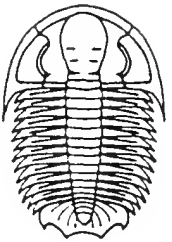
THE FOSSIL COLLECTOR

BULLETIN Nº 18 JANUARY 1986



SECRETARY

F.C.Holmes, 15 Kenbry Road, Heathmont, Victoria 3135. (03)7290447

REPRESENTATIVES

AUSTRALIAN CAPITAL TERRITORY:

Mrs. M. Webb, Fairlight Stn., R.M.B.141 via Woden, 2611. (062)365123

NEW SOUTH WALES:

G. Dale, 50 Cuzco Street, Coogee, 2034. (02)3495523

NEW ZEALAND:

Mrs. N. Giles, 1006 Sussex St., Hastings, N.Z. 84272

NORTHERN TERRITORY:

D. Aslin, P.O.Box 1032, Alice Springs, 5750. (089)524759

QUEENSLAND:

I. Sobbe, M/S 422, Clifton, 4361. (076)973372

SOUTH AUSTRALIA:

R. Threadgold, 38 Burlington St., Walkerville, 5081. (08)443176

J. Barrie, P.O.Box 227, Coonalpyn, 5265. (085)711172

TASMANIA:

Mrs. D. Vincent, 6 Caroline St., Launceston, 7250 (003)442673

VICTORIA:

F.C.Holmes, 15 Kenbry Rd., Heathmont, 3135. (03)7290447

WESTERN AUSTRALIA:

Mrs. L. Schekkerman, 3 Pascoe St., Karrinyup, 6018. (09)3416254

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EDITORIAL

Having calculated the length of the material already prepared for this Bulletin, I find to my great delight that there is only about 1/2 a page available for the Editorial. After a terrible start to the year - nothing prepared or submitted for the January issue - we have again managed to fill 32 pages, albeit with one major article. Thanks to John Barrie and Sue Turner I even have some excellent material ready for the May issue, but as always need more.

It was both gratifying and worrying to note in "The Sun" (Melbourne, Feb. 7th. 1986) a report headed "BAY THREAT TO FOSSIL BEDS". Gratifying to see the press reporting the Port Phillip Conservation Council's concern at proposals to reclaim areas of Beaumaris Bay and nearby Keefer's boatshed for purposes associated with boating, but also worrying to think that the internationally important fossil beds at the base of the Beaumaris cliffs are under threat. The report notes that the Planning Ministry's coastal division is awaiting advice from the local councils concerned, one of whom has at least sought advice on the effects of such reclamation from Dr. Eric Bird of Melbourne University. Let's hope they don't give in to the mighty dollar or Melbourne's only major near city fossil locality will disappear.

Frank Holmes.

QUEENSLAND PALAEOBIOLOGY FORUM - NEXT MEETING

We are hoping to hold the next forum in the Geology Museum of the University of Queensland on Saturday afternoon, March 22nd. 1986. This time we shall be holding a fossil "surgery" and would like all to come. Bring your problem fossils, any you can't identify or would like to discuss, as well as any new finds which you consider will be of interest. Hopefully there will be people present with knowledge of vertebrate, invertebrate, plant and trace fossils to provide a few answers to any questions. Andrew Simpson, the Geology Curator, will organize a slide show, so do please bring along any interesting slides of fossils. More information from Andrew Simpson or Barry Fordham (Geol. Surv. Qd.).

Sue Turner

FINANCES

Statement of finances as at 31st. January, 1986

Carried forward from previous year	$ 926-67
Add income - 1st. March '85 to 31st. Jan. '86	823-02
	1749-69
Less expend. - " " " " "	981-20
Balance in hand	$ 768-49

IN THE NEWS

CAVERS DISCOVER EXTINCT TIGER SKULL

Two thylacine skulls dating back 4000 years have been found on the Nullarbor. W.A. Museum authorities confirmed the identification and gave the skull's approximate age.

They were discovered just before Christmas by Innaloo teacher and caver Lindsay Hatcher, about 100km east of Eucla.

The Thylacine, sometimes called the Tasmanian tiger or wolf, was the dominant predator in Australia until about 10,000 years ago. Many authorities believe it became extinct on the mainland as recently as 3,000 years ago. Its remains have been found in W.A. from the south coast to the Kimberleys.

Mr. Hatcher, who last September found a 2,000 year old Tasmanian devil skull near Gingin, made his latest discovery while working with an A.B.C. documentary team on flint deposits and cave scrapings at Koonalda in South Australia. During a break in filming he and other cavers decided to explore another cave nearby. There were three small chambers leading off the main hole. In the third chamber they found the thylacine remains, plus those of several well preserved kangaroos, possums and small rat kangaroos. The smaller of the two thylacine skulls still had a tuft of hair adhering to the bone and nearby the larger skull there were several vertebrae.

It is generally believed that the thylacine found on the Nullarbor was smaller than that found in Tasmania.

The West Australian Saturday February 1st. 1986.

COULD MARSUPIALS HAVE ORIGINATED IN AUSTRALIA?

Theories that marsupials migrated to Australia have been shattered by a startling new fossil discovery. The new find suggests the animals may have originated here.

A 3mm vertebra found last year in Queensland is believed to be at least 100 million years old - 20 million years older than a North American marsupial fossil till now believed to be the oldest marsupial fossil in the world.

Scientists are now almost certain the Queensland specimen came from a marsupial mammal or a descendent of the group and not from a dinosaur.

Cont...

COULD MARSUPIALS HAVE ORIGINATED IN AUSTRALIA? (Cont.)

If correct, it could be one of the most significant scientific discoveries of recent times, because it infers that marsupials almost certainly originated in Australia and moved to colonise other parts of the world.

Scientists traditionally have believed pouched mammals migrated to Australia, either from South America over Antarctica, or from Europe through south-eastern Asia.

According to Dr. Ralph Molner, Curator of Mammals at the Queensland Museum, this discovery is going to shake up the whole idea of how people think about the origins of these animals. In future we had better take much more seriously than we have in the past the idea that Australia is the real home of marsupials.

Until now, it had been assumed that because the oldest marsupial fossils have been found in North America, that is where they originated from.

The fossil vertebra found in June last year near Hamilton Station, east of Bouliain, north-west Queensland, was embedded in rock and remained unnoticed until limestone deposits collected at the site were dissolved in acid.

Dr. Molner stated he was not positive about the fossil's significance until it was examined by scientists during a recent tour of England, West Germany and the United States.

The consensus is that the specimen is either a marsupial or one of their descendents.

A colleague of Dr. Molner's from the Free University in Berlin has firsthand experience with similarly aged placental mammals from Europe and is quite excited by the find.

The previous oldest known Australian marsupial fossil is 20-25 million years old and related to the modern day native cats and phalangers.

Dr. Molner said the Hamilton Station specimen probably belonged to a mammal about 10cm long and dated back to the Lower Cretaceous era - about 40 million years before dinosaurs became extinct.

The Sun (Melbourne), Saturday, December 28th. 1985

FOSSIL FIND MAY REWRITE THE HISTORY OF MAMMALS
by Peter Roberts.

Australian zoologists have found a 15 million year old fossil mammal that has a jaw and teeth unlike any other known creature and may have lived exclusively on a diet of eggs.

The rabbit-size animal - the first such animal discovered - was found by a team led by Dr. Michael Archer, Associate Professor of Zoology at the University of New South Wales.

Dr. Archer, stated that the animal had two forward-pointing teeth that were probably used to pierce eggshells. It also had sharp V-shaped back teeth that could work against each other like a pair of scissors, but had no teeth that could be used to grind food. This has led him to postulate that the animal was an exclusive egg eater.

"We don't know what it is yet, it is one of the weirdest mammals that has ever surfaced." Dr. Archer said. "Most animals will have a go at an egg, but usually have the capacity to eat other things as well."

The mammal is one of more than 100 new species discovered in a massive fossil region found on the Riversleigh Plateau of north-west Queensland in 1983. These finds have doubled the number of species known from Australia that are greater than two million years old.

Yet to be named, the animal is likely to have been a tree-dweller, foraging for birds' eggs high in the rainforest canopies of ancient Australia. It is possible that the animal ate frogs' eggs.

Until now there have been only two groups of placental mammals known in the Australian fossil record - rodents and bats. The new animal's identification as representive of a third group, comes from the structure of its tooth enamel.

It has always been assumed that marsupials developed by default in Australia because there was no competition from placental mammals.

Rodents and bats were considered to be relatively recent arrivals in Australia, but this idea had been overturned by the discovery of the new animal living at an early date in pre-

Cont...

FOSSIL FIND MAY REWRITE THE HISTORY OF MAMMALS (Cont.)

history. "Clearly placental mammals were here and, what is more, they were exterminated." Dr. Archer said.

He also stated that the Riversleigh Plateau contained a continuous fossil record going back at least 15 million years. This would allow the evolution of marsupials to be traced over that time.

The team working with Dr. Archer has named only six of the new species so far. Sponsors were needed to continue the work, which is supported by the Australian Research Grants Scheme.

Volunteers are being sought by the research team to join the next expedition to the site which starts on 15th April,1986. Interested people should contact Mr. John Courtenay of the Gulf Local Authorities Development Assoc.,Post Office Box 2291, Cairns, or by phoning 070-517299.

The Age (Melbourne), Monday Jan. 28th. 1986.

AUSTRALIAN ORDOVICIAN GRAPTOLITES AND THEIR ZONAL DISTRIBUTION compiled by Frank Holmes

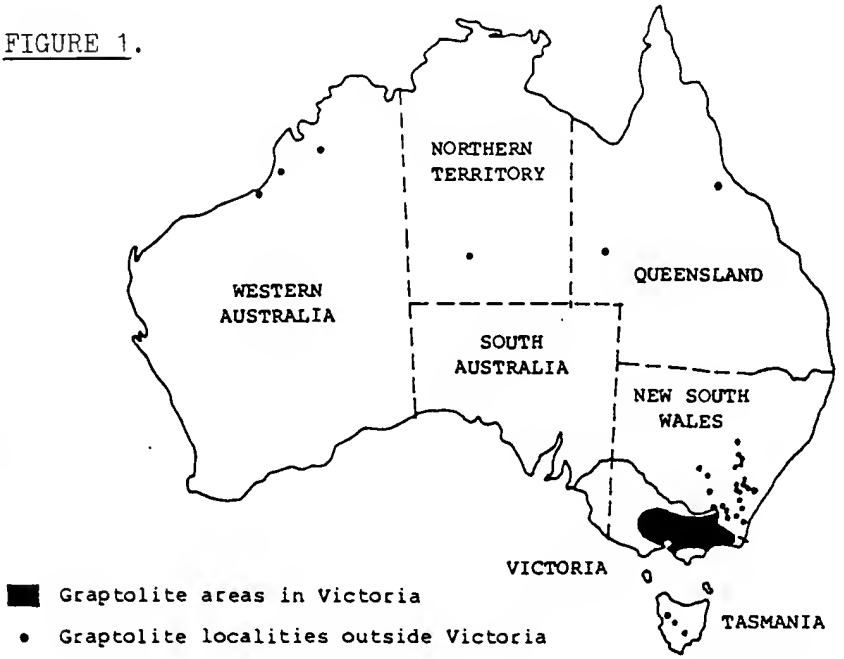
Graptolites, colonial marine organisms which became extinct in the Lower Devonian, are particularly important as zonal fossils in Ordovician and Silurian marine sedimentary rocks.

Victoria is extremely fortunate in having what is probably the best sequence of Ordovician graptolites in the world.

A virtually continuous record of the evolution and diversification of the Order Graptoloidea during the 67 million or so years of the Ordovician Period, exists within a 150 kms of Melbourne. The Australian distribution of these creatures is shown in Fig 1.

Preservation is generally in the form of compressed flattened carbonised remains in shales and similar argillaceous rocks; consequently what is known of the detailed anatomy of graptolites can only be understood by reference to the relatively rare specimens preserved in three dimension, such as the pyritised forms from Scotland. However, in Victoria what is lacking in fine detail is certainly counteracted by the diversity of species to be found.

