BOOK REVIEWS

Science in the Federal Milieu

Politics on the Endless Frontier. Postwar Research Policy in the United States. DANIEL LEE KLEINMAN. Duke University Press, Durham, NC, 1995. xiv, 249 pp. $39.95; paper, $16.95.

A discussion of present-day struggles to reform federal science and technology policy ends Daniel Lee Kleinman's *Politics on the Endless Frontier*. Kleinman's main focus, however, is earlier—specifically, on the emergence during World War II and immediately afterward of a consensus that the country needed a National Research (eventually Science) Foundation and on the eight years it took to create something of the sort. This was, as almost everyone who has studied the period has recognized, a delay with enormous implications for subsequent research policy in the United States. Drawing on the existing historical accounts and filtering them through a large selection of political science writings (all of which are cataloged in a useful 24-page bibliography), Kleinman makes a number of key observations.

During World War II, leaders of the American academic science establishment developed or strengthened already close associations with their counterparts in technology-based industry. Kleinman describes how, following the war, many of these men came to occupy positions of enormous influence both within and at the periphery of governmental organizations. This "permeability" of national policy-making structures protected academic and industrial interests and severely constrained the kinds of reform that could be made (especially with respect to practices like peer review and issues like patent policy). Kleinman also provides an account of various personal and organizational splits within the Truman era government and within the evolving Democratic Party. He shows how those splits worked against Senator Harley M. Kilgore and his goal of creating one lead central agency in the federal government to "plan and coordinate" federal support of basic and applied research in the national interest.

It is much to the author's credit that in covering such well-trodden territory he highlights a number of important points that are not always recognized or given due emphasis. For instance, he points up the remarkable effectiveness of what he calls the "collective advancement project" of the American scientific community. Also noteworthy is his account of the role played in the science policy debate by "discourses."

The displacement of the New Deal rhetoric of planning and centralized coordination, according to Kleinman, by the rhetoric of scientific independence and self-governance (rhetoric given extraordinary power by the events of World War II and the public perception of scientists and their role within it) severely constrained the outcome of policy debates. For the most part, assertions about the relationship between scientist-controlled basic research and national prosperity and security went unchallenged, even as they radically limited government options.

The United States Congress and the White House are currently in the midst of a titanic struggle to redefine the size and role of central government in American society. The battleground is the federal budget. The process is extraordinarily messy and the result, more than likely, will be inconclusive. Lost in the scramble over entitlements and federal versus state control over social welfare programs, a number of important science policy issues also hang in the balance. What should the federal government's role be with respect to supporting, coordinating, and even planning scientific research? How should its activities be organized? And who should be in control?

Kleinman's book shows how, in the 1940s, contests over such seemingly narrow questions as patent policy and the consistency of placing geographical or other constraints on the National Science Foundation aside, it was such larger policy questions that were ultimately at issue. The book is quite useful, therefore, in placing the debate over American research in the context of American policy-making overall. Recent science policy initiatives, as Kleinman points out, are subject to many of the same forces (if aligned somewhat differently). Certainly scientists (outside and inside industry) continue to "permeate" government agencies, advisory bodies, and legislative staffs. And certainly deals continue to be made within and across political parties to advance or to block all manner of possible agreements or compromises. What is most different is the rhetoric (the discourses) that serves to shape the debate. Instead of prosperity and security we have "competitiveness." But we also have the often repeated, seldom questioned rhetoric of balanced budgets and "pay-as-you-go."

Politics on the Endless Frontier may well be most valuable as a reminder to a new generation of scientists that government policy toward them and toward their research careers must be viewed in context and that the context is hardly straightforward and rarely fully rational. The adoption of consistent, workable long-range plans for science, as for the federal government more generally, has always been extremely difficult except under extraordinary circumstances (of war or threatened economic collapse). And for good or for evil, optimal long-range planning at the federal level will likely remain beyond the reach of our established political institutions.

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Old World Herbivores

Colobine Monkeys. Their Ecology, Behavior and Evolution. A. GLYN DAVIES and JOHN F. OATES, Eds. Cambridge University Press, New York, 1995. xiv, 415 pp., illus. $79.95 or £50.

The Colobinae are a subfamily of Old World monkeys that includes the colobus monkey of Africa and the langur of India. Curiosity about these animals, which are commonly called "leaf monkeys," has centered on their unusual (for primates) fo-

"Banded leaf-monkey *Presbytis melalophos* leaping, West Malaysia." [From Oates, Davies, and Delson's chapter in *Colobine Monkeys*; photograph by John Fleagle]

livorous abilities. A related aspect of colobine diet that caught the attention of early workers was their ability to detoxify plant poisons, strychnine in particular. McCann (1928) quoted Blanford as stating that langurs eat the fruits and leaves of the tree *Nux vomica*, from which that poison is extracted, and that substantial amounts of strychnine can be given to langurs without effect, while the same dose will kill a macaque. *Colobine Monkeys* is a collection of papers that touches on some of the same issues as these early reports by emphasizing the central importance of diet and feeding behavior for understanding colobine ecology. The book is not one-dimensional, however, and touches on many other aspects of the paleontology, anatomy, geographical distribution, and social behavior of colobines. The novel conclusion is that we must no longer look upon colobines as simply leaf-eaters: there must also be seeds.

