diversity of male reproductive strategies found within some species of bees and wasps. The stimulating paper by R. Barrass on the survival value of courtship in insects, specifically *Nasonia* wasps, is a gem of lucidity and economy of style.

The discrimination by scorpionfly females, the silence in some male crickets, and the advantage the male praying mantis gains by being eaten by its mate can all make sense once the uncompromising and inevitable evolutionary logic of mating is clear. This logic is repeatedly explained in the different papers. In some of the papers the data are sufficient to disclose underlying patterns. Others report preliminary research results the meaning of which is still highly speculative. Still others are general and theoretical. In particular the leading paper by Otte traces the historical development of sexual selection theory, and G. Borgia discusses sexual selection and the evolution of mating systems, drawing heavily on the vertebrate, particularly bird, literature. The concluding paper, by R. D. Alexander and Borgia, explores the interesting question of why the asymmetrical "male" and "female" strategies evolved in the first place.

The volume contains highly interesting, if not original, material for the naturalist as well as for the theorist who is willing to sift through its sometimes wordy, poorly edited pages. It documents some of the invented tricks of one-upmanship insects exhibit in the highly competitive game of the selfish genes.

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Cases of Starvation

Hunger Disease. Studies by the Jewish Physicians in the Warsaw Ghetto. Translated from the Polish by Martha Osnos. MYRON WINICK, Ed. Wiley-Interscience, New York, 1979. xiv, 262 pp., illus. $15. Current Concepts in Nutrition, vol. 7.

"The history of the Warsaw Ghetto can be divided into two periods—[the 18 months] before July 22, 1942 and the period following. The first period was characterized by general hunger; the second period by massive death. It is not surprising, therefore, that when the second period started, the [research that was in progress] on hunger stopped. The hospitals and laboratories were destroyed and, most important, the human element, our workers and the subjects of our work, were gone. Work was stopped but not liquidated. . . . The accumulated scientific material was studied again and organized. This is the work being published now. It is an 'unfinished symphony' full of meaning, written by Jewish doctors in 1942. . . . 'Non omnis moriar,' 'I shall not wholly die.' "

These passages are taken from the introduction to this book, written in October 1942 by Dr. Israel Milejkowski, the head of the Department of Public Health, Jewish Council in Warsaw.

The report of the research, smuggled out of the Warsaw Ghetto to non-Jewish colleagues, hidden underground until the end of the war, and subsequently published in Polish and French (*Maladie de famine: recherches cliniques sur la famine executées dans le ghetto de Varsovie en 1942*, E. Apfelbaum, Ed., American Joint Distribution Committee, Warsaw, 1946), is now at last available to the English-speaking world. The book, a collection of seven chapters by eight physicians, is readable and technically easy to understand—a tribute to the authors' clarity and medical acumen and to the translator's linguistic skills and scientific knowledge.

Those who work among the malnourished become inured not just to the presence of a dehumanizing disease but even more to the injustices of its causes. Even such inurement, however, prepared me ill for the emotions evoked on discovering the French edition and again on reading this English translation a decade later, for the investigators and patients in the Warsaw Ghetto were victims of an injustice all the greater because it was willed. The book describes starvation, with 43,000 deaths over 18 months, and mentions the even more lethal deportation during which 250,000 deaths occurred in two months. A further reflection of the brutality of that deportation is that a number of the manuscripts that might have been chapters in the book were lost in 1942. Unsuspected at that time were the further 800,000 deaths of the survivors of famine and deportation in concentration camps and gas chambers. Twenty-two of the 28 investigators, including the initiator of the project, Milejkowski, were dead by 1946. (Apfelbaum, the editor of the Polish and French editions of the book, was the only senior investigator to survive the Holocaust, and he died before the manuscript was published.)

However, it is not the circumstances in the Ghetto but the way the opportunity was grasped that makes this a remarkable treatise. The scientific work was motivated above all by the most urgent need to apply science to alleviate the debilitating symptoms of starvation and to postpone or even cheat death. The questions addressed are clearly and concisely stated. The approaches that were taken to attain answers are often ingenious in the face of unpropitious circumstances. Clinical cases and descriptions are not lacking. Besides permitting differential diagnoses these studies identified the most urgent questions and the most promising approaches. The issues addressed range from immunology (why was tuberculosis so quickly lethal?) through vitamin, carbohydrate, fat, nitrogen, and energy metabolism and pulmonary, cardiovascular, and renal physiology to hematology and ophthalmology (what caused the cataracts in those suffering from starvation?). This information is complemented by sparse but well-focused autopsy and histological data. The result is the most comprehensive description of the clinical and physiological effects of severe starvation in the literature.

