

Introduction

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This book is about a singularly well-studied population of Japanese monkeys, the Arashiyama macaques, and it is a compendium of some of the research that gives these monkeys a unique place in the history of primatology. Since 1954, the monkeys of Arashiyama have been observed daily by many researchers from around the world. In 1966, the original group fissioned into two daughter groups (named Arashiyama A and B), and shortly thereafter, Japanese scientists began to look for a new home for one of the two groups. In 1972, the entire Arashiyama A group was captured and transferred to a large ranch in Texas, where they were rechristened the "Arashiyama West" group. Since that time, these macaques have been studied as two sister groups of genetically related animals, living in both Japan and North America. One objective in editing this volume is to demonstrate the historic and continuing value of the Arashiyama groups to scientific research, by gathering together a representative sample of the many types of studies conducted on the monkeys in recent years. A second objective is to reflect on how different cultural perspectives influence the manner in which we approach the science of primatology.

Twenty-five years have passed since the 1965 publication of a small volume entitled *Japanese monkeys: A collection of translations*. Edited by Stuart Altmann from papers selected by Kinji Imanishi, this book was one of the first to introduce to North American and European researchers to the Japanese science of primatology. In the quarter century that followed its appearance, the discipline of primatology, in both the West and the East, has grown exponentially in size, and matured enormously in the sophistication of its methodology, data bank, and theoretical foundations. Japanese primatologists now publish much of their research in English, and many Westerners publish their findings in the Japanese journal, *Primates*, and all attend international conferences to exchange findings and ideas; however, there still exists an East-West gap in our discipline, brought about by cultural, historical, and language differences, as well as by geography.

A few cooperative Japanese-Western research efforts have taken place in the last 25 years, such as the 1965 transfer of a previously unstudied group of Japanese monkeys from Mihara City (Hiroshima Prefecture) to the Oregon Primate Center (Eaton 1976) and the 1968 workshop on "regulators of behavior in primates" chaired by Clarence Carpenter (see Carpenter 1973). However, the most unusual event in the history of East-West primatology may well have been the gift of the entire Arashiyama A group to Western researchers in 1972, after the colony had been the subject of intense investigation for 18 years in Japan. The sister group, Arashiyama B, remained in Japan, and there followed continued study of the two groups through to the present day, as well as the exchange of scientific visits between the researchers working at the different sites (see Minami 1988).

Several pivotal articles have been published on the Arashiyama monkeys over the past three decades, papers that we feel have been of wide significance to the developing discipline of primatology (e.g., Koyama 1970 on kinship and group fission; Stephenson 1973 on precultural behavior; Norikoshi and Koyama 1975 on male transfer; Gouzoules 1980 on matrilineal dominance changes). Rather than republish these, we decided to present a range of new material in the body of the text, and to include a complete bibliography of past Arashiyama publications at the end of the book. In bringing together examples of previously unpublished research conducted on the Arashiyama groups, we hope to provide the reader with an overview of the diversity and extent of knowledge about this population of monkeys. Many people have heard of the Arashiyama macaques, but are unaware of the scope and magnitude of the research and management efforts that have surrounded them over the past 35 years.

This volume follows an international workshop, held in 1987 and sponsored by the Wenner-Gren Foundation for Anthropological Research, in which eight Japanese and nine North American scientists, with the help of two translators, gathered for five days to discuss their current research on the Arashiyama macaques. Some of the revised papers from that meeting are included; however, this book is not a collection of conference proceedings. Rather, we solicited, reviewed, and then selected a set of manuscripts to round out the picture of the research conducted on these monkeys. Some of the Arashiyama researchers were unable to attend the workshop or to submit manuscripts, and although we regret their absence, their relevant publications are included in appendix 2.

