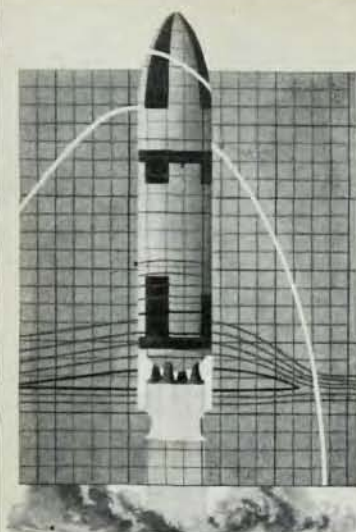




## LOOK AT LOCKHEED...IN AEROMECHANICS

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netism, there is almost no reference to Gauss' outstanding contributions to physics. Thus the famous divergence theorem in field physics, associated with his name, is nowhere mentioned and nothing is said about his famous principle of least constraint, which constituted his attempt to provide a logical basis for mechanics comparable with the principle of D'Alembert.

The book contains a few unnecessary errors of fact. It is not correct to say that the "gauss" refers to *electromagnetic* induction; actually it is a unit for the vector **B**, or the *magnetic* induction. It is also an error to refer to Hans Christian Oersted as a German.

The author's style is in general clear and entertaining, and the book will be read with pleasure by those interested in popular aspects of the history of science.

**Differential Equations of Mathematical Physics.** By N. S. Koshlyakov, M. M. Smirnov, and E. B. Gliner. Transl. by Scripta Technica. Translation edited by Herbert J. Eagle. 701 pp. (North-Holland, Amsterdam) Interscience, New York, 1964. \$21.00.

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

The solution of partial differential equations, especially of linear equations of the second order, plays a central role in mathematical and theoretical physics and engineering, and there exists a correspondingly wide variety of literature. Despite the wealth of the available material, this posthumous work of Koshlyakov is a valuable contribution, particularly for purposes of teaching, since its content and manner of presentation fall between the generality, elegance and depth of Courant-Hilbert's Volume II (1963), and the almost overwhelming detail of the relevant portion of Morse and Feshbach.

Since this book covers the entire gamut of classical partial differential equations, only features which seem of particular interest will be commented on here. In the treatment of hyperbolic equations, the method of characteristics is described in a detailed and illuminating way for the problem of a vibrating string, for the longitudinal oscillations of a rod (in-

cluding the question of impact), and for the equation of telegraphy. The notion of a "generalized" solution is introduced in connection with these problems. An interesting and novel feature is a description of "functionally invariant" solutions for hyperbolic equations, which concept is related to that of "self-similar" solutions.

The section on elliptic equations contains a detailed and extended discussion of the integral theorems of Gauss, Green, et al, the general properties of Dirichlet and Neumann problems, and many applications of spherical harmonics to hydrodynamic and acoustic problems.

There is a lengthy section on the application (and applicability) of integral transforms to partial differential equations. Maxwell's equations are discussed at length, with special reference to radiation and propagation problems. There is a concise but illuminating description of viscous motion (including the notion of Reynold's number), and the book ends with a summary of the properties of generalized functions, and an indication of their application to relevant problems.

The text is full of examples, elaborate enough to be interesting, but not so complicated as to be exhausting. The same seems to be true of the many examples left for the reader, generally with hints for their solution. There is unfortunately no index, though the table of contents is quite exhaustive.

**Hamiltonian Dynamics.** By C. W. Kilmister. 146 pp. Wiley, New York, 1964. \$4.75.

*Reviewed by D. J. Montgomery, Michigan State University.*

Mathematical physics should of course be called physical mathematics, for there is often precious little physics in it. Dr. Kilmister is reader in mathematics at King's College, London, and the mathematical-physics series in which his book appears is edited by Dr. G. Stephenson of the Department of Mathematics at Imperial College, London. Correctly we surmise that in *Hamiltonian Dynamics* the physics is pushed into the background, and that we had better think twice be-