the scientist's

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By ***Wayne A. R. Leys***

FEW ECHOES of the controversy over the nature of science will be found in this article. An earlier generation agonized over the question: "Does scientific inquiry tell us anything about values and moral obligations?" and reached a very skeptical conclusion. Fifteen years ago studies of the language and logic of science appeared to many scientists and philosophers to have settled the question: you could not logically leap from assertions about what is and what is possible to assertions about what ought to be. Then came war and the Manhattan project, and many who had accepted the divorce of science and ethics were frightened into reconsidering the matter. If science had nothing to say about values and duties, so much the worse for science. There ought to be a connection between science and ethics. Whatever the semantic difficulties, something needed to be done to prevent a suicidal use of scientific knowledge. Since 1945 there have been many conferences, many symposia, reconsidering the relation of fact to value, the relation of science to ethics. Despite the ingenuity of these discussions, I find them, on the whole, inconclusive and disappointing.

Science with a capital "S" makes no choices; scientists do make choices. Instead of attempting to redefine science in such a way as to justify scientific concern with the ends of life, why not deliberate upon the choices actually experienced by the man of knowledge? In this paper we shall treat scientists as members of an occupational class that has developed standards of its own, a class upon which other groups also make certain demands. The problem will be to identify the scientist's conflicts of duties, and determine whether

CODE OF ETHICS

The fact that a scientist spends a good deal of his time in studies from which he tries to exclude moral judgments, the author of this article points out, does not mean that the scientist and his activity will not be subject to moral judgment.

the traditional systems of ethics help him achieve wise resolutions of these conflicts. In a word, instead of trying to torture an ethics out of a definition of *science* we shall try to show the relevance of ethical ideas to the *scientist's* practical choices.

Every occupational group regulates itself by common standards, which may or may not be formalized in a code of ethics. These rules about rights and duties, to some extent, reflect the expectations of the rest of the community; they interpret the work tasks of the occupation; and they forbid practices that result in quarrelling within the work group. The clergy, at various times, have been commanded to observe pious ceremonial and to take vows of poverty, celibacy, and obedience. Land-owners and managers at one time were forbidden to do any manual labor. The modern factory workers set limits to the tempo of work and punish those who exceed the limits by treating them as "chiselers" or as "rate-busters."

Biologists, chemists and psychologists have codes of ethics, too. These codes contain performance standards that have evolved in the course of decades or generations, but—once established—they have all of the characteristics of moral commandments. In their most general form, they give the following commands:

1. Seek true knowledge. This rule gets elaborated in a variety of injunctions that say, in effect, "Do not stop inquiry."

2. Publish the truth. From the days of Paracelsus the most heinous sin among scientists has been the faking of evidence. Almost as sinful is any censorship which prevents the exchange of ideas and the critical examination of what is published.

3. Do what you can to see that true knowledge is used for the good of mankind.

This approach to the ethics of scientists may seem to promise a quick and decisive settlement of all controversy. The question posed is, "What obligations do scientists themselves recognize?" With the aid of modern polling methods, psychologists and sociologists should be able to establish the answer. An ethical problem would thus be transformed into a scientific problem.

Unfortunately, the ethical problem is not so easily disposed of. David Hume, the eighteenth century philosopher, advocated the polling method to settle ethical issues.[1] Hume's critics have shown that, however useful and interesting such a poll may be, it does not resolve all ethical problems.[2] The proposition, "Most of the chemists believe that the restriction of inquiry is wrong" is not logically equivalent to the assertion that "The restriction of inquiry is wrong;" any more than "Most of the chemists who were alive in 1850 believed the elements cannot be transmuted" is equivalent to "The elements cannot be transmuted."

