Simien population and the Dunbars' perception that, unlike common baboons, gelada individuals look very much alike (p. 17) made the identification and monitoring of discrete units difficult. The Dunbars did not mark their subjects. Nevertheless, during the second half of the study at Simien, they could confidently identify all members of 12 one-male units and 1 all-male group.

The Dunbars have successfully sketched the basic social structure of *Theropithecus* and they provide considerable insight into possible cohesive mechanisms and ontogenetic transformations of their one-male (or harem) units, all-male groups, and bands. Their results also serve as a sound base for comparisons with Kummer's classic studies on *Papio hamadryas* and for testing the hypothesis that one-male units are especially adapted for arid environments.

The integrity of the one-male units is maintained to a considerable extent by female-female bonds that are reflected in (and probably reinforced by) grooming relationships and the tendency for geladas to repel strays back to their own harem units. The male is somewhat peripheral to the females of his unit and, except during their estrus, he interacts quite preferentially among them. Female geladas lead unit group movements. They also initiate transference to new units. This contrasts markedly with the androcentric pattern of *Papio hamadryas*. Herding by the male gelada is relatively uncommon (and sometimes ineffective) by comparison with that of the hamadryas baboon. The male gelada usually stares and threatens; he rarely bites his females.

On average, the largest harem units include a mid-prime and a young adult male, six adult females, and six youngsters. The next largest units contain one mid-prime male, five females, and five youngsters. Units with only young adult males or with old males are generally smaller than those with mid-prime males. As subadults, males live in all-male groups of between 3 and 13 individuals that are "led" by one young adult male. A young male may eventually acquire females by joining a harem unit in which he interacts primarily with its young juvenile females. Fission probably occurs gradually as the females become reproductively mature (p. 104). Young adult males also may attack a unit male (generally a post-prime one) and usurp his unit. The old male remains peripherally with the unit. But unlike his collateral, the hamadryas, the old male gelada does not influence the movements of the band.

The Dunbars conclude that despite superficial similarities between the structures of gelada and hamadryas social groups, the mechanisms that underlie them are radically different (p. 141). These considerations plus the fact that gelada habitat is not even seasonally arid (p. 142) cast serious doubt on the universality of Crook's explanation that in terrestrial cercopithecines one-male units were adapted for arid environments. The rapidly increasing population (the increase is estimated to be 15.7 percent per year; p. 29) at Simien indicates that food is plentiful (or at least was during the Dunbars' visit). Thus, the evolution of gelada social structure remains mistier than the Simien Mountains. The impoverishment of natural predators and encroachments by man allow little optimism that decisive answers will be forthcoming. But the Dunbars' continuing studies should rule out some of the more unlikely speculations about the behavioral evolution of *Theropithecus* and also of *Homo*, with whom it has become faddish to construct analogies.

Hausfater's is the most narrowly focused of the three studies. This might be expected since, unlike *Theropithecus* and especially *Symphalangus*, savanna *Papio* have been subjects of numerous naturalistic behavioral and laboratory physiological studies for more than 15 years. Over a 14-month period in Amboseli National Park, Kenya, Hausfater tried to determine whether the dominance rank of male baboons was related to their reproductive success. This might illuminate whether and how sexual selection is operant in the species (p. 1). Since the essence of this work was reported recently in *Science* (**191**, 55 [1976]) by G. B. Kolata, I will touch only briefly (and critically) on a few aspects of it here.

Hausfater only partly solved his proximate puzzle and failed to reveal the nature of sexual selection in savanna baboons, perhaps because the Carpenter-Altmann priority-of-access model is too simple to apply to a complexly social species like *Papio* living in a vicissitudinous habitat like Amboseli National Park. Unlike Chivers and the Dunbars, Hausfater passes over potential perturbing environmental factors that might affect the normality of his single study group. He simply states (p. 4) that during the seven years prior to his study the baboon population had reduced from 2600 to around 200 individuals and that Masai tribesmen lived and grazed their cattle within the study area. He does not mention the intensity of tourist traffic and the frequency of visits by other baboon watchers to the area. It could be that external environmental factors were overshadowing aspects of the social communicative network that might reveal sexual selection. The effects of dramatic environmental deterioration on the reproductive physiology of Amboseli baboons also remain unexplored.

Additional longitudinal studies on baboons in several different habitats are required to test Hausfater's revised hypothesis, that the relation between dominance and mating behavior holds only for short-term reproductive behavioral strategies of males, and the assumptions upon which it rests (see Kolata, p. 56). If questions about sexual selection in savanna baboons are to be pursued, a good deal more attention must be given to how females express their preferences for certain males and the morphological, physiological, and behavioral features upon which preferability is based. Observers might be wise to concentrate on a few specific subjects throughout their daily activity cycles until the subtle details of their communication are better understood.

