

of the country and also for self-reliance.

Today, no individual can be as an island and no nation can survive in isolation. The world is moving towards a global society. At present it is passing through a transition period. This is manifested in the formation of regional organisations like the European Community, COMECON in East Europe, Organisation of African Unity, ASEAN, etc. India cannot avoid the effect of this wind of change.

The above are a few illustrations to show that a time has been reached when no more extrapolation of past experience or present status can serve as the basis for planning for the future, as the future society in India will be radically different from the one being visualised by the planners and politicians of today.

Considering the constraints and compulsions — geo-political and others factors — one may visualise that Indian society in the 21st century will be a highly urbanised and sophisticated industrial society.

Existing *mandis* (market centres) may serve as nuclei of urbanisation.

To facilitate modernisation and avoid further deterioration of the situation, early steps need to be taken to control land use through proper legislative measures. Small land holdings can no longer serve the overall national interest. Moreover, land area under agriculture has to be rationally reduced to increase forest area to save the country from desertification and soil erosion, flash flood and drought, not to speak of the forest products needed in future as a major energy resource. This will necessitate national integration of land holdings for judicious use of science and technology to increase agricultural production. Such changes will need changes in values, understanding and attitude of the people, and this in turn means drastic changes in approach to educational planning to make the educational system really secular, based on international understanding and tuned to the need of a highly sophisticated technological society. □

State, Science and Universities

DIPANKAR GUPTA

FOR a long time now scientists and knowledge-makers in India have been suffering from an extended guilt complex, for they believe that rarely, if ever, are they of any practical use to national developmental programmes. Jawaharlal Nehru's programme of educational reforms and his subsequent educational policy (of 1958) have deepened this sense of guilt as scientists are easily taken in by socialist realism, even if it be purely rhetorical. Universities at the apex level have been set up with a call for removal of poverty, malnutrition and disease. As these categorical imperatives are in themselves unobjectionable, many academics have got caught in the "prove it to Parliament" trap. Inferior academics in this situation, have managed to cover themselves with glory by devising short-term courses, extension programmes and policy studies which jibe with the ruling prejudices of the powers-that-be. Concurrently they write paeans in praise of ruling dogmas, and strive to universalise a sectional perspective. The not-so-inferior scientists and academics have found the going much more difficult. No matter to what discipline they belong, as scientists they instinctively rebel against political diktat, and against patronising directives promoting the "scientific temper". Science and scholarship, they believe, is entirely their personal affair, and they ought, therefore, to be left alone by the non-scientific political institutions. That this has never

occurred in history makes no difference to the basic conviction. But since this conviction lacks both self-confidence and pride, injunction to be worthy of the nation slowly but inexorably erodes their confidence.

Prof. Rais Ahmed in a recent paper entitled "Universities: Perspectives and Problems",¹ has done the predictable by advocating what I call "law-and-order science". He lauds the universities' "linkage" with productive enterprises and development departments of Government. He believes that universities can demonstrate their scientific credentials only if they "contract" Government departments and help to train manpower necessary for national development. In passing he also mentions how crucial basic research is for scientific development, but this occurs to him as an afterthought and is never fully articulated. As evidence of the fact that this is an afterthought, we find that he recommends highest level research only when it either aids in the development of the discipline or is significant for the life of the community. Even when stated this way, it is quite obvious that there is a basic contradiction in his formulation. What if the development of a discipline at that point has nothing to do with the life of the community — however the latter term may be understood? This ambiguity is resolved when we learn from him a little later that special incentives should be given to those who do extension work. No such bonuses, it may be noted, are recommended for those works that are irrelevant to Government's concerns. Neither does it occur to Rais Ahmed that there may be governments that are irrelevant to the nation. The epithet "law-and-order scientist" does not, therefore sit uneasily on prof. Rais Ahmed's head.