The second reason for not terminating the ethical controversy by taking a vote is that scientists are not an isolated community. Scientists' codes of ethics may protect group interests which the rest of the community does not recognize as legitimate; for example, other classes have regarded the medical code as a mere restraint upon trade. Irvin S. Cobb gave expression to this criticism when he said: "Anything doctors do in the mass is ethical. Almost anything they do singly and on individual responsibility is unethical. Being ethical among doctors is practically the same thing as being a Democrat in Texas or a Presbyterian in Scotland." [3]

There is still another reason why you can't prove the duties of scientists by polling expert opinion. That reason is found in the nature of action as opposed to the nature of theorizing. You can think abstractly and in general, but you cannot act in general or in abstraction. The conduct which is subject to ethical judgments is always dated and located, and our duties have to be determined by reference to complex circumstances. All sorts of conditions are assumed when the physicist, for example, makes the general assertion that it is his duty to seek and publish the truth. He does not mean that every waking moment shall be devoted to scientific work; he assumes a "reasonable" amount of time for family life, for the social amenities and for "necessary" nonscientific tasks. He will approve of physicists taking administrative positions, to head universities and research bureaus and even industrial corporations; although the scientist-administrator nearly always sacrifices a major part of his theoretical productiveness. The scientist gives grudging approval to certain "unavoidable" inaccuracies and inadequacies in popular reports of research. He recognizes that there are circumstances under which it is the part of wisdom not to rush into print and not to pick quarrels with ignorant men, whether they be clergymen or legislators.

NO GENERAL ASSERTIONS about the duties of scientists, however revered, will solve all of the scientist's ethical problems. Ethics, in the sense of a code of ethics, is not a complete guide in decision-making, since our more difficult choices are among alternatives that arise when we cannot act strictly according to our professional code or when we are not sure how to apply the code to the immediate situation. Granting that scientists ought to be scientific, we are still puzzled by conflicts between an ideal life of intellectual activity and the demands of a very unideal world. We need more than a code of ethics; we need ethics in the sense of a philosophical method of thinking about practical choices.

I shall now illustrate how we may appeal to four or five types of philosophical ethics for help in making these difficult choices. I shall mention authoritarian casuistry which uses legalistic methods in applying rules; utilitarianism which asks about efficiencies in producing desirable results; the abstract ethics of Kant which tests motives; and several other varieties of philosophical ethics.

It may seem perverse to suggest that scientists tend to be authoritarian in their philosophical ethics. Yet, this is true. The student reads the history of science and becomes familiar with a great number of precedents that were established by Galen, Sir Humphrey Davy, Pasteur, and the other saints. The actions of these men become precedents for interpreting the duties of scientists.

It is rather rare for an issue to be a clear-cut choice whether to seek, speak and use the truth, all other values being equal. Once or twice in the lifetime of a few scientists something happens to test their code with the simplicity and clarity of Galileo's case before the Inquisition or Scopes' trial under Tennessee's anti-evolution law. But the more common testing of the scientist's ethics is in a confused case, an oblique challenge, a complex problem of judgment. Even when the scientist thinks the issue is one of truthfulness, which is his main business, laymen may say that he is misinterpreting the situation.

To show how actual cases do not neatly fall under general rules, I shall mention the dilemma of the scientist who is trying to secure adequate appropriations for his laboratory. Suppose that the men who control the budget are interested in a kind of research that the scientist does not regard highly. Shall he take the occasion to speak what he regards as the truth? Shall he say bluntly that the favored project is unpromising? Or shall he encourage a delusion in the hope of financing good work along with the legislator's hobby? This difficult choice may be made without any critical deliberation, but one method of inducing real thought on the issue is to look for precedents in the history of science. Is the appropriation-seeker like Kepler, unable to secure a living from wages for his astronomy, supporting his important work by harmlessly indulging the superstitions of his time, that is, by casting horoscopes? Or, should our scientist be like Pasteur, responding to the pleas of the wine-makers, and finding an opportunity for theoretical progress in what was for the nonscientist merely an industrial problem? Or is our scientist betraying the cause of science, like those German professors who fell in with the Nazi's crazy investigations of race?

