Henry Winthrop

SOME POSSIBLE SOCIAL BENEFITS OF SPACE RESEARCH

It is becoming obvious that space technology and space exploration are producing discoveries which must inevitably have a major impact on the condition of man. The possible effects to come may be gleaned from a series of volumes which have already been published under the auspices of the National Aeronautics and Space Administration[1] (NASA). Rarely, however, is an effort made to relate discoveries in space technology to the concerns of humanists and social critics and to the type of research that is of paramount interest to social scientists. It will therefore be pertinent to point to some socially important effects which may emerge in the future, and even well within the lifetime of most people living today. Of two probable social repercussions, one will be the effect of space research on planned product obsolescence—an industrial practice now widely lamented even by manufacturers themselves. The second will be the use to which communications satellites may be put in dissipating international misunderstanding. These have received elsewhere either no examination at all or one quite different from that which is essayed in this article.

In discussing these two repercussions, we shall ignore what the economist calls their "social costs." This term refers to a wide variety of cost elements. In general, it covers all direct and indirect losses suffered by third persons, the general public, or the government, as a result of private economic activities. Many of these, of course, will crop up as space science and its applications become widespread. Billions of the taxpayers' dollars going into government space research, for example, will furnish much of the financial groundwork for applications and developments by private industry. The same taxpayers, however, do not share in the subsequent profits, nor does their government. In nuclear testing for defence, the social costs show up in unwanted radiation and fallout which, appearing in our food, constitute a threat both to human nutrition and to the normal mechanisms of human heredity. These social costs are not, in any sense, borne by the military in the form of financial compensation to be paid to food growers and processors for eliminating fallout in their products, nor is compensation made for damages to human beings who may be injured by such radiation or fallout.

Many such social costs of space technology will emerge over the years, and in studying the social effects chosen for discussion here, we shall ignore their social costs on the assumption that they will be borne uncomplainingly—if not cheerfully—as many kinds of social costs resulting from our system of free enterprise are borne now.

I

Space Technology And Industrial Philosophy

Free enterprise is beginning to depend increasingly on Planned Product Obsolescence (PPO). This is the industrial method we have developed of ensuring that buyers will accept consumer durable goods with a useful life much shorter than that which current science and industrial technology can provide. Vance Packard[2] has catalogued the sins of production committed in the name of PPO, and John B. Stewart[3] in a recent study indicated that two-thirds of American manufacturers were, themselves, not very happy with this practice. One of the contradictions of a free-enterprise economy is the conflict between the ideal of providing service to the consumer and the ideal of ensuring that Gross National Product (GNP) will be forever on the increase. This second ideal entails either expanded markets for whatever comes out of the industrial hopper or expanded consumption within those markets that have already been established for our GNP. When foreign markets do not expand fast enough to take up any increases that occur beyond our own current and domestic levels of consumption, then the extra volume of goods and services which we have produced must be taken up by domestic demand. If this does not happen, unemployment increases, prices fall, and capital investment declines, all of which threaten stagnation and, when severe enough, even collapse of the economy.

One means of getting the consumer to absorb unexportable increases in the volume of GNP is to increase the speed with which consumer durables cease to function efficiently, so that as time goes on more units of that item will have to be purchased and consumed to provide the same service. If prices remain stable or if they decline at a rate such that the total cost to the consumer, per hour of use of a consumer durable, rises with the passage of time, the manufacturer will be able to dispose of a large portion of the increase in domestic goods which cannot be absorbed by foreign markets alone. This industrial makeshift represents one form of what has come to be called planned product obsolescence.

Typical results of this unfortunate industrial habit are razor blades that can serve for perhaps only two good shaves,[4] automobiles whose parts wear out much too soon, and radio and television sets which require both repairs and replacements earlier than is necessary. Similar examples could be supplied, were they needed, for dozens of other "durable" items produced by some major American industries. There are, of course, other forms of planned obsolescence. One of these is to persuade the consumer to part with an item that is still useful in order to purchase another which will confer upon him an increased measure of social status. Another form of planned obsolescence is a natural result of competition and is highly desirable. This occurs when industry makes a model of an item which will do what the existing model does, either more efficiently or more cheaply, or both. Neither of these latter two forms of planned product obsolescence is part of the focus of our attention. The first form of this undesirable industrial habit, however, puts a premium upon shoddy work and is under indictment almost everywhere.

