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ECOSPHERE AND CREATING OF THE PARADIGM IN GEOGRAPHY

Koloman Ivanička: L'écosphère et la création du paradigme dans la géographie. Geografický časopis, Bratislava 1972, XXIV, 2, 23 travaux cités.

De point de vue d'accès systématique, l'auteur renvoie aux connexions inséparables entre l'homme et la nature, par l'intermédiaire de l'écosphère et, en même temps, il souligne la singularité de la sphère socio-économique et la dissemblance entre l'homme et les autres créatures de la nature, existante surtout grâce à ses propriétés uniques, comme celle de sa conscience, la maîtrise de soi, sa capacité d'apercevoir les valeurs, le sens et l'importance des phénomènes, son aptitude de penser théoriquement et d'employer des symbols en temps et l'espace. Il utilise ces qualités pour régulariser de nombreuses transactions entre la nature et la société. Elles lui permettent d'écarter les changements dans l'écosphère ou dans la sphère socio-économique, qui mettent en danger son existence ou bien-être. Cette faculté de l'homme, en tant que système social vivant est essentielle pour la formation actuelle du paradigme de la géographie.

Man as a part of nature, stable and developing biological system and at the same time a social system, can be understood only on the basis of his interaction with the big „black box“, i. e. the nature.

In the initial phase there existed an unconscious complete animal cooperation with the nature as the source of the rise of life and its evolution and then by means of work there arose the process of humanization and a quick evolution of beings that can be indicated as homo in the direction of homo sapiens and finally in the consequence of thinking it came to more or less conscious self-regulation and direction as the own open system of man and society and thus to a system „man-environment“. J. Antonov and V. Charlamov (1968) give the latter the name of the closed system. We cannot agree because our planet which is man's environment has also its secured fluent receipt of energy from the Sun and various developed subsystems for the transformation of this form of energy into other energetic forms. Some authors approach man as the living system of energy

Each living organism has a number of subsystems which are highly independent and which are a part of organism as an integrated system. The living system is an open system, it means that it can continue to exist only as a consequence of metabolism, exchange of energy and information with its environment. The human organism is characterized by a considerable autonomy of these subsystems. One of them is e. g. the respiratory system by means of which man is continuously connected with his environment either natural or artificially formed. Then it is the digestive system by means of which man receives energy in the form of food and through which he is coherent

with the biosphere of the nature by the food-chain. The blood circulation system supplies the organism with new materials and the nervous system with its centre continuously produces information about the inner activity of the organism proper and provides it with the necessary information about the environment by means of the sensorial organs and enables the use of this information for the desired adaptivity or activity.

The effort to know the dependences of man as a living social organism on the nature more in detail, is not of a new date and it meant the orientation of research into the interior of the „black box“ — the nature. A number of stimuli in the study of the food-chain was provided by the ecology and the human ecology bound methodologically with it. The „web of life“ in which all living organisms, plants and animals are mutually connected in an extensive system of interrelations and dependences, is the key concept of a similar importance as Darwin's concept of the „struggle for existence“. Darwin's example of cats and clover is a classic illustration of these dependences. In the world of plants and animals the structure is determined biologically and the division of labour has a physiologic and instinctive basis. In the society of human beings the social organization and structure lean against the self-consciousness, self-organization, customs and therefore they have an institutional character. The human society is organized at two levels: the biological and cultural-social one. Robert Ezra Park (1936) calls it the symbiotic society which is characterized by the mutual communication and principles. According to him the symbiotic (biologic) substructure is only the basis for a cultural superstructure and the energy from the symbiotic substructure appears at the social-cultural level in a subtler and sublimer form. Therefore the human society in its ripe form cannot be expressed by the ecological but the economical, political, cultural and moral order.

To understand the complex structure we need a complex approach and the ability of differentiation what in which and at which level is substantial and decisive.

