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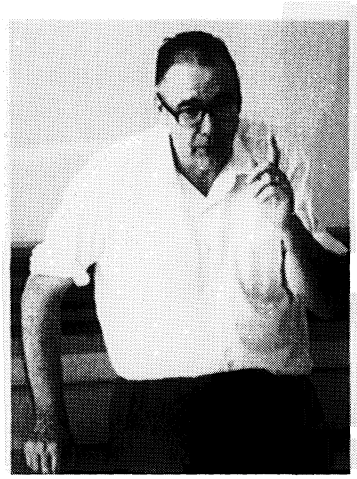
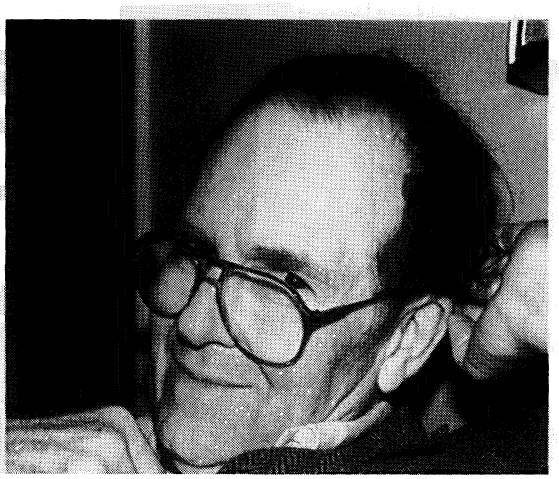


Res Jost

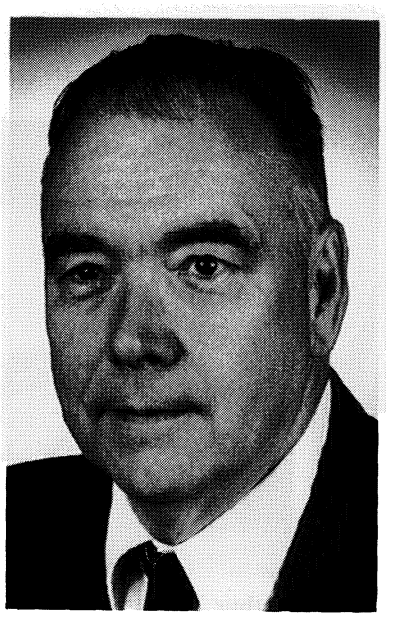


Arthur Wightman

This special issue of CMP is dedicated to Res Jost and to Arthur S. Wightman. It stands for our recognition and our admiration for their leading role in the attempt to put the theory of elementary particle physics on a solid mathematical foundation. Theirs was a crucial contribution to the challenging – and still not finished – endeavour to bring mathematical rigour and beauty into a branch of theoretical physics where it was often not so easy to separate facts from fancies. Besides being strong researchers both Res and Arthur have left a lasting footprint in the world of mathematical physics through their power of teaching. Each one of them in his own characteristic and unique way was the teacher for a whole new generation of young scientists. Their success and their lasting influence cannot be explained just by their being leaders in their field. With all the weight of their strong personalities they impressed upon their disciples a deep sense for what good and honest and beautiful science was. Through their own example they also demonstrated how to embed the tasks of a scientist in the general endeavour of human existence. Their love and affinity for nature and history, for music and poetry has been inspiring for many. But most important of all they have offered their personal affection and friendship to all of us – including many who unfortunately have not been able to contribute to this volume.

Res and Arthur, we thank you.

Arthur Jaffe,
On behalf of your students,
your colleagues, and
your friends



For Res Jost

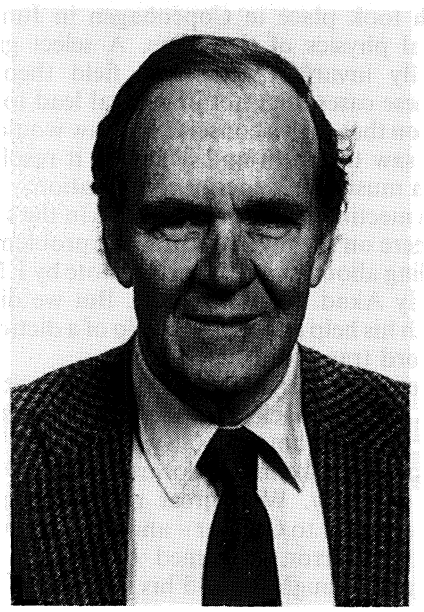
An invitation to write an introductory page or so for an issue of the Communications dedicated to Res Jost set off a flood of memories of old times. For me, Res always had an aura of wisdom, of critical insight, of historical prospective, and of laughter of the twists of circumstance which affect scientists even more than science.

