

THE ROLE OF "GOOD" SCIENCE FICTION AND SPACE APPLICATIONS  
AND THE FUTURE

Charles F. Urbanowicz\*

I have been involved with a variety of issues that have dealt with "science fiction and science fact" for almost a decade (Urbanowicz 1973, 1976, 1977, 1978a, 1978b, 1979, 1980, 1981, and 1982) and an idea that I have presented on various occasions is that "good science fiction, at times, can do more than science fact when one is encouraging thinking about the future."

Trained as a professional anthropologist, with research in the South Pacific Kingdom of Tonga, it might seem somewhat unusual to advocate "fiction" over "fact" when encouraging thinking about the future, but strangely enough, I do see certain useful similarities between anthropology and science fiction. Frederik Pohl recently wrote that "science fiction is the world's finest inoculation against future shock" (1981: 137) and this almost sounds like a variation on the statement of the late Margaret Mead, one of the long-time leaders of American (if not worldwide anthropology) when she wrote: "...it is possible that the greatest contribution that anthropology can make will be to keep men's imaginations open" (1978: 6).

Indeed, I have not been the only professional anthropologist who has found value in fiction or science fiction when dealing with certain issues, and one can look at the work of Carol Mason et al. and the 1974 volume entitled ANTHROPOLOGY THROUGH SCIENCE FICTION, or the 1973 volume ANTHROPOLOGY THROUGH LITERATURE by Spradley and McDonough, or Leon Stover's 1973 article entitled "Anthropology and Science Fiction," or Stover's 1968 review of

\* Associate Professor of Anthropology, Associate Dean, Regional and Continuing Education, California State University, Chico, California 95929



the film 2001, or Stover and Harrison's classic 1968 volume from Doubleday & Company entitled APEMAN, SPACEMAN: ANTHROPOLOGICAL SCIENCE FICTION; and, of course, there is always the outstanding work of the eminent anthropologist at the University of Texas at Austin, Chad Oliver, and his superlative science fiction works, including the widely reprinted short story "Of Course" which I shall refer to later (Oliver 1954, 1956, 1960, and 1981, this last item being a non-fiction work).

#### SCIENCE FACT: ANTHROPOLOGY

Definitions can be demanding, and an easy definition for "anthropology" would be one that simply stresses "anthropos" + "logos" or the study of mankind. If by science one means "knowledge" or the acquisition of knowledge, and if science can be operationally defined as the "systematic reduction of error," then we should remember that the first of the sciences to be given the suffix "logos" or discourse was that of "anthropos" in the year 1539 (T. H. Savory, 1967: 88). Professional anthropology however, anthropology as a discipline, is slightly more than one hundred years old, and Darwin's 1859 publication of ON THE ORIGIN OF SPECIES is often a good benchmark for discussions of the discipline of anthropology.

It is only in this century, within recent times, that anthropological studies have made some input into world affairs. What the anthropologist has done is extremely important in our lives, for the anthropologist serves as the "translator" of cultures, recording information through one set of cultural rules and translating those rules and procedures into understandable rules for others (Urbanowicz 1982).

Perhaps the most important contribution of 20th Century anthropology has been the detailed and documented account of the tremendous "range of variation" in cultures of this planet. This has been a distinct move away from various 19th Century monolithic interpretations of "CULTURE" against which all other "cultures" were appropriately, or more inappropriately, "ranked" (Urbanowicz 1976: 6).

The Anthropologist, by discovering and determining various cultural rules, has pointed out this range of variation in "cultures" and the many myriad ways that human beings have adapted themselves to a variety of environmental situations on this planet. This study of human beings in interaction with the environment is a key to understanding the impact of space applications and the future,



for successful space applications (either through shuttle technology or increased telecommunication satellites) will alter the environment of this planet into the next century. Anthropology is a "fun" discipline for me, and I can only echo the words of the anthropologist/science fiction author Chad Oliver, who wrote in his 1981 book entitled THE DISCOVERY OF HUMANITY: AN INTRODUCTION TO ANTHROPOLOGY:

The study of anthropology should be a fascinating thing. It is not a chore to be performed but an opening of the doors that lead to challenging new horizons (1981: xx).

#### SCIENCE FICTION

The challenge of new horizons, or of the future, can come from a wide variety of either "science fact" works or "science fiction" works. A feel for space applications and the future is not only available in such professional publications that deal with the future, like Kahn's THE NEXT 200 YEARS: A SCENARIO FOR AMERICA AND THE WORLD (1976), or G. Harry Stine's THE SPACE ENTERPRISE (1980), or Stine's earlier publication entitled THE THIRD INDUSTRIAL REVOLUTION (1979) (where the first two revolutions were industrial machinery and feedback, the third revolution is the space industry); but space applications and the future can also come from such gifted science fiction authors as A. C. Clarke, Frederik Pohl or Robert Silverberg.

