wishes to distance himself from it, arguing that neurological data can sometimes make a contribution and that there are circumstances under which group studies are valid. Any cognitive neuropsychologist will want to ponder the arguments here, even if ultimately disagreeing with them—as I do.

Another belief held by many cognitive neuropsychologists is that assigning patients to syndromes such as "Broca's aphasia" or "amnesia" is unhelpful: if every patient has a unique constellation of impaired and preserved processes, why group patients into categories? Shallice's line here is to distinguish between "mixed syndromes" (where the patient exhibits a variety of symptoms that are caused by more than one impairment of the relevant processing system) and "single-component syndromes" (where the symptoms are all due to a single underlying impairment of processing). I find it difficult to accept this defense of the syndrome concept, simply because I doubt that examples of single-component syndromes can be clearly demonstrated. One such syndrome that Shallice would offer is pure alexia: patients with this condition can have normal spoken-language processing, normal writing and spelling, and normal vision but severely impaired visual word recognition. One might be inclined to group all such patients together, claiming that they all have exactly the same processing impairment, namely, damage to the visual word recognition system. As Shallice himself notes, however, a different functional lesion—impaired access to the visual word recognition system—would produce the same symptoms (as indeed would impairment of the procedures that pass information on from the system to subsequent processing stages). Thus in any plausible model of the language-processing system, different pure alexics will have different loci of impairment, and so treating them as a homogeneous group is unjustified. Since, I believe, this is a perfectly general argument, applying to any condition that Shallice would regard as a single-component syndrome, I remain dubious about the utility of the concept of the syndrome.

But I am not dubious about the value of this book. The interesting and profound things it has to say about many different kinds of cognitive processes make it important as a contribution to cognitive psychology. The meticulous analyses of the methods and inferences used to draw conclusions about normal cognition from studies of abnormal cognition make it crucial as a contribution to cognitive neuropsychology.

MAX COLTHEART
School of Behavioural Sciences, Macquarie University, Sydney, NSW 2109, Australia

Rain Forests from Inside

The Tropical Rain Forest. A First Encounter. MARIUS JACOBS. Remke Kruk *et al.*, Eds., with a chapter by Roelof A. A. Oldeman. Springer-Verlag, New York, 1988. xiv, 295 pp., illus. Paper, $39.95. Translated, with revisions, from the Dutch edition (Muiderberg, 1981).

In this book, a tropical botanist tries to convey to students and educated laypersons the beauty of rain forest, the delicately interwoven relationships among its plants and animals, and the wasteful profligacy with which humanity is progressively destroying it. Jacobs introduces us to how rain forests work, to the diversity of their plant forms and the multitude of their species, and surveys the status and discusses the peculiarities of rain forest on different continents. He also discusses its exploitation and the devastating consequences thereof and wrestles with how to justify its preservation.

Jacobs deliberately evokes E. J. H. Corner's vision of rain forest as a magnificent culmination of evolution, an epitome of mutualism. Jacobs shows how rain forest regulates its environment, how its plants inveigle animals into pollinating them and dispersing their seeds and enable them to do so more easily, and how the forest is organized to recycle nutrients with minimal loss.

Jacobs is much influenced by Corner's worldview. Like Corner, Jacobs shows little interest in the mechanisms of evolution. His discussion of speciation is cursory, his remarks about the defenses of plants against herbivores minimal, and his interest in any aspect of competition practically nil. Many American biologists will seethe to see him ignore so many topics we consider important. There are, however, other ways to approach biology, and attending to them might broaden our own perspective. Perhaps we need reminding that Adam Smith and Howard Odum, both quite interested in competition, viewed competition simply as an engine for the development of more perfect mutualism. Corner and Jacobs were surely right to see mutualism as the key to understanding the interdependence of rain forest organisms, as it is, as Regal has argued, to understanding the evolution of flowering plants.

In other aspects as well, Jacobs offers glimpses of an unfamiliar world. Readers will be jarred to learn that this lover of the rain forest considers it quite normal to cut down a tropical tree bearing flowers or fruit if there is no other way to identify it. Readers will rejoice at the wealth of references to Dutch work in Indonesia (and Suriname)—a tradition of which most English-speaking biologists know far too little. Readers will puzzle over the lovely drawings of tropical scenes, some quite strange, from the *Flora Brasiliensis* of Martius, which Jacobs scattered through his book in the view

"A biologist's camp in the rain forest. Shelters have been made of poles cut nearby; tarpaulins give protection from the rain. Note the hammocks: in the lowlands, like here, it is much too warm to sleep in a closed space." [Photograph taken north of Manaus, Brazil, 1982; from *The Tropical Rain Forest*]

The cauliflorous nangka, or jackfruit, *Artocarpus heterophyllus* (Moraceae), growing in a farmyard in Jambi, Sumatra. "Cauliflory, or the bearing of flowers and fruits on the trunk of a tree rather than at the ends of branches, is a rain forest phenomenon [the advantage of which] seems to be that the plant can produce larger, heavier fruits on such stout supports and that the larger, heavier animals can more easily reach them." The genus *Artocarpus* comprises "47 species . . . indigenous to Asia, though some species have been found to be so useful to mankind that they are now found pantropically." As the fruit of *A. heterophyllus* approaches maturity "the human owners of the tree protect [it] by wrapping it in jute or plastic bags to ward off the attentions of [the giant bat] *Pteropus vampyrus*." [From *The Tropical Rain Forest*]

that a drawing illustrates rain forest better than can any photograph (the book, however, is full of good photographs).