Space technology has more to do with this matter of planned product obsolescence than is apparent at first glance. It is now recognized that space technology, in the form of communications satellites, holds the promise of revolutionizing our currently existing communications industries. If we are to believe such men as Berkner,[5] the impact of space technology will be felt on such processes as radio, telephone, and television transmission, on messages sent by the teleprinter, wirephoto, and radiophoto, and on still other but less-known means of communication. The impact on all of these of space technology, in the form of both passive and active relay systems, may result in the creation of one or more new industries. The number of radio channels suitable for long-distance communication by presently existing technologies is severely limited. Transmission by cable is also limited and quite costly. All this can be changed by facilitating communication through the use of properly oriented, suitably designed, and efficiently equipped communications satellites. *Telstar* is merely the first of these which has been put on a commercial basis. The efficiently equipped communications satellite of the future will probably condemn *Telstar* to The Smithsonian Institution, that graveyard of many of those technologies which reflect crude beginnings, if our crude beginnings in communications satellites can ever be recovered and prevented from cluttering up the skies.

We are now ready to focus our attention on the relation of space technology to planned obsolescence. For these complicated communications gadgets that will soon be scattered overhead, we shall need component parts of electronic circuits that must achieve a high reliability in performance and, even more important, a very long life. Communications satellites may have to last for decades, and parts will therefore demand precision features and durability rarely asked for in the production of instruments for use in manufacturing, aeronautics, or navigation. If anything goes wrong in a communications satellite, no repairs or replacements can be made. The cost of making them would be prohibitive, and the operation would be both risky and unpractical. Barring unforeseen technologies of self-repair and replacement for communications satellites of the future or technologies which minimize the need for maintenance, we shall have to pin our faith on components of lasting durability. In this connection let us note that the Soviets have now developed a technology which minimizes the need for maintenance of parts in space. The Russians have developed a nuclear reactor, capable of being used as a power station in space, which requires a minimum of maintenance in space as a source for long-term power supply. This nuclear reactor, called the "Romashka" or "Daisy" reactor, achieves its advantage because it has no rotating parts.

The emphasis on the need for having reliable and durable components in all types of space hardware, but particularly in communications satellites, will demand production specifications which contravene planned obsolescence. The same demand will also have to be made for artificial satellites which are intended as space probes for nearby bodies. This same demand must also be anticipated for unmanned space ships that will be expected to land on the moon and on other bodies in the solar system, even if their only purpose is to discover whether or not successful landings can, in fact, be achieved. High standards of reliability for the coming age of robot technology can also be foreseen. We have to look forward to robots which can collect samples of various kinds of substances and gather various kinds of data, after they have emerged from a space ship that has landed at its celestial destination. Such robots will then have to televise back to earth pictures of objects or substances by some sort of orbiting relay system. They will also have to transmit data readings by some kind of long-distance communications system. High component reliability and durability will also become pressing necessities when we want *unmanned* space ships to land, pick up samples of various substances, accumulate data for a given period, and then be capable of relaunching themselves to earth, perhaps through a pre-set timed signal, while carrying their prizes with them.

Finally, and of current practical urgency, the *manned* space ships that will presumably follow the unmanned will have to be blessed with highly reliable and long-lasting circuits, sub-assemblies, and components. This demand will, of course, be inevitable where human lives are at stake. The occupants of manned space ships, because of their unusual abilities and the expensive training which has been necessary to equip them for their tasks, represent almost irreplaceable resources. We cannot afford to lose the enormous investment which such persons and their space ships represent, through the failure of one or more components of their space vehicle. Component reliability and durability must then become one of the most essential requirements for space technology and space research.