FIGURE 1.



In very broad terms the structure of these predominantly planktonic organisms consists of a rhabdosome, a secreted exoskeleton with characteristic growth bands and lines, consisting of a series of hollow interlinked tubes (see Fig.2). The first formed part of a graptolite colony is the sicula, a conical tube with its aperture pointing downwards and its apex terminating in a long thread like nema, which when embedded in the wall of the graptolite is known as the virgula.

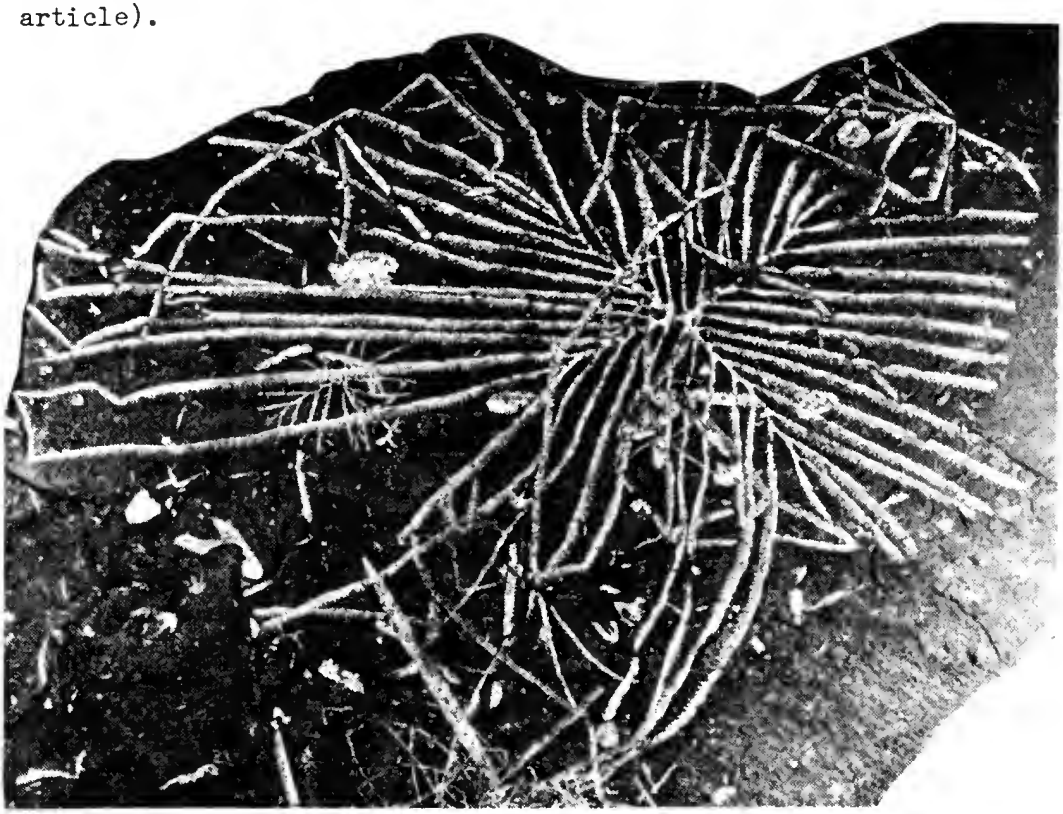
Projecting below the aperture is a stout spine called the virgella. From the sicula there grew a number of cup-like thecae, the initial one beginning at a primary notch in the growing edge. The thecae housing individual zooids, simple animals with some sort of food gathering apparatus, are usually arranged in a single or double row along the stipes (branches) of the rhabdosome (colony), rarely in irregular aggregates.

The stipes of graptolites show an evolutionary trend from a position in which they hang downwards from the nema and sicula, through intermediate positions to the scandent type of growth in which the stipes grow upward along the nema (see Fig.3).

Cont...

AUSTRALIAN ORDOVICIAN GRAPTOLITES (Cont.)

It is not the intention of this article to provide detailed descriptions of the morphology of the various families that make up the Order or even to list all the recorded genera, let alone species that have been recorded in Australia. Rather to provide a general guide to the recognition of most of the common species based mainly on the illustrations contained in D.E. Thomas' 1960 article "The Zonal Distribution of Australian Graptolites" Anyone wanting in depth information about these fascinating Palaeozoic animals should read the "Treatise" or the relevent chapter in any of the recent standard textbooks on Invertebrate Palaeontology (see References at the end of this article).



A slab of slate exhibiting a variety of different graptolite genera. The very large specimen is *Goniograptus speciosus* T.S.Hall. The smaller many branched specimen at centre left also belongs to this genus. Other genera represented are *Tetragraptus* lower left of smaller goniograptid; *Isograptus* a larger species (lower right) and smaller species lower left. Fragments of *Oncograptus* and *Cardiograptus* are also visible

The name Graptolithus (from the Greek *graptos* - inscribed, painted + *lithos* - stone) was first applied by Linne in 1735 to inorganic markings such as dendritic incrustations simulating fossils.

It was not until 1821 that the name was used by Whalenberg for definite graptolite remains. The term graptolithus was eventually abandoned as a catch-all genus in the 1870's when graptolites began to be subdivided on the basis of easily recognisable features such as distinctive general form (Phyllograptus, Dicranograptus), number of branches (Tetragraptus, Monograptus) or biseriality (Diplograptus) etc.

Graptolites are now included in the Phylum Hemichordata as it is considered they bear a distant affinity to vertebrates. For a long time, however, they were regarded as allied to corals, a group which have a much simpler grade of biological organisation.

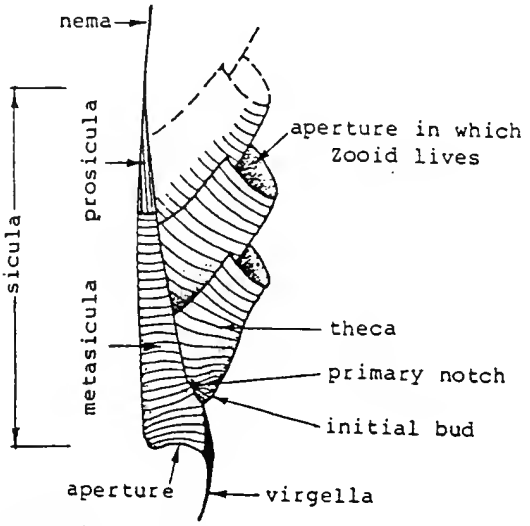


FIGURE 2.

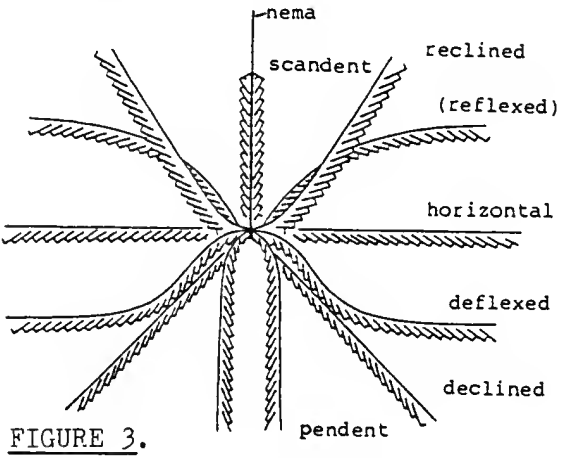


FIGURE 3.

The two main Orders of the Class Graptolithina Bronn 1846, that we are concerned with in this article are the Dendroidea and the Graptoloidea. The following table shows the subdivision of these orders into families and includes a list of illustrated genera.

Order DENDROIDEA Nicholson 1872. Range? M.Cambrian, U.Cambrian-Carboniferous

Dendrograptidae:	*Rhabdinopora*
Anisograptidae :	*Adelograptus, Anisograptus, Araneograptus, Clonograptus, Kiaerograptus*
Ptilograptidae :	-
Acanthograptidae:	-

Cont...

AUSTRALIAN ORDOVICIAN GRAPTOLITES (Cont.)

Order GRAPTOLOIDEA Lapworth 1875. Range L. Ordovician-L.Devonian

Didymograptina (suborder) " Ordovician

Dichograptidae :

-Multiramous forms : *Brachiograptus, Dichograptus, Goniograptus, Loganograptus, Pseudobryograptus, Pterograptus, Schizograptus, Sigmagraptus, Trichograptus, Zygograptus.*

-Pauciramous forms : *Cardiograptus, Didymograptus, Isograptus, "Maeandrograptus", Oncograptus, Phyllograptus, Pseudisograptus, Skiagraptus, Tetragraptus.*

Sinograptidae : *Sinograptus*
Abrograptidae : -
Corynoididae : *Corynoides*
Nemagraptidae : *Leptograptus, Nemagraptus, Pleurograptus*
Dicranograptidae: *Dicellograptus, Dicranograptus*

Glossograptina (suborder) Range Ordovician
Glossograptidae : *Apiograptus, Glossograptus, Paraglossograptus.*
Cryptograptidae : *Cryptograptus*

Diplograptina (suborder) Range L.Ordovician-U.Silurian
Diplograptidae : *Amplexograptus, Climacograptus, Diplograptus, Glyptograptus, Orthograptus, Pseudoclimacograptus, Undulograptus.*
Lasiograptidae : *Hallograptus, Neurograptus, Nymphograptus.*
Dicaulograptidae : -
Peiragraptidae : -
Retiolitidae : *Orthoretiograptus, Reteograptus*
Dimorphograptidae : -

Monograptina (suborder) Range L. Silurian-L.Devonian
Monograptidae : -
Cyrtograptidae : -

The Australian Ordovician graptolite sequences have been divided into 30 zones (VandenBerg 1980 - unpublished report), however, the

subdivision of the Gisbornian succession and the late Bolindian are listed as informal because of the current lack of documentation of these particular sequences and the Yapeenian zone Ya3 may be too localised to justify such a subdivision.

The following table lists the various zones and index fossils of the Australian stages with an approximate indication of their relationship to the internationally accepted epochs.

STAGE	ZONES	ZONAL FOSSILS	EPOCH
BOLINDIAN	Bo(u)	*Climacograptus ? extraordinarius*	ASHGILL
	Bo(m)	*Dicellograptus ornatus -Climacograptus latus*	
	Bo1	*Climacograptus uncinatus*	
EASTONIAN	Ea4	*Dicellograptus gravis*	
	Ea3	*Dicranograptus hians kirki*	CARADOC
	Ea2	*Climacograptus baragwanathi*	
	Ea1	" *spiniferus* n.ssp.	
GISBORNIAN	Gi(u)	post *N. gracilis* with *Climacograptus bicornis*	LLANDEILO
	Gi(m)	*Nemagraptus gracilis*	
	Gi(l)	pre *N. gracilis* (no index fossils)	
DARRIWILIAN	Da4	*Glyptograptus teretiusculus*	LLANVIRN
	Da3	*Pseudoclimacograptus decoratus*	
	Da2	*Glyptograptus intersitus*	
	Da1	*Undulograptus austrodentatus*	ARENIG
YAPEENIAN	Ya3	*Apiograptus*	
	Ya2	*Cardiograptus morsus*	
	Ya1	*Oncograptus*	
CASTLEMAINIAN	Ca3	*Isograptus victoriae maximus*	
	Ca2	" " *victoriae*	
	Ca1	" " *lunatus*	
CHEWTONIAN	Ch2	*Didymograptus protobifidus*	
	Ch1	*D. protobifidus* and *T. fruticosus* 3 br.	
BENDIGONIAN	Be4	*Tetragraptus fruticosus* 3 br.	
	Be3	" " " & 4 br.	
	Be2	" " 4 br.	
	Be1	*T. approximatus* & *T. fruticosus*	TREMADOC
LANCEFIELDIAN	La3	*T. approximatus*	
	La2	*Adelograptus victoriae*	
	La1.5	*Psigraptus* and *Clonograptus*	
	La1	*Rhabdinopora scitulus* & *Anisograptus*	

The boundary of a zone is defined by the appearance or disappearance of one or more species of graptolites. The zonal fossils themselves are usually but not necessarily short lived forms which are found only within one particular zone. The presence of these short lived forms in Australian Ordovician rocks has permitted a far more detailed subdivision than those in the United Kingdom.

