

SCIENCE: SERVANT OR MASTER?*

PROF. M. ELAINE BOTHA, *Department of Philosophy, PU for CHE*

ABSTRACT

The so-called omnipotence of modern science and technology rests on fundamental convictions and views regarding their basic nature. The mythical claims as to the demonic or magical role played by science in society are strengthened on the one hand by the scientists, and on the other hand they find an easy access to a "lay" public. The belief in the omnipotence of science leads to a belief in progress which, in the context of the modern science and technology which have been "freed of values", is endowed with the role of saviour in a world devoid of mysticism. For the practice of academic and intellectual stewardship in the allocation of a legitimate but limited role to science, one of the primary pre-requisites is the demythologizing of the over-extended expectations cherished of science as an idol of progress.

When future generations look back on our day, they will envy us for having lived in an age of brilliant achievements in many fields, and not the least in science and technology. We seem to be at the threshold of basic knowledge concerning the origins of life, the chemical elements and the galaxies. We are near an understanding of the fundamental constituents of matter, of the process by which the brain works and of the factors governing human behaviour. We have launched into physical space and have begun to see how to conquer hunger and disease on a large scale. Not only is scientific knowledge applicable to a wider range of ideas, but it is also growing quantitatively to such an extent, that it dominates human life. (Holton, 1964). In the light of these developments it is appropriate that searching questions are now asked about the function and place of this lusty giant. Views about the place of science — as it is, or as it should be — differ. Some writers argue that science is claiming too much of our allegiance and requires too much sacrifice on the part of the public. Others argue that science has never really been appreciated the way it ought to be. Science, we would all agree, is not a simple matter. This is backed up by the fact that scientists both in the natural sciences, social sciences and humanities, need many years of training. Yet, when we are confronted with the complexity of a world dominated and determined and even manipulated by science, we often act as if it would be possible to come up with simple and instant

* Title from the book of Hans J. Morgenthau.

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solutions. A century ago the Swiss historian Jacob Burckhardt foresaw that ours would be the age of the great “simplifiers” and that the essence of tyranny was the denial of complexity. When dealing with the problem of living in a scientific world, this has to be kept in mind: Science is complex, its marriage to technology is even more complex and the way it has determined our lives and our values, is not easy to unravel. The problems produced by the interrelationship of these mammoth powers have confronted modern man with challenges so complex and overwhelming in scale that their individual and practical solutions seem to recede in a fog of political and economic constraints. The major problem in which this interrelationship of factors has surfaced has been the energy crisis and the fuel problem. A commodity that the majority of people has taken for granted over a long period of time, has suddenly proved to be the most vulnerable aspect of the modern industrialized world. The effects that this crisis has had on the economies of the world and the lifestyles of people has proved how fragile the chain of interrelated factors are, on which many have built their future.

These developments seem to be symptomatic of an identity crisis of the Western world, one in which the most important belief of the value and belief system of modern society is breaking down and is giving rise to questions concerning the validity of its basic assumptions. Modern man seems to have learnt to live according to a certain “image” or belief in science and this belief has been betrayed. This basic belief is the belief in *progress*: one of the idols of our time. Historically this belief has become interrelated with two other major factors which have developed as dominant cultural factors in modern society, technology and the power of human organization (Van Riessen, 1971). Perhaps the manner in which the majority of people have experienced the presence of these major factors in their lives, is in the form of negative forces, such as e.g. bureaucracy, technocracy and scientism. Fundamentally, these distorted developments represent the power of organization, technology and science in human life. Evidence for this statement can be drawn from the everyday experience. It is incongruous that it is possible that highly computerized airways can actually be helpless in the face of one pistol waving terrorist, or just ponder the powerlessness of trying to track down a responsible person or agency in the maze of any modern bureaucracy. Technology has enriched human life, that is clear, but it has also enslaved it. This demonic hold of the power of human cultural endeavour becomes clear when the manner in which science has influenced human life through the religious motivating force of scientism, is considered. Science seems to have provided modern culture with a whole host of religious images and idols which have acquired

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tremendous influence in human life. The purpose of this article is an attempt to come to terms with some of the underlying convictions that have propelled science in such an anti normative direction. This will be done by analyzing a few of the basic assumptions that have influenced our culture and have determined what the role of science and the authority of science will be in such a scientized culture. It is possible to identify various basic images that are generally formed concerning science and that will assist the process of analysis in order to discover some of the basic assumptions of scientists.

