

Francis Bacon

From Magic to Science

by

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This attitude was responsible for the English humanists' intolerance of disputatious Scholastic learning and the Puritans' opposition to logical subtleties, and even for Ramus' great popularity in England. The burning of the texts of university debates in the market place, the pages torn from Duns Scotus' works and strewn over the quadrangle of New College, Oxford, in 1553²⁶ were more than political demonstrations against the abolition of monastic schools or against new religious jurisdiction. The concept of logic as a practical guide to the art of discussion which ensured success in religious controversies was being replaced by that of logic as an art and instrument for the purposes of natural research.

Bacon had read Agricola and certain aspects of his philosophy may well have been inspired by Bernard Palissy.²⁷ Palissy was an apprentice potter whose quest for a white glaze for ceramics had brought him a brief renown followed by almost total ruin. Sir Clifford Albutt, and later Farrington,²⁸ have suggested that Bacon—who was in Paris at the age of sixteen—might have attended Palissy's public lectures on agriculture, mineralogy, and geology, and that when he wrote in the *New Organon* that it 'occasionally happens that some workman of acuter wit and covetous honour applies himself to a new invention which he mostly does at the expense of his fortunes',²⁹ he was probably referring to Palissy who was, indeed, a typical example of such a workman. Significantly enough among the few books Palissy had read we find Vitruvius, a pamphlet by Paracelsus, and a treatise by Cardano.³⁰ Philosophy, he wrote, is the art of observing, which is not the prerogative of scholars: it is shared 'by all the inhabitants of the earth'. And he opposed the philosophical tradition in favour of a cult of nature:

How can a man understand and discuss the workings of nature if he has not read the Latin books of the Philosophers? So might it be said of me, for I prove by experiments that the theories of many philosophers are fallacious in many ways, even the most famous and ancient; and this can be seen and understood in less than two hours, by anyone who will take the trouble to come to my laboratory where he will see some wonderful things set up as examples and proofs of my writings, arranged by order and by

degree, with labels attached so that everyone can learn for himself. I can assure you (reader) that in a very short time, namely in the first day, you will learn more of natural philosophy by the instances contained in this book than you could learn in fifty years reading the theories of ancient philosophers.³¹

Though crudely and ingenuously expressed, this passage contains two basic ideas of Bacon's philosophy:³² traditional learning must be replaced by the cult of nature so as to re-establish the contact between man and reality; collections of facts are a means of study, an instrument for scientific research and not objects of pleasure and curiosity.³³

Indeed Bacon was voicing the general opinion of his age, defining some of its essential demands, when he strove to rehabilitate the mechanical arts, denounced the sterility of Scholastic logic, and planned a history of arts and sciences to serve as foundation for the reform of knowledge and of the very existence of mankind. He constantly contrasted the fruitlessness of traditional culture with the progressive nature of the arts. These, he says, unlike theoretical sciences, will not be set up as idols of perfection, for they are continually thriving, growing, advancing, and alive to the needs of humanity; we have already seen this happen in the case of printing, artillery, and navigation. These achievements were made possible because many minds collaborated to one end: in the mechanical arts there can be no dictators but only 'senates' of free and equal workers. Time, says Bacon, favours these arts but it saps the foundations of the great traditional monuments. There are many comprehensive works on methods of agriculture and other arts, but too many people think it is degrading for cultured men to study these methods. These men, in their foolish arrogance, are like the philosopher who fell into a pond because he was looking up at the stars—after which he could observe neither the stars nor the water—whereas if he had looked attentively at the water he could have seen the stars reflected in it. The new philosophy is based on a humble exact analysis of technical procedures; its function—besides transposing methods from one art to others and helping to advance technology—is to encompass in the sphere of technology sciences that had hitherto been excluded from it.³⁴ In fact Bacon sees the collective, progressive aspects of the mechanical arts as what

finally distinguishes them from magic, as well as being a model for research in various fields of knowledge.

In 1609 Bacon, who was nearly fifty, decided to publish his third philosophical work, *De sapientia veterum* (*On the Wisdom of the Ancients*). Here he uses the classical Promethean myth to illustrate his theory of collectivity:

The last point remains—namely the races with burning torches initiated in honor of Prometheus. This . . . alludes to arts and sciences, and carries in it a very wise admonition to this effect that perfection of the sciences is to be looked for not from the swiftness nor ability of any one inquirer, but from a succession. For the strongest and swiftest runners are perhaps not the best fitted to keep their torch alight since it may be put out by going too fast as well as too slow. It seems however that these races and games of the torch have long been intermitted. And well were it to be wished that these games in honour of Prometheus, that is of Human Nature, were again revived; that the victory may no longer depend upon the unsteady and wavering torch of each single man but competition, emulation, and good fortune be brought to aid. Therefore men should be advised to rouse themselves, and try each his own strength and the chance of his own turn, and not to stake the whole venture upon the spirits and brains of a few persons.³⁵

Bacon was putting up a modern ideal of scientific research in opposition to the traditional ideals of magic and alchemy. To grasp the cultural significance of this ideal we must remember that the infiltration of technology into the different spheres of learning was no simple matter, in sixteenth- and seventeenth-century Europe and England.

In this respect Bacon's attitude was distinctive; and for this reason he has been so often and so completely misrepresented. Some—like Liebig for instance—stress only the errors and scientific absurdities that are certainly not lacking in Bacon's work.³⁶ Others, like Farrington, ignore the formative influence of Renaissance magical traditions on his mind.³⁷ Farrington's portrait, though basically correct, tends thus to distort the historical significance of Bacon's attitude; and Farrington's over-zealous followers make indiscriminate use of his intelligent formula—after cleverly distinguishing science from technology—to fit Bacon into their ready-made history. These representa-

tions of Bacon as philosopher of nature or pioneer in the application of science to industry are equally incomplete and misleading.

The basic themes of Bacon's philosophy are often biased and polemical. They were directed at specific objectives and may be ascribed to a definite phase of culture. This is a point that should be always kept in mind by the historian whose aim is to discover how certain traditional concepts are gradually remoulded by the demands of a given age. Bacon's appraisal of the mechanical arts and his concept of science must be seen in the light of his reaction to the Renaissance magical hermetic tradition; and his reaction to magic, his reasons for both acknowledging and rejecting it,³⁸ cannot be fully appreciated till we cease to misrepresent certain cultural manifestations as the relics of ancient or medieval superstitions. We should not forget that these problems enthralled such men as John of Salisbury, Albertus Magnus, Roger Bacon, and in the seventeenth century Bacon and Descartes, Kepler, Mersenne, and Gassendi.³⁹

The heritage of magic

Bacon spent the last years of his life compiling a great encyclopedia of nature and of arts (or nature modified by man). It was to provide the material for a study of the New Science, and Bacon was convinced that its publication would finally establish his fame and his reputation. Assisted only by his secretary Rawley he worked for many years at a *Primal History* (*Historia prima*) to include material for all particular histories, which was published as the *Sylva silvarum* (*Forest of forests*) only after his death. But the particular histories came to assume an ever increasing importance for Bacon who made a 'sort of vow' to publish one each month for six consecutive months. Only two of these six histories were ever published in their entirety: the *History of Winds* (*Historia ventorum*) and a year later the *History of Life and Death* (*Historia vitae et mortis*) which was to have been the sixth.⁴⁰

Bacon believed that a meticulous and exhaustive compilation of natural and experimental histories would rapidly change the destinies of mankind, so he discarded his logic⁴¹ and gave up all his time to the realisation of this fantastic project, the greater part of which was never to be completed.