The Spirit of the Tao

seems to me to be analogous to the words of Masamune Shirow (a pseudonym) in the book Ghost in the Shell 2: Man-Machine Interface (issue 11 of 11) (Dark Horse Comics 2003):

"... two thousand years ago it was the **jewel** millenium, during which **religion** was extremely powerful ...[one thousand years ago]... the s**word** millenium ... was symbolized by powerful **science and technology** ...[now is the]... **mirror** millenium ...[in which]... **science and religion mirror each other** ...

the [Yasakani Magatama] jewel ...

[which represents a Yin-Yang binary choice of the Taiji of the Great Primordial-Tao School, which includes the cultivation practices from the Unconventional School, and of IFA, and which also represents the Bezels of Wisdom of Ibn Arabi] ...

the [Kusanagi] sword ...

[which represents math/science/technology ranging from Iron to Gravity and the Standard Model and Beyond]

and ... the [Kagami] mirror ...

[**the 8-fold mirror Kagami** = Kami (spirit) + ga (ego) shows that **the Binary Choices of the Yasakani Magatama jewel** are mirrored as a representation of **the Gravity and Standard Model of the Kusanagi sword** by **VoDou Physics of the D4-D5-E6-E7-E8 Physics Model** which is based on the 8 binary choices of the Cl(8) Clifford Algebra and which **unites all three: jewel, sword, and mirror**; so that they, like the three legs/eyes of Yatagarasu]

are all together now ...".

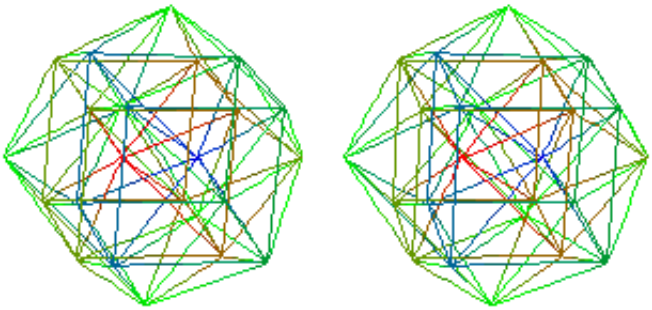
Images from http://onmarkproductions.com/assets/images/shinto-text.jpg (top image) and from http://www.uwec.edu/philrel/shimbutsudo/ninigi.html (second fourth and fifth images from the top) and from material on http://www.valdostamuseum.org/hamsmith/swas.html (third image from the top and its description). The etymology of the word Kagami is taken from http://www.nihonbunka.com/shinto/blog/archives/000098.html .

According to http://www.hotsuma.gr.jp/index-e.html: "... The Hotsuma-Tsutae is an epic poem of more than 10,000 lines written in "yamato-kotoba", an ancient form of Japanese. It tells the story of the "gods" who inhabited Japan in the Late Jomon, Yayoi, and Early Kofun eras (spanning more than a thousand years from the 8th century BC to the 3rd century AD). Its authors are given as Kushimikatama, Minister of the Right in the reign of the Emperor Jimmu, and Ohotataneko, who lived during the reign of the Emperor Keiko. Kushimikatama wrote the first two volumes (The Book of Heaven and The Book of the Earth). Ohotataneko edited these and added the third volume (The Book of Man). ... CONTENTS OF THE HOTSUMA-TSUTAE ... Awa-no-Uta The Awa-no-Uta is a song that starts with the letter "a" and ends with "wa", hence its name. It contains each character in the 48-syllable script of ancient Japan (the "Hotsuma script"), and appears in the first chapter of the Book of Heaven. ... The Book of Heaven (Chapters 1-16) ... The Book of the Earth (Chapters 17-28) ... The Book of Man (Chapters 29-40) ...".