Cont...

AUSTRALIAN ORDOVICIAN GRAPTOLITES (Cont.)

VandenBerg (1983) states -"By virtue of its historical priority, the British Ordovician graptolite subdivision has been widely used as a correlation 'standard'. It has some serious drawbacks, however, below the *N. gracilis* Zone, the faunas consist of long-ranging forms that are almost all endemic to NW Europe and there is an almost total lack of the short-lived near-cosmopolitan forms that characterise the Victorian succession. The more finely subdivided and easily correlated Victorian succession is gaining increasing acceptance as a correlation standard for regions outside NW Europe".

NOTES ON PLATES 1 to 12

The illustrations in Plates 1 to 12 should be used carefully when identifying graptolites to specific level. Some genera, for example the Isograptids, have a range of transitional forms which look very similar to each other. Positive identification may require detailed examination and reference to scientific descriptions of similar species. In addition collectors have to contend with specimens which represent various stages of growth, specimens distorted by the shearing and folding of the rocks in which they are found and finally, incomplete and damaged specimens which can often be very confusing.

The ranges given for each illustrated species should also be used with caution as in many cases there is insufficient data available to establish upper and lower limits with any certainty. Those ranges followed with a (?) are considered suspect particularly in the upper limit however, they do give a fair indication of the predominant stage in which each species may be found. The letter Z preceding the zones indicates a zonal fossil.

As far as practicable illustrations are arranged in chronological order with the Early Ordovician species (Lancefieldian) first and the Late Ordovician (Eastonian & Bolindian) last. Silurian and Early Devonian forms are not included.

Finally it should be remembered that the detailed classification of graptolites is continually being revised as the knowledge of the morphology of these creatures increases. Re-examination of existing specimens can result in their placement in a different taxanomic group or if they do not fit into any known taxa, the erection of a new unit.

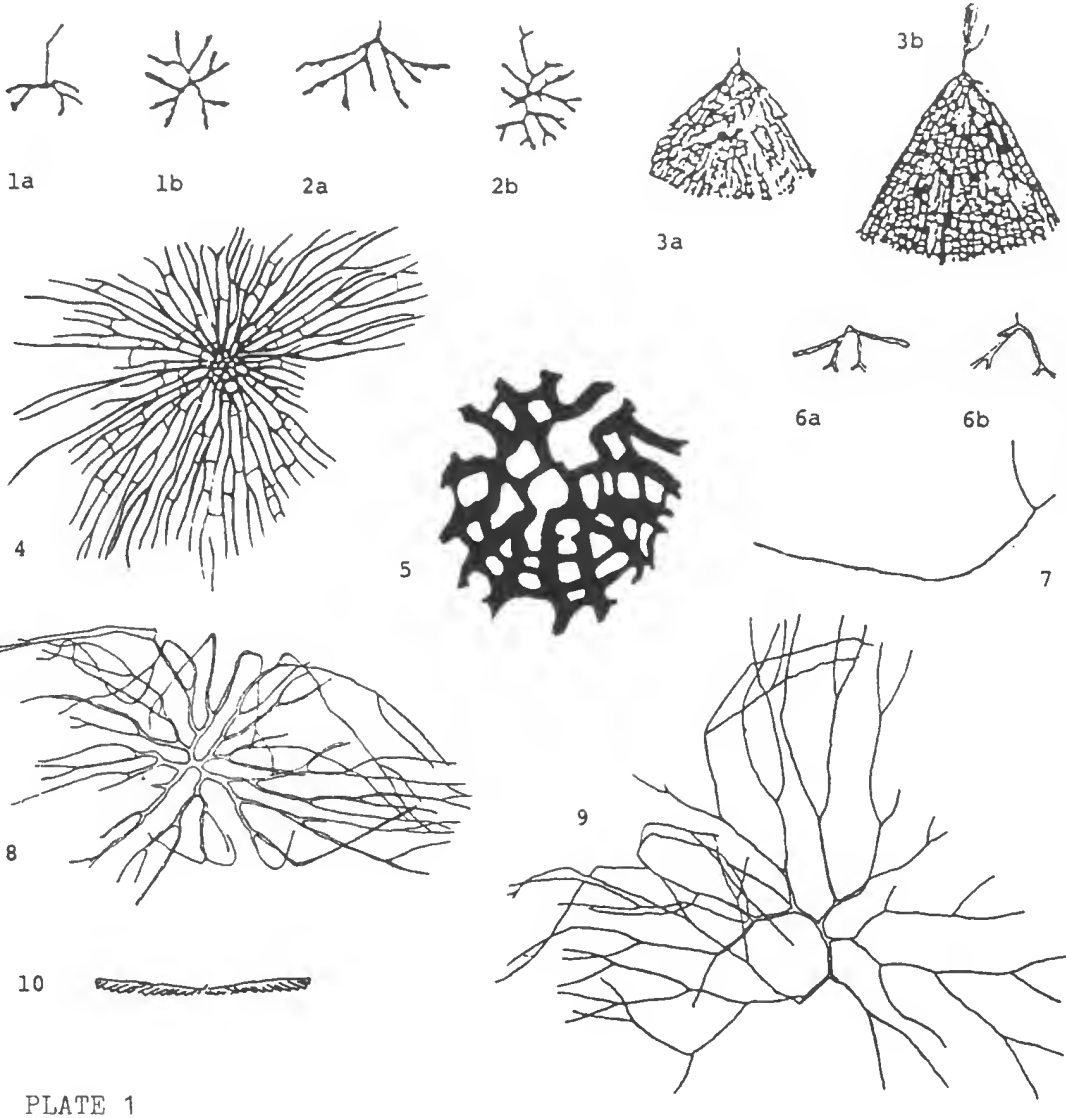


PLATE 1

1.	*Anisograptus delicatulus*	Cooper & Stewart	x 1.3	Z.La1
2.	*A. compactus*	" "	x 1.3	Z.La1
3.	*Rhabdinopora scitulus*	(Harris & Keble)	x 1.3	Z.La1
4.	*Araneograptus macgillivrayi*	(T.S. Hall)	diagrammatic	La2
5.	*A. pulchellus*	" "	"	La2
6.	*Adelograptus victoriae*	" "	x 1.2	Z.La2-La3
7.	*Kiaerograptus antiquus*	" "	x 1.2	La2
8.	*Clonograptus flexilis*	(J. Hall)	x 1	La2+
9.	*C. rigidus*	"	x 1	La2+
10.	*Didymograptus similis?*	J. Hall	x 1.2	Bendigonian

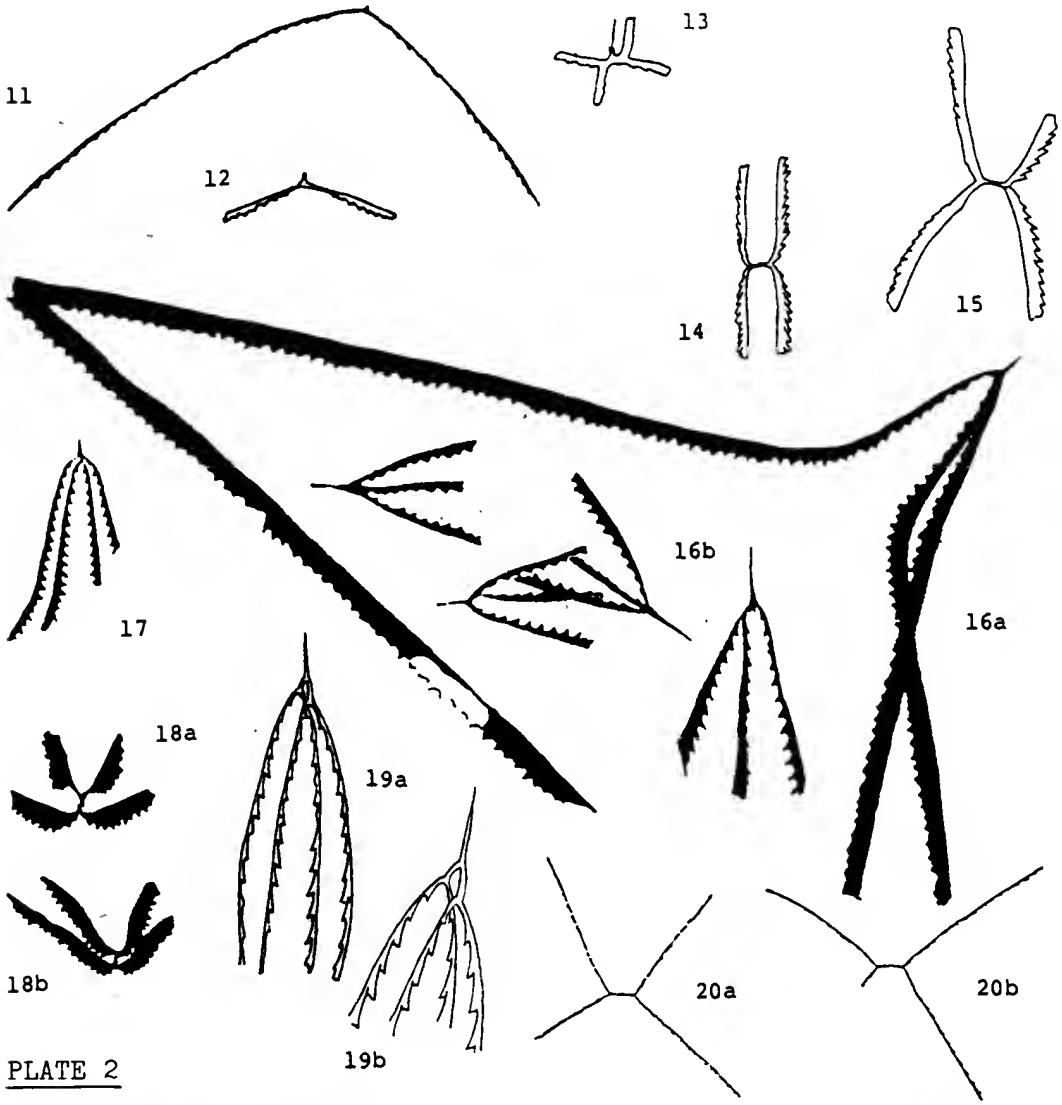


PLATE 2

11.	*Kiaerograptus pritchardi*	(T. S. Hall)	x 1	La2-La3
12.	*Didymograptus tayloni*	T. S. Hall	x 1.3	La2
13.	*Tetragraptus decipens*	"	x 1.2	La2-La3
14.	*T. approximatus*	Nicholson	x 1.2	Z.La3-Be1
15.	*T. acclinans*	Keble	x 1.2	La3-Be1
16a.	*T. fruticosus* 3 br.(f'grown)	J. Hall	x 1	Z.Be3-Ch1
16b.	*T.* " " " (juvenile)	"	x 1	Z.Be3-Ch1
17.	*T.* " 4 br.	"	x 1	Z.Be1-Be3+
18.	Forms generally ref. to *T.serra* (Brongniart) however specific ident. cannot be confirmed		x 1	Bendigonian +
19.	*T. pendens* Elles	a.x 1; b.proximal portion	x 3	" +
20.	*Etagraptus harti*	T.S.Hall	x 1.2	"

