ration of the present table. It seems appropriate to note here that a proposal for a similar table was made by O. Kohl [3] in 1953, using basic data computed by Peters.

The user of this table will undoubtedly read with profit the detailed discussion of both direct and inverse linear interpolation, including the use of both Lagrange's formula and Taylor's theorem, which is supplemented by a total of ten numerical illustrations. On the other hand, the user will vainly search in this book for a description of the procedures followed in the calculation and checking of the tabular data. Furthermore, he will probably be somewhat disconcerted to discover at the beginning of the table an inserted slip advertising several errors, the most conspicuous occurring in sin 30°!

Through correspondence with Dr. Salzer this reviewer learned the following details relating to the preparation of this table. Dr. Levine used a computer program based on Maclaurin series to obtain 15D values of sine and cosine at multiples of 0.001°, which were rounded to 10D on the computer and stored on tape preliminary to printout. A similar table was subsequently calculated by Ward Hardman on another electronic computer, using a different double-precision program, involving the use of key values in conjunction with the appropriate addition formulas. Proofreading of both versions of the table was performed by Dr. Salzer, who thereby found no error in the duplicate table of Hardman.

The isolated error in sin 30° was apparently caused by an error in the routine for converting the computer output from binary to decimal form. The error in sin 38.441° noted on the errata slip is clearly attributable to a typographical imperfection, whereas the error noted in sin 42.055° was caused by a careless hand-correction of a partially obliterated digit when this table was printed in Poland. Neither of these last two errors appeared in the original computer output.

A number of additional examples of annoying typographical imperfections are to be found, notably in cos 2.268° and sin 38.438°, where individual digits are nearly obliterated. Despite these defects, this unique table should be very useful and reliable, after the necessary emendations have been made. Especially welcome would be a second printing, of improved quality, incorporating the known corrections.

J. W. W.

1. National Bureau of Standards, *Table of Sines and Cosines to Fifteen Decimal Places at Hundredths of a Degree*, Applied Mathematics Series, No. 5, U. S. Government Printing Office, Washington, D.C., 1949.
2. J. Peters, *Seven-Place Values of Trigonometric Functions for Each Thousandth of a Degree*, Van Nostrand, New York, 1942.
3. A. Fletcher, J. C. P. Miller, L. Rosenhead, & L. J. Comrie, *An Index of Mathematical Tables*, Second Edition, Addison-Wesley, Reading, Massachusetts, 1962. (See Vol. I, Art. 7.2, p. 173.)

36[E].—H. C. Spicer, *Tables of the Ascending Exponential Function* e^x, U. S. Geological Survey, Washington 25, D. C. Deposited in UMT File.

This manuscript is in the form of original computation sheets. It contains the values of e^x with x ranging in value as follows: [0(0.0001)1] 21D; [1(0.001)6.963] 24D; [6.96(0.01)15.80] 24D.

On each sheet the column indicated as x, the argument, is followed immediately on the same line with the 25-decimal-place value of e^x. The four sets of values just beneath the tabular e^x are to be disregarded, as they were obtained as parts of the computational procedure. The vertical lines drawn in divide the decimal part of the table into groups of five places.

Values indicated by a check have been recalculated either by another computer or by comparison with previous tabulations.

AUTHOR'S SUMMARY

37[E].—H. C. SPICER, *Tables of the Descending Exponential Function* e^{-x}, U. S. Geological Survey, Washington 25, D. C. Deposited in UMT File.

This manuscript is in the form of original computation sheets. It contains the values for e^{-x} with x ranging in value as follows: [0(0.0001)1] 25D; [1(0.001) 3.923] 25D; [3.923(0.01)10] 25D.

On each sheet the column indicated as x, the argument, is followed immediately on the same line with the 25-decimal-place value of e^{-x}. All of the values tabulated between two tabular values of e^{-x} are not to be used, as they were obtained as parts of the computational procedure.

The values indicated by C. K. at each 0.0005 mid-value are check values obtained by an additional computation. The difference between the two values is only indicated for the digits at the end of the value.

The values indicated by T. V. are comparison values from previous tabulations. The difference, as before, is only indicated for the end digits.

AUTHOR'S SUMMARY

38[F].—ROBERT SPIRA, *Tables Related to* $x^2 + y^2$ *and* $x^4 + y^4$. Five large manuscripts deposited in UMT files.

The following three tables have been computed:

1. All representations of $p^k = a_i^2 + b_i^2$, where p is a prime $\equiv 1 \pmod 4$ and $p < 1000$. The k's are such that max $(a_i, b_i) < 2^{35}$. The factorizations of a_i and b_i are also given.

2. All representations of $n = a^2 + b^2$ for $n < 122{,}500$. Also given are the factorizations of n, a, and b. The table continues to $n = 127{,}493$ but is not complete here, since a and b are always less than 350. Francis L. Miksa [1] has previously given the representations of the odd $N < 100{,}000$; as he explains in his introduction, the even N are easily derived from these. Miksa did not give the factorizations of n. It is not clear why Spira factors a and b also.

3. All representations of $n = a^4 + b^4$ for a and $b \leqq 350$. The table is thus complete for $n < 351^4 = 15{,}178{,}486{,}401$ but continues up to $n = 350^4 + 350^4$. Also given are the factorizations of n, a, and b.

This last table was searched for solutions of

$$U^4 + V^4 = W^4 + T^4,$$

and only the three known solutions, for U, V, W, and $T \leqq 350$, were found. This confirms the result of Leech [2]. The author adds that there is no solution of $U^5 + V^5 = W^5 + T^5$ for U, V, W, and $T \leqq 110$.

The calculations were done using a sorting routine on an IBM 704 in the University of California Computer Center.

D. S.