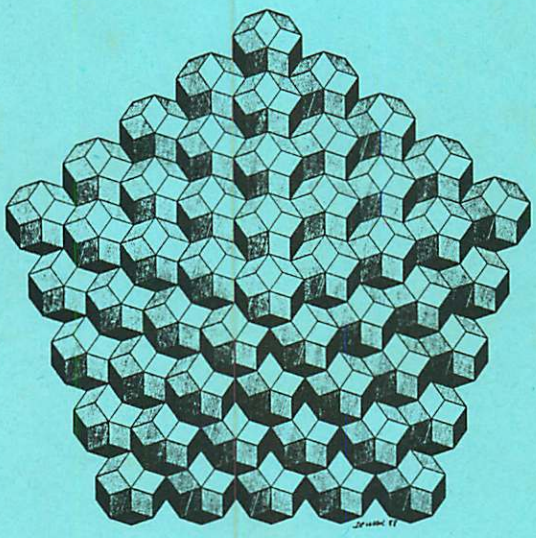
Symmetry of STRUCTURE

an interdisciplinary Symposium

Abstracts

I.



Edited by Gy. Darvas and D. Nagy

Budapest

August 13-19, 1989

hungary

THE PROBLEM OF SYMMETRY OF "THE PRIMARY ELEMENTS" IN THE THRACIAN ORPHISM AND PYTHAGORISM

DANKOV E., GENOVA D., DANKOVA R.

Dankov E.
Dankova R.
Samuil str. 6
Veliko Turnovo 5000
Bulgaria

Genova D.
Dimitar Naidenov str. 127 G
Veliko Turnovo 5000
Bulgaria

Differenciation in the Orphic mythological consciousness results in the formation of definite concepts about the role of symmetry in the formation of the world. The cosmic view of life in Ancient Greece demanded a rational explanation of the Earth's and cosmos's organization as well as their invariant interrelationships. Water, fire, earth, air and ether were world forming elements in the Thracian Orphism and Pythagorism /Fall, 1986, Dankov 1988/. If philosophers of the Milet school accepted one of them as the world's forming element, Pythagoreans thought of all these together in their interaction and interdependence. Five regular geometrical figures correspond to these elements: a cube to the Earth, a tetrahedron to fire, an octahedron to air, an icosahedron to water and a pentagondodecahedron to ether.

From the point of view of symmetry the five elements can be represented as convex polyhedrons, Oiler's theorem being valid for all of them. The representation of the primary elements is also possible with the help of the so called metric theory of convex polyhedrons which is different from the combinatory ones in using such concepts like length, angle and volume.

When represented as polyhedrons primary elements represent a convex aurface of a non-void closed set. Each polyhedron $P = \text{con } V\{x_1,\ldots,x_n\}$ can be called a k-polyhedron if $p = k$. This means that some subfamily of the family $/x_1,\ldots,x_n/$, consisting of k+1 point is independent affinely and every subfamily, consisting of k+2 points is dependent affinely. The k-simplex is to be understood as a k-polyhedron, appearing as a simplex. Such a simplex appears as a k-simplex only and only if it has k 1 apexes. Thus 1-simplex is a segment, 2-simplex is a triangle, 3-simplex is a tetrahedron and 4-simplex is a pentogram. The latter is known as a world model.

The idea of the geometrical aspect of the material organisation of the structure forming elements is used successfully by de Beaumont /1852/ for the explanation of the architectonic aspect ofthe global organisation of the Earth. Some definitely perceivable parities between the structure of the earth's crust and the mentioned elements of symmetry gave him cause to hold the view that 20 hedrons of the icosahedron, one of Plato's figures, correspond to the firmest areas on the earth's crust, that 30 of its edges correspond to the most important mountain ridges /less firm areas on the earth's crust/. In connection with this Lapparan/1882/ considered the tetrahedron a form "which holds the earth's crust in case of deformation"/Shafranovskii, 1975/. Similarly Lalleman holds the view that the four apexes of that tetrahedron, together with the corresponding edges, represent the Alps, the Himalayas, the Rocky Mountains and the South Pole and considered the tetrahedron structural organisation of the Earth a form which determines a minimum reductions in the earth's crust/Shafranovskii, 1975/. The octahedron whose symmetry is

$4L_4 6L_2 3P_6 C$/besides its axis of symmetry, planes and centre/ is characterized with 12 one-dimentional edges, 8 two-dimentional hedrons and 6 0-dimentional apexes. The cube, having the same crystallographic symmetry as that of the octahedron, is characterized with 12 one-dimentional edges, 6 two-dimentional hedrons and 8 0-dimentional apexes. These numbers, according to Pythagoras, are in a relation of "a golden proportion".