All of the papers presented here share one common feature. Not one of them could have been written without the accumulated years of historical and genealogical data which are the heritage of 35 years of cooperative endeavor on the part of the Arashiyama researchers. When scientists study animals that are long-lived, permanently social, and highly responsive to

tradition, but silent on the history of their relationships, the value of such archives cannot be overestimated. The detailed data available on individual life histories, genealogies, hierarchical and affinitive relationships, as well as a chronology of major events in the history of the groups, allow the researcher to move far beyond descriptive and exploratory questions based only on what is presently observable, to highly sophisticated investigations of long-term trends and their impact on present patterns.

The first part of our book chronicles the history of the monkeys in both their native and relocated habitats, and provides an overview of the scientific work that has been conducted on them (chaps. 1 and 2). In the process of writing what had been previously only an oral history, it became apparent that the long-term research on the Arashiyama colonies represents a microcosm of the larger trends in primatology since the 1950s, and that, in particular, some of the major developments in Japanese primatology are reflected in the specific history of research on the Arashiyama macaques. For example, in the 1950s, primate groups were thought to be "closed societies" in which all members remained in their group of origin from birth to death. Hazama, one of the earliest researchers at Arashiyama, observed the repeated disappearance of males from the group, and thought they were being killed by hunters until, in 1960, he was able to find one of these males in a neighboring group, thus documenting male transfer for the first time in Japanese macaques (Hazama 1965). A logical consequence of the observation at Arashiyama that males emigrate but females do not, was the realization that from a longitudinal point of view, Japanese macaque groups are composed of sets of related females. Koyama (1967, 1970), who took over from Hazama at Arashiyama, was able to document that a knowledge of female kin relations is the key to understanding much of Japanese monkey social behavior, from dominance to group fission. These insights into the social dynamics of the Arashiyama monkeys were an important contribution to our changing perception of the nature of social life in *all* primates. Interpretations of the findings at Arashiyama formed part of a larger trend in the discipline away from a static view of primate societies as "closed" and otherwise invariant, and toward a recognition of the significant role played by female kin groups in the social structure of many primates.

Although many of the discoveries made about the Arashiyama monkeys were followed and/or paralleled by similar findings on other Old World monkey species, much of the Arashiyama research reflects the special nature of Japanese primatology. Certain characteristics of Japanese primatology (e.g., provisioning, long-term observation, identification of individuals, investigation of protocultural behavior, and the species society, "specia") that were introduced to the West in the late 1950s and 1960s

primarily by Frisch (1959, 1963) and Imanishi (1957a, 1957b, 1960, 1963), are today taken as almost diagnostic features of their study. Not all of these features were or are unique to Japanese primatology, nor do all hold true today (for a discussion of provisioning and Japanese primate studies, for example, see Asquith 1989). The apparent reluctance of the Japanese to place their findings into a wider theoretical framework familiar to Western researchers, such as sociobiology and the evolutionary process generally, has contributed to the East-West gap alluded to earlier (e.g., see the comments on evolution in the chapters by Kitahara-Frisch and Asquith, this volume).

Our 1987 international workshop provided a forum for discussion by researchers of both traditions, who have worked on the same population of monkeys and who had access to the same background data, to discuss the implications of these differences in more detail. Chapters 3 and 4 provide background material and interpretation of these differences, focusing especially on the less familiar (to English readers) Japanese studies.

Kitahara-Frisch (chap. 3) discusses culture and primatology in two senses. First, he points to the features central to Japanese social life that affected what primatologists looked for in nonhuman primates, such as the importance of the group in determining the behavior of its members and their role in it. This led to a search for ways to ascertain how each animal is inserted in the group in terms of, for instance, kinship or rank. Another example is the importance of personal relationships in Japanese society, which led researchers to focus on identifying animals and the relationships between them. Japanese primatologists discovered very early on that the behavior characteristic of one group was not necessarily characteristic of the species as a whole. This led to various, now familiar examples of culturelike or protocultural behavior in Japanese monkeys, the most famous of which are those recorded in the Koshima group.

