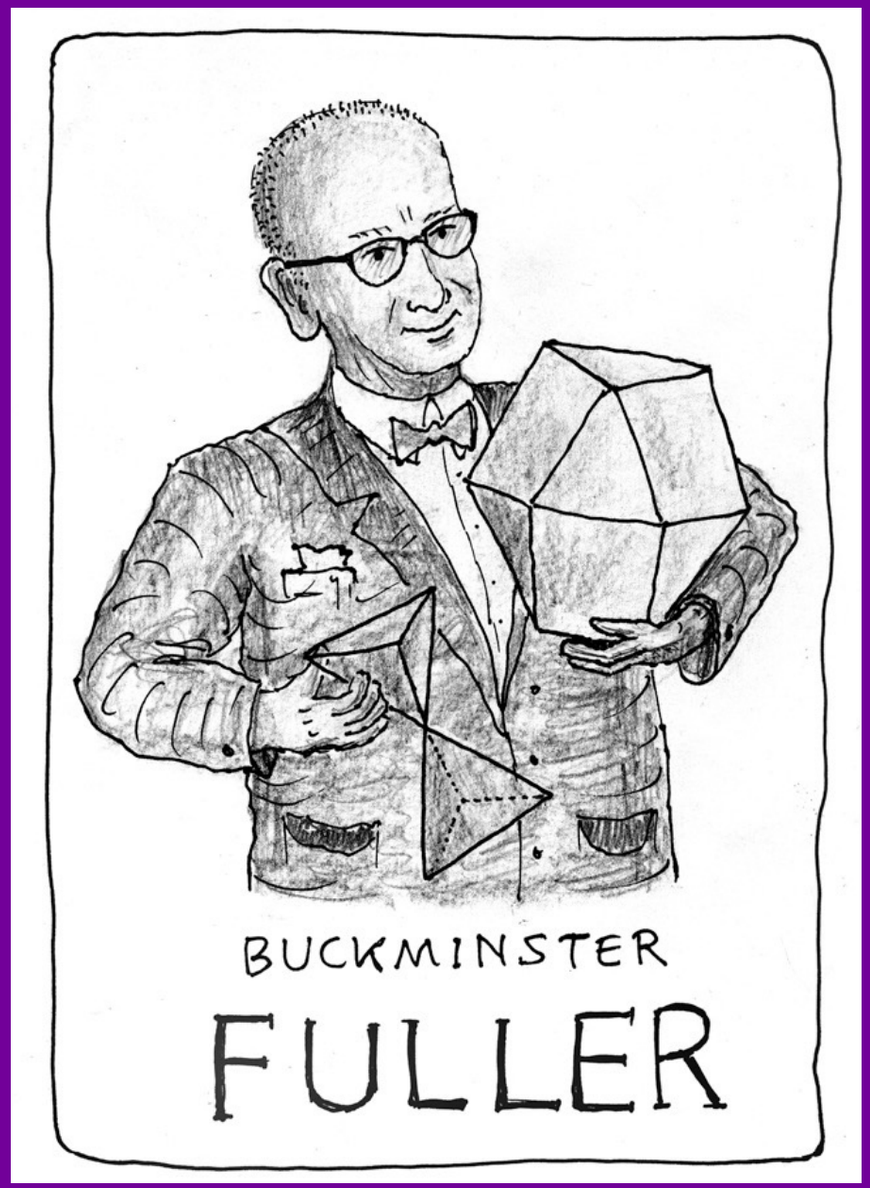
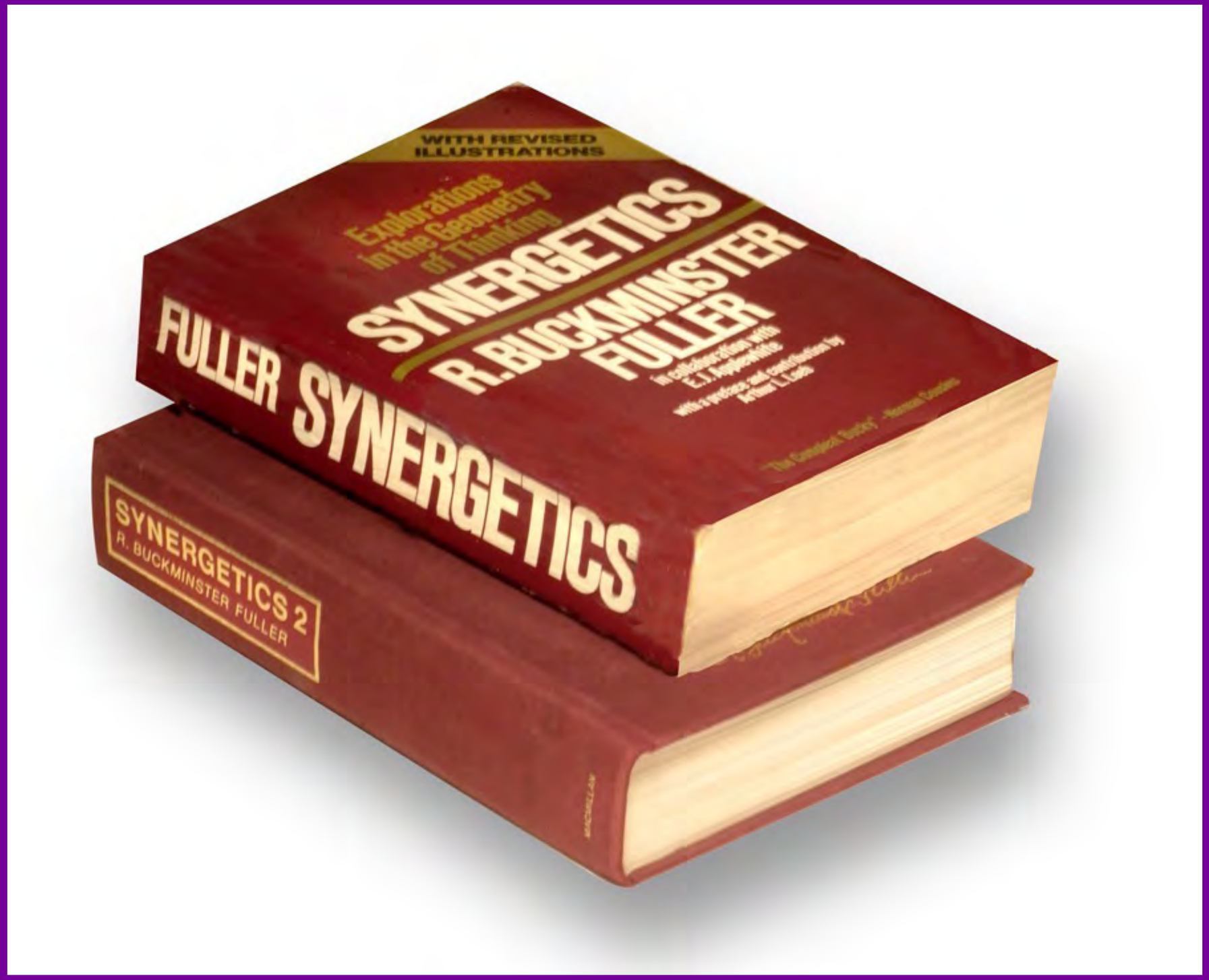
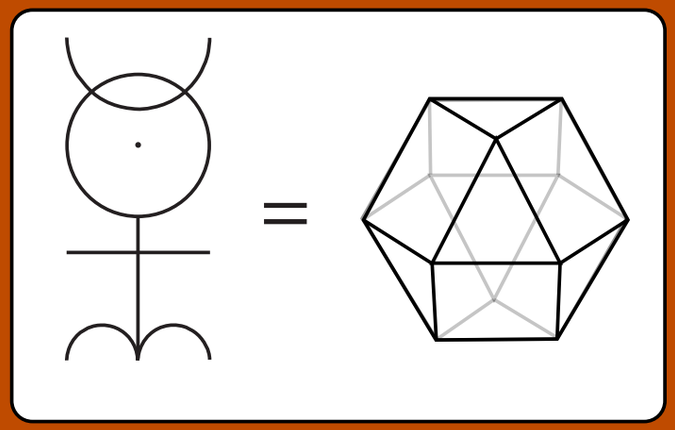

BUCKMINSTER
FULLER

Bucky designs cars, homes, maps, and domes

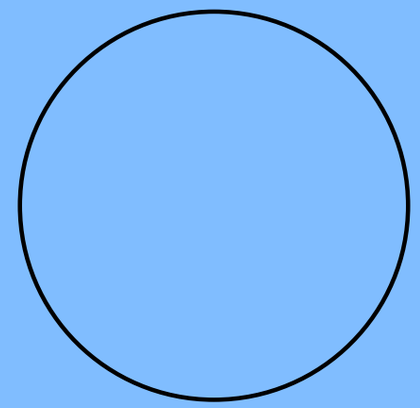

WITH REVISED ILLUSTRATIONS
Explorations in the Geometry of Thinking
SYNERGETICS
R. BUCKMINSTER FULLER
FULLER SYNERGETICS
SYNERGETICS 2
R. BUCKMINSTER FULLER

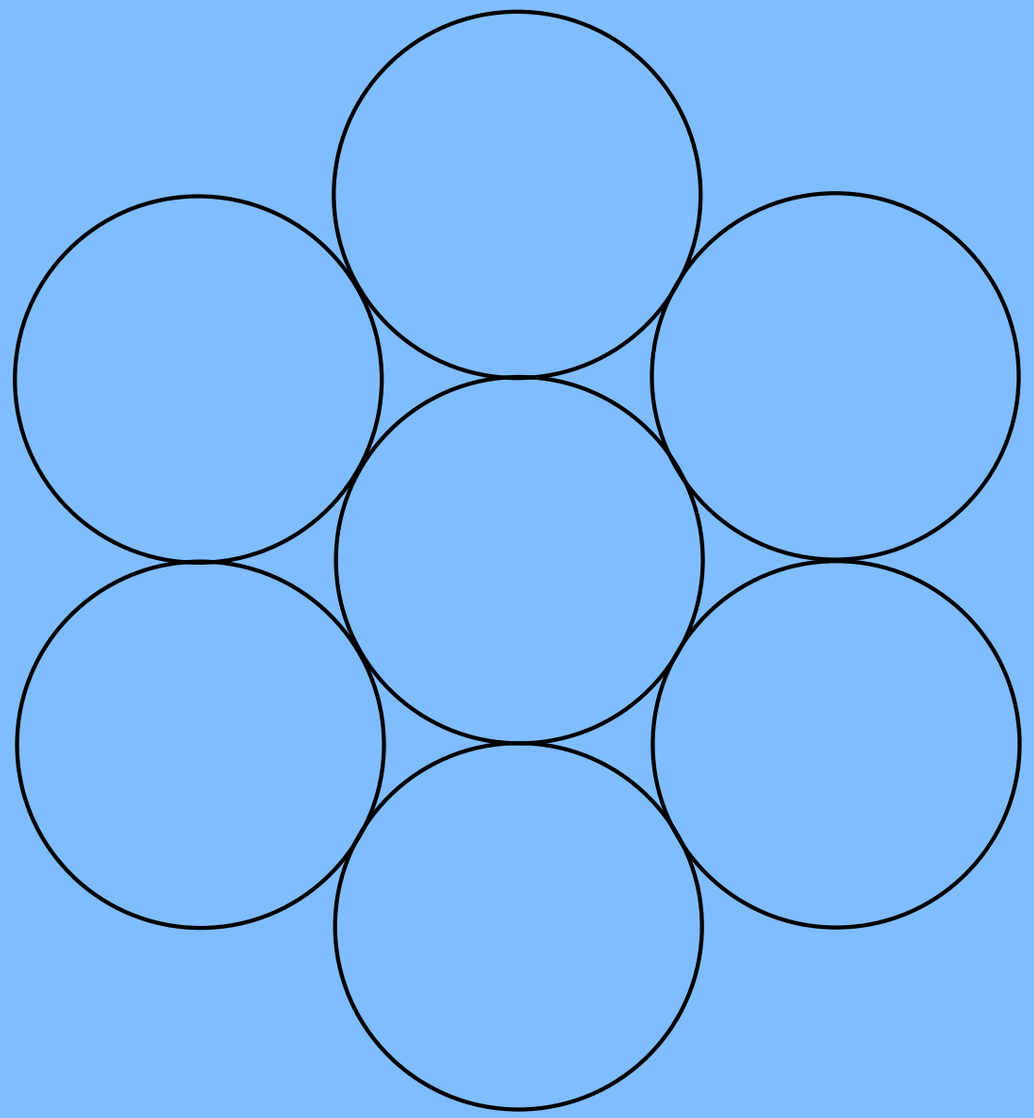
The Meaning
of the
Monas Hieroglyphica
with regards to
Geometry

