

HOMOLOGOUS INVERSION METHODS IN ENVIRONMENT DESIGN

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Relation of human groups and environment can be approached in many ways. The man to environment relation may be determined, among others, in a connection system of economic growth, general development and ecology. Though a long enumeration of approaches is possible, decisive is the realization of involution¹ of the individual elements in the methodology.

Investigation of the environment supposes a complex methodology working either with mathematical models and a statistical approximation, or with structuralist methods. Some characteristic features of the structuralist methodology reflect also the attitude of the structuralist researchers.² Therefore:

1. The structuralist investigation does not tend to the development of the system but rather to its operation, it endeavours to reduce the given phenomena to a fundamental relation, a principle. It is in general more interested in regularities than in phenomena.

2. Instead of investigating the actual phenomenon, it forms models and creates with them such a comparison basis, thus being able to put side by side appearance forms up to now incomparable, e. g. it uses mathematical models.

Different science territories become comparable, it strengthens especially the interdisciplinary way of thinking.

3. Instead of unilateral cause-and-effect relations, more complicated connection systems, multi-lateral, mutual and multiple causal systems are investigated. Relations are analysed by *cause-and-result networks*, by functions of many variables and mutual *causalities*.

4. The concept of structure (as aspect and method) is, according to the above interpretation, a substratum valid on a general philosophical level, in our discussion the "genes proximum" of environment investigation.

¹ In this case, after different transformations, the required basic element is obtained. The starting point is that the elements never appear on the level of the phenomenon, only in their relation, in their mutual relation system.

² The structuralism is not only a scientific method but also an approach of philosophical value; many philosophical trends are connected to it and reciprocally, e.g. among the American new critics infiltrated into the personalist and existentialist philosophy conception.

The degree of structurality might be different and might have a changing basis. Every change of the constituents is expressed in the change of the structure. The importance of its investigation methods consists in *indicating the place of the constituents in a system* enabling to formulate and study their relation to each other (thus making analysable the restructurizing as well as the destructurizing-degradation processes).

The structuralism can be considered — from the viewpoint of methodology — as an effective, fundamental method, because it does not examine separately the elementary, “divisible” and irreducible moments but the mutual relations of the phases, their relation system, the general concept pointing to totality established by the interior relation system and dynamics of the constituents.³

*Contextualism*⁴ theory develops further the structuralism, by investigating — on an architectural, environmental level — the connections between space and man, society and human environment.

Methods of environment investigation are very different depending on what constituent of the complex, and what relation of the constituent connections they refer to.

The investigation has three scopes:

1. Localization and definition of the human environment and its relation system.
2. Development of the suitable method, unambiguous exploration of the different systems; finally:
3. Choice and application of the suitable method in architecture, regional and environmental protection.

*One of the possible methods of environment examination:*⁵

I. Definition of concepts:

HUMAN ENVIRONMENT: material, spatial structure “enveloping” the total social functions, or: material condition of the influence of total social functions.

DEVELOPMENT OF HUMAN ENVIRONMENT: value-directed activity in the sense that its scope is to create the material frame of the total social functions, therefore it is based on knowledge of the total social demands and the method how to meet them.⁶

³ This *structural entity* differs from the pure bulk of elementary phases in that it is different from, and more than, the total or bulk of the incorporated constituents. It is as different as a gothic cathedral is different from the mass of stones forming the building.

⁴ Originally — like structuralism — it is a method, developed by linguists, investigating the meaning relations of speech, the interpretation and combination possibilities of the words.

⁵ Concrete analysis and detailed exposition see in the description of the Scientific Students Circle Work in 1977 directed by the author. Prepared by the students of architecture at the Technical University Budapest. Details were published in the Students' Hostel Periodical Information B₃₀ 78/1.

⁶ A common scale of values means that members of the society understand the same by total social needs and their satisfaction.

METHOD OF DEVELOPMENT OF HUMAN ENVIRONMENT:

It may be approached through knowledge of total social relations by the following method:

1. Clearing up the total social relations by systems approach (constituents, connections, operation, control).
2. Borders of the human environment system, definition of its connections.
3. Control of this system through the controlling sub-system (control of the connections and function of constituents forming the environment).

METHOD OF ENVIRONMENT FORMATION ON A SOCIAL LEVEL:

- systemic clearing up of notions in connection with man, world and society,
- methods of memory and handling of the totality of knowledge,
- determination and development of the controlling sub-systems,
- promotion to develop a common scale of values (evolving a certain self-regulating system),
- place of the individual in forming the environment (either as influenced or as activizing element).

THE METHOD:

Systemic modelling of human environment on three levels:

1. Description by general categories of environment in the widest sense.
2. Determination by special categories of artificial environment.
3. Description by specific categories of the sub-systems of the artificial environment. The table form, and the MATRIX forming make survey easier.

Openness and development are characteristic of the system, according to the development and knowledge process of the environmental system.

Information in the tables can be fixed in alphabetic catalogues. (They can be transmitted to punch cards and become suitable for computer aided processing.) Their place in the table may be coded, making identification and call at short notice possible (Fig. 1).

