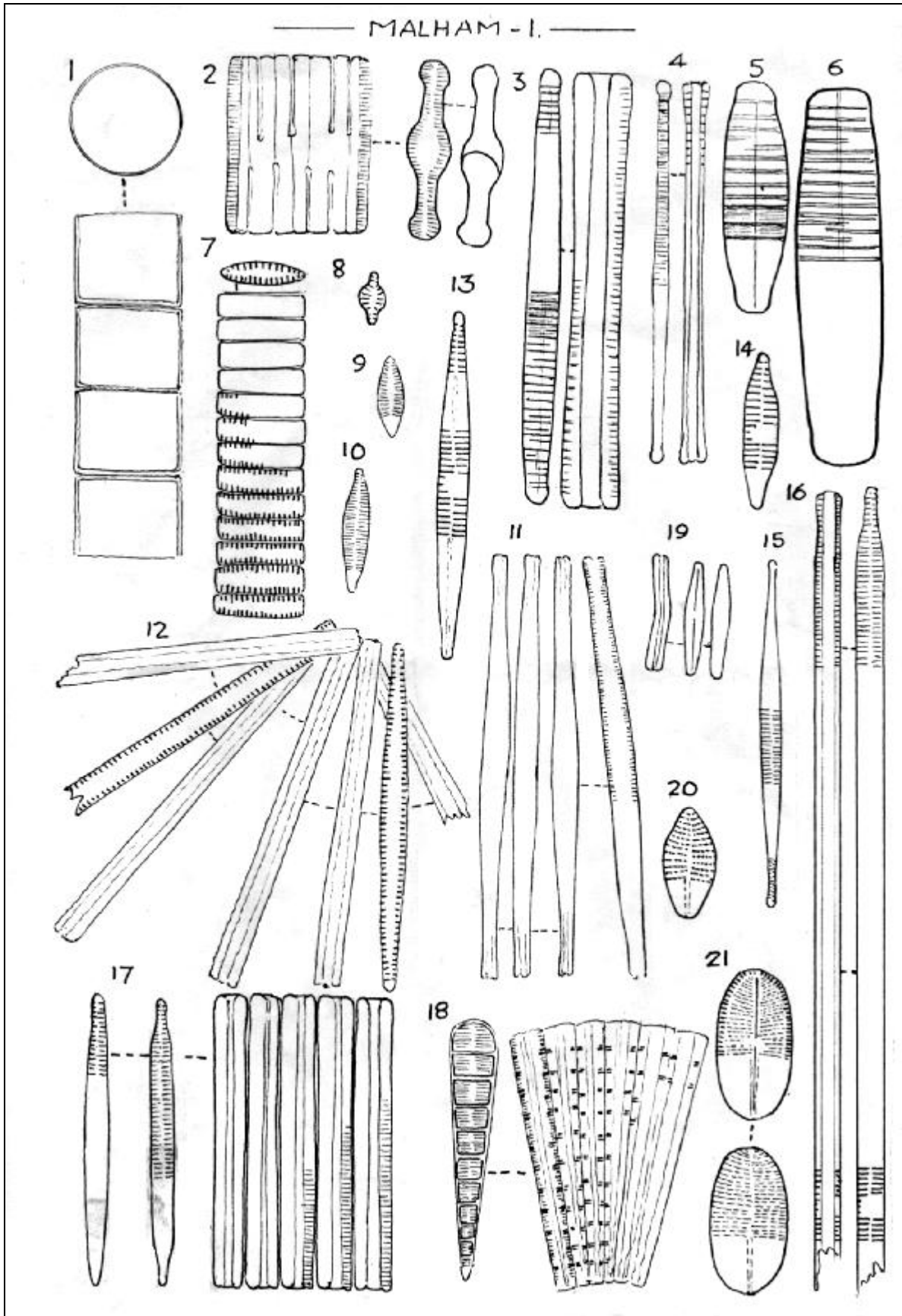


*The spring on the east shore of the Tarn*

## Plate 1

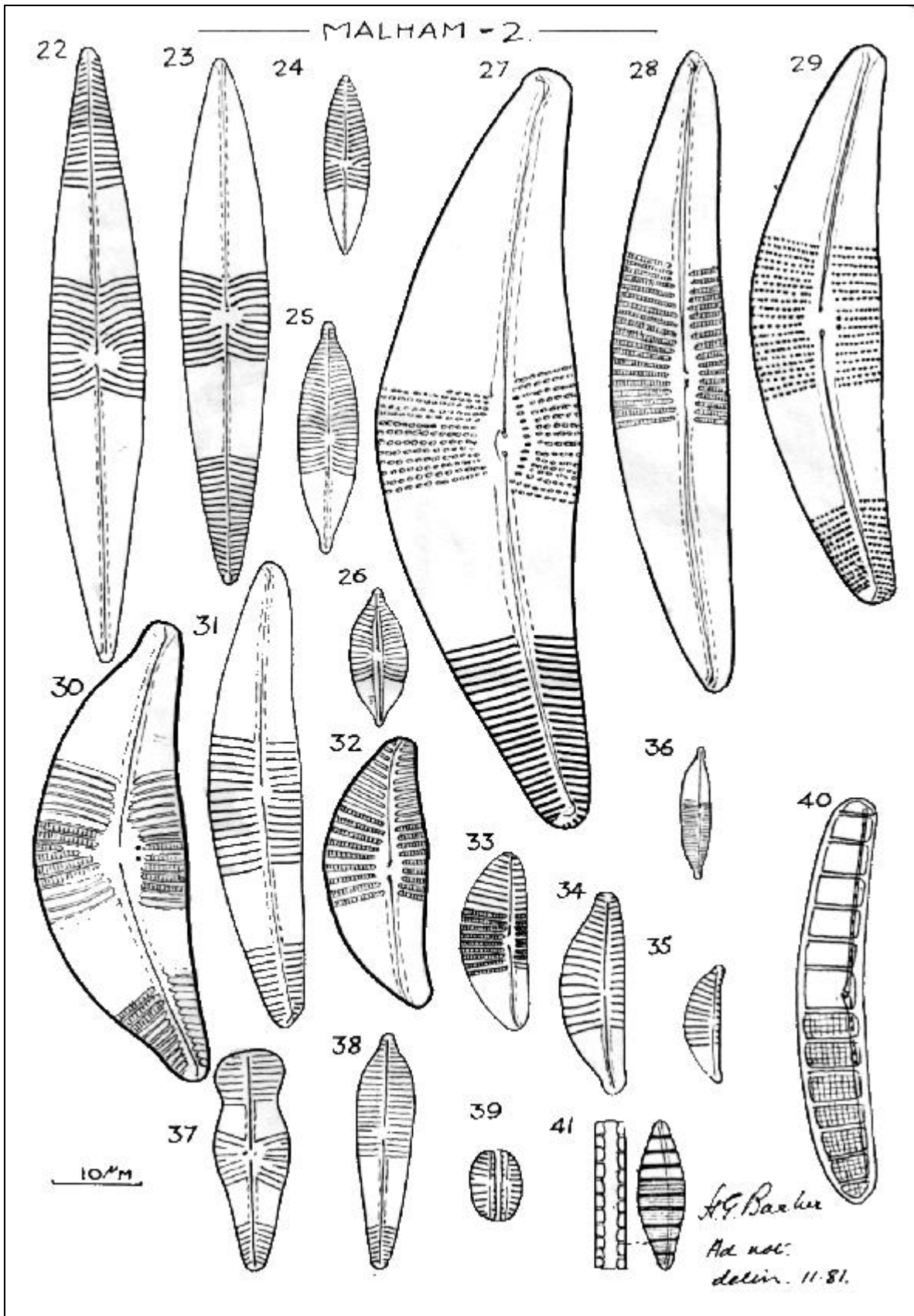
Figure	Name
1	<i>Melosira varians</i> Agardh
	(From the spring) Rare
2	<i>Tabellaria flocculosa</i> (Roth) Kützing
	(From the spring) Frequent
3	<i>Diatoma vulgare</i> var. <i>grandis</i> (W.Smith) Grunow
	Massive
4	<i>Diatoma elongatum</i> Agardh
	Massive
5	<i>Diatoma vulgare</i> var. <i>producta</i> Grunow
	Few
6	<i>Diatoma vulgare</i> var. <i>producta</i> Grunow
	?auxospore form. Few
7	<i>Fragilaria</i> sp. var. <i>ventis</i> (Ehrenberg) Grunow
	Occasionally in bands up to 1mm long
8	<i>Fragilaria construens</i> (Ehrenberg) Grunow
	Only one seen
9	<i>Fragilaria construens</i> var. <i>venter</i> (Ehrenberg) Grunow fa.
	Few
10	<i>Fragilaria construens</i> var. <i>venter</i> (Ehrenberg) Grunow fa.
	Few
11	<i>Fragilaria crotonensis</i> Kitton
	A few stellate formations
12	<i>Synedra actinostroides</i> Lemerman
	A few stellate formations
13	<i>Fragilaria intermedia</i> Grunow
	Few
14	<i>Fragilaria intermedia</i> Grunow fa.
	Few
15	<i>Fragilaria</i> ? <i>gracillima</i> Mayer
	Few
16	<i>Synedra ulna</i> (Nitzsch) Ehrenberg
	Few
17	<i>Fragilaria construens</i> var. <i>subsalina</i> Hustedt
	Frequent
18	<i>Meridion circulare</i> Agardh
	(From the spring) Few
19	<i>Achnanthes affinis</i> Grunow
	Frequent
Not figured	<i>Achnanthes microcephala</i> (Kützing) Grunow
	Frequent
20	<i>Achnanthes Clevei</i> Grunow
	Hypovalve only seen
21	<i>Cocconeis placentula</i> (Ehrenberg) Hustedt
	(From the spring only) Rare





## Plate 2

Figure	Name
22	<i>Navicula radiosa</i> Kützing
	(Rombic Form) Rare. This taxon varies from rhombic to lanceolate
23	<i>Navicula radiosa</i> Kützing
	(Lanceolate Form) Rare. This taxon varies from rhombic to lanceolate
24	<i>Navicula cryptocephala</i> var.
	Near <i>Navicula veneta</i> Kützing. Frequent
25	<i>Navicula intermedia</i> Grunow
	(near) Few
26	<i>Navicula</i> sp.
	Only one seen
27	<i>Cymbella sturii</i> Grunow fa.
	Rare. This form could come within the orbit of <i>Cymbella cistula</i> (Ehrenberg) O.Kirchner
28	<i>Cymbella helvetica</i> Kützing
	Frequent
29	<i>Cymbella ?cistula</i>
	Frequent Usually <i>cistula</i> has 4 or 5 isolated punta. <i>Cymbella turgida</i> W.Gregory, has rostrate ends so there is a question here.
30	<i>Cymbella tumida</i> (Brébisson) H.v.Heurck
	Few
31	<i>Cymbella ? helvetica</i> Kützing fa.
	Rare
32	<i>Cymbella prostrata</i> var. <i>auerswaldii</i> (Rabenhorst) Reimer
	Very Frequent Present in gelatinous tubes and is the first occasion I have found them so. There is much variation in the outline and particularly to the ventral edge.
33	<i>Cymbella prostrata</i> var. <i>auerswaldii</i> (Rabenhorst) Reimer
	Very Frequent Present in gelatinous tubes and is the first occasion I have found them so. There is much variation in the outline and particularly to the ventral edge.
34	<i>Cymbella affinis</i> Kützing
	Rare
35	<i>Cymbella ventricosa</i> Kützing
	Frequent
36	<i>Cymbella microcephala</i> Grunow
	Frequent
37	<i>Gomphonema constrictum</i> Ehrenberg
	Only one seen
38	<i>Gomphonema augur</i> Ehrenberg fa.
	Only one seen
39	<i>Amphora ovalis</i> var. <i>pediculus</i> Kützing
	Frequent
40	<i>Epithemia zebra</i> (Ehrenberg) Kützing
	Fragments only seen
41	<i>Denticula tenuis</i> var. <i>crassula</i> (Naegeli) Hustedt
	Frequent



The sketches were all made from uncleaned material and no doubt after chemical cleaning some forms will afford a closer identification. After cleaning there are a number of forms additional to the above records and time permitting it is the intention to add to the account.

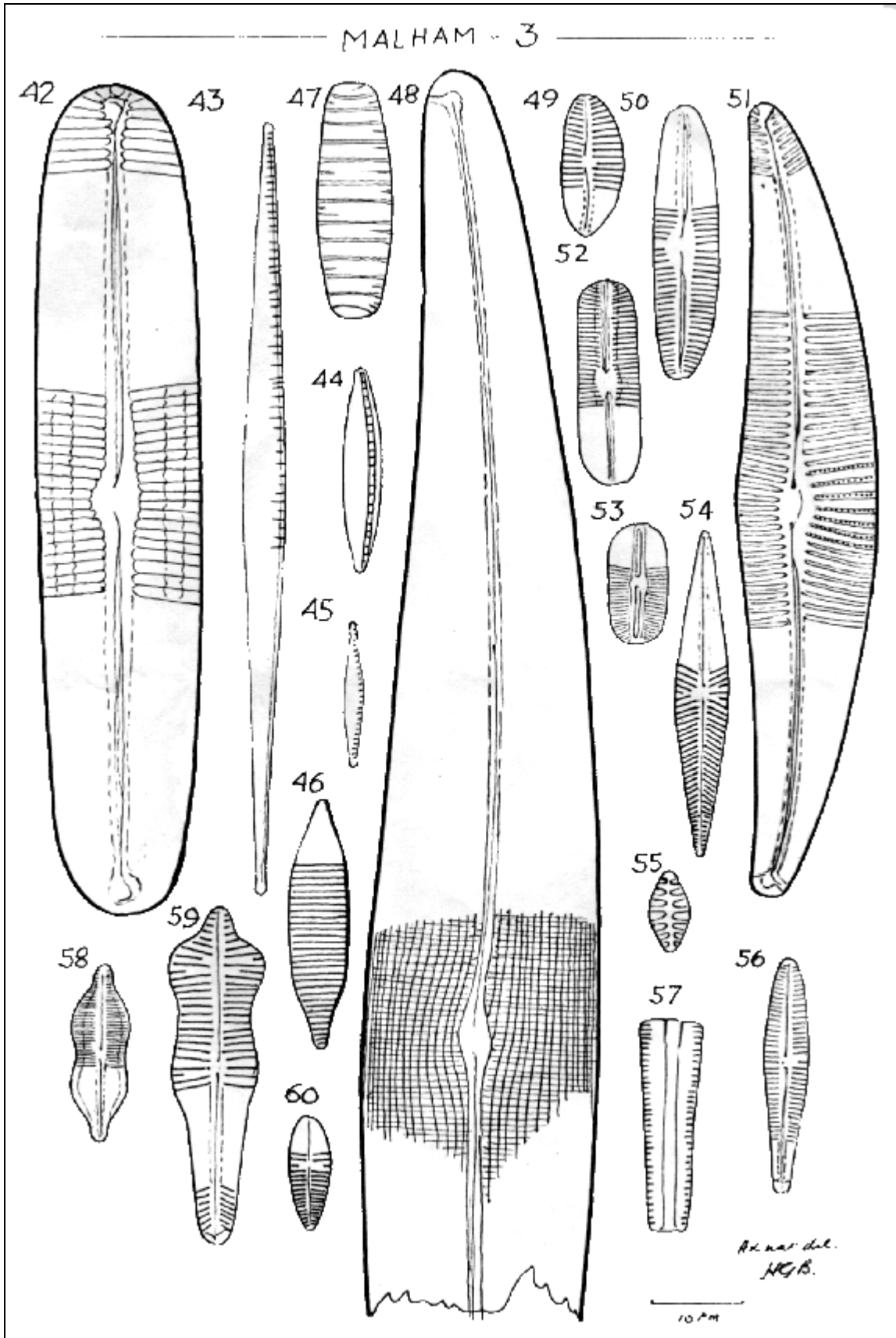
*H.G. Barber*

Hafan, 91 Mancetter Road, Nuneaton  
November 1981

Subsequent to the foregoing record the material was acid cleaned and a more extensive search made which resulted in Plates 3 & 4. The forms on these plates are very infrequent, many only occurring once. There are still a few minute forms I have refrained from recording for I cannot be confident as to the Genera.

## Plate 3

Figure	Name
42	<i>Pinnularia viridis</i> (Nitzsch) Ehrenberg
	Only one seen
43	<i>Nitzschia</i> sp. (? <i>gracilis</i> )(? <i>acuta</i> )
	Only one seen
44	<i>Nitzschia dissipata</i> (Kützing) Grunow
	Only one seen
45	<i>Nitzschia</i> sp.
	Only one seen
46	<i>Nitzschia augustata</i> var. <i>acuta</i> Grunow
	Very rare
47	<i>Diatoma vulgare</i> fa.
	One only (Taxon subject to intermediates)
48	<i>Gyrosigma attenuatum</i> (Kützing) Rabenhorst
	One only
49	<i>Cymbella prostrata</i> var. <i>auerswaldii</i> (Rabenhorst) Reimer
	(End of clone form?)
50	<i>Cymbella obtusa</i> W.Gregory
	One only
51	<i>Cymbella lanceolata</i> (Ehrenberg) H.v.Heurck
	Rare
52	<i>Diploneis marginestriata</i> Hustedt
	One only
53	<i>Diploneis marginestriata</i> Hustedt fa.
	One only
54	<i>Navicula radiosa</i> var. <i>tenella</i> (Brébisson) H.v.Heurck
	One only
55	<i>Fragilaria leptostauron</i> (Ehrenberg) Hustedt
	One only
56	<i>Gomphonema angustatum</i> (Kützing) Rabenhorst
	Rare
57	<i>Gomphonema</i> sp.
	Rare (Girdle view)
58	<i>Neidium binodis</i> (Ehrenberg) Hustedt
	One only
59	<i>Gomphonema acummatum</i> var. <i>coronata</i> (Ehrenberg) W.Smith
	One only
60	<i>Gomphonema olivaceum</i> (Lyngbye) Kützing
	One only



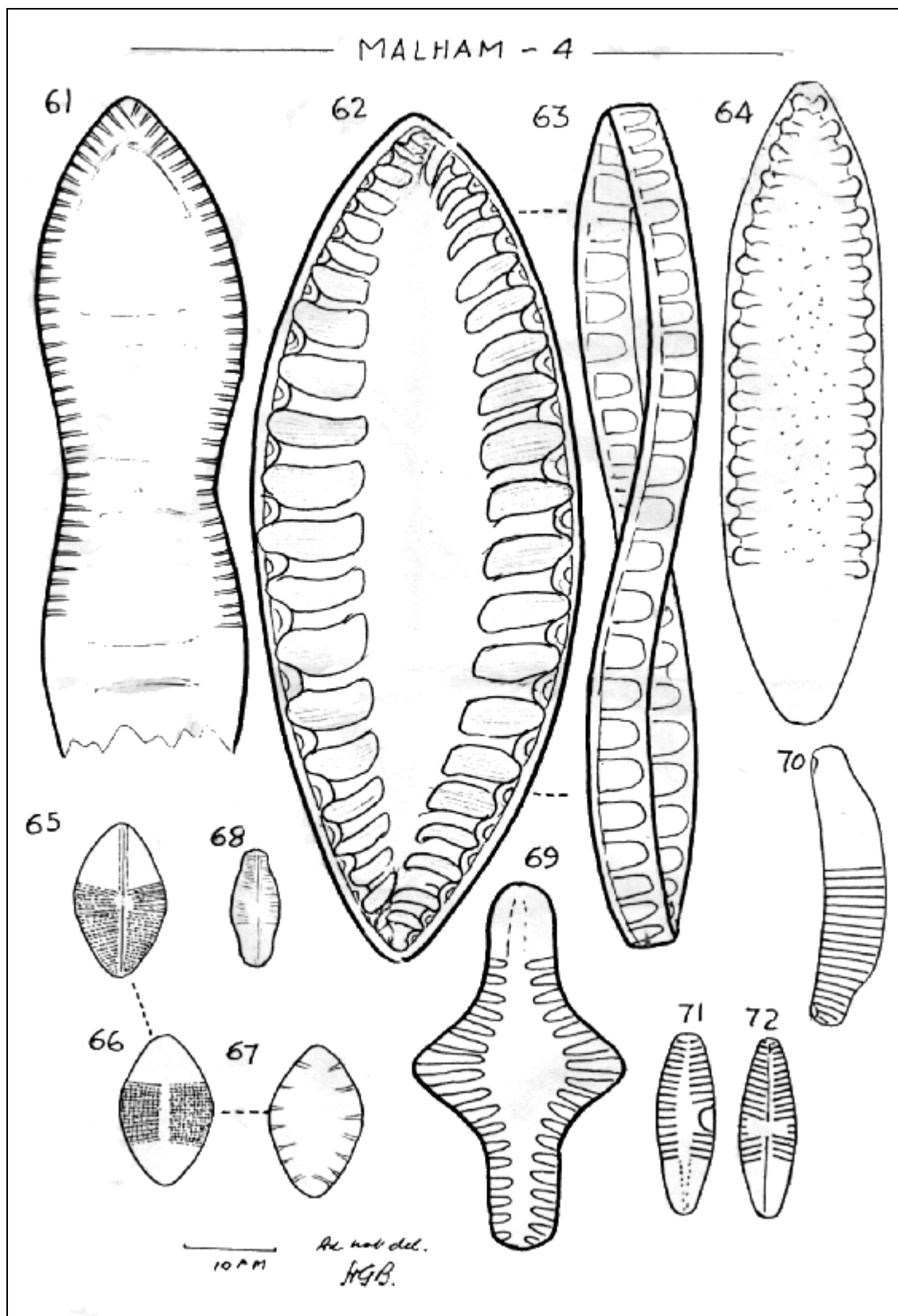
**Plate 4**

<b>61</b>	<i>Cymatopleura solea</i> var. <i>constricta</i> Grunow
	One only
<b>62</b>	<i>Surirella spiralis</i> Kützing
	One only
<b>63</b>	<i>Surirella spiralis</i> Kützing
	Conjectured girdle view
<b>64</b>	<i>Surirella linearis</i> fa.
	One only
<b>65</b>	<i>Cocconeis pediculus</i> Ehrenberg
	Epivalve. One only
<b>66</b>	<i>Cocconeis pediculus</i> Ehrenberg
	Hypovalve. One only
<b>67</b>	<i>Cocconeis pediculus</i> Ehrenberg
	Septum. One only
<b>68</b>	<i>Cocconeis flexella</i> var. <i>aepestris</i> Brun
	One only
<b>69</b>	<i>Fragilaria leptostauron</i> var. <i>Harrisonii</i> W.Smith
	One only
<b>70</b>	<i>Eunotia arcus</i> Ehrenberg fa.
	One only
<b>71</b>	<i>Achnanthes lanceolata</i> Brébisson
	Hypovalve. One only
<b>72</b>	<i>Achnanthes lanceolata</i> Brébisson
	Epivalve. One only

*H.G. Barber*

November '81





## Poison Creek Formation, Owyhee County, Idaho

[Editor's Note: This next series of illustrations is somewhat confused in that the initial description of the material is 'Non-Russian Fossil F/W Sample 10-23-2' for the first 4 plates and thereafter plates 5-12 are captioned USSR – but this has been crossed out.

Somewhat later the following has been added:

'Idaho, Owyhee County, Poison Creek formation (? Miocene deposit)

Ref: BH1309 Jan. 1981

Ex. HGB Cleaned KDK

Notes by H.G. Barber

Plates 1-4'

The following is a copy of Bernard Hartley's entry for sample 1309.

The Bernard Hartley index record:

1309	Site in the Rockies (? Iowa) ex. John Bradbury, American Geological Survey, of Denver, Colorado, 10-2302 Received from H.G. Barber and separated over a 400 mesh sieve. Cleaned by K-D. Kemp See also HGB plates 1-4 and his slide 1316
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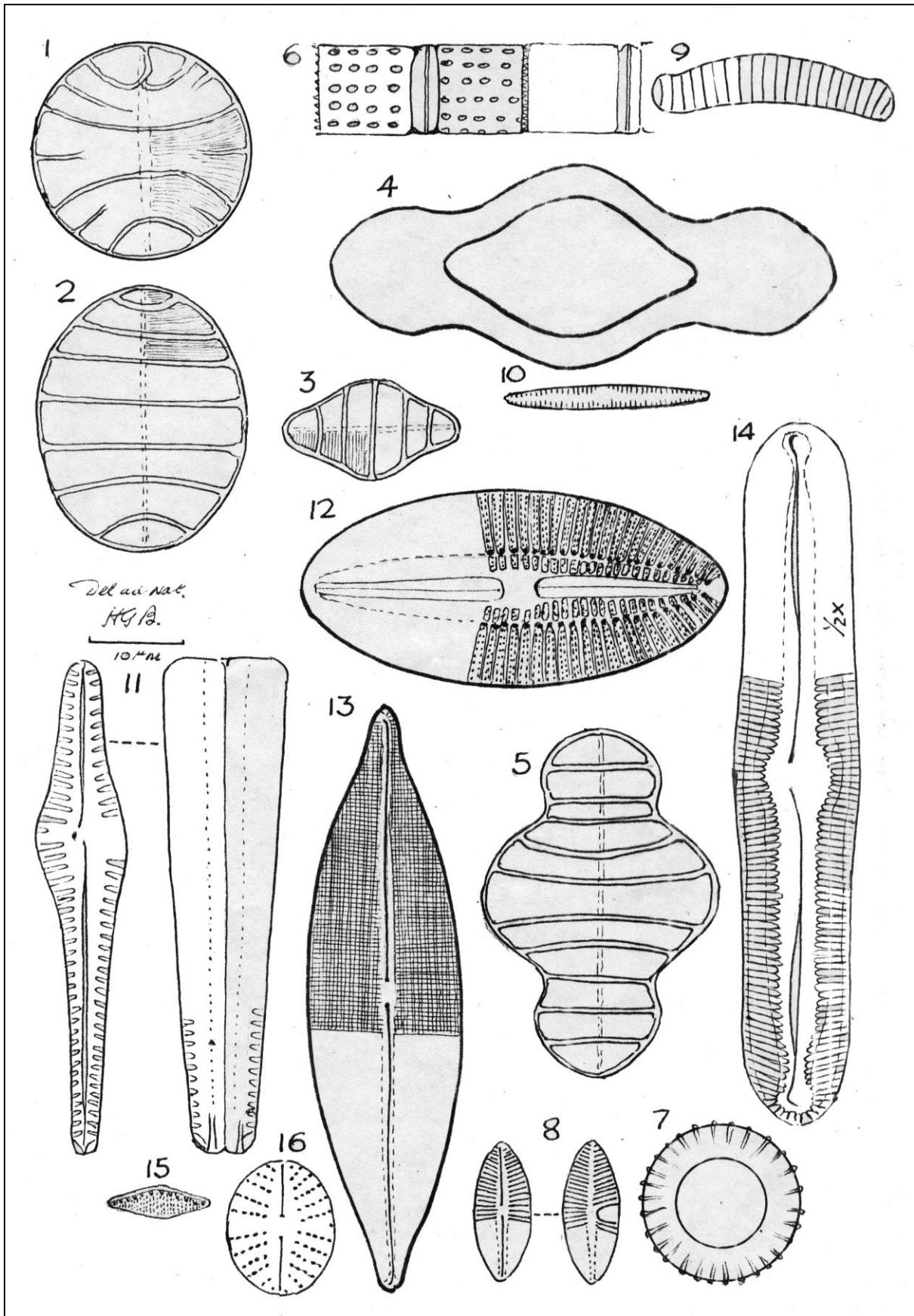
Plates 5-12 are stated to be from sample 10-22-20. The numbering system would appear to be that of The American Geological Survey (a borehole or well drilling - 10 representing the thickness of the core material and 2302 and 2220 the depth at which the material was taken – numbers in feet) and if this is the case then Plates 5 thru 12 are also likely to represent an American sample, possibly from the same source. This is surmise and needs ratification.]

The Notes associated with these plates are a combination of those sent with the illustration by Horace G. Barber and those by Bernard Hartley.

## Plate 1

Figure	Name
1 & 2	<i>Tetracyclus</i>
	The genus is quite common and many frustules lie in girdle view. Outlines vary considerably.
3	<i>Tetracyclus</i>
	Near to <i>T. lacustris</i> var. <i>rhombrica</i>
4	<i>Tetracyclus</i>
	Septa of
5	<i>Tetracyclus</i>
	Near to <i>T. lacustris</i>
6	<i>Melosira granulata</i>
	The genus is common and this too is quite variable so far as areolae are concerned. They vary from coarse to fine.
7	<i>Melosira granulata</i>
	End of valve
8	<i>Achnanthes lanceolata</i>
9	<i>Eunotia</i>
	May be a form of <i>fallax</i> . Many frustules lie in girdle view.
10	<i>Synedra</i>
	Close to <i>Synedra miniscula</i>
11	<i>Gomphonema</i> sp.
	Not a familiar form. Very coarse striae. May be related to <i>G. angustatum</i> .
12	<i>Diploneis subsmithii</i>
	Not <i>Dip. Smithii</i> , which is marine.
13	<i>Navicula cuspidata</i>
	Intermediate to var. <i>ambigua</i> . Note central polar hooks.
14	<i>Pinnularia</i> sp.
	(at x½) An indeterminate form with some features of <i>P. major</i> and <i>P. viridis</i> .
15	<i>Nitzschia</i> sp.
	Near <i>Nit. amphibia</i>
16	<i>Navicula scutelloides</i>

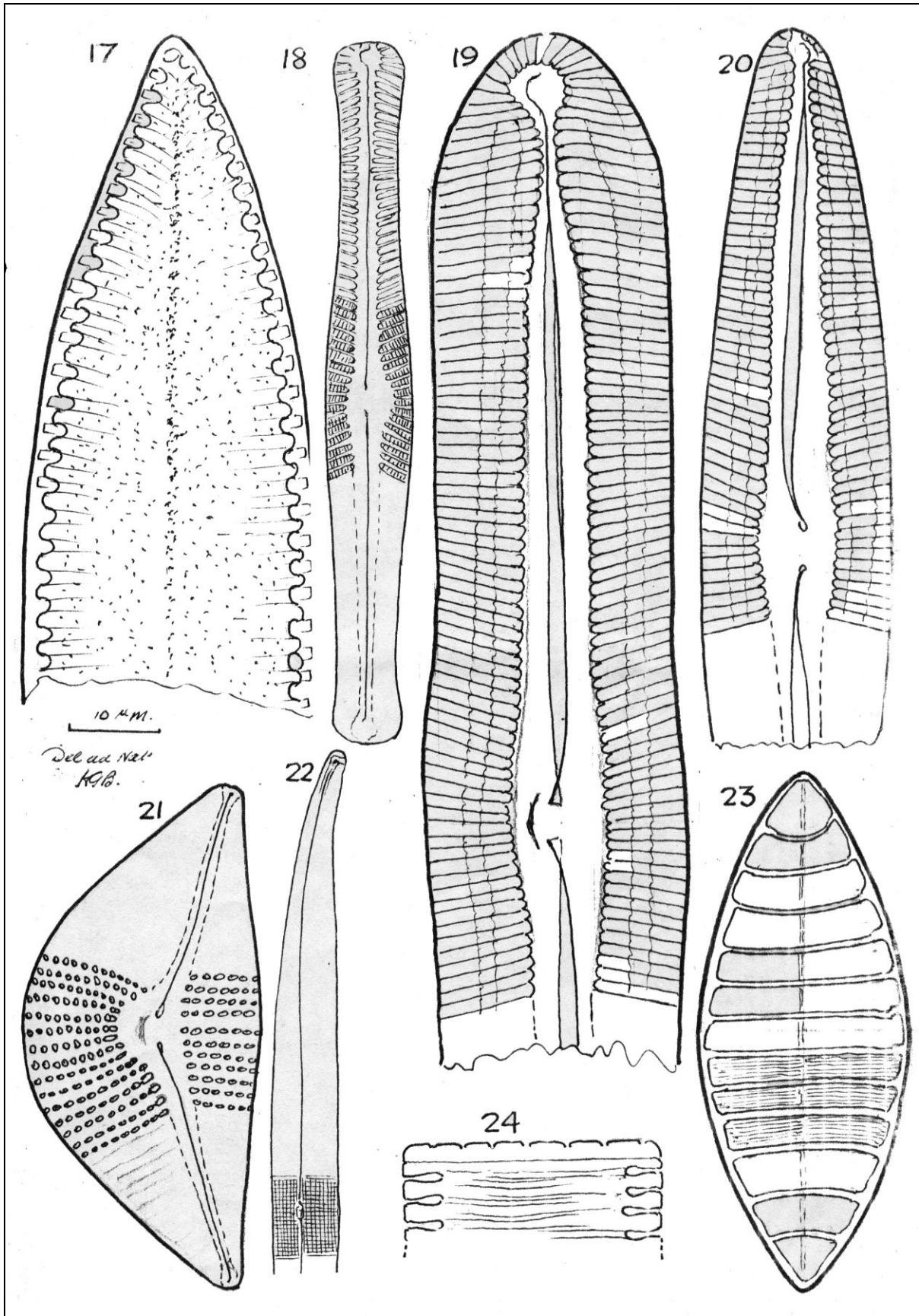
Plate 1



## Plate 2

Figure	Name
17	<i>Surirella</i> sp.
	Possibly one of the <i>fullebornii</i> group, which are not present in the flora. One fractured form only seen.
18	<i>Navicula</i> sp.
	A coarsely marked lineolate form.
19	<i>Pinnularia major</i>
	Raphe correct and langsbands correct.
20	<i>Pinnularia</i> sp.
	Not major or <i>viridis</i> . Possibly A.Cl. fig.1097.
21	<i>Cymbella</i> sp.
	One or two seen. Very large "areolae". Quite an angular dorsal edge in some specimens.
22	<i>Gyrosigma</i> sp.
	Possibly <i>Kützingii</i> , but have not seen a complete valve.
23	<i>Tetracyclus</i> sp.
24	<i>Tetracyclus</i> sp.
	Girdle view

Plate 2

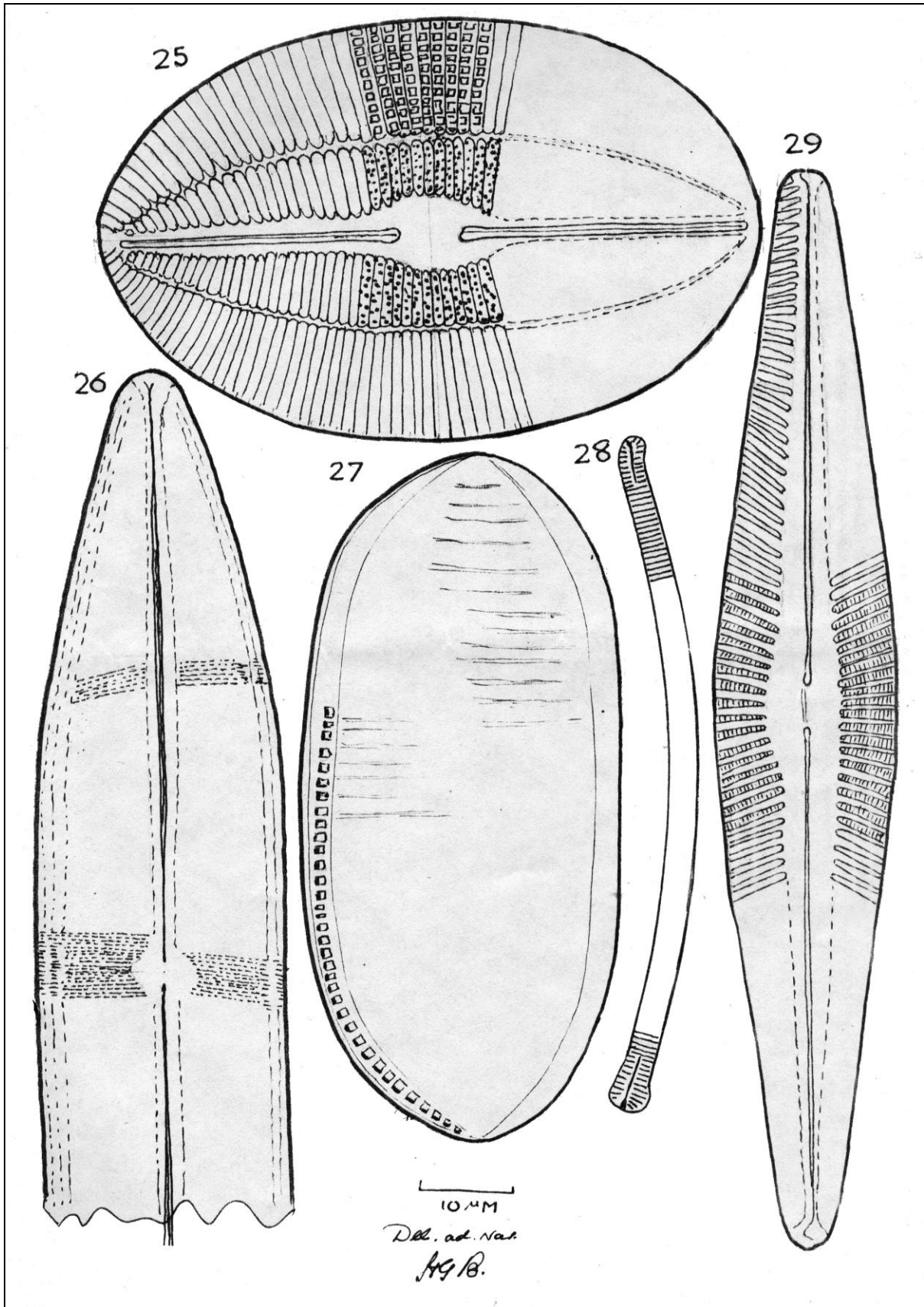


**Plate 3**

Figure	Name
25	<i>Diploneis</i> sp.
	Not a <i>subsmithii</i> nor <i>D. elliptica</i> . Could be related to <i>Dip. finnica</i> but the secondary structure is not typical.
26	<i>Neidium iridis</i> fa.
27	<i>Nitzschia tryblionella</i> fa.
	A variable taxon.
28	<i>Eunotia</i> sp.
	? <i>gracilis</i> or <i>lunaris</i> , all are variable
29	<i>Navicula</i> sp.
	There are very few forms of this group with such an axial area.



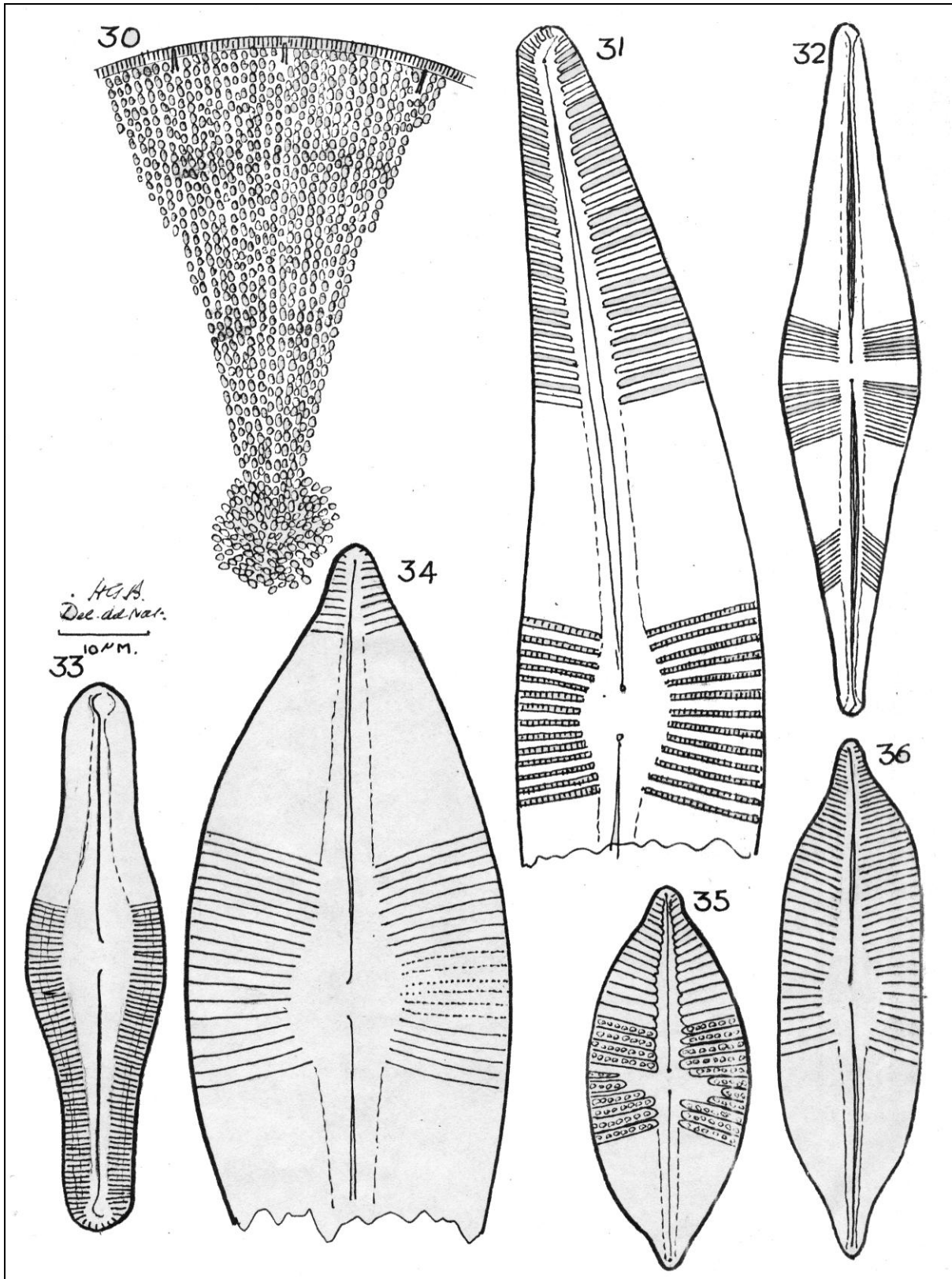
Plate 3



## Plate 4

Figure	Name
30	<i>Coscinodiscus</i> sp.
	H.G.B. thinks it is of this genus. The taxon is very common and has a considerable size range from 30-200 $\mu$ . Why is a form like this in freshwater or even was it freshwater and of what pH?
31	<i>Cymbella helvetica</i>
	Is as near as HGB can say.
32	<i>Stauroneis</i> sp.
	Not <i>St. acuta</i> as there is no pseudo-septum. Could be a form of <i>phoenicentron</i> .
33	<i>Caloneis</i> sp.
	Possibly near to <i>Cal. pulchra</i> but not by any means a good fit.
34	<i>Cymbella cuspidata</i>
	Or perhaps <i>C. suecica</i> (but punctae are not lineolate, they are round.)
35	<i>Navicula</i> ? sp.
	No idea!
36	<i>Cymbella hybrida</i>
	Very close, but central area not quite typical.

