

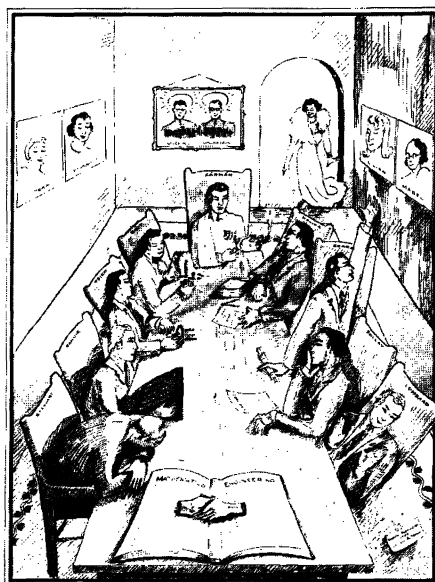
BOOK REVIEWS

Orbits of a Rocketeer

Thread of the Silkworm. IRIS CHANG. Basic-Books, New York, 1995. xx, 329 pp. + plates. \$27.50 or Can\$38.75.

Iris Chang calls Tsien Hsue-shen, the subject of this fascinating short biography, the Chinese Wernher von Braun. And not without reason—he was the genius of Communist China's missile and space programs. But her comparison is even more appropriate than she seems to realize. As her book shows, Tsien too switched countries and ideologies, working enthusiastically on weapons for very different political masters. A student of the famous aerodynamicist Theodore von Kármán, Tsien played a crucial role in American rocket programs of the 1930s and '40s and helped found the Jet Propulsion Laboratory in Pasadena, California. He almost became an American citizen before being falsely accused in 1950 of having briefly been a Communist. After being held under virtual house arrest for five years, he was deported back to China in 1955 in what was probably the greatest act of stupidity of the entire McCarthyist period. The People's Republic now has nuclear missiles capable of hitting the United States, in large part because of Tsien.

As a result of her command of Mandarin and her efforts to ferret out information about, and acquaintances of, Tsien in both countries, Chang has created a more complete picture of his life than has ever existed before. *Thread of the Silkworm* is also written with verve and style, making it a highly readable as well as solidly researched example of popular history. Unsurprisingly, it also has some of that genre's flaws: inadequate references, a tendency to write for the sake of effect, and technical and factual errors. The latter are mostly unimportant, but it should be noted that the V-2, not the WAC Corporal, was the first man-made object to leave the



"A 1940 cartoon by Frank Malina depicting members of GALCIT," the aeronautical laboratory at the California Institute of Technology. Tsien (third from left) "is shown as indecisive about whether to stay in the United States as he flips an egg marked 'US' on one end and 'China' on the other." Theodore von Kármán sits at the head of the table. [From *Thread of the Silkworm*; courtesy of the Archives, California Institute of Technology]

Earth's atmosphere and that China was not the only country to launch a live nuclear warhead on a relatively untested missile—both the United States and the Soviet Union did it earlier.



"Tsien demonstrating the flight of a theoretical jet in class at Caltech, 1949 or 1950." [From *Thread of the Silkworm*; Hearst Newspaper Collection, Special Collections, University of Southern California Library]

Chang cannot be blamed much, however, for the book's biggest problem. Despite her best efforts, Tsien remains a distant, almost unreachable figure whose motivations are often mysterious because he refused to be interviewed, was aloof even during his two decades in America, then became the servant of a totalitarian regime. The book ends on a depressing note, as Chang describes Tsien's com-

plete self-abasement to the most absurd aspects of Maoist politics. Yet none of this should be allowed to obscure the contribution she has made to the history of rocketry in the United States and China.

Michael J. Neufeld

National Air and Space Museum,
Washington, DC 20560, USA

Inside ESA

Launching Europe. An Ethnography of European Cooperation in Space Science. STACIA E. ZABUSKY. Princeton University Press, Princeton, NJ, 1995. xiv, 261 pp. \$49.50 or £14.95.

The European Space Agency (ESA) was established in 1975—although its roots go back another decade—to promote cooperation among the various European nations in space research and technology. Over the last two decades ESA has established a solid reputation for high-quality space technology and successful space missions, most notably in its regular launch of satellites on the European-built Ariadne rocket. Not surprisingly, ESA and its predecessors have been seen as proof that the disparate cultures and countries of the European community can indeed be united in pursuit of a common objective.

Stacia Zabusky, however, is less interested in the results of cooperation than in knowing of what exactly it consists. More specifically, she wants to know how the assorted scientists and engineers in ESA's Science Programme cooperate (she conducted her field research in the Space Science Department at the European Space Research and Technology Centre), why they often deny that there is cooperation, and why they continue to cooperate when it is evidently such a difficult process.

Cooperation, she suggests, is not the consequence of political agreement or administrative fiat. Neither politicians nor bureaucrats bring about cooperation in ESA, notwithstanding their statements endorsing this outcome. Instead, cooperation emerges from the daily work of scientists and engineers, even though much of this work is riddled with conflict. Consider, for example, the combination of a spacecraft with its scientific payload (such as a space probe). Scientists favor the biggest and most complex payload possible, to maximize the amount of data to be gathered, whereas engineers worry about the design and construction of the spacecraft and view the payload as inessential technology. The paradox of cooperation, in Zabusky's analysis, is that it is produced by these disputes.



