

## PREFACE: OUR HISTORICAL NOTE

It was 1970 when Gerry Ruppenthal and Jim Sackett moved from the University of Wisconsin in Madison to the University of Washington in Seattle. In Wisconsin, Gerry had been working for Harry and Margaret Harlow for over a decade and supervised many of their classic studies of the 1960s. Jim was an associate professor in the psychology department and was in his seventh year of primate research in what is now the Harlow Primate Laboratory. Collectively, we were experienced in studying infant, juvenile, and adult rhesus macaques that had been reared under a variety of captive conditions. Many of these monkeys had been reared in the Harlow Primate Laboratory nursery.

We were brought to Seattle by the Regional Primate Research Center (PC) and the Child Development and Mental Retardation Center (CDMRC), now called the Center on Human Development and Disability (CHDD). Gerry was a research scientist with both NIH-funded centers, while Jim was a professor in the psychology department, a PC core staff member, and PI of a CDMRC 3-year new program grant. Harry Harlow generously allowed us to take a great deal of equipment from Wisconsin—cages, rearing units, developmental testing apparatus, and recording devices. If he had paid more attention, we probably would not have gotten away with as much “loot,” but the University of Wisconsin and NIH approved it all. With some additional local start-up funds and a really large amount of space, we started a primate nursery and organized a developmental rearing room and some testing rooms. Our equipment and methods were essentially identical to those used for over 15 years in the Wisconsin laboratory.

Our initial goal was to replicate the effects of isolation and peer rearing found in rhesus macaques in the classic Harlow work. We wanted to do this to learn why male rhesus macaques were affected so much more than females by asocial rearing. Because the PC breeding colony consisted of pigtailed macaques (*Macaca nemestrina*), we needed to demonstrate that they responded like rhesus macaques with the same sex and rearing differences before going on to mechanistic studies of possible causes. Not only did we fail to find sex differences following asocial rearing of pig-tails, we also failed to find the same devastating effects of isolation rearing on postrearing social and exploratory behavior. This convinced us that gene–environment interactions were to be expected in assessing acute and chronic effects of rearing conditions on behavior, and probably also on physiology. This theme, in one guise or another, will be found through much of this book.

Our nursery is situated adjacent to the University Hospital, just below the human neonatal intensive care unit, and word soon got out that it was possible to study monkey pregnancy, neonates, and infants in a primate nursery located almost next to one's own office and laboratory. This led to requests to use our facilities by a number of medical researchers, especially a group of neonatologists who were studying lung function in premature newborns. With their help, our nursery came to include a primate neonatal intensive care unit. Also, rather than euthanizing newborns that were premature or low birth weight, ill, had life-threatening birth defects, or whose mothers were ill, wounded, or dead, the PC breeding colony managers began sending such at-risk neonates and young infants to our nursery, initiating an "Infant-Save" program that continues to this day.

By 1971 it was obvious that our nursery was a valuable resource for scientists who were interested in prenatal, perinatal, and infancy studies. As both the PC and CDMRC 5-year core grants were being written for renewal in 1972, we convinced the directors of both centers to include a proposal to support a nursery facility, the Infant Primate Research Laboratory (IPRL). In what appears to be a unique relationship among NIH-supported university centers, our proposal was funded by both core grant requests and we have shared this funding ever since.

From our point of view, the IPRL has had two main purposes. The first has been to use primate models to study important human medical

and behavioral problems. This has been the major reason for continued grant success in the CDMRC arm of our endeavors. Equally important, we have spent much of our PC-based resources studying primate medicine and husbandry issues related to breeding, pregnancy and fetal development, hand-rearing methods, and methods of assessing growth, physiology, and behavioral development. Our NIH-supported efforts and those of many other researchers and veterinarians led to the then state-of-the-art publication, *Nursery Care of Nonhuman Primates*, edited by Gerry Ruppenthal and Dorothy Reese, published by Plenum in 1979.

Although much of that book is still relevant today, methods of nursery care, methods of testing, and types of experimental and husbandry problems have changed markedly since 1979. This has resulted in new challenges involving nursery rearing of monkeys with many types of naturally occurring and experimentally induced medical and developmental conditions. New challenges have arisen through changes in attitudes toward animal testing and resulting changes in standards of animal care involving concerns for both the physical and psychological well-being of captive primates. One goal of this book is to describe how these challenges have been met over the past 25 years. The other goal is to show how changes in rearing methods have altered for the better the developmental outcomes of nursery rearing, at least in some species and some facilities. We hope that our story, begun in the 1979 book and continued in the current one, will produce a more realistic view of nursery rearing and its effects than that claimed by opponents of nursery rearing on the basis of antiquated methods now used by only a few facilities or individuals.

This book originated in a workshop of the same name, *Nursery Rearing of Nonhuman Primates in the 21st Century*, held in 2002 at the Oklahoma City meeting of the American Society of Primatologists. All of the workshop presenters are represented, in addition to a number of authors recruited to present important topics not covered in the workshop. We are grateful to all our contributors. We had hoped to include either a section or a CD of basic growth and health data for nursery-compared with mother-reared primates that would serve as normative comparison data for current and future research. Unfortunately, we were able to collect such data on only a few species, although they are ones that are frequently nursery reared in current work. Data on health sta-

tistics are included in the final section as an example of basic data that can, and probably should, be collected and disseminated for all laboratory and zoo nursery-reared primate species.

Over the decades our work has involved a large number of students, scientists, health workers, technical personnel, and administrators. They are too numerous to list here, but we must thank our earliest University of Washington students, Dick Holm, Sharon Ramey (nee Landesman), and Jon Lewis, who helped us start the IPRL in both concept and fact. Carol Fahrenbruch, Sherry Savage, Colleen Walker-Gelatt, and Gary Bartram provided invaluable effort in developing and implementing our rearing and developmental testing methods. Without the support of our Primate Center directors, especially Orville Smith, and our CDMRC directors, especially Irvin Emanuel and Michael Guralnick, we would have had quite different careers. We are also grateful to the NIH for its continued support from the National Center for Research Resources, grant RR00166, and NICHD Mental Retardation Branch, grant HD02274.

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Seattle and Pittsburgh, 2004

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