Arthur C. Clarke, future forecaster of telecommunication satellites in a short article published in the October 1945 issue of WIRELESS WORLD as "Extraterrestrial Relays," has probably best summed up the reason for utilizing science fiction for thinking about the future when he wrote of science fiction as being "inspirational" rather than "educational" (1967: 139). Indeed, this is the same theme that Alvin Toffler elaborated upon when he wrote of education in the future sense and that "science fiction should be required reading for future studies" (1970: 425) in his celebrated 1970 publication FUTURE SHOCK.

The problem in utilizing good science fiction for dealing with the future however, is inherent in attempting to determine a working definition of "good science fiction." The definitional problem is perhaps put into some perspective by the following comment attributed to the science fiction author Theodore Sturgeon:



Ninety percent of all science fiction is crud, the science fiction writer Theodore Sturgeon once said; but on the other hand, ninety percent of everything is crud. (S. J. Lundwall 1971: 25, SCIENCE FICTION: WHAT IT'S ALL ABOUT.)

I shall not attempt to get into lengthy definitions of "good" science fiction, but it suffices to say that (1) good science fiction is well-written, for the authors often try to make a living from it; (2) good science fiction is speculative, allowing for flights of fancy and creativity; (3) and good science fiction is based on known facts of the times, albeit perhaps treated from a slightly different point of view that a nonfictional writer would use. Good science fiction, or science fiction as I am defining it, has its origin in the 19th Century, when the human-technology debate began in earnest, and there are probably few who would disagree with the 1818 publication date of FRANKENSTEIN: OR, THE MODERN PROMETHEUS by Mary Shelley as the beginning date of modern science fiction (Aldiss 1973: 20, and Asimov 1978 in 1981: 4).

Good, or well-written science fiction, in my opinion, contains information for the reader that is "timeless" and readily identifiable; information or ideas which always have as their reference points ideas or situations in the present time and the "real world" of the reader. There is an excellent statement by the science fiction author Robert Silverberg in his 1966 edited volume entitled EARTHMEN AND STRANGERS which clearly makes this point:

...the science fiction writer, in the final analysis, is never really writing of other worlds and other times. Behind the futuristic trappings of his [or her] stories lies a more earthbound core. For the science fiction writer, no matter how vaulting his imagination may be, is still a man of twentieth century Earth. He has never visited another planet nor laid eyes on an alien being. What he writes about, then, comes from within--what he himself has seen and thought. He translates his own experiences and speculations into the soaring wonders of science fiction, but we can [and must or should] look beyond the rockets and the strange creatures to find the real world of today. Science fiction, at its best, illuminates our own time by turning a mirror towards the future (1966: 8).



I firmly believe that good Anthropology and good Science Fiction can be used quite successfully at a variety of grade levels in the academic situation. Good Anthropology and good Science Fiction get us to speculate about "things out there" and what that may mean to "things back there." Good Anthropology deals with Homo sapiens on this planet; good and well-presented Science Fiction gets us to think about sentient and living beings which are not necessarily bipedal, but certainly have their own "culture;" good science fiction has forced us to think about beings that don't appear human, but certainly "act" human enough; and good science fiction has made us think about beings that do not worship any variation of a Judeo-Christian deity, but certainly have "religion." Good Anthropology encourages thinking about the past in the present and the present in the present; good Science Fiction encourages thinking about the present in the present and the future of the present! Both science fiction and science fact can get us, or should get us, to think about space applications and the future: what will the revolution in telecommunications be like with increased space applications? Should one look to science fiction or science fact? What can provide better "direction" or "inspiration" for us as we move into the 21st Century? If "science" can be defined as the "systematic reduction of error" it also can be defined as "a progress report to date;" and "good science fiction" can be defined as "a variation of the progress report to date."

#### SF, SF, AND SPACE APPLICATIONS

Frederik Pohl, whom I seem to be citing a lot, has an admirable statement concerning science fiction which I would like to share with you:

For we know ourselves by our extremes...perhaps thinking about horn-skinned bloodless aliens from another planet will teach us something about getting along with the divergent races, creeds, and sects who are our own cousins (Pohl 1954: 1).

To me, at least, this strikes a familiar chord to me when I read something like the following from an anthropology book by Chad Oliver:



There are no "natives" who are "out there" patiently waiting to be "studied"--unless we are all natives and out there is also right here. This is a world of human beings who are following lifeways that have become increasingly intertangled (Chad Oliver 1981: 378).