The legalistic approach, arraying precedents and distinguishing cases, is one type of ethics. It accepts the rules of the scientists' code; it keeps reiterating that the main business of the scientist is to search for true and systematic knowledge, and that this enterprise should be protected from ignorant meddling; but it does not assume that these professional rules apply themselves. The legalist or casuist sees the need for nice discriminations. By his knowledge of the history of science, he reminds scientists of the many values affected by decisions that were more or less similar to their decisions, values to which they may otherwise be blind.

A definition of the scientist's work does not give him a sufficient directive for all of his choices, any more than the mechanic, the mother, or the manufacturer is relieved of the necessity of deliberating by recalling that they are paid to repair machines, to bear and nurture children, or to manufacture useful things. Membership in an occupational group imposes some tasks and ideals upon a person, but it does not automatically settle all questions as to what is right and good. The problem is not merely how to be a geologist or a bacteriologist, but how to pursue such a career in an unideal world which contains both ignorant and demented people and how to improve systematic knowledge under circumstances where a great deal of nonscientific work is required to clothe, feed, warm, entertain, and otherwise serve human beings.

I have indicated how the precedent-examining methods of an authoritarian ethics may help a scientist to think about his duties. An authoritarian ethics calls for a study of all the applicable rules and precedents and then eliminates those authoritative pronouncements that happen to be irrelevant, by distinguishing the circumstances of different cases.

IN CONTRAST to such backward-looking ethics, there are forward-looking systems of ethics that specify desirable results and ask whether our actions are designed to achieve these results. Let us examine a series of instances in which the publication of findings is likely to be damaging to some human interest. First, consider the plight of a health commissioner who discovers the existence of a dangerous epidemic. If he issues warnings of an alarming nature or if he closes theatres, churches, schools, and stores, many persons will be seriously inconvenienced and some may be ruined financially. If he does nothing, scores and perhaps hundreds of persons may die needlessly and prematurely. In such a predicament, common sense supports a Utilitarian ethics which asks what the consequences of alternative actions will be and which course of action will most efficiently serve the greatest happiness of the greatest number. The publication of alarming medical findings is properly guided by a calculation of desirable and undesirable results. Such deliberations would seem more righteous than conniving with businessmen and politicians or pandering to the whims of reckless pleasure-seekers. The moral prescription is to determine how accurate knowledge can serve the greatest human good, publish your findings accordingly, and let the chips fall where they may. This is a clear and simple choice from the ethical point of view, though the technical problem may be very difficult.

The same kind of mandate is given by Utilitarian deliberation upon the problem of the scientist who gives expert testimony in lawsuits, before regulatory commissions and legislative committees. We disapprove of engineers, economists, and physicians who frequently testify for litigants and always somehow manage to find evidence favorable to power companies or injured customers or to whatever class of clients has hired them. Under many circumstances the ethical expert may be distinguished from the unethical expert by noting whether he is as impartial and foresighted in the use of his knowledge as he was in his research.

I now wish to call attention to a common failure to evaluate *all* the consequences, and I do so by referring to a series of conflicts in which experts were perhaps needlessly involved. Several of them have been reported by the Inter-University Case Program:

1. The dispute between the economists of the War Production Board and the War Department regarding the feasibility of production goals in 1943 and 1944.[4]

2. The attack by labor unions on the cost-of-living index of the Bureau of Labor Statistics and the defense of the index by the statisticians.[5]

3. The controversy over the merits of natural as contrasted with portland cement in the state of Minnesota, a controversy which seemed to become unnecessarily a clash of personalities.[6]

In the first case, the economists were clearly correct: production goals had been set above industrial capacity for 1943 and 1944. But I call your attention to the tactless manner in which the generals were informed of their error. Here are a few sentences from one memorandum which an economist sent to a general:

> "In view of the gravity of the problem discussed in these Documents, I hesitate to take your memorandum seriously . . ."
>
> "The fact that we once urged that the sights be raised, is no reason for now adopting an ostrich-like attitude when goals are established that are above probability of achievement . . ."
>
> "I regret that the memorandum . . . was not phrased so as to be comprehensible to you."
>
> "Apparently you changed your mind since May 14, 1942 . . ."
>
> "Your conclusions from it, however, that these judgments be carefully hidden from the eyes of thoughtful men is a non-sequitur . . ."
>
> "The basic findings of the report have been overlooked in favor of minutiae. . . ."[7]

In the intense excitement and inter-agency frictions of 1942 the above statements were needlessly irritating. They suggest that the economists had not thought as carefully about their human relationships and the phrasing of their communications as they had about the facts which were under discussion. It was as if a teacher should correct a pupil who had said that 9×7 is 54, not by giving the correct answer or suggesting another try, but by saying, "You stupid ass, you can't think straight." The communication was not just an assertion of findings but an emotional expression of contempt for a person who did not immediately recognize the accuracy of the findings.

The ethics of Utilitarianism can challenge emotional explosions by experts, by reminding them to consider the consequences of their manner of publication as well as the ideas contained in the publication. An ethics of Utilitarian results can deal with the results of personal piques and passions, but the scientist, like other people, will probably find an ethics of motives better suited to this problem. Somehow, the research man needs to ask himself whether he is acting from mere irritation or pride or some other passion.

SCIENTISTS, being intellectuals, often experience intense dislikes for unintellectual people, not only because of the latter's slow-moving and limited talk, but also because of the nonintellectual's craving for physical enjoyments. Thus it happens, that learned men serving as consultants in practical affairs not only tell unscientific people that they hold erroneous beliefs but also, by manner of expression, they convey the idea that the unlearned are inferior as persons. This state-

ment can be documented by records of bad labor relations where experts have been inconsiderate of the feelings and self-esteem of workmen and also by records of bad customer relations where consultants have forgotten that the customer was not only a man with an unsolved technical problem, but also was a man expecting courtesy and maybe a little flattery. Learned men, like anyone else, need to ask themselves Kant's question: "Am I treating other persons as ends and not merely as means?"

Kant's critical standard, the treatment of human beings as ends in themselves, is a very disturbing standard for the contemporary specialist. The utilization of scientific discoveries has been speeded up. In many fields advances in knowledge are planned with the needs of practical institutions in mind. The investigator can no longer assure himself that his efforts merely satisfy a curiosity about the workings of nature. The nuclear scientist is conscience-stricken in his awareness that the next achievement may multiply by ten the number of human lives that will be snuffed out by a single bomb. The biologist or the biochemist may be painfully conscious of the fact that his employer will use his next discovery, not to distribute a benefit to the maximum number of citizens, but to maximize short-run profit for a price-gouging monopoly. The social psychologist may realize that his findings will be used to protect the game of some politician or bureaucrat. A social scientist told Alexander Leighton during the war: "You always get one of two requests: to show that some policy the executive has already decided upon is badly needed; or, to show that some policy the executive is already employing is working well."[8] The scientist who knows that his work will have practical consequences is apt to worry lest he provide the weapons for an unjust war, the means of reaping unjust profits, or the material for dishonest propaganda. How can he keep science from the service of bad causes?

On no issue is the discussion of scientists' duties more confused today. The opinions range from simple denials of responsibility to proposals that the professions take over the complete government of mankind. The scientist who suspects that he is serving evil purposes is not in a unique predicament. Any workman may experience the same difficulty. Ordinarily, a mechanic who repairs an automobile is not expected to judge the purpose of the motorist's travel. But, if the mechanic, while repairing an automobile, sees some sawed-off shotguns, he will wonder whether he does not have an obligation to call the police or take other measures to prevent crime.

If the mechanic calls the police, he ceases to practice his art as a mechanic. So, too, the scientist who resolves that he will not serve a war lord, a price-gouging monopolist, or a self-serving propagandist usually stops his pursuit of scientific knowledge and enters upon another business. The issue is whether, as a citizen, the scientist shall act on his present fund of political information and whether he shall accept the risks of reward and punishment.