In discussing culture in the second sense, Kitahara-Frisch points out that the Japanese readiness to accept the concept of nonhuman culture without clearly distinguishing between analogous human and nonhuman behavior, can lead to the failure to assess the unique quality of monkey behavior. He suggests that so-called protocultural behaviors in Japanese macaques have, in fact, little in common with human culture and we can more usefully seek characters that may have led up to the human cultural adaptation, such as the open quality of different macaque groups' behavioral repertoire, or the role of "gifted" individuals in originating new behavior.

Asquith (chap. 4) shows that Japanese primatology is not monolithic and discusses the different origins and orientations of the major primate research groups which, nonetheless, hold common reservations about some Western orientations, especially sociobiology, as an exclusive explanation of behavior. She also discusses the intellectual traditions that gave rise to the

East-West differences in primatology and explains why the perceived absence of a theoretical orientation in the Japanese research is not strictly true. The concept of the society of a species is distinguished from the biological species and is shown to have had an extensive effect on Japanese primatology and on its research questions.

After presenting historical overviews of the colonies and the cultural contexts for the research on the Arashiyama monkeys in the first part of the book, we move immediately to studies that ask questions that can be answered only through the use of longitudinal data. Huffman (chap. 5) documents the existence of long-term patterns of female selection for male sexual partners, and he argues that females play the key role in mate selection. He also uses longitudinal data to show how female preferences can influence whether males remain in groups or leave them. In the process, he suggests a solution to the mystery of why high-ranking males often leave groups at precisely the time when the priority-of-access model assumes these males to be at the peak of their reproductive success (see a review of this model in Fedigan 1983). Huffman finds that females often repeat consorts with the same males from one year to the next, but that after the first two or more years, the females begin to avoid mating with these same males. In Japanese macaques, males tend to accrue rank the longer they remain in groups. However, as they rise in rank over time, they are also, according to Huffman, being rejected increasingly as mating partners. Thus, in spite of being active in the solicitation of sexual activity, high-ranking males actually suffer a decrement in mating success over time, due to increasing female avoidance. Male Japanese macaques tend to emigrate from groups every four to five years, even when they hold top-ranking positions, and Huffman uses individual examples of male-mating success over a five year period to argue that, as their consort frequencies decline over the years, males are more prone to emigrate from their group. These findings provide us with a more dynamic and complex view of the interaction of female preference with male dominance and emigration than does the traditional axiom in primatology that dominant males are more reproductively successful solely by virtue of their rank. It is also in accordance with the repeated finding for the Arashiyama macaques of both sexes, that dominance is not well correlated with mating or reproductive success (e.g., males: Fedigan and Gouzoules 1978; Takahata 1980; females: Gouzoules, Gouzoules, and Fedigan 1982; Wolfe 1984; Fedigan et al. 1986).

Moving from this finding of how female preferences can change over time and work counter to male dominance in influencing mating success, we turn, in chapter 6, to a study of female rank relationships traced over time. Takahata's paper is an elegant demonstration of how a complex web of female dominance relations will fall into an orderly pattern when we

apply Kawamura's (1958) two "rules of dominance". The two rules are that daughters are ranked in dominance hierarchies immediately below their mothers, and that younger daughters rank above their older sisters (the latter being the rule of "youngest ascendancy"). As noted by Takahata, from these two rules we can also predict rank order between females who hold other types of kin relationships. For example, a female should rank below those "aunts" who are her mother's younger sisters, but above the aunts who are her mother's older sisters. Although there are minor differences between species, these two principles, first enunciated by Kawamura, have had a far-reaching impact on our understanding of social dynamics in female-bonded Old World monkey species, an impact that is often unacknowledged or underestimated because of their very simplicity. (Nine years later, in 1967, Sade described the same patterns of female rank order in rhesus macaques, and since that time, similar patterns have been reported for many species of Old World monkeys). Indeed, the simplicity of Kawamura's model and its ability to explain a wide range of dominance relations with just two precepts is a phenomenon that has proved to be very rare in the behavioral and social sciences.

