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Science and perestroika

An anniversary of a book is an event rather rare in the history of science. Its celebration has its own grounds in each case. In this very case the fact of holding a conference dedicated to the 50th anniversary of J. D. Bernal's book "The Social Function of Science" is not only a recognition of the historic significance of this work. It may be regarded also as a recognition of the fact that the book and its ideas belong to contemporary science, that they continue to play their role in scientific life, in the comprehension of the processes relevant to the interaction of science and society.

J. D. Bernal has thoroughly substantiated the thought that in our days science becomes an essential element of society and its culture, that it fulfills important social functions influencing society both directly by the force of its ideas and obtained knowledge, and indirectly, through its impact on technological progress. We can not but be impressed by Bernal's striving to impart a humanist orientation to science, to place it at the service of mankind, its welfare and its development, and to relate science to the struggle for peace and social progress.

I made these general statements in order to define my attitude towards Bernal's standpoint as regards the relationship between science and society. At the same time the half a century that has passed since Bernal's time has made evident that not all of his assumptions proved to be correct, that new unforeseen aspects and problems have been revealed in the interaction of science and society, and that the interaction itself is sometimes more intricate and contradictory than it seemed previously.

Both strong and weak points in Bernal's position can be shown in his assessment of Sovient science if the latter is viewed in its historical retrospective and if Bernal's assessments are compared with the problems that science faces under perestroika.

To comprehend Bernal's approach to Soviet science one must bear in mind that he directly contrasts the position of science in the USSR to the position of science in fascist Germany, exhibiting hatred for the Nazi regime, whose policy leads also to the destruction of science. In Bernal's view socialism on the contrary elevates science, providing the most favourable conditions for its development and humanistic foundations for research work (Bernal, 1939/1973: 231). While giving a very favourable description of the state of Soviet science in

the 1930's, Bernal seems to proceed not only from the facts, but he reproduces a certain ideal, a desirable scheme of the relationship between science and society: Bernal's best hopes were linked with socialism.

What features of Soviet science does he draw our attention to? The thing he points out first of all is that "the cornerstone of the Marxist state is the utilization of human knowledge, science and technique directly for human welfare" (p. 222), and that Lenin created a state capable of implementing this theory in practice. Despite lacking funds, the new state from the very first days of its existence encouraged the development of scientific institutions and education in close relationship with industrial advancement. Science became "an essential part of the social fabric" (p. 224).

According to Bernal's understanding, the specific features of Soviet science are revealed in a wide involvement of workers in the process of implementing scientific findings in practice, in industry, as well as the use of planning in the sphere of science, naturally with due account of the specific nature of science and the distinctions of research work. Planning enables the main problems to be highlighted and scientists' efforts to be united in the major fields on the state level. Bernal also emphasizes that it is not the results of science which are planned because they can not be anticipated, but research surveys of certain fields providing sufficient grounds for expecting valuable results. Accordingly, necessary resources are allotted to science (p. 224—225).

Bernal describes the organization of Soviet science — academic, university and industrial science — pointing to its changeable, still unsettled nature, to the existence of an intrinsic interconnection of its structural units as well as to a movement from industry to applied and basic science and vice versa. It is interesting to note that the activity of the All-Union Institute of Plant Growing founded by N. I. Vavilov was used as an example of this connection.

In Bernal's view, the involvement of science in the general process of socialist development in all its spheres and the way Soviet science is organized enables it to achieve good results even with relatively limited resources, especially in production, and rational use of scientific equipment, in the regulated relations in science, since the collectivist attitudes penetrated by socialism allow individual responsibility to be combined with collectivism in scientific discussions and work.

The book contains Bernal's reflections on the place of science within the system of national culture under socialism. Here Bernal proceeds from the Marxist thesis (implemented in the Soviet Union in his opinion) that science pervades socialist society providing the basis for education and culture.

Popularization of science here aims at showing how the use of science promotes the improvement of the life standard, and it falls on the beneficial soil of the public's complementary striving for knowledge. Besides, in the Soviet Union the people need no longer fear that science will be used to simplify production and throw them out of work or to devise weapons for their destruction. It has become their science, to be used by them for themselves (p. 229).