Plate 4

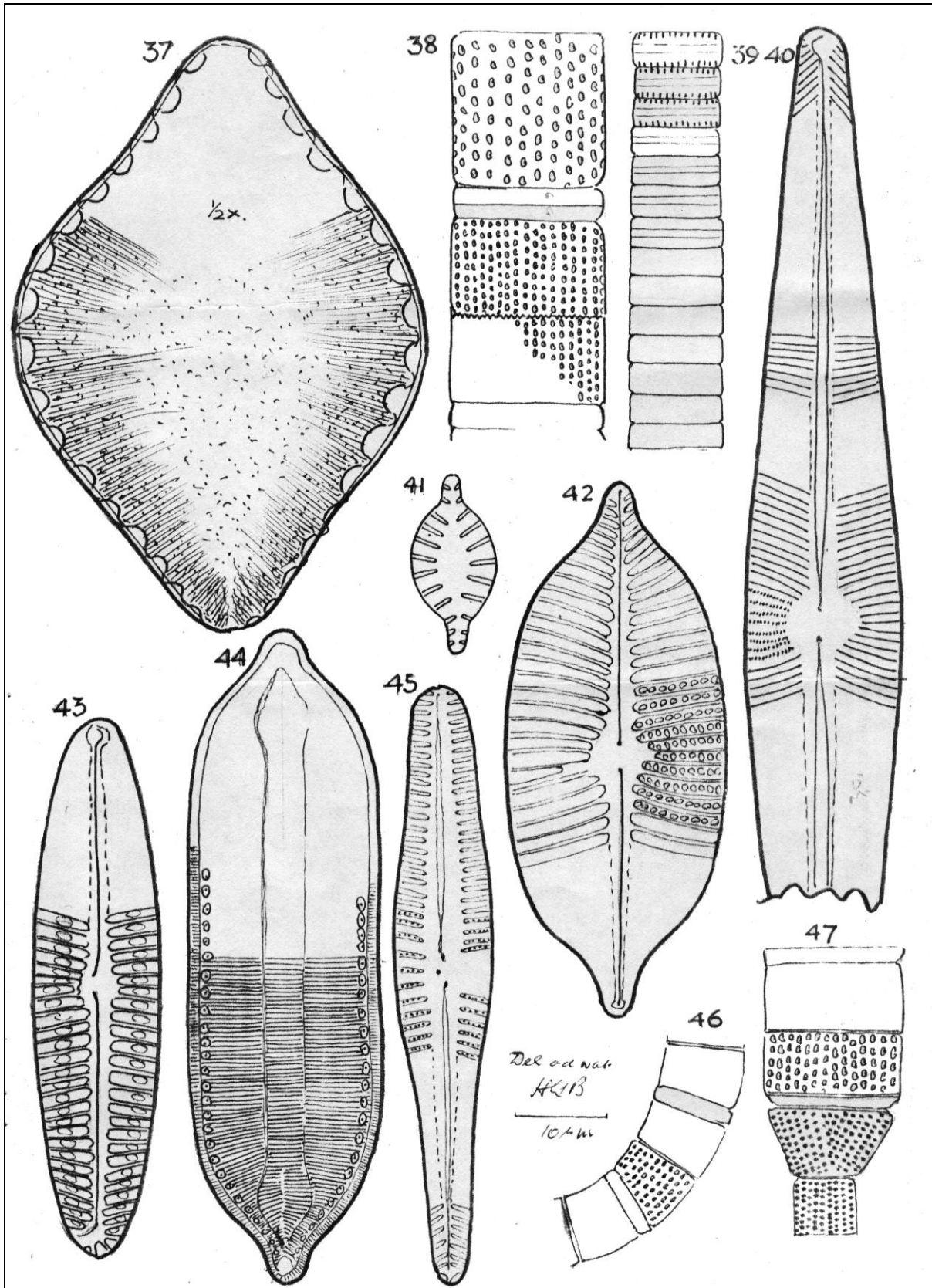


**Plate 5**

The figures shown on Plates 5-12 are from the sample numbered 10-22-20.

Figure	Name
37	<i>Surirella</i> sp.
	(x½) Sketched from part of a valve
38	<i>Melosira granulata</i>
	Two valves with different rates of striae.
39	<i>Fragilaria</i> sp.
	Chain of frustules. Could be <i>construens</i> .
40	<i>Navicula</i> sp.
	One of the lineolate group
41	<i>Fragilaria</i> sp.
42	<i>Navicula</i> sp. ?
43	<i>Pinnularia</i>
44	? genus
45	<i>Gomphonema acuminatum</i> fa.
46	<i>Melosira granulata</i> fa. <i>spiralis</i>
47	<i>Melosira granulata</i>
	The first time such a phenomena seen.

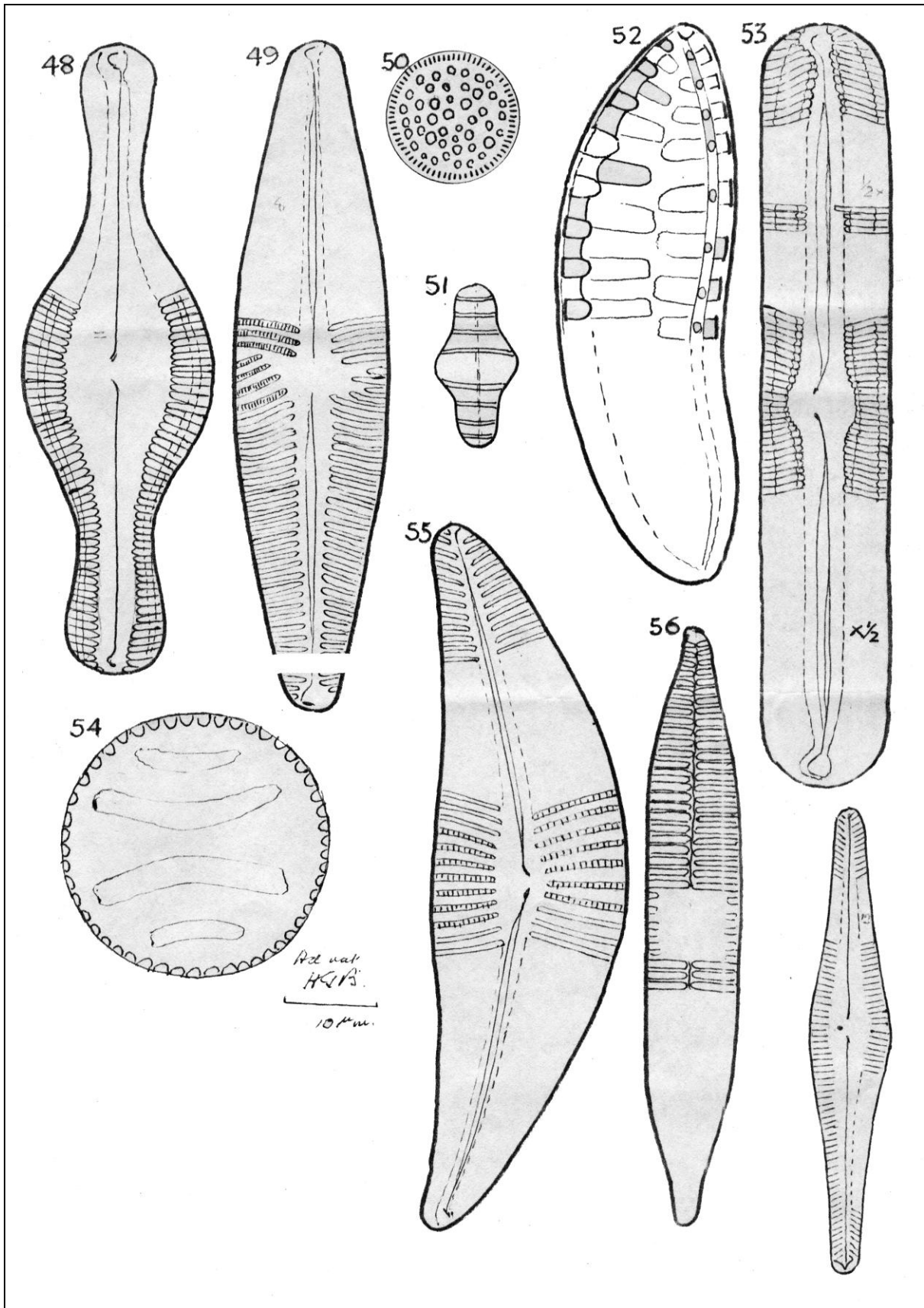
Plate 5



**Plate 6**

Figure	Name
48	<i>Pinnularia</i>
	Not known in British Isles (or elsewhere).
49	<i>Navicula</i>
	Note axial area and raphe system.
50	? genus
51	<i>Tetracyclus lacustris</i>
52	<i>Surirella</i>
	The specimen is tilted and difficult to portray.
53	<i>Pinnularia nobilis</i>
	A reasonable fit.
54	<i>Cymatopleura</i>
	Usually found in elliptical outline.
55	<i>Cymbella</i>
	Near to <i>C. cistula</i> . Note ventral stigma.
56	<i>Synedra</i> sp.

Plate 6

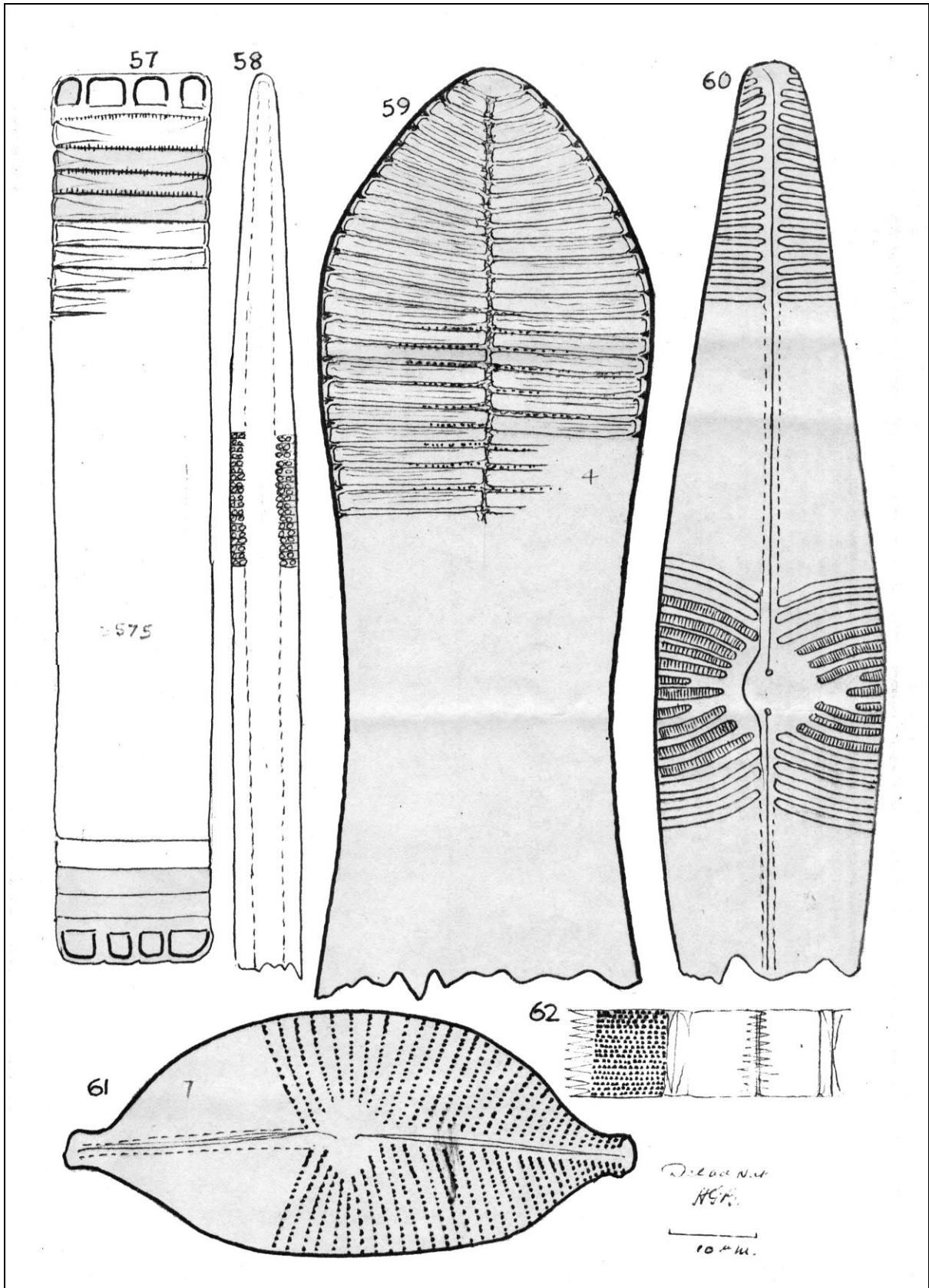




## Plate 7

Figure	Name
57	<i>Tetracyclus</i> sp.
	Note the exceptional number of septa. (See also in A.Cl. var. <i>struminosus</i> (Ehrenberg) Hust.)
58	<i>Synedra</i> sp.
	More like the marine forms than the F/W forms. Close to <i>S. Gaillonii</i> . See A.Cl. fig. 333c. <i>S. marina</i> var. <i>antigua</i> A.Cl.
59	? genus
	Could be mistaken for a <i>Cymatopleura</i> . No sign of a peripheral raphe. Note also the few puncta on the transapical ridge.
60	<i>Navicula</i>
	Another lineate form somewhat like <i>Nav. vulpina</i> but HGB has never seen the latter at this size or with striae rate.
61	<i>Cymbella cuspidata</i> (?)
	But there are a lot of minor differences.
62	<i>Melosira granulata</i> fa.

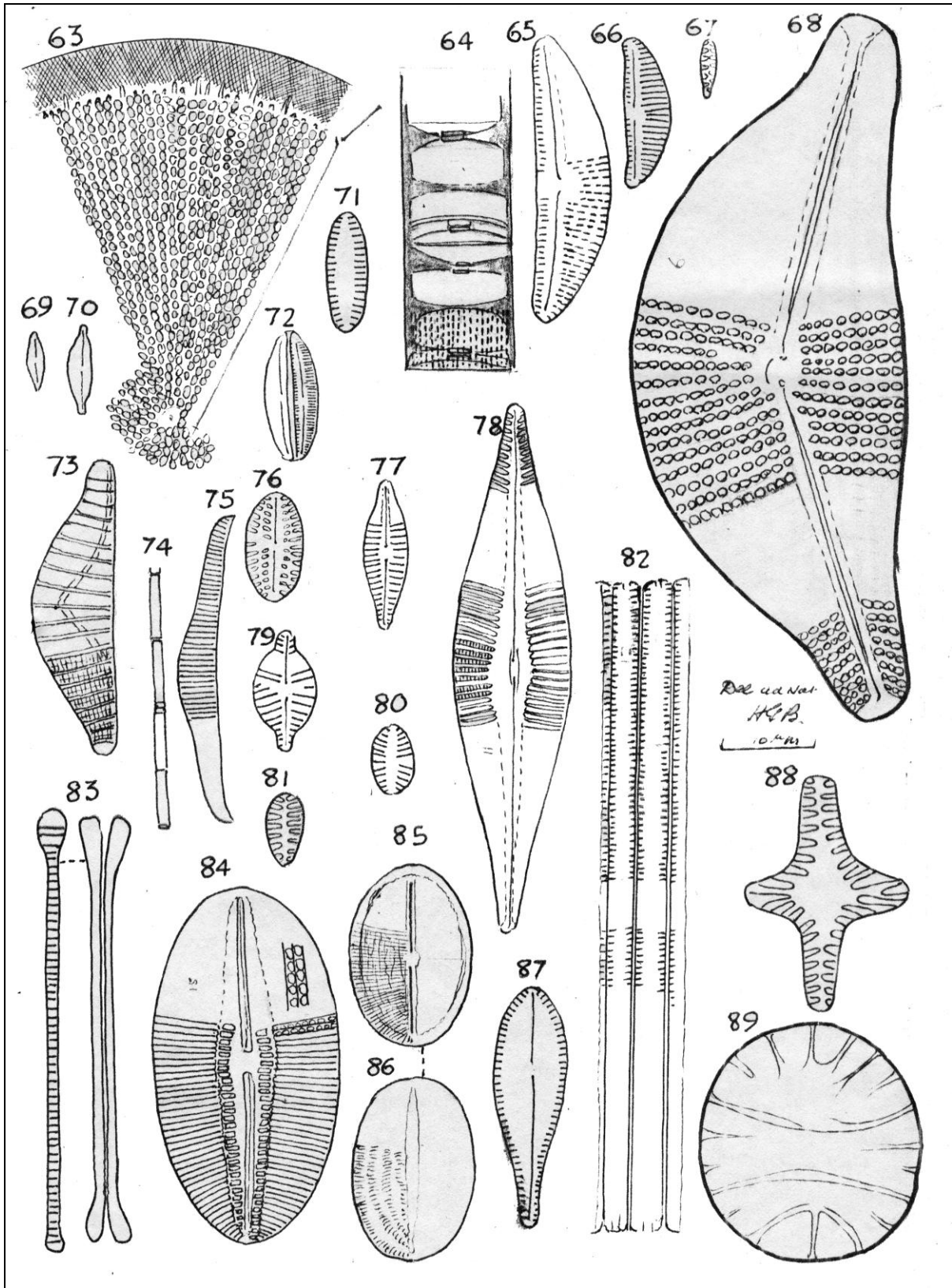
Plate 7



## Plate 8

Figure	Name
63	<i>Coscinodiscus</i> sp.
	This taxon is quite different from that in sample 10.23.20. HGB does not consider it an <i>Actinocyclus</i> in spite of the illustration. He cannot see an ocellus! after having examined many valves. Valves seem to fracture quite easily at the peripheral change in structure.
64	<i>Melosira</i>
	Rare in the sample, and difficult to examine the structure.
65	<i>Amphora ovalis</i>
	One of two variations are present. One even like <i>A. proteus</i> , the marine form.
66	<i>Cymbella ventricosa</i>
	A reasonable fit.
67	? <i>Opephora</i> sp.
	By virtue of it being heteropolar. Possibly <i>O. marina</i> .
68	<i>Cymbella</i> sp.
	Somewhat like <i>C. prostrata</i> .
69	<i>Navicula</i>
	Very small. Difficulty in resolving striae pattern.
70	<i>Cymbella</i>
	Could be a small <i>Cy. microcephala</i> but cannot resolve the striae to be sure.
71	<i>Fragilaria construens</i>
72	<i>Amphora delicatissima</i>
	Near.
73	<i>Epithemia argus</i>
74	<i>Melosira</i> sp.
	Like var. <i>angustissima</i> but cannot detect any punctae.
75	?
76	<i>Navicula</i> sp.
	New to HGB. Note the break in striae like a small lyrate form.
77	<i>Navicula</i>
78	<i>Navicula</i>
	A further lineolate form with wide axial area.
79	<i>Navicula</i>
	Close to <i>Nav. schroderi</i> but the striae rates are well out.
80	?
	Rapheless valve of <i>Achnanthes</i> ?
81	<i>Fragilaria pinnata</i>
82	<i>Fragilaria capucina</i>
	But not seen in valve view. Not <i>F. crotonensis</i> !
83	<i>Diatoma</i> sp.
	? A.Cl. fig.330N var. <i>pachycephala</i> .
84	<i>Diploneis</i>
	Not <i>elliptica</i> .
85 & 86	<i>Cocconeis placentula</i>
87	<i>Gomphonema</i> sp.
	Close to <i>G. yatukaensis</i> Horik. Et Okuno Foss. Diatoms of Japan Pl.28.
88	<i>Fragilaria harrisonii</i>
89	<i>Tetracyclus</i> sp.
	Not strictly circular. See also Pl.1.

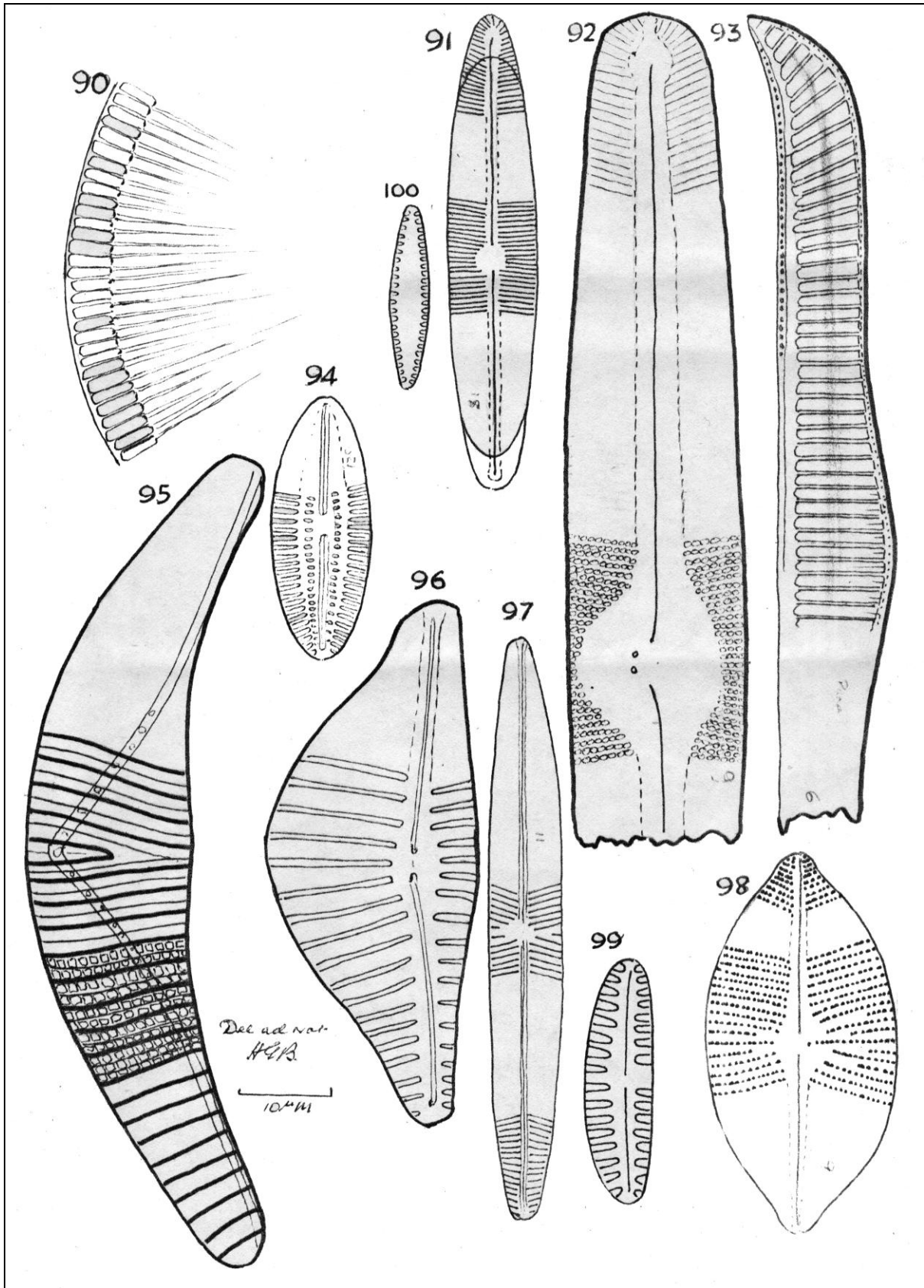
Plate 8



## Plate 9

Figure	Name
90	<i>Melosira</i> ?
	I have only seen a fragment but I am sure that it is a piece of <i>Melosira teres</i> .
91	<i>Navicula</i> sp.
	Note pseudospeta. Not a <i>Caloneis</i> or a <i>Stauroneis</i> .
92	<i>Cymbella</i> ?
	Could be a <i>Cymbella</i> . Only $\frac{3}{5}$ of the valve present and even this is partly covered.
93	<i>Rhopalodia parallela</i>
94	<i>Diploneis</i>
95	<i>Epithemia sorex</i>
	Rather big though
96	<i>Cymbella</i> sp.
	No secondary structure visible.
97	<i>Navicula</i> ? <i>radiosa</i> fa.
	Or <i>N. cari</i> var. <i>angusta</i>
98	<i>Cymbella</i> or <i>Navicula</i> sp.
	HGB suggests <i>Navicula exiguoides</i> . See p.804 Das Kieselalgen
99	<i>Cymbella</i>
100	<i>Fragilaria</i>

Plate 9

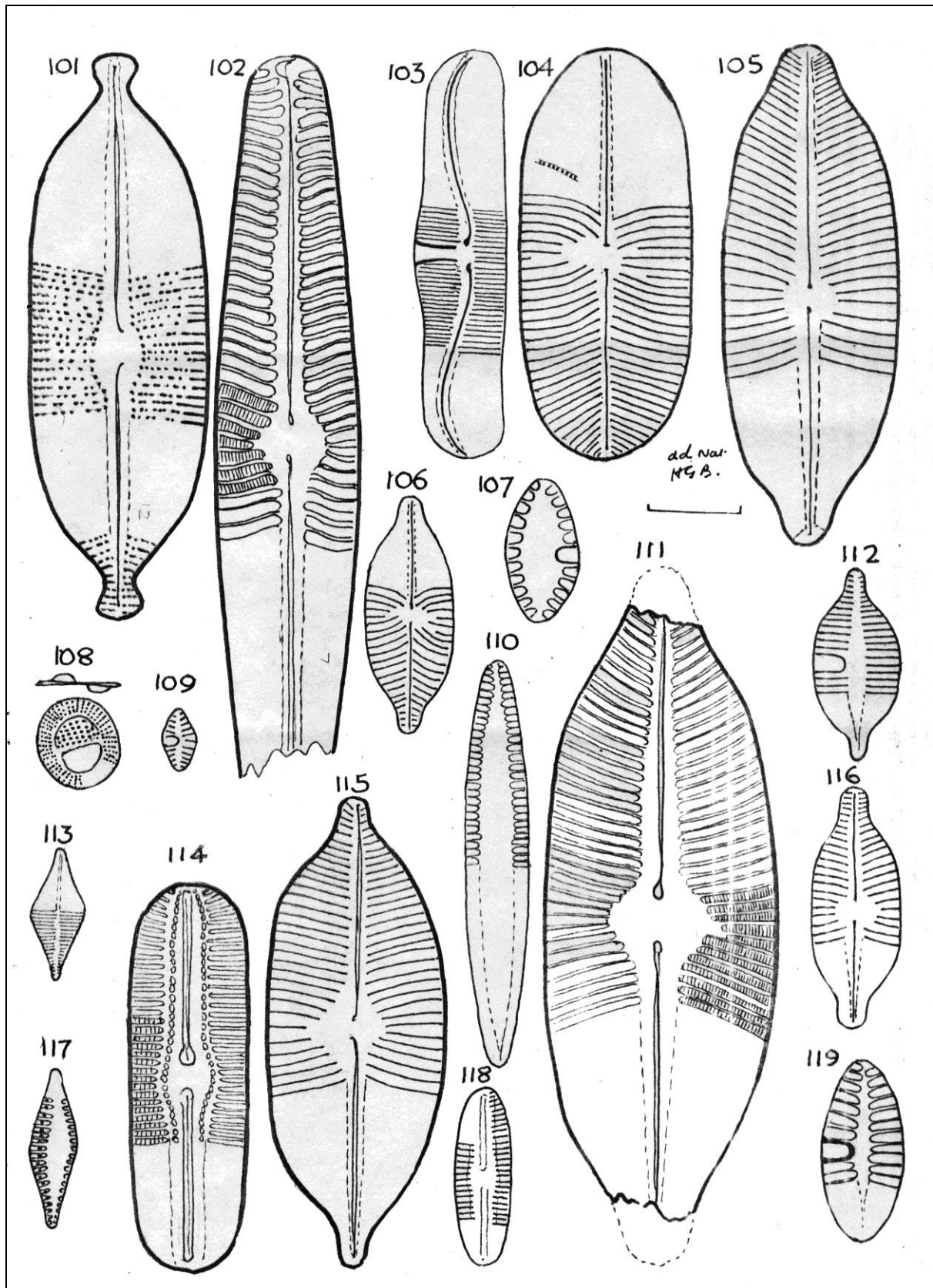


## Plate 10

Figure	Name
101	? <i>Anomoeoneis</i> sp.
	Puncta and spacing seem right.
102	<i>Navicula</i>
	Lineolatae group.
103	<i>Amphora</i>
	Maybe <i>A. laevis</i> group – marine.
104	<i>Navicula</i>
	No idea!
105	<i>Navicula placentula</i> fa. <i>rostrata</i>
106	<i>Navicula</i>
	Close to <i>N. salinarum</i> .
107	<i>Achnanthes</i>
	Hypo valve. There are quite a number such hypovalves but no corresponding epivalves.
108	?
	A small centric form. Note the highly inflated hemispherical portion in which the puncta are parallel, not radial. Not a <i>Cyclotella</i> or <i>Stephanodiscus</i> .
109	<i>Achnanthes</i>
110	? <i>Fragilaria</i> sp.
	A stranger to HGB.
111	<i>Navicula</i>
	Lineolate form.
112	<i>Achnanthes</i>
113	? <i>Fragilaria</i>
114	<i>Diploneis</i>
	Near to <i>D. domblittensis</i> but not a good fit.
115-119	?
	No notes received by Bernard Hartley from H. G. Barber.



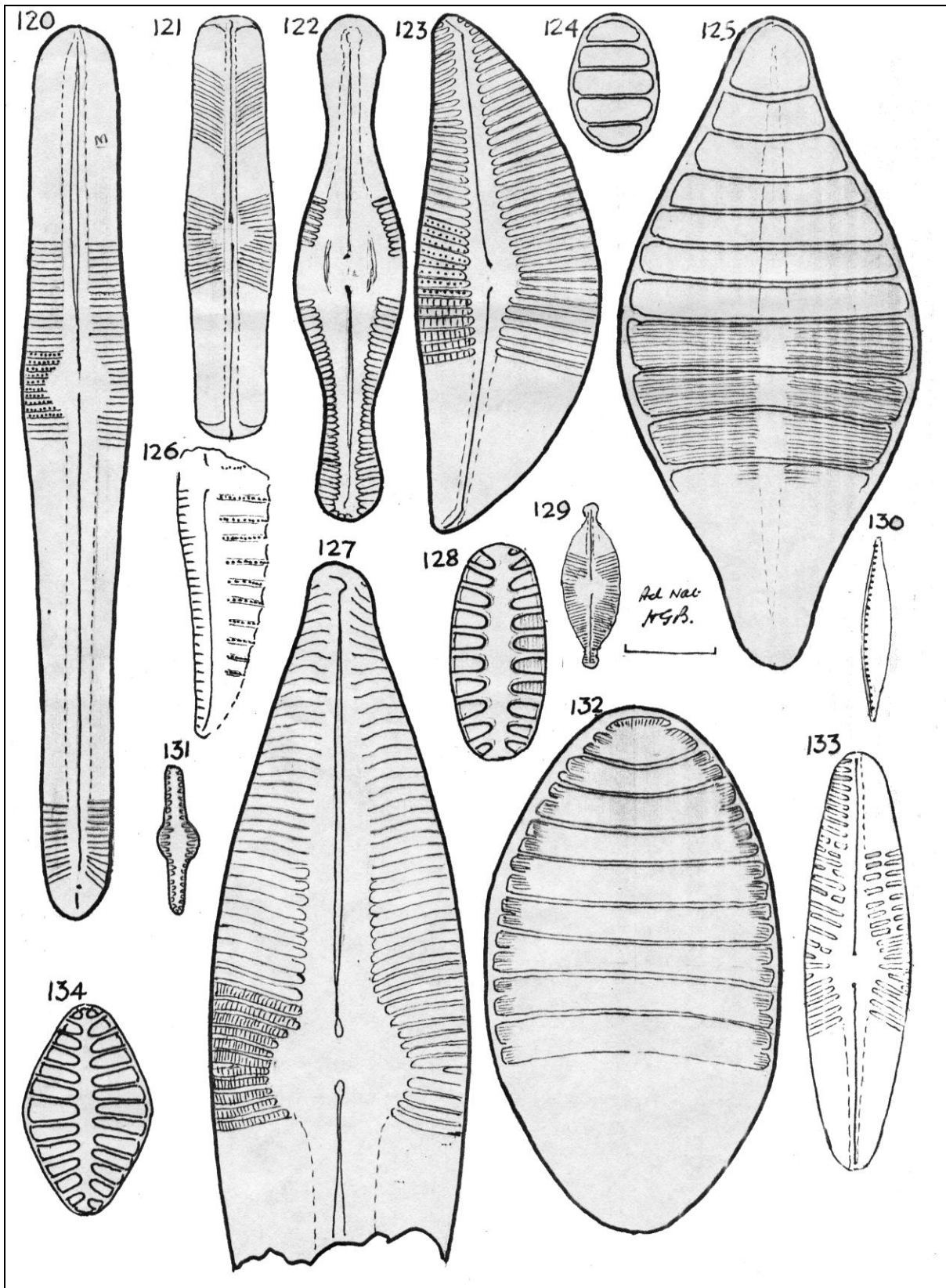
Plate 10



**Plate 11**

Figure	Name
120-131	?
	No notes received by Bernard Hartley from H. G. Barber.
132	<i>Tetracyclus</i> or <i>Diatomella</i>
133	<i>Navicula</i> sp.
	Has some characteristics of <i>Oestrupia</i> .
134	<i>Fragilaria</i> sp.

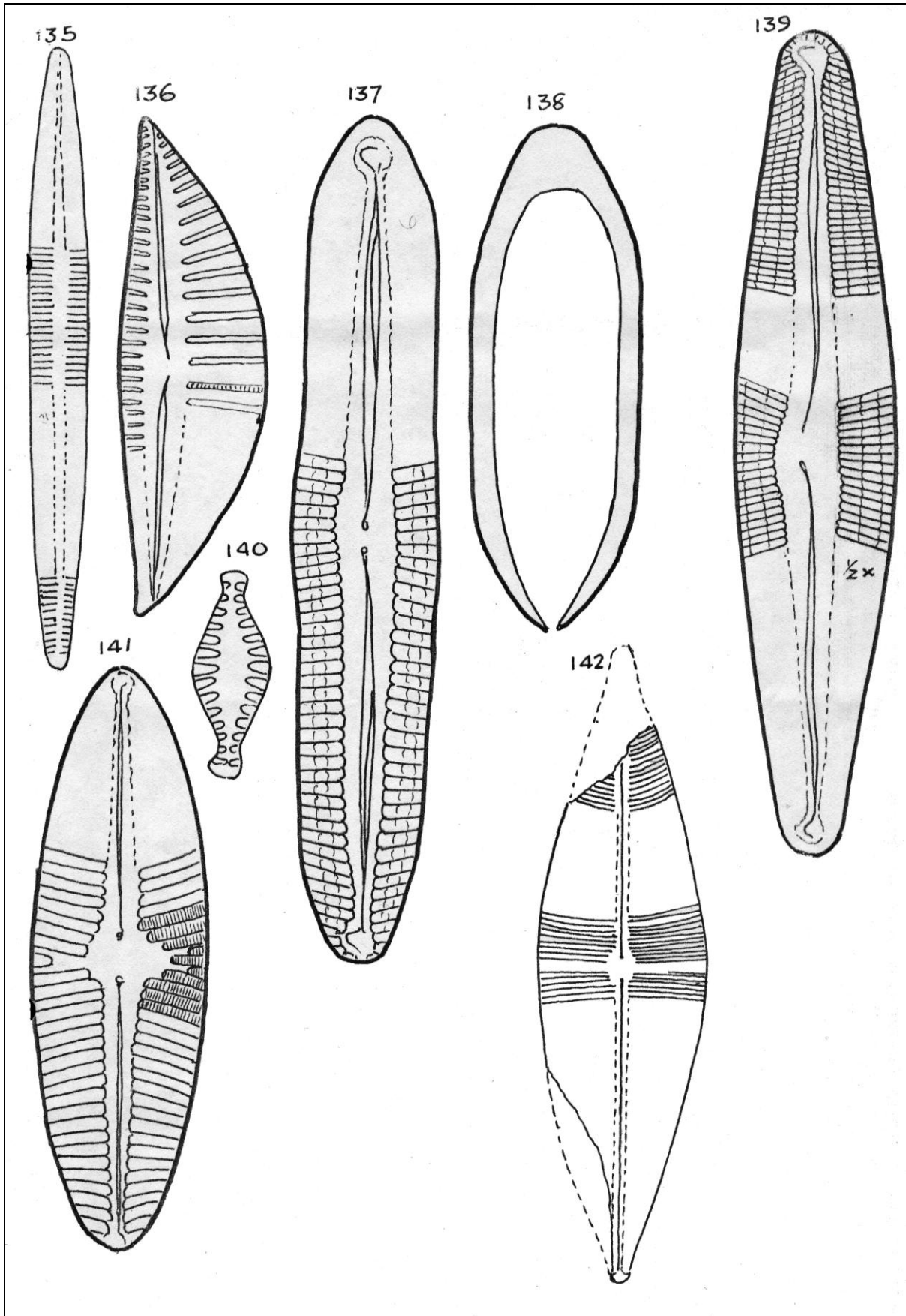
Plate 11



**Plate 12**

<b>Figure</b>	<b>Name</b>
<b>135</b>	<i>Fragilaria</i> sp.
	Or perhaps <i>S. tabulata</i> group.
<b>136</b>	<i>Amphora</i>
	See fig. 126. This is a whole valve
<b>137</b>	<i>Pinnularia</i>
	Near to <i>P. viridis</i> . Striae at 6 in 10 $\mu$ .
<b>138</b>	<i>Tetracyclus</i>
	Septum of.
<b>139</b>	<i>Pinnularia</i>
	Unknown. Striae at 6 in 10 $\mu$ .
<b>140</b>	<i>Fragilaria</i>
	Captitate. Lower end deformed.
<b>141</b>	<i>Navicula</i>
	Unknown lineolate.
<b>142</b>	<i>Stauroneis</i>
	Fractured piece.

Plate 12



**Chiloquin, near Chemult, Oregon**  
**Freshwater Diatom Deposit**  
**Coll. Francis T. Jones, Berkeley, California**  
**Figures by Horace G. Barber, Nuneaton, England**

The diatomite beds in the Klamath district have been exposed by erosion of the overlying Pliocene (?) lavas. They lie along the lower mountain slopes and on the flats and may be grouped into the six districts described below.

**CHILOQUIN**

A large area of diatomite occurs in the vicinity of Chiloquin, close to the main line of the Southern Pacific Railroad. At two localities samples were collected.

Sample 229 came from a bluff on the north side of the Sprague River just east of the settlement known as Bray Mill, in the SW $\frac{1}{4}$  sec. 19, T. 34 S., R. 8 E. Here the following section was exposed:

Soil.	Ft.	in.
Diatomite, massively bedded.....	5	
Gray volcanic ash or dust.....		4
Diatomite, massivey bedded.....	1	4
Gray volcanic ash or dust.....		4
Diatomite, massively bedded (sample 229).....	8	
	15	

The beds dip 3° W. The diatomite is an impure, rather gritty material which is massively bedded and breaks with a subconchoidal fracture. It is of poor quality. Although a large amount of this material is exposed in bluffs along this portion of the Sprague River, it is of no economic importance.

On the grade of the Sprague River road 0.3 mile north of Chiloquin a cut exposes a considerable thickness of diatomite beds, which are regarded as the westward continuation of those exposed near Bray Mill. In the southwest end of the cut basaltic sand and ashy diatomite strike N. 35° W. and dip 28° NE. Above these comes nearly 85 feet of diatomite represented by sample 231. This sample is slightly gritty and of poor quality. In spite of the large amount of material present, it is of no economic interest.

*Extract from "Nonmetallic Mineral Resources of Eastern Oregon (Geological Survey Bulletin 875) by Bernard N. More 1937 – Page 40".*

The following plates were included in the archive of Barber material from Bernard Hartley. Unfortunately no key to the plates was included. This may turn up at a future date.

