Paul Felix Neményi: 1895–1952

C. A. Truesdell

Naval Research Laboratory, Washington, D. C.

THE NAVAL RESEARCH LABORATORY mourns the death of Paul Felix Neményi on March 1, 1952. He was head of the Theoretical Mechanics Section at the laboratory and one of the country's principal authorities on elasticity and fluid dynamics. Dr. Neményi was born June 5, 1895, in Fiume, at that time a part of Hungary; his degrees were Dipl. Ing. (Budapest Institute of Technology, 1918), Dr. Ing. (Berlin Institute of Technology, 1922), Habilitation. During a life of travel and change he had held positions at many institutions of learning here and abroad. He leaves a son, Peter, a student of mathematics at Princeton University.

Neményi's lifelong interest was pure mechanics. He worked mainly in five fields: static elasticity, fluid dynamics, hydrology and hydraulics, organization of mechanics, methods of research.

The first of his three major discoveries in elasticity was a new singularity method (*1*). A number of rather complicated singularities, obtained by confluence of simple ones, are classified in terms of their influences in accordance with a duality principle. Neményi's statement of this generalization of Maxwell's reciprocity theorem is:

> The influence lines, influence surfaces (or in general the influence fields) of any influence in the elastic solid, can be represented by deflection curves, deflection surfaces (or in general by the displacement field) of the same solid, if acted upon by a singularity *dually corresponding* to the influence in question.

Possibly this principle, which has not attracted the attention it deserves and which has never been put into mathematical form, could be made the basis of a general integration procedure. Neményi was content to illustrate its usefulness in special problems concerning beams, plates, and slabs.

His interest in analogies, which he collected and always planned to organize into a treatise on the method, may well have begun with his own discovery that the streamlines of any potential flow of an incompressible fluid may serve also as stress trajectories for a plane elastic system. He first approached the problem through his method of singularities (*2*). Later (*3*), he gave an analytic proof of this beautiful result in the reformulation now called "Neményi's theorem": *Given any net of isothermal curves, there exists a five-parameter family of plane stress systems for which these curves are stress trajectories.* Phrased thus in terms of pure elasticity, it suggests another question: To what extent is the solution of a problem in continuum mechanics characterized by an associated trajectory system? This subject attracted Neményi throughout the rest of his life. For a certain class of problems in plane elasticity, it was settled in a paper written with Van Tuyl (*4*); a more general elastic case is considered in a paper written with Sáenz (*5*); and related problems were solved by Prim and Sáenz.

His third major discovery in elasticity is the reduction of the general extensional theory of thin shells of revolution with meridian $y = (f)x$ to the remarkably simple equation

$$\frac{U''_n}{U_n} + (n^2 - 1)\frac{f''}{f} = 0.$$

The functions U_n, called "Neményi's stress functions," yield at once the nth Fourier coefficients of all stress resultants. This fact has been made the basis of an analytic theory for this class of shell problems, and to the equation itself, which should be called "Neményi's equation," some subsequent literature has been devoted. Neményi discovered the result by an intricate analysis in graphical statics (*6*); later an analytical derivation was obtained (*7*).

All this theoretical work illustrates the inverse or semi-inverse approach, of which Neményi was a strong advocate. He summarized the field in a fine organizational summary (*8*). In papers written jointly with Prim (*9*) he applied this method to obtain numerous exact solutions of the nonlinear equations of gas dynamics, many of them representing rotational flows of nonuniform total energy. He named and pointed out the importance of "generalized Beltrami flows," in which the reduced velocity is a Beltrami field, and obtained many examples.