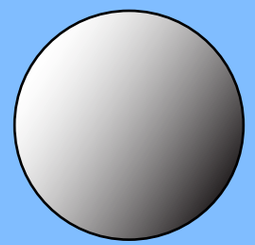


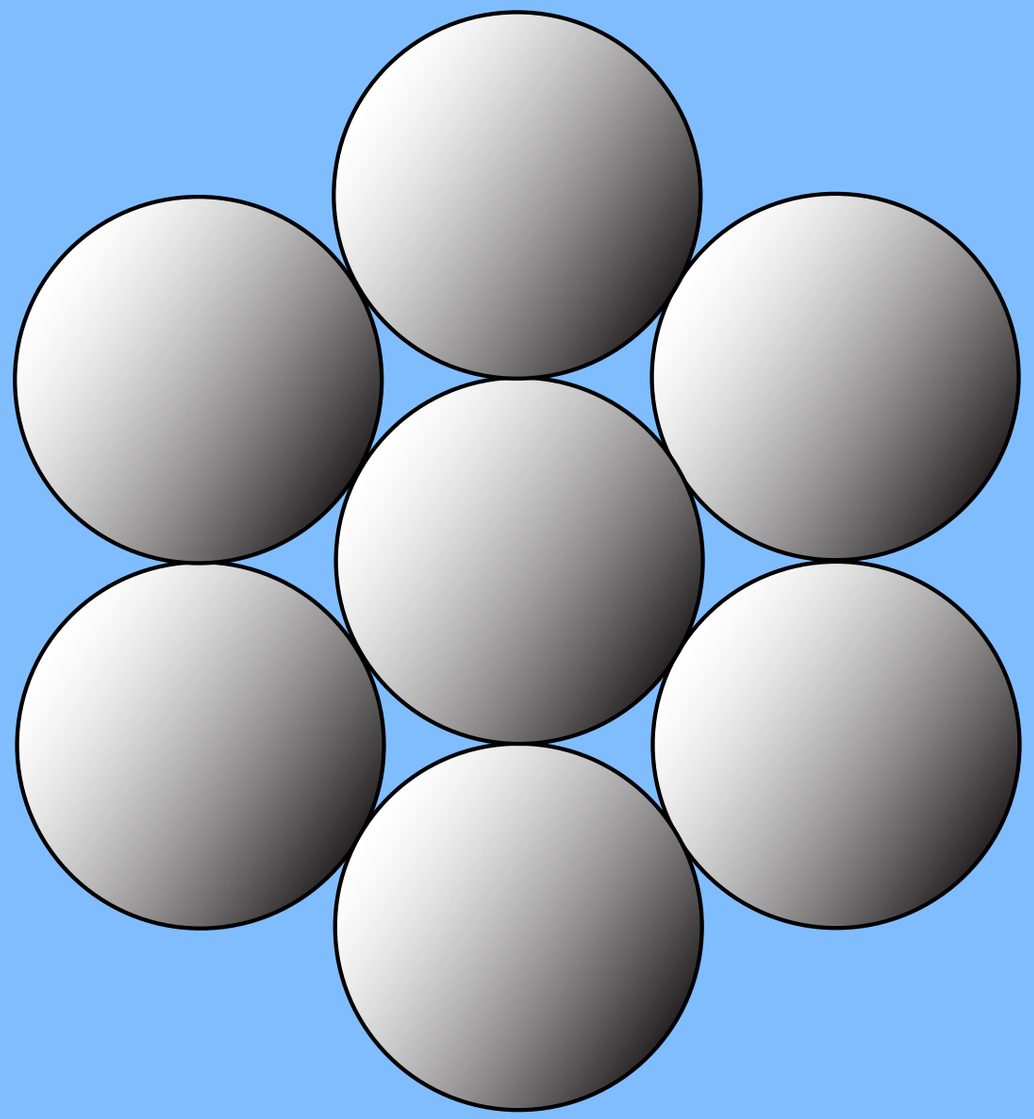
Jim Egan

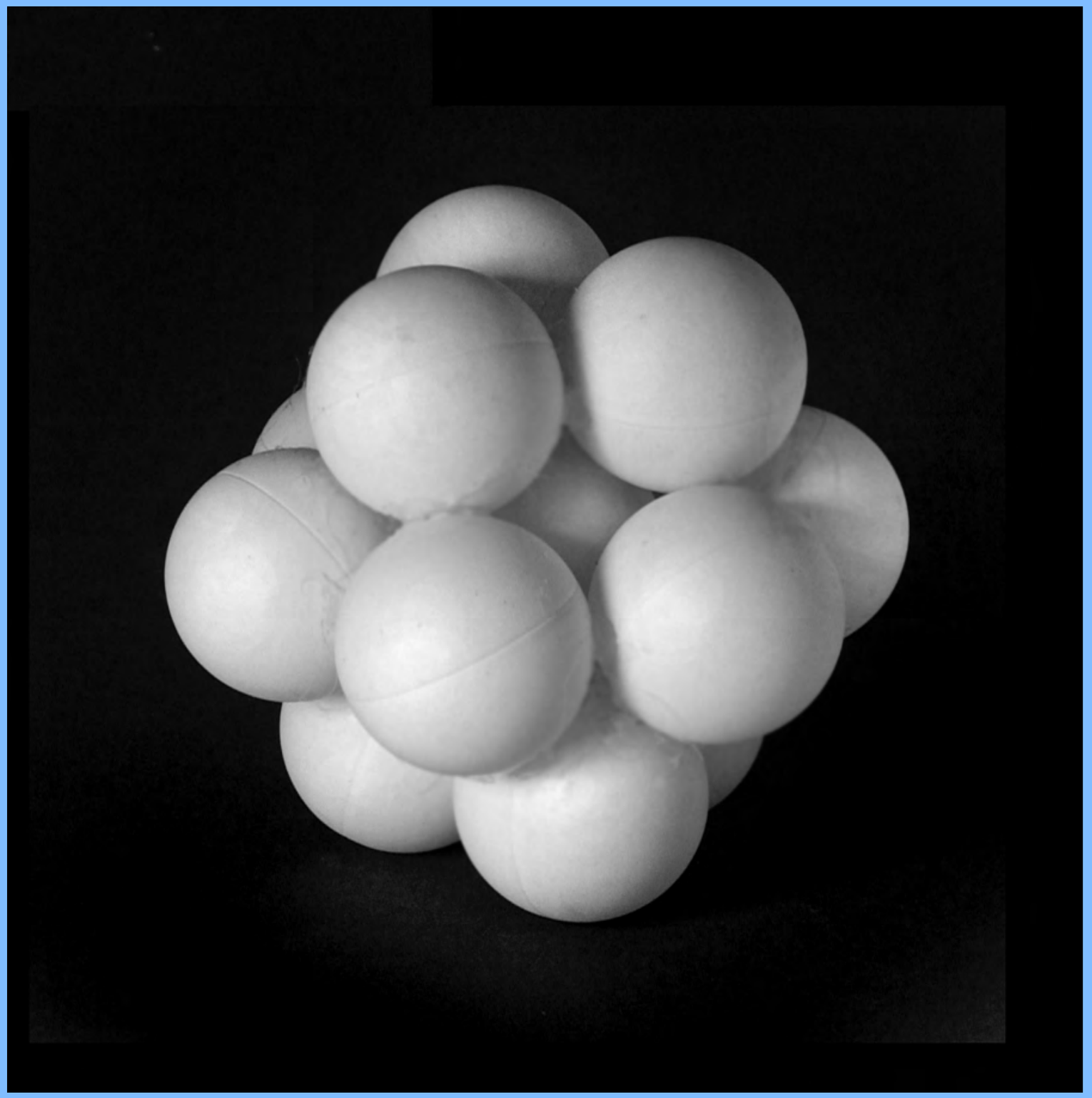
Book 3

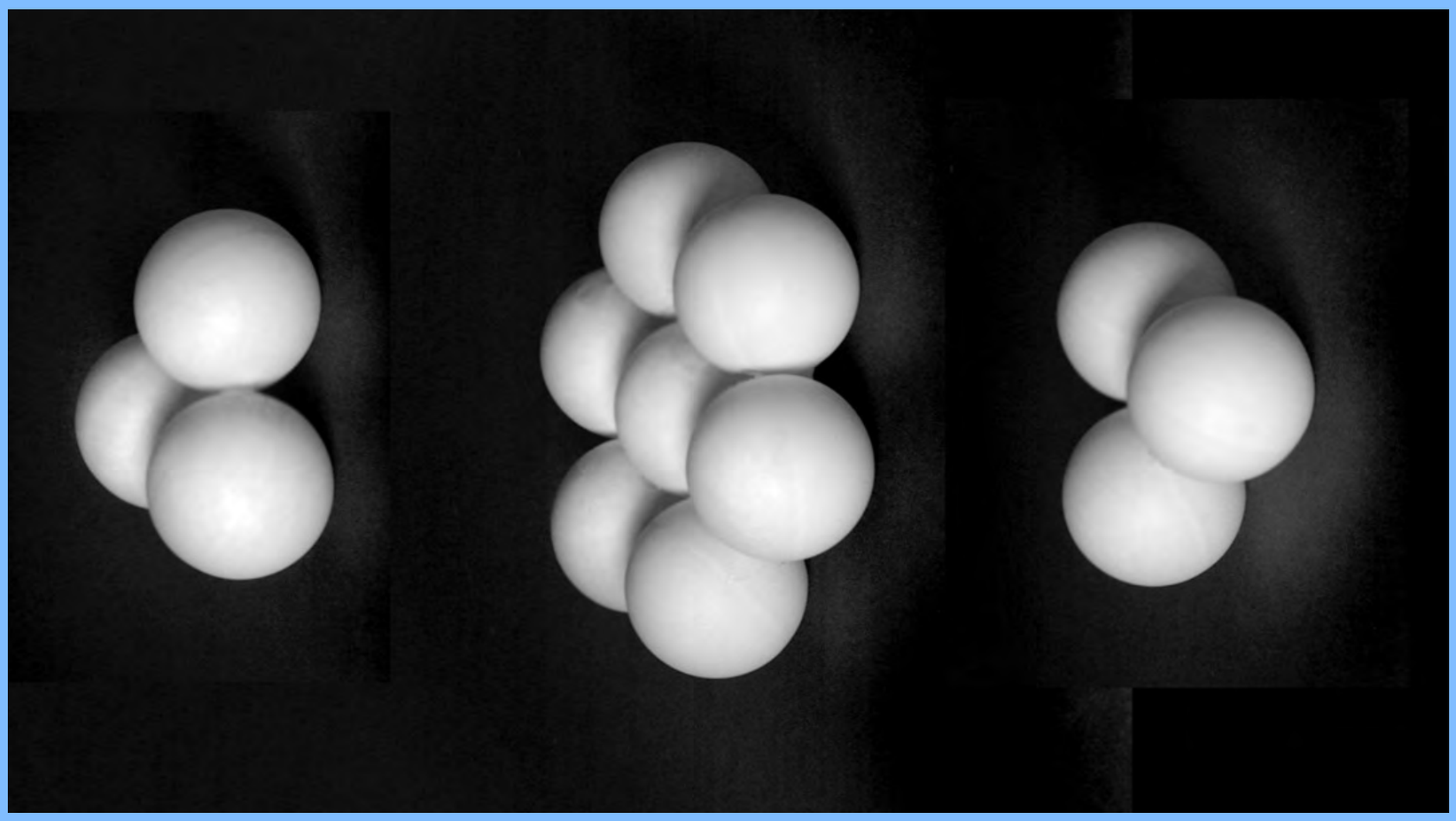


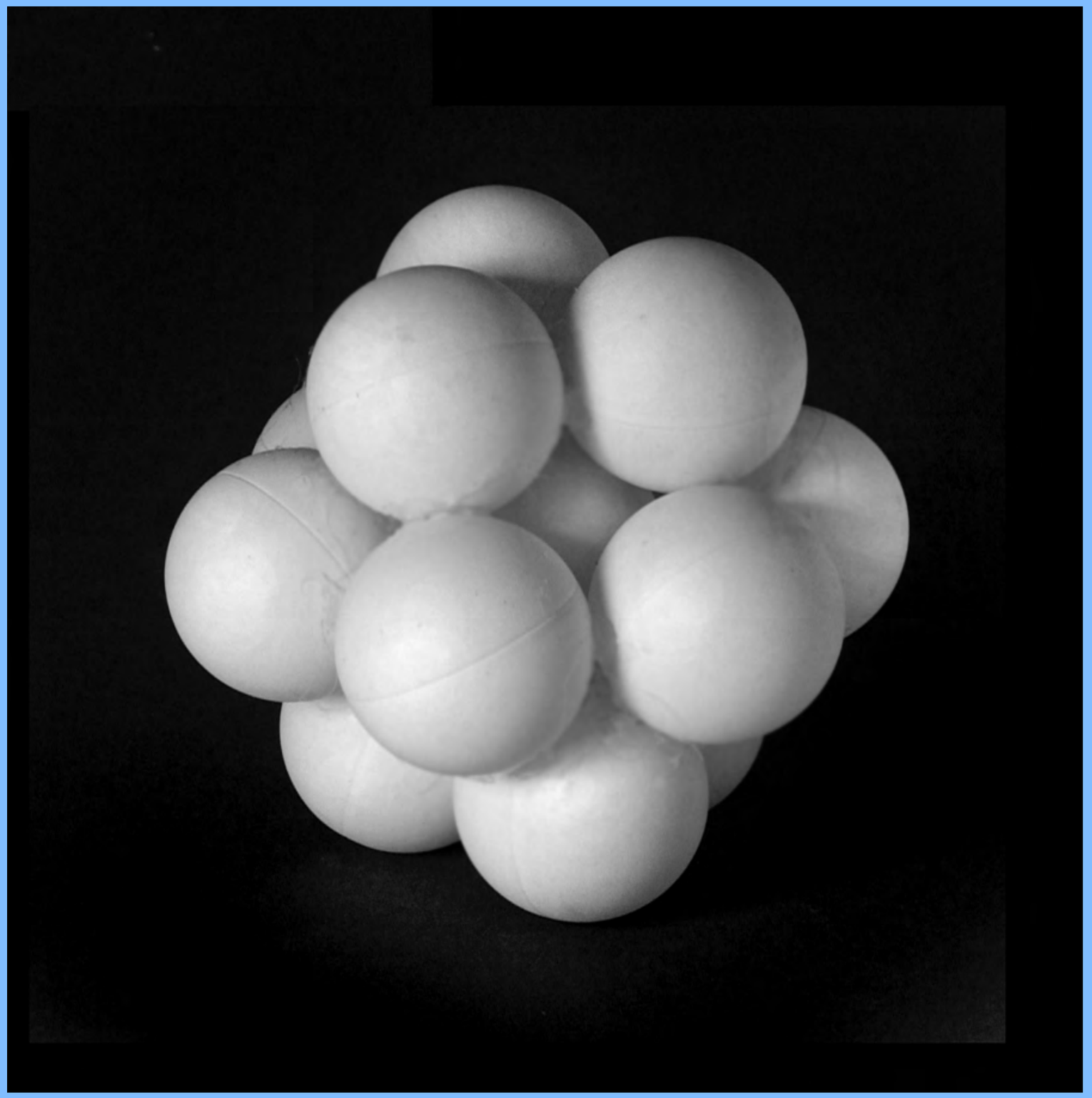


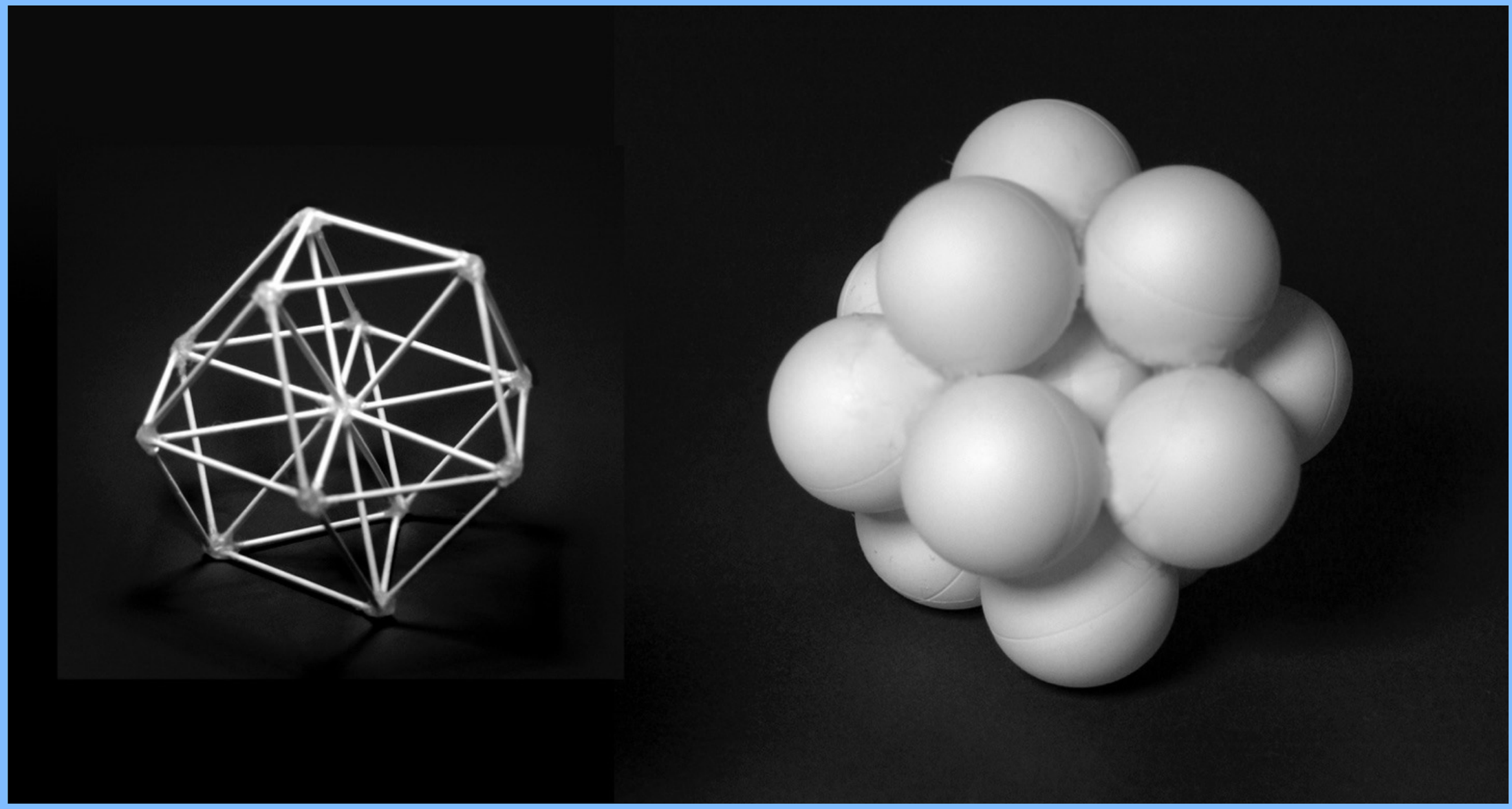


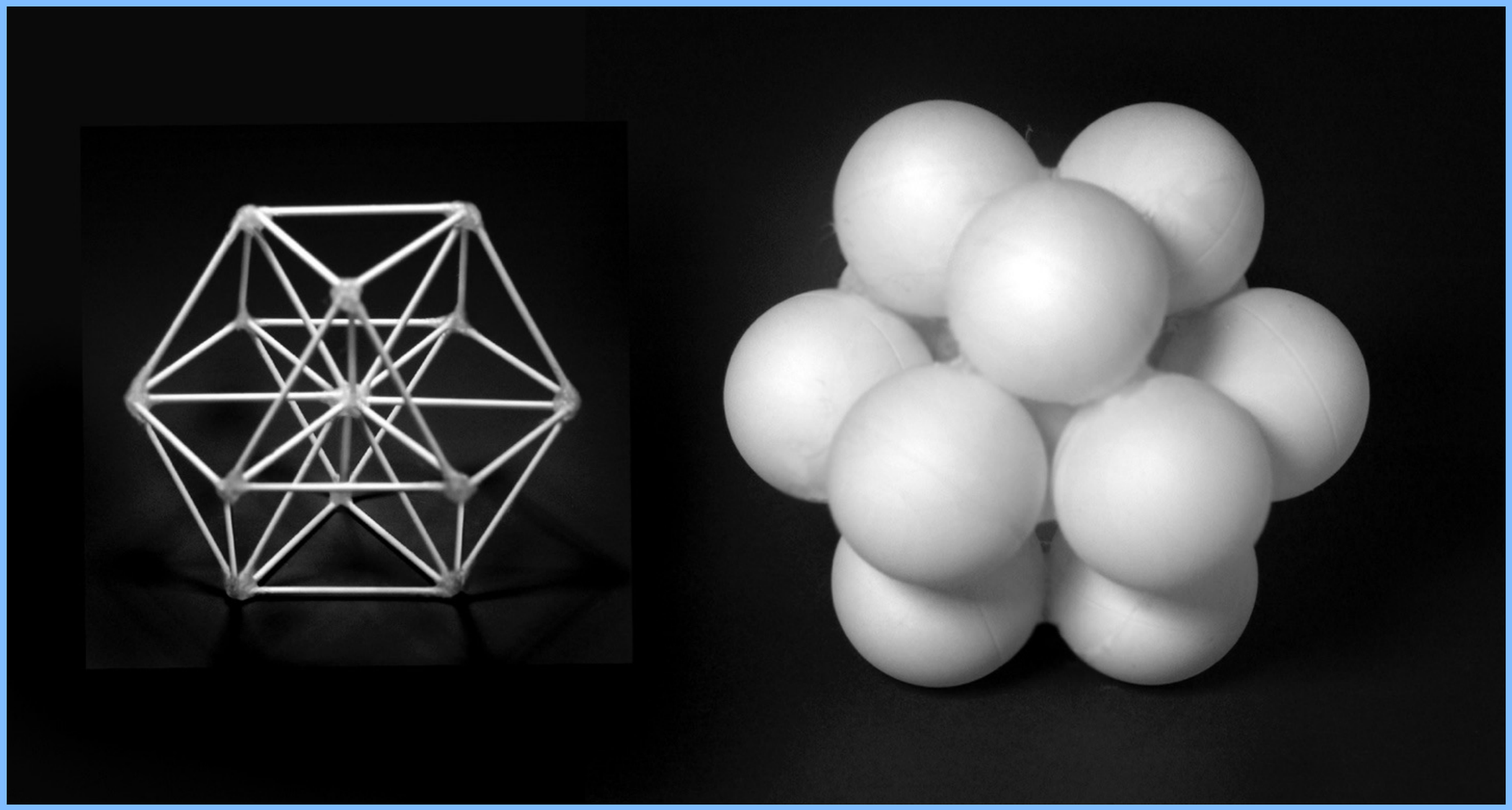


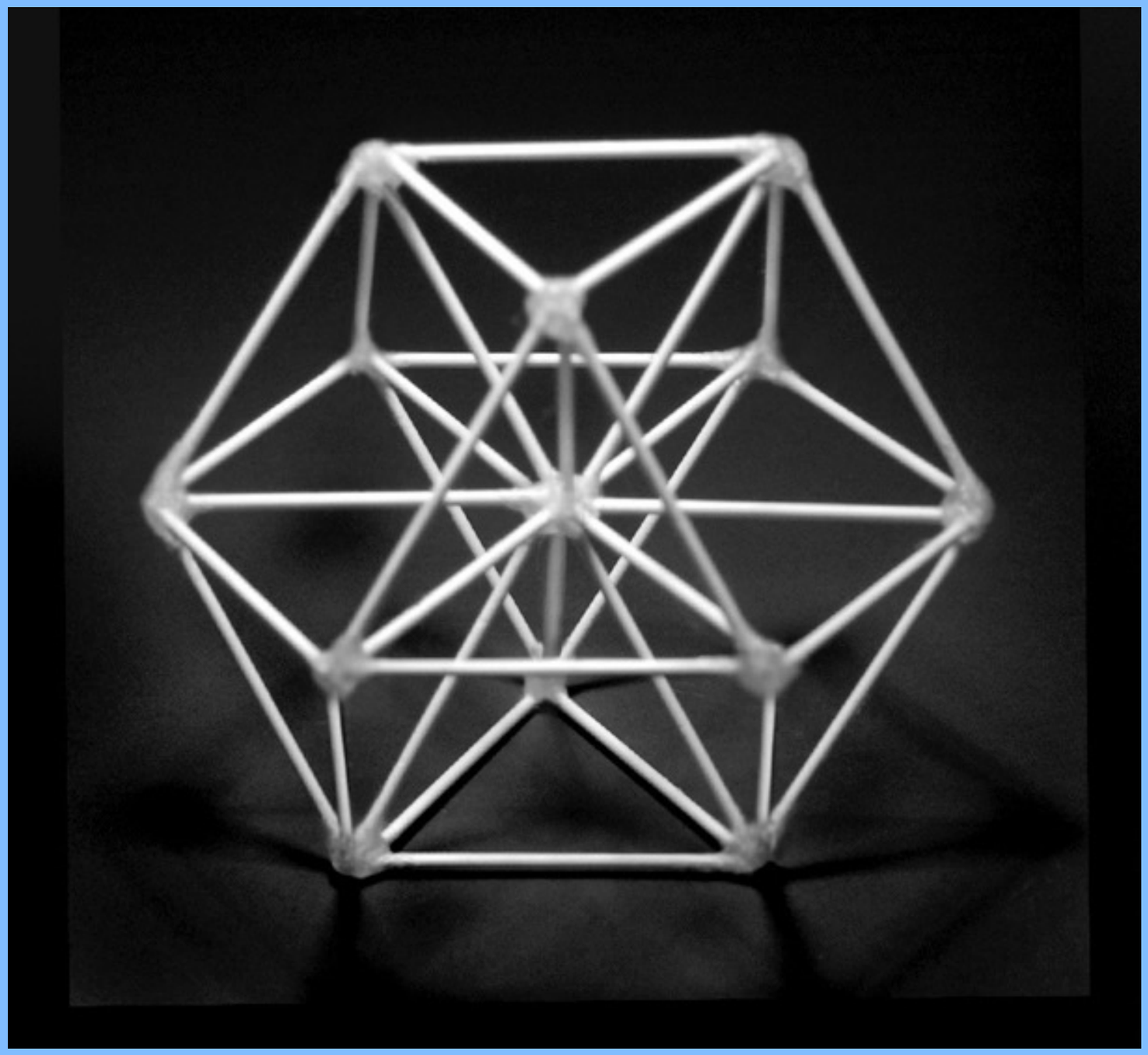


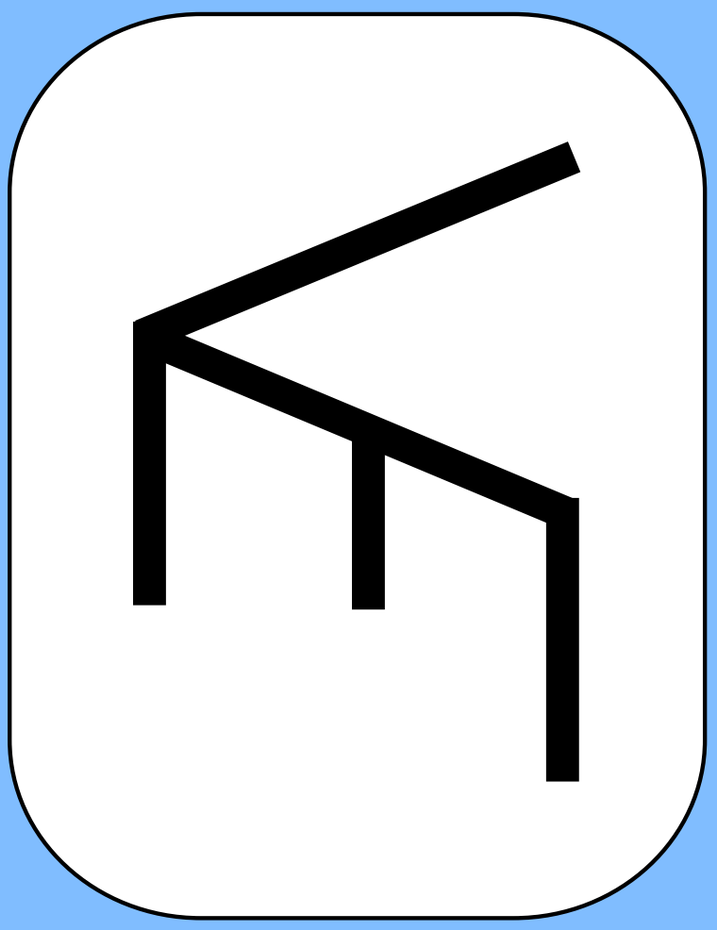


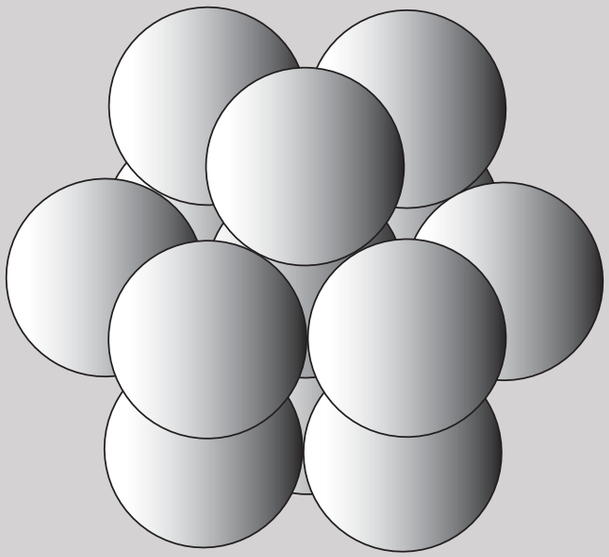




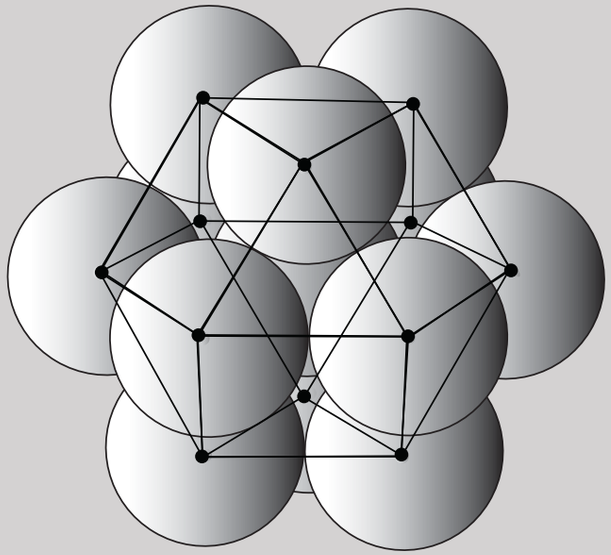




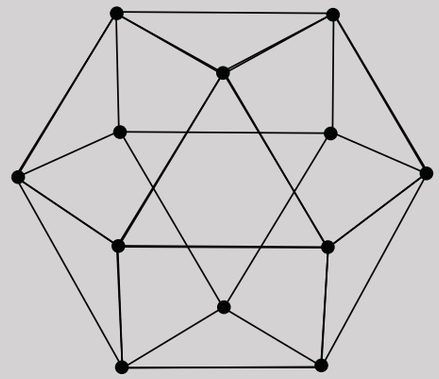




Cuboctahedron
of 12 spheres
around 1 central sphere.