The dodecahedron/$6L_2 10L_3 15L_2 15$ PC/ is characterized with 30 one-dimentional edges, 12 two-dimentional hedrons and 20 0-dimentional apexes; the icosahedron, whose structure has the symmetry of a dodecahedron, is characterized with 30 one-dimentional edges, 20 two-dimentional hedrons and 12 0-dimentional apexes.

The importance of the symmetrical organization of the earth is seen from the fact that certain symmetrical elements correspond to places of natural resources, i.e. in the distribution of diamond formations. Uranium deposits have a similar symmetrical location. "The uranium-235 deposits in Gabon, considered to be an extinguished natural reactor, astonishingly correspond to one of the apexes of a polyhedron"/Kanev, 1975/. According to him that polyhedron has the symmetry of a dodecahedron. Its orientation is such that "if the dodecahedron coincides with the earth's axis, two of its edges coincide with the Atlantic submarine ridge. A number of well known submarine and continental anomalies in the earth's crust also coincide with other hedrons of the dodecahedron"/Kanev, 1975/. The ridges in the middle of the ocean appear to be the constructive boundaries of a plate that is a source of the lithosphere.

In that way the symmetrical relations in the earth's organization carry information in which the dynamics of exogenous and endogenous processes is reflected. That is why "tectonics represents a carcass, a skeleton, a coordinate system around which data of the distribution of natural resources gather and which allows the prognosis of new locations"/Kosigin, 1974/. Kanev holds a similar point of view when asserting that as a result of the presence of an analogical tectonic ordering in the structure of the Earth "different blocks of different structure and tectonic activity exist in the earth's crust. This circumstance gives grounds to believe that initiallyour planet represented a gigantic polyhedron crystal-like body. Gradually that polyhedron body turned into a geoid"/Kanev, 1975, p.192/. Analysing modern achievments of geology and first of all geophysics the author concludes:"deep into the earth a crystal-like surface exists or to be more precise a frame of force whose apexes and edges represent the most sensitive places in the earth's crystal"/Kanev, 1975, p. 193/. He writes further: "This frame creates and changes the tectonic field of force of the Earth and represents the main force in the movement of the earth's crust in relation to its development"/Kanev, 1975, p.197/.

At the same time the earth's crust is in an antisymmetrical relation to the ocean symmetry/as a result of which their surface tends to levelling/, i.e. to an equal number of hedrons which in fact represents an antiequation. Parallel to this oceans and continents are also in an antipodal relation /Lichkov, 1965/. This relation is genetically conditioned and is represented symmetrically with the help of two antisymmetrical tetrahedrons. According to Shafranovskii and Plotnikov /1975/ "the ideal model of the distribution of land and water on the earth's sphere can be that of the black-white "octahedron" /a combination of two tetrahedrans/ with the following antisymmetry - $3L_4'(3L_i 4)4L_3 6L_2' 3P_6 C'$ - $m'3m$.

Actually if we take the white hedrons to represent the mainland and the black ones to represent the oceans and if the orientation of the octahedron is such that the "black" hedron is situated at the bottom and the "white" one at the top then the triple crystallographic axis of the symmetry will be perpendicular to these hedrons and will coincide with the axis of rotation of the earth. In this case the top "black" hedron represents the North icy ocean while the "white" hedron represents the Antarctic. The structure of this octahedron belongs to the crystallographic system with the following symmetry - $3L_4 4L_3 9PC$. According to it there are 3 oblique "white" triangles around the "black" triangle: "These are the continents - North and South America, Euroafrica and Asia"/Shafranovskii, 1975/. The rest of the "black" triangles correspond to definite oceans. The combinatory "octahedron", consisting of two antisymmetrical "tetrahedrons", separates visually "the basic regularities in the distribution of land and water on the earth's surface"/Shafranovskii, 1975/. Modern "global tectonics" does not take into full account these regularities, which is more than necessary since "modern plate tectonics...springs from the conception of a previously existing mainland /"Pangeo"/, consisting of a number of plates. These plates were separated from one another with boundaries along which each of the plates was subjected during the Mesozoic to spreading, going up or going down in relation to one another" /Gerasimov, 1976, p.6/.

