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MORAL CONSIDERATIONS RELATING TO PROBLEMS OF SPACE DEBRIS

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ABSTRACT

It is argued that a more viable approach to the moral aspects of environmental pollution is required. Using the problems of space debris and pollution of the earth from space as an example, the suggestion is advanced that technical and ethical factors are unjustifiably dichotomized and that the way to overcome this dichotomy is to extend the application of scientific method to moral as well as technical problems. This is the approach defended by John Dewey in his instrumentalist theory of value. A brief review of the hypothetico-deductive pattern of problem-solving, first outlined by the American pragmatist philosophers, is offered. An explanation is furnished of the applicability of this method to any problem, including those which are moral. The approach to problems of space pollution follows as a matter of course. It is suggested that the problems being grappled with by participants in the present Symposium are of unparalleled gravity. They are much too important in their moral aspects to be resolved by appeal to merely technical factors, or to scripture, moral intuition, traditional standards and values, the "greatest happiness principle", or to any other alternative to what Dewey was fond of calling the "method of intelligence".

INTRODUCTION

I intend in this paper to describe briefly a very narrow and well defined area of biospherical pollution--the mounting accumulation of debris in space--and then demostrate that the technical considerations involved in this problem are inescapably bound up with moral considerations. I would like to show, following the lead many decades ago of the American philosopher, John Dewey, that no bifurcation can be made between engineering and scientific problems, on the one hand, and moral and value problems on the other.

It has been widely publicized that the Wright Brothers' first attempted flight on December 17, 1903, was shorter than the length of today's space shuttle. A little more than fifty years later, on October 4, 1957, there was one man-made object in space: the Russian Sputnik I. And then, within twenty years, approximately 4,500 objects in space were being tracked by NORAD, North American Air Defense. Today, seven years later, somewhere around 25,000 objects are being tracked. Included are such diverse objects as communications satellites that malfunctioned, some burned out 30 by 15 foot

Saturn Five tanks, and an austronaut's glove.

One area in space is especially becoming embarrassingly overpopulated. This is the area of placement for geosynchronous equitorial orbiting communications satellites. Before long some hard international bargaining will have to take place, even though there appears to be no precedent in international law for a problem such as this.

And how do we resolve the problems stemming from collision in space? The Space Command Space Defense Operations Center, SPADOC, claims that during the 4th shuttle mission, a Soviet rocket body passed within only a few miles of the orbiting shuttle. Officials at SPADOC say that they eventually may have to become the traffic cops of outer space--though of course one wonders how the Soviet Union will greet that kind of unilateral decision? In any event, collisions in space will result, at the very least, in the creation of more space debris. The three authors of a paper in last year's Journal of Spacecraft and Rockets claim:

> "It is conceivable that debris population will be created which will make the near-Earth orbit unusable for any extensive space programs. If this occurs there will be very little that can be done except wait for atmospheric drag to clean out the lower-altitude regions."(1)

SPACE DEBRIS AND MORAL ISSUES

Not only do we face unprecedented problems of the collisions of objects in space, but we also must somehow lay down ground rules for the re-entry of undesirable space objects into the earth's atmosphere. An already classic example of this, of course, is the landing in Canada on January 24, 1978, of the Cosmos 954 reactor. This mishap, and the consequent search and recovery of debris, cost millions of dollars.(2) And a similar threat was posed by Cosmos 1402, a malfunctioning nuclear-powered radar ocean surveillance spacecraft. The attempted separation of its reactor into a high-altitude orbit failed, and the fission system of Cosmos 1402 was left in low orbit.(3)

Among the other significant space pollutants are rocked effluents which, according to D.M. Rote in a 1982 issue of the Journal of Spacecraft and Rockets, may actually cause "compositional changes" in the atmosphere.(4) And of course we cannot ignore one of the most ominous environmental threats of all: the militarization of space. It is now known that the first Department of Defense payload entered the new frontier aboard space shuttle number four. In the meantime, of the 101 missions into space launched by the Russians in 1983, approximately 85% included military objectives.

Questions abound--many, or possibly most, of which appear to be philosophical in nature. Shall we solve the engineering problems first, and then sit down at the bargaining table? Shall we agree first on a common moral code or system of values or set of international laws? How do we judge the rightness or wrongness, the good or evil, of colliding and exploding and falling objects of different national ownership? National laws, in this last case, are worthless. And international law is ineffective, at the very

most, and usually is totally inapplicable.

The way to answer these questions, it seems to me, is actually quite simple, although the answers certainly are highly complex. There has been in the tradition of European culture, a dichotomizing of fact and value, science and humanities, means and ends, that traces back at least to Aristotle, and probably back to Plato. I contend, with all due respect to these two great thinkers, that this dichotomy is false.

One does not ask: Do we solve the technical problems first, or the moral problems? The scientist or engineer or philosopher or moralist or religionist does not deal with one type of problem to the exclusion of the other. I am not saying that it is time for science and ethics to marry or remarry. Rather, it is time to recognize that they should never have been divorced.

The ancient Greeks, lacking a history, had reason to detemporalize ethical knowledge and to sanctify morals as eternal and universally binding. We no longer are justified in adopting this position. For one, too many moral revolutions have taken place over the past two thousand years.

The scientist does not function professionally in a contextual or temporal or moral vacuum. He comes to his laboratory with a very great number of moral assumptions and value presuppositions. Nor ought the moral philosopher come to a problem of applied ethics without a thorough layman's knowledge of the relevant empirical data.

It would appear that the false assumptions underlying the bifurcation of science and ethics are two in number. The first assumption is that science and ethics are of a different logical form The second is that they treat of different issues, the ethicist dealing with the moral issues while the scientist leaves aside the moral and pursues his empirical or theoretical research.

