done easily and quickly by eye. If, instead of "assigning the label A arbitrarily", we pick a to be the smallest of all four entries, a large number of entries in Tables I and II can be eliminated, making the test seem still easier.

John Van Dyke

National Bureau of Standards
Washington, D. C.

1. D. Mainland, "Statistical methods in medical research. I. Qualitative statistics (enumeration data)", *Canad. J. Res.*, Series E, v. 26, 1948, p. 1–166.
2. D. Mainland & I. M. Murray, "Tables for use in fourfold contingency tests," *Science*, v. 116, 1952; p. 591–594.
3. D. Mainland & M. I. Sutcliffe, "Statistical methods in medical research. II. Sample sizes required in experiments involving all-or-none responses," *Canad. J. Med. Sci.*, v. 31, 1953, p. 406–416.
4. R. A. Fisher & F. Yates, *Statistical Tables for Biological, Agricultural, and Medical Research,* Hafner Publishing Company, Inc., New York, 1953.

77[K].—A. M. Yaglom, *An Introduction to the Theory of Stationary Random Functions*, Prentice-Hall, Inc., Englewood Cliffs, New Jersey, 1962, xiii + 235 p., 23 cm. Price $10.60.

This book is an exceedingly well written account of the subject of stationary processes and linear prediction theory. It does not require much mathematical background on the reader's part. The small quantity of Hilbert space theory needed for prediction theory is supplied by the author. Bochner's fundamental theorem (also due to Khinchin) on the representation of positive definite functions as Fourier transforms of finite nonnegative measures is not proved but is discussed at length. The theorem due to Szëgo, and Kolmogoroff's generalization, that

$$\inf_p \frac{1}{2\pi} \int_{|z|=1} |1 - zp(z)|^2 f(\theta)\, d\theta = \exp\left\{\frac{1}{2\pi} \int \log f(\theta)\, d\theta\right\},$$

where p runs through all polynomials in z, $f(\theta) \geqq 0$ in L_1, and its corollaries characterizing deterministic discrete and continuous processes, are also examined but not proved. The problem of linear extrapolation is therefore restricted to cases in which the optimal estimate can be expressed as an infinite series of past values:

$$\hat{\xi}_m = a_1\xi_{-1} + a_2\xi_{-2} + \cdots + a_k\xi_{-k} + \cdots,$$

$m \geqq 0$, in which the series converges in $L_2(f(\theta))$, f being the power density. The case in which $f(\theta)$ is a rational function of $e^{i\theta}$ is treated in detail. The extrapolation problem is followed by a chapter on linear filtering; that is, given ζ_n for $n \leqq -1$, with $\zeta_n = \xi_n + \eta_n$, find the optimal estimate of ξ_m. The problem is solved in detail for the case in which ξ and ζ have power densities rational in $e^{i\theta}$. The problems of extrapolation and filtering for random functions (instead of sequences) come next, with a chapter for each. This new edition concludes with two short appendices: one on generalized random processes, in which "white noise," for example, can be defined rigorously; and the other, written by D. B. Lowdenslager, on some recent developments, in particular, vector-valued processes.

Although the reviewer does not read Russian, it must be concluded on the basis of the beautiful style of the book that the translator, R. A. Silverman, has done an excellent job of translating or writing, or both. This book will provide both for beginners and for more experienced mathematicians a fundamental grasp of the applied aspects of linear prediction theory, and is highly recommended.

JOSEPH BRAM

Operations Evaluation Group
Arlington, Virginia

78[K].—A. H. ZALUDOVA, "The non-central t-test (q-test) based on range in place of standard deviation," *Acta Technica*, v. 5, 1960, p. 143–185.

This paper presents tables of percentage points of the non-central q-distribution and additional tables which were used to compute these percentage points. The non-central q is a non-central t-type statistic, which is based on the mean sample range. Because of the ease with which it is used, the non-central q-test is proposed as a substitute for the non-central t-test as given by Johnson and Welch [1], especially when the application is in sampling inspection by variables.

The statistic q is given by

$$q(m, n) = \frac{T - \bar{x}}{\bar{w}(m, n)},$$

where $\bar{w}(m, n)$ is the mean of the m ranges of m sub-samples, each of size n, drawn from a normal population $N(\mu, \sigma)$; $\bar{x}$ is the over-all sample mean; and

$$T = \mu + K_p\sigma,$$

where K_p is the normal deviate exceeded with probability p. The distribution of $q(m, n)$ is derived by the author.

Tables 1, 2, 4, and 5 give percentage points q_ϵ to 3D for percentiles $\epsilon = .05, .95, .25$, and $.75$. For each value of ϵ the points are tabulated for $m = 1(1)5, n = 3(1)12$, and $p = .20, .10, .05, .02, .01$, and $.001$. Some details of the computation of the values and remarks on their accuracy are given.

In order to calculate the percentage points q_ϵ it was necessary to tabulate the frequency functions $f_m(\bar{w}_m)$ of the sample range and mean range, $\bar{w}_m$ denoting the mean range in m independent sub-samples from a normal population having unit standard deviation. This was done only for combinations $m = 1, 2, 4$ and $n = 3, 4, 6, 8, 10, 12$. These values of $f_m(\bar{w}_m)$ are given in Tables 7, 8, and 9. All values are given to at least 5D. They are tabulated for the following intervals of $\bar{w}_m$: $\bar{w}_1$ (single range) $= 0.0(0.1)8.2$, $\bar{w}_2 = 0.0(0.1)6.5$, and $\bar{w}_4 = 0.1(0.1)5.5$. These three tables were used to calculate a framework table of values of q_ϵ from which values of q_ϵ for other combinations of m and n were obtained by interpolation. Remarks on the calculation and accuracy of the values of $f_m(\bar{w}_m)$ are made.

It was found desirable for interpolation to know the limiting value of q_ϵ for $m = \infty$. The limiting distribution of q is derived and found to be concentrated at the point $E(q) = K_p/d_n$, where d_n is the expected value of the range in samples of size n from a normal population with unit standard deviation. Table 3 gives values of K_p/d_n to 5D for $n = 3(1)12$ and values of K_p corresponding to $p = .20, .10, .05, .02, .01$, and $.001$.

One additional table (Table 6) is presented; it shows a comparison of the non-