Plate 1

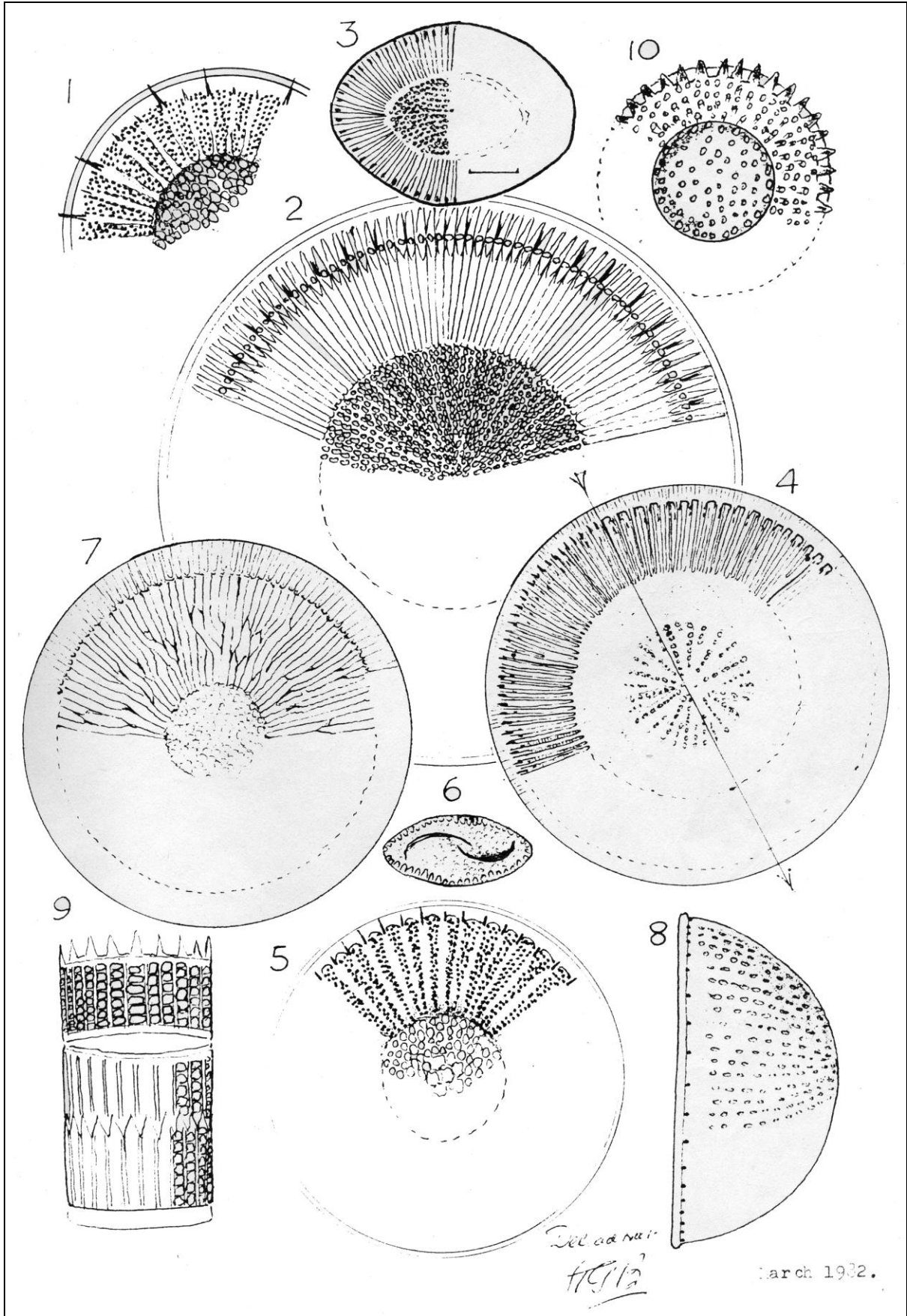




Plate 2

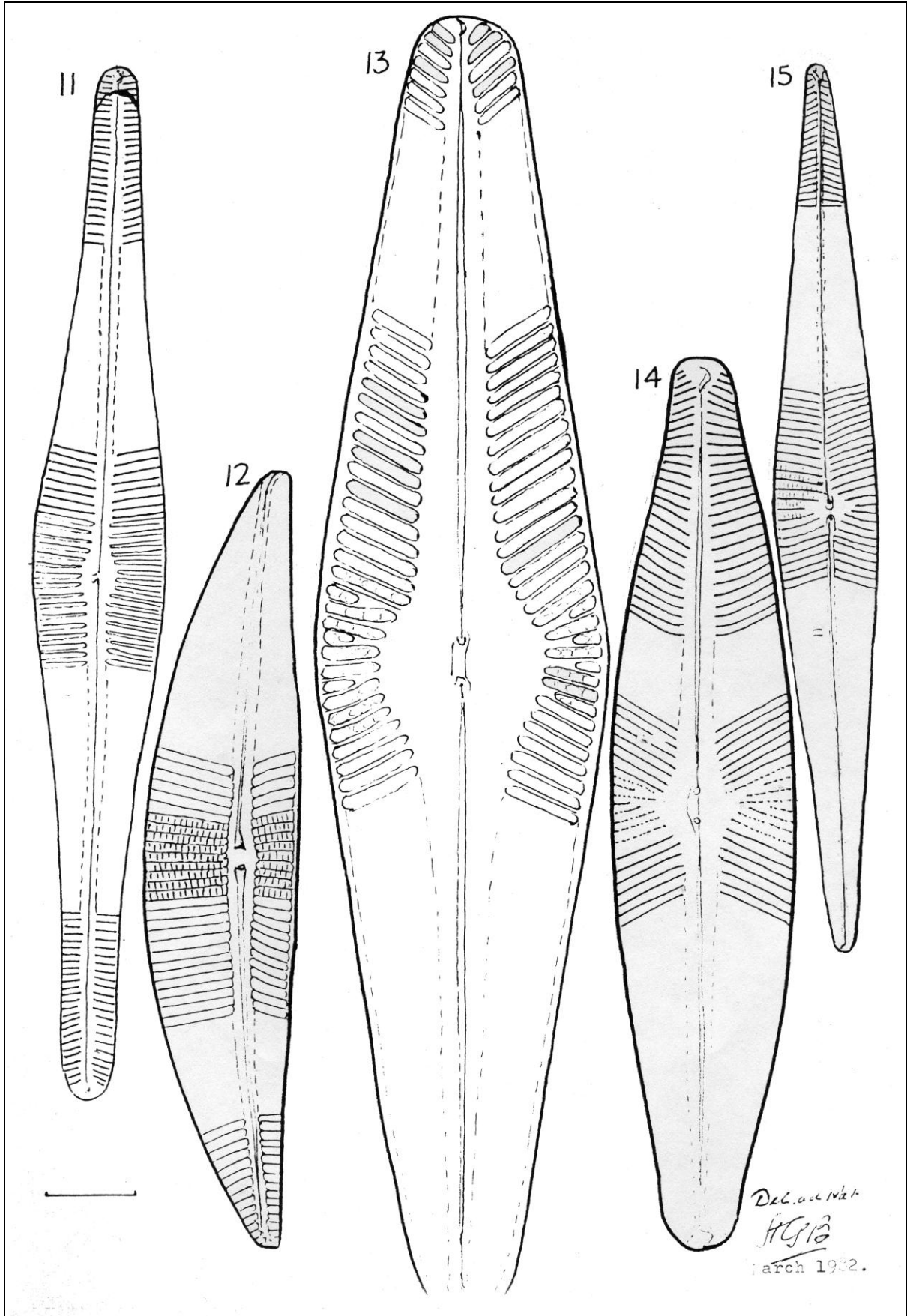


Plate 3

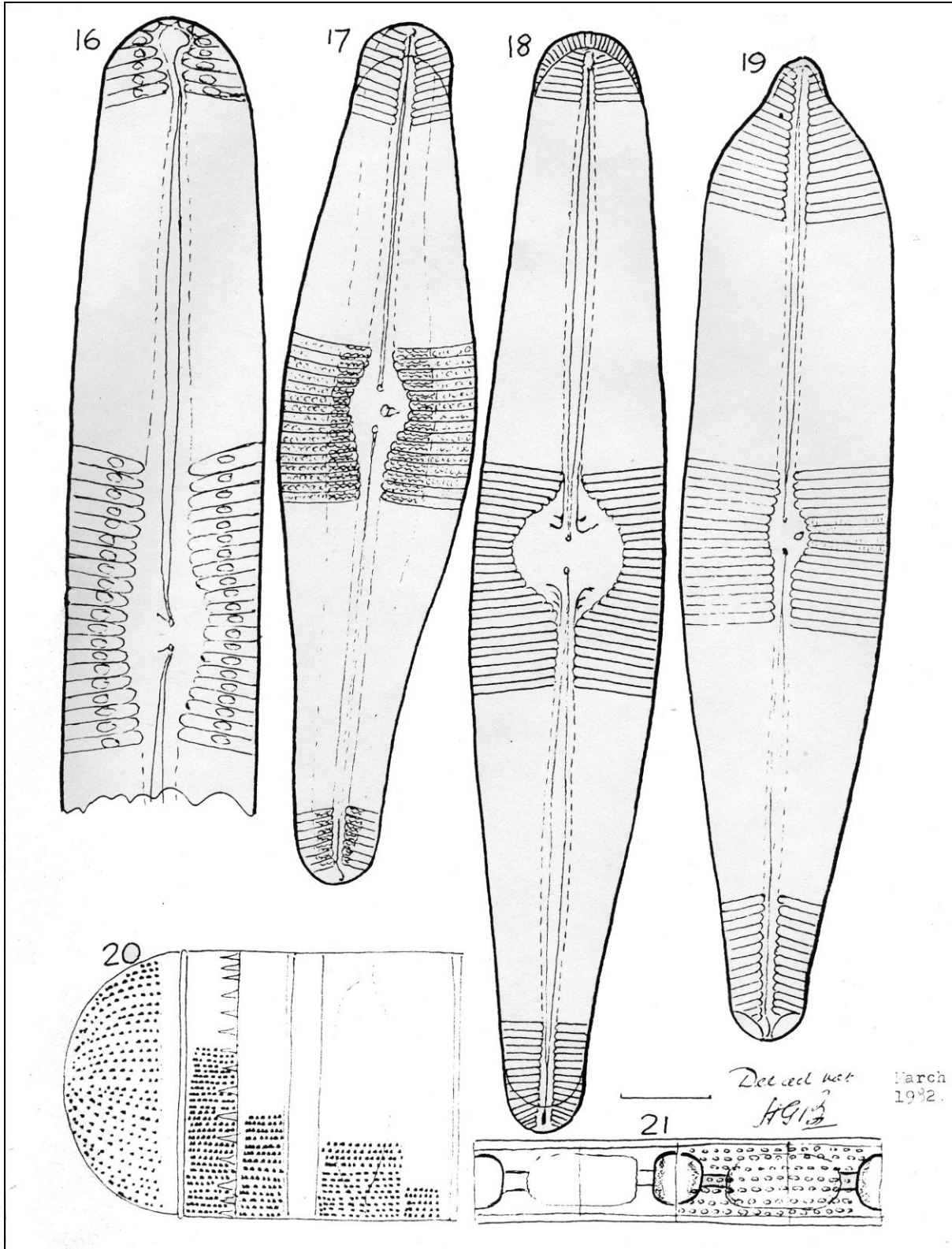


Plate 4

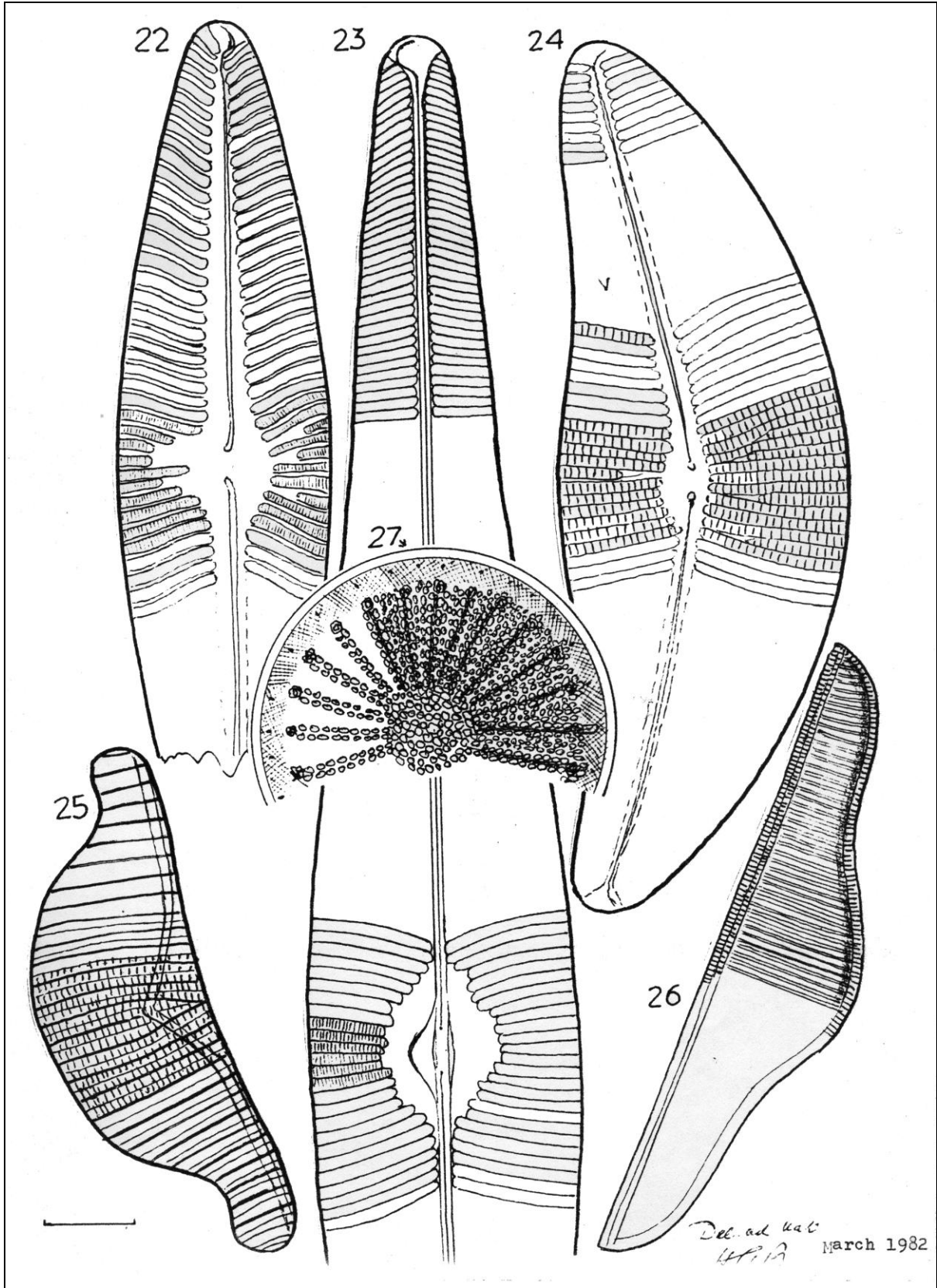


Plate 5

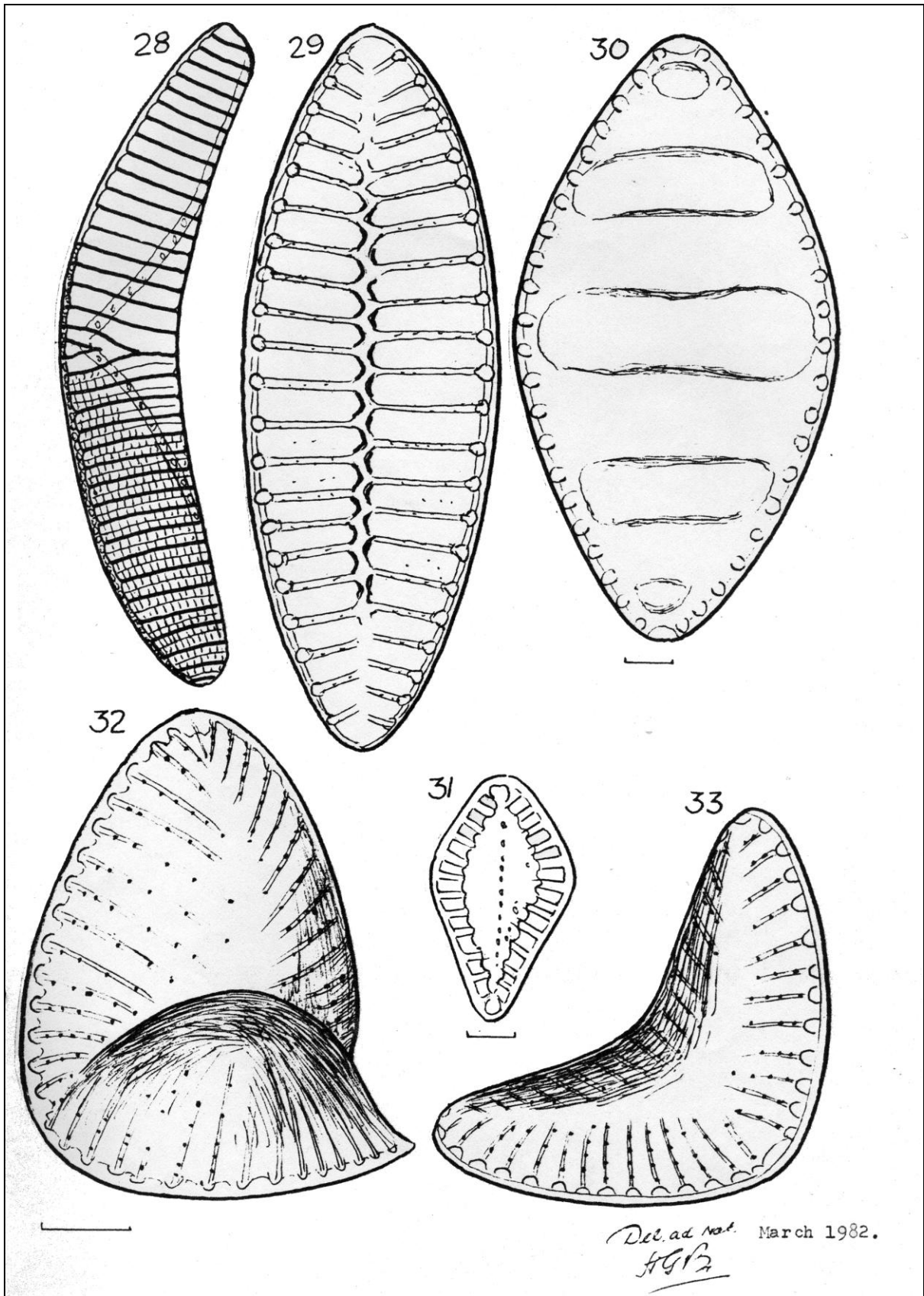


Plate 6

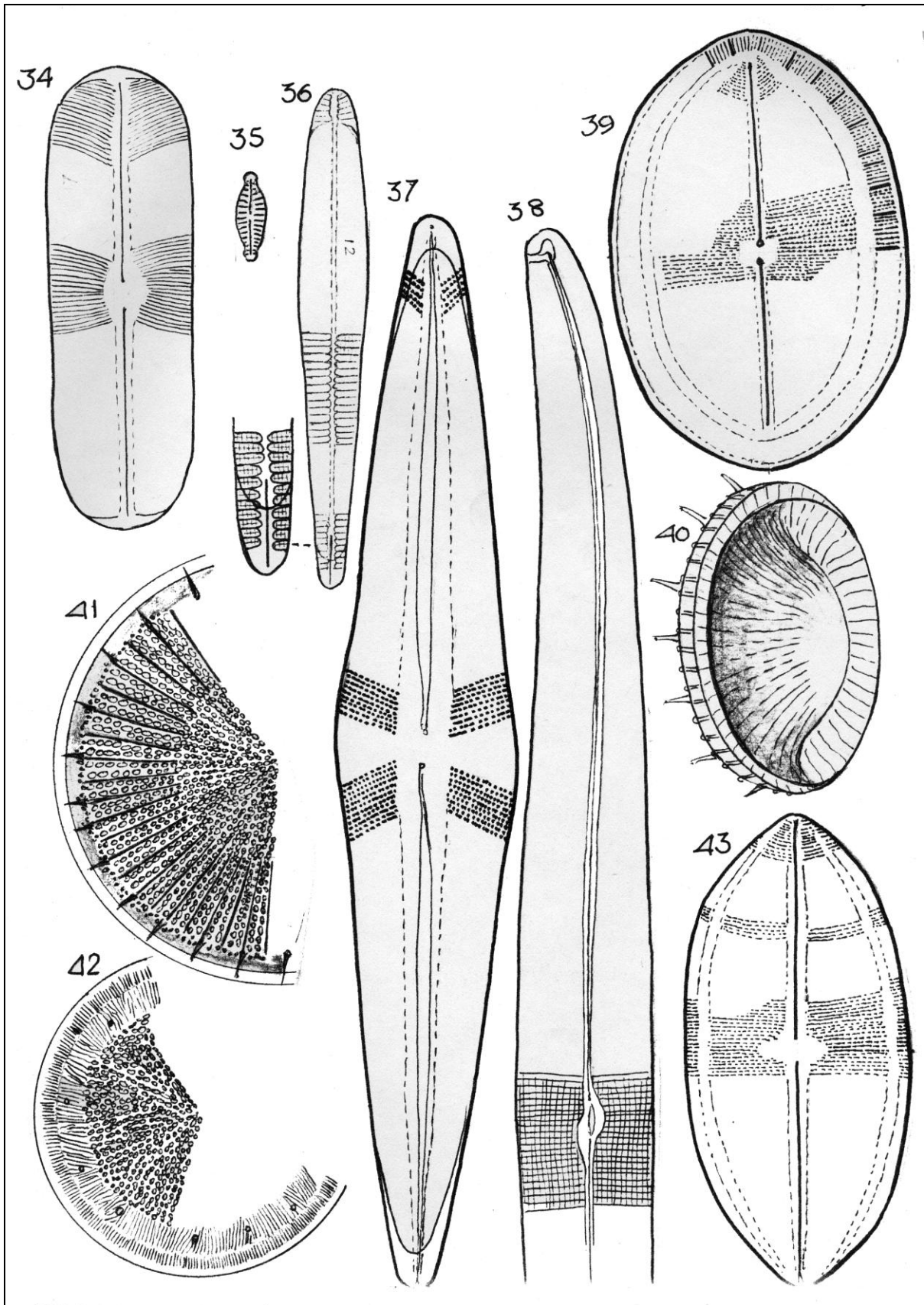




Plate 7

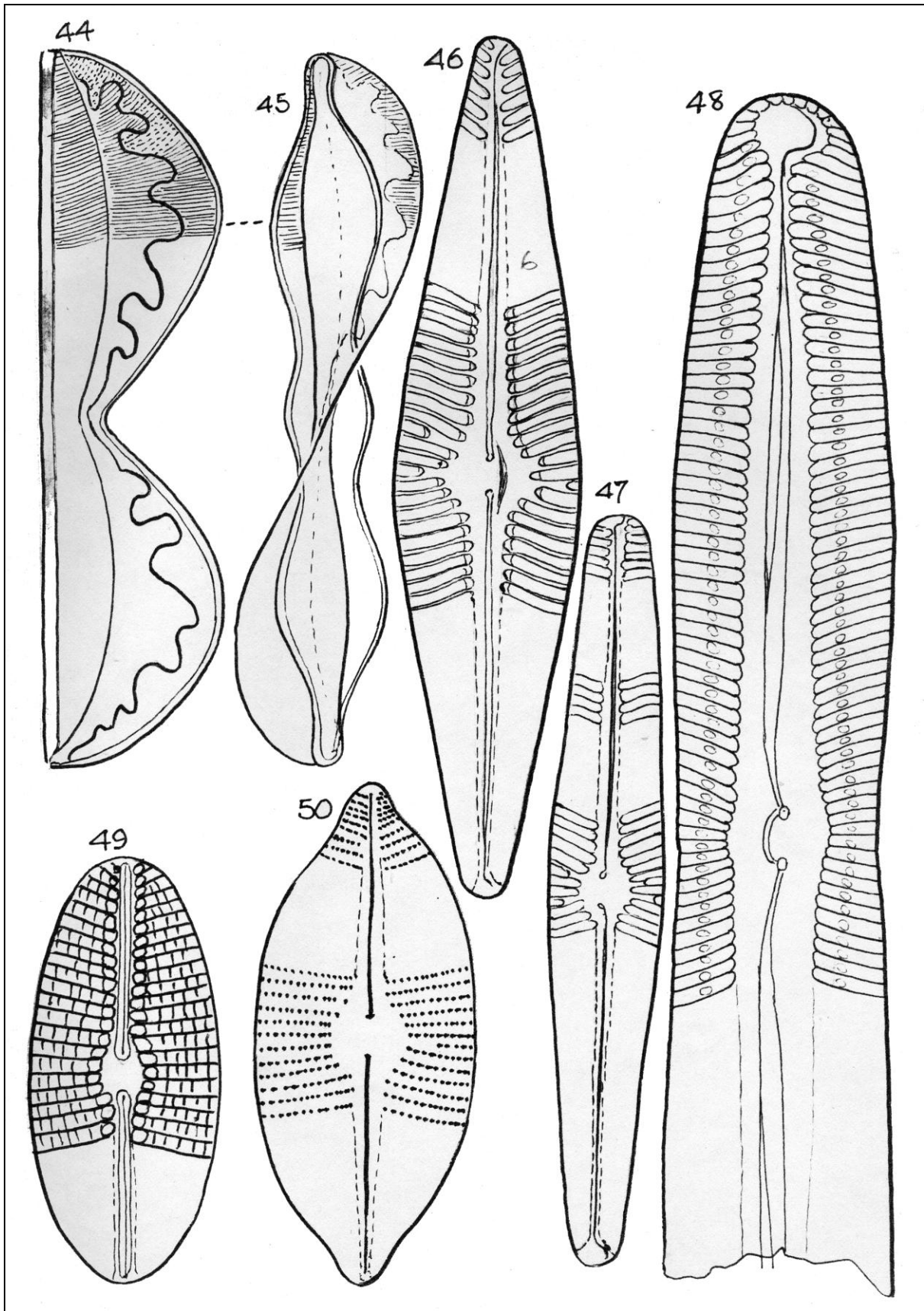


Plate 8

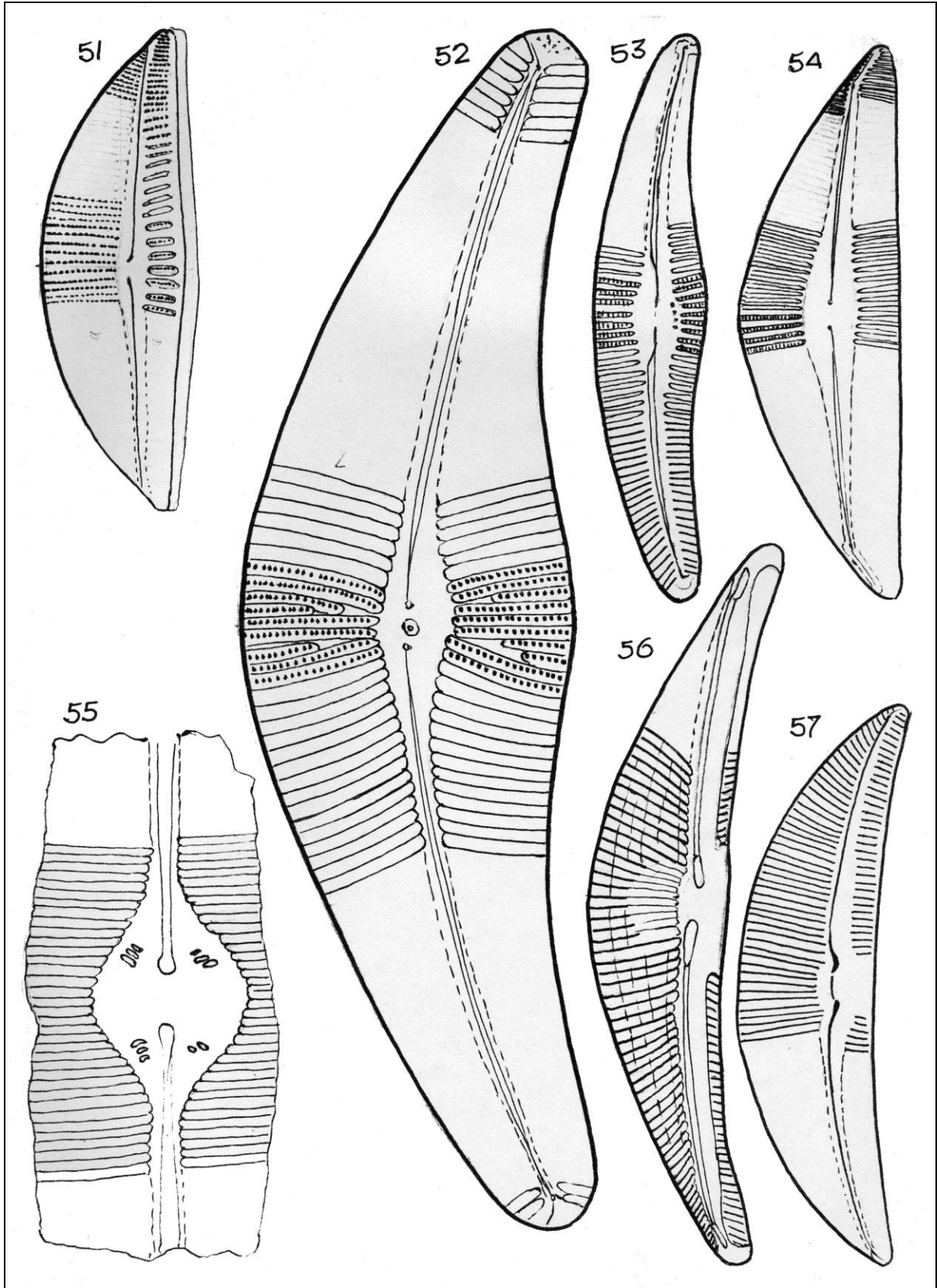




Plate 9

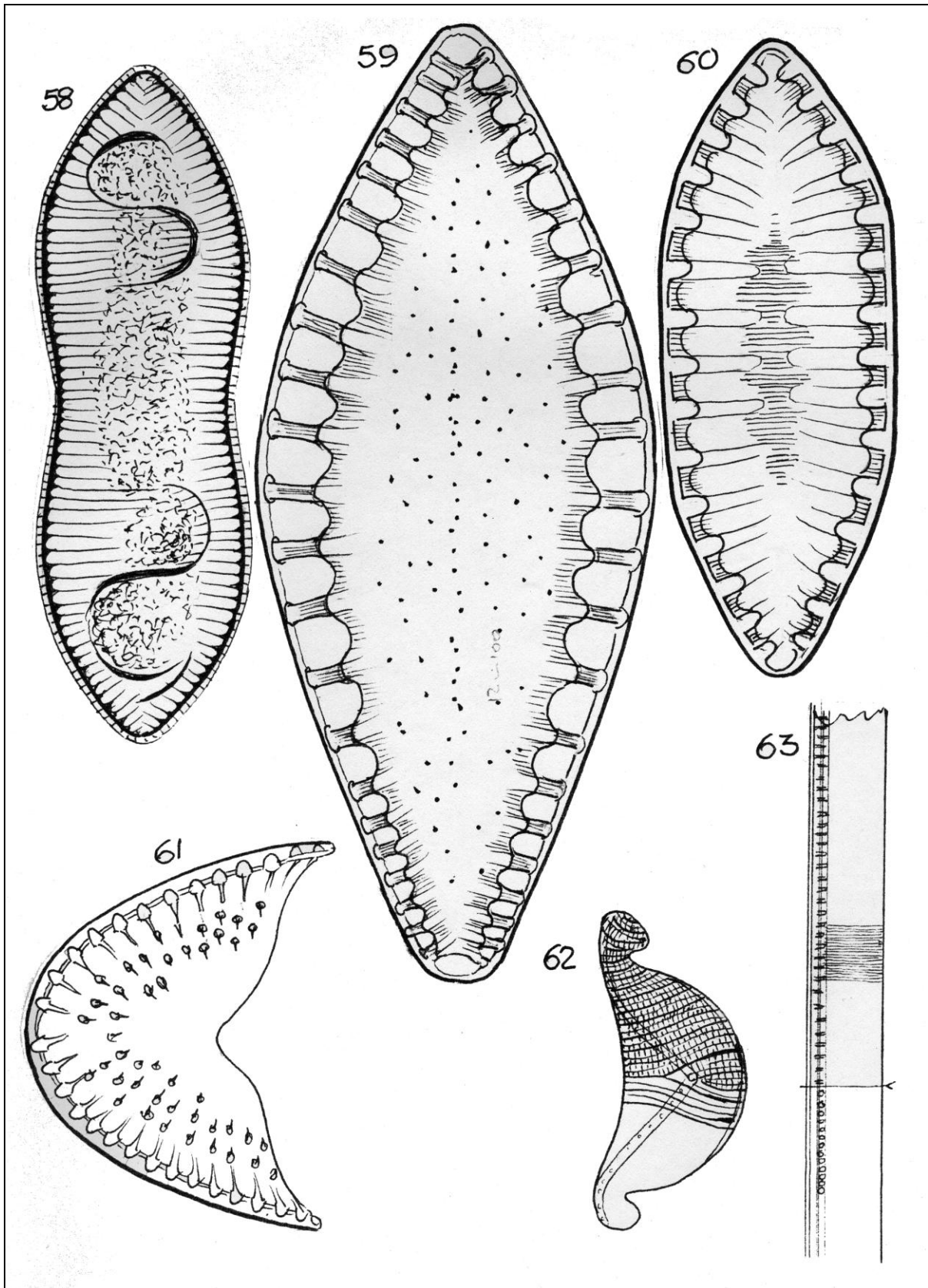


Plate 10

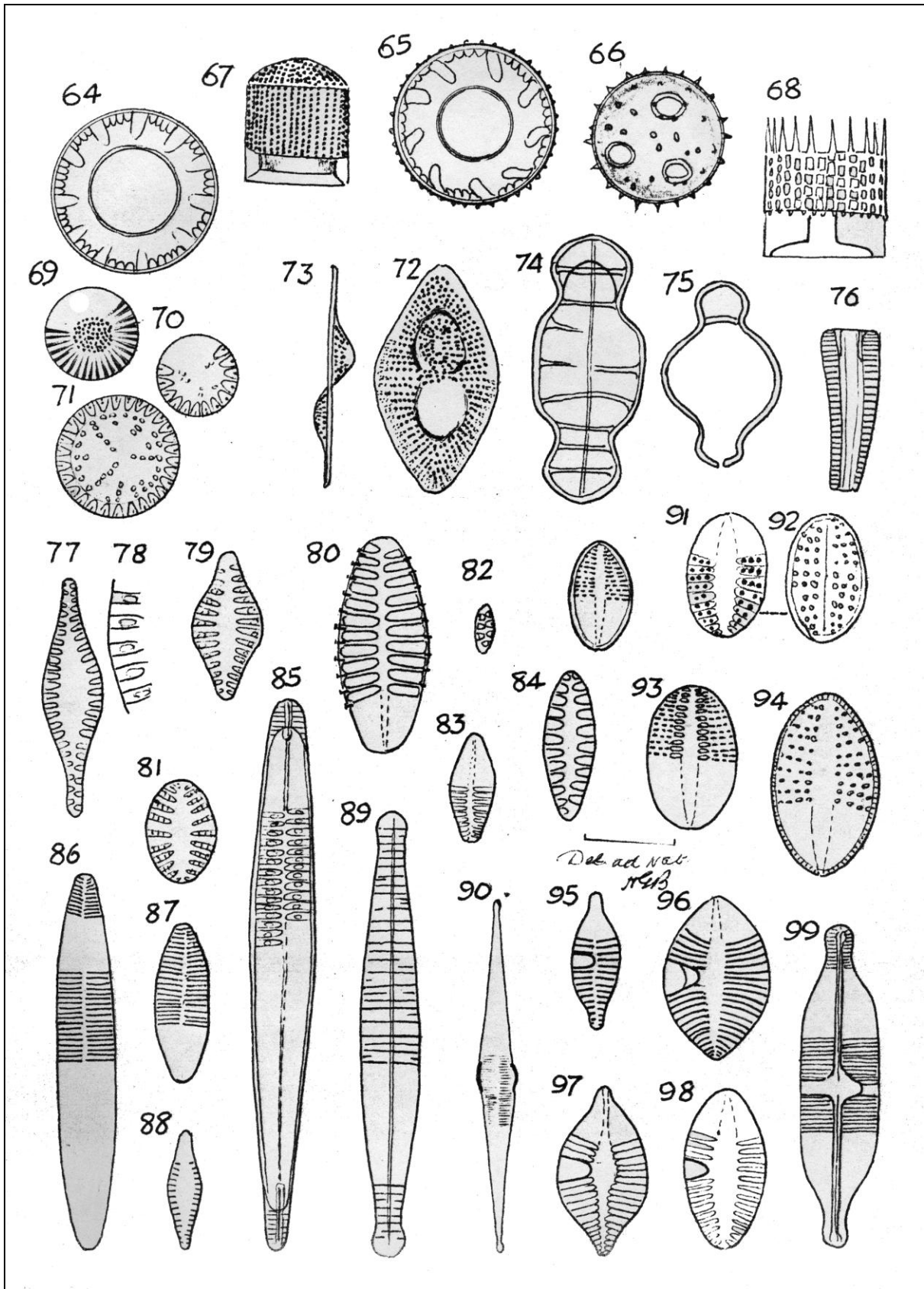


Plate 11

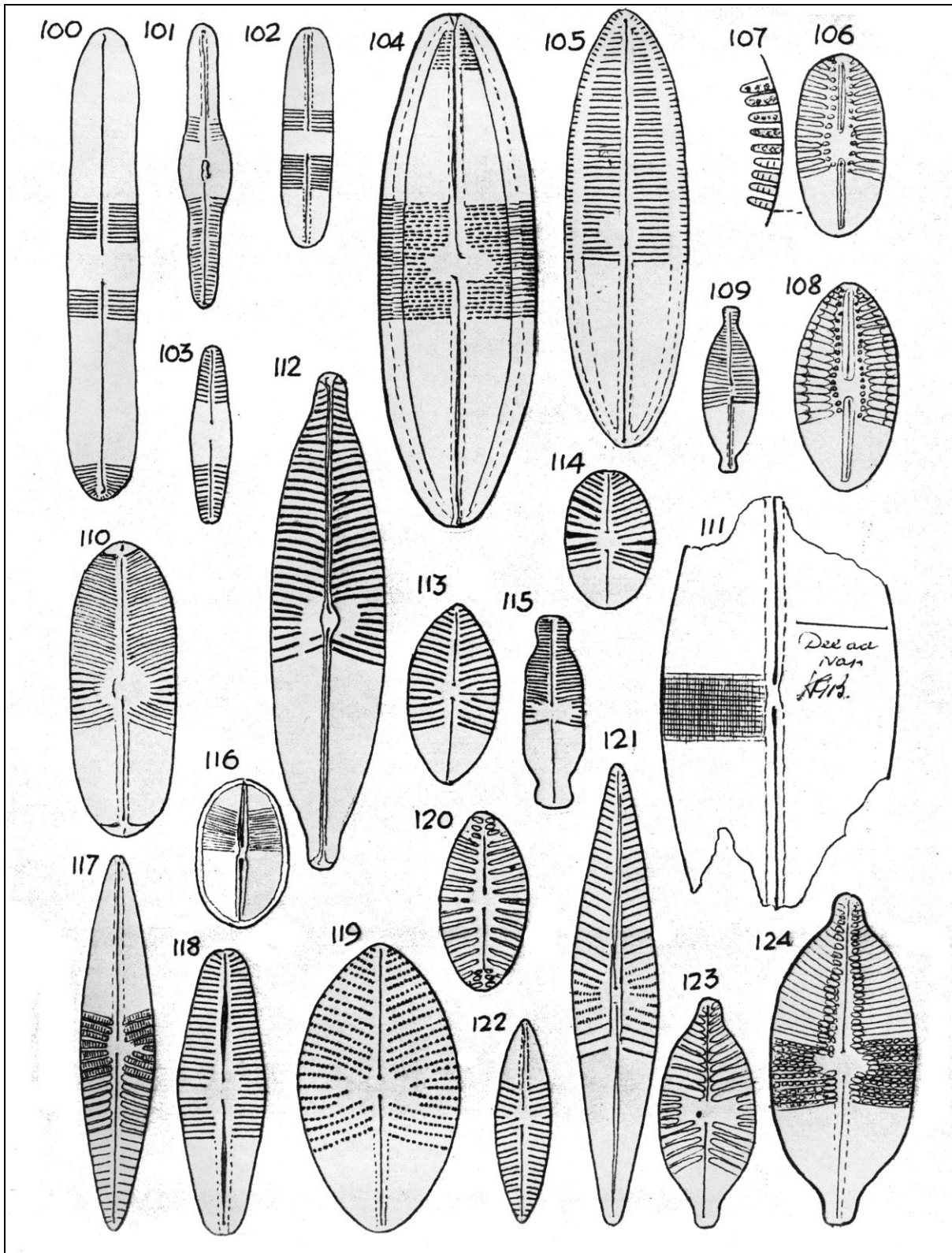
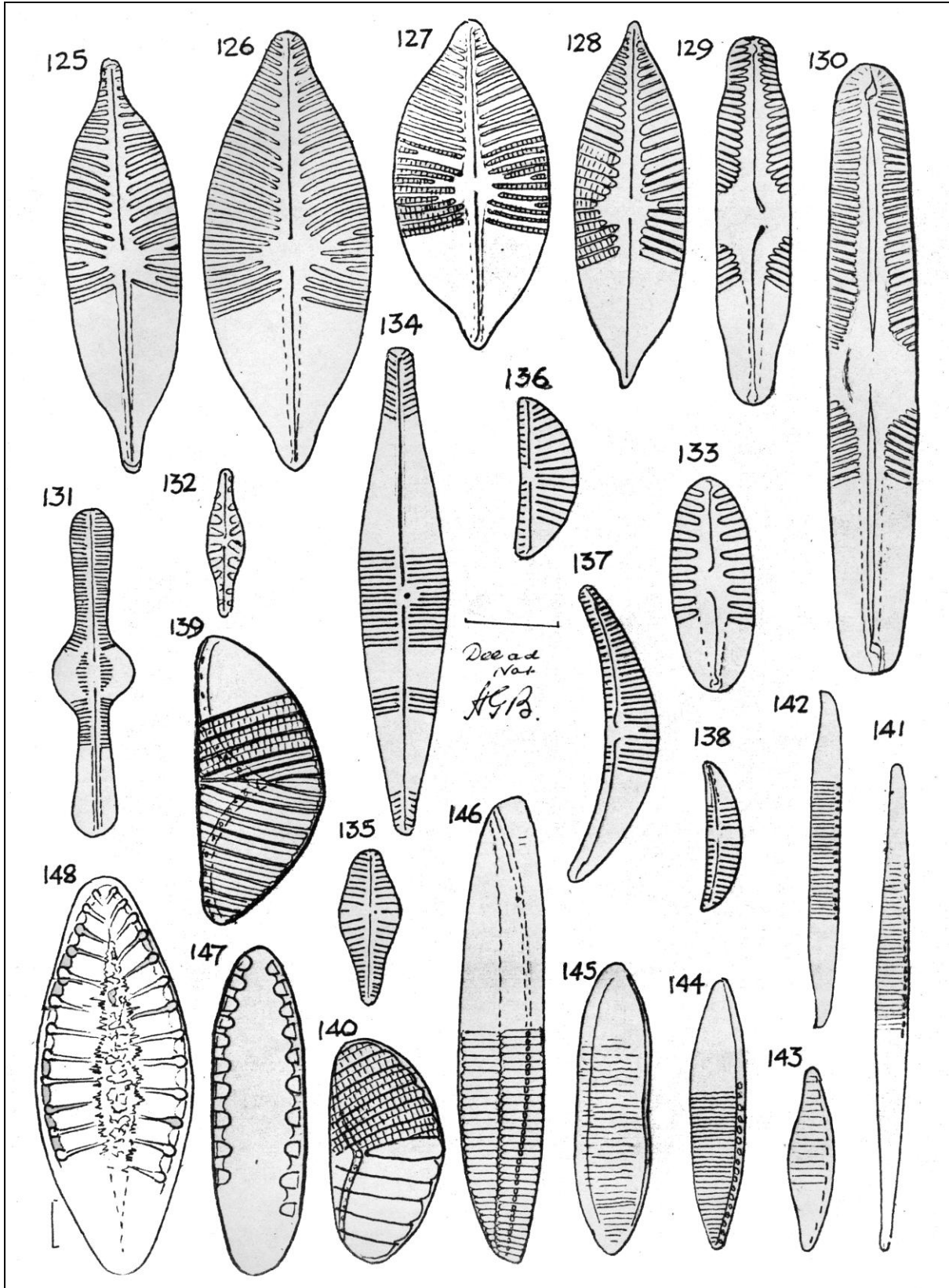


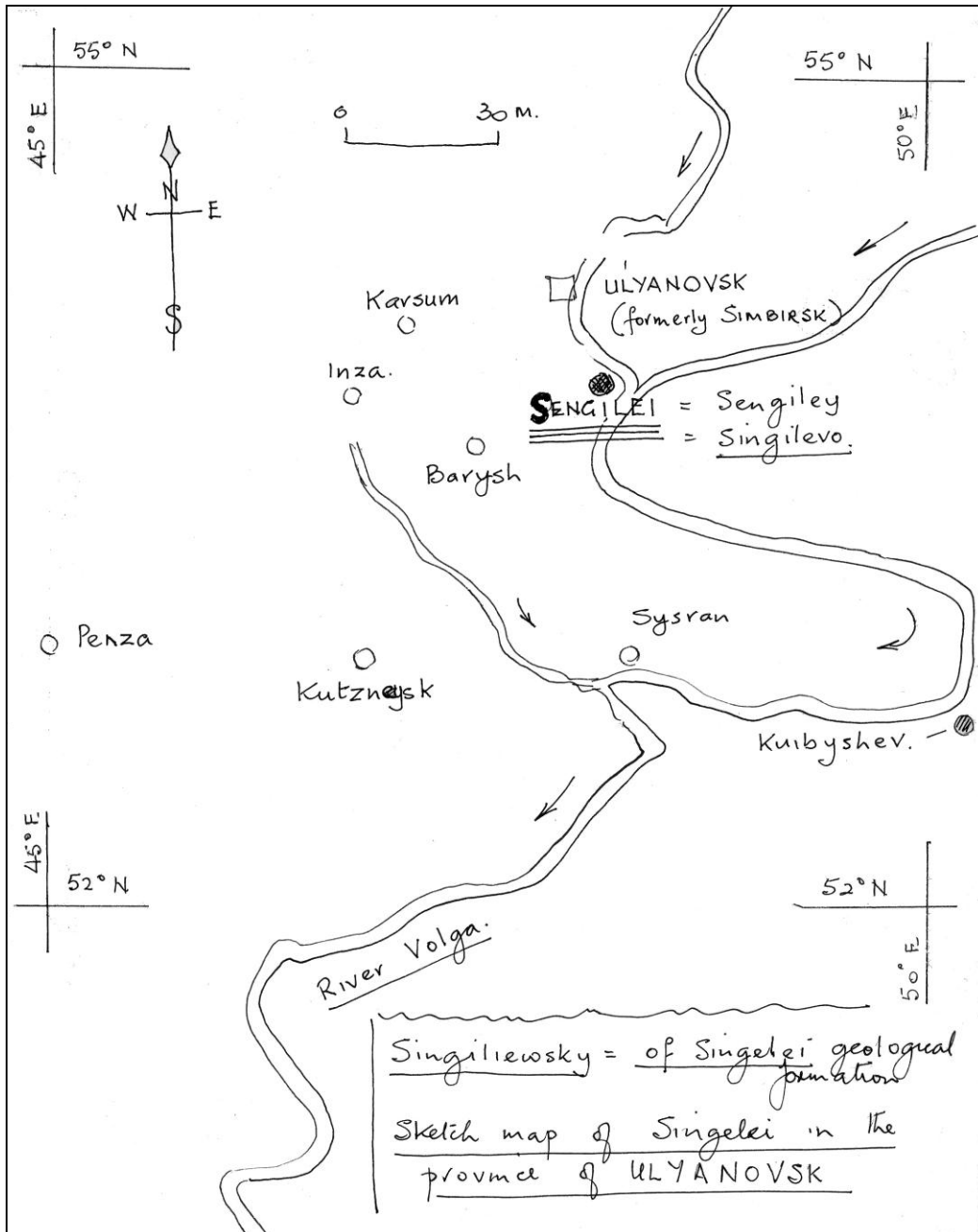
Plate 12



## Singiliewsky

The following account of the diatomaceae found in this fossil deposit includes the notes of both Horace Barber and Bernard Hartley.

