for pastoralists who live on the edges of complex agrarian states but quite inappropriate for people in most of the 108 tribal and band societies Paige and Paige use for testing their theory. People who lack the concept of private property seldom worry about the virginity of brides or the unambiguous biological paternity of offspring, and not all men have as great a need for collecting loyal kinsmen as do property owners whose ability to enjoy a privileged life-style depends on having many kinsmen to protect their herds.

A further difficulty is that Paige and Paige posit motives only for men, although several of the rituals they analyze, such as girls' puberty ceremonies, are often put on by women. In all societies, the motives people attribute to women are related to the motives they attribute to men, but seldom are they identical.

In summary, the "political theory" of reproductive rituals presented by Paige and Paige rests on three insights that elevate their book above previous explanatory, cross-cultural studies: that ritual is a form of politics, that rituals can be explained only in terms of motives held by sponsors, not in terms of benefits accruing to such nonsponsors as youthful initiates, and that rituals are motivated by self-interest. Though Paige and Paige fail to take full advantage of their insights, their failures offer opportunities for future researchers.

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Imaging from Space

X-Ray Astronomy with the Einstein Satellite. Proceedings of a meeting, Cambridge, Mass., Jan. 1980. RICCARDO GIACCONI, Ed. Reidel, Boston, 1981 (distributor, Kluwer Boston, Hingham, Mass.). viii, 330 pp., illus. $44.50. Astrophysics and Space Science Library, vol. 87.

The successful launch of the Einstein Observatory in November 1978 put high-resolution x-ray imaging instrumentation into orbit for the first time and thus represented an enormous stride forward for x-ray astronomy. The detectors on board Einstein provided the first optical-quality images of celestial x-ray sources and, as a result of their imaging capability, were a thousand times more sensitive to point sources than anything flown previously. (This, it has been noted, is analogous to proceeding from a 6-inch telescope to the 200-inch on Mount Palomar in a single step.)

This volume consists of the proceedings of a meeting of the High Energy Astrophysics Division of the American Astronomical Society devoted to the presentation and interpretation of the results of the first year of observations by the satellite. An impressive range of topics is addressed: nondegenerate stars, supernova remnants, normal galaxies, clusters of galaxies, and quasars, among others. Such breadth seems particularly significant when one considers that as recently as a few years ago x-ray astronomy was regarded by traditional astronomers (not completely unfairly) as a rather isolated subfield with a particularly narrow range of interest—the accreting degenerate stars in binary systems.

Because of the tremendous explosion of data that Einstein provided and the relatively short time that astronomers have had to analyze it, much of the material here is necessarily presented in somewhat undigested form. This is not a major drawback, however, and most of the contributors do a creditable job in outlining the initial results and their possible implications for existing and, perhaps, future theories.

The paper that is probably the highlight of the proceedings is uncharacteristic in that it represents more of a closing of a particular chapter in x-ray astronomy than an opening. It had been suggested in the mid-'70's on the basis of some rather indirect arguments that the x-ray sources in globular clusters might be black holes of a thousand solar masses. In "X-ray sources in globular clusters," J. E. Grindlay describes his observations of eight such clusters with Einstein, in which the precise positions of the x-ray sources were measured with respect to the optical centers of the clusters. By considering these sources as "test particles" in the cluster potential wells, one could then determine their masses in a statistical sense. Grindlay found a probable mass of 2 $M_\odot$, which is consistent with the masses of the familiar x-ray binaries and rules out heavier, more exotic objects. (One can rest assured, however, that the 1000 $M_\odot$ black hole will not soon pass into obscurity; its existence—in a new context—is predicted even before the end of the volume.)

The book provides a valuable background against which the new literature in x-ray astronomy can be read; it should not be taken (nor is it intended) as a source of journal-type articles or reviews. One drawback to the collection is that a few of the contributors, faced with such a wealth of data, somewhat paradoxically overinterpret them. For example, it seems unlikely that the x-ray data on quasars really constrain the numbers of optically faint quasars as severely as is suggested here, and the issue has in fact been much debated since the meeting. Occasional excesses of this sort might have been tempered by including in the volume a few of the often probing questions that followed each paper at the conference.

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Massive Sulfide Orebodies

The Buchans Orebodies. Fifty Years of Geology and Mining. E. A. SWANSON, D. F. STRONG, and J. G. THURLOW, Eds. Geological Association of Canada, Toronto, 1981. x, 350 pp., illus., + loose maps in slipcase. $36. The Geological Association of Canada Special Paper 22.

The Buchans district, in the Central Volcanic Belt of Newfoundland, has truly exceptional orebodies of the volcanic-associated massive sulfide type, with 17.5 million tons of ore that yielded, from 1928 until the present, much more total zinc, lead, and copper than the 94 million tons of ore in the Noranda district of Quebec. The Buchans deposits are of late Ordovician age and are slightly deformed and metamorphosed and thus are ideal for intensive study of primary depositional characteristics.

The volume contains, in addition to a broad selection of papers on specific aspects of the deposits, two papers (Neary and Swanson) reviewing the history of exploration, discovery, development, mining, and research at Buchans. Although these papers are atypical for a technical review volume, they provide an excellent perspective for the research efforts presented in the remaining 13 technical papers. Throughout the history of Buchans, exploration was guided by geological deduction and not by the geophysical data more typically used in most Canadian massive sulfide camps.

Discussions of the geology of the Central Volcanic Belt (Kean, Dean, and Strong) and of the Buchans district (Thurlow) are accompanied by excellent loose colored maps. The Buchans Group is a late arc sequence, formed about 450 million years ago, according to Bell and Blenkinsop's interpretation of rubidium-strontium data.

Thurlow and Swanson, in an excellent description of the Buchans deposits, em-