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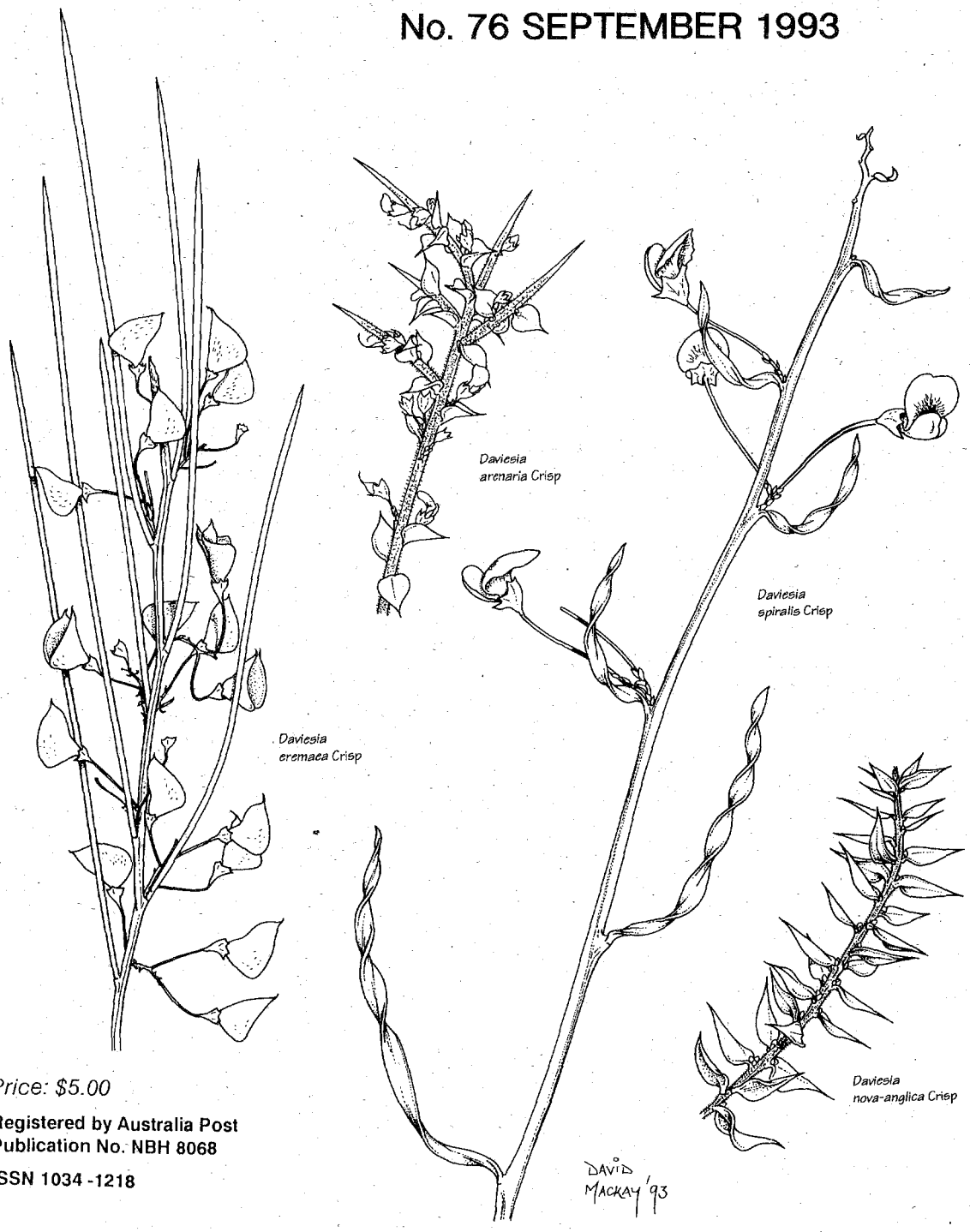

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COMMENTARY

Burning questions

Over the last ten years, I have been thinking about a number of questions and aspects of systematics in relation to computing. My list of questions and my opening comments follow; please feel free to reply (preferrably electronically) to any or all of them.

1. Why has the "traditional" taxonomic community not taken actively to computing and the use of computational tools to speed up traditional processes?

I am speaking about the *majority* of practicing taxonomists, who identify plants and deal with the day-to-day job of keeping the world's biological information accessible and in order. Obviously there is a minority who have taken to computing "like ducks to water", but I maintain that they are a small minority.

I am 49 years old, and I have a 486 PC and a laptop at the office and two PCs at home for the family. In the next few months, I plan to purchase a notebook computer for use at home. I write computer programs in Pascal, use the Internet electronic network every day, and I cannot work without a PC now. I feel that I am an exception, not the general rule for taxonomists.

I am a subscriber to TAXACOM, the American equivalent of the European information-exchange network called Plant-Taxonomy, at the Harvard University Herbaria on Internet; but the message traffic on Internet TAXACOM is almost nil. I also access the telephone bulletin board TAXACOM at Buffalo, New York, USA; again the message traffic is almost nil. Why?

A few years ago, a young man at Kew (i.e. in his 30s) told me that he had never touched a computer and that he was never going to! Fortunately, he has changed, and this summer I learned that he is now using computers. Why did he have this attitude to begin with?

