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A WORLD FEDERATION OF LEARNING

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after 1964

Of necessity, a number of disclaimers must be made at every turn in the program we have undertaken at this conference. Our charge has been to look ahead, not to the next step but to some far leap where valor is the better part of wisdom. Imagination is our guide, not present feasibility. We are to respect the laws of physics and the nature of man, but we can push both near the limits. For example, an acceptable topic might be the storing of antimatter in some stable configuration nicely isolated in space until called on to supply its energy of annihilation. Such a paper would not belong in the education section, but perhaps some similar straining of credulity might. One of the papers that did not develop for this session was to have considered how much the social behavior of man could be changed under the stimulus of a new environment such as space; this author was working in California and thus had a head start on the observation of strange environments, but unfortunately the paper did not take form. Certainly space does provide a new environment--not merely the environment of outer space but the new environment here, on this familiar thin boundary between earth, water, and air--made new by the fact that space is out there to be acted on and to act on us.

When one is asked to imagine what that action might be, one can perhaps justify some inconsistencies as the blinding of logic by the light of the imagination. As it turns out, the light is not all that dazzling, but then logic is weakened and easily blinded. For the most part, the imagination falters at the prospect of the whole universe to draw upon. Few of us turn out to be Dante. But at times we do ask of you poetic faith, as Coleridge called it -- the "willing suspension of disbelief."

A federated world, whatever benefits might come from the union, is not the purpose of a world federation of learning. Whether or not such a world might have peace or be more humane or more prosperous is beside the point. The federation must be advantageous to learning itself to such an extent that consequent effects, whatever they be, are rendered good by the "rational milk of the world," so to say, if a federation of learning is to be viable. We seek, then, the advantages to learning which come from the utilization of space and the further advantage which comes from the cooperation of learning institutions around the world in this utilization.

Cooperation between scholars at the top of the educational spectrum is easiest to visualize since much is in existence now. Educational spectra are quite different in different societies and are changing rapidly. In this country the highest level completed for the segment of population between 25 and 35 years

old runs as follows:

Highest Level of Education Completed, U.S.A., 1964

For 33 million people, ages 25-35

(Estimated and Adapted from OE-10024-65 and OE-54013-61)

Doctor	0.3
Master	2.2
Bachelor	10.1
College, no deg.	24.5
H. S. Grad.	32.4
9-12, no grad.	21.4
5 - 8	7.0
0 - 4	2.1

Between countries of like spectra, federation might follow the pattern of present arrangements between colleges, such as the one here in north Texas, wherein several private colleges and universities will be linked this fall by closed circuit television for the purpose of teaching graduate courses and, in effect, forming a federated graduate school. But an advantageous worldwide federation involves countries of quite different spectra; interlinkages, however they may be formed, would be between like levels and therefore between different bulks of the societies involved. The problems arising from such disparities are manifold, but they are not entirely unfamiliar because of experience in this country with minority groups.

Between the top lines of the spectra--the accomplished scholars--the problems are simplest; present, feasible linkages hold much promise. Research remains one of the principle tasks of any institute of higher learning. It strongly interacts with teaching and sad indeed would be the day these two functions become separated. A research laboratory located in space might well be shared by a number of researchers working in separate institutions.

Special instances of investigators working on the same project will exist and, if space provides the desirable environment, the researchers could cooperatively operate a remotely controlled laboratory. More generally, however, multiple use orbiting facilities need to be designed and placed in operation with time assigned to different research teams as on an accelerator; since the facility would not be easily available for insertion of sources or special instruments, great generality would have to be designed in. The need is present on earth bound facilities now. Some severe critics of research practices could point out redundancies in experiments and needless duplication of equipment, field by field. It is rather easy to imagine that magnetic resonance studies could have been well served by an international orbiting laboratory, even without the possibilities opened by super conductivity. Many physical and biological investigations of academic interest would be open to such handling once the launching and remote control of these miniaturized laboratories

becomes routine and economical.

Worldwide television, perhaps such as the Ford Foundation envisages, could provide the medium for continuing seminars for scholars of like disciplines--not only in the sciences but in all fields of learning. The cultural and language gaps are most easily overcome by such scholars through the use of a few simple ground-rules. One can imagine a three-camera booth at the home station of each participant in a seminar, with the technical crew of the communication system forming a collage on the viewing screen of, say, a dozen people around the discussion table. The seminar participants would be sitting together although worlds apart. This use of an expensive arrangement for such a purpose may seem, perhaps, too pedestrian--another instance of what Marshall McLuhan (Understanding Media) has pointed out as an attempt to use new media to convey old messages--in this case, international scholarly meetings, no doubt discussing the same old problems despite the new technology. But the nature of these meetings would change radically under the stimulus of the regularly scheduled seminar; the participant would less likely be a lonely investigator and more likely be the representative of a local group engaged dynamically in the project under study; the groups would, in effect, be competing but would have coherent efforts along similar lines of investigation, phased together weekly. Federation would thus be accomplished in small segments of disciplines.

