if they have neither a common point nor a common perpendicular. The author develops this "negative" definition into a very remarkable criterion. From an arbitrary point on b, draw g perpendicular to a, and e perpendicular to g. From an arbitrary point on e, draw perpendiculars to a, b, and let h join their feet. Then a and b are parallel if and only if e and h are perpendicular. Following Hilbert, he calls a pencil of parallels an *end*. He uses the above criterion to prove that any two ends determine a line. As an instance of the application of projective geometry to hyperbolic geometry, he points out that Seydewitz's theorem provides an immediate proof for the following property of a trebly-asymptotic triangle: the perpendiculars from any point on one side to the other two sides are perpendicular to each other.

In the elliptic plane, the effect of the absolute polarity is to make the reflection in a line a equivalent to the reflection in its pole A. Every isometry is expressible as the product of two such reflections. Isometries are represented as points in elliptic space, in a manner resembling §§7.3–7.5 of the reviewer's *Non-euclidean geometry* (3rd ed., University of Toronto Press, 1957). The author considers, in this group-space, a plane hexagon $P_1Q_2P_3Q_1P_2Q_3$ whose vertices lie alternately on two lines p and q. He draws lines through P_1, P_2, P_3 left-parallel to q, and lines through Q_1, Q_2, Q_3 right-parallel to p, so as to form Dandelin's *Hexagramme mystique* (cf. H. F. Baker, *Principles of geometry*, vol. 3, Cambridge University Press, 1923, p. 44) consisting of six generators of a Clifford surface. This enables him to prove Pappus's theorem in the plane pq. The deduction is illustrated by a particularly fine perspective view on page 254.

The above remarks may serve to suggest something of the flavor of this unusual book, which is well written, well printed, well indexed, and "chock full" of unfamiliar results. All geometers and most algebraists will be glad to keep it on an accessible shelf.

H. S. M. COXETER

Statistical independence in probability, analysis and number theory. By Mark Kac. Carus Mathematical Monographs, no. 12. New York, Wiley, 1959. 14+93 pp. $3.00.

This delightful little book is an example of informal pedagogy at its best. It entertains, it stimulates interest, it educates (somewhat haphazardly) and it challenges current dogma, all in such deceptively simple style that one feels as if he is reading a popularization from Scientific American. In fact it is popularization, on a very high level, and as such represents an effort on the part of the author which all too few mathematicians undertake nowadays.

As regards its mathematical content, the unifying theme is indicated exactly by the title of the monograph; the main outlines of the historical development of the notion of statistical independence are laid out, and it is shown how this notion has proved to be a keystone of analysis and number theory, as well as of probability and statistics, with which it is more usually associated. With a view to kindling interest by making the underlying ideas more accessible, the author has chosen to omit some details, but he gives a bibliography adequate for leading the interested reader back to the literature. Some knowledge is supposed of Lebesgue measure and integration, Fourier integrals and number theory.

Most of the development hinges ultimately on the specific realization of statistical independence provided by the Rademacher functions. The range of problems considered is very broad, including continued fractions, the law of large numbers and the central limit theorem, normal numbers, prime numbers and additive number-theoretic functions, the ergodic theorem, and the convergence of series with random signs. None of these topics is treated at all intensively, but the rich flow of ideas, the many interrelations which are brought out, and the elegance of exposition, all contribute to provide a remarkable panoramic view of one mathematical landscape.

Professor Kac is an ardent exponent of the theory that what is newest is not always what is best, and he takes the opportunity here to argue against what he considers overemphasis on abstraction in modern mathematics. This is first-class hortatory writing, and it should be read by every graduate student, along with Bourbaki.

W. J. LeVeque

Formes sesquilinéaires et formes quadratiques. By N. Bourbaki. Eléments de Mathématique I, Livre II. Actualités Scientifiques et Industrielles, no. 1272, Paris, Hermann, 1959. 211 pp.

This is volume 24 of Bourbaki's *Elements* (in the simple minded numbering system that seems to serve better than calling it Chapter 9 of Book 2 of Part I). From an impetuous youth who dared to announce that he planned to write up all of mathematics, N. Bourbaki has turned into a middle aged fixture gallantly and interminably teaching us how to do things right. Addicts expect more from Bourbaki—and they get it: a text ranging from watery soup to several solid meat courses, with a stunning collection of exercises for hors