The first botanical bulletin board that I joined appeared to me "like I had died and gone to heaven". This was an electronic main street. Here was a place where I could freely exchange electronic information with other taxonomists. I proceeded to dump all sorts of files into the board. The Systems Operator called me, by telephone (not e-mail), to tell me to stop it. The members of the bulletin board had been calling to complain about me (please notice again, not electronic). This is another bulletin board with no interaction and little message traffic.

The significant exception to all this is the molecular taxonomy community. They have taken to computing totally, including the massive GENBANK database. None of them participate in either TAXACOM or Plant-Taxonomy, but they are on the Internet in the molecular biological community. Why do they not energize TAXACOM? Will they join Plant-Taxonomy?

2. In many institutions, including my own, electronic publication and data distribution is not acceptable for peer evaluation. Everything must be printed in ink on paper as well as electronically. Why is this attitude so prevalent, and when will it change?

3. What form should electronic publication take?

We have just submitted our family-genus catalogue for electronic publication. Five-hundred pages were converted to more than 1.6 megabytes in six ASCII files. Three of the files were reformatted text straight from the book, and three were the generic data as databases, one genus (record) per line with variable length fields separated by @. We felt compelled to provide the data for use by both the computer literate and the computer illiterate. We trimmed the text to the bare essentials, to hold down the size. What form will computer publication take in the future? Will it simply be use of the traditional format as a text file, or will it be databases, or will it be some combination of the two? Also, graphics will surely be an integral part of the mix, in my opinion.

In the field of computer interchange, the American botanists seem to be leading the European botanists. For those members with an Internet connection, you should definitely call up HUH.HARVARD.EDU via FTP and explore Internet TAXACOM; the user-id is FTP, and the password is FTP. We also have an electronic botanical directory, Plant Taxonomists Online (PTO), which is issued monthly by e-mail. Send your name, postal address, telephone and fax numbers, and e-mail address to JMYGATT@UNMB (via Bitnet) [or JMYGATT@bootes.unm.edu via Internet, see Jeremy Bruhl's notice in *Austral. Syst. Bot. Soc.*

Newsletter 69: 29 and 70: 38], and you will be included in future sendings. This year, PTO has grown by 500 or 600%.

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A.S.B.S. Inc. BUSINESS

Symposium

Origin and Evolution of the Flora of the Monsoon Tropics

July 4–6, 1994, Atherton Tablelands

Planning for this meeting, in association with the Australian Bryological Study Group, is continuing. The first circular was distributed June, calling for provisional expressions of interest. If you have not seen this circular and would like to, then please write to:-

ASBS Symposium
c/- J.R. Clarkson
Queensland Herbarium, Mareeba Office
P.O. Box 1054
Mareeba. Qld. 4880.

A second circular, giving details of requirements for papers and abstracts, registration fees, programme, field trip, and including a booking form to be returned with deposits, will be sent to those people who have responded to the first circular.

The sympsium will be held at the Tinaroo Recreation Camp. This is situated on the Atherton Tablelands, about 100 km southwest of Cairns and 21 km northeast of Atherton. It is close to rainforest, open-forest, and woodland communities.

The theme for the symposium will be the origin and evolution of the flora of the monsoon tropics. This will include topics such as systematics, evolution, pollination, dispersal, and biogeography.

The Australian Bryological Study Group will be holding a workshop in association with the symposium. A number of short excursions will be made to a range of bryophyte habitats, and there will also be a session on cryptogamic botany in the general symposium programme.

The Australian Systematic Botany Society Inc. will hold its Annual General Meeting during the symposium.

A field trip is planned for 7–9 July, covering a wide range of tropical plant communities. The trip will follow a circular route from Tinaroo to Cooktown via Cape Tribulation, then travel to Laura via the Battle Camp Road, traversing the Normanby River sandstones and the southern end of Lakefield National Park, before returning to Cairns by the Peninsula Developmental Road via Lakeland Downs.

There's this desert prison, see, with an old prisoner, resigned to his life, and a young one just arrived. The young one talks constantly of escape, and, after a few months, he makes a break. He's gone a week, and then he's brought back by the guards. He's half dead, crazy with hunger and thirst. He describes how awful it was to the old prisoner. The endless stretches of sand, no oasis, no signs of life anywhere. The old prisoner listens for a while, then says, "Yep. I know. I tried to escape myself, twenty years ago." The young prisoner says, "You did? Why didn't you tell me, all these months I was planning my escape? Why didn't you let me know it was impossible?" And the old prisoner shrugs, and says, "So who publishes negative results?"

Jeffrey Hudson
A Case of Need

REPORTS

Australian Biological Resources Study

Volume 50 of the *Flora of Australia*, Oceanic Islands 2, was published on 29 July 1993, and is now available from AGPS bookshops in most capital cities. It costs $44.95 in soft-cover format, and $59.95 in hard-cover. It was officially launched at simultaneous ceremonies on Christmas Island and in Canberra by the Hon. Warren Snowdon, and Peter Bridgewater, CEO, Australian Nature Conservation Agency, respectively.

Volume 1 of the *Flora of Australia*, Introduction, which had gone out of print, is also now available in a reprinted edition. We are investigating the possibility of developing an updated and expanded version of this volume, but this will be at least two years in preparation.

A revised edition of the guide for collecting-permit requirements in Australia will be available from late September, and can be obtained free on request from the Executive Editor, Flora Section. This important document lists requirements and addresses for obtaining collecting permits from public authorities in each state and territory, and should be consulted well before embarking on collecting trips.

