

A HARBINGER OF NOOSPHERICAL NATURE MANAGEMENT AND SURVIVAL OF MANKIND (S.A.PODOLINSKY)

Y. K. Duplenko

Dr. Med., Prof. of the National University of «Kyiv-Mohyla Academy», Kiev, Ukraine

Summary. *Y.K.Duplenko. A harbinger of noospherical nature management and survival of mankind (S. A. Podolinsky).* On the basis of the analysis of the working text "Human work and its relation to the energy distribution" author of article supports opinion of modern researchers that S. Podolinsky's ideas synergetic who published his work in 1880, V. Vernadsky's noosphere concept I. Prigozhin's synergetic approaches.

Sergey Andreevich Podolinsky published in 1880 in the Petersburg journal "Word" his article «Work of human and its relation to a distribution of energy» [1]. During the same period of time he was publishing fragments of that article on German, French, Italian journals. Subsequently they were translated into Ukrainian and other languages. F. Engels named S. A. Podolinsky's conclusions «the real discovery», V. I. Vernadsky considered him as a forgotten scientific innovator. Present researchers of his creativity recognize S. A. Podolinsky's concept as the forerunner of the noospherical representations [2, 3], and also I. R. Prigozhin's approaches to an understanding of specificity of vital processes. It is considered that conclusions of the scientist who outran time, formed the new scientific outlook, created the fundamentals of social science, in basis of which objective laws of historical development were laid, and misunderstanding of them had a tragic impact on the destiny of mankind, approaching inevitably catastrophic consequences [4].

S. A. Podolinsky finished physico-mathematical faculty of the Kiev University in 1871. Then in 1876 he finished Medical faculty of Vroslav University. All that time he was thoroughly studying also political Economics, History and Philosophy. Deeply inducted into K. Marks's philosophical and political economics approaches (S. A. Podolinsky translated the first K. Marks's "Capital" into Ukrainian), he tried to answer the question from those positions: "Whether there can be such kind of nature processes which is characterized by an efficiency coefficient over hundred percent?" As P. G. Kuznetsov underlined, that such process which would have been characterized by efficiency coefficient for more than 100 %, the human work was. According to that, it was easy to understand that the process of human work was such a special process of nature which could be

considered as the amplifier of capacity [4]. As a matter of fact, S. A. Podolinsky outcome from the consideration that the nature was capable to generate a human and the human society [5].

How did S. A. Podolinsky proved his conclusions?

In the chapter 5 entitled «Value of animals and human in energy distribution. Concept about work», he wrote (using terminology of that time) that the higher forms of energy extracted by plants and animals, eventually, were always useless dissipated in space and never were directed on the work, which was exceptionally useful for an energy increase, i.e. on the new transformation of the lowest forms of energy into the highest. As an example, he showed the transformation of the energy of sun rays into mechanical work. S. A. Podolinsky especially noted the distinctions of different kinds of work activity concerning energy distribution (chap. 9).

S. A. Podolinsky was continuing his thought: “Looking around ourselves, we see that now the quantity of the solar energy, which is transforming into the more transformable energy on a terrestrial surface, undoubtedly, gradually increases. Nowadays the amount of plants, animals and people undoubtedly is larger than it was during the epoch of the first occurrence of human. Many bad lands are cultivated and covered by magnificent vegetation. Harvests have increased in all civilised countries. The amount of pets and also amount of people have considerably increased. Whatever it is spoken about the large amount of herds of wild animals, but there is no doubt that pets and people in the sum represent more live substance and consume a larger amount of the nutritious material which plants preserve, than wild animals alone.” Thus he underlined (and that was very significant supervision from modern positions) that there were the countries which were earlier rich, and now transformed nearly in deserts, but that facts obviously depended **on errors in managing** (my italics – Y. K. D). And S. A. Podolinsky's conclusion was that: “Since occurrence of mankind, it is necessary to accept the fact of increase of manufacture of the nutritious material, comprising a stock of a transformable energy on a terrestrial surface.”

“Where from it comes surplus of the energy, which is necessary for development nutritious and combustible materials?” S. A. Podolinsky asked. Also he answered: “Only from work of human and pets. What is the work in that case? Work is such consumption of the mechanical and mental work, which have been preserved in an organism, which also has an increase of transformable energy on a terrestrial surface. The increase in the amount of transformable energy, which already exists on a terrestrial surface, can occur – directly or through the transformation of new amounts of solar energy into a more transformable form, or by its preservation from dispersion, which is inevitable without an intervention of work.”