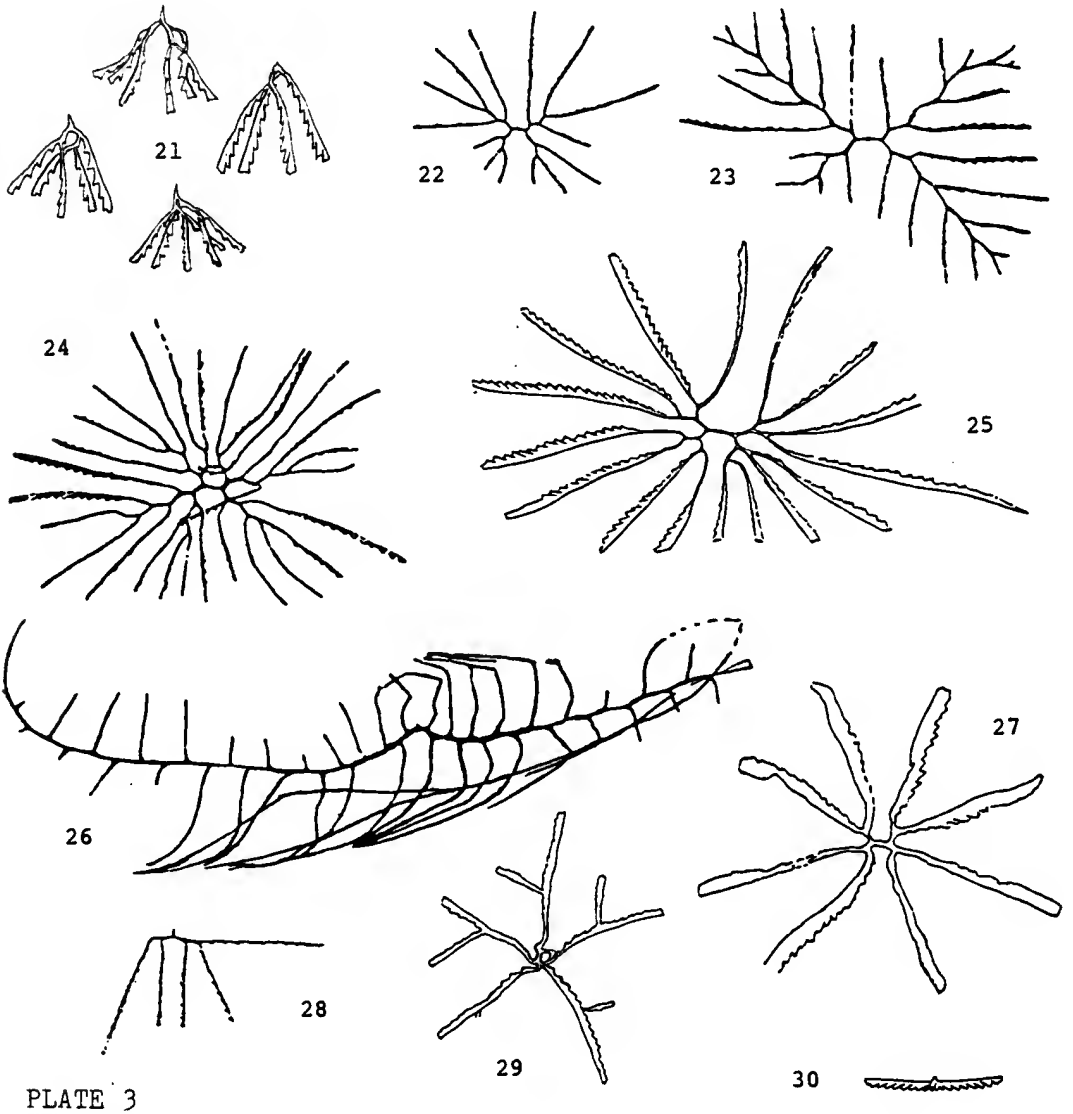


PLATE 3

21.	*Adelograptus crassus*	(Harris & Thomas)	x 1.2	Be1
22.	*Goniograptus macer*	T.S. Hall	x 1	Be1-Be4+
23.	*G. thureaui thureaui*	McCoy	x 1	Be1-Be4(?)
24.	*G. clonograptoides*	Harris & Thomas	x 1	Be1(?)
25.	*Loganograptus logani logani*	(J.Hall)	x 1	Be1(?)
26.	*Sigmagraptus crinitus*	T.S. Hall	x 1	Be1-Ch2(?)
27.	*Dichograptus octobrachiatus*	(J. Hall)	x 1.2	Be1-Da2(?)
28.	*Trichograptus fergusoni*	T.S. Hall	x 1.3	Be1-Ch1(?)
29.	*Schizograptus incompositus*	Harris & Thomas	x 1.2	Be1-Be2(?)
30.	*Didymograptus abnormis*	Hsu	x 1.2	Be1(?)

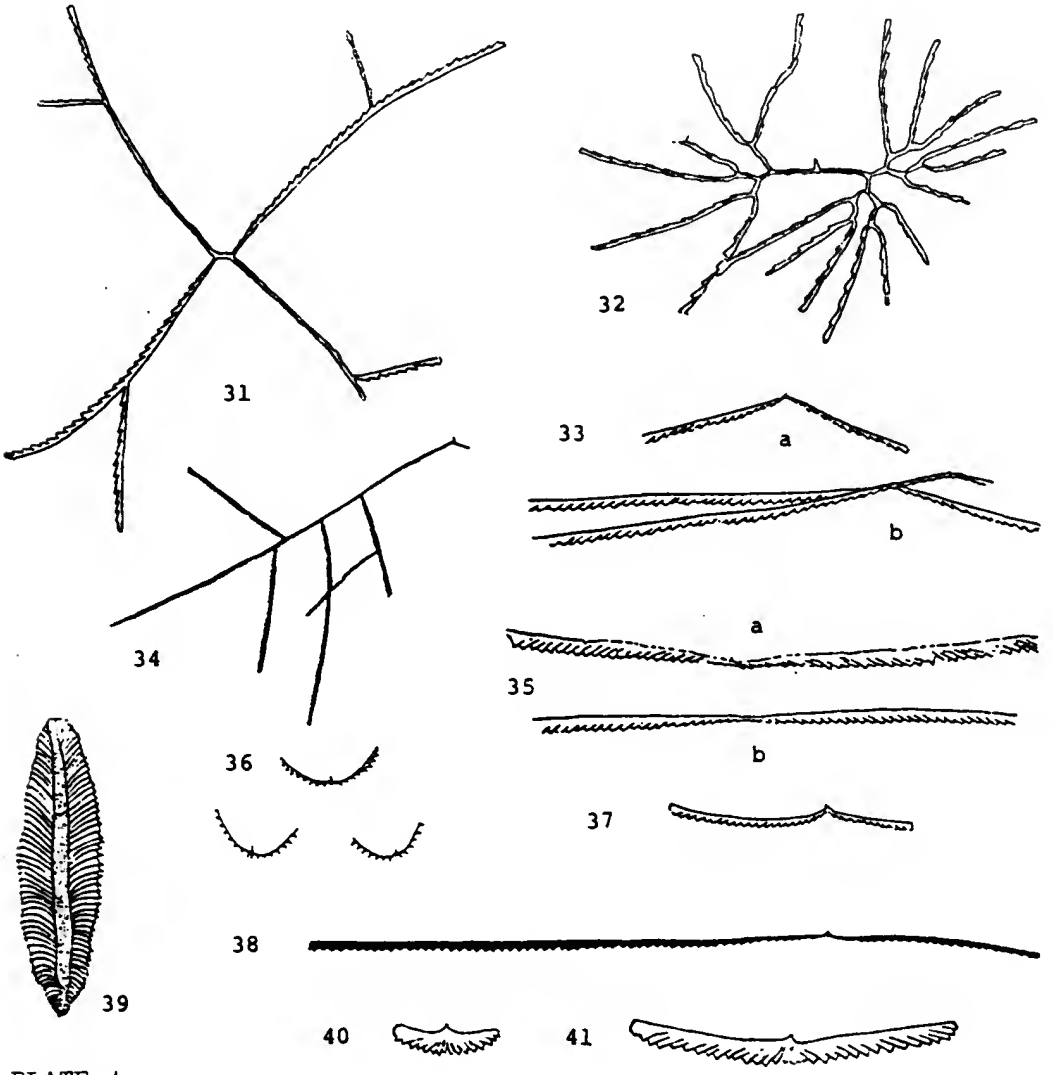


PLATE 4

31.	*Schizograptus spectabilis*	Harris & Thomas	x 1	Be1-Be2
32.	*Zygograptus junori*	" "	x 2.5	Ch1
33.	*Didymograptus dilatans*	T.S. Hall	x 1	Be2-Be3 (?)
34.	*Mimograptus mutabilis*	Harris & Thomas	x 0.6	Ch2
35.	*Didymograptus ensjoensis*	Monsen	x 1	Be1-Be2 (?)
36.	*D. hemicyclus*	Harris	x 1.2	Be1 (?)
37.	*D. nitidus?*	(J. Hall)	x 1	Ch1-Ca2 (?)
38.	*D. extensus*	"	x 1	La3-Ch2 (?)
39.	*Phyllograptus typus?*	"	x 1	Be4 (?)
40.	*Didymograptus latus*	T.S. Hall	x 1.2	Bendigonian
41.	*D. latus aequalis*	Harris & Thomas	x 1.2	"

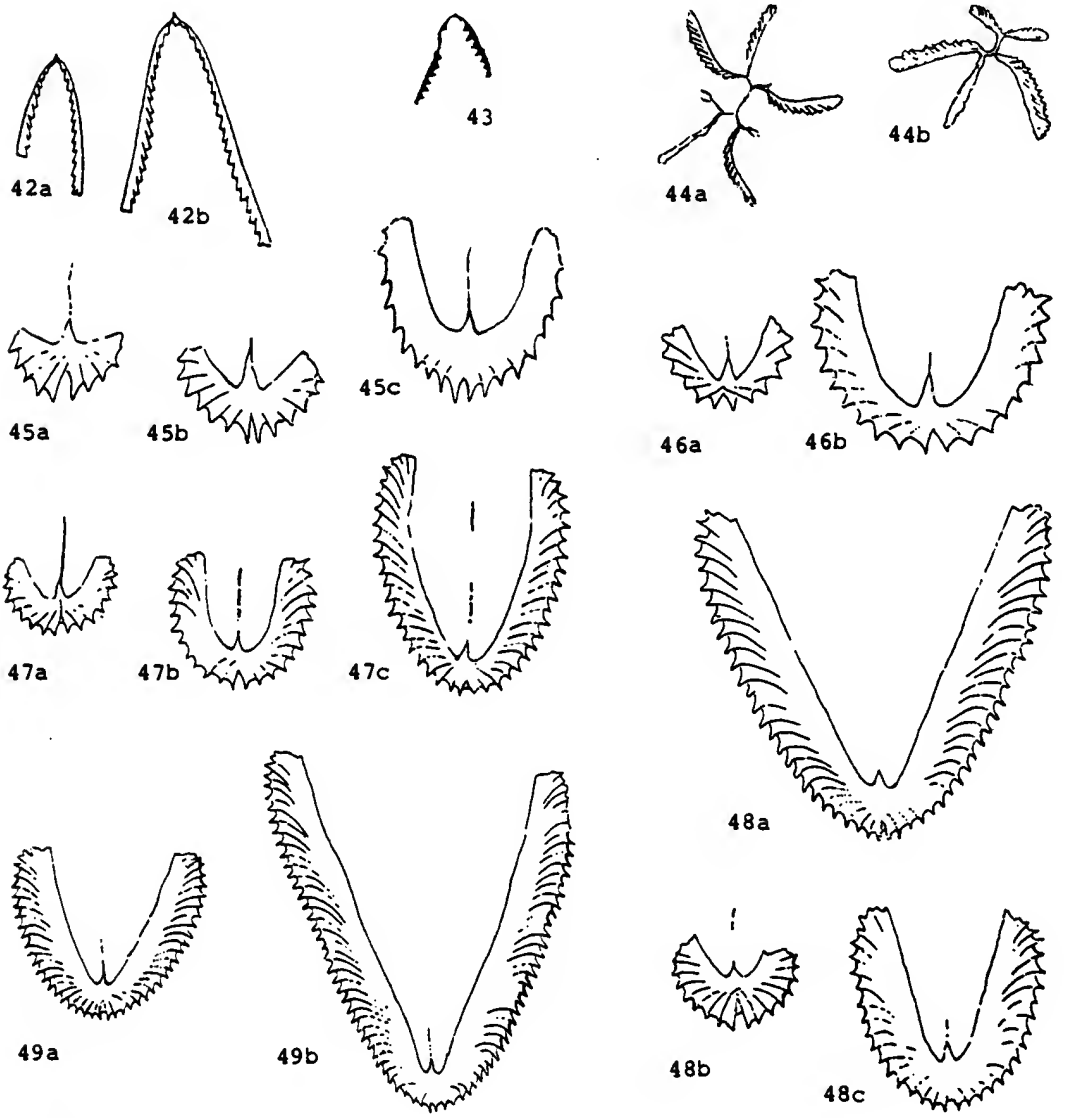


PLATE 5

42.	*Didymograptus* sp.cf. *D.protobifidus*	Elles	x 1	Ch1-Ch2
43.	*D. mendicus*	Keble & Harris	x 1	Chewtonian
44.	*Dichograptus octonarius*	(J. Hall)	x 1	Ca2-Ya2 (?)
45.	*Isograptus primulus*	Harris	x 3.5	Ch2-Ca1
46.	" *victoriae lunatus*	Harris	x 3.5	Z.Ca1
47.	" *victoriae victoriae*	Harris	x 2.1	Z.Ca2
48.	" *victoriae maximus*	"	x 2.1	Z.Ca3
49.	" *victoriae maximodivergens*	Harris	x 1.4	Ca3-Ya1