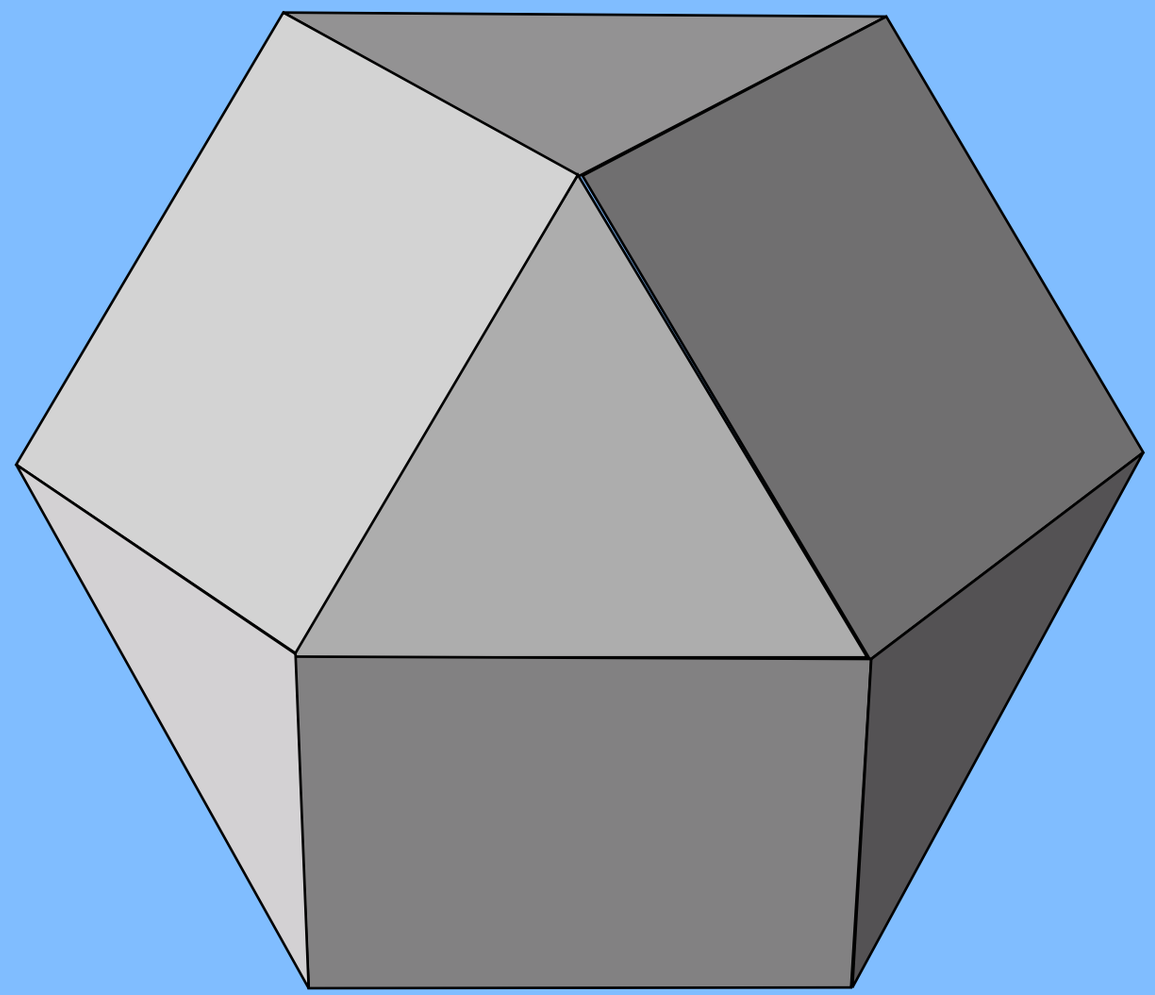


The 12 vertices
are the centerpoints
of the 12 spheres.

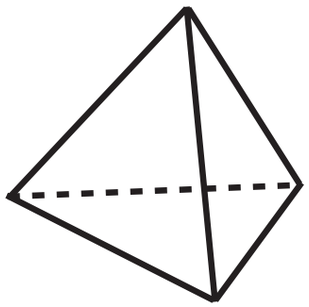


Cuboctahedron of
12 vertices
and 24 edges

Bucky's Vector Equilibrium or the cuboctahedron

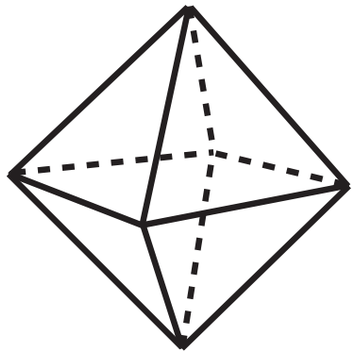


tetrahedron



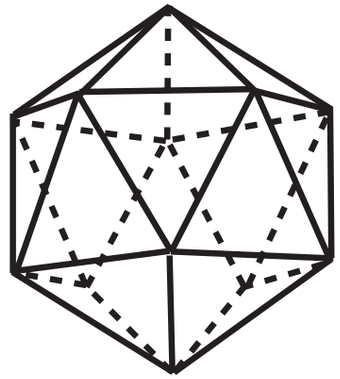
4 triangular faces

octahedron



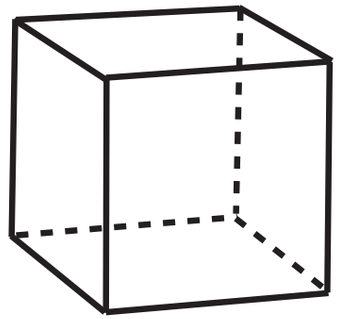
8 trianglular faces

icosohedron



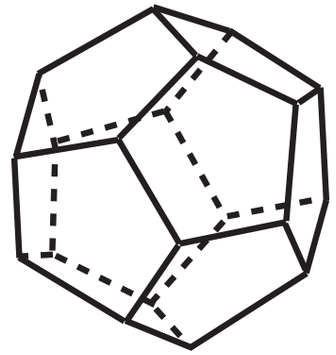
20 trianglular faces

cube



6 square faces

dodecahedron



12 pentagonal faces

5 "Platonic Solids"

13 "Archimedean Solids"

types of faces		edges	radiating vertices	total faces
4 triangles	tetrahedron	6	4	4
8 triangles	octahedron	12	6	8
20 triangles	icosahedron	30	12	20
6 squares	cube	12	8	6
12 pentagons	dodecahedron	30	20	12
8 triangles and 6 squares	**cuboctahedron**	**24**	**12**	**14**
20 triangles and 12 pentagons	icosidodecahedron	60	30	32
4 triangles and 4 hexagons	truncated tetrahedron	18	12	8
8 triangles and 6 octagons	truncated cuboctahedron	36	24	14
6 squares and 8 hexagons	truncated octahedron	36	24	14
20 triangles and 12 decagons	truncated dodecahedron	90	60	32
12 pentagons and 20 hexagons	truncated icosahedron	90	60	32
8 triangles and 18 squares	rhombicuboctahedron	48	24	26
12 squares and 8 hexagons and 6 octagons	great rhombicuboctahedron	72	48	26
20 triangles and 30 squares and 12 pentagons	rhombicosidodecahedron	120	60	62
30 squares and 20 hexagons and 12 decagons	great rhombicosidodecahedron	180	120	62
32 triangles and 6 squares	snub cube	60	24	38
80 triangles and 12 pentagons	snub dodecahedron	150	60	92

$$\frac{\text{length of edge vector}}{\text{length of radiating vector}}$$

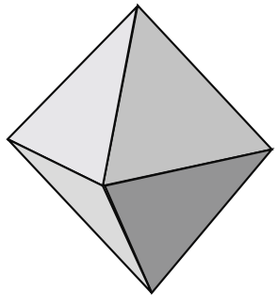
1.6329931619	tetrahedron
1.4142135624	octahedron
1.0514622242	icosahedron
1.1547005384	cube
0.7136441795	dodecahedron

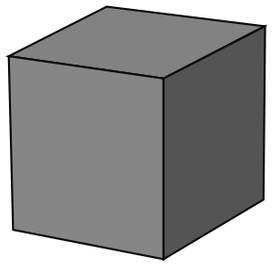
5 "Platonic Solids"

1.0000000000	**cuboctahedron**
0.6180339887	icosidodecahedron
0.8528028654	truncated tetrahedron
0.5621692754	truncated cuboctahedron
0.6324555320	truncated octahedron
0.3367628118	truncated dodecahedron
0.4035482123	truncated icosahedron
0.7148134887	rhombicuboctahedron
0.4314788105	great rhombicuboctahedron
0.4478379596	rhombicosidodecahedron
0.2629921751	great rhombicosidodecahedron
0.7442063312	snub cube
0.4638568806	snub dodecahedron

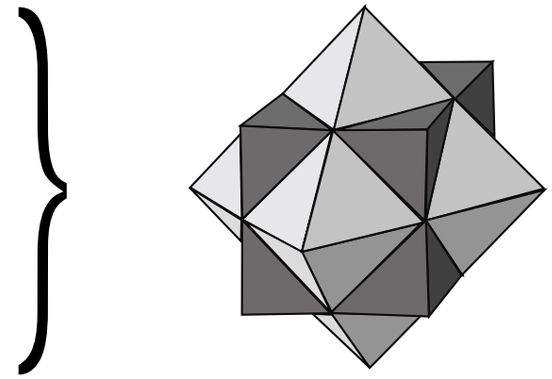
13 "Archimedean Solids"

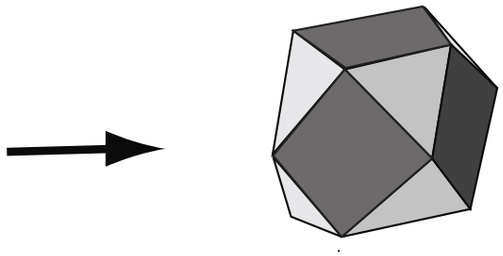
octahedron



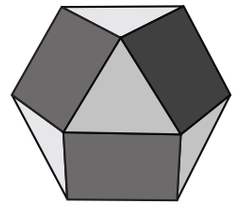


cube

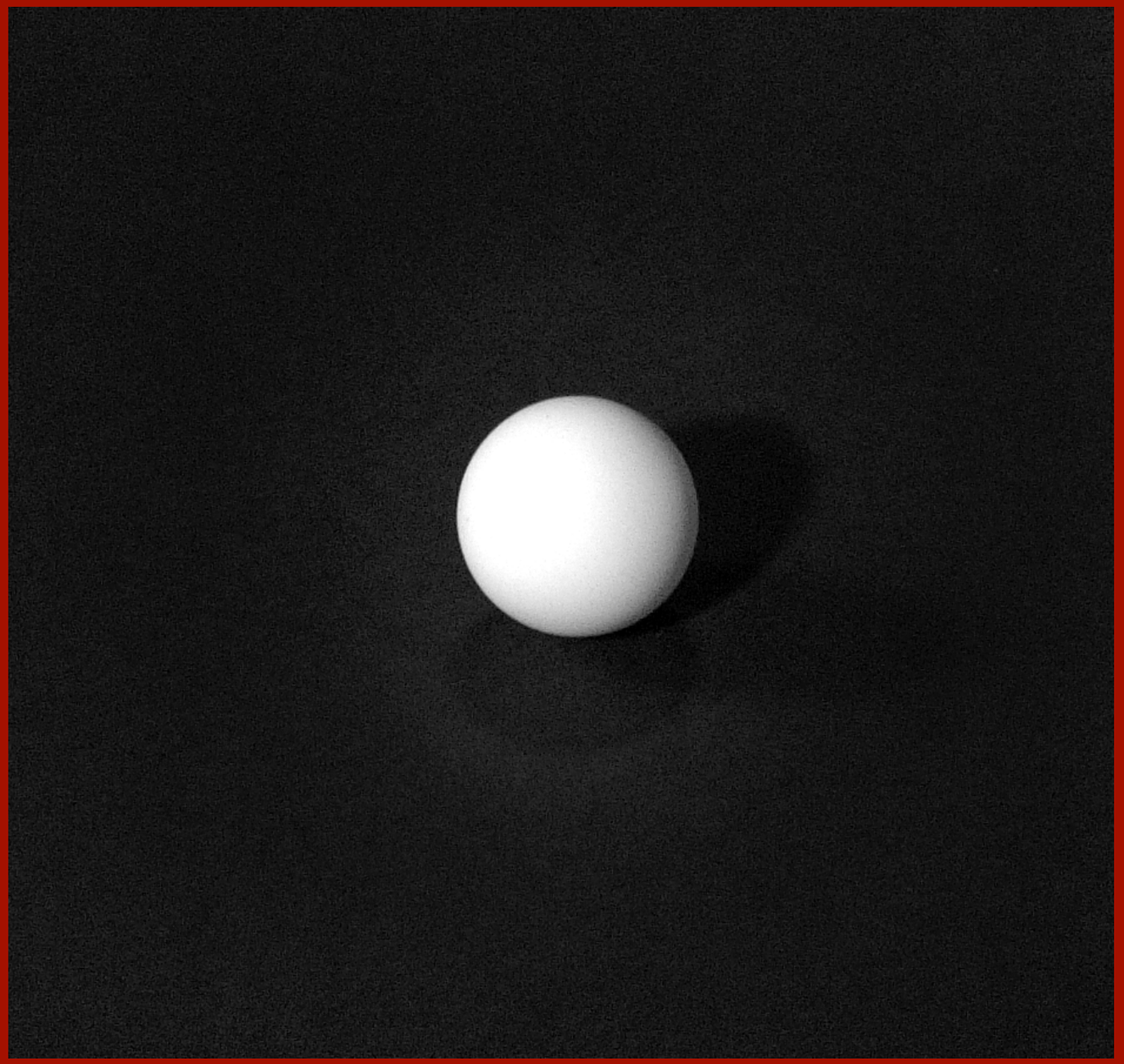




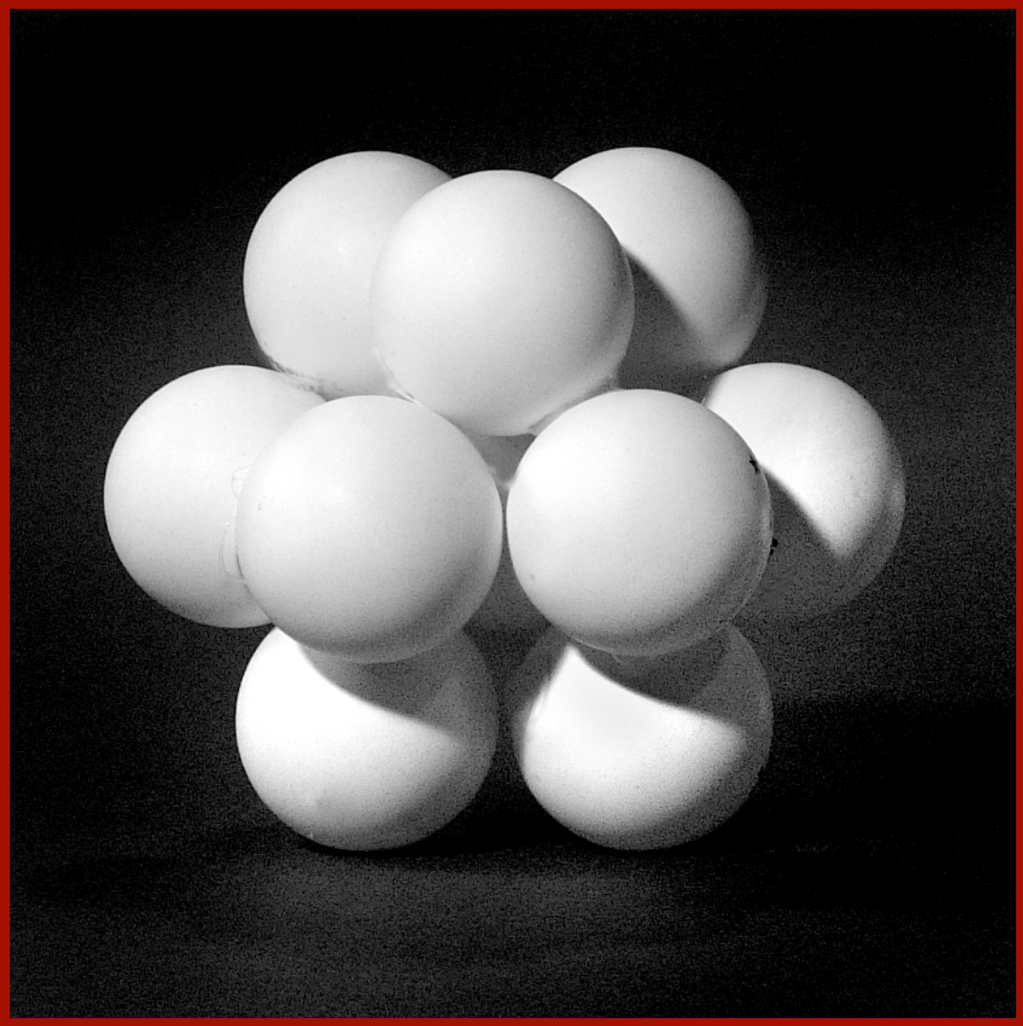
The intersection
(removing all the pointy,
projecting stellations)
leaves a cuboctahedron.



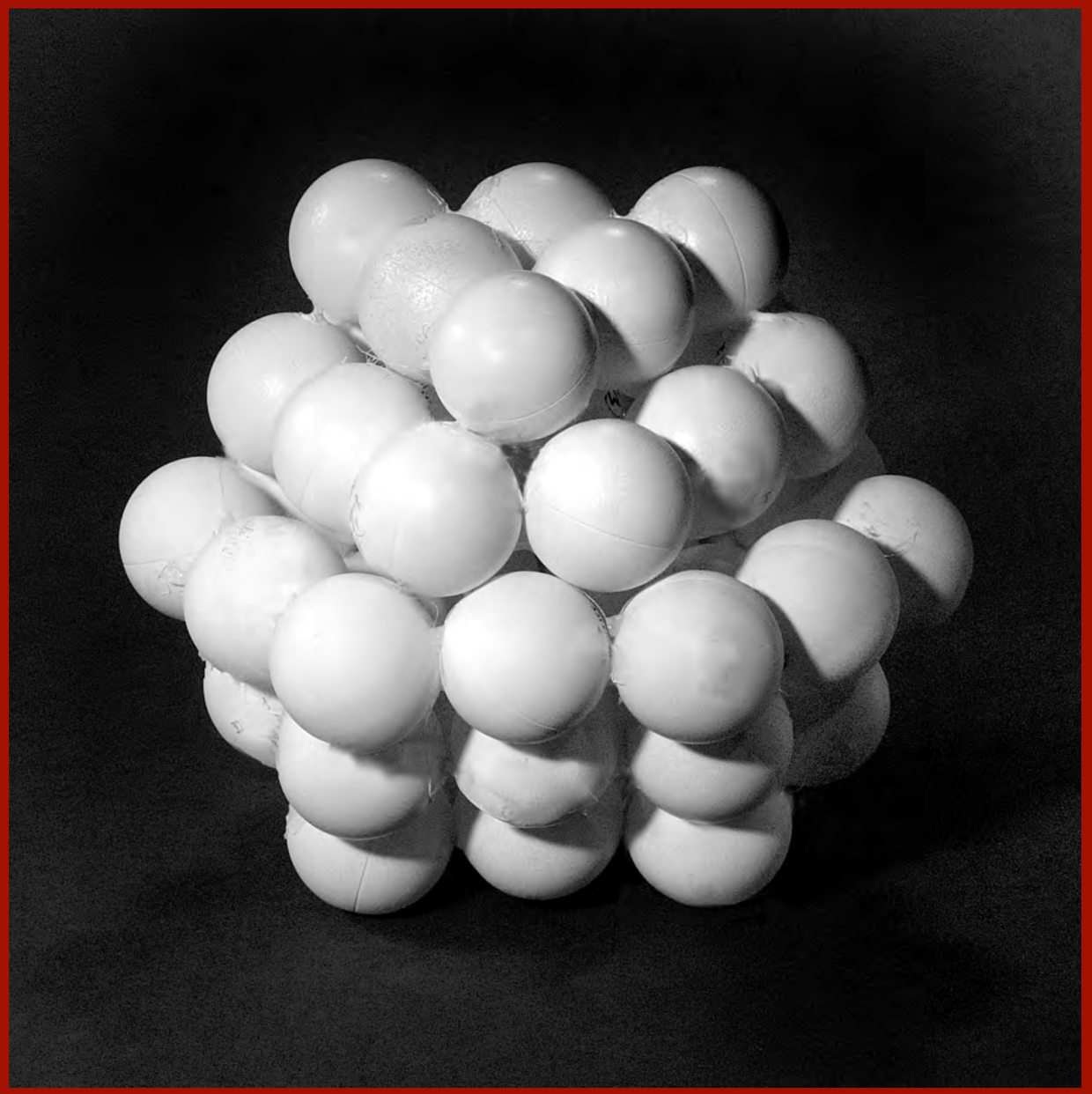
(the same shape,
oriented in an
“upright” position)