In order to link up the ecologic system with the social -economic one we can use the technique of „inputs- outputs“. Under the social-economic system we can understand all social, economic and cultural organizations which are in the studied area and which perform activity and are in the mutual relation. Under the ecologic system we can understand a wide series of mutually connected elements of the environment and activities which in the form of mutual inputs and outputs include a quantity of products from which only some correspond to those which are in the social system. These activities are not only based on each other, i. e. each represents an input for the next one, but they also form the final outputs, if you like, deliveries into the social-economic system. They depend on the social-economic system because they use a series of its products in the form of inputs (to the effect of import). This import from the social-economic system is at the same time an export of the social-economic system into the outside world, similarly as the export from the ecological system is at the same time an import into the social-economic system which is the outer world for it. Therefore we can speak about their mutual effective connection. W. Isard (1967) investigated the region of Plymouth Bay by the method of „input- output“ paying attention to its „food-chain“. In each region such as Plymouth Bay we can define the plants and bacteria as autotrophic and heterotrophic. The former have the ability to draw the energy and food directly from the anorganic sources of their environment, the latter can obtain the energy and food only from other organisms — living or withered. A part of the energy gained by the organism is consumed in the consequence of metabolic processes but a part is put aside in the form of an animal organism or biomass. If one organism consumes another, it obtains the energy of the received biomass. Such a subsequence in

which each following organism obtains the biomass from the preceding one, is called the food-chain. The first element in each chain must be autotrophic. Plymouth Bay is formed by water surfaces and swampy territories with semi-salt water. This salt water produces detritae and plants which are the food input for annelida, algae, mollusca, crustacea, etc. These are the food for flounders. W. Isard quantificated this food-chain and defined the volume input requirements for each stage to come. The last link as a result of hunting becomes the input into the social-economic system in the form of commercial goods and sport and hunting activity.

This whole ecological system is used by the society but it is essential that on the basis of quantification of its singular links, it is possible to quantify also the extent of the commercial and industrial establishments of the social-economic system as well as the extent of sport activity and tourist facilities. The waste water in this area has even more remarkable relation. It directly paralyses the activity of the ecosystem or its singular parts and so also the import of products into the social-economic system. There it is the substance of an influence of an open social-economic system upon its environment. If a proper social economic system is not to be open, we must accept such a direction of activity which secures their mutual harmony and mutual functional activity.

Man with his activity changed the natural ecosystems on the extensive surfaces of ecumene and substituted them by a present structure of anthropogenic systems. The knowledge of substantial features of both has a great theoretical and practical importance. The anthropogenic ecologic systems in comparison with the former are noted for their lability and dependence on human ingerence. Gradually with the evolution of society and the growth of inhabitants the intensity of these changes is being increased. The anthropogenic activity differs in the dependence on the level of social development.

1. The personal level has a character of physiological and biological relations.

2. The level of natality is the level of local groups as e. g. communities which change a certain local environment.

At the social level the environment can be changed very substantially in the reasonable or unreasonable direction which is dependent on the anticipation and regulation of these changes. A. S. Kostrowicki (1970) classifies the changes evoked in the environment by the influence of man's activity in a following way:

- a) supletive changes which consist in the enrichment of the environment structure and in the enlargement of its ecologic potential. The forest ameliorations or fertilization of fields can serve as an example.

- b) compensatory changes, which compensate the deficiencies of environment or consequences of the incorrect economy by means of introducing extraneous elements into the environment. There belongs the change of the tree structure, or the supply of soil with missing mineral materials.

- c) reduction changes which consist in the activity limitation of some environment elements. They occur in the urbanized and suburban areas.

- d) destructive changes which mean the disturbance of links among the elements of ecologic system. They are undesirable for the society and require protection, if you like, recultivation of environment.

The mentioned relations do not include the infinite variety of man's links with his environment. Ch. Foote and B. G. Wooten on the basis of system approach pointed at the decrease of salmon fishery in the Kabuk river. By means of the analysis of the chain of energy it was stated, that the macrospatial meteorologic conditions cause the southern flow of temperature, which is brought about by the arise of wet air masses

in Brooks Range in the north of Alaska and the passing of intensive precipitations. The examination of the river shows a direct correlation of the water temperature, altitude of level and the rate of flow with these meteorological conditions. The research of biological subsystem showed the relation between the temperature of water and the content of oxygen in water on one hand and the intensity of salmon migration on the other. The increase of the river temperature and the rate of flow cause changes in the conduct of the fish. The salmon look for a way of the smallest resistance, and proportionally increasing metabolism is compensated by a decrease of the stored energy in the form of proteins and fats. The study of the dependence on the social-economic system showed, that the increase of the level on the river means decrease of nutritious value of fish caused the stopping of human effort and the fishing of Eskimo fishers.

The study of living systems shows their continuous transactions with the environment and this cooperation modifies, both — the system and the environment. Each lower system is a part of a system of a higher level or environment. E. g. the organ is a subsystem of the individual, the individual is a subsystem of a group and a group is a subsystem of society. The environment for a human being is both a physical environment and a social environment. Therefore if we want to understand the human conduct, we must study both sides — the inner and the external one because these together determine the actions of individuals.

