

Readings in Applied Rationality:

Suggestions for a course to establish
the locus standi of Science in Society

1. Introduction: the Rozak Syndrome

Liberal intellectuals and others who are concerned with the propagation in Society of the ideas of liberal humanism repeat with almost monotonous regularity one cardinal error: that of assuming that the message has 'caught-on', that there is no need to repeat, from scratch, their tenets and arguments as such preaching to the converted only inflicts on their audience the tedium of burdensome repetition. But, with equally monotonous regularity, the liberal establishment is taken by surprise by the virulence with which contrary views gain currency and circulate from time to time. The 'dosage' of fundamental principles required to suppress the new resistant strain of illiberal doctrine has to be raised at each new outbreak of the disease and the task of re-education becomes progressively more difficult.

A recent brush with Theodore (Counter-Culture) Rozak at an SSSRS meeting on the Sussex campus has left me with the distinct impression that the scientific establishment is finding itself in a very similar position. It has taken for granted that Science has a pre-ordained place in society, that its locus standi is self-evident to most people and which, should need arise, is easily demonstrated to any stubborn, unbelieving minority which may from time to time erupt. The scientist today is caught on the hop and reacts with incredulity when asked the Muggeridian question - why Science? In its most elemental form the attack is on rationality as a vehicle for acquiring knowledge; a more frequent variation of this attack is the one directed towards establishing the alleged bankruptcy of 'objectivity' and the 'scientific method'. (The question of resource allocation - that of deciding how much for Science? - which society began to ask in the late fifties and early sixties has been dealt with by largely internalising the problem through the establishment of Councils for Scientific Policy and the such like. Science was, and is, still handled almost exclusively by scientists through buffer organisations manned and operated by scientists. These look after the largely technical questions of who gets how much for what and when).

If my experience at the Rozak meeting is anything to go by, the current attacks are very fundamental and it would be wrong to dismiss the attackers as mis-guided ignoramuses who can be dealt with by no more than a condescending nod towards the recorded place of science in the history of Man's development. Not only is such reference likely to be challenged by counter explanations for man's intellectual development (zeitgeist,

movements etc.) but also by outflanking manouvres which prescribe that Art is the only true index of civility e.g. Kenneth Clarke in his BBC series on 'Civilisation'.

2. Need for and purposes of the suggested course

Dramatic exaggeration or induced panic are not in order here but it is difficult not to point to the serious consequences to civilisation and the sheer survival of mankind if this attack is allowed to go unchallenged or allowed to be propogated through the polemics by even a minority of the educated elite of any country. Even if one were to take the view that this 'Science-bashing' is a passing fad there is an urgent reason for repelling the attacks; it is this:- In most of the less developed countries religious bigotry and ideological dogmatism are only just being held in check by the imperitives of science-based modernisation. However, intellectual fads travel around the world (on the hem of the mini-skirt?) and it would be a tragedy of the first magnitude if the struggling, tender shoots of developing science (I regret the use of these cliches but they are really quite apt) in the developing countries were to be smothered and destroyed for all time by a mere fad read-across from the over-developed countries.

There is thus a need to educate the undergraduate into some profound, yet often very simple (simplicity is a necessary though not, of course, a sufficient condition for profundity) ideas about the nature of science, the social practice of 'scientific-method' and the uses and limits of 'objectivity'.

3. Disederata for a course

A course designed to establish the locus standi of science must reflect and employ those virtues of scientific communication we wish to extol. Accordingly, the course must satisfy certain disederata which should include the following:-

Brevity: the course should be only so long as is necessary to do the job it is designed to do.

Transparent clarity of exposition: there must be no fudging of issues or blurring of edges. Like the business of a free Press, it shall be the business of the course 'to tell it like it is' in Science - in all its dimensions.

Discrimination between essentials and details: with the emphasis on the former.

The emphasis on solutions and synthesis: a consensus should be established at each stage of the various arguments in such a way that the student is interested in the solution to a particular problem rather than in the problem itself. The course must not provide a

sense of accomplishment to those who merely grapple, however ferrociously, with problems (through experiments, words or mathematics). Unlike literary criticism, scientific criticism carries with it an obligation to offer something better.

Dynamic self-correction: the course must submit to a rational appraisal of its performance in order that it may be improved.

I shall now try to outline the content of such a course bearing in mind the above disederata.

