

A Look to the Future

HERE we are, all slaving wretches running to keep up, in the year nineteen hundred and seventy-nine, 20 years from the last of the fifties when (as we were told by the Today Program), Christmas presents were anywhere from 100 to 200% cheaper. Economically, it is shattering to look both backward and forward. As usual, I prefer to escape such realities as inflation, the unsettled world, teeming poverty, and our expanding government bureaucracy spinning exponentially spiraling confusion, and to retreat to vistas in which all sorts of marine craft move through an inviscid fluid producing only such small disturbances as to yield first-order effects! Such Utopian seas are now being filled with viscous fluid, and nonlinear effects are faced up by frontal assaults employing finite difference and finite element numerical procedures. Alas, it seems necessary to bid at least a partial farewell to the idealized world wherein adroit mathematics has produced elegant* solutions. What then is the future of ship hydrodynamics?

An engaging look to the future of ship model basins was given very recently by Marshall P. Tulin in a paper entitled "Ship Model Basins-The Next 75 Years" (delivered at the Diamond Jubilee Symposium of the Versuchsanstalt für Wasserbau und Schiffbau, Berlin, November 20-22, 1978). To assist him in this difficult prediction process, Tulin sought responses from 13 colleagues in different corners of the world to a set of well-posed questions.

Briefly looking backward, Tulin recounted a most interesting commentary by the great Leonhard Euler in 1773:

From good Models in Miniature which represent Vessels exactly as they are, very important Experiments upon the Resistance of Vessels may be very usefully made; and which is so much the more necessary, as the Theory upon the Subject is still very defective.

(It is interesting to note that the "Theory upon the Subject" is still suffering from grave defects which are slowly giving way to numerical methods applied to "exact" representations of the physics of the phenomena.)

Tulin reviewed the origin of the model towing tank by William Froude who discovered the law of similitude or scaling of hull-generated waves in 1887 and was commissioned by the British Admiralty to build the first enclosed model basin at Torquay to solve *all* the problems of prediction of ship powering for 5000 pounds sterling!

*I once worked for a Chief Naval Architect who, upon reviewing my report, flatly informed me that the word "elegant" could be applied only to describe the appearance of an aristocratic, beautifully gowned woman and hence could not be used in reference to a mathematical result!

Space does not permit an adequate recounting of the replies to Tulin's four basic questions:

"Which new tasks will model basins undertake in the long range?"

"Which old tasks will be taken over by the computer?"

"For which tasks will the basin and the computer be used together to supply better answers?"

"What changes in equipment and techniques can be contemplated?"

Those responding were, understandably, more comfortable in making more near-term predictions (~25 years) as the development of experimental model facilities has been strongly conditioned by the character of the vessels required by the shipping industry and the world's navies. Pervading the responses was a strong feeling that many of the traditional, day-to-day experimental tasks will be taken over by the computer. This should shift the character of experimentation to examination of flow details by laser and yet-to-be-discovered techniques. It also is predicted that model basins will become more and more involved in the design of ships and offshore structures and entire marine systems.

Tulin's summary emphasizes that the largest and most active basins will become increasingly more widely diversified in the following areas:

- genuine multi-disciplinary research and system studies
 - specialized design
 - full-scale trials and measurement
- and even
- hardware system development

He also predicts a great increase in the number of model basins by 2053 with consequently growing competition to serve the needs of ocean engineering endeavors in the years ahead.

It is hoped that this brief preview of Tulin's interesting paper, which will be published in a near-future issue of *Schiffstechnik*, will spur our readers to contribute a plethora of forward-looking manuscripts to enable the *Journal of Hydraulics* to play a vigorous part in the forthcoming evolution of ship science and ocean engineering.

We thank our contributors and reviewers (listed on the next page) for their dedicated efforts during the past year. I am personally indebted to Associate Editors, Professor Donald M. Layton and Dr. Denny R.S. Ko and to the Publications Staff of the AIAA for their enthusiastic and effective support. A Happy, Prosperous, and Productive New Year to all our subscribers!

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Editor-in-Chief