Despite certain criticisms expressed here, I suspect that primate sociobiology might come of age soon, especially if observers like Chivers, the Dunbars, and Hausfater succeed with longitudinal extensions of their field studies. Let us hope that the *rites de passage* instigated by critics of sociobiology will speed its maturation and integration with the human sciences instead of prolonging its isolation or mutilating it.

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Observers' Report

Childhood in China. WILLIAM KESSEN, Ed. Yale University Press, New Haven, Conn., 1975. xvi, 242 pp., illus. Cloth, $12.50; paper, $3.95.

The joint Committee on Scholarly Communication with the People's Republic of China of the National Academy of Sciences, the American Council of Learned Societies, and the Social Science Research Council has been the main vehicle by which serious exchange on a scholarly and scientific level has been encouraged between China and the United States in recent years. The breadth of the Committee's activities is documented in its *China Exchange Newsletter* and the quality of its delegations and their efforts on our behalf is illustrated in the report now published as *Childhood in China.* A distinguished group—mainly psychologists, but also including sociologists, China specialists, a pediatrician, and a working nursery school

teacher—spent three weeks in China late in 1973 touring and observing kindergartens, nurseries, primary and secondary schools, child health-care facilities, and a few homes along the way. Their report is recommended for its prudence in the face of obvious limitations, while at the same time providing a thought-provoking and occasionally moving account of the group's observations among the Chinese people.

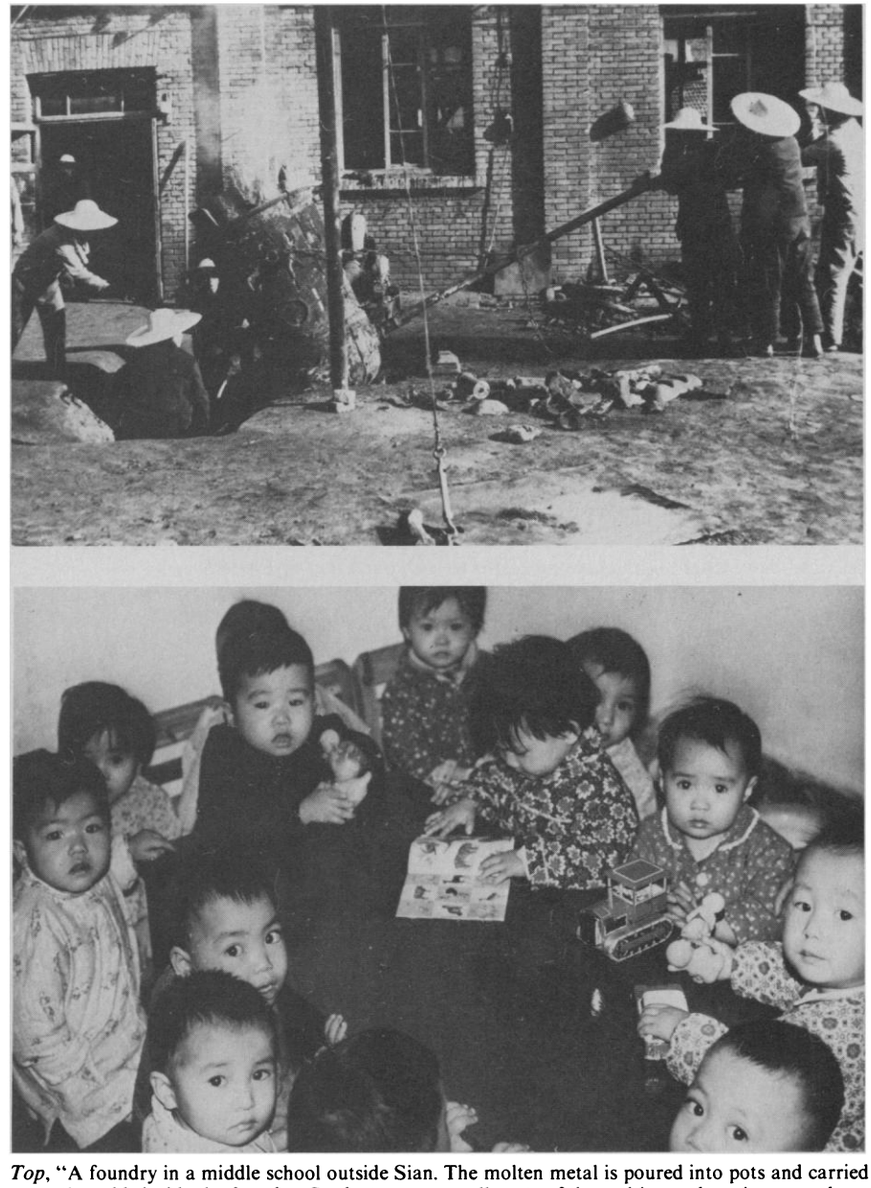
The report relies very little on secondary materials, but rather emphasizes "what we saw and measured ourselves" (p. 187). Much of the meat of the book is contained in vignettes of families or nurseries visited and sample classrooms and lessons observed. The report is frank about the inevitable selectivity of such a short visit, but within these limits the authors communicate a fair degree of credibility as human "sampling and recording devices." Their generalizations ring true partly because of attention to contrary examples and to cases where they as observers momentarily broke out of the prescribed and understood visitor role. Their generalizations are also compelling because of the solid, albeit informal, comparative base line they were able to provide; the authors often refer to contrasts in behavior of American children of comparable age and in educational practice between the two countries.