Jacobs believes that logging virgin rain forest is a horrendously wasteful way to use it. Rain forest timber is a nonrenewable resource (at least given current knowledge and the present incapacity of tropical countries to enforce sound practice). Jacobs shows how the complex interdependences of rain forest utterly defeat the common sense of forestry practice. Removing "uneconomic" trees eliminates the alternate food sources needed by dispersers; removing lianas removes crawlways on which small seed-dispersing mammals move from tree to tree; removing rotten trees destroys homes for seed-dispersing hornbills. Moreover, customary logging practice profits businessmen and central governments at the expense of the future welfare of the poor, who are left with a tenacious, barren grassland. Even if the grasslands were useful farms, extinction of rain forest organisms destroys an irreplaceable storehouse of plants and animals, some of which might in future be essential for human welfare. Far better to keep the rainforest as a storehouse of "minor forest products."

Here Jacobs faces a dilemma that pierces many lovers of rain forest, a dilemma that is a primary source of tension in his book. Rain forest is overwhelmingly magnificent. It seems frivolous to defend it simply as pleasing to (some) humans. As Jacobs shows, harvesting the world's rain forests would be a reckless act whose consequences we cannot forecast with precision but which may entail not only economic inconvenience on a grand scale but also enormous human suffering. Nevertheless, it seems dishonest to defend rain forest in terms of economic advantage, as if we would consent to its destruction were the destruction shown to benefit mankind. Conserving rain forests is an ethical issue. Jacobs implies it is *wrong* to destroy the rain forests, which he sees as, like mankind, one of the "summits of creation." Who are we to destroy it for our profit? Yet scientific publications are poor vehicles for appeals to God. In this dilemma, Jacobs casts about for "objective" arguments to defend his beloved rain forest, some of which are remarkably unattractive. Ethics without God is so very dicey a business. How much simpler to say that human beings were created (never mind by what means) lords of creation and that if we rule creation as shepherds, not as plunderers, the other good things we seek shall be given us. Sadly, the memory of countless persecutions, inquisitions, imperialism, and holocausts and the prevailing mechanistic worldview make such arguments seem folly. To resolve this dilemma, must biologists with no belief in supernature teach "creationists" a proper admiration for nature, to receive in return a true foundation for conservation ethics? Such a rapprochement seems more likely in India, where religious traditions are more respectful of nature.

EGBERT GILES LEIGH, JR.
Smithsonian Tropical Research Institute, Balboa, Panama

Some Other Books of Interest

Cantor's Dilemma. CARL DJERASSI. Doubleday, New York, 1989. viii, 230 pp. $18.95.

This is a novel about science in the spirit of the times—its action centers on a question of misconduct in the Nobel leagues. The cancer biologist I. C. Cantor intuits (in a hotel bathroom) a general theory of carcinogenesis. The theory is recognized as brilliant at the highest echelon in his field but is (as the author didactically explains) dependent on experimental confirmation. That assignment falls to Cantor's much-vaunted post-doc Jerry Stafford, who gets the results. But they aren't replicated elsewhere, and Stafford's notebook is sketchy and his hours have been odd. Reputable ways around this are found—Cantor devises and himself conducts in his private lab another experimental test of the theory—and the prize is won by the one-time collaborators. There follow a confrontation in which Stafford attempts to square things and an idyllic trip to Stockholm with a little tension of its own—what will Stafford say in his lecture? In the event Stafford quotes T. S. Eliot's observation that "The Nobel is a ticket to one's funeral. No one has ever done anything after he got it" and announces his intention to redirect his career by applying to medical school.

The Cantor-Stafford story is played against the story of Jerry's lover, Celestine (Celly), and her more personal and egalitarian relationship with her P.I., Jean Ardley. Their field, pheromones, is also seen by its protagonists as fast-moving and with high stakes (perhaps in reflection of the author's sympathies as a biological chemist), but the maneuverings are more straightforward, though Celly's career has included a sexual initiation not paralleled in Jerry's. An incredulous deconstructionist graduate student in literature serves as a foil for the explication of such issues of modern science as the relative merits of alphabetical order of authorship and putting one's name last on one's students' papers. (Though she changed her name from Yardley in anticipation of the former, Jean explains, she has found a different role model and now does the latter.)