

## PREFACE

Forty years ago — in 1952 — I published my first high energy physics book on “Meson Physics” (the name ‘particle physics’ for our discipline was still some years off) based on a series of lectures delivered at Nevis Laboratory (Columbia University). This was five years after the two-meson theory and the Bristol discovery of  $\pi \rightarrow \mu$  decays, and four years after the observation of the copious production of pions on the first synchrocyclotron ever built (Berkeley). Although the sub-discipline of meson physics had barely reached its maturity, I was moved to say in the preface of my book:

“...the body of experimental knowledge in the field will no doubt grow rapidly in the years ahead as new meson-producing accelerators swing into action and as cosmic-ray workers take increasing advantage of the latest experimental techniques...”.

Since theory was then in a state of befuddlement as to how to deal with the rapidly increasing body of experimental information concerning the Yukawa meson (pion) and the second-generation lepton (muon), it did not require an act of courage to devote the last chapter of “Meson Physics” to the newly-discovered V particles (soon to acquire the name ‘strange particles’) in which the concluding paragraph reads:

“Quite a few theoretical attempts have been made to explain the longevity of the V particles — either by invoking new kinds of selection rules, requiring production in pairs or by postulating complex structures for the new unstable particles. However, none of these theories has shown itself capable of coping with the rapidly changing experi-

mental situation, and discussion of the relative merits of the various theories is postponed to a more auspicious occasion”.

The next two decades (the 1950s and 1960s) saw a number of valiant attempts — in which I happily participated — to develop serious dynamical theories of the strong and weak interactions (QED was already in good shape) but progress was slow. It was not apparent in 1970 that all the essential ingredients of the standard model were in hand and no one told me — I guess no one knew — that a “heroic decade” in particle physics was ready to be launched. And so, just as the “heroic decade” with its exciting parade of experimental discoveries and theoretical triumphs began, I accepted the City College presidency as an act of public service. I took the CCNY job very seriously — trying to develop on many fronts what I called the “urban educational model” — and there was very little time for physics. Thanks to my friendly physics colleagues at City College, Bunji Sakita and Rabi Mohapatra, I received a weekly one-hour briefing (through seminar or private discussion) on the latest developments in particle physics, but this was hardly sufficient to keep abreast of the swift-moving developments in our field. In 1979, I resigned the City College presidency, eager to learn what had actually transpired during the “heroic decade” in particle physics and to join the ranks of those who wished to push beyond the standard model. But, again, I called the shots incorrectly: the resiliency of the standard model was phenomenal and soon transformed the “heroic decade” into the more deliberate “period of consolidation and speculation” in which we presently live.

There is clearly much to learn from the fluctuating fortunes of particle physics and, upon my retirement in 1987, I decided to write a book that would record my personal assessment of what had taken place in the conceptual evolution of modern particle physics during my own scientific lifetime, especially during the “heroic period”. The writing of the book turned out to be a major “voyage of discovery”, of brilliant theoretical insights and ingenious experiments, that completely transformed particle physics by 1980. I hope that some of the reflections on my retrospective journey will help to prepare the younger generation for the next “heroic decade” in “super-modern” particle physics.

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