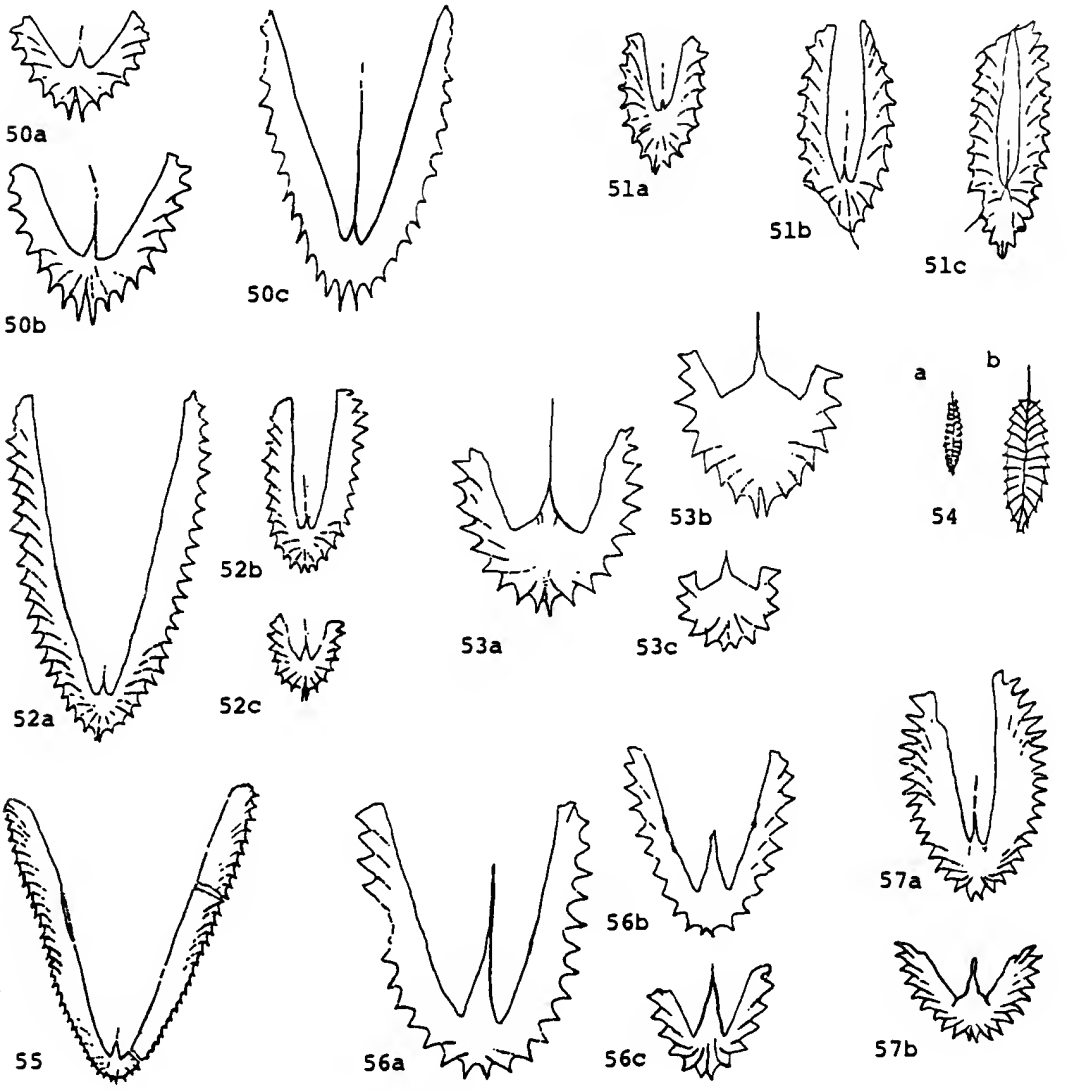


PLATE 6

50.	*Isograptus caduceus imitatus*	Harris	x 3.5	Ca3-Ya1
51.	*I. cf forcipiformis*	Ruedemann	x 3.5	Ca3-Ya1
52.	*I. caduceus australis*	Cooper	x 2.1	Ya1-Ya2
53.	*Pseudisograptus dumosus*	(Harris)	x 3.5	Ca3-Da1
54.	*Skiagraptus gnomonicus*	Harris & Keble	a x 1; b.diag'c.	Ca3-Da2 (?)
55.	*Isograptus victoriae divergens*	Harris	x 1.4	Ya1-Da3
56.	*Pseudisograptus hastatus*	(Harris)	x 3.5	Ca3-Da1
57.	*P. manubriatus*	(T.S. Hall)	x 2.1	Ya1-Ya2

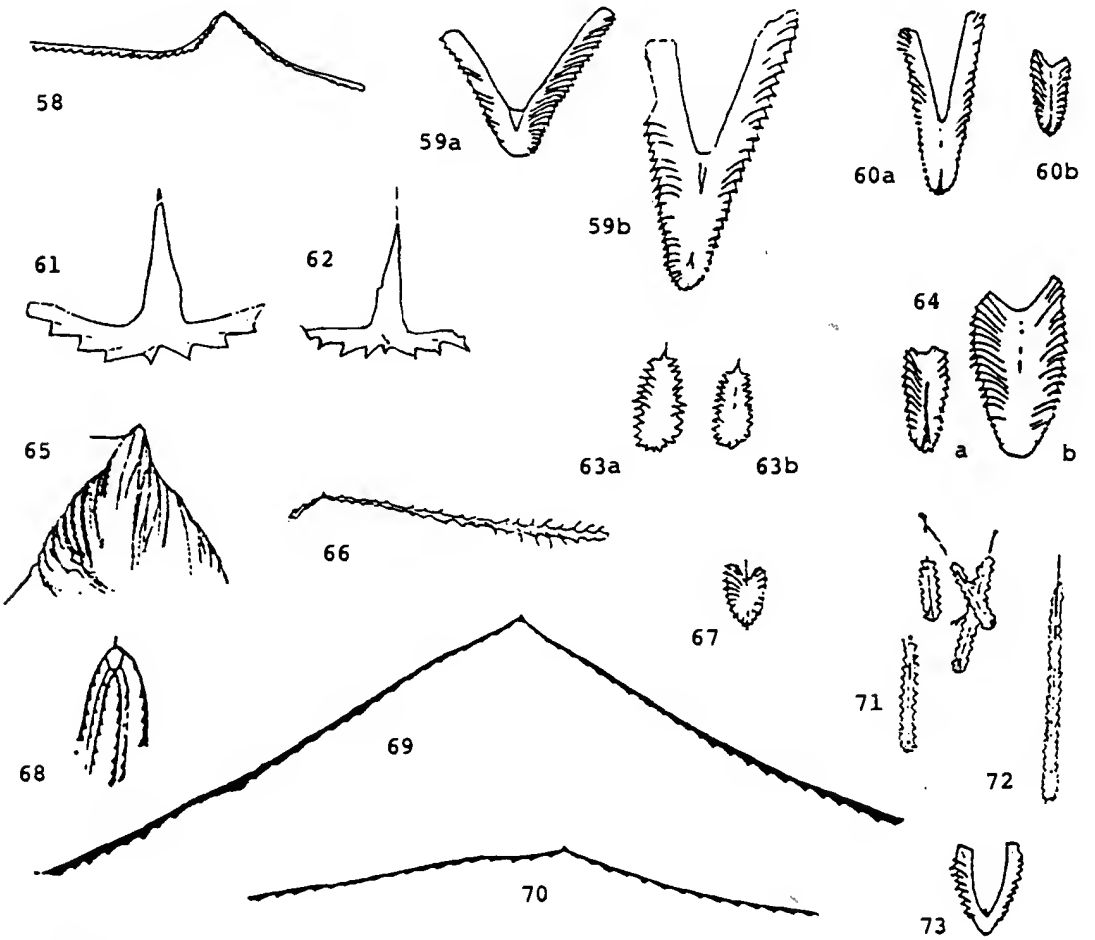


PLATE 7

58.	*Didymograptus v-deflexus*	Harris	x 1.2	Ya1-Da1
59.	*Oncograptus upsilon upsilon*	T.S. Hall	x 1.2	Z.Ya1-Ya2
60.	*O. upsilon biangulatus*	Harris & Keble	x 1.2	Ya1-Da1
61.	*"Maeandrograptus" tau*	Harris	x 5	Ca3-Ya2
62.	*"M" aggestus*	"	x 5	Ca3
63.	*Apiograptus crudus*	(Harris & Thomas)	x 1.2	Z.Ya3-?-Da3
64.	*Cardiograptus morsus*	Harris & Keble	x 1.2	Z.Ya2-Da1
65.	*Pterograptus lyricus*	Keble & Harris	x 1.2	Da4
66.	*Holmograptus spinosus*	(Ruedemann)	x 1.2	Da2-Da3
67.	*Cardiograptus crawfordi*	Harris	x 1.2	Da2-Da3
68.	*Pseudobryograptus incertus*	(Harris & Thomas)	x 1.2	Da2
69.	*Didymograptus compressus*	Harris & Thomas	x 2.3	Da2-Da3 (?)
70.	*D. cognatus*	" "	x 2.3	Da3 (?)
71.	*Cryptograptus schaeferi*	Lapworth	x 1.2	Da2-Gi(m)
72.	*C. tricornis*	Carruthers	x 1.2	Da3-Gi(m)
73.	*"Isograptus" ovatus*	(T.S. Hall)	x 1.2	Da4