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IN this paper I shall argue in favour of anti-law-and-order science. Let me say at the outset that I am not a proponent of unbridled anarchism. Nor am I denying that scientists can sometimes make discoveries that can be easily translated into practice and can help the people if not the Government. But such occurrences are rare and need considerable ingenuity, for they must not hurt the state and yet help the people. It is as difficult to accomplish this as it is to have the cake and eat it too. But in all such cases the scientist works through organisations and channels outside the state sector and rarely establishes anything more than a tenuous alliance with the governmental machinery. However, these instances are so rare that they need not detain us any longer.

On the other hand, scientists who have committed themselves to "contract" with the Government offer half-hearted technicist solutions, which do not aid the growth of science but help primarily in the legitimising process of the state. The main thesis that I shall propose in the following pages is that when scientists try to derive their legitimacy from Governments, and/or believe that their contributions should be primarily pragmatic, they run the risk of converting science into teleology, and thereby disarticulate the basic character of science. As Prof. Rais Ahmed has tried to provide a historical perspective to his law-and-order science, I too shall delve into history to prove my point. I shall primarily depend upon the history of medicine, which I am confident, with the history of science in general, will bear me out.

HEGEL in a rare lucid moment had said: "Nations and governments have never learned from their histories". I suppose if they had, then most of social science today would be irrelevant. Nevertheless, the historical lesson we are told to learn from law-and-order scientists and sundry patrons of the "scientific temper" seems to be that ancient medicine suffered because of the overpowering influence of religion. Some horror stories are told to illustrate this position and the causality regarding the casualty of ancient science is taken as proved Q.E.D.

My readings on the subject of ancient medicine tell me a different story. Religion rarely, if ever, has interfered with pragmatism. I have tried to demonstrate this position vis-a-vis the caste system in earlier papers and I shall do no more now than refer my readers to recent scholarship on caste and religion in the context of modernity and change. Religion begins to tamper with science only after pragmatic scientists have created a situation conducive to this. Religion could not stop a Galileo from bequeathing his intellectual heritage to posterity though it may have tried its best to do so. No religious passion, no bigoted obscurantism has ever lasted long enough to prevent a scientific breakthrough from reaching Man. It is only after ancient science was forced to be pragmatic that religion could step in to ensure that no scientific talent would be expended in a direction that would destabilise a settled and routine socio-political

hierarchy. It is only when all is right with the world that God after all can be in his heaven.

An understanding of this situation can be arrived at if we proceed step by step. Let us first try and understand the character of ancient science via the optic of ancient medicine. I believe there are three characteristics of ancient science that differentiate it from what is called modern science.

First of all, structure and event in ancient medicine went together. In other words, the so-called theoretician and the practitioner were one and the same. The ancient Ayurvedic preceptor and the concocter of medicinal potions were not two different persons, carrying out two different roles. The position of the scientist in ancient medicine and that of the clinician or the practitioner were not differentiated. This is true not only of Ayurveda, but also of Hippocratic, Galenic and Arabic medicine. It is probably because the two roles were coalesced into one that the preceptor who was also the scientist, in order to prove himself, had to immediately demonstrate the validity of his calling. In such a situation it is not difficult to imagine that such a demonstration was also necessary to appease the state and religious orthodoxy. Wherever such immediate demonstrability was lacking the state and religious orthodoxy condemned, attacked and persecuted the scientists. Investigation of human anatomy through dissection did not have anything immediate to offer for crass patrons of practical science, and that is why till very late in the history of medicine, both Oriental and Occidental, surgeons were only seen as inferior craftsmen.

Debiprasad Chattopadhyay has put forward an alternative thesis which has gained great currency of late because of the author's undoubted scholarship and persuasive argumentation. Chattopadhyay argues that science collapsed in ancient India because of the interference of religious orthodoxy.² Chattopadhyay, however, is not unaware of the fact that religious orthodoxy could only persecute if it had the power of the state behind it. As a matter of fact this is one of the theses in his earlier book, *Lokayata*. But in *Science and Society in Ancient India* no reference is made to the manner in which the state concurred with religious orthodoxy in condemning Ayurveda scientists. In the absence of reference to this point, and from evidence available elsewhere regarding the patronage Ayurveda practitioners received at various courts, from the Buddhists to the Gupta empire and later, we are encouraged to make two statements which are not contradictory.

