Preface

WALTHER NERNST, physicist, chemist, Nobel laureate, cofounder of the field of physical chemistry, teacher, research manager, inventor, textbook author, farmer, and diplomat, covered an enormously wide range of activities. The discovery of his Thermal Law, subsequently referred to as the Third Law of Thermodynamics, for which in 1921 he was awarded the Nobel Prize in Chemistry (of the year 1920) represented perhaps his most outstanding and most widely recognized accomplishment. But there were many other important advances and actions connected with NERNST. We mention his work on the thermomagnetic effects in metals performed already during his thesis, his fundamental contributions to electrochemistry, his specific-heat measurements at low temperatures supporting the new quantum theory, his Presidency of the Physikalisch-Technische Reichsanstalt in Berlin, and his diplomatic initiatives for reaching an earlier ending of the First World War.

Already from this listing we can see that a description of the life and the activity of WALTHER NERNST is similarly rewarding as it is difficult, if one attempts to present at least their main aspects in a satisfactory way. In addition to many shorter and sometimes also longer articles devoted to the memory of NERNST, which are quite valuable in this connection, three authors have covered this subject in the past in the form of books.

Motivated by the memorial events on the occasion of the 100th birthday of NERNST in 1964, the low-temperature physicist KURT MENDELSSOHN first presented the highly noteworthy and valuable book on the great scholar and his times [Mendelssohn (1973)]. He had personally witnessed NERNST during his last creative period at the Physical Institute

of the University of Berlin. Unfortunately, many times the fluent description suffered from incorrectness. EDITH VON ZANTHIER, the daughter of NERNST, who had supplied MENDELSSOHN with material, expressed her opinion on the book: *"In it there appear peculiar points, which really do not correspond to the nature of my father."* [Zanthier (1978)]. As a source of the history of science the book by MENDELSSOHN can be compared perhaps with the *"History of the Thirty Years War"* (1790) by FRIEDRICH SCHILLER in terms of its role as a secondary source.

In 1989 there appeared the shorter biography by HANS-GEORG BARTEL in the German language, in which an attempt was made to correct these inaccuracies at least regarding the most important points [Bartel (1989)]. As a volume within a series of biographies at the popular-science level it was limited to a relatively small size.

The works by DIANA K. BARKAN from the middle or the end of the 1990s are oriented more historically-epistemologically [Barkan (1995); (1999)]. Unfortunately, its great value is scattered in various directions. The historian of science DIETER HOFFMANN (Max Planck Institute for the History of Science, Berlin) hence remarked about this book in his review: *"The core of Barkan's study, where she deals with the growth of modern physics and Nernst's pivotal role in the process, is the best part of her analysis. However, her study is less detailed and insightful in its presentation of other parts of Nernst's scientific work. Indeed, those research topics in which he was engaged after the First World War are more or less neglected."* [Hoffmann (1999)]. Also the life of NERNST during the First World War is treated quite inadequately. Furthermore, there are several more incorrect points.

It is the goal of the present book to try and overcome the mentioned deficiencies of its predecessors. The book attempts to bridge the inseparable unity of biography and historical epistemology in the case of WALTHER NERNST, in many ways an exceptional human being and scientist, and his activities within the many fields mentioned above. In addition to the description of his life and the rise of his academic career up to reaching the very high peak in the second decade of the 20th century, special attention has been given to his activity during the First World

War and the subsequent time. Aside from some special treatments, up to now this period – from 1914 until his death in 1941 – has been covered only relatively briefly or in a summarizing way. This is in contrast to its importance. The period contains NERNST's actions during both World Wars, his attitude toward fascism, his occupation as Rector of the University of Berlin and as President of the Physikalisch-Technische Reichsanstalt, as well as his contributions to the electroacoustic musical instruments and to cosmology and astrophysics, which are frequently underrated in value.

The treatment in the book is supported by presenting quotations written by NERNST, his students, coworkers, colleagues, and members of his family. In this case sources have been cited, which up to now were used only rarely or not at all. An attempt to include only such statements the validity of which could hardly be questioned was made. Sometimes for the discussion of physical or physical-chemical facts, a mathematical presentation has been used. In this case, an opinion of the physical chemist HANS JAHN, having some importance in NERNST's biography, served as a good example: *"Because it is a fruitless endeavor ... to want to aim at a goal along bumpy, impassable secret paths, where the mathematical analysis has prepared already royal roads."* [Jahn (1895): IV].

In the attached name index to a large extent completeness has been observed regarding the (different) spellings, the first names, the years of the birth and the death, the titles of nobility, and any other information.

Due to the enormous amount of material, in this book too, some aspects could be treated only indirectly or marginally. In this case we have in mind NERNST's popularity as an academic teacher and his role as "father of the institute family", his attitude toward women, his love of motor cars and of traveling, in particular to Italy, but also the occupation with more special scientific problems. However, this did not noticeably affect the intended goal of a comprehensive treatment of the unique personality of WALTHER NERNST and his important achievements in science, technology, and society.

We hope that the present book has come reasonably close to this goal. Certainly, a total realization of it was not possible. Because of the large

complexity of the subject "WALTHER NERNST", after one has treated it there always remains the fact that something had been left out which deserves to be discussed in the future.

We thank World Scientific for taking up the publication of our book, and we are especially grateful to Senior Editor Ms LAKSHMI NARAYANAN from the Singapore Office for handling capably and promptly our many questions. Prof. Dr. DIETER HOFFMANN and Dr. ULRICH SCHMITT (Institute of Physical Chemistry, University Göttingen) deserve thanks for their friendly advice and their support in connection with the science-historical questions. Last but not least our thanks go to Dr. SABINE BARTEL and Dipl.-Math. HANS-JOACHIM MUCHA for their support in the electronic traffic between Berlin and Tubingen.

Berlin and Tubingen, April 2007

Hans-Georg Bartel *Rudolf P. Huebener*