Preferred citation: A.H. Nissan. Heinz Corte Memorial Lecture. Chairman's introductory remarks. In **Papermaking Raw Materials**, *Trans. of the VIIIth Fund. Res. Symp. Oxford, 1985*, (V. Punton, ed.), pp 943–947, FRC, Manchester, 2018. DOI: 10.15376/frc.1985.3.943.

HEINZ CORTE MEMORIAL LECTURE

by Prof. C.A. Hogarth

Chairman Dr. A.H. Nissan

INTRODUCTORY REMARKS

ALFRED H. NISSAN

Ladies and Gentlemen.

This is a very special meeting in our Conference. It is a meeting dedicated to the memory of Heinz Corte - a founder and a profound student of contemporary paper physics, who dedicated his professional life to the service of our industry. Heinz Corte was known and universally respected in our industry by every professional who was interested in the progress of paper science and certainly by every professional who attended these Fundamental Research Conferences for the last decade or more. He was simply indefatigable in organizing and attending to the minute details of these productive meetings, which have affected the careers and professional growth of every one of us. We owe much, very much, to Heinz Corte's efforts on our behalf - and our friend and benefactor died in harness working for us. So it is fitting for us to gather together today and pay homage to him who was a mentor and critic to some of us, and an authoritative scholar and scientist to all of us.

In the short time available, I can only reflect on the highlights of this excellent scientist and complex person.

Heinz Corte was a passionate scientist -- a scientist who fell in love, passionately in love, with phenomena. To him, phenomena were sacred objects or events and demanded the most acute in observations and the most rigorous and precise of analyses. Thus, he himself became a devotee of careful and well-conceived experiments. More than that, he insisted that theories must not deviate in any way from observed phenomena -- not from ANY observed phenomenon! To him a theory had to explain not only a majority of phenomena but every single one related to it. And woe betide him who dared to deviate from this strict rule! This dedication -- absolute and undeviating dedication -- to observations of phenomena explains, I think, his three main and pet criticisms of some theories of other workers. I would like to give you these first and then go on to some of his more important positive and creative ideas which have led many other scientists to follow successful paths in paper science.

Heinz Corte did not believe in the validity of the electric double layers, nor in the applicability of the Kubelka-Munk theory to paper, nor in the hydrogen-bond theory of the mechanical properties of paper.

However, with the first two of these theories, he was content to point out the discrepancies and simply feel sorry for those misguided enough to continue to use them. What really brought out his passion was the hydrogen-bond theory, which was entirely brazenly based on treating paper not only as a continuum but also as homogeneous. He would literally roar and metaphorically thunder: "Paper is not a continuum!" He would then patiently but emphatically instruct me just to look at paper under the microscope and see for myself its discontinuous structure and heterogeneity.

But even with these pet concerns of his I would like to point out to you his remarkable scientific fairness. He was open-minded enough to invite Professor Overbeek to come to one of our Conferences precisely to explain his ideas on the electric double layers surrounding surfaces immersed in water. He was equally generous to me, not only in continuously inviting me to these Conferences to expound my theories at successive meetings, but also in privately advising me to replace the use of the very approximate Morse function and to use instead a more precise one if I was to go on with my misguided theories.

Last year, at last, I followed his suggestion and, of course, he was right in predicting that I would get better results. My only regret is that I had not heeded his advice earlier and earned his approval. But I wish to acknowledge my debt, and give credit here, publicly, to my friend Heinz Corte. I am certain that he will be a little more forgiving toward my stubborness and perhaps even smile at my waywardness in treating paper as a continuum now that I am following his advice to use a better-founded and more precise function for the hydrogen bond.

But Heinz Corte was not a scientist who built his solid reputation internationally on the basis of critical assessments of other people's ideas. It is only one part, although an important part of a scientist's duty to keep vigil on his field and weed out whatever error he believes is raising its head to corrupt and poison the crop of true knowledge. But the more important part of a scientist's mission is to plough new fields and raise new crops of knowledge. And to this task Heinz Corte bent his mind diligently, creatively and most effectively.

Heinz was the first to analyse for and determine the type and amount of hydrogen bonding in paper. He measured its energy of 4.5 kilocalories per mole and generously gave me that figure privately even before I saw it in print. He then embarked on a totally novel approach to describe quantitatively the very difficult concept of paper structure and thus to create new approaches to the study of the mechanical and optical properties of paper which depended on the solid fraction of the sheet and of its porosity and permeability which resulted from the voids within it. These studies let him to plunge into the uncharted seas of statistical geometry, which were neither then nor are even today developed disciplines.

To demonstrate how novel and difficult was this task let me tell you that at the same time that Heinz Corte led his team to create new paths in the wilderness of statistical geometry, the late Professor Bernal was assaying the difficult task of developing a theory of liquids which demanded formulating laws of statistical geometry in three dimensions, just as Corte's ambitious attempts in defining paper exacted from him tackling these laws in two dimensions.

I remember reading a letter in a scientific journal over Bernal's signature, pleading for world-class mathematicians of extraordinary insight and ability and of the stature of Gauss or Reimann to undertake the formulation of the laws governing statistical geometry so that physical scientists might apply them to structures which are both chaotic or random and co-ordinated or interconnected. Even though the mathematician Voronoi had, at the beginning of this century, tesselated space with convex polyhedra of randomly spaced polygonal tiles and his structures now promise to give good representations of the random structures of paper and other porous bodies, his work could not be properly used until the advent of modern, fast computers with large memories. Thus it lay unknown until recently.

I mention these facts to give you an idea of the difficulties involved. But Heinz Corte went into the unknown and with courage, perseverance and precision came out with elegant and useful results. Several of his colleagues went on to build superstructures of theory and experimentation on the foundations which he and they had laid down. We are all the better informed because of Heinz Corte's prodigious efforts in these difficult areas of research.

For his untiring efforts in organizing successive Fundamental Research Conferences, for his watchful eye for errors in our theories and observations, and for his precise and elegant experiments and seminal theories, we honour the memory of Heinz Corte today and render thanks that he lived amongst us.

Your Committee decided that the most appropriate and useful way to show our appreciation to Heinz for his efforts on our behalf was to invite a world authority on material science to talk to us about some aspect of this science which was so dear to Heinz. They could have chosen no better than our speaker, Professor Cyril Hogarth, Professor and Head of Department of Physics at Brunel University and, formerly Pro-Vice-Chancellor of his University -- a high honour and a demanding task.

Professor Hogarth -- our speaker -- has published nearly two hundred papers in the fields of solid-state physics particularly on semi-conductors, and also on educational themes. He is also the editor of and contributor to two books on non-destructive testing and on semiconductor devices.

Besides his active and prolific research and his constant and varied contributions to the foundation and growth of his University since and even before its evolution from Brunel College in the late fifties and early sixties, by serving on almost every committee of Faculty, of the Senate and of the Council of Brunel, Professor Hogarth has found time to serve on committees of his professional institute, on his district council, on his parish council and on the liaison committee between Brunel and Hillingdon Hospital. In most of these committees his term of service ended with Progressor Hogarth as Chairman.

Professor Hogarth is truly that Renaissance prototype, the man of many parts, and I deem it a distinct honour and pleasure to introduce him to you today to speak on "The development of materials science, with reference to the special role of paper."

Professor Hogarth.