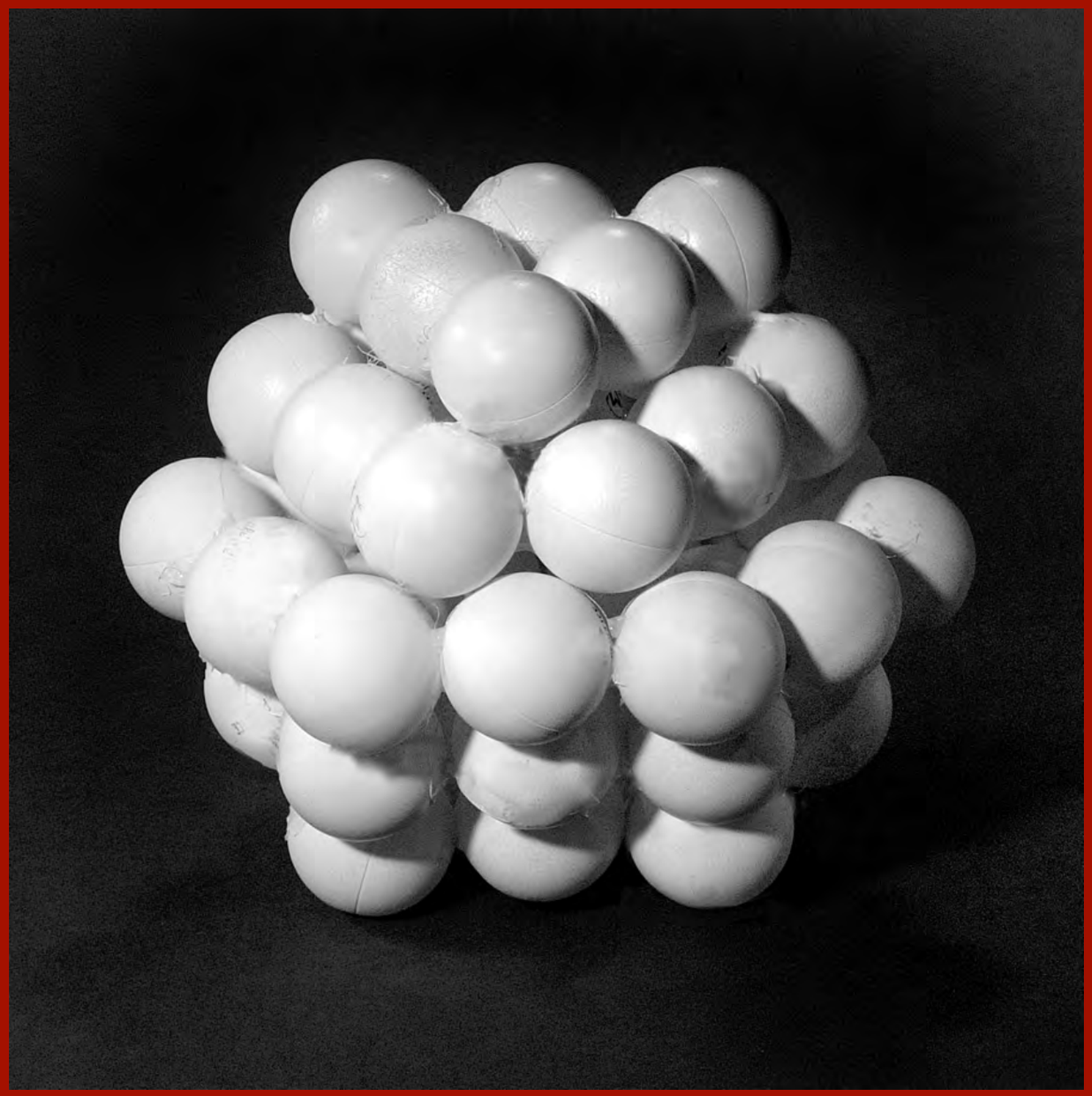
1
central
sphere



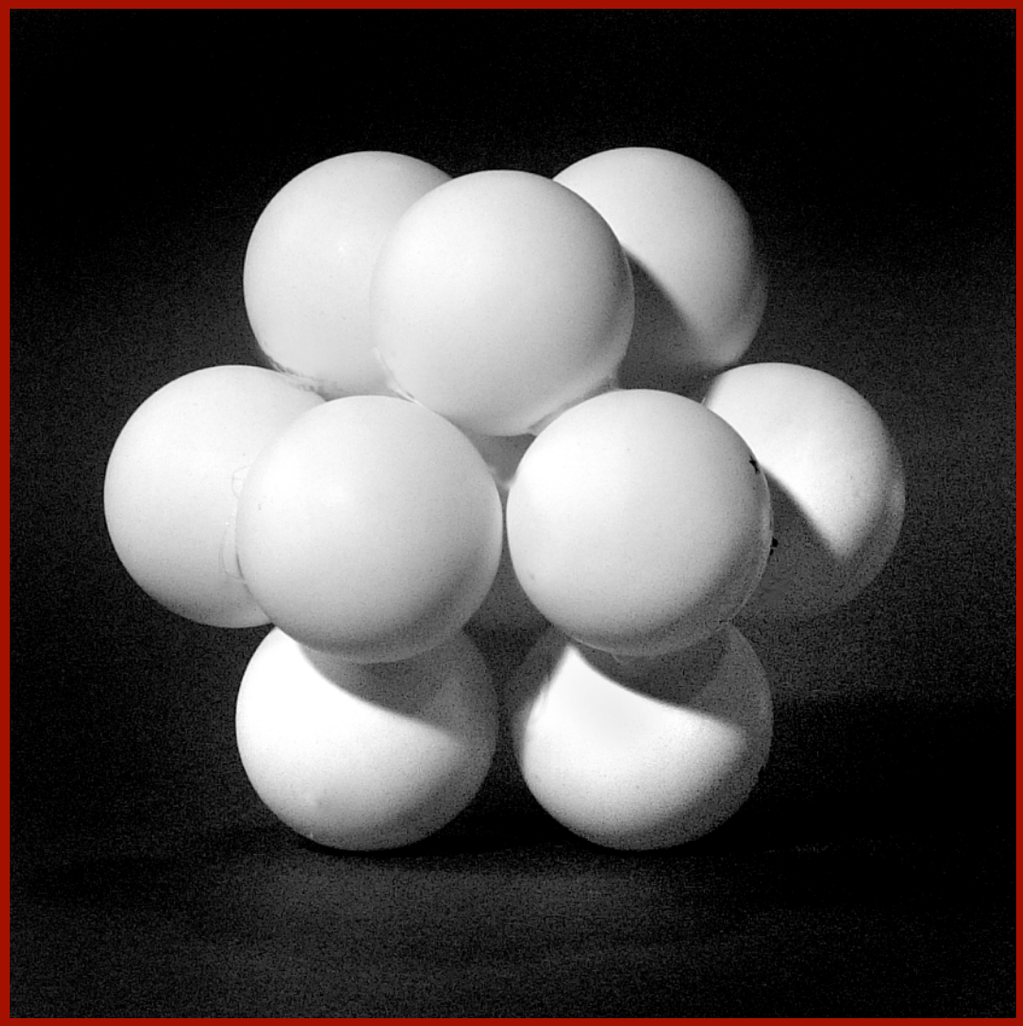
12 spheres
in Layer 1



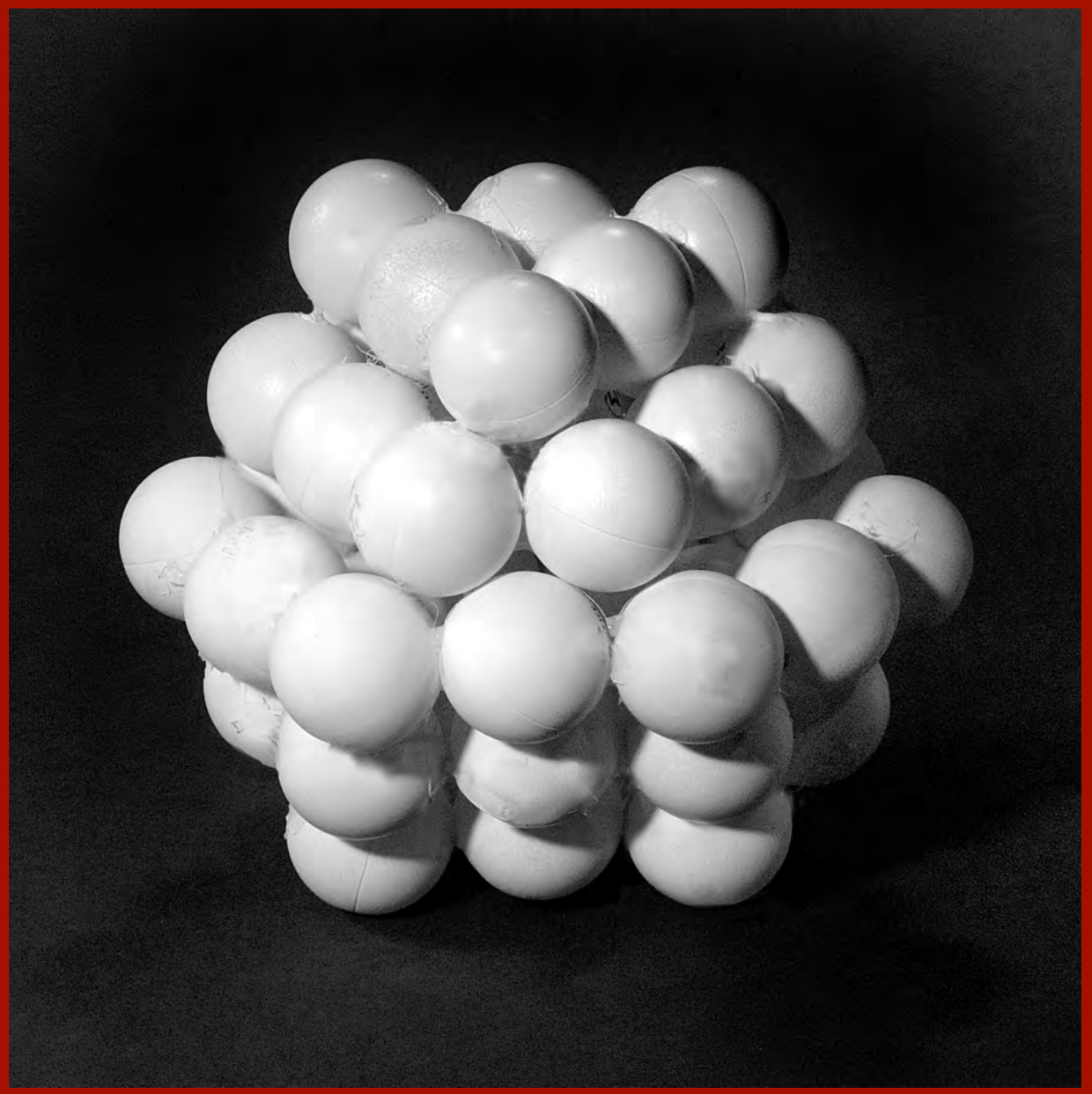
42 spheres
in Layer 2



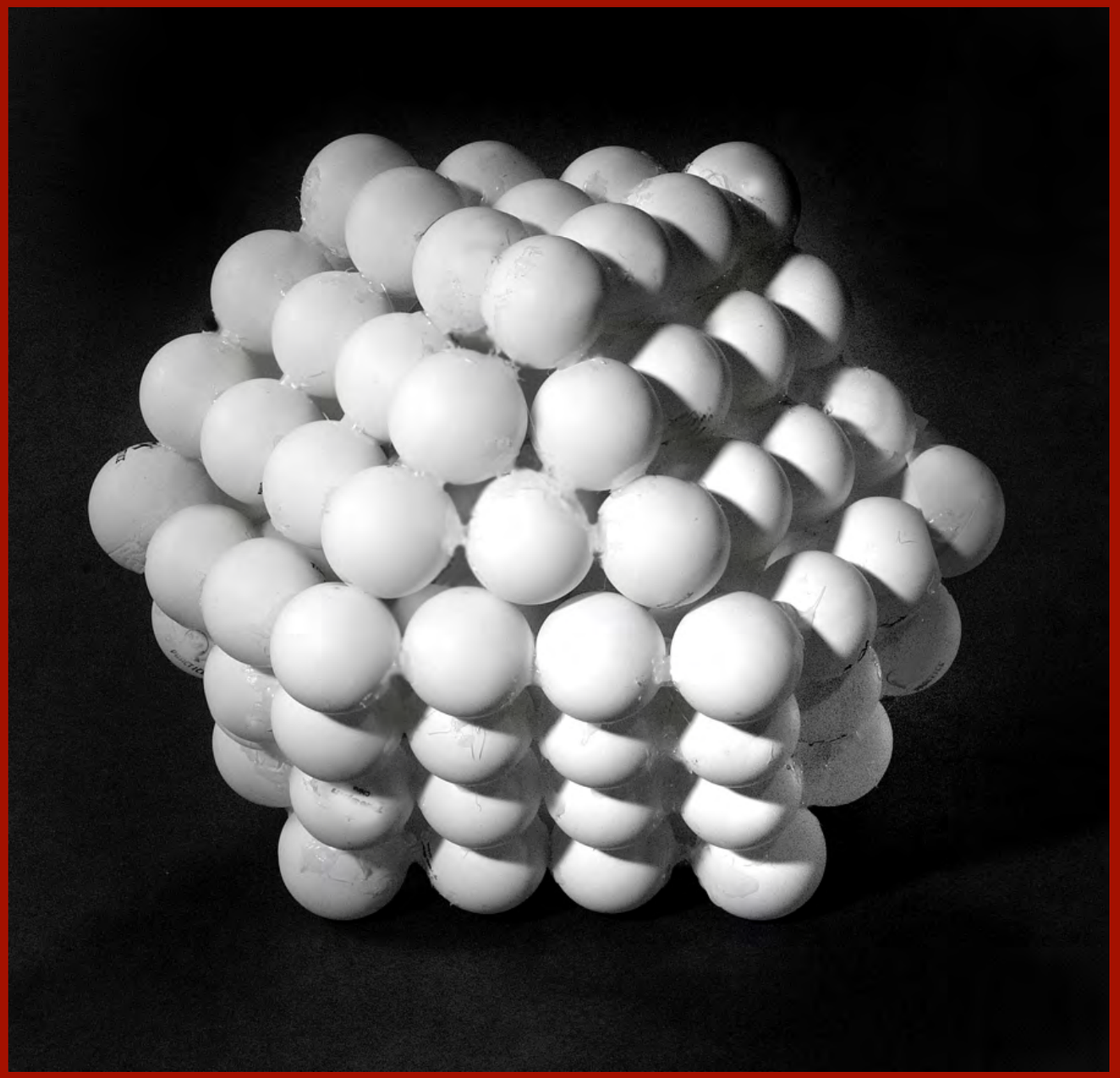
A cluster of 55 total spheres
makes the central sphere
a “true nucleus.”



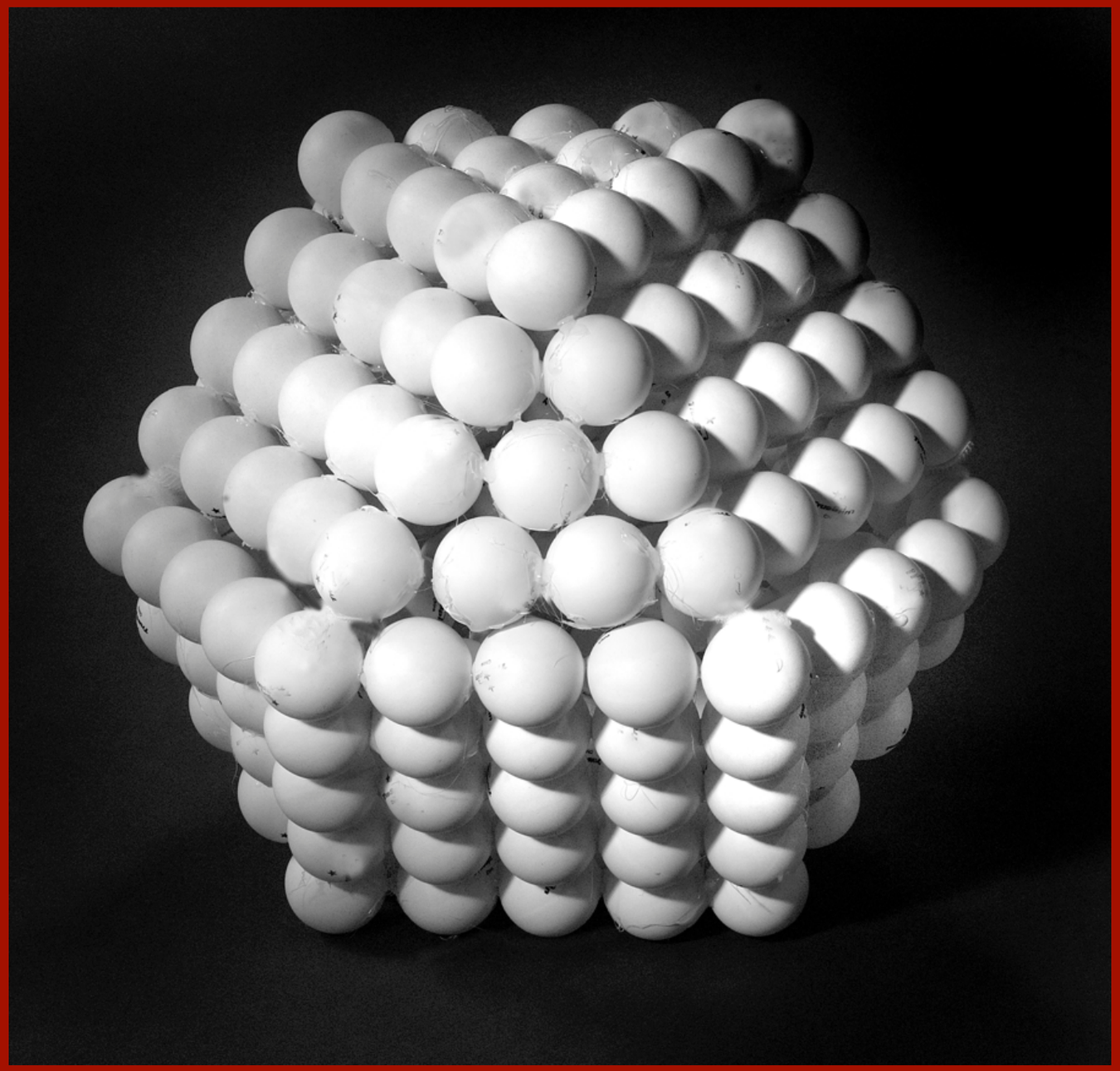
12 spheres
in Layer 1



42 spheres
in Layer 2



92 spheres
in Layer 3



162 spheres
in Layer 4

Layer 1	12
Layer 2	42
Layer 3	92
Layer 4	162

Euler's Formula
for the number of
spheres-per-layer
in the
closest-packing-of-spheres

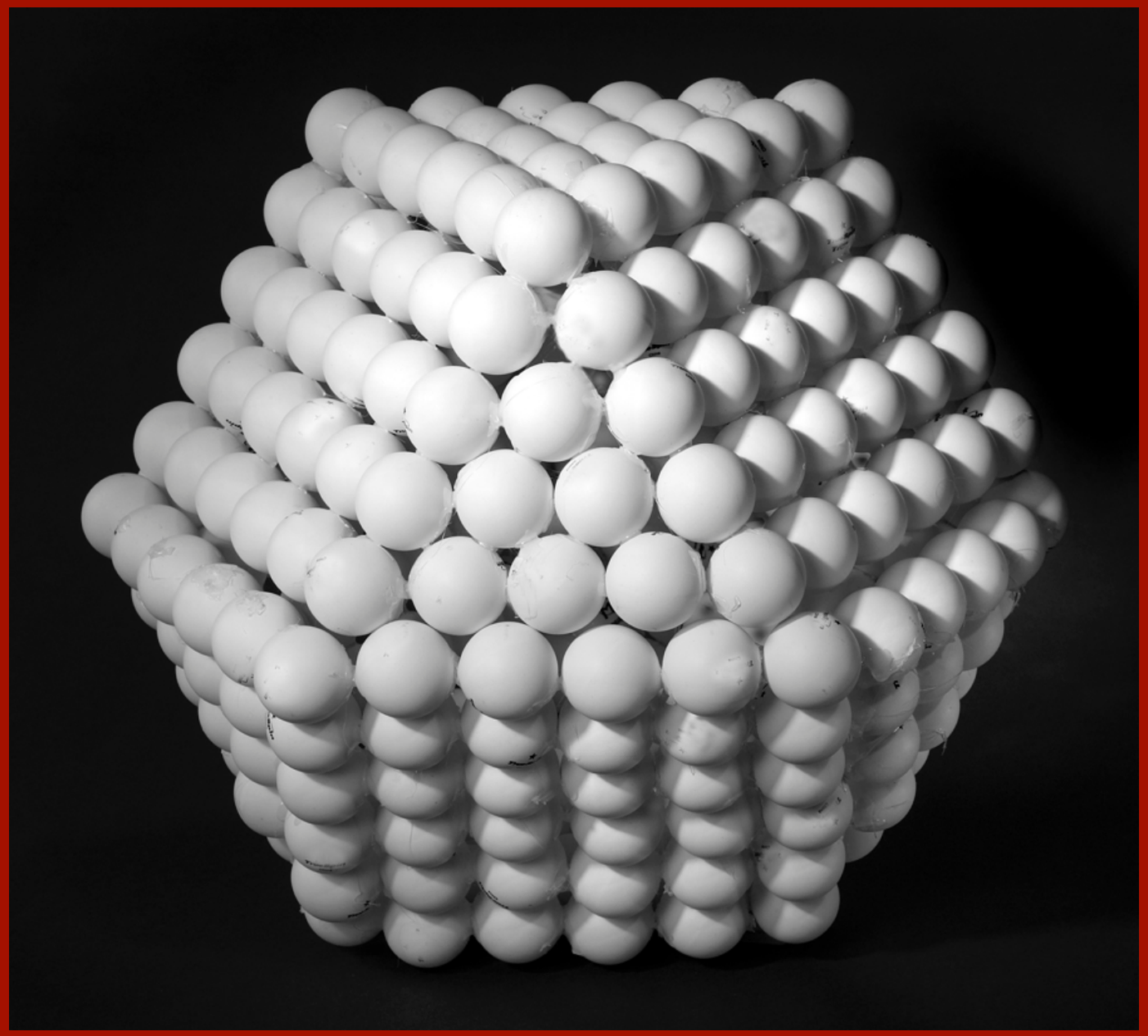
$$(10\,L^2) + 2$$

L= Layer number

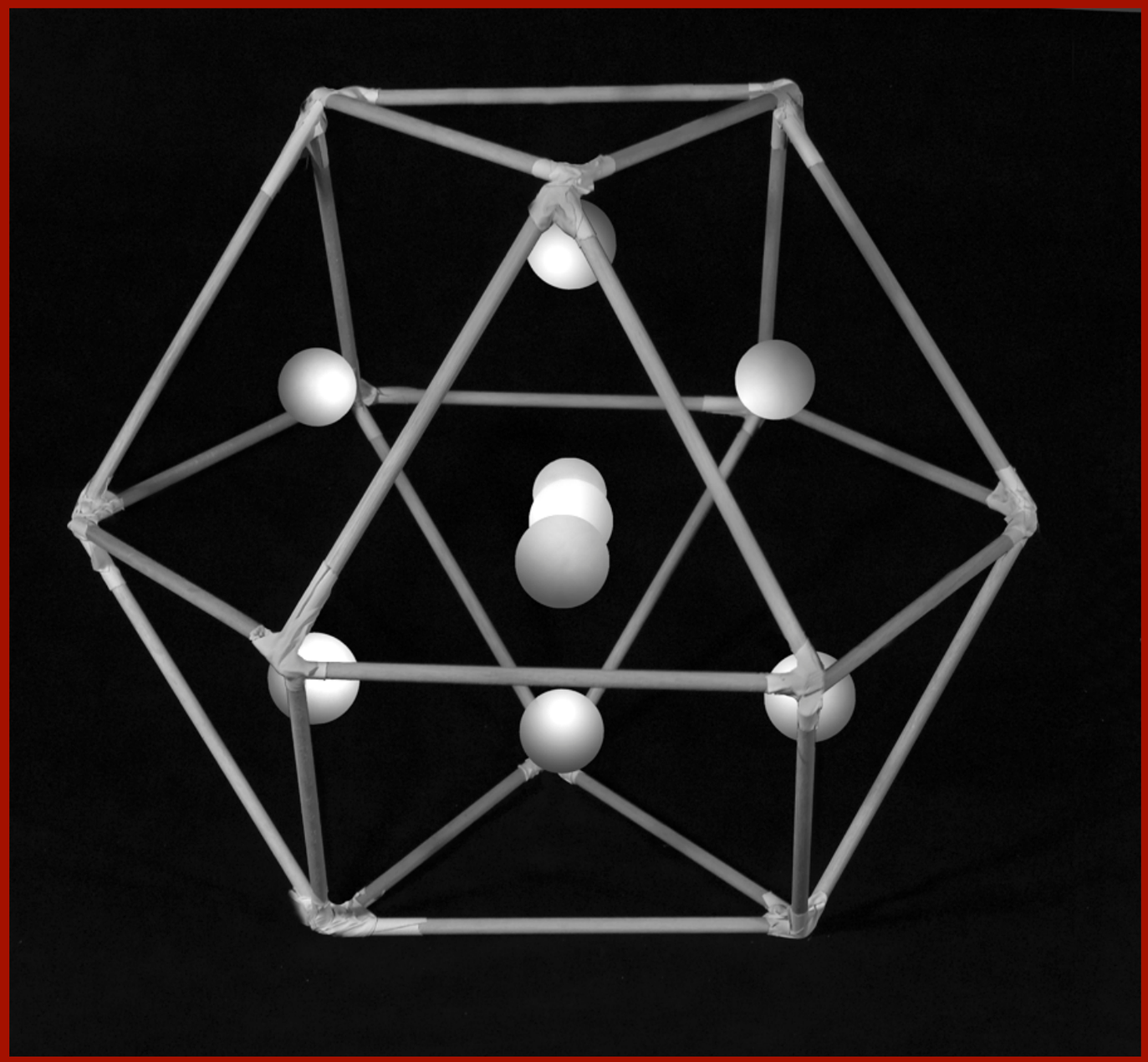
	Ten times (the Layer number "squared")...	...Then add 2.
Layer 1	10 x1 = 10	10 +2 = 12
Layer 2	10 X 4 = 40	40 +2 = 42
Layer 3	10 X 9 = 90	90 +2 = 92
Layer 4	10 X 16 = 160	160 +2 = 162

