In searching for a cause for the syndrome, the possibility that deficient aeration played a part in it naturally suggests itself. The sequence of events is much like that described in "mountain sickness" and certain cardiac psychoses. While the respiration was regular and of approximately normal rate, the action of the intercostal muscles was feeble or absent in all cases. Slight cyanosis was often observed. Atelectasis of the lungs was observed at autopsy in three of the cases. Studies of the oxygen content of the arterial blood in three cases showed it to be reduced in all, and in one at a level at which symptoms might be expected.

Another possibility is that the syndrome is due to interruption of vasomotor pathways or of sensory tracts. The physiologic aspects of the condition are being studied further under a grant from the Committee on Scientific Research of the American Medical Association.

TRACY J. PUTNAM

"IDEST"

ONE may profit by Mr. Charles H. Briggs's warning against ambiguous use of "or" (SCIENCE, November 5) without accepting his proposal to substitute "idest" (Latin *id est*) where the terms connected are equivalent. Equivalence is unmistakably implied by the use of commas in the phrase "A, or B, . . ." Conversely, "A or B . . ." should imply that A and B are non-equivalent, and it would do so if all readers knew the rule and trusted all writers to know and apply it. But there's the rub! Mr. Briggs evidently distrusts, in this regard, the writer of the phrase "gauze or leno"—and so do I, after having found from the dictionary that leno is a kind of gauze.

A writer who wishes to make the non-equivalence of two terms connected by "or" unmistakable even to a distrustful or a careless reader, or to emphasize it for any reason, can do so at the cost of an extra word or two (*e.g.*, "either A or B"; "of A or of B"). Equivalence, on the other hand, may be emphasized by substituting dashes or parentheses for commas, or by inserting "that is" or *"i.e."* (usually read as "that is"). Mr. Briggs mentions all these devices only to reject them. He stigmatizes "that is" and *"i.e."* as "awkward and interruptive." But it seems to me that neither they nor the punctuation marks interrupt the reader; he takes them in his stride because they are familiar. "Idest," on the contrary, will slow up most readers, even though it be defined in a footnote for each article in which it appears, unless and until it becomes so broadly accepted as to be "an English word," which it is not now.

But "idest" may appeal to those who use "A and/or B" instead of the plain English, "A or B or both"!

F. C. CALKINS

U. S. GEOLOGICAL SURVEY

SCIENTIFIC BOOKS

CALCULUS

Differential and Integral Calculus. By RICHARD COURANT. Translated by E. F. MCSHANE. Blackie and Sons, Ltd., London and Glasgow. New York: Nordemann Publishing Company, Vol. I, xiii + 568 pp., 1934 ($5.00); Vol. II, x + 682 pp., 1936 ($7.00).

EXCELLENT treatises on advanced differential and integral calculus are as valuable as they are rare. Such a treatise can do much to spur the student of marked mathematical ability to go on beyond the beginnings of the calculus and can help greatly in deepening and making effective the knowledge of those who wish to use the calculus as a tool in some of its varied applications. And yet only two English works of this kind seem to me to have been available in the last two decades: I refer to the well-known books written by Osgood and by Edwin B. Wilson. The two volumes of Courant's "Differential and Integral Calculus" here under review form a third distinctive treatise of high quality. This comes as a translation and extension of his well-known German work on the same subject. As in the other cases mentioned, Professor Courant's presentation is a labor of love. Its pages are steeped with a broad and appreciative mathematical spirit which is deeply interested in purely mathematical considerations, but at the same time recognizes the importance of the numerous applications. Of their significance no one is more aware than Professor Courant, whose mathematical text-book for physicists, written in collaboration with Professor Hilbert, has proved extraordinarily useful.

The two volumes have the great advantage that they are written so clearly and at such length (some 1,250 pages) that they can be read without the fatiguing necessity of weighing each word, which too often confronts the reader of a mathematical book. Furthermore, the style is lively and the matter is treated from a modern point of view by one who is himself a distinguished mathematician, which makes the reading interesting in detail. Differential calculus and integral calculus are introduced side by side.

