

A. Vibert Douglas

"The Social Significance of Science"

86.

Loc 2303.9

Box 4

File 7

The Social Significance of Science

I

Throughout the centuries science has been one of the major influences moulding the course of civilization. That it has increased man's control over his environment is so obvious as to need little elaboration. From cave dwelling to modern skyscraper, from primitive cart or dugout to airplane, from roots, berries and the skins of animals to synthetic foods and fabrics, from the resonant boom of percussion on a hollowed log to radio and television, the changes in man's environment and range of activities have been due to the application of simple or of less simple scientific principles.

The growth of knowledge which has resulted in establishing these principles is an inspiring record of seeking, searching, observing, finding, testing, modifying, confirming, discarding and then trying again and yet again. The challenge of the unknown has called forth many of the noblest characteristics of the human mind and spirit. It has required intuitive insight, winged imagination, indefatigable patience and creative ingenuity both theoretical and practical. It has demanded unflinching self criticism, deep faith in the worthwhileness of truth seeking, and integrity both of motive and of method. "High faith in honesty" is the hallmark of the scholar.

These great qualities have not been the sole possession of the scientists, but in no other scholars nor in artists, nor in any other group of men, have these characteristics been more pronounced. Indeed the scientist through the centuries has set an unparalleled example of singleness of purpose in truth seeking.

Science has moulded man's physical surroundings; it has also influenced his mental and spiritual environment. Trevelyan has described "the easily terrified imagination of primitive man". Writing of the Britons of the Roman occupation he says, "every spring, wood, river and hill was haunted by named or nameless spirits, to be worshipped, propitiated, and at fall of night avoided. Such very ancient gods and the fear of them were strong with the strength and terrible with the terror of the untamed, all-enveloping wilderness." Two influences have worked against this primitive dread of unseen and unknown evil - one is faith in an omnipotent God of love and light, the other is science.

It is only against the background of man's unreasoned dread of evil influences and in the mysterious forces of malevolence/of nature that the full miracle of the power of religious faith to dispel fear can be appreciated. Passages of calm assurance such as are contained in Psalm 23 or 46 or 91, written over 21 centuries ago, are an amazing revelation of the reality of this power. But it is science that has made the light shine to banish the darkness of ignorance and superstition and all the unreasoned fears to which they give rise. Science has thus been a great liberating influence with its appeal to the intellect, to common sense, based on a rational interpretation of more and ever more of the phenomena of the world in which man finds himself - a world of vastness inconceivable, of complexity, of beauty, of endless change but of ordered change, a cosmos not a chaos, a universe of which he is himself a part. Chemistry has displaced alchemy, astronomy has discredited the superstitions of astrology, meteorology can forecast storms so that warning signals can be flashed over continent and ocean, the biological and medical sciences can fight and to some extent prevent disease with increasing effectiveness and understanding, psychological science can throw considerable light upon the problems of personality and into the deep recesses of the mind. And through ^{recognition of} its own limitations, ^{science} ~~it~~ directs attention to the vast realm of spiritual experience - the realm of religion.

The point may therefore be made with justice that, far from being deadly enemies or even rivals, true religion and science have been co-workers in the long struggle against fear that is born of ignorance and superstition.

The tragedy of many centuries has been that too often religious leaders have themselves succumbed to fear in the face of the new truths which science was bringing to light; and that too often there have been philosophers or disciples of the great men of science who have misinterpreted new scientific ideas, drawn unjustifiable, sweeping conclusions about the all-sufficiency of science to the apparent discrediting of things spiritual. Thus both religion and science, in their respective wars upon fear, have been less successful than they should have been.

Religion and science must fight fear side by side with mutual respect and trust, like the Great Twin Brethren who turned the tide of battle against the evil Tarquins,

For there are black Tarquinic evils in the world today which neither religion alone nor science alone can overcome. But if religion and science complement one another and stand together, they can overcome the darkness of individual fear and ~~prevent a~~ ^{prevent a} whirlwind of mass hysteria ~~which could drive the world into the calamity of another war.~~ ^{which could drive the world into the calamity of another war.}

II

The fears which grip many people in many countries today, are largely the result of two things. Some sociologists have transferred the emphasis of basic importance from the individual and his essential value, to society or mankind in the mass. Thus the state ceases to be servant to the people. As soon as the individual finds himself servant to the state, a cog only in a vast inhuman machine, his freedom is diminished and he is a prey to fear of the future, since his own destiny is less and less in his own hands and his dignity as an individual is largely denied. Professor A. Boyce Gibson has called this "a new philosophy of life - the philosophy of collective man.... [it] regards the human person as a means only; in the name of humanity, it rides roughshod over men." No wonder there is fear in men's minds.

