



Wilhelm Friedrich Kühne

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WILHELM FRIEDRICH KÜHNE; AN APPRECIATION

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Willy Kühne, who changed his name to Wilhelm Friedrich Kühne, has made a number of quite distinct contributions to the explanation of physiological phenomena in molecular terms during the second half of the 19th century. He was born in Hamburg in 1837, the son of a wealthy merchant, and showed an early interest in scientific experiments during his time at school. In the context of this collection of essays we are mainly concerned with Kühne's period in

Heidelberg, where he succeeded Helmholtz to the chair of Physiology in 1871 and continued his teaching and research until his death in 1900.

Before coming to Heidelberg Kühne studied in Göttingen under Wöhler (Chemistry), Rudolf Wagner (Neurohistology) and Henle (Anatomy). This training layed the foundation for a successful approach to a variety of topics in research. In Jena he continued work on diabetes and other metabolic problems. In



The Physiological Institute in Heidelberg where Kühne lived and worked from 1871 until his death in 1900.

Berlin (with du Bois-Reymond) he learned about muscle. He had contact with many other eminent teachers of his time (Hopper-Seyler, Bernard, Ludwig and Brücke) who all influenced his future interests.

In Heidelberg Kühne appears to have been well supported by the Grand Duke. He expanded the Physiological Institute in the Akademie Strasse 3 into a fine building. As was not unusual at that time, he lived in nice apartments on the top floor of the Institute. This must have been a considerable help to a man obviously devoted to work in the laboratory. In spite of his preoccupation with experimental work he appears to have been sociable and well liked by his colleagues.

From Claude Bernard in Paris, Kühne learned the technique of pancreatic fistula which helped him to isolate 'ungeformte oder nicht organisierte fermente' which digest proteins. On the 4th February 1876 Kühne presented a paper to the Heidelberger Naturhistorischen und Medizinischen Verein, which is reprinted on pages E 3–E 12. In this paper he suggested that such non-organised *ferments* should be called *Enzymes*. He also presented some interesting results from his experiments with trypsin. It is clear that he realised that proteolytic enzymes are not only of physiological interest but also have considerable application to the study of proteins.

The word enzyme comes from the Greek for 'in yeast' or 'leavened'. The association of ideas from ferment to yeast must have influenced Kühne when applying the term first to trypsin when working with a ferment from the pancreas. In a later paper in the house journal of his Institute [1] he specifically states that the term enzyme should be used for all *ferments* in the unorganised state and not just for those from

yeast. He states that higher organisms, from which pepsin, trypsin etc. can be prepared, are fundamentally not so very different from unicellular organisms.

The description of Kühne's experiments make fascinating reading. His wide knowledge of chemical, histological and physiological techniques, as well as his keen powers of observation, enabled him to make important contributions to many fields. Apart from the studies already mentioned his greatest contribution was probably to the fields of neurohistology and vision. He discovered rhodopsin and was probably the first to observe both the light-induced bleaching and the regeneration of the retina.

Apart from their own importance, enzymes offer very good systems for the development and practice of techniques for the study of the functioning of other devices such as muscle proteins, transport proteins and visual pigments. To those of us who take this view of the wide application of enzymological techniques Kühne's investigations serve as an inspiration. It is with the future of enzymology and the functions of protein in mind that we have planned this commemorative issue.

The suggestion to produce this issue came from Professor S. P. Datta, who drew my attention to the paper by Kühne, which follows. I have had considerable help in planning this issue and in obtaining information about Kühne from Professor Sir Hans Krebs of Oxford and from Dr R. H. Schirmer of Heidelberg.

Reference

- [1] Kühne, W. (1878) Unters. a. d. physiol. Institut der Univ. Heidelberg 1, 291.

The following ten pages contain a reproduction of Kühne's original papers, as published in 1876