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European Conference on Electrotechnics, Eurocon 74

Haut lieu de la collaboration internationale en matière d'information réciproque des spécialistes de la branche électricité, le Congrès «European Conference on Electrotechnics, Eurocon 74» a tenu ses assises à Amsterdam du 22 au 26 avril 1974. C'est en effet la première grande manifestation organisée conjointement entre l'«Institute of Electrical and Electronic Engineers, IEEE» et sa «Région 8» d'une part et la «Convention des Sociétés nationales d'électriciens de l'Europe occidentale», groupant 16 sociétés de 13 pays, d'autre part.

Au cours de quelque 30 séances, plus de 270 rapports, dont 6 en provenance de Suisse, ont été discutés par plus de 750 spécialistes venus de 22 pays du monde. Si on ajoute qu'en plus des documents remis aux participants eux-mêmes, 265 résumés et 1500 copies in extenso de conférences ont été distribués séparément, on a confirmation que la manifestation fut un succès. Seuls ¾ des rapports annoncés ayant été acceptés, la plupart des rapports présentés furent d'un niveau scientifique et technique élevé.

Au cours de la séance d'ouverture, M. van den Broeke, président du comité d'organisation, souhaita la bienvenue à chacun et particulièrement au prince Claus des Pays-Bas, au lord maire d'Amsterdam, au représentant du ministère des Sciences et à de nombreuses autres personnalités du monde de la science et de l'électrotechnique.

Puis M. Guarrera, président de IEEE releva que si la solution des problèmes critiques du monde d'aujourd'hui requiert des systèmes complexes touchant à maintes disciplines, chacune jouant son rôle respectif, celle de l'ingénieur électricien en constitue le système nerveux qui, de ce fait, est uni à toutes les autres.

Pour sa part, M. Hagson, président de la «Convention ...» constata que le thème du Congrès «l'ingénieur dans la société», incluait des problèmes comme le déclin de l'influence et de la reconnaissance de l'ingénieur dans la société ou l'absence d'ingénieurs dans la politique qui, bien qu'absents des programmes des réunions, n'en seront pas moins, selon lui, discutés en coulisses durant la semaine. Puis il ajoute encore que, pour défendre au mieux sa position, l'ingénieur doit éprouver constamment ses connaissances et ses capacités professionnelles afin de mieux les mettre à disposition pour le bien de la société et de l'humanité tout entière.

Ouvrant le Congrès, le prince Claus prononça une allocution reproduite in extenso dans notre bulletin ASE, de même que la conférence du professeur Casimir, président de l'académie royale des arts et des sciences des Pays-Bas, sur le thème «Technology for the futur».

Tout au long de la semaine, les six séances quotidiennes parallèles furent assidûment fréquentées et les discussions souvent fort intéressantes, se sont réparties sur les thèmes suivants: Controlling the Futur, Instrumentation Electronics, Communication for the 1980's, The computer in Society, Biomedical Engineering, Education.

Sur le plan matériel, le congrès parviendra probablement à boucler ses comptes sans pertes. Ainsi donc, Eurocon 74 fut un succès et, d'ores et déjà, on songe à une réédition en 1977.

R. Richard

Ansprache

gehalten am 22. April 1974 von seiner Königlichen Hoheit, Prinz Claus der Niederlande, anlässlich der Eröffnung der Eurocon '74

Ladies and Gentlemen,

It was with great pleasure that I accepted the Organisers' invitation to open this European Conference on Electrotechnics, Eurocon '74. I extend a hearty welcome to all our distinguished guests from so many foreign countries. May your stay here be most agreeable as well as most useful.

The theme of the conference, 'The Engineer in Society', appears to me to be most felicitous. It gives evidence of a most timely desire to reflect on the social role of that vigorous human activity which has brought about so many changes in our world – technology. Long acclaimed as the brain behind so many modern amenities, the engineer still has to accustom himself to being criticised for the many things that go wrong. The rapidity with which the world changes and the profoundness of the change tend to accentuate any shortcomings and the distances separating those who lead from those who lay behind. The very achievements in modern communication, which, among so many other subjects, will occupy your thoughts during this conference, tend to aggravate society's evolutionary pains; they are felt so poignantly that there is great uneasiness in many quartes. We can sense the spontaneous generation of anti-technology and 'back-to-nature' lines of thinking or you might even call them creeds.

But in spite of the pessimists, the Cassandras, modern society cannot exist, let alone continue to exist, without the evergrowing contributions of either 'advanced', 'intermediate' or 'appropriate' technology in every field. This is true of the rich and the poor, of the developed and the developing countries. Technology has enabled us to populate this planet with our thousands of millions; we are now tied to technology's apron strings – we cannot but follow the course set by technology, that is, by human genius! If we do not wish to do so, we must be prepared to put a thousand million people aboard a space ship and send them aloft to seek their fortunes in other galaxies.

Technology has from its most primitive beginnings exerted a very powerful influence on the course of human history. It is becoming pre-eminently the agent that shapes the environment in which we live.

It is through technology that we are able to create new living conditions. This, as you will agree, is a highly political matter. In point of fact, when addressing an audience like this I can say 'It is you, ladies and gentlemen, and not the politicians who (without realising it most of the time) are actually the pacemakers and inventors of politics'. Politics can only exist where human beings can create or change living conditions. The man who invented the first tool 'invented' politics, a typically human instrument. Everything that is 'makable' becomes politically relevant and vice versa. Let me give you an example.