A second ground for fear today is the spectacular acceleration in scientific advance, and the harnessing of atomic, chemical, bacterial forces to the destructive purposes of war. The technical achievements in engines of war, bombs and bombers, guided ram jet missiles, proximity fuses and new under water craft, all aimed at the destruction of ones fellow men and their works, are indeed enough to explain much of the ~~panic~~ ^{alarm, restlessness and cynicism} that ~~are~~ ^{are} widespread.

From every side one hears the blame for the world's present day evils directed against the scientists: they are to blame for the spread of materialism and the lowering of ethical standards; they only are responsible for the devilish inventions of modern warfare; they will not be content until they have blown up the world.... so run the comments.

Being untrue, all such statements and the frame of mind from which they arise are potentially very dangerous. Let us not forget nor allow the public to forget that we

owe the victory of 1945, our freedom, and quite possibly our lives to the scientists. All the courage, the heroism, the self-sacrifice of army, navy and air force could not alone have saved us from defeat. Good and evil exist side by side in the world, and everything, including the fruits of science, can be used constructively or destructively.

But it is not the free choice of the scientists to expend their finest efforts on the destructive applications of science. When they do so, it is because of the pressure of the society to which they belong, a pressure which harnesses every potential resource throughout the state in a vast effort of self preservation or of national aggression. If it be for the latter purpose, the scientist has the choice of cooperating or of being branded a traitor and suffering the consequences; if it be the self preservation of a state threatened by a ruthless aggressor, the scientist can play the part of a conscientious objector if he wishes, but he is more likely to accept the tragic necessity of turning his energies to the problems of survival which include both defense and attack.

The great advances made by scientists under the stress of war necessity can happily be turned to constructive ends in a peace time program. This is true of atomic energy, of aeronautics, of radar, of rockets, of ~~many~~ medical and surgical discoveries. The future welfare of mankind is immeasurably more hopeful than it was before these discoveries were made. But the realization of this welfare depends largely upon the wisdom of our spokesmen at the United Nations and ^{upon} an informed dynamic public opinion throughout our countries. In this social order scientists have a significant part to play - and they must play it not only as scientists but as scientists who are active citizens.

immediate and the long range effects
The ~~restriction~~ of exaggerated secrecy born of fear ~~are~~ obvious and very disturbing to the scientist. Science stagnates in an atmosphere of secrecy; it flourishes in freedom, not only national but international freedom. Restrictions upon the free interchange of ideas, denial of the right of all peoples to the new knowledge arising from man's great international heritage of the accumulated knowledge of past centuries, are dangerous - they breed distrust, suspicion and fear. These form a vicious spiral of increased distrust, still less freedom, yet more suspicion, and eventual war is the dire consequence. Scientists everywhere should be working for freedom and for strict intellectual honesty.

These together with the international cooperation born of fair play and kindness are the only bases on which peace can be maintained - the sort of peace which makes disarmament practicable. An armed truce is not peace.

III

Many able men have expressed their views in no uncertain terms on the social significance of science. A few quotations follow. The names of these authors carry weight.

L.A. Du Bridge, Director of the Radiation Laboratory, M.I.T. - "Science must be free ...free exchange of ideas and free discussion...freedom from controls and restrictions... freedom from direction and so-called planning from above...In November 1945 and henceforth, secrecy on basic scientific matters is not only unnecessary but it is dangerous. It is unnecessary because the facts of nature cannot be hid...It is dangerous because it interferes with our own scientific progress, gives a false sense of security, and endangers international good will and understanding."

