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Ludwik Finkelstein and Measurement – a challenge for the future

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Abstract: A brief reflection on the contribution of Ludwik Finkelstein and, echoing his own words, the continually changing and developing response to the push of advancing technology and the pull of changing requirements, setting a challenge for education in the field of measurement and instrumentation for future generations.

Ludwik Finkelstein was the towering figure of his generation in measurement and instrumentation, establishing field as an academic discipline in its own right in the United Kingdom and contributing for over 50 years to the formation and discussion of the subject internationally. His principal research interests were on the development of measurement and instrumentation as a systematic discipline and the principles of analysis and design of scientific instruments as well as measurement in complex systems, particularly in biological applications and on the theory and philosophy of measurement. He was, over his lifetime, the co-author of 4 books, and author or co-author of over 175 papers in journals, conference proceedings and chapters in books.

In one of the last of those papers was one that he gave personally, at the 13th IMEKO TC1-TC7 Joint Symposium at his home institution of City University London and less than a year before he died, he discussed a subject close to his heart '*Measurement and instrumentation science and technology: the educational challenges*' [1]. The keynote address that he contributed to that meeting endeavoured to initiate debate and give shape to a consideration of the educational aspect of the science of measurement and instrumentation which, as he said 'deserves more attention than it has hitherto received'. He went on to say 'The nature, scope, content and organization of this science are now widely agreed, although it is continually changing and developing in response to the push of advancing technology and the pull of changing requirements. It provides a necessary basis for education and training, but is not of itself sufficient' and he went on to examine some of the educational challenges which that brought and which still are before us.

Ludwik Finkelstein inspired a generation of scientists and engineers, introducing them to the field of measurement and instrumentation – the authors of the present paper amongst them. His inspiration was practical measurement problems in to solve the problems of industry – he began his career as a scientist when he was employed as a physicist in the electronics industry, working on problems related to the manufacture of electronic tubes. Following that, in 1952, he became a staff scientist at the Mining Research Establishment of the National Coal Board, developing instrumentation for the mining industry and testing and evaluating it underground, as shown in Figure 1. His academic career began in 1959 when he joined the academic staff of the Northampton College of Advanced Technology, which was even then on its way to becoming City University

London. In addition to his extensive contributions to research and scholarship, he went on to become Professor of Measurement and Instrumentation, Dean of the School of Engineering and Pro-Vice-Chancellor of the University before his retirement in 1993 and also President of the Institute of Measurement and Control in the UK.

That keynote paper [1] included the reflection 'when considering engineering and scientific formation it is important to bear in mind that the professional is not just an engineer or scientist alone. We must bear in mind that he or she has multiple other roles as an individual human being and as a member of society. Formation in measurement should be so devised as to develop the person in all respects'.

His thoughts on the subject continued 'formation must continue throughout an engineering or scientific career' and he further commented 'It should indeed extend throughout life including retirement'. He exemplified that approach in his own life and work – he was constantly refining and extending his philosophy of measurement as a discipline and for him retirement from his major administrative responsibilities simply gave him more time to reflect on his passion of measurement science. In this he remains for those who follow him a source of inspiration. Indeed he himself contributed much more widely to scholarship and to society than is often realized and the obituary published in *The Times* newspaper in London [2] revealed something of the breadth of that contribution, known to friends and colleagues, but often not beyond.

One area where he made that broader contribution, and from which he never really retired, was in the Editing of this journal, *Measurement*. Although not the founding editor, he took over the senior role on the fledgling journal just a few years after it was created and saw it joining the Elsevier fold, where it has since flourished. He contributed enormously of his time to the journal, even after stepping down from the main role as Editor, yet subsequently remaining and contributing fully as an Associate Editor for many years. It is not widely known that his wife also supported the journal for over a decade as its Editorial Assistant, working under her professional name, Mirjam Weiner. The authors of this paper have been delighted with the growth of the Journal and its impact, building on the foundation he laid: the breadth of material currently being published truly reflecting, as Finkelstein noted in his keynote paper in 2010 [1] a field 'continually changing and developing in response to the push of advancing technology and the pull of changing requirements'. The breadth of material in the measurement field, seen over any year in this journal, is quite astounding. The year 2013 will see well over 1000 papers submitted to the Journal, which now receives as many papers in a single month as it did in 2001 revealing the magnitude of that growth.

He ended that keynote paper which exemplified his philosophy on measurement and instrumentation with the telling words 'It has been shown by the considerations above (i.e. those presented in the paper [1]) that there is extensive and important work to be done on educational aspects of measurement and instrumentation. If we do not respond to the challenge, who will? If we do not start now, then when?' Let all of us who follow after him and respect his legacy make our response to be to undertake that work and educate the next generation in measurement and instrumentation – and let us start now. We owe it to our mentor and our inspiration to do so, and to do it with all the skill and enthusiasm we can muster as we see the field 'continually changing and developing'.

