HERMANN ARTHUR JAHN 1907–1979

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Hermann Arthur Jahn, who died on 24th October 1979 after a nine-months illness, bravely borne, was modest to a fault and hence not easy to know. But it was worth a little effort to penetrate this reserve, for one would soon be rewarded. He had a fine sense of humour and, though he did not sport the uproarious laugh of the double-whiskey boys, he had an easy and infectious chuckle which (as the successor to his chair of Applied Mathematics in Southampton) I came to appreciate. Once I said to him on his drive, as he was sweeping the leaves away, "I see that the Jahn-Teller effect has now a whole book devoted to it. Have you seen it?" I was referring to Englman's book of the early seventies, which has a one-page historical note by Edward Teller at the front. Jahn chuckled; "Teller has got it all wrong" he said. "Oh?" I raised my eyebrows. "Teller says I was a refugee from Germany, but that is not so." There was no malice in his voice, but just quiet amusement.

In fact, Jahn's father had come from Germany to England in 1890 so that he was a first-generation Englishman. He was born in Colchester, educated in Lincoln and took a Chemistry B.Sc. degree at University College, London (1925–28). This was the exciting time of the early quantum theory, and Jahn went to Leipzig for further study to doctorate level under the guidance of two distinguished people: Heisenberg and van der Waerden. After his doctorate he went to the Royal Institution (1935–41), the Royal Aircraft Establishment (1941–46), and he took up the first Chair in Applied Mathematics at the (then) University College, Southampton, having spent 1946–48 in Professor Peierls' Department of Mathematical Physics in Birmingham. He held the post of Dean of Science with quiet distinction from 1963–1965 during his period (1949–1972) in Southampton. We shall turn to his main contributions from these various periods shortly.

A career summarised in this way sounds smooth and inevitable. But it might have been different. Thus Jahn would tell the story of how he was interviewed by Klaus Fuchs, Head of Theoretical Physics at Harwell, in the hope of possibly obtaining a position there in 1947. But Jahn was a realist. "I suppose I may not be able to get a post here", he remarked, "because of my German ancestry". "Why not?" said Fuchs, "Look at me. I have access to the classified material, and I have German ancestry." The irony of the conversation transpired only later.

When Jahn came to Southampton University College he was soon regarded as one of the most distinguished academics on the campus, and Professor Richards, who remembers this time, tells me that he was classed with the inimitable and unforgettable N. K. Adams (Chemistry) and Eric Zepler, a creator of the great Electronics Department at the University. Indeed, he had considerable achievements to his credit. His Ph.D. work on the vibrations of the methane molecule was published in the Annalen der Physik (1935), was extended to the acetylene molecule (1936), the absorption spectrum of methane (1937) and culminated in two Royal Society papers (the first with E. Teller) on the stability of polyatomic molecules in degenerate electronic states (1937/38). This was the Jahn-Teller effect dating from Jahn's Royal Institution days—days round about the year 1935 when Teller was also

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in London. This work was immediately recognised as being very important, and Jahn's name along with Teller's became enshrined in the literature. Even now, forty-five years later, both theoretical and experimental research on the Jahn-Teller effect is being carried out, and there are international conferences on this topic. Despite this extremely fruitful and happy collaboration, the ways of Jahn and Teller parted at this time and Teller reports that they did not meet again. This is not suprising for, distinguished though Jahn was, he did not travel much to conferences or on scientific business. Was it part of his self-effacing character? Certainly when I succeeded to his Chair and invited him to give us a seminar, he explained that he preferred to use his time in retirement to work on his current research problems. I recall being rather suprised, since I thought that he might be pleased to be called out of retirement, as it were, by this kind of invitation.

The end of his time at the Royal Institution marked a shift of interest to the theory of X-ray scattering near Bragg peaks in solids, i.e. by comparatively low energy accoustic phonons. This work was published in Nature (1941), the Royal Society Proceedings (1942) and, with Kathleen Lonsdale, in the Physical Review (1942). Jahn showed here that the orthodox theory which had been initiated by Waller and Faxen in the 1920s could lead to results in agreement with experiment. This was of importance in view of certain criticisms by Raman. Jahn pointed out that elastic constants of crystals could be measured by X-ray scattering, as was done later for example in the case of aluminium in the 1950s. On the whole these methods have now been replaced by inelastic neutron scattering. A contemporary report of this work will be found in the *Reports in Physics*, 9, 256 and 294 of 1942/3. To some people working in this area it would not have been obvious that the Jahn of diffuse X-ray scattering was the man of the Jahn-Teller effect.

During the war Jahn moved from vibrations in molecules and crystals to the vibrations in larger structures at the R.A.E. He contributed to various reports on flutter, and vowed never to fly in an aeroplane – and he never did.

Then in Southampton, J. P. Elliott (now professor at the University of Sussex) was one of the first of a series of research students and collaborators with whom he explored the application of Racah's tensor operator techniques to nuclear structure. He contributed to about 10 papers in this area in the decade from 1950 to 1960. In these he stressed the importance of applying group theoretic techniques to nuclear structure problems, discovered some important symmetry properties of the coupling coefficients of angular momentum theory, and did more than anyone else to keep alive the connection between the symmetric group and the continuous groups which is made explicit through the use of Young operators. In addition he initiated the use of computers in the calculation and tabulation of coupling coefficients in rational form. In a different area he advocated the application of Morpurgo differential equations to nuclear physics problems many years before such a programme was developed in France and the U.S.S.R. Rather more algebraic topics dominated the last years of his life. In an effort to improve the available algorithms for constructing symmetrised state functions he continued to do work on the symmetric group until the time of his terminal illness.

Throughout his time at Southampton he gave inestimable help to students and colleagues alike, and taught always the virtues of patient persevering research. He and his wife, Lily, entertained generously and thus provided a focus for a rapidly-growing Mathematics Department of what became the University of Southampton in the 1950s.

The story of Hermann Jahn is that of a first-rate mathematical physicist who made significant contributions to the theory of vibrations in molecules, solids and nuclei, and whose work is widely appreciated. Behind it all was a meticulously careful but humorous and kind scientist.

There was no list of his publications to be found amongst his papers when he died. It is surely true that personal modesty and aversion to self-advertisement can also lead to a certain lack of contemporary appreciation by the scientific community, and it is a matter for conjecture whether Jahn felt that this applied in his case.

Those who knew him will continue to miss him. He is survived by his wife, a son, a daughter and two grandsons.

I am indebted to Mrs. L. Jahn, Professor W. Cochran, Professor J. P. Elliott, Dr. R. C. King and Dr. E. Teller for their help in writing this obituary.

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