3. M. F. JONES, *Isoperimetric Right-Triangles*, Memorial University of Newfoundland, St. John's, Newfoundland, Canada, April 1967. (See *Math. Comp.*, v. 22, 1968, pp. 233–234, RMT 21.)

4. ALBERT H. BEILER, *Consecutive Hypotenuses of Pythagorean Triangles*, ms. in the UMT file. (See *Math. Comp.*, v. 22, 1968, pp. 690–691, RMT **74**.)

5. ALBERT H. BEILER, *Recreations in the Theory of Numbers*, Dover, New York, 1964, Chapter XIV.

70[14].—COSRIMS, *The Mathematical Sciences: A Report*, National Academy of Sciences, Washington, D. C., 1968, xiv + 256 pp., 23 cm. Price $6.00.

A series of reports on major areas of science have been prepared and issued under the aegis of the Committee on Science and Public Policy of the National Academy of Sciences. COSRIMS, under the chairmanship of Lipman Bers, was responsible for the mathematical sciences (see the other reviews). This report sets forth their conclusions with respect to mathematical research in the U. S., its character, its importance, the current extent and sources of its support, and its needs. Some little space is devoted to an attempt to explain, in language understandable to the layman, what mathematics is all about, and how and where it is applied.

"Remarkably enough, it is impossible to predict which parts of mathematics will turn out to be important in other fields." This statement appears on page 8, and the theme recurs. "Cayley . . . believed that matrices, which he invented, would never be applied to anything useful (and was happy about it)" (page 49). "How fast ought society to expect the results of innovation to be transferred?" (page 215). However, the last half-page is entitled "The Nonutilitarian View."

The first chapter is entitled "Summary," and includes the "Recommendations." "The State of the Mathematical Sciences" attempts to describe in simple terms "Core Mathematics" and to illustrate applications. The third chapter takes up mathematical education, and the fourth, "Level and Forms of Support."

Altogether this is an impressive and authoritative statement of the place of mathematics in contemporary society.

A. S. H.

71[14].—COSRIMS, *The Mathematical Sciences: Undergraduate Education*, National Academy of Sciences, Washington, D. C., 1968, ix + 113 pp., 23 cm. Price $4.25.

COSRIMS, the Committee on Support of Research in the Mathematical Sciences, as one phase of its activities undertook to investigate the state of undergraduate education in mathematics. This is the report of the Panel on Undergraduate Education in Mathematics, made up of eleven members with John G. Kemeny as chairman. One member of the Panel, Henry Pollak, was from industry, all others from colleges and universities.

The general picture that develops can hardly come as a surprise to any mathematician, whether academic or industrial, pure or applied, but the documentation, and the array of facts and figures, is impressive. Over the past ten years the percentage of undergraduate students majoring in mathematics has increased from 1.5 to 4.0. Meanwhile the level of offerings has gone up in ways that are not easy to measure in quantitative terms. However, the "case histories" of eight colleges and universities over the past quarter century vividly illustrate these and other changes that have taken place.

Among the factors that have served to bring about these changes are the many new areas of application, the increasingly sophisticated demands made by traditional areas of application, and, as part of the same picture, the computer revolution. With increasing employment of mathematicians in government and industry, the colleges and universities, especially the smaller and less prestigious ones, are unable to maintain the quality of the staff, even where, in simpler days, it may have been adequate.

All this is spelled out in considerable detail in the report, and a series of recommendations are made. They are convincing enough to those already close to the problem. One can only hope that also others will be convinced.

A. S. H

72[14].—COSRIMS, *The Mathematical Sciences: A Collection of Essays*, The MIT Press, Cambridge, Mass., 1969, x + 271 pp., 24 cm. Price $8.95.

This volume is intended to supplement the main report of COSRIMS, also reviewed here, by developing more fully, still in the language of the layman, special branches of mathematics and special areas of application. It is in the form of twenty-two essays, mostly by mathematicians. A few titles and authors, selected almost at random, may give some notion of the depth and breadth: "The Social Sciences Call on Mathematics" (16 pages) by Kemeny; "Topology of Molecules" (15 pages) by Lederberg; "Non-Euclidean Geometry" (8 pages) by Coxeter; "Statistical Inference" (12 pages) by Kiefer; "Solving a Quadratic Equation on a Computer" (15 pages) by Forsythe; "Mathematical Linguistics" (7 pages) by Harris; "The Continuum Hypothesis" (9 pages) by Smullyan. Usually, but not always, the mathematical authors attempt to at least indicate some applications outside mathematics of the discipline they are discussing.

One could find fault, perhaps, with one or two of the essays, but taken as a whole this is a remarkable collection. It would seem that even one who is mathematically completely illiterate should be able to read it with both pleasure and profit.

A. S. H.