Global Ecology Priorities.

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Summary. — An attempt to substantiate priorities of global ecology has been undertaken with an emphasis on two principal aspects: 1) heat balance of the Earth and anthropogenically induced redistribution of its components; 2) closed nature of global biogeochemical cycles. It has been shown that the ecological faith of the Earth depends first of all on biosphere dynamics disturbed by man's impact. The Global Change programmes worked out in the U.S. and France have been summarized to analyse their advantages and disadvantages. The principal conclusion is that further discussion is necessary, preferably at the UN level. The Second UN Conference on Environment and Development will open such a possibility.

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1. - Introduction.

Since ecological problems all over the world become ever more acute and urgent, the general preoccupation in this respect is enhanced and determines the absolute necessity for substantiating the priorities because these problems are numerous and diverse, whereas means for resolving them are rather limited. In this connection, of primary importance are global-scale ecological problems which sometimes are a realistic threat to human life[1-17].

Life is possible on the Earth due to the interaction of physical, chemical and biological processes taking place in the environment and the biosphere in conditions of ever growing impact of man's economic activity on nature. There is no doubt, however, that the basic external factor regulating natural processes is the income of solar radiation which is determined by the value of the so-called «solar constant»[5,14], since it is in fact a single source of energy required for the
functioning of natural processes. The favourable (from the viewpoint of the distance from the Sun) location of our planet within the Solar System has created unique possibilities for the origination of life on the Earth and the formation of a specific heat budget of the planet. Naturally, from its definition, the Earth's heat budget (the difference between the solar radiation it absorbs and the loss of heat due to the outgoing long-wave radiation) is on the average equal to zero (otherwise, a catastrophic heating or cooling of our planet would happen in the end). Of paramount importance for the evolution of life on the Earth are changes in the fine structure of the solar radiation spectral distribution [7, 8].

With regard to the internal regular features of the functioning of processes on the planet, they are above all relevant to the matter and energy cycles [1, 2].

2. Priorities.

2'1. The Earth's heat budget. - There are two problems of priority in the Earth's heat budget dynamics: 1) the variation in the solar energy income—the solar «constant», which is defined as an integrated (over the spectrum) solar radiation flux at the upper atmospheric boundary level, with an average distance between the Earth and the Sun; 2) the anthropogenically induced redistribution of the heat budget components of the surface and the atmosphere, which is above all noticeable as an enhancement of the greenhouse effect of the atmosphere due to the increased concentration of the so-called «greenhouse gases» (GG)—optically active minor gaseous components of the atmosphere (atmospheric trace gases) [3-5].

As far as variations in the extra-atmospheric insolation are concerned, which are first of all significant as a climate-forming factor, although these are rather considerable (up to a few percent) in the UV spectral region, the solar constant value varies within to 0.2% only, as has been revealed by the analysis of satellite observational data [4, 14]. However, even these minor variations should be taken into account in the examination of causes for changes in the global climate. Since some satellite observations are rather short-term (during about 10 years), it is not clear yet whether one can speak of long-term trends of the solar constant, although there are some grounds to suppose that such long-term trends exist (it is a known fact that during the several billion years of the Earth's evolution, the solar constant increased by (30 ÷ 35)%). On the scale of hundreds, thousands and more years, the role of the redistribution over the globe of extra-atmospheric insolation, caused by variations in the orbital parameters, seems doubtless. More and more observational data are accumulated revealing the influence of solar activity on climate; however, no important progress has been achieved thus far in the understanding of mechanisms determining this influence [4, 14].

From the point of view of monitoring the Earth's heat budget dynamics, most essential still are satellite observations of the extra-atmospheric spectral distribution of solar radiation, the solar constant and the Earth's radiation budget (ERB) components. Very important also are observations of the radiation budget (RB) of the surface and the atmosphere making use of ground-based, and ship-, air, and balloon-borne observing aids. An exceptionally complicated priority problem is the research in the entire set of transformations of the energy and water cycles due to anthropogenic impact. The urgent necessity of identifying the «greenhouse» signal in climate change requires the implementation of respective complex observation