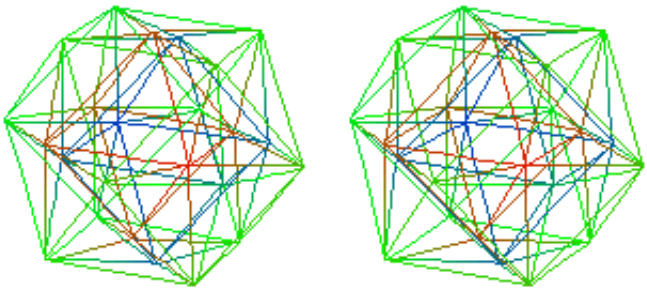
According to http://www.hotsuma.gr.jp/awanouta-e.html: "... Isanagi and Isanami, the 7th generation of rulers ... revived the productivity of agriculture ...[and]... set about standardizing the national language, which had become polarized into barely intelligible dialects. To do this, they employed a form of song called the Awa no Uta.

Singing in harmony to the accompaniment of musical instruments, Isanagi would intone the "upper" 24 sounds and Isanami the "lower" 24. In this way, they tried to standardize the number of sounds in the language and, along with their efforts to diffuse agriculture, this helped them bring the nation back to its feet. ...".

Note that the upper 24 plus lower 24 can represent the 48 root vectors of the F4 Lie algebra, which form in 4-dimensional space a 24-cell



and its dual



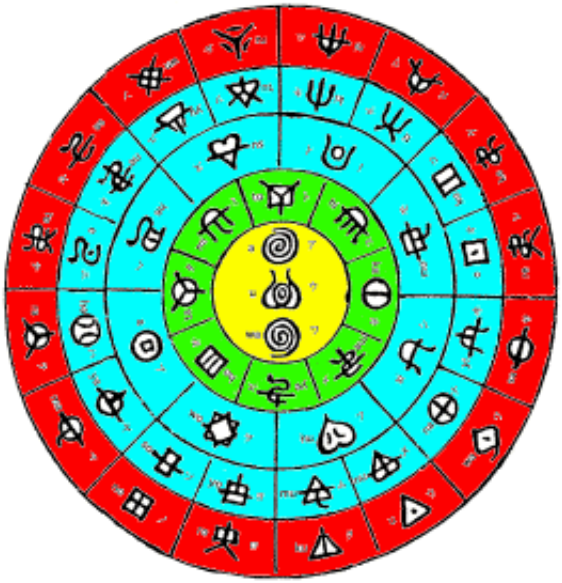
24-cell.

According to http://www.hotsuma.gr.jp/futomani-e.html: "... Toyoke, lord of the northern provinces ... drew up a chart using 51 phonetic symbols to represent the 49 deities residing in the heavens.

This he presented to his daughter Isanami and her spouse Isanagi, 8th in the line of divine rulers of Japan. Amateru, son of Isanagi and Isanami, had his nobles compose poems based on Toyoke's chart. From these, he selected 128, which were then set down as the Futomani Book of Divination (the origin of Shinto divination rituals).

- The symbols A-U-WA in the inner circle represent Amemiwoya, the creator of heaven and earth. The Amemiwoya (August Heavenly Ancestor) deity
- TO-HO-KA-MI-YE-HI-TA-ME in the first inner ring are the eight deities who create the human soul, connect it to the physical form, and govern the span of human life. The Amoto (Heavenly Origin) deities
- A-I-HU-HE-MO-WO-SU-SI in the second inner ring are the deities who govern the cardinal directions, language, and human organs. The Anami (Heavenly Parity) deities

- The thirty-two symbols in the two outer rings govern the outer form of humans and protect day and night. The Misofu (Thirty-Two) deities ...".



Note that the 16+8 = 24 cyan letters can represent the 24-cell root vectors of the 28-dimensional D4 subalgebra of the F4 Lie algebra; the 8 green letters can represent the vector space of D4; and the 8+8 = 16 red letters can represent the 16 full spinors (8 +half-spinors and 8 -half-spinors) of D4.