Furthermore, Takahata suggests that these structural principles originate quite simply in the inhibition that Japanese macaque females have against challenging their mothers in most situations. Since mothers usually support their younger offspring in conflicts between siblings, a secondary effect of this inhibition is that a female does not challenge her younger sibling, which would be an indirect challenge to the mother. Although he considers exceptions to these rules, which occur especially when mothers become very aged, Takahata argues that the reluctance to challenge their mothers is a starting point for matrilineal rank order as we know it in female Japanese macaques. A later chapter by Chapais (chap. 13) also examines matrilineal dominance patterns, but with a rather different interest. Chapais reports on the situations in which individuals *are* willing to challenge others in order to maintain and/or acquire rank. His experimental work on how alliances and aggressive interventions by mothers and other individuals function in the acquisition and maintenance of dominance rank will be described in more detail in the section on experimental studies.

Our third example of a study analyzing longitudinal data from Arashiyama is found in chapter 7, by Laurence Fedigan. Starting from a previous finding that longevity is the most important predictor of the lifetime reproductive success of Japanese macaque females (Fedigan et al. 1986), he presents an analysis of some life history characteristics of a much larger cohort of females. Applying the concept of trimesters, he defines old age (the third trimester) as beginning at age 20. He then compares the reproductive lives of females in the cohort who lived into the third trimester (> 20 years) to

those who died before the age of 20. He finds that longer-lived females experience a significantly later onset of reproduction and greater survivorship of their infants, as well as a trend toward longer interbirth intervals. However, unlike some studies of Japanese macaques (e.g., Wolfe and Noyes 1981; Itoigawa 1982; cf. Gouzoules et al. 1984) he finds no evidence for generalized reproductive senescence or menopause. Finally, Fedigan presents a tentative finding, based on small samples, of a positive relationship at the matriline level, between adult body weight and longevity. This would suggest that one correlate of a long life expectancy in these females is a large body size, but, as he notes, this finding awaits further testing with a larger sample.

In Part 3, we move to a set of papers that focus on particular stages, or cross-sections, of the female life-course, although these studies still rely indirectly on the longitudinal data available in the genealogical records. Each of the three chapters in this section also takes advantage of another benefit of studying the Arashiyama groups, which is the availability of relatively large sample sizes of individuals of known age, rank, and parity. The Collinge study (chap. 8) makes use of this information by comparing weaning patterns in a sample of mother-infant pairs matched for these features (i.e., mother's age, rank, and parity) and for birth dates and the sex of the infants. Collinge finds that Arashiyama West mothers are highly variable in their weaning patterns, but infants are less so. Traditional factors, such as the features just listed, do not explain this variation, but the estrous state of the mother does correlate with the frequency and severity of her weaning behaviors. When in estrus, these mothers are more rejecting of their infants, and the infants respond, at least in the short term, with distress and clinging behaviors. Collinge explains these findings both through reference to Triver's model of parent-offspring conflict (i.e., the mothers are curtailing their investment in their present infant in order to put energy into the conception of the next one), and also through reference to proximate factors. For example, when in estrus, mothers may exhibit weaning behaviors as part of an attempt to keep yearlings out of range of possible aggression from male mating partners.

With the papers by Nakamichi (chap. 9) and Pavelka, Gillespie, and Griffin (chap. 10), we turn to a consideration of social interactions at later stages of the life course, in particular, the "old age" of female monkeys, which they define, as did Fedigan in chapter 7, as beginning at age 20. Relatively large samples of older females of known birth dates are available from the Arashiyama colonies, and aging recently has become an important topic in primatology, in part because of the development of the discipline of gerontology. Nakamichi examines a sample of old females from both Arashiyama groups, and finds that older females in both groups tend to rest

