10[11D09].—RANDALL L. RATHBUN, *Table of Equal Area Pythagorean Triangles, from coprimitive sets of integer generator pairs*, iii+199 pp., deposited in the UMT file.

Diophantus of Alexandria asks for three equal area right triangles [6, Ch. XX, p. 500], showing very old interest in this question of triangles of equal area. Dickson studies the problem, mentioning that Pierre de Fermat showed how to obtain as many rational triangles as one desires from a given one, all with the same area [3, Ch. IV, pp. 172–174]. This question of Diophantus was raised by Lewis Carroll of Alice in Wonderland fame, and answered by both J. P. McCarthy [8] and D. L. MacKay [7], who gave a short list of n-triangles of equal area for $1 < n < 6$. Taking up the problem, W. P. Whitlock, Jr. discusses the question at some length and provides two parametric solutions [10]. He additionally repeats D. L. MacKay's tables. Martin Gardner asked for more sets of triples of primitive Pythagorean triangles other than the one found by Charles Shedd in 1945 [4]. Most recently, Andrew Bremner considers the problem as a set of linear automorphisms upon an elliptic surface and gives a list of parametric solutions [2].

There appear to be two extensive lists of primitive Pythagorean triangles deposited in the UMT file, the first by A. S. Anema [1] and the second by Francis L. Miksa [9], arranged according to increasing areas.

The present table is the result of an extensive computer search to find all sets of Pythagorean triangles (primitive or not) that have equal area and are created from integer generator pairs (m, n) in $(*)$ such that their areas are equal:

$$(*) \quad A = 2mn, \quad B = m^2 - n^2, \quad C = m^2 + n^2; \qquad \text{Area} = AB/2.$$

The table lists 9916 sets of coprimitive generator pairs on 199 pages. There are 50 sets per page, and the relative indexed entry range is given at the top along with the actual generator pairs covered. All coprime opposite parity generator pairs are in bold, because they generate primitive triangles. Also, any area not divisible by 10 is printed in bold.

All 49,995,000 (m, n)-pairs from $(2, 1)$ to $(10000, 9999)$ were searched. The third page of the introduction gives a short summary page of all primitive triplets, all quadruplets, and all quintuplets of equal-area triangles found. There appear to be only five primitive triplets found so far, the author's main purpose for creating the table.

All sets of pairs provide solutions for the face diagonal type of rational cuboid solution, as noted in Problem **D18** of [5, pp. 97–103]. The author is making available an ASCII MSDOS version of the table on a floppy disk for a nominal fee upon the asking.

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1. A. S. Anema, *Primitive Phythagorean triangles with their generators and with their perimeters up to* 119,992, manuscript in the UMT file, MTAC **5** (1951), UMT **111**, p. 28.

2. Andrew Bremner, *Pythagorean triangles and a quartic surface*, J. Reine Angew. Math. **318** (1980), 120–125.

3. Leonard E. Dickson, *History of the theory of numbers*, Vol. II, Chelsea, New York, 1956.

4. Martin Gardner, *Simple proofs of the Pythagorean theorem and sundry other matters*, Mathematical Games, Scientific American, October 1964, Volume 211, #4, pp. 118–126.
5. Richard K. Guy, *Unsolved problems in number theory*, vol. 1, Springer-Verlag, New York, 1981.
6. Thomas Heath, *A history of Greek mathematics*, Volume II, from Aristarchus to Diophantus, Dover, New York, 1981.
7. D. L. MacKay, *Solution to Problem* E327[1938, 248] *proposed by Philip Franklin*, Amer. Math. Monthly **46** (1939), 169–170.
8. J. P. McCarthy, *A Lewis Carroll problem*, Mathematical Notes 1196, Math. Gaz. **20** (1936), 152–153.
9. Francis L. Miksa, *Table of primitive Pythagorean triangles, arranged according to increasing areas*, 5 vol. ms. comprising a total of 27+980 pp. deposited in UMT file; see Math. Comp. **23** (1969), Review **69**, p. 888.
10. W. P. Whitlock, Jr., *Rational right triangles with equal area*, Scripta Math. **9** (1943), 155–161; ibid., pp. 265–268.

11[11D09].—Randall L. Rathbun & Torbjörn Granlund, *The Integer Cuboid Table, with Body, Edge, and Face Type of Solutions*, vii+399 pp. (2 vols.) + *The Integer Cuboid Auxiliary Table*, 100 pp., deposited in the UMT file.

The Integer Cuboid Table and its Auxiliary Table is the collation of computer searches for all three types of integer cuboids as noted in Problem **D18** of [1, pp. 97–103]. The range of the smallest edge is from 2 to 333,750,000 exhaustively, and 19,929 primitive cuboids were found (6800 body, 6749 face, and 6380 edge).

There exist earlier lists of cuboids, or cuboid generators, but they cover only one type of cuboid at a time, or list only the generators [2–8, 11]. Furthermore, they are not exhaustive over the dimensions of the cuboid, and have corrections [9, 10, 12]; hence this present table, which attempts to be accurate and complete both over the dimensions and type of cuboid solutions.

The new table is presented as a two-volume set, owing to its extensive length. There are 50 cuboids listed per page. At the top of the page is the indexed range of cuboids covered, both by their smallest edge and number of actual occurrence. Upon each line is listed the type of cuboid, B, F, E standing for body, face, and edge cuboids, respectively. Next is given the three edges and body diagonal of the actual cuboid. The primitive Pythagorean generator pairs for each type of cuboid are the last set of entries per solution. At the bottom of each page is given the subtotal of the B, F, E types and then a running total of all types found. The Auxiliary Table is indexed as a supplement to match the cuboid table, giving the irrationality of either the edge or diagonal of a selected cuboid in terms of a square and small excess or deficit, whichever is closer.

The seven-page introduction provides an adequate instruction about the integer cuboid problem, and introduces some properties of the Pythagorean generators associated with each type of solution. Additionally, a simple summarization is provided of the cuboid table, including other tables resulting from its study, such as cuboid solutions with pairs of common values, extended B, F, E solutions not covered in the current table, but derivable from an entry, etc.

The first author is making available a catalog and/or copy of one of these tables upon request. Additionally, an extensive bibliography of over 60 references on the integer cuboid is also available.