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R. Vaughan
& NJAS
Correspondence
1975

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New Sequence
squares folled by 2

VAUGHAN

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T91

Due!

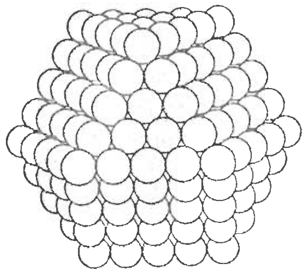
NJA Sloane
Mathematics Research Center
Bell Tel. Lab's. Inc.

Dear Sir,

I just purchased your book, A Handbook of Integer Sequences & enjoy it. I wonder if I could be put on the list for persons receiving supplements. I will be happy to forward sequences you may have missed. I couldn't find this one: 1, 12, 42, 92, 162, 252, etc, for the number of spheres in a closest-packing model. $10 \times (\text{the number of layers})^2 + 2$ = the total number of spheres (not including the central sphere the others are packed around). See Wizard Of The Dome by Sidney Rosen (Little. Brown) about R. Buckminster Fuller, P. 108, 109, 110.

Yours truly,

R. Vaughan



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What name could he give to this pattern of spheres? Bucky decided that the most obvious name would be "the closest packing of spheres." He did not know that many years before, about the time he was born, a scientist named Barlow had already suggested this principle as one way of describing how atoms were structured in common salt, and in other crystalline forms of matter. Nor did Bucky know that at about the same time he was beginning his sphere-packing game an English physicist named Sir William Bragg had shot x-rays through crystals in an effort to uncover crystalline structure. Bragg had found the same kind of patterns as had Bucky. Of course, the English scientist knew nothing of a wild-eyed American inventor named R. Buckminster Fuller. But Bragg chose Barlow's description of *closest-packing* for the atomic arrangements he found in crystals.

Playing his game further, Bucky discovered that he could predict the number of spheres in a closest-packing model by using a simple mathematical formula:

$$10 \times (\text{the number of layers})^2 + 2 = \text{the total number of spheres.}$$

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A5901

Mar 13/75

Dear Mr. Sloane

Enclosed is a xerox of the page from Sidney Rosen's book, WIZARD OF THE DOME, aimed at young readers, about Buckminster Fuller.

10 × (number of layers)^2 + 2 = total number of spheres, it is now obvious to me, is actually the number of spheres in the 14-sided polyhedron, with surfaces consisting of 8 triangles & 6 squares.

From a consideration of this polyhedron, and the vector equilibrium which Fuller considered its edges, - plus the lines ~~from~~ to its vertices ~~to its~~ from its center - to represent, Fuller went on to consider the 20-sided regular polyhedron, the ICOSAHEDRON; and this led him to the octahedron & this in turn led him to the tetrahedron, which he holds in great repute in his theories. (how mystical these theories are, I do not know - !).

Might $10n^2 + 2$ ~~might~~ still have sufficient interest for your collection?

Yours truly,

R. Vaughan

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PS - How about 1, $\underbrace{100, 200, 400, 800, 1500, 5000, 10,000,}_{\text{the numbers of metres in olympic running races?}}$

A5901

MAR 20 1975

Mr. R. Vaughan
Box 12
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Dear Mr. Vaughan:

Many thanks for your letter of March 13, 1975 and the enclosed photocopy of the page from the Wizard of the Dome. I think $a_n = 10n^2 + 2$ is too special to put in the book. The trouble with it is that if you have the first 8 or 10 terms then it really is obvious. I later added it as A5901

Best regards,

MH-1216-NJAS-mv

N. J. A. Sloane