References

1. L Finkelstein 'Measurement and instrumentation science and technology-the educational challenges' Proceedings of 13th IMEKO TC1-TC7 Joint Symposium, London, UK, 2010 Published in Institute of Physics Journal of Physics: Conference Series 238, 012001, 2010

2. 'Obituary of Professor Ludwik Finkelstein' *The Times*, London, UK, Friday, September 2nd, 2011

Figure Caption

Figure 1: Professor Ludwik Finkelstein evaluating equipment during the time he worked for the National Coal Board in the UK in the 1950s
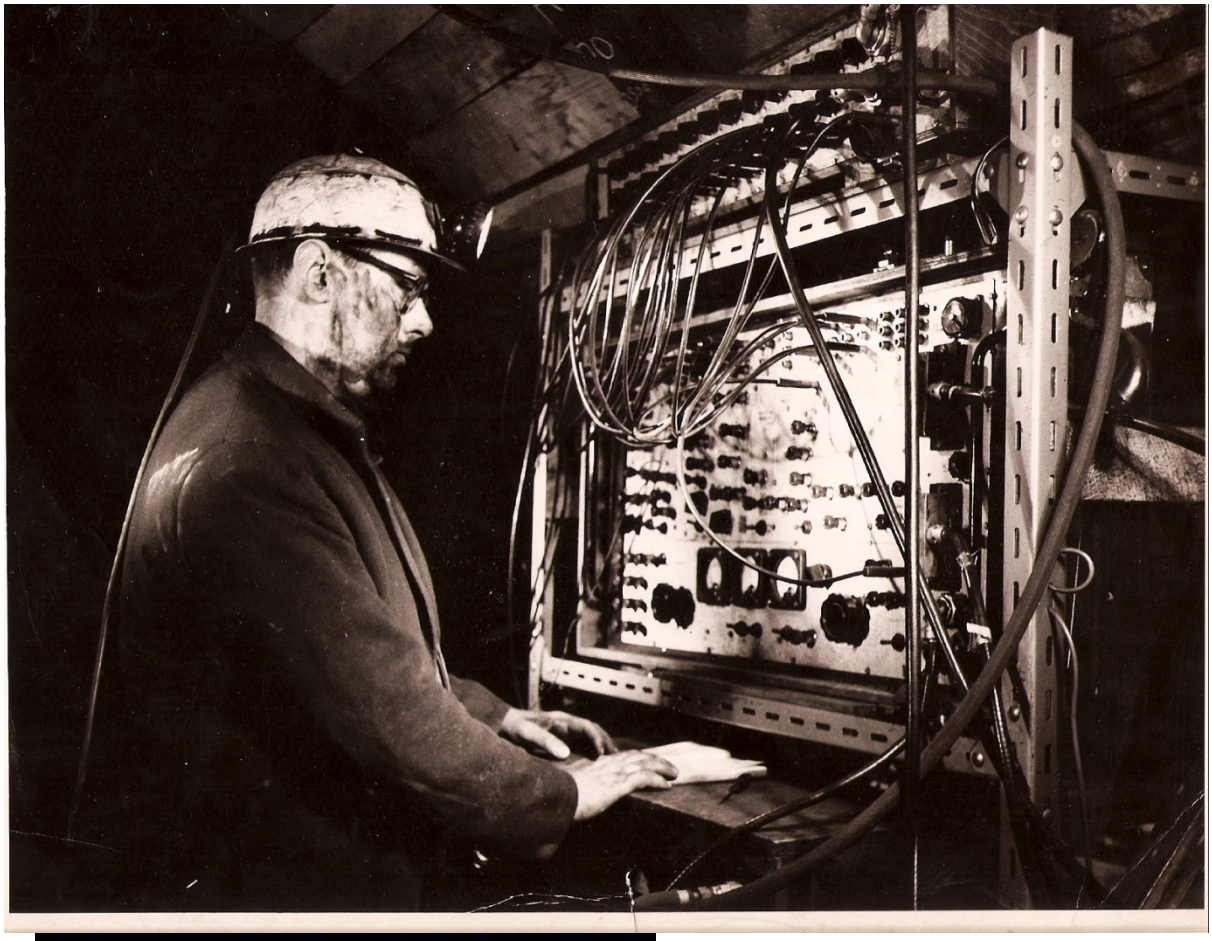
Figure 2: Professor Ludwik Finkelstein speaking at City University London on the occasion of his 80th birthday in 2009