The main plates are reproduced from photographic reproductions made of Horace's original plates. These photographs were executed by Bernard Hartley. Only a minimal amount of 'cleaning' of these plates was possible before losing detail due to my ineptitude in the use of image processing applications. The plates, as will be seen are somewhat grey in overall hue. Nonetheless, sufficient detail is present and ignoring the grey matte and the lack of sharpness they are faithful reproductions of the originals which, I believe, are now in the possession of the British Museum (Natural History).



Horace Barber's Sketch Map of the location.  
Sengiley - (Russian: Сенгилей)

The notes accompanying these plates were titled:

**"H. Barber's notes on the Singilevo Plates"**

There is also a note stating:

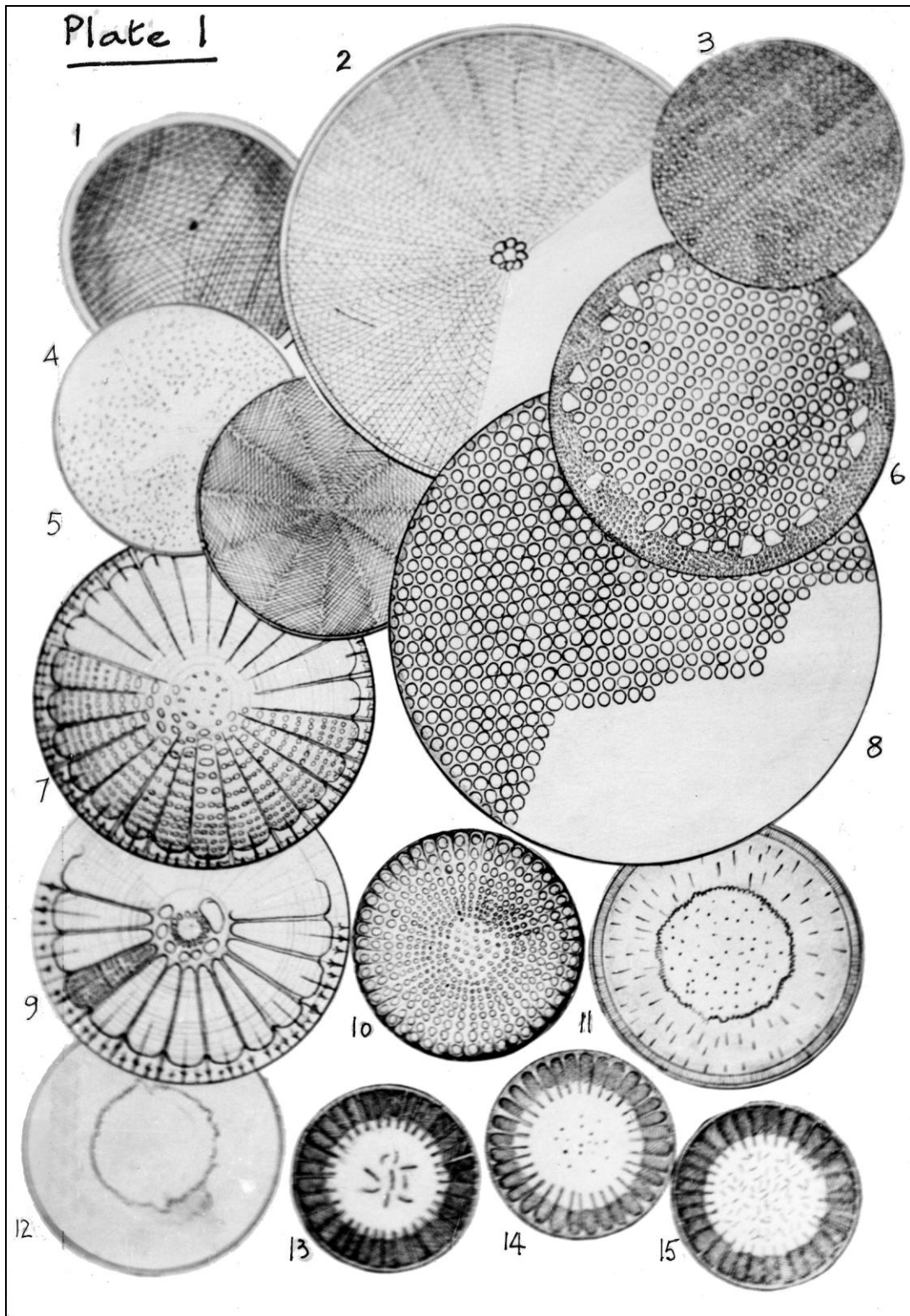
"35mm negatives of these plates are held by Mr. Richard Gosden of 99 Gorse Avenue, Felpham, Bognor Regis."



## Plate 1

Figure	Name
1.	<i>Coscinodiscus sol</i> Wallich
	A.S. Atlas Not common in this deposit.
2.	<i>Coscinodiscus subtilis</i>
	Not common in this deposit.
3.	<i>Coscinodiscus lineatus</i> Ehrenberg
	Figures 3 and 8. This diatom is very common and varies from quite small forms 50 $\mu$ to 300 $\mu$ . Fragments of larger forms than this can be found. A noticeable point is the variation of colour between the small forms and the larger ones, the small ones being blue or blue-green and the larger no colour, no doubt due to the size of the cells in the small forms causing refraction. Another noticeable point is that generally the forms are flat but some can be found which are convex. Occasionally forms of <i>C. lineatus</i> in this deposit vary from the regular hexagonal structure and exhibit the formation as shown in Plate 2 Fig. 2, this being due to very slight variations in the size of individual cells thus disarranging the whole of the regular formation. Regarding Fig. 6. This is undoubtedly a freak form but is interesting from the smaller border of bells around the periphery.
4.	<i>Melosira borreri</i> Grev.
	This form is not common in the deposit. The fact that there is a star-shaped blank area in the centre of the frustule is not deemed important.
5.	<i>Coscinodiscus denarius</i> A.S.
	The form is not common in the deposit.
6.	<i>Coscinodiscus lineatus</i>
	Deformity. See remarks in Fig. 3 notes.
7.	<i>Arachnoidiscus ruscicus</i> Pant.
	The identification in this case was from N.E. Brown's " <i>Arachnoidiscus</i> " and a noticeable point is the alternate rows in this form. The genus is not frequent in this deposit.
8.	<i>Coscinodiscus lineatus</i> Ehrenberg
	See Notes Fig. 3.
9.	<i>Arachnoidiscus sendaicus</i> N.E.Br.
	This frustule is drawn from an inner view, the identification as <i>Arachnoidiscus</i> may be questionable. N. E. Brown does not illustrate the form.
10.	<del><i>Coscinodiscus</i></del> <i>Stictodiscus</i> var.
	Superficially this is one of the <i>Coscinodiscus</i> but on closer examination is more akin to the <i>Stictodiscus</i> .
11.	<i>Hyalodiscus radiatus</i> Bail.
	Not rare.
12.	<i>Hyalodiscus laevis</i> Ehrenberg
13, 14, 15.	<i>Cyclotella asiatica</i> Brun
	See Brun & Tempere Diatomees Fossilles du Japon 1889 Pl.IV. Fig.16. These forms are undoubtedly those figured by Brun & Tempere and are questioned as to whether <i>Cyclotella</i> or <i>Melosira</i> . According to H. Coupin, Album General des Diatomees they are <i>Liostephania archangelskiana</i> Pant. From a number of the forms examined there is quite a variety of centres. Figures 13 and 15 are views of the interior of the frustule and Fig. 14 from the outside of the form.

Plate 1

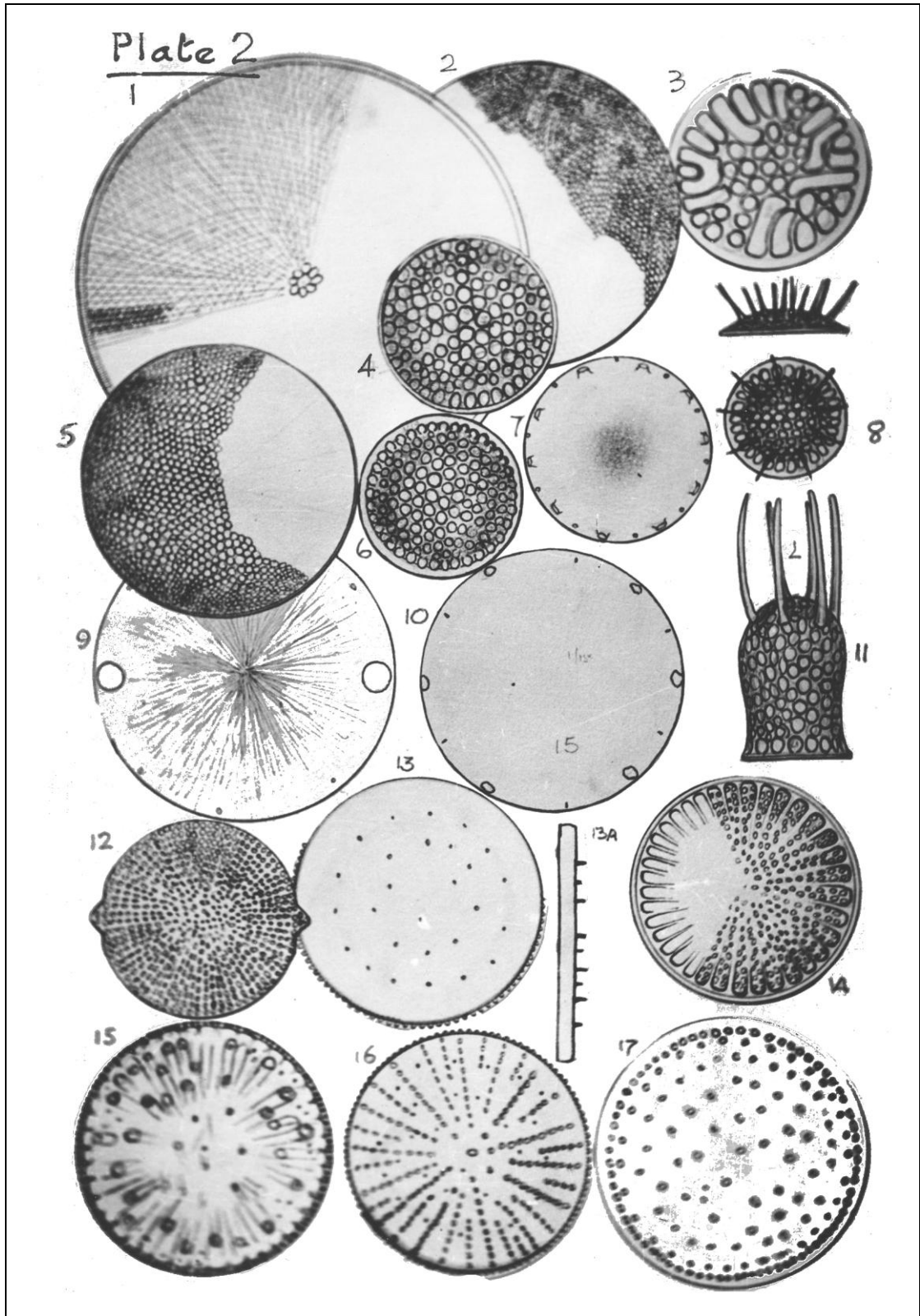




## Plate 2

Figure	Name
1.	<i>Coscinodiscus</i>
2.	<i>Coscinodiscus lineatus</i> Ehrenberg Although the cells are arranged like <i>C. nodulifer</i> there is no central nodule. The form is lineatus with disarranged cells, two of these forms have been noticed with similar but slight disarrangement.
3.	<i>Stephanopyxis? grunowii</i> Deformed form. Note a form similar to this is shown by A.S. from Oamaru Pl.164. Fig.10. See notes for Pl.1. Fig.3.
4.	<i>Stephanopyxis grunowii</i> ? Note cells larger towards centre.
5.	<i>Coscinodiscus ? sol</i> Wall.
6.	<i>Stephanopyxis grunowii</i> Note cells the same width all through.
7.	<i>Isodiscus</i> ?
8.	<i>Stephanodiscus</i>
9.	<i>Isodiscus</i>
10.	? <i>Ratrayella</i>
11.	<i>Stephanodiscus</i>
12.	<i>Pseudostictodiscus angulatus</i> Grun. See A.S. Pl.74. Fig.2. This form is rare in the deposit.
13 and 13a.	? New genus See notes for Fig.16.
14.	<i>Stictodiscus</i> (Very rare)
15.	<i>Stictodiscus</i> (Very rare)
16.	- See A.S. Pl.163. Fig.10. This is of the same type of radial cells, the 163/10 is named <i>C. elegans</i> Grev. On Pl.266 Fig.12, S.A., this form is shown and very similar called <i>Stephanodiscus pantocseki</i> n.sp. calling attention to <i>Cosc. elegans</i> as being a wrong identification, the genus being <i>Stephanodiscus</i> . The form although falling somewhat in the confines of the genus <i>Stephanodiscus</i> as quoted by F.B. Taylor with marginal corona of spines. The spines in this case are not marginal but scattered over the surface. This form is rare in the deposit.
17.	<i>Coscinodiscus nitidus</i> Greg. Although this form certainly falls in the <i>Nitidus</i> type, the cells are so sparse as to warrant recognition as a variety of <i>nitidus</i> at least. Form rare.

Plate 2



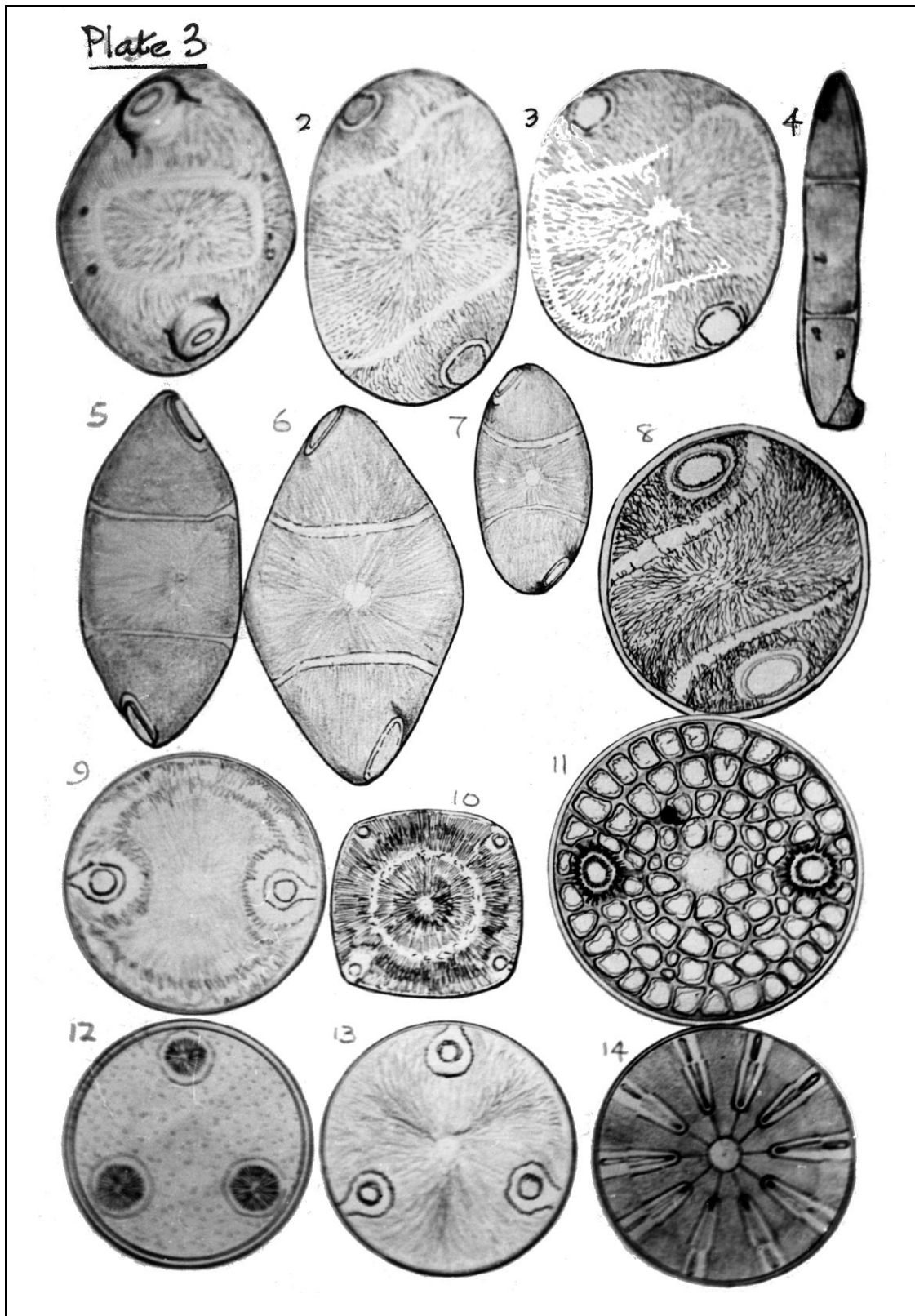
## Plate 3

Figure	Name
1 – 8.	<i>Huttonia/Auliscus</i>
	<p>This is a puzzling form for it has some of the aspects of the genus <i>Huttonia</i> or could be a genus halfway between <i>Huttonia</i> and <i>Auliscus</i>. Fig.2 could be accepted into <i>Huttonia</i> by virtue of the processes offset from the major axis and the frustule divided into 3 portions, but when one looks at Fig. 3. Then the dividing of the frustule into 3 takes on a different aspect.</p> <p>Undoubtedly Figs. 4 to 7 are <i>Huttonia</i> and that of Fig. 4. Being <i>H. zonata</i> as described by Barker and Meakin from Singiliewsky, see J.Q.M.C. Pl.16. Ser.4. Vol.II. Figs. 6 and 7 vareiations of Fig. 5, and Fig.4 still a variation.</p> <p>This latter form could perhaps claim variety status by its small minor axis and the lengthened processes, but basically is the same as Fig. 5.</p> <p>Between Forms Fig. 5, 6 and 7 many connecting ones are found so that the outline of <i>zonata</i> is variable from oval to linear with sub-acute ends and on again to diamond-shaped with rounded angles.</p> <p>Although Barker and Meakin quote as very rare in Singiliewsky material can be verified by the present authors the case with Singelev material is different as there is generally one found per spread.</p> <p>This of course enabled a much greater survey of the variation of <i>H. zonata</i>. Fig. 8. Also comes under the category of Figs 1 to 3, rare in deposit.</p>
9.	<p><i>Auliscus</i> (? <i>odanii</i>)</p> <p>This form is not very rare in the deposit and is suspected to be new, both Fig. 9 form and the one figured 13 have that same unusual blank space which surropunds the ocellus extended at the periphery side extended to the rim of the frustule.</p>
10.	<i>Glyphodiscus stellatus</i> Grev.
11.	<i>Pseudo-Auliscus</i>
	<p>This form appears to be a new species.</p> <p>The mounting became broken into 2 near equal pieces, these were recovered from the mountant and placed together again, but unfortunately on half reversed. The resulting slide gives, however, quite sufficient to be a permanent record.</p>
12.	<i>Auliscus</i>
	Species allied to <i>trilunaris</i> or <i>trigemmis</i> .
13.	<i>Pseudo-auliscus</i>
	<p>(HGB later says <i>Auliscus pulvinatus</i> Cleve fo. <i>inervis tricellata</i> Pant)</p> <p>If the description of the genus <i>P. aubicus</i> is adhered to then this form must also be classified as such.</p> <p>From the foregoing forms and the remarks of Barker and Meakin JQMC page 252 Ser.4. Vol.I, it would appear that the genus <i>Pseudo-auliscus</i> is not at all stable, it may have contained the original form as distinct from <i>Auliscus</i> but in the light of subsequent forms then a subsection or further genus be created accomodating those forms with 2 or more ocelli and a central space.</p>

## Plate 3 (continued)

Figure	Name																
14.	?																
	The nearest genus that would accommodate the form is that of <i>Anthemodiscus</i> Barker & Meakin but there are a number of major features which do not agree.																
	<table border="1"> <thead> <tr> <th>Major Differences</th> <th>Form under notice</th> <th>Genus <i>Anthemodiscus</i></th> </tr> </thead> <tbody> <tr> <td>Point 1</td> <td>Well defined and clear central area</td> <td>Central area strongly marked with puncta</td> </tr> <tr> <td>Point 2</td> <td>No median zone at all</td> <td>Median zone faintly marked</td> </tr> <tr> <td>Point 3</td> <td>The zone between the central area and periphery is faintly divided into two portions. The busier portion being double the width of the periphery portion</td> <td>Broad outer zone radially divided into segments – strongly marked with puncta</td> </tr> <tr> <td>Point 4.</td> <td>No puncta or cells of any description visible and yet there is quite a difference in the colour of the silica (Grey) to that of the central area and the areas immediately surrounding the 10 radial processes.</td> <td>Frustule is patterned with puncta</td> </tr> </tbody> </table>		Major Differences	Form under notice	Genus <i>Anthemodiscus</i>	Point 1	Well defined and clear central area	Central area strongly marked with puncta	Point 2	No median zone at all	Median zone faintly marked	Point 3	The zone between the central area and periphery is faintly divided into two portions. The busier portion being double the width of the periphery portion	Broad outer zone radially divided into segments – strongly marked with puncta	Point 4.	No puncta or cells of any description visible and yet there is quite a difference in the colour of the silica (Grey) to that of the central area and the areas immediately surrounding the 10 radial processes.	Frustule is patterned with puncta
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Plate 3



#### Plate 4

The identification of the species of the genus *Lepidodiscus* is most difficult due to the very poor illustrations to hand for this purpose. i.e

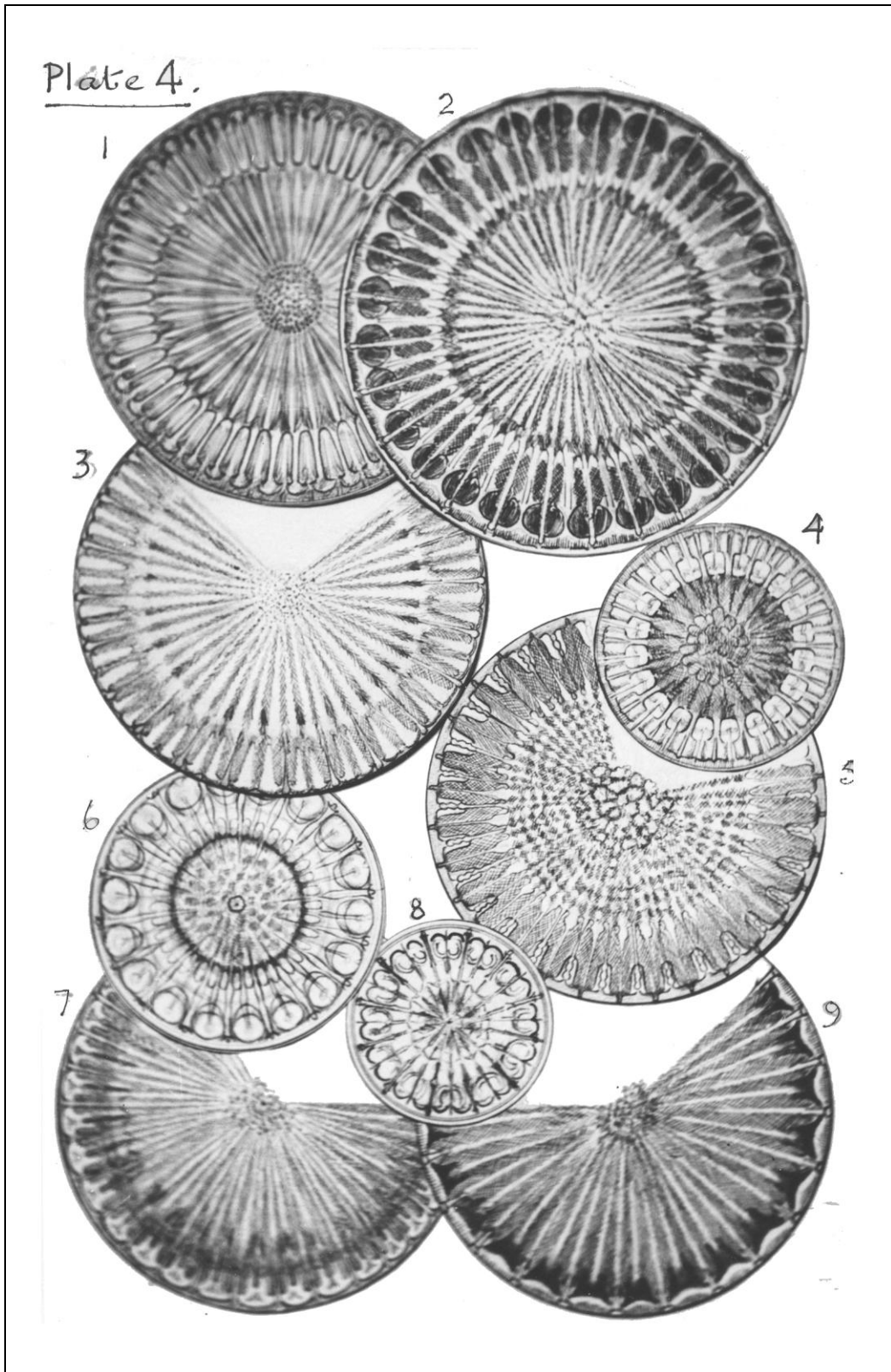
- O. Witt. Simbirsk Diatoms Pl.VII Fig. 6.
- Lefebure. Atlas of Diatoms Pl.8. Fig.5.
- H. Coupin. Atlas of Diatoms Pl.294. Fig.J.

These three authors illustrate "*L. elegans*" in quite different figures and that of H. Coupin is so schematic as to mean anything.

It is appreciated though, that the genus is difficult to portray from a mere detail point alone, without the various levels of focus. All the species examined shew great diversity from the flat circular state as the contour of the valve rises and falls in concentric circles and the sectors are in the form of corrugations radially. Consequently in portraying the various forms, they have been sketched at different levels of focus. The action of varying the focal levels alters the general appearance of the structure and adds to the difficulty of assessing the general appearance. Every effort, however, has been made to produce an illustration of the form had the microscope been capable of a depth of field sufficient to embrace the full rise and fall of the corrugations.

It could be assumed that the illustrations of *L. elegans* as depicted by O. Witt was a representative sketch of the original *L. elegans*. If this is so then the form depicted by P. Lefebure and named *P. elegans* Witt. surely cannot be true and is surely another species.

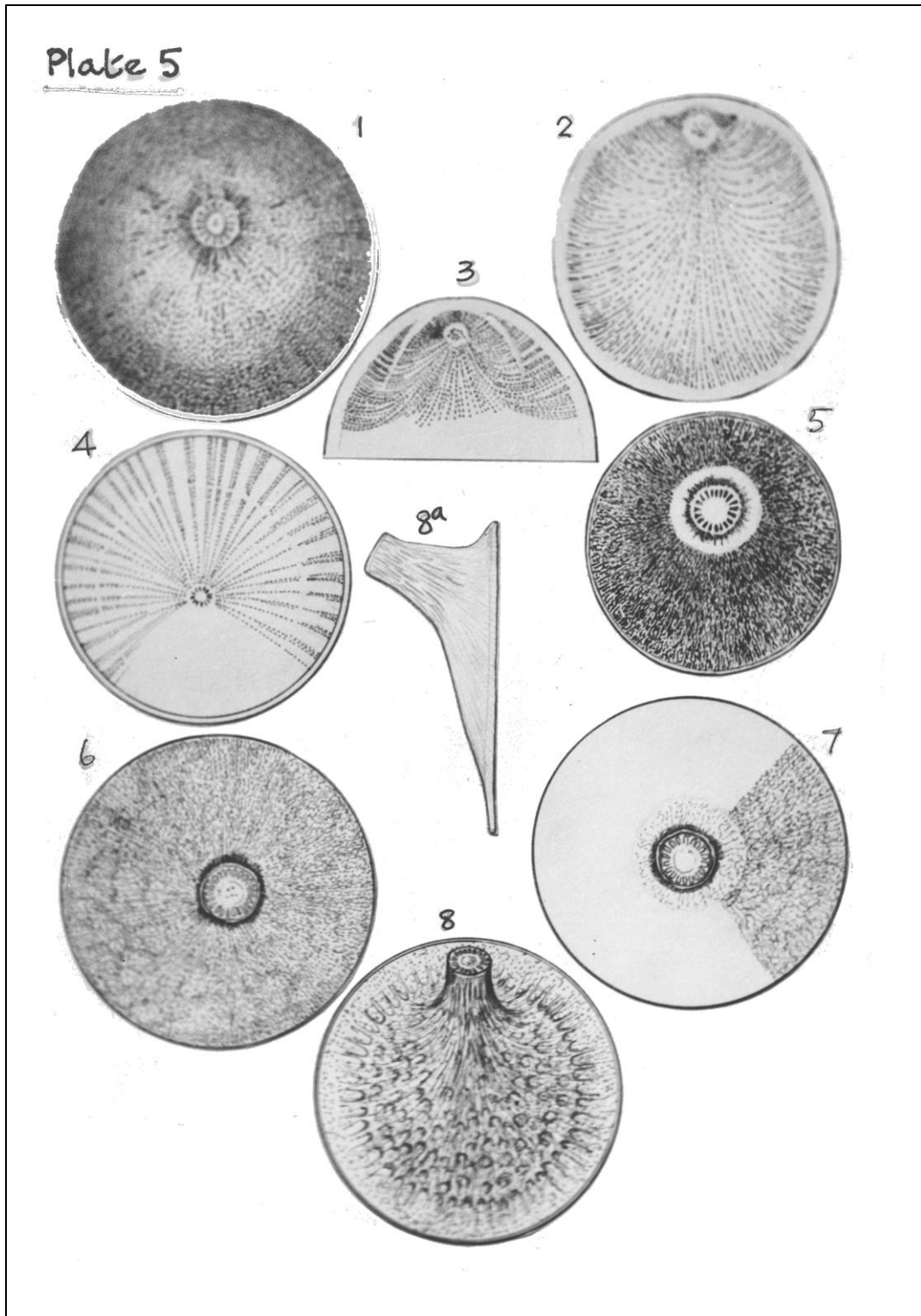
- L. imperialis* Brun – Xmas card from N.I. Hendey
- L. elegans* - O. Witt. Simbirsk Diatoms Pl.VII Fig. 6.
- L. elegans* - Lefebure. Pl.8. Fig.5.
- L. elegans* – Coupin circa 1912. Pl.294. Fig.J.





## Plate 5

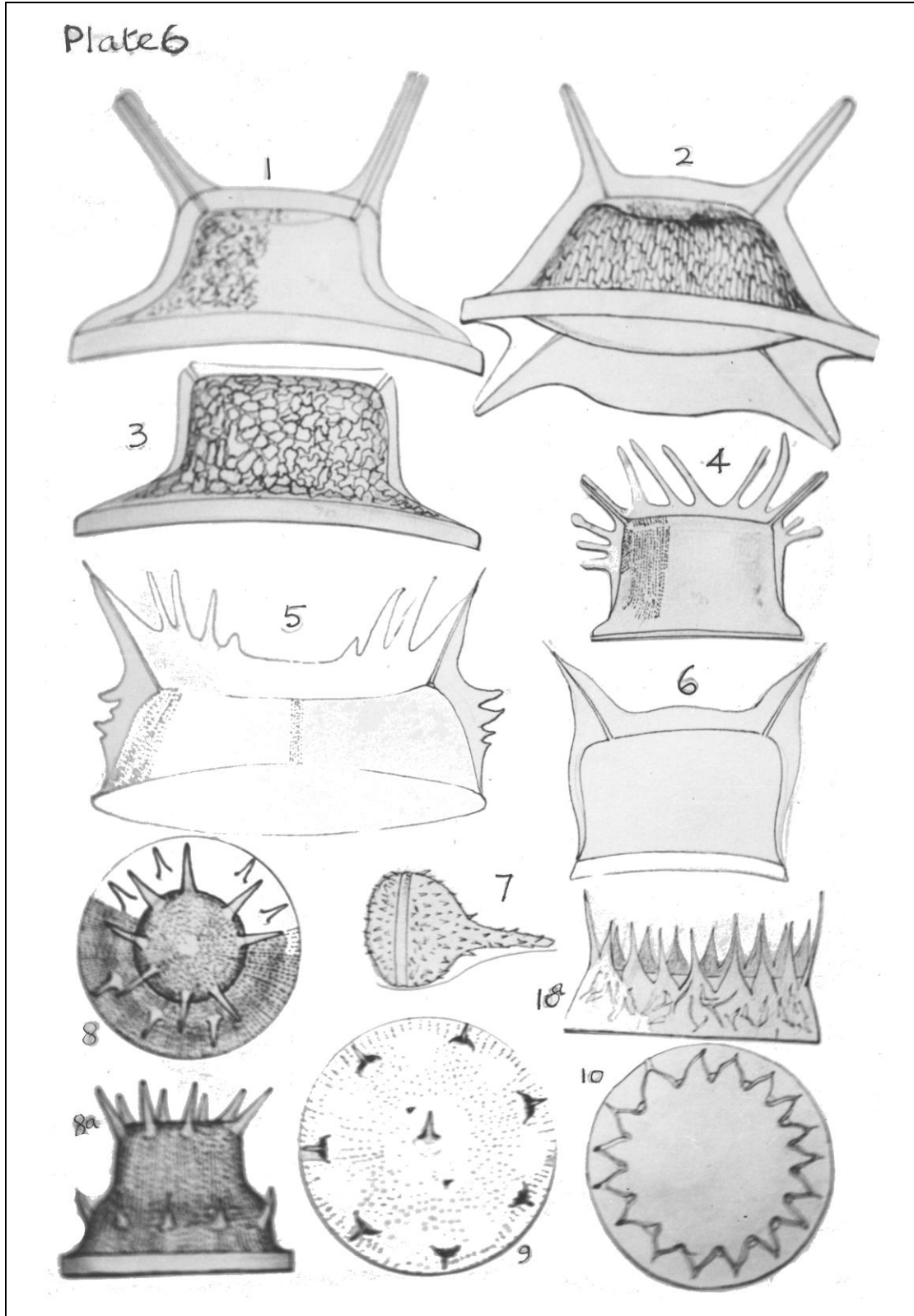
Figure	Name
1.	<i>Monopsia</i> n.sp.
	Later – “ <i>wisei</i> ”
2.	<i>Monopsia</i> n.sp.
	Later – “ <i>excentrica</i> ”
3.	<i>Monopsia</i> n.sp. (or var. of 2.)
	Later – “ <i>excentrica</i> fo. <i>lunaris</i> ”
4.	<i>Monopsia corrugata</i> Ba. & Me.
	See JQMC Fig.10. Pl.39. Ser.4. Vol.1.
5, 6 and 7	<i>Monopsia excentrica</i> Ba. & Me.
	Although Barker & Meakin JQMC Ser.4. Vol.1. pg.254 state the process is concentric there are a number of variations to the species:- <ol style="list-style-type: none"> <li>1. The process is not always concentric but may be eccentric to quite a degree. Meakin realised this in correspondence after the publication of ‘Concentric’ description.</li> <li>2. The process may or may not be surrounded by a hyaline area (see Fig. 5.)</li> <li>3. The process may or may not be surrounded by an area of much lighter markings.</li> <li>4. The border (as distinct from the rim) may be reduced to negligible proportions)</li> </ol> Later: HGB calls these: Fig. 5. <i>Monopsia hyalinus</i> Fig. 7. <i>Monopsia hyalinus</i> fo. <i>nebulosa</i>
8.	<i>Monopsia</i> n.sp.
	Later “ <i>elongata</i> ”
8a.	<i>Monopsia</i>
	Side view of Fig. 8. To depicted elongated ocellus.



