correspondence were published, and, more generally, that the entire Bohr correspondence were readily available. It also reminds one of one of the great desiderata of modern intellectual history: a biography of Niels Bohr. Perhaps the 1985 centennial celebration of his birth will be a stimulus for such an undertaking.

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Geophysics

Nutation and the Earth's Rotation. Papers from a symposium, Kiev, U.S.S.R., May 1977. E. P. FEDOROV, M. L. SMITH, and P. L. BENDER, Eds. Reidel, Boston, 1980 (distributor, Kluwer Boston, Hingham, Mass.). xvi, 622 pp., illus. Cloth, $34; paper, $21. International Astronomical Union Symposium No. 78.

The earth's variable rotation has interested astronomers, mathematicians, and geophysicists for at least the last 200 years. That this interest has been maintained for so long follows from the planet's nonrigid behavior when subjected to external and internal forces. Thus the motion not only is unpredictable, it also provides some insight into the global nature of these forces and into the nature of the earth's response to them. Discussion of the earth's rotation is conveniently and traditionally focused on one of three aspects: the rotation in space, that is, the precession and nutation; the motion of the instantaneous rotation axis with respect to the earth's crust, that is, the polar motion; and the variations in the speed of rotation about this axis, that is, the changes in length of day. This subdivision is due partly to the different observational techniques employed in studying the different aspects and partly to the properties of the equations describing the motion.

This book of symposium proceedings is concerned mainly with the first component, and in particular with the forced nutations. The forced nutations are the small periodic oscillations superimposed upon the precessional motion of the rotation axis about the pole of the ecliptic. They are the consequence of periodic variations in the gravitational torques exerted by the moon and sun on the nonspherical earth. To an adequate approximation these motions can be described by rigid-body theory, but small discrepancies between observations and such a theory do exist, mainly owing to the earth's fluid core. That the observations of nutation terms contain information on the structure of the earth's interior was recognized by Kelvin in 1876, but in general the geophysical information to be gleaned from such observations is more limited than what may be deduced from the other rotation components. For that reason geophysicists, apart from some notable exceptions, particularly Jeffreys, have not given the nutations much attention.

The interest of astronomers in these rotational motions is largely a consequence of their efforts to establish a precise lunar and planetary ephemeris, an interest recently renewed by the possibility of measuring lunar and planetary motions with unprecedented accuracy by means of laser ranging and long-baseline radio interferometry. The volume under review reflects this interest in that many of the papers deal with the analysis of the astronomical observations and the estimation of the amplitudes of the principal nutation terms. It appears from some of the reported discussions that the emphasis at the meeting was largely on establishing a set of nutation parameters to be used in conjunction with theories so as to establish consistent ephemerides. If the resolutions passed at the meeting and published at the end of the book are an indication, a consensus on "best values" was indeed reached. But no error estimates are given, and these decisions are only of limited geophysical use.

In addition to the forced nutations, the earth has two free nutations, of which the Chandler wobble is the best known. The other free nutation is a nearly diurnal motion introduced by flow in the core past the mantle. These nutations, perhaps more properly grouped in the polar motion category, receive some attention in the book, particularly in papers by F. A. Dahlen and M. L. Smith, who discuss the increase in period compared to rigid body rotation due to the presence of the oceans and core and to the elastic yielding of the mantle. It has long been recognized but is not always remembered that these polar motions have a counterpart in the motion of the rotation axis in space and that the latter is much amplified if the polar motion is retrograde and nearly diurnal. This is the case for the free oscillation introduced by the fluid core, and the amplitude of the motion in space should be about 400 times that of the motion with respect to the crust. Several papers discuss the astronomical evidence for this oscillation, and the general conclusion appears to be that if it exists its amplitude relative to the crust must be small indeed, less than 5×10^{-4} arc second. Even the long-baseline radio interferometry methods discussed in a useful paper by W. H. Cannon and J. L. Yen will be taxed beyond their promise if this oscillation is observed.

The most complete geophysical discussion dealing with the nutation is a paper by T. Sasao, S. Okubo, and M. Saito, who have computed the nutation for a realistic earth model that takes into account the mantle elasticity, a stratified fluid core, and dissipative coupling of the core to the mantle motions. The paper clarifies and updates the important work published by M. S. Molodensky in 1961.

Taken together, the papers present in a summary way—many of them are really little more than abstracts—a status report on research in this field some three years ago. The papers are of variable quality, and many have a certain déja vu air about them, for the publication of the proceedings postdates the actual conference by three years, a number of the papers have already been published or updated in a more extensive form elsewhere, the papers present arguments that have been voiced on many similar occasions, and there has been a proliferation of conferences on similar subjects.

Specialists interested in aspects of the astronomical data may find useful contributions in this volume, but for a more general audience it is indeed of limited value. The latter will benefit more from studying relatively recent papers by Rochester, Jensen, and Smylie (*Geophys. J.* **38**, 349 [1974]) and Smith (*ibid.* **50**, 103 [1977]) and requesting reprints of the better papers in this volume.

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Genetics in Russia

Animal Genetics and Evolution. Papers from a congress, Moscow, Aug. 1978. NIKOLAY N. VORONTSOV and JANNY M. VAN BRINK, Eds. Junk, The Hague, 1980 (U.S. distributor, Kluwer Boston, Hingham, Mass.). x, 384 pp., illus. $99.