PERCEPTIONS OF SCIENCE:

When dealing with various perceptions concerning science, its nature and role in society, it soon becomes clear that science, scientists and academic institutions cannot be held solely responsible for the strange images and beliefs that are held by the public about the demonic, or magical role that science is believed to play in society. Of course science has contributed to these myths, but the lay public is very susceptible to the mythical claims of an overrated scientific enterprise.

Holton (1964) distinguishes seven basic images that are generally formed about science:

- * Science is regarded as the endeavour through which the mind finds truth and by which tools are found for effective action. This identification of scientific truth with *Truth*, is one of the general fallacies about science.
- * A second longstanding image of science is that of the scientist as iconoclast. Almost every major scientific advance has been interpreted — either triumphantly or with apprehension — as a blow against religion. To some extent science was pushed into this position by the tendency to appeal to God to solve the unsolvable riddles of science. In this fashion God functioned as “a God of the gaps” with the result that whenever science made any real advances in the direction of solving this apparently unsolvable riddles, it was interpreted as a blow against religion! The advance of knowledge therefore inevitably brought about an apparent conflict between science and religion. Gradually it became clear what a large price had to be paid for this misunderstanding of both the nature of science and the nature of religion. To base religious beliefs on an estimate of what science cannot do, is as foolhardy as it is blasphemous (Holton, 1964, 180).
- * The third image of science is that of an evil force which can invade,

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Possess, pervert and destroy man. According to this view scientific morality is inherently negative. This image is often strengthened by the way in which scientific knowledge is applied in technology. The fact that the fruits of science are often very effective, available in massive quantities and easily distributed, has brought about an inescapable human dilemma: mankind is tempted to reach out for the fruits of these developments yet are aware of the fact that it is not quite sure that it is able to cope with the effects of these fruits in human and societal life. This dilemma can most probably no longer be resolved, and this increases the anxiety and confusion concerning science. A current symptom of this dilemma is the popular identification of science with the technology of super weapons. Moreover these choices that have to be made by scientists are embedded in a social, economic and military setup in which the final control is not in the hands of the scientists any more, but in the hands of those who exercise political control of society.

- * Where the last two views held that man is inherently good and science evil, the next image is based on the opposite assumption, i.e. that man cannot be trusted with scientific and technical knowledge. Science, seen as indirectly responsible for the power of man to destroy the world, is regarded as ethically neutral. The solution to this problem is then sought in calling a moratorium on the development and implementation of science until mankind has somehow developed resources to deal with this evil personality trait. Ironically enough there are many who expect that science will eventually also provide the answer to this problem of human evil by providing sufficient insight into the causes of war and aggression amongst men.

- * Another prevalent image of science holds that while neither science nor man may be inherently evil, the rise of science has brought about disastrous changes and consequences. Apart from ecological effects of science, it has led to a corrosion of values and consequently to relativism. This image represents a position of revulsion towards science or a critical attitude which blames science for the development of a relativistic attitude towards values.

- * Because of the semblance of omnipotence that science has acquired and because of its intrinsic lack of limitations, science is often regarded as a magical force which is in principle able to do anything. The attitude towards the scientist and science on this plane ranges from terror to sentimental subservience. This attitude of uncritical reverence towards science and its theories adds to the limitless power of science in modern life.

- * The abovementioned influence can also be related to the phenomenon of *scientism*, an addiction to science and its results. Perhaps the most salient symptoms of this attitude is the tendency to divide knowledge into two categories: science and *non-sense*; or the view that the mathematical sciences

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and the large research laboratory offer the only permissible models for successfully employing the mind or organizing effort and the identification of science with technology (Holton, 1964, p. 185).

