presence of the imponderable fluid *caloric*—the matter of heat. This prevailing view of the gaseous state had two supporting pillars: the orthodox Newtonian view that the particles were stationary and that the required repulsive forces existed between them, and second, the caloric theory itself, which was rooted in the doctrines of fire of such natural philosophers as Boerhaave and Cleghorn and which was formed and championed by Lavoisier and Laplace. Fox gives a detailed account of the evolution of the calorist theories and pays particular attention to the zenith of their strength and popularity in the works of such giants of Continental physics and chemistry as Laplace, Carnot, and Avogadro.

Fox's account increases in drama and in pace when the groundworks are completed; the decline and fall of the caloric theory of gases are the meat of the issue. He sees the rather long decay of the caloric view as linked inseparably with the faltering of the influence of Laplace and the Laplacian hypothetico-mechanical style of science on French physics. The assault was led by Fourier and by such younger men as Dulong, Arago, Petit, and Fresnel; Fox sees them (with the possible exception of Fourier) as attempting to find a middle way between Laplacian orthodoxy and an ultimately sterile positivism, the latter a symptom of the interregnum created by the increasing weakness of the former. The author concludes that the disintegration of this brilliant group of younger physicists after 1830 may well have been responsible for France's loss of scientific leadership in the middle and late 19th century.

This book would have been immeasurably improved by a fuller treatment of what Fox terms "Laplacian physics," the decline of which plays so important a part at the dénouement. But Fox has written an engaging book, demonstrating in it that he is neither daunted by the "big issues" nor fearful of touching upon problems which can be dealt with in an only partially satisfactory way.

One of these larger issues, however, is raised only obliquely. Fox maintains that the caloric theory went out with a whimper and not with a bang; contrary to T. S. Kuhn's view of scientific revolutions, no "crisis" situation existed here, and no satisfactory "paradigm" was yet readily available to replace the theory. It is perhaps unfortunate that Fox did not see fit to face this issue squarely, for it still after all bears examination. Certainly, Joule's experiments on the interconvertibility of heat and mechanical motion in the 1840's appear to have given a severe shock, at least to the calorist views of William Thomson.

Unquestionably, *The Caloric Theory of Gases* is a readable and often compelling book, one in which historians of science will find considerable matter to debate and scientists may discover much that is stimulating and surprising.

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Structural Chemistry

Conformational Analysis. Scope and Present Limitations. A symposium, Brussels, Sept. 1969. G. CHIURDOGLU, Ed. Academic Press, New York, 1971. xii, 280 pp., illus. $15. Organic Chemistry, vol. 21.

This book is not a systematic treatise on conformational analysis but consists of the short invited papers presented at a symposium held under the auspices of the International Union of Pure and Applied Chemistry in 1969.

With this reservation understood, the book has much to recommend it. The topics it treats are quite broadly representative, ranging from five-membered rings (Altona) through six-membered (Reisse; Stolow; Garbisch, Hawkins, and McKay), seven-membered (von Bredow, Friebolin, and Kabuss), and eight-membered rings (Anet) to ten-membered ones (Westen); from carbocycles to heterocycles (Anteunis on oxygen and sulfur heterocycles; Lyle, Thomas, and Walsh, Fodor, Mandava, Frehel, and Cooper, and McKenna on nitrogen heterocycles); and from sugars (Onodera) to steroids (Bucourt). There are also chapters on solvolytic cyclization (Felkin), on *ab initio* calculations (Lehn), on the conformation of molecules containing atoms from groups V–VIII of the periodic system (Musher), on catenanes and molecules with knots (Schill), and on carbonium ions (Schleyer). Excluded from the symposium were papers on the conformation of biopolymers or synthetic polymers; the closest one gets to these topics is in a discussion on cyclodepsipeptides (Ivanov and Ovchinnikov) and in a chapter on optical rotation in branched paraffins (Pucci, Aghetto, Luisi, and Pino).

As one might expect in a collection of papers presented at a meeting, the length, the quality, and even the language of the contributions vary widely —although only one contribution is in a foreign language (German), one or two others are in "that international language of Science: broken English." Several of the chapters duplicate more extensive reviews by the same authors that have appeared elsewhere; one of the authors has actually published an entire book on the topic of his chapter in the same Organic Chemistry monograph series to which the present collection belongs.

This reviewer has reservations concerning the desirability of collections of the present type—at the very least, contributors to a symposium who have recently reviewed their work in other places should be excused from duplicating such reviews in abbreviated form—but given the objective of this collection he must commend the editor for achieving it handsomely. All 20 contributors to the symposium submitted manuscripts; publication in the form of an attractively printed and sturdily bound book with clear tables and neat diagrams was achieved in only about 15 months; the book is carefully edited, is largely free of errors, and has adequate author and subject indexes. (In contrast, the ten plenary lectures given at the symposium, published as articles in *Pure and Applied Chemistry*, took almost two years to appear.)

This collection is a high-priority item for institutional libraries serving chemistry departments. In addition it is recommended for individual chemists working on conformational problems; several of the chapters, notably that by Altona on pseudorotation in five-membered rings, those by Garbisch *et al.* and Reisse on the evaluation of thermodynamic parameters in conformational equilibria, and, above all, the beautifully clear and instructive contribution by Lehn on the status of *ab initio* calculations are of more than ephemeral interest.

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