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Arthur H. Friezsche

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The Impact of Applied Science Upon the Utopian Ideal

ARTHUR H. FRIETZSCHE

A great dream of the past four centuries—of the period which we think of as the “modern world”—is the vision of progress through the systematic application of man’s own powers. This application, to which I shall give, in desperation, the unsatisfactory title of “applied science,” is nowhere more fittingly expressed than in the series of Utopian fantasies which are a feature of the Renaissance.

One should not be surprised to find this so. Visions, dreams, ideals—all lead naturally to fantasy. For the Middle Ages, the ultimate dream was the perfect Heaven, as in the *Paradiso*, for example. For an age too impatient to wait for the *here-after*, the ultimate dream was the perfect *here*, often equated with the perfect state.

In the brief compass of the paper which follows, I wish to investigate the attitudes of these dreamers toward applied science, as displayed in various imaginary commonwealths. Relying upon three outstanding Utopian works, conveniently spaced across two centuries, I hope to demonstrate stages in the development of man’s hopes for, and feelings toward, applied science.

More’s Utopia

Sir Thomas More’s *Utopia* (1516) was not, of course, the first work to express the ideals which we now refer to as “Utopian.” Indeed, that it should have a classical progenitor (in this case, Plato’s *Republic*) is only to be expected, for its author is famed as one of the great English humanists. And *Utopia* is clearly the work of its period, the early humanistic period of the Renaissance. Primarily it is social commentary,

Dr. Frietzsche is associate professor of English at Utah State University.

the depiction of a near-perfect society of a nature which can fairly be labelled "communistic." In its aim and purpose, *Utopia* exhibits the same intellectual preoccupations which brought into being Machiavelli's *The Prince* (1513), Castiglione's *The Courtier* (1528), and Elyot's *The Boke of the Governour* (1531).

In pursuit of this near-perfect society, the author invokes the aid of what the Twentieth Century would call "science," although the Renaissance called it "natural philosophy." More sees no conflict between religion and science; in the observation of Basil Willey, "natural philosophy is considered, not as 'conjuring,' involving a pact like that of Faust and Mephistopheles, but something acceptable to God, and even as a part of religious duty."¹ As Ralph Richardson's Elizabethan translation of the *Utopia* puts it,

For whyles they by the helpe of this Philosophie searche out the secret mysteres of nature, they thinke themselves to receave therby not onlye wonderfulle greate pleasure, but also to obteine great thankes and favour of the authour and maker therof.²

But this natural philosophy is to be turned to social ends; implicit in this work is the "concept that science can be responsible for human happiness."³ In fact, More spends much more space in discussion of technology and applied science than in discussion of natural philosophy proper (though this should occasion no surprise, for technology has been well ahead of scientific theory throughout almost all recorded history). The passage quoted above is the heart of the only discussion of pure science in More's text, whereas the work abounds with practical applications of science: paper-making and printing, incubation, hospital operation, veterinary care, selective cattle breeding, even sanitation of abbatoirs. If astronomy and meteorology enter this first Utopia, they do so because of their

¹Basil Willey, *The Seventeenth Century Background* (Garden City, N. Y.: Doubleday, 1955), p. 41.

²Thomas More, *Utopia*, trans. R. Richardson ("Everyman Edition"; New York: Dutton, 1910), p. 82.

³J. R. Adams, "The Social Responsibilities of Science in Utopia, New Atlantis, and After," *Journal of the History of Ideas*, X (1949), p. 387.

practical use in seamanship. Applied science is, therefore, in More's mind of great assistance to that long-time hope of humanity, the ideal commonwealth. And for centuries to H. G. Wells and after—Utopianism and applied science were to go hand-in-hand.

Bacon's *New Atlantis*

The increasingly close relationship of the ideal commonwealth and applied science during the century following More is best illustrated in Sir Francis Bacon's *New Atlantis*, published posthumously in unfinished form in 1626. Bacon is still commonly thought of as a great prophet of theoretical, abstract science, for only in the past few decades have literary scholars been made properly aware of his deficiencies in this field.⁴ His great bias is toward applied science, and his ideal commonwealth is both dependent upon it and ruled by it. We may well sympathize with him, for his vision was stimulated by the century of advancement in applied science and technology which had passed since the appearance of More's *Utopia*.