Introductory chapters place colobines in a systematic and historical context. Delson surveys the evolutionary history of colobine monkeys and outlines adaptive scenarios to explain the origin of some of their distinctive anatomical features, especially the "bilophodont" tooth pattern. He reminds us of the interesting contrast between cercopithecoid and hominoid species richness: in the early Miocene of Africa hominoids were far more common and diverse than cercopithecoids, whereas the reverse is the case today. Delson favors an ecological explanation for this contrast according to which early cercopithecoids were adapted to more open environments than hominoids. With a shift in the middle Miocene to a preponderance of such habitats these monkeys diversified into the modern subfamilies. This in turn facilitated a migration out of Africa to Europe and Asia in the late Miocene (8 to 5 million years ago) when open environments prevailed.

There follow several well-organized and informative accounts of the taxonomy, distribution, and socioecology of all the living species of colobines by Oates, Bennett, and Davies. These authors emphasize that colobines are not just leaf-eaters; seeds are identified as another major food source, a point that is revisited in several papers on colobine anatomy and physiology.

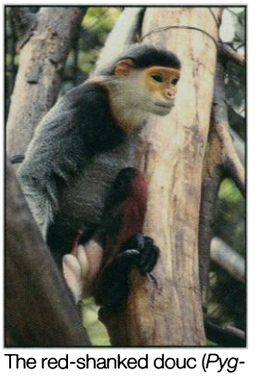
The distinctive bilophodont molar structure of colobines is described by Lucas and Teaford. They make a useful contribution to understanding how bilophodont teeth work and argue that the physical properties of seed coats may explain the structural design of colobine teeth just as well as adaptations for folivory.

Chivers also takes up the seed-eating theme. He notes that while digestion of structural carbohydrates in leaves is importantly linked to the complex stomach morphology of colobines, there is still a great degree of variation in this morphology that must be accounted for. Chivers sees seed-eating as a crucial link in the evolutionary transition from frugivory to folivory and the specialized gut tube that goes with it. Seeds are protected by a seed coat, which, once digested, yields a rich source of nutrients. Perhaps the enlarged, specialized foregut of colobines evolved initially as a fermentation chamber to assist the digestion of seed coats; once developed, the expanded foregut was further modified for the digestion of leaves in many colobines.

Interesting chapters by Kay (not this reviewer), and Davies and by Waterman and Kool bring us up to date on colobine digestive physiology and food selection in relation to plant chemistry. These authors review the factors that influence colobines' ability to digest complex carbohydrates and detoxify secondary compounds. Several such factors are body size, nutrient quality, metabolic rate, food passage time, and daily activity budgets. What is surprising here is how little we know about the digestive physiology of colobines *per se* and how much we must infer from the physiology of ruminants. This work does not strongly support the seed hypothesis and raises the possibility that foregut fermentation was selected as a means to detoxify plant parts.

Davies rounds out the volume by arguing that food supply is what limits the size of colobine populations, but he recognizes that this is far from a complete story.

So, we are left with the sense that colobine ecology is driven by a specialized diet but that seed-eating, not just leaf-eating, is a very important component of the story. This well-integrated set of papers that demonstrates how far we have traveled toward understanding the interactions among diet, anatomy, demographics, and social behavior. One regrettable aspect of the book is the absence of data on ontogeny, positional behavior and its anatomical correlates, or brain evolution. Why do colobines have such small brains for their body sizes compared with cercopithecines? Is it a structural limitation of the folivorous diet, as has sometimes been proposed? If not, what other factors come into play?



The red-shanked douc (*Pygathrix nemaeus nemaeus*). [From Oates, Davies, and Delson's chapter in Colobine Monkeys; photograph by Noel Rowe]

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Vignettes: Meanings

A common definition of a weed as "a plant out of place" is rather naive and ignores some of the main features of what makes a weed, a weed. In the first place, who is to judge if a plant is out of place? This is a matter of opinion or prejudice; as a matter of fact, many weeds are so much in place that they cost us dearly in control measures. How can a plant so well-adapted to human-made habitats be out of place? These habitats are its place. Weeds are organisms adapted to human disturbance and the definition need not be confined to plants. There are weedy animals too. Consider the house sparrow, starling, pigeon, house mouse, sewer rat, *Drosophila*, house fly, etc. And while we are about it, what about *Homo sapiens*?

—*Jack R. Harlan*, in *The Living Fields: Our Agricultural Heritage* (Cambridge University Press)

Among the set of meanings we've attached to the natural world, perhaps the most overarching and powerful is that nature is *not* a shifting set of human meanings. It's tangible, secure, rocklike, stable, self-evident, definable, real. In a word, it's natural.

—*Jennifer Price*, in *Uncommon Ground: Toward Reinventing Nature* (William Cronon, Ed.; Norton)