In the fall of 1947, J. Robert Oppenheimer, the man who directed the U. S. project that made the atomic bomb, delivered the Arthur D. Little Memorial Lecture at the Massachusetts Institute of Technology. In the lecture, he said:

Despite the vision and far-seeing wisdom of our war-time heads of State, the physicists felt a peculiarly intimate responsibility for suggesting, for supporting, and in the end in large measure for achieving the realization of atomic weapons. Nor can we forget that these weapons, as they were in fact used, dramatized so mercilessly the inhumanity and evil of modern war. In some sort of crude sense which no vulgarity, no humor, no over-statement can quite extinguish, the physicists have known sin, and this is a knowledge which they cannot lose.¹

Physicists have known sin. Sin came to them, in Oppenheimer's view, through power, the power that science had gained and used.

Going back over 300 years to the beginning of the period which we refer to as the Scientific Revolution, we find that the image of power was put very clearly and very directly by Francis Bacon, philosopher, Lord Chancellor, a commentator on knowledge and what it might do. Let me quote him.

It is well to observe the force and effect and consequences of discoveries. These are to be seen nowhere more conspicuously than in those three which were unknown to the ancients and of which the origin, though recent, is obscure, namely, printing, gun powder, and the magnet. For these three have changed the world: the first in literature, the second in warfare, the third in navigation, whence have followed innumerable changes. In so much that no empire, no sect, no star seems to have exerted greater power and influence in human affairs than these mechanical inventions.²

"Knowledge is power," Bacon said in his famous epigram. "We understand nature in order to command her" is another well worn Baconian phrase. The goal was human gain, to improve the commonweal, but the basic aim was to have dominion over things. The new science, the new knowledge was, indeed, to improve the estate of humans on earth. But there was something more behind Bacon's science, and, in a sense, it had a power over him, as it was to have over his contemporaries. In developing this new approach to nature, these new ways of controlling nature, humans, he felt, would regain their prelapsarian state of the period before the fall.³ They could prolong life,

they could conquer disease, they could do all those things which humans
had dreamed of, but which they had not been able heretofore to achieve.

More than 300 years separate Bacon and Oppenheimer. The earlier vision
of Bacon was an optimistic one but, curiously enough, it was developed in a
time when humans actually possessed very little power to control nature. The
more recent vision is a pessimistic one. At the very time that humans have
achieved the ability to exert power over nature, they question the ends of
such ability. What has happened in between? Why has this change of outlook
and change of attitude occurred?

There are two clear senses in which the notion of power is used. One
reflects science's ability to do powerful things, to bend nature to the human
will. The second refers to the achievements of scientists and to their positions
of power and authority in the societies of which they are a part. Whence does
science derive its power? How has it developed?

There are at least four ways of looking at science and its sources of power.
First, science is a body of concepts and techniques involving theories and
ways of acting and thinking. Second, science is a way of knowing, a way of
ordering reality and, ultimately, of acting upon that reality. It provides a way
of knowing that has transcended the boundaries of the practising scientist
and has been adopted broadly in society at large. Third, science is a socially
organized activity, a profession with a locus within society and part of a
hierarchy, related to other social institutions including governmental, military,
and industrial. Finally, science is a source of utilitarian instruments of power
for science and for others to use.

The seventeenth century was a period of fertile, conceptual innovation.
Indeed, the innovations in ways of knowing and in conceptual structures of
this period are what we label as the Scientific Revolution. An epistemology
was established which set in place a way of knowing nature through reason
and experience. Processes of demarcation were established to set rules about
what was to be included in the sciences and what was to be excluded from
them. Both the cognitive nature and the content of science were being
developed.

Rules of exclusion from science were important. There were certain topics
science would eschew. Science would not deal, said the founders of the Royal
Society of London (and indeed, this might have been repeated by the
founders of almost any of the academies of science in the seventeenth
century) with religion, rhetoric, metaphysics, politics, or morality. But even
though it claimed it would not deal with these topics, science did maintain
one value quite clearly — dominion over nature or mastery over things. While