some halting steps toward the development of a theory of culture. Despite obvious substantive differences in science, art, literature and other components of culture, Crane feels that there are sufficient similarities in their "modes of social and ideational development" to merit looking at all of them from the same theoretical perspective. The key for Crane is that all are characterized by "cumulative growth punctuated by periodic discontinuities."

Interesting and provocative as these ideas may be, they are, to my mind at least, somewhat premature. Nothing in this volume convinces me that we already know enough about the sociology of science—even in the limited way in which she has defined it. Whether developing a general sociology of culture is more likely to accelerate or enhance our understanding of science in its own right also remains to be seen.

But these are issues best elaborated in sociological communities, invisible colleges and "circles." Many physicists may find this book of interest—particularly much of the discussion in chapter 6 on some of the conditions facilitating the transmission of ideas especially in the interaction between scientific communities.

NORMAN KAPLAN
Northeastern University

Introduction to Particle Physics

Roland Omnès; G. Barton, trans.
414 pp. Interscience, New York, 1971. $18.50

In a currently developing field such as particle physics the problems of a textbook writer are perennial. Ideally he must present the established material that lays the foundation for a student's study and also give an account of current activity that indicates new directions in the subject. Some authors concentrate on the former task and present an encyclopedic survey of standard material, and leave the newer developments to conference proceedings and to journals.

In his book, *Introduction to Particle Physics*, Roland Omnès seeks to cover both the established and the current. He does this by dividing the text into two distinct parts and by aiming at a deliberate contrast between the topics treated in each. Part I he calls the "grammar" of the subject, and Part II the "guide to the literature."

Thus Part I begins with a broad survey at a level that includes sketches of a cyclotron, snychrotron, linear accelerator, and a bubble chamber and goes on to topics such as conservation laws, group theory, collision theory, and resonances. A good many matrices are written out explicitly (a factor that seems to have become a measure of the sophistication of a work). The treatment in this section is largely pedagogical and generally elementary. On the other hand, chapters 4 and 10 constitute a far more advanced discussion of relativistic kinematics using the Poincaré group and the derivation of the Dirac equation from this point of view.

The introduction to Part II promises to "present a relatively complete panoramic view of the many different aspects of particle physics, and to be deliberately superficial. . . ." The topics covered are quantum electrodynamics, strong interactions, SU(3), Regge poles and weak interactions. As usual, such a survey is inevitably biased toward the author's own interests, and Omnès, who is co-author of *Mandelstam Theory and Regge Poles*, is no exception.

The division into parts I and II is

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novel, but perhaps a bit artificial and forced; the treatment in both parts is uneven in level and thoroughness, and specific topics could have been placed as well in either part. The book was completed in early 1969; thus current algebra is treated in only a page and a half of small print, and there is no discussion of scale invariance or related high-energy problems.

There are useful exercises with each chapter, and, in the back, a very interesting chronology of particle physics from 1911 to 1968. The layout, print, and paper of the volume are exceedingly pleasant and conducive to study.

This work has been translated from the French by G. Barton (author of *An Introduction to Advanced Field Theory* and *Dispersion Techniques in Field Theory*). Like many translations, the text exhibits a certain inelegance and stiffness in style, and contains a number of misspellings. Certain mathematical expressions, such as "rot," "sh" and "ch" are left in European form. These features may be a drawback to the avowed pedagogical aim of the book.

This book is intended as an elementary introduction to particle theory for first-year graduate students, and has little interest for advanced workers. Supplemented by more thorough treatments of the material in Part II, it forms an accessible nucleus for a first course in particle physics, and I personally am likely to use it in my own teaching in this way.

R. A. URITAM
Boston College

Applications of Green's Functions in Science and Engineering

M. D. Greenberg
141 pp. Prentice-Hall, Englewood Cliffs, N. J., 1971. $6.95

M. D. Greenberg, a member of the department of mechanical and aerospace engineering at the University of Delaware, opens this text book with the statement: "It is often felt that the Green's function method is too sophisticated to be widely available to engineers and scientists." Rejecting this premise (in which I see at least a grain of truth, but which Greenberg evidently offers as a straw man), he goes on to develop a self-contained treatment of Green's functions that "should be suitable either for advanced undergraduates or graduate students ... with only a modest background ... in ordinary and partial differential equations." I surmise, although the author does not explicitly state, that the book is intended either for a short course devoted primarily to Green's functions or as collateral reading for a longer course on methods of mathematical physics. It is significantly below the level of Arnold Sommerfeld's classic *Partial Differential Equations in Physics* (Academic, 1949) and, at least in its choice of examples, appears to be directed rather more to engineers than to physicists.

Part I is devoted to ordinary differential equations and develops such basic concepts as the adjoint operator and the delta function. The latter is introduced in the usual, heuristic manner, starting from the concept of a concentrated load, after which there is a brief discussion of generalized functions and limit sequences. The development of one-dimensional Green's functions is restricted to quite simple examples, but the author states that, even though he may appear to be "cracking peanuts with a sledgehammer, ... an understanding of these examples will leave the reader in a position to deal with more complicated applications." In fact, the treatment is so elementary that I was unable to find such an important result as the general construction of $G(x, \xi)$ for a second-order differential equation in terms of a given pair of linearly independent solutions of that equation; nor could I find the statement that the discontinuity in dG/dx at $x = \xi$ is equal to $1/p(x)$, where p is defined by the self-adjoint form of the differential equation, $(py')' + \ldots$.

Part I closes with a brief discussion of the eigenfunction method and Sturm–Liouville theory. This discussion serves to illustrate some of the difficulties that may arise when a particular problem admits an eigensolution; it also serves to suggest that a more thorough grounding in eigenfunction theory is a necessary condition for a proper understanding of the Green's-function technique (see above).

Part II is devoted to partial differential equations. It begins with the formal classification of a linear, second-order equation through the sign of its discriminant, but without any reference to characteristics (which are not mentioned even in connection with D'Alembert's solution of the wave equation or in the discussion of domains of influence and dependence). Green's functions for the Laplace, Helmholtz, and diffusion equations in two dimensions and the wave equation in one dimension are developed in some detail, after which additional examples are treated more briefly. The relation between the eigenfunction and Green's-function methods is illustrated by solving Poisson's equation for a rectangle.

On the whole, this book is clear and