Judging political activity from the Utilitarian standpoint of efficiency and the desirability of results, we can observe that some scientists have been careless in jumping to conclusions. Emotional outbursts of sympathy or rage have caused certain scientists to respond to the gold-brick promises of communists, fascists, and other propagandists. The result has been treason on the part of politically naïve men like Fuchs and narrow partisanship on the part of scientists who have been uncritical of super-patriotic emotions.

From the standpoint of Kant's ethics of motives or Socrates' ethics of consistency, what is even more conspicuous is the self-deception of scientists who believe that it is their duty to call the police but never finally decide to do their political duty, and think confusedly that if they confine themselves to scientific investigation circumstances will somehow mysteriously conspire to guarantee a moral use of their findings. They indulge in a shallow faith that they can eat their cake and have it, too. They respond emotionally to an injustice or an emergency, but they are panic-stricken over any possibility of losing their privileges as research scientists. They demand reform, but they think they can combine reform with security for themselves.

If one honestly believes that the whole political power structure of society is intolerably corrupt, one must be prepared—like Lenin, Trotsky, or Gandhi—for exile, imprisonment, loss of privileges and even assassination. If one honestly believes that the policies of his government are not totally evil, but stand in need of mild reforms, one must be prepared for some enmities, some abuse, and some interruptions of research activities; one must be willing to "waste time" and endure silly disputations. If one wishes, on the other hand, to spare no time, to endure no abuse, to take no chances, one should say, "I only work here" and take whatever orders are issued by those in power.

I am convinced that the talk about science and values is often muddled by unresolved mental conflicts, conflicts between the resolution not to serve an evil purpose and the desire to win a Nobel prize. The mechanic who calls the police when he finds gangsters' weapons in the automobile should not expect the gangsters to pay him for repair work. The mechanic who shuts his eyes to gangsterism should not kid himself that he is somehow preventing crime.

In the worst political regime for which records are now available, the Nazi regime, it is apparent that some scientists, like some generals, stopped work or at least diverted part of their energies to the correction of abuses. They took the chance of going to a concentration camp. It is also obvious that some scientists, like some generals, shut their eyes to criminal policies, and opportunistically busied themselves with professional advancement in a rotten system.

In a society with mixed purposes, like ours, the scientist's political decisions are less tragic. Nevertheless, less extreme choices are unavoidable. No blind faith in progress or in providence can wish the option out of existence. The critical ethics of Socrates and Kant cuts

through the fog of wishful thinking by asking the scientist whether he is seriously committed to the benevolent application of knowledge or whether he is willing to aid in the perpetration of injustices or in the destruction of humanity or whatever policies are adopted by the men in power.

A FEW of the practical choices that confront a scientist have been commented upon in the foregoing. The fact that he is a scientist does not deprive him of the necessity of making decisions. The fact that he is a scientist does not guarantee, when he gets away from the study of his experimental apparatus or his statistics, that he will make thoughtful and wise choices. Like the mechanic and the businessman, the man of knowledge faces alternatives both within his occupation and in his nonprofessional career.

The scientist usually has a job description which directs him to seek, to publish, and to use systematic knowledge. This job description serves as a code of ethics, a set of rules and directives. But the code does not relieve him of the need for deliberating upon the extent to which he should let other interests steal time from his investigations. No code will finally determine what compromises to accept in securing financial support. However committed he is to the improvement of knowledge, a scientist still faces hard choices in the publication and use of his findings. He has to decide upon his role in litigation and in controversy. He may or may not be wise in his dealings with unscientific people. Finally, no code will ever finally settle all future issues regarding the need for political reform.

Philosophical methods of ethical analysis have the same relevance to the scientist's choices that they have to anyone's decisions. They do not guarantee that he will not make a regrettable decision, but they clarify and order the thinking which relates information and action to the ends of life, that is, to those objectives about which he has feelings, sentiments, and loyalties.

