red down to about 2000 Å in the ultraviolet. Raman spectroscopy is also included. Another chapter is concerned with sample preparation, appropriate solvents, cells and cell windows, and the like. Several chapters are devoted to theoretical aspects and to interpretations of absorption. These include brief treatments of classical and quantum mechanics, electronic states and electronic spectra, molecular vibrations and rotations, and the principles of molecular spectroscopy. One chapter treats the use of absorption as a tool of qualitative analysis, demonstrating its value both in identifying compounds and in showing the presence of characteristic groups in unknown compounds. Still another chapter explains and demonstrates how absorption spectra may be used to analyze quantitatively a mixture of several absorbing compounds, and as an aid in this treatment, matrix methods are treated in an appendix. Other appendices consider nomenclature and character tables.

This book meets an extensive current need, and in addition to its classroom functions, it should find a place in many libraries and research laboratories.

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Fluorometry

Fluorescence Assay in Biology and Medicine. Sidney Udenfriend. Academic Press, New York, 1962. x + 505 pp. Illus. $14.

Although this book fulfills its purposes, namely, to serve as a practical reference and laboratory manual on fluorometry for those who are engaged in various fields of biology and medicine, it is written in such an informal and elementary manner that it is primarily a text for the truly unsophisticated novice. This is regrettable, in view of the much more urgent need for an authoritative text, which this book might have been, that would provide a frankly critical evaluation of the instrumentation and methodologies presently applied in fluorometry, not only for the practical applications of chemical assay but, perhaps more importantly, for the purpose of obtaining the unique information about molecular structure and properties that can be derived from carefully determined spectral measurements of fluorescence (and phosphorescence). Although they will be gravely disappointed by this default, those who are already knowledgeable or who are experts, to use the author's euphemism, will nevertheless find this book of some value, not simply as a handy reference intended for useful practical information but more so for its very comprehensive and fairly up-to-date bibliography.

The major portion of the book is devoted to specific assays of various compounds, arranged in topical order according to their biochemical classification; this, of course, leads to grouping the compounds in a chemically unrelated manner. This may be a convenient and possibly logical arrangement for a laboratory manual in biochemistry, but it was ill-chosen for a general reference text on fluorescence assay, in which the correspondence of molecular structure with the physical property of fluorescence is of major topical concern. Moreover, the procedures that have been detailed are incorporated in the main body of the descriptive text; this is a particularly poor format for a working laboratory manual, since each specific assay must be sought out.

The last three chapters are somewhat perfunctory surveys of the extension of fluorescence assay to a number of applications which most likely will be of only passing interest to those concerned with the basic assays that comprise the major sections of the book. However, the initial chapters on instrumentation and on the practical considerations to be taken into account in the technique of fluorometry merit attention, particularly by those who seek some practical guidance on the type of instrumentation and the technical requirements that need to be considered for specific types of application.

By having the temerity to write an introductory text on a discipline that is in such an extraordinarily dynamic phase of growth and new development as a result of the remarkable advances being made in modern technology, this competent author has exposed himself to the basic criticism that such a laboratory manual is somewhat premature and that it is predestined to a very short lifetime of useful service because of the great pressure of change; this change is not only within the particular sphere of fluorescence but also in contesting disciplines which potentially could adumbrate its practical significance and usefulness. The task, it would seem, for those who would further the use of fluorometry as a basic technique, is not its popularization, which could lead to discreditation by abuse and misuse as a result of the push-button nature of modern instrumentation, but rather to provide the necessary guidance, either by demonstration or instruction, for its properly sophisticated use.

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Natural Continuum

The Sciences and the Arts. A new alliance. Harold Gomes Cassidy. Harper, New York, 1962. 182 pp. $4.75.

The author, a professor of chemistry at Yale, attempts to fling a philosophical bridge between the "two cultures" —science and art. The result is a brilliant and highly abstruse analysis.

Cassidy asserts that "if humanists understood science and would effectively make their voices heard, they could, with the aid of scientists, control the forces of cultural change in the process of their actual generation." He goes further and asserts that such a conjunction would enable men to direct cultural change toward "the morally and ethically just ends that arise from a union of art and science."

Of what is this bridge to be constructed? The central argument of the book is that a natural continuum exists between all of the disciplines of the intellect; every activity is a dialectic, interpenetrated by "analysis, synthesis, and reduction to practise." All three activities, he says, "must go together for science or art to be healthy." He asserts that it is a failure to distinguish between the analytic and synthetic functions, accompanied "often by a preference for one or the other," which is "one of the chief causes of schism between scientists and humanists."

To demonstrate the continuum, Cassidy presents several delightful essays comparing the processes involved in a mathematical theorem with those in a poem, those in geometry with those in sculpture, and so on. He brings to these essays a certain architectonic flair: "There are," he writes, "too few constructive efforts to bring

the arts and sciences into healthful interaction."

