CD Publications of interest to Diatomists

All titles available from Savona Books

	Author/Company	Title/Description	Price UK Pounds
M3.	Griffith and Henfrey	Micrographic Dictionary 4th Edition. 1883. Plates only	£8
M4.	Flatters & Garnett	1929 Microslide Catalogue includes images of slides.	£10
M7.	P. T. Cleve	Diatoms from the West-Indian Archipelago 1878.	£10
M8.	J. Brun et J. Tempere	Diatomees fossiles du Japon 1889. 73 Pages, 9 Plates.	£10
M9.	Peragallo et Peragallo	Diatomees marines de France. 1897-1908. 137	£15
M10.	F. T. Kutzing	Synopsis diatomearum. 1834. 93 Pages, 7 Plates.	£8
M16.	Hilmar v. Schonfeldt	Die Deutschen Diatomeen des Susswassers	£8
M17.	Adolf Schmidt	Atlas der Diatomaceenkunde	£35
M19.	Leuduger-Fortmorel	Diatomees Marines de la Cote Occidentale d-Afrique	£6
M20.	Luard and Witt	Die Diatomaceen der Polycystinenkreide von Jeremie in Hayti.	£5
M35.	Arthur Scott Donkin	The Natural History of the British Diatomaceae	£10
M36.	Jacob Whitman Bailey	Notes on New Species of microscopical Organisms	£5
M37.	Charles Pooley	The Diatomaceae of Weston-super-Mare	£15
M43.	Rev. William Smith	List of the Diatomaceae in the British Museum 1859	£5
M44.	William Gregory	New forms of Marine Diatomaceae Firth of Clyde and Loch Fine	£4
M45.	Otto Muller	Kammern und Poren in der Zellwand der Bacillariaceen	£5
M47.	Kain and Schultze	On a Fossil Marine Diatomaceous Deposit from Atlantic City, N.J.	£5
M48.	Dr. József Pantocsek	A FERTŐ TÓ KOVAMOSZAT VIRÁNYA	£5
M49.	Dr. Josef Pantocsek	BESCHREIBUNG und ABBILDUNG der FOSSILEN	£5
M50.	E. G. Grahn M.D.	Diatomaceae found in the neighborhood of Brookville, Indiana.	£4
M69.	Little Imp	A Checklist of British Diatoms	£4
M71.	Little Imp	Diatomaceae on Magic Lantern Slides V.1.0.	£3
M72.	Alfredo Truan y Luard	Diatomeas de Asturias 1844	£5
M73.	Little Imp	A Checklist of Diatoms of the Central U.S.A.	£3
M74.	Little Imp DiatCode -	List of Diatom Species with Int. codes	£3
M76.	Various Authors	Practical Direction for collecting, Preserving, Transporting, Preparing and Mounting Diatoms	£4
M78.	Rev. Eugene O'Meara	Report on the Irish Diatomaceae	£6
M80.	William Smith	A Synopsis of the British Diatomaceae	£10
M81.	J. D. Moller	Diatomaceen Typen-Platte 335	£4
M88.	Klaus D. Kemp	Diatom Database	£95
M121.	Little Imp	Conversion Tables for Diatomists	£3
M122.	Little Imp	The Light Microscopist's Diatom Glossary (V.1.0)	£6

A1. Science Museum/Brian Bracegirdle/Little Imp Publications
The Microscope Collection at the Science Museum
Catalogue of the Microscopy Collection of the Science Museum, London.
More than 2500 descriptions of this pre-eminent collection, by Brian Bracegirdle. £20

N1. Little Imp Publications/C. F. Bause
The Microscopy Notebook of C. F. Bause £9

N2. Little Imp Publications/John J. Grover
The War-time Microscopy Notebook of John J. Grover £9

Send copy for publication to: The Amateur Diatomist, c/o D. S. Gill, 123 The Longshoot, Nuneaton, Warwickshire, CV11 6JQ. Email:- steve@microcat.demon.co.uk

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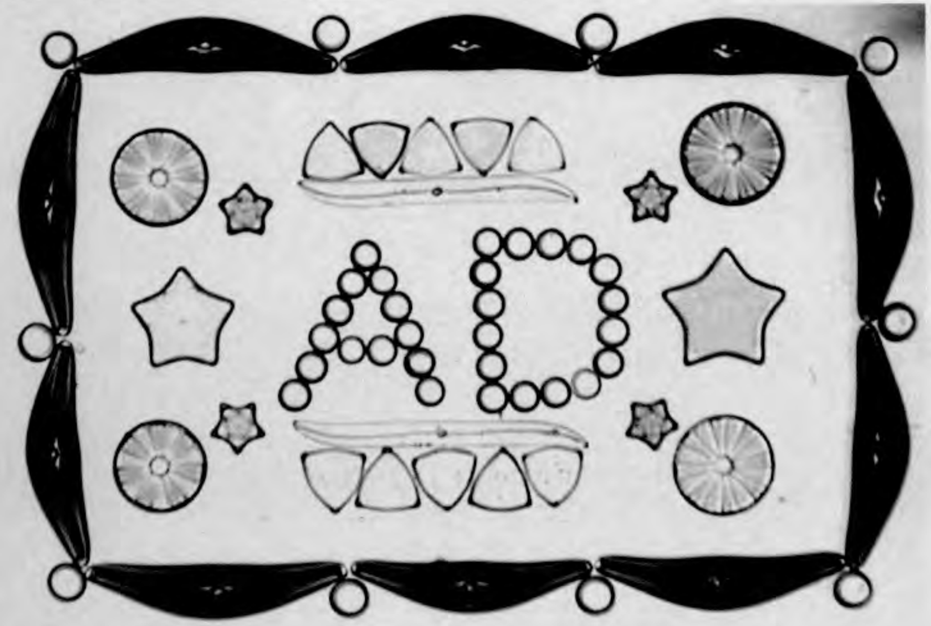
Tel.: 01539 732660 email: steveedgar@1stimpression.org.uk

The Amateur Diatomist

Vol. III. No. IV. **May 2006**

Little Imp Publications



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There is no strict editorial policy.

Front cover picture: A special slide to mark the completion of the 3rd Volume. by K. D. Kemp

Field Microscopes (VI)
The Wild M11

This microscope is really in the category - Portable Microscopes - as it is a full-blown laboratory stand in a metal jacket. It is also fairly heavy, but it does have a leather carry strap. I wouldn't recommend taking this stand on a long hike but where you are heading into the field with the intention of staying at one specific location then it is certainly worth taking with you, preferably in a back pack.

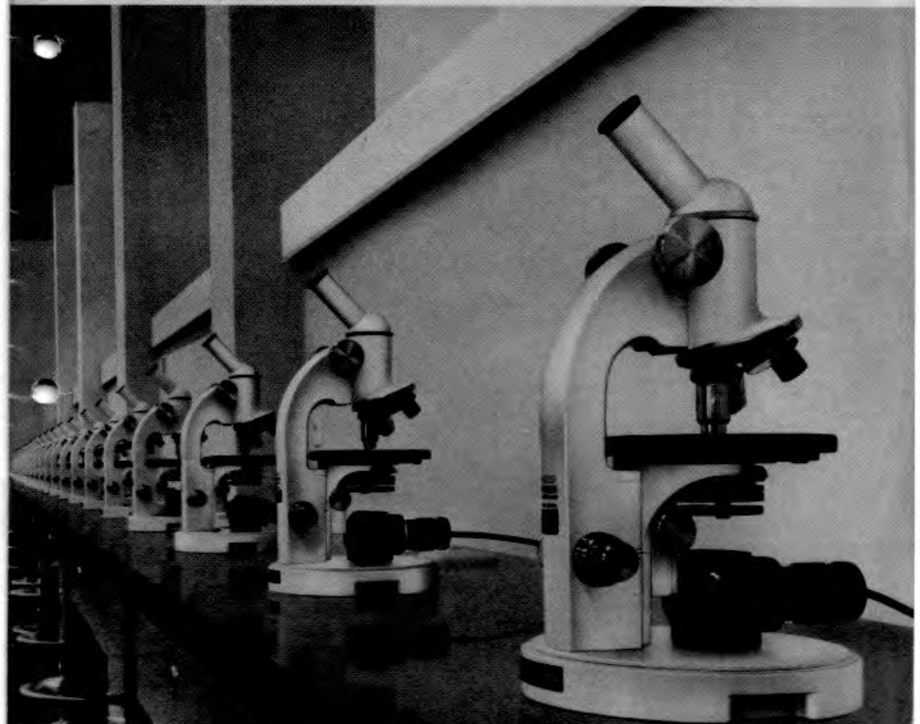
It provides you with absolutely everything you would expect from a students laboratory microscope in a fairly compact format. You can even, if you wish, take along some immersion oil and use the x100. The objectives are RMS thread, standard Wild forms. A binocular head (which I believe was an option) is just perfect. These stands occasionally appear on the market but are snapped up fairly quickly. There are some Wild specialists in the UK who normally know where these things are to be had - Mike Samworth and Carel Sartory spring to mind. I have also seen the stand converted to use High Bright LEDs instead of the mirror.

The following literature provides lists of objectives and accessories.

Wild M 11

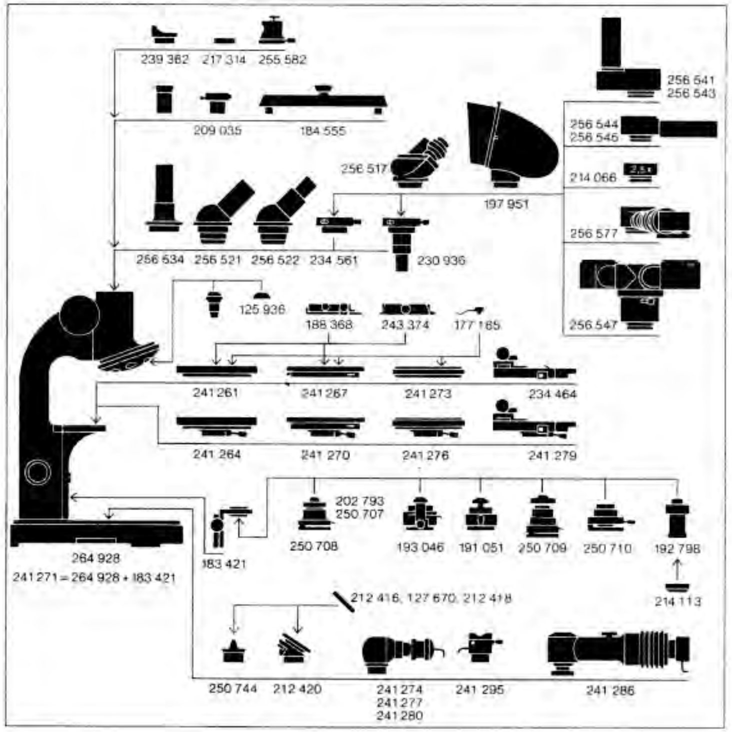
An Expansible Microscope Ideal for Field Work, Courses and Laboratory

WILD
HEERBRUGG
Switzerland



The Wild M11 is the ideal microscope for schools and courses.
This easily-carried precision instrument has been proved on expeditions under extreme climatic conditions.

Assembly Diagram for the Wild M11 Microscope.



14

REALGAR As4S4, Arsenic Sulphide

Pronunciation: ree - al - gar

Synonyms: red arsenic sulphide, arsenic sulfide, arsenic sulphide, arsenic disulphide, red orpiment, ruby arsenic, realgar

Melting point: 320 C

Boiling point: 565 C

Refractive index: alpha = 2.4; beta = 2.81; gamma =3.02

Uses: A major ore of arsenic, formerly used for pigments, firework colouring agent.

Other Characteristics: Realgar is unstable in light; specimens should be stored in complete darkness, rarely some specimens fluoresce under UV light and crystals are pleochroic between dark red and orange red. Highly toxic - may be fatal if swallowed or inhaled, and in contact with skin.

Notable Occurrences include most importantly Hunan Province, China; but also Switzerland; Japan; Macedonia; Mercur, Utah, USA; Romania and many other localities.

The raw sample that we have is of a deep red colouration and is quite granular in appearance whereas those samples we have seen in mineral collections have been almost glass like. The accompanying photograph doesn't do it any justice at all but is reproduced here to show that this mineral is certainly available from mineral dealers. We would, however, reiterate the warnings as to its handling (Highly toxic - may be fatal if swallowed or inhaled, and in contact with skin.).

Realgar is an unusual sulphide as it is one of only a few such that are not metallic, opaque or blandly coloured. It has a structure analogous to that of sulphur and resembles it in most respects except for its colour (orange to red.). Indeed the name "ruby sulphur" has been applied to realgar.

Sulphur has a structure composed of 8 sulphur atoms linked in a ring. Realgar's structure alternates between sulphur atoms and arsenic atoms producing rings of As4S4. The arsenic atoms affect the structure altering it from sulphur's orthorhombic symmetry to realgar's monoclinic symmetry.

Realgar occurs in hydrothermal veins with valuable metal sulphide ores and its bright red colour can be an aid to prospectors. It also can be found in hot spring deposits and as a volcanic sublimate product (crystallizing from vapours). Realgar gets its name from the Arabic words for "powder of the mine" (rahj al ghar). Realgar is famous for some wonderfully beautiful specimens. Some specimens can have a deep ruby red colour with an amazing clarity and a high lustre. The colour of realgar is truly something to appreciate and cherish. But realgar's beauty is sometimes fleeting.

It is an unstable mineral and will alter to a different mineral, pararealgar and eventually to a powder. This process takes time and is accelerated by exposure to light. Specimens should be stored in dark, enclosed containers, and only exposed to light for the brief enjoyment of its owner and friends. This sounds extreme, but wonderfully beautiful realgar specimens are worth preserving for as long as possible. If you are wondering how quickly the deterioration occurs, the answer is immediately, but fortunately very slowly. Ancient Chinese carvings of realgar are still in existence, but badly affected by the deterioration. The deterioration of realgar was thought to produce the closely related yellow orpiment, but this was recently proven to be false and the deterioration product is in fact yellow-orange pararealgar. In old paintings and manuscripts, realgar was a common pigment for paints and dyes. Many of these paintings now have a yellow or orange hue where once the colour must have been an original red.