Science has departed from the small setting of the individual research worker with a small group of colleagues and students to the point where it has become part of the big industry, military and political complexes, with the result that it is difficult to ignore the results of scientific research. Big organizations and big money disseminates the results of research to such an extent that society is succumbing to the temptation to make science and its insights, values, fruits and ruling guidelines of human life.

From this list of current perspectives on science it is quite clear that we are dealing with a factor of such significance in human life, that it is imperative to analyze those dynamic spiritual forces which motivate the scientific enterprise and also to demythologize the omnipotent and often demonic powers which this force has acquired in modern technological society. This implies harnessing the creative powers of the human mind, capturing them to make them obedient to what should ultimately guide all human endeavour viz. the motive of the dynamic rule of God in this world. In order to do this, we need to know why science has acquired these mythological dimensions.

SCIENCE: THE MOST POWERFUL MYTH OF OUR TIMES

One of the reasons for the power of science is the fact that it represents a type of knowledge which differs fundamentally from other types of knowledge. Where *factual* knowledge guides human practical life and makes it possible for human beings to apply their knowledge to a diversity of practical purposes, scientific knowledge is pre-dominantly systematized knowledge aimed at uncovering the regularities which govern phenomena. This type of knowledge is always interested in generalities and not in a specific instance, event or happening and is usually formulated in universal statements. Scientific theories aim at universally valid statements concerning the regularities that regulate natural and human phenomena. It is exactly this pretentious type of claim which is an intrinsic part of the scientific endeavour which provides it with the aura of omnipotence and infallibility. When this claim is further enhanced with the qualification that it is "objectively true", neutral and valuefree, it is very difficult to oppose the claims made in the name of this powerful giant of modern culture. This approach argues that the scientist ought not be completely cleansed of any

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bias, preconceptions and prejudice that he might have about the facts that he observes and that it would be possible for him to come to dependable and certain insight concerning the world by means of pure and uncontaminated observation. The so called “brute facts” would be provided by this pure and uncontaminated observation and then scientific theories would be constructed to try to explain these facts. Because of the phenomenal success of the natural sciences in explaining the regularities governing natural phenomena, it was assumed that the same would be possible in the social sciences and in this way whatever statement was qualified by the adjective “scientific” became synonymous with certitude, truth and even sometimes infallibility! Why would this way of looking at the world develop into one of the most powerful myths and images of our times? Van Riessen (1971, p. 217) claims that the sterile scientific method which abstracts from the concrete situations of everyday life, comes up with theories which attempt to formulate universally-valid laws. They acquire a coercive power over human life and because they are the end products of a scientific method which claims to be value free (but of course is not actually value free) they project the attitude of “scientific secularism” into the products of science and so penetrate the world under the guise of “objectivity” but actually laden with the values of secularism. It is a twentieth century scientist who observed that modern man may have succeeded in emancipating himself from his belief in the magical powers of the supernatural agencies only to plunge in the magical powers of science... “a belief that precise measurement and prodigious calculation will lead not only to widespread human happiness... but to a knowledge of ultimate reality, which the philosophers have vainly sought through the ages” (Andarde, 1957). This is the faith in science which has become such an integral part of our modern lifestyle and culture, that the revelations made in the name of the goddess of science, are seldom doubted! This has given rise to the dogma of *scientism*.

THE DOGMA OF SCIENTISM

When a white robed scientist momentarily looking away from his microscope or cyclotron, makes some pronouncement for the general public, he may not be understood, but at least he is certain to be believed. The statements made by scientists are seldom doubted. Statesmen, politicians, industrialists, ministers of religion, civic leaders, philosophers are all questioned and criticized, but scientists ... hardly ever! Thus the world is divided into scientists, who practice the art of infallibility and non-scientists — sometimes called laymen — who are taken in by it. They see the marvelous things that science has done and is impressed and overawed by it.