	Ten times (the Layer number "squared")...	...Then add 2.
Layer 5	10 x 25 = 250	250 +2 =252

252



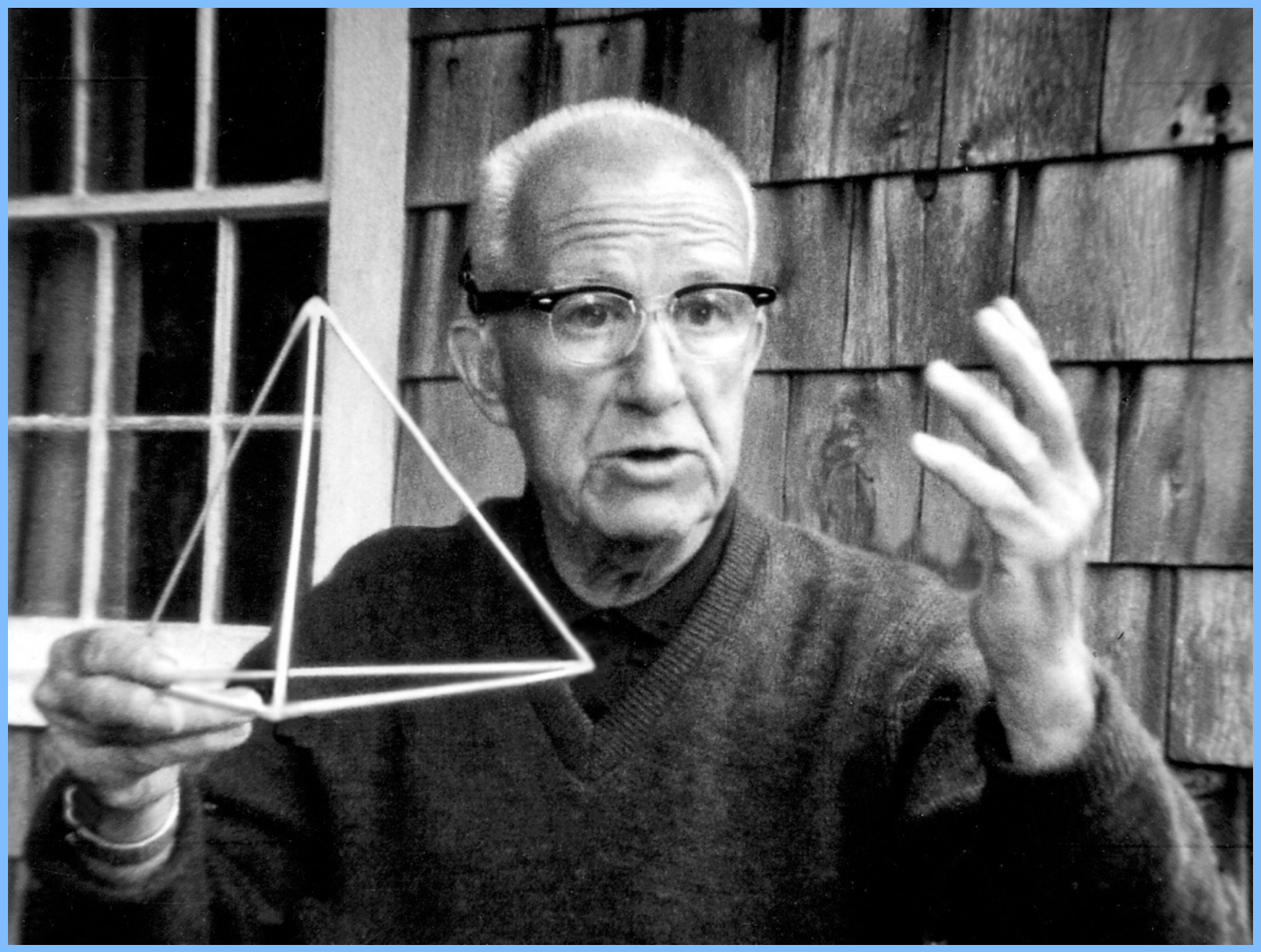
252 spheres
in Layer 5

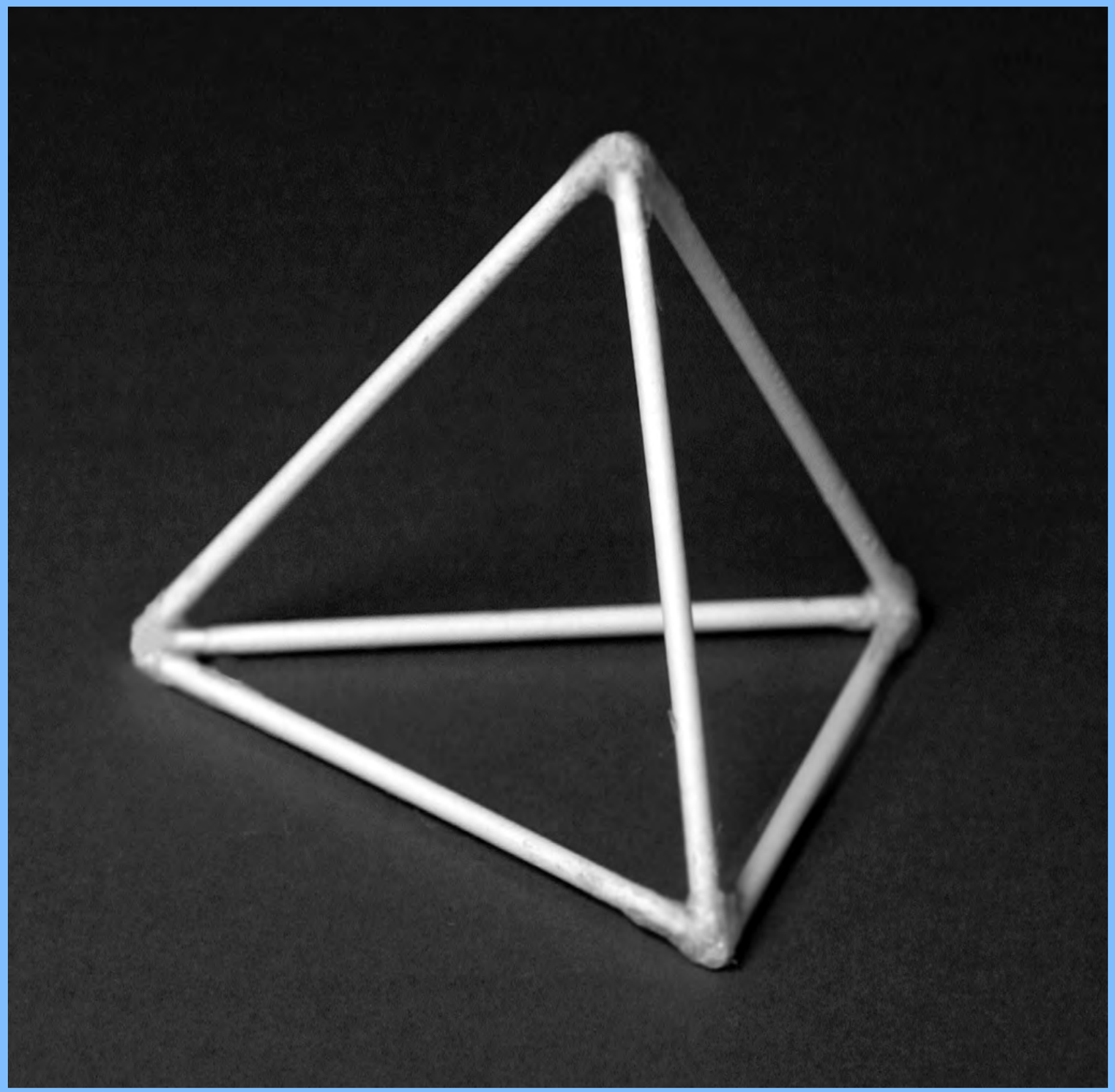


8

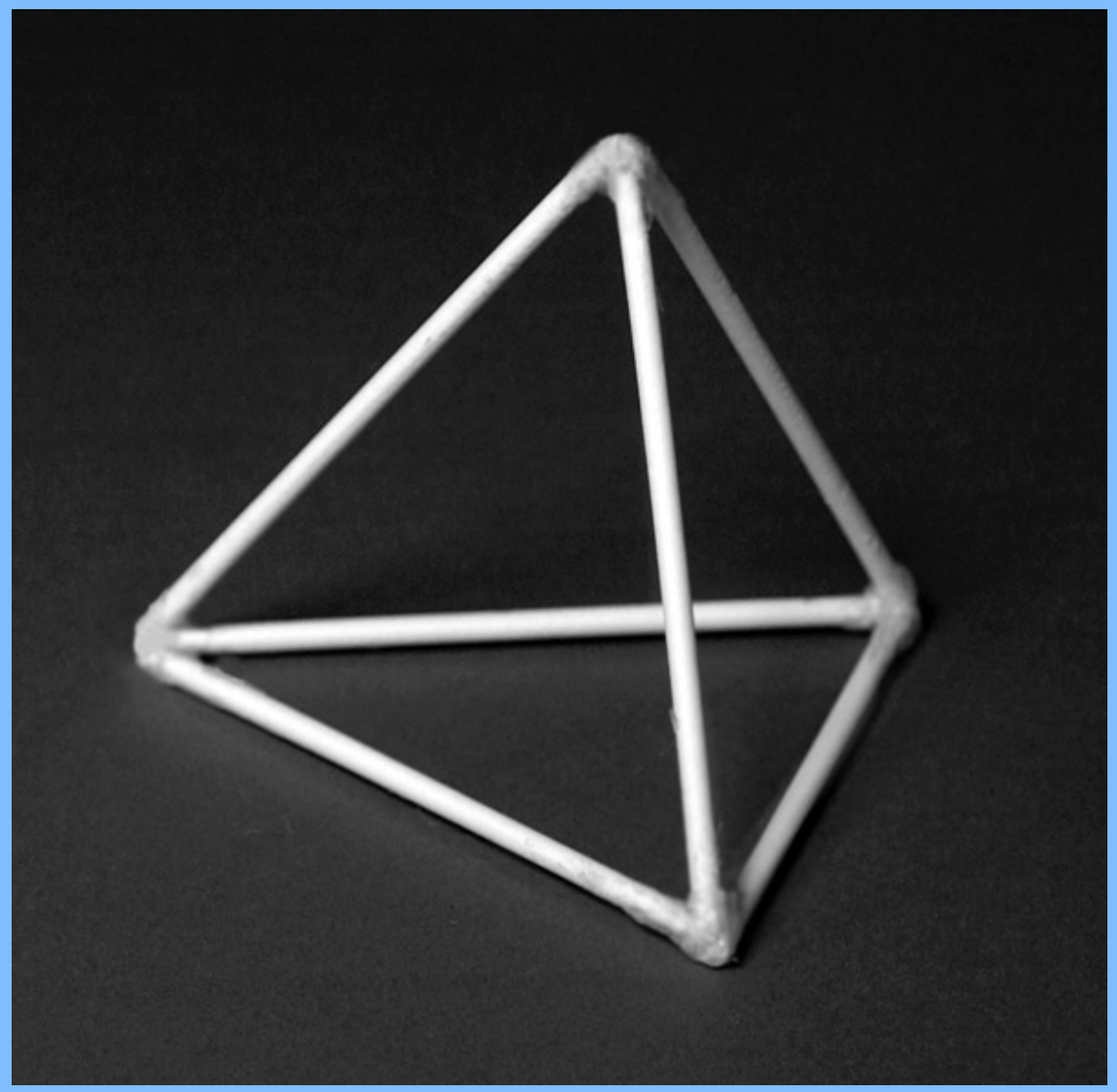
Dee, referring to those who
have studied “Space and Void”:

“They have seen that the Surfaces of Elements,
which are in close proximity are
coordinated, connected, and Joined Together
by a Law (decreed by God Almighty)
and Bond (practically Unable to be Loosened) of Nature.”

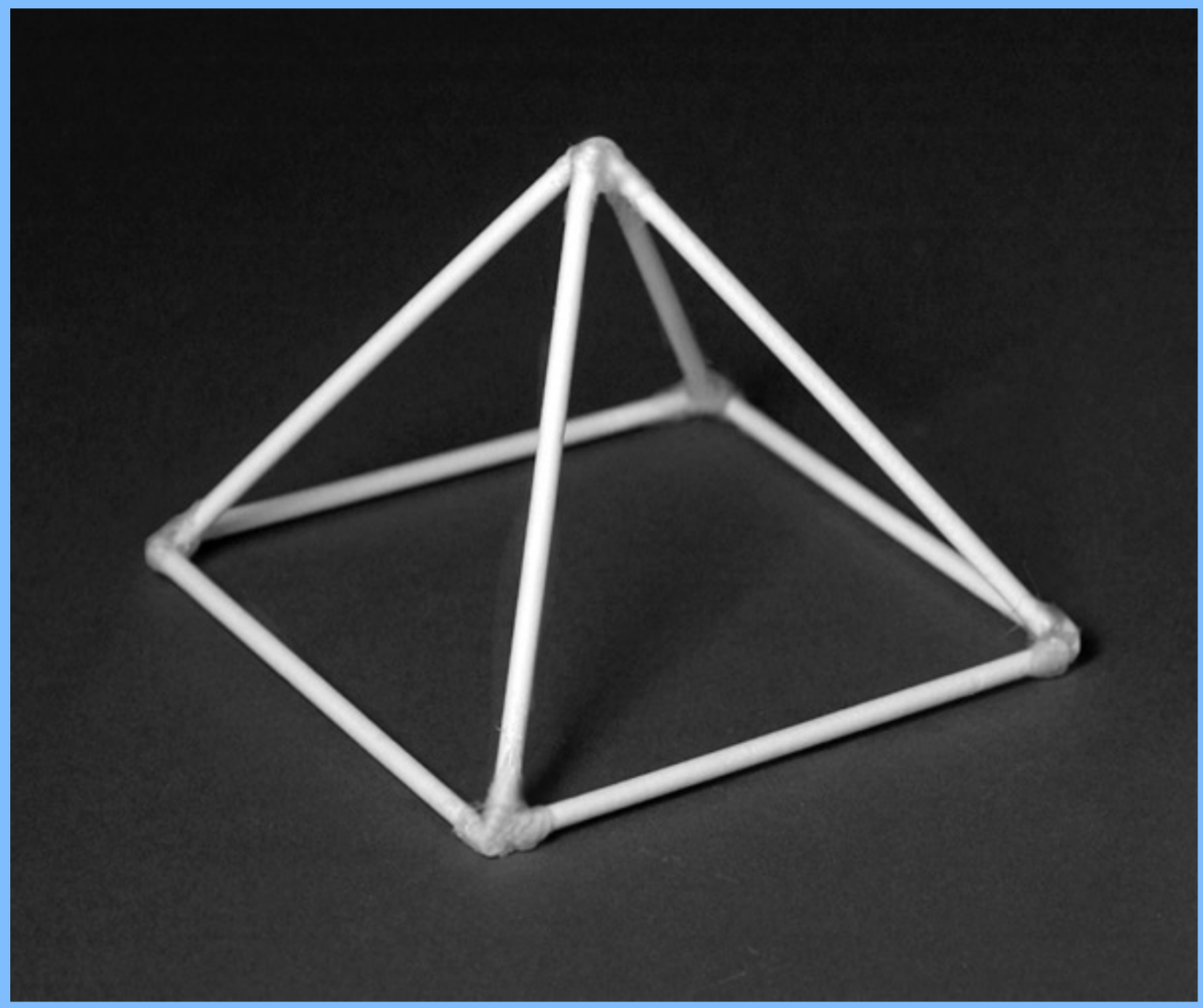




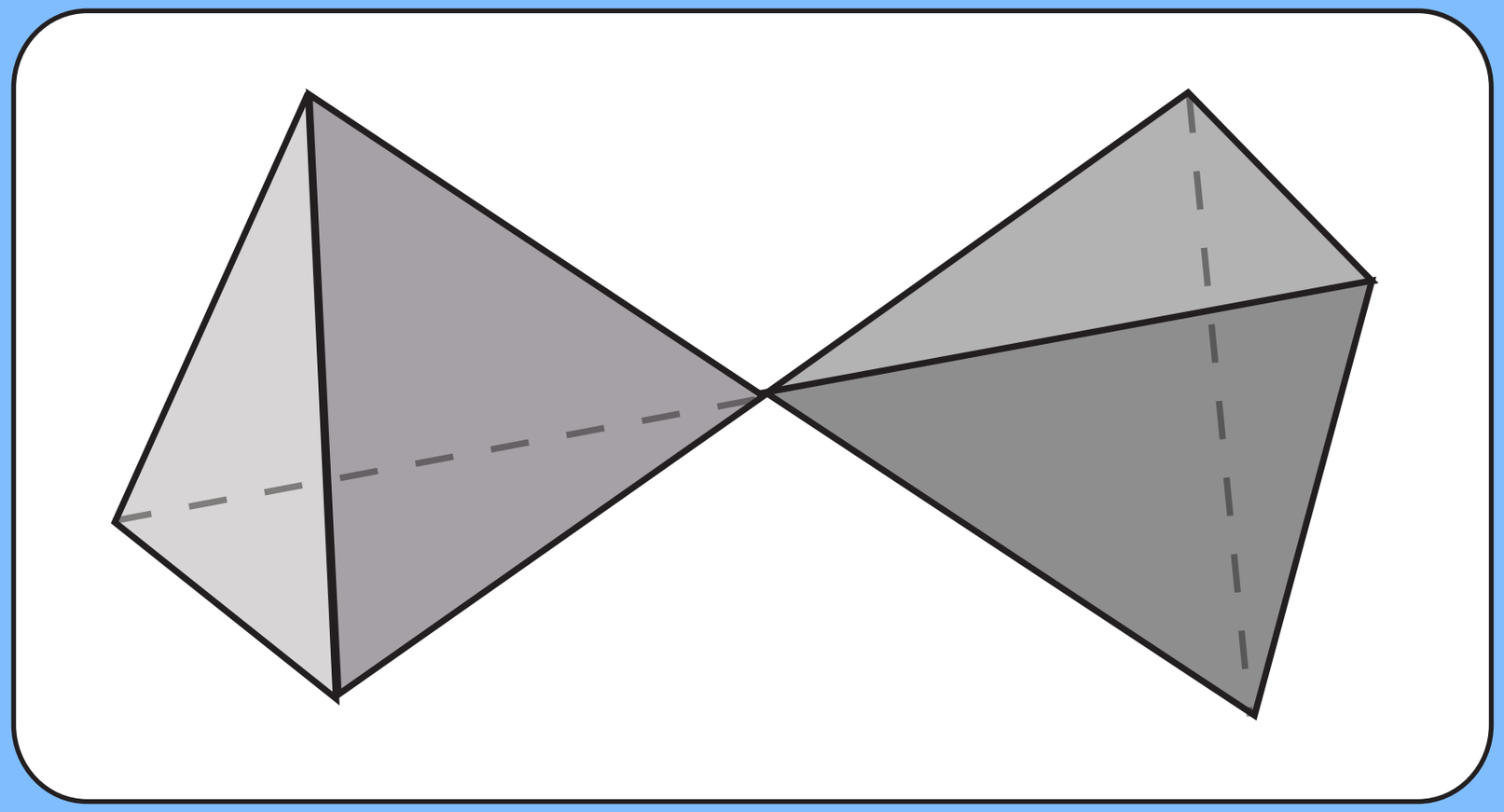
tetrahedron



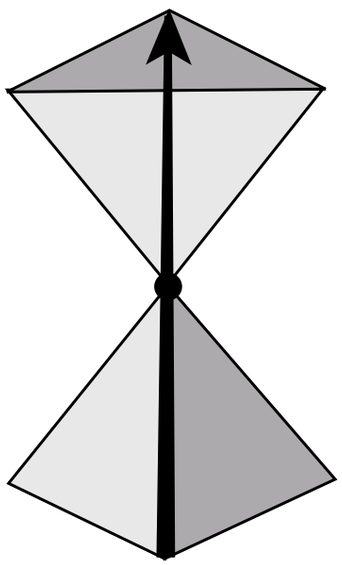
tetrahedral pyramid
with its triangular base