Good science fiction and anthropological science facts get us to think about people and processes and things in the here and now, not about distant abstractions.

The value of science fiction works, when dealing with issues of "space applications" is that science fiction works are so much more readily available than official tomes that deal with space applications! Ask yourself when was the last time that you saw copies of ADVANCES IN THE ASTRONAUTICAL SCIENCES at the local bookstore; or some NASA publications like SPACE BENEFITS (1981) or SPACE SETTLEMENTS: A DESIGN STUDY (1977) or SPACE RESOURCES AND SPACE SETTLEMENTS (1979) at the local bookstore?

The intelligent public, or the interested student, can probably get more information about the support structure necessary for the space shuttle in the "science fiction" work entitled SHUTTLE DOWN (1980) by G. H. Stine (under his pen name of Lee Correy) than they can get from the two volumes from the 26th American Astronautical Society Conference held in Los Angeles in 1979 (SPACE SHUTTLE: DAWN OF AN ERA, edited by Rector and Penzo), and SHUTTLE DOWN is undoubtedly much more available than the two science fact volumes! (There are two other science fiction "shuttle" novels which could well be avoided by future readers: Washburn's 1980 THE OMEGA THREAT and Onley's 1981 SHUTTLE.)

Nowhere have I ever suggested that "science fiction facts" should be substitute for "science facts" in general discussions or in the classroom situation; what I am suggesting, however, is that science fiction, if properly used, can inspire individuals to go beyond the fiction to ascertain the facts which were necessary for the author to write that fiction! Science fiction, in terms of space applications (as well as many other things) can be inspirational.

What is probably more true than the "inspirational" nature of science fiction works is the fact of their availability: science fiction works probably account for slightly more than ten percent of all of the yearly publications of new volumes, and Sturgeon's rule/problem is evident every year! One way to plow through the seemingly morass of science fiction works is an arduous one



indeed: wide-spread reading! An excellent aid to cross-reading and cross-referencing is the 1979 publication by Searle's entitled A READER'S GUIDE TO SCIENCE FICTION: if you stumble upon author abc, Searles et al. will refer you to a similar author def who is writing in a similar vein; likewise, some excellent histories of science fiction are necessary reference tools to deal with "inspirational reading (Aldiss 1973, Asimov 1981, Lundwall 1971, and Wilson 1973).

In addition to wide-spread reading of science fiction works, and general background on the genre itself, for those who wish to utilize "good science fiction" in any sense, there is also the corollary of: "attempting to keep up with the science fact literature!" While I pride myself on "being in the know" about science fact issues, especially space application activities, every time I attend a conference or even when I read various articles, I am continually impressed with my own growing ignorance of various aspects of "space" and all that is happening right now.

Last year I presented a paper entitled "Anthropologists in Space: Science Fiction and Science Fact" at the Fifth Princeton Conference on "Space Manufacturing" held at Princeton University in New Jersey. Sponsored by the American Institute of Aeronautics and Astronautics, the Space Studies Institute, and the University, with Associate sponsors of OMNI magazine and the National Space Institute, I commented in a published version of that paper:

The meeting was, of course, excellent! I enjoyed myself and learned quite a bit, including what I do and do not know about all that is currently going on with "space manufacturing" plans for the future (Urbanowicz 1981: 3).

Trudy Bell, present at the Princeton Meeting, has written an excellent article on "space activism" (Bell 1981a) and the various groups that are involved in future applications of space technology; she has also written of "American space-interest groups" (1981) and the listing of her 39 "interest groups" could keep one in "space" materials throughout the year. From a fee for members ranging from a "percent of aerospace business" (Aerospace Industries Association) or a "contribution dependent on company revenue" (The Geosat Committee) or \$1,200 (Universities Space Research Association), the reader would need at least \$1,713/year to keep up with 37 American space-interest groups (not including the "percent" and "contribution" items). From a few dollars a year to \$36.50 a year, a minimum of \$513 would be necessary to



keep somewhat involved in "space activities" (this is excluding the \$1,200 cost of the Universities Space Research Association). What this clearly says to me is that (1) there is a lot going on about space and (2) if you are a "space fact" or "science fact" dilettante, you are never going to make it!