A revised *Guide for Contributors* is now available for those preparing *Flora of Australia* treatments. Copies have been distributed to Australian herbaria, and to those who have recently requested copies. Any other contributors requiring one can obtain it free on request from the Executive editor.

The Flora Section of ABRS has recently purchased "Viridans" mapping software, which runs on a PC microcomputer with output to a laser printer. It has been customized to accommodate the production of *Flora of Australia* maps based on latitude/longitude or AMG records. Once this system is operational, we envisage that it will be available to prepare maps for contributors to the *Flora*, on presentation of data to the Flora Section on disc in the appropriate format. Alternatively, herbaria and other institutions may be interested in purchasing their own copies of the software. It can be customized to deliver maps in many formats, with multiple overlays, and it has zooming and interrogation facilities. Further details are available from the Executive Editor, or for those considering purchase, from:-

Dr Paul Gullan,
Viridans Pty Ltd
Suite 4, 614 Hawthorn Road
Brighton East. VIC. 3187.
Tel (03) 596 8592.

ABRS funds for the current financial year have been cut by half a million dollars, following the Prime Minister's Environment Statement (December 1992). This will have an impact in all areas of the programme, including the Participatory Programme grants scheme.

Following the ABRS Review, ABRS is currently reviewing its policy on databasing of the data that it holds. One suggestion is that the *Flora of Australia* data should be made available not only on hard-copy but also in an electronic database, and perhaps as "electronic books". While this has advantages by making the data more easily manipulable, it also has substantial implications in terms of resources. At a time of shrinking budgets, very careful consideration of cost-benefit analyses must be made for proposals that may require diverting time and money away from existing activities. Archiving of ABRS publications in hard and electronic forms is also under review. Questionnaires concerning these matters were distributed to herbaria and universities during July, to try to ascertain the feelings of the taxonomic botany community on some of these matters. Replies were requested by 13 August, but if you missed it, then we would still like to hear from you.

ABRS has recently organized contract funds for Mike Dallwitz to upgrade the DELTA software. He proposes to develop it for the PC environment, to install a Windows interface, to develop a new User Manual, and generally to make it more user-friendly. Part of the agreement is that the DELTA software will be made available free of charge by CSIRO to authors/contributors using DELTA software for ABRS purposes.

Dr Ken Thomas has recently been appointed to the Flora Section as Publications Assistant, and will take up his duties late in August. The section will also be making a short temporary appointment of an Assistant Scientific Editor for 3–6 months from late August. A new substantive position of Scientific Editor / Assistant Scientific Editor was advertised on 14 August. These staff will bring the section up to full strength for the first time in nearly a year. Their first task will be concentrated editing of *Volume 49*, the second of the Oceanic Island Floras, due for publication in May 1994.

I shall be attending the International Botanical Congress in Yokohama, Japan, from 21 August to 5 September. This conference promises to be important on a number of fronts. The Nomenclature Sessions are expected to generate brisk discussion, especially on the topic of Names in Current Use. There will be a number of associated meetings, such as those concerning *Flora Malesiana*, IOPI, and the Species Plantarum ("World Flora") Project. Decisions made at these meetings may have considerable impact on Australian taxonomic botany in future years. It promises to be a busy fortnight.

The contact numbers and address for ABRS remain:-

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Tony Orchard
Executive Editor
Flora of Australia

Centre for Plant Biodiversity Research

Recently we have seen the establishment of the Centre for Plant Biodiversity Research, in Canberra. This is a joint venture between the CSIRO Division of Plant Industry, including the Australian National Herbarium, and the Australian Nature Conservation Agency (ANCA, formerly the Australian National Parks & Wildlife Service), in particular the Australian National Botanic Gardens. The Centre will combine the programs and activities of the two herbaria, and the native plant research of both institutions.

The much-expanded Australian National Herbarium will form a core of the Centre. The CSIRO herbarium is currently undergoing expansion through the construction of a new wing, which will enable us to bring together the collections and staff of this herbarium and that of the Botanic Gardens.

The amalgamated herbarium, to be known as the Australian National Herbarium, will consist of nearly 1 million specimens, with a broad coverage of Australia and Malesia, particularly New Guinea. While most of the collection consists of vascular plant specimens, it also has an extremely good representation of the cryptogamic flora of Australia and New Guinea, the moss and liverwort collection being the largest in Australia. The existing reference herbarium of the Botanic Gardens will be further developed, to provide a shop-front to the public.

The activities of the Centre relate to three main areas of plant biodiversity:- scientific collections, research, and botanical data management. In particular, the Centre aims to:-

- expand, develop, and manage scientific collections as a permanent record of Australian plant diversity and as a resource for research on Australian and related floras;
- conduct research into plant biodiversity, evolution and systematics, horticulture, and conservation biology of vascular plants, non-vascular plants, and fungi, to provide a basis for sustainable management, and understanding, conservation, and use of Australian vegetation. This will further expand the collaborative work between the existing native plant research programme of Plant Industry, the Botanic Gardens, and other parts of ANCA such as the Endangered Species Unit and the Australian Biological Resources Study, which takes responsibility for the *Flora of Australia*;
- take responsibility for the co-ordination, maintenance, and upgrading of important national botanical databases developed by ANCA and CSIRO, including the *Australian Plant Name Index*, the *Census of Australian Vascular Plants*, and the *Economic Plants of Australia*. Participants in the Centre will continue to take an active role in the development of national and international standards for botanical data exchange, and to collaborate with the Environmental Resources Information Network.