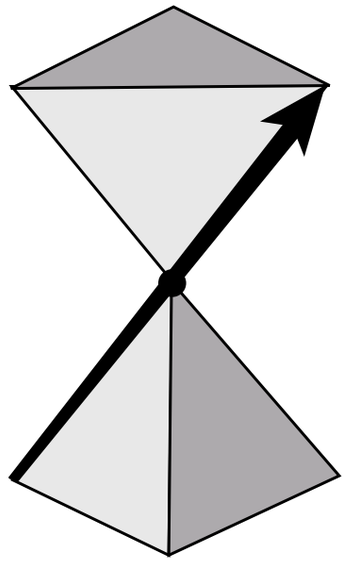
Pyramid of Giza
with its square base



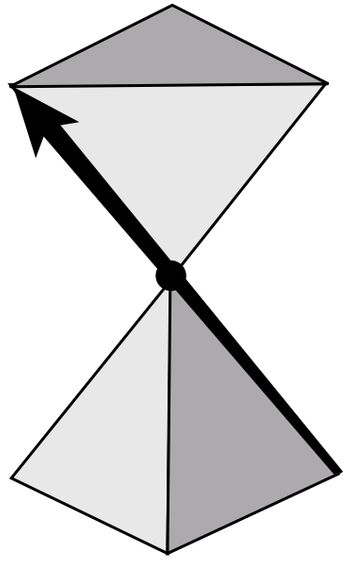
The Union of Opposites



front edge
becomes
the back edge

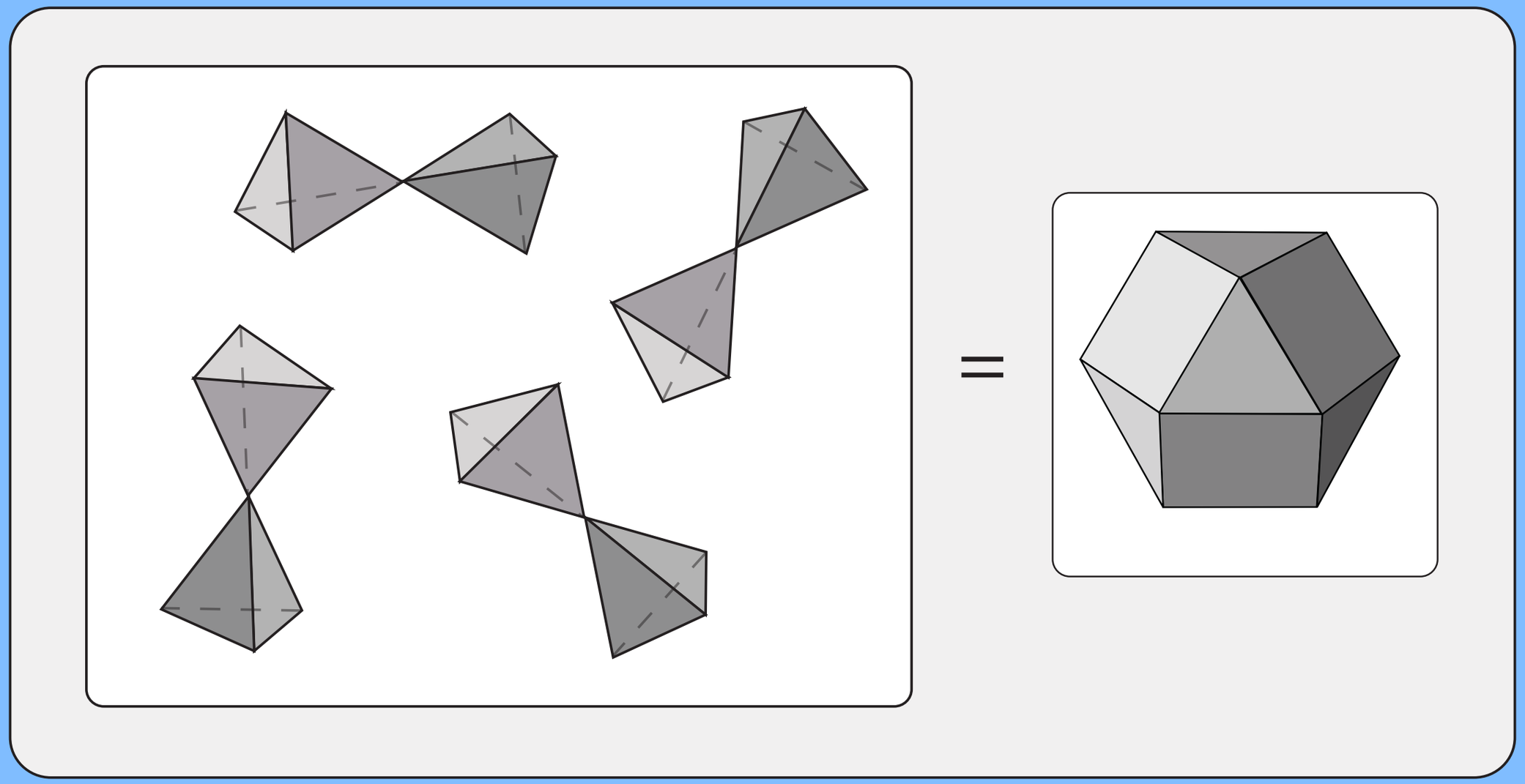


left edge
becomes
the right edge



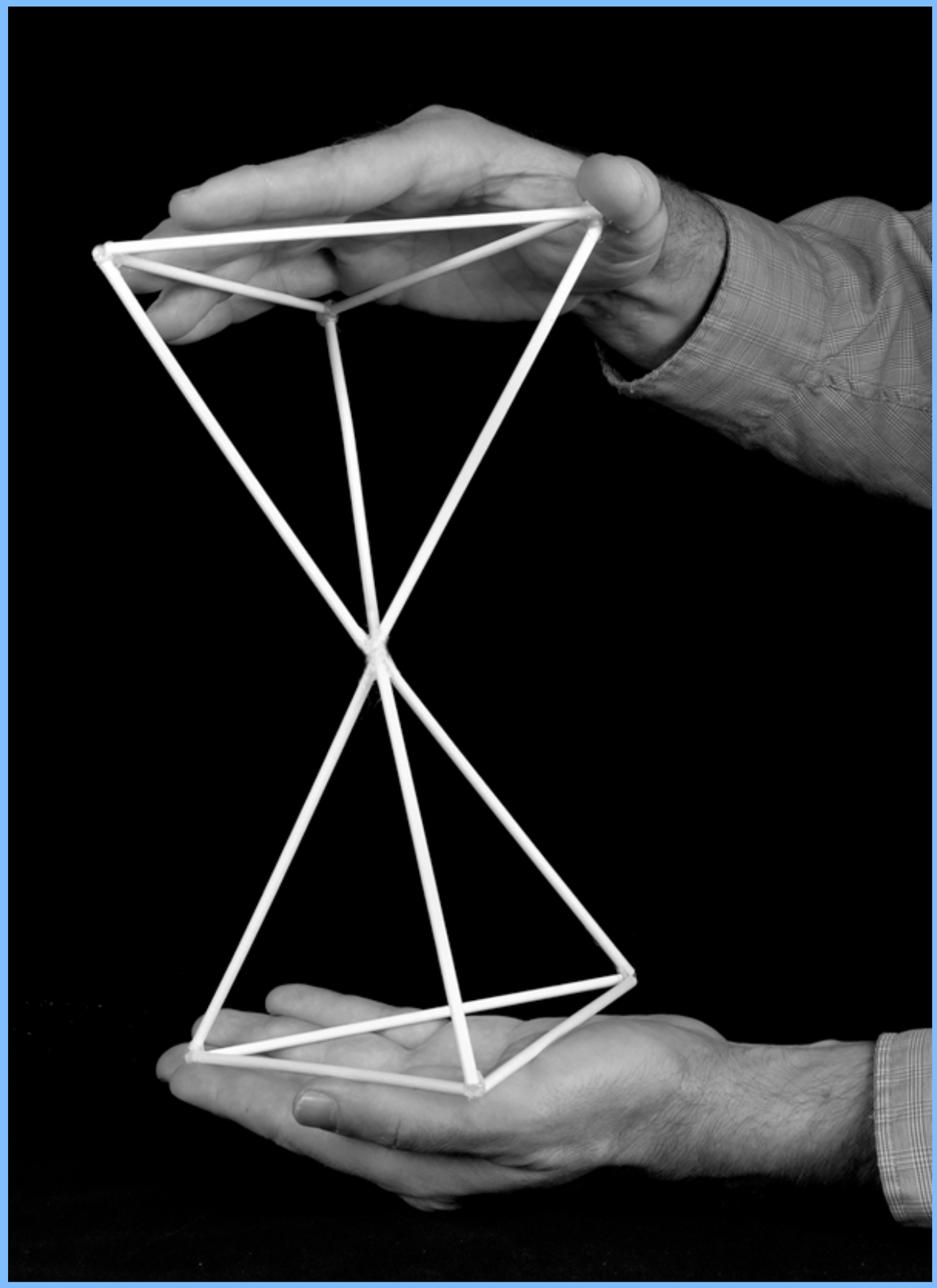
right edge
becomes
the left edge

Bucky frequently
wore a bowtie

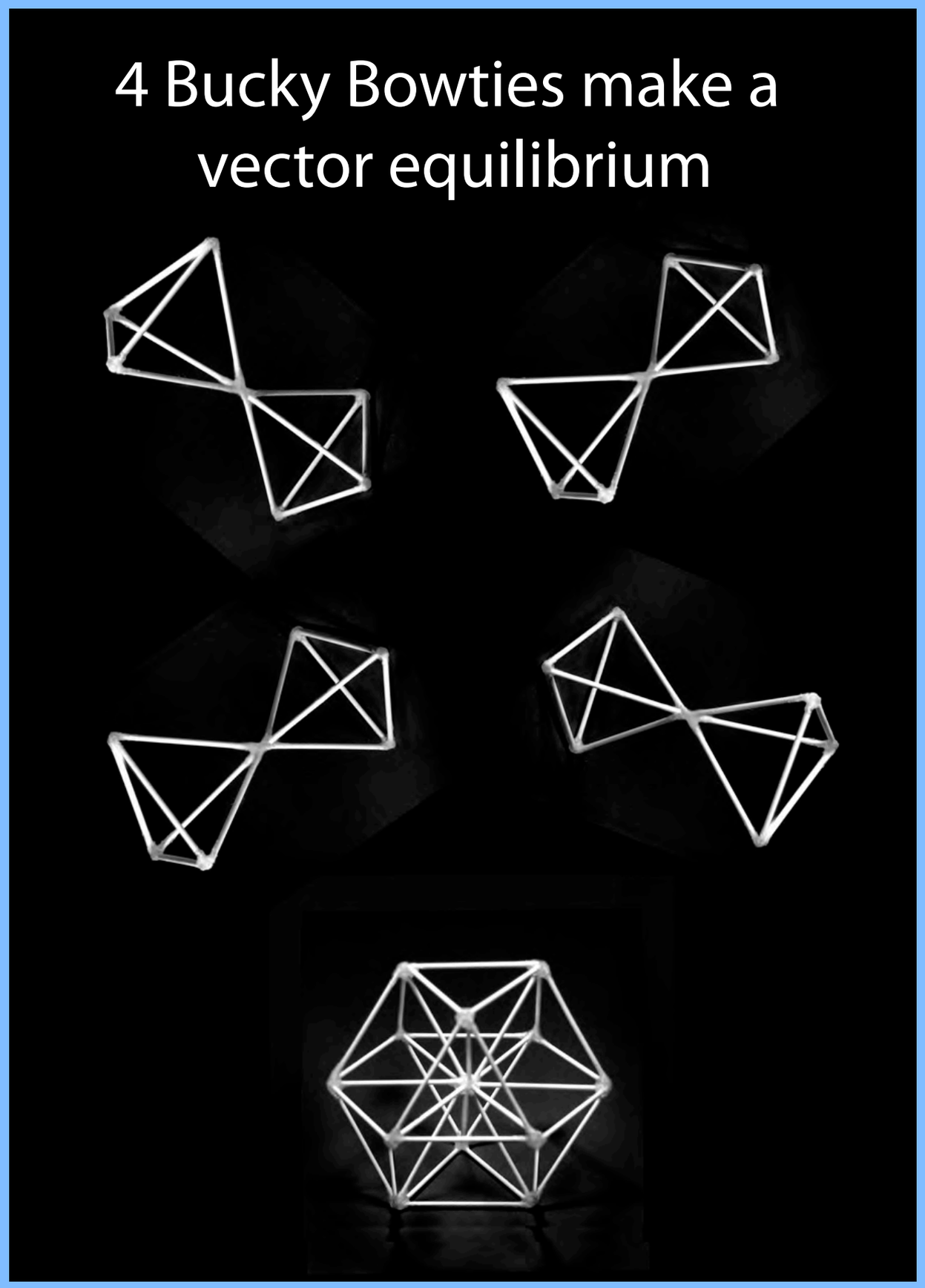


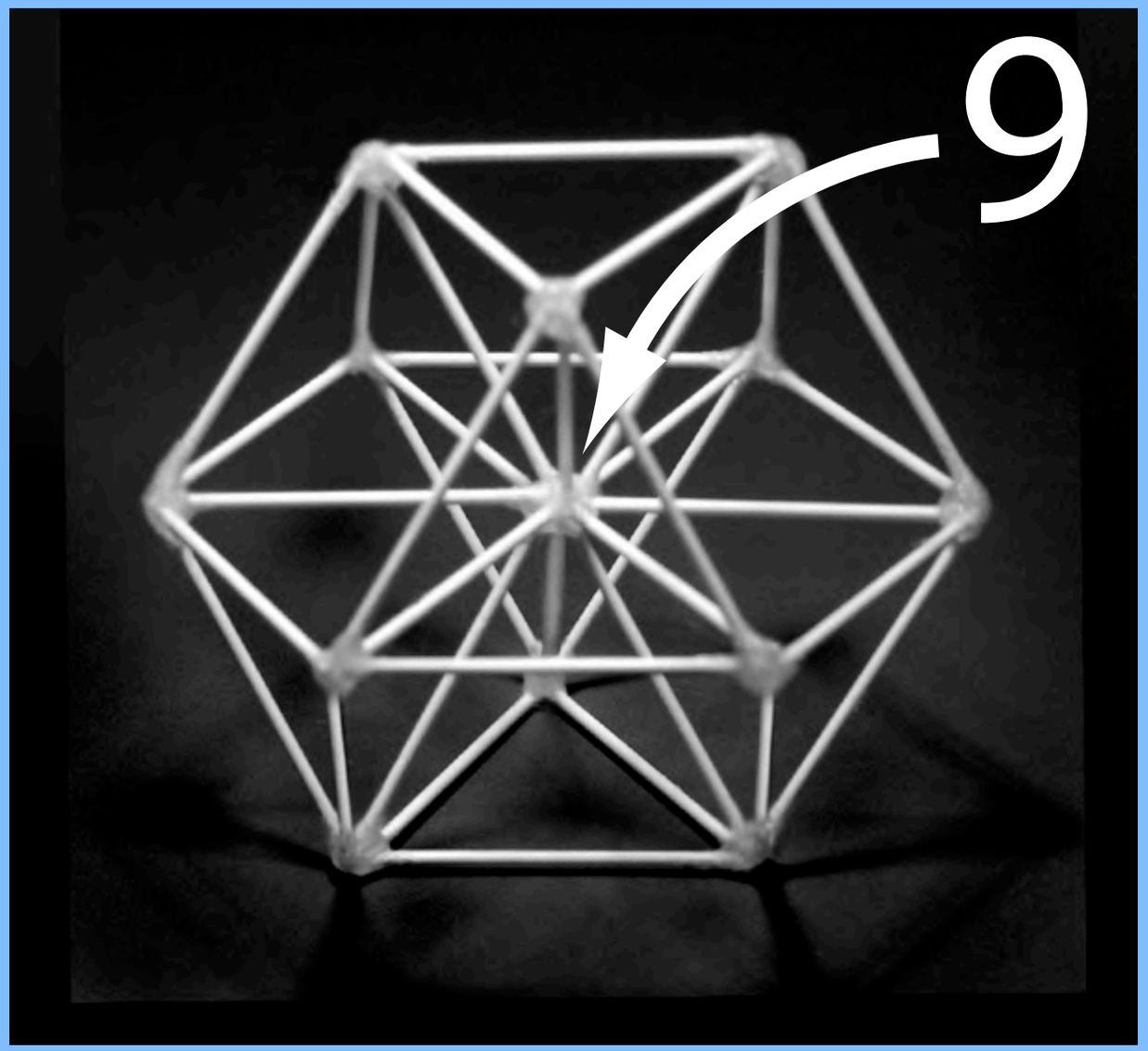
4 pairs of tip-to-tip tetrahedra assemble into a cuboctahedron

“Bucky Bowtie”



4 Bucky Bowties make a vector equilibrium




9

Examples of indigging:

24 indigs to 6

913 indigs to 4

90909 indigs to 0

6372815 indigs to 5

4678 indigs to 25, which further indigs to 7

Checking multiplication by "casting out nines."

7 2 9 4 2

X 5 3 9 6

4 3 7 6 5 2

6 5 6 4 7 8

2 1 8 8 2 6

3 6 4 7 1 0

3 9 3 5 9 5 0 3 2

4 + 2 = 6

= 5

5 + 5 + 2 = 12

6 X 5 = 30

3 + 0 = 3

1+ 2 = 3

These two results should be the same if the original long multiplication was done correctly.

“From this I saw that nine is zero.”

“Nucleus as Nine = None = Nothing”

“Nucleus as Nine,

i.e., non (Latin);

i.e., none (English);

i.e., nein (German);

i.e., neuf (French);

i.e., nothing;

i.e., interval integrity…”

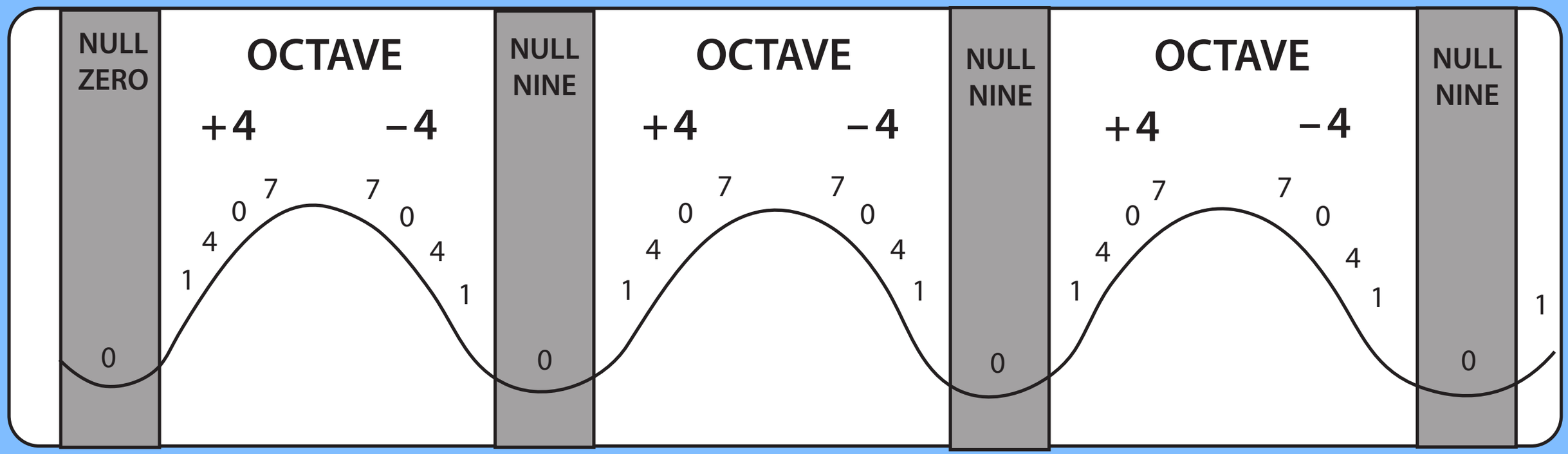
(Fuller, *Synergetics 1*, 1012.01, p. 647)

Indigging
the normal flow of numbers
reveals an “octave, null nine” rhythm.

1 = **1**	10 = **1**	19 = **1**	28 = **1**	37 = **1**
2 = **2**	11 = **2**	20 = **2**	29 = **2**	38 = **2**
3 = **3**	12 = **3**	21 = **3**	30 = **3**	(...)
4 = **4**	13 = **4**	22 = **4**	31 = **4**	
5 = **5**	14 = **5**	23 = **5**	32 = **5**	
6 = **6**	15 = **6**	24 = **6**	33 = **6**	
7 = **7**	16 = **7**	25 = **7**	34 = **7**	
8 = **8**	17 = **8**	26 = **8**	35 = **8**	
9 = **0**	18 = **0**	27 = **0**	36 = **0**	

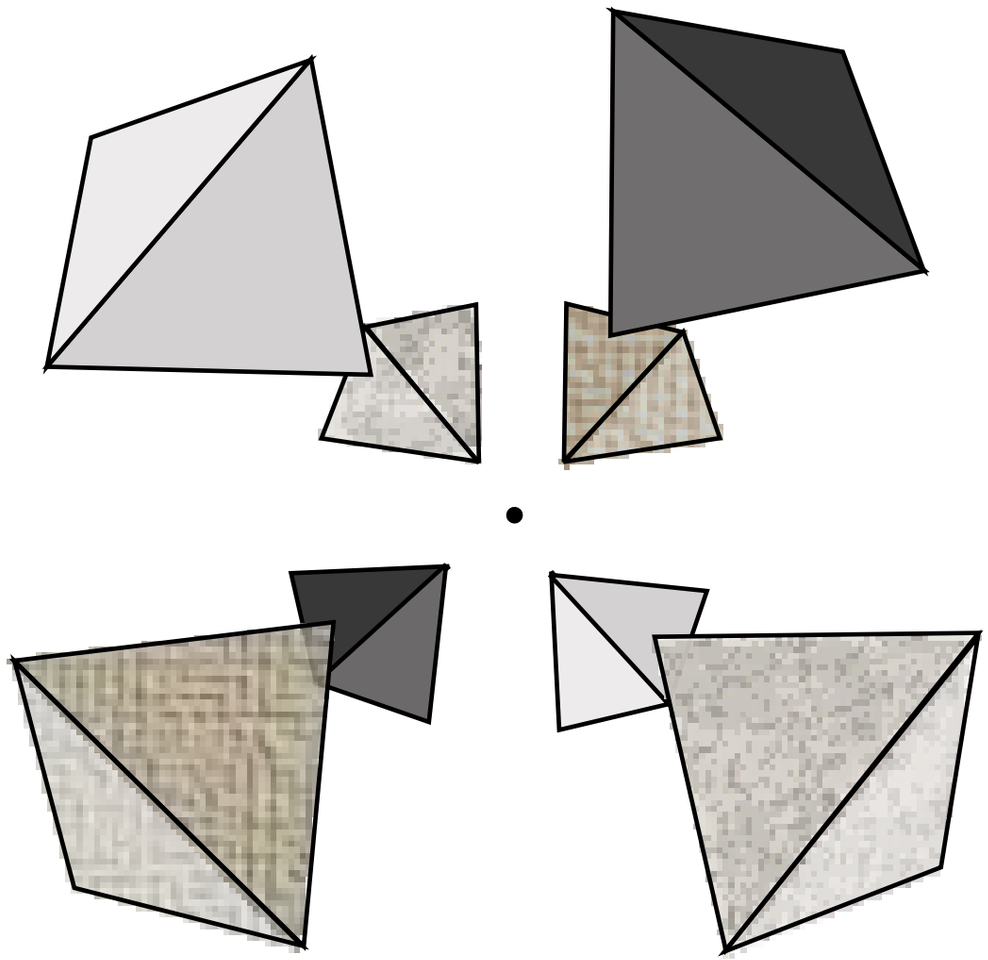
Indigging the SQUARES
of the normal flow of numbers
reveals an "octave, null nine" rhythm.

1 = **1**	100 = **1**	361 = **1**	784 = **1**	1369 = **1**
4 = **4**	121 = **4**	400 = **4**	841 = **4**	1444 = **4**
9 = **0**	144 = **0**	441 = **0**	900 = **0**	(...)
16 = **7**	169 = **7**	484 = **7**	961 = **7**	
25 = **7**	196 = **7**	529 = **7**	1084 = **7**	
36 = **0**	225 = **0**	576 = **0**	1089 = **4**	
49 = **4**	256 = **4**	625 = **4**	1156 = **0**	
64 = **1**	289 = **1**	676 = **1**	1225 = **1**	
81 = **0**	324 = **0**	729 = **0**	1296 = **0**	


NULL
ZERO
OCTAVE
+4
–4
1
4
0
7
7
0
4
1
0
NULL
NINE
OCTAVE
+4
–4
1
4
0
7
7
0
4
1
0
NULL
NINE
OCTAVE
+4
–4
1
4
0
7
7
0
4
1
0
NULL
NINE
1
0

“Indig congruences demonstrate that nine is zero
and that number system is inherently octave...”
with an internal rhythm of
“ four positive and four negative.”

