subtle and imperceptible threshold between pupil and student, and the absence of evidence that everyone can reach or cross this threshold; and he urged that it is the supreme duty of a sixth-form teacher to lead his charges to this threshold and encourage them to venture beyond, independent of teacher or text-book. A similar task, different only in level, confronts every teacher in further education. Britain's economic and industrial future, no less than the extent to which she can rise to her opportunities of leadership, alike depend largely on the effectiveness and vision with which it is discharged.

MATHEMATICAL TABLES

Table of Values of the Function

$$w(z) = e^{-z^2}\left(1 + \frac{2i}{\sqrt{\pi}}\int_0^z e^{t^2}\,dt\right)$$

for Complex Argument

By V. N. Faddeyeva and N. M. Terent'ev. Edited by V. A. Fok. Translated from the Russian by D. G. Fry. (Mathematical Tables Series, Vol. 11.) Pp. v+280. (London and New York: Pergamon Press, 1961.) 100*s*. net.

Tables of Airy Functions and Special Confluent Hypergeometric Functions for Asymptotic Solutions of Differential Equations of the Second Order

By A. D. Smirnov. Translated from the Russian by D. G. Fry. (Mathematical Tables Series, Vol. 7.) Pp. vii+260. (London and New York: Pergamon Press, 1960.) 100*s*. net.

Bessel Functions

Part 3: Zeros and Associated Values. Edited by F. W. J. Olver. Prepared under the direction of the Bessel Functions Panel of the Mathematical Tables Committee. (Royal Society Mathematical Tables, Vol. 7.) Pp. lx+79. (Cambridge: At the University Press, 1960.) 50*s*. net.

Tables of the Riemann Zeta Function

By C. B. Haselgrove, in collaboration with J. C. P. Miller. (Royal Society Mathematical Tables, Vol. 6.) Pp. xxii+80. (Cambridge: At the University Press, 1960. Published for the Royal Society.) 50*s*. net.

Representations of Primes by Quadratic Forms

Prepared by Hansraj Gupta, M. S. Cheema, A. Mehta and O. P. Gupta. Edited by J. C. P. Miller. (Royal Society Mathematical Tables, Vol. 5.) Pp. xxiv+125. (Cambridge: At the University Press, 1960.) 45*s*. net.

ANY suggestion that the advent of electronic computers may lead to the cessation of further publication of mathematical tables is refuted by this collection of new tables. The collection is particularly interesting, since the first two are of Russian origin, and allow some sort of comparison with British tables.

The first volume deals with a function $w(z)$, which at first sight would appear to have little practical value. But if we write $z = x + iy$, then both $w(x)$ and $w(iy)$ are simply related to integrals of exp $\pm t^2$, and when $x = y$, $w(z)$ is connected with integrals of the Bessel function $J_{\pm\frac{1}{4}}(t)$. The function itself may be expressed in the form:

$$w(z) = \frac{i}{\pi}\int_{\infty}^{\infty} \frac{\exp - t^2\,dt}{z-t}$$

It occurs in scattering theory, in the propagation of electromagnetic waves, and in the breadth of spectral lines. These tables give $w(x + iy)$ for $0 \leqslant x,y \leqslant 5$, to 6 figures, with differences, and at a tabular interval of 0·1. The tables themselves are clear to read, but it is a pity that not more information is available about their checking, and the elimination of errors. The publishers apologize for the 'messy' character of the introductory pages. The apology is very appropriate.

The second volume, by Smirnov, deals with Airy functions. These functions satisfy differential equations of the form $y''(x) + x^a y(x) = 0$. They appear frequently in all sorts of numerical methods, and their tabulation in detail is very desirable. This collection gives $y(x,a)$ and certain derivatives and differences, for $|x| \leqslant 6$ at intervals of 0·01, and for 16 rational values of a between $-\frac{3}{4}$ and 2. Lagrangian interpolation is possible to within 10^{-3} on average. The tables are beautifully printed, and are presumably copied photographically from the Russian original. The preliminary explanatory material is less attractive, and the volume is rendered less satisfying than it could be by the inclusion of some so-called "confluent hypergeometric functions", which are quite distinct from the usual function $F(a,b,x)$ of that name.

The remaining three volumes are all part of the Royal Society series of mathematical tables. Here we meet an element of distinction, previously missing. All three introductory sections are alive, well informed and interestingly written. In particular, the volume on Bessel functions—which is No. 3 in the series, and follows earlier volumes in 1937 and 1952—reads like a detective story. It is an intriguing sign of the influence of electronic computers that in the end, as part of the checking process, 18 years of work by desk machines was repeated in 12½ hours on the computer. But zeros of transcendental functions are notoriously difficult to evaluate. Here again are given the first fifty zeros of J_n, Y_n, J_n' and Y_n', together with those for the gradient of the spherical Bessel functions, for $n = 0(\frac{1}{2})20\frac{1}{2}$. The layout is good, and the methods of testing and checking are clearly stated. This is a first-rate volume.

With the Riemann zeta function we enter the realm of pure mathematics. There is still no proof that all the non-trivial zeros of $\zeta(s)$ in the critical strip for which the real part of s lies between 0 and 1, are on the critical line bisecting this strip. But this seems to be the case so far as calculations have been carried. This volume gives the real and imaginary parts of $\zeta(\frac{1}{2} + it)$ and $\zeta(1 + it)$ for $t = 0$ (0·1) 1000 to 6 decimals. Immense tabulation on a computer was needed. But the results are worth it.

Finally, we have Gupta's tables giving various representations of prime numbers p not exceeding 100,000. If $p = a^2 + Db^2$, where D = 5, 6, 10 or 13, the values of a and b are given (if they exist) for all p. So also is the least value of k and corresponding n, where, for the same p and D, $kp = n^2 + D$. These tables are easy to read, and should give much pleasure to those mathematicians interested in the theory of quadratic fields. The tests used by the authors are impressive. The typing of the tables in a form suitable for direct photo-copying was admirably done on a card-controlled typewriter. C. A. COULSON

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