The Centre will be established initially with existing facilities from CSIRO and ANCA, and we anticipate that this strong grouping of botanical research and progressive herbarium activities will

help attract further external funding. Staff for the Centre will be seconded from the Botanic Gardens and the Division of Plant Industry. This will be basically all of the present native plant research programme, which will bring together c. 80 people in all. The Centre is to be administered by a Board, the chairman being Prof. Derek Anderson, a Director, Dr Judy West (CSIRO), and a Deputy Director, Mr Jim Croft (Botanic Gardens).

The research of our groups is complementary, especially in plant systematics, and most of the existing research projects of the two groups can readily be integrated. Bringing together the wide-ranging skills and expertise of these people also provides us with greater scope to develop new collaborative projects.

Although the tasks of amalgamation of herbarium collections and people, and the setting-up of the Centre, are a little daunting for us, it is also a very exciting prospect. It provides one of the best opportunities that Australian has seen to develop a range of stimulating research projects on our native plants, and the ecosystems of which they are a part.

Judy West
Australian National Herbarium

Australian Botanical Liaison Officer

Life has been hectic since my last report:- the Kew Monocot Symposium and the conference on "Models in Phylogeny Reconstruction" have come and gone, as have the Australian visitors who came to attend one or both of those meetings. My family and I moved out of our house in Teddington in mid-August, after saying fond farewells to school mates, teachers, and other local friends and then enduring the epic of sorting and packing. Now Lawrie Jessup and his family have arrived and settled in.

David Bedford, Barbara Briggs, Jeremy Bruhl, Andrew Drinnan, Carolyn Weiller, Karen Wilson, and I made up the sizeable Australian contingent at the monocot meeting. None of us had been invited to speak, but David, Barbara, Jeremy, Carolyn, and Karen contributed to the excellent poster display and session.

Monocot systematists are fortunate in having the monumental work on monocot phylogeny and classification published by Dahlgren, Clifford & Yeo in 1985 as a general framework for their work. The main focus of the symposium was to improve on that baseline.

Like the "International Legume Conference" a year before, a notable feature of this meeting was the prominent role played by macromolecular data and cladistic analysis. It became clear towards the end of the conference that a few participants regarded these new kids on the block as more of a gruesome twosome than a dynamic duo, but both are obviously here to stay. Of the 29 spoken presentations, 11 made substantial use of very recently acquired DNA sequences; and, of course, these were all analysed cladistically. A further 10 speakers presented explicit cladistic analyses of "conventional" characters.

As at the legume conference, the most impressive studies demonstrated substantial congruence between analyses of macromolecular and morphological data sets. Such gratifying results were also found here for the Ariflorae, Arecaceae, and Poales. On the other hand, the Zingiberales, Pontederiales, and Alismatiflorae proved much less cooperative. My favourite result was the discovery, supported by both molecules (French *et al.*) and morphology (Mayo), that the Lemnaceae are nested well within the Araceae, belonging to the "monoecious clade" of that family. I recently had reason to consult Landolt's monograph of the Lemnaceae, and found that the pinnacle of *Wolffia* development is a blob of cells less than a millimetre in diameter. *Amorphophallus* is more closely related to this pitiful excuse for a plant than it is to *Monstera*! I think this is wonderful.

Another interesting fact that I learned from Mayo's talk was that the close relationship of Lemnaceae to monoecious aroids was first suggested on the basis of vegetative similarities between *Spirodela* and *Pistia*, an aquatic aroid. It turns out that *Pistia* is not the sister group of the Lemnaceae, and that the apparently synapomorphic morphological similarities shared by these taxa are largely convergent. So the (almost) right answer came up for the wrong reasons. Amazing. This must say something about morphological canalization.

Amidst the technical sophistication of the

molecular/cladistic papers was a purely descriptive morphological paper that was perhaps the most talked-about presentation of the entire conference — Tillich's "Seedlings and systematics in monocots". To quote his abstract:- "Due to the lack of comparative seedling studies, the character syndrome of the seedling was up to now almost totally neglected. The diversity of seedling types in monocots exceeds by far the variability of dicots". Almost every following speaker noted seedling characters that were congruent with groupings supported by other characters. Perhaps the most impressive was the suggestion, consistent with results from both rDNA (Zimmer) and rbcL sequences (Chase & Albert), that the alismatids and aroids are sister groups.

I could go on at length about aspects of the monocot meeting that I found interesting, but I will leave it at that. Suffice it to say that since 1985 amazing progress has been made in sorting out higher-level monocot relationships. Kew will be publishing a volume containing papers by the speakers as well as a few papers by poster authors. The Aussies succeeded in making an impression, especially when Barbara Briggs offered to host the next monocot symposium in Sydney. So, later this decade it will probably be on again, closer to home. I would strongly recommend attendance, given the success of the Kew meeting.

