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Founding and developing the journal *Applied Physics* in post-war Germany

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Before World War II, most scientific results in physics were published in the German language. In the Nazi years, many scientists left Germany and settled, in particular, in the USA. Consequently, the scientific community switched to the English language after the war, and publishers in Germany then lost their dominance. Simultaneously, the average age of German scientists increased during those years. Although the younger generation studied on the basis of the German language, they slowly adopted the English language for publishing their research results. But as non-native speakers, dealing with international science publishers and publications in English were a challenge for them.

During those years (1961–1964) I was fortunate to have been awarded a NATO fellowship by DAAD (Deutscher Akademischer Austauschdienst) to further my education, allowing me to study at elite American universities in California, namely for 2 years at the California Institute of Technology and 1 year at Stanford University. Thereafter, I worked in industrial space-oriented laboratories. In 1970, W.L. Engl invited me to pursue a Dr.-Ing. Degree at the RWTH Aachen. At this time, I contacted Julius Springer-Verlag in Heidelberg to explore a German translation of the McGraw-Hill book *Introduction to Fourier Optics* by J.W. Goodman. I had met Goodman at Stanford University and assisted him in the development of this graduate textbook.

The negotiations, however, revealed that Springer was not eager to publish yet another German-language textbook, but was more interested in establishing a book program in English for the international market. My background and the experience acquired in the USA transformed the original negotiations into the "reverse direction", namely, I received a job offer. Julius Springer-Verlag hired me with the goal in mind for me to move from California to Heidelberg at the beginning of 1972 and to build up a physics book program in the English language.

It just happened that Springer-Verlag had discontinued the German journal *Zeitschrift für Angewandte Physik* shortly before my arrival in Heidelberg. In the meantime, this decision had already been recognized as a mistake, and the top management of Springer-Verlag (H. Götze und K.F. Springer) was anxiously looking for a way to mitigate the consequences. Discontinuing this established journal meant a loss of potential book authors and also of the associated connection to the German Physical Society (DPG). Therefore, although I was originally hired for the English-language book program, I was asked to first concentrate on this pressing matter. It was a lucky happenstance that, in those days, W. Buckel was President of DPG. He was a professor of physics at TH Karlsruhe (today called KIT), where I had studied for my Dipl.-Ing. Degree in the years after the war.

A short excursion into the topics of my research is useful here to set the scene. The fundamental concept of the laser/maser was theoretically conceived by Charles H. Townes and Arthur L Schawlow in 1960, and first demonstrated by Theodore Maiman at Hughes Malibu, CA, in 1967. These developments occurred just before I arrived at the California Institute of Technology in Pasadena. They triggered a surge at universities and other laboratories all over the USA. Scientists tried to explore and find applications for this new kind of light. Drawing on my background in TV picture-tube engineering from my work at Telefunken in Ulm, Germany, I proposed the replacement of the cathode rays in the RCA shadow-mask tube by lasers. Telefunken formulated for this idea the German Patent #1 193 166 (*Optischer Sender für mindestens zwei Farbkomponente*n), applied for on October 26, 1963 and awarded on January 20, 1966. But my main field of research during my stay at the Californian universities was diffraction theory applied to optical resonators for lasers. It was an active field enabling me to gather experience in publishing in various national and international journals.

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Thus, when unexpectedly confronted with the idea of developing a successor for the German journal *Zeitschrift für Angewandte Physik,* I was able to draw on those experiences as an active researcher. I put forward the name **Applied Physics** for the new Springer journal. Recalling my enthusiasm for publishing scientific papers, I proposed to the top management of the Julius Springer-Verlag that I would myself serve as the scientific editor of *Applied Physics.* This idea caused concern, since it was then generally unheard-of for the editor of a scientific journal to be an employee of the publishing company itself. The issue was ultimately resolved by the compromise that I would build up the Springer book program, as originally intended, and edit *Applied Physics* in my spare time from home! Only the correspondence connected with the publication of *Applied Physics* was to be handled by my staff at the Springer office. This solution offered me the possibility to develop my ideas, but of course it came at a cost to my family (wife and two little boys). With hindsight it is clear that I was engaged in two fulltime jobs (*Applied Physics* requiring almost as much time and effort as my entire book program), it was only thanks to my wife, who cared for and brought up the boys, that we achieved the balancing act of establishing the journal whilst still keeping the family intact.

It goes without saying that the founding and guiding of the new journal is not something I could have managed alone. H.-J. Queisser of MPI Stuttgart (later President of DPG) was an immense source for fruitful discussions in developing *Applied Physics* over the years, he became one of the Founding Co-Editors. Others were, for example, A. Seger of the MPI Stuttgart (one of the most cited scientists in those days), J.W. Goodman of Stanford University (today Honorary President of the Optical Society of America 'OSA'), K. Shimoda of the University of Tokyo (Japanese Person of Cultural Merit 2008), A. Benninghoven (Cologne), F. Kneubühl (ETH Zürich), T. Tamir (Brooklyn), H.P.J. Wijn (Philips Eindhoven), and H. Wolter (Marburg). Over the years, many other experts rotated as members of the editorial board, of whom a small selection is listed further below.

As already mentioned, *Zeitschrift für Angewandte Physik* has been discontinued before I joined Springer-Verlag, with the consequence that all subscriptions had been lost. *Applied Physics* had to start from scratch. This task, the building up of new subscriptions, became a tremendous job for Springer-Verlag. Simultaneously, it was a big challenge to convince authors to publish in a new, not widely circulated journal, and also to find internationally recognized experts to co-edit a new journal with only a nascent distribution. One of the ways, we helped to spread the word was through typewriter-composed advertisements prepared by my secretary and printed in Springer books and journals. Thanks to the support of colleagues from Springer-Verlag New York, issues of *Applied Physics* with their rapidly published articles were prominently displayed and given away at important scientific conferences in the USA and other international meetings.