S. A. Podolinsky's following question was: “How does an ability to work appear and realise?”

The energy preserved by plants lifted its stock on a qualitatively new step only in that case, if that energy was used thankfully to a food of an animal or a human, that do that work, or if that stock became a fuel for the machine, which was constructed and operated by the work of the human. Differently, work was carried out by an animal which went in a plough, or by the human who brought up an animal and operated it. In that case, if it was spoken about a machine, its constructor. The concept of work provided consumption of the mechanical or mental work, which had an indispensable result of an increase in a transformable energy or a prevention of its dispersion that would have a consequence increase in a power stock.

While a human existed among other animals, submitting to the general laws of struggle for existence, receiving from the external nature, without an influence from its own part, everything that was necessary for a satisfaction of his requirements, — until then a human did not alter in a little appreciable image a size of the power budget of a terrestrial surface. In other words, a work of muscles should not be mixed with a useful work.

The first (in a sense of a transformation of an energy) work was a cultivation of pets and their protection, a regular destruction of predators – enemies of livestock, etc. Those actions established the initial balance under an influence of struggle for existence in a power exchange of a terrestrial surface, and had been broken. Certainly, a cultivation and protection of herds together with a destruction of predatory animals, undoubtedly, increased to a certain extent an amount of the higher forms of the energy, which is expressed partly in a mechanical work of numerous pets, partly in an accelerated reproduction of people. But that increase occurred only at the expense of the further transformation of solar energy, which had been already preserved by plants and consequently that stock soon appeared insufficient. Pastures could not feed too numerous herds of the nomadic people any more. It became easy clear when it was taken into consideration that work of cultivation of pets only promoted transition of an energy preserved by plants into a higher form, but in itself was not accompanied yet by savings of new, additional amounts of solar energy. Nevertheless, the role of nomadic life and cattle breeding in a work development is extremely salutary. Abundance of pets, which saved people from extreme need for some time, had given them leisure, an enterprise and the development, necessary for successful makings of those numerous supervision and more or less successful experiments, which preceded general distribution of agriculture.

That was a S. A. Podolinsky's answer for the next question. Thus he underlined that the superfluous amount of energy which was involved in an exchange by human, caused his advantage comparing with animals. Thus, work, which was spent for hunting and fishery, though indirectly, but increased an exchange of energy on a terrestrial surface and consequently could be ranked as a category of a useful work or work in general in a real meaning of that word.

Nearby the hunting and fishing there was a manufacturing of the weapon and tools. The relation between the savings or increase in energy and work was already much more distinct there, than in a primitive hunting or fishing without the aid of any tools. It was important also that the poor food of people was thus replaced by plentiful, and on that way in them the ability to a harder mechanical work was developed. S. A. Podolinsky applied similar reasonings for an estimation of the first, still the roughest pottery. The work, which was spent for manufacturing of a pottery, was generously remunerated by savings of a transformable energy in a human body, and involving of it into exchange of new quantity of solar energy, which was preserved by plants, and which without work intervention, would not have been involved into exchange or would have dissipated, (for example, at rotting) mostly unproductively. The human expenditure of own power reserves eventually led to that a conservation of energy started to be made, as though, by itself or, at least, was created a possibility to preserve from dispersion that share of a transformable energy which already existed at the disposal of human.

S. A. Podolinsky fixed further attention on the most important, from his point of view, question – on a relative amount of energy, preserved in an agricultural product. He accepted size of an economic equivalent of human with an equal $1/10$, and an amount of all mechanical work, which was spent in agriculture, equal $1/2$ of all human work. Proceeding from an amount of the transformed energy, which was received by human from food, he asserted that for returning to human wholly all energy, which was spent for agriculture, a solar energy stock in an agricultural product should exceed in 20 times the amount of mechanical work of human, which was spent for that agricultural work. By S. A. Podolinsky's calculations, it is necessary to consider as a society balanced development (or as formulate today – a sustainable development), such in which an expense of one calorie of human work involved in a turn 20 calories of solar energy – «a Podolinsky's principle». Concerning animal industries, the main thing he considered there was using of work of pets as means for increase in mechanical work of human.

S. A. Podolinsky extended the reasonings to metallurgy and mountain workings. The work, which was spent for extraction and manufacture of iron, in his opinion, would have been compensated in a form of a preserved energy of human. It would have been provided by improvement and reduction of expenses that would have been given to human by the iron transformed into instruments of work, tools, machines and etc. He meant the same thing to gold mining, considering its value as means of a trading exchange. Fossil coal and etc. are the ones already done, and preserved stocks of solar energy, which at wasteful getting are consumed often wastefully too, without a providing those savings of energy that they could have given. He reminds also that coal is the stock of the solar energy, which had been saved up for an enormous period of time, and consuming which, it should have been taken to attention that the amount of solar energy

on a terrestrial surface, which equaled energy of the extracted coal. Then, really, all that work could have been considered as the useful; then they look at intensive operation of this combustible material with a fair fear.