Bacon's preoccupation with "fruits" has not gone unnoticed among modern historians of science. Benjamin Farrington's book⁵ is based largely upon recognition of Bacon's overwhelming interest in applied science. As A. Wolf notes, "Scientific knowledge was not valued by Bacon for its own sake, but as a potent instrument for improving the lot of mankind by means of inventions which might result from it."⁶ Wolf is careful to point out that this utilitarian view was not foolishly shortsighted, and that Bacon favored "experiments of light" as well as "experiments of fruit." Nevertheless, Bacon's ultimate practical aims never wavered.

Farrington's words are direct and uncompromising:

The story of Francis Bacon (1561-1626) is that of a life devoted to a great idea . . . that knowledge ought to

⁴For a succinct summary of Bacon's weaknesses as a scientific philosopher, see Charles Singer, *A Short History of Scientific Ideas* (New York: Oxford University Press, 1959), pp. 264-67.

⁵Benjamin Farrington, *Francis Bacon, Philosopher of Industrial Science* (London: Lawrence and Wishart, 1951).

⁶A. Wolf, *History of Science, Technology, and Philosophy in the 16th and 17th Centuries* (2nd edition; New York: Harpers, 1959), II, 634.

bear fruit in works, that science ought to be applicable to industry, that men ought to organize themselves as a sacred duty to improve and transform the conditions of life.⁷

"The final purpose of science was power over nature,"⁸ although Bacon insists, in the *New Atlantis* as in many of his works, that pursuit of the knowledge of nature is a holy art, rather than an accursed one. Nevertheless, it is certainly true, as J. R. Adams indicates, that whereas applied science is employed in More's Utopia to bring about the highest moral and cultural benefits, in Bacon's Bensalem "man's vulgar wants are becoming insatiable," and applied science is being manipulated to supply them.⁹

Turning to the *New Atlantis* itself, I began to make a list of instances of the use or influence of applied science, and quickly covered four pages with subject titles alone, beginning with the use of fresh fruit as a preventative of scurvy and continuing through the long discourse on Salomon's House. Much has been made of this institution as a model for the Royal Society of a later generation,¹⁰ but we must not forget that its activities are practical to the extreme. Indeed, the last stages of the filter through which every idea passes are technical editors ("compilers," Bacon calls them) and men who are devoted to the practical application of the discoveries made through research. These "fruits" are intended to justify the dominance of science in Bensalem. Bacon, in propagandizing his dream of the future (for the *New Atlantis* was intended to spur the British imagination toward realizing that dream), writes of discovery in science, but invariably stresses the practical application of the discovery.

The *New Atlantis* can be faulted as a document of scientific philosophy: the idea of "progress" in its modern sense is missing (although the possibility of regress is admitted), and

⁷Farrington, *op. cit.*, p. 3.

⁸A. C. Crombie, *Medieval and Early Modern Science* (2nd ed. rev.; Garden City, N. Y.: Doubleday, 1959), II, 294; see also II, 286; and Hiram Haydn, *The Counter-Renaissance* (New York: Charles Scribner's Sons, 1950), pp. 242, 254.

⁹Adams, *op. cit.*, p. 387.

¹⁰See, for instance, Farrington, *op. cit.*, pp. 17, 18.

so is a true understanding of scientific method. But as a vision of what science applied to the problems of common life can do for man, it has few rivals in its time. It is a vision of both hope and faith, setting the stage for the achievement which would turn vision into reality.

Swift's *Voyage to Laputa*

To move forward another century, into an Age of Reason, is to witness the waning of those hopes and the withering of that faith. The third book of Jonathan Swift's *Gulliver's Travels* (1727) employs the assumptions and devices of the Utopian pattern for anti-Utopian ends. The plausible arrival at an undiscovered land, the unflagging travel, the acute observation, the implied comparisons, and the carefully explained departure are all part of the Utopian tradition, and all are as evident here as they are in the other three voyages of Gulliver. But the third voyage is a voyage to a land where science has gone wrong and reaped evil instead of good.

Gulliver enters that land of which Bacon had received only a Pisgah view, the land ruled by science. Scholars have assumed that the science which dominates Laputa and its environs is theoretical or abstract science, but it would be equally easy to call it applied science misapplied; most of the experiments described are intended by their "projectors" to be of useful application; the error lies chiefly, we see, in the practicability of the application. Laputa is a land of advanced science, but it is also a barren waste.

