

...national development



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whom I treat is better known to some others than to me." Russell made a special study of Leibniz, so his views about the latter are important: we will return to this later.

Rene Descartes was born in 1596 at La Haye near Tours in France, and was educated at the Jesuit College at La Fleche. He was unhappy, like many of his contemporaries, about the education based on Aristotelianism. After leaving College he attempted to resolve the crisis by inventing a method based on mathematical reasoning. For a time he served as a soldier in Holland, Bohemia and Hungary. After leaving the army in 1621 Descartes devoted himself to the study of science and philosophy. He retired to Holland in 1629 and lived and worked there in great seclusion for twenty years. A small fortune that he had inherited and invested enabled him to be free of financial worries. His doctrines, however, brought him in confrontation with Dutch theologians. In 1648, through the initiative of the French ambassador in Holland, Descartes accepted an invitation from Queen Christina of Sweden to instruct her in philosophy. As the queen was very busy, she fixed five o'clock in the morning as the time for her lessons. This was too strenuous for the philosopher. He caught a chill and died in Stockholm in 1650. Russell is critical of Queen Christina, "who thought, as a sovereign, she had the right to waste the time of great men." 17

Russell's summing up of Descartes is as follows

"Descartes was a philosopher, a mathematician, and a man of science. In philosophy and mathematics, his work was of supreme importance; in science, though creditable, it was not so good as that of some of his contemporaries." 18

Descartes' work on mathematics I will discuss elsewhere. His main works in philosophy were the Discourse on Method (1637) and the Meditations

(1642). In these he propounded the method of 'Cartesian doubt', that is, a way of gaining knowledge by first doubting everything that is known, and accepting only those pieces of knowledge about which one is absolutely sure. In this manner Descartes came to the conclusion that the surest piece of knowledge he possessed was that he exists, for if he didn't exist he could not doubt. Or, at any rate some being or agent that is thinking exists. Hence we have Descartes' famous dictum 'Cogito ergo sum' (I think therefore I am). Russell makes the following remark about the cogito: 19

"There is thus, in all philosophy derived from Descartes, a tendency to subjectivism, and to regarding matter as something only knowable, if at all, by inference from what is known of mind."

Although the sense perception from an object is direct, something which animals also feel, the idea or notion of the object itself requires the mind; one does not directly 'feel' the object. This aspect occurs later in the work of Immanuel Kant (1724-1804) in his idea of 'things-in-themselves'. Although Descartes' method ran into difficulties, his influence has been pervasive. One of the most important aspects of this influence was that after him the tendency to appeal to previous authority (such as to Aristotle) to settle scientific questions diminished. Russell traces the transition from medieval scholasticism via the Italian renaissance to the rise of modern science. He says:

"The new conceptions that science introduced profoundly influenced modern philosophy. Descartes, who was in a sense the founder of modern philosophy, was himself one of the creators of seventeenth century science." 20

Gottfried Wilhelm Leibniz was born on July 1, 1646 in Leipzig in Germany; he was the son of a professor of moral philosophy. He obtained a bachelor's degree in philosophy after a brilliant career and a doctor of law in 1667. He was offered a university post but

rejected it in favour of service of the German nobility. During his service he spent four years (1672-1676) in Paris. These years were crucial for his mathematical studies, and in 1675 he invented differential calculus independent of Newton. In 1676 he entered the service of the Duke of Hanover, until he died there on November 14, 1716. All through his service he continued his intellectual pursuits in mathematics, science, technology, philosophy, theology, law, politics and history. The works that he left behind continue to be of great interest to scholars until the present time. It appears that when he ceased to be of use, the German nobility ignored him.

He died neglected; the only mourner at his funeral was his secretary JG Von Eckhart, who said, "he was buried more like a

robber than what he really was, the ornament of his country." 21

Russell says

"Like Descartes and Spinoza, Leibniz based his philosophy on the notion of substance, but he differed radically from them as regards the relation of mind and matter, and as regards the number of substances." 22

Russell goes on to explain that Descartes allowed three substances, God and mind and matter, while Spinoza admitted God alone. Leibniz thought there must be an infinite number of substances; this led him to his famous 'Monads', which most people find very difficult to understand. In spite of their strangeness, Russell says:

"... his monads can still be useful as suggesting possible ways of viewing perception." 23

Leibniz brought to perfec-

tion the arguments for the existence of God; since his time this kind of reasoning has become unfashionable. The arguments are based on (1) the ontological argument (using considerations of existence and essence), (2) the cosmological argument (a kind of First-Cause), (3) the argument from eternal truths, (4) the argument from pre-established harmony. Although some aspects of this debate are out of date, it is interesting that in various forms and guises these ideas and this kind of reasoning appear again and again in different contexts.