Mineral realgar is normally heated with sulphur, allowing a more pure Realgar to sublime out.

So what has all this to do with Diatoms?

A number of Victorian Diatomists used this compound to mount diatoms. It has a Refractive Index in excess of 2. A phenomenal number. No other mountant has got close to this figure.

That's fantastic, so how come we're not all using this. Well, for a start it's highly toxic and before you all go off mining for this most interesting mineral, I would recommend you sit back and build yourself a laboratory complete with extractors and filters, take a course in Chemistry, establish a company and employ someone else to prepare your specimens. If, however, you work in a University then perhaps you might have all the right facilities already, but please remember it wasn't me that put you up to it.

The method used by these Diatomists of old - Thum and Moller for example was sublimation.

This technique involved the drying of the selected specimen onto a coverslip and this slip was then mounted onto a slide (with what is unknown - probably wax) and the slide place on a crucible containing a small sample of realgar. The realgar, when heated becomes a vapour without passing into a liquid state and condenses on the slip as a solid. It is likely that the now realgar encased diatoms on the slip were then mounted with balsam onto a fresh slide and ringed.

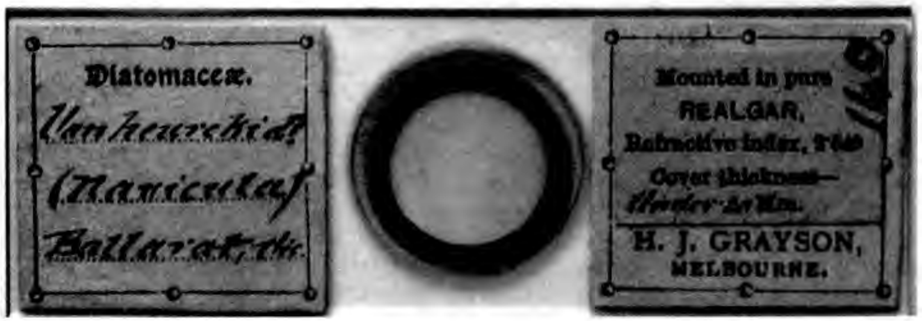
F.A.S. Sterrenberg wrote in October of 1995:

"Years ago, I experimented with realgar (arsenic trisulphide), which has an RI of >2.0 (!). I sublimated this onto the sample, dried on the cover-slip, a method that was used in the 19th century for Grayson rulings. The rulings were then "scratched" into the realgar. Needless to say that this MUST be done under a hood, and the synthesis of the realgar itself is not to be laughed at. Contrast is awesome, diatoms like Frustulia rhomboides var. saxonica become as easy as pie. Sublimation is very uneven, however, and the preparation looks pretty horrible."

It would certainly be interesting to repeat this process but I will have to think carefully about doing so, and may actually leave it until I'm sure that my days are numbered.

Very few realgar slides seem to have survived. This may be because of the fragile nature of realgar itself.

Nonetheless the editors have a few in their collections, four of which are reproduced below.



Note:

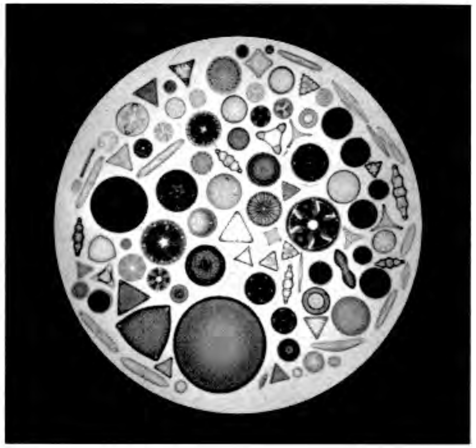
H. J. Grayson born in Yorkshire, England (circa 1857) travelling to Australia and New Zealand as a young man. Later settled in Melbourne where he was appointed assistant to Professor Charles Martin, Chair of Physiology.

The valves on the first slide stand out beautifully - a dark brown against a pale yellow under low power and really high contrast against an almost white background under a higher power.

Zeiss Apochromat 2mm N.A.1.40

Following the mention of the Zeiss 3mm objective in Barry Ellam's article on Amici our search for such an objective has resulted only in the location of a Zeiss 2mm Apochromat. Nonetheless, the results of this objective were impressive enough to reproduce. You may note that the field is not completely flat and focus drops off at the edges.

The photographs are both by Kenneth R. Green.



Arthur C. Cole & Son
Series B

24 Very Rare Diatomaceae

August 1880

In printing the article with the same title in Vol. II No. IV I had assumed that Series B was a fixed and immutable set produced by this eminent mounter.

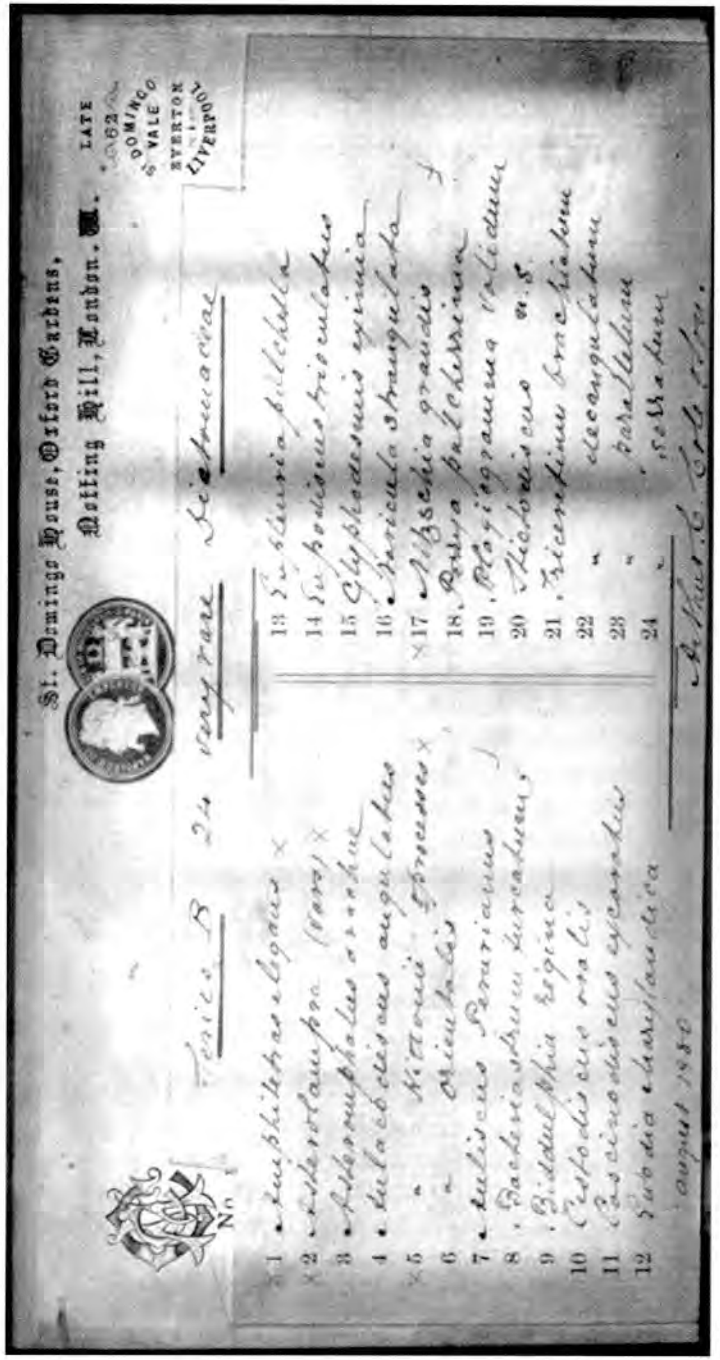
I would have happily, and it appears ignorantly, continued with this idea had it not been for the appearance of a second set.

"Oh! Series B." I said confidently. "Yes, you'll find a jolly decent article about this set in Amateur Diatomist, let me show you."

"Ahem! Yes. Well. Of course you realise they produced different set Bs." I pointed out, hopefully with an air of expertise, but probably not.

We are also able to refine the point at which A. C. Cole moved from Liverpool to London. In the article concerning Cole Vol. II. No. III our notes concerning this move are based on Membership lists and note his appearance in London from 1881. We can now note that he was at the London address by August 1880.

Produced hereafter is this later set in a similar form as the previous article. Added to the list in square braces [ ] is the location/notes from each slide.



1. *Amphitetras elegans*
[Recent]
[Perrano]
Syn: *Biddulphia elegans* (Greville 1866) Boyer 1900
Current: *TRICERATIUM ELEGANS* (Greville 1866) Grunow in Van Heurck 1883, (Authority implied) ; Grunow 1886 in Schmidt et al 1874
2. *Asterolampra* (vars)
Probably from Barbados or Oamaru
Illustrated in Vol. II. No. IV
3. *Asteromphalus arachne* (Breb) Ralfs in Pritchard
[Maccabees. Isl. de Guano]
Publication:- Wallich 1860
Locations cited:- Indian Ocean
Plate/Figure & Notes:- Plate 2/Figure 11
Syn: *Spatangidium arachne* Brebisson 1857
Syn: *Asterolampra arachne* (Breisson 1857) Greville 1860
Syn: *Asteromphalus maleus* Wallich 1860
Syn: *Asteromphalus malleiformis* Wallich 1860
Syn: *Excentron cancroides* Ralfs in Pritchard 1861
4. *Aulacodiscus angulatus* (Robert Kaye Greville)
Also Illustrated in Vol. II. No. IV
Publication:- Adolf Schmidt - Atlas der Diatomaceenkunde
Locations cited:- Kekko Hungary
Plate/Figure & Notes:- Plate 105/Figure 7
5. *Aulacodiscus Kittonii* - 5 processes (Arnott ex Ralfs in Pritchard)
Publication:- Norman Ingram Hendey 1964
Locations cited:- British Coastal Waters
Plate/Figure & Notes:- Plate 22/Figure 5
Syn: *Aulacodiscus laevis* Brightwell 1860
Syn: *Aulacodiscus ehrenbergii* Janisch 1861
Syn: *Aulacodiscus brightwelli* Janisch 1861
Syn: *Aulacodiscus deformis* Habirshaw in Habirshaw et al 1877-1894
6. *Aulacodiscus Orientalis* (Robert Kaye Greville)
Publication:- Adolf Schmidt - Atlas der Diatomaceenkunde
Locations cited:- Sandwich Isleses
Plate/Figure & Notes:- Plate 34/Figure 2
Syn: *Aulacodiscus orientalis var nankooriensis* Grunow 1870
Syn: *Tripodiscus orientalis* (Greville 1864) Mann 1907
7. *Auliscus Peruvianus* (Kitton ex Pritch) Greville
[Santa Marta]
Publication:- Adolf Schmidt - Atlas der Diatomaceenkunde

Locations cited:- Peruvian Guano
Plate/Figure & Notes:- Plate 32/Figure 29
Syn: *Auliscus peruvianus var. (?)ovalis f. quadriocellata* Weissflog collection
Syn: *Pseudauliscus (Pseudoauliscus) peruvianus* (Kitton ex Pritchard 1861) Rattray 1888
Syn: *Eupodiscus? peruvianus* Kitton ex Pritchard 1861
Syn: *Auliscus peruvianus var. (?) ovalis* Weissflog collection ?
8. *Bacteriastrum furcatum* (G. Shadbolt 1854) :Synonym Bacteriastrum varians
[Hong Kong Harbour]
Syn (Current):*BACTERIASTRUM DELICATULUM* Cleve 1897
Syn: (Current): *BACTERIASTRUM VARIANS* Lauder 1854
9. *Biddulphia regina* (William Smith)
[Extremely rare]
[Manila]
Publication:- Peragallo 1897-1908
Locations cited:- Cannes
Plate/Figure & Notes:- Plate 93/Figure 5-9
10. *Cestodiscus ovalis* (Greville)
[Fossil]
[Richmond Va.]
(Not illustrated)
Described by Greville. Mentioned in 'On a Fossil Marine Diatomaceous Deposit from Atlantic City, N.J.' by C. Henry Kain and E. A. Schultze 1889
11. *Coscinodiscus excavatus* (Robert Kay Greville)
[Fossil]
[Nottingham, Maryland]
Publication:- Adolf Schmidt - Atlas der Diatomaceenkunde
Locations cited:- Piscataway U.S.A.
Plate/Figure & Notes:- Plate 65/Figure 1
Syn: *Coscinodiscus febigeri (febigerii)* H.L. Smith 1874
12. *Euodia Marylandica*
[Fossil]
[Hillan???s Cliff, Va.]
Syn: *Triceratium marylandicum* Brightwell 1856
Syn (Current): *ACTINOPTYCHUS MARYLANDICUS* (Brightwell 1856) Schmidt 1874 in Schmidt et al. 1874
13. *Eupleuria pulchella* (Arnott)
[Monterey Bay, Cal.]
Syn (Current): *ENTOPYLA OCELLATA var. PULCHELLA* (Arnott 1858) Fricke 1902 in Schmidt et al 1874

14. *Eupodiscus trioculatus* (Greville)
[Extremely rare]
[Santa Marta]
Illustrated in Vol. II. No. IV
Publication:- Robert Kaye Greville 1864
Locations cited:- Barbados
Plate/Figure & Notes:- Plate 12/Figure 3

15. *Glyphodesmis eximia* (Greville)
[Rio de Janeiro]
Illustrated in Vol. II. No. IV
Publication:- Robert Kaye Greville 1862
Locations cited:- Jamaica
Plate/Figure & Notes:- Plate 10/Figure 7-10

