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Short Note

Introduction to Harlow's scientific memoir

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In physics and mathematics, the names we give important contributions remind us of their origin, such as Schrödinger's equation or the Lax equivalence theorem. In scientific computation, this custom is sometimes followed, as in the Metropolis algorithm or Godunov's method, and sometimes not. For example, the names of the MAC (Marker-and-Cell) and PIC (Particle-in-Cell) methods sound more like the product of a corporation than an invention of an individual. Nevertheless, these widely used methods, and many others besides, were contributed by Francis Harlow, as described in the Special Paper, 'Fluid Dynamics in T-3...', which follows. As is Sergei Godunov's earlier paper [1], Frank's memoir is a first-person account and personal in tone. It successfully conveys a sense of a time when scientific computing was more a dream than a reality, and opportunities for new discoveries lay in every direction.

Frank has chosen to recount the activities of T-3, a group he formed in the Theoretical Division of Los Alamos National Laboratory, as it used large-scale computation to solve fundamental fluid dynamics problems. The group's publications did much to introduce the wider scientific community to the potential of computational fluid dynamics. Calculations such as free-surface flow resulting from a dam breaking, and of a Karmann vortex street attracted a wide audience, and laboratory reports taught how to do it themselves. Frank's paper also conveys the scope of T-3's contributions, which span compressible and incompressible flow, free-surface and multifluid flow, and turbulence. To all of these, Frank and his group made pioneering contributions.

Applied to Frank, unusual is an understatement. He is singular. I have known him for almost 40 of the 50 years he has been a staff member at Los Alamos, so mine is not an entirely objective point of view. However, even a completely detached observer would be struck by the breadth of his interests. His paintings line the walls of the Laboratory, his books on Southwest Indian pottery fill a shelf, and his monograph on brachiopods, in which he identifies 24 new species and 3 new genera, is still the definitive reference on the lowest parts of the Pennsylvanian period. He has grown orchids, learned silversmithing, and stopped riding a Harley because it was not fast enough. He knows an incredible number of people in all walks of life by their first name, yet can be met in person only in Los Alamos because he refuses to travel. It all seems to work for him, because he brings to his work an undiminished energy and focus.

Reference

[1] S.K. Godunov, Reminiscences about difference schemes, J. Comput. Phys. 153 (1999) 6–25.

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