Bernal seeks also to give an unbiased picture of the obstacles faced by Soviet science, on the one hand and its advantages, on the other. He sees the latter in the large-scale organization of research internationally renowned in certain fields of knowledge, in the ability of getting beyond traditional approaches in certain cases, etc. It is interesting that the absence of strict criticism is viewed by Bernal as a detrimental shortcoming, as a negative side of the youthful enthusiasm of Soviet science. As shown by experience this shortcoming, so keenly observed by Bernal, had far deeper roots. Bernal concludes his review of Soviet science by attributing its positive attitude towards the philosophy of dialectical materialism to historical considerations and vigorously rejects the idea that dialectical materialism imposes its dogmas on science. According to Bernal, philosophy offers a method of cognition settling the orientation of thought and providing greater prospects of obtaining fruitful results. As we would say it now, it serves as an intergrating factor in science and its relationships with society, it gives a humanistic orientation to

science.

Such is the outline of Soviet science drawn by Bernal. While depicting it he thought to be unbiased, proceeding from real facts and the Marxist principles he adhered to, and being to the utmost favourable in his assessments. He viewed socialism as a new growing social system full of energy and having brilliant prospects, a social system created in the interests of man. And Sovient science is a science of the given society reflecting the society's specific features in the organizational forms, in the nature of social relationships in the sphere of science, in its relations with society and in its social goals and value attitudes.

This was a noble position of a Western intellectual of high rank. However, if viewed from our present perspective, when perestroika made us reappraise our whole history, we have every ground to say that truth was mixed with illusions in this position, that this was rather wishful thinking than a reproduction of reality. The illusoriness was in his view of the administrative-command system established in the USSR by that time as essentially corresponding to socialist principles, and as built according to these principles. However this error was characteristic not only of Bernal. He shared this illusion with many of his progressive contemporaries who saw a stronghold of socialism in the USSR and linked their ideas of a reasonable and just social order with socialism. They wanted the Soviet Union to be up to their ideals and they closed their eyes to much that was going on in the country in the 1930's. The Soviet media have recently discussed the reasons for such prominant humanists and intellectuals as R. Rollan, L. Feuchtwanger and others to have been supportive of the Soviet Union although they could not help knowing about the murderous deeds, lawless actions and abuses of power that utterly contradicted socialist ideals. This is a question somewhat outside the scope of this article, offering no unambiguous answer. Much seems to be explained by the international situation and the danger of Fascism threatening the world. A record in a diary belonging, if I am not mistaken, to Heinrich Mann, testifies to the fact that the intellectuals of that time saw and understood much. It runs that the idea of socialism is a great idea, whose implementation unfortunately got into the hands of villains.

Of course the USSR in 1920's and 1930's witnessed a quantative and partially qualitative growth of science. The vast country couldn't advance economically, educationally and culturally without developing science. Later, in the war period, Soviet scientists contributed greatly to the victory over Fascism, devoting all their effort to work and manifesting remarkable moral qualities. So there was a grain of truth in what Bernal wrote about Soviet science.

However, also the other side of our complicated and tragic history, including the history of science, shows today with a growing intensity. The Stalinist system, with its rigid ideological control based on the repressive machinery, was detrimental to the development of Soviet science in many respects. The latter suffered irreplacable losses in intellectual resources, having been heavily struck by unjustified repressions.

But the system demanded not only human sacrifices. The involvement of science in the general process of the social and economic development of the country at the same time proved to be a process of the forced adaptation of science to the administrative-command system, which left its imprint also on science. The major point consisted of the bureaucratization of management in science. The bureaucratic "table of ranks" with a hierarchy of positions and titles embraced science as well. The disease typical of the system, i.e. the omnipotence of departments — resulted in industrial science becoming an appendage of the industrial ministries. There appeared a gap between science, education and industry. The introduction of scientific achievements in industry became a complicated problem since industry, totally oriented to fulfilling a plan, was not interested in technological modernization. The planning system, proclaimed to be an advantage of socialism, came into conflict with the demands of the technological advances.

This lead to detrimentally backward positions in this crucial sphere of society.

Here reality proved to be the opposite of what Bernal wrote about Soviet science. Of course the fact of "unclaimed science" couldn't promote scientific development, especially not in applied research. Generally speaking, wage-levelling, inadequate financial incentives of research work, the growing impact of monopolism and other similar factors adversely affected the efficiency and productiveness of scientific labour. Some institututes established in appplied and industrial science even bore only a very remote relation to research.

In 1956 the 20th Congress of the Communist Party exposed Stalin's deeds and dethroned his cult without however undermining the system he created with its bureaucratic and command methods of management. After N. S. Khrushchov resigned, the system began to consolidate, and any criticism directed against it was regarded as an encroachment on the fundamentals of socialism. All this had grave consequences for the country, bringing it to a crisis in the late 1970's. It became obvious that Soviet science failed to keep pace with the science of developed capitalist countries, especially in maintenance, development of new technologies, interaction of science and industry, and encouragement of scientific work.