more, to groom less, and to be in close physical contact less than relatively younger females. From these findings he concludes that there is a trend for older females to engage less frequently than younger ones in both physical activities and social interactions. However, Pavelka, Gillespie, and Griffin examine the behavioral effects of aging in a sample of females from the Arashiyama West group, and come to a very different conclusion. Their study finds no significant differences between older and younger females in overall sociability scores. The apparent contradiction between the findings of these two studies is very likely the result of differences in their methods: different samples of females; different time periods and durations of study; and most importantly, different measures of social interaction. Nakamichi chooses a few specific behaviors and measures of "sociability" such as grooming and physical contact, whereas Pavelka, Gillespie, and Griffin use two composite measures of sociability: total amount of time spent in social interaction, and total number of others seen as interactants. Until primatologists reach some agreement on standard measures of "sociability", we will be limited in our attempts to generalize from these diverse answers to the question of whether female monkeys are increasingly isolated from social interaction as they age. Pavelka, Gillespie, and Griffin argue strongly that female monkeys do not become socially isolated as they grow older. The theory of "social disengagement" has fallen into disfavor in human gerontological studies, and McDonald (1988) has argued elsewhere that the popular assumption that old people are less sociable, although without empirical substantiation from human studies, has had a strong impact on our perception of aged monkeys.

Both chapters also briefly describe the confounding variable of available kin in determining a female's social pattern. Nakamichi points out that the relevant issue is not the total number of a female's offspring or relatives, but whether or not she has an infant and/or juvenile offspring with which to interact. Similarly, Pavelka, Gillespie, and Griffin note that total number of available kin does not correlate with sociability scores.

Furthermore, the Pavelka, Gillespie, and Griffin study includes dominance rank in the consideration of behavioral changes with age. Thus, they find that there are changes with age, but that these changes are specific to certain rank categories and would cancel each other out when females of all ranks are considered together. Their interpretation of these findings is that females born into certain dominance rank categories follow different social strategies as they age. For example, low-ranking females increase their social network size but not the time spent in social interaction as they grow older. The authors suggest that these females are emphasizing quantity over quality (more others, less time) in their social patterns, and they may do so as part of an attempt to expand beyond the low-ranking social network into

which they were born. This interpretation would support Seyfarth's (1977) model of affiliative interactions (specifically grooming) in which he argues that low-ranking females compete to interact with high-ranking females, the latter being more desirable social partners. Whether or not these authors' findings and interpretations of variant strategies being followed by females of different ranks over their lifetimes ultimately will be corroborated remains to be seen. However, both the Pavelka, Gillespie, and Griffin and the Nakamichi chapters show us that age interacts with other variables (e.g., kinship and dominance ranks), and thus, in the future, we may well consider it inappropriate to study aging as a univariate determinant of social behavior.

Pavelka, Gillespie, and Griffin's conclusions on why some females attempt to accrue more affiliative relationships as they age is followed by two studies that look for general structuring principles in affiliative interactions (part 4). Focusing exclusively on grooming interactions, which are almost a diagnostic pattern for detecting affiliation, Koyama (chap. 11) analyzes grooming dyads in terms of the age, sex, rank and kinship of the partners. Grooming between matrilineally related monkeys accounts for the vast majority of the interactions recorded, especially grooming between mothers and offspring. Koyama notes that in some studies of Old World monkeys, adjacently ranking individuals have been found to groom each other preferentially and/or high-ranking males were found to exhibit grooming preferences for high-ranking females. However, he points out that in these studies, longitudinal kinship data were lacking, and thus the patterns found may not reflect the effects of dominance on affiliation, but the fact that similarly ranked kin prefer each other as grooming partners. Indeed, he argues that kinship is the overwhelming explanatory principle in patterns of grooming interactions, and suggests that the major function of grooming is to maintain and strengthen affiliative bonds between relatives.