16. *Navicula strangulata*
[Bahia]
Publication:- Schmidt's Atlas der Diatomaceenkunde
Plate/Figure & Notes:- Tafel 160 Figure 17-19
Syn (Current): *DYCTYONEIS MARGINATA* (Lewis 1861) Cleve 1890; Cleve 1890 in Schmidt et al. 1874

17. *Nitzschia grandis* (Kitton)
[Colon]
Publication:- Adolf Schmidt - Atlas der Diatomaceenkunde
Locations cited:- Colon Spain
Plate/Figure & Notes:- Plate 351/Figure 1 [Recent Marine]
Syn: *Homoeocladia grandis* (Kitton1874) Kuntze 1898

18. *Perrya pulchessima*
[Colon]
Syn (Current): *NITZSCHIA PULCHERRIMA* Grunow ex Kitton 1874 (Perrya); Grunow ex Kitton in Cleve et Grunow 1880

19. *Plagiogramma validum*
[Extremely rare]
[Campeche Bay]
Publication:- Adolf Schmidt - Atlas der Diatomaceenkunde
Locations cited:- Campeche Mexico
Plate/Figure & Notes:- Plate 210/Figure 2-3
var. tumidulum illustrated (Grun in Cleve)

20. *Stictodiscus* n.s.
[Extemely rare]
[Fossil]
[Jeremie, Haiti]
(Not illustrated)

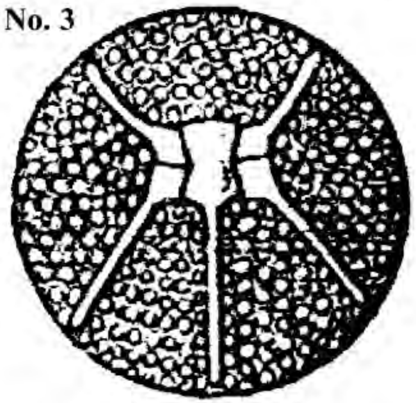
21. *Triceratium brachiatum* (Brightwell)
[Fossil]
[Barbados]
Illustrated in Vol. II. No. IV
Publication:- Adolf Schmidt - Atlas der Diatomaceenkunde
Locations cited:- Cambridge Barbados
Plate/Figure & Notes:- Plate 77/Figure 22-24

22. *Triceratium decangulatum*
[Extremely rare]
[Campeche Bay]

23. *Triceratium parallelum*
[Red Sea]
Publication:- Adolf Schmidt - Atlas der Diatomaceenkunde
Plate/Figure & Notes:- Plate 75/Figures 3-5
Syn: *Amphitetras pararella* Ehrenberg 1839 (1841)
Syn (Current): *STICTODISCUS PARARELLUS* Grove et Sturt 1887

24. *Triceratium serratum*
[Extremely rare]
[Bahia]
Syn (Current): *TRICERATIUM SPINOSUM* J.W. Bailey 1843 (1844)

No. 3



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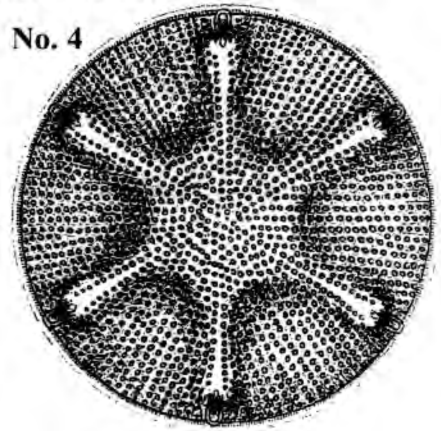

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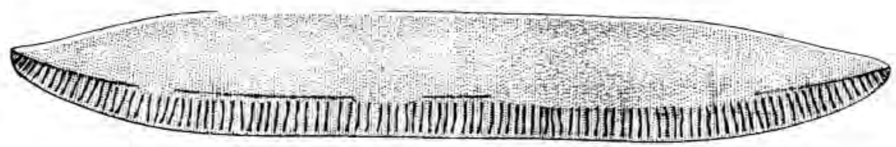

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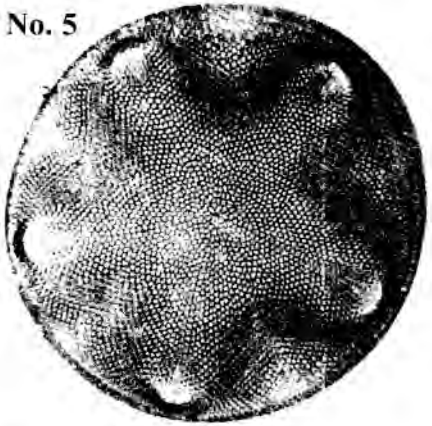

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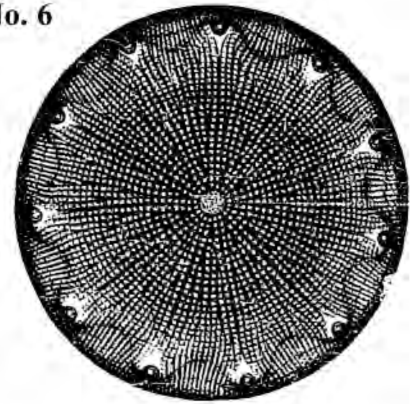

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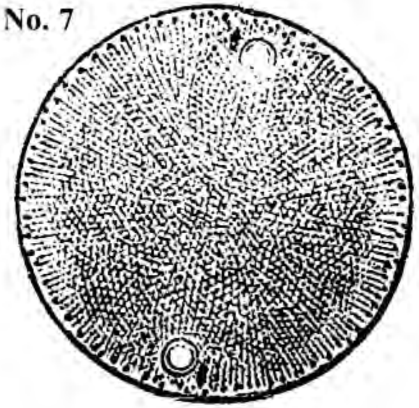

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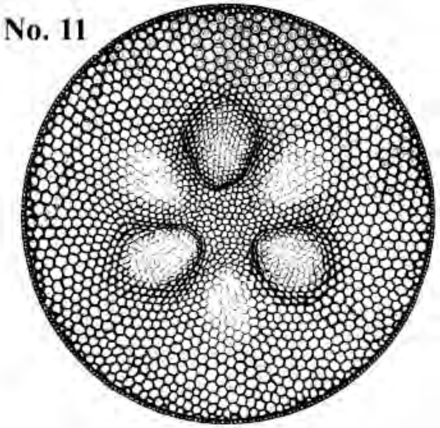

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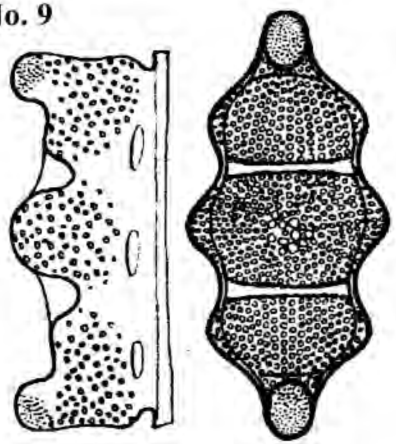

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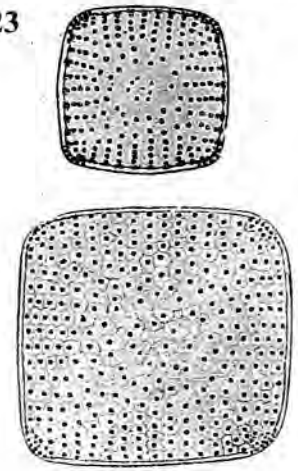

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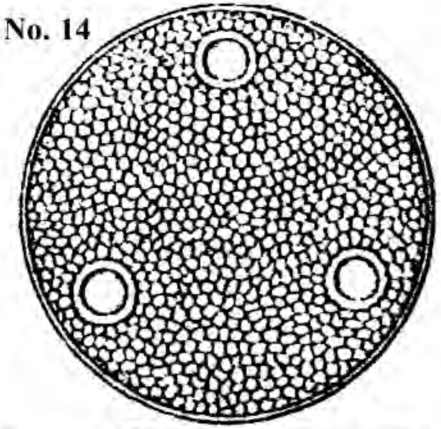

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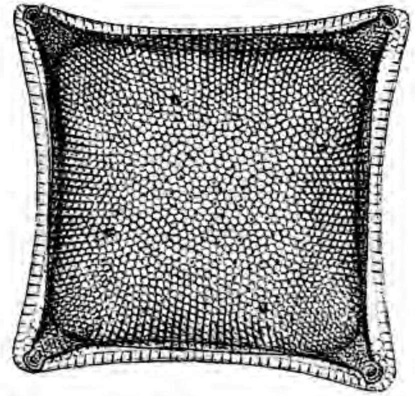

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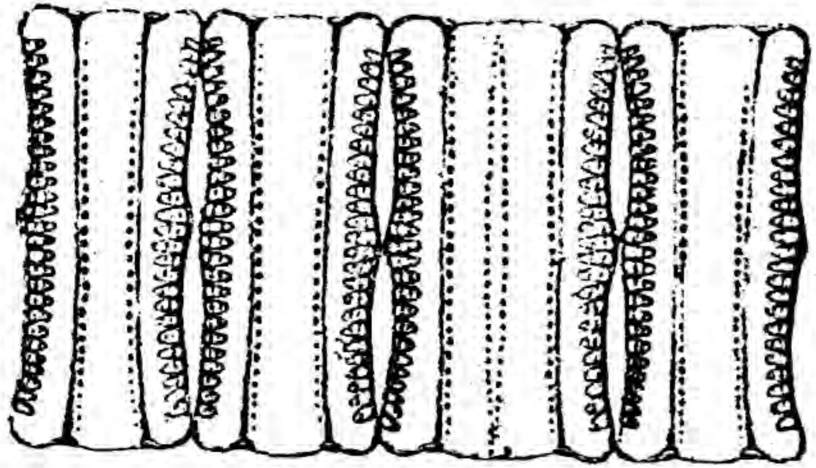

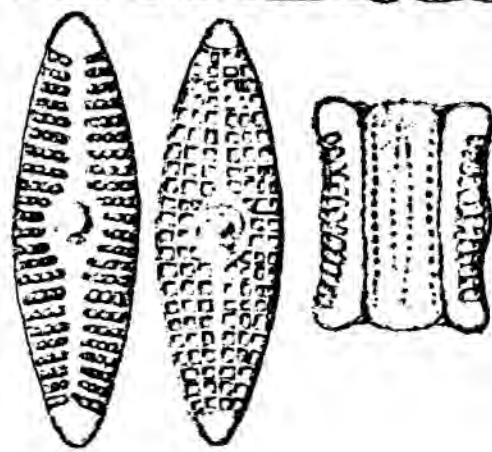

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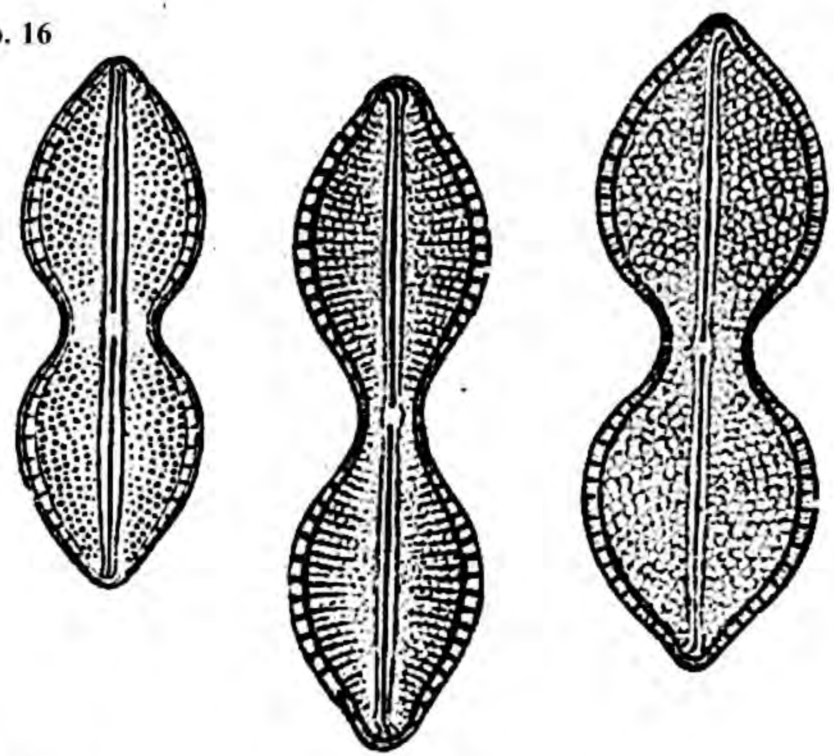

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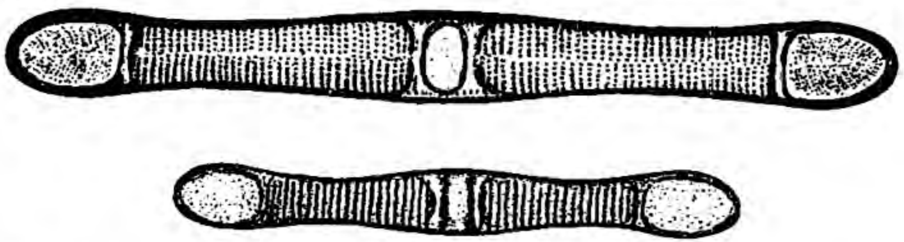

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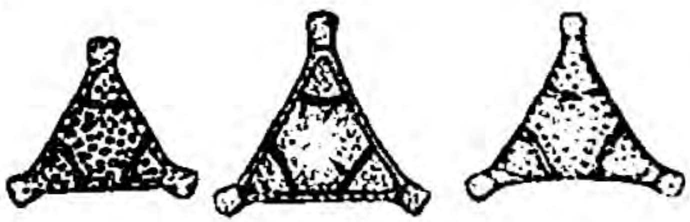


Out and About with Klaus-Dieter Kemp

It is always a pleasure to sit at the elbow of one of our truly great diatomists and it has been my fortune and privilege to spend some time with Klaus-Dieter Kemp (Klaus to his friends). It was Klaus that first introduced me to the wonderful world of diatoms, their beauty, variation and life-history. His long experience in collecting, identification and mounting gives him a rare insight into what is likely to be about in any particular location at any time of the year.

