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THE CRITICAL APPROACH TO SCIENCE AND PHILOSOPHY

Essays in Honor of Karl R. Popper

Edited by Mario Bunge

The 29 essays presented here in honor of Karl R. Popper reflect his influence—if only by way of reaction, and always in recognition of his achievements. The philosophers, scientists, and social scientists (including two Nobel Prize winners) who contribute to this volume are among the leading figures of their fields. Most of their contributions, though original pieces with no particular emphasis on Popper's work, constitute a tribute to him. *The Critical Approach to Science and Philosophy* will be profitably read by philosophers, physicists, biologists, mathematicians, historians, and social scientists concerned with methodology. \$9.95

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by Sol Weintraub

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remarkably lucid fashion, so that anyone who wished to embark on a detailed examination of one of the many subjects discussed in this book would be well advised to start with the presentation contained here. Inevitably, there are omissions of subject matter; in particular one regrets that the authors did not choose to give the reader the benefit of their clarity and insight in the matter of ionization phenomena.

In summary, this is an excellent account of the subject of real-gas phenomena, which should be of great value to both students and practicing aerodynamicists.

Fundamentals of Orbital Mechanics. By D. A. Pogorelov. Transl. from Russian by Morris Friedman. Transl. edited by Julius J. Brandstatter. 112 pp. Holden-Day, San Francisco, 1964. Paper \$5.00.

Reviewed by T. Teichmann, General Atomic Division, General Dynamics.

The orbital motion of small bodies in central (or nearly central) fields has become a topic of practical importance in recent years, with a resulting revival of interest in the computation of orbits, and the determination of orbital elements from a variety of measurements. There is a wealth of literature available dealing both with analytical and numerical techniques, which is greatly influenced by its astronomical origin. While these methods are well adapted to "exact" numerical calculations, they are often too elaborate for someone who wishes to go beyond the most general properties of the Kepler ellipse, but does not wish to compute firing tables. Pogorelov's work partially meets this need.

Starting with Newton's equation in vector form, he derives the Keplerian orbits, and shows the dependence of the orbital parameters on various initial and other conditions. The discussion is strongly oriented towards ballistic trajectories (though it is not restricted to them), and many range, altitude, velocity, and error relations are explicitly given in manageable terms.

The approach is a direct consequence of the vectorial form of the Kepler relations, and it is of interest to note that the eccentric anomaly

enters only in a rather indirect way in the treatment.

It is unfortunate that many important (if small) effects such as rotation, oblateness, and drag were not introduced even in a general way in this discussion since anyone going beyond the Kepler ellipse finds himself having to contend with them. What there is, is direct and useful, but for most readers there will not be quite enough.

The World of Flying Saucers. By Donald H. Menzel and Lyle G. Boyd. 302 pp. Doubleday, Garden City, New York, 1963. \$4.50.

Reviewed by J. Allen Hynek, Northwestern University.

Nearly a score of years have passed since the first waves of flying saucer reports, in Sweden (1946) and in the United States (1947), but UFO's (Unidentified Flying Objects, the more technical name for flying saucers) still continue to be reported to the US Air Force at the rate of several hundreds per year. Many more are reported to the numerous UFO civilian groups and "saucer" publications in this and other countries, organizations actively on the lookout for support for the thesis that planet Earth is the unwitting host to visitations by intelligently guided craft from elsewhere.

That the flow of UFO reports has continued for these many years, is itself a phenomenon worthy of study by social as well as physical scientists. For the world of flying saucers is a world of reports.

Astronomer Menzel and his talented and witty co-author, Lyle Boyd, who subtitled their book, "A Scientific Examination of a Major Myth of the Space Age", have examined the world of reports (the complete file of the Air Force was made available to them) and ably linked that world to the world of those stimuli which very often give rise to UFO reports. They did not select merely the "easy cases", but pitched right into many controversial sightings which the "true believers" in this Myth of the Space Age regard as the mainstay of their creed. And all but those enthusiasts who, "when told there's a horse in the bathtub . . . begin speculating