

## SOME VICTORIAN FOSSIL DIATOMS

*By B. Tindale*

At the request of Mr. E. D. Gill, palaeontologist to the National Museum, I have treated and examined samples of the diatomites listed below with a view to discovering their floral content and ecological relationships. A description of each deposit is given, and the diatom content set out in the accompanying table, so that the occurrences of the species can be readily seen. Wherever possible, I have followed in this table the classification of Dr. Henri van Heurck, ignoring such genera as *Pinnularia* and *Neidium*, both of which are listed under *Navicula* for purposes of simplification.

*Sample 1. South Yarra Railway Station*

*Description.* Dark grey, soft, and laminated; easily worked, disintegrating quickly under treatment. The sample contained much sand and many sponge spicules. The diatoms most abundant are brackish and marine types, but associated with them are a few purely freshwater forms. The locality does not seem to have been influenced by tides to the same extent as sample 5 from the Yarra Improvement Works.

*Slides:* P 15565-7.\*

*Sample 2. Sewerage Tunnel, South Yarra*

*Description.* Dark grey, soft, and laminated; closely related to sample 1, but differing slightly in the diatom content. The sample contained much fine quartz sand, and sponge spicules were fairly numerous.

*Slides:* P 15394-5.

*Sample 3. Junction of South Yarra and Richmond Main Sewers*

*Description.* Dark grey, soft, and laminated. Although closely related to samples 1 and 2, it appears to have been less subject to tidal influence. Contains a good deal of very fine quartz sand, but sponge spicules are not plentiful.

*Slide:* P 15600.

\*The slide numbers are registered numbers in the Palaeontological Collection of the National Museum.

*Sample 4. Church Street Bridge*

*Description.* From 13 feet below high-water. Dark grey, fairly dense, compact, and difficult to clean. Contains much fine sand which appears to be cemented to the diatoms. Closely related to the preceding samples, but from the general content I should think that it has been more subject to the influence of the sea. The types most abundant are marine or brackish forms, and a few freshwater forms are present. Contains a few sponge spicules.

*Slide:* P 15601.

*Sample 5. Yarra Improvement Works*

*Description.* From bottom of old river bed, near Botanical Gardens bridge. Moderately soft, disintegrating easily under treatment. This sample is certainly an estuarine deposit, and appears to have been influenced by the tides to a much greater extent than any of the preceding samples. The most abundant diatom is *Melosira borneri*. As this is a littoral form, its presence in great numbers seems to suggest a close proximity of the actual shoreline. Purely freshwater forms are rare, and the quartz sand content of the sample is rather coarser than in the others. Sponge spicules are not plentiful.

*Slides:* P 15318-20.

*Sample 6. Keilor, Victoria*

*Description.* Dark grey, dry, and granulated. In the first sample of this material sent to me, I was unable to detect any diatoms, although several generous portions were treated. In a later sample, which appeared lighter in colour and somewhat finer in texture, abundant diatoms were found, the greater number of which were brackish or marine. The scarcity of freshwater forms in this deposit is notable. The presence of an occasional *Melosira borneri*, and the great abundance of *Chaetoceros* spores seem to suggest that the environment was a shallow inlet of the sea.

*Slides:* P 15369-70, 15372.

*Sample 7. Coburg, Victoria*

*Description.* Greyish-white, compact, and of considerable hardness. This deposit is a purely freshwater one, the diatoms in greatest abundance being two species of *Melosira*. It appears from the spread of the species to be a lacustrine deposit. The sample contained a number of sponge spicules of two species.

*Slides:* P 15563-4.

*Sample 8. Brunswick, Victoria*

*Description.* Grey, hard, and dense; difficult to break down, and the resulting diatoms much fragmented. The material is of freshwater origin, probably lacustrine. In addition to diatoms, it contains numerous sponge spicules.

*Slide:* P 15396.

*Sample 9. Yarraford Avenue, Fairfield*

*Description.* White, soft, laminated in parts, and easily worked. The resulting diatoms are much cleaner than in any of the preceding samples. The majority of the diatoms are of freshwater types, but it contains some that can flourish in brackish water. Purely marine types are absent. Sponge spicules are not numerous.

*Slides:* P 15561-2.

*Sample 10. Craigieburn, Victoria*

*Description.* Pure white, soft, and laminated. Similar in texture and colour to the Talbot and Lillicur diatomites. This is purely a lacustrine deposit, and is related to the Lillicur diatomite, although the flora differs in general composition. The frustules of the larger types are less in evidence. The predominating forms in the Craigieburn sample are two species of *Fragilaria* and two of *Melosira*. Other writers have recorded *Tabellaria* from this deposit, but in all the samples I have examined I was unable to detect any. Sponge spicules are very plentiful.

*Slides:* P 15598-9.

*Sample 11. Grange Burn, near Hamilton*

*Description.* Greyish-white, hard, very dense and compact. Contains much extraneous matter, which is cemented to the individual diatoms. The diatom content is small, and the individual frustules much fragmented. One peculiar character is, that if the cleaning process is continued, the diatoms appear to fracture; they only appear whole when cemented together in small groups. Few complete frustules of the larger diatoms were seen, so that it is difficult to determine their species, but sufficient fragments were recognized to establish the fact that they are of freshwater origin. Sponge spicules are numerous.

*Slides:* P 15249-51.

## ACKNOWLEDGEMENT

I would like to acknowledge the help of my wife in the search for species and their determination.