Vignettes: Literary Marksmanship

A microbiologist who publishes an article in *Science* or *Nature* knows that at least 90 percent of the readership will not be in a position to read it critically. But she will also have the satisfaction of appearing on the dais alongside luminaries from other fields, in plain view of university colleagues from remote departments who will be suitably impressed by her association with *their* big names—a reciprocal exchange of reputation that allows scientists to taste the pleasures of purely literary fame.

—Geoffrey Nunberg, in *Future Libraries* (R. Howard Bloch and Carla Hesse, Eds.; University of California Press)

At the point in history when Darwin lived, it was still very much required for scientists to be interested in writing *as writing*. It is not simply that they could tell better “stories”; nor is it true that they were allowed greater spontaneity in their use of language, a free hand at invention. It is more that the repertoire of materials and techniques, the latitude of expressive possibility, the toolbox of authorship, in other words, was far larger than that allowed scientists today. Building a variety of different discourses and using a variety of literary tactics was part of what was demanded and expected, by readers and writers both. Scientific writing simply partook of the greater literary field. Much technical writing, after all, was still aimed at the educated public generally: both reader and author were therefore entities of greater scale than today.

—Scott L. Montgomery, in *The Scientific Voice* (Guilford)

Cooperation thus depends on conflict—it is through asserting their divergent interests that ESA members find the basis for unity.

Decisions are the concrete expressions of unity, and, in perhaps the best chapter of the book, Zabusky examines these “quintessentially political moments in working together” (p. 126). Decisions terminate disagreement; they involve the exercise of power and control, and they confront the seemingly egalitarian community of free-thinking engineers and scientists with the reality of organizational hierarchy. The question Zabusky poses is how the participants come to terms with the contradiction between their culture of equality (and conflict) and the requirement that they accept authority. She argues that they do so in two ways. First, they have developed a “discursive system of evasion,” which allows them to claim a kind of moral superiority for their work compared to the work of others; for example, scientists disparage the work of administrators as mere “politics,” in contrast to their own concern with “science.” Science, in this view, is valued because it is both technical and nonhierarchical. Second, participants emphasize alternatives to hierarchy—the circulating of authority and the sharing of responsibility. These imply decision-making through consensus, a voluntary commitment to group objectives, a willingness to trust others to meet their commitments, and a willingness to share blame.

Finally, Zabusky argues, what keeps the

scientists and engineers participating in this process of extracting cooperation from conflict and maintaining equality in the face of hierarchy is that they are engaged in a “sacred journey” (p. 197) to a higher, more transcendent form of cooperation than the pragmatic version that characterizes their daily routine. Sacred cooperation is the ultimately unattainable domain of “real work,” where all that matters is the technical imperatives of data collection and analysis and the mundane intrusions of politics and hierarchy are kept out.

Zabusky has written a subtle and penetrating account of an important form of cooperative activity. In reading it, however, three reservations occurred to me. First, it seems that the prose is more difficult than it needed to be; frankly, the book is a tough read. Second, I wondered whether the process of cooperation at a more culturally homogeneous organization like NASA would look any different from that analyzed here. Third, I was unconvinced by the notion of sacred cooperation as the motivation for the participants’ continued collective efforts. Zabusky admits that this is an imputed motive rather than one that has been empirically identified; but perhaps the participants’ true motivations, like their everyday work, were more practical.

William Finlay

Department of Sociology,
University of Georgia,
Athens, GA 30602, USA

Aussi Notable

Scientifically Yours. In two volumes. Technique et Documentation (Groupe Lavoisier), Paris, 1995. Paper, F320. *Le Courrier de la Communication Scientifique en Anglais: 300 Modèles de Lettres.* LYDIE NAVARD, ATRICK NAVARD, and GERALD FULLER. xvi, 352 pp. *400 Tests d'Anglais Appliqués à la Communication Scientifique Internationale: Avec Corrigés.* LYDIE NAVARD. viii, 119 pp., illus.

This pair of books is intended to help francophone scientists make their way by mail in the English-speaking world. The authors (a teacher of English to students at the Ecole des Mines, a research director at the Centre National de la Recherche Scientifique, and a professor at Stanford University) have anticipated many kinds of social and professional situations that may arise in the pursuit of a scientific career and in “Le Courrier” present a total of some 300 model letters in English for dealing with them. The models are categorized according to *études supérieures*, early postgraduate affairs (“le candidat”), relations with potential and actual employers, meeting arrangements, publication, *projets de recherche*, commercial relations, social activities, and business trips (*déplacements professionnels*), with a detailed table of contents (in French) and two indexes to facilitate finding the right letter for the purpose at hand. Most of the letters are designed for relatively routine transactions—responding to invitations, inquiring about positions, submitting manuscripts, ordering equipment, and so on—but some knottier matters such as rebutting reviewers’ comments (“Obviously, he either did not carefully read our text or he did not understand its scientific content”) and demanding co-authorship are also represented. The letters are perhaps somewhat stiffer in style than the typical letter from an English-speaking scientist, nor are they entirely free of infelicities or outright errors, but they are clear and succinct and should be serviceable not just for French users but for others who know some English but are uncomfortable composing science-business correspondence in the language. The second volume of the pair, arranged according to the same ten categories as the first, consists of a series of multiple-choice tests requiring the reader to supply the idiomatic phrases missing in a variety of statements needed in common situations: “This course will end [at/with/by/into] a general discussion.” The section of “corrigés” at the end gives the correct answers with French translations of the sentences, and there are indexes categorized as grammatical and vocabulary.

Katherine Livingston