One consequence of all this emphasis on excellence in craftsmanship and design is that thousands of workers will become directly familiar with good industrial workmanship and millions of citizens not directly connected with space activities will be *educated in a philosophy of planned product durability.* It will also mean that engineers' ideals and engineers' dreams of high performance standards, their admiration of good workmanship for component parts, and their knowledge of extended life for complex assemblies will all come to the forefront. It will finally mean that all people associated with the production and design of space-equipment will not have to wrestle continually with the moral problems that accompany productive activity in which the profit motive predominates. In short, at least in those industries associated with space technology, it means the eclipse of planned obsolescence forever.

Can we then expect that industrial countries, operating under free-enterprise ideals, will allow a double standard of industrial morality to exist in their economies? Do we really believe that when the capital goods needed for space technology of every sort have entered the era of mass production—perhaps under some type of United Nations planetary co-ordination—that this will have no effect on the consumer durables industries? The question is, of course, rhetorical. I believe that the intelligent citizen of the not-too-distant future will stage a buying revolt against consumer durables, until the standards of planned product durability, which will then be so characteristic of the space-goods industries, will be applied to consumer durables as well.

When this socio-economic phenomenon takes place on a large scale, planned product obsolescence will disappear. When it does, all our Western economies which now function in terms of what the economist Rostow calls high mass-consumption will have to be revamped on an entirely new institutional basis. It cannot be suggested here what that basis will be, but the problem can be indicated. It is that of planning for and co-ordinating a series of objectives which at present are not very coherent. These objectives include the maintenance of high industrial productivity, the achievement of a longer life for consumer durables, population control, the satisfaction of the profit motive, and the ability to maximize human energies and human ingenuity within the framework of our industrial system. This will have to be done without producing waste, without slowing up the rapid pace of industrial change, and without altering our designs for living. I do not envy the social experts whose responsibility it will be to deal with social problems of such complexity. But one consequence does seem to be in the offing. Space technology and space activity should result in some drastic institutional and economic changes, some pervasive changes in our notions of a functional standard of living and in the eclipse forever, let us hope, of planned obsolescence. Thus do great economic trees from spatial acorns grow.

The change in industrial attitudes and consumer buying habits that will result from increasing recognition of the ease with which reliability and durability can be obtained is not a matter to be underemphasized. The demands of reliability are inescapable in weather satellites, communications satellites, fuel cells, rocket engines, boosters, and guidance equipment. The need for durability in other fields—such as that of medical engineering and biotechnology—is obvious in such lifesaving devices as the heart pacer or "heart pump". Such devices have to be powered without cumbersome and failure-prone batteries. In the future, transmitters implanted in the human body and powered by the body's own electricity may telemeter back to a physician's office a continuous report on the state of a patient's health. It must be remembered that the achievement of component reliability and durability in such areas as medical engineering and biotechnology is frequently a direct result of this same achievement in space research.

As a result, the consumer's eyes are bound to be opened wide both by the quality of production in the manufacture of space hardware and by the quality of performance of other items whose reliability and durability stem from the initial triumphs of parts manufacture for a variety of equipment to be used in space research. Both these broad avenues of change can be expected to reduce the influence of PPO considerably on the domestic front of consumer durables.

II

Semantography and International Understanding

The second topic of concern is a proposal about *one way* in which communications satellites in space may be so exploited as to increase the fund of international good will in our time—a desideratum which is today conspicuous by its absence.

The effort to achieve international understanding *is in part a function of a common language.* Needless to say we have none such today. Although English has for a long time worked its way into nearly every corner of the globe, current historical tendencies, such as the aggressive, expansionist efforts of Russia and China, create competition in the task of finding a single language that can be adopted by the whole world in order to aid in the process of achieving international understanding. Recognizing that any modern language can serve as propaganda for a given way of life—whether that of the West or that of the Communist East—all countries today are alert to the gain or loss in sympathy towards any national and cultural outlook which can come from the use of any particular language as an international medium of communication. There is a decided advantage in having one's native tongue adopted as a second language everywhere. Textbooks, literature, pamphlets, newspapers and magazines, and broadcasts can be deployed to gain a cultural, political, and social advantage. As a result, for a long time to come, we can expect that no existing language will be allowed to take "squatter sovereignty" and become the first international language deliberately adopted in the hope of achieving a common, global understanding.