Jeremy Bruhl returned to London for the symposium on "Models in Phylogeny Reconstruction", and we were joined by fellow Australians Adrian Gibbs, Pauline Ladiges, Peter Lockhart, and George Weiller. Given the list of invited speakers, this meeting originally was shaping up as a confrontation between cladists (particularly Steve Farris) and evolutionary modellers (especially Joe Felsenstein). Steve and Joe must have got sick of having intellectual punch-ups at meetings like this, because both eventually pulled out. Nevertheless, two main camps were definitely evident, and both were clearly suspicious (afraid?) of one another. Thus, question time did not really warm up until halfway through the second day.

I should explain the main feature distinguishing the two groups. Cladistics in the strict sense reached the English- speaking world with the publication of Willi Hennig's *Phylogenetic Systematics* in 1966. Hennig deduced his method from an explicit evolutionary model, but since 1966 a number of cladists have been busily identifying what they consider to be unnecessary evolutionary assumptions in Hennig's account of the method. The evolutionary modellers have attacked the problem of phylogeny reconstruction from the other direction, insisting that reconstruction of phylogeny must be based on an explicit (and preferably detailed) model of the evolutionary process. They tend to have been dismissive of morphology, concentrating on macromolecular sequences, but a couple of papers in this symposium dealt with stochastic models of morphological change. Starting with blatantly simplistic evolutionary models, they have incorporated more and more parameters, arriving at today's relatively complex models.

The first day was dominated by philosophical discussion and papers on ontogeny. Ron Brady gave an erudite talk on the possibility of distinguishing between descriptive and explanatory hypotheses in science. He argued that even dynamic concepts such as "transformation" can be invoked without implying notions of process, in a way that I found surprisingly persuasive.

Olivier Rieppel and Colin Patterson continued in a similar vein, both arguing that all of our knowledge about phylogeny stems from our knowledge of systematic patterns. Mae-Wan Ho went a big step further, and claimed that the morphological-taxonomic hierarchy is not even a phylogenetic pattern but is an inevitable consequence of "generic" developmental processes. This idea predicts that analyses based on morphological and macromolecular data will be largely incongruent. Since this prediction has been demonstrably false for some years now, I decided that my time would be best spent loading the slides up for my talk, entitled "Direct methods for polarizing character transformation series", than listening further. I have already published a couple of papers on this subject, so I suppose that it is something of a bee in my bonnet. After spending months agonizing over this problem, I think I almost have it beaten now. Mario de Pinna gave a talk on more-or-less the same subject, and came up with some strikingly similar as well as dissimilar conclusions.

The second and third days focussed very usefully on the main weaknesses of current parsimony-based cladistic methods and of the alternative, model-based, maximum-likelihood and distance techniques for analysing macromolecular data. The main problem with parsimony is that under certain conditions (the so-called Felsenstein zone), it will be positively misleading — that is, "wrong with confidence". David Penny and his colleagues came up with the interesting finding that "the parsimony tree selection criterion is always consistent (will converge to the correct tree) if appropriate transformations for multiple changes are made first". The 60 million dollar question is "how do we make appropriate transformations?"

The main problem with most model-based methods is that, despite their sophistication, the models are still too simplistic. For instance, nearly all of the models assume that there are no site-to-site differences in the rate of sequence change within a macromolecule. Victor Albert showed convincingly that this assumption is false, at least for protein-encoding genes such as rbcL, due to functional constraints. Gary Olsen claimed, in a presentation that went largely over my head, that with some existing maximum-likelihood programs, site-specific rates can be both inferred and used in analysis. The cognoscenti seemed sceptical of this claim, but Olsen's results will represent a notable advance if they stand up to critical scrutiny.

Not surprisingly, this meeting did not produce any compromise between cladists and modellers, nor did one side "win" over the other. However, I found it immensely useful to be able to talk about the problems with leading figures from both camps. The Systematics Association, in association with Oxford University Press, will be publishing the papers from this symposium in a special volume.

Finally, no ABLO report is complete without some sports results. Yesterday I played cricket for "the rest" against the Living Collections Division. Unfortunately we lost by 50-odd runs, my contribution being a modest 14 runs, one wicket, and a run-out. Perhaps I should stick to soccer. Also, in my last report I erroneously stated that there had been no ABLO vs Brummitt sporting contests. I neglected to mention our long-running tea-room debate about cladistic and gradistic classifications. This started promisingly, but eventually fizzled out to a scoreless draw after extra time.

Having come to the end of my posting, I would like to say how stimulating, enjoyable, and educational my time at Kew has been, and how much my whole family has benefited from the experience. Thankyou very much to all of the staff at K and BM for their generous help and advice, and, above all, their friendship. I am sad to have to say goodbye.

Peter Weston
ABLO

REVIEWS

The Compleat Cladist.
A Primer of Phylogenetic Procedures.

By E.O. Wiley, D. Siegel-Causey, D.R. Brooks, and V.A. Funk. University of Kansas Museum of Natural History Special Publication No. 19. 1991. x+158 pp. ISBN 0-89338-035-0. $US15. Available from Museum of Natural History, 602 Dyche Hall, University of Kansas, Lawrence KS 66045, U.S.A.

In some of my recent book reviews, I've made the odd caustic remark about the often woeful way in which cladistics is discussed in general taxonomic books. By and large (with one exception, see *Austral. Syst. Bot. Soc. Newsletter* 71: 35), these introductions seem to be written by people who do not have any depth of knowledge about cladistics, and who have very little practical experience with cladistic analyses of biological groups. Consequently, these introductions vary from dubiously inadequate to definitely inaccurate.