His scientific knowledge extended well beyond the subjects of his researches, and the organization and scope of his numerous expository articles give them permanent value—e.g., *"Selbstspannungen elastischer Gebilde"* (*10*); *Tragwerke auf elastisch nachgiebiger Unterlage"* (*11*). He was a leading authority on fishways (*12*) and the morphology of rivers (*13*). His *Wasserbauliche Strömungslehre* (*14*) was the first book to include an exposition of fluid flow through porous media. Other surveys deal with water power, soil mechanics, theory of structures, transport of granular materials, and filtration. He left a draft for an extraordinary book on fluid mechanics, emphasizing the basic principles valid for all types of fluids and the consequent variety of their application to aerodynamics, hydraulics, meteorology, oceanography, and other fields. The introductory chapter is an analysis of the historical development of the main ideas and concepts, both in theory and in experiment, drawn entirely from the original sources. It will be completed and published as a memoir.

Experimental work always interested him, and by inserting into a stream a lens-shaped rotatable tube,

punctured by a single hole and connected to a manometer, he was able to make rapid measurements of velocity direction along with speed and pressure (*15*).

Neményi's interest and ability extended to several nonscientific fields. He collected children's art and sometimes lectured upon it. One of his last works is a brilliant review of the *Encyclopaedia Britannica* (*16*).

For any person with a genuine question in mechanics, Neményi was always willing to supplement his great knowledge and deep understanding by hours of library work. Since 1946 many of his ideas have been worked out by his pupils: (in temporal order) C. Truesdell, R. C. Prim, A. Van Tuyl, A. W. Sáenz, R. Toupin, and J. L. Ericksen.

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News and Notes

International Symposium on Anthropology

THE Wenner-Gren Foundation International Symposium on Anthropology was held June 9–20 at the foundation's headquarters in New York. Of the 80 participants, 39 were anthropologists from the United States, 14 from other fields in this country (biology, anatomy, biochemistry, psychiatry, history of medicine, philosophy, linguistics, folklore, art, and the Department of State). The 27 foreign members represented 18 countries and the United Nations: 14 Europeans, seven Asians, four Latin Americans, and one Australian.

The symposium was based on 50 inventory or background papers, each reviewing the present state of knowledge in a field in, or relating to, anthropology, and outlining the problems arising from this knowledge. The papers were prepublished and circulated among the members, in every case before the opening of the symposium, and in most cases from ten to thirty days before participants left their homes to attend the gathering.

The symposium itself met for ten working days, on each of which two sessions were held, aggregating six hours of discussion on problems raised by the inventory papers or developed during the meeting. Each meeting was presided over by a pair of co-chairmen, one American, one foreign.

On account of the range of subject matter, covering all aspects of anthropology and many in adjacent fields, it is impossible even to attempt to summarize the deliberations or findings in a few paragraphs. Those who are interested may, however, obtain copies of the session-by-session program, including the list of participants and titles of basic inventory papers, by request to the Wenner-Gren Foundation for Anthropological Research, 14 East 71st St., New York 21.

The symposium was the idea of Paul Fejos, director of research of the foundation, who broached it to the writer. They jointly submitted it to a planning group consisting of Wendell Bennett, Harry Hoijer, Clyde K. Kluckhohn, David Mandelbaum, Duncan Strong, S. L. Washburn, and, after his availability, Ralph Linton. This group formulated both the program and the technique of the execution; A. L. Kroeber acted as president of the symposium. Except for some minor changes caused by unexpected and unavoidable cancellations, the group also agreed on the participants and the allocation of their functions as writers of papers, cochairmen, discussants, or editors. This selection was made partly on the basis of general professional distinction, partly on the basis of specialized competence in particular fields, partly to ensure maximum international participation.

The proceedings of the symposium will be edited by Loren Eiseley, Irving Rouse, and Carl Voegelin in two volumes. The first volume will consist of the 50 underlying inventory papers and will appear in the fall of this year. The second volume will contain a record of the discussions during the symposium and is to be ready by the end of 1952.

The symposium presented an unusual combination of features, such as its coverage of a whole discipline, wide internationalism, tight planning to ensure coordination of individual efforts in a general scheme, maximum time for discussion, and speedy publication. The gathering was exceptionally successful in provoking new ideas and attitudes.

A. L. KROEBER

Wenner-Gren Foundation International Symposium on Anthropology