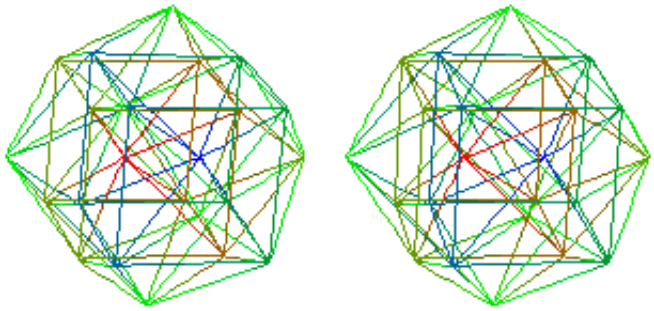
The diagrams in the yellow center are not Hotsuma letters, but are symbols of left-handed and right-handed spirals and a double spiral. If the double spiral is counted twice, as representing Yin and Yang of a Yin -Yang symbol  , then there are 4 elements, corresponding to the 4 Cartan subalgebra elements of the 48+4 = 52-dimensional Lie algebra F4.

Amateru's 128 poems correspond to two sets of the 64 hexagrams of the I Ching.

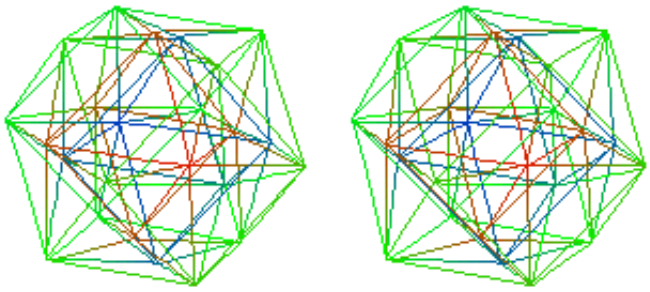
They also correspond to half of the 256 Odu of IFA, and to the 128-dimensional even subalgebra Cl(8)e of the 256-dimensional Cl(8) Clifford Algebra with graded structure

```
1   8  28  56  70  56  28   8   1

The graded structure of even subalgebra Cl(8)e is

1      28      70      28       1

which can be written in two dual 64-dimensional parts as

1      28      35
               35      28       1
```

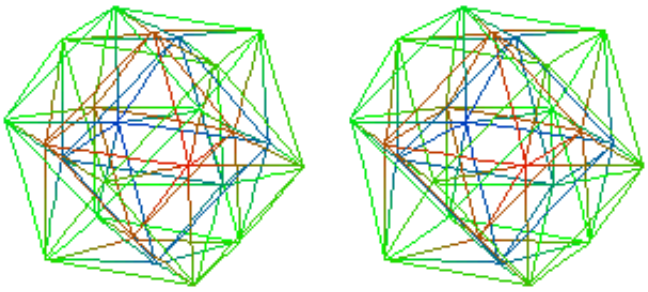
in which the first 28 corresponds to the 28-dimensional D4 Spin(8) Lie algebra whose 24 root vectors correspond to 24 of the 48 Hotsuma letters and to the vertices of a 24-cell



and in which the second 28 corresponds to the momentum space duals of the 28-dimensional D4 Spin(8) Lie algebra whose 24 root vectors correspond to the other 24 of the 48 Hotsuma letters and to the vertices of a dual 24-cell



Note that the 128 contains two dual 24-cells whose 24+24 = 48 vertices form the root vectors of the 48+4 = 52-dimensional exceptional Lie algebra F4.



the only regular polytope in any dimension that is both centrally symmetric and self-dual, impressed me so much that I took it to be the foundation of the model:

- Since the 24 vertices of the 24-cell describe the vertex figure of the Quaternion Integral D4 lattice, I tried to develop a model with a Lattice SpaceTime having 4-dimensional Quaternionic structure that carried over to its continuum limit as a smooth 4-dim SpaceTime manifold. In January 1980 the Notices of the American Mathematical Society (27 (1980) 67) published a Query (no.208) from me saying: "... J. A. Wolf (J. Math. Mech. 14 (1965) 1033-10470 has shown that there are 4 types of 4-dimensional complete simply connected Riemannian symmetric spaces with quaternionic structure:
  - (I) Euclidean 4-space, which has Abelian structure [the 4-torus T4];
  - (II) SU(2) / S(U(1)xU(1)) x SU(2) / S(U(1)xU(1)), ... [S2 x S2] ...;
  - (III) SU(3) / S(U(2)xU(1)), ... [CP2] ...; and
  - (IV) Sp(2) / Sp(1)xSp(1) ... [= Spin(5) / Spin(4) = S4] ...,

  and the noncompact duals of II, III, and IV. ... Can the correspondence between the 4 ty0es of spaces having quaternionic structure and the 4 forces of phyiscs be used to constuct a unified theory ...?".

