The problem is very clearly stated; it is the study of rational or irrational $(1, p)$ correspondences between the points of two algebraic surfaces, the p points being the successive images of a given one in a birational correspondence of period p. A projective model of each surface is constructed in hyperspace, such that the birational correspondence becomes a collineation. Involutions are then classified according to the number of invariant points. An isolated invariant point may be perfect or imperfect, according as every direction through it does or does not remain fixed. In the case of imperfect points the two invariant directions are examined further. This process is continued until the form of contact at each point is completely accounted for. The procedure is illustrated by a detailed discussion of a plane cyclic collineation.

A regular surface can not have irregular involutions, but the converse is not true. Each combination is discussed, and the criterion obtained in order that a surface shall represent an involution. Finally the theory is applied to surfaces having a canonical curve of order zero.

The booklet is excellently printed on stiff paper, making an attractive page. It furnishes a welcome resumé of this interesting theory.

VIRGIL SNYDER

Gesammelte Werke. By David Hilbert. Volume 3. *Analysis, Grundlagen der Mathematik, Physik, Verschiedenes. Nebst einer Lebensgeschichte.* Berlin, Springer, 1935. 435 pp.

This third volume completes the edition of Hilbert's collected mathematical papers. The last volume spans over a wide range and reminds one again of Hilbert's outstanding contributions to our mathematical knowledge. It contains the papers on Dirichlet's principle, on the calculus of variations, on Hilbert space, and all his papers on physical problems. The series of investigations on the foundation of mathematics has also been reserved for this volume.

One rereads with pleasure Hilbert's famous talk on mathematical problems at the Paris congress in 1900 and one cannot avoid realizing the tremendous strides of the mathematical sciences in the past third of a century. A majority of his problems have been solved as precisely as they were formulated, and for almost all of them one can say that important contributions have been made. One should not forget to mention in this last volume the necrologues on Weierstrass, Darboux, and Hilbert's long-time friends and associates, Minkowski and Hurwitz. They reveal to us more than anything else Hilbert's human qualities and his unusual ability as a writer.

It should be mentioned that some of Hilbert's papers are not to be found in this edition, most of them papers which have been published in similar versions in several periodicals. His books have also been omitted. Through this expedient it was possible to reduce the number of volumes to three instead of the four originally scheduled. One finds, however, a list of all publications, lectures, and dissertations completed under his supervision.

Hellinger has contributed an account of Hilbert's work on integral equations, and Bernays gives an appreciation of his work on the foundation of mathematics. They are both excellent, clearly and well written, but one has a feeling, particularly in regard to the papers on the foundation of mathematics,