guage shows "a higher plane of thinking, a more rational analysis of situations, than our vaunted English" (p. 85), or "how much more precise and finely elaborated is the system of relationships in many such [preliterate] tongues" (p. 84) have made Whorf vulnerable to those critics who attack the lack of scientific rigor in his methodology. Too, his belief that "it was . . . enlightening to see English from the entirely new angle necessitated in order to translate it into Hopi" (p. 112) sounds suspiciously similar to the old classicist's superstition that everyone should study Latin, for there is no better way to learn English grammar. The two points of view are, perhaps, merely different sides of the same coin.

A more serious criticism of Whorf's methodology, pointed out in Carroll's very fair evaluation, is the undue importance given to translation as an index of the differences between languages. It is surprising, for example, that Whorf considered it so noteworthy that, say, Hopi had only one word where English has three; that there is no one-to-one correspondence between languages is obvious to anyone after his first experience with another language. Differences (or similarities) in the linguistic behavior associated with two events do not necessarily imply corresponding differences (or similarities) in the perception of those events. A number of factors may operate to cause such situations: metaphorical extensions, semantic change, idioms (that is, a case where the meaning of a complex whole cannot be predicted from the meanings of the constituent parts), and so forth. Would anyone, for example, infer that English speakers consider the two events of (i) *dying* and (ii) *hitting a pail with one's foot* as being closely related because they each may be referred to as "kicking the bucket?"

That Whorf's argument suffers from circularity of inferences has been pointed out by his critics. We must observe the linguistic and nonlinguistic events separately before they can be correlated; otherwise, the only evidence for differences in "world-view" turns out to be the linguistic differences. Even assuming that we find a striking difference in language structures, and what seems to be an associated difference in some nonlinguistic behavior, it must be demonstrated (i) how often such co-occurrences might be expected merely by chance, and (ii) what the exact nature of the relationship is. If A and B co-occur, either A causes B, or B causes A, or perhaps some other factor C causes both A and B. To use a trivial example of the relationships between language and culture, it is certainly likely that people who live near the sea and who are engaged primarily in fishing will have a large and precise terminology for things connected with fishing. However, no one would suggest that these people took up fishing because their language had such an appropriate terminology.

Carroll quite rightly points out that regardless of whether the linguistic relativity principle is valid or not, the interest it has aroused should not be allowed to minimize the attempts to search for language universals. Whorf maintains, for example, that such a contrast as that between verb and noun is "meaningless" in some languages—"in Nitinat it seems not to exist" (p. 99). However true this may be, it seems reasonable to assume that language as a form of learned behavior should be subject to the general laws that govern all learned behavior and that there should be some manifestations of these general laws in the forms of "universals."

These remarks are not meant to refute the Whorf hypothesis, but merely to indicate where some refinement is necessary before the hypothesis can be adequately tested. Collection of the data required for investigating the validity of the hypothesis will certainly be fruitful. It is hoped that the appearance of this book will further stimulate research in determining the nontrivial, other-than-chance relationships between language structure and nonlinguistic behavior, perception, cognition, and so forth—research of the nature Carroll himself is engaged in as director of the Southwest Project in Comparative Psycholinguistics.

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Scientific Books, Libraries and Collectors. A study of bibliography and the book trade in relation to science. John L. Thornton and R. I. J. Tully. Library Association, London, 1954. 288 pp. 24s.

In 1949, the senior author, librarian of St. Bartholomew's Hospital Medical College, London, issued *Medical Books, Libraries and Collectors*. He then promised a companion volume, *Scientific Books, Libraries and Collectors*. Now that this work has appeared, it should be welcomed by historians of science, librarians, collectors, and all who are concerned with the growth and development of scientific literature.

Although the book is mainly bibliographic in nature, it has the rare merit of being both readable and interesting. It is not, as the authors point out in their preface, "an exhaustive treatise on the bibliographical aspects of science, but rather an introductory history of the production, distribution and storage of scientific literature from the earliest times. Our aim has been the recording of information accessible only at the expense of much research, rather than the presentation of new material, and our selected bibliography guides readers to sources of additional information."

It may be said at once that the authors have succeeded very well in their aim. Although the volume appears to be small, a vast amount of information has been packed into it. There are 12 chapters that include such topics as scientific literature before the invention of printing, scientific incunabula, scientific books of the 16th century, 17th century scientific books, scientific books from 1700–1799, the rise of scientific societies, the growth of scientific periodical literature, scientific bibliographies and bibliographers, private scientific libraries, scientific publishing and bookselling, and scientific libraries of today.

In addition to many bibliographic footnotes, there is a valuable 26-page bibliography and an index.

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Science and Christian Belief. C. A. Coulson. University of North Carolina Press, Chapel Hill, 1955. 127 pp. $2.50.

Coulson is a professor of applied mathematics and an acknowledged authority in several fields of chemistry and physics. He is also a sincere Christian. Therefore, when he undertakes to talk about science and Christian belief, he deserves a respectful hearing from both scientists and churchmen. His book is one of the best discussions of this difficult subject that I have read.

The author's thesis is that science itself is essentially a religious activity. In science, discovery of facts alone is not enough. Facts are all related to each other, and what the scientist especially seeks is to tie them together by unifying concepts. "Scientific truth means coherence in a pattern which is recognized as meaningful." Religion, in the same way, seeks unifying concepts among its own facts and experiences. Both share a common ignorance and a common hope. Furthermore, the underlying assumptions of science are essentially moral and spiritual ones—honesty, integrity, humility, hope, enthusiasm, patience, cooperation with others, and the use of both reason and imagination. Both seek for truth and for order and constancy in nature, but they study different aspects of the truth as one might study different aspects of the complex blueprints for a building. An artist would see in these blueprints something