From Chattopadhyay's work we realise that the bulk of the attack on ancient medical scientists occurred because some of them believed in dissecting dead bodies in order to understand the marvels of the human organism. And we also know from history that anatomy played a picayune part, if any at all, in the curative practice and knowledge of ancient medicine. In other words, those scientists whose labours and whose enquiries had no immediate practical impact were obvious victims of religious orthodoxy. It is little wonder then that Christianity, Islam and Hinduism in one voice in

different regions of the globe, condemned anatomy so unambiguously. Galen, after all, only dissected pigs and apes and confidently transferred his discoveries to human anatomy. My second statement is that sacerdotal literature is never a sure guide to the understanding of ancient history. To believe so is tantamount to accepting that religious history subsumes the history of society which is something that Chattopadhyay himself has taught me to reject in his earlier books. In which case then we believe there must have been a genuine shortage of true impractical scientists in the field of medicine. This is however not true in other fields of science where scientific contributions were made, and moved either West or East, or remained in the intellectual heritage of Man to be used, applied and realised at a later date. It is the practical burden that medicinal science carries that has paradoxically thwarted its continued and extended practicability in our hoary tradition.

From our postulation of the first characteristic of ancient science, namely, the co-existence of structure and event, the other two characteristic follow quite logically, almost as corollaries. The second characteristic of ancient science is that Ayurvedic teachers were known and celebrated far and wide not for their discoveries but rather for their compilations. Not a single authority in ancient medicine is credited with any worthwhile discovery, but is canonised for the extensive sweep of his compilation and redaction. Here again the impress of practicability is clear. Cures and remedies to diseases were accreted to the materia medica not by puzzle-solving discoveries (of Kuhn) but by haphazard, random, hit-or-miss, trial-and-error methods. The third characteristic of ancient science, especially ancient medicine, is the close connection between men of medicine and the state, and the complete dependence of the most prestigious of them on the largesse of the ruling court.

WHAT could be the possible factors that were responsible for these characteristics of ancient medicine? Apart from certain very rudimentary surgical instruments in ancient Indian and Western medicine, the history of the development of instruments for medicine had to wait till the seventeenth century for its first major breakthrough. In 1609 the microscope was invented by Jansen suddenly opened up a hitherto unexplored world, which has been beyond the reach of the naked senses. It was possible now to apprehend this world objectively via an impersonal instrument, and one did not need to depend any more on the subjective pronouncements of the preceptor or on his powers of transcendental deduction. Some scientists, however, had come perilously close to a proximate supposition of this world though it was informed guesswork more than anything else that had brought them so close to the truth. Mention must be made here of Fracastora who in the sixteenth century propounded his theory of infectious agents, or *seminaria*, though, ironically, credit was to be given to him only retrospectively, after the lapse of three centuries, when a paradigmatic shift took place in

the science of medicine. A minute watch for accurately measuring pulse beat was invented by Floyer in 1707. In 1819 Laennec invented the stethoscope which made possible an objective method of auscultation. Undoubtedly, auscultation had been practised from the earliest years. Had not Hippocrates by placing his ear on the chest of a patient accurately diagnosed pleurisy when the sound of friction from the patients chest had resembled the "creaking of leather?" The stethoscope, however, not only allowed for a more intensive method of auscultation, but also made it possible for those less gifted than Hippocrates to diagnose certain diseases quite effectively.

It was probably because of the lack of instruments of this kind in ancient medicine that the didactic atmosphere of ancient medical schools was highly personalised and the dependence on memory so great. The Hippocratic oath, for instance, clearly demands that the disciple show life-long filial respect for his teacher. The position of the teacher is just below Apollo, Hygiea, Panacea, and "all the gods and goddesses". The discipline did not develop through the impersonal overlapping of discourses and each preceptor organised a school around himself and assiduously demarcated himself and his tradition from preceptors and novitates elsewhere. In such a situation the propagation of a science was possible only through a superior agency, and this superior agency was naturally the political state.