The ground covered in the two volumes is extensive. In fact, such a subject as uniform continuity is soon introduced in the first volume, while the last 150 pages of the second volume deal with differential equations, the calculus of variations and functions of a complex variable. The precise limitations of the

material will be best indicated to mathematicians by saying that the Lebesgue integral is nowhere mentioned —a limitation which to the reviewer seems a wise one. As an instance of this material may be mentioned Harald Bohr's simple theorem that $y = \log \Gamma(x)$ is the only "convex" solution of the functional equation $y(x+1) - y(x) = \log x$ such that $y(1) = 0$. This shows the interesting fact that the gamma function, $\Gamma(x)$, is uniquely characterized in the real domain by its well-known functional equation and the condition that $\log \Gamma(x)$ is a convex function.

It is certain that all American mathematicians will feel grateful to the author, Professor Courant, and also to the translator, Professor McShane, for their cooperation in making this excellent text-book immediately available to our mathematical public.

GEORGE D. BIRKHOFF

RADIOACTIVITY

Radioactivité. By MADAME PIERRE CURIE. Paris: Hermann et Cie, Editeurs, 6, rue de la Sorbonne. 563 pp., price, 150 Fr., 1935.

FINISHED in 1934 at the death of Madame Marie Curie and seen through the press by Irene Curie-Joliot and Frederic Joliot, this book deals mainly with the classical phenomena of radioactivity. The first part (p. 1–125), serving as a brief introduction into modern physics, has as a sub-title: "Ions, Electrons and X-rays." It contains in some detail the more old-fashioned methods of ionization measurements; modern equipment (counters, Wilson cloud chamber, etc.) are referred to in the second part, but only briefly. The treatment of the many phases of modern physics touched upon is rather sketchy, but references are given in this first part to more extensive texts for the student who wishes to study the different subjects in detail.

The second part of the book is devoted to radioactivity proper. The discovery of the radio elements and the chemical methods of extraction and purification are discussed in some detail. The theory of radioactive transformations is developed and illustrated with examples; the analysis of the decay curves is carried out for the most important cases. The chapters that follow (203–335) are devoted to the discussion of the radioactive radiations and their properties. In these chapters the results of the modern investigations (both experimental and theoretical) are given, but without derivations or any detailed discussion.

Artificial disintegration, the discovery of the neutron, the positron and of artificial radioactivity are briefly discussed (p. 367–389). A few pages (389–401) are given to the discussion of the structure of the atom and the modern theory of radioactive disintegration. The remaining chapters deal with the effects produced by the radiations, the classification of radio elements and their chemistry and a brief discussion of radioactive families. An appendix contains numerical tables useful for the student of radioactivity.

Throughout the book facts and not problems are discussed. A serious handicap for the student and the non-specialist who wants to study the subject is the complete absence of literature or quotations. The book which covers the work done over a period of more than 30 years will be of small value for the beginner, for whom, according to the plan, it is intended because of this serious lack of references. Since derivations are only given for the most elementary formulae, it is necessary to consult the originals to understand the full meaning of the results. This, however, has to be done by using other references, since no quotations are given where, or even when the work was published. An appendix giving the necessary references would enhance the value of the book considerably. A number of excellent photographic plates accompany the discussion of the different subjects.

K. LARK-HOROVITZ

PURDUE UNIVERSITY

SPECIAL ARTICLES

DETECTION OF CRYSTALLINE SILICA IN LUNG TISSUE BY X-RAY DIFFRACTION ANALYSIS

IN the analysis of lung tissue for silica, present chemical methods permit only the estimation of total silica. It is not possible to differentiate between free and combined silica or between crystalline and amorphous silica. When such a differentiation is attempted by the application of petrographic methods to a study of lung ash, the results are frequently unsatisfactory because, first, the silica may react with the alkaline constituents of the ash at the high temperature (500° C.) necessary for the elimination of carbon and, secondly, the particles may be so small that they can not be rigorously identified. It is thus highly desirable to develop a procedure for the study of the inorganic constituents of lung tissue which does not involve the destruction of the organic matter and which may be applied to particles of extremely small size. Our preliminary experiments, which we are now reporting, indicate that such a procedure may be based upon an application of a suitably refined x-ray diffraction technique.

In the present investigation the lung tissue was hardened in a dilute solution of formaldehyde, dried in vacuo at 70° C., ground to pass a 40-mesh sieve,