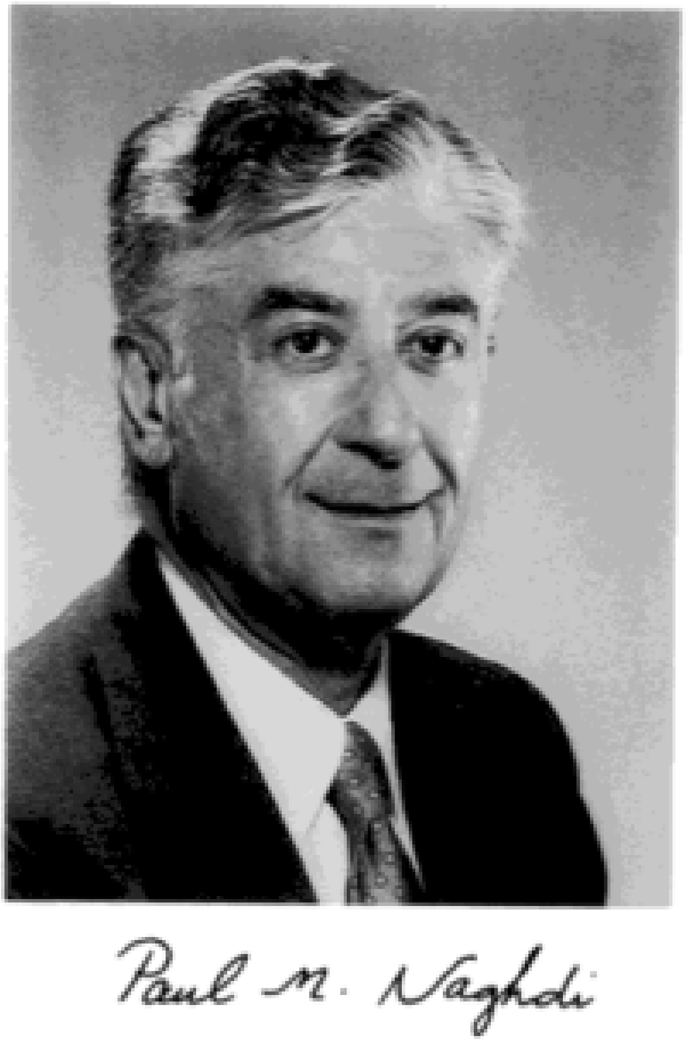

Professor Paul Mansour Naghdi (1924 – 1994)

From Wikipedia, the free encyclopedia: http://en.wikipedia.org/wiki/Paul_M._Naghdi

Paul Mansour Naghdi (March 29, 1924-July 9, 1994) was a professor of mechanical engineering at University of California, Berkeley.

Awards

- George Westinghouse Award of the American Society for Engineering Education (1962)
- Honorary doctorate, National University of Ireland (1987)
- Honorary doctorate, Université catholique de Louvain (1992)
- Berkeley Citation (1994)
- Timoshenko Medal of the American Society of Mechanical Engineers in 1980
- member of the National Academy of Engineering in 1984

References

Paul M. Naghdi, Acceptance Speech upon Receipt of the Timoshenko Medal

Paul M. Naghdi (1924-1994), in "Theoretical, Experimental, and Numerical Contributions to the Mechanics of Fluids and Solids-A Collection of Papers in Honor of Paul M. Naghdi," edited by James Casey and Marcel J. Crochet, Journal of Applied Mathematics and Physics (ZAMP), Volume 46 Special Issue,1995, pp. S3-S47.

Acceptance Speech upon Receipt of the ASME Timoshenko Medal, November 18, 1980, Chicago, Illinois

President Jones, Ladies and Gentlemen:
I would like to express my deep appreciation and gratitude for this honor, which has a very special meaning for me. Even more so, because I have personally known nearly all the previous recipients and I feel deeply honored to be included among them. I have been fortunate over the years to have met a number of distinguished people in our field (some of them are previous recipients of the Timoshenko Medal) who have been very helpful to me. Perhaps this is an appropriate time to mention a few of these people and reminisce a little.

I met Stephen Timoshenko, the first recipient of the Timoshenko Medal, when I was a graduate student at Michigan. In the late 40’s and 50’s the Department of Engineering Mechanics at the University of Michigan, as part of its graduate program, offered extensive, advanced courses in mechanics during summer school. I understood then that this arrangement of offering graduate courses during the summer was initiated by Timoshenko in the early 30’s when he was a professor there. In fact, during the summer of 1949, when I first met Timoshenko, he was a Visiting Professor at Michigan and he taught a course on the theory of plates. As you might expect, the number of people enrolled in the course was quite high – approximately 100. He was a kind person and also I recall that when someone asked him how he would grade, he could not understand how anyone could get less than an A.