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To a certain extent this attitude of the non-scientist is understandable and also legitimate. Science has given mankind many wonderful things, penicillin, radium and other treatments for cancer, to mention only a few of the most impressive discoveries in the medical field. One's first response towards science is usually positive. Yet, it is exactly this naïve and uncritical attitude towards science which is characteristic of the modern dogma of scientism (Standen, 1950). It means more than the cult of quantification; it implies a naturalistic world view in which man, nature and society are seen as "objects" which can be understood primarily by the methods of physics. This dogma originated in the philosophy of Descartes in the seventeenth century and had as one of its dominant assumptions the deterministic and mechanistic view of the universe, man and society. The legacy of Cartesianism historically blended with the legacy of the empiricist and the positivist tradition to bring about one of the most fundamental beliefs characteristic of modern science: The doctrine of neutrality and value-freedom.

A strange anomaly is built into this conception: It states that the scientific enterprise should be free from the contamination of all possible bias, prejudice and value judgements and religious and political beliefs. This implies that the scientist is called to shed all these commitments and convictions before he enters the laboratory or the study; yet when he leaves his laboratory, then the public seem to be quite satisfied that he may now speak authoritatively on all possible and impossible questions in the name of science. His "beliefs" are then regarded sacrosanct and therefore beyond questioning. This "one way attitude" in which political and other beliefs are supposed not to be present in or influence scientific attitudes, but the scientists are allowed full reign in the other direction, is illustrated by the power of the *public opinion poll*. One of the foremost spokesmen of a positivistic and behaviouralistic approach in the social sciences, Lundberg, argues quite explicitly, that the scientific salvation of society consists in the elimination of politics in favour of the administration of public policies drawn up by the social scientists and validated by scientific techniques. Foremost amongst these techniques is the already mentioned public opinion poll. This technique is acclaimed to be the solution of the impasse brought about by the conflict between authoritarian control on the one hand and the public will on the other hand. The public opinion poll, Lundberg argues, can bridge this gap, by substituting the whole antiquated democratic procedure with a scientific substitute. It would also replace the whole range of political choices and decisions with scientific diagnoses and decisions (Matman, 1966, p. 73).

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This is just one minute example of the way in which we are brainwashed into believing the so called neutrality of science. What is actually happening, is the following:

Science is elevated to a realm free from values;
Under this guise of neutrality and objectivity it is then given entry to all aspects of society.
Once it has acquired access to an area or a realm of society it claims that it ought to have the final and decisive say — once again on the basis of its so called objectivity and neutrality.

What has actually happened in this process is of course the fact that one set of commitments and beliefs (political in nature) have been supplanted and replaced by another set of commitments and beliefs. Because these commitments claim to be scientific they are often not questioned by the public and accepted uncritically. An important reason why science is given this important position is because it is believed to implicitly embody *progress*.

SCIENCE AND THE IDEOLOGY OF “PROGRESS”

Peter Shoulls* argues that the specific connotation of progress being synonymous with science, dates from the period after the Middle Ages. Each age, Shoulls claims, seems to institutionalize its own concept of progress. The modern notion of progress which has become part of modern man's terminology, dates from Descartes (Cf. Obitts, 1973). In the modern era Descartes provides us with a well defined and clear criterion of what ought to be regarded as “progress”... Science is viewed as the means by which it is possible to bring about progress and through progress also human happiness. Shoulls claims that Descartes argues as follows:

Human reason can come to clear and distinct understanding of reality. Human reason is the only reliable point of departure in our relationship to the world. Human reason provides us with clear and distinct insight into truth. Truth is arrived at by means of the rational method. Science provides

* Lecture given to the Philosophy department at University of Alberta, Edmonton, Canada, 1981.

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certitude and therefore guarantees progress. Prejudice is characterized by a lack of clarity (obscurity). (The sequel of this argue is of course that the mind has to be cleared of all these obscurities (prejudices) in order to come to clear insight.)