It is apparently necessary to analyze the state of Soviet science as a social institution, to reveal the reasons of negative phenomena and trends, and to work out the program of its restructuring. Unfortunately such a comprehensive program is still lacking. But changes do occur in science. The forms of its organization and the stimulation of research work are changed, with a view to create favourable conditions for research work and encourage scientists' creative activity.

It is evident that the main direction in the restructuring of science as an institution lies in its democratization, in the elimination of the bureaucratic fetters binding science and in the development of self-organization of science.

Without dwelling on a mass of specific social and organizational problems facing present-day Soviet science, I would like to touch upon a fundamental dimensions of the issue, which is interesting from the sociological point of view.

It is to be noted, first of all, that the entire history of Soviet science indicates that science is intrinsically connected with society in its development. At present our society is struggling to break the chains of the administrative-command system and the period of stagnation through a radical economic and political reform. This reform aims at the replacement of the administrative methods of industry management by economic methods, based on the development of commodity-and-money relations, on the one hand, and by a comprehensive democratization of social life on the other. These profound, indeed, revolutionary changes cannot but affect science. Moreover, perestroika in science is demanded not only by science, but also by society interested in obtaining an increased amount of scientific knowledge and new technologies necessary for the acceleration of the scientific and technological advances. However "perestroika" in science has its own distinctive features which are to be borne in mind so as not to do harm by ill-considered innovations.

Incompetent interference in science is inevitably destructive. Thus, the formation of a fruitful and successful research team requires much effort, talent and time. And under the bureaucratic system it could be ruined in a day by a mediocre functionary holding power. Democratization of science bars this kind of actions. However it has its specific features in science, since issues of truth are not decided by a majority of votes. A similar situation arises with the application of economic methods of management. Putting industrial science on a self-supporting basis may become a powerful incentive for the growth of its efficiency, but for basic science such procedures may be ruinous.

The social organism of science is rather complicated, and before any changes are introduced, it is necessary to grasp its essence, bearing in mind that various social aspects of science are interlinked, making an entity. It is impossible to affect one side without an impact on the others. Therefore, the issue of how to advance, how to make perestroika in science

an integral component of the renovation of socialism, is not simple and evident.

It appears that two trends intervoven in the history of Soviet science are reflected in its current state. The first trend ensues from the fact that the development of science since the October Revolution and up to the 1980's was primarily extensive. As was historically necessary, this enabled a quantitative growth of science. At present over 4 million people are employed in the sphere of science, 1,5 million of them as research workers. Financing of science accounts for over 4 % of the national income. Numerous research centers, in various parts of the country in numerous republics having no such institutions previously, were established during this period. A system of training research personnel was evolved. Industrial science in fact emerged anew and developed on a wide scale. But already in the mid- 1970's many findings, including deceleration of the growth of the main social parameters of science, indicated that further movement along these lines is not efficient, and that increase in the efficiency of science requires a shift from extensive development mainly towards intensive development. In this connection the Soviet science of science started elaboration of the concept of the intensified development of science. Factors began to be revealed that were to be put into action so that science could be transferred to the lines of chiefly intensive development. However this rather complicated process was influenced by another trend closely interwoven with it.

The point is that the "purely" extensive process proved to be disturbed by the stagnation phenomena which adversely affected the country partially involving also science, as stated earlier. "Deceleration mechanisms" forming in science, just as in other spheres of activities, had a negative impact on its efficiency and its application in production processes. The administrative-command system with its forms and methods oriented solely towards the extensive type of development was intrinsically unable to provide intensification of scientific activities. Implementation of this task requires the elimination of the "deceleration mechanisms" generated by the administrative-command system. However this problem involves not only science, but society as well as a whole.

Elimination of these mechanisms on the way to creating economic, social and organizational mechanisms of scientific self-organization doesn't imply, it seems to us, the rejection of all forms of controlling scientific development within the framework of the whole society. Nor does it imply the rejection of planned research as emphasized by Bernal when he discussed science under socialism. On the contrary, the task is to improve these forms, to implement a science policy corresponding to social needs, to provide a proper apportionment of allocations to science, to develop international cooperation, etc.

It is reasonable however to speak of changes in the functions of management, which should not suppress the process of self-organization based on the scientists' initiative and activity, but encourage and rely on these processes.

Bernal linked the implementation of the ideals of an efficient and humanistically oriented science with the development of science under socialism. The subsequent development of science and technology and the creation of the means of mass destruction has shown that the humanitarian orientation of science has become essential for the preservation of modern civilization. Processes occurring in the Soviet Union and other socialist countries allow hope that socialism will make a ponderable contribution to the implementation of this ideal.

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