Thus we find in the annals of ancient Indian medicine that the greatest compilations and the most revered preceptors, from Atreya to Caraka to the Hakims of medieval India, flourished under the aegis of the court. Compilations, memorisations and ad hoc accretions continued unabated. They were not only sanctioned but also glorified. The *Susruta Samhita*, which is at least the second most important medical text of ancient India, is as the name suggests a compilation from memory of knowledge gained by rote. The rubric of medical compilations of medieval India clearly suggests the political overlordship under which they took place. In the fourteenth century, during the reign of Firoze Tughlaq, some of the most renowned medical treatises handed down to posterity were grandiosely named after the emperor — the Tibbe Firoze Shahi and the Kuhle Firoze Shahi, for instance. In later years there was the Humayuni, the Ilayat e Dara Shikohi, the Tibbe Aurangzebi, and several others which confirm the dependence of the earlier men of science on the benevolence of the state.

These compilations and some of the reductions were made not only during the reign of enlightened emperors, those who in retrospect we might believe were endowed with the "scientific temper" (Akbar is everyone's favourite in this respect) but also during the reign of the most despotic and the most bigoted (here Aurangzeb is hard to beat in popular history). What motivated these emperors to patronise compilations and translations? The answer very simply is that with every compilation and translation the armamentarium of random

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methods for the cure of several ailments was quantitatively increased. The compilations thereby served an immediate practical function and did not waste a moment in reflection.

In such a situation we believe that science soon begins to dislodge itself from its source and, in fact, turns against it and condemns it as subjective. It is necessary, therefore, to understand the abasement of practical science.

In *Critique of Pure Reason*, Immanuel Kant tells us that whenever the conditioned conditions which form the axiomatic premiss of true science are traded for unconditioned conditions of religion; in other words, when science is perjured for teleology, then theology is not far behind. According to Kant, the fundamental principle of dialectical reason enjoins that there be a last term in our series of premisses which is *complete in experience*, and by which practice can be regulated on an unyielding categorical principle. The compulsions of practicality, to paraphrase Kant, undermine the axiomatic character of science, where the highest order premiss is only provisionally admitted and is not coterminous with the last term of absolute metaphysics. To rephrase, practice dominated knowledge, that is, a knowledge that must on the pain of extinction immediately lend itself to practice hardens the provisional character of scientific truths and governing assumptions to ultimate truths. It is said that Jacques Dubois, the teacher of the famous sixteenth century scientist, Andreas Vesalius, followed Galen with such fidelity that when he found any anatomical structure which did not conform to Galen's description he concluded that the human body must have changed since Galen's time, that is, since the first century AD⁴. When there is a demand that there be a last term for a series to be complete in experience, then the natural outcome, according to Kant, is formation of the ideas of the soul, of God, and, in one word, theology. It is in this way that religion begins to dominate over science with the active intervention of the state. It is not religion then that with primeval force alone corrupts science. It is only after science has first corrupted itself in the practical service of the state that religion enters to deliver the *coup de grace*.

For those who are still unconvinced by the arguments put forward so far, we have the history of the persecution of scientists. The persecution of Galileo is famous. But there have been others also in the history of science, and of medicine in particular, who have been persecuted by the state only because they dared to suspend practice and to bracket political reality for a while. Rhazes or Abu Bakr ibn Zakariya was persecuted by the ruler of Bokhara in the ninth century AD. It was decreed that Rhazes be hit on the head with his book till either the book gave way or his head did. Needless to say it was his head that gave way first and he spent the rest of his life in blindness. Michael Servetus was burned alive at the stake by the Calvinists in 1509 only because he suggested that there was something in pulmonary circulation, and that Galen's "ebb and flow" unconditioned condition

