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Part A. Twin Biology
and Multiple Pregnancy

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and Walter E. Nance

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TWIN RESEARCH 3

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Part A **Twin Biology and Multiple Pregnancy**

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TWIN RESEARCH 3

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Preface

The Third International Congress on Twin Studies, held in Jerusalem in June 1980, was a successful event because of its site and because of the number and quality of contributors, as reflected in these proceedings. But its relevance and success were perhaps also partly due to its taking place at a particular stage in the evolution of human biological sciences. The latter, and medicine among them, can no longer do without the lead offered them by genetics, since the study of the individual needs to be approached within the context of the generational tissue. Without genetics, it is impossible to understand what takes place in the phenotype, or to forecast what will occur in the offspring.

The boom in genetics can be compared to that of nuclear physics. In fact, the study of nonliving matter requires the understanding of nuclear forces, just as the study of living matter requires that of gene forces. The energy of the gene is the force behind any gene information, and the interweaving of the primary gene products is the loom on which the generational tissue is produced, from which life and its variability depend. Our understanding of these processes, as deep as it may be, is still comparable to what one gathers looking through a keyhole. The study of twins, with its many modern refinements, can frequently offer a broader understanding of the genetic times and processes involved in the human design, both at the physical and the psychological level.

Any research into human biology can draw water from this well, as is made clear by the variety of the contributions to these proceedings, and of those already published in the 30 years of life of the journal I established in 1952, *Acta Geneticae Medicae et Gemellologiae* (the proceedings of the First International Congress on Twin Studies, held in Rome in 1974, were published in Volume 25 of this journal in 1976), as well as by the increasing membership and impact of the International Society for Twin Studies. This has been largely the result of a truly collaborative effort, to which many have contributed, from many countries and various areas of interest. They cannot all be mentioned but I should like to at least acknowledge the efforts of Gordon Allen, organizer of the Second International Congress on Twin Studies held in Washington in 1977 (the proceedings of which were published by Alan R. Liss, Inc. in 1978 in three volumes entitled *Twin Research*, edited by Walter Nance with coeditors Gordon Allen and Paolo Parisi), and Ian MacGillivray, organizer of the Aberdeen Workshop in 1979, respectively Past President and President of our International Society, as well as those of Walter Nance and Paolo Parisi, the coeditors of these proceedings.

Luigi Gedda

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The Twinning and Fertility Paradox*

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Are parents of twins more fertile than other parents, on the average? The answer is yes, and the answer is no. There are several lines of evidence for the affirmative answer, and at least one piece of evidence for the negative. A complete resolution of this paradox should throw light on a number of observations about human reproduction.

In Caucasian populations twins occur in about 1% of all deliveries, but the frequency is found to differ significantly from one population to another and from year to year. These variations have been the subject of much study and speculation.

Although in most of what follows I shall refer to twins without distinction, our attention will really be focused on dizygotic (DZ) twins. The interesting variation in the frequency or rate of twinning concerns the DZ twins, but almost as interesting is the remarkable constancy of monozygotic (MZ) twinning [11]. That is fortunate for our purposes, because in many problems it enables us to use data on all twins together and to attribute whatever variation we see to the DZ component.

It is also important for what follows to note that some women or some parental couples are twin-prone [9,26], as evidenced, at least, by the tendency of twinning to recur in sibships that already contain one set of DZ twins. This appears to be a hereditary trait of the woman [29]. Unfortunately for studying these matters, one cannot positively identify twin-prone couples until they give birth to twins. Consequently, the evidence must be based mainly on twin births, although of course twin-prone couples also bear singletons.

Returning to the question of fertility and twinning, I shall first discuss two ways in which parents of twins definitely are more fertile than other parents. I shall then explore the question whether any of this high fertility may imply high fecundity; that is, whether the large number of offspring in twin families is in part due to unusually good reproductive capacity. This I shall call the fecundity

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