I first met Norman Goodier, an early recipient of the Timoshenko Medal, when I was an undergraduate student at Cornell. As a senior in Mechanical Engineering, I took his graduate course on the theory of elasticity (I think it was called applied elasticity). Later when Norman Goodier was a professor at Stanford and I moved to Berkeley, we saw a lot of each other and became good friends. He was one of the warmest people I have ever known. We got together two or three times each year for technical discussions that were both enjoyable and inspiring for me. We had very different ways of thinking about the same subject even though we generally reached the same conclusions.

Another recipient I got to know when I was a graduate student is Sydney Goldstein. I was fortunate to have taken two courses in fluid dynamics from him when he was a visiting professor at Ann Arbor. He was a witty and stimulating teacher in the classroom with a strong sense of commitment toward his subject. He has been an instructive leader in mechanics education and research.

One of the first meetings I attended after receiving my Ph.D. was the first U.S. National Congress of Applied Mechanics in Chicago in June, 1951. I arrived there on a Sunday afternoon at the old Stevens Hotel (I think the current Conrad Hilton is the same hotel). I went to the coffee shop and found myself sitting next to Ray Mindlin. He didn’t know who I was, of course, but I recognized him, introduced myself and took advantage of the situation to ask him some questions on the theory of elasticity. He was delighted and seemed to take an interest in a young person. In fact, our discussion lasted for more than an hour. During that time I learned a great deal and got many hints that kept me busy for several months in connection with a course that I was teaching on elasticity theory.

I met Albert Green, another Timoshenko Medalist, in 1955 when he was on a lecture tour in the U.S. Later, I saw him at several international meetings and we hit it off rather well from the start. When we invited him to come to Berkeley as a visiting professor, he immediately accepted and, from my point of view, that visit led to a very exciting and profitable collaborative effort.
Another person who has been very helpful to me is Dan Drucker. When around 1952 I was first trying to set up an experiment in plasticity, Dan spent a whole day with me sharing his experiences and alerting me to the difficulties that one has to be aware of in conducting any experiment.

Now I should like to make some remarks pertaining to the teaching of mechanics and the impact of teaching on research and that of research on teaching. In the early part of my career I was rather critical of the engineering curricula of the time, including those pertaining to theoretical and applied mechanics. As the years have gone by, I have acquired more understanding. I have developed an increasing sense of admiration and respect for the engineering profession and its standards as compared to numerous other professions with which I am familiar. In recent years, I have revised my thinking about engineering curricula, especially in mechanical engineering, including the part that pertains to undergraduate and graduate instruction in mechanics. I have become highly impressed with the academic discipline and standards of the rather balanced curricula we offer to engineering students, in comparison with somewhat one-sided curricula offered by a number of other professions. Indeed, during the past few years I have often felt that other professions, such as medicine and law, could profit by examining their curricula in the light of those in engineering in general, and mechanical engineering in particular. Of course, despite the high standard and sense of commitment of the engineering profession, there is always room for further growth in striving for excellence.

Applied mechanics is an integral part of engineering but is also more than that. As an interdisciplinary subject, mechanics in its broadest sense serves not only one area but in fact all areas of engineering and a number of other areas in physical sciences as well. As teachers and leaders of mechanics, we have a responsibility to instill a sense of excitement, commitment and urgency within the profession that will set an example for younger people in the field. Quite often nowadays, one does not come away from a technical meeting with a feeling of urgency and commitment. Ideally one should come away from such meetings with a feeling that there are important and exciting problems that must be solved, contributing toward both our understanding of mechanics and the well-being of society.

Since the inception of the Applied Mechanics Division of ASME 53 years ago, the Division and its Journal have contributed much to ASME and the profession by encouraging the pursuit of mechanics and by creating a desirable identity for the field. I hope it is not presumptuous of me to make some comments about our national identity. Most of you probably know that mechanics enjoys high stature comparable to that of other basic disciplines such as physics and chemistry in Western Europe and the USSR – but the same is not true in this country. It is time for us to face the fact that we have a crisis of identity – not so much from our point of view, but from outside the discipline. For example, a large number of universities, including my own, do not have Departments of Mechanics and the visibility of mechanics is absent. Usually, mechanics faculty is a subgroup in a particular department or is diffused in two or more departments. This aspect of a name in the title of a department may not be important to most of us, but the lack of visibility creates a problem from time to time. I was told recently by responsible people in a government agency, which supports a significant portion of mechanics research in this country, that they pattern their organization after universities and in most of our universities mechanics has no visibility. It is perhaps time that the mechanics community, whether in industry or in universities, attempt to effect some changes which would at least add mechanics to the names of the existing departments.

