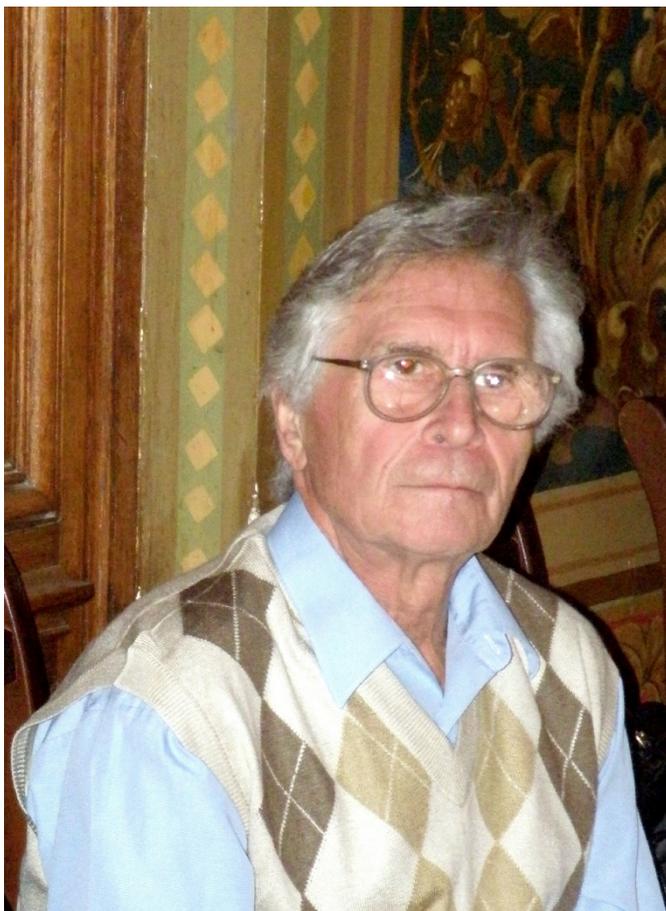


ERON AERO, GERARD MAUGIN AND MECHANICS OF GENERALIZED CONTINUA

E.L. Aero and G.A. Maugin never worked together, but a lot of things unite them. The generalized continua, physical mechanics, nonlinear waves – here are the keywords of that general that was done by them in all years of terrestrial life which were released to them.

The work of the young scientist Eron Aero, published in 1960 in collaboration with his



supervisor, Professor E.V. Kuvshinsky and dedicated to the derivation of the basic equations of the theory of elastic media with rotational interaction, inspired the scientific community and aroused a keen interest in the mechanics of generalized continua.

The work of the young scientist Gerard Maugin, published jointly with his scientific adviser, Professor A.K. Eringen, contributed to the development and deepening of this interest.

The interest in new models of continuum media greatly contributed to the need to return to the foundations of mechanics of generalized continua, namely, to the theory of the E. and F. Cosserat brothers (1909): to their book devoted to the missed chapter of the classical continuum mechanics – the rotational dynamics of particles in

continuum medium.

We note, in this connection, that E.L. Aero and, independently of him, J. Eriksen gave the first example of a specific application of the Cosserat continuum to the theory of liquid crystals.

Both E.L. Aero and G.A. Maugin considered mechanics, first of all, as a branch of physics, and only then, as a part of applied mathematics or a part of the theory of engineering calculations.

E.L. Aero organized the Laboratory of Micromechanics of materials and headed it almost for 30 years in the Institute of Problems in Mechanical Engineering of the Russian Academy of Sciences. He considered one of his main scientific interest essentially nonlinear micromechanics of media with a varying periodic structure. It is not correct to say that he developed this mechanics, he created it, and his students and followers develop it today. One of the important parts of the mechanics of E.L. Aero is the theory of nonlinear waves in solids undergoing a cardinal rearrangement of the crystal structure.



The interest of G.A. Maugin to the study of wave processes is deep and diverse. If the problem "Relativistic Continuum Mechanics and Waves", he related to his past scientific interests, then the problems "Linear and nonlinear surface waves in deformable media", "Nonlinear localized waves in solids with microstructure", "Lighthill - Whitham wave mechanics" he considered as the scientific interests of the present and the future.

E.L. Aero and G.A. Maugin left us in one year: E.L. Aero died in July 2016, and G.A. Maugin – in September 2016. At the end of June 2017, the annual International Conference "Advanced Problems in Mechanics" was held, within the framework of which the Mini Symposium "Nonlinear wave dynamics of generalized continua" was organized, dedicated to the memory of E. L. Aero and G.A. Maugin. The works presented at this Minimosium were included in the basis of this issue. They contain the papers of the closest students and colleagues of E.L. Aero on the Institute of Problems in Mechanical Engineering of the Russian Academy of Sciences (St. Petersburg), and they are devoted to highly nonlinear dynamic processes in media with complex structure. The direction associated with the development of the theory of generalized continua is also presented in the papers of the Nizhny Novgorod scientific school. Authors from these two scientific groups were lucky to work with both E.L. Aero, and G.A. Maugin, and to publish joint works with them. Other papers of the issue reflect the latest achievements in the nonlinear dynamics of crystals, wave solutions of nonlinear equations of mechanics, micropolar materials and waveguides.

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