needed re-thinking. In 1555, Vesalius too was attacked and persecuted because he had said that blood cannot pass from one ventricle to the other. Incidentally, this suggestion was at the bottom of William Harvey's discovery of blood circulation. Harvey himself was shunned by his patients and his practice quickly fell, after he discovered that blood did not flow but circulated. He so incensed his King, Charles I, with this discovery, that he was forced to concede that the King was like the heart, the centre of all power, and of all things in motion. Jacob Henle was persecuted in 1835 because he politically differed with the state which did not particularly care to note the fact that Henle had in many ways anticipated the germ theory of disease. But of course, this was incidental to the fact that he could not immediately translate it into practice. Oliver Wendell Holmes and Ignaz Phillip Semmelweis were persecuted for suggesting that infections caused death and for anticipating the need for anti-septics. Holmes retired to the arms of literature and art, while Semmelweis died in an asylum sanatorium. These are only some examples from the gory history of medicine, but the low esteem that non-practical oriented science was accorded by the state through the ages. Conversely, those like Hermann Boerhaave who were suspected of philosophical radicalism by the state and by religious orthodoxy (he was suspected of being a Spinozist) were forced to take up clinical medicine and demonstrate through practice that they were not actually atheists and political radicals.⁵

THE economic history of medieval India, as authoritatively documented by Irfan Habib, tells us that because merchant capital was tied to the ruling court it impeded the transition to capitalism. I think this might serve as an opposite analogy to understand the decadence of medicinal science in ancient and medieval history. Without violating the illustrative character of our analogy we may add that the science of medicine in Europe actually developed outside the state after the seventeenth century, that is, after the state itself had been considerably weakened. All state established medical centres like Salerno (for Arabic medicine) in the tenth century or the centres at Leyden and Glasgow did not produce any breakthroughs. Whether it is Europe, Arabia or India, centres set up by the state sponsored compilations and translations only. Even public health which was talked about at great length by what George Rosen calls the mercantilist state in the seventeenth century actually produced no concrete benefit to the people.⁶ This is notwithstanding the individual works undertaken on this score by Ludwig von Sekendorff and John Bellers. In the eighteenth century and later, public health was taken up actively by private citizens and was given a certain viability in local boroughs and counties.⁷ Doctors and the state again had precious little to do with this development.

The development of the history of medicine is neither unilinear nor characterised by paradigmatic jumps. There has been a great deal of overlapping of diverse scientific activities which have only retros-

pectively, as Foucault rightly points out, been grouped into a unitary discipline called medicine.⁸ For nearly two centuries, Leeuwenhoek's discovery of bacilliforms and spirilla under a microscope, and Harvey's discovery of blood circulation were integrated with the humoral theory of medicine. Fortunately for both of them neither Leeuwenhoek nor Harvey realised the radical potential of their scientific wanderings and enthusiastically supported the theory of miasma and the theory of humors respectively. One can only shudder at what the prospect of modern medicine might have been had Leeuwenhoek, Harvey and Pasteur been motivated solely by mission oriented research. Prof. Rais Ahmed does not realise that mission oriented research, or research towards practical and feasible ends supported by the state, cannot afford to be iconoclastic and can only develop into mindless technologies. It is often researches of this kind that lead people like Ashis Nandy to paranoid delusions about science.

If theory and practice of science go together, then the possibility of the technological devastation of humanity can become an awesome reality. UN style Cassandra complexed reports can then well lead Ashis Nandy and his kind to bemoan the structure of science *per se*.⁹ What are commonly perceived as the "ills" of science are in fact caused by the machinations of technological practitioners who "contract" themselves for the glory of the "nation" and for the cause of productive enterprises. The arms build-up, the development of germ warfare, the increasing pollution of our environment, the galloping incidence of inotropic diseases, are the outcome of these alliances. But such outright denigration of science actually does injustice to the brave, albeit lonely, scientists who have done much to express the genius of men. A true scientist never offends humanity, though he often offends his political co-evals. At a more innocuous level, the complete fidelity between theory and practice can spawn scores of mindless vocational guides who can only be called scientists if one stretches one's imagination to its utmost technological limit.