This implies that there is no possibility to have different points of view about any matter. There is only *one* correct view about a matter and that is the *scientific* view, which is reached by means of the *rational* method. Once man is equipped with this rational, scientific knowledge, he is able to master and control nature. This takes place through the application of scientific insights in technology.

The sequel of the argument is now clear:

- Human reason can acquire clear and distinct insight.
- This knowledge is indubitable.
- Application of this knowledge, which is truth, is “good”.

This was one of the most important images which lie at the philosophical roots of our modern idol of progress. What, of course, is in need of explanation is how this very important image which lies at the philosophical roots of the modern Idol of progress, become a *faith* in progress?

Faith should be understood as a propelling, all-embracing vision, which direct persons in everything they feel, think or do. When images from the world of science or of philosophy are absorbed into the basic elements of a world view, then it inescapable influences the architecture of human society, its values and basic beliefs. The important developments of the 18th century, especially the natural scientific insights of Newton and others, gave rise to the conviction that these developments were the outcome of human reason and would inevitably lead to progress in all areas of human life. It was also simultaneously infected with a few other elements of Enlightenment thinking, viz.:

- * A strong anti-Christian attitude in which reason and faith were seen as opposite poles.
- * The paradise image of what science would eventually bring about.
- * The ideals of social improvement.

The idea — the image of progress — became an *idol* of progress, a religious conviction and choice which indelibly put the stamp on the mind and

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actions of people. Modern man learnt to live by faith; faith in progress, hope in progress and love for progress. Progress has concretely conjured up the image of a society which will inevitably lead to social amelioration and even moral progress through the implementation of human knowledge and the application of technology. Unfortunately these projected and expected developments will depend on the development of the productive forces in society: capital, labour, stable political systems and of course the availability of resources. Now that one important link in the chain has been heavily strained and taxed: the availability of energy, the whole edifice of this belief system seems to have been jeopardized. A sample question could illustrate this. If progress depends on standard of living and that is measured by the ownership of motorcars, then how will the world sustain a billion private cars? If it cannot, society is doomed to permanent gross inequality or to a sharp decline in the standards of the West. For with some five billion people we have a billion families, who more or less would be refused the right of car ownership. Which ones ought to be refused? Neither prospect — permanent inequality or decline — is attractive, but who can see another? (Ravetz, 1980, p. 89).

This belief in progress seems to be a self-perpetuating cycle:

Faith in progress gradually leads to the identification of progress with material well-being. Progress implies the application of science and technology. Technology it is assumed, would lead to more possibilities of production. Production would bring about more consumption. Consumption inevitably leads to economic growth (so it is believed). Economic growth can be stimulated by cultivating “needs”. Awareness of needs are raised by advertising. Advertising in its turn, appeals to the notion of progress to stimulate consumption! This has led to the exploitation of the earth, to pollution and to the creation of destructive nuclear weapons which are to be employed in the defence of the world. It is clear that the ecological crisis has been one of the constant companions of the notion of progress. This crisis has been widely discussed by both the so-called Club of Rome intellectuals (Meadows, 1981), who prophecy doom and their opponents who claim the one should expect the solution of this ecological crisis from science itself. Yet, it was exactly the application of science unlimited that led to the possibility of the leak at Three Miles Island. In spite of modern man’s elevated image of science, it seems to have become one of “the gods that failed us” (A term borrowed from Arthur Koestler). One important reason for this collapse in the faith in science has been the discovery that science was actually misleading society under the guise of value freedom.