As a work of literature, the account of their third voyage has been violently, and I think rightly, criticized. Nicolson and Mohler have shown¹¹ that the objects of Swift's satire are not drawn from literary antecedents but from contemporary science. Yet the satire is overly topical, ill-organized, and intemperate. "About science abstract and applied, Swift knows nothing. He merely falls in with the fashion among the wits

¹¹Marjorie Nicolson and Nora N. Mohler, "The Scientific Background of Swift's *Voyage of Laputa*," *Annals of Science*, II (1937), 299-334, reprinted in Marjorie Nicholson, *Science and Imagination* (Ithaca, N. Y.: Cornell University Press, 1956), pp. 110-54.

of guying the virtuosi; the energy of his original mind is not engaged."¹²

Even though Swift was unlearned in science, the very existence of the fashion of satirizing scientists is significant, as is Swift's willingness to join in with it. There is, generally in the period, a "disenchantment with man's accomplishment."¹³ H. T. Pledge sums up the situation in this manner:

. . . during the first two-thirds of the 18th century, "applied science," as we understand it, was undergoing a period of discouragement after the bright promise of the previous century. The great primary advances of the time, in textiles, in metallurgy or iron and steel, in power, were inventions, not scientific discoveries. Even Watt was as much a mechanic as a scientist.¹⁴

It is true, admittedly, that much of Swift's criticism in *Gulliver's Third Voyage* is not directed at applied science *as method*; it is directed at the misapplication of science toward impractical, even base ends. The apologist for science may be quick to point out that a method is only a means, and cannot be proclaimed at fault if it is applied for unworthy ends; but the moralist is equally quick to indicate that scientific method does not contain within itself any corrective, or any protection against misapplication, and may therefore be considered potentially evil. Immorality and amorality may be distinguishable in principle, but in practice they can (and do) bring about the same vicious effects. Needless to add, this is essentially the modern predicament.

It appears to me that Swift's revulsion is based on what he took to be the testimony of a century of scientific endeavor that man is fundamentally a moral and social creature, and that preoccupation with the "things" of science (such as seen in Bacon's *Bensalem*) leads to neglect of man's proper concerns. As Bacon foresaw, science can lead to vast improvement in man's surroundings, but Swift now saw that such im-

¹²John Middleton Murry, *Jonathan Swift: a Critical Biography* (New York: Noonday Press, 1955), p. 332.

¹³Jonathan Swift, *Gulliver's Travels, etc.*, ed. W. A. Eddy ("Oxford English Authors"; New York: Oxford University Press, 1933), p. iii.

¹⁴H. T. Pledge, *Science Since 1500* (New York: Harpers, 1959), p. 101.

provement can prove embarrassing or even dangerous without corresponding refinement in man, the "projector" of science. This idea is one which might logically be expected in Swift, of course, but it is also close to the foundations of the entire Age of Reason. The "things" of science might serve well as objects for satire, but "the proper study of mankind is man."

Surprisingly, Swift's attitude is in many ways a return to the premises which underlie the Utopia of Sir Thomas More, and is a counter-attack upon the "reaction toward natural ethics"¹⁵ so apparent in Bacon. The truth seems to be that, different as the personalities and social attitudes of Swift and More evidently are, their preoccupation with human morality is enough to unite them on a sweeping range of issues, and to place them in opposition to Bacon's unquestioned materialism. Like More, Swift believed that the quest for a better society was essentially a quest for better *men* rather than for better *things*; if this belief is correct, the recognition is merely hindsight on Swift's part, but foresight on More's part.

The Modern Predicament

It is not my intention to extend the brief time allotted to me and carry this survey of the impact of science on the Utopian ideal onward through the two-and-a-half centuries which separate us from *Gulliver's Travels*. It is enough to say, I believe, that the lines of issue had been drawn. Scientific prophet has since alternated with moralist; Utopia has succeeded anti-Utopia and has been succeeded in turn. If we have had our Bellamys, our Butlers, and our Holbergs, we have also had our Orwells and our Huxleys. If we have heard *News from Nowhere* and been whirled through the *Time Machine*, we have also catapulted through space with Captain Stormfield and suffered through a *Year Nine*. And so it must be, as society perennially vacillates between emphasis on man's innermost hopes and emphasis on man's outward accomplishments. As our hopes and fears emerge, they

¹⁵Joyce O. Hertzler, *The History of Utopian Thought* (New York: Macmillan Co., 1923), p. 151.

will continue to do so in the form of Utopias and their darker shadows.

When Sir Thomas More launched his *Utopia* on the troubled waters of the Renaissance, he could not have foreseen where the currents of time would carry it. Within a century, a form which had first been employed as a vehicle for the propagation of humanistic ideals was to be usurped to serve the ends of the scientific visionary. And in another century, the same form was to be used to carry a message which mocked science, applied and abstract. In following the treatment of applied science in Utopian literature, we catch a glimpse of the split which was to widen into the "two-culture gap" afflicting society in our own day.