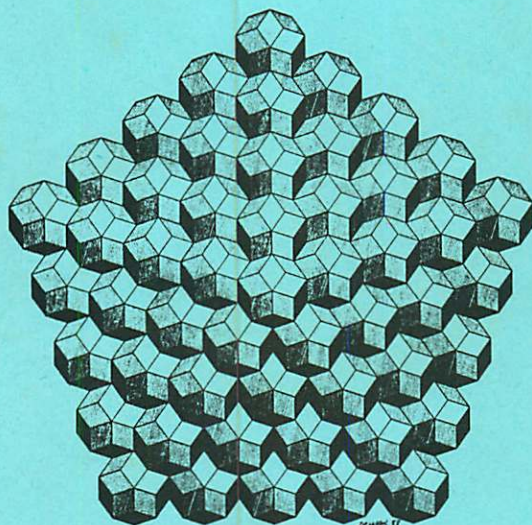


Symmetry of STRUCTURE

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Abstracts

I.



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ROSE, WHEEL, RONDO AND MANDALA:
 ROTATIONAL SYMMETRY AS FOCUS OF RESEARCH PROCESSES FOR THE
 PLANNING OF AN INTEGRATIVE CURRICULUM IN POLYAESTHETIC EDUCATION
 (ABSTRACT)

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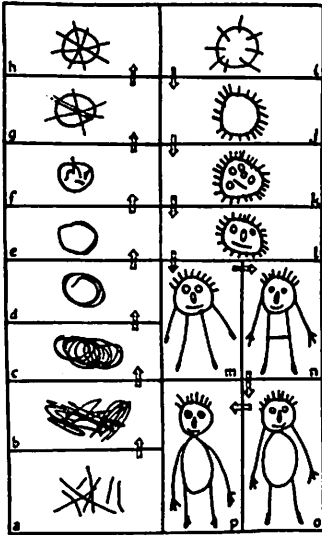
The paper attempts an integrative examination of several crucial educational questions, of some central issues of aesthetics and of a number of related fields. The starting point is one of the major problems of curriculum planning, i.e. the looking for the rational justification of the selection of particular objectives and learning experiences. For the construction of a comprehensive curriculum in aesthetic education a particular form, appealing strongly to the learner, was regarded as one of the possibilities of a connecting, integrative basis of the curriculum. The problem arose, what form should be chosen and how this choice could be rationally justified.

Comparisons with anatomic and cosmological phenomena revealed the central role of the circle as the basic form of rotational symmetry. The reviewing of research related to aesthetic activities of animals and a small child pointed again to the circle, as probably more appealing to a person than other forms. Rensch's Test of Aesthetic Preference (Morris 1968, 160) showed that all the four examined animals (crow, jackdaw, Guenon Monkey and Capuchin Monkey) preferred generally "regular patterns". The Capuchin Monkey preferred the regular pattern in all examples. Only in two examples all the four animals preferred the regular pattern: in the forms of circle and half circle.

Desmond Morris showed similarly in his experiments that forms of more or less imperfect circles constitute the optimal creative achievement of a chimpanzee (cf. Fig. 1).



Fig. 1: Circular Forms Drawn by a Chimpanzee (Morris, 1968, 133).



R. Kellogg points to the importance of circular forms symbolizing a face as a decisive stage in the gradual development of the drawing of a human figure by a child (cf. Fig. 2).

Fig. 2: Schematic Representation of Developmental Stages in the Drawing of a Human Figure by a Child (Morris, 1968, 124).

In the attempt to examine the question of form-preference in an empirical way it was presumed that the intensity of interest in a certain form or of the contact with it were positively correlated with the level of creative expression based on that form. An examination related to the Torrance-Test in Visual Creativity was carried out, in which the examinees had to complete various forms in a "creative" way (Torrance, 1966, cf. Fig. 3). The data were examined by means of Analysis of Variance for Repeated Measurements - (ANOVA) (Hays, 1973) and Tukey's Test of "Honestly Significant Difference (HSD)" (Runyon and Haber, 1971).



Fig. 3: Test of Visual Creativity (Torrance, 1966, 32).

The result showed that in all criteria the average achievements based on the circle were higher, in some of them significantly higher, than those based on other forms. Consequently the form of the circle (or rondo or mandala) was considered to be an appropriate integrative expression and a fitting basis for the planning of a polyaesthetic curriculum devoted to the fields of visual arts, literature, music, architecture and broadly including even areas outside the realm of aesthetics like certain related subjects in the behavioral sciences, and technology.

The circle is seen by scholars as one of the "symbols of perfection in its unlimited multitude of symmetries". Far beyond the fields of geometry and aesthetics it has great significance in the area of religion. It is furthermore used as "means of contemplation and meditation" (Wille, 1986, 457).

It should be important to examine the function of this basic form of rotational symmetry for education in general and for curriculum planning in particular.

Polyaesthetic education is defined for these purposes as the framework for a curriculum in which "aisthesis", activity of the senses in the broadest interpretation of the concept, should play a central role. In the suggested curriculum intermedial and interdisciplinary relationships are going to be emphasized and the three activities of evaluating apperception, reproduction and creativity will be of importance (cf. Fig. 4).

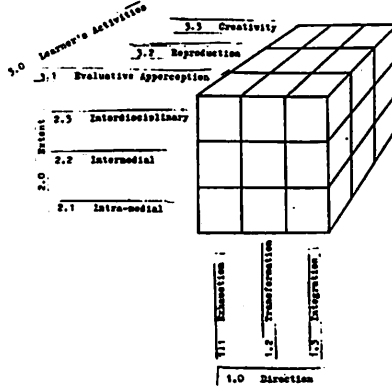


Fig. 4: Theoretical Model of Polyaesthetic Education

The polyaesthetic curriculum "Rose, Wheel, Rondo and Mandala" will be organized according to the following subject fields:

- 1) Forms of rotational symmetry in nature, in technology and in art: The sliding stone, the circular form in botanic and zoological phenomena, the wheel and the church-window (oculus, wheel-and rose-windows).
- 2) The circle as important form in plastic art in the course of time and in the diversity of cultures.
- 3) The circle in Jewish art (cf. Fig. 5).
- 4) The circle in literature and music.
- 5) The circle in architecture.
- 6) Circle, religion and myth: Sun-gods, zodiac and mandala.
- 7) The mandala in psychological research.
- 8) Forms of rotational symmetry and creative expression.

The last item will enable us to "close the circle" and to go back to the point of departure, to the scribbling of the ape and the small child, to the empirical experiment.

The circle occupies a central place in the brain and in the heart of man. He enjoys to perceive it, he is interested to use its particular form in order to express his important thoughts and his vital feelings.

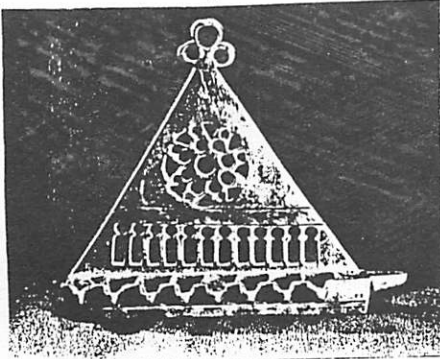


Fig. 5: Bronze Hanukkah Lamp, Lyons, 14th century (Wigoder, 1972, 63). Decoration reminiscent of rose-window of Gothic cathedral.

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