## Plate 6

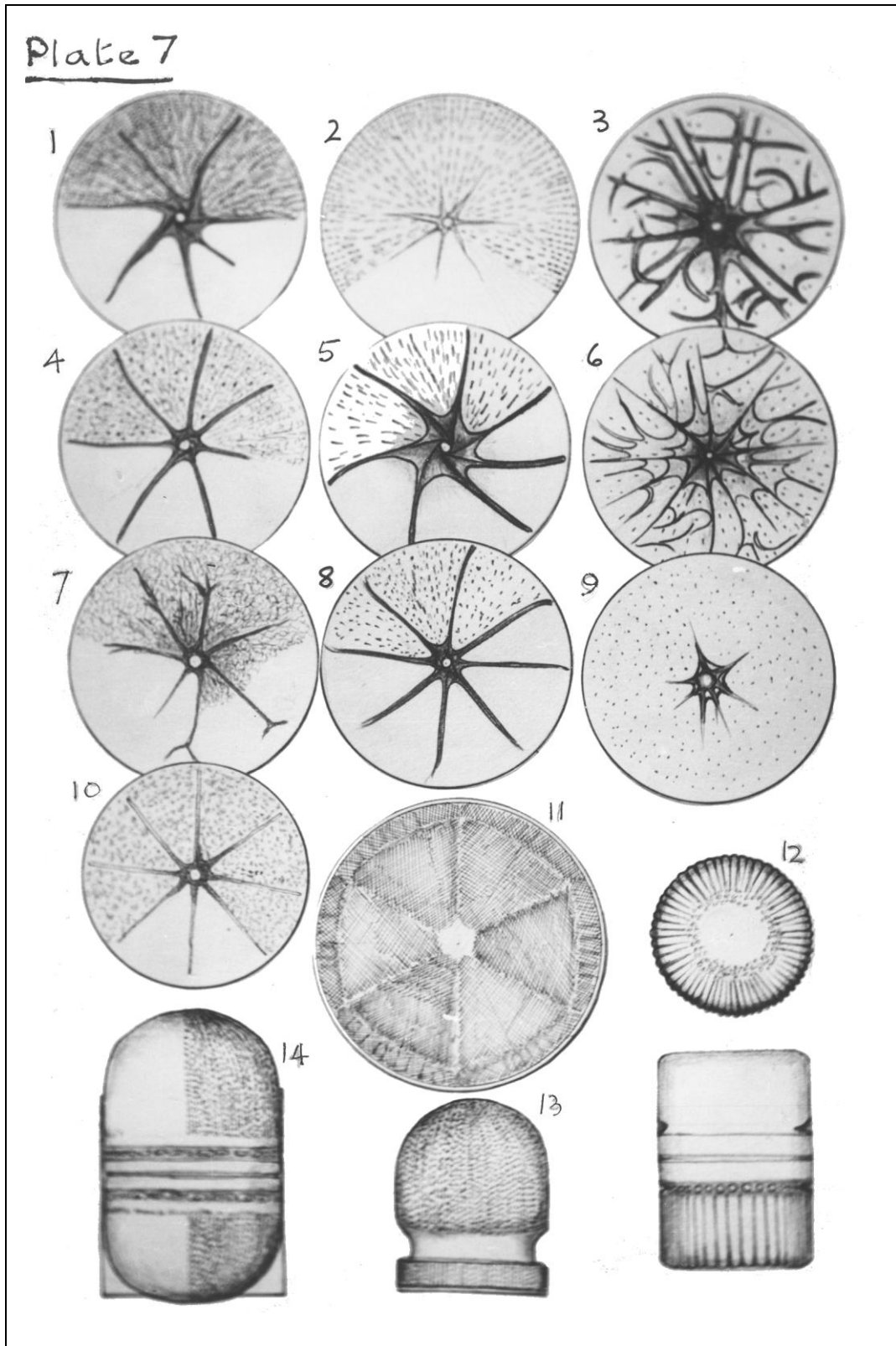
Figure	Name																
1.	<i>Odontotropis</i> Later " <i>pruinosa</i> "																
2.	<i>Odontotropis</i> Later " <i>birostrata</i> Pant."																
3.	<i>Odontotropis</i> ?																
4.	<i>Odontotropis</i> ?																
5.	<i>Odontotropis cristata</i>																
6.	?																
7.	<i>Kentrodiscus</i> Later " <i>fossilis</i> Pant."																
8.	<i>Pyrgodiscus</i> n.sp. Not " <i>ornatus</i> "!																
8a.	<p><i>Pyrgodiscus</i></p> <p>Side view of Fig. 8. The specimen from Singelevo is a much finer form than that figured by various authors as "<i>armatus</i>", the latter being very unsymmetrical and a basically different shape.</p> <table border="1"> <thead> <tr> <th><i>Pyrgodiscus ornatus</i></th> <th><i>Pyrgodiscus n.sp.</i></th> </tr> </thead> <tbody> <tr> <td>Base Circular.</td> <td>Base Circular.</td> </tr> <tr> <td>Periphery of base surmounted by 8 mambose-like inflations each surmounted by robust inward curving spine.</td> <td>Periphery of base not surmounted by inflations but extended to form 1/3 of the tower-like body. Around this lower 1/3 are situated 8 robust incurving spines.</td> </tr> <tr> <td>Central tower round to square surmounted at the tip edge by 8 very robust spines. One to each corner of the rounded square and one halfway between.</td> <td>Central tower circular. Edge of top surmounted by 8 robust spines.</td> </tr> <tr> <td>Apex series of spines 4 to 5 times larger than those at base.</td> <td>Apex series of spines the same size as the base spines.</td> </tr> <tr> <td>Puncta fine.</td> <td>Puncta fine.</td> </tr> <tr> <td>Cross-shaped hyaline space on top of lower.</td> <td>Small circular hyaline space at centre of tower.</td> </tr> <tr> <td>Narrow hyaline areas from base spines to central tower.</td> <td>No hyaline spaces around base spines.</td> </tr> </tbody> </table>	<i>Pyrgodiscus ornatus</i>	<i>Pyrgodiscus n.sp.</i>	Base Circular.	Base Circular.	Periphery of base surmounted by 8 mambose-like inflations each surmounted by robust inward curving spine.	Periphery of base not surmounted by inflations but extended to form 1/3 of the tower-like body. Around this lower 1/3 are situated 8 robust incurving spines.	Central tower round to square surmounted at the tip edge by 8 very robust spines. One to each corner of the rounded square and one halfway between.	Central tower circular. Edge of top surmounted by 8 robust spines.	Apex series of spines 4 to 5 times larger than those at base.	Apex series of spines the same size as the base spines.	Puncta fine.	Puncta fine.	Cross-shaped hyaline space on top of lower.	Small circular hyaline space at centre of tower.	Narrow hyaline areas from base spines to central tower.	No hyaline spaces around base spines.
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Cross-shaped hyaline space on top of lower.	Small circular hyaline space at centre of tower.																
Narrow hyaline areas from base spines to central tower.	No hyaline spaces around base spines.																
9.	<i>Pantocsekia clevosa</i> Grun. The form found in Singelevo has 7 processes on the periphery and 1 in the centre. This is a very fine form and superior to any seen illustrated. It is, of course, possible to be a new species. [A further note records – " <i>The other half of a Pyrgodiscus is a Pantocsekia.</i> "]																
10.	Genus ? Later note – <i>Pyrgodiscus kinkerii</i> Pant. (Girdle view)																
10a.	Genus ? Later note – <i>Pyrgodiscus kinkerii</i> Pant.																

Plate 6



## Plate 7

Figure	Name
1.	<i>Gyrodiscus "Conchoidea"</i>
2.	<i>Gyrodiscus "Reedii"</i>
3.	<i>Gyrodiscus intricatus</i> Ba. & Me. New var. <i>concentricus</i>
4.	<i>Gyrodiscus "flemigiana"</i>
5.	<i>Gyrodiscus "elongatum"</i>
6.	<i>Gyrodiscus danica</i> Grun (near)
7.	<i>Gyrodiscus "prunosus"</i>
8.	<i>Gyrodiscus "parkerii"</i>
9.	<i>Gyrodiscus "glacilis"</i>
10.	<i>Gyrodiscus "nebulosum"</i>
11.	<i>Actinoptychus</i> ? fa.
12.	<i>Pleurodiscus pantocsekii</i> Ba. & Me. Complete and end forms
12a.	<i>Pleurodiscus pantocsekii</i> Valve view of Barker & Meakin.
13.	? genus
14.	? genus

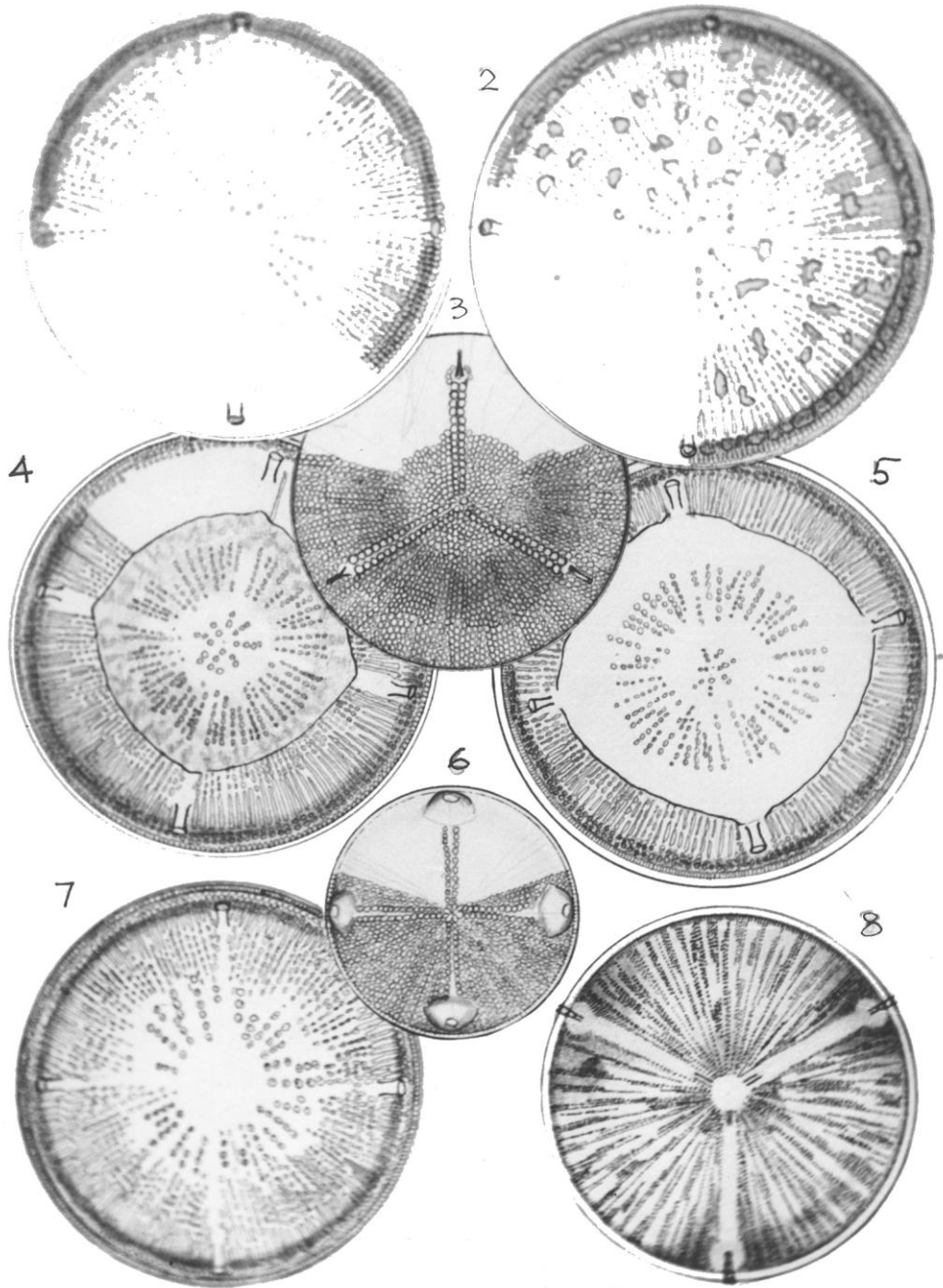


## Plate 8

Figure	Name
1.	<i>Aulacodiscus lahusenii</i> O.Witt
	(typical)
2.	<i>Aulacodiscus lahusenii</i> O.Witt
	Variety
3.	<i>Aulacodiscus ? probabilis</i>
	Or <i>longicornis</i>
4.	<i>Aulacodiscus lahusenii</i> O.Witt
	Variety
5.	<i>Aulacodiscus lahusenii</i> O.Witt
	Variety
6.	<i>Aulacodiscus ? sp.</i>
	(not <i>crux</i> ) ? <i>Kittonii</i> var. <i>johnsonii</i> Arnott
7.	<i>Aulacodiscus lahusenii</i> O.Witt
	Variety
8.	<i>Aulacodiscus acutua</i> Ratt.



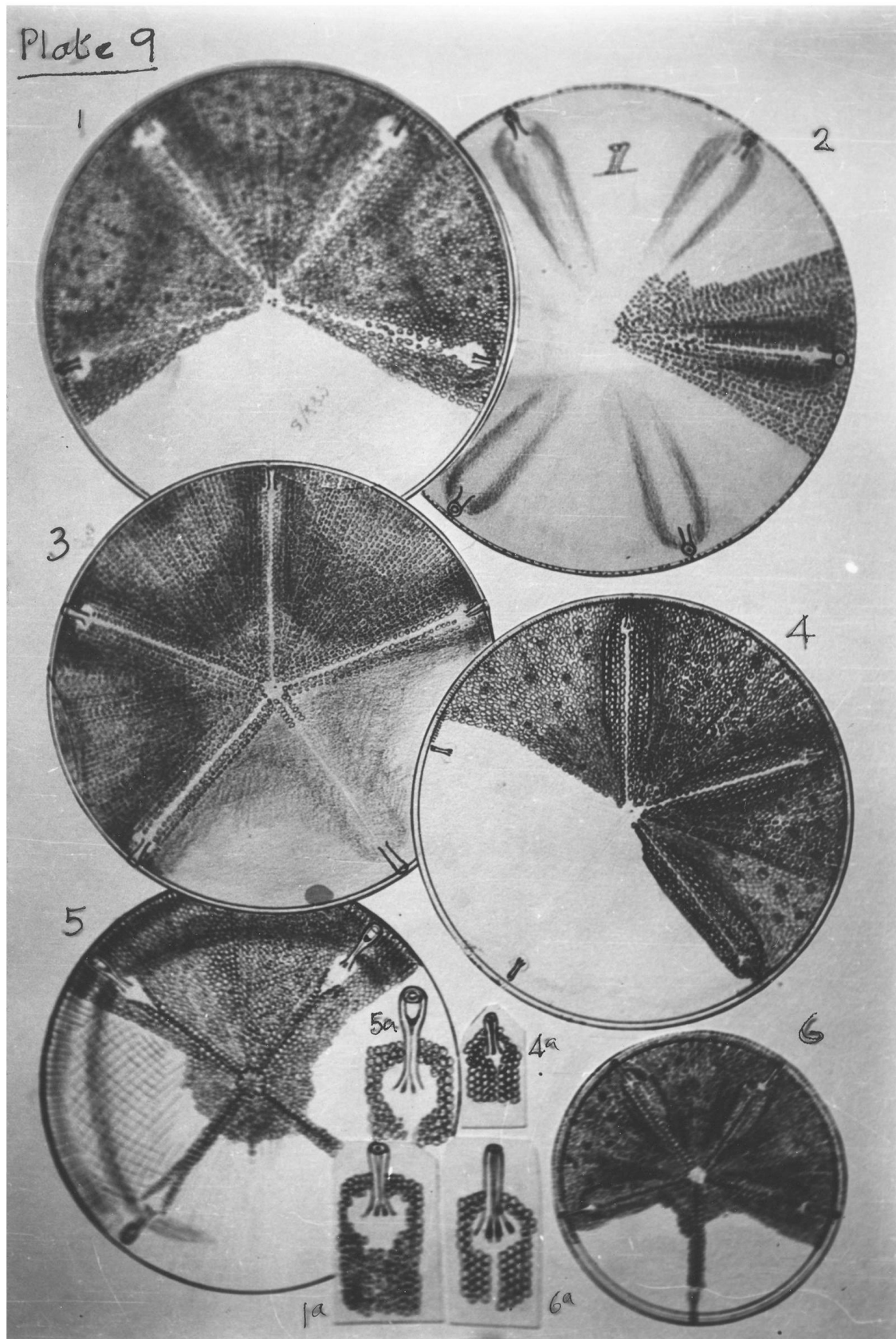
Plate 8



**Plate 9**

<b>Figure</b>	<b>Name</b>
1.	<i>Aulacodiscus falseoculatus</i> Pant.
2.	<i>Aulacodiscus</i> sp.
3.	<i>Aulacodiscus singiliewskianus</i> Ba. & Me.
4.	<i>Aulacodiscus</i> sp.
5.	<i>Aulacodiscus eminens</i> Ba. & Meakin
6.	<i>Aulacodiscus</i> sp.

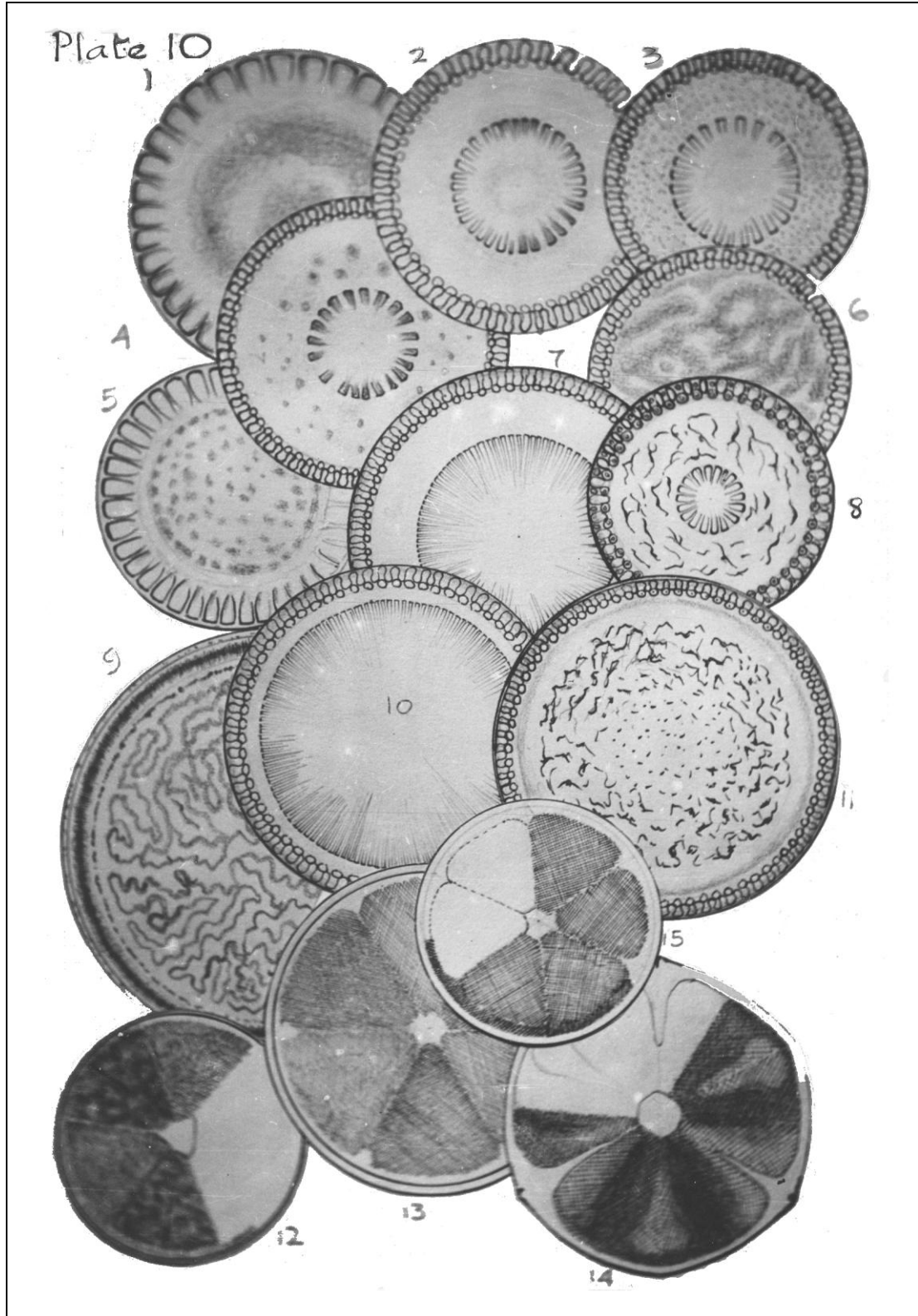
Plate 9



## Plate 10

Figure	Name
1.	<i>Aulacodiscus heterosticus</i> Ba. & Me.
2.	<i>Aulacodiscus ? lahusenii</i>
	Group
3.	<i>Aulacodiscus</i> sp.
4.	<i>Aulacodiscus</i> sp.
5.	<i>Aulacodiscus septus</i> O.Witt
	(? <i>A. schmidtii</i> )
6.	<i>Aulacodiscu septus</i> O.Witt
	(? <i>A. schmidtii</i> fa. <i>quatuor-radiata</i> )
7.	? genus
8.	<i>Aulacodiscus symmetricus</i> Ba. & Me.
9.	<i>Aulacodiscus lahusenii</i> var.

Plate 10



## Plate 11

Figure	Name
1.	<i>Goniothecium</i> sp.
2.	<i>Goniothecium</i> sp.
3.	<i>Goniothecium</i> sp.
4.	<i>Hemiaulus</i> sp. (Not F. C. Wise's Oamaru form)
4a.	<i>Hemiaulus</i> sp. Side of valve
5.	? Genus Side of valve
5a.	? Genus Valve view
6.	<i>Rhaponeis (Raphoneis)</i> sp. ? <i>grunowiella geminata</i> (Grun.) H.v.H.
7.	<i>Cladogramma</i>
8.	<i>Navicula</i> sp.
9.	<i>Biddulphia</i> sp.
10.	<i>Hemiaulus</i> sp.
11.	? <i>Anaulus</i> or <i>Eunotogramma</i>
12.	-
12a.	-
13.	<i>Hemiaulus</i> sp.
14.	<i>Biddulphia tuomeyii</i> H.v.H.
15.	? <i>Biblarium</i> sp.?
16.	? <i>Hemiaulus</i>
17.	<i>Biddulphia ruthenica</i> O.Witt
18.	? <i>Hemiaulus</i> sp.
19.	? <i>Hemiaulus</i> sp.
20.	<i>Biddulphia</i> sp.
21.	<i>Hemiaulus</i> sp.
22.	<i>Biddulphia ruthenica</i> O.Witt
23.	<i>Hemiaulus lobatus</i> Grev.
24.	<i>Hemiaulus lobatus</i> Grev.
25.	<i>Hemiaulus</i> sp.
26.	<i>Biddulphia</i> sp.
27.	<i>Hemiaulus</i> sp.

Note by Bernard Hartley – HGB refers to Hemaulus not Hemiaulus.

Plate 11

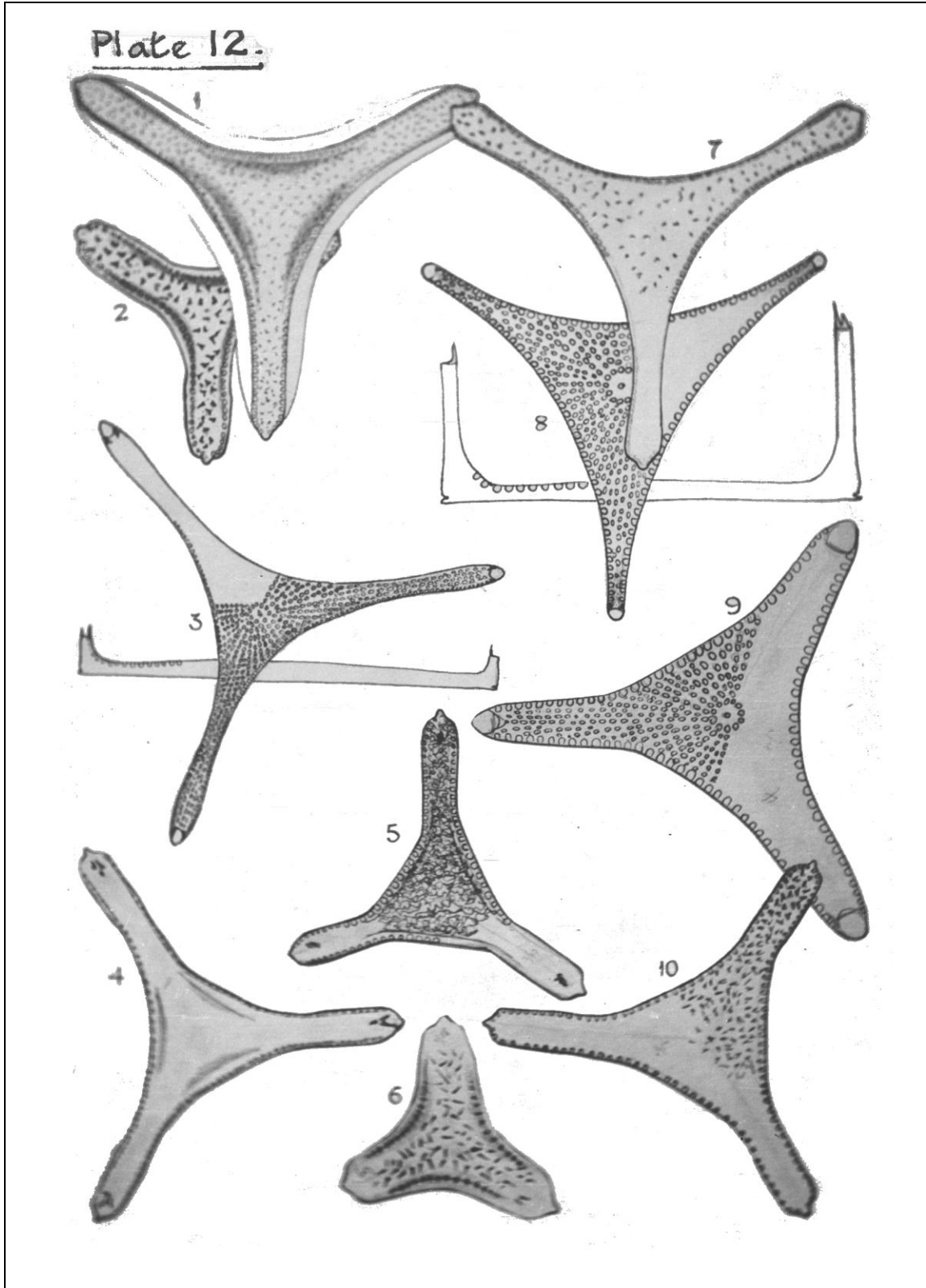




## Plate 12

Figure	Name
1.	<i>Trinacria simulacrum</i> Gr. & St.
2.	<i>Trinacria simulacrum</i> var. <i>grossepunctata</i> Chenev.
3.	<i>Trinacria excavata</i> Heib.
4.	<i>Trinacria simulacrum</i>
5.	<i>Trinacria</i> sp.
6.	<i>Trinacria simulacrum</i> var. <i>grossepunctata</i> Chenev.
7.	<i>Trinacria simulacrum</i> var.
8.	<i>Trinacria grunowii</i> O.Witt
9.	<i>Trinacria grunowii</i> O.Witt
	?var. of above
10.	<i>Trinacria grunowii</i> O.Witt
	?var. of <i>simulacrum</i>

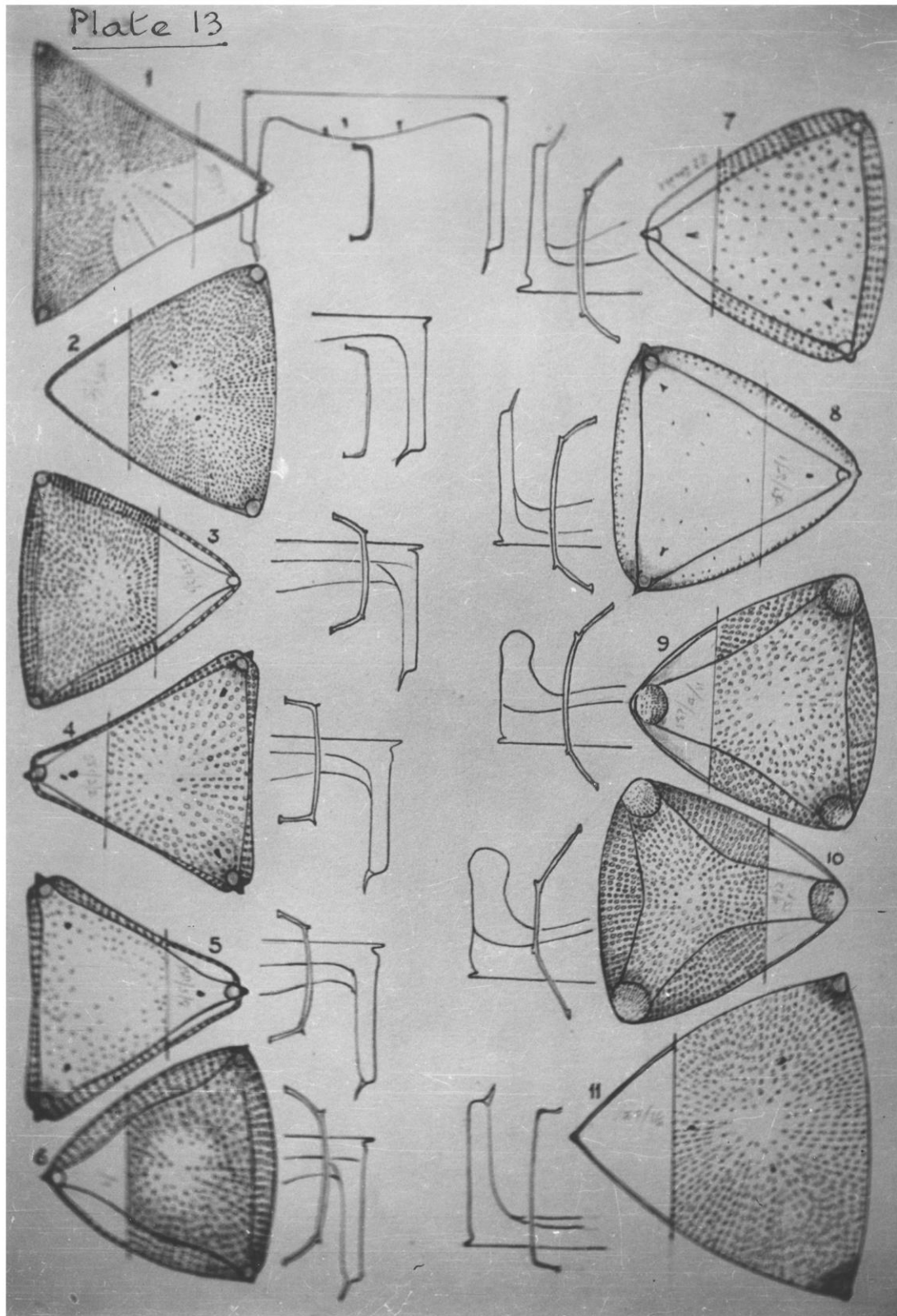
Plate 12



## Plate 13

Figure	Name
1.	<i>Trinacria ?regina ?witti</i>
2.	<i>Trinacria</i> sp.
3.	<i>Trinacria regina</i> Heib.
4.	<i>Trinacria</i> sp.
5.	<i>Trinacria</i> sp.
6.	<i>Trinacria</i>
7.	<i>Trinacria</i>
8.	<i>Trinacria</i>
9.	? <i>Triceratium</i>
10.	? <i>Triceratium</i>
11.	<i>Trinacria</i>

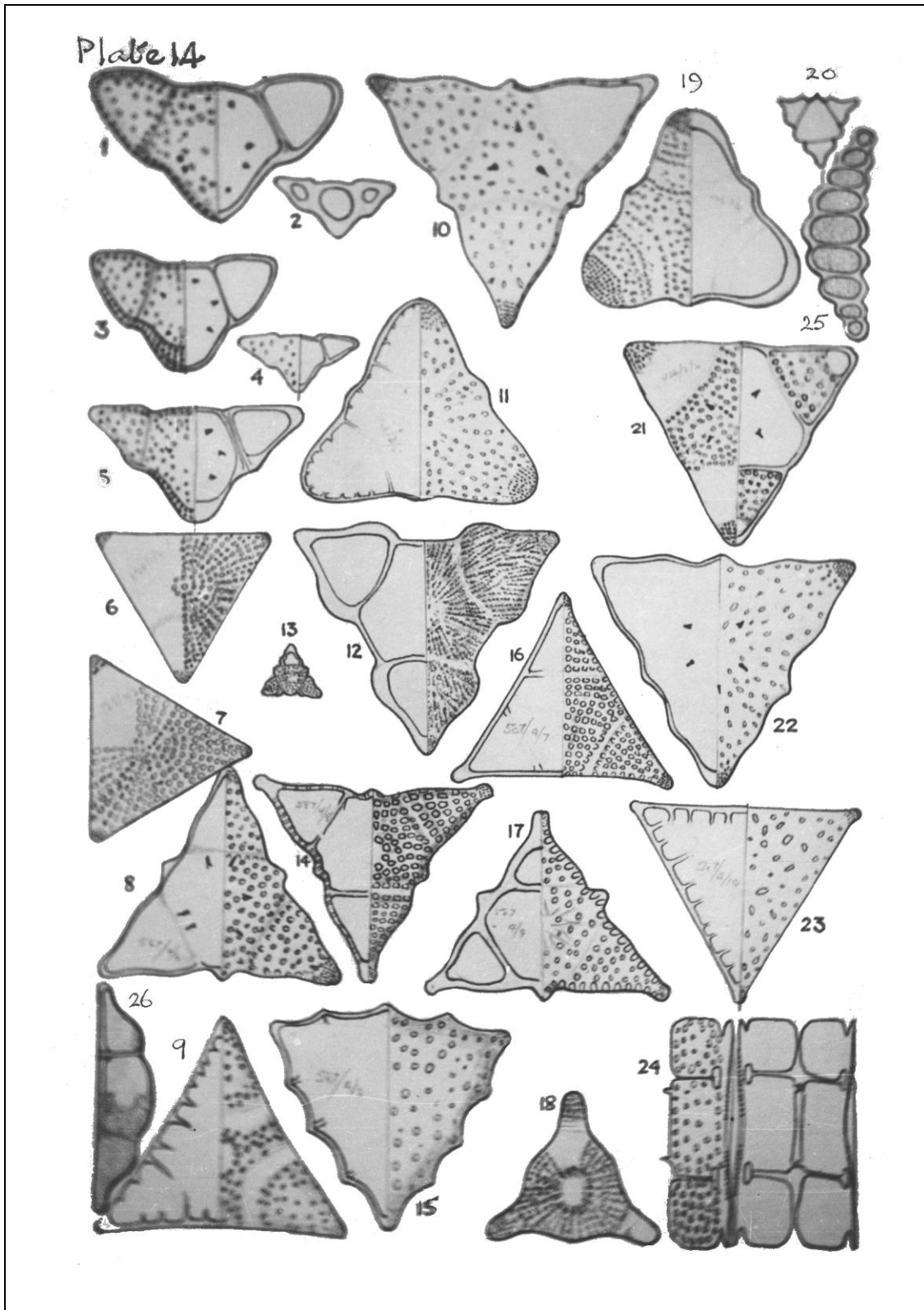
Plate 13



## Plate 14

Figure	Name
1.	<i>Eunotogramma</i> sp.
2.	<i>Eunotogramma</i> sp. fo.
3.	<i>Eunotogramma</i> sp. fo.
4.	<i>Eunotogramma</i> sp. fo.
5.	<i>Eunotogramma</i> sp. fo.
6.	<i>Triceratium</i> sp. ? <i>archangelskianum</i>
7.	<i>Triceratium</i> sp. ? <i>archangelskianum</i>
8.	<i>Triceratium archangelskianum</i>
9.	<i>Triceratium archangelskianum</i>
10.	<i>Triceratium</i>
11.	<i>Triceratium flos</i> Ehrenberg
12.	<i>Triceratium</i> sp.
13.	<i>Triceratium fenestratum</i> O.Witt
	Near
14.	<i>Triceratium</i> ? <i>archangelskianum</i>
15.	<i>Triceratium</i> ? <i>archangelskianum</i> var.
16.	<i>Triceratium</i> ? <i>archangelskianum</i> var.
17.	<i>Triceratium</i>
18.	<i>Triceratium weissi</i> (Grun.) O.Witt
19.	<i>Triceratium flos</i> Ehrenberg
20.	<i>Triceratium</i> sp.
21.	<i>Triceratium</i> sp.
22.	<i>Triceratium</i>
23.	<i>Triceratium fenestratum</i> O.Witt
	Near
24.	<i>Eunotogramma</i>
25.	<i>Eunotogramma variabile</i> Grun.
26.	<i>Eunotogramma</i>
	Or <i>Anaulus</i>

Plate 14

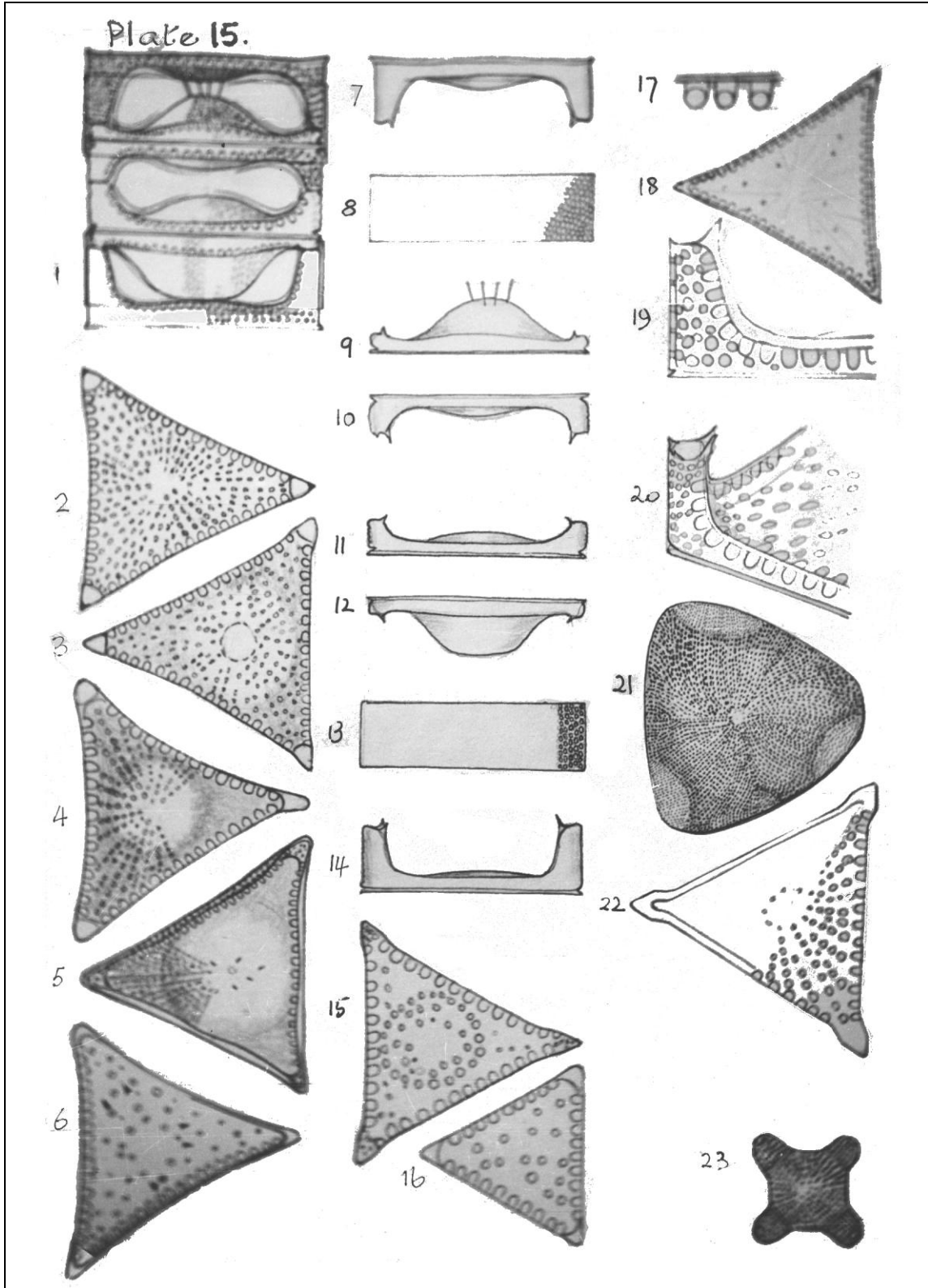


## Plate 15

Figure	Name
1.	<i>Trinacria insipiens</i> O.Witt
	Block of 3 valves
2.	
3.	
4.	
5.	
6.	
7-14.	<i>Trinacria insipiens</i> O.Witt
	Exploded view of Block No.1.
15.	
16.	
17.	
18.	
19.	
20.	
21.	<i>Triceratium</i> sp.
	Allied to <i>Huttonia</i> ?
22.	<i>Trinacria</i> sp.
23.	<i>Trinacria solium exsculptum</i>



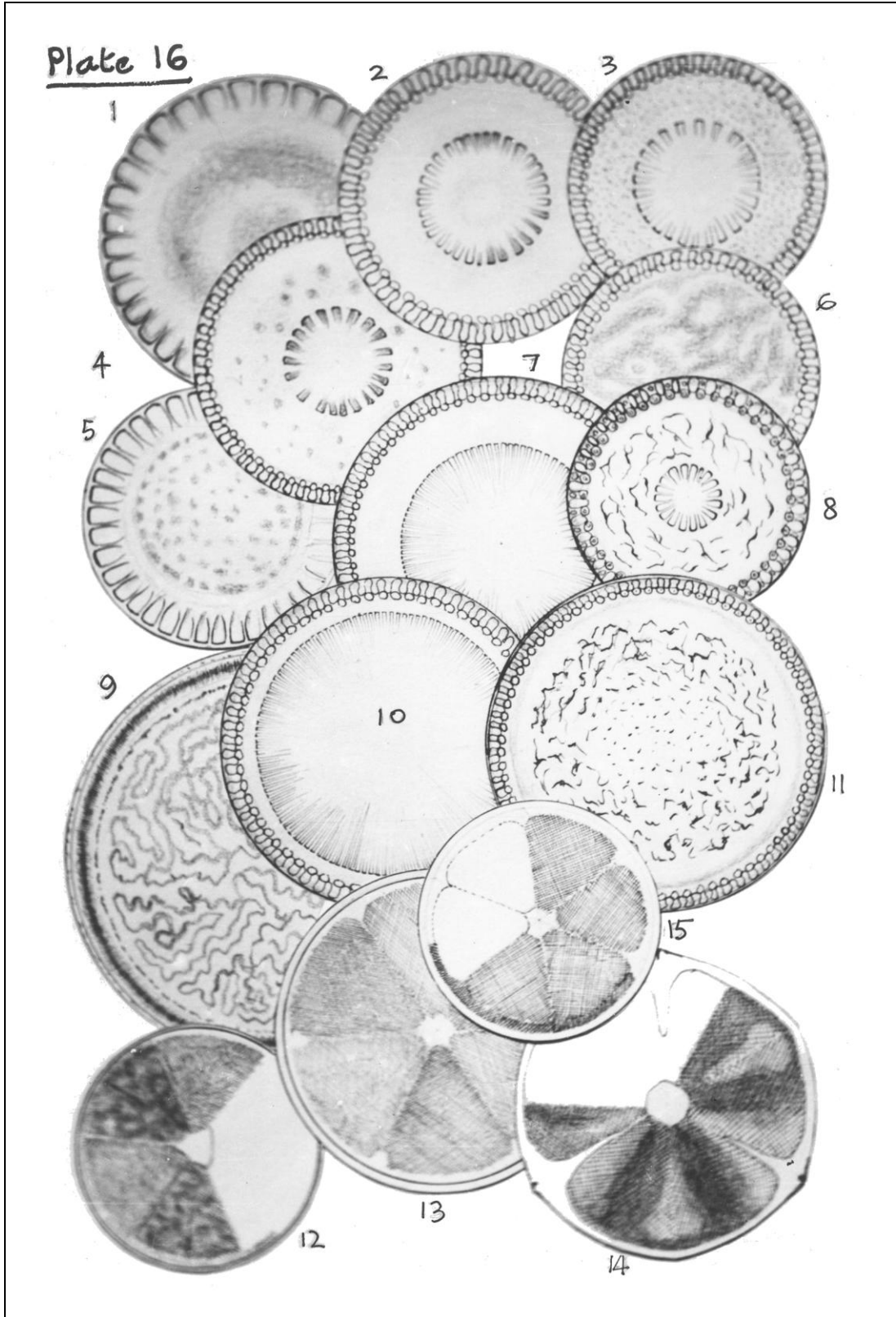
Plate 15



## Plate 16

Figure	Name
1.	<i>Melosira ornata</i> Grun
2.	<i>Melosira ornata</i> Grun
3.	<i>Podosira sulcata</i> var. <i>hungarica</i> Chen.
4.	<i>Podosira sulcata</i> fa. ?
5.	<i>Melosira ornata</i> var. or fa.
6.	<i>Podosira</i> var.
7.	<i>Podosira sulcata</i>
8.	<i>Podosira sulcata</i> fa.
9.	<i>Melosira</i> ?
10.	<i>Podosira sulcata</i>
11.	<i>Podosira selecta</i> A.Sch.
12.	<i>Actinoptychus senarius</i> ?
13.	<i>Actinoptychus</i> sp.
14.	<i>Actinoptychus</i> sp.
15.	<i>Actinoptychus</i> sp.