The bulk of the population would, of course, not be touched

directly by this arrangement. Although all 168 hours of the week would be available for broadcast, since two o'clock in the morning and two o'clock in the afternoon are pretty much alike to scholars apread around the world, only a good sized handful of scholars would participate. Nonetheless, if there were twelve participants in each one-hour-a-week seminar, each representing a team of ten, with four times that many nonparticipating teams following the seminars, a hundred thousand people would be involved--something less than a hundredth of one percent of the world's population, admittedly, but if instead of people we say one hundred thousand scholars, roughly ten percent of those at the Master's level or above, the proposition sounds quite different and may well be worth the expense. It is an economic question deserving an economic analysis. Perhaps the dollar value of scientific advances could be estimated but as yet there are no theories by which to evaluate the changing of the sensibility of a society in relation to poetry, say, or art, although quite obviously such changes do have economic value. I suspect it is going to be most difficult to saddle with numbers reluctant or obstreperous humanitarians, aesthetes, philosophers, or other evangelists who, along with the scientists, might alter this world; but it is a job that needs to be done. In the absence of the appropriate theories and numbers, perhaps here is a place for the suspension of disbelief: perhaps we should leap into the project. The gains to learning itself, discipline by discipline, would

justify the system, and the outcome would be a world federation at this upper level of learning.

At the level of the undergraduate, the problems become more complex. A heavier investment in shared facilities of obvious advantage would be needed to bind together the institutions of learning separated by cultural and language gaps, more difficult to bridge at this level than at advanced study. It would be necessary to tackle the language barrier directly, with new techniques of rapid learning or possibly simultaneous translation. An involvement in world communication would provide stimulus and motivation to any experiments with language which might be tried. But communication itself is not sufficient justification for a federation of learning. Since bulk instruction rather than small group discussions is the economic mode of operation, film might be a superior medium, with the language being handled by translation and the scheduling being done at local convenience. However such a method has long been available to us, and little has been done with it, even in our own country, perhaps because it is not a notably effective means of teaching. Something more has to be added, something which will make the instructional process better; by now we know it cannot be merely a smoother, more polished, or even more dramatic presentation. We need to supplement the local teacher not with some remote master teacher but with devices--devices with which the student himself interacts. The orbiting instructional laboratory might be an example of such a

device. True, it may be that whatever can be done in such a laboratory could be calculated on a computer, but then one faces the whole question of the value of laboratory instruction. After one passes the PSSC level of experiment, the buildup of intuition is a much more subtle affair, involving the delimitation of purpose and the critical design experiment rather than aimless and happy exploration. The miniaturized orbiting laboratory, controlled at many institutions around the world in a time-sharing arrangement, could provide the dramatic medium for forcing this maturation growth in the individual student. A sequence of experiments, designed to mature the intermediate student, designed with the imagination and enthusiasm that characterized the work on introductory physics by the PSSC group, would so tie together curricula that the common worldwide lecture would then be feasible and desirable. Jumping of the language gap would seem worthwhile. Lectures could be locally recorded on tape, for replay at convenient undergraduate hours; and feedback of a sort could be provided by questions transmitted to the lecturer between sessions and answered in the following lecture.

Perhaps more ingenuity might be needed in other fields to discover the physical facilities which might foster the coordination of curricula and thus establish some harmony of minds throughout a discipline. But the possibilities of space as a storehouse for information in the form of tape libraries and computers, with whatever advantages superconductivity or high vacuum or zero gravity

might provide, certainly open new dimensions for shared investments.

The cultural gaps are much wider than language differences, of course. The differences in educational practices between even the developed countries is quite marked at the undergraduate level and more so at lower levels. These differences will not be bridged by compromise, by everyone's giving a little, but only by everyone's gaining a lot. There is room for this gain in space, and it is likely to come, though not without effort. The underdeveloped nations present a much more complicated picture. Involvement of the exceedingly small segment at the top can be attempted on the supposition that the body of a society will begin to conform to the opportunities offered; but experience with our own disadvantaged groups indicates that such a program will not suffice. If these countries are to join the educated society, then education must begin at birth, in the very social conditions of the home. That concept opens a Pandora's box, but it is already open and will be around to plague us for a long time. Like it or not, I suspect that a world federation of learning through social agencies at the subsistence level of society will come about. But life is more than bread alone. The expansion of the intellect and the spirit is a responsibility at least equally demanding; consequently we must find ways to help the emerging countries over the lower hurdles of education.

Inevitably one's imagination turns to world-wide communication as the principal use of space in education. Yet, actually, there

could have been world-wide communication by surface means for many years past. What space does is to reduce the cost and open the imagination and thus make communication more feasible. The orbiting laboratory, or computer, or even the space colony classroom, may turn out to present similar economies which make their uses feasible. Perhaps it is not the physical characteristics of space so much which makes of it a new environment as it is its general availability. And it is this characteristic which makes a federation possible and attractive. The shared facilities can present the investment needed to bind together a federation, and the resulting cooperation can induce the coherent learning which will continue the exponential increase of knowledge we believe is the birthright of man.