It is clear that healthful interaction is desirable, not only between art and science but between all intellectual disciplines. The question arises, however, whether precise semantic distinctions and new syntheses of old terminologies constitute a significant movement in this direction. If, as Cassidy asserts, there is a natural continuum unifying all intellectual activity, it is doubtful that C. P. Snow's case for the "two cultures" has any validity. One may not feel confident that, if science lacks a soul, it will find one in the humanities; nor may humanists find new efficacy in scientific tools. The alleged chasm may merely be an abstraction based on the real differences of values between men in an age of scientific weaponry and Cold War. Many humanists would challenge the contention that "ends" would arise from a union of art and science and that such ends would appear "morally and ethically just" to all; many would doubt that even men of good will could direct cultural change toward such ends.

This caveat does not detract from Cassidy's refreshing effort to build a philosophic system, encompassing art and science, for a complex world to which science may hold many keys.

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Changing Cultures

Traditional Cultures and the Impact of Technological Change. George M. Foster. Harper, New York, 1962. xiii + 292 pp. $6.50.

Every technical assistance expert who goes to one of the newly developing countries to help introduce better methods in health work, agriculture, industry, public administration, science teaching, or some other specialty, should read this book.

The major contribution of cultural anthropology to the equipment of technical assistance workers has been the "culture concept" itself. This concept engenders a point of view and an attitude which help to counter the natural ethnocentric tendency to assume that what is good, efficient, and "the right way to do it" in our society is also best for other societies. Beyond this, however, the writings of cultural anthropologists have not been as directly useful to those of us engaged in technical assistance as we might legitimately have hoped. Anthropological writings have run to case studies, mostly of rather primitive communities, and only occasionally have they come directly to grips with the problems that arise in development work.

George Foster's book changes this situation. It brings the kind of help that technical assistance workers need from the anthropologist and sociologist. Although it "is not intended as a handy pocket guide to successful technical aid work, and it contains no formal lists of do's and don'ts," it does present in a well-organized, clearly written way, with abundant illustrations from case histories and with numerous practical hints, those aspects of the knowledge of the social scientist, and especially of the anthropologist, which are most relevant to technological development in a traditional society.

In the less developed countries, 20th-century scientific culture is impinging upon traditional, prescientific cultures —"Clinical medicine struggles with folk remedies; the results of experimental agriculture are carried to custom-bound farmers; and literacy is brought to non-readers." Foster analyzes the way traditional cultures change, the barriers to change, the stimulants to change, and the role and problems of the technical expert. The responsible technician is the one who is able to adapt scientific technology and methods to the ecological, social, and economic environment of the developing country. Such technicians must learn to be "problem-oriented and not program-oriented," despite their training as engineers, doctors, or other professionals, which predisposes them toward programs of the types considered best in their home environment. There are several interesting pages on that "occupational disease of people who have been suddenly transplanted abroad," which Kalervo Oberg named "culture shock."

Foster devotes three chapters to the way the anthropologist works and to problems of teamwork in relating technical aid and social science. I think his generally excellent discussion would be improved if he recognized more clearly a distinction between the role of the anthropologist as *social scientist* and as *social technologist*. In the social field, as in the fields of the physical and biological sciences, we need both the scientist who is primarily interested in the advancement of knowledge and the technologist who, though scientifically grounded, concerns himself with inventing and applying methods of dealing with practical problems.

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Low Temperature Physics

Experimental Cryophysics. F. E. Hoare, L. C. Jackson, and N. Kurti, Eds. Butterworth, Washington, D.C., 1961. 396 pp. Illus. $14.

This book, which is described as a collection of review articles, consists of a collection of ten chapters; each of the first nine is by one of the editors or by a contributor, and their average length is 30 pages. The tenth chapter consists of a series of 12 very brief articles (average length, four pages); each of these articles is by a different contributor.

The first nine chapters cover such a variety of aspects of cryophysics (history, commercial production of liquefied air, storage of liquefied gases, mathematics of liquefaction, magnetic cooling, and four other topics) that there is little continuity and the overall impression is one of rather haphazard arrangement, with some probably unavoidable duplication of subject matter. In these chapters the presentation of the subject ranges from an adequate to an excellent treatment, and most chapters include extensive literature references to assist readers who wish to explore the subject more comprehensively.

The tenth chapter, on cryogenic techniques and miscellaneous applications, is crowded with so many short articles on unrelated (though important) subjects that its value lies primarily in providing what amounts to a series of abstracts with related bibliographies. A 25-page appendix includes 20 tables of thermal and physical data needed by workers in the field of cryophysics.

In summary, this book affords relatively brief treatment of many branches of cryophysics; the treatment varies from descriptive, to empirical, to mathematical investigation of selected problems. Although its contents are un-