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If We Could Land a Man on the Moon...

by Marsha Freeman

Rocket Science

By Alfred J. Zaehring (with Steve Whitfield)

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Paperback, 216 pp., \$20.95

Since the successful Apollo 11 mission of astronauts Neil Armstrong and Buzz Aldrin in July 1969, people tackling difficult (but achievable) challenges are often admonished, "this is not rocket science," or "you don't have to be a rocket scientist," indicating that nothing was as difficult as landing men on the Moon.

In June 1947, Alfred Zaehring and a handful of colleagues in the Detroit Rocket Society began publishing a journal called *Rocketscience*. By doing so, they introduced a word, and more important, a concept, into the lexicon, which would become sensible only a few years later, when "rocket science" created the age of space exploration.

Zaehring had his first encounter with rockets during World War II, when he watched German V-1s and V-2s used against London. He had experimented with rocket propulsion as a teenager, tested various propellant materials, and put on demonstrations for his high school chemistry club. At the end of the war, Zaehring was in the U.S. technical military group to whom the German rocket pioneers, led by Wernher von Braun, surrendered to the U.S.

With an appreciation for the groundbreaking work of the German space pioneers, after the war Zaehring enlisted the participation of Hermann Oberth, Wernher von Braun, Eugen Saenger, Krafft Ehrlicke, and other German visionaries in his *Rocketscience* journal, to write and help translate seminal work in this new field. A decade before the first rocket had successfully orbited the Earth, the journal dealt with the fundamentals of orbital, planetary, and manned space flight, and future technologies, such as nuclear propulsion. During its five-year span of publication, *Rocketscience* was read around the world,



by a burgeoning network of space enthusiasts.

The Detroit Rocket Society, like similar amateur groups in New York and Cleveland, carried out rocket tests, and actual flights, of liquid- and solid-fueled rockets. Alfred Zaehring continued a career in chemistry and worked on research related to rockets in industry, and in parallel, continued writing and editing. His book, *Soviet Rocket Technology*, was released on April 12, 1961, the same day Yuri Gagarin became the first man to orbit the Earth.

Now into his 80s, Alfred Zaehring has maintained an active interest in space developments, and in this new book, he takes a retrospective look at how far we have come, and where we have yet to go.

Energy and Economics

The starting point of Alfred Zaehring's evaluation of various rocket technologies, the which he thoroughly reviews and explains in his book, is the cost of the energy required. He compares the energy cost of various modes of terrestrial transportation to what is available in rocket technology, concluding that until the price per pound of bringing material to space can be reduced, little progress will be made in making flight into space as common as travel on and around the Earth.

Zaehring reviews the span of technologies that the military and NASA have taken only halfway steps to develop, over the past

50 years. These include ramjet applications, nuclear propulsion technologies, magnetic lift systems, and other novel concepts. But because of the cost of bringing such revolutionary propulsion technologies to fruition, these projects were all abandoned.

"Its clear that the state of the art in space propulsion systems is in direct proportion to the amount of money that has been spent on research and development," Zaehring observes in his book. "Expenditures to date may seem excessive, but in relation to the overall U.S. Gross Domestic Product, or even just compared to military R&D spending, it has been only a drop in the bucket."

In a radio interview with Dr. David Livingston in "Space Show" on Jan. 4, Alfred Zaehring proposed that the "next quantum factor is transportation" in ultimately enabling the large-scale exploration of space. Systems should be developed which allow the hypersonic transport, in "90 minutes of people and cargo across the Earth, including the military and tourists," he stated. Such a program, dubbed the "Orient Express," was initiated by President Ronald Reagan in the early 1980s, but funding was never provided to conquer the scientific and technical challenges.

The 1990s brought us no closer to the goal, Zaehring said, noting that former NAA Administrator "Dan Gouldin's policy of 'faster, better, cheaper,' seems to have overlooked quality, safety, and integrity." He finds it foolish to outline a program to go back to the Moon and then to Mars, as President Bush has done, without making the budgetary commitment necessary to develop the new transportation capabilities that are prerequisite to get us there.

Mr. Zaehring is an author with a long and personal history of involvement with the array of technologies he describes in this work. His book is very readable, and as it is geared for the interested layman, you don't have to be a rocket scientist to benefit from and enjoy it.