Plate 16

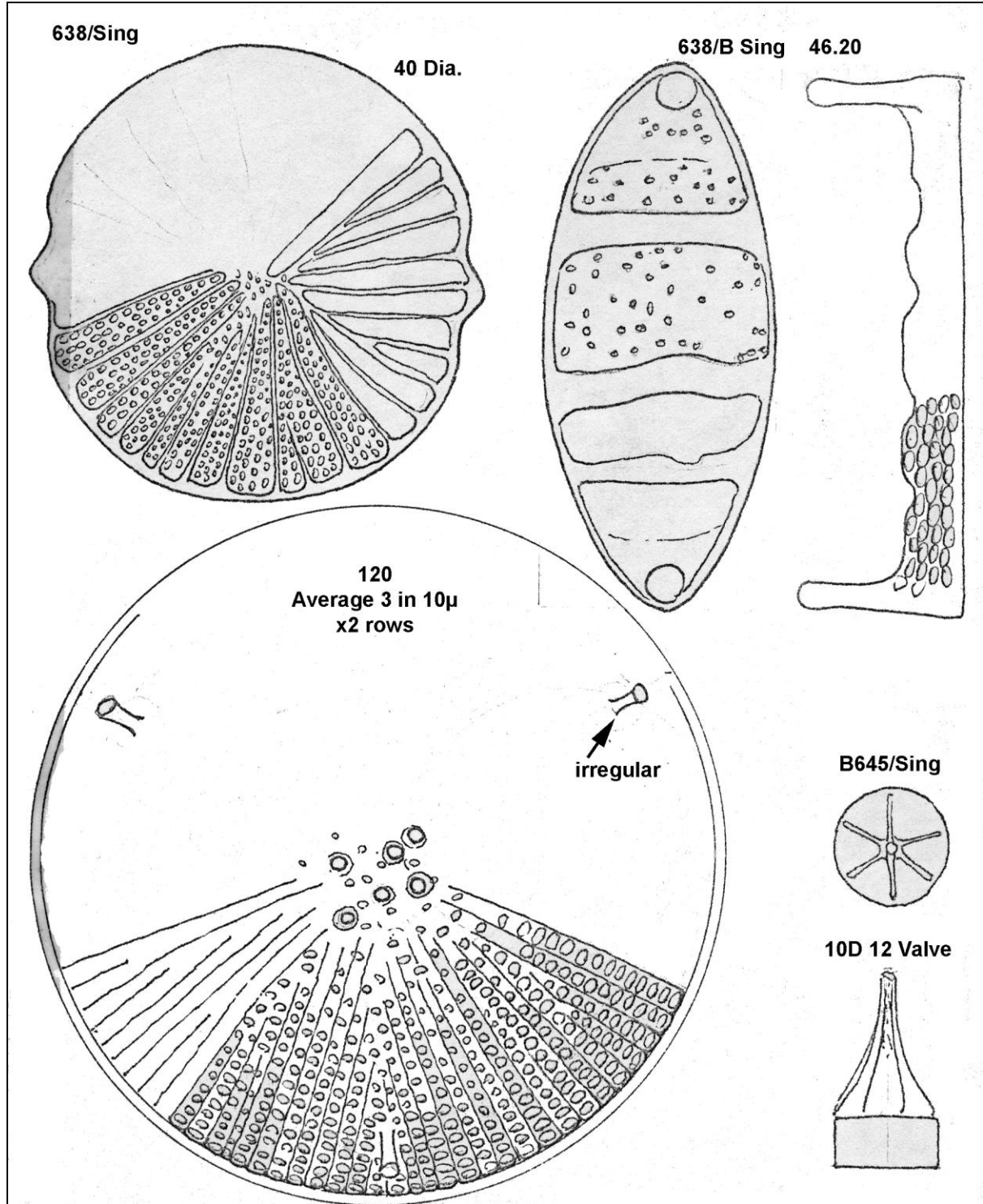


Horace Barber produced some supplementary plates after consultation with Bernard Hartley. These are reproduced below. There are 13 plates (all reproduced) but it should be noted that notes only exist for the first 8.

**Plate 1s**

638/Sing 40 Dia.	<p><i>Pseudo-stictodiscus angulatus</i> Grun</p> <p>This is the same taxon as 2/12. It will be noted the only difference is the costate areas and I would think is only a new forma "<i>costatus</i>".</p>
638/B Sing. 46.20	<p><i>Biddulphia</i> ?n.sp.</p> <p>The form here is devoid of short spines or processes. In view of the general idea that <i>Trinacria</i> are those forms endowed with terminal spines on the angular processes, seems to me to be a weak point of determination. See plate 11 Sing &amp; there are quite a few forms biangular with mucronate processes, which are undoubtedly <i>Biddulphias</i> and not <i>Trinacrias</i>!</p> <p>I have always considered the whole of the Bidulphoid group need a good shake up.</p>
120 dia.	<i>Aulacodiscus hetrostictus</i> Barker
648/B Sing. 10D 12 Valve	?Pyrgodiscus

Plate 1s



## Plate 2s

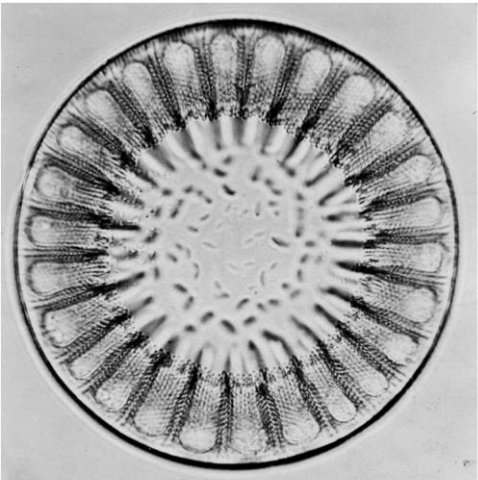
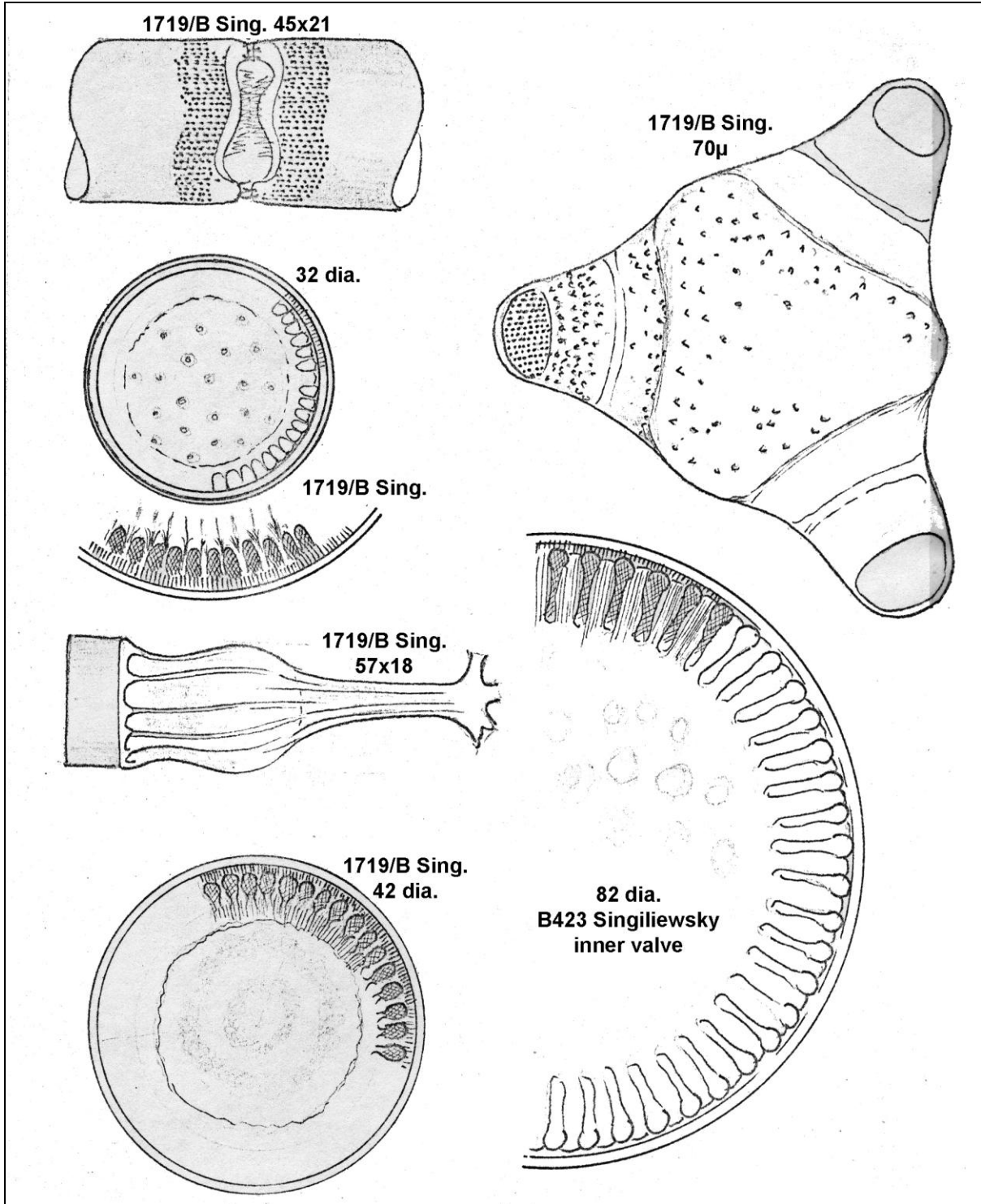
B423 Singiliewsky 82 dia.	<p><i>Melosira ornata</i> Grun</p> <p>This is the same form as Sing 16/1, 16/5. I have done three other forms on the page to shew the degree of variation of presentation. The original sketches 16/1, 16/5 are not good! Hence my reason for re-sketching.</p> <p>The principle structure is the trouble – very complex and each change of focus alters the appearance considerably. The features are variable too, from form to form and the nebulous faciae markings very fluid. One can hardly find two identical. I have made illustrations more suggestive than strictly accurate for if I attempt to copy the stria etc. in black ink then all semblance would be destroyed. When all said and done, diatoms are silex (glass) not black ink!</p> <p>I have adopted this drawing technique a lot in recent years, for, to me at least; I am able to shew varying points of the structure and fill in mentally, thus avoiding blocking up with ink. I did the original Singiliewsky – or Sengelevo (both mean the same) – forms with diluted ink but the snag with this is “reproduction” not good.</p> <p>Note by Bernard Hartley - Mr. R. Gosden says re. 4 figures of “<i>Melosira</i>” he is always suspicious of them when they show a 45° cross-hatchind. If they do, he calls them <i>Truania</i> and Plate 1 Figs. 13, 14, 15 are <i>Truania</i>. [Editor’s note: also included a photograph by J.W. Barker]</p> <div data-bbox="671 887 1318 1536" style="text-align: center;">  <p><i>Truania Archangelskiana</i> Pantocsek ( x 850 ) Singiliewsky, Russia. Photograph by Barker.</p> </div>
1719/B Sing. 70μ	<p><i>Triceratium flos</i> Ehrenberg</p> <p>A slight variation to Pl.14. Fig. 19.</p>
1719/B Sing. 45 x 21	<p><i>Biddulphia</i> sp.</p> <p>In the original Sing. material the form is quite frequent, of small diameter and deep mantle. The mantle and girdle are generally curved and I always suspect grow or grew in loose open spaces like <i>M. granulata</i> var. <i>spiralis</i>. Note too, the valve mantle is torsioned as illustrated, the valve will be elliptic! Is hetropole in apical axis, not isopole as sketched.</p>
1719/B Sing. 57 x 18	<p>-</p> <p>The produced branched costae of this form are not complete, the ends having been broken. The form is not rare and one can find more complete specimens.</p>

Plate 2s

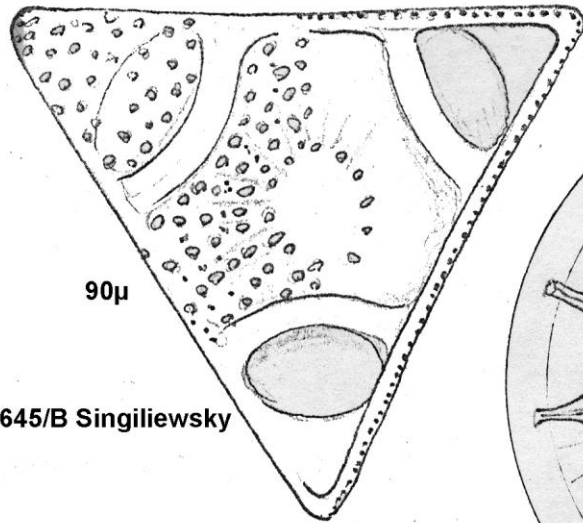




**Plate 3s**

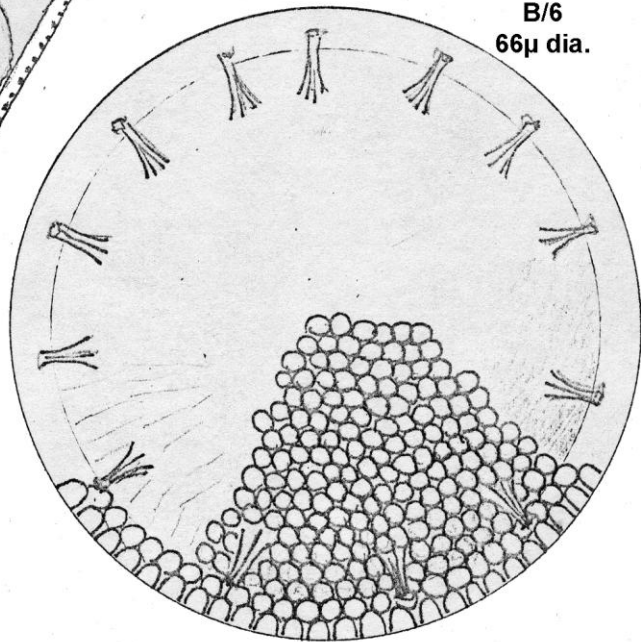
645/B Sing. 90 $\mu$	<i>Triceratium</i>
B/6 66 $\mu$	<i>Stephanodiscus</i> The representatives of this genus take a lot of sorting out and as yet cannot make my mind up how many species there are, or the degree of variation. The peripheral connecting spines can be single row or two or more irregular ones. I note also variation in areolae size. Whether these features are stable I do not know but I suspect not.
B1718 Sing. 42 dia.	<i>Monopsia</i> sp. I have seen one or two of these recently and am inclined to think that certain ones are very variable. For instance the form under note and Pl.5 Figs. 5, 6 and 7 could be of the same species cycle. There is really no major difference. I would be inclined to relegate to forms of the type. Of course, it would be wise to see many more of the series before final conclusions.
1718/B Sing. 54.15	- Note by Bernard Hartley – R. Gosden says See Wolle Plate LXV Fig.21. He calls it <i>Pyxilla kittoniana</i> Grun.

Plate 3s



90 $\mu$

645/B Singilewsky

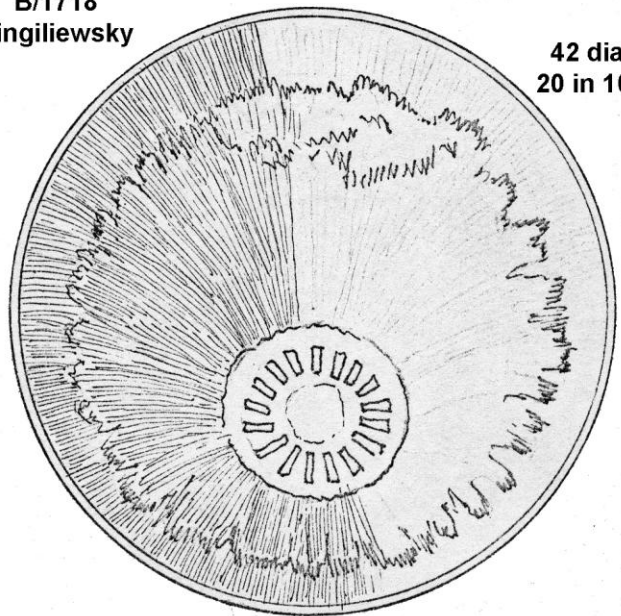


B/6  
66 $\mu$  dia.



1718/B Sing.  
54.15

B/1718  
Singilewsky

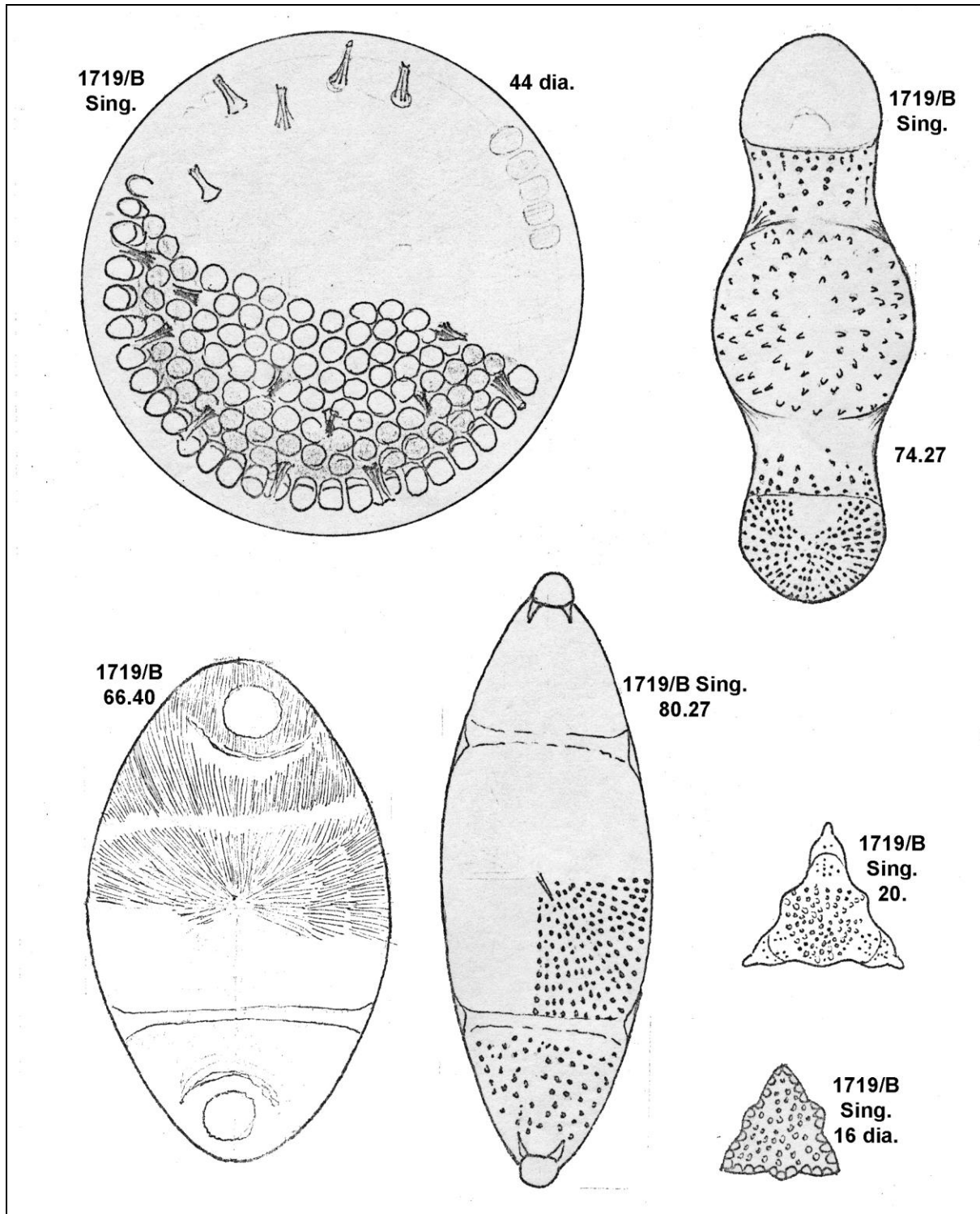


42 dia.  
20 in 10 $\mu$

**Plate 4s**

1719/B Sing. 66.40	<p><i>Huttonia</i></p> <p>See Pl.3 Figs 5 and 6, the same taxon but note the ocelli are nearly on the apical axis and not on mantle edge as is usual. See Barker and Meakin illustration for <i>H. zonata</i>.</p> <p>The rest of the features a reasonable fit.</p>
1719/B Sing. 44 dia.	<p><i>Stephanodiscus</i></p> <p>This is the form with irregular circular rows of connecting spines I referred to on Plate 3s.</p>
1719/B Sing. 80.27	<p><i>Biddulphia</i> sp.</p> <p>Note two mucros on processes and one central.</p>
1719/B Sing. 74.27	<p><i>Biddulphia</i> sp.</p> <p>This is rather like <i>B. includens</i> but does not carry any mucros, at least I could not see any signs.</p> <p>See also F. C. Wise's article on <i>B. novae zealandica</i> JQMC – as above form.</p>
1719/B Sing. 16μ	<i>Triceratium</i>
1719/B Sing. 20μ	<i>Triceratium</i>

Plate 4s

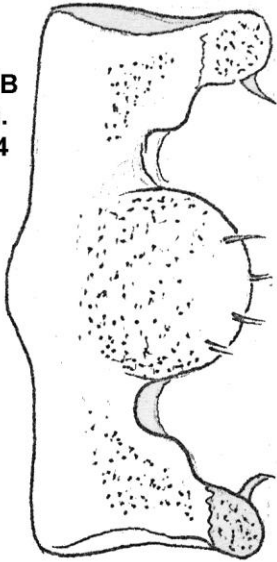


## Plate 5s

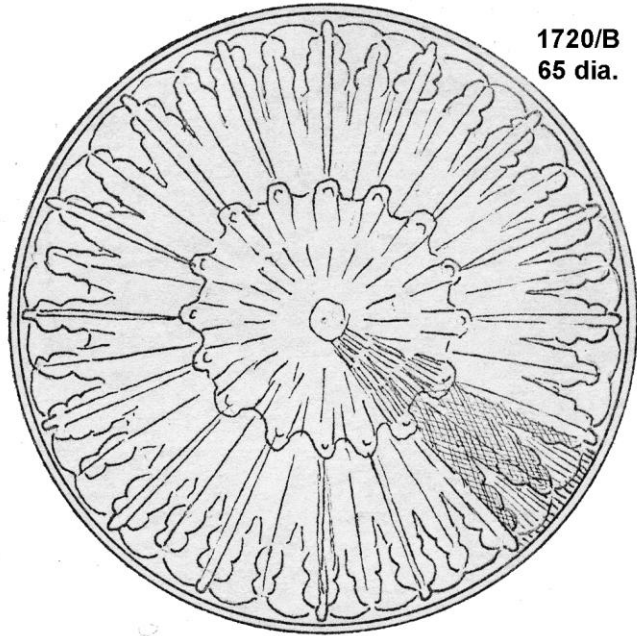
1721/B Sing. 57.24	<i>Biddulphia ?includens</i>
1720 Sing. 65 dia.	<i>Lepidodiscus elegans</i> I have seen quite a few <i>L. elegans</i> now and find the central area in particular is quite fluid, about the only feature of any constant character is the outer $\frac{1}{3}$ of the valve.
B639 Sing.	<i>Actinoptychus</i> See Plate 16 Figs. 13 and 15, basically the same form but differs by scattered spines(?) over the surface. Note. The valve face is not in hexagonal areas like <i>A. senariosus (undulatus)</i> O. Witt Pl.8 Fig. 3. is very close but has particular marks in the centres of three sectors.
1721/B Sing. 41 dia.	<i>Melosira</i> A nice variation of the central area for this form. See notes for <i>M. ornata</i> . Bernard Hartley note: R. Gosden thinks this is <i>Truania</i> .
1721/B Sing. 32 x 20	<i>Biddulphia</i> sp. ? Note no mucros.

Plate 5s

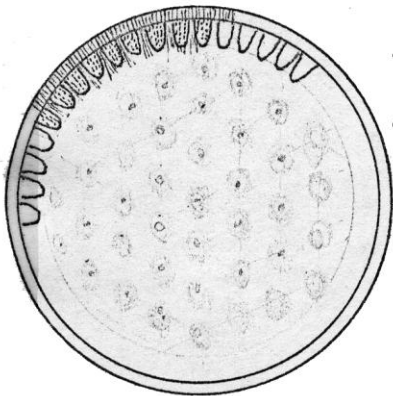
1721/B  
Sing.  
57.24



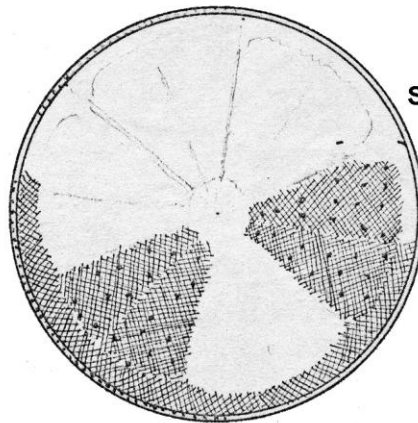
1720/B  
65 dia.



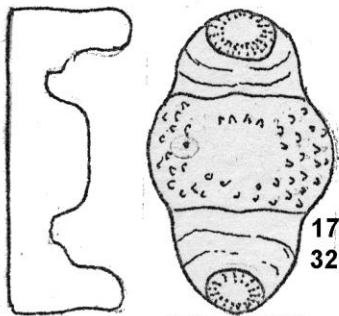
1721/B  
Sing.  
41 dia.



B639  
Singilewsky



1721/B  
32 x 20

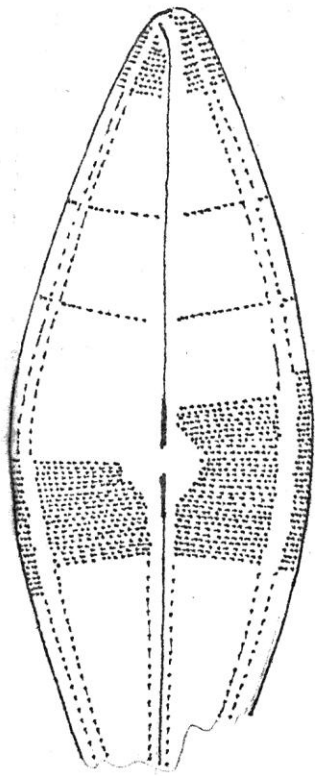


## Plate 6s

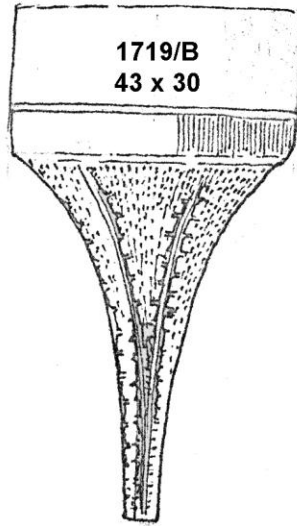
1719/B Sing/ 24 dia.	<p>? <i>Stictodiscus</i> sp. ?</p> <p>Note costae are only partially radial. Areaolae are set along edge of costae but do not continue on both sides! I think the same as previously figured on Pl.2. Fig. 14.</p> <p>Bernard Hartley note: R. Gosden says not unlike the small form found in Oamaru material by Grove and Sturt – <i>Cosmiodiscus normanianus</i>.</p>
1719/B Sengelevo 75 x 18	<i>Biddulphia</i> sp.
1719/B 43 x 30	<p><i>Eupodiscus</i> sp.</p> <p>Girdle view and Valve View.</p> <p>The puncta pattern and costae of this genus are so diverse that I wonder if there is any consistency in these factors? If not then the whole should be bundled under one cycle.</p> <p>Valve view of larger form.</p>
1719/B 95.32.21	<p>? <i>Navicula</i> sp.</p> <p>Undoubtedly a naviculoid diatom but what sub genera? The form is fractured so I cannot say whether polar ends of raphe are bilaterally flexed.</p> <p>It has features of:-</p> <p><i>Caloneis</i></p> <p><i>Neidium</i></p> <p>And even <i>Orthoseiraceae</i>!</p> <p>The peripheral hyaline band is somewhat like <i>Neidium</i> but the raphe is wrong!</p> <p>There is a “look” of <i>Caloneis</i> but the peripheral l.b. is not right.</p> <p>The central terminals of the raphe – are strangers to me.</p>



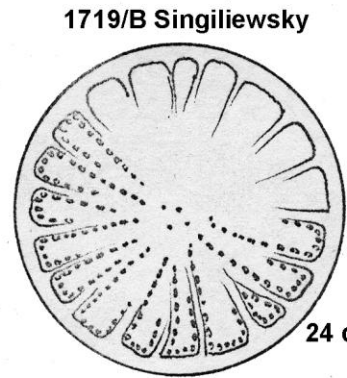
Plate 6s



1719/B Singiliewsky  
95.32.21

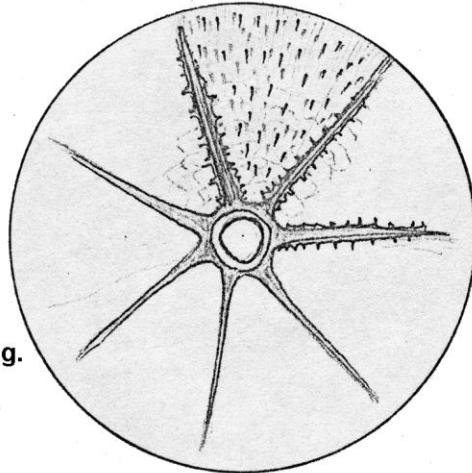
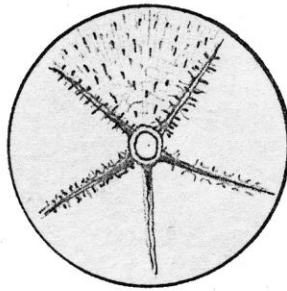


1719/B  
43 x 30

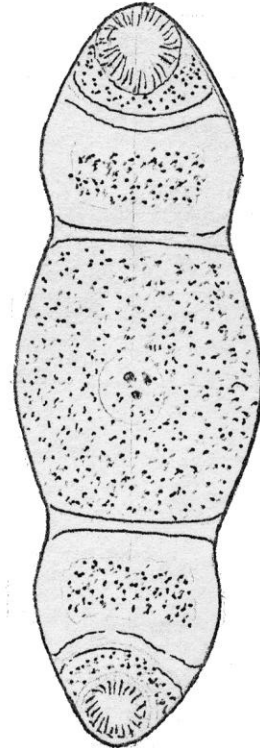


1719/B Singiliewsky

24 dia.



1719/B Sing.  
49 dia.



1719/B Singiliewsky  
75 x 18

**Plate 7s**

630/B Sing. 60 dia.	*? <i>Coscinodiscus</i> ? sp. ?? <i>Gyrodiscus</i>
	See Pl.2. Figs 16 and 17 – two more sparsely punctate forms. Fig. 17 could be <i>nitidus</i> group Fig. 16 No! * No! again –The peripheral areolae in this case quite large and linear – does not equate with <i>C. nitidus</i> at all!
120 dia.	<i>Lep.</i> ? <i>elegans</i> Or another spp?

I think this is about all I need comment on for I am sure you (Bernard Hartley) will have better ideas than me on this ship! It must be 12 years since I ventured in the F.M. domain! And one loses touch.

Plate 7s

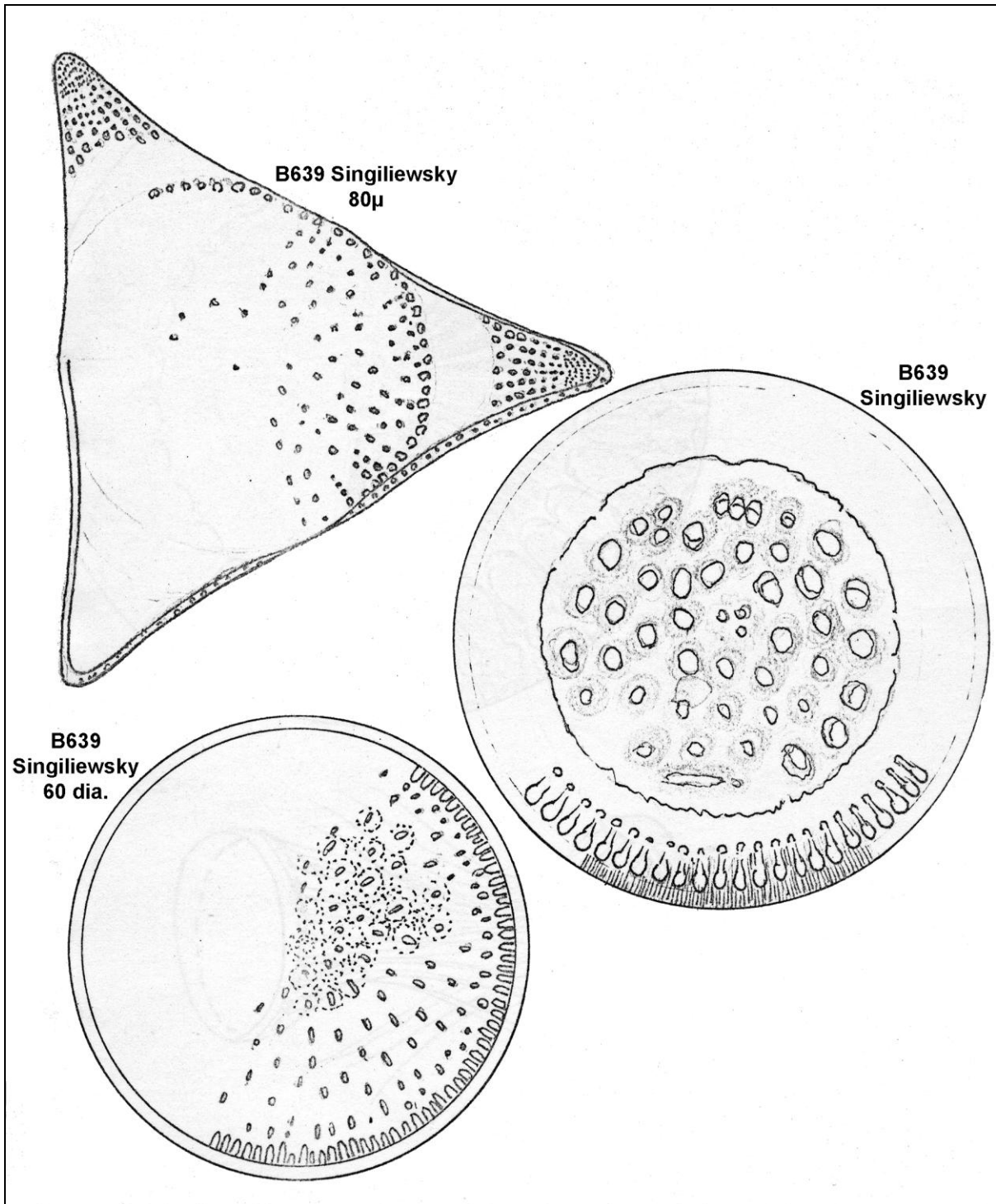
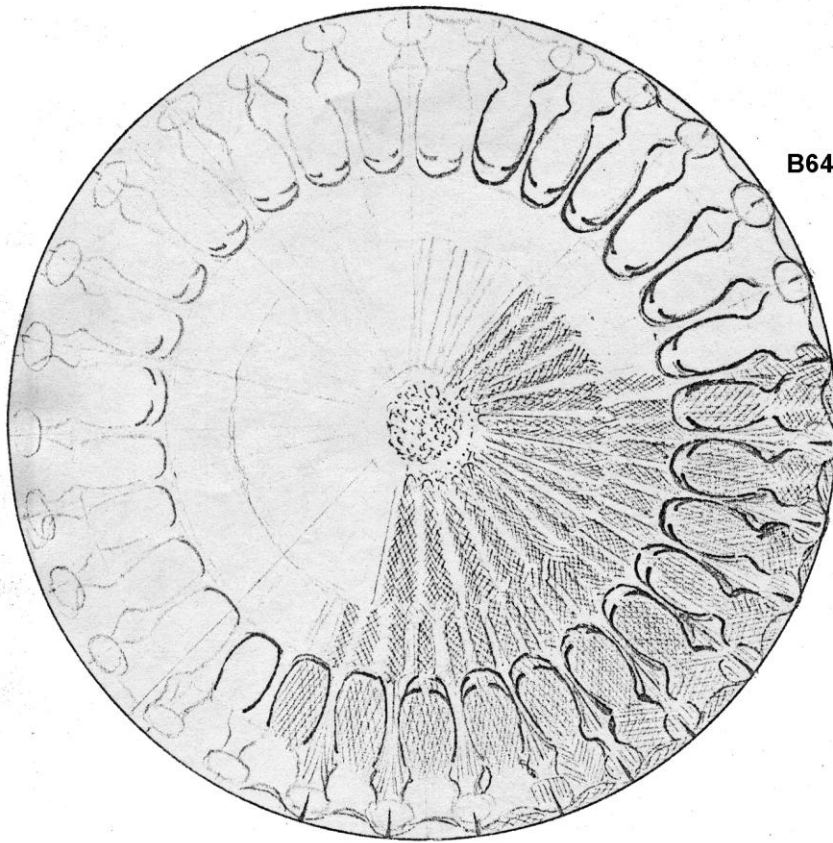
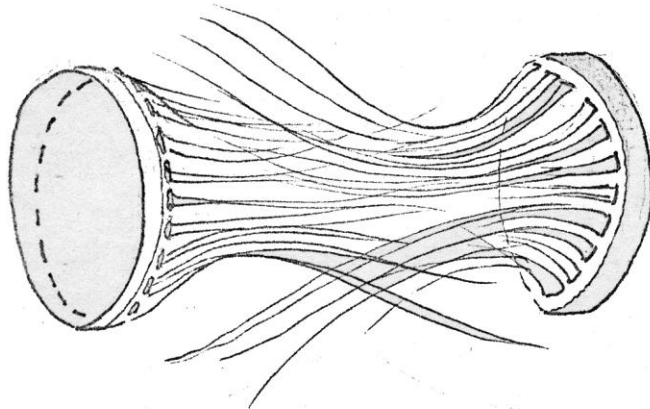


Plate 8s

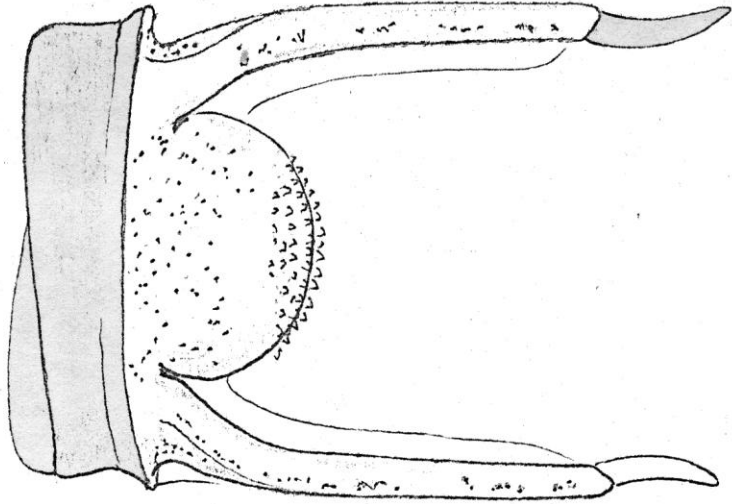


B645 Singiliewsky  
120 dia.



