homogeneous coordinates really mean geometrically? In the last chapter the start is made at the other end. A point is defined by a set of coordinates and a line by a linear equation; it is verified that this system obeys all the axioms, and the general collineation and correlation are expressed as linear transformations.

It will be seen from the foregoing that the work is severely and carefully argued from beginning to end, and that within its limitations to the real field and to two dimensions it covers just about everything that one could think of including. The shelving of the serious discussion of continuity to a late stage, by assuming one of its chief results as a temporary axiom, probably makes greatly for the intelligibility of the book to beginners. A great number of admirably clear diagrams (probably more than one to every page on an average) illustrate the ideas. The proofs are lucid, and in nearly every case lay bare the fundamental ideas that are being used rather than obscuring these in a mass of detail. The whole book, indeed, is most readable; there are interesting historical notes on the genesis of the ideas presented and a very good bibliography. An appendix of only a couple of pages briefly indicates the nature of the step from real to complex geometry.

PATRICK DUVAL

Extrapolation, interpolation, and smoothing of stationary time series with engineering applications. By Nobert Wiener. Cambridge, Technology Press of Massachusetts Institute of Technology, and New York, Wiley, 1949. 10+163 pp. $4.00.

This is the second book by Professor Wiener on time series and communication engineering published since 1948. While the first book, *Cybernetics*, treated the subject from a general standpoint and was more philosophical than mathematical, the present book is more technical than theoretical, and is intended to give a useful tool for engineers working in the field of electrical communication and related subjects. This book is essentially a reproduction of a pamphlet which had limited circulation during the war.

The main problem discussed in this book is the following: Let $\{x_t\}$ be a stationary time series of class L^2, where the parameter t runs through all integers (discrete case) or all real numbers (continuous case); given a random variable y of class L^2 and a set T of the values of the parameter t, how can we approximate y by finite linear combinations of x_t with t from T?

In the terminology of Hilbert space, this problem can be formulated in a different manner. Let $\{x_t\}$ be a "sequence" (discrete case)