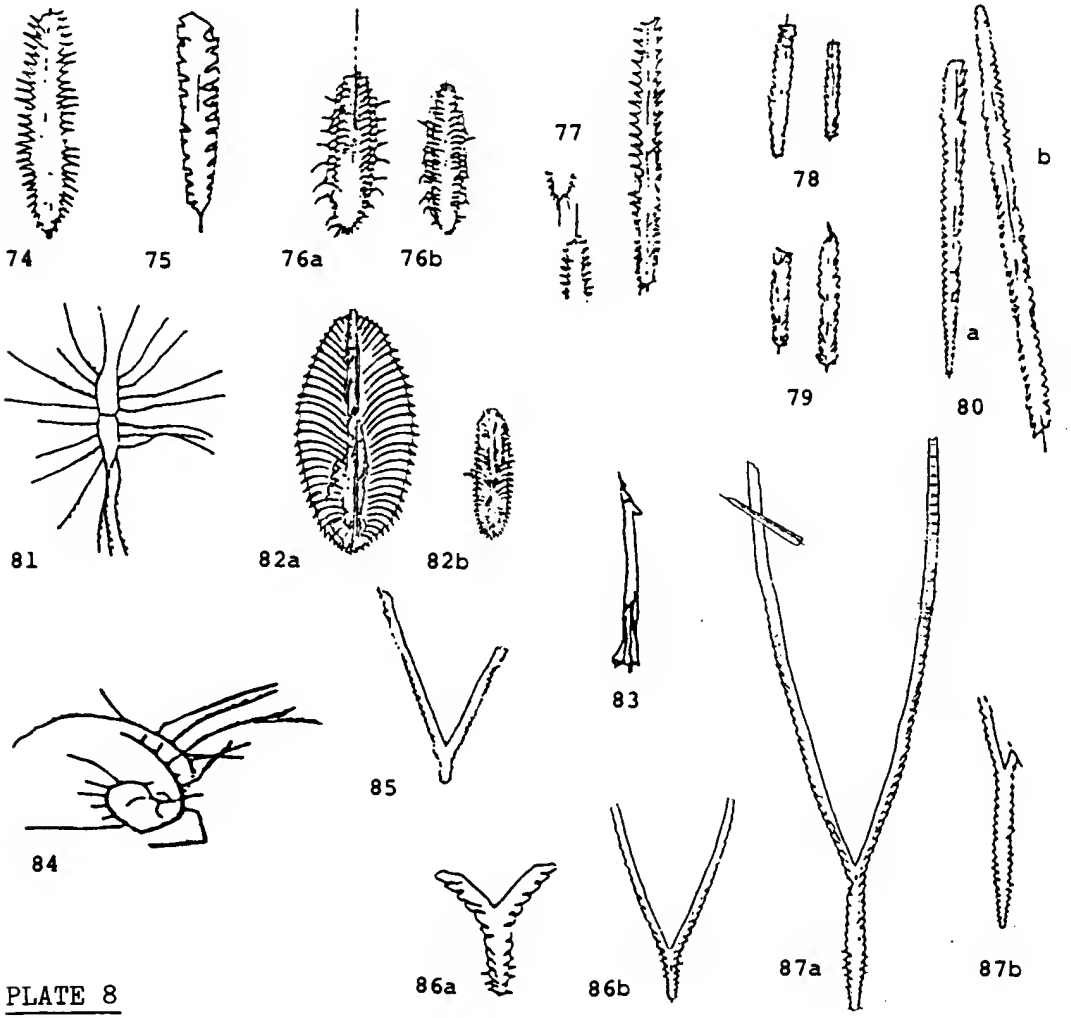


PLATE 8

74.	*Glossograptus acanthus*	Elles & Wood	x 1.2	Da1-Da3
75.	*Amplexograptus differtus*	(Harris & Thomas)	x 1.2	Da3
76.	*Paraglossograptus tentaculatus*	(J. Hall)	x 1.2	Da1-Da3
77.	*P. proteus*	(Harris & Thomas)	x 1.2	Da2-Da3
78.	*Glyptograptus intersitus*	Harris & Thomas	x 1.2	Z.Da1-Da3
79.	*Undulograptus austrodentatus austrodentatus*	(H & T)	x1.2	Z.Da1-Da2
80.	*G. teretiusculus*	(Nicholson)	x 1.2	Z.Da4-Gi(m)
81.	*Brachiograptus etaformis*	Harris & Thomas	x 1.2	Da3
82.	*Phyllograptus nobilis*	" "	x 1	Da3 (?)
83.	*Corynoides curtus australis*	" "	x 1 2	Z.Gi(m)-Ea2
84.	*Nemagraptus gracilis gracilis*	(J. Hall)	x 1.2	Z.Gi(m)
85.	*Dicranograptus brevicaulis*	Elles & Wood	x 1.2	Gi(1)-Gi(m)
86.	*D. nicholsoni nicholsoni*	Hopkinson	a x 2.3;b x 1.3	Gi(m)-Ea2
87.	*D. ramosus semispinifer*	T.S. Hall	a x 1.3;b x 1.2	Ea1-Ea2

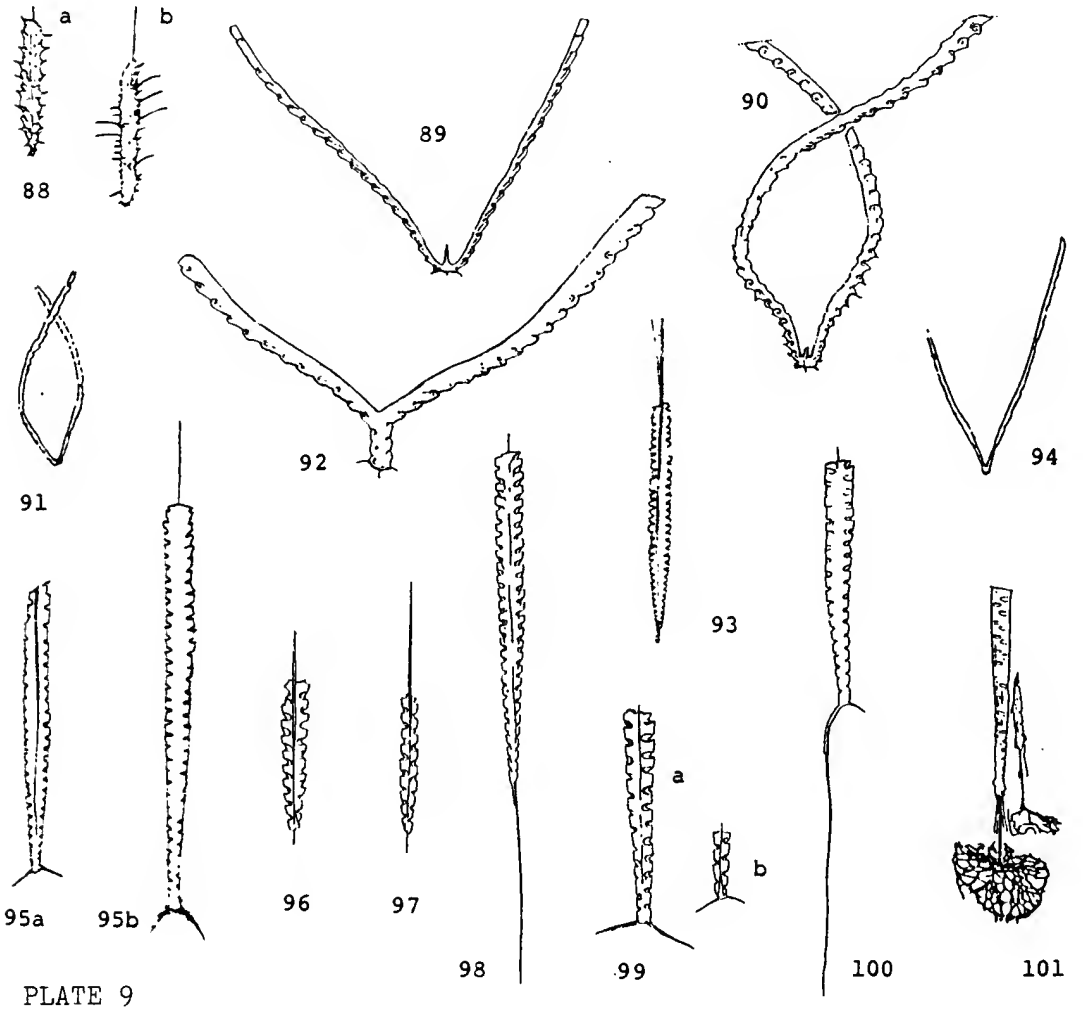


PLATE 9

88.	*Glossograptus ciliatus*	Emmons	x 1.2	Da4-Gi(u)
89.	*Dicellograptus flexuosus*	Lapworth	x 2.5	Ea2-Ea4
90.	*D. caduceus*	"	x 2.5	Ea3-Bo(m)(?)
91.	*D. intortus*	"	x 1.2	Gi(m)
92.	*Dicranograptus hians hians*	T.S. Hall	x 2.7	Ea1-Ea2
93.	*Climacograptus tubuliferus*	Lapworth	x 1	Ea3-Bo(u)
94.	*Dicellograptus divaricatus*	(J. Hall)	x 1.2	Gi(m)-Gi(u)
95.	*Climacograptus bicornis bicornis*	"	x 2	Gi(m)-Gi(u)
96.	*C. brevis brevis*	Elles & Wood	x 2.5	Ea1
97.	*C. brevis* cf. *strictus*	Ruedemann	x 2.5	Ea1
98.	*C. caudatus*	Lapworth	x 1.7	Gi(u)-Ea2
99.	*C. spiniferus spiniferus*	Ruedemann	x 2.7	Ea1-Ea3
100.	*C. spiniferus* n.sub.sp.		x 1.7	Z.Ea1
101.	*C. baragwanathi*	T.S. Hall	x 1.7	Z.Ea2

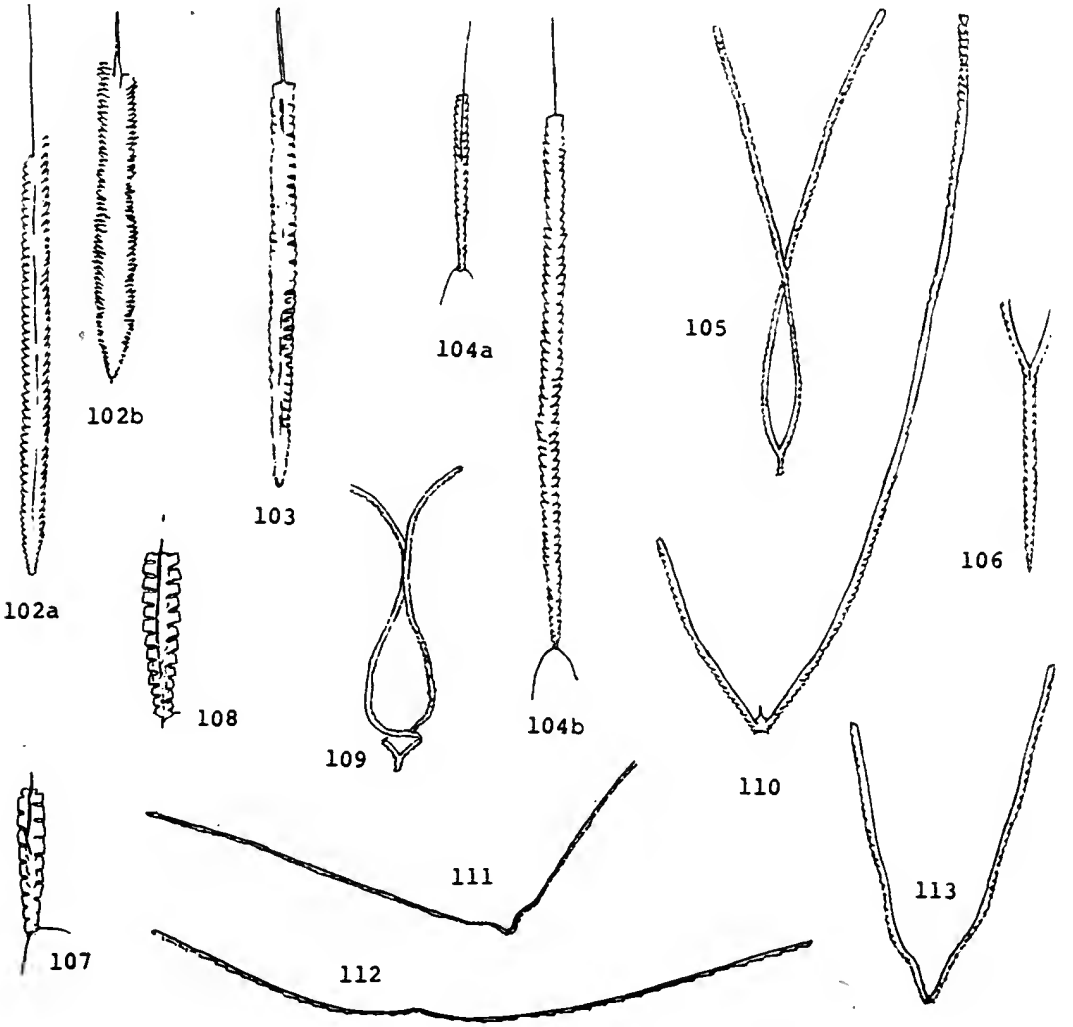


PLATE 10

102.	*Orthograptus calcaratus acutus*	(Lapworth)	x 1	Z.Gi(m)
103.	*O. calcaratus vulgatus*	"	x 1	Gi(u)
104.	*O.* sp.nov.		x 1	Bo1
105.	*Dicranograptus hians hians*	T.S. Hall	x 1	Ea1-Ea2
106.	*D.ramosus longicaulis*	Elles & Wood	x 1	Gi(u)+ or -
107.	*P.(Pseudoclimacograptus)* sp.nov.		x 2.5	Ea1
108.	*P.(P) scharenbergi* cf. *scharenbergi*	(Lapworth)	x 2.5	Ea1
109.	*Dicranograptus hians kirki*	Harris & Thomas	x 1	Z.Ea3+
110.	*Dicellograptus gravis*	Keble & Harris	x 1	Z.Ea4
111	*D. sextans*	(J.Hall)	x 1	Gi(1)-Gi(u)
112.	*Leptograptus* sp.unidentifiable		x 1	?
113.	*Dicellograptus elegans*	Carruthers	x 1	Ea3