B6/Singiliewsky

**B639 Singiliewsky**  
**75 x 50**



**44 x 20**  
**Very fine puncta not in**  
**strict pattern - slightly radial**  
**?Ocelli very fine punctate**

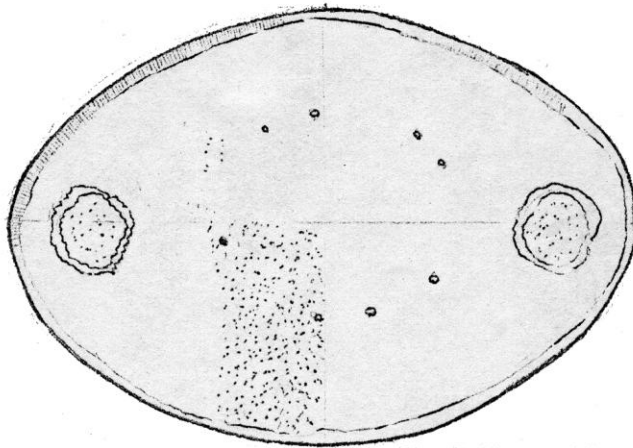
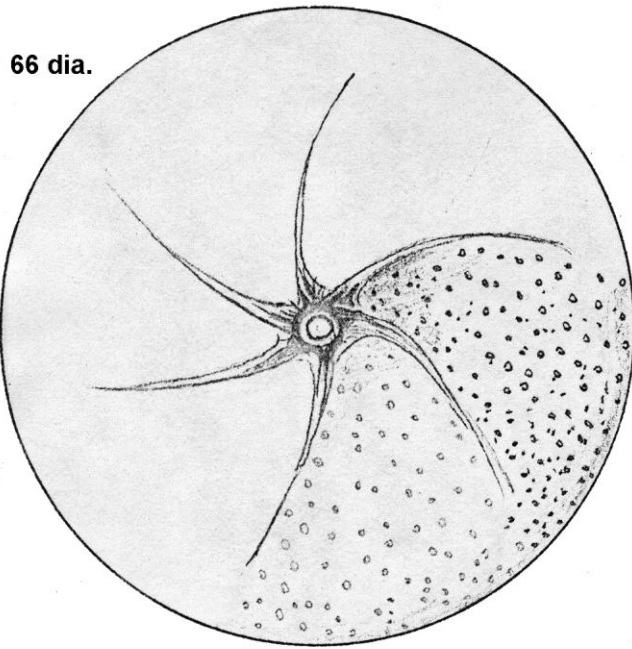
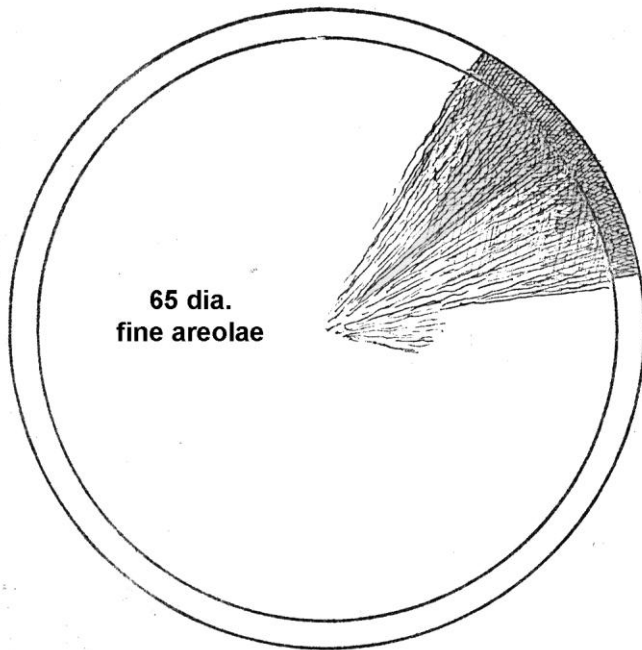
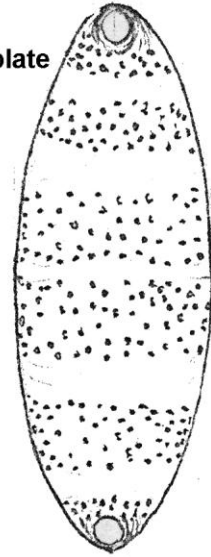


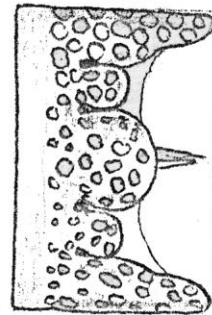
Plate 10s



57.20  
See earlier plate



30.45



35.26

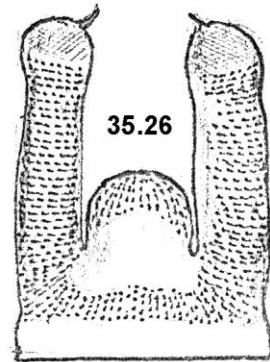
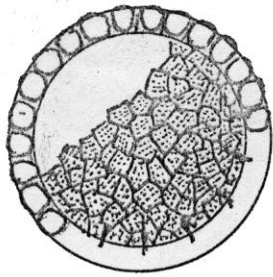
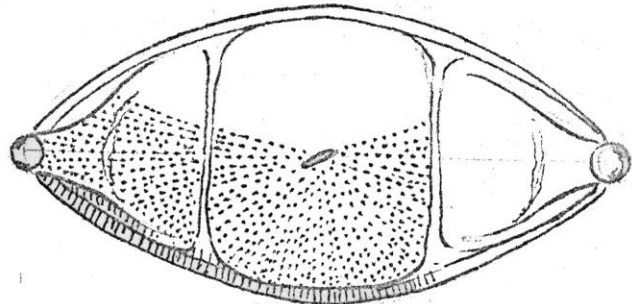


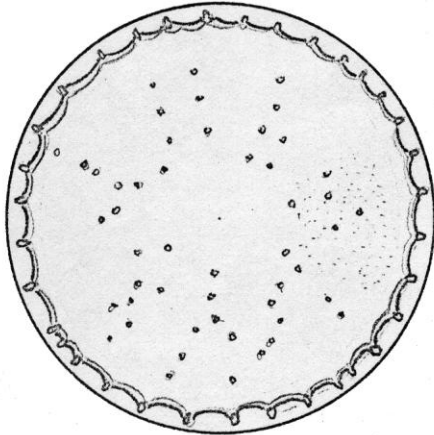
Plate 11s



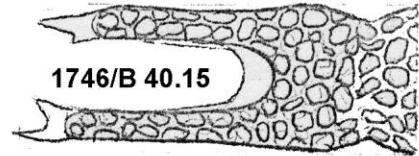
1746/B  
26 dia.



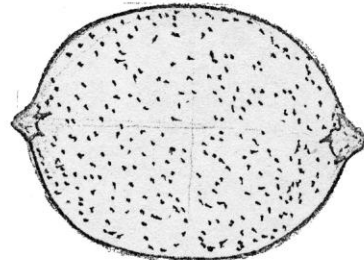
1746/B  
60.30



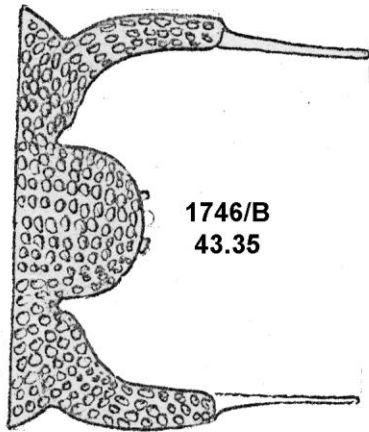
1746/B  
44 dia.



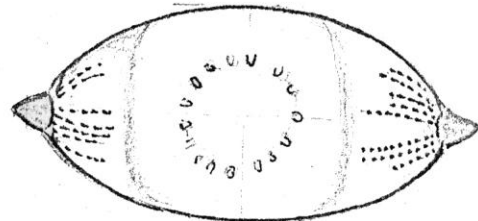
1746/B 40.15



1746/B  
36.26



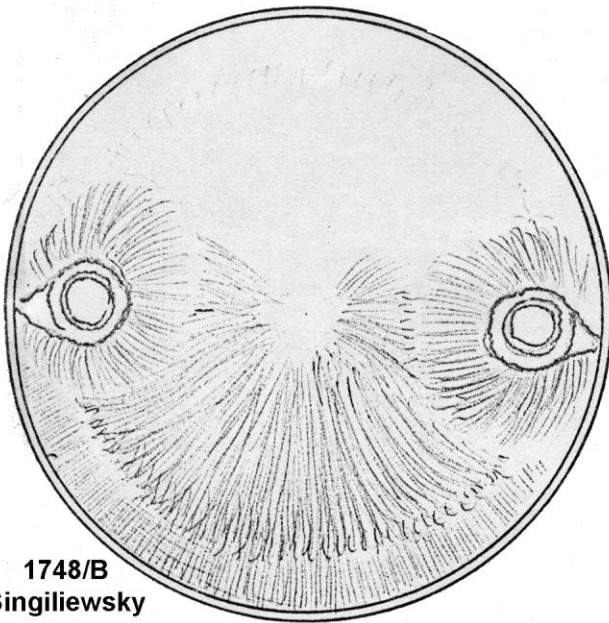
1746/B  
43.35



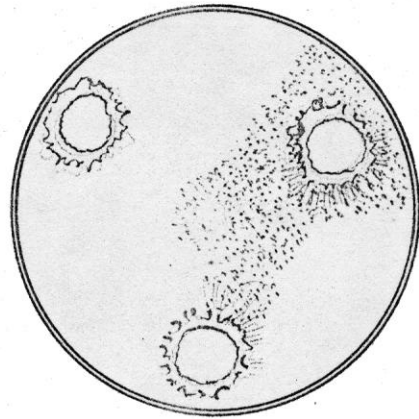
1746/B  
47.22



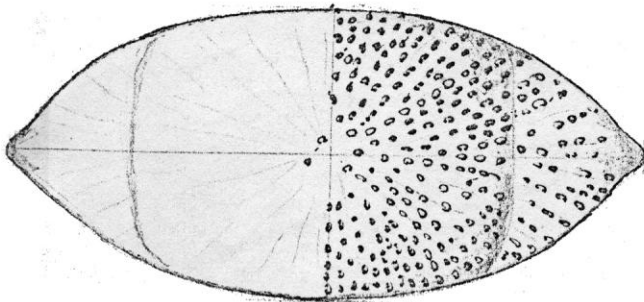
Plate 12s



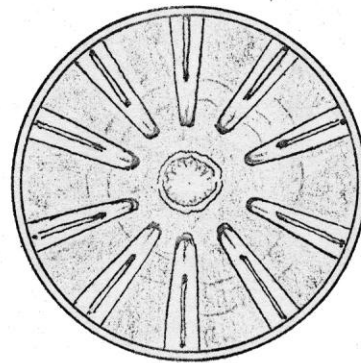
1748/B  
Singiliewsky  
63 dia.



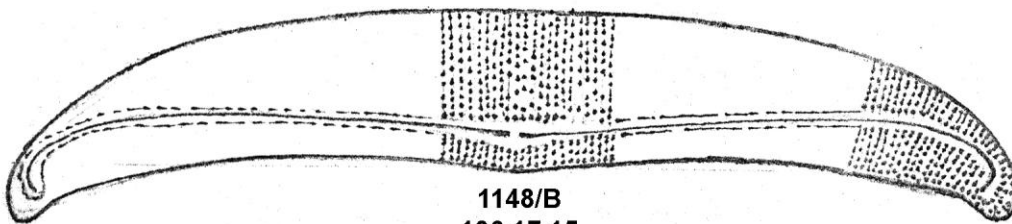
1748/B  
Singiliewsky  
42 dia.



1748/B  
66.20

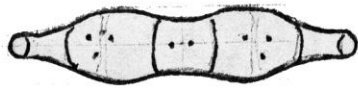


1748/B  
Singiliewsky  
36 dia.



1148/B  
103.17.15

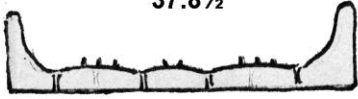
Plate 13s



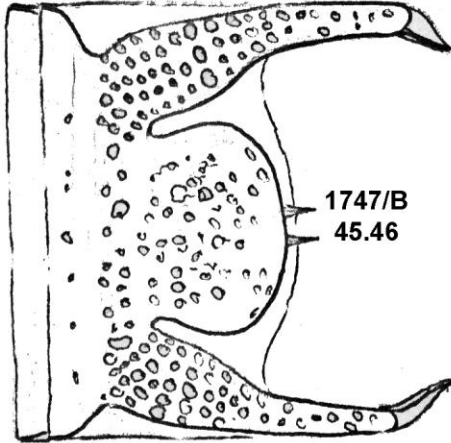
1747/B  
37.8½



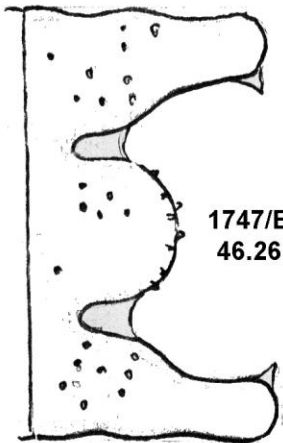
36.8



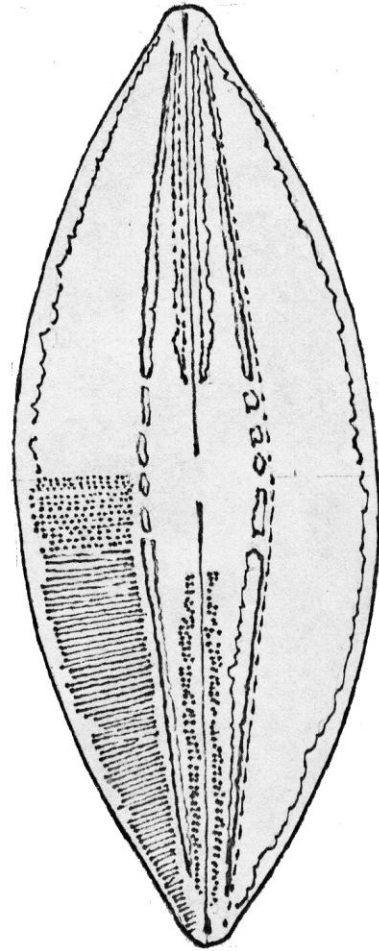
Girdle View - Conjectural



1747/B  
45.46

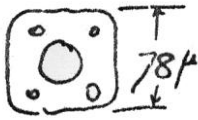



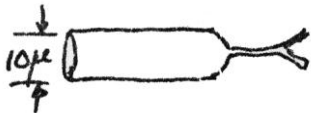
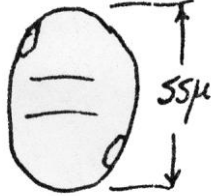
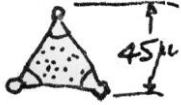
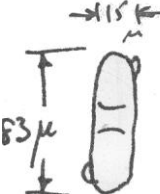
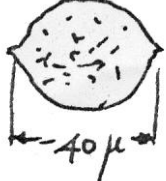
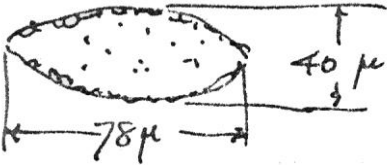


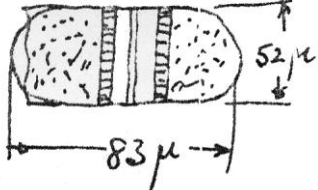

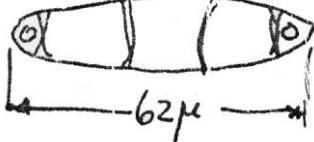
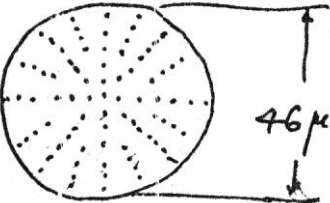
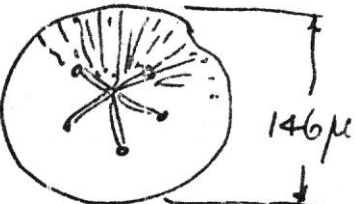

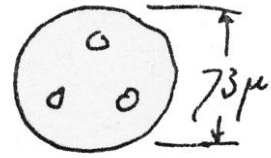
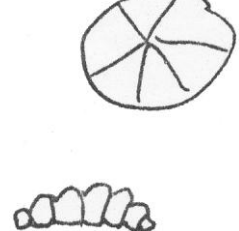
1747/B  
46.26

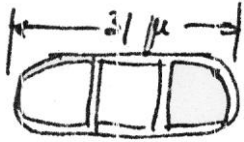

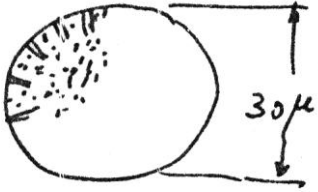
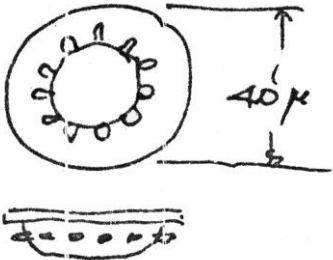



1748/B  
Singiliewsky  
100.38.18

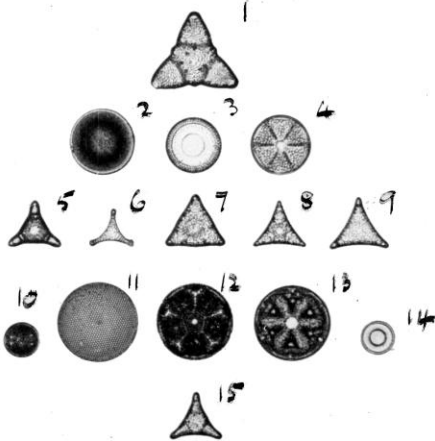
Sketches and dimensions of Forms not yet listed – Singelevo – by Bernard Hartley  
(Sent to Horace)

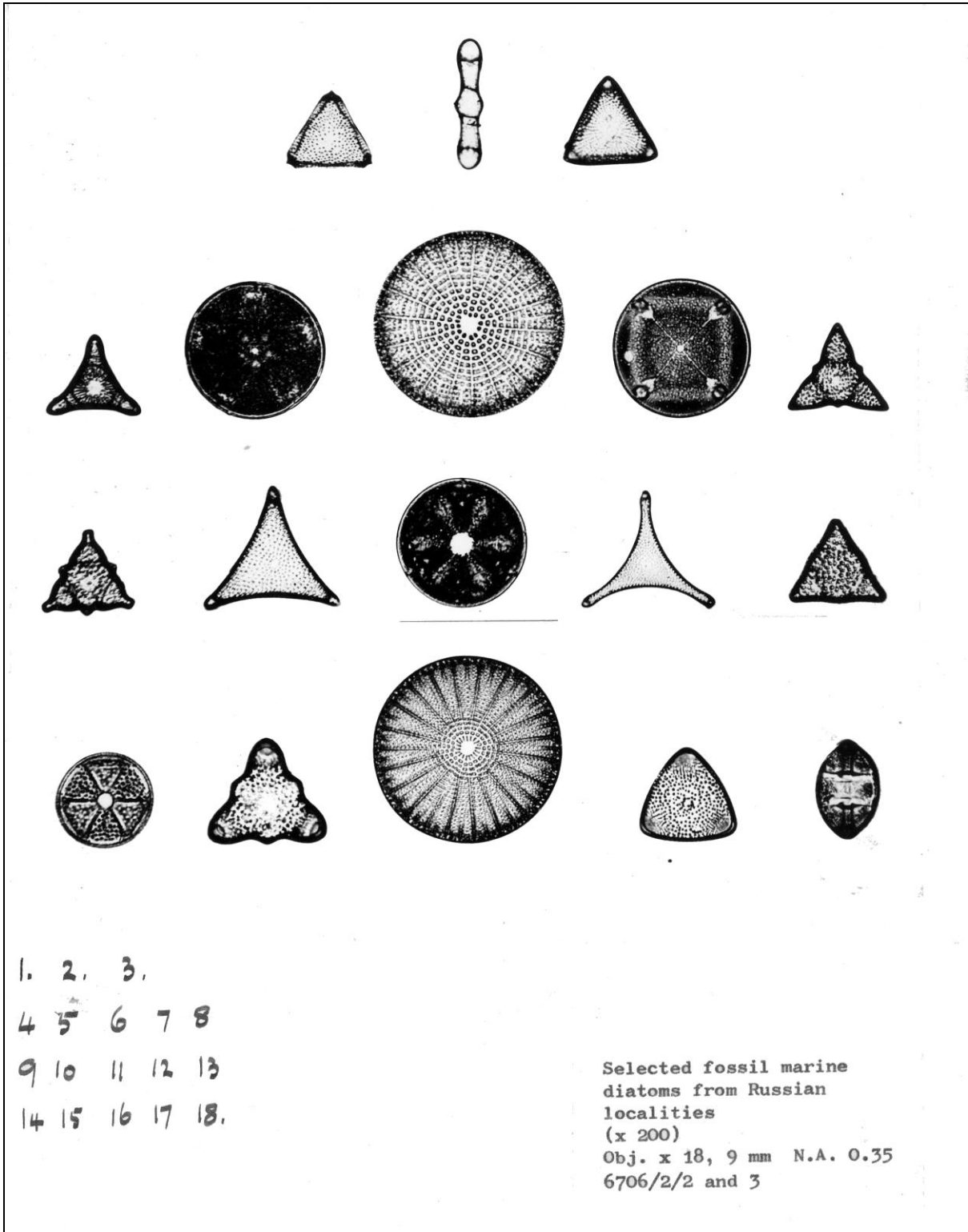
(1)		<p><i>Glyphodiscus stellatus</i>. This was rather a surprising find. One only.</p>
(2)		<p><i>Actinoptychus</i>, quite impossible to draw easily, but different from any on your slides.</p>
(3)		<p><i>Aulacodiscus</i>, 4 processes, coarse granular in sectors.</p>
(4)		<p><i>Stictodiscus nitidus</i></p>
(5)		<p>?</p>
(6)		<p><i>Auliscus</i>, but almost a <i>Huttonia</i>, could be considered a transitional stage!</p>
(7)		<p><i>Triceratium</i></p>
(8)		<p><i>Huttonia</i>, long thin one like <i>H. virgata</i> of Oamaru</p>
(9)		<p><i>Cotyledon</i> sp.!</p>
(10)		

(11)		Complete frustule?
(12)		<i>Triceratium</i> , something like <i>T. bullatum</i> of Oamaru
(13)		?
(14)		<i>Coscinodiscus</i> ?
(15)		<i>Aulacodiscus</i> with processes (5 off) about $\frac{2}{5}$ of radius in from rim.
(16)	Not illustrated	<i>Pyrgodiscus armatus</i> , a most amazing form. See Lefebure Atlas Pl.X. Fig.7.
(17)	Not illustrated	<i>Pantocsekia clevosa</i> See Lefebure Atlas Pl.II. Fig.6.
(18)		<i>Aulicus</i> ? Mostly hyaline, characteristic pointed surround to the bosses.
(19)		<i>Auliscus</i> , 3 eyed, practically hyaline all over.
(20)		<i>Actinoptychus</i> , very low relief and the sectors all look alike.
(21)	Not illustrated	<i>Eunotogramma variabile</i> O.W. Pl. VI. Figs. 3 & 4

(22)		?
(23)		?
(24)		<i>Coscinodiscus</i> ?
(25)		? mostly hyaline
(26)		?
(27)	Not illustrated	Small Lapi.

Two selected slides photographed by Bernard Hartley.

<ol style="list-style-type: none"> <li>1. Triceratium Archangelskianum</li> <li>2. Aulacodiscus simulans</li> <li>3. Melosira sulcata, var. siberica</li> <li>4. Actinoptychus seductilis</li> <li>5. Triceratium Weissei</li> <li>6. Trinacria excavata, var. Archangelskiana</li> <li>7. Triceratium flos</li> <li>8. Triceratium fenestratum</li> <li>9. Triceratium nobile</li> <li>10. Aulacodiscus probabilis (abnormal)</li> <li>11. Coscinodiscus lineatus</li> <li>12. Aulacodiscus Archangelskianus</li> <li>13. Actinoptychus heterostrophus</li> <li>14. Hyalodiscus subtilis var.</li> <li>15.</li> </ol>	
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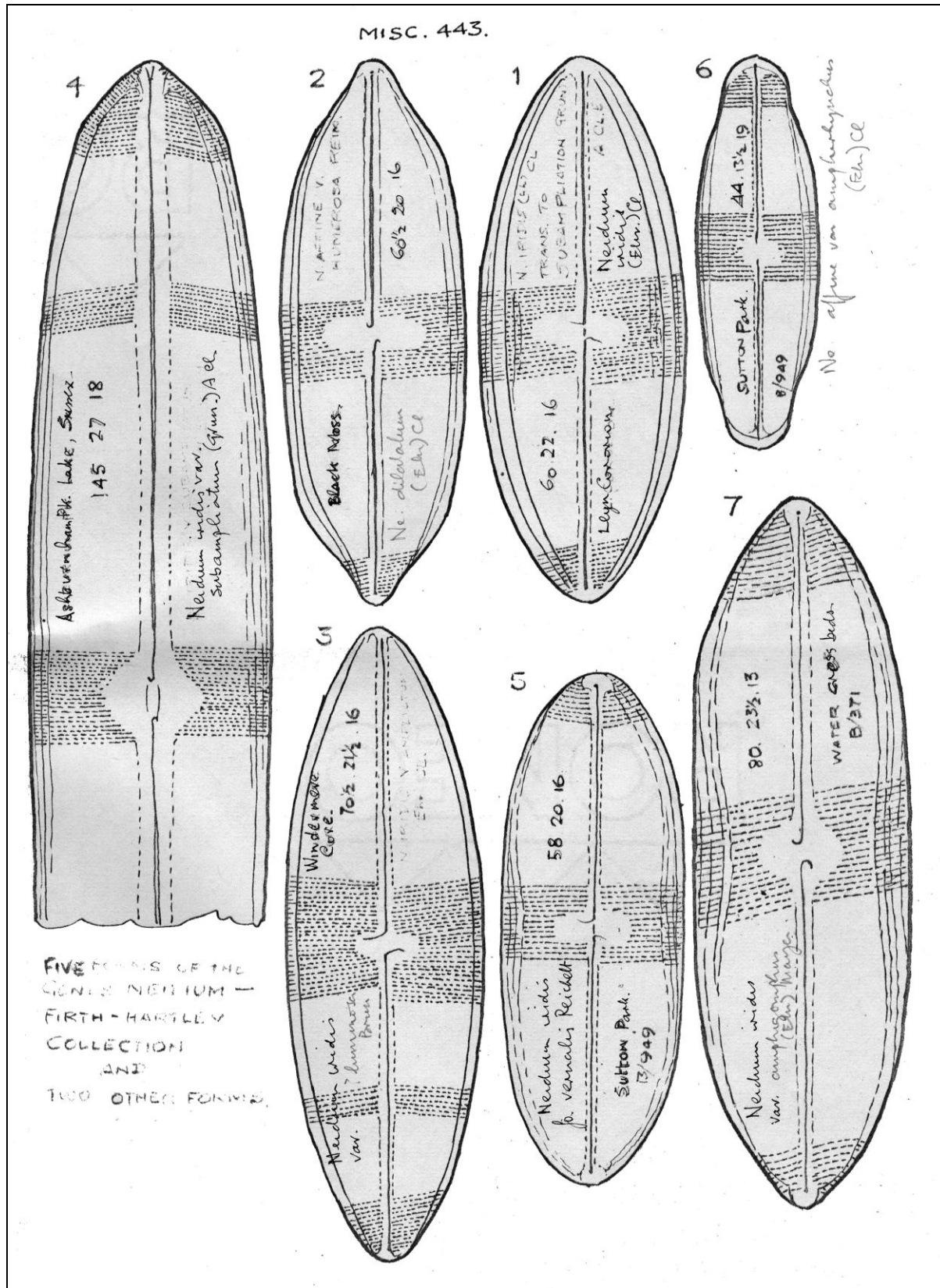


**Delineation of the Genus *Neidium* forms from the Firth-Hartley Collection  
and other slides  
August 1981**

**Plate Misc. 443**

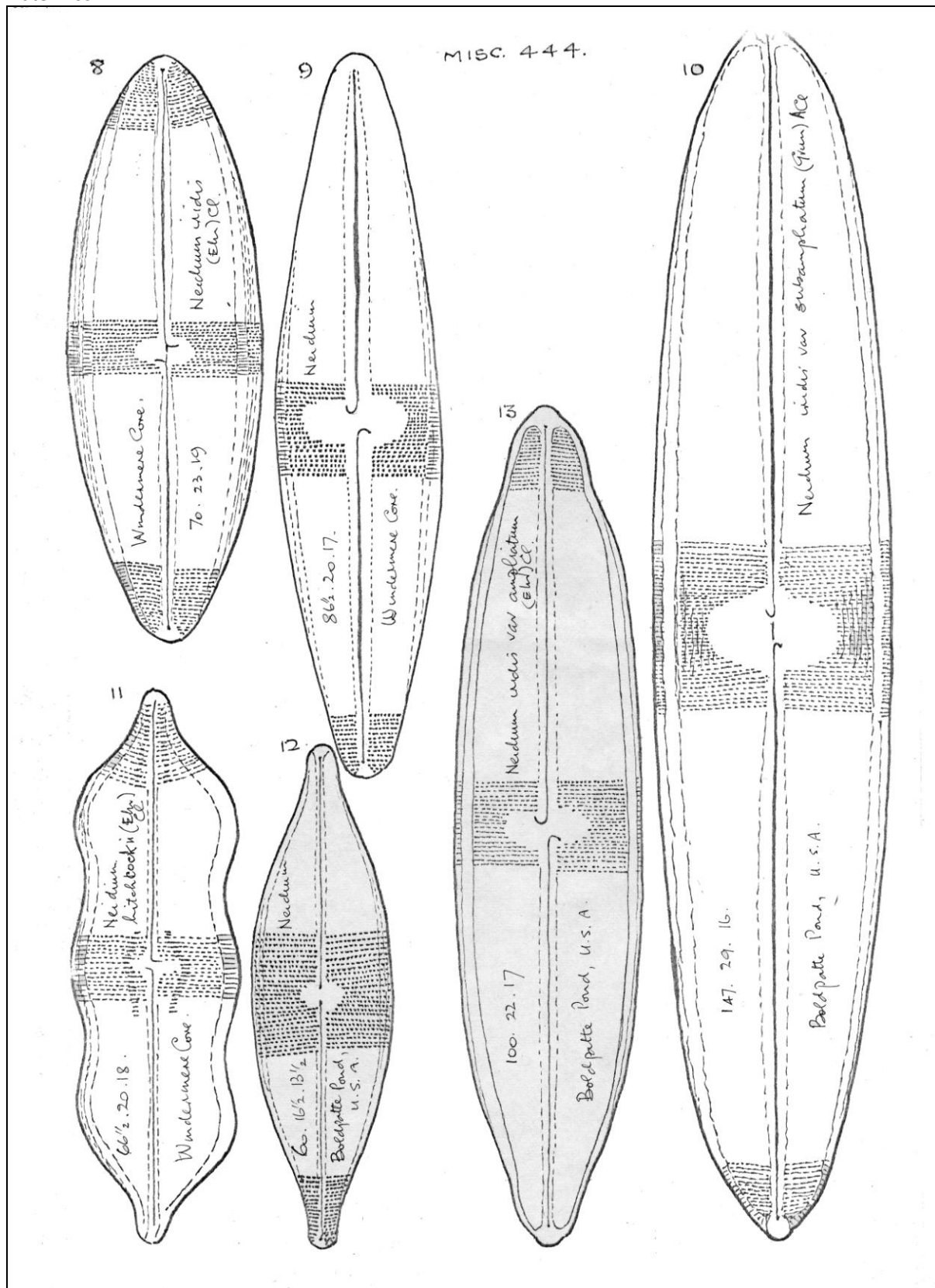
Figure/dimensions	Name (according to slide label)
1/60.22.16	<i>Neidium iridis</i>
	Transferred to <i>subampliatum</i> (Grun.) Cleve Site:- L. Cororion
2/60½.20.16	<i>Neidium affine</i> var. <i>humerosa</i> Reimer
	Site:- Black Moss
3/70½.21½.16	<i>Neidium iridis</i> var. <i>ampliatum</i> (Ehrenberg) Cl.
	Site:- Windermere Core
4/145.27.18	<i>Neidium iridis</i> var. <i>subampliatum</i> (Grun.) Cl.-Eu.
	Site:- Ashburton Park Lake
5/58.20.16	-
	Site:- Sutton Coldfield Park HGB Slide 949
6/44.13½.19	-
	I am unable to resolve the type of central terminals other than depicted. Site:- Sutton Coldfield Park
7/80.23½.13	-
	Site:- Water Cress Beds, Hartshill, Nuneaton, Warwickshire HGB Slide 371





**Plate Misc. 444**

<b>Figure/dimensions</b>	<b>Name (according to slide label)</b>
<b>8/70.23.19</b>	-
	Site:- Windermere Core HGB Slide 2305
<b>9/86½.20.17</b>	-
	Site:- Windermere Core HGB Slide 2305
<b>10/147.29.16</b>	-
	Site:- Boldplatte RIF Slide
<b>11/66½.20.18</b>	<i>Neidum hitchcockii</i> (Ehrenberg) Cl.
	Site:- Windermere Core HGB Slide 2305
<b>12/60.16½.13½</b>	-
	I am unable to resolve the type of central terminals other than depicted. Site:- Boldplatte RIF Slide
<b>13/100.22.17</b>	-
	Site:- Boldplatte RIF Slide



**Plate Misc. 445**

Figure/dimensions	Name (according to slide label)
14/142.36.15	<i>Neidium iridis</i> var. <i>subampliatum</i> (Grun.) Cl.
	Site:- Toombe Bridge RIF Slide
15/113½.26½.13½	<i>Neidium iridis</i>
	Site:- L. Cororion RIF Slide
16/106.23½.15	<i>Neidium iridis</i> var. <i>ampliatum</i> (Ehrenberg) Cl.
	Site:- Burton Pond RIF Slide
17/72.22.15	<i>Neidium iridis</i> var. <i>ampliatum</i> (Ehrenberg) Cl.
	Site:- Black Moss RIF Slide

**Criticism of sketches:-**

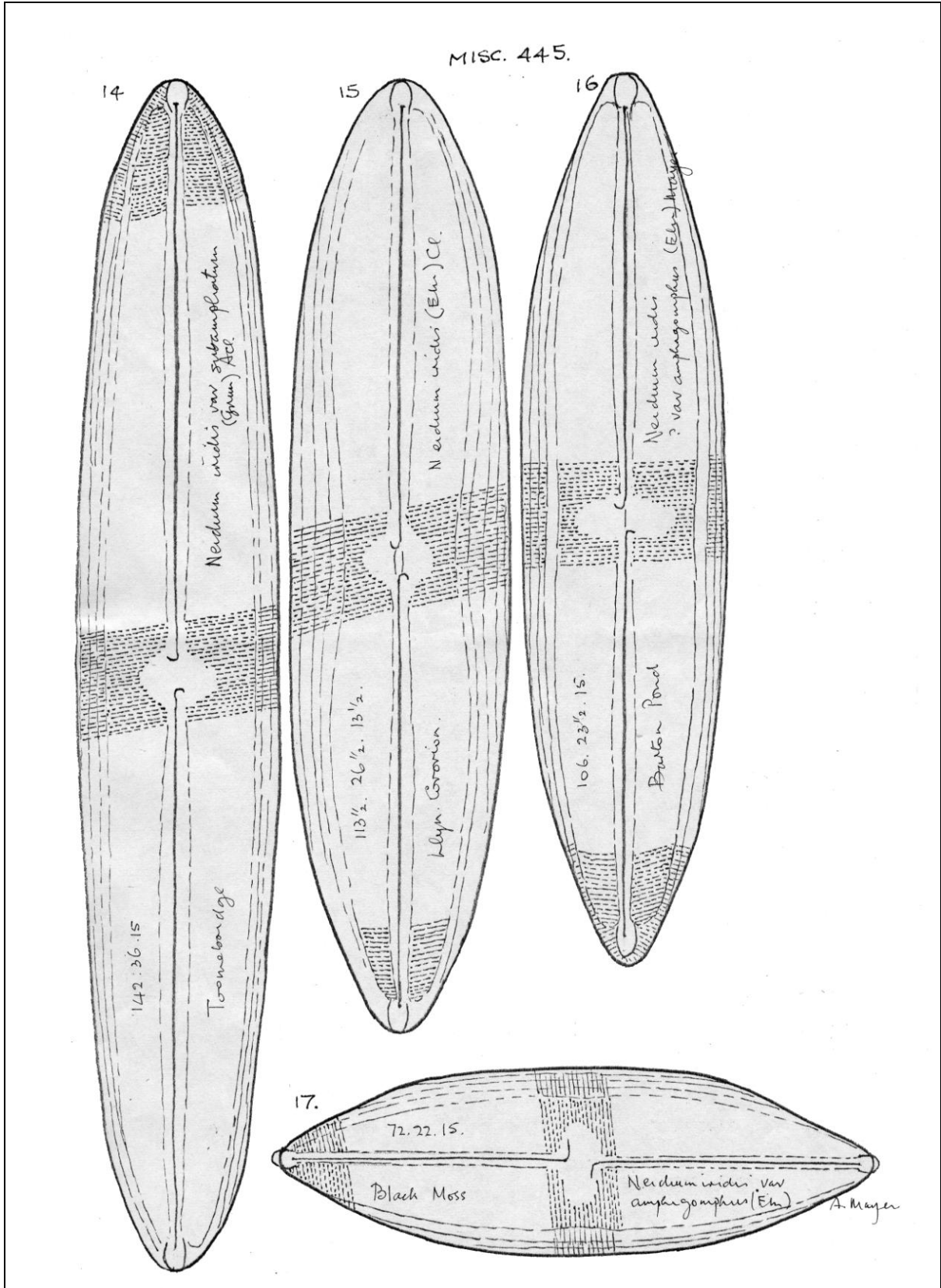
Outlines are fairly accurate to the form depicted, as are also striae directions, central terminal hooks, axial and central areas. With regard to the peripheral 'långsbands' these are more or less an impression.

The weak points are punctae often dashes and should be round, striae not to scale, polar terminals not depicted, unable to resolve these so have not guessed. It would appear the ends of the valve are as a raised boss and difficult to portray. On some of the slides are a number of forms but have only depicted certain ones which I think are typical.

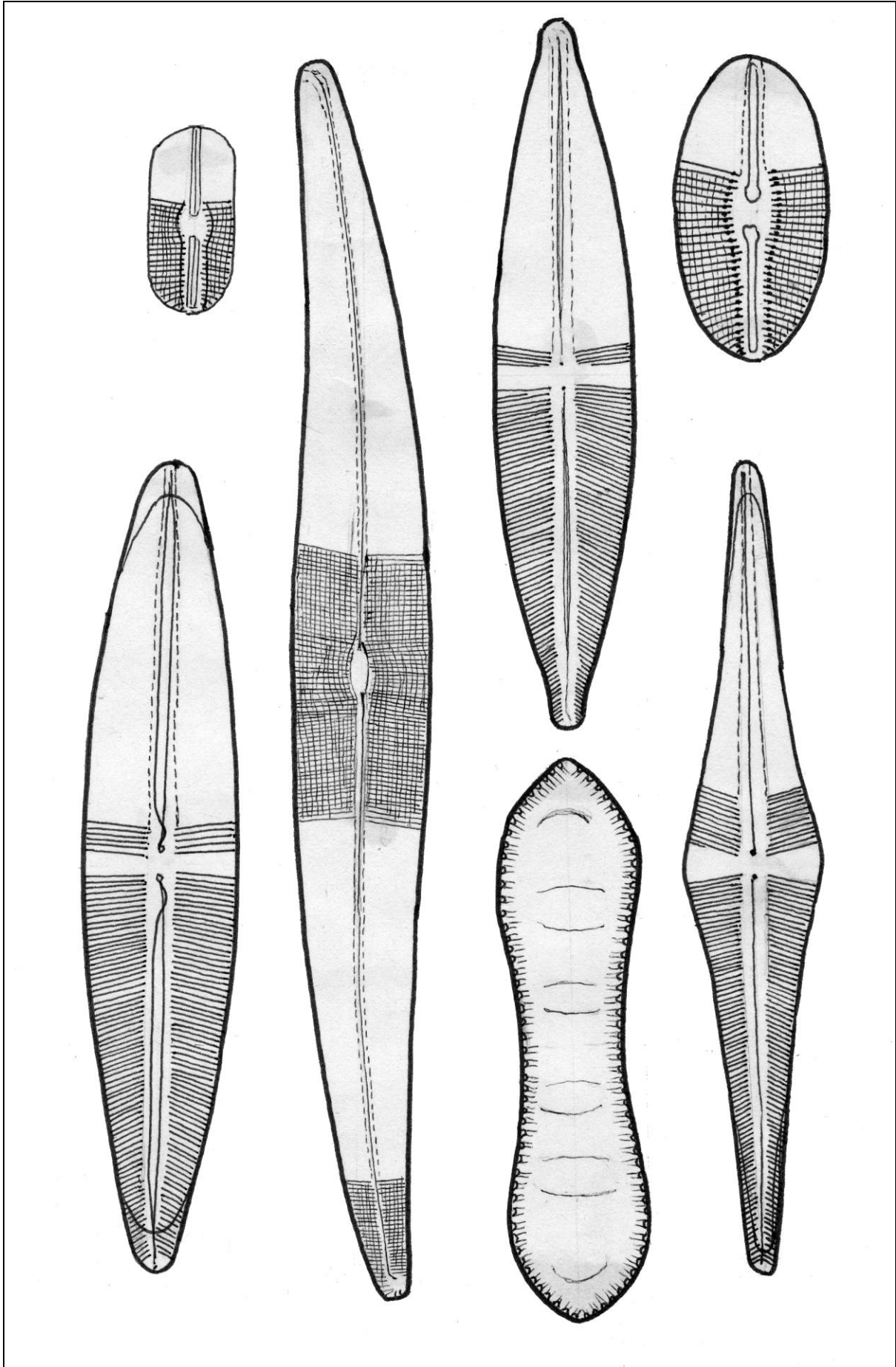
I admit to uncertainty regarding the variety status of *ampliatum* and *subampliatum* and would like to know the specific points determining same. What bearing on identity do the hooks or otherwise have? To my mind *N. iridis* is a polymorphic diatom and its variations have too many names by various authors.