Armed with the appropriate collecting apparatus -in the case of Klaus this comprises a number of clear plastic bags and a credit card - he hurriedly informs me that the credit card is in fact a points card from a supermarket which has no points left on it (he's a Northern lad) - we set off for a couple of sites we examined some years back as part of another project.

"Plastic bags are great" says Klaus, "when you fall over the worst that can happen is you end up with a pocketful of water.....and you can still recover the sample".

"It was Bernard Hartley that first used plastic cards for scraping rocks and other surfaces" he continues, "In fact, I've still got one of Bernard's AA membership cards which has travelled halfway around the world with me".

We had decided on a return to Max Mills, a place we had collected from before and we had discovered together.

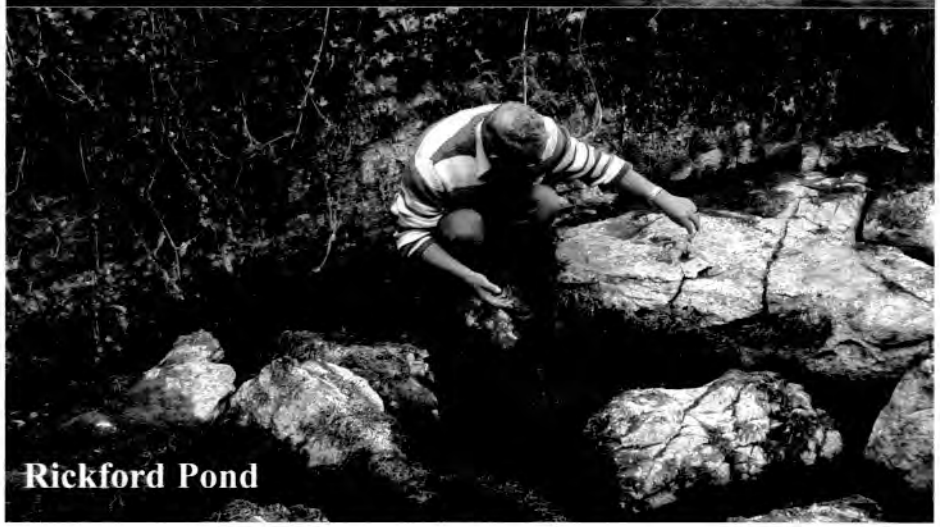
"Not really the best time of year for this," Klaus mused as we drove down the lane leading to the mill remains and noticing the almost dry stream in the verge. It was mid-July.

Nonetheless, we persevered and collected some likely looking brown slime apparently oozing from the stonework. A quick check with Klaus's McArthur showed a few frustules but nothing like the abundance we had collected one frosty day in April.

Max Mills

From Max Mills we headed for one of Klaus's favourite spots which we had also visited back in April - Rickford Pond.

Here Klaus's practiced eye scanned the likely looking spots eventually declaring his preference



Rickford Pond

for the pond outlet.

Armed with a number of plastic bags we made our leisurely way home where Sheila, Klaus's long suffering wife (she tells me) was ready with tea and cakes (how can I get my wife to supply tea and cakes after a diatom collecting trip?). A cursory examination of the samples was all we had time for before I was making my way back up the motorway. Klaus will report on our finds in a future issue.

Uses of Diatomite

The two labels here are from commercial products believed to be available in the 1970s.

The first is a Car Polish. The abrasive qualities of finely ground fossil diatom frustules would no doubt have scratched a thin layer of paint from bodywork. I'm not sure what repeated use would do!

It mentions Diatomite from a Loch on the island of Bernera in the Hebrides. This is a source we at AD have not come across before. However, and coincidentally the next issue contains an article about Loch Cuithir and the Lealt Valley Diatomite Railway.

The second is a product Tripoli which is a buffing wheel compound and would be used to polish metals. The active ingredient in this would be of a similar nature to the car polish above. Tripoli was one of the names given to Diatomite.

Diatom mounters through the ages

by Mike Samworth

Herewith 50 plus slides, from a variety of mounters. Even those mounters that are duplicated have quite different labels.

Most of these slides are either selected specimens or groups or arrangements of diatoms. Please be careful when handling these slides, and even more so when viewing. Only the lower powers are needed for the vast majority of them, and don't hesitate to ask if you need .

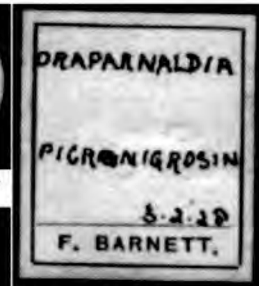
Some of these labels are of course that of commercial suppliers, though where known I have added the name of the mounter. Those with an asterisk (*) are to my knowledge still alive, though not necessarily still active. In both these cases I am interested to hear from those who have extra information, or indeed corrections.

H J Baker

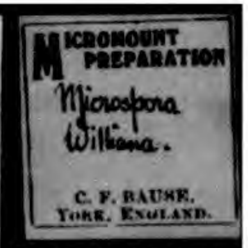
H(orace) G Barber

CFB (Carl F. Bause)

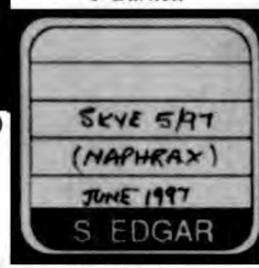
Darlaston



F Barnett



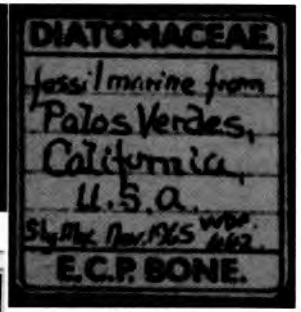
CFB (Carl F. Bause)



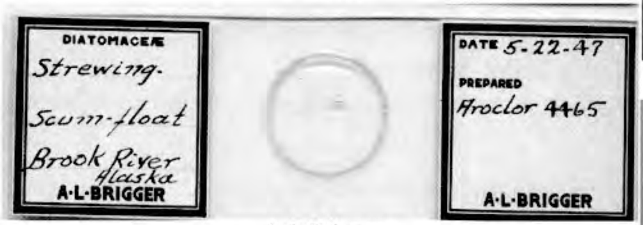
*S(teve) Edgar **

William Gatrell

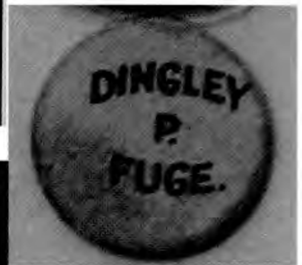
A. L Brigger



E C P Bone

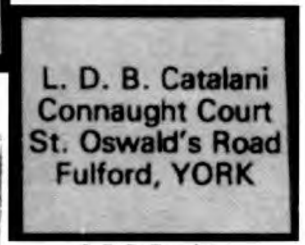


A. L Brigger

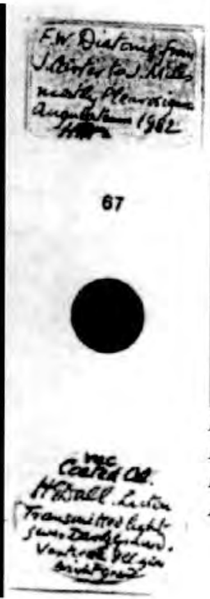


Dingley P Fuge

Dingley P Fuge



L D B Catalani



Far Left: Brian Darnton
Mid Left: Arthur Cottam
Left: Horace Dall
Above: H Ebbage

T E Doeg

W A Firth

R Gosden

T Peters

(Lawrence) Hardman

Bernard Hartley *

R Hudson

Eric Impey

W Johnson

W Joshua

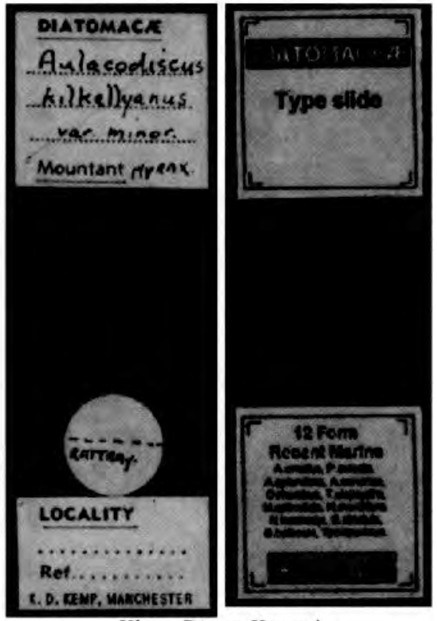
M Pillischer

Herbert Potter

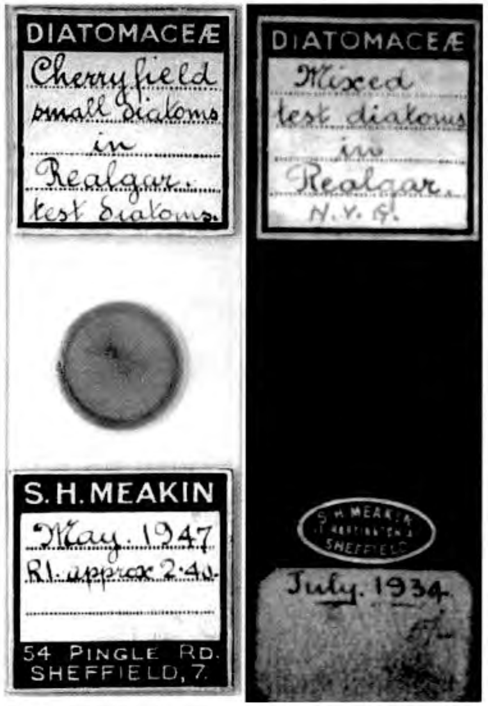
Far Left: Philip Harris
Mid Left: SL
(=[S. Louis] Tempere)
Near Left: Norman

C Baker

Flatters and Garnet



Klaus-Dieter Kemp *



Left: S. H. Meakin

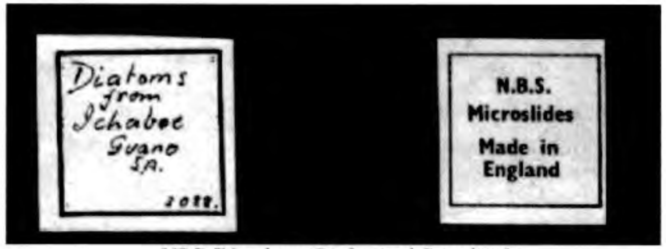
Above: S. Meakin

J A Long, Menston, Leeds

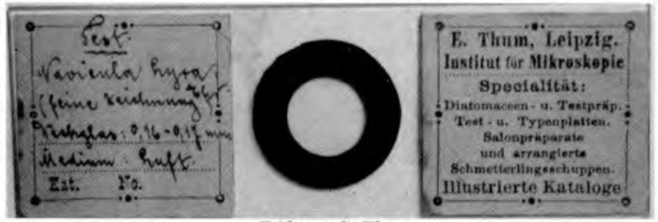
R Suter

H R S Williams

T W Robertson



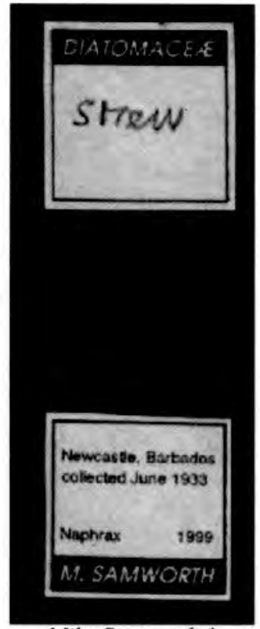
NBS [Northern Biological Supplies]



E(dmund) Thum

J Redmayne

J Tempere (see also S.L)



Mike Samworth *

C N Walter

Edward Ward

W Watson

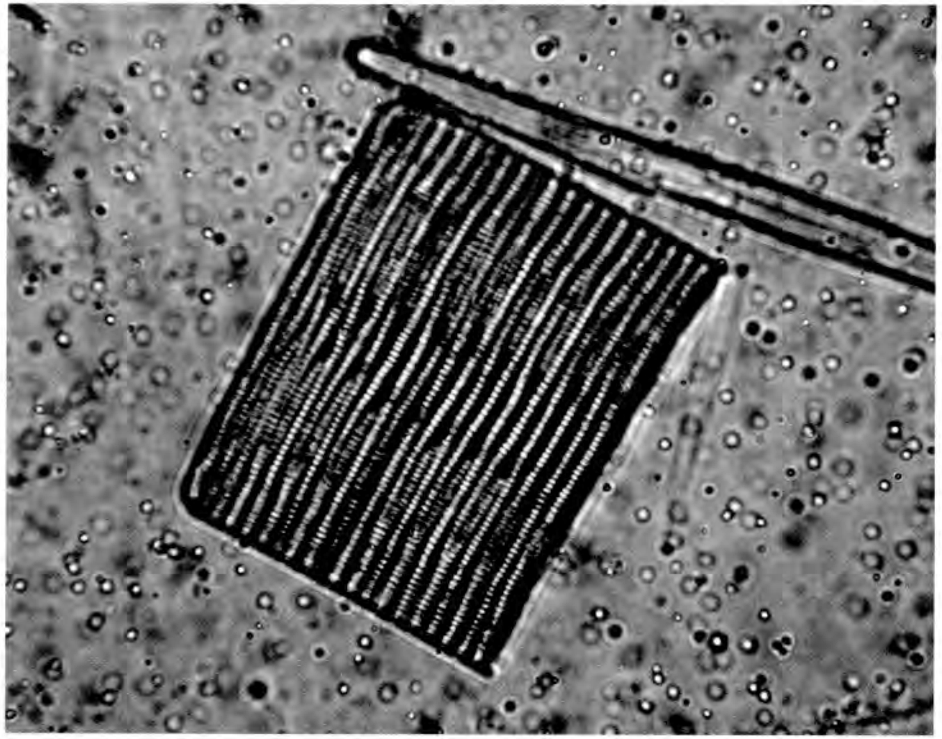
E(dmund) Wheeler

Naphrax or Naff-rax

For a long time we have heard reports of mounts made with Naphrax becoming filled with what has been described as 'oily globules'. All the editors have slides using this mountant and only recently have we discovered some relatively recently made slides exhibiting this phenomenon. The photograph on the next page is a particularly severe example.

