**Social Understanding of Science**

Scientists are primarily moved by curiosity, by the passionate desire to know how things happen in life and Nature and secondly, by the desire to use this knowledge for human welfare.

Nobody can deny that science has rendered invaluable service to mankind in various spheres. It is due to the discoveries of science that we have been able to find a cure for most diseases and prevent the outbreak of epidemics, thereby vastly increasing life expectancy.

The most valuable service which science has rendered to mankind is that it has given it **supreme self confidence**. It has given man the assurance that, instead of being a slave to his environment, he can control and modify it to suit his needs. Before the scientific era, an agriculturalist eked out a precarious existence, his livelihood depending upon the vagaries of the weather.

Insect pests, locusts, drought devastated his fields. Now we have built huge dams to supply waters through perennial canals, manufactured fertilizers which enormously increase agricultural production, produced ef­fective pesticides, learnt how to prevent soil erosion, introduced multiple cropping and devised other ways to improve output.

Population control would still be needed if food production is to keep pace with the growth in numbers, but the spectacular progress which scientific cultivation has made possible in the field of agriculture has belied all Malthusian fears. Progress in the industrial field has been even more spectacular, thanks to the application of science to industry.

The world, particularly the developed part of it, now enjoys a standard of living which in former ages was not even enjoyed by the wealthier classes. The higher standards of living have made it possible for the governments to provide the social services on a liberal scale.

**The machine** has not only relieved man of heavy burdensome tasks, but has also provided him with **ample leisure** in which he can engage himself in cultural pursuits, cultivate various kinds of hobbies and travel. It is through science that he has been able to invent new sources of entertainment and education, such as cinema, radio and television.

The enormous popularity of these sources of entertainment proves how useful they are to mankind. Before the invention of the printing press, education was confined to a small section of the community and was of a predominantly religious character. The printing press revolutionised the art of publication and brought books, periodicals and newspapers within everyone's reach.

**Democracy** would have been impossible without the printing press. The modern media of mass communication are another fruitful source of education. are being spent on manufacturing weapons of mass annihilation and space exploration, the affluent nations are not prepared to help developing nations on a scale which would make a significant impact on their lives.

Many civilisations in the past perished because the people recklessly exploited natural resources, exhausted the soil and turned the land into a desert.

Impelled by the profit-motive, nations are still recklessly exploiting world resources without giving any serious thought to what would happen a few hundred years hence. When we know that man has to live on this planet for millions of years, this policy of exploiting natural resources and not judiciously conserving them is, to put it mildly, extremely short-sighted. The same short-sightedness is being displayed over population growth.

Science has rendered great service to humanity by finding a cure for most diseases, by preventing the outbreak of epidemics which formerly used to kill millions of persons, and by curtailing the death rate in other ways. But unless men learn to curtail the birth rate as well, we will, before long, be faced with a population explosion.

Science has not proved that Malthus was wrong. It has only proved that for some time natural restraints on population in the form of wars, pestilences and famines can be held back. This planet can be made a decent place to live in only if man is wise. Science gives knowledge and power, but not necessarily wisdom.

The most effective way of preventing abuse of science and technology is to keep political power under control. Science has enormously strength­ened the State. The administration has at its command resources for detect­ing opposition and subversive forces which no ancient State ever had. It can mould the mind of the masses far more effectively than ever before.

Before the development of rapid means of communication, like rail­ways, the telegraph, internet and the telephone, people lived in small communities.

In earlier times, there were, to be sure, empires, but these empires disintegrated as soon as they became very big in size, because, for want of rapid means of communication, the distant parts could not be kept under control and rebellions could not be promptly dealt with. Now, the people are living in big communities and we have not only national but also multi-national States.

**Economically** also, we have organised ourselves on a big scale. We have, instead of small farms, giant collective and co-operative farms, as well as huge personal estates. Workers are organized in huge trade unions with a membership running into millions.

We now have factories employing lakhs of workers, industrial combines and trusts with incomes larger than the revenues of many States, big cooperative stores and stores owned and managed by private entrepreneurs, nation-wide political parties and parties of an international character. Even the national boundaries are considered too narrow for man's activities, and people are coming closer in huge international organisations.

Though giganticism seems inevitable, it poses a number of problems. In a vast organisation a person's individuality is lost and he feels that his fate is being determined by huge impersonal forces beyond his control. The State ought to see that these forces do not harm its citizens.

If the State, for example, provides adequate social security benefits, including unemploy­ment insurance, a citizen would be able to face with equanimity the hazards of unemployment caused by trade depressions or global trade fluctuations.

We can arrest the movement towards greater **urbanisation** and concentra­tion of population by locating new factories in rural surroundings and es­tablishing garden towns. While science and technology make for centralisation of economic and political activity, we can, in several ways, decentralise political and economic authority.