So, just to even things up a bit, maybe it's about time that I reviewed an introduction to cladistics that has been written by people whom no-one could ever claim were not died-in-the-wool fundamentalist cladists. Can cladists write an introduction to cladistics that is not inadequate and/or inaccurate? Can cladists write an introduction to cladistics that contains information that is both necessary and sufficient for a working understanding of the topic? Can cladists write an introduction to cladistics that is readable by non-cladists?

The answers to these questions are, not surprisingly, "yes" and "no". This book contains few inadequacies, almost no inaccuracies, all of the necessary information, most of the sufficient information, and it should be readable (and understandable) by anything that can be placed in a one-to-one relationship with *Homo sapiens*. That's as good a recommendation as you'll ever get from me.

However, I have heard that this book was not always of a high standard. A number of people are acknowledged for "valuable comments" on early drafts of the book, and, if rumour is to be believed, many of these comments were aimed at removing outrageous inaccuracies. If so, then these people deserve our thanks as well (and perhaps we should conclude that some cladists are no better at introducing cladistics than are any other people).

Perhaps the most bizarre remaining feature of the book is the complete contradiction between the title of the book and its sub-title. The authors freely claim that their book is neither "compleat" nor complete, so why use this ridiculous title? The sub-title is, in fact, a much more accurate description of the contents of the book itself.

The book is basically a practical workbook designed to accompany a university teaching course, but it can easily be read as a free-standing work. There are seven chapters, each of which introduces a particular topic in simple straightforward language, and most of which then contain detailed worked examples of simple analyses, followed by a set of exercises for the reader to try for themselves. All of the worked examples and exercises can easily be done by hand, since it is the general principles behind the analyses that the book focuses on, and the answers to all of the exercises are at the back of the book. Each chapter also provides a good (i.e. selective) guide to the original literature on each topic, and the book is almost worth its price for this feature alone.

The chapters include:- Introduction, terms, and concepts; Basic phylogenetic techniques; Character argumentation and coding; Tree building and optimization; Tree comparisons; Classification; and Coevolutionary studies. This covers all of the necessary topics for an appreciation of cladistic techniques, and I suppose that one could argue that the topics are also sufficient for such an appreciation. The only misleading title is the last one, since all of the examples in the chapter are about biogeographic studies rather than co-evolution in the strict sense.

The book thus takes the reader through a logical and carefully-constructed sequence of topics, explaining the essentials, and describing clearly how the techniques work. None of the topics are treated lightly, but neither are the essentials lost in a mass of detail. The book thus presents a nice balance for the beginning student or the older taxonomist who wants to find out what the fuss is all about.

The inadequacies of the book mostly arise from a desire (completely understandable) not to go into too much detail about some of the topics. For example, tree-building is restricted to the Hennig and Wagner techniques only (with a brief mention of branch-swapping), and only descriptive parsimony is considered as a criterion for choosing the optimal phylogenetic tree (with a brief mention that maximum likelihood and least squares methods also exist). This means that the book really is nothing more than a primer on these topics (which is, after all, all that it claims to be). The best introduction to the niceties of the broad range of cladistic analyses that are currently available is still the chapter by David Swofford and Gary Olsen in *Molecular Systematics* (edited by David Hillis and Craig Moritz; Sinauer Associates).

I'm also not sure how successful the presence of the exercises would be outside of a university setting. It is my experience (e.g. from having colleagues sit in on some of the subjects that I teach) that no-one but students who are forced to do them (e.g. by making them assessable) will ever bother to try the examples for themselves. This is a pity, because the process of having to think a problem through for yourself is one of the single most effective ways of reaching a true understanding of a particular topic; and this is doubly so for any topic involving data analysis techniques. Therefore, the exercises are actually an integral component of this book; but how many general readers are likely to reap any benefit in practice from their presence? (In case you're wondering, I *did* do the exercises when I read the book.)

One topic that could have usefully been expanded is the discussion of interpreting cladograms. I find, for example, that novices often don't realize just how many ways there are of drawing exactly the same tree (i.e. a tree that contains exactly the same phylogenetic information), and therefore they often treat identical trees as being different just because some of the branches have been reversed. This problem becomes even worse when you are dealing with unrooted trees (as often occurs when analysing molecular data, for example), and I have seen even experienced people mis-interpret such cladograms. I would even go so far as to suggest that this is the single biggest hurdle to overcome when teaching phylogenetic analysis (what's the point of getting the analysis right if you can't correctly interpret the answer?), and so I would personally have put much greater emphasis on this topic than do the authors.

Inaccuracies are few, and are usually minor, which is a relief. There are four typographical errata listed for the book, and I came across several more, including:- capitula on page 46 should be capitulum; a genus name is not italicized on page 47; page 51 refers to Exercise 4.5 instead of 4.4; Table 4.6 is identical to Table 4.5, and is thus redundant; the word "worst" appears to be missing from page 74; there seem to be four spurious lines on page 142 (which is a worry, because it is at the beginning of the answer to one of the exercises); and characters 3-1 and 4-1 are missing from one of the cladograms on page 149 (which is also an

answer to one of the exercises).

There are also a few places where I could not follow what was being said (which may be a problem with me rather than with the book). For example, "basal bifurcations" are referred to on page 40, which seems to be an odd expression for the concept that the authors appear to be discussing at the time; I cannot see any reason for wanting to include fossils in a cladogram (page 106); and some of the biogeographic interpretations about dispersals (pages 125 and 158) are not clear to me.