"The inherent $+4, -4, 0, +4, -4, 0 \longrightarrow$ of number"



4 pairs of tetrahedra
and the
centerpoint is “null nine”

Geometry and Arithmetic

Here haue you (acco

my MATHEM

pub

Sciences, and Artes Mathe-maticall, are, either

Principall, which are two, onely,

Arithmetike. *Sim*

M

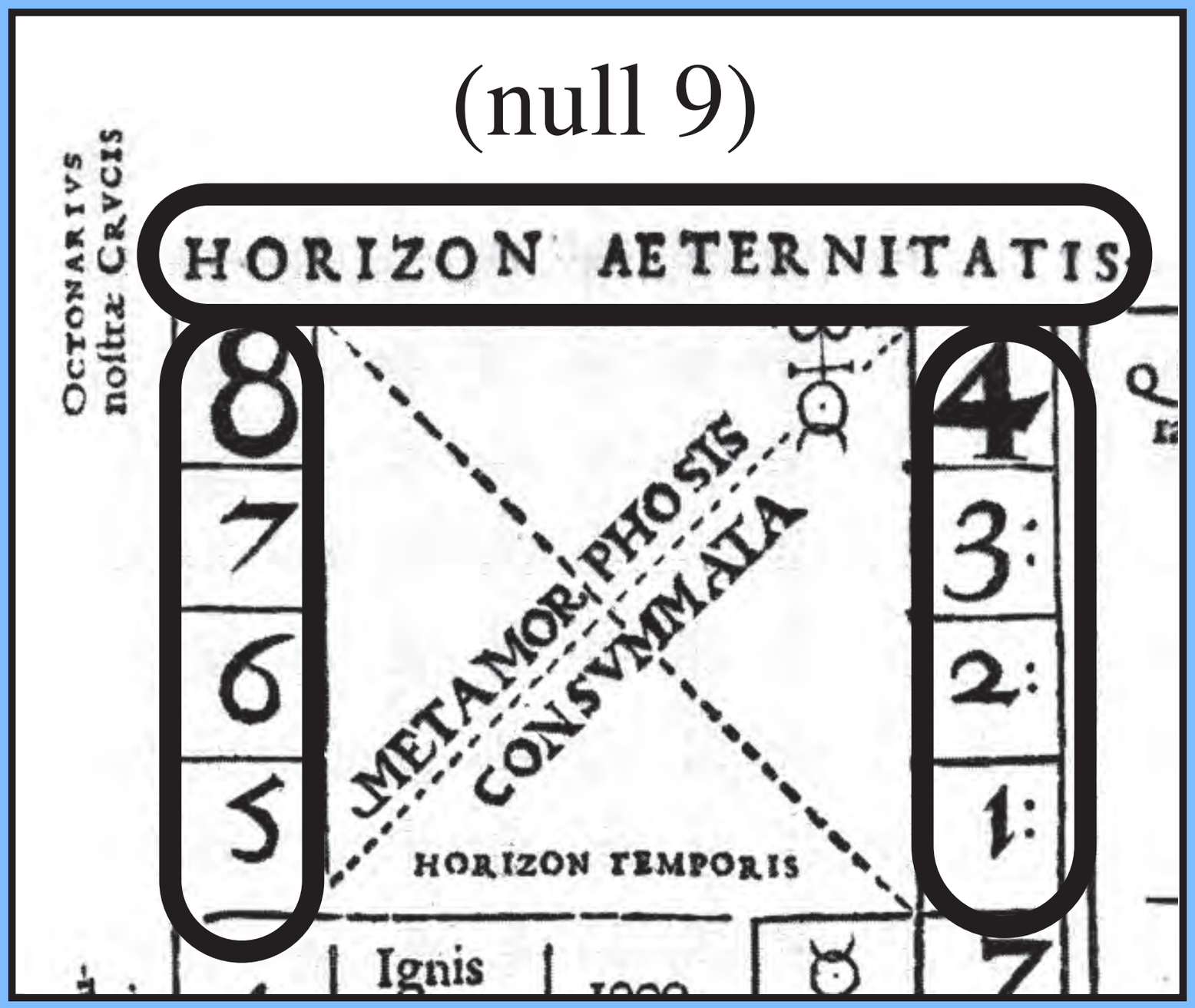
Geometrie. *Sim*

M

A

vul

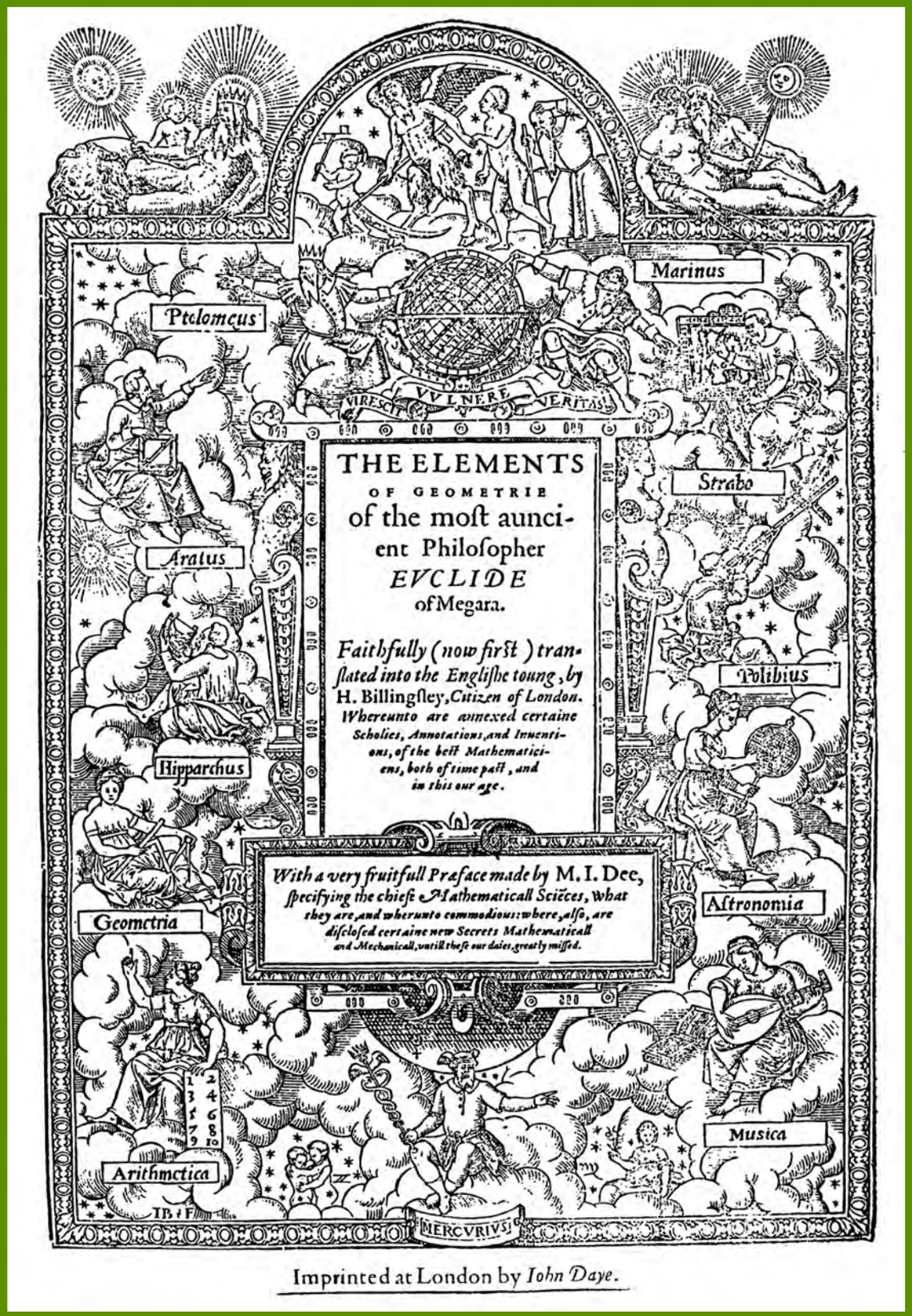
(null 9)


OCTONARIVS
nostræ CRVCIS
HORIZON AETERNITATIS
8
7
6
5
4
3:
2:
1:
METAMORPHOSIS
CONSVMMATA
HORIZON TEMPORIS
Ignis

Dee discovered in the 1500's

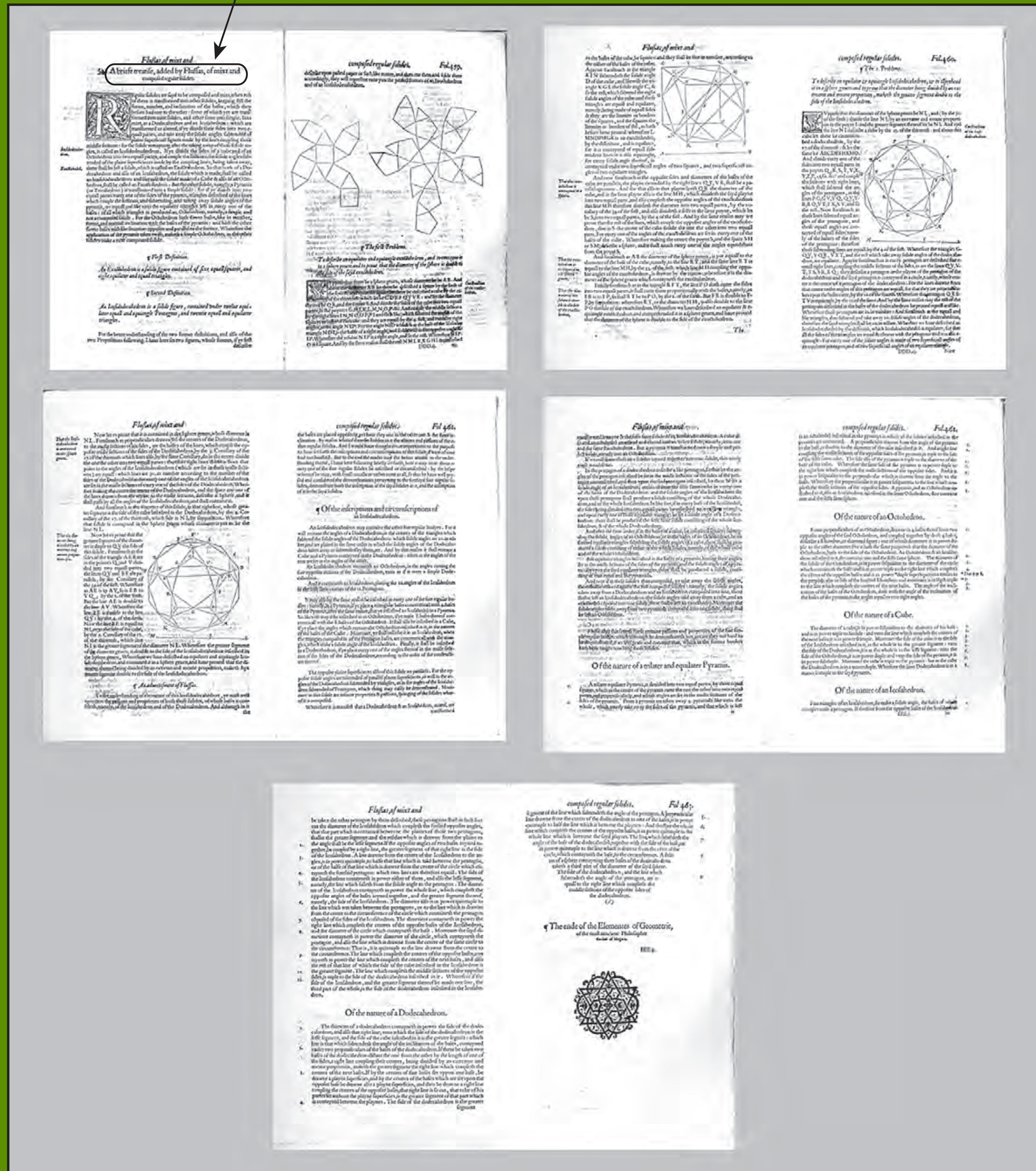
what

Bucky discovered in the1900's

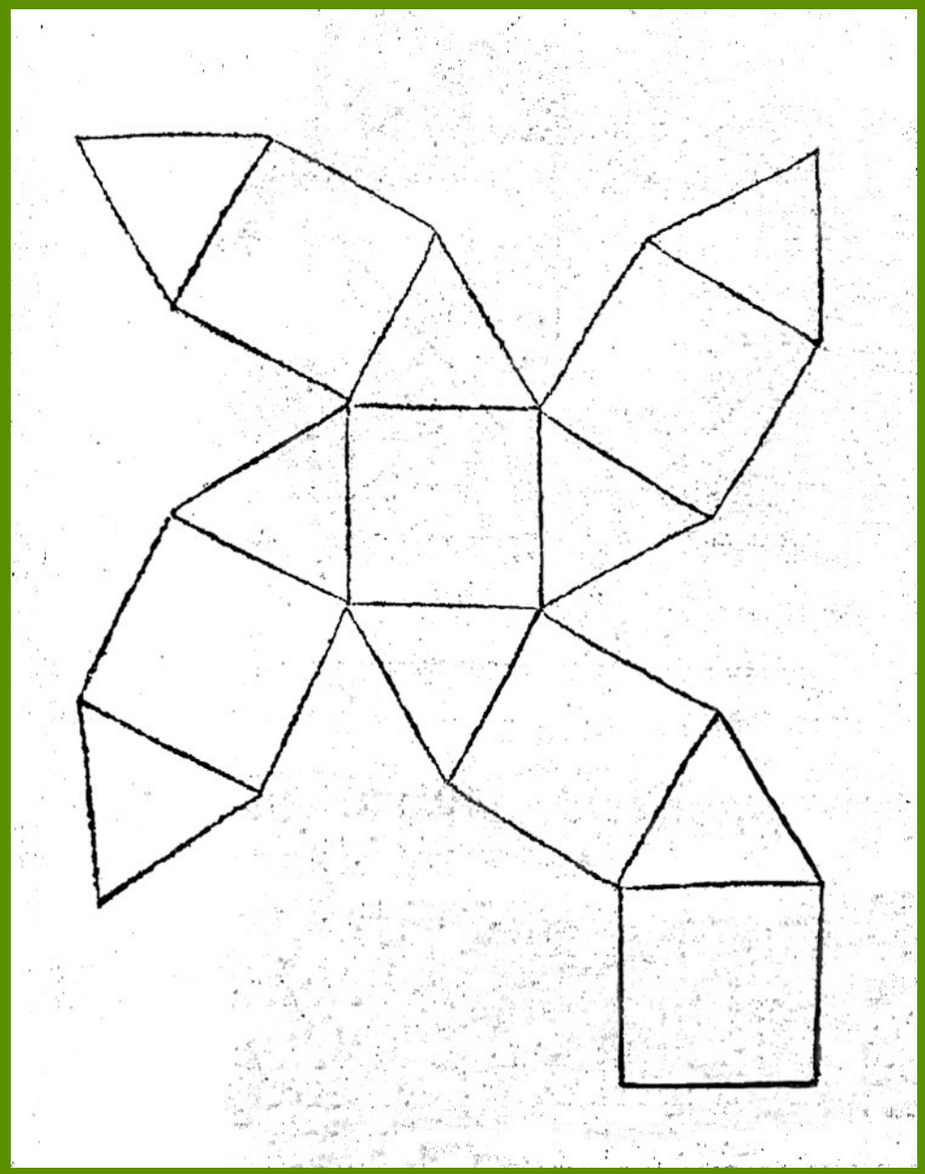


The Title page of Henry Billingsley's (and John Dee's) Elements of Euclid

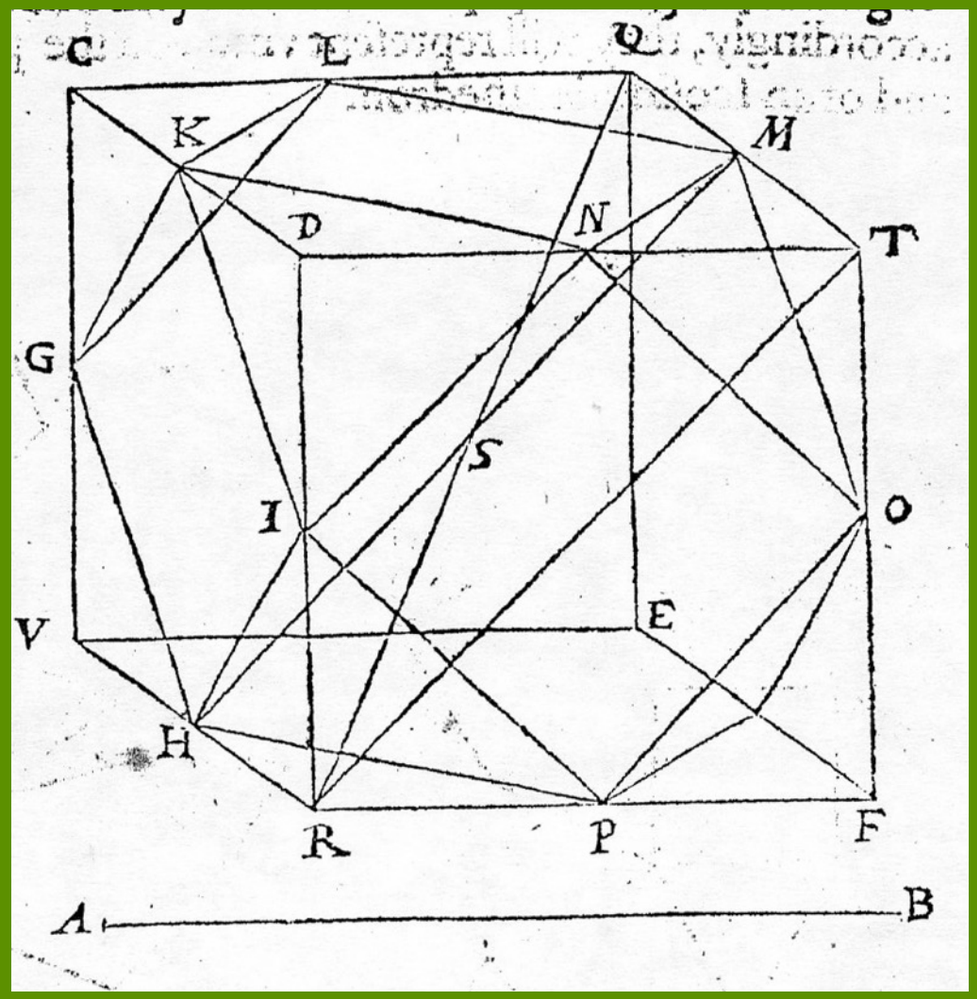
A briefe treatise, added by Flussas, of mixt and composed regular solides.

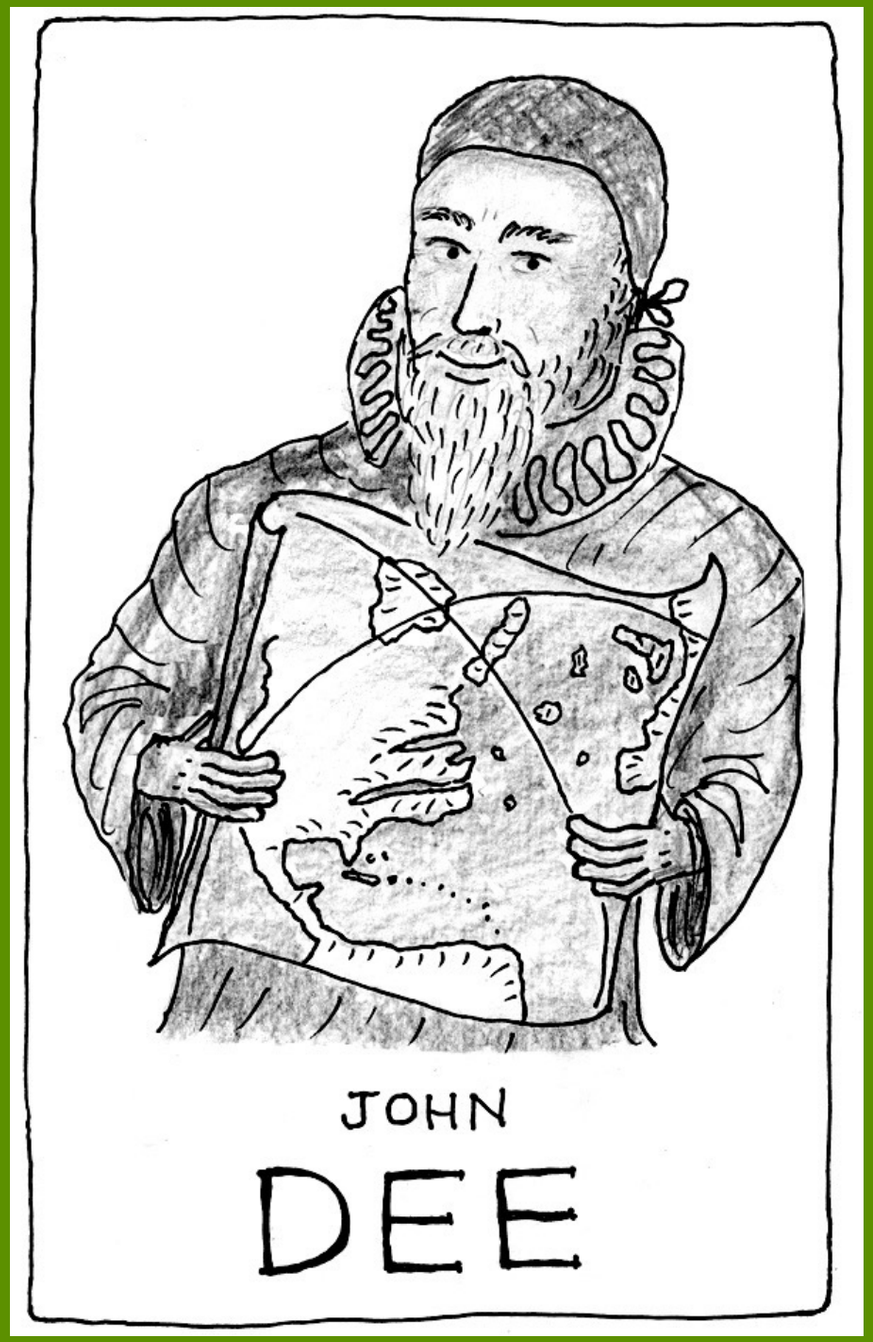


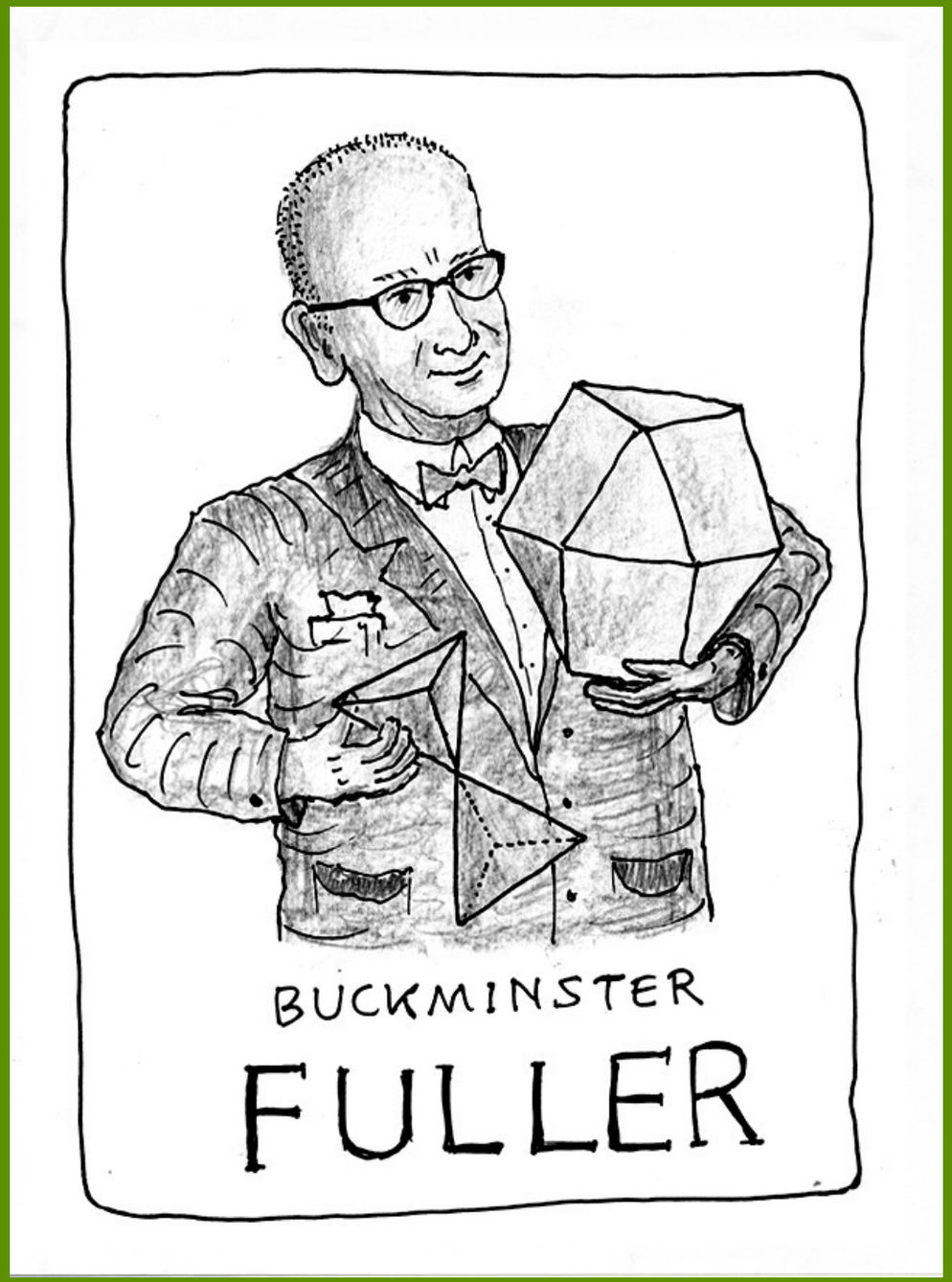
“An Exoctahedron is a solid figure
containing six equal squares
and eight and equilateral and equal triangles.”

