SPIRAL DIFFERENTIAL STRUCTURES AS A PRINCIPLE FOR HARMONIC ORGANIZATION OF ARCHITECTURAL SPACE AND FORM.

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There is a persistent tendency, without any historical connection, to use organic forms and rythms in architecture.

It's cause lies in deep correspondence of the laws of perception to the structure of organic matter. The structure of organic matter, its symmetry corresponds to one of stable stereotypical models of perception of the man to surround himself by natural environment.

The aim of this environment is normal functioning of the human organism in an adequate cycle. In an adequate cycle one could spend less energy than in other cycles with maximum efficiency, least weariness and the greatest reliability of function.(Achmerov U.,1987).An adequate cycle appears with the aesthetic way of perception and is fixed subjectively by the aesthetic feeling of pleasure.(Kant I.Aesthetics.).

That's why a formal-aesthetic problem of human perception of the environment is an ecolojical problem at the same time. Its solution guarantees maximum adaptation to the environment and as a result provides the maximum survival because the environment gives more chances for survival because the greatest information of the environment easies the process of its comprehension.

The analysis of plants meristem structure of the point of growth carried out by Richards and his diagrams of growth and the arrangement of sprouts reveals the process of differentiation in the spiral systems. But Richards considered this process as a visual phenomenon characteristic for big flat meristems.

Investigations, carried out by the author, show that the differentiation appears in all the spiral structures when the diametre of its system changes and it is not a paradox of perception, but a deep property of the spiral structure, which reveals later in the organic matter on it

higher levels as a separation of elements of the organic matter (viens of leaves, branches of the tree etc.).

All these things give us the posibility to consider organic forms as a spiral differentiation structures of the growth and developement.

Spiral structures as well as differentiation processes can be describe by recurrent numbers (numbers of Fibonaccy) and in this way it is connected with proportions of famous so called Golden cross-section - the traditional instrument of architects in their creative searches for harmony. These structures have a developement and at the same time preserve the whole. The high combinations of structural elements provides for its plastic variety. All these properties of spiral structures create a lot of opportunities for their wide use in architectural practice as a principle of structural organization of the architectural space and form.

On the base of Richards's works and the works of the author there were made some flat spacial structures and developed some variants of their use in architecture on the town planning levels:

1) town planning sheme
2) space-volume design
3) design

Architecturally interpretted properties of spiral structures reveal themselves as organic harmony of proportions, opening of system for futher developement, formal variety and functional flexibility.

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Illustrations:

Fig.1. Flat Spiral Differentiation Structures on the Base of Similar and Standard Elements.

Fig.2. Spacial Spiral Differentiation Structure.

Fig.3. Children's Playground on the Base of Spiral Differentiation Structures. Authors: Belova L.,Jernakova N.

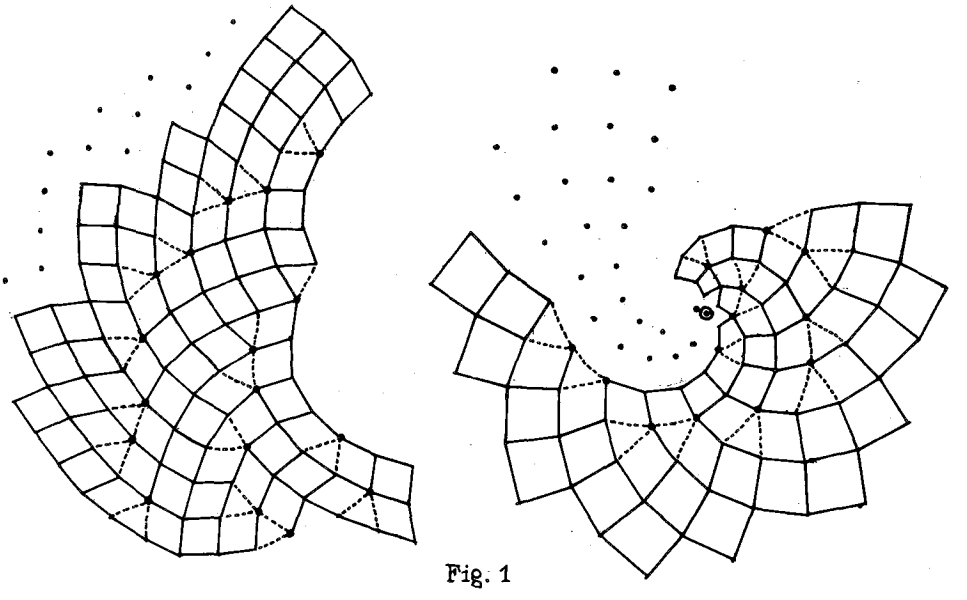

Fig. 1

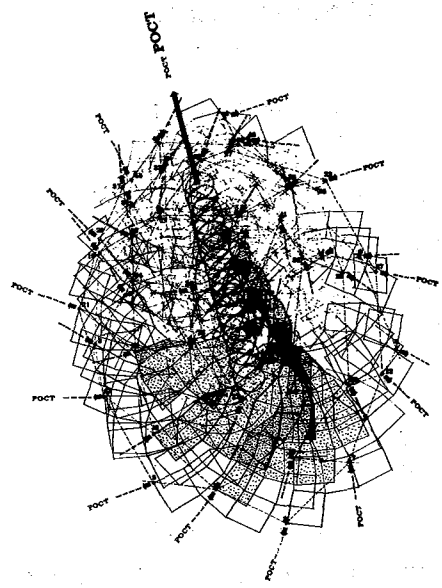

Fig. 2

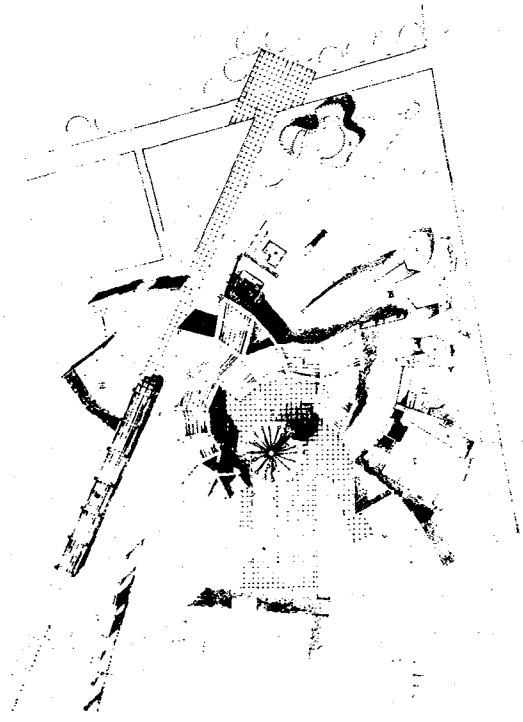

Fig. 3