The Naphrax used on this slide was from NBS, and one correspondent speculated that the 'oily globules' were a contaminant of the NBS product - possibly the plasticiser that was known to be added at some stage during its manufacture. Another postulated that the 'oily globules' were formed as a result of a reaction between Naphrax and a coating on the slide itself, where perhaps a cleaning agent has not been throughly removed.

Any other explanations welcome - chemists offering help appreciated.



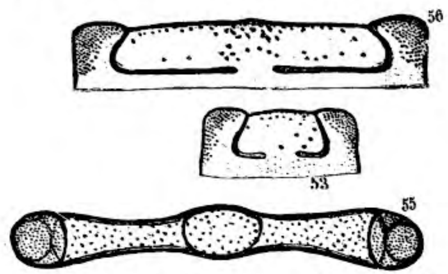
Problems with Depth of Field

by Steve Gill

Having made the change to a modern microscope (made in the latter half of the last century) and a digital camera (made in the latter half of last week), I am having problems with depth of field (known as depth of focus by some).

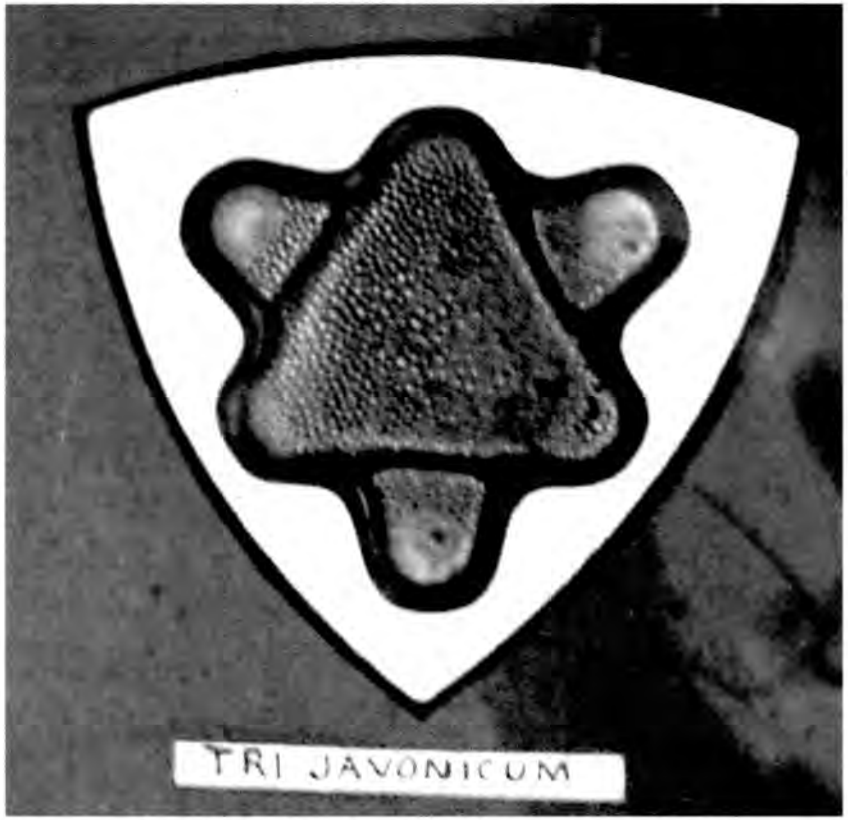
The equipment in question is a Zeiss Universal Microscope with standard achromats and a Nikon Coolpix 990 (OK, not actually made in the latter half of last week).

The diatom I have chosen to illustrate this problem (which I am sure is something to do with



what I am doing, or not doing) is a triangular version of Poreia quadriceps. This particular diatom

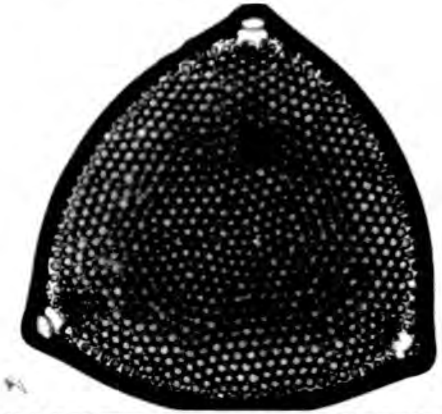
valve face, when examined in girdle view, isn't grossly 3D, but does undulate gently. The illustration from Schmidt's Atlas der Diatomaceenkunde reinforces this.
When you consider what was achieved at the turn of the 19th century my pitiful attempts with 'superior' technology can only mean one thing - 'I don't know what I am doing'. I don't have a problem admitting that this might be (and probably is) the case.
To illustrate what I would like to achieve let us first look at a scan of a photograph from a



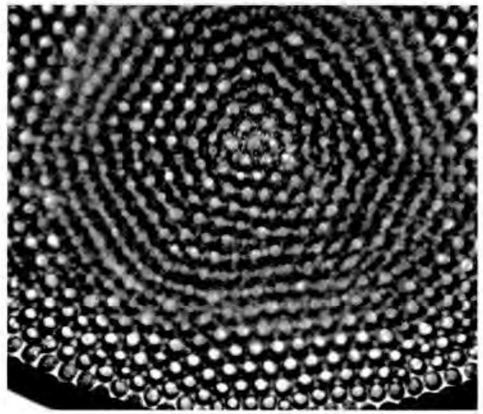
photographer - Thomas Castle - from about the 1920s. This photograph is from a vast number donated to me with a view to writing an article about this diatomist (or possibly to make me feel inadequate). Any information about Thomas Castle would, by the way, be much appreciated.
Although the diatom in question is of a different genus it exhibits the depth of field required on these larger valves with prominent plateaus, occelli etc.
I have taken a number of photographs of complete valves and parts thereof to illustrate what I am talking about and where I perceive the problem.

I must point out at this juncture that I don't particularly have a problen with relatively 'flat' valves - like most of the Navicula. Lots of curvature and processes immediately send me into paroxysms of frustration when any number of microscope associated accessories are subjected

to the most awful language.
The camera is attached to the microscope with a 28mm threaded standard eyepiece. On this basis my assumption is that whatever the microscope system has done the image appearing above the eyepiece will either have a good depth of field or it won't. The f number used on the camera can be large enough to admit sufficient light and is irrevelant as regards the depth of field question (of course, I may be wrong).

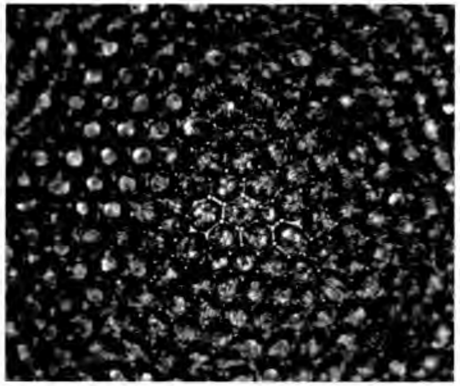


Using a x10 achromat - not bad but a bit fuzzy at certain elevated sections.
CAMERA : E990V1.1
METERING : MATRIX
SHUTTER : 1/4sec
APERTURE : F4.0
IMG ADJUST : AUTO
SENSITIVITY : AUTO
WHITEBAL : AUTO
SHARPNESS : AUTO



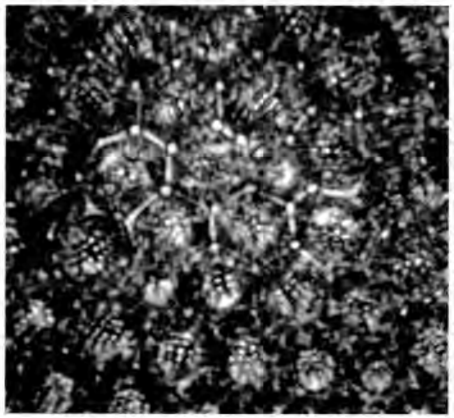
A x16 achromat - not so good.
CAMERA : E990V1.1
METERING : MATRIX
SHUTTER : 1/3sec
APERTURE : F4.0
FOCAL LENGTH : f23.4mm(X1.0)
IMG ADJUST : AUTO
SENSITIVITY : AUTO
WHITEBAL : AUTO
SHARPNESS : AUTO

The same x16 achromat.
CAMERA : E990V1.1
METERING : MATRIX
SHUTTER : 1/3sec
APERTURE : F4.0
FOCAL LENGTH : f23.4mm(X1.0)
IMG ADJUST : AUTO
SENSITIVITY : AUTO
WHITEBAL : AUTO
SHARPNESS : AUTO



A x25 achromat focussing on the central ridge.
CAMERA : E990V1.1
METERING : MATRIX
SHUTTER : 1/2sec
APERTURE : F4.0
FOCAL LENGTH : f23.4mm(X1.0)
IMG ADJUST : AUTO
SENSITIVITY : AUTO
WHITEBAL : AUTO
SHARPNESS : AUTO

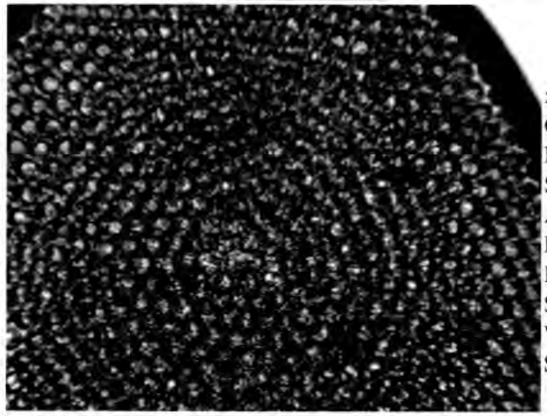
The same x25 achromat.
CAMERA : E990V1.1
METERING : MATRIX
SHUTTER : 1/3sec
APERTURE : F4.0
FOCAL LENGTH : f23.4mm(X1.0)
IMG ADJUST : AUTO
SENSITIVITY : AUTO
WHITEBAL : AUTO
SHARPNESS : AUTO



The central portion with a x63 NeoFluar with iris.
CAMERA : E990V1.1
METERING : MATRIX
SHUTTER : 1/3sec
APERTURE : F4.0
FOCAL LENGTH : f23.4mm(X1.0)
IMG ADJUST : AUTO
SENSITIVITY : AUTO
WHITEBAL : AUTO
SHARPNESS : AUTO

This last image I was quite impressed with (the greyscale doesn't really do it justice). I was able to increase the depth of field using the iris. Unfortunately I don't have lower power objectives with an iris but I did have a Davis Shutter which I had used on my older stands. With modern objectives so well corrected to tube length the addition of something like a Davis shutter onto the nosepiece of a Zeiss Universal was probably going to be a disaster.

x10 with Davis shutter.
CAMERA : E990V1.1
METERING : MATRIX
SHUTTER : 1/6sec
APERTURE : F4.0
FOCAL LENGTH : f23.4mm(X1.0)
IMG ADJUST : AUTO
SENSITIVITY : AUTO
WHITEBAL : AUTO
SHARPNESS : AUTO



x25 with Davis Shutter
CAMERA : E990V1.1
METERING : MATRIX
SHUTTER : 1/4sec
APERTURE : F4.0
FOCAL LENGTH : f23.4mm(X1.0)
IMG ADJUST : AUTO
SENSITIVITY : AUTO
WHITEBAL : AUTO
SHARPNESS : AUTO

I really can't decide whether this made a difference. The effect on correction was nowhere near as drastic as I thought it might be.

So, what I would like now is an authoritative article from someone telling me how to achieve what Thomas Castle achieved all those years ago.

Diatoms on the web

from Stephen Nagy M.D.