The antisymmetry of these tetrahedrons differs not only in the sign of their enantiomorphism but also in their characteristics which also points to the dialectical character ofthese two antisymmetrical opposites. From the point of view of dialectics this antisymmetri cal organisation of the earth and its elements manifests its /antisymmetrical/ being only in relation to a certain structural dimension determining the dialectical unity of motion and nonmotion of the architectonics of the earth. The absolutisation of either of them has always caused discussions while the objective course of development of geology demands that these opposites be regarded from a new angle. Spilhaus's conception is an important step into this direction.

The formation of the isomorphic and antisymmetric relationships in the process of the development of the earth represent its selfregulation, selfpresentation and selfdevelopment. At the same time the influence of structural genetic links in the organisation and development of the earth helps the formation of certain isomorphic genetic relationships. All the structural variety in the process of the earth's development is based on these relationships. For example each of the 6 main plates which represent the base of today's continental mainland has a triectory of movement corresponding to the crystal structure of the tectonic field of the earth. The plates represent a continuation in the existence of elements of "Pangeo" in today's earth's structure. That is a definite quantitative transition from one structure into another /from a simpler into a more complex one/ that appeared in the history of the earth. The transition in the system of the geological movement is one of its selfrearranging conditions at a given stage of its development, e.g. "Pangeo" and it is the result of structural activity, which helps its symmetrical and harmoneous ordering of its inner elements. In that sense the system of the geological movement of matter in the state of "Pangeo" took on such a symmetrical ordering, which helped the "disruption" of "Pangeo", a necessary transition for the next

stage of development of the earth and the formation of the ancient platforms. The "disruption" was conditioned by a definite symmetry of the tectonic field and in such a way was of a necessary, regular and ordering character, corresponding to the carcass symmetry of the tectonic field of the then existing tectonosphere.

Such regularities enabled Spilhaus to reconstruct the primary position of the platforms and to create an epistemologico-geological model, revealing the informational regularities in the symmetry and selfordering of the earth. The global two-dimentional model of tectonic structure, put forward by the author and obtained with the help of an equidistant projection, happens to be a derivative of the simplex structure of the earth/Dankov,1977/. Giving Plato his due, Spilhaus came at the end to Pythagoras's idea and to be more precise to the Pythagorean model of the dynamic harmony of the world /Dankov, 1976/. This amazing link in the global equidistant projection of the icosahedron was most probably the basis of an integrated theory of the development of the earth and in particular the basis for revealing the symmetry of the acting tectonic regularities in the history of the earth. All this is very important for the reconstruction of some invariant regularities representing the "logic" in the development of inorganic geological processes and the transition from geogenisis /crystay genisis/ to biogenisis and noogenisis in the history of the earth. Undoubtedly a further analysis of the Pythagoras's idea of the geometrisation of the world forming elements is necessary for the reconstruction of some crucial ideas in the history of geology.

BIBLIOGRAPHY

de Beaumont E. Notice sur systems de montagnes. I-III, 1543pp. Paris, Bertrand, 1852.

Gerasimov,I.P. Герасимов,И.П. Архитектура Земли /геотектуры/ в свете теории глобальной тектоники плит. Геоморфология, 1976, № 3.

Dankov,E. Данков,Е.Симетрия,отражение, развитие. Пифагорейская модель динамической гармонии мира. В-к Моск. унив. Философия, 1976, № 2.

Ленинская теория отражения и науки о Земле. Автореф. канд. диссертации. М., 1977.

Тракийският орфизъм и възникването на философията. Сб.тезиси, XI межд. есм., В.Търново, 1988.

Kanev,D. Канев,Д. Движения на земната кора. С., Наука и изкуство, 1975.

Kosigin,U.A. Косыгин,Ю.А. Основы тектоники. М., Недра, 1974.

Lichkov,B.L. Личков,Б.Л. К основам современной теории Земли. Л., Изд-во Ленингр. унив., 1965.

Spilhaus,A. Geo-Art: Plate tectonics and platonic solids. E.O.S. Transactions, american geophysical union, Vol. 56 2, Febr. 1975.

Foll,A. Фол,А. Тракийският орфизъм. Изд. "Кл. Охридски", С., 1986.

Shafranovskii Шафрановский,И.И., Плотников,Л.М. Симметрия в
Platnikov,L. M геологии. Л., 1975.