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THE DISILLUSIONMENT OF LIVING IN A SCIENTIFIC WORLD

Although science pretended that it was value free, it had values tucked into each one of its premises and many of those premises were of such a nature that they ruled out the possibility of ever coming to any theoretical understanding that the world man lives in is God's world. Other factors have also been instrumental in this process. One of these factors is the ambivalence of science. The titles of many books dealing with modern science testify to the fact that science seems to be imbued with this ambivalent nature. *Science: Servant or master?* (Morgenthau, 1972), and Jacques Ellul's *New Demons* describe science as a phenomenal force in modern society, which is being implemented for both good and evil purposes. Van Riessen (1971) gives a valid explanation for this strange characteristic of science and for the fact that it has acquired such a formidable position in modern society. Modern secularized culture, he claims, has acquired the image of self sufficiency. It gives the impression of having developed to a position independent of God. The powers of modern culture, he argues, of which science and technology form the most important driving forces, seem to have come of age, they appear to have no need for God and faith. This semblance of autonomy and independence functions in society. It permeates society like a ferment, gives it a "lift", but also inflates it with faith in itself and especially its own intellectual and technological powers. Just as inflation in the economy means that the level of productivity and output is not equal to the amount of money in circulation, and the money itself has become valueless, so it is also the case with the scientific mind-set. Science has created an image of man-independent-from-God. It claims to be able to provide the guidelines for a new society; it even succeeds in verifying this claim, yet in the long run, it fails to live up to its own claims. On the one hand science seems to be able to create new worlds, yet at the same time and by the same token it has become competent to destroy the world it has created, through nuclear weapons and pollution and the exploitation of energy and the creation of technological instruments for the effective exercise of totalitarian controls (Morgenthau, 1972, p. 5). The final decisive question that these developments pose is how the Christian and especially the Christian scholar is to cope with the spiritual motivating forces that propel science.

THE RESPONSIBILITY OF THE CHRISTIAN

Perhaps one of the first and most important tasks is one of discerning the spirits i.e. of understanding how science and technology acquired this immense

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influence in the life of modern man and how this image of science was actually predicated on the idol of progress. The demythologizing of both the inflated expectations of science and the idol of progress is absolutely imperative.

The prevalent conceptions of the nature of science also have to be cut down to size. Amongst other things this implies a reduction of the claims of science that it can provide man with full truth about the world. Its conception of truth needs to be relativized. The ideas of neutral, negative or positive science have to be weighed very carefully. Because it is the product of the human intellect science cannot be neutral, but it is also *both* negative and positive — it is a mixed bag and this character of science needs to be acknowledged in order to limit the expectations that are held about science (Van Riesen, 1971).

Perhaps the most virile antidote to a distorted view of science is one in which science is appointed its legitimate, but limited role in the life of man, against the background of the fact that science — like all other forms of human endeavour — have a task of stewardship of God's creation. Being an academic and intellectual steward and implementing these stewardly insights, imply a vision of the world being God's world. The consequence of this is clear: Science is a servant — of God and His coming Kingdom; science is a master — of the God given responsibilities given to man by God, who has called science to render service to the progress of the coming Kingdom which might at times even imply the need to curb progress and economic growth for the sake of the stewardship of His earth and His people.

BIBLIOGRAPHY

- ANDARDE, E.N. de C. 1957. *An approach to modern physics*. New York: Doubleday Anchor.
- HOLTON, Gerald. 1964. Modern science and the intellectual tradition. In: Arons, ARNOLD B and BORK Alfred M. *Science and ideas*. New Jersey: Prentice Hall.
- MORGENTHAU, Hans. 1972. *Science: Servant or master?* New York: New American Library.
- MATSON, Floyd W. 1966 *The broken image: man, science and society*. New York: Doubleday Anchor
- OBITTS, Stanley, 1973. Descartes, Kant and the development of science. In: Hatfield, Charles ed. *The scientist and ethical decision*. Downers Grove: I.V.P.
- RAVETZ, Jerome. 1980. The scale and complexity of the problem. In: Shim, Rober L., ed. *Faith and science in an unjust world; report of the World Council of Churches' Conference on faith, science and the future*. Vol. I. Plenary presentations. Philadelphia Fortress Press.
- STANDEN, Anthony. 1950. *Science is a sacred cow*. New York:
- VAN RIESEN, H. 1971. *Mondigheid en de machten*. Kampen: Kok.