Some more diatom links that could be of interest to the readership:

http://aslo.org/phd/plankton.pdf

http://www.geog.ucl.ac.uk/ecrc/report/diatoms.pdf

http://www.biconet.com/crawlers/infosheets/MarvelousMyriadDiatoms.pdf

http://www.umanitoba.ca/faculties/medecine/radiology/Dick_Gordon_papers/Drum & Gordon (2003).pdf

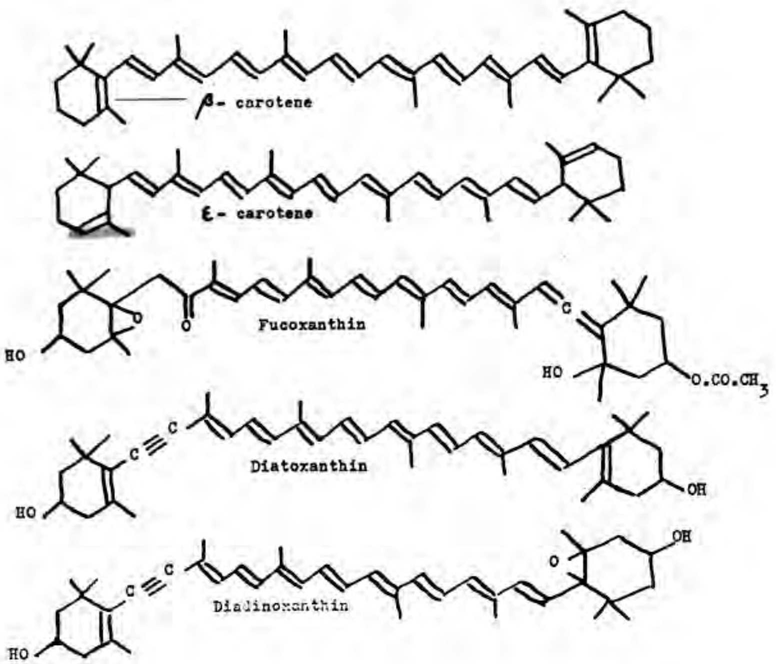
http://www.joanmyers.com/Journal11.htm

Notes concerning Photosynthesis

by Dr. Maurice Moss

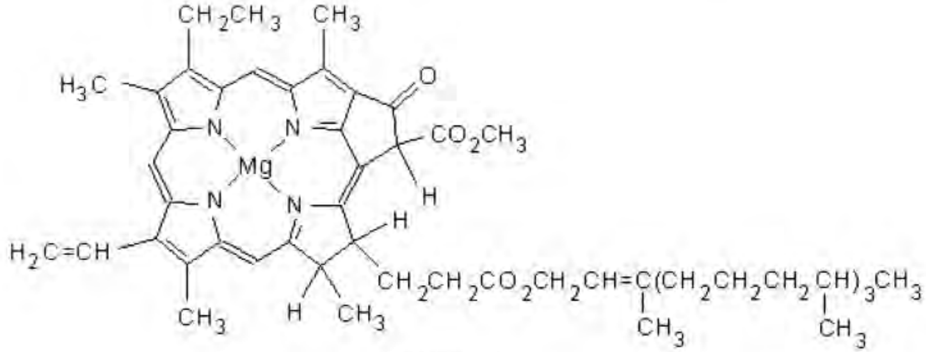
First of all let me thank you all for another fascinating issue of Amateur Diatomist (Vol. III No. 2). I took the family to Reeth in 1980 so the article on Reeth Bridge was a pleasant trip down memory lane.

It was good to see an article on Photosynthesis BUT there is a possible source of misunderstanding. You suggest that "Diatoms also contain a form of Chlorophyll-Xanthophyll - which perform the same function". The Xanthophyls and Chlorophylls are chemically unrelated compounds. All photosynthetic algae, including diatoms, contain Chlorophylls which are the compounds involved in the conversion of light energy to chemical energy. The Xanthophylls are oxygen containing carotenoids and all the plants and algae contain the ordinary carotenes which are yellow but the introduction of oxygen deepens the colours up to red (and I guess red and green combined look brown to us, so diatoms seem to be brown). The presence of carotenoids in the chloroplast probably has several roles, one of which is to protect the chlorophylls from the damaging effects of light. They may also absorb the light and pass the energy on to Chlorophyll. But one thing is certain, they are NOT responsible for the main process of photosynthesis. Below is an extract from a handout I used to give to my students (although they did not like the chemistry) because I find these Xanthophylls fascinating - fucoxanthins with its allene group and the diatoxanthins with an acetylene group.

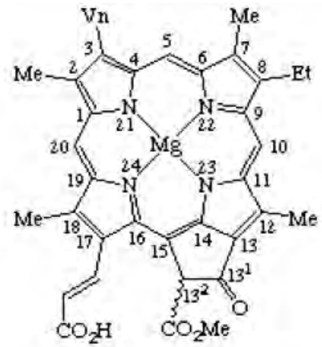


Editors Note:

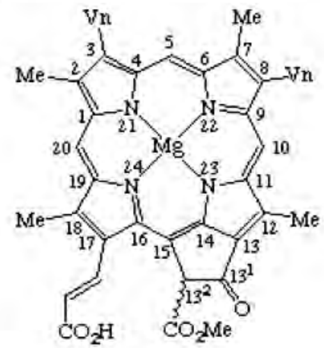
Many thanks for the clarification Maurice. We print below - since you introduced the chemistry - similar diagrams for Chlorophyll-a, Chlorophyll-c1, Chlorophyll c2.



Chlorophyll-a



Chlorophyll-c1



Chlorophyll-c2

Monmouthshire Horse Troughs

by kind permission of The Wellspring Fellowship.

A constant watersource may over time host a series of surrounds. Initially a standing stone or an avenue of stones may lead to the watersource. This may give way to a simple enclosure of stones which, in turn, can develop into a covered well structure. Plumbing developments may pipe the water away into more accessible structures like fountains, village pumps or animal troughs. The Llanover horse trough and spout (ST 3070 0907) is such a transmutation. It rests at the bottom of a field still called Coed y Ffynnon (Well Wood); just beside the A4042. Its proximity to the encroaching road probably caused highway engineers to pipe its water away and now its spout is dry. But the trough - in the curious shape of a barque - is full of rain-water. The inscription round the rim invites all to drink and to remember the bee of Gwent (Lady Llanover, the benefactor). Other inscriptions on the well structure issue warnings about devilish alcohol & encourage self-reflection. Wellsprings member Chris Naish has translated, reflected and came up with the conclusion: "I wouldn't necessarily agree wholeheartedly with those sentiments - I'd sooner drink a quart of Hancock's Best than the stagnant soup I found in that trough!"

Intrigued by horse troughs now? The Monmouthshire warden, Mark Langley, has furnished a list (reproduced below) detailing some of the county's troughs.

Drinking troughs at:-

Bettws Newydd	SO 3603 0820
Maypole	SO 4700 1657
Rockfield	SO 4834 1489
Hendre	SO 4560 1469
Tal y Coed	SO 4190 1508
Llanfaenor	SO 4310 1700
Skenfrith	SO 4570 2019
Penpergwm	SO 3340 1029 (near the King of Prussia Pub)
Llanarth (near)	SO 3703 0997
Trellech	SO 5030 0510 (village pound)

Further details from - The Wellspring Fellowship, 5 Gladis Place, Llanfoist, Abergavenny, Mons. NP7 9NH. Tel: 01873 855474.

The Wellspring Fellowship also produce a splendid little pamphlet entitled Wells, Springs and Things available from them at £1.20, which gives details of A Trellech Trail, a walk around some of the featured water courses and features.

Diatom deposits of Victoria, Australia.

The information in this article has been extracted from the 1912 edition of the Bulletins of the Geological Survey of Australia No. 26. by D. J. Mahony, M.Sc., F.G.S. For the loan of this document we are indebted to Colin Lamb.

Most of the deposits cited we haven't heard of before and certainly don't have any samples (a

thinly veiled challenge to our Australian readership).

The Loddon Valley Deposits

Along the valleys of the Bet Bet, Mount Greenock and Tullaroop Creeks. Particularly at Lillicur on the Bet Bet Creek. The best known deposit on the Tullaroop or Deep Creek is situated in the north-western portion of the parish of Glengower about half-way between Clunes and Rodborough.

Ballarat District

The deposit here appears to be far underground with no outcroppings hence probably not an accessible occurrence. However, for any miners the deposit occurs 150 feet below the surface at Bunker's Hill, about 8 miles south-west of Ballarat.

Melbourne and Suburbs.

Quite how much of these deposits are still extant will depend much on the extent of developments around Melbourne itself. There are four deposits mentioned:

South Yarra - From the Yarra, at the South Yarra railway bridge, a valley runs in a south-easterly direction across Bridge Road and onwards to Toorak Road. This area was originally a swamp but was drained for the building of the railway. The swamp area revealed an extensive deposit of diatomaceous earth which, when wet, is dark and mud coloured but on drying is a light grey.

Fairfield - 3 miles north-east of the city on the right-hand bank of the Yarra.

Brunswick - No details.

Northcote - On the Merri Creek, Northcote.

Mickleham (Braigieburn)

Mickleham is about 25 miles N.N.W. from Melbourne and 8 miles west of Craigieburn railway station. The Saltwater river in this locality has cut a deep gorge through a wide-extending basalt plain. Look for a contrast in the layers of basalt and the diatomaceous earth deposit.

Lancefield

Apparently inaccessible down a well. Don't even think about it.

Portland

Not a surface deposit but some diatomaceous earth was found when a post hole was being dug in the parish of Bolwarra. Another deposit was found at Boomer's Creek, Gorae.

Swan Hill District - Swan Hill on the Murray river. Beneath the crust of Kow Plain.

Bacchus Marsh

Exposed deposits on the slopes leading either to Coimaidai Creek on the east or Goodman's Creek on the west.

Mounting Techniques

This article was amongst some notes received from a book supplier. It was in the form of a handwritten A4 sheet. However, we think it is a copy of an original article as it mentions an environmentally friendly approach to cleaning which, in our experience, was not a consideration with diatom preparers prior to the 1980s. Nonetheless, it describes a method of cleaning which is a combination of two methods described in previous issues of this publication and we think it so clear and concise that it is well worth publishing. If the original author, should there be one, reads this then we hope they will appreciate our difficulty in locating them and will not be too perturbed by its re-issue.

Reagents:	Hydrogen Peroxide	30% or weaker
	Hydrochloric Acid	10%
	Ammonia	1-2%
	Diatom Mountant	

Precautions

Heating H2O2 with strongly organic sediment can lead to violent reactions. Both HCl and NH3 give off strong fumes, and these chemicals must be used in a fume cupboard. Diatom mountants contains organic solvents, and must be used in a fume cupboard as well. (Editors note: Health and Safety considerations)

Method

The method described here follows that of Battarbee (1986). Refer to this paper for a full discussion of diatom analysis and preparation. Since publication of the paper, the method has changed on two points. HCl treatment is now usually done after H2O2 digestion, and the flotation agent ZnBr2 has been replaced with the slightly less environment unfriendly NaWO3.

Place approximately 0.1 g (dry weight) or 1.0 g (wet weight) of sediment in a beaker. Add a small quantity of H2O2, around 20 ml usually is sufficient but more may be necessary for samples with a high organic content. Carefully heat on a hot-plate until all organic material has been removed. Alternatively, the samples can be left standing overnight (or longer) until all organic material has been removed.

Add a few drops of HCl to remove carbonates and any remaining H2O2 from the sample (in fume cupboard). After cooling, pour the sample into a clean centrifuge tube. Any coarse sand may be left in the beaker and thrown away.

Centrifuge the samples for 4 minutes at 1200 rpm. Higher centrifuge speeds will cause increased breakage in the diatoms. Decant the samples discarding the supernatant, re-suspend the sediment by carefully tapping the tube and fill the tubes with distilled water and centrifuge again for 4 minutes at 1200 rpm. Repeat the washing and centrifuging at least 3 times to remove all chemicals. During the last washing, clay can be removed by adding a few drops of very dilute

NH3. However this may not remove all clay, especially in sediment rich samples. Careful sieving over a very fine sieve (10 mm or less) may help here.

Slide preparation

Dilute the diatom suspension to the right concentration. This is something the obviously depends on the material, and it takes practice to get it right. Place a round coverslip on a flat, even surface and with a pipette put some of the diatom suspension on the cover slip. With some care, a nice meniscus can be created. When uncertain about the concentration of the suspension, a second coverslip with a more dilute suspension can be made. Leave the coverslips to dry overnight, making sure that they will not be disturbed by drafts, dust or cleaners. The drying can take up to two days.

When the coverslips have dried they can be mounted on microscopic slides. Heat a hot-plate in the fume cupboard to 120 °C. Place a drop of diatom mountant on the slide and place the coverslip with the sediment down on the drop. Carefully heat the slide on the hot-plate to remove the solvent from the mountant. Allow the slide to cool, and test if the coverslip moves. If so, it will need to be heated a little longer. Two coverslips (of the same sample) can be mounted on one slide.

Literature

Battarbee, R.W. (1986) Diatom Analysis; in: Berglund, B.E. (ed.) Handbook of Holocene palaeoecology and palaeohydrology, p. 527-570.

How to make easy slide labels on a PC

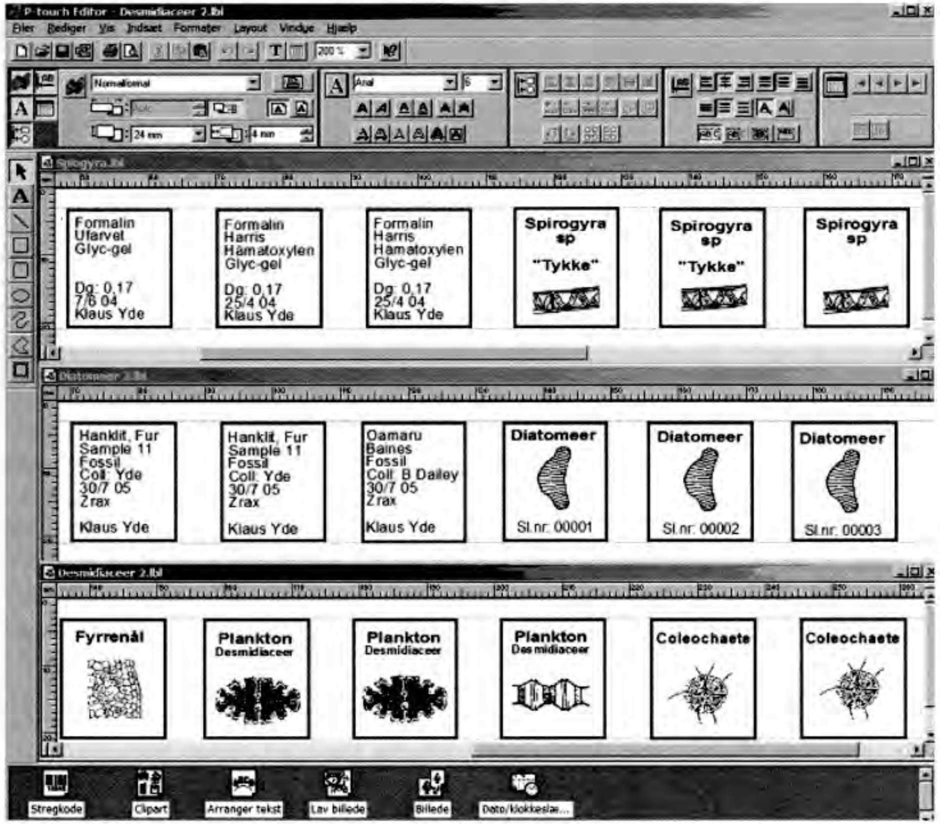
By Klaus Yde, Denmark

I have for many years – as many have before me – used old-fashioned handwritten slide labels on my permanent slides. As my handwriting isn't as neat as could be wished, I have tried to find other solutions. Many colleagues have suggested I use Tom Moore's excellent slide labels from his Microsoft Excel Spreadsheet (if anyone would like to have the file – just email me). They are very neat and nice, but you have to cut them out individually, glue them on the slide and then cover them either with some film or lacquer them. It gave some very nice slides, but it was a lot of work on top of making the slide and ringing it. As I - at that time - made lots of slides (waterbears) I looked for an easier way to make reasonable, aesthetic, oil resistant slide labels.
The solution I found was a Brother P-touch 2420 label printer connected to my computer by an USB cable (fig: 1). But I would think that other label printers could be used with the same results.
The labels are designed using the P-touch editor program that comes free with the label printer. It is intuitive and easy to use, if you are familiar with a PC text editor and are able to make your own small icons. If not – I will gladly share my little but growing collection of designs. Until now I have been able to print all the necessary information on one label and have still been able to read it.