It also seems desirable that the community as a whole be tolerant in accommodating different points of view. In fact, such diversity of viewpoints is likely to create the atmosphere of excitement necessary for vitality of the field. By different viewpoints, I do not mean lowering the standards of our profession or disregarding what we all agree to be good mechanics based on sound physical ideas. On the contrary, I am suggesting that, while maintaining high standards and good taste, different viewpoints and approaches are the essence of scientific progress; and, in fact, such different viewpoints are even more important in engineering and applied sciences than in purely basic sciences. Indeed, the history of science and engineering shows that different approaches to the same topic have led to enlightening results.

Let me mention two examples that illustrate the importance of different perspectives. When I was a graduate student, the only topics that one learned in mechanics consisted of linear elasticity, hydrodynamics and classical rigid body dynamics and the only books to study from, in addition to Timoshenko's books, were by Love, Lamb and Whittaker. In the nearly 30 years that have elapsed, the whole picture has changed and great progress has been made in the context of nonlinear theories. But often this has not affected the teaching of mechanics at the beginning graduate level. Many of us these days find it much better to first teach finite deformation of elastic solids before embarking on the linear theory of elasticity (and this is an example of different viewpoints).

An important change that has occurred in engineering over the past 20 years is our ability to perform huge calculations by means of the computer. From the point of view of applied mechanics, this is a good thing indeed, since it allows us to deal in a fruitful manner with the rather complicated, realistic constitutive theories which may be necessary to describe some technological processes. I do feel, however, that in emphasizing the use of computers, not enough attention is being paid to the correct formulation of problems, especially when relatively simple analytical solutions are possible. I have had graduate students come to me to ask for help with their problems when all they really wanted was a system of equations that could be put on a computer. This is a serious matter in the case of engineers. If any group should understand the physical basis and the limitations of a theory, it is certainly the engineers. To have taught them that they could go on and use equations without questioning how the equations were acquired is a serious flaw in our recent educational endeavors.

On occasion one hears about the amount of mathematics that should be required in engineering curricula. Not too long ago, I heard a talk in which the question was raised of how much mathematics should one teach in order to ruin a good engineer! Of course, these words were presumably spoken in jest, but I imagine that many people may have come away with the wrong impression. I do not believe the question to ask is how much mathematics should be taught; that is similar to asking how much English should be taught. Each is essential for our profession and the answer is clear. You teach enough of these in a balanced engineering program so that the graduating engineer knows how to read and write English clearly and is able to understand mathematics well enough to function and to communicate.

I indicated earlier my belief that the community should develop more tolerance. Let me elaborate a bit more on this. Suppose I told you that it is possible to develop a theory – essentially an ordinary beam theory of Bernoulli-Euler type – that would be applicable not only to metallic structures as in problems of stability of elastic columns or vibrations of elastic beams, but also to other media such as fluid jets. On the basis of recent experiences, I know that a good many people in solid mechanics (not to mention fluid dynamicists) would be skeptical and would not look kindly on this. However, I recently came across a paper by Weber written nearly 50 years ago about an important stability problem of a viscous jet. If you examine this paper, you will see that Weber was only discussing elementary beam theory that is slightly modified and slightly dressed up. The results, which are quite good, have gained wide acceptance in the fluid dynamics community and have led to the definition of the so-called Weber number. But his method of derivation, which is basically a direct approach to the subject, seems to be largely ignored. Incidentally, this work by Weber is an example of how relatively simple mechanics can successfully serve engineering. Yet, I have not seen the problem mentioned or discussed in any elementary or intermediate level book on fluid dynamics. Imagine how exciting it would be for undergraduates at the sophomore (or junior) level to learn in the same course that the same elementary principles (momentum conservation and continuity equation) can be applied to such different but equally important engineering problems as the stability of an Euler column and the stability of a viscous jet. Here, I should like to borrow from a recent past chairman of the Division, Ronald Rivlin. In his words,

"Forward motion can continue only if the Division maintains its receptivity to new ideas and points of view."

In conclusion, I would like to express the wish that the sense of community that one feels here tonight could be felt more often and could become the basis for us in the mechanics community to be more supportive of each other in the future.

Thank you for listening.