In this sense the S. A. Podolinsky's following thesis also was extremely important. "While people will not find some fuel for their machines, which would provide them for a longer period time without fear of the fast exhaustion, until then all calculations of the sum of the energy, which are in mankind disposal, should be considered invalid, as the energy stock can be exhausted in due course. An industry and life maintenance they all consume known amount of a transformed energy in the form of mechanical work of human. But all of them return that consumption with an overflow, mediately or directly, by means of increase in an exchange of energy or by means of granting to human of possibility to keep a part of spent energy and to use it with a more benefit.

S. A. Podolinsky also provided two examples – one from an area of brainwork and one from art area, paying attention to that such people had not been making any material advantage during all their lives. And he came to the conclusion: "While brainwork and art are raising human to the activity, which gives a profit in the budget of mankind energy as a result, until then it is a useful work."

As a whole, the most important conclusions made by S. A. Podolinsky in his work, are the following (stating them with modern language):

- The total of the energy received by a surface of the Earth from its bowels and from the Sun, is gradually decreasing. At the same time the total of the energy, which has been saved up on a terrestrial surface and is preserved at a mankind disposal, is steadily increasing.

- This increase is occurring with the influence of work of human and pets. The name of a useful work is understood as any use of a mechanical work of animals and human with their mental work, which has an increase in the budget of the transformed energy on a terrestrial surface as a result.

- Human has a certain economic equivalent, which is decreasing along with an increase of human requirements.

- Existence of people and their reproduction is provided until each human can use the set of an energy potential; and this set exceeds a human energy potential for so much time, as the denominator of his economic equivalent more than the numerator is. The explanation is that a mechanical work always in certain relation can be expressed in nutrients and other means of satisfaction of human need. Restriction of this position is only the absolute amount of the energy received from the Sun, and set of the inorganic materials, which there are on the Earth.

- Productivity of human work is considerably increasing, when it is used for transition of energy to a higher level (for example, the pets' adaptation to work, the device of machines, etc.).

- The actions, which have phenomena opposite to work, as a result represent an energy plunder, i.e. an increase in amount of the energy disseminated into space.
- The main points standing next for continuation of the process of the energy accumulation on the Earth with the greatest efficiency coefficient, the following is. It is spending of solar energy as a direct mover and manufacturing of nutrients from inorganic initial materials.
- The absolute increase in a power budget should be a mankind overall objective in work, as at its constant amounting transformation of the lowest energy into an energy of the higher level would reach a limit soon, further of which it won't be able to go without excessive losses on its dispersion.

All that allowed to consider, that S. A. Podolinsky was a predecessor of V. I. Vernadsky and of I. R. Prigozhin. S. A. Podolinsky's merit consisted of that he had laid the foundation for the new approach to the analysis of the mankind development, and that approach had connected that development with energy preservation and accumulation. Differently, the political economy should have been integrated with physics.

Finishing the article, it is necessary to admit the P. G. Kuznetsov's opinion about that the S. A. Podolinsky's adherents are: N. A. Umov and K. A. Timirjaziev [4]. The first in 1901 suggested to add into physics the law which was opposite to the second law of thermodynamics and covered a specific feature of the all forms of life. And K. A. Timirjazev told the same in his Kruniansky lecture in 1903. As a matter of fact, both radical questions of natural-science knowledge were a problem of life and a problem of the second law of thermodynamics and, actually, are two sides of the same phenomenon, complete representation about essence of life.

THE LIST OF REFERENCES

1. Подолинский С. Труд человека и его отношение к распределению энергии. – Слово (СПБ), 1880, № 4/5. – С. 135-211.
2. Вернадский В.И. Философские мысли натуралиста. Разд. первый: Научная мысль как планетное явление (1938). – М.: Наука, 1988, – С. 19-195.
3. Крисаченко В.С. Сергій Подолинський // Людина і довкілля. Антологія: У 2 кн. Кн.2. – К.: Заповіт, 1995. – С. 371-374.
4. Кузнецов П.Г. Предисловие к 2-му изд. кн.: С.Подолинский. Труд человека и его отношение к распределению энергии. – М., 1991. – С. 7-10.
5. Пригожин.И., Стенгерс И. Порядок из хаоса: Новый диалог человека с природой: Пер. с англ./ Общ. ред. В.И.Аршилова и др.- М.: Прогресс, 1986. – 432 с.