The weather – you know, our most cherished topic of non-committal small talk – is not yet 'makable' and that is the sole reason why it has no political relevance yet. If you, scientists and engineers, were to succeed in 'making' weather (not just occasional rain here and there), we should have cabinet ministers for weather affairs the very next day – your achievement would most certainly give rise to new international tensions more explosive than any we have to cope with today. And that is no trifling matter.

On the whole in modern times the technological and scientific revolutionising of our productive forces, of the 'makable', brings the revolutionising of politics in its train.

All this, ladies and gentlemen, may sound quite unfamiliar to you, even unusually flattering – let me assure you that your influence transcends your disciplines. But there is another side to the matter: If your activities as engineers do have a far greater impact on politics than is commonly realised, a political responsibility rests on your shoulders whether you see it or not and whether you like it or not. To paraphrase Marx, who said that the only thing philosophers could do was interpret the world in different ways while the real question was how to change it, we can say: 'So far philosophers have only been able to interpret the world in different ways but now *we* can change it.'

We have reached the point beyond which the questions as to whether everything is 'makable' should in fact be made and whether everything we can change should be changed become increasingly pertinent. Controlling the weather is a case in point.

Technology makers, those who engender technology, are potentially powerful people. If they use their power, they become technocrats. Powerful people indeed ... In our democratic society it is only natural that we should desire to control the power of potential technocrats. The proliferation of discussions on the social relevance of research and development within the world of scientists and engineers is evidence that this desire is not restricted to the non-scientific, more politically orientated sectors of society.

Discussions on the subject are getting under way at the universities and in private corporate research and development institutes, so I think it was a good idea of the organisers of this congress to arrange for a panel discussion on your very special responsibilities towards society. I am sure the discussions will make a positive contribution to our thinking and will help us to mould our ideas on the subject.

I hope you will have a very successful congress indeed.

I now have the honour to declare the European Conference on Electrotechnics open.

Technology for the future [1])

by H. B. G. Casimir

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The conference we are opening today reflects the enormous width of the field of electrical and electronic engineering, as well as the depth of it details. A mere glance at the printed program should be sufficient to convince us of this.

Therefore it would be futile if I were to try in this opening address to really introduce the subject matter that will be dealt with in the course of these days. I will restrict myself to some general considerations.

I have chosen as a title technology for the future and this brings to mind the old saying that predicting is always difficult, but in particular predicting the future. This is not just a silly crack: it is a useful reminder that, when looking at the past, we may believe that we understand why things happened the way they did; we feel that we might have predicted the past – but this does not mean that we can predict the future with any degree of certainty. And so I will begin with a few historical remarks.

Electrical and electronic engineering is the primary and still the most important example of a technology that is science-based or perhaps rather science-originated. Architecture, mechanical engineering, windmill design and shipbuilding had already reached quite a high level as empirical crafts before the basic principles underlying these crafts were well understood, and practical engineers must have had a great many useful rules of thumb before a really quantitative treatment became possible. There was also quite a bit of chemical and metallurgical industry before the principles of chemistry were established.

Thermodynamics was created, the general notions of energy and of entropy were introduced, at least partly in order to understand the principles of operation and the limitations of thermal engines.

The case of electrical engineering was entirely different. Here, for the first time in history and through more than a century, observations and discoveries by physicists and physical theory preceded any type of engineering. There were no useful electric batteries before the work of Volta. No electric motors before Ørsted had observed that an electric current produced by a battery exerts a force on a magnet and vice versa. No dynamos were in existence prior to the discovery of electromagnetic induction. Maxwell's theory preceded the discovery of electromagnetic waves by Heinrich Hertz and it was several years after that, that these waves were applied by Marconi.

The notion of electrons was introduced by several theoreticians, foremost among them H. A. Lorentz, and their existence was established experimentally by J. J. Thomson. The first thermionic valves came soon after that ... but of course, the discovery of the electron came first. No entirely satisfactory theory of the conduction of electricity in metals was possible before quantum mechanics had been formulated. After the great breakthrough around 1925 it took only a few years to work out such a theory – at least, in principle: one is even today busily working on refinements. This gave rise to the notion of holes in energy bands, which in turn some 20 years later led to the discovery of hole injection into n-type Germanium and to the invention of the transistor. The laser, which is probably going to play an increasingly important role in telecommunications, is based on Einstein's ideas on emission and absorption of radiation from 1917, on notions on inversely populated energy levels, and, of course, on the beautiful basic work of Townes.

An interesting feature is, that not only did the work of physicists precede technical applications but they were entirely unaware of the technical consequences their work might have. This is of importance in connection with discussions on the social and economic relevance of research, a theme that is quite fashionable these days, although there are some doubts as to its social and economic relevance.

Now electricity is no longer unique in this respect: nuclear engineering is obviously in the same class. And it should also be pointed out that in other, older, branches of technology the situation today is not too different although the historical development was. Thermodynamics may have been created after the introduction of steam-engines but today no designer in his right mind would build a major thermal engine without a thorough theoretical study based on thermodynamics, hydrodynamics and so on. It is similar in other subjects. Windmills and sailing boats may have been built for ages and theoretical aerodynamics may not have been the strongest point of the brother Wright, but the design of a modern aircraft depends definitely on a very advanced knowledge of aerodynamics – and of quite a number of other things besides. Whereas there is also a lot empiricism, of practical tricks and of that hard-to-define but undeniably existing thing called experience in electrical engineering.

[1]) Vortrag, gehalten am 22. April 1974 anlässlich der Eröffnungssitzung der Eurocon '74 in Amsterdam.