

of a long working day, if he detected only the suspicion of an error or novelty.

Most (19) of the papers contributed analyze different aspects of solid-propellant combustion:

- Five papers are dedicated to modern problems of flame structure for a variety of solid-propellant compositions including pure components (ADN, CL-20, HNF, AP) and mixtures based on nitramines, AP, and AN.
- Two papers examine the difficulties of aluminum combustion in solid propulsion.
- Four papers focus on pressure-driven intrinsic burning stability and/or frequency response function (two theoretical efforts including condensed-phase chemical activity and two experimental investigations by ultrasound or magnetic flowmeter).
- Two papers treat modeling of the new HNF propellant (steady and transient).
- Two papers investigate some special solid rocket motor operations (propagation of entropy waves and underwater ignition).
- Four papers discuss peculiar problems of solid-propellant burning (flame propagation in heated-gas airbag inflators, implementation of Automatic Control Theory to understand solid-propellant burning, use of solid propellants in electrical propulsion, and a survey of capacitive methods to measure burning rates).

Solid-propellant themes are further considered in four technical notes: a survey of experimental studies on solid-rocket-motor high-

frequency instability in Russia, suppression of solid-rocket-motor combustion instability by metallic additives, an approximate solution of the hyperbolic heat equation for the heterogeneous-solid-propellant gas-phase ignition theory, and underwater incineration of heterogeneous solid propellants.

The remaining six papers, some from former colleagues at Princeton University, deal with pyrolysis in hybrid propulsion, vaporization of liquid fuels and propellants, internal ballistics of nozzleless rocket motors, combustion thermodynamics of metal-complex oxidizer mixtures, flammability limits of diffusion flames, and combustion instability in a lean-premixed dump combustor.

The variety of international authors and topics contained in this collection proves the effectiveness of the pioneering work of Summerfield in energetic-material combustion. From the initial seed on solid propulsion planted by him, a large plant has grown with branches projecting in many directions: hybrid propulsion, electrical propulsion, metal burning, air bags, gas generators, pyrotechnics, incineration. . . . Whenever possible, connections of the current investigations with Summerfield's pioneering work have been noted.

★ ★ ★ ★ ★

Here we all are, Professor Summerfield, burning the shining flame of the memory of your inspiration and leadership of the Princeton SP Group!

Luigi T. DeLuca, Robert S. Brown, Boris V. Novozhilov
18 July 1999

A Standout of the Millennium

IT is fitting that this issue of the *Journal of Propulsion and Power*, the final issue of this millennium, should be dedicated to the memory of Professor Martin Summerfield, since he was an innovative leader in many fields of propulsion. In addition, he made numerous valuable contributions to publications of technical literature. The editorial (p. 737) and biography (p. 739) mention many of his technical contributions. However, it must be noted that Martin came to Princeton 50 years ago to become the Editor of the *Princeton Series*, and produced 12 books by the Princeton Press on high-speed flow. He also served as Editor-in-Chief of the *Journal of the American Rocket Society*, and was the President of the American Rocket Society during the negotiations for the merger with the IAS that led to the formation of AIAA. Since I was a student of his at the time, many of our discussions were interrupted by phone calls regarding this merger; his role in its success has never been adequately recognized.

The idea for this special issue came from a seminar organized by Luigi DeLuca, one of the many distinguished leaders trained by Professor Summerfield. It was noted that many of the participants had either been educated at Princeton or had visited the Solid Propellant Laboratory there to meet with Martin. As a result, this issue

contains papers from that and a later seminar, as well as contributions by students and cohorts at Princeton. Luigi and another long-time friend, Bob Brown, volunteered to serve as guest editors. Needless to say, I took them up on their offer immediately! In addition, Boris Novozhilov agreed to assist with the many Russian authors. I want to express my sincere appreciation to all three of them at this time.

The breadth of the influence of Professor Summerfield can be seen in the range of authors (from eight countries!) who have contributed papers to this issue, as well as in the range of topics of the papers. It is obvious that he was a leader in many fields for the second half of this century.

I have attempted to recognize Luigi, Boris, and Bob for their efforts in assembling this special issue in memory of Martin Summerfield. However, their job required the assistance of all those who served as reviewers. Listing of their names below is only part of the appreciation for their role.

R. H. Woodward Waesche
Editor-in-Chief
Journal of Propulsion and Power

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