Paracelsus once said that philosophy was the gateway of medicine, and believed that all those who entered through other gates were thieves and murderers. But the tragedy is that no matter what breakthrough scientists who enter through the gate of philosophy make, there are always thieves and murderers, petty arsonists, touts and brokers around ready to don the feathers of the state and to strut about with a mission to their madness. Only people such as these can believe in the finality of their own knowledge and be willing to trade it for a smile to the power of the day. The state which is constantly under pressure to prove itself rejoices when it discovers such men of practice and conveniently transforms them into men of eminence.

Science, as science, must take leave of practice to return to it. Science, after all is not an empty rattling of concepts, and is therefore quite unlike the transcendental dialectic whose essence was made familiar to us by Kant. Science unlike religion does not make a final, unconditioned condition on

which it premises all. Science unlike technology never gives its axioms any more than a provisional validity. Science, though it has empirical referents and is rooted in material reality, interprets this reality in an unpredictable and non-doctrinaire way. And this is why it is rarely of direct and immediate service to the doctrinal reality of the state, even though this doctrinal reality is capable of a finite number of transformations. A great thinker, said Butterfield, "operates on the margin of contemporary thought."

Science has yet another uncomfortable characteristic. It purposefully and consistently violates popular constructions of reality. In *Critique of Judgement* Kant tells us how science self-consciously breaks away from teleology and yet operates delicately on a teleology of its own. Science believes that its purpose is to supersede itself and that material reality is a source of constant challenge. Nor, according to Kant, can generalisations be slowly accumulated into a heap and called science. But this is precisely how the medical compendia in pre-modern days were compiled. Sydenham, the famous 17th century clinician who despised anatomy and botany, was known for the Sydenham *laudanum* whose ingredients were opium, cinnamon, cloves and cardamom. This laudanum administered unwaveringly for all conditions of fever. Ambroise Pare, a sixteenth century healer, discovered by chance a remedy for gunshot wounds. The remedy was boiled oil of lilies, young whelps and earthworms in turpentine. He was thrilled by this discovery, though in reality he had borrowed it from a lay practitioner. He was happiest, of all because he did not have to justify it by reference to scientific principles, for he had "not read it out of a book".

In spite of Sydenham and his *laudanum*, disciplines such as botany, mathematics, zymurgy and so on, indirectly and impersonally aided medicine, albeit after a yawning time lag, to organise and even perceive new data. The botanical fixism of Carl von Linne (or Linnaeus) helped in the development of nosology which, in turn, helped to dispel the theory of fever.¹⁰ Laplace, Quetelet and Leibniz helped to develop what is now called epidemiology, and then of course there was Louis Pasteur. In other words, if one is to develop one's discipline one will rarely manage to do so by rooting oneself in practice or by "contracting" with the Government, which by definition is the lowest common denominator of popular constructions of reality.

THE arguments that have been put forward in this paper run counter to three popularly held positions. My first argument is that the state, and not religion alone (pace J.R. Russel and Debiprasad Chattopadhyay), was responsible for the degeneration of science. My second argument is that religion only attacked those sciences, and especially those medical scientists, whose works could not be translated into immediate practice. There was always the danger that these scientists would, sooner or later, undermine the moral legitimacy of the state — why else it was asked was their science not immediately

translatable into practice. If Debiprasad Chattopadhyay looks into his data again he will find that they strengthen my conclusion rather than his own. My third argument is that science can on no account be likened with religion. Science consciously breaks away from the transcendental dialectic of teleology, and religious inspiration that a scientist may believe he has been favoured with, is either anecdotal, or merely retrospective. Science on the other hand easily slides into teleology because that is the stuff of popular constructions of reality, and that is how it can be realised in practice by unrepentant practitioners. It is after teleology has secured the practical relevance of a science, that theology finds it safe to condemn the uncommitted scientist in his search to realise himself in a "moment of humanity." To believe that science and religion inspire each other, as Nandy believes,¹¹ is a conceptual confusion of epic proportions. But to say that science can become religion, as I have said, and can perpetrate untold horrors on mankind as religion has done with the consent of the state, is an entirely different matter.