## DISTRIBUTION OF FOSSIL DIATOMS

Locality Numbers	—	1	2	3	4	5	6	7	8	9	10	11
	HABITATS	South Yarra Railway Station	Sewerage Tunnel South Yarra	Junction of Richmond and South Yarra Main Sewers	Church Street Bridge	Yarra Improvement Works	Keilor	Coburg	Brunswick	Fairfield	Craigieburn	Grange Burn
<i>Achnanthes lanceolata</i> .. .. .	F									R		
<i>A. triodis</i> .. .. .	F									C		
<i>Actinocyclus barklyi</i> .. .. .	M	F	C		F	C						
<i>Amphora cymbifera</i> .. .. .	M-B			C								
<i>A. robusta</i> .. .. .	M-B	C	R	R	VR							
<i>Campylodiscus clypeus</i> .. .. .	M-B	F			F							
<i>C. echeneis</i> .. .. .	M-B	R	C	F	F	C	A					
<i>Chaetoceros spores</i> .. .. .	M						A					
<i>Coscinodiscus lacustris</i> .. .. .	F		F		F		A					
<i>C. radiatus</i> .. .. .	M-B				R							
<i>Cocconeis placentula</i> .. .. .	B-F			VR				A		C	F	VR
<i>Cyclotella meneghiniana</i> .. .. .	F	C			F							
<i>C. stelligera</i> .. .. .	B-F			VR						A		
<i>C. striata</i> .. .. .	M	A	C	C	C							
<i>Cymatopleura solea</i> .. .. .	F				VR					F		
<i>Cymbella aspera</i> .. .. .	F									A		
<i>C. cistula</i> .. .. .	F	C	F		C			C			C	
<i>C. delicatula</i> .. .. .	F		F	F								
<i>C. gastroides</i> .. .. .	F	F		F	VR	R	R			F		F
<i>C. ventricosa</i> .. .. .	F									C		
<i>Epithemia gibba</i> .. .. .	F	C		R	R					C	R	
<i>E. gibberula</i> .. .. .	*	C	R	F	F		R			C		
<i>E. hyndmannii</i> .. .. .	F						C					
<i>E. turgida</i> .. .. .	B-F				F		C	C				
<i>E. zebra</i> .. .. .	F								R			VR
<i>Eunotia arcus</i> .. .. .	F							F	C			
<i>E. eruca</i> .. .. .	F		R	R	R	R	R	C		C	VR	
<i>E. flexuosa</i> .. .. .	F								R			
<i>E. lunaris</i> .. .. .	F											F
<i>E. major</i> .. .. .	F	C		R	F					C		C
<i>E. pectinalis</i> .. .. .	F			R				C		C	R	C
<i>E. praerupta</i> .. .. .	F				R							
<i>Fragilaria harrisonii</i> .. .. .	F							C		A	A	
<i>F. mutabilis</i> .. .. .	F			F				C				
<i>F. virescens</i> .. .. .	F	A								A	A	
<i>Gomphonema intricatum</i> .. .. .	F	F		F		R		C		C	C	R
<i>G. montanum</i> .. .. .	F			F				C				

FREQUENCIES.—A = abundant, C = common, F = few, R = rare, VR = very rare.

HABITATS.—M = marine, M-B = marine and brackish, B = brackish, B-F = brackish and freshwater, F = freshwater, \* = all habitats, according to variety.



## DISTRIBUTION OF FOSSIL DIATOMS (continued)

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<i>G. ventricosum</i> .. .. .	F			F						C		
<i>Hantzschia amphioxys</i> .. .	B-F						R	C				
<i>Hyalodiscus laevis</i> .. . . .	M	C	C	C	C	C	C					
<i>Mastogloia dansei</i> .. . . .	B-F	A	C	C								
<i>M. grevillei</i> .. . . .	B-F										C	
<i>Melosira borneri</i> .. . . .	M-B		VR			A	R					
<i>M. crenulata</i> .. . . .	F							C	C	C	A	F
<i>M. granulata</i> .. . . .	F										A	F
<i>M. varians</i> .. . . .	F							A		F		
<i>Navicula ambigua</i> .. . . .	F						R	F				
<i>N. aspera</i> .. . . .	M				F							
<i>N. borealis</i> .. . . .	F						VR					
<i>N. cuspidata</i> .. . . .	B-F	F	C							F		
<i>N. elliptica</i> .. . . .	B-F	A	C	C	C							
<i>N. iridis</i> .. . . .	F	F		F				R		F		
<i>N. lauta</i> .. . . .	M-B			R	VR	R						
<i>N. liber</i> .. . . .	M				C							
<i>N. lyra</i> .. . . .	M			R	R	R						
<i>N. macilentata</i> .. . . .	F										C	
<i>N. major</i> .. . . .	F	C	R	A				R	C	C	C	
<i>N. nobilis</i> .. . . .	F								C			
<i>N. smithii</i> .. . . .	M	A	C	F	C		A					
<i>N. subcapitata</i> .. . . .	F			C						A	F	
<i>N. viridis</i> .. . . .	F							R				R
<i>N. yarrensensis</i> .. . . .	M-B	F	F	C	C	C						
<i>Nitzschia scalaris</i> .. . . .	B	A		A	F	A						
<i>N. spectabilis</i> .. . . .	B-F								C			
<i>N. tryblionella</i> .. . . .	B-F		R	C	F		C	R				
<i>N. vitrea</i> .. . . .	B								C			
<i>Pleurosigma balticum</i> .. . .	M	R	VR	R	R							
<i>Stauroneis acuta</i> .. . . .	F									F		
<i>S. anceps</i> .. . . .	F	F		F				R	R	F		R
<i>S. phenecenteron</i> .. . . .	F			F					R	F		R
<i>Surirella ovalis</i> .. . . .	B-F				F							
<i>S. robusta</i> .. . . .	F							F		F		
<i>S. sp. (fragments)</i> .. . . .		VR										VR
<i>Synedra ulna</i> .. . . .	B-F			C	F			C		C	C	
<i>Vanheurckia rhomboides</i> .. .	F	C		F				F				

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