The living systems differ from the unanimated ones but at the same time they differ mutually. With the successive increase of living systems level appear new structural and functional qualities, or qualities which have no greater importance at the lower levels became substantial at the higher levels. The nervous system which approached up to the brain serves as a good example. James G. Coleman (1969) summarizing the substantial and unique properties of man stresses mainly the self-consciousness and selfregulation, his ability to modify his conduct when meeting various situations, his employment of symbols, richness of transactions with environment, an interest in information and the ability to appreciate values, sense and importance of phenomena.

Man is noted for a special type of self-consciousness which enables him to act through a continuous period and the lasting of his own future and the reaction in a new situation in a new original way. In modern age the human ability of adaptability to complex and rapidly changing demands is his critical priority. The evolution teaches that the animals which had not managed to adapt themselves to new conditions died out. Man is noted also for a further property i. e. he is able to operate and exercise control over these changes, carry out prevention, or if need be, to avert changes threatening his welfare. The human ability of thinking in symbols enables him the understanding of inner order of systems and the employment of symbols enables the communication with individuals or groups far away in the history or in space.

In this quality there lies the ability to read the messages of ancient Egyptians, Greeks and other antique nations and it enables him to give the direction to his action and to make plans with regard to the present, past and future. In order to give the direction to his action, he must understand the importance of values and have the possibility of choice among the alternatives. Such abilities are unique human.

Man also becomes acquainted with his biological side, his instincts and he is able to employ them in order to handle masses. The history of the World War II proved it. The advertisement based on instincts in the commercialized countries can serve as another example. The possibility of the social control of this knowledge and instincts is very important and forms preconditions for the prevention of the ill use. The creator of the system theory L. von Bertalanffy who had overemphasized isomorphism in his

first works, published in 1969 the paper in Teacher College Record, in the World of Science and the World of Value, the contents of which is deeply saturated by humanism and the stress on what is specifically human, what has the lasting cultural, artistic and moral value and what causes that the living social-human systems are unique and unrepeatable.

Nowadays it is possible to state that the fear for the future development of mankind is justified. If the development of society is to follow the direction of prosperity or that of decline, it is necessary to appreciate the everlasting values.

On one hand we can see the direction which since the first agricultural revolution realized some 4,000 years B. C. went over through classical and Renaissance times. The future in this direction would mean the continuous self-improvement, communication with other planets and establishment of the human settlements there. It is the direction of the development of social system by means of processes forming deviation. But there it is here also an other thread of history. The civilizations arose, developed and became extinct. We are in fear if our civilization will be able regulate itself so that the devices of mass destruction, if you like, the used technological processes do not lead to its extinction

For the forming of paradigm of modern geography from the above sketched picture there follow important conclusions. First of all there is here the statement that social factors are substantial for the control and sound development of social-economic systems. The research of the regularity of spatial and time activity enriches the society and science with necessary knowledge. Therefore in the framework of the social-economic geography we require the development of basic research in its whole complexity i. e. the recognition of spatial aspects of all sides of man and society or in other words the recognition of the task of individual subsystems and their function in the whole vital-social system in time and space. It is necessary to verify the gained knowledge and identified laws and regularities and to apply in practice for the rational space planning and living environment not only from the standpoint of instantaneous commercial values and contemporary social, if you like, group demand, but first of all from the standpoint of lasting human values, lasting values of civilization and culture. Such solutions have a character of engineering interventions similarly as the medicine is a kind of biologic engineering, if you like, technical branches kinds of technologic engineering. After historical and contemporary experiences we have no the smallest causes to presuppose that the society does not need complex engineering of space and living environment. Several past and contemporary interventions into the social-economic space require a high portion of self-consciousness and self-regulation of society for their recultivation, prevention and rationalization. The regional research and planning form a direct social demand of social-economic geography which together with physical geography have all preconditions to realize this topical demand of our civilization.