In conclusion one might say that if one were to take Prof Rais Ahmed's recommendations seriously, then whatever hope there lies in universities can be given up with a teleological finality. Universities will be no more than vocational institutes, and one should not then be perturbed if a neighbourhood motor driving institute seeks affiliation to its nearest university. In universities, and in universities alone, can a scientist work without having to prove himself to entirely non-scientific state political functionaries. This does not mean that university scientists should only indulge in pure research. Some may be motivated to test their findings in practice, but this is not the same thing as being motivated by political imperatives of the state. Therefore, by and large a scientist in university environs should be largely dictated by scientific drives, and an enlightened state is one that lets the scientist follow his own course without holding up his next pay cheque or pillorying him in Parliament.

In view of all this one might suggest three levels of university training and research. This would mean either three different tiers within an institution. At one level, maximum attention may be given to purely practical ventures. At the second level, practical ventures should be coupled with interme-

diating quality research which is conducted primarily to strengthen practice. At the third level we have the so-called "uncommitted" (not necessarily pure) research, where scientists are not held accountable to politics and to political imperatives. Personnel may be employed keeping in mind the level at which they are expected to perform. The most scientifically gifted should obviously be at the third level. This stratification does not mean differential payments, but certainly means that the limits to governmental interference are clearly specified. But most significantly it returns pride and dignity basic to those who are committed to "uncommitted" scientific research. Ideally, the three levels should be within the same institution, so that a misfit in one move over to another level. It might also help in a freer flow of information which is so necessary to all manner of scientists. But it is hoped above all that practitioners and politicians, bureaucrats and bores, realise in a hurry that a true "scientific temper" can never inhabit their regions. And if they should perchance stumble upon it in any of their missionary peregrinations, would they please be more kindly disposed towards it, or, at least, ignore it with benign neglect? □

Notes

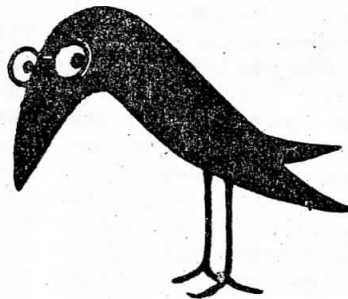
1. Presented on January 27, 1982, in the Indian Institute of Technology, Delhi. This was the first talk in the series "Indian Issues in Science and Technology".
2. Debiprasad Chattopadhyay, *Science and Society in Ancient India*, 1977, p 213 and *passim*.
3. See Douglas Guthrie, *A History of Medicine*, 1958, p 55.
4. See F.F. Cartwright, *A Social History of Medicine*, 1977, p 16. See also Guthrie, *Ibid*, p 136.
5. Lester L. King, *The Medical World of the 18th Century*, 1958, p 61.
6. George Hosen, *A History of Public Health*, 1958, p 136.
7. *Ibid*, p 136.
8. Michel Foucault, *The Archaeology of Knowledge*, 1974, p 22.
9. The most popular and outstanding spokesman of this view is of course Ivan Illich. See his *Limits to Medicine*.
10. King, *op cit*, p 199.
11. Ashis Nandy, *Alternative Sciences: Creativity and Authenticity in Two Indian Scientists*, 1980, p 12. Nandi cannot alone be blamed for this. Joseph Needham himself said that Taoism and Neo-Confucianism have idea systems which "would seem to have been more congruent with modern science". See Maurice Goldsmith, *Three Scientists Face Social Responsibility: Joseph Needham, J.D. Bernal, F. Joliot-Curie*. ❁

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