The main substantive generalizations seem to me to be four. First, Chinese children in the areas visited were well nourished, growing well by Asian standards, and provided with simple but adequate physical facilities and health care. Second, despite, or perhaps because of, a high level of employment of married women, families remain a very basic unit and coresiding grandparents an important part of child care. Third, the educational system is a highly structured, adult-oriented one in which teachers rely primarily on approval and moralistic reasoning, and one in which problem-solving and spontaneity or choice of activities are not emphasized. Finally, the children themselves are characterized as remarkably self-controlled, attentive to tasks, low in aggression or other antisocial behavior, and *at the same time* expressive and lively and without "obvious signs of tension, depression, or apathy" (p. 142).

It is clear that the authors were deeply impressed by what they saw in China; the word "unnerved" (p. 216) seems quite appropriate. As developmental psychologists, they were puzzled by the skill Chinese 5-year-olds show in dance and figural representation and by the very early control of aggression. They guess that a great deal of healthy stability has characterized the day-to-day lives of young Chinese in the People's Republic. But in fact the authors' *explanation* of their observations rests on a notion that expectations for children are high, uniform, and unquestioned. "We had no sense that Chinese parents and teachers were conflicted about the goals of education and child rearing in the formation of personality. . . . Chinese adults appeared to share, almost without exception, a conception of what a properly raised child should be like" (p. 218).

The very simplicity of this argument is perhaps appealing; indeed, the simplicity Americans see in the whole of the Chinese life-style may help to account for the current wave of laudatory books concerning the People's Republic. But we as Americans and as scientists must guard against the ways in which our conceptions and our needs may distort the Chinese reality. Paradoxically, this emphasis on the simplicity and lack of stress by which Chinese children are molded into healthy and responsible adults may perpetuate notions of a basic difference between us and them: at its worst, the stereotype of the "inscrutable Chinese."

There is much to be said for this report, but sharp wits, good will, and 21 days in China cannot produce an adequate accounting of human behavior as it occurs under Chinese conditions. If the Chinese



Top, "A foundry in a middle school outside Sian. The molten metal is poured into pots and carried to earth molds inside the foundry. Students carry on all parts of the melting and casting procedures under the direction of a worker-advisor." *Bottom*, "Two-year-olds in a nursery class. Most of the toys they use are visible in the picture; the crowding is representative of our observations; the color and variety of the clothing contrasts with the plainness of adult clothes; and the capitalist on the right has a toy in each hand." [From *Childhood in China*]

find it difficult—as they apparently did—to understand what we mean by a "retarded" or "hyperactive" child, we should likewise be alerted to the cultural opacity of such of their words as are translated "naughty" or "persuade," or even "Study the thoughts of Chairman Mao" (who has never, to my knowledge, written anything very specific about raising kids). That kind of understanding can come about only through long-term fieldwork and comparative analysis. I hope some day this kind of work will be possible in China.

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Geology and Oil

Petroleum and the Continental Shelf of North-West Europe. Vol. 1, Geology. Proceedings of a conference, London. AUSTIN W. WOODLAND, Ed. Halsted (Wiley), New York, 1975. x, 502 pp., illus. $47.50.