From the Slovak translated by P. Miššej

LITERATURE

1. BRAIDWOOD, J. R.: The agricultural Revolution. Scientific American, September 1960.
- 2. BROWN HARRISON: Human Materials Production as a Process in the Biosphere. Scientific American, September 1970.
- 3. COLE, LaM. C.: The Ecosphere. Scientific American, April 1958.
- 4. DEEVEY, E. S. Jr.: The Human Population. Scientific American, September 1960.
- 5. McDERMONTT, W.: Air Pollution and Public Health. Scientific American, October 1961.
- 6. KELDYŠ, M.: Zbliženie vedy s výrobou. Materiály z XXIV.

zjazdu KS ZSSR, Moskva 1971. — 7. LENIN, V. I.: Sočinenija. T. 18, Moskva. — 8. ISARD, W. & others: On the Linkage of Socio-Economic and Ecologic Systems. Regional Science Ass. Papers, Vol. XXI. — 9. BERTALANFFY, L. V.: An Outline of General System Theory. The British Journal for the Philosophy of Science, Vol. 1, 1950—1951. — 10. BOULDING, K. E.: General Systems Theory-The Skeleton of Science. Modern Systems Research for the Behavioral Scientist, Chicago 1968.

11. IVANIČKA, K.: The Structure of Agriculture in the Hinterland of Bratislava: A System Approach. Acta Geographica UC, s. Economico-Geographica, Nr. 10, Bratislava 1971. — 12. KALESNIK, S. V., O nekotorych nedorozumenijach v teorii sovjetskoj geografii. Izv. Vsesojuznogo geograf. ob-va, Nr. 1, 1971. — 13. BUCKLEY, W.: Society as a Complex Adaptive System. Modern System Research for the Behavioral Scientist, Chicago 1968. — 14. FILKORN, V.: Veda a jej metóda. Filozofia č. 6, Vyd. SAV, Bratislava 1971. — 15. ENGELS, F.: Dialektika prírody. Bratislava. — 16. SEDLÁČKOVÁ, E.: Problém prírodného a spoločenského faktora v človeku pred marxizmom a u Marxa a Engelsa. Filozofia č. 6, Bratislava 1971. — 17. MARX, K., ENGELS, F.: Vybrané spisy 2, Bratislava 1953. — 18. ANTONOV, Ju., CHARLAMOV, V.: Kibernetika i žizň, Izd. Sov. Rossija, Moskva 1958. — 19. PARK ERZA, R.: Human Ecology. American Journal of Sociology, XLII, 1936. — 20. KOSTROWICKI, A. S.: Z problematiki badawsej systemu człowiek-środowisko. Przegląd geograficzny, z. 1, t. XLII, 1970.

21. FOOTE, Ch. D., WOOTEN, B. G.: Approach to System Analysis in Cultural Geography. Proffes. Geography, 1968, Nr. 2. — 22. COLEMAN, J. C.: Psychology and Effective Behavior. Atlanta, Dallas, London and oth., 1968. — 23. BERTALANFFY, L. V., World of Science and the World of Value. Teacher College Record, 1964.

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EKOSFÉRA A TVORBA PARADIGMY V GEOGRAFII

Človeka ako súčasť prírody, stabilný a vyvíjajúci sa biosystém a súčasne ako súčasť spoločnosti, t. j. spoločenský systém možno pochopiť iba na základe jeho spolupůsobenia s prírodným, ekonomickým, kultúrnym, sociálnym, politickým a umeleckým prostredím. V začiatkovej fáze jestvovania rozhodujúcou bola nevedomosť, živočíšna súčinnosť s prírodou, postupne v dôsledku evolúcie smerom k homo sapiens došlo k uvedomovaniu sebausmernenia a riadenia vlastných otvorených systémov človeka, spoločnosti i systému „človek — príroda“. Žijúci systém je otvoreným, čo znamená, že môže kontinuovať svoju existenciu len v dôsledku vzájomnej výmeny látok, energie a informácie so svojím prostredím. Pre takéto výmeny disponuje s relatívne autonómnymi subsystémami, ako napr. dýchacím systémom, tráviacim systémom, nervovým systémom, prostredníctvom ktorých je neustále spojený s prostriedkami, v ktorých žije. Ľudská spoločnosť je organizovaná na dvoch úrovniach — biologickej a kultúrno-spooločenskej. Spoločnosť vyrastá z biologickej subštruktúry. Energia z biologickej symbiotickej subštruktúry sa objavuje na sociálno-kultúrnej a ekonomickej úrovni v transformovanej podobe, najmä v dôsledku spoločenských noriem a zásad. Preto, ako správne poukázal R. E. Park (1936), ľudská spoločnosť v jej zrelej forme nemôže byť vyjadrená ekologickým, ale ekonomickým, politickým, kultúrnym a morálnym poriadkom.