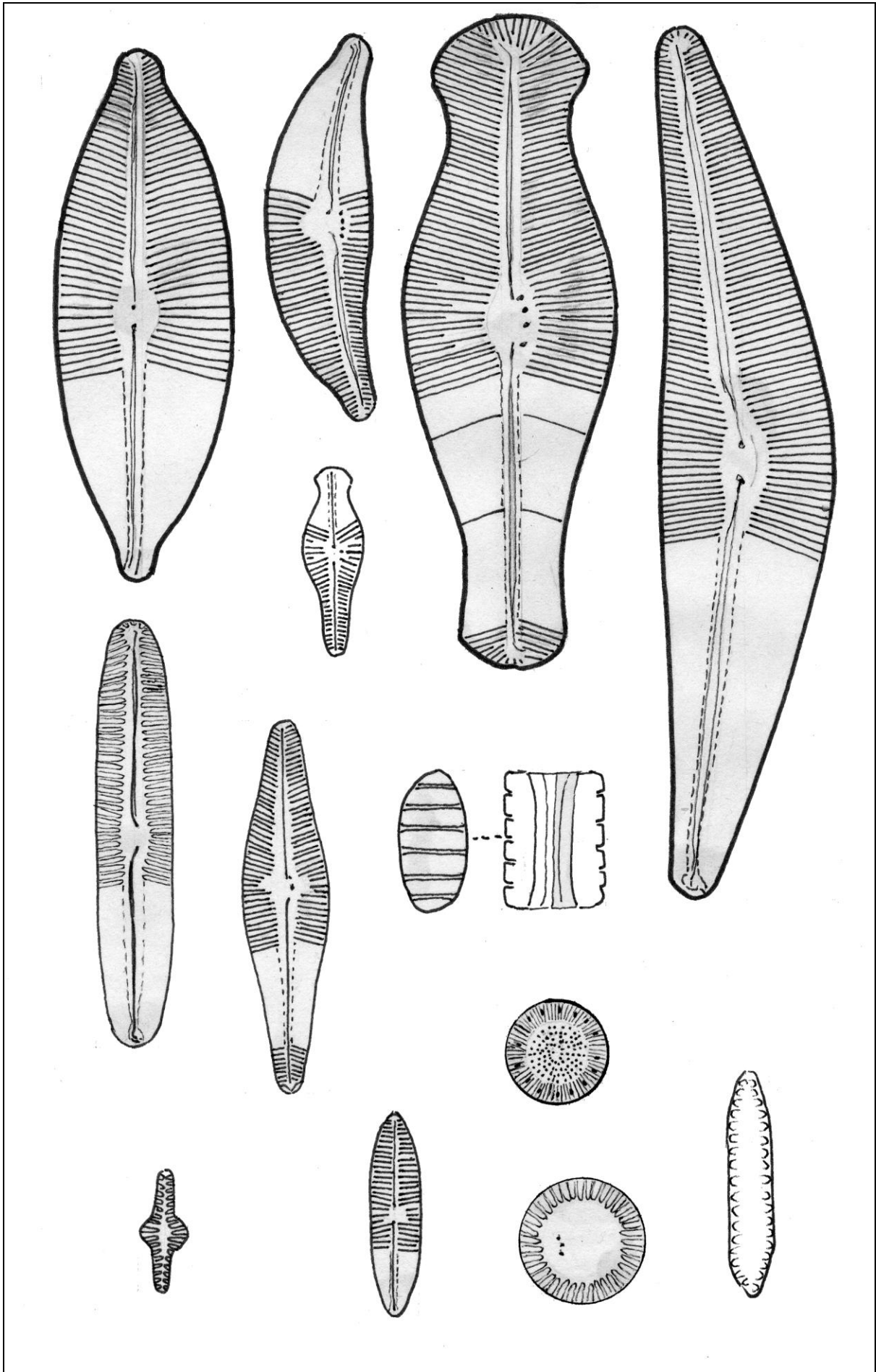
H.G.B.

8/81



**Two plates, un-numbered and un-titled.**







Horace George Barber first had the idea of a fully illustrated volume on The Diatomaceae of the British Isles. He worked up his drawings into 200+ plates and identifications.

Following Horace's death this mammoth undertaking was taken up by Bernard Hartley as arranger of the illustrations, also responsible in large part for identification confirmation in conjunction with diatomists of the day. John Carter as well as assisting in the identification and classification supplemented the work with drawings of his own. Eventually the whole was edited by Pat Sims of the British Museum and printed by Biopress Ltd in 1996 as "An Atlas of British Diatoms".

The following three 'sections' comprise alternative 'Introductions' to Horace's original work written by him to be included in the work, none of which were used in the publication above.

## **Diatomaceae of the British Isles**

### **General Notes and Comments**

#### **H.G. Barber**

This work was commenced on my retirement in the autumn of 1968 and really as a result of discussion with my long-standing colleague J. J. Carter, for it was felt there was no comprehensive illustrated account of the British Isles Flora, other than one or two compiled many years ago, and lists compiled by various diatomists. It was my wish to illustrate the whole flora from fresh to marine sites as there could be no hard and fast dividing lines between such sites, consequently JRC promised help at least with the freshwater flora; marine etc., not being in his field, this he has done to a most valuable degree. Of later years, colleague Bernard Hartley has shared invaluable criticism to the various illustrations.

I suppose I have a modest library on the subject but nowhere as comprehensive as I would like, but with the resources of the two gentlemen concerned then the field of possible reference is much wider.

A very extensive library is all very well but even this can give rise to shortcomings such as short-comings of illustrations, personal interpretation concerning various forms, reliance on then and other workers identifications etc., etc., so much so that when one does get the opportunity on rare occasions it is more surprising to see the original or type form.

Many of the forms I have illustrated, I am embarrassed to admit, I've refrained from naming for a number of reasons. Where I am not sure or unable to trace in literature a reasonably identical form or again due to the taxons variable presentations and my lack of knowledge of such variations, consequently I have, wherever such variations are present simply recorded them as "sp."

The illustrations are to the best of my ability, allowed by my optics and what I cannot see, then I have not sketched. Often these features have been such as raphe polar terminals and structure of a secondary nature. With the exception of one or two sketched from S.E.M photographs all are from existing specimens, none from other peoples work, for this I consider would defeat my objective.

The outlines of forms shown are good and can be relied upon. The delineation of striae are often, not meant to be an accurate feature but a better guidance can be obtained from the quoted rates, for to try and depict high striae rates in black ink destroys the 'look' of a form.

When all is said and done diatoms are transparent silica objects not black images!

The failure to complete the whole of the striae or punctae etc. is purposeful, to save time, eyestrain and to provide an area for key figures necessary when building up plates from the 'Miscellaneous sheets'.

Up to about 1975 I used quarto size plates and paper and had at that time about nineteen volumes of sketches and detailed notes. I then decided to adopt the present format and make separate the volumes of relevant notes. Since then I have had to include "A", "B", "C" etc. plates because one cannot visualise what is to be recorded in the future. Of course this has resulted in some plates bearing two or more genera. It would, of course, be nice to revise the whole work but a really formidable job! – and providing I knew all the 'answers'.

In order to trace specimens sketched – refer to 5 volumes of notes which will give Plate No., Fig. No. of specimen (book no.), appropriate slide will be found in slide boxes. A few specimens have been marked with ink spots. Tubes of material are marked with a gathering or cleaning No. (also shown on slides).

See book of Records of Slides. Many slides have been sent to me, some of which had to be returned, of these I have no material, There are also many slides made by calcining and no material kept for cleaning (regrets). With this method one does have the whole of the flora in a gathering. I think that many of my early slides were overcleaned and no doubt many of the smaller forms lost in the washing process. For quite a while I had difficulty in obtaining the necessary acids etc. – the sale of which had political undertones. It was difficult to make Sales Assistants realise what the cleaning entailed and nothing to do with making bombs!

## **Notes and Thoughts concerning an attempt to Record Pictorially the Diatom**

### **Flora of the British Isles.**

#### **Commenced October 1968.**

As a result of depicting the floras of many areas of the British Isles I decided to attempt The British Isles as a whole, covering fresh, brackish and littoral marine sites.

The drawings are done to the same scale except on those occasions when very small forms are at double scale (x2) and very large ones at half scale (x½) generally connected by a dotted line. Where each valve differs in a frustule these are also likewise connected, often by a double dotted line. Along with the name of the form I have recorded the length, breadth and striae rates. Measurements are made by an eyepiece with an incorporated graticule marked 1-100. Apart from the main dimensions, note is made of the varying widths and features, such as axial areas, undulations, central areas, widths between central raphe terminals, curvature of outlines, raphes etc. Also the particular striae arrangement of central areas, degree of radiation etc., all of which contribute to a reasonable picture of the diatom concerned. A consequence of this practice is that I am able to check the various forms seen subsequently, otherwise all recordings would be a waste of effort and time!

At the outset of the work I had intended keeping each genus or sub-genus to separate plates but it was not possible to envisage how far the sections would extend. As a result, as time has passed, overlapping has occurred. This I regret but to rearrange would be out of the question.

There are items where I have not been able to record striae rates due to fineness or the optical inability to resolve. In such cases this is shewn as "x" or an estimate "c" [meaning *circa*].

One weakness of the illustrations is depicting accurately to the scale – striae rates per 10µ. It is advisable to rely more on the quoted rate.

During the 40 odd years I've been engaged in the study I realise how variable diatoms are, no doubt due to many habitat and environmental factors too numerous to mention. Consequent on these factors the type form is but one facet a species may take and consideration should be made of what I call a species cycle.

An examination of some of the taxa I have copiously depicted will prove the point. Regrettably many such forms have been designated to a status higher than I would accept and given names which only adds to the chaotic state of nomenclature.

In naming some of the forms I have recorded it has not been possible to state other than at generic level. This is due to a number of factors – lack of a very extensive collection of literature and also the paucity of literature concerning these islands. I know there are many who have published in the past, often incomplete or just lists of species. Further, how accurate is the information contained therein. To take an isolated taxon, compare the views and determinations of various workers, one gets a most surprising set of results. I have done exactly this in a number of cases and the results have to be seen to be believed.

Many of the forms depicted are from brackish or littoral marine sites and apart from the works of Norman Ingram Hendey the Isles are very poorly served. Peragallo's work is helpful but does not cover the shores of these isles.

I feel very strongly that more attention should be paid to the flora of these islands for I am convinced there is a field of opportunity here.

The flora drawings are contained in four volumes (a fifth volume is the flora of the Isle of Bryher, Scilly Isles). Accompanying the four volumes above are five volumes of rough notes, correlated by plate number and figure. It has been practice for me to send a Xerox copy of what are known as "Misc. Sheets" to my two friends John Carter and Bernard Hartley for their comments and criticisms of my identifications – "Three heads are better than one". On return of the said notes the original drawings are filed in the flora of cut notes in the appropriate position of the notes section. It can be noted that cases occur where the name of a taxon in the 'flora' does not agree with that in the 'notes', for I have on occasion been able to later determine more accurately a species, lazily altering the 'flora' only.

Generally speaking I have refrained from naming a form until I am reasonably sure. I console myself that the Canon Adolph Schmidt often did this.

There are occasions when, in light of longer experience, I have checked certain sketches with the slides and found the sketch to be quite reasonable but the identification is faulty!

Note: In order to trace specimens in the Flora proceed as follows:-

1. Take note of Flora plate and figure number
2. Refer to rough cut notes in separate volumes
3. The notes contain the site and slide numbers. Slides with my red numbers are contained in the slide boxes. Slides with any other numbers such as xxx/H is a B. Hartley number, xxx/CC is a J.R. Carter number. I have generally made a record of other peoples numbers in The Record of Slides folder.
4. On many of my early slides are two numbers. Red – Slide No. and Black – Cleaning (CLG) number. The cleaning number will be found on the tops of the cork – later I used a 4 figure identification which is the same as the slide or slide red numbers.

Acknowledgements.

During the compilation of this work I am very mindful of various forms of assistance freely given by diatom friend and correspondence.

John Ridley Carter of Denholm for many years of close co-operation in the study of British Freshwater forms and innumerable slides and gatherings made by him.

Norman Ingram Hendey of St. Agnes, Cornwall for valuable help on the Brackish and Littoral Marine forms.

Bernard Hartley of Stourbridge (now of Yeovil) for valuable criticism and slides.

There are many who from time to time have collected and sent slides:

Mr. F. Oldaker, optician – Nuneaton

Dr. E.Y. Haworth of F.B.A, Ambleside

Col. W.D. Fleming of Denver, Colorado

Miss P. Sims – British Museum

Mr. G. Greenfield  
R.I. Firth – Lewes  
B.C. Howarth – formerly Orkneys  
A. W. Round (Tony) – Ewell



## General Notes concerning the attempt at depicting the Diatom Flora of the British Isles

All drawings are as viewed by 1/16" Oil immersion 1500X, but there are certain exceptions where large or very long forms are reduced to half size and noted by "x½". Very small forms are often drawn to general scale size and then in detail at approximately 3000x.

Particular care has been paid to the varying dimensions of forms, such as measuring width of capitate and rostrate ends, widths of central areas etc., distances between central raphe ends. Degree of curvature in such forms as found in *Pleurosigma*, *Eunotia*, *Nitzschia*, etc, so that once a form is sketched, I can rely on my previous sketch to check. Length and breadth dimensions are reasonably accurate for the particular form depicted but I would admit to the difficulty in measuring stria rates above about 25 per 10µ in various literatures. Where I have been unable to resolve the stria, then I have marked the statistics with an 'x'.

Although many of the species have a number of sketches, I've tried to cover all the variations particularly size and outline, etc. I have often depicted forms from varying habitats due to 'habitat variation'.

I have attempted to keep each genus separate and subsections to a degree, but I find many forms difficult to designate. Faced with placing forms in correct sub-generic sections I have often, for my convenience, kept 'like' outline forms together as it facilitates reference when checking as to whether I've already met and sketched previously.

I have not knowingly included any auxospores, post-auxospores or deformities (although, of course, I've seen many!).

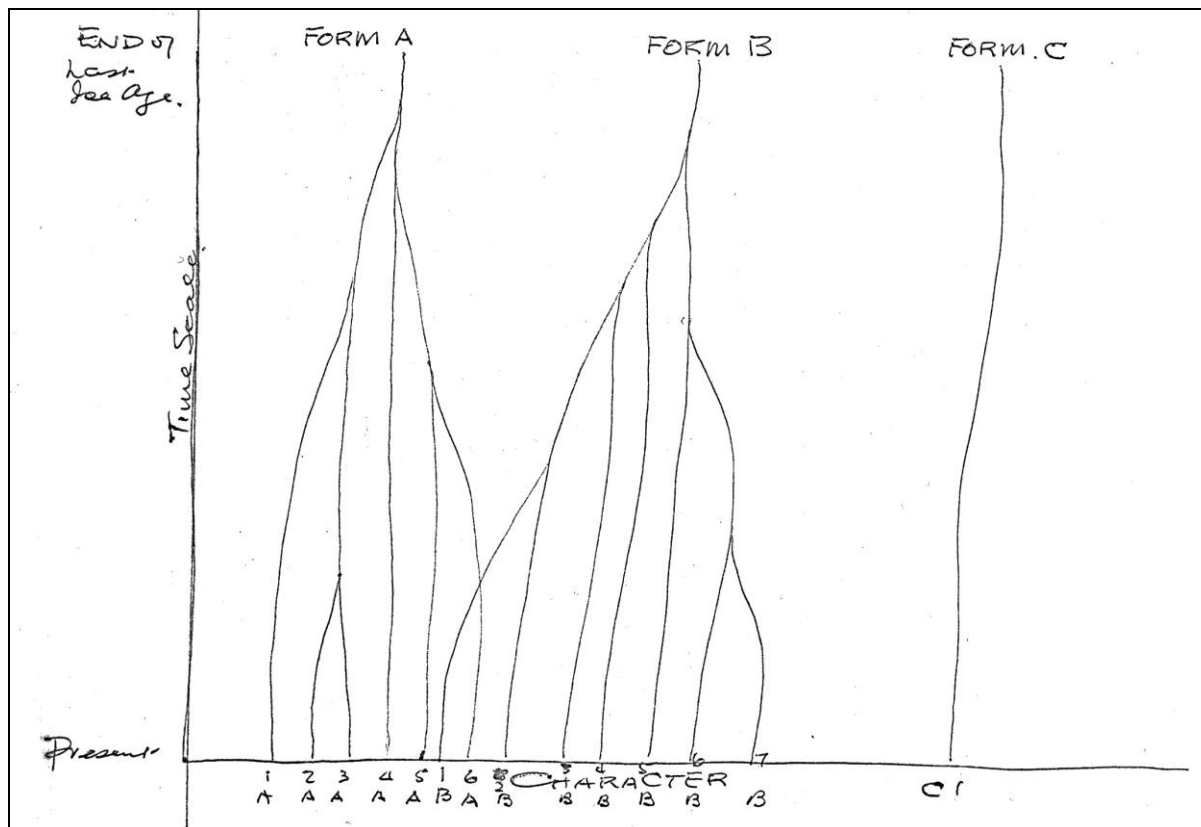
Particularly with the brackish flora I find considerable variation of sizes and stria rates to those quoted in literature and I am sure this is due primarily to the paucity of work done and subsequent literature.

I am aware many of the forms are named to generic status only and have purposely refrained from quoting specific status until such times I am confident and possibly seen a fuller range of forms. There will, no doubt, be occasions where my diagnosis is questionable.

Throughout the notes concerning the various forms I have often made comment on quite small features, particularly closely related forms which would seem to be contrary to my general views of what constitutes a species or species cycle. I have deliberately done this so as not to miss any feature which may facilitate identification at a later date.

## Some thoughts on Parallel or Divergent Evolution

It seems quite feasibly to me that forms may have evolved between the last ice-age and the present, both away from the original colonisers or/and towards other original species. Possibly this idea may be visualised better from a diagram.



Instead of the 3 taxa I could substitute 3 known diatoms.

Form A = *Pinnularia major*

Form B = *Pinnularia viridis*

Form C = *Pinnularia acrospheria*

Form C1 is still the same at whatever point in time specimens were taken. It has remained very constant.

Form B throughout time has by nowadays developed and become fixed(?) many different characters from the original race or form.

Form A – The same state of affairs could have taken place with this originally differing taxon which have by nowadays become very similar to B even to the extent of overlapping.

The whole state of affairs could be limited to one character or more.

As previously stated, I am only too well aware the factors of habitat, which are many, influence the growth of diatoms. One has only to reflect a little on such influences on the macro-flora to realise such a state could apply to the micro-flora.

A further point in the study of diatoms which I have noted over the years. With some species we allow very great latitude of 'specific' characters but in others stick hard to quoted features. To me, this appears an unsatisfactory state of affairs. For instance *Nitzschia amphoxys* can vary widely in many factors and the forms are all dubbed *N. amphioxys*, and this is not the only case. However, if we take *N. linearis* or *N. palea* then extremely little latitude is allowed. Is this consistent? Do we vary the 'rules' to suit ourselves in many cases?

## Thoughts on the General Study of Diatoms November 1970

I am painfully aware of the difficulties in trying to identify various forms from literature, particularly where the literature and figures are 100 or so years old. Many of the small form (the majority of British FW and BW) were ill delineated or due to low refractive mountants could not be distinctly seen. New species formed on isolated valves and no consideration given to the shape range present in the orbit the plant could assume.

I can think of and if needs be, quote or illustrate, many cases where n.sps have been unnecessarily made possibly due to-

1. Sparsity of material
2. Failure to critically examine the form range of more than the original habitat
3. The desire to winkle out new species for self agradisement
4. Absence or lack of literature
5. Failure to appreciate the part different habitat makes
6. And a few others

I have recently been concerned with the form *Surirella fastuosa* – group, yes – a hell of a group and dozens of named varieties and forms. I have one or two good gatherings of this litoral marine diatom and can honestly say, hardly any two forms are alike! So where do we go? The original author of *S. fastuosa* possibly (?) named it on one form. The Peragallo brothers gave a much broader field to *S. fastuosa*, presumably from the Mediteranean and English Channel, but I have a great difficulty in identifying the forms I find with those they illustrate (the same applies to *Diploneis*).

What is the answer? Either resonable 'specie form cycles' or a few hundred n.sps. or vars. etc.

I am nowadays fairly confident that this variation of diatoms must take place in many species, the difficulty is not having a strong factor to keep ones eye on so as to be able to trace thro the whole of the 'form cycle'.

As to whether my views are "splitter or lumpner" I would not like to state but the more I see diatoms the more I realise too many species and varieties have been unnecessarily made and are being made. Again, however, I realise there are very close forms which are really different and should not have been made varieties etc. of existing 'somewhat similar' forms.

H. E. Sovereign was a strong believer in what he called 'Habitat Races' and I could not agree more! N. I. Hendey uses the term 'Environmental Shock' which is a habitat feature and I am sure here there is a lot of what one could call 'improved truth'. I feel very stringly that diatoms are like John (Carter) says of oak leaves – "No two are alike, yet they are all oak leaves". This simile can be likened to my strawberries and John's, his blackberries and mine! There is no comparison, yet both are the same plants. The strawberries are in their seventh heaven at John's but mine – well, pathetic! Where with blackberries the shoe is on the other foot.

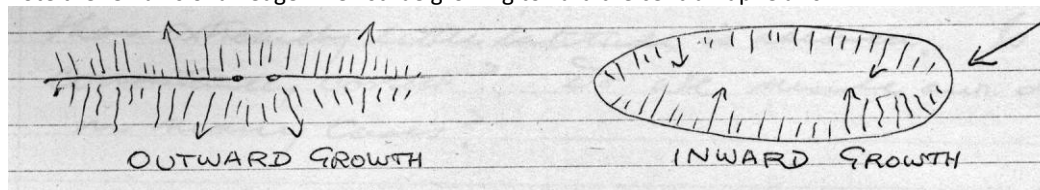
The pattern arrangement of many forms often varies. To me the important factor is long and shorts and number of striae around the central area, or that constitute the central group of striae. For instance *viridula* (type) has, say, 8-10 each side. If a form had just 2-3 then it could not be *viridula*.

I am a little bit dubious too of curvature of central striae, as in all cases being a specific feature, for I do notice generally the more a lanceolate form departs from the lanceolate shape to linear then the striae stray also (this open to criticism).

It would be of interest too, to know how a diatom pattern of striae grows, if from the raphe to the edge or vice versa, when being formed. I think it is from the raphe outward towards the edge and not the other way – edge to raphe. I am lead to this conclusion by noting deformities, for when the raphe system is deformed or disturbed then the striae arrangement is always deformed.

There are cases, however, where ther are no visible signs of deformity to the raphe and stria are deranged but I cannot comment as to why.

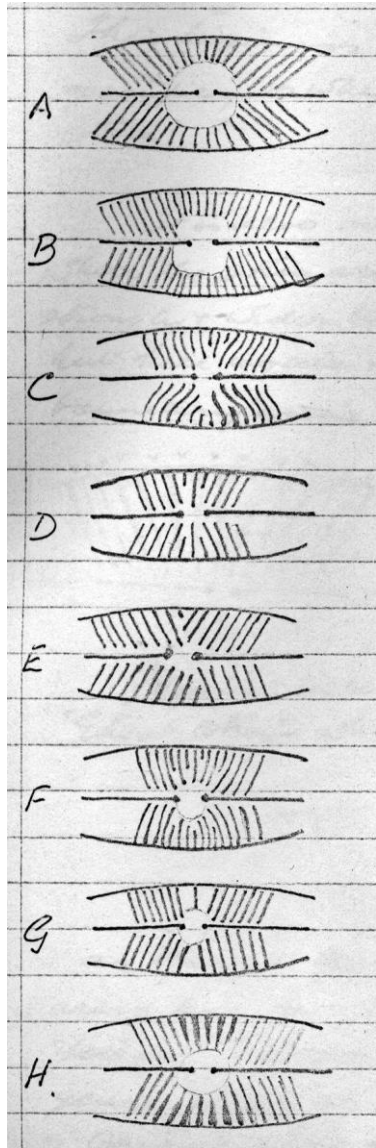
A further argument for the outward growth is that 'auxospore forms' are often found with no edge and I have yet to note the remains of an edge when striae growing toward the central raphe axis.



## Central Areas" and Striae Arrangements etc.

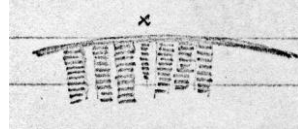
This feature has intrigued me for a long time and I find there are a number of set patterns and some are quite specific to certain diatoms, and again some patterns common to many.

These I will attempt to illustrate but not in any particular order.



Where the central area is large then there are no long and short striae unless the striae are of a high rate per  $10\mu$ . This makes me think there is some genetic factor which controls the building of striae and requires that no stria formation takes place unless a certain minimum of space is available.

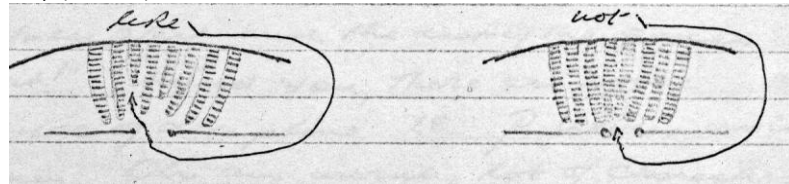
For instance I never find 'part width' striae such as:-



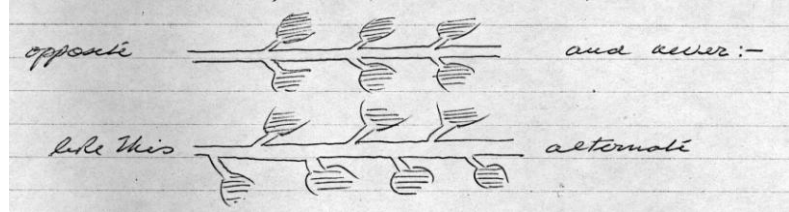
..the space would be left blank like so:-



Again each stria remains separate and does not join up with another, even to stop (or start) short when the available width is under the minimum:-



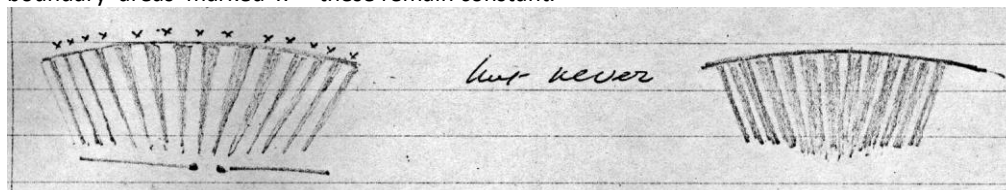
I think this affair is like the macro-flora counterpart, where, for instance, honeysuckle leaves grow:-



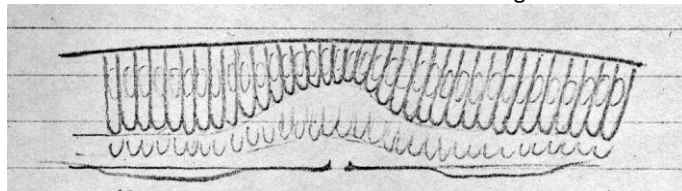
This business is determined genetically and, of course specific, so why not a similar state of affairs in diatom striae?

It is noticeable that when centres such as <sup>H</sup>H, where the striae are wider apart then the striae are more strongly and wider built thus absorbing the available room, but here again the resultant width does not impinge on the

boundary 'areas' marked 'x' – these remain constant.



Another noted feature of Central area striae are 'ghost stria' – which is as a rule only peculiar to *Pinnularias*.



As though the gene responsible for the central and axial areas had had a false start and the rest of the genes yelled "Not yet!". Mind you, there are some genes with no sense of discipline i.e. *P. viridis* axial and central area genes. Oh! An unruly lot of characters! They even do one thing on one valve and something else on another!

## OBITUARY



**Horace G. Barber**

(1908-1982)

THE UNTIMELY death of Horace Barber has left a gap in the ranks of microscopists which will be difficult, if not impossible, to fill. Particularly amongst the diatomists will his loss be felt for he represented the type of amateur worker, who, with unremitting zeal, studied his subject in great depth and produced work of an excellence seldom exceeded.

Born in Crewe, he joined the staff of the old London and Midland Railway in 1922 and remained with them until his retirement in 1966 having held various positions in their Control Office. In his younger days he was a keen long-distance cyclist and mountaineer and he retained his interest and activity in cycling until the day of his death when he was out riding in the morning. In 1930 he became a microscopist largely because of his interest in the local natural history society. Very quickly his work crystalized round the study of diatoms and he joined the Club in 1946.

After his retirement this study deepened and culminated in one of the most comprehensive Diatom Atlas's extant in the preparation of which he used his very considerable talents as an artist. The Atlas comprises at least 200 plates and several thousand individual drawings of British diatoms and, fortunately, this work will be available to all serious students at the British Museum (Natural History). Besides his many papers published in the Club Journal his latest contribution in association with Dr E. Y. Haworth and issued by the



Freshwater Biological Association as Scientific Publication No. 44, *A Guide to the Morphology of the Diatom Frustule with a Key to the British Freshwater Genera*, produced to help the non-specialist find his way in the diatomists world.

His interests were catholic and included membership of the Nuneaton Photographic Society of which he became President. He was a magnificent artist specialising in line drawing. He produced pottery of superlative beauty and in any spare time he had he cultivated a garden which was the admiration of his many friends.

He will be remembered as a diatomist, as an artist and, above all, as a generous friend. To his widow we extend our deepest sympathy.

H.H.G.

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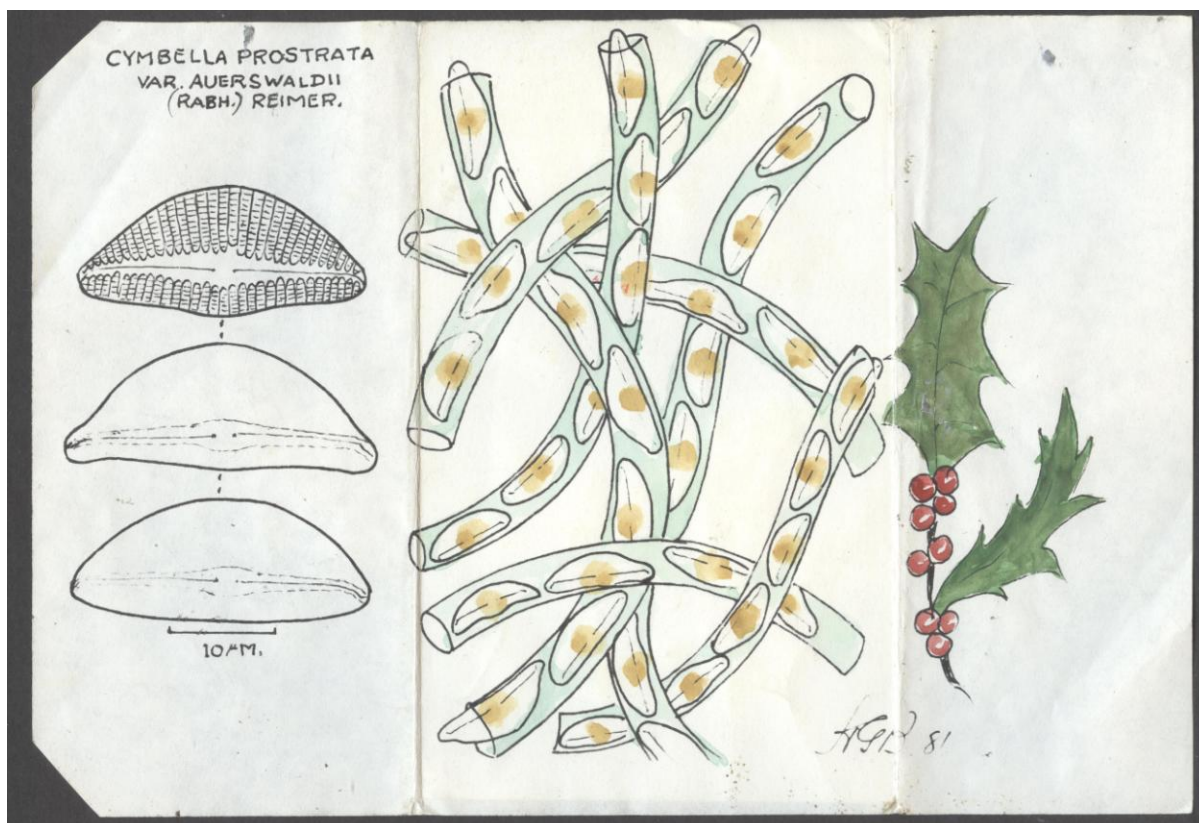
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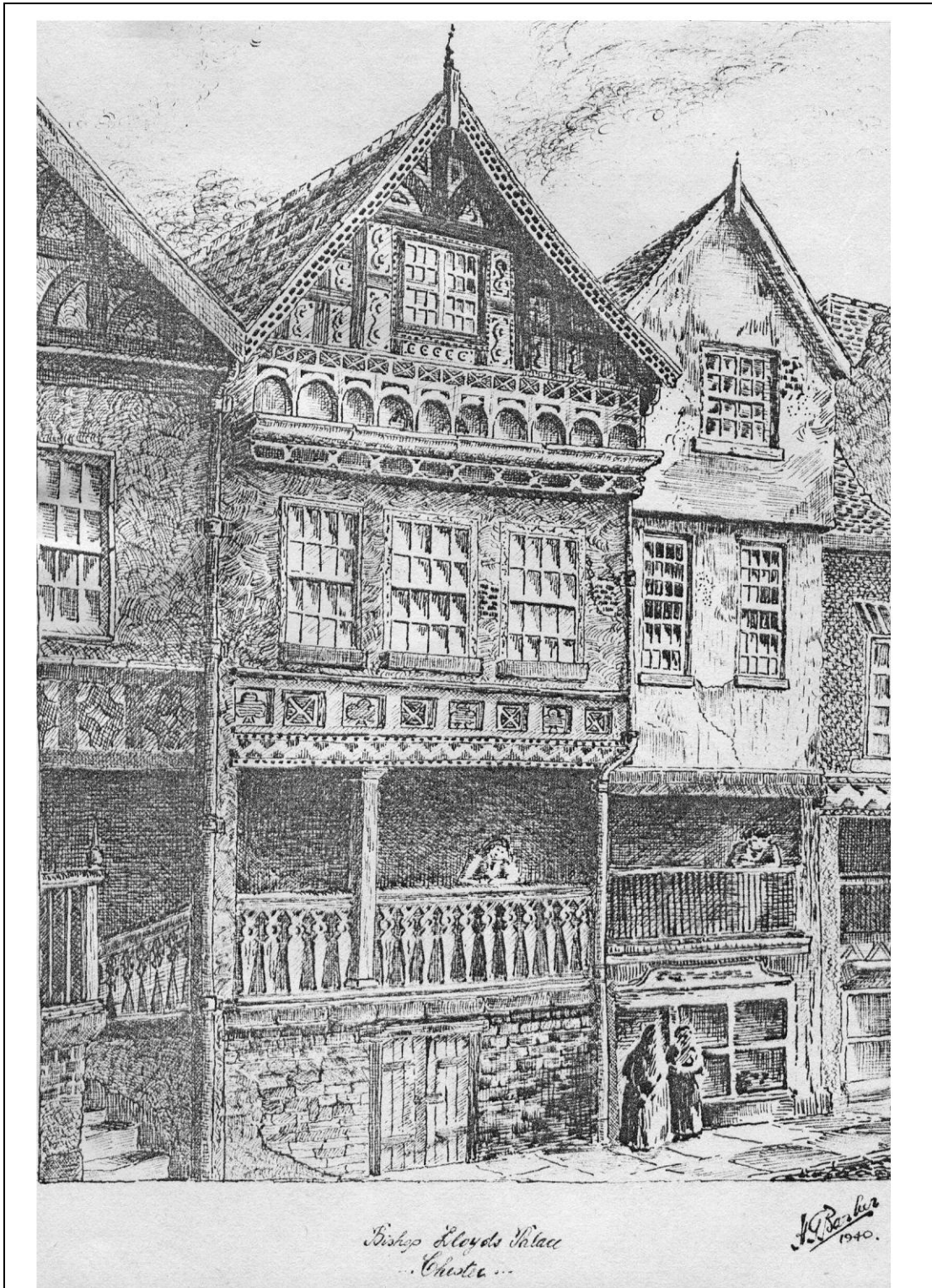
A note on unusual diatom deformaties.  
The fossil freshwater diatoms from Ongarto Valley, New Zealand.  
Freshwater diatoms from Cass, South Island, New Zealand.  
The collection and preparation of recent freshwater diatoms.  
A note on the genus *Mastogloia* in Anglesey.  
Fossil freshwater diatoms from the Harper River, South Island, New Zealand.  
A note on *Nitzschia sigmoldea*.  
An account of fossil freshwater diatomaceous earth from New Zealand (in conjunction with J. R. Carter).

*Hantzschia marina* (Donkin), Grunow.  
Observations on the marine taxon known as *Pinnularia ambigua* (Cleave).  
Observations of *Pinnularia nodosa*, Ehr.  
A note on the taxon *Pinnularia microstauron* var-*brebissonii* (Kurtz) Hustedt.  
*Pinnularia corminata* N Sp (in conjunction with J. R. Carter).  
A note on epiphytic formation of a littoral marine diatom.  
A gathering of diatoms from Malham Tarn.  
Observations on some deformaties found in British diatoms (in conjunction with J. R. Carter).  
An account of the diatom flora on a cooling tower, Central Electricity Generating Board.









The following table of “**The Record of Number of Sketches of Diatoms made by H.G. Barber up to 1972**” was found in Bernard Hartley’s archive.

Achnanthes	128	Glyphodesmis	2
Actinocyclus	4	Gomphonema	59
Actinotychus	1	Grammatophora	3
Amphicampa	1	Hanzschia, Nitzsvia, Bacillaria	140
Amphipleura	3	Hyalodiscus	1
Amphiprora	3	Lichmophora	3
Amphora	56	Mastogloia	33
Anomoneoneis	26	Melosira	17
Anorthoneis	2	Meridion	4
Asterionella	1	Navicula	216
Auliscus	5	Nav-lineate	252
Auricula	2	Neidium	28
Caloneis	73	Opephora	9
Campylodiscus	1	Peronia	2
Campyloneis	6	Pinnularia	307
Ceratoneis	1	Plagiogramma	4
Cocconeis	56	Pleurosigma	29
Coscinodiscus	8	Rhabdonema	5
Cyclotella	23	Rhaponeis	3
Cymatopleura	7	Rhoicosphenia	5
Cymatosira	2	Rhopalodia	6
Cymbella	95	Stauroneis	46
Diatoma	14	Stenopterobia	3
Diatomella	4	Surirella	66
Didymosphaenia	1	Synedra	31
Dimerogramma	9	Tabellaria	15
Diploneis	57	Tetracyclus	5
Donkinea	3	Thalassiosira	1
Ephemia	16	Toxonoidea	3
Eunotia	89	Triceratium	8
Eunotogramma	1	Tropidoneis	15
Fragilaria	44		
Frustulia	24		

**Extracts of letters to Bernard Hartley from Horace G. Barber.**

15<sup>th</sup> September 1977

---Yes, the *Amphoras* are a real problem, the majority are marine and not much is known about them. The literature is ill defined, and many species and varieties were named years ago on trivial grounds.

The more I see of British diatoms, the more I think of a “Species Cycle” being more relevant than the use of the terms “form” and “variety” for individual stages sometimes taken at arbitrary points within the varying cycle of the one whole species.

....I would not be wrong if I stated that 90% who are unable to see the TYPE form of a species must depend on a predecessors conception, half correctly, or incorrectly. A classic case of this is *Pinnularia nodosa* Ehrenberg of which we are all aware.

26<sup>th</sup> June 1977

In compiling this Flora, it has enabled me to realise by comparison of forms, the tremendous variation some species are able to assume. This comparison is not possible if one relies only on memory, or on one author’s interpretation on a single illustration.....

I’ve done this slide of *Pinnularia* ‘dose of the lurgies’ specially for you. This is the one Mrs. Euler calls ‘var. *horrida*’. It is not specific, and the feature applies to more than one species. In this case the feature is on *P. nobilis* Ehrenberg

**Extract from Horace G. Barber’s particular note.**

In the recording of the various species and forms of the Genera *Cocconeis* and *Achnanthes*, there are many cases where it has been possible to record the raphe bearing valve in conjunction with that of the Area valve i.e. Pseudoraphe valve. It is little known that the Area valves outnumber the raphe bearing valves, and it would seem that during division there are more Area valves produced for a number of occasions. So much so, that a count of any strewn slide with a fair number of genera on it will substantiate this fact.

Horace G. Barber

Miscellaneous Note.

Some twit who has spent 15½ weeks “research on diatoms” starts naming all that he can’t find in his literature, i.e. 90% for he or she hasn’t an inkling of the variations that take place in practice. Very likely doesn’t like to get wet feet in order to gather them, so buys a few slides instead of making 2 or 3 thousand gatherings and slowly coming to the conclusion that many taxa are indeterminate. Many classical illustrations are only depicting one form along a long chain in time and space. AND I MEAN TIME AND SPACE!

--ooOoo--

**Once again I thank Alan Barber and his wife Judith for permission to reproduce the work of his father. Without their support the production of Horace’s unpublished works would not have been possible.**



*Alan George and Judith Ann Barber*