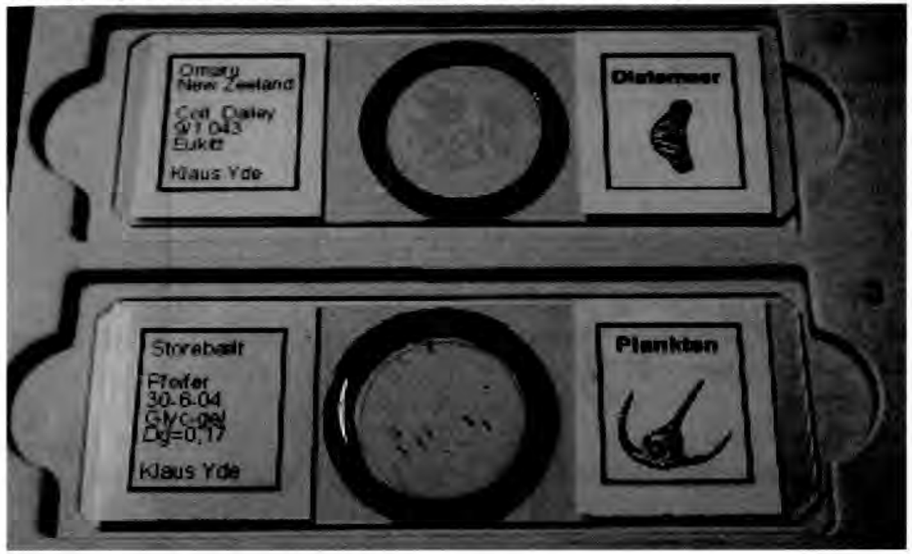
The program interface and some of my designs can be seen at fig 2. below.

Just be aware that if you think my labels look a little odd, it is because they are Danish labels with Danish names and comments about fixing, dying and mounting. All your designs can of course be saved and reused. The greatest problem for me has been finding the small drawings/icons for the labels.

The labels are printed on 24 mm wide plastic coated film, which can be had in several colours for specific slide series. I have only used white until now. I normally make 5-8 sets of labels at one time, which I then print out. You only then have to cut the labels across and as they are self-adhesive, they are easy to place on the slides



I have - until now - not had any problems with my slides. The oldest are about 3 years old and still look as good as new. Some of my finished slides can be seen at fig:3.



The cost of the printer is about 80-100 euros and the labels cost about 10-12 euros for 8-10 metres (which gives a lot of labels), and, of course, the label printer can be used for a lot other purposes. I originally bought it for making address labels and other labelling purposes in my house.

Comments and questions are welcome and the above mentioned files/designs can be had at: **klaus.yde@dadlnet.dk**.

Reducing Slide-to-stage Friction When Selecting Diatoms

by Stephen Nagy, M.D.

Many diatomists prefer to use a bare stage, with no mechanical apparatus to aid movement, when selecting and mounting diatoms. Although the use of a bare stage takes some time and practice to use successfully, it allows for much greater flexibility in movement of the slide than does use of a mechanical stage, and extremely tiny movements are simple to do.

One problem that can arise, however, is increased friction due to water or oils from the diatomist's hand depositing between the slide and the stage surface, which can cause such tension as to prevent smooth movement and sometimes even cause a "backlash," where the slide moves back towards it's original position after being relocated.

A number of techniques have been devised to keep this from happening: dry hands; wipe off the slide bottom and the stage top periodically; use a thin coat of talcum powder. All of these approaches have their drawbacks.

Experimenting with alternative ways to reduce friction, I came across a lubricant used in bicycle shops: Pedro's Extra Dry Chain Lube with Teflon, composed of "natural oils" and 2% teflon. This is produced by Pedro's USA, PO Box 3532, Newport, Rhode Island, 0240-091 USA (401) 849-2909 in a bottle containing 59 ml. The bottle has directions in French, Spanish, German, and several Scandanavian tongues, suggesting that it might be available worldwide, or at least in Europe and the UK.

I have been very pleased with this product, using it as follows:

First, clean the stage with an alcohol swab and allow to dry. Apply a tiny amount of Pedro's Chain Lube with a tissue, spreading it out across the top surface of the stage which has contact with the microscope slide. Then flip over the tissue, and remove as much of the material as possible, leaving only a tiny film remaining on top of the stage.

This application results in a lovely absence of friction; movement of the slide is smooth and feels like refocussing the fine focus on the microscope. Because this is a liquid and not a powder, there is no risk of having extraneous particles of talc appearing in any mounts.

At this time I do not have a sense about how long one application will last, but since only a tiny drop is used per application, one bottle should last for a very long time.

Another use for a micropipette

By Klaus Yde, Denmark

In my years of slide making I have always had trouble in applying the correct amount of mountant on my slides. Either it was too less or too much or very seldom exactly the right amount. That irritated me a lot until I - in some other errand - was at "my" hospitals lab and saw a micropipette used for some obscure blood test. I thought that it could be a solution to dosing

Round 19 mm Ø			
Layer thickness		Volumen	
0,02	mm	5,7	µl
0,04	mm	11,3	µl
0,06	mm	17,0	µl
0,08	mm	22,7	µl
0,10	mm	28,4	µl
0,12	mm	34,0	µl
0,14	mm	39,7	µl
0,16	mm	45,4	µl
0,18	mm	51,0	µl
0,20	mm	56,7	µl
0,22	mm	62,4	µl
0,24	mm	68,0	µl
0,26	mm	73,7	µl
0,28	mm	79,4	µl
0,30	mm	85,1	µl
0,32	mm	90,7	µl
0,34	mm	96,4	µl
0,36	mm	102,1	µl
0,38	mm	107,7	µl
0,40	mm	113,4	µl
0,42	mm	119,1	µl
0,44	mm	124,8	µl
0,46	mm	130,4	µl
0,48	mm	136,1	µl
0,50	mm	141,8	µl
0,52	mm	147,4	µl

my mountant. On eBay I bought 2 micropipettes – One adjustable in 1 uL steps and one with a fixed 1 ml volume – see fig 1. I think I gave about 20 euros for both pipettes and some tips. I have later got several thousand tips packaged in boxes for easy use, for only a couple of euros at eBay – I remember that I had to pay more in P&P than for the tips themselves. I use those two pipettes for nearly all slide working and they are also excellent for catching small interesting things - alive or dead - from small containers.

For working with mountants I then made a small spreadsheet where I calculated the correlation of layer thickness and volume in uL for a given size of cover glass. An example for round 19 mm cover glasses can be seen here.

I quickly found out that theory and practice differed some as I had to some more than the table said, but it was a big help and improved my slide making considerably and the pipettes was much more easy to use than the old 1 ml plastic ones that I used before.

Comments and questions are welcome at: **klaus.yde@dadlnet.dk**.

A Pure Gathering of Achnanthes sp. from the Larval Cases of a Chironomid

by Ed Markham

1. Introduction

In late March 1999, whilst investigating aquatic larvae found in a horse trough at Glenaraneen, Brittas, Co.Dublin, the author observed a considerable number of orange coloured cases had attached themselves to the walls of the trough. Preliminary examination showed they were associated with the larvae of a chironomid which broke free from these cases and swam freely in the water with a whip-like motion. It was found that these gelatinous cases contained large numbers of a diatom later identified as an Achnanthes sp. together with other orange coloured bodies that have not yet been fully identified. This paper is a preliminary description of the identification of the diatom found in the larval cases and a description of the chironomid larvae inhabiting the cases. The other organisms present have not yet been fully identified but the predominant species seem to be the encysted form of Haematococcus.

2.0 Experimental methods

2.1 Isolation and cleaning of the Diatoms

Samples of the gelatinous larval cases were drawn into a Pasteur pipette and released into a Petri dish of pure water. The larvae almost immediately vacated the tubes and swam free. The cases were washed again into a second dish of water and then decanted into a small tube. The washed cases were then fixed and preserved by the addition of a few drops of 40% formalin to give a final concentration of 5%. Half of the sample was digested with concentrated sulphuric acid and oxidized by the addition of sodium nitrate. This sample was then centrifugally washed six times in deionised water. During the washing of the diatoms the author has found it advantageous to add a few drops of a saturated solution of EDTA (disodium salt) early on in the washings. Slides were prepared of the fully washed suspension using Naphrax as mountant. The second half of the undigested sample was later examined for other organisms.

2.2 Preparation of the larvae

The living larvae present in the cases broke free at collection and moved freely in the water. Six were collected and stained with NBS Arthropod stain and mounted according to the methods described in Marson's "Practical Microscopy"(1). Unfortunately the samples were mounted in Numount which subsequently threw a quite heavy dispersion of minute crystals making photographic records overly grainy. The deterioration of the slides continued for some time after their preparation. Line drawings drawn from the mounts when fresh have been substituted in this paper. However, one photograph has been included to show the underside of the head. Examination of all six larvae collected showed them all apparently to be from the same species.

2.3 The Other Organisms Present

Temporary slides were made from the preserved gelatinous tubes of the larvae preserved in 5% formalin. These slides were examined with a x100 (N.A. 1.25) oil immersion lens and x10 eyepiece.

All photographs were taken using a Nytech ND 4020, 4.0 megapixel digital camera.

3. Findings

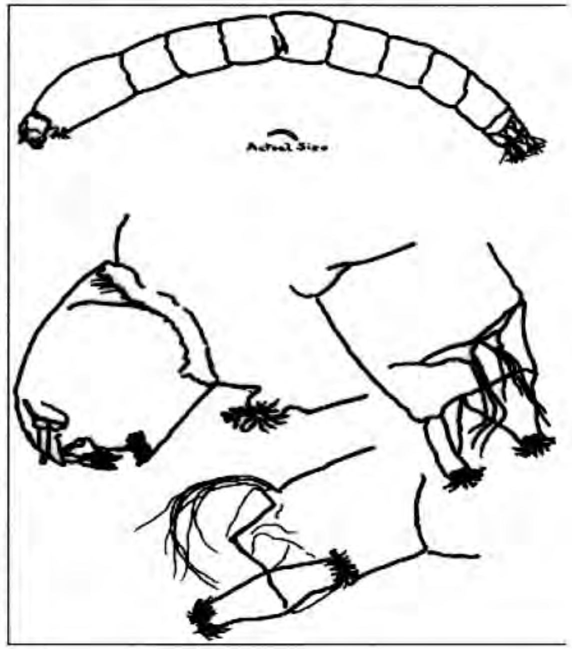
3.1 The Diatoms

The slides showed the cleaned material to be an almost pure gathering of Achnanthes minutissima var. cryptocephala. The photograph below shows the characteristic bent shape of the valves and their small size. The cells were heterovalvar and one can discern the rapheless valves from those with a raphe. The average cell length was 13 microns and the width of the cell at its widest was 2.5 - 3.0 microns. The image below was taken using a x10 eyepiece and a x100 (N.A. 1.25) objective. The number of striae were, however, beyond the capabilities of the author's microscope although they could just be discerned. The identification of the diatom was kindly confirmed by Bernard Hartley (private communication).

The Achnanthes species are widespread in nature and they are generally found in marine environments. One notable exception is Achnanthes minutissima var. cryptocephala, which is usually found as a freshwater species. Foged (2), in his extensive diatom floras, found this species in almost every freshwater environment he visited. It is, we can safely assume, a

cosmopolitan species. In fact, whilst travelling in Ireland, Foged took samples in 15 of the 32 counties and found the taxa in all of them. He found it in 56 of the 143 localities he sampled. It is a widely dispersed taxa. In all cases he found the diatom in freshwater samples either on stones or submerged plant life. In a previous review of the diatoms of the Brittas Ponds (3) the author had not found this taxa although Achnanthes minutissima Kutz 1833 was common.

3.2 The Larvae



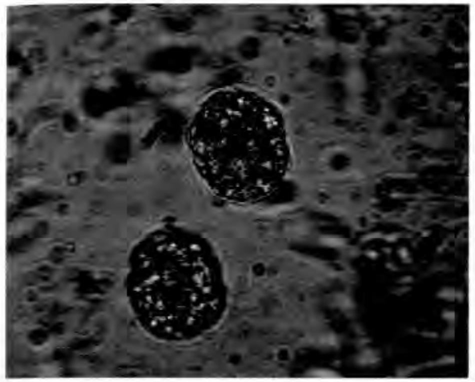
An examination of the six specimens of the larvae showed them to belong to the Chironomidae family. The larvae had both anterior and posterior forelegs (parapods), one pair on the thorax and the second pair on the last abdominal segment. No anal or ventral tubules were observed (4). The average length of the larvae was 10.6 mm.