Although I personally abhor the specialization which is necessary when it comes to "space applications" (or any other of the other technological aspects of our specialized society), and while I enjoy the relative "freedom" of being an eclectic anthropologist, I know full well that the contributions that I can only hope to make will be "inspirational" in attempting to "turn on" other individuals to dwell in the realms of space and deal with space applications. There are more than enough "science fact" publications when it comes to space applications and a reading of the titles from the Fifth Princeton Conference (or earlier American Astronautical Society meetings) can give one a sense of awe and perhaps unreality, for these topics would have been considered "science fiction" a few years back, and now they are being discussed as "science fact" in the present:

- Aspects of international cooperation in space manufacturing between advanced countries.
- Space manufacturing and the proposed moon agreement.
- Recent trends in space law.
- Military implications of solar power satellites.
- The impact on U.S. industrial growth of solar power satellites from space manufacturing facilities.
- The supply of lunar oxygen to low Earth orbit.
- Cooperating ethnotronic and ethno-biological systems in space.
- Electrophoretic separation of lunar soils in a space manufacturing facility.
- Powder metallurgy in space manufacturing.
- Space riches.



My favorite volumes, however, to cite as contemporary space fact comes from the publications of the 23rd Annual meeting of the American Astronautical Society held in San Francisco in 1977, where I presented a paper entitled "Cultural Implications of Extraterrestrial Contact and the Colonization of Space" (Urbanowicz 1978); those meetings, and the publications, dealt with "The Industrialization of Space" and the overall theme was "Planning for Profit at the High Frontier" (Van Patten et al., 1978). Certain major topics discussed included:

- Economic realities of space operations.
- Space Law.
- Space Community planning.
- Technical aspects of large space structures.
- Advanced transportation systems.
- Communications and navigations.

Joels (1978) presented an excellent overview of "Space Industrialization: Education" and Moravec (1978) discussed "A non-synchronous orbital skyhook." (For two intriguing science fiction volumes dealing with a potential elevator to the sky, please see Sheffield's 1979 volume entitled THE WEB BETWEEN THE WORLDS and Arthur C. Clarke's far more readable 1978 publication entitled THE FOUNTAINS OF PARADISE.)

While I have a favorite volume dealing with space applications that I like to cite, I also have a favorite single article, and that is the one that Barron Hilton presented at the Thirteenth Annual Meeting of the American Astronautical Society in Dallas, Texas, in May of 1967: "Hotels in Space" where Hilton discussed the "possibility of an orbiting or lunar hotel" and how it was suggested that "when space scientists make it physically feasible to establish hotels in space and to transport people, the hotel industry will meet the challenge" for "when a space hotel becomes a practical reality, it will simultaneously become a practical financial reality" (Hilton 1968: 261). (The same meeting, it should be pointed out, also discussed "Space Tourism" by K. A. Ehrlicke [1968: 259]). Hilton's "hotels in space" should be compared with the 1959 "science fiction" work by Curt Siodmak entitled SKYPORT, where a "skyport" 1,075 miles above the Earth is planned as a main character says "I need your assistance in building a hotel in outer space" (1959: 11). Arthur C. Clarke, in commenting on this presentation by the Hotel Hero, has pointed



out that "space tourism is going to be a major industry in the twenty-first century" (1967, 1972: 139).

I am trying to stress the fact that there are numerous publications that deal with "updates on space" (from a 1981 volume of a similar name edited by B. J. Bluth and S. R. McNeal), and we need not confine ourselves only to "science fact" when thinking about the future. Steve Cheston and David Webb pointed this out in 1979 in the first publication of The Institute for the Social Science Study of Space entitled THE SPACE HUMANIZATION SERIES, and I (and others) have stressed this opinion at earlier times. Readers can get a "feel" for the problems which might be inherent in "space colonization" by either reading a rather pessimistic 1977 article by Paul L. Csonka the THE FUTURIST (entitled "Space Colonization: An Invitation to Disaster?") or a 1979 RAND Corporation paper entitled "The Economics of Strikes and Revolts During Early Space Colonization: A Preliminary Analysis" (M. H. Hopkins 1979), or the science fiction works of Robert Heinlein entitled THE MOON IS A HARSH MISTRESS (1966a), or the recent outstanding works of Ben Bova (Editorial Director of OMNI) entitled MILLENIUM: A NOVEL ABOUT PEOPLE AND POLITICS IN THE YEAR 1999 (1976) and COLONY (1978). Incidentally, it is in this latter novel that Bova has an intriguing "science fiction" statement:

...the flinty anthropologist [Dr. Cryus Cobbs] who had just been named Director of the Colony [at one of the Earth-Moon Liberation points]---to the surprise of everyone except the Board and himself... (Bova 1976: 49).

Who really knows what the future will bring?

#### CONCLUSIONS

I am not suggesting that this [paper] is necessarily the vision of anthropology [and space applications]. Many of my colleagues [probably] do not share my views. I have even been accused of being an unreconstructed optimist, among other things (C. Oliver 1981: 387).