However, some affiliative bonds do cross kinship boundaries, and Ehardt (chap. 12) also examines affiliative patterns in the Arashiyama monkeys, focusing on the interactions between adult males and other group members, especially adult females, during the birth season. She asks what functions nonmating male-female relationships serve, and what contributes to the formation and persistence of these relationships. Like Koyama, Ehardt finds that natal males often continue to affiliate with their mothers and sisters as adults, approaching, grooming and staying in proximity to their close kin. However, some males also affiliate with females who are not related to them, especially those females without newborn infants. She examines the possibility that these friendships are formed by males for the purpose of prospecting for future mating partners, but reminds us that Japanese macaques, unlike baboons, do not tend to mate with their opposite-

sex "friends". Since most females who engage in these birth season affiliations with unrelated adult males do not have young infants, and since they are not preferentially selecting dominant males, it is also unlikely that adult females are looking to these male friends as potential protectors for themselves and their young. Ehardt concludes that a very important factor is the unique history of interactions between a particular male and female. It is now widely accepted that baboons and macaques do form affiliative relationships between opposite-sex adults in the absence of immediate mating interactions, relationships that are analogous to human "friendships" (e.g., see Altmann 1980; Smuts 1985; Strum 1987). We may also be finding, through studies such as Ehardt's, that Old World monkeys, like humans, choose their friends for largely idiosyncratic and difficult-to-measure characteristics, such as availability and compatibility.

In the final section of our volume, we provide examples of studies that are experimental rather than purely observational in nature. The Arashiyama groups, with their habituated but free-ranging monkeys (or semifree-ranging in the case of Arashiyama West), and their extensive historical and genealogical archives, offer the experimenter a combination of the advantages of both field and laboratory studies. Under certain circumstances, individual monkeys can be manipulated, either with or without removing them from their larger groups, and the background data allow the researcher to build a dimension of social context (e.g., kinship, dominance, and historical information) into their research design. The three chapters presented in this section were chosen to exemplify the value of the Arashiyama colonies to experimental research involving group-membership manipulation, cognition, and the latest advances in DNA techniques for the construction of genealogies.

As Chapais notes (chap. 13), we owe the vast majority of our understanding of Japanese macaque social life to more than three decades of observational and/or descriptive studies, but experimental tests of our understandings and assumptions have much to contribute. Over the past several years, Chapais has performed numerous experiments on the effect of alliance on rank acquisition and maintenance in a small kin-related subgroup of Arashiyama macaques. He does so by creating situations in which an individual's ability to successfully challenge and intimidate others is experimentally increased or decreased by adding or subtracting potential allies. Alliances are often difficult to detect in stable dominance situations, but Chapais argues that high-ranking females are not born dominant but must acquire their rank through support from relatives and from unrelated females in conflicts with lower-ranking females. He finds that several hypotheses from observational studies are supported by his experimental work; for example, that matrilineal dominance relations are socially ac-

quired and polyadic, rather than innate and dyadic, that although female ranks tend to be stable, individuals will compete opportunistically for a higher rank, given an appropriate situation with sufficient potential power asymmetry, and that aggressive interventions by relatives and by unrelated females play a central role in both rank acquisition and maintainance. Chappais's paper provides an excellent overview of what is known about matrilineal dominance in Japanese macaques, and offers new insights into the mechanisms that underly our observations of rank and power asymmetry in this complex social system.

The next study to be presented took advantage of the habituation of the Arashiyama macaques to researchers by introducing mirrors into the group's habitat, and observing how known individuals respond to their reflections. The paper by Platt, Thompson, and Boatright (chap. 14) is a review of selected aspects of mirror-research on monkeys, an area that is also experimental in methodology, but that differs from the previous chapters of the book in its focus on cognitive rather than social aspects of Japanese macaque behavior. A field study by two of the authors at Arashiyama West showed that adult macaques behave toward their mirror-image in a manner different from behavior shown to other members of their species, thus demonstrating that they do not perceive the mirror-image as an "unknown conspecific," as do some other animals in mirror tests. However, the Japanese monkeys also fail to demonstrate behaviors that are considered to indicate self-recognition. Unlike chimpanzees and orangutans, monkeys in several different studies, including this one, do not respond to new marks on their bodies when given the opportunity to view themselves in mirrors. From these negative findings it is argued by some researchers that monkeys lack self-recognition.