The publication of this book is a signal event in the history of genetics. That its contents are scientifically rather unexciting is a detail that most geneticists will overlook. For these are papers that were presented at the 14th International Congress of Genetics held in Moscow in 1978. That such a congress was assembled in the Soviet Union at all is a remarkable example of the unsinkable spir-

it of scientific inquiry, and the present book, pedestrian as it is, stands as proof that political repression of scientific discovery does not succeed, even if continued for some years and backed by the full power of the state. The great Russian geneticist Vavilov, who died in detention in Siberia shortly after the first purge under the ascendancy of the charlatan Lysenko, has always been recognized around the world as a leading pioneer in agricultural genetics. That one of the three organizing bodies of the 14th Congress is called the "All-union N. I. Vavilov Society of Geneticists and Breeders" is clear evidence that considerable healing has taken place.

Much to the relief of the international community, genetics in Russia appeared to make a recovery, albeit a slow one, from Lysenkoism, which essentially collapsed in 1964 with the fall of Khrushchev from power. Thereafter, genetical reports from the Soviet Union began to make sense again, and in 1965 the National Science Foundation provided a grant for the publication of continuing English translations of the leading Russian journal, *Genetika*. The decision to hold the 14th Congress in Moscow did not meet with anything like unanimous approval in international circles, yet all signs indicated that the political heat was off the science. Most felt that after 16 years it was time not only to make a new start but also to recognize the courage of those Russian geneticists who had risked everything by resuming their scientific work.

The attempt to hold a normal international congress in Moscow was, unfortunately, not successful. As August of 1978 approached, many invited Western geneticists withdrew from the symposia and from the congress. The causes of these withdrawals were various, but there was an undercurrent of relatedness. Despite protests from the West, Orlov and Scharansky were sent to jail for their roles as proponents of human rights; anti-Semitism in the Soviet Union was again in the public eye; and, perhaps most serious of all, visas for some important geneticists were not forthcoming, a situation that seemed to make a travesty of an "international" meeting.

In view of all these events, certain curious properties of the present book can be understood. Forty papers have been put together under one cover as volumes 52 and 53 of the leading Dutch journal *Genetica* (not to be confused with the Russian *Genetika*). All papers are in English although the co-editors are Russian and Dutch. Although printed with the usual elegance of the publisher, Dr. Junk, the papers are presented in alphabetical order by author's name. This studied lack of favoritism results in a chaotic lack of organization; the impression given is that of a regular issue of a scientific periodical.

As might be expected, about half the authors are from laboratories in the Soviet Union, and it is delightful to see these papers published together in a Western language. The preface states: "The heart of the volume is made up by reports of Symposium S 16 ('Problems in evolutionary and population genetics') . . . and of Session C 11 ('Animal cytogenetics and karyosystematics')." I don't know about session C 11, but, as an invited speaker at symposium S 16, I received a letter dated 3 January 1978 that listed 12 participants who had accepted invitations, along with the titles of their papers. Only five of these papers appear in this book, and four of them are from nations of the Eastern bloc. The rest of the volume is made up of contributed papers taken from various other sessions in animal genetics at the congress. Little evolutionary emphasis can be discerned in any of these papers. One surprise is the remarkable interest in Russia in chromosome counts and banding techniques, especially as applied to mammals. Well over half the papers deal with such cytogenetics, and this collection is an important feature of the book. Only one author, however (from Venezuela), has seen fit to mention the great seminal work in his field of the Israeli scientist Eviatar Nevo on the mole rat, *Spalax*. The lack of an index makes the job of gleaning facts of this sort a difficult one. Moreover, the problem of presenting references from the Cyrillic alphabet has not always been successfully dealt with. A considerable deciphering job remains to be done if these citations are to be used as an introduction to the Russian literature.

In addition to the work on vertebrate chromosomes, there are about six papers dealing with insects, two with isozymes, and two with DNA. The last present melting curve comparisons for vertebrates. Both are from Russian laboratories, and the results are discussed in a manner that manifests full appreciation of the Western literature. Nevertheless, they stand alone in the volume.

Scattered through the book there are six papers dealing with theoretical topics. The three Western authors all have something interesting to say. Ayala makes a good case for equating regulatory genes and polygenes; Holmquist has recast chromosomal evolution in a new and promising context; and Ohno gives a short and elegant review of the newer developments in mammalian sex determination and differentiation, with special attention centered on the extraordinary case of the H-Y antigen. Of the other papers, that of Golubovsky from Novosibirsk has the greatest sweep. He ties in the older classical Russian literature on outbursts of mutability with his own recent work and the remarkable findings of Green, Kidwell, and others in the West. It is an exciting and sophisticated paper, joining East and West.

Genetics is alive but not very well in the Soviet Union. That the grand rapprochement that was to have taken place in 1978 fell on hard times in no way reflects discredit on the editors of this strange volume. We must be thankful to them that this much was salvaged for those, including the writer, who chose not to attend. It is safe to say that all concerned hope for a better day when communication across the morass of politics is somehow easier.

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Some Data on Book Prices

Authors, reviewers, and readers often express concern over the prices of books. To provide an indication of recent prices of books of interest to scientists, Table 1 gives average prices for the books reviewed in *Science* over the last few years, with separate calculations for the technical books in the natural sciences (representing about 60 percent of the total).

All the data given here represent hardcover books except where books were available only in paperback. For the books available in both forms that were reviewed in 1980, the average difference in price between the two editions was $19.67, the range of differences being $8

Table 1. Average per-volume prices of books reviewed in *Science*, 1977–1980. Books priced only in foreign currencies were excluded from the calculation.*

Category	Price (dollars)			
	1977	1978	1979	1980
All books	27.85	29.65	30.33	35.52
Technical books in natural sciences	32.70	36.04	39.18	42.61

*Some of the data here were originally published, with further discussion, in *Paleobiology* **6** (4), 377 (1980). I thank Janet Kegg for help with the calculations.