Leibniz was in some sense the first person to invent a form of mathematical logic. The idea was to introduce a formal procedure through which arguments could be settled; no matter in what field or topic these arguments took place. Modern mathematical logic incorporates this, but its success is somewhat limited, so far. 24

Those who think that scientists live in ivory towers, will be surprised to read the following excerpt from Roger Penrose's book 'Shadows of the Mind'. I am quoting at some length because I consider this excerpt to be very relevant to the matters we are discussing.

Can robots save this troubled world?

"As we open our newspapers or watch our television screens, we seem to be continually assaulted by the fruits of Mankind's stupidity. Countries, or parts of countries, are set against one another in confrontations that may, from time to time, flare into hideous warfare. Excessive religious fervour, or nationalism, or separate ethnic interests, or mere linguistic or cultural differences, or the self-seeking interests or particular demagogues, may result in continuing unrest and violence, sometimes boiling over to outbursts of unspeakable atrocity. Oppressively authoritarian regimes still subjugate their peoples, keeping them in check by the use of death squads and torture. Yet, those who are oppressed, and who might seem to have a common purpose are often locked in conflict with one another, and when given a freedom that they may have been long denied, may seem to choose to use that freedom in horribly self-destructive

ways. Even in those fortunate countries where there is prosperity, peace, and democratic freedom, resources and manpower are squandered in apparently senseless ways. Is this not a clear indication of the general stupidity of Man? Though we believe ourselves to represent the pinnacle of intelligence in the animal kingdom, this intelligence seems sadly inadequate to handle many of the problems that our own society continues to confront us with.

Yet, the positive achievements of our intelligence cannot be denied. Among these achievements are our impressive science and technology. Indeed, whilst it must be admitted that some of the fruits of this technology are of distinctly questionable long-term (or short-term) value, as is borne witness by numerous environmental problems and a genuine fear of a technology-induced global catastrophe, it is this same technology that has given us our modern society, with its comforts, its considerable freedoms from fear, disease and need, and with its vast opportunities for intellectual and aesthetic expansion, and for mind-broadening global communication. If this technology has opened up so many potentialities and, in a sense, increased the scope and the power of our individual physical selves, can we not expect much more in the future?

There is little doubt in my own mind that there is indeed, implicit in our (frequently computer-driven) technological society, at least one direction with an enormous potential for enhancing intelligence. I refer, here, to the educational possibilities of our society, which could gain great benefit from different aspects of technology - but only if it is used with sensitivity and understanding. Technology provides the potential, by use of well-produced books, film, television, and interactive computer-controlled systems or various kinds. These, and other developments, provide many opportunities for expanding our minds or else for deadening them. The human mind is capable of vastly more than it is often given the chance to achieve. Sadly, these opportunities are all too frequently squandered, and the minds of neither young

nor old are provided the opening that they undoubtedly deserve."

Incidentally, Prof Penrose lectured at the first Chittagong Conference on Mathematical Physics in January 1986. The late Prof Abdus Salam, who inaugurated the conference, after his usual recitation from the Holy Qur'an said: "I am happy to see Roger Penrose, one of the world's greatest mathematicians". Last year I was invited by Penrose to give a talk at Oxford. As usual, I used chalk and blackboard, and remarked that I have never seen Roger use anything but chalk and blackboard, or notes (except on one occasion when he used a hand-written transparency). Prof Penrose has retired from the Rouse Ball chair of mathematics at Oxford; he was awarded the order of Merit, Britain's highest civil award. He is making strenuous efforts to understand 'the mind'!

We continue with this 'collage' of seemingly disparate items which, nevertheless, hopefully, will form a harmonious and integrated whole.

Penrose has displayed considerable insight into the contemporary scene. I am sure he is aware of the unscrupulousness, or worse, of established institutions. The 'unspeakable atrocity' of Hiroshima and Nagasaki were not perpetrated by the likes of the Hutu and the Tutsi!

Kofi Annan, the UN Secretary-General, made the following statement at the general assembly in 1998:

"The manner in which technical assistance is provided ... needs to be critically re-examined. Technical assistance as it was originally conceived was designed to close the technical capacity gap between industrial and developing countries by accelerating the transfer of knowledge, skills and expertise, thereby building national capacity. In some cases this has been done but, in many others, technical assistance has had precisely the opposite effect, reining in rather than unleashing national capacity. It has been observed that today, after more than 40 years of technical assistance programmes (in Africa), 90 per cent of the \$12 billion a year spent on technical assistance is still spent on foreign expertise despite the fact that national experts are now available in many fields."

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