Platt, Thompson, and Boatright argue however, that mirrors have not been demonstrated to be the best tool to test for self-recognition in monkeys, since it is not even certain that monkeys can discriminate, manipulate, or recognize *any* objects in the mirror, much less themselves. According to the authors, it is still possible that self-recognition with a different type of definition (one not involving mirrors), could be documented via the visual mode or some other method. Platt, Thompson, and Boatright also suggest a plan for testing mirror skills in order to determine the appropriateness of mirrors as an investigative tool for self-recognition.

The final paper in our volume, by Lanigan (chap. 15), demonstrates that the Arashiyama population also can provide an excellent subject for developing and testing recent method and theory in population genetics. Lanigan describes recent recombinant DNA protocols that can be applied to problems of individual recognition and genealogy reconstruction, in particular paternity testing. She points out that long-term research efforts such as

the Arashiyama project, provide complete data from the maternal side of genealogies as well as records of mating interactions with males, and that the recombinant DNA techniques discussed in her paper have the potential to link these two types of data via genetic documentation of paternity. Although it has been possible to document reproductive success in female Japanese macaques through longitudinal studies, researchers have had to rely on inferential measures of male reproductive success, through observations of their mating activities. In the near future, it should be possible to test the widespread assumption that the quantity of a male's mating activity is a reliable indicator of his actual success in fathering offspring, and the hypothesis that the dominant males father more offspring than do subordinate males. When this becomes possible through the application of recent DNA techniques for genealogical reconstruction, an important new dimension will open for the study of multimale, multifemale social systems, such as that found in the Arashiyama groups.

Finally, following the presentations of the research papers, the book concludes with two appendixes. In appendix 1, examples are given of complete genealogical records for two matriline, the first issuing from an original founding female in Japan whose offspring still live there, and the second matriline now residing in the United States. These examples are provided in part to demonstrate that the Arashiyama macaques are essentially "pedigreed" monkeys, but more importantly to reinforce our point that 35 years of cooperative effort does result in a remarkably detailed knowledge of an individual's ancestry and a group's history.

Appendix 2 presents a complete bibliography of the scientific publications that have resulted from work with these monkeys. We believe that this compilation will be useful to other researchers in related fields, and we hope that readers will find this list of past and ongoing studies to be as impressive and stimulating as we do.

For ultimately, the objective of our book is to encourage continuing and future study, as well as conservation, of the monkeys of Arashiyama. Through our "editors' sampler" of the many types of research conducted on these monkeys (from longitudinal analyses to cross-sectional studies with large samples, to experimental work), and through our reflections on the East-West differences and the East-West cooperation that has characterized the Arashiyama studies, it has been our intention to document the continuing value of this international research effort, and the value of the monkeys themselves.

All of the scientists who contributed to this book and to the larger, ongoing research projects, and all of the "friends of Arashiyama" have given of their time and energy not just to learn more about monkeys, but to preserve the social lives of these animals in an era of shrinking habitat. For

their efforts, we thank them. From the Arashiyama monkey project, as from all studies of the social behavior of animals, we learn much about the nature of social life in general, and much about the human place in nature. We hope that this jointly edited volume will play even a small role in the stimulation of new and ongoing research on the Arashiyama macaques, and that the work, in both Japan and North America, will continue for another 35 years. The monkeys of Arashiyama still have much to teach us.



Arashiyama, Kyoto. Courtesy of Nobuo Asaba



Home for the Japanese monkeys in Texas is arid mesquite brushland, where the temperatures in summer often exceed 40 degrees Celsius. Courtesy of Karen Dickey