The Editor of Nature reported on a lecture delivered at Yale by President J.B. Conant - "Man's power over Nature is obtained only by studying and using the facts, and the facts will not consent to adapt themselves to fit a man-made theory...We should consider the problem of the relationship between the intellectual and the spiritual sides of man's life, between the science of acquiring knowledge and the art of using it....Man's material advance has outstripped his spiritual progress...could anything do more to help recapture moral control than the universal recognition that physical science belongs in essence to the humanities."

Lord Goyo Orr, whose food surplus proposal was turned down by the U.S.A./in the UN, in 1946
a refusal which, according to a recent editorial writer, may have more disastrous consequences than many Security Council vetoes - "There is no hope of peace until mankind frees itself from superstitions and inherited beliefs, looks at the facts as they are, and seeks to adjust the structure of society so that the great powers that science has given us might be directed towards beneficial instead of destructive ends...This new age with modern science might be a great age, freeing man from physical poverty and his mind from

ignorance and false beliefs...creating a new faith in mankind itself."

Vannevar Bush, president of the Carnegie Institution and first chairman of Research and Development Board of U.S.A. Department of Defense - "I believe first that the Technological future is far less dreadful and frightening than many of us have been led to believe, and that the hopeful aspects of modern applied science outweigh by a heavy margin its threat to our civilization. I believe, second, that the democratic process is itself an asset with which, if we find the enthusiasm and the skill to use it and the faith to make it strong, we can build a world in which all men can live in prosperity and peace... [another war] need not come if we realistically enough and with enough determination resolve that it shall not...if we learn to make our democracy work... [if] we believe in human dignity and human freedom...can submerge selfishness and petty motive, make our way of life function with true effectiveness for the good of all."

David E. Lilienthal, chairman of the U.S. Atomic Energy Commission, 1946-49 - "The purpose and atmosphere of science and technology must be moral. Science is not simply a body of knowledge, it is a thing of the spirit. It is the spirit of adventure, the urge to know what lies beyond...a way of thinking...a faith in the power of knowledge, a deep conviction that the truth can make men free...that man's hopes lie in expanding the area in which reason, not arbitrary force, directs his destiny and determines his relations to his fellow men the world over...Greater knowledge about the world...greater love and understanding among men...greater faith in humankind and in the purposes of the Creator of the Universe. Knowledge, love, faith - with these three the Atomic Age, the age in which we live, can become an age of mercy, of joy and of hope, one of the blessed periods of all history."

Lord ~~Chakland~~ Geddes, professor of anatomy, soldier, cabinet minister, ambassador, chairman of the Rio Tinto Co., London - "I have never submitted to the idea that wars are economic in their real origins. There is always some obsession in the background...The cause of war is mass insanity as a result of which some objective becomes so overwhelmingly important in the imagination of a community that all other interests and all others' interests are as nothing in the balance."

Sir Richard Gregory, F.R.S. - "The spirit of human brotherhood will never be established by a single religion, but with this ideal as the driving force of them all. It is the essential factor of all international equations...Both science and religion can cooperate in this humanistic service, each in its own field and in its own way, yet united in their endeavours to attain high ideals by works as well as by faith. These are the influences which have affected the course of civilization and the progress of the human race..."

The problems facing mankind are very complex, the dealings of man with man, the attitude of nation to nation. No solutions making for international good will and world peace will be achieved by men of narrow mind, myopic sight and dwarfed soul. Faith in mankind, far vision in time and space, the winged imagination that leaps the barrier of here and now, knowledge of the best in the past, comprehension of the needs of the present and the possibilities of the future - these are the qualities of mind and spirit needed in every walk of life and needed superlatively in the leaders of the nations. The man of science must play a larger part in mass education, he must endeavour to bring into all the affairs of his community and nation his standards of freedom and integrity, and the ideals, aims, and methods of the scientific approach to facts and problems.

The misuse of science drives home with bitter and tragic intensity the truth of the words of Rabalais, "Science without conscience is damnation". Science is not unique in this context. The moral and intellectual level of a whole people is on trial. If men of science be not stifled by cramping restrictions, if they keep close touch with ethical principles and lose not sight of moral values, if they hold fast to their incomparable standards of integrity in truth seeking, then when the history of the next 500 years comes to be written, amongst the most important chapters will be found those on the social significance of science. It should and can be a noble record.