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J.D. Bernal as historian of science

J.D. BERNAL (1901–1971) PUBLISHED three books on straightforward historical themes: *Science and Industry in the Nineteenth Century* (1953), *Science in History* (1954), which went through several editions, and the posthumous *The Extension of Man* (1972). Curiously, this element of Bernal's many-sided activities received little attention and, inasmuch as it did from historians of science, it was critical if not hostile and derogatory.

Being a Marxist, Bernal placed history firmly at the centre of his analysis of what science is about. "To see the function of science as a whole", he wrote in the concluding chapter of his seminal *Social Function of Science* (1939), "it is necessary to look at it against the widest possible background of history". He continued by identifying three major changes which mankind has experienced since its relative late emergence on earth. The first and second change, the foundation of human society and civilization respectively, occurred before the dawn of recorded history. As to the third change, Bernal associated with it, as he put it, "that scientific transformation of society which is now taking place and for which we have as yet no name" Bernal traced its origin to the related processes of the rise of capitalism and the birth of modern science in the middle of the fifteenth century. In discussing this two-way relationship Bernal argued, though capitalism as essential to the early development of science, giving it for the first time a practical value, the human importance of science transcends in every way that of capitalism, and, indeed, the full development of science in the service of humanity is incompatible with the continuance of capitalism.

In effect what Bernal did in the concluding chapter of the *Social Function of Science* was to divide world history into three stages of humanity whereby he stressed that the third stage had still to be achieved. The following formulation in the concluding chapter of the book published 67 years ago, may help to bring out the author's significance as one of the twentieth-century creative thinkers about society, man and nature:

We must realize that we are in the middle of one of the major transition periods of human history. Our most immediate problem is to ensure that the transition is accomplished as rapidly as possible, with the minimum of material, human and cultural destruction ... belonging to an age of transition we are primarily concerned with its task, and here science is but one factor in a complex of economic and political forces.

But he had no doubt that once the third stage of humanity has been definitely established science will constitute its characteristic feature. Drawing on and expanding the ideas set down in *The Social Functions of Science*, Bernal seems to have been the first to use the term 'Scientific-Technical Revolution'. He introduced it, in 1957, in the second edition of his *Science in History* stressing that the new revolutionary character of the twentieth century could not be confined to science. It resided even more in the fact that science had come to dominate industry and agriculture. The *concept* as such has virtually not attracted attention. Certainly in comparison to abundant literature devoted to the Scientific Revolution and the Industrial Revolution, the Scientific-Technical Revolution has not invited debate and controversy over its nature and place in the history of the twentieth century.

Take the consequences of the twentieth-century emblematic breakthroughs and their ramifications: the penetration to the nucleus of the atom and the penetration to the nucleus of the cell. Never before in history, when it came to assimilate fruits of scientific research, had humanity had to face more

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profoundly troubling social and ethical issues. While the nucleus of the atom and the nucleus of the cell are variously present in historiography of contemporary science and technology, they have not been addressed as two major products and factors of the Scientific-Technical Revolution in the context of a specific historic phase of social evolution.

The need to do just that may well be the most important bequest to us by J. D. Bernal the historian.