The international artificial languages, such as Esperanto, Ido, and Volapuk, require intense effort and some linguistic background for widespread adoption. Such effort and such background are likely to be the exclusive possession of an educated elite. Even Interglossa and Interlingua, much of which can be read at sight by most educated people, still take for granted a familiarity with the linguistic roots of various languages, particularly Latin and its derivatives. It may occur to the reader that Basic English could be learned with little difficulty as a vehicle of communication, if there were international agreement to adopt it.[6] This is quite true, but the successful use of Basic English for purposes of reading would demand literacy, while its successful use orally would demand at least some sort of contact with spoken English. There are, unfortunately, many areas of the world, either primitive or—if not primitive—unblessed with the two cultural advantages just mentioned. Basic English would obviously be of little value as a vehicle for communication in such areas.

What would be most useful is a language of symbols, a great part of which could immediately be understood by all peoples, which would require hardly any instruction, and which would be capable of extension to some of the abstract ideas and concerns of modern man. If such a language could be found, it could be used for international communication and understanding, through the instantaneous, visual transmission of messages in its terms, using telecommunications systems like *Telstar* and its coming progeny. Such a language, being visual and therefore relayable, would also have the advantage of being immediately receivable on the screen of a receiving set anywhere. The instantaneous aspect of the transmission would tend to reduce somewhat the efficiency of space-jamming operations, whenever these are developed and whenever there is reason to fear opposition to truth and information. It would be easier to transmit information via the communications satellite in such a language, and far less costly, than to attempt to transmit the same information through the smuggled printed word. In the presence of such a language, together with the prospects of communication by space satellites, competition in blocking information and propaganda would give way to the exchange of information. Ideas would have to fight it out, trading punches on the principle, "Let the best relayer win."

Is there a universal language of symbols now available for such use, requiring little special educational effort to be understood and formed so that messages cast in it would be easily transmitted by televising communication satellites? Indeed there is such a language.

C. K. Bliss, an Australian, set out to realize the dream of the philosopher, Leibniz, namely, to produce a symbolism that would provide a system of universal communication.[7] Such an international language Leibniz himself called a *characteristica universalis*. Bliss was convinced that he had achieved this language in the form of a symbolic system called Semantography. It is an auxiliary, simple Picto-Ideography for interlinguistic communication. It is intended not only for people who do not understand each other's language but—and this is perhaps equally important—it is also intended for scientists, technicians, and business men who cannot communicate with one another. Bertrand Russell, a logician and mathematician as well as the twentieth century's best example of a universal mind, praised highly the possibilities that seem to be inherent in Semantography. He is one man whose opinions should carry some weight in this matter.

Why is it believed by Bliss and some of his supporters that Semantography is the answer to an internationally-minded idealist's prayer? The inventor of Semantography had for a long time been fascinated by cuneiform and picture writing. He made a study of the ideographs of the Chinese, the Babylonians, and the Egyptians. In these studies he even included the cave paintings of Aurignacian man. Bliss's objective was to separate, if possible, from all picture writings any unitary elements of symbolism which they might contain. By analyzing the ideographic elements of symbolism with which he became familiar, Bliss succeeded in separating the basic units of meaning which he thought common to them all. He arrived at the conclusion that he could produce a simple system that could be used by hand or with a special typewriter, so that the content of a message written in these units of symbolism could be understood by everyone who was, in any sense, familiar with them.

The task of creating such familiarity is not very difficult because Semantography consists of only 100 symbol elements. It offers a kind of literacy to millions of persons throughout the globe who have not had a formal education of even the most elementary kind. It is the considered judgment of Reiser[3] that peasants everywhere could master *Bliss's Primer for Children*. Semantography therefore could become not only an invaluable aid to the technical-assistance programme of specific countries or of the United Nations but, what is even more important, it could be used for purposes of disseminating important news and information all over the globe, thereby increasing the fund of international understanding and goodwill. It is believed by many who have become familiar with Semantography that its units of symbolism can prove of real worth in generally accepted human relations and can be used as a basis for communication related to the common needs of peoples of diverse cultures. In the course of time, it might even prove useful in the communication of matters involving complex abstractions.