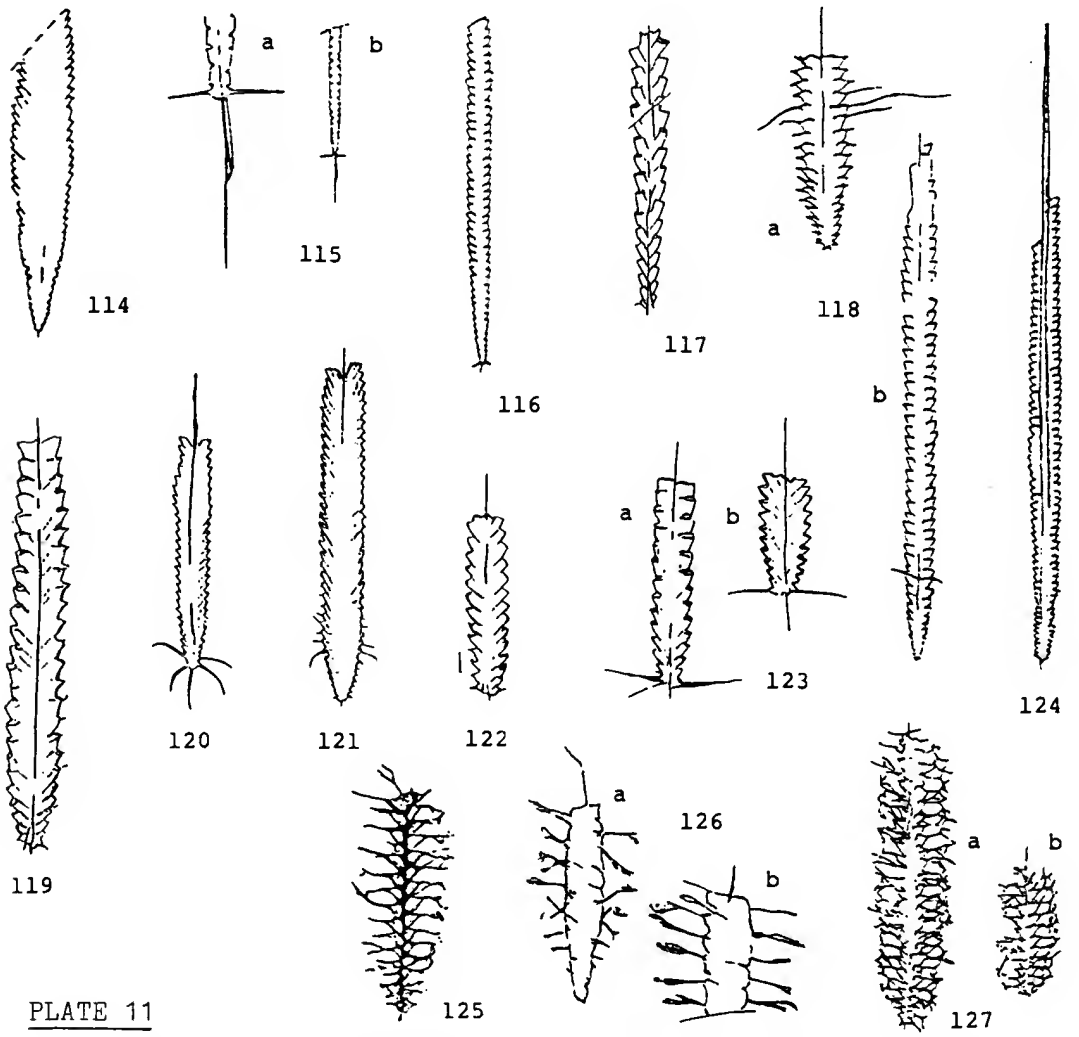


PLATE 11

114.	*"Amplexograptus" ingens ingens*	(T. S. Hall)	x 1.2	Ea1-Ea2
115.	*Climacograptus* cf. *bicornis tridentatus*	L'worth	a.x 4.6;b.x 1.2	Gi(u)
116.	*Orthograptus* cf. *intermedius*	Elles & Wood	x 1.2	Ea1-Ea3+
117.	*O. amplexicaulis*	(J.Hall)(s.l.)	x 2.5	Ea2-Bo(u)
118	*O. quadrimucronatus spinigerus*	(L'worth)	a. x 2.3; b x 1.2	Ea1-Ea4
119.	*O. quadrimucronatus* cf.*quadrimucronatus*	(J.Hall)	x 2.5	Ea1-Bo1
120.	*O. quadrimucronatus(?)* sub.sp.		x 1.3	Ea1
121.	*O.pageanus (?)* cf. *spinosus*	Harris & Thomas	x 1.3	Ea1
122.	*O. ruedemanni*	(Gurley)	x 2.5	Ea1
123.	*O.* sp.nov.		x 2.5	Ea1
124	*O. calcaratus basilicus*	(Lapworth)	x 1.2	Gi(u)
125.	*Neurograptus libratus*	"	x 2	Ea1-Ea2
126.	*Hallograptus bimucronatus*	(Nicholson)	x 4	Ea1-Ea2
127.	*Neurograptus margaritatus*	(Lapworth)	x 2	Ea1-Ea2

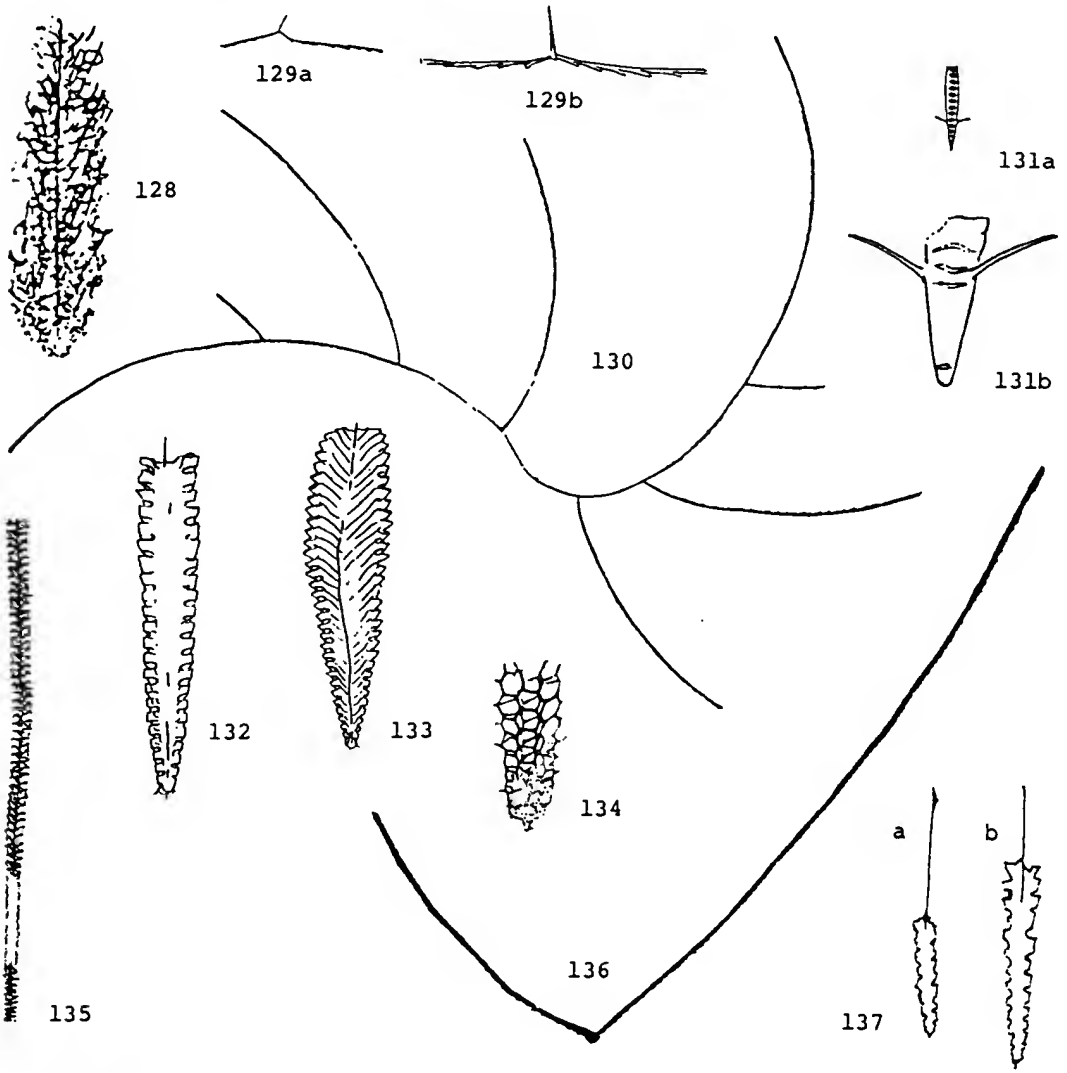


PLATE 12

128. *Nymphograptus halli*	Harris & Thomas	x 2	Ea1
129. *Leptograptus eastonensis*	Keble & Harris	a.x2; b. x4	Ea3-Bo1
130. *Pleurograptus linearis simplex*	Elles & Wood	x 1	Bo1
131. *Climacograptus uncinatus*	Keble & Harris	a.x1.2;b.x4.2.	Bo1
132. *"Amplexograptus" tardus*	(T.S.Hall)	x 2.5	Gi(u)-Ea3
133. *A.(?) ingens*	"	x 1.8	Ea1-Ea2
134. *Reteograptus geinitzianus*	J. Hall	x 4	Gi(m)
135. *Orthoretiograptus? pulcherrimus*	(Keble & Harris)	x 1	Ea3-Bo1
136. *Dicellograptus divaricatus rigidus*	Lapworth	x 1	Gi(m)
137. *Climacograptus missilis* (possibly = *C. tubuliferus*)	Keble & Harris	x 2	?

AUSTRALIAN ORDOVICIAN GRAPTOLITES (Cont.)

Acknowledgement

The Editor wishes to thank A.H.M.VandenBerg for assisting with the descriptions of the illustrations and providing details of reference material used in this article.

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THE QUEENSLAND MUSEUM IS MOVING

By Tempe Lees, Queensland Museum.

For the past 84 years the Queensland Museum has resided in its striking red brick building on the corner of Gregory Terrace, and Bowen Bridge Road, Brisbane. Now it is on the threshold of a new era. On the 3rd of November 1985 the public galleries were closed in preparation for the move to a new home in the Queensland Cultural Centre complex on the south bank of the Brisbane River.