I may as well list a few of my minor quibbles, while I'm about it (it's good therapy to get them off your chest, or so I'm told). Firstly, the language of the book is very carefully worded, almost to the point of pedantry. Those of you have read any of Ed Wiley's other works will instantly recognize the writing style, and it does not always make for easy reading. Furthermore, many of the examples and exercises are based on real data sets, and this often leads the authors to provide "hints" for some of the solutions, in order to avoid the imperfections that inevitably appear in the real world. The idea of using real data sets is generally a good one, because it makes the whole enterprise more realistic for the reader, but the limitations of this approach must be recognized, and a judicious mix of real and artificial data sets is usually the best option.

Some of the terminology may also surprise a few people. The authors have deliberately chosen to use the "transformation series/character" combination in place of the more common "character/character state" combination that appears in the literature. Their argument for doing so is logical, but any reader will have to be careful about potential confusion when transferring their reading to the original literature. The coevolutionary section also refers to the "missing taxon" and "widespread species" problems, which seems to be a rather inconsistent mixture of terminology.

Moreover, I do not agree with the suggested treatments of polymorphic taxa — why not subdivide them into monomorphic terminal taxa? Nor do I think that consensus trees are of much use in cladistic analysis — you can't plot characters onto them, and they are unlikely to actually represent the true phylogeny, so why not try and make a rational choice from among the competing trees? Nor do I agree that phylogeneticists are neither splitters nor lumpers when erecting a classification from their cladogram — all that possessing a phylogenetic tree does is formalize the way in which the cladist goes about the lumping or splitting.

Finally, in all except two places in the book, taxonomists are referred to as "she". This seems to me to be a bizarre solution to the almost universal male sexism that pervades most taxonomic books, because it is just as sexist to treat everyone as female. There are better solutions to the problem than this, the most effective suggestion to date being to treat people as plural (thus using "they" instead of "he" or "she").

All in all, this book is one of the best introductions to the process of cladistic analysis that I have read so far. It is specifically written to introduce the topics in a learn-by-doing fashion, which engenders a type of understanding (a "feel", if you like) that does not come from a purely theoretical introduction. The book is certainly nothing more than a primer, and I wouldn't want anyone to feel that they were an expert with nothing more than this book as a background. But as a starting point, you could do a lot worse (and many people have).

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CSIRO Handbook of Economic Plants of Australia

Edited by Mike Lazarides and Bernadette Hince. CSIRO, Australia. 1993. xii+330 pp. ISBN 0-643-05240-2. $50.00.

I like beautifully produced books, and this specimen is a delight to handle. The layout is good, and the colours and type-faces used are pleasing to the eye. The information is in compact form, so that it is easy to see everything that is said about a particular species, and the distribution maps are very clear. The book appears to be well bound — an important consideration for a volume that should be extensively used.

But this is a serious book, to be assessed for its aims and contents, and not aesthetics. The major aim of the book is to provide a list of "authoritative scientific and common names for economic plants". The primary listing is organized alphabetically by genus and species, and this is supported by an index of common names. It therefore provides a cross-reference between the common and scientific names — something that would go a long way towards standardizing the usage of common names. The families are indicated in brackets after the genera, and are therefore not part of the alphabetical reference system.

A subsidiary aim is to provide "useful supplementary data in a readily accessible form". The additional data include distribution by state, growth-forms, economic uses (crop, poison, fodder, shelter, medicinal, etc.), and references to descriptive information and economic information. The blurb on the back of the hard-cover is very explicit about the completeness and usefulness of this information.

I do not have a sufficiently broad knowledge of the Australian flora and botanical literature to assess how well the book matches up to its claims, overall. However, a critical reading of the entries on the danthonoid grasses revealed several deficiencies.

For example, the list of species is rather incomplete. In the danthonoid grasses there are some surprising omissions:- *Danthonia racemosa*, which is one of the most common paddock grasses of the Southern Tablelands; *Danthonia decumbens*, which was introduced as a forage grass, appears to have become naturalized in Tasmania; and *Pentaschistis airoides*, which has become a common annual weed, ranging from Western Australia to New South Wales. In contrast, it is not clear why relatively rare species such as *D. procera* were included. There are also errors, with the distribution areas of both *D. longifolia* and *D. pallida* being in reality much smaller than those indicated.

A more extensive literature referencing would greatly improve the value of the book. If the book is largely aimed at non-taxonomists, then referencing to illustrations would be very useful. Although this appears to have been done for some taxa, the taxonomic description and illustration referencing for the danthonoid grasses is poor. The same would apply for the economic uses of the species. The literature is very extensive, and review articles are rare, but this book could provide a good starting place for anybody wishing to find an entry into the available information. With more complete referencing, this book (or more precisely, the database from which it was generated) could become the central link between the economic literature, the descriptive information, and the formal taxonomy.

Although the blurb claims that synonyms are listed, this appears to be rather weak in the text. For example, the Australian species of *Danthonia* are placed into *Rytidosperma* by some authorities — this is not mentioned in the text; and although *Monachather paradoxa* is referred to under *Danthonia*, *Danthonia paradoxa* is not referred to under *Monachather*. This would make understanding any older literature virtually impossible, unless the common names are used!