- Since the 24-cell is the Root Vector Polytope of the 28-dimensional D4 Lie Algebra Spin(8), I tried to develop a model whose Gauge Bosons were the represented by the 28 infinitesimal generators of Spin(8). In my early work,
  - 10 formed the Anti-deSitter Lie Algebra B2 = C2 = Spin(2,3) = Sp(2), which could be gauged by the MacDowell-Mansouri mechanism to produce Gravity with a Cosmological Constant and Torsion;
  - 8 formed the 8 gluons of Color SU(3)
  - 6 formed the 3 weak bosons of the SU(2) Weak force, with
    - 3 of the 6 corresponding to 2 of the 4 polarization directions t,x,y,z and
    - the other 3 corresponding to the other 2 polarizaitons; and
  - 4 formed the U(1) photon of ElectroMagnetism,
    - one for each of the 4 covariant polarizations t,x,y,z.

(I have since changed my mind about how the 28 generators of D4 work, in that now I use 16 of them to form U(2,2) = U(1)xSU(2,2) = U(1)xSpin(2,4) and gauge it to get gravity, with the remaining 12 forming 8 gluons, 3 weak bosons, and 1 U(1) photon.)

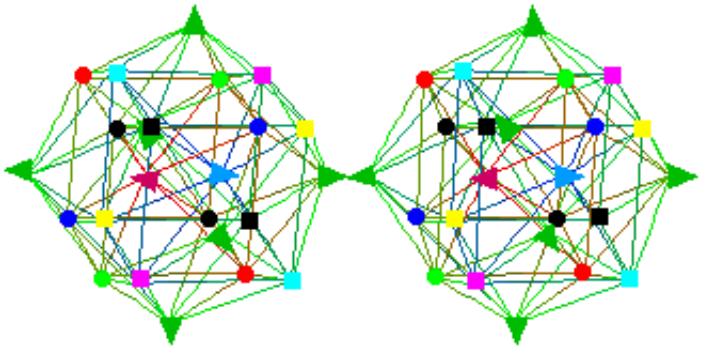
```
Recall 256-dim Cl(8) with grades 1   8  28  56  70  56  28   8   1

The graded structure of even subalgebra Cl(8)e is

1      28      70      28       1

which can be written in two dual 64-dimensional parts as

1      28      35
               35      28       1
```

in which

- the square root of the first 1+28+35 = 64 = 8x8 corresponds to 8 +half-spinor fermion particles and
- the square root of the second 1+28+35 = 64 = 8x8 corresponds to the mirror image 8 -half-spinor fermion antiparticles.

In the D4-D5-E6-E7-E8 VoDou Physics model the 24 vertices of a 24-cell can represent 24 of the 28 non-Cartan-subalgebra gauge boson generators of Spin(8) as desribed above.

The dual 24-cell can also be seen (alternatively to being seen as a momentum-space dual) in this way:



- 16 of the 24 vertices of its dual 24-cell can represent
  - 8 first-generation +half-spinor fermion particles; and
  - 8 first-generation -half-spinor fermion anti-particles
- Its other 8 vertices are not dirctly in the 128-dim even subalgebra of Cl(8) but are by triality isomorphic to 8-dim half-spinors and are the 8-dim SpaceTime vector space on which 28-dim Spin(8) acts.

The 8-dimensional SpaceTime is reducible to

4-dimensional Physical SpaceTime, whose corresponding vertices are denoted by

plus

4-dimensional Internal Symmetry Space, whose corresponding vertices are denoted by

Frank D. (Tony) Smith, Jr.
P. O. Box 370
Cartersville, GA 30120 USA
770-382-5875
www.tony5m17h.net/
www.valdostamuseum.org/hamsmith/