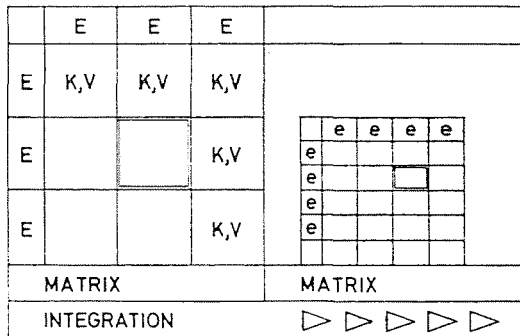


Fig. 1. C. R. connections, relations; E, e = element

In consequence of the value-oriented character of the knowledge, important information is built into the models, therefore the model is oriented to reality (Fig. 2).

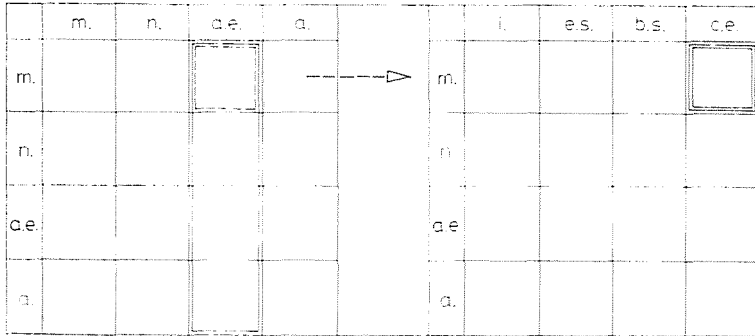


Fig. 2. m. = man; n. = nature; a. e. = artificial environment; a. = activity; i. = implement; e. s. = engineering structures; b. s. = built spaces; c. e. = changing environment

The method made the environmental investigation of Csepel, one of the largest industrial areas of the capital, possible. Process investigation was carried out, based on different forms of information such as primary and secondary information; directing, communicating etc. information. Information spheres were limited to different notions:

- enclosed environment,
- hierarchical order of the space,
- environment circumstances,
- social sphere.

Inquiring information was carried out on *general* and *concrete* levels.⁷

The *homologous⁸ inversion⁹ method* established new disciplines, completing earlier, rather limited methods.

To develop specifications of the method it was presumed that the physical environment¹⁰ produces three-dimensional products, based on identical rules and regularities, however, their function takes place in a two-dimensional sphere.

And functions of these spheres are divided and this combination in their systems is always bound in the strongest way to the oriented function. Thus as long as the *development circumstances of the artificial environment sup-*

⁷ Set-up of the method is valid for the actual structures. Further investigations will be directed to obtain by adequate extrapolation also methods to investigate ideal, later developing environmental conditions (modelling).

⁸ Here: of agreeing structure and origin but of different function.

⁹ The case of combination when some element of higher order precedes one of lower order.

¹⁰ Here: the so-called "second nature".

pose a three-dimensional existence form, the function is multilateral, but — remaining at the model analogy, — it is not three-dimensional.

Development of the systems is analogous to that of spatial grids, whereas the use is affine to the "tissue" structure.

The morphology of urban environment connected with the tissue structure of built-up area and space has been developed by the *Dutch urbanistic group SAR*, founded in 1965 and directed by MR. CHRISTOPHER ALEXANDER.

The group gave many witty ideas to the theory of environmental investigations. However, it contains conceptions in some points already antiquated e. g. categorical division of the phenomena of residential unit and scale of urban relations.

Though, introduction of the concept of *tissue analogy* made the character of the traditional town planning perceptible. The group itself declared: "Statements in connection with the tissue do not affect all the aspects of physical environment. Primarily they are connected with the aspects of situation and dimension, the material and the space."

Notes

Complex investigation of environment formation cannot miss the viewpoints of "environmental protection" and "regional protection". The literature on this subject is already almost puzzling. The actual problems of environment building can only be solved — in our opinion — by taking the *five points* of environmental protection into account preferred by UNO, realizing them effectively in building.

The scope of environment investigation was determined in three points:

1. Outlining and definition of human environment and its relation system.
2. Development of a suitable method and exploring the different systems.
3. Selection of an adequate investigation method and its concrete use in architecture, regional, landscape and environment protection.

Essentials of the HOMOLOGOUS INVERSION METHOD:

— The homonymic meaning points to the continuously and dynamically changing connection of man, and while the connection system may be called — formally — static, the morphological pattern shows important rearrangement and rapid change in time.

— The attribute *inversion* shows that in "process control" priority is due to multi-directional functional connections but so that they can be arranged in the plane, subelements being the multilayer factors containing environmental objects.

Thus the homologous inversion method defines the hierarchy of relations and operations, provides an *elastic system for information processing and classification for the investigation*.

Summary

Comprehensive investigation of the effect of environment on man or their interaction, more information is necessary. In the hierarchy of information, all those elements and connections are primary information which are objective factors of environment (including the five fundamental points of environment protection or the spheres of built-artificial systems but also regional protection factors). Secondary information includes factors of phenomenology and sociology (phenomena of human environment perception, concept of synesthesia, the elements of psychology, etc., but also information about social spheres and the concept of environment aesthetics). Naturally, spheres of action of elements and element connections overlap and form higher-order relation systems.

According to our definition, "*environment aesthetics*" include elements and connections surrounding people, interact with intellectual and psychological life of man and are aesthetically determined.

They range from plant culture to the form of objects. The separate discussion of environment aesthetics is important, because in the course of his activities man meets the effects not separately but as a complex, in interaction. Environmental effects are therefore not simply the relation between environment and man, but the interaction between elements of environment effect, reaction of man on his environment and also the man to man relation.

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* In Hungarian.