Introduction

This volume of *Folia Primatologica* is devoted to the proceedings of a special residential symposium held at the Charterhouse of Ittingen (near Zurich) Switzerland on 11th-15th September 1989. The symposium was the first in a projected series to be known as the Schultz-Biegert Symposia. This title was selected to acknowledge the major contributions to primatology made by two former Professors of Anthropology at the University of Zurich, Adolph H. Schultz (1891-1976) and Josef Biegert (1921-1989). Among many other achievements, both were intimately involved in the launching and management of *Folia Primatologica* and Josef Biegert was Editor of the journal for a period of 23 years, from the production of its first issue in 1963 until his retirement in 1988. It is a cause of great sadness that Josef Biegert, who was consulted in the initial planning discussions, did not live to see the beginning of the symposium series. It is fitting that the title of the symposium series should honour his memory by simultaneously paying tribute to his long-term commitment to *Folia Primatologica* and commemorating his long working association and friendship with Adolph Schultz.

The basic concept of the symposium series is to bring together a small group of anthropologists and primatologists to discuss a specific theme of current special interest. The first theme, that of new quantitative developments in primatology and anthropology, was chosen not only for this reason but also because quantitative approaches have been emphasized at the University of Zurich from the very beginning. This is witnessed by the influential textbook *Lehrbuch der Anthropologie*, initially published in 1914 by Rudolf Martin (the first Professor of Anthropology in Zurich). Quantitative approaches have become increasingly prominent over the years, but recently there have been several new developments that have broken entirely new ground. These developments include advances in new technology, in new methods of analysis and in new theoretical approaches. The time was ripe to bring together a set of succinct reviews, with the goal of providing a general reference source for the availability and application of quantitative methods in comparative investigations of primates.

The symposium itself was preceded by a long period of advance preparation. Authors were requested to submit draft papers well in advance and galley proofs were made available at the meeting. Considerable modifications were made as a result of discussions during the symposium, but the availability of proofs at the meeting has allowed us to publish the final papers extremely rapidly thereafter.

The 16 participants at this first international symposium were drawn from a variety of disciplines, many of them reflecting the continuing importance of the close link between medical science and anthropology/primatology. In most cases, new techniques developed in medical science have found secondary applications in anthropological or primatological research. The flow is not all one-way, however, and benefits will also accrue to medical science from new applications in the overlapping areas of interest revealed in various contributions to this volume.

Some of the most spectacular advances in recent years have concerned the generation and analysis of three-dimensional images. Scanners employing computed tomography or nuclear magnetic resonance are now yielding high-quality images of individual body regions and the development of appropriate software has opened up entirely new possibilities for imaging and interpretation. The two papers by Vannier and Conroy provide an extremely useful survey of the advances that have been made and illustrate their potential, including applications in the study and interpretation of fossil material. Similar new opportunities for the recording of data in three dimensions, in this case through direct measurement, are provided by the new family of Reflex Instruments surveyed by MacLarnon.

New developments in the equipment for collection of quantitative data in anthropology and primatology have been paralleled by developments in theoretical approaches. A basic background to these is provided by Preuschoft, who rightly emphasizes the need to link measurement to realistic assessment of functional implications. This is borne out particularly in the paper by Demes and Günther, illustrating an important recent advance through explicit marriage of biomechanical considerations with allometric comparisons, and in Ruffs discussion of new approaches to structural evolution of limb bones. Other papers deal with individual techniques for morphological comparisons between species. Richtsmeier provides a timely survey of the technique of finite-element scaling analysis, which shows great promise for meaningful quantitative comparisons of complex three-dimensional structures such as skulls. This paper is complemented by the report given by O'Higgins on a comparative survey of various other quantitative methods for comparing skull structure between species. As a final contribution within the context of comparative methods, the paper by Martin and Barbour opens up some new angles on the vexed issue of the choice of a best-fit line in allometric analyses. Two papers deal specifically with new quantitative approaches to the investigation of dental features. Dean's contribution reviews the revolutionary changes in the study of individual ageing now being brought about by quantitative studies of growth increments in hard tissues, notably tooth enamel. This paper provides a particularly useful survey of a fast-moving, highly innovative field. Walker and Teaford have provided a companion review of developments in quantitative studies of dental microwear, which are permitting entirely new insights into the relationships between dietary habits and teeth. In both cases, there are considerable benefits for the interpretation of fossil material.

The last group of papers deals with the twin topics of phylogenetic analysis and evolutionary tree-construction: Page and Harvey provide a valuable survey of the topic of comparative studies in relation to the phylogenetic tree. Maddison and Maddison, joint authors of the now widely-used computer programme MacClade, provide a valuable guide to its properties and applications. MacClade (of which version 3 will soon be available) is not a tree-building programme as such, but provides for interactive exploration of the implications of alternative phylogenetic hypotheses. Friday's paper deals specifically with the question of tree-building in relation to quantitative biochemical data and clarifies some of the major issues that are currently of importance. In the final contribution, Dunbar explores the possibilities for development of explicitly quantitative models in relation to hypotheses linking evolution to behavioural and ecological variables.

The overall strategy of the symposium was to encourage discussion and to provide opportunities for exchange of information. This strategy worked very well, leading to numerous improvements in the final versions of the papers and in some cases revealing unexpected common ground. Two good examples of the latter are provided by the complementary conclusions reached by

Richtsmeier and O'Higgins regarding the significance of skull landmarks, and by the uniform conclusion from all three papers on procedures for phylogenetic reconstruction (Pagel and Harvey; Maddison; Friday) that the process of tree-building must depend upon underlying models of evolution.

As a final note, I would like to express my deep gratitude for the substantial final contributions made by the A.H. Schultz-Foundation and by S. Karger Verlag, without which the symposium would not have been possible. I am particularly grateful to Dr. Thomas Karger for suggesting the Charterhouse at Ittingen as the venue for the symposium and for his valuable encouragement throughout. Thanks also go to Josiane Tardent, Urs Thalmann and Davide Zanetti for valuable assistance.

6th November 1989 Prof. Dr. R.D. Martin
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