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The European Experience of Nature

A. C. Crombie

There is a story, perhaps well known but which I heard only recently, about the great Japanese admiral Isoroku Yamamoto. He had to summon before him a good but careless young officer guilty of some misdeed. Instead of the expected reprimand, the young man found himself invited to sit down. He did so, and immediately sprang up again, The admiral had placed a number of drawing pins point upwards under the cover of the chair. He dismissed the officer with the single comment: You have had a useful experience of the element of risk and fantasy present in every situation.

The characteristically Western tradition of rational science and philosophy can be dated from the ancient Greek commitment to the decision of questions by argument and evidence, as distinct from custom, edict, authority, revelation, or some other source. The Greek philosophers and mathematicians at the same time committed the Western tradition to the belief that, among many possible worlds, the world that exists is a world of exclusively self-consistent and discoverable rationality. These rational commitments have been applied formally as much to decision about moral values and principles showing what ought or ought not to be done, as to the decisions of science about what is or is not the case, Aristotle meant his ethics to be derived as systematically from a theory of human nature as his physics was from a theory of matter and causation, It was the generation of Galileo and Descartes who finally clarified and defined science as a mode of rational thinking in the modern world and who gave it a recognizable and enduring identity in relation to other fields of inquiry and decision. The act of definition required first a restriction, the delimitation of the questions as well as of the answers to be admitted. The questions had to be answerable by acceptable means, eventually if not immediately. Later came the expansion of this initial restriction to such exclusively answerable questions into all realms of experience and thought. The first half of the seventeenth century is a genuine turning-point in the potentialities of Western culture, throwing light on what came both before and after. From that time a scientific community has come into existence with conditions of education and communication providing for both agreement and disagreement by a specific kind of rationality. How does this bear on moral values?

The purpose of this brief contribution is to introduce some examples, if not of risk and fantasy, at least like the drawing pins meriting attention, in this relation between beliefs about existence and beliefs

bout values. By treating the European experience of nature historically s a kind of intellectual anthropology, looking back to the origins of ur culture, we may be helped to relate this to the diverse experiences f the different societies which face the common problems of mankind. ne modern West on its part has not only brought to other societies its cience, medicine and technology; it has brought about the confrontation f our time in the meaning men give to existence as a whole and to life, ecision and disease within it.

An obvious characteristic of the Western scientific tradition is nat from the beginning it was a moral enterprise as much as a means of olving physical problems. This has had a profound effect on the pecific character of Western science. Plato saw rational philosophy as whole as the progress of knowledge from the material particulars of hysics through mathematics to the eternal truths and laws which, while bstracted from all matter, provided the model and reason for its ehaviour. These truths were highly charged with moral values such as roportion, harmony and fitness, for example in the perfection of the ircle which dominated ancient cosmology. The world was a work of art. lato's scheme of education was aimed to lead the mind of virtuous youth p through these stages to the contemplation of the true harmony of xistence which fortified and sustained the human endeavour towards armony of the soul and of society. This Platonic goal of education was idely used to justify the systematic introduction of mathematics into chools and universities in sixteenth-century Europe. The Italian latonists and the Jesuits especially gave mathematics this moral role n their educational policy, seeing its certain demonstrations also as refutation of current scepticism, and its applications as essential for he practical arts. Mathematically-minded Platonists and Jesuits were o be the principal educators of Galileo and Descartes.

The consequences of this view of nature as both a deductive system nd a moral order have appeared most dramatically when it has encountered ther sources of cosmology in the widest sense. Historians have seen the eepest consequences both for scientific thinking itself and for the otentialities of science in Western culture in encounters at the level f theology. Aristotle's theory of the world as a necessary and eternal manation from the First Cause carried with it the powerful belief that en could discover not only how the world was constructed, but also the ecessary reasons in the First Cause why it must be so and was best so. hen this doctrine was famously condemned in 1277 in Paris, the heologians responsible acted, not out of any special interest in science r philosophy, but in order to defend the Christian (and Hebrew) doctrine f God's absolute, omnipotent freedom as creator of the world. God's

reasons were hidden from men except in so far as he himself had revealed them either by word or by the discoverable, providential design of his creation. The creation as the realm of secondary causes was open to human science, but its ultimate cause was not. Theology so to speak secularized the world. At this time something like the modern conception of "laws of nature" appeared, for example in optics, as distinct from "natural law" as developed by the Stoics with overtones of moral justice. It has been argued that the effect of this defence of divine freedom was to make natural philosophers free to explore hypothetically the possible worlds God might have created. Following this paradoxical liberation there was in fact a burst of speculation, putting the Earth rather than the heavens in motion and postulating infinite space containin other worlds like our own: and the principles of 1277 were later cited in defence of Galileo.

Moral tension in one form or another, sacred or profane, has remained an enduring feature of western intellectual culture. It must accompany any framework that gives meaning to existence and values. Perhaps without it any society would disintegrate in meaningless boredom. Clearly the tension has not all involved science, but the emergence of science as a rational norm in the Western search for universally and exclusively true principles in all regions of thought has made it a notable source of conflicting certitudes. The medieval issues were parallelled in the public controversies and private thoughts that have made Galileo, beginning in his own lifetime, an historical symbol of the conflict of loyalties that can take place both within the minds of individuals and externally in the relation of free inquiry to the habits of society and its institutions. Galileo assumed that freedom to find and state the truth was an established right with precedence in all policy, and in the long run essential for good policy. "In the matter of introducing novelties", the words he wrote during his last Copernican dispute have an obvious application to many later situations:

> Who doubts that the novelty just introduced, of wanting minds created free by God to become slaves to the will of others, is going to give birth to very grave scandals? And that to want other people to deny their own senses and to prefer to them the judgement of others, and to allow people utterly ignorant of a science or an art to become judges over intelligent men and to have power to turn them round at their will by virtue of the authority granted to them - these are the novelties with power to ruin republics and overthrow states ... Be careful, theologians, that, if you want to make the propositions concerning the movement and the rest of the Sun and of the Earth a matter of faith, you will expose yourselves to the risk of being in need of condemning perhaps in the long run as heretical those who asserted that the Earth stays at rest and the Sun moves from one place to another: I say in the long run, when it has been demonstrated by the senses or by necessity that the Earth moves and the Sun stays fixed ... Your doctrines are the new ones that harm, as you want ... to force the mind and the senses

not to understand and not to see ... With novelties you cause great ruins in religion.

