arguments (see Farris, 1982). But that scarcely excuses a "philosopher" who does the same.

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CLASSES AND CLADISTS OR INDIVIDUALS AND EVOLUTION

Beatty (1982) identifies "two ever more distinguishable groups of cladists"—"phylogenetic" and "pattern" cladists, and quotes me as an example of the latter group. Why are we separated from other cladists by a "widening split?" According to Beatty it is because of "a change of heart" following "acceptance of what [we] perceived to be Popperian standards for judging science" (p. 28) or "disillusions concerning evolutionary theorizing, based in part on a naively falsificationist philosophy of science" (p. 33). Odd, for I still hold the view (Patterson, 1978:221) that systematists are mistaken if they take falsification seriously.

My own change of heart to pattern or transformed cladistics had nothing to do with Popper. Instead, it came mainly from the realisation that the interminable argument about method and philosophy in systematics had only one source, evolutionary theory, specifically the belief that there is a necessary connection between phylogeny and systematics, and that knowledge of phylogeny exists and should influence our systematics. Unlike many others, Beatty does not insist on those beliefs; instead, he argues that cladists cannot "shuck . . . evolutionary aspirations and connotations" without taking a position that is actually antagonistic to evolutionary theory. I think that the problem Beatty raises to reach that conclusion, the defining properties of species, is no problem at all. It is answered for the phylogenetic cladist by Løvtrup's (1977:25, 27) proposal that species or terminal taxa are not fully definable because they "have not yet 'come into existence' " or are still "under creation." For the pattern cladist, it is answered by ontogeny. Using Beatty's example of the polar bear's white coat, an embryonic (hairless) or melanic *Ursus maritimus* would still be one: absence of the defining characters of a species in an individual, as in early or late ontogeny, or teratology, is no disqualification. Pattern cladists expect organisms to lack the defining characters of their groups, or to show general conditions, in early ontog-

eny, and to acquire those special conditions during life.

At the more interesting level of groups, rather than single species, as Platnick (1982) points out, groups (e.g., spiders) exist, and may be observed, bumped into, or discovered, regardless of the causal theory one may hold to explain their existence. That existence is guaranteed by congruence of homologies, and homologies may be hypothesized and tested by a rational procedure that has no necessary dependence on evolution (Patterson, 1982). I found that procedure, and a consequent non-evolutionary view of systematics, interesting enough to explore and present in talks. It is a pity that the tape-recorder allows others to give the permanence of print to verbal explorations. Beatty's printed quotes from one such talk do less harm than extracts from another in the current creationist literature, but in both cases I would have preferred a chance to approve what is published.

Beatty's disapproval of pattern cladists rests mainly on accusations that they (1) necessarily view species as classes, not lineages (or individuals); (2) view groups not as lineages (or individuals) generated by genealogy and history, but as classes generated (Platnick, 1982) solely by congruence of homologies or synapomorphies. These may or may not be real problems. If they are, Beatty is too narrow in his strictures, for "remnants of the class interpretation" of species and groups are not exclusive to a handful of pattern cladists, but are rife among evolutionary systematists. Every systematist who is ambiguous about what relationship means, or advocates grade (paraphyletic) groups, or adopts a morphological species concept, or argues that there is more than one pattern in nature, is also advocating the class interpretation. One reason why pattern cladists are fond of Venn diagrams is that they show up paraphyletic (in the phylogenetic sense) or non-natural (in the pattern sense) groups as "timeless abstractions" (Patterson, 1978:220) or "not part of the way the world is—but . . . simply man-made constraints upon what we can possibly know," Beatty's words (1982:26) on defining properties, which paraphyletic groups lack.

Beatty seems to hold no brief for evolutionary systematics. He recommends the position of phylogenetic cladists like Wiley (1981) since they avoid the "problem [that] lies in the pattern cladists' conception of 'group' " (p. 30). Let's see how they avoid it. For Beatty (p. 32) "pattern cladists offer no other criteria for what it is to be a particular group than to have the characters associated with it" whereas phylogenetic cladists have the additional "independent" criterion of "being a monophyletic lineage." Let's look at this independent criterion that gives phylogenetic cladists' groups their reality: "what 'makes' a group a real group is its genealogical history" (p. 30). Not exactly, because para- and polyphyletic groups also have genealogical histories. For the phylogenetic cladist, what makes a group monophyletic or real is that it includes a common ancestor and all its descendants. Is this a criterion? No, for *Chambers's* gives "criterion . . . a means or standard of judging: a test" and *Webster's* "an identifying indication; a basis for discrimination." By what criterion, test, or discrimination is a group judged to be monophyletic? Beatty's chosen phylogenetic cladist, Wiley (1981:78, 129), agrees with pattern cladists that the only criterion for monophyletic or natural groups is homologies. And for Wiley (1981:11, 121) homologies are characters found in or inferred to have originated in the common ancestor of the taxa exhibiting them. Thus for Wiley both monophyly (Beatty's independent criterion of groups) and homology (our means of recognising, distinguishing or describing those groups) are defined by reference to the same inferred common ancestor. For Wiley agrees (1981:114, 138) that no phylogenies are known, and all common ancestors are therefore inferred. What has happened to criteria?

Wiley (1981:130, 138) refers to "the problem of homology," of which the

above is one version. He finds that the problem is removed or broken "by simply realizing that homologies can be treated as hypotheses which are tested by other hypotheses of homology and their associated phylogenetic hypotheses" and concludes that this outlook "is a direct appeal to the evolutionary process" (p. 139). But the method Wiley describes is precisely the method used by pattern cladists, who call it congruence (Patterson, 1982; Platnick, 1982). Thus there is no argument between pattern and phylogenetic cladists over how groups are recognised (i.e., on criteria), or what the groups include. The disagreement seems to lie only in that last phrase quoted from Wiley—phylogenetic cladists appeal to the evolutionary process to justify their groups, and pattern cladists do not find this necessary. For Wiley (1981:78), the appeal is necessary because "characters alone are insufficient to define a natural taxon." This is exactly the argument used by Beatty, and the one Platnick (1982) shows to be without force.

I can appeal to evolutionary process (assume common ancestry) or not (discard that assumption) at will. According to Beatty, when I make the assumption, my groups are real, all is well and I can make sense of the world, but when I discard it, my groups are classes, my attitude is "antagonistic . . . to . . . undermines and is undermined by evolutionary theory" (Beatty, 1982:30), and I am beset with philosophical riddles. It doesn't feel like that as I make the switch. Beatty asks under what circumstances scientists should take philosophers seriously. The puzzle of that mental switch seems the right occasion. But I hope philosophers would tell me something more illuminating than that assumptions are independent criteria.

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THEORETICAL ISSUES AND "PATTERN CLADISTICS"

Beatty (1982) makes two important points about a party of cladists he terms "pattern cladists." These are: (1) that by searching for characters that define a hierarchical pattern of groups those researchers reduce their groups to Aristotelian classes, and (2) that this position is not "theory-neutral" with regard to current evolutionary theory, but actively antagonistic, even though it does not advance counter-explanations of evolution. When submitted to close reading, however, Beatty's discussion of the implications does not produce the clarification he intended. An unfortunate result, since the issues raised are part of an ongoing