REVIEWS AND DESCRIPTIONS OF TABLES AND BOOKS

1[F].—MARGARET ASHWORTH & A. O. L. ATKIN, *Tables of $p_k(n)$*, copy deposited in UMT file.

Define $p_k(n)$ by

$$\prod_{m=1}^{\infty}(1-x^m)^k = \sum_{n=0}^{\infty} p_k(n)x^n.$$

Then $p_{-1}(n)$ is the well-known partition function, generally written $p(n)$, and $p_{24}(n-1)$ is the famous Ramanujan function $\tau(n)$. The 688 computer sheets here give two tables, the first being

$$p_k(n), \qquad k = 10(1)15, \qquad n = 1(1)16200,$$

225 entries listed per page, and the second gives

$$p_k(n), \qquad k = 16(1)31, \qquad n = 1(1)1920,$$

120 entries listed per page.

There are very few published tables of these functions. In [1], Newman gives $k = 1(1)13$ to $n = 800$, and $k = 14, 15, 16$ to $n = 750, 500$, and 400, respectively. There are a number of tables of $\tau(n)$, the best published being that ot Watson to $n = 1000$ [2]. The present table ($k = 24$) goes to $n = 1921$. There is a table by Lehmer [3] to 2500, said to be in the UMT file, but in fact not there at this time.

The present table was computed at the Atlas Computer Laboratory by recursive multiplication with the gap series for $k = 1$, using the Chinese remainder theorem for the needed multi-length precision. No indication of checking was included, but the reviewer has made some spot comparisons for $k = 24$ with the table in [2], and verified that Kolberg's relation for $k = 23$:

$$p(n+1) \equiv p_{23}(n) \mod 5 \qquad (n \equiv 0, 1 \mod 5)$$

is valid for $n < 200$ and $800 < n < 1000$.

At some future date the second-named author plans to discuss the zeros:

$$p_k(n) = 0.$$

The copy that was deposited here was the personal copy of the reviewer. This may be superseded by a more formal copy from the authors, including the tables for $4 < k < 10$, and details of the computation.

D. S.

1. M. NEWMAN, "A table of the coefficients of the powers of $\eta(\tau)$," *Nederl. Akad. Wetensch. Proc. Ser.* A, v. 59, 1946, pp. 204–216.
2. G. N. WATSON, "A table of Ramanujan's function $\tau(n)$," *Proc. London Math. Soc.*, (2), v. 51, 1950 (paper is dated 1942), pp. 1–13.
3. D. H. LEHMER, *Tables of Ramanujan's $\tau(n)$*, UMT **101**, *MTAC*, v. 4, 1950, p. 162. Copy said to be deposited in UMT file.