to the references in the paper, I would like to call attention to work by J. Guckenheimer and by R. Williams).

A large number of fields that rely upon models of nonlinear differential equations are plagued by resonances; celestial mechanics definitely is one of them. As just one of many examples, the planet Mercury, in its rotation about the sun and about its own axis, is in a resonance state; is this an accident, or did the dynamics force this behavior to be "captured into resonance"? There are several emerging ways to attack various resonance questions, and one is represented here by J. Henrard's development and application of the adiabatic invariant. Other more specialized treatments are represented by P. J. Message's analysis of planar three-body problems and by B. Garfinkel's review of his "ideal resonance problem" and his work on the Trojan asteroids. (These are the asteroids that are strongly influenced by the Sun-Jupiter system. The key members of this family are located at the vertices of the equilateral triangles in which both the plane of motion and the base of the triangle are defined by the motion and the locations of the Sun and Jupiter.) K. Aksnes relates resonances to other problems coming from astronomy in his paper on that most current topic, the rings of Saturn and of Uranus. (A companion paper by G. Colombo considers satellites of Saturn.) As part of his discussion, Aksnes reminds us of the Kirkwood gaps; these are gaps in the distribution of asteroids that are described in terms of resonances. Some of these resonance zones are populated whereas others are avoided. Why? Hadjidemetriou's paper sheds some light on the problem, but it remains unresolved.

The conference also included topics more specialized to celestial mechanics. I'm not familiar with lunar theory, so I found J. Kovalevsky's introduction to some of the modern problems very interesting. (I was unaware of how fast technology had outstripped theory—lunar laser technology demands an analytic theory with internal precession of better than 10 centimeters. This demands a theory that will include even relativistic corrections. As a result, I was intrigued by a related paper by S. Coffey, represented in the book only by an abstract, in which he claims to have developed a higher-order analytic satellite theory.) Other more specialized topics are discussed in papers by C. Marchal and J. Waldvogel on the behavior of collisions, A. E. Roy on the possible ways to interpret n-body hierarchical systems, and U. Kirchgraber on invariant manifold theory. More practical concerns are raised by R. O. Vicente, who outlines the merits of an agreed-upon reference system for Earth dynamics, and P. van de Kamp, who describes perturbations in stellar paths.

The book is a potpourri of topics, of approaches, and of research interests. Some of the papers trace their birth to practical considerations, others to more theoretical ones. Yet, similar themes tie papers and their various concerns together.

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Cyanocobalamin

B_{12}. DAVID DOLPHIN, Ed. Wiley-Interscience, New York, 1982. In two volumes. Vol. 1, Chemistry. xvi, 672 pp., illus. Vol. 2, Biochemistry and Medicine. xvi, 506 pp., illus. The two-volume set, $130.

An earlier treatise on vitamin B_{12} (*Second European Symposium on Vitamin B_{12}*, H. C. Heinrich, Ed., Enke, Stuttgart, 1962) is prefaced by the statement "B_{12} is not a vitamin—it is a fraternity." The intervening 20 years bear testimony to a continuing and deepening interest in the multifaceted chemical, biochemical, and medical problems posed by this most complex organometallic natural product. The latest work brings together 29 papers encompassing the literature of B_{12} in a critical and frequently stimulating way. Volume 1, which is largely devoted to structure, synthesis, biosynthesis, and chemical reactivity, provides an encyclopedic account of these topics that will serve as important reference material for both novice and expert. This reviewer particularly enjoyed the more controversial papers in which attention is drawn to the many unsolved problems concerned with the mechanism of action of coenzyme B_{12}, a topic still largely shrouded in mystery. These critical reviews, by B. T. Golding, J. Halpern, and J. M. Pratt, indicate a wide range of fascinating subjects for future investigation. The remaining contributors to volume 1 provide comprehensive coverage of the structural, spectroscopic, and biochemical data, which allows the reader to attempt the solution of the mechanistic puzzles and to follow this exercise with a perusal of the biochemical details fully elaborated in volume 2 without recourse to the primary literature. In fact, volume 2 contains a series of beautifully written and highly detailed papers that not only provide complete background to the ten main biochemical reactions catalyzed by coenzyme B_{12} but in some cases contain sufficient experimental data to allow a reader to perform the requisite enzymology. The volume is nicely balanced, with up-to-date coverage of transport, binding, and analysis. The theme throughout both volumes is one of excitement and challenge in unraveling the synthetic, biosynthetic, and mechanistic problems posed by the corrin family. Since the main structural, stereochemical, and synthetic problems relating to B_{12} itself have now been solved, the whole emphasis of research is on mechanistic details of mode of action (including mimicry), transport, metal-free corrins, and intrinsic factor, all of which are discussed in depth in the book. Some idea of the complexity of studying the cleavage and formation of the cobalt-carbon bond in vivo is conveyed by discussions of the controversial nature of the various model reactions in chapters 10, 14, and 15 (volume 1). Much definitive work is needed on this subject.

In my view, *B_{12}* will find a lasting place not only as a well-thumbed workbook in all laboratories connected with research on corrinoids but as a valuable and comprehensive reference source for organic and inorganic chemists, biochemists, theorists, clinicians, and physicians.

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Books Received

Administrative Law. The Law of Government Agencies. Stanley A. Reigel and P. John Owen. Ann Arbor Science (Butterworth), Ann Arbor, Mich., 1982. xii, 138 pp. $15.95.

Advanced Views in Primate Biology. Papers from a congress, Florence, July 1980. A. B. Chiarelli and R. S. Corruccini, Eds. Springer-Verlag, New York, 1982. x, 268 pp., illus. $45.60. Proceedings in Life Sciences.

Advances in Atomic and Molecular Physics. Vol. 17. David Bates and Benjamin Bederson, Eds. Academic Press, New York, 1982. xii, 434 pp., illus. $58.

Advances in Microbial Physiology. Vol. 23. A. H. Rose and J. Gareth Morris, Eds. Academic Press, New York, 1982. x, 270 pp., illus. $43.50.

Advances in Physical Geochemistry. Vol. 2. Surendra K. Saxena, Ed. Springer-Verlag, New York, 1982. x, 356 pp., illus. $39.80.

Alkalophilic Microorganisms. A New Microbial World. Koki Horikoshi and Teruhiko Akiba. Japan Scientific Societies Press, Tokyo, and Springer-Verlag, New York, 1982. xii, 214 pp., illus. $39.80.

Amateur Astronomer's Handbook. J. B. Sidgwick. Revised by James Muirden. Enslow, Hillside, N.J., ed. 4, 1982. xx, 568 pp., illus. Paper, $7.95. Reprint of the 1980 edition.

Analytical Chemistry in Nuclear Technology. Proceedings of a conference, Gatlinburg, Tenn., Oct. 1981. W. S. Lyon, Ed. Ann Arbor Science (Butterworth), Ann Arbor, Mich., 1982. xii, 402 pp., illus. $29.95.

Analyzing Natural Systems. Analysis for Regional Residuals—Environmental Quality Management.

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