Človek svojou činnosťou na rozsiahlych plochách ekumény zmenil prírodné ekosystémy a nahradil ich súčasnými štruktúrami antropogénnych systémov. Antropogénne ekologické systémy v porovnaní s prírodnými sa vyznačujú labilitou a závislosťou od sústavnej ľudskej ingerencie. Medzi spoločnosťou a ekosférou jestvuje nepretržité ovplyvňovanie. Napríklad prostredníctvom potravinovej reťaze, prostredníctvom pitnej vody, resp. ovzdušia spoločnosť dostáva nazad vo forme vstupov do spoločenského systému časť svojich výstupov. To znamená, že nielen biologická hodnota, ale i obchodná, tovarová stránka môžu byť podstatne ovplyvnené predchádzajúcou činnosťou človeka, resp. činnosťou predchádzajúcich generácií, alebo premiestnuté do bu-

dúcnosti, súčasná generácia ovplyvňuje život budúcich generácií. Zásady spoločnosti do ekosféry môžu mať charakter supletívny, kompenzačný, redukčný alebo deštruktívny. Spoločnosť sa vyznačuje špeciálnym typom sebauvedomenia, ktorý jej umožňuje akciu cez nepretržité časové obdobie a v zmysle vlastnej budúcnosti reagovanie novým originálnym spôsobom na novovznikajúce situácie. V súčasnej civilizácii schopnosť sebauvedomenia a sebaregulácie človeka je jeho kritickou prednosťou. Človek je schopný riadiť a kontrolovať zmeny v prostredí, ktoré vznikajú v dôsledku jeho pôsobenia alebo v dôsledku síl, ktoré sú mimo spoločnosti. Schopnosť teoretického uvažovania v symboloch mu umožňuje pochopiť vnútornú podstatu procesov a komunikáciu so spoločnosťami, ktoré zanikli v histórii, resp. sa nachádzajú na iných vzdialených priestoroch planéty. Od uvedenia si trvalých hodnôt prírody i hodnôt spoločenských závisí, či vývoj spoločnosti pôjde v smere rozkvetu alebo úpadku. Evolúcia nás učí, že nižšie živočíchov, ktoré sa nedokázali adaptovať k novým podmienkam, vyhynuli.

Pre tvorbu paradigmy modernej geografie z načrtnutých skutočností vyplývajú dôležité závery. Predovšetkým možno konštatovať, že spoločenské a psychologické faktory sú podstatné pre kontrolu a zdravý vývoj nielen sociálno-ekonomických systémov, ale aj pre systém ekosféry. Preto tiež v rámci geografie kľúčové postavenie má spoločenská geografia, v rámci ktorej je potrebné rozvíjať výskum v celej jeho komplexnosti, t. j. zameranie výskumu na všetky stránky priestorových vzťahov spoločnosti, alebo inými slovami, objavovať funkcie a vzťahy jednotlivých subsystémov v celostnom životno-spoločenskom systéme v čase i v priestore. Získané poznatky a poznané zákonitosti a zákony je životne dôležité uplatniť a verifikovať v praxi pri racionálnom plánovaní priestoru a životného prostredia, a to nielen z hľadiska momentálnych komerčných hodnôt a súčasnej skupinovej alebo spoločenskej objednávky, ale predovšetkým z hľadiska trvalých ľudských hodnôt, trvalých hodnôt civilizácie a kultúry. Takéto riešenia majú charakter inžinierskych zásahov podobných zásahom technických a technologických odvetví, alebo sú v určitom zmysle analógiou lekárskeho zásahu, ktoré v mnohých prípadoch sú určitým druhom biologického, resp. psychologického inžinierstva. Majú v porovnaní s nimi ešte komplexnejší charakter. Po historických skúsenostiach s vývojom regionálnych civilizácií, resp. po súčasných skúsenostiach niet najmenších dôvodov sa domnievať, že spoločnosť nepotrebuje komplexné inžinierstvo priestoru a životného prostredia. Niektoré minulé a súčasné zásahy do sociálno-ekonomického a prírodného priestoru si vyžadujú vysokú úroveň sebauvedomenia a sebausmernenia spoločnosti, aby mohla nastať rekultivácia a v budúcnosti i zábrana nežiadúcej aktivity. Regionálny výskum a regionálne plánovanie tvoria priamu spoločenskú objednávku pre sociálno-ekonomickú i fyzickú geografiu, ktoré spoločne majú všetky predpoklady realizovať aktuálne objednávky našej civilizácie.