4. Readings in Applied Rationality: the course content

4.1 The core of the course and a word about its title:

Much of what needs to be said has been said before and is available in books - many of them fairly short books. What is needed to provide the student with all the basic ideas is a required-reading list (~~now Applied~~). The classroom encounters need only be discussion seminars. Thus 'Readings' satisfies part of the first of the disederata.

Although science is the crowning cultural achievement of Rational Man, science as it is currently practiced is not, a priori, the only terminus of the rational mind nor, indeed, is it necessarily a 'terminus' at all. Science is an exercise in rationality although of a particular kind: it is applied rationality as distinct from pure logic which is an exercise in rationality for its own sake. Hence the predicate of the title of the course.

4.2 The edge of communicable knowledge:

An integral part of the course will be a series of lectures on currently valid conclusions from four fields of basic ('pure') science which lie at the very edge of communicable knowledge (as distinct from 'gut' knowledge to which poets, mystics and demogogues lay claim), namely: Astronomy, particularly Radio-Astronomy; Molecular and micro-biology; Particle-physics and Brain Research. Each of these fields deal with, respectively: the origin of the universe; the origin of life; the nature of Matter and the nature of Mind.

The emphasis in this series of lectures will be to demonstrate Science operating in its two main dimensions; the physical and the social. The lectures will show

- * that science moves in steps from one strata of difficulty to another;
- * that synthesis is achieved through consensus freely formed and communicated to and amongst those who accept rationality as a vehicle for acquiring knowledge;

- * that although total synthesis is the ultimate aim of science, spurious shot-gun marriages between ideas are not permitted and this is why pseudo-syntheses by impatient (even if well-meaning) people like Arthur Koestler and Teilhard de Chardin are not acceptable as communicable knowledge.

These lectures will be part of 'telling it like it is' and will make considerable demands on the combined skills of most of the science faculty. We should not shrink from asking popular expositors of science to come and speak. Full use should be made of films and other audio-visual aids, for example - the two BBC 2 films on the Violent Universe and The Mind of Man.

4.3 The lives of outstanding scientists: Biography as one of the 'contextuals' of the course:

If there one sentiment which is something of a running sore in the body of science as it is presented to society, it is its alleged "inhumanity". That particular individuals are not relevant to theories or the facts upon which they rest is held against science as an example of its 'inhumanism'. The course needs to emphasise that although this is true, the life-style of science as it is practised is very much a product of individuals. This can, I believe, be best done by providing several biographies of individual scientists in the reading list. Then, an effort should be made to identify, where possible, a particular research style with a particular scientist or scientific school - as has been done for e.g. in "The Cambridge Mind" (1970).

5. The Question Why

Science must not only be done, it must be seen to be done. At the end of the Course a substantial consensus must appear in the students which establishes the locus standi of science in society. The lack of the appearance of a substantial consensus can mean one or both of two and only two things, namely:

- * The course was unscientific and badly designed and hardly a proper introduction to science.

and/or, more disturbingly:

- * Science has failed to establish its locus standi in Society and at least one round in the battle to stop the retreat from rationality would have been lost.

Appendix

Suggested Reading List

In adding works to this list it would be well to bear in mind that short works, preferably paper-backs within the means of students, are more likely to be read than long ones.

Required reading

1. Conant, James B., (1967), "Scientific Principles and Moral Conduct", Cambridge Univ. Press. Paper. 6 sh.
2. Medawar, P.B. (1967), "The Art of the Soluble", Methuen & Co. Ltd. 25 sh.
3. Watson, James D., "The Double Helix".
4. Ziman, John (1968), "Public Knowledge", Cambridge Uni. Press. 10. sh. 6d. (Paper).

Additional reading

5. Pfeiffer, A. (1967), "Dialogues on Fundamental Questions of Science and Philosophy", The Commonwealth and International Library, Pergamon Press. (Paper), 15 sh.
6. Habermas, Jurgen (1971), "Towards a Rational Society", Heinemann Educational Books Ltd. (Paper), 15 sh.

Bed-time reading

7. Schrodinger, Erwin (1967), "What is Life? Mind and Matter", Cambridge Univ. Press, (Paper) 12 sh. 6d.

Biographies and Styles

8. Eric Homberger and Willian Janeway (1970), "Ninety years of The Cambridge Review 1879-1969", Jonathan Cape, 80 sh.
9. Clarke, Ronald (1968), "JBS: The Life and Work of JBS Haldane", Hodder and Stoughton, London.
10. Segre, Emilio (1970), "Enrico Fermi: Physicist", Chicago Univ. Press.