The American editor of this edition includes a preface and comments on every chapter. The purposes of these often extensive inserts are not clear. The preface explains the history of the document but leaves one inadequately informed about the circumstances of the work and about the antecedents and subsequent fates of this unique team of medical scientists. The editor's comments appended to the chapters may have been intended to place the findings in the context of today's science. If that was the intention it failed, except occasionally in areas of the editor's specific scientific competence or that of the two other American physicians who also contributed comments. Even then the lack of any references makes this attempt of doubtful utility—especially when starvation with edema is confused with kwashiorkor (protein-deficiency disease), which has a quite different pathophysiology. At worst there is a pundit's air of saying again what had been said better by the original authors and of interjecting opinions as facts without references that could be checked to differentiate the good from the bad. This contribution seems slim justification indeed for the American editor's name appearing on the title page in lieu of the names of those responsible for the work.

The Polish manuscript as translated in this edition attains the objectives of its authors. It is both a witness to great heroism and an exceptional scientific docu-

ment containing unique primary data on a disease that although still common is rarely studied. The document belongs on the bookshelf of every scientist and physician interested in nutrition. Should we not wait, however, until its senior authors are recognized on the cover and title page before purchasing it?

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Stellar Rotation

Theory of Rotating Stars. JEAN-LOUIS TASSOUL. Princeton University Press, Princeton, N.J., 1979. xvi, 508 pp., illus. Cloth, $40; paper, $15. Princeton Series in Astrophysics.

Soon after the foundation of the theory of gravity, Newton as well as Huygens realized that the earth should be flattened near its poles as a consequence of rotation. This flattening, which was indeed measured in the first half of the 18th century, gave rise to the brilliant work of Clairaut and Maclaurin on the shapes of rotating gravitating fluid bodies—later on perfected by Laplace, Legendre, Poisson, Jacobi, and others. The theory of rotating stars finds a solid foundation in these works and forms one of the most beautiful applications of classical mechanics and mathematical physics in modern astrophysics.

It was not until our century that the great importance of rotation for the structure, shape, and evolution of celestial bodies of all kinds, ranging from planets to stars and galaxies, was fully realized. To paraphrase Kip Thorne's words about the role of gravity, one might say that "rotation plays the role of midwife as well as undertaker in the universe." At the birth of stars the large excess of angular momentum of interstellar clouds causes contracting clouds to become rotationally unstable and to fragment, in a way still poorly understood, to form double and multiple systems of stars, which by far outnumber the single stars (if any such stars exist at all). The very existence of the planetary system and its harmonic structure are nowadays believed to be a direct consequence of the large excess of angular momentum in the nebula from which the solar system condensed. At the end of the life of a star a few times more massive than the sun, angular momentum conservation causes its collapsing core to become an extremely rapidly rotating neutron star, spinning some 30 or more times a second around its axis, like the Crab pulsar, and emitting some hundred thousand times the energy flux of the sun purely by the dissipation of rotational energy.

It is surprising to realize that, apart from a symposium volume published some ten years ago, there has been no book devoted to the subject of stellar rotation. Tassoul's monograph fills this gap. Although, as the title shows, the book is largely theoretical, it begins with a clear and up-to-date review of the available observations, with a complete list of references. Similarly, in the subsequent theoretical chapters, where possible full attention is given to the comparison of theory with the observations. This makes the book valuable for observers and theoreticians alike and also makes it very well suited as a basis for a graduate or advanced undergraduate course on the subject.

The theoretical part of the book leads from the basic hydrodynamical equations for rotating fluid bodies and the techniques for solving them to the most advanced aspects of the subject, such as fission theories and the formation of binaries. It covers the theories concerning meridional circulation, differential rotation, the effects of rotation on the positions of stars in the Hertzsprung-Russell diagram and on stellar evolution, oscillations and stability of rotating stars, rotation of white dwarfs and neutron stars, and the effects of rotation and tidal interaction in close binaries and dynamo theories for the generation of stellar magnetic fields. Each chapter is followed by a list of key references. Author and subject indexes together with five appendixes complete the book. The appendixes list basic constants and equations and tabulate functions that are useful to have at hand, such as the shapes of Maclaurin spheroids and Jacobi ellipsoids.

The clarity of the presentation—even of the most complicated topics—demonstrates the didactic skills of the author as well as his love for the subject, a love that he knows how to convey to his readers. I expect this beautiful book to become a classic, useful for many generations to come. Apart from astronomers and astrophysicists, planetary scientists, meteorologists, and geophysicists will find here much of interest to them, notably in the chapters on differential rotation, tidal interaction, dynamo theories, and basic hydrodynamics.

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