



MODERN SCIENCE

Threshold & Philosophical Problems

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CHAPTER 9

THE NATURE OF SCIENCE-SOCIETY IMPACT

Since the revolutionary birth of science over 300 years ago, society could no longer be insulated from it. Since this birth, science via technology has, especially in the last 100 years, wrought a tremendous transformation of society. In this way science and science-based technology became major social and economic phenomena urgently calling for an understanding. Understanding the nature of this impact is the *raison d'être* of this part of this book while analyzing the nature of the impact is the *leitmotif*. This is a critique, a philosophical reflection on the critical point of intersection where science, technology and society interplay and mutually influence one another. This also implies a reflection on the impact of science on so many different aspects of human endeavour, intellectual, economic, political, social, cultural, and demographic.

At the centre of the whole interplay is man. The reflection is done by man; the science-society impact is over and above on man. Therefore there is the need to enunciate a sound philosophical anthropology. It is only against the canvas of such a philosophy of man that the critical evaluation of science-society impact via technology would be clearly perceived.

The initial trend in analyzing the nature of science-society impact was to focus on the view that science influences society. This is the view of a direct, single, one-dimensional flow of influence from science to society; a one way cause-effect impact of science on society. This view is believed to be amply supported by examples in the history of the march of civilization. When sticks and stones were the main tools of production we had the Stone Age; when bronze was, we had the Bronze Age; there was the Iron Age, the jet age, etc. These were inventions that profoundly fashioned attitudes and marked civilizations.

The current trend is to focus on the notion of institutional interchange between science as an on-going intellectual activity and society as a web of relationship. This is the view of a reciprocal relationship between science and society. This chicken-and-egg metaphor in defining science-society interaction

engenders the view of a two-way flow of influence between science and science-based technology on the one side and society on the other. Science influences society and society influences science. The initial view that it was science that influenced society is steadily being abandoned. Thus when we today talk about the transformation wrought by science, we are really actually talking about the mutual influence between science and society.

In analyzing the nature of science-society impact, a lot of approaches could be used. Some just focus on the "opportunities" created by science, such opportunities as the mechanization of production. Others focus on the problems brought about by science, such as the unemployment effects of new technologies. These are merely thematic of a host of "opportunities" and "problems" of science and science-based technologies. Let us see some outcomes of science-society interplay.

THE AGE OF ENLIGHTENMENT: On the philosophical plane, the Enlightenment is the immediate and direct sequel to the modern scientific revolution. The century after the revolutionary birth of modern science, the eighteenth century, was called by the French the *Siecle de lumières* literally meaning *the century of light*. It was also called the *Age of Reason* because of its emphasis on *reason* as a path to knowledge. More popularly, however, it has been called the "Age of Enlightenment". This name came about from Immanuel Kant's response to a question in 1785. Kant was asked whether he believed he lived in an "enlightened age"? He answered: "No, we are living in an age of enlightenment." The point Kant meant to stress was that by 1785, the scientific revolution was still in progress. Kant's conviction was vindicated by the first modern great political revolution, the French Revolution, which five years after Kant's answer occurred following the intellectual revolution which Kant said was still in progress.

The Enlightenment holds reason and nature in equal esteem. The connection between these two was derived from the role they played in the natural theology of the seventeenth century England. The natural theology of the Middle Ages was the field where truth could be discovered via the use of reason alone without any recourse to the revelation of the Bible. Purely rational arguments, such as the ontological proof of God's existence, do not refer to the physical world. On the other hand, rational arguments such as the Arguments from Design are based on reasoning from creation (natural or physical world). Both argument-types, the first not based on physical nature, the second based on it, use *reason*. With the success

of science in the seventeenth century, the Design Argument began to replace the *a-priori* rational arguments and even revelation. Thus the concept of reason changed from the methods of formal logic to those of the natural science; and the laws of reason became identical with the laws of nature. This change in the meaning of reason also led to a change in the way one learned about the natural world. Pure rational argument alone was no longer sufficient to learn about nature; experiment was necessary. In this way experiment became a part of the “reasoned approach to nature”.

From the foregoing, two essential features of the enlightenment stand out: the autonomy of the individual and the potentials of rational thinking. This means the recognition that each individual is responsible for himself; and, the confidence in the power of human beings to use reason (and so technology and science) to create a better future. There was a belief, during the Enlightenment, in the possibility of attaining human independence and omniscience, a belief in the triumph of the human spirit. On the contrary there was distaste for superstition and the tyranny of the supernatural. Goethe, an Enlightenment-poet portrays these contrary feelings in his poem “Prometheus”. He writes:

I know of nothing poorer
Under the sun than you gods
Wretchedly,
You feed your majesty
On imposed sacrifices.
And the breath of prayers,
You would waste away,
If children and beggars
Were not hopeful fools.¹

The dominant philosophy of the Enlightenment was the mechanical philosophy. This is a rationalistic philosophy or objectivistic rationalism inherited from the seventeenth century. Mechanical philosophy removed from natural philosophy metaphysical notions such as final cause or divine purpose, forms, substance and accident which hitherto were the dominant terms of explanation and replaced them with mechanical concepts such as space, time, mass, force, momentum, rest, etc.

The philosophers of the Enlightenment, consequently, extended the application of the new scientific canons to such areas of human affairs as politics, ethics and to even metaphysics and theology. They argued that what can be said must be stated in quasi-mathematical terms. They believed that language less

precise to mathematical language may turn out to conceal errors, confusions, obscurities, superstitions and prejudices, which characterize theology and dogmatic doctrines the new science aims to sweep away and supersede. The *a-priori* deductions without experiment prevalent in the Middle Ages such as, “all bodies come to rest when no longer under the influence of any force” or “that the natural part sought after by heavy bodies in the quest for self-fulfillment is necessarily circular”, were abandoned. The laws of Kepler, the observations of Tycho Brahe and the experiments of Galileo contradict all these. Thus only measurable aspects of reality, capable of being couched in mathematical equations, were treated as real. The explanations of nature using qualitative and theological terms were abandoned.

The application of scientific method during the Enlightenment to the regulation of human affairs did a great deal of good: dogmas were refuted, prejudices and superstitions were dispelled. But the feature of enlightenment, the conviction that science would cure all evils proved delusive. Nonetheless we will conclude with Isaiah Berlin that:

The intellectual power, honesty, lucidity, courage and disinterested love of the truth of the most gifted thinkers of the eighteenth century remain to this day without parallel. Their age is one of the best and most hopeful episodes in the life of mankind.²

REFERENCES

¹cf. Paul Kurtz, “The Promethean Attitude: Prometheus Unbound”, *Free Inquiry*, Vol. 14, No.4 Fall 1994 P.31-342.

²Isaiah Berlin, *The Age of Enlightenment: The 18th Century Philosophers*, USA: Meridian Bks. 1984, P.29



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