Despite this nit-picking, I think that this will be a useful book. An impressive amount of data have been accumulated, and are presented in a very user-friendly form. To a foreigner, it is even more impressive how many species of Australian plants are economically useful, and how much progress there has been towards documenting their uses. But I would suggest that the database would be even more useful than the book, especially if it is made available as electronic text. If it could be expanded to contain more complete referencing, and to fill in the gaps in the species listed, then this data-base (or a hard-copy printout from it, like this book) would not only be essential for anybody working with economically important plants, but will also be used very extensively.

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Vegetation Survey and Mapping in Queensland. Its Relevance and Future, and the Contribution of the Queensland Herbarium

By V.J. (John) Neldner. Queensland Botany Bulletin No. 12. 1993. 76 pp. $12 + $4 postage.

This publication provides a good discussion of all aspects of vegetation survey and mapping — the mistakes to be avoided, the questions of scale, the costs and benefits, and the impact of new technologies. However, I am still unclear as to the intended audience, as the detail and tone of the paper changes throughout. At times it seems to be aimed at the student of vegetation classification; at other times it seems to be addressing other researchers; and still at others it seems to be pleading the case to the management of the Queensland Herbarium for the continuation of vegetation survey! Despite this confusion of styles, it would satisfy all of those readers, as all of the topics are dealt with at length.

One of the most valuable aspects of the work is the compilation of a (seemingly) comprehensive list of the vegetation surveys carried out to date in Queensland. As the paper points out, the lack of a centralized database of such surveys is a serious problem, since there is a danger of work being unnecessarily duplicated, as well as land use decisions being made without using all available information. This document forms a very good basis for just such a database, and will fill the Queensland

gap until the ERIN and NRIC projects are completed.

Despite Neldner's justifications, I remain unconvinced as to our ability to map, or the value in mapping, pre-European vegetation. I doubt that we understand the determining factors of vegetation pattern well enough to extrapolate to a time where there were no exotic grazers, a different fire regime, pre-European clearing, no modern pollutants, no introduced plant species, and an intact assemblage of fauna. Land-use decisions have to be made based on the present-day distribution of biota. Educated guesses can be made for specific projects (such as the rehabilitation of certain areas), but such mapping should not proceed at the expense of mapping current vegetation patterns. I also dispute that grazing is a low-impact land use. It may not change the structure of the community as quickly as, say, clearing, but given time the community will change equally as dramatically.

These are not major criticisms, however. The mapping programs as outlined are based on sound scientific principles, and the author is obviously keen to encourage a standardized methodology for survey throughout Australia. This paper is a good starting point for the discussion and production of such guidelines.

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Recent Publications

Cladistics.
A Practical Course in Systematics.
By P.L. Forey, C.J. Humphries, *et al.* The Systematics Association Publication No. 10, Oxford Science Publications. 1992. ISBN 0-19-857767-2. $45.

Hidden Rainforests. Subtropical Rainforests and their Invertebrate Biodiversity.
By Geoff Williams. New South Wales University Press, Kensington. 1993. 220 pp. ISBN 0-86840-054-8. $59.95.

Flora of New South Wales, Volume 4.
Edited by Gwen Harden. New South Wales University Press, Kensington. 1993. 800 pp. ISBN 0-86840-188-9. $120.

The Fern Guide. A Field Guide to the Ferns, Clubmosses, Quillworts and Horsetails of the British Isles.
By James Merryweather and Michael Hill. Field Studies Council, Preston Montford, Shrewsbury, Shropshire SY4 1HW, England. 1993. ISBN 1-85153-211-0. £5.25.

Global Biodiversity.
By World Conservation Monitoring Centre, Cambridge UK. Chapman & Hall, London. 1992. 614 pp. ISBN 0-412-47240-6. £29.95.

NOTICES

The role of networks

An international conference on the role of networks among people involved in conservation is being organized by the CSIRO Division of Wildlife & Ecology, the Centre for Conservation Biology at Auckland University, World Wide Fund for Nature, and the Department of Conservation and Land Management, Western Australia.

It will be held in Geraldton, Western Australia, from sunday 15 to friday 20 May, 1994.

The conference will cover such subjects as:- community involvement in conservation; the link between scientists and community groups; conservation biology as a discipline and as a force for change; current understanding of landscape linkages in conservation with production and development; the role of Landcare groups; integrating conservation with production and development; and the role of mining companies.

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Please inform David Bedford (NSW) of any changes or additions.

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Membership

Membership is open to all those interested in plant systematics. Membership entitles the member to attend general meetings and chapter meetings, and to receive the *Newsletter*. Any person may apply for membership by filling in an "Application for Membership" form and forwarding it, with the appropriate subscription, to the treasurer. Subscriptions become due on January 1 each year.

The Newsletter

The *Newsletter* appears quarterly, keeps members informed of Society events and news, and provides a vehicle for debate and discussion. In addition, original articles, notes and letters (not exceeding ten published pages in length) will be considered.

Contributions should be sent to one of the editors at the address given below. They should preferably be submitted as:- an unformatted word-processor or ASCII file on an MS-DOS or Macintosh diskette, accompanied by a printed copy; as an unformatted word-processor or ASCII email file, accompanied by a fax message reporting the sending of the file; or as two typed copies with double-spacing.

The deadline for contributions is the last day of February, May, August, and November.

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