Here is an anecdote to evoke one of those old days. It is the summer of 1958, one year after the publication of the Jost proof of the CPT-theorem and the Jost-Lehmann-Dyson representation. Jost and Wightman are sitting in the Jost's living room in Zürich discussing what might be done with the x-space and p-space analytic functions in quantum field theory. Around the periphery, busy with his own concerns, but keeping his eye on us moved son Resli. We had a little book, which we occasionally consulted, H. Behncke and P. Thullen's, *Theorie der Funktionen Mehrerer Komplexer Veränderlichen*. We were skeptically optimistic in our manner. After all, it was the golden age of the general theory of quantized fields. (Little did we know that it was actually "the dark ages of quantum field theory" according to the conventional wisdom of particle theory.) However we got stuck on something – what it was, I don't recall. We discussed from various angles, always ending up, expressing incomprehension. At this point Resli interrupted, "Why don't you look it up in the book?" Uproarious laughter.

Here is another vignette from two decades later. I had given a general talk in the palace on Hönggerberg about convexity in statistical mechanics beginning with Gibbs' two papers on thermodynamics. I expressed surprise that such great expositors as Planck had not assimilated the fundamental ideas of Gibbs on the connection of convexity with thermodynamic stability in the simple geometric form he originally expressed them. Res said something like, "You evidently don't know about the wounds Planck suffered as a young radical for his views on thermodynamics." After the one hour lecture that followed, my eduction in the history of statistical mechanics had progressed appreciably. (If you don't know the story, you can read it in Boltzmann and Planck: Die Krise des Atomismus um die Jahrhundertwende und ihre Überwindung durch Einstein, Lecture Notes in Physics, 100, pp 128–145.)

Dear Res, we wish you well.

Arthur Wightman



To Arthur Wightman

Disease and age enwrap my life as a permanent wintertime. A thick fog of oblivion covers my past. Chance rather than relevance determines what I remember. But unexpectedly the clouds disperse and free the view on a blue sky and massifs of inaccessible mountains, peaks on which in old times we oriented our work. Such a massif is Arthur Wightman's scientific work and teaching. I had the privilege to roam through some of its modest foothills.

I met Arthur and his wife Anna-Greta shortly after our arrival in the United States in December 1949 in the flat of our unforgettable friends Sonya and Valya Bargmann. I did not, at that time, realize to whom I had just been introduced. I was still ignorant of the wide difference in scientific standards between Zürich, where I came from, and Princeton. As an example, I barely knew the definition of a Hilbert space. (I had memorized the axioms from J. von Neumann's book on the Mathematical Foundations of Quantum Mechanics, a book which I had read despite the warnings of my teachers.) Arthur, however, moved with ease through the vast domains of functional analysis. During his student days he had been a member of a congregation, named "The Group Characters," which included the later mathematician John Tate. Together they studied the difficult modern theory of the unitary representation of non-compact groups, a theory to which Eugene Wigner and Valentine Bargmann had made so decisive initial contributions. No wonder then that our meeting at the Bargmann's did not, for the moment, result in a close connection between Arthur and myself. He was occupied by problems of principle in the domain of theoretical physics, whereas I played with peripheral trifles, paying little attention to the developments in the center of science. So it happened that the fundamental investigation of G.C. Wick, A.S. Wightman, and E.P. Wigner, which introduced the all important notion of superselection rules, was almost lost on me, as was the analysis of L. Gårding and A.S. Wightman on the representations of the canonical anticommutation and commutation relations.

An incident which took place in Copenhagen in June 1952 illustrates the situation in theoretical physics of that time. A select group of theoreticians discussed relativistically invariant, non-local field theories. The variational principle applied to these cases does not in general lead to an energy integral. It was the accepted opinion that such a conservation law would not exist. Arthur was the lone fighter, who saw the truth and defended it resolutely: the invariances under time translation must imply energy conservation.

Copenhagen was a meeting place for physicists. In the same year 1952, Walter Kohn and I worked there on the inverse scattering problem. Through Arthur we learnt from Lars Gårding about an all-important note by I. M. Gel'fand and B. M. Levitan in the Doklady Akad. Nauk. S.S.S.R. But we did not know Russian. Arthur rescued us. With his help and with the help of a dictionary we finally pieced together a word by word translation.

In 1955 I left Princeton for Zürich. My next contact with Arthur was indirect. It was in fall 1956. On my way back from the U.S. I stopped over in Göttingen, where I met with R. Haag, H. Lehmann, K. Symanzik, and W. Zimmermann. In a discussion I discovered a mistake in a preprint by Gunnar Källén on the three-point function in field theory. With great restraint (so it seemed to me) I communicated my observation to Gunnar – and obtained a most indignant reply, in which he defended his error. It turned out that Arthur was visiting in Copenhagen, and Gunnar thought he had his support. It matters little how the misunderstanding finally was resolved. It was only important that my ties with Arthur became strengthened. On March 29th 1957 he and Anna-Greta visited us in Bern. While the ladies toured the city, Arthur and I worked in front of a blackboard in my old Gymnasium: he explained to me his field theory. That was my initiation. In the early morning of the next day my second son Beat was born.

Res Jost