tribution law. The author finds Pr $(X \leqq h, Y \leqq k, Z \leqq m)$ in terms of three functions:

$$G(x) = (2\pi)^{-1/2}\int_{-\infty}^{x} \exp\left(-\frac{x^2}{2}\right) dx, \qquad T(h, a)$$

$$= (2\pi)^{-1} \int_0^a [\exp \{-h^2(1 + x^2)/2\}](1 + x^2)^{-1}\, dx,$$

and

$$S(h, a, b) = \int_{-\infty}^{h} T(as, b)G'(s)\, ds.$$

The T-function has been tabulated by D. B. Owen [1, 2] and a table of $S(m, a, b)$ is given in the present paper to 7D for $a = 0(.1)2(.2)5(.5)8$, $b = .1(.1)1$ and a range of values of m decreasing from $0(.1)1.5$, ∞ for $a = 0(.1)1.2$ to $0(.1).3$, ∞ for $a = 6(.5)8$. The tabulated values are believed accurate to 0.6 in the seventh decimal place. There is considerable discussion of the main problem, of properties of and relations among the functions used, and a numerical example is worked out. The method of construction of the table is given and the efficacy of linear interpolation in it is discussed.

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1. D. B. Owen, *The Bivariate Normal Probability Distribution*, Office of Technical Services, Department of Commerce, Washington, D. C., 1957, [*MTAC* Review 134, v. 12, 1958, p. 285–286.]
2. D. B. Owen, "Tables for computing bivariate normal probabilities," *Ann. Math. Stat.*, v. 27, 1956, p. 1075–1090. [*MTAC* Review 135, v. 12, 1958, p. 286.]

90[K].—G. Taguti, "Tables of tolerance coefficients for normal populations," Union of Japanese Scientists and Engineers, *Reports of Statistical Application Research*, v. 5, 1958, p. 73–118.

The tolerance limits T_1, T_2 are to be determined so that with probability $1 - \alpha$ the interval (T_1, T_2) includes a given fraction, P, of the population. Following the method of Wald & Wolfowitz [1] for a sample from $N(\mu, \sigma^2)$, T_1 and T_2 are found by $T_1 = \hat{\mu} - k\sqrt{S_e/\nu}$ and $T_2 = \hat{\mu} + k\sqrt{S_e/\nu}$, in which $\hat{\mu}$ is an unbiased estimate of μ with variance σ^2/n and S_e is an independent error sum of squares with ν degrees of freedom. As illustrated by the author this permits useful applications in which n is not simply the sample size and $\nu = n - 1$ as is the case for the tables of Bowker [2]. The present tables give k to 3S for $P = .9, .95, .99$, $1 - \alpha = .9, .95, .99$, $n = .5(.5)2(1)10(2)20(5)30(10)60(20)100, 200, 500, 1000, \infty$ and $\nu = 1(1)20(2)30(5)100(100)1000, \infty$. The calculations were done with a slide rule and the author fears there may be errors up to one per cent. Some cursory comparisons with Bowker's tables for $\nu = n - 1$ showed frequent differences in the third significant figure.

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1. A. WALD & J. WOLFOWITZ, "Tolerance limits for a normal distribution," *Ann. Math. Stat.*, v. 17, 1946, p. 208–215.
2. CHURCHILL EISENHART, M. W. HASTAY & W. A. WALLIS, *Techniques of Statistical Analysis*, McGraw-Hill Book Co., New York. 1947. (See p. 102–107.)

91[K].—R. F. TATE & R. L. GOAN, "Minimum variance unbiased estimation for the truncated Poisson distribution," *Ann. Math. Stat.*, v. 29, 1958, p. 755–765.

For a sample of n from a population with the density function, $e^{-\lambda}\lambda^x/(1 - e^{-\lambda})$, $x = 1, 2, \cdots$, i.e., a Poisson distribution truncated on the left at $x = 1$, the authors derive the minimum variance unbiased estimation of

$$\lambda : \tilde{\lambda}_0(t) = \frac{t}{n}\left(1 - \frac{\mathfrak{S}_{t-1}^{n-1}}{\mathfrak{S}_t^n}\right) = \frac{t}{n}\, C(n, t),$$

in which t is the sample sum and $\mathfrak{S}_t^n$ is a Stirling number of the second kind. Using an unpublished table of F. L. Micksa [1] of $\mathfrak{S}_t^n$ for $n = 1(1)t$, $t = 1(1)50$, this paper contains a table of $C(n, t)$ to 5D for $n = 2(1)t - 1$, $t = 3(1)50$.

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1. FRANCIS L. MIKSA, *Stirling numbers of the second kind*, RMT 85, *MTAC* v. 9, 1955, p. 198.

92[K, P].—P. A. P. MORAN, *The Theory of Storage*, John Wiley & Sons, Inc., New York, 1960, 111 p., 19 cm. Price $2.50.

This is a book about dams. Prof. Moran is at the Australian National University at Canberra, and I imagine that dams have great practical interest there. For many years he has been interested in estimating the probability that a dam will go dry or that it will overflow. He is also interested in how one finds a program of releasing water from a dam in such a way as to optimize the operations of a hydroelectric plant.

The first chapter contains some basic information about statistics and probability. To spare 14 pages for this from a total of a mere 96 shows how necessary Prof. Moran considered it to be.

The second chapter considers various general inventory and queueing problems analogous to dam problems.

In the third chapter the author plunges into his favorite topic, dams. First he considers discrete time—he looks at his water level only once a day. Under certain conditions distributions for the amount of water can be found, but two troublesome conditions occur which limit the regions of analyticity of the distributions. One is overflow. The other is running dry. If one ignores either or both of these, then he is dealing with an imaginary "infinite dam". Some queueing is analogous to an infinite dam, since there is no law limiting the lengths of queues.

Another chapter is devoted to dams which have as input a continuous flow, and from which the release is continuous.

In practice the inputs do not satisfy the assumption of independence, dry weeks tend to come in succession, so the results of the first four chapters are of limited applicability. Monte Carlo methods get estimates of the probabilities without