Galileo's assumption of the right to intellectual freedom and ruth represents perhaps the greatest moral contribution of science to ıe humane conception of a responsible, rational man. But this moral ɔnception itself came neither from science nor from nature. Galileo ı fact began to make nature something new in modern experience by .smissing its fitness and design as a moral norm. Nature was "deaf ıd inexorable to our entreaties". With this change came also a sys- ɜmatic change in that other guide to the meaning of existence, the .ew taken of time and history.

Of the great originators of civilizations it seems to have been ıe Greeks and Hebrews in the West, and the Chinese in the East, who ıinly found their meaning through history. By contrast the Egyptians ıd Babylonians and the Hindus seem to have turned to the creation of rths rather than to history. It is true of course that every national .storiography has myths designed to influence attitudes and actions, ıt these are something different. In the West a profound change in ıe meaning of history was brought about eminently by St. Augustine ıen he rejected the Greek view of time as an eternal succession of rclical returns, and replaced it by the Hebrew view that cosmological ıd human history fulfilled in a linear time the providential purpose the creation. This conception of the benevolent destiny provided ɔr responsible man must surely have given the evangelical flavour to ıe European sense of mission in science as in religion. The Mechanistic ıilosophers, social as well as natural, geologists and biologists from ɜscartes to Malthus, Darwin and beyond, whose thinking dismissed design rom time and history, inevitably gave the mission of science a rather .fferent flavour. If the order of nature and the order of society ɜre simply successions through time of states of statistical ıuilibrium, and something like this was the whole truth about existence, ɔral values could be regarded only with profound frivolity or profound ɜspair.

Modern science has developed its power to solve problems by its ɜlectivity and by its programme of reduction of more and more classes phenomena to increasingly general theories. In this it has made ɜself explicitly neutral to all values except truth; the aesthetic ıalities of theories must also pass this test. Then if science as the ruest available account of nature offers us no moral guidance, where ɜe we to find reasons for restraint? Most of us as individuals live custom, varied more or less rationally. Science can show us as indi- ıduals and as societies the consequences our actions may have for our ɜll-being or our survival. The risk, alas without fantasy, at which

both our environment and ourselves, the whole biological and human ecology, are put by present technological, commercial and political exploitation is only too well known. But what reasons can be offered to restrain the powerful from doing whatever they have power to do for their own selfish advantage, against nature, against rivals, or against the weak? Why should those with the power not feel entitled to exploit all opportunities? It is a bleak question in the present world, in which the so-called developing, weaker societies are no more virtuous in intention than the developed.

We might look for a way to justify an answer to this very old question in the bearing of the fundamental methods of modern science on our understanding of human nature itself. By its programme of selection and reduction science inevitably eliminates all data irrelevant to its current problems and theories, but these may be the most relevant to existence and experience outside a confident scientific scheme. There are many examples of this in the study of perception. The scientific understanding of human nature built up from biological, neuropsychological and psychiatric theory inevitably falls into the pattern of any general system, which must logically eliminate from consideration each individual's sense of attention, intention, thinking, anticipation, recognition of principles, decision, responsibility. These are irreducible, yet they belong to our experience. Sometimes it seems almost as if in our scientific culture people felt a need to use the discovered regularities of human psychology and psychiatry to deny individual responsibility, to treat all human acts as caused, all sin as sickness, all social injustices as products of the system. Why should we believe this about evidently healthy persons? It lacks both truth and humour. Would we really expect a sophisticated savage, bureaucratic, technological or raw, caught in the act of pollution or aggression, to plead diminished responsibility except as a device?

It is as if the whole of modern industrial society was in the grip of a vast theory, a reflection of the specific rationality of science, gearing its programme of selection and reduction to the competitive acquisition of material advantage and power. It is no accident that rational science and rational power have arisen together in the experience of nature. But must we accept the committal of our society, whatever the political system, developed or developing, towards this single goal? The specific rationality of science, mirrored in industrial society, has imposed on free men the need to recover and retain the responsible decisions from which the individual is eliminated by faceless organization. It seems that human life is not all comfortable; it seems that the price of freedom is vigilance. Obsession with power and achievement is only one expression of science; and science is not the

nly way our culture relates itself to nature and existence. We can
iodify and multiply our rational choices as long as we are alive.

The most difficult choices are as always not simply between good
ınd bad, but between various combinations of good with bad. Science,
›y liberating mankind from a purely biological regime of existence, of
:ood, disease, energy, transport or whatever it may be, has made these
lifficult choices part of all practical life, whether in medicine or
ın industry. How fortunate we are to be able to choose! And how better
ıay I conclude these moral thoughts on truth than by quoting the words
ıddressed by Monkey to his future subjects when he claimed the Kingdom
›f the Mountain of Flowers and Fruit: "Gentlemen! With one whose word
:annot be trusted there is nothing to be done!"