In the present context, however, I am suggesting that televised visual communications, using communications satellites, could take full advantage of so important an invention as Semantography. The period of learning would be short for all. The effort required to learn Semantography, either within the schools of each country or via spatial communications using a United Nations channel, would not be very taxing. The intellectual sophistication demanded by artificial international languages is done away with. At the same time, no current language is a casualty if space technology succeeds in making an international language of Semantography. The jamming of messages becomes highly impracticable because of the lead time which will probably occur between presentation of a programme and the time required to succeed in jamming a visual message telecast from great distances in space. Most important of all, the peoples of the earth can begin to communicate with one another in earnest—politics or no politics—and with or without the physical presence of the communicants.

It is submitted that in the long run this blending of Semantography with the advantages offered by communications satellites may reduce international misunderstanding and ill-will. Should this possibility become a reality, we shall owe an immeasurable debt of gratitude to the space technology which made it possible. It would then become a dramatic triumph of good-will in which the technological product of man's newest ideas will have combined with a technique of communication that is among the oldest of man's artifacts to reduce social and cultural parochialism. In so doing, it may provide that millennial type of understanding which, until now, has seemed to be only an idle dream.[9]

NOTES

1. See the following volumes: (1) *Conference On Space, Science, And Urban Life*, March 28-30, 1963, 254 pp; (2) *Conference On Space-Age Planning*, May 1-9, 1963, 301 pp; (3) *Conference On Nutrition In Space And Related Waste Problems*, April 27-30, 1964, 400 pp; (4) *Fourth National Conference on the Peaceful Uses of Space*, April 29-May 1, 1964, 225 pp; and (5) *Conference On New Technology*, June 4-5, 1964, 156 pp.
2. Vance Packard, *The Waste Makers* (New York: David MacKay, 1960).
3. John B. Stewart, "Planned Obsolescence", *Harvard Business Review*, Vol. 37 (1959), pp. 14-28, 168-174.
4. Occasionally it is profitable to fight PPO. The fairly recent introduction into the market of stainless steel blades has reduced obsolescence by two-thirds or more. The process employed has been known for some time. One manufacturer who opposed the trend forced others to fall in line.
5. L. V. Berkner, "Are Space Probes Worth It?", in L. Friedman and C. P. Potter, eds., *Issues Of The Sixties* (San Francisco: Wadsworth Publishing Company, 1961), pp. 33-39. Reprinted from *The New York Times Magazine*, August 28, 1960.

6. Basic English, the invention of C. K. Ogden and I. A. Richards, is a simplified form of English intended to meet the objections to such artificial languages as Esperanto and, at the same time, remove the difficulties inherent in the large and complex vocabulary of ordinary English as ordinary English is seen by the foreigner. Intended as an auxiliary international language, Basic English consists of 600 common nouns, 18 verbs, 150 adjectives and 82 assorted pronouns, prepositions, conjunctions and adverbs. The 850 words of the general vocabulary are supplemented by an additional 150 for scientific purposes. The term "Basic" is an acronym for British, American, Scientific, International, and Commercial.
7. C. K. Bliss, *Semantography, a non-alphabetical symbol writing, readable in all languages,* 3 vols. (Sydney, Australia: Institute for Semantography, 1949); *100 symbol elements to overcome Babel in reading, writing and thought* (Sydney, Australia: No publisher given, 1949).
8. Oliver L. Reiser, *The Integration of Human Knowledge: A Study of the Formal Foundations and the Social Implications of Unified Science* (Boston: Porter Sargent, 1958).
9. A second article by Dr. Winthrop on the possible consequences of space research will appear in the next issue of the *Review*.

HOMECOMING

Deborah Eibel

Though none has ever bothered to molest
The unmet lady getting off the train,
She still has guilty dreams within her breast,
For nutriment. But she is porcelain,
For want of love. Now, on this harvest night,
Her country birthplace lies in savage ease.
On porches, in a wilderness of spite,
Her cousins revel in their strategies.
Their words incriminate the innocent—
And so she is a spinster. Yet, in fall,
She comes with no particular intent,
To visit kin—a harmless ritual.
And, palpable, she speaks. But kin are deaf
To one who comes unbidden as a leaf.