In this paper I have concentrated attention upon a few types of philosophical ethics: the legalistic methods of an authoritarian ethics—the scientist employs these methods when he relates his present dilemmas to the precedents established by the scientists of the past; the calculating methods of Utilitarian ethics—the scientist is guided by these methods when he asks whether the consequences of his practices are going to be desirable; the ethics of Socrates and Kant—the scientist employs their methods when he asks whether his motives are disciplined and consistent, or whether he is trying to eat his cake and have it too.

Paraphrasing a famous speech, I would say that there is no special ethics for scientists because scientists are human and subject to the same fears and compulsions that upset the judgment of other human beings.

> "Hath not a scientist eyes? hath not a scientist hands, organs, dimensions, senses, affections, passions? fed with the same food, hurt with the same weapons, subject to the same diseases, healed by the same means, warmed and cooled by the same winter and summer . . .? If you prick us, do we not bleed? If you tickle us, do we not laugh? If you poison us, do we not die? And if you wrong us, shall we not revenge?"

With the same weaknesses of the flesh, the scientist can experience value-blindness. Possessed of glands and a nervous system, the scientist can lose his head in panic or anger. Like anyone else, the scientist experiences difficulty in making clear-cut choices, though his choices are somewhat different from those of the layman. His practical problems are as subject to ethical judgment as those of the politician or the businessman, although they are concerned with the extent to which—in a world full of conflicts—it is possible to pursue knowledge.

The fact that a scientist spends a good deal of his time in studies from which he tries to exclude moral judgments does not mean that the scientist and his activity will not be subject to moral judgment. Like any other human being, his actions will be deliberate or impulsive, right or wrong, wise or foolish. The scientist who is value-blind may think of his actions as merely a theoretical or technical pursuit, while the rest of the community interprets his action as snobbery, disloyalty, or graft. The scientist who measures up to ethical standards may derive little of his good judgment from science; he may be responding to what is an irrelevance from the standpoint of inquiry.

The differences between an educated fool and a scientist who has good judgment are often an unplanned accident. I have been suggesting that philosophical ethics can bring these differences out of the realm of sheer guess, intuition, and hunch by formulating a few deliberative questions. The philosophers of great insight help the scientist ask whether he has evaluated his own conduct in the light of precedents, from the standpoint of its consequences, by an examination of his own motives, by considering his adjustment to personal limitations, and the like. Such questions force a man to relate his activities to his values and loyalties.

All that I have said assumes that the most difficult ethical problem of scientists is not to avoid choosing evil, but to realize when a moral choice is being made. Hence, the scientist who is ethical is probably the scientist who asks the right questions. I suggest that future contributions to the literature dealing with the ethics of science give more attention to the asking of pertinent value questions, not about science in general but concerning day-to-day activities of the man of science.

1. See David Hume, *Enquiry Concerning the Principles of Morals.*
2. See C. D. Broad, *Five Types of Ethical Theory,* Chapter IV. Kegan Paul, Trench, Trubner & Co., Ltd., 1930.
3. Irvin S. Cobb, *Speaking of Operations,* p. 21. Doubleday, Doran & Co., 1915.
4. *The Feasibility Dispute* by John Brigante. Copyright, 1950, by the Committee on Public Administration Cases, No. 3 Thomas Circle, Washington 5, D. C. This and other cases will be published by Harcourt, Brace & Co., in 1952, under the editorship of Harold Stein.
5. Kathryn Smul Arnow, *The Attack on the Cost of Living Index.* Committee on Public Administration Cases. Copyright, 1951.
6. Paul N. Ylvisaker, *The Natural Cement Issue.* Committee on Public Administration Cases, 1950.
7. Brigante, op. cit., pp. 84–6.
8. Alexander H. Leighton, *Human Relations in a Changing World,* pp. 127–8. E. P. Dutton & Co., 1949.