The existing Museum building was built in 1891 as an exhibition hall for the National Agricultural and Industrial Association of Queensland. The construction took only 23 weeks and cost a mere 20,400 pounds. The Queensland Museum moved into this building in 1899, opening the galleries officially in 1901. At that time the transfer of the Museum took 15 days using 4 horse-drawn drays and a total of 210 trips.

In contrast, the new building has been designed especially for the Museum and has taken over 2 years to construct at a cost of more than 30 million dollars. The transfer from its present locality to its new home in the Cultural Centre is expected to take at least, 9 months and involve the movement of approximately 700 truck loads of material.

To physically move the Museum's vast collections poses some interesting problems. How, for example, are we to move a life-size model of Tyrannosaurus rex? Answer, by helicopter of course! However, planning the move has already been in train for over twelve months. It is expected that the transfer will go smoothly,after all, compared with transporting the remains of a dinosaur some 2,000 kms on the back of a landcruiser, the transfer of a collection a mere 4 kms seems simple!

The Museum's new building, will be quite a change from the rambling edifice which it presently inhabits. Constructed of white concrete it will contain six floors; three devoted to display, two to house the curators and the collections, and one for technical services such as metal workshop, wood workshop, artists, preparators, photography and our education service.

The geology collections - fossil and mineral - will all be housed in a single vast storage room of some 385 square metres,

an area more than three times the storage facilities presently in use. Most of the collections will be housed in compactus units, although some heavy duty shelving will be available for large heavy objects such as the dinosaurs.

Adjacent to the collection is a central laboratory equipped with all the facilities necessary for fossil preparation, collection, sorting, registering and cataloguing. Another laboratory specially designed for preparation of fossils using acid etching techniques will be available on the floor devoted to technical services. Here a sophisticated air extraction system has been instaled to cope with acid fumes and thereis a lifting beam available for handling large, heavy specimens. Quite a change from the "facilities" presently in use!

The fossil displays in the new building promise to be exciting, work on them already being well under way. Generally they will be quite a departure from traditional taxonomic displays, being more interpretative, supporting the objects displayed by means of models as well as graphic and AV techniques.

These displays will concentrate on Mesozoic Queensland, guiding the visitor through this era showing the changes in fauna, flora, sea level and geography which occurred. Accompanying the actual fossil material displayed for each period will be 2 maps; one showing a reconstruction of the coastline of Queensland at that time and one Australia's position in relation to the other continents of the world. The fossils themselves will be interpreted with graphics or 3 dimensional reconstructions of the organisms and dioramas illustrating the palaeoecology. Spectacular models have been prepared; there will be life sized and life-like reconstructions of an ichthyosaur and a plesiosaur as well as some small dinosaurs. Material incorporated in the displays include :- Triassic vertebrates from Rewan; dinosaur footprints and plants; Jurassic Rhoetosaurus and Siderops; Cretaceous terrestrial vertebrates such as Muttaburrasaurus; Winton trackways; ankylosaur and pterosaur material; Cretaceous marine organisms including ammonites; bivalves, fish, turtles, Kronosaurus, and ichthyosaur and plesiosaur material. In addition to actual material some life sized models of skeletons of various vertebrates will also be on display, including a breathtaking replica of Australia'a most complete dinosaur Muttaburrasaurus, towering 4 m high.

Not only will the Museum have new displays, but also a reference centre. Through this centre it is hoped to promote the Museum's

Cont...

THE QUEENSLAND MUSEUM IS MOVING! (Cont.)

non display functions such as collection, research and consultancy. The reference centre will provide the public with access to systematic displays and collections representative of the Museum's vast holdings. These will enable people to make their own identifications of objects they may have collected, and to conduct their own research projects. Specially trained staff will be available to assist the public in using the centre and, of course, curators will always be on call for difficult or special enquiries. The reference centre will incorporate its own reference library, have numerous AV aids and will make available specially produced information sheets. Microscopes and photography facilities will also be provided for public use.

The Museum's new building is scheduled for opening at the beginning of October, 1986. With the availability of these new resources it is hoped that the Queensland Museum will be able to greatly improve services to the public, storage of collections and staff working facilities. We look forword to seeing you at our new premises in 1986.

QUEENSLAND PALAEOBIOLOGY FORUM

The third Palaeobiology Forum was held on Saturday afternoon, November 16th at the Queensland Museum and was attended by over 40 people. Barry Fordham as well as introducing speakers on the topic of Plants of the Past, announced that the Association of Australasian Palaeontologists had agreed to take the Forum under its wing to underwrite any of its activities. Hopefully, this will ensure the future of the Forum which intends to bring together professional and amateur palaeontologists in Queensland for informal discussion of subjects of mutual interest and to solve those fossil problems which beset us all. The Queensland representative of the AAP will be encouraged to take on the running of the Forum in the future; at present there is no representative because the State currently accommodates the AAP committee which includes Jack Jell (Hon.Treasurer), Sue Turner (Hon.Secretary) till the end of December 1985, George Fleming (Publicity), Geoff Playford and Bob Day.

The Forum was addressed by Trevor Clifford (Univ.Q'ld Botany Dept.) who gave a botanist's perspective on the distribution of Australian grasses and some of his thoughts over the years on the longevity and relationships of the group. He outlined

how his early thoughts were influenced by the reading of Du Toit's book on continental drift. Australia's indigenous grasses are all of Gondwanan distribution and even now, long after the break up of that great continent, some introduced South American species can interbreed with Australian ones of the same genus. Grasses do not have a marvellous fossil record, probably only to the Miocene, although there is an enigmatic record of Cretaceous grass-like forms from Greenland which Dr Clifford has not been able to verify.

John Rigby (Geol.Surv. Q'ld.) gave a synopsis of the evolution of floras in Gondwana and told us about some of the anomalous 'mixed floras' (Gondwanan + e.g. Laurasian) in fairly southerly parts of Gondwanan continents, which he put down to climatic effects. He put the point of view that there were no true seeds before the Triassic and that seeds seem to appear in Gondwana floras and those elsewhere almost simultaneously - perhaps in response to the Permian climatic hardships?

Plant-insect co-evolution was the theme behind the final presentation given by Andrew Rozefelds of the Queensland Museum. Andrew showed us his leaf mining finds and told us a little about the insects which indulge in this phytophagous way of life - larvae of dipterans, lepidopterans and hymenopterans, usually the more primitive members of these groups. The larvae tunnel in the middle layers of the leaf shovelling their droppings behind them and growing larger as they go. Andrew also showed us Tertiary leaves from the Anglesey coal measures of Victoria and told us of a Triassic example from Queensland which might be a surface "miner". Very few fossil leaves show these marks which could be explained by the seasonal nature of the activity which is restricted to Spring and Summer. Stan Colliver advised that he hadn't noticed any traces in the thousands of specimens collected in Victoria.

Between the main speakers, Sue Turner and Stan Colliver showed a selection of the palaeobotanical books both young and old, available in bookshops and libraries, including Jack Douglas's "What Fossil Plant is That?" and Mary White's "Australia's Prehistoric Plants". Stan told how intrigued students were in the early days when told they had to study from a book by Marie Stopes, a well known campaigner of birth control in post World War 1 Britain - that is until they learnt it was her book on "Ancient Plants", for Marie was also a talented palaeobotanist (for a biography see "Marie Stopes" by Keith Bryant, Hogarth Press, London 1962 which provides a background to her pioneer studies into fossil coals and plants in Japan).

Cont...

QUEENSLAND PALAEOBIOLOGY FORUM (Cont.)

Jim Beeston (GSQ) brought along some specimens to show the range of fossil fruiting bodies - cones, flowers and the like, and Cyril Walker told us of a Tourist Resort at Longreach which was advertising guided tours of the Winton dinosaur trackways protected site.

Most of those in attendance stayed for wine and cheese and to swap stories and ideas on the fossil plants brought along. Topics for future forums will be gratefully received - suggestions already include a fossil surgery where problem fossils can be discussed, identification of fossil wood, echinoids and possible field meetings in the winter.

Sue Turner

BOOKS & BOOK REVIEWS

One of the problems of including this section in our Bulletin is being able to get copies of new books for review particularly if their source is not in the Editor's home State.

The following details of "new" books are therefore, based on promotional literature rather than review :

ATLAS OF INVERTEBRATE MACROFOSSILS Edited by John W. Murray in collaboration with the Palaeontological Association. Published by Longman Group Ltd.(United Kingdom),1985. U.K. price £13.95 - Australian price approx. $40.

"The book provides a fully illustrated classification of invertebrate macrofossils using 1,400 original photographs of 900 genera from around the world including Australia.

As well as providing diagnostic features, stratigraphic range and palaeoecology for each genus illustrated,it suggests monographs and treatises for further reading"

- Available in Australia subject to supplies from U.K. - (Order through your newsagent from Longman Australia P/L.)

KADIMAKARA - EXTINCT VERTEBRATES OF AUSTRALIA by P.V. Rich, G.F. van Tets and F. Knight. Published by Pioneer Design Studio P/L.,1985. Australian price $45.00 incl. postage (Overseas surcharge to cover sea mail postage $6.00.)

"Kadimakara" is about Australian fossil vertebrate discoveries, in particular the people who found them and their own views on the processes of interpreting what these ancient creatures looked like when alive and the conditions under which they lived.

The book includes 32 full colour paintings by noted Australian wildlife artist Frank Knight and contains contributions from 28 respected palaeontologists.

- Available from Pioneer Design Studio P/L., 31 North Road, Lilydale, Victoria 3140, Australia.

FOSSIL CLUB OF N.S.W., NEWS SPECIAL EDITION, NOVEMBER 1985
HOW TO FIND FOSSILS IN SYDNEY. Editors Peter Watson & Gai McMurtrie - Price $2.50 including postage

A 16 page illustrated special edition of the Club's news letter giving details and general locality maps of many historic fossil localities in Sydney, including such areas as Lane Cove, Northern Beaches, Central Coast and the Centre of Sydney.

There is also information on where to see fossils displayed, who to talk to, how to get specimens identified and what literature to refer to.

A very useful introduction to collecting in the Sydney area.

- Available from the F.C.N.S.W. Secretary, John Irving, 16, Mason Street, Merrylands, N.S.W., 2160.

FOSSILS FOR AMATEURS by Russell P. MacFall & Jay C. Wollin
Published by Van Nostrand Reinhold Co., U.S.A.
Originally published in 1972, a second edition of this "classic" was produced in 1983 and is currently available in Australia at a recommended retail price of $18.95.

An excellent introduction to fossil collecting, preparation, cataloguing and display with a general outline of fossils and their families.

OVERSEAS COLLECTOR WISHING TO EXCHANGE

Doug. De Rosear, Box 125, Donnellson, Iowa 52625, U.S.A. is a geologist-collector interested in complete trilobites, starfish and blastoids. Has trilobites, crinoids (calyxes & crowns), blastoids and plants etc. to trade.

SYMPOSIUM ON VERTEBRATE PALAEONTOLOGY & ALLIED SCIENCES

It is proposed to hold a three day symposium in Brisbane in early 1987, dedicated to Charles Walter De Vis (1829-1915), the first Director of the Queensland Museum.

The symposium "Problems in Vertebrate Biology and Phylogeny - An Australian Perspective" is being convened by Dr.R.A. Thulborn, Dept. of Zoology, University of Queensland, St. Lucia, Queensland 4067 and Dr. Susan Turner, C/o, The Queensland Museum, Gregory Terrace, Fortitude Valley, Queensland, 4006.

Anyone who envisages presenting a paper or just attending should contact either Dr. Thulborn or Dr. Turner. An early response is essential if the symposium is to be a success. It will also enable you to be kept informed through subsequent circulars.

DONATIONS

The Secretary wishes to thank Mrs. Anne Brearley from Swanbourne W.A. and Dr. Piero Garonetti from Pavia, Italy, for their donations to the F.C.A.A. These will be used to sponsor professional palaeontological expeditions and research projects etc. in the future.

CHANGES OF ADDRESS

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NOTE: A full membership list will be included with the next issue.

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