The continental shelf of northwest Europe has developed as a major oil and gas province with remarkable rapidity, mostly within the last decade. Largely hidden beneath the sea, this region remained geologically little known and even less understood prior to the imperative of hydrocarbon exploration. The entire battery of exploration techniques has now been brought to bear on it, and a flood of new geological information has resulted. Synthesis of the new data is a monumental task but one fraught with challenge. This is the first major oil province to develop since the advent and general acceptance of plate tectonic concepts, and it furnishes a test of the utility of these concepts in guiding exploration and a case study of major plate movements as they affect a marginal shelf. Predictably, most of the 38 chapters in this book involve synthesis and many are concerned with interpretations based on plate tectonics.

The editor has arranged the chapters so as to begin with the most general topics and proceed to those of a more specialized nature. Within this framework regionality and chronology are secondary organizational principles. The first seven chapters deal principally with the geology of the submerged shelf around the British Isles on both the Atlantic and the North Sea margins. A second group of four chapters is concerned with the geology of the North Sea between Norway and the Netherlands. The remaining chapters deal largely with specific oil and gas fields, their discovery, reservoirs, and production histories. This section deals first with fields producing from the oldest reservoirs, which are in the Permian Rotliengedes beds, and then proceeds upward through the stratigraphic section to the lower Tertiary sands that form the youngest producing horizons. Scattered among the chapters in this section are some dealing with other pertinent topics such as the distribution of volcanic rocks and the thermal history of the region.

Any book that endeavors to present such a wealth of information as this one does must lean heavily on illustrations. Here the illustrative materials include maps, cross sections, charts, stratigraphic diagrams, and even a few photographic plates, and almost without exception they are clear, well executed, and well integrated into the text. This last feature will be welcome to the average reader, who will find himself bombarded with unfamiliar place and stratigraphic names. The format of the book is concise and pleasing. Typographical errors are few, and it is evident throughout that both authors and editor have labored hard and well.

Anyone with an interest in general or regional geology will profit from reading the more general chapters dealing with interpretation and synthesis. Those with a need for more specialized information will doubtless profit as well from the more detailed and specific papers. It appears beyond doubt that this volume is, and will continue to be, an invaluable compendium concerning the region it covers.

[Volume 2, Environmental Protection, edited by H. A. Cole, is now available. —Ed.]

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Non-Newtonian Fluids

Rheometry. K. WALTERS. Chapman and Hall, London, and Halsted (Wiley), New York, 1975. x, 278 pp., illus. $32.

Although *Rheometry* is not "the first book to deal exclusively with non-Newtonian fluid mechanics," as is claimed on the dust jacket, it is certainly one of the most comprehensive and digestible. The book is intended to be a textbook on the use of most commercially available rheometers, but it also provides some background on rheometry in general. The author has been careful to avoid excessive mathematical rigor, with the result that those concerned with the more practical aspects of the subject can use the material without first having to familiarize themselves with the theoretical background. Nonetheless, the necessary background in the first three chapters of the book is presented in a manner that is at times oversimplified and that presupposes some familiarity with the rudiments of tensor analysis. (The well-known book by A. S. Lodge, *Elastic Liquids*, could be used to complement these sections.)

Chapter 4 is devoted entirely to the measurement of the material functions of fluids with the Weissenberg rheogoniometer, at present the rheometer most widely used. The sections on possible sources of error in this and other chapters are especially valuable parts of the book. In these sections the author discusses the precautions that must be taken and the limitations that the experimentalist must be aware of when applying the basic theory to real situations, as well as modifications of the theory that must be introduced in order to take into account some of the sources of error.

Chapter 5 follows the same format and concerns itself with the measurement of the material functions with capillaries, slits, and similar devices.

In chapter 6, the author deals with the measurement of the complex dynamic viscosity and related functions with conventional rheometers, as well as with the new rheometers developed for this purpose (the orthogonal rheometer, the balance rheometer, the eccentric-cylinder rheometer, and others). Much of the material in this chapter, as well as some of the sections in other chapters, is presented here for the first time in a textbook.

Chapter 7 is a readable introduction to the theoretical and experimental aspects of the measurement of extensional viscosity, and it discusses some of the experimental difficulties that have been encountered and the ingenious devices that have been conceived to overcome some of them.

Another strong feature of the book is that it presents the most recent advances in the field, including improvements in the performance of commonly used rheometers, the advent of new techniques, and the development of completely new rheometers. For example, the last chapter deals with the novel rheometrical flow experiments that were not dealt with in the previous chapters and whose potential is now being explored.

In short, *Rheometry* provides a clear, comprehensive, and up-to-date introduction to the subject that will prove most useful, especially to those concerned with the more pragmatic aspects of non-Newtonian fluid mechanics and the experimental determination of the rheological properties of non-Newtonian flow systems.

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