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Professor Jan Stecki

Prof. Jan Stecki was born in 1930 in Warsaw. He obtained the MSc degree in 1952 from Warsaw University and joined the staff of the Physical Chemistry Chair. His first papers were on the thermodynamics of solutions and of phase equilibria. This theoretical work, supervised by Prof. W. Świętosławski, resulted in a Ph.D. degree in 1959. The year 1959/60 he spent as a postdoctoral fellow in the group of Prof. I. Prigogine at the Free University of Brussels, where he developed with A. Bellemans a statistical theory of ionic interactions in dilute electrolytes, which was the basis of his habilitation thesis defended in 1961. Earlier in 1961 Prof. Stecki obtained a permanent position in the Institute of Physical Chemistry of the Polish Academy of Sciences. In 1962 he left for the University of Southern California, where the collaboration with Professor Howard S. Taylor resulted in papers devoted to statistical mechanics of irreversible processes and kinetic theory of gases. In 1964 Prof. Stecki returned to join the Laboratory of the Institute headed at that time by his good friend W. Malesiński, where thermodynamics of nonelectrolyte solutions was the main subject of research. In 1969, after a sudden death of Malesiński, he took over the head of this Laboratory. He and his coworkers continued the research initiated by Malesiński and also started new subjects, reflecting Stecki's own interests, firmly attached to statistical physics. Already in his early work on ion solvation and on ion-ion interactions, the solvent was not treated as a dielectric continuum, but as a Gibbs ensemble of molecules. It was summarized in *Adv. Chem. Phys*., **6**, 413 (1964). In statistical mechanics of irreversible processes he made a successful formal comparison of the theory of the Brussels group (P. Resibois, R. Balescu, headed by I. Prigogine), with the Bogolyubov theory, then being developed by the Uhlenbeck group (with H.S. Taylor, *Rev. Mod. Phys*., **37**, 763 (1965)). These results were then extended and systematized by the Brussels group.

Research in the new field of liquid crystals, introduced by Stecki, led to new results on phase diagrams, new stability conditions, new spinodal lines, and pretransitional effects near critical lines; in 1979 Prof. Stecki proposed a new statistical theory of the Frank elastic constants, which became a classical theory in this field. The theory of the virial series for adsorption on a flat solid surface was the first – and the definitive statistical approach to that subject. The role of the Henry constant was exposed and new virial coefficients were defined. The "second" adsorption virial coefficient was calculated for some simple models.

Since 1980's his main research are the structure and correlations in the interfacial region between coexisting fluid phases. In the numerical and analytical studies, correlation functions in the Ising and in the solid-on-solid models were obtained. Further, exact analytical results for the interfacial, wetting, and critical behaviour in confined geometry of the two-dimensional Ising model were important contributions to this subject.

Later he studied interfaces in three-dimensional fluid mixtures and between the liquid and the vapour phases by the method of Molecular Dynamics, obtaining unique results for correlation functions in the interfacial region and the capillary-wave contribution to the structure factor. Further studies were devoted to extension and improvement of the theory of these ubiquitous capillary modes. In 2000, in his latest work, he extended these studies to systems with weak surfactants and began a comparison of "normal" interfaces with membrane-like self-assembled interfaces.

Prof. Stecki is the author or co-author of over 130 scientific publications and of a textbook ("Statistical Thermodynamics", PWN 1970, Warsaw, in Polish). Much of his research was done in collaboration with foreign scientists. He was invited as a Visiting Professor to Bristol, Cornell, Trondheim, and Copenhagen Universities. He supervised 25 Ph.D. theses, and many of his former students, including three with habilitation degree and three full professors, continue and develop research initiated by him. He was a member of editorial boards of scientific journals: Advances in Chemical Physics, Molecular Physics and the Journal of Chemical Thermodynamics.

The occasion of his 70-th birthday was celebrated on 29th of September 2000 at the Institute of Physical Chemistry of the Polish Academy of Sciences in Warsaw with an international seminar attended by: J.S. Rowlinson from Oxford, B. Widom from Cornell, R. Evans from Bristol, S. Toxvaerd from Copenhagen, P. de Gottal from Mons, S. Sokołowski from Lublin, P. Pierański from Poznań, A. Koliński from Warsaw, as well as his colleagues and coworkers from the Institute. Some of the papers in this special issue are based on the talks presented at this seminar.

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