However, attempts to further classify these larvae into subfamilies and tribes has so far proved unsuccessful. Suitable keys seem difficult to find for European taxa. Epler (5) has published a key for North and South Carolina listing ten subfamilies and sixteen tribes. A key for the adults of British chironomids has been published by Pinder (6) which lists some seven subfamilies and ten tribes. The only key to British species is presently out of print and unavailable (7).

3.3 Other Organisms

The 5% formalin slide preparations, when fresh, still retained a bright orange colour but faded quite quickly on keeping. The most obvious organism was the large circular cell shown below. It is thought this is an encysted cell of Haematococcus. The size of the cells averaged 26 microns.

Two other organisms were observed. So far the author has been unable to identify these organisms. Both were embedded in the gelatinous matrix. No specific colour could be identified with either of them in the temporary preparations.



4. Discussion

Diatoms are virtually ubiquitous in nature in any conditions that pertain to water or damp environments. The only requirements these habits must supply are water, silica and essential nutrilites and some light. However, the author is not aware of any previous reports of diatoms inhabiting the gelatinous cases of chironomid larvae. In such a habitat it is not clear whether they could serve any symbiotic purpose or whether they could be considered parasitic or simply opportunistic. One might consider that the excretory products of the larvae provide a richer or more specific nutrilite choice. It seems strange, however, that they inhabit these cases when the true host frequently vacates them on its forays into the main body of the water. Maybe, quite simply, the diatom merely finds the silken cases another base on which to attach itself. Note: These diatoms produce mucilaginous sheaths. Could it be the silken cases are part constructed by the diatoms? The numbers of the diatoms seem so large as to indicate that they do reproduce within the cases. One might ask what use does the case serve? Could it be that the diatom or the alga provides some essential nutrilite that the larva needs? Interestingly Round, Crawford and Mann (8, p.502) describe the Achnanthes taxa as sub-aerial and find they inhabit such areas as the damp areas between Bryophyte leaves. Diatoms are also known to inhabit the mucilaginous areas of the freshwater ciliate Ophrydium (8 p.114). West and Fritsch (9) describe some algae as endophytes that live within the bodies of other organisms. They describe these as "space parasites " (7, p.4). However, the diatoms described in this paper inhabit not the body of the organism, but its dwelling tube.

The presence of other organisms within these cases in cyst form is interesting. Why should Haematococcus exist in cyst form under apparently ideal conditions? The organism is known to readily form cysts but the water itself showed no great redness or presence of the organism.

5. Conclusions

Normally diatoms are found in free water or attached to rocks or plants. To find diatoms growing within larval tubes seems unusual. It remains to be seen which organisms benefit from this arrangement.

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4. Guthrie, M., "Animals of the Surface Film", New Naturalists Handbooks No.12, 1989. See also:
Stubbs,A.,and Chandler,P., (editors) "A Dipterist's Handbook", The Amateur Entomologist ,1978, Vol.15, p.7.
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6. Pinder,L.C.V., "A Key to the Adult Males of the British Chironomidae", Pt 1 The Key, Freshwater Biological Association, No.37, 1978, p.17
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8. Round, F.E., Crawford,R.M. and Mann,D.G., "The Diatoms" Cambridge University Press, 1990, p502.
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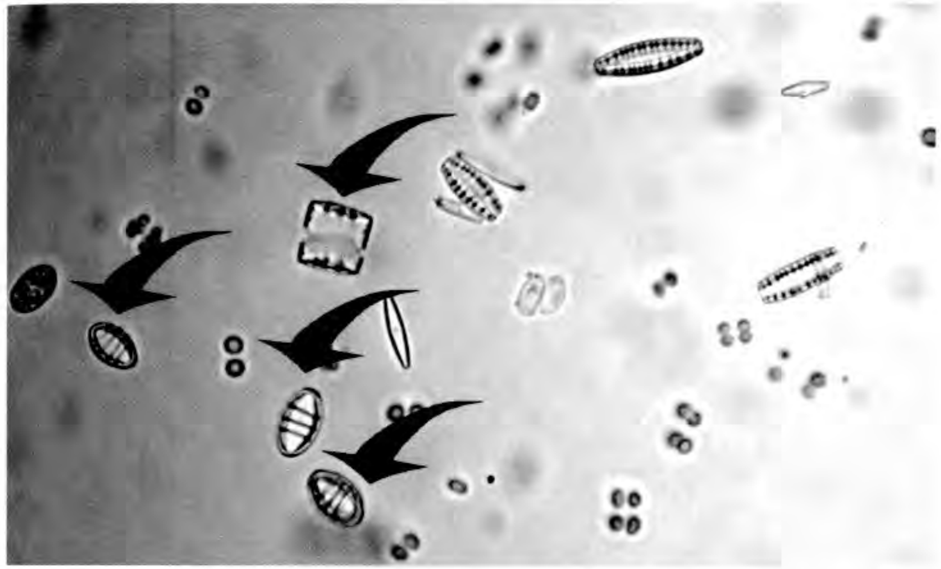
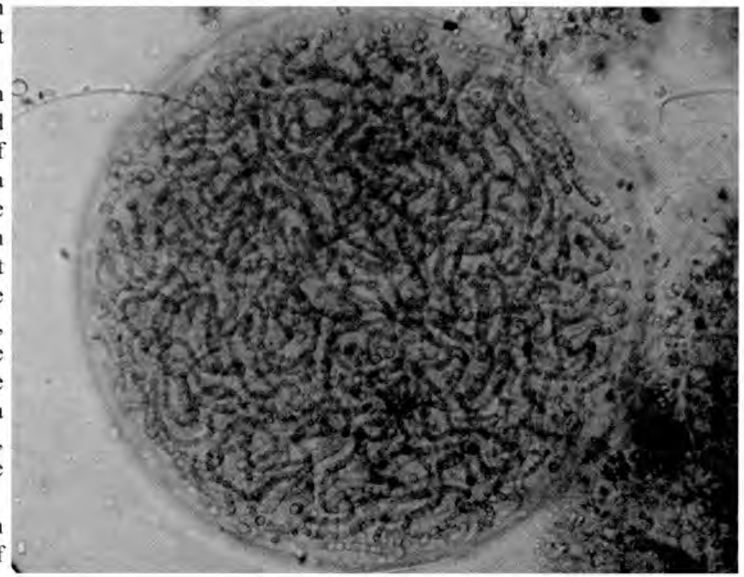
Glass Houses in Glasshouses.

The other day I was sent, by my wife, to repair the greenhouse. She had, she told me, mentioned a few months back that a pane had been blown out and needed replacing. There was no supporting evidence but I graciously set off down to the bottom of the garden to measure up for a replacement pane. Indeed it was the case that a sheet of glass had been blown out and the rain had been getting in, not to mention the heat getting out. Whilst measuring up I noticed that a pot base had filled with water and a formless mass of what looked like diatoms had nearly covered the whole surface area of the water. Unlike growths in the water butt which were always red and of a completely useless red glutinous algae this mass was brown with a slightly green tinge here and there.

This growth, I decided, needed investigating and as my wife had gone shopping I took the opportunity to collect a sample and repair to the microscope room.
Sure enough loads of diatoms - small naviculoids and more interestingly lots of small Diatoma hiemale var. quadratum, or so I believe them to be. Not a variety I had encountered before. Feeling very pleased with myself at this identification.

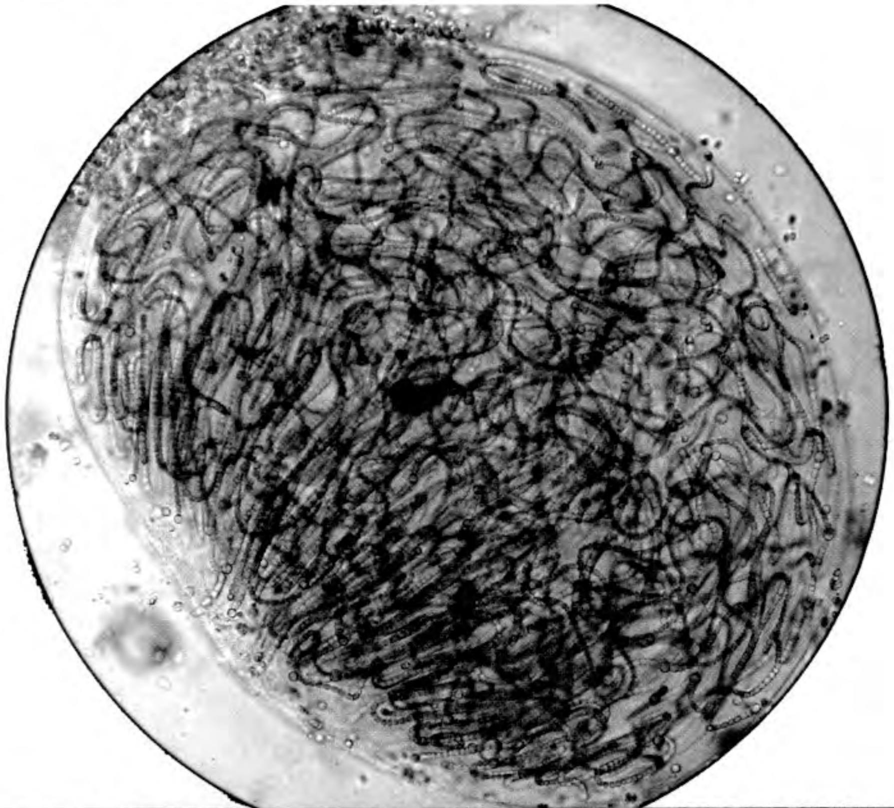


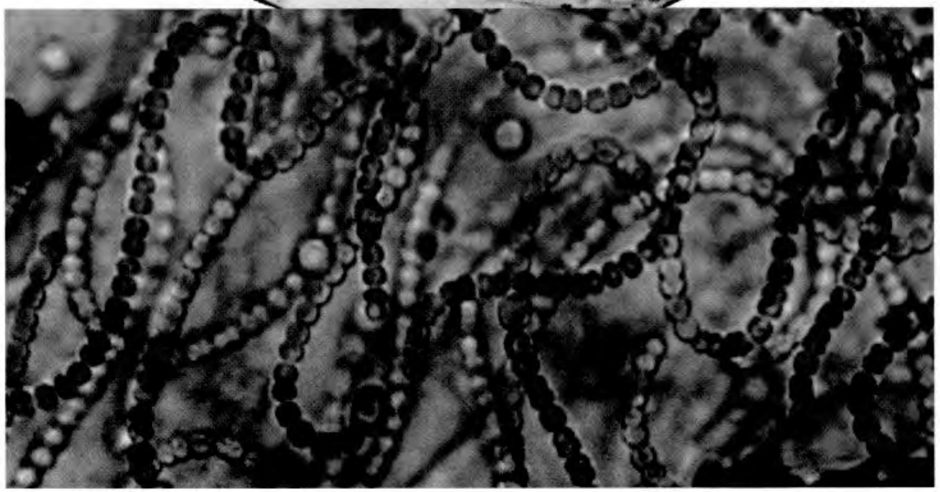
I countinued to scan the slide and was surprised to find some further algae which I found interesting, even though not diatoms.



Every so often there occurred small colonies of an algae with a quite distinctive structure, again something I hadn't seen before. The 'strings of beads', as I would describe the filaments, were enclosed in a mucilagenous case, all of which where spherical.
They were all, I'm sure a species of

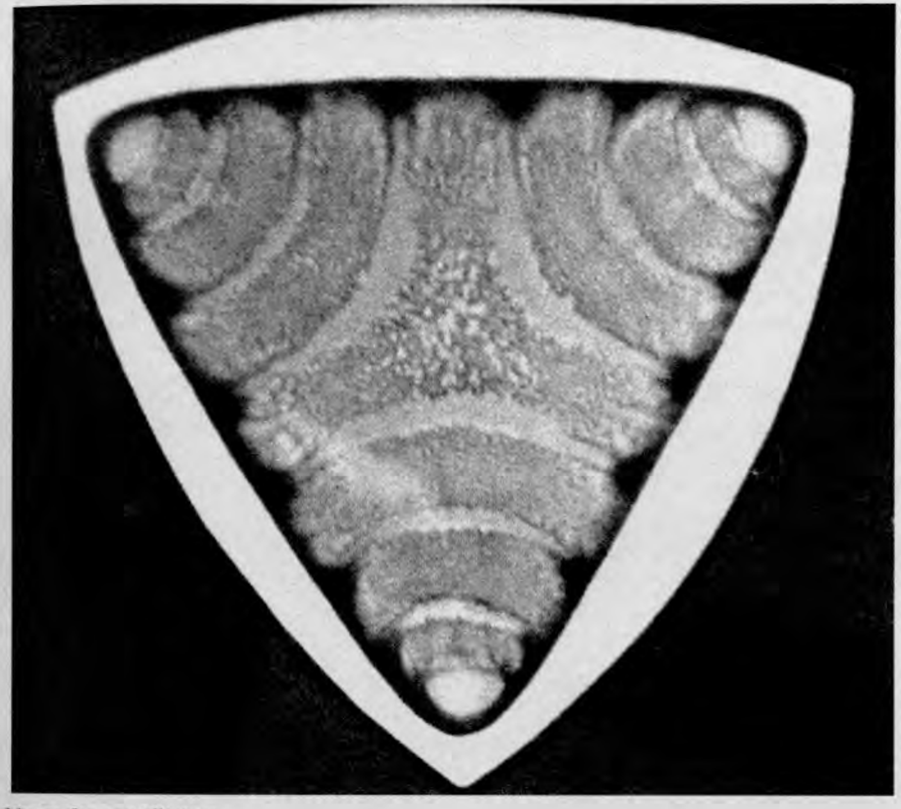
the Nostoc genus. An interesting aside. I'm afraid this little distraction meant that I didn't actually get to measure for the replacement glass but maybe it will be forgotten.





The next issue of

The Amateur Diatomist



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"No one of us know all there is to know, and yet we do not know what we do not know." - Anon.