This modified statement comes from the distinguished anthropologist and science fiction author Chad Oliver, and it seemed most appropriate to begin the conclusion of this paper with it. What you are receiving is my personal perspective, and I am of the utmost and firm opinion that "good science ficiton" has been getting us to think about the future more than any other



collective body of information. As Sagan pointed out in his 1979 publication entitled BROCA'S BRAIN: REFLECTIONS ON THE ROMANCE OF SCIENCE, "if we survive, science fiction will have made a vital contribution to the continuation and evolution of our civilization" (Sagan 1979: 146). Good science fiction can be informative, enlightening, inspirational, and easily accessible. Good science fiction can encourage us to go from mere "science fiction" into "solid" science fact and "good science fiction" can get us to think about our collective reactions to potential questions: "what if" we were not the only space-roving intelligent creatures in the Universe? (Please see Pohl's two masterful volumes entitled GATEWAY (1977) and the sequel entitled BEYOND THE BLUE EVENT HORIZON (1980).)

It should be perfectly clear that this paper advocates the position of utilizing good science fiction and science fact when discussing various space activities/space applications. The "science fact" volumes are extremely diverse, and one must also carefully cull through the "science fiction" to discover such "good" items like Clarke's 1967 publication entitled TIME PROBE: THE SCIENCE IN SCIENCE FICTION, or the many recent "science fiction readers" which deal with various aspects of the human condition:

- ANTHROPOLOGY THROUGH SCIENCE FICTION
- CRIMINAL JUSTICE THROUGH SCIENCE FICTION
- AMERICAN GOVERNMENT THROUGH SCIENCE FICTION
- SOCIOLOGY THROUGH SCIENCE FICTION
- INTERNATIONAL RELATIONS THROUGH SCIENCE FICTION
- INTRODUCTORY PSYCHOLOGY THROUGH SCIENCE FICTION
- PSY FI ONE: AN ANTHOLOGY OF PSYCHOLOGY IN SCIENCE FICTION
- THE SOCIOLOGY OF THE POSSIBLE
- NO ROOM FOR MAN: POPULATION AND THE FUTURE THROUGH SCIENCE FICTION
- TRANSFORMATIONS: UNDERSTANDING WORLD HISTORY THROUGH SCIENCE FICTION



◦GREAT SCIENCE FICTION ABOUT DOCTORS

◦ABOVE THE HUMAN LANDSCAPE: AN ANTHOLOGY OF SOCIAL  
AND SCIENCE FICTION

These, and many other volumes or articles in aid of "science fiction and..." are numerous (such as the 1980 article published by the National Council for Geographic Education at the University of Houston, Houston, Texas, in their publication JOURNAL OF GEOGRAPHY entitled "Science Fiction for Geographers: Selected Works" by Elbow and Marginson); we must feel somewhat comfortable when we see such volumes as SCIENCE FICTION: A COLLECTION OF CRITICAL ESSAYS (M. Rose 1976), SCIENCE FICTION: TODAY AND TOMORROW (R. Brentnor 1974), or the "ULTIMATE" "Cliffs Notes" and SCIENCE FICTION: AN INTRODUCTION (L. D. Allen 1973).

Science fiction ideas obviously work well with many disciplines, and I would like to think that "good science fiction" is very useful when it comes to dealing with certain anthropological concepts. As mentioned earlier, the concept of culture, that anthropological abstraction, shows us that there is no one single sacrosanct privileged frame of reference, no one single "CULTURE" which can serve as the ultimate model for analysis for all other cultures. There is no one single "culture" against which all other cultures can be rank ordered and subjected to scrutiny. This is but the idea of "cultural relativity" which has been practiced to a certain degree by various Anthropologists over the years. Perhaps we can somewhat cryptically state that "cultures are not equal, but all cultures are equally the same!"

All cultures on this planet are related, and who can honestly say that one is truly superior to another in...? A similar point comes across in the 1954 excellent short story by Chad Oliver, which is entitled "Of Course." Briefly, an Extra-terrestrial vehicle appears over the United Nations building in New York City and every Government on Earth receives an identical message:

The ship wasn't fussy about defining 'government,' either. It contacted every sort of political division. In certain instances where the recipients were illiterate, or non-literate, the message was delivered vocally. [in APEMAN, SPACEMAN: ANTHROPOLOGICAL SCIENCE FICTION (1968: 319); also in SOCIOLOGY THROUGH SCIENCE FICTION (1974) edited by J. W. Milstead et al.].

The message read, in part:



Please do not be alarmed. We have come in peace on a mission of good will. Our task here is to determine to our satisfaction which one among you has the most advanced culture on your planet.

After three