With this increased visibility, *Applied Physics* grew in acceptance in the international community, and membership in the editorial board became attractive to highly recognized international scientists. This increased the options for a timely, high-quality peer reviewing of the manuscripts submitted from (all) around the world. Here is an incomplete list that reflects their stature and geographical diversity: C.A. Albrecht (Ithaca), S. Amelincks (Mol, Belgium), H.H. Andersen (Copenhagen), D. Bäuerle (Linz, Austria), S.N. Bagayev (Novosibirsk), M.H. Brodsky (IBM, and later director of the American Institute of Physics), W. Demtröder (Kaiserslautern), V. Dose (Garching), G. Eckhardt (Hughes Malibu, discovered the Raman laser), R. Gomer (Chicago), P. Hautojärvi (Espo, Finland), A. Hebard (Murray Hill, NJ), J. Heydenreich (Halle), Y. Horikoshi (NTT, Tokyo), E.P. Ippen (MIT, and President of OSA), H. Ibach (Jülich), A. Javan (MIT, inventor of the gas laser), W. Kaiser (Munich, pioneer of picosecond-pulse technology), U. Keller (ETH Zürich), M. Kikuchi (SONY, Tokyo), K. Kompa (Garching), A. Lahee (Heidelberg), H. Lüth (Jülich), M.B. Maple (San Diego), D. Mills (Irvine), R.Osgood (Columbia, NY), M. Razeghi (Evanston, IL), F.P. Schäfer (Göttingen, co-inventor of the dye laser), Y.R. Shen (Berkeley), F.K. Tittel (Houston), W. Welford (London), W. Weppner (Kiel), J. Wolfrum (Heidelberg), R.N. Zare (Stanford).

From the outset, as the prerequisite for achieving the goal of internationality, English was the language of publication. Originally, this was a challenge for the older generation of German scientists and, of course, for many other non-native speaking authors from around the world. Thus, I became personally engaged in language editing to improve the clarity and readability of the research articles. For example, at a conference on laser spectroscopy in Megeve (1975), I met the two Russian physicists V.P. Chebotayev and V.S. Letokhov, who had just published a book in Russian, and who showed interest in an English edition. I was able to convince them that a literal translation from Russian would not be the ideal solution. In those early days, scientific works by non-native speaker were frequently written in a rather verbose style and sounded more like a patent application: the text said little, but the conclusion claimed everything. Chebotayev and Letokhov instead started to submit their works to *Applied Physics* and found out that language editing not only improved the readability but also cleared up crucial points of the presentation. They quickly discerned the benefits of intelligent copyediting; we became friends, and they joined the editorial board of *Applied Physics* to help attract papers from colleagues. This fruitful cooperation lasted for about 15 years – benefitting not only the journal, but also my Springer book program. In 1978, Chebotayev and Letokhov

invited my wife and me to a banquet in Leningrad (today St. Petersburg). Later that same evening they took the overnight train to Moscow, and the next afternoon we saw them on Russian TV when Leonid Brezhnev awarded both of them the **Lenin State Prize for Science and Technology** in the Kremlin (in the Soviet Union at that time, the Lenin State Prize was established as a pendant to the Nobel Prize). The following evening my wife and I took the same overnight train and were greeted upon arrival in Moscow by the two prize-winners, giving us the opportunity to hold the golden **Lenin Medal** in our own hands!

Fast publication was one of the goals of *Applied Physics*. When the physicist Stefan Hell was once visiting Heidelberg, we met for a discussion. Hell was rather frustrated at that moment since an article of his, which he felt to be particularly significant, had just been rejected by a highly respected journal after a long back and forth. I suggested to Hell that he should summarize the essential results in a short article and submit it to *Applied Physics.* The article was accepted and published as a "Rapid Communication" [1] to assure the priority of publication for the authors. On October 17, 2014 Stefan Hell wrote me an E-Mail saying: "Ich war sehr froh, dass ich Sie damals getroffen habe, und Sie das damals publiziert haben. Es ist eines von drei fettgedruckten Papern in der Begründung des Nobelkomitees. ("I am glad that I met you back then and that you published this at the time. It is one of three papers emphasized by the Nobel Committee for Chemistry in their citation").

Before closing, I would like to give special mention to several members of the editorial board. R. Wiesendanger (Hamburg) was presented with the **Julius Springer Award for Applied Physics** in 2016, G. Bednorz (IBM Zürich), T.W. Hänsch (Munich and Stanford) and G. Mourou (Ann Arbor, MI) were awarded the **Physics Nobel Prize** in 1987, 1991 and 2018, respectively, and H. Walther (Munich) was decorated with the annual **Herbert Walther Prize,** inaugurated by the German Physical Society and the Optical Society of America in 2008.

Applied Physics was started with an emphasis on laser sciences for the reason previously outlined, but it gradually widened in scope. It was possible to track this using the "Physics and Astronomy Classification Scheme" (PACS) that had been developed by the American Institute of Physics and was possibly first applied to the 15-volume index of *Applied Physics.* This suggested that, in the intervening years, the coverage of *Applied Physics* has become so broad that it had been wise in 1981 to subdivide the coverage of volume **26** into a part **A** (Solids and Surfaces) and a part **B** (Photophysics and Laser Chemistry), both of them remained under my editorship. In this way two individual journals were developed using a uniform concept. When approaching retirement age, I stepped down from the dual editorship and placed the journals in the hands of younger co-editors: M. Stuke for part **A** (Material Sciences & Processing) and F. Träger for part **B** (Lasers and Optics) starting with volume **62**. The rest, as they say, is history.

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Reference

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