We can create a rule of law which compels all organisations to submit their disputes to negotiation, mediation and arbitration, rather than settle them by strikes which paralyse national life and put the community to great inconvenience. We have the family, the church, the social club, the local sports associations, cultural bodies and other face-to-face organisations to counteract the effect of depersonalisation of modern life.

The fact is that, while science provides knowledge and power and affects life at several points, its use is determined by our culture and by our wisdom.

Science has made a most valuable contribution to the acquisition of knowledge and the development of a rational outlook on life. Not long ago, the masses were sunk in superstition. They attributed diseases to the wrath of the gods. They believed in ghosts, witches, magic and sorcery. Human and animal sacrifices were made to propitiate gods and demons. The appearances of eclipses and comets were regarded as most ominous.

As­trology was accepted everywhere as a science. Mythological accounts of the origin of the universe and movements of heavenly bodies were believed even by the educated. Anyone who offered a different interpretation based on scientific laws was severely frowned upon. Galileo came into clash with the Inquisition when he made the simple observation that the earth moves round the sun.

Newton himself believed in God and he held that a Creator was necessary to set the universe in motion, but once the process had started, it required no further supernatural intervention. The law of gravity came into conflict with the view of Providence as omnipotent, kind and generous who responded to prayers, achieved miracles and set things right.

Darwin's biological discoveries banished purpose and moral design from the uni­verse. His theory of Evolution and the principles of the struggle for existence and the survival of the fittest leave no room for the view of the universe held by theologians. Modern astronomy does not inspire much hope and faith. Life, it holds, exists only on this planet. Though the universe has millions of years of existence, according to astronomers, it is ultimately moving towards dissolution. Science has helped man see the world and life in it really as they are.

But in doing so, it is said, it has deprived the people of their religious and spiritual faith. The principle of the struggle for existence and the survival of the fittest has been invoked to justify imperialistic wars. Science has created a problem for mankind by taking away its faith. It has also given rise to philosophic systems which do not favour disinterested pursuit of truth but judge what is true by the severely practical test of how far it serves the ends in view.

This indictment against science, however, is not fair. Science has exploded fairy-tales, mythological fantasies, irrational fears, unfounded speculations. It is for statesmen, religious teachers, humanists and social reformers to give a sense of purpose to mankind. If scepticism is the price which mankind has to pay for the truth of things, nobody can say that the price is prohibitive.

Men ought no longer to live on myths. Instead of becoming determinists they must take their destiny into their own hands, and build a glorious future for the human race. Science and scientific outlook open up infinite possibilities for man. What he must bring with him as his contribution is wisdom.

Science has given man various forms of power to replace the power of animals and that of human muscles. This has made it possible for him to annihilate distances, overcome the forces of gravitation and explore outer space and undertake production on a big scale.

Never was the world so completely integrated as it is today. Chemistry gave mankind gun powder which resulted in the destruction of feudalism and the emergence of the modern State. It also gave man the power to create new materials. The resources of the world in many things are very limited, and there is always the fear that, if they continue to be used on the present scale, they would be exhausted before long. This fear is no longer so serious because chemistry has discovered substitutes for them or made synthetics to replace them.

Scientific breeding has already yielded highly satisfactory results in the case of animals and plants. Given more knowledge of heredity and embryology, it would be possible to produce even finer specimens of the animal and human species. It is a fascinating subject to speculate on what physics, chemistry and biology would be able to achieve in the next few centuries.

Man may be able to reach other planets, explore further the im­mense interstellar spaces, learn to control the climate, manufacture a vast number of synthetics, including food. There is no theoretical limit to what man can achieve through science and technology.

Science has revolutionised life in the intellectual, social and material spheres, creating a large number of problems for the human race. These problems are not unmanageable. What is needed is revolution in the minds of men to ensure that the knowledge and power gained through science is used for a constructive purpose. The future of mankind cannot be left to be determined by old parochial passions, reckless competition among produc­ers and the operation of uncontrolled urges. The future has to be scientifi­cally planned.

Science and technology have annihilated distances, brought the vari­ous parts of the world much nearer each other, enormously increased inter­national trade and integrated the economy of all nations. Yet, it cannot be said that the material and manpower resources of the world are being utilised on a scientific and planned basis.

India, for example, could have raised the standards of living of its people to a much greater extent than at present if it had not been thwarted in its endeavors by shortage of foreign exchange and inadequacy of foreign capital and technical skill. It is one more example of the bankruptcy of world statesmanship that, while astronomical amounts are being spent on manufacturing weapons of mass annihilation and space exploration, the affluent nations are not prepared to help developing nations on a scale which would make a significant impact on their lives.