The first assumption runs as follows: Science deals with the generic and universal, hence the hypothetical, the intellectual, and the causal. Ethics, on the other hand, deals with the particular, the categorical, practical and non-causal. It deals, that is, with the intrinsic rather than with the instrumental, with ends rather than with means. Leaving aside, for the moment, this description of the form of scientific thought, what must be questioned here is the view of ethics. To regard ethics in this way is to place it in the same feudalistic system that characterized science hundreds of years ago, and with potentially the same results: a total lack of growth and a frustrating barrier in the way of solutions to moral problems.

The second assumption is that science and ethics deal with different issues. Again this simply is not true. At the very heart of any environmental issue, for example, are the moral issues. We place value on life and the quality of life. When science helps to detect and resolve human problems involving basic values, then it, science, becomes by definition moral. When, as Dewey says, "the consciousness of science is fully impregnated with the consciousness of human value, the greatest dualism which now weighs humanity down,

the split between the material; the meachnical, the scientific and the moral and ideal will be destroyed. Human forces that now waver because of this division will be unified and reinforced."(5)

In the early days of science men who adopted what is now called the scientific method of inquiry were thought to be foes of science and subverters of truth. Francesco Sizzi, Professor of Astronomy at the University of Pisa, refused to look through Galileo's new telescope. There cannot possibly be four new bodies orbiting Jupiter, Professor Sizzi argued, since there are sevend days in the week, seven apertures in the head, and so on; so there must only be seven bodies in the solar system. And today the moral philosopher who adopts the scientific form of inquiry is widely considered to be a foe of genuine moral inquiry. This is simply not true for ethics, anymore than it was ever true for science.

In science we don't start with categorical and antecedently given conceptions as dictated, for example, by some church, and then expect to resolve our problems. Neither should we do so in ethics. Rather, the general pattern of ethical inquiry quite clearly follows that of sicentific inquiry.

We start, as all you engineers and scientistsknow, with a problem situation. We gather relevant data, and formulate plausible hypotheses. From these hypotheses we deduce consequences which we test, sometimes empirically, but usually ideationally. Most hypotheses we reject without an experimental test. Some are too expensive, some are inherently implausible, others run afoul of generally accepted mores. The few remaining hypotheses are tested and confirmed or disconfirmed, or quite possibly shoved into a desk drawer to await further thought or more time.

Now I ask you wherein resides the difference between your scientific problem-solving and the intelligent--and I stress intelligent--solving of ethical or value problems?

Let's take a problem mentioned earlier, that of the December, 1982, Cosmos 1402 mishap. The Soviet engineers tried to separate a nuclear reactor from a radar ocean surveillance spacecraft. The maneuver failed. The dangerous fission system, rather than being sent into a high-altitude orbit, remained in an ominous low orbit. When it enters the atmosphere and lands at a site other than the ocean, who pays the damages? Who does the cleaning up? Who compensated the maimed and the families of the dead? What exactly is right or wrong, good or evil, in this problem-situation? What ought to be done?

To gather data bearing on questions such as these is difficult, of course, but it is not impossible. And it is of surpassing importance. Consider the alternatives. An appeal to Judaic-Christian Scripture perhaps? or to the Koran? or to das Kapital? or a simple fideistic appeal to some popular contemporary religious or political leader? or an appeal to moral intuitions? It's a very great pity, actually, but nonetheless true, that the moral intuitions, scriptures, injunctions, and so on, of the adversaries in this sad game simply do not agree. We need desperately to find a common moral stand, one on which men will agree, much as they agree on scientific theory and hard technical data.

Relevant data concerning Cosmos 1402 would surely include, for example, the design age of the reactor-launchers. Does the design need updating? Or should it be replaced by a new design? In point of fact, the Soviet design is about 15 years old and should be updated and preferably replaced.

But more important would be possible guidelines and parameters on safety features that could, by mutual consent, be incorporated into satellites using nuclear fission. Presumably continued and responsible discussion concerning issues like this would eventuate in a treaty (that is, a hypothesis) that would seek to prevent future threats of falling nuclear reactors. So we try it out. If it works, so much the better for the well being of mankind. If it does not work--if the hypothesis is disconfirmed--we had better get back to the bargaining table in a hurry.

What I have suggested barely scratched the surface of a problem such as that posed by Cosmos 1402. But I hope my point has been made. Does all this, or does it not, involve human values? A negative answer is pretty hard to swallow. Were it not for the fact that human values are irrevocably bound up with technical facts, then what difference would it make that the near-Earth environment might become glutted with debris and other pollutants?

Let me press this thesis in a somewhat different, perhaps more personally effective way. Suppose one of you engineers or scientists were to discover a simple new equation, say, on the proportionality of some chemical with some pollutant. Let us assume that you are delighted by this discovery. But suppose then that someone comes along and demonstrates to you in some way that your discovery will have utterly no perceptible effect on human affairs or industry or progress in science. I don't quite know how this will be demonstrated to you--but let us suppose that you have been convinced. What would be your reaction? Think about it. I suggest that you might for a while indulge in a little secretive fantacizing--a vacuous mathematical game-playing. But after this unproductive period was over, would you not seek another line of research, one that would involve in some conceivable way human values?

CONCLUSIONS

In closing let me reemphasize what I consider to be the two most important points in my paper. First, the bifurcation of science and ethics, or more fundamentally of fact and value, is not merely an unjustified dichotomy. It is a dichotomy which, if perpetuated, can only become increasingly pernicious. And second, a closely related consideration: a solution to the problem of overcrowding of objects in near-Earth orbit, as well as the solution to almost any other environmental problem, requires that moral factors be considered, not only as related to, but as inseparably bound up with technical factors.

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