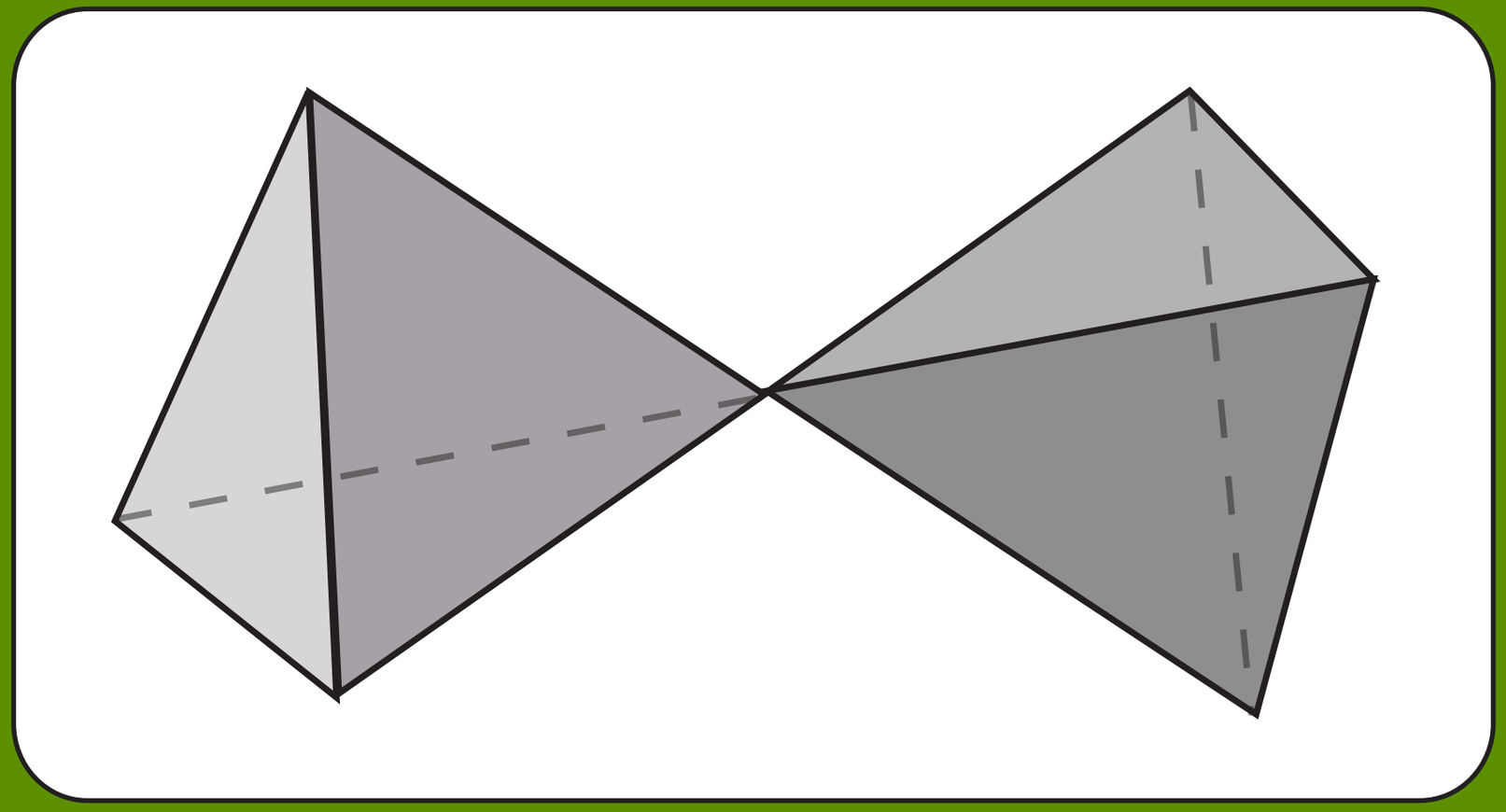


cutting the corners off a cube makes an “exoctahedron”




JOHN
DEE


BUCKMINSTER
FULLER



The Union of Opposites

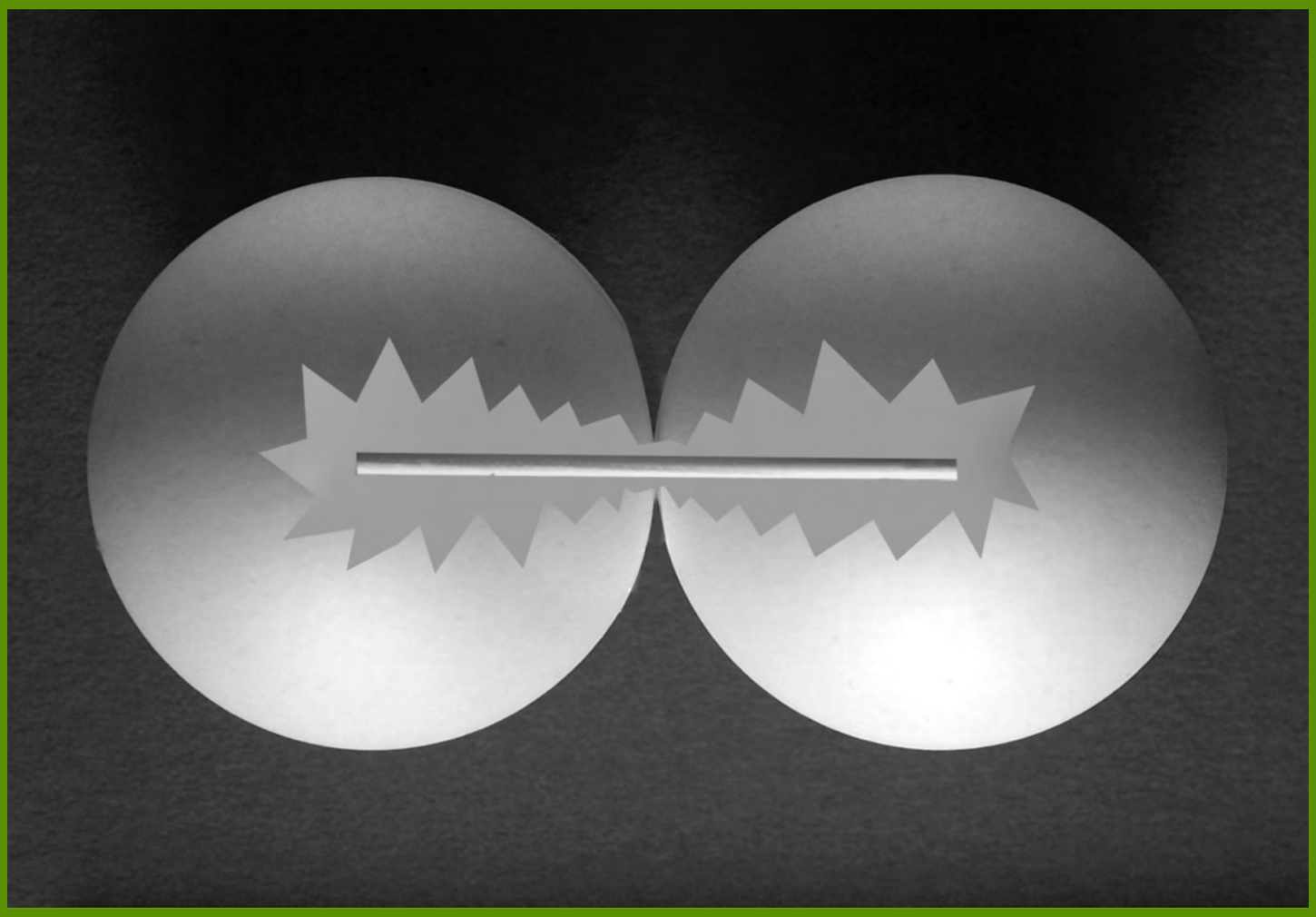
“Unity is plural,
and at minimum two.”

outsidedness

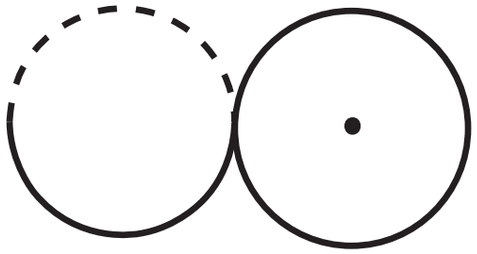
convex

insidedness

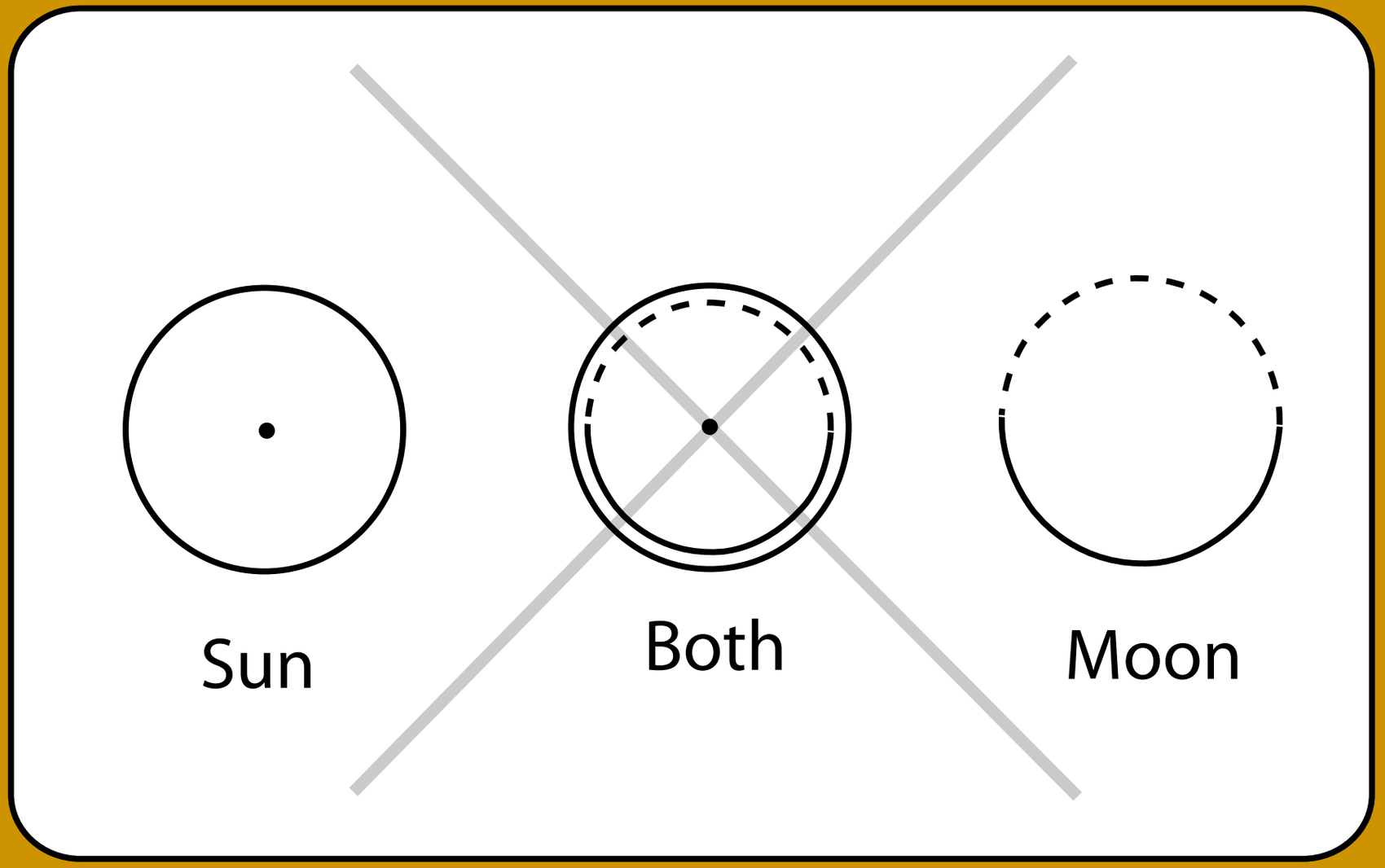
concave



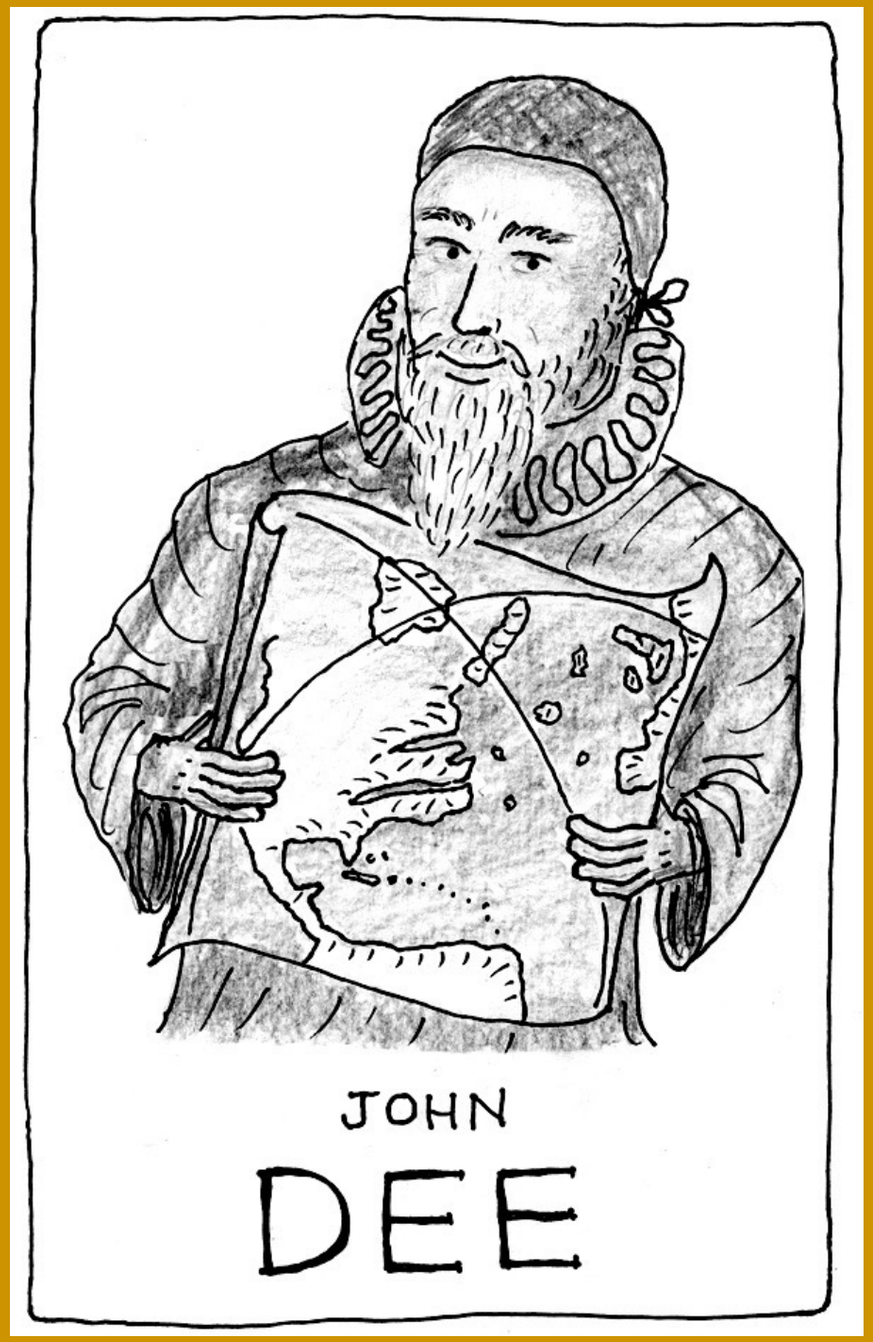
Unity=2



The LIGHT of the Philosophers was made
the day the Moon and Sun were joined.

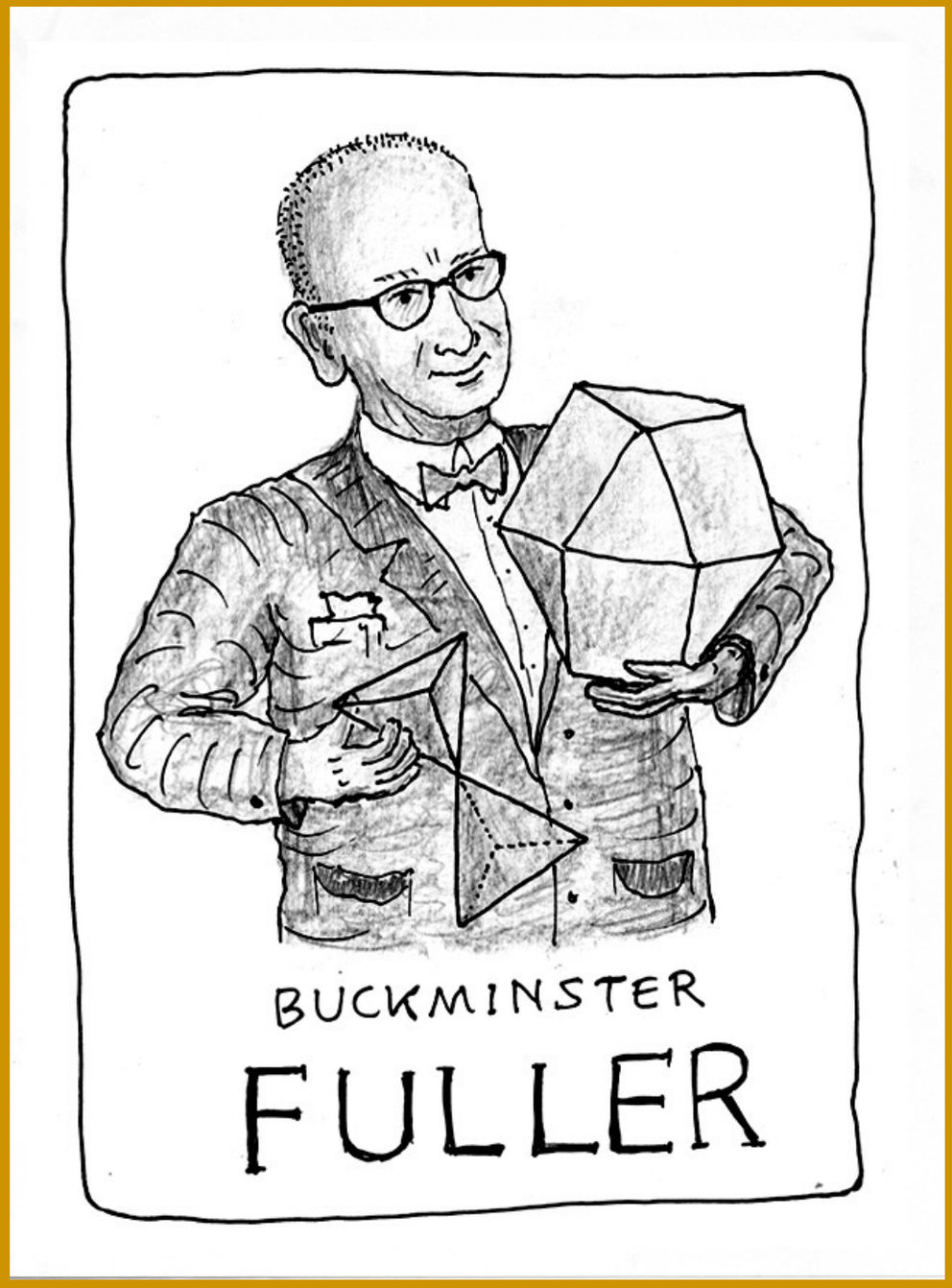


The Union of Opposites



JOHN

DEE



BUCKMINSTER

FULLER