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Asim Barut: A Personal Tribute

I met Asim Barut in the Fall of 1984 at the University of Colorado at Boulder, where I was a second-year graduate student in the Mathematical Physics PhD program. The encounter was purely happenstance; he was teaching a graduate course in statistical mechanics that I was taking that semester. Up until that time I had been concentrating on my courses in quantum mechanics and particle physics, and it looked as if I was going to go into high-energy theory, perhaps even superstrings. One semester with Asim changed all that for me.

What impressed me the most was his style of doing physics, which came across clearly in that stat-mech class. He would take a simple model of a physical problem, and then squeeze it for all it was worth. I was amazed by his clear and methodical approach as he took us through first the one- and then the two-dimensional Ising model of a thermodynamic spin lattice. It was this steady hand and clearness of purpose that guided all of his work. By the end of the semester, I was hooked. Abandoning superstrings forever, I asked Asim if I could do my PhD with him on the foundations of quantum electrodynamics. That began a friendship that lasted 10 years until his untimely death in 1994. Asim was a teacher, a friend, and a colleague—and he had a lasting effect on me that I will never forget.

In 1986–1987, I spent a year with Asim in Trieste, Italy, at the International Centre for Theoretical Physics (ICTP), an institute of which Asim was a co-founder and a place where he spent many a summer and sabbatical. I remember that in the summer he would go every evening for a swim in the sea around the beautiful Castle of Miramare. Out he would go, paddling slowly and surely past the rocks and through the waves—and he would cover this amazingly enormous distance. I think his swimming style in the unpredictable sea mirrored his approach to theoretical physics. After the swim, we would meet at the Adriatico guest house for dinner, followed often by long discussions out on the balcony overlooking the sunset over the Adriatic Sea. We would talk about everything from physics to politics,

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from philosophy to religion. Asim always had a unique viewpoint and a simple way to look at things by cutting through the gobbledygook.

Asim was interested in the foundational questions of physics, in particular those of quantum mechanics and quantum electrodynamics. He served on the editorial board of this journal, *Foundations of Physics*, for many years. He was not afraid of looking at alternative ways of doing things, even if those ways seemed slightly heretical to the rest of the physics community. He always tried to construct simple models of seemingly complex phenomenon. He developed an alternative theory to the standard model of composite hadronic particles that was not based on quarks but rather on a simple model based on leptons bound together by magnetic resonances at short distances. Simple algebraic formulas predicted quite accurately the masses of all the known hadrons. Another area of interest, in which I helped to contribute, was to see how far one could go in understanding quantum electrodynamics without second-quantization of the electromagnetic field. In the spirit of the work of Jaynes, but far outstripping Jaynes's neoclassical theory, the Barut self-field approach to quantum electrodynamics was able to arrive at the correct first-order expressions for spontaneous emission, the Lamb shift, the electron's gyromagnetic ratio, and even the Unruh effect.

As one might imagine, some of Asim's work sparked quite a bit of controversy. In particular, the self-field approach to QED drew harsh criticism from some of the "high priests" of QED, as Asim liked to call them. In spite of this, I never saw him lose his temper or lose his way. He was kind and gentle in his recognition of their criticisms, as well as in the tone of his response. He never had an unkind word to say about anyone, in spite of the virulence of some of his critics. Kindness radiated from the man, kindness and a timeless sense of wisdom. He was a very thoughtful teacher, and his door was always open to any student. Sometimes the students would ask about homework, and sometimes about the nature of the universe. He would always answer clearly and with great thoughtfulness—working with the student to develop the answer. No question was ever dumb or silly to Asim.

I last saw Asim in September of 1994 in Edirne, Turkey, where I was attending one of the many NATO Advanced Study Institutes that he had organized over his career—this one was on *Electron Theory and Quantum Electrodynamics : 100 Years Later* . He was very ebullient and upbeat, showing me the grounds and facilities at the International Centre for Physics and Mathematics, where the conference was being held. He was director of this new center that he had been instrumental in founding, with support that he had tirelessly lobbied from the Turkish government. Having recently retired from the University of Colorado, he had high hopes for

seeing his new center through to grow and blossom into a Middle Eastern companion to the ICTP in Italy. Alas, this was not to be. He died unexpectedly a few short months later of heart failure, in Denver on December 5th, 1994. He was 68 years old.

It seems like only yesterday that I was asked to contribute an article to special issues of *Foundations of Physics* that was in honor of Asim's 65th birthday. Those issues appeared in 1993. Now, five years later, I have the sad task of assembling the 35 or so wonderful papers that now appear in this special set of memorial issues of *Foundations of Physics* which is to honor him in death. I would like to thank all of Asim's friends and colleagues who have contributed to make this a truly exceptional special volume that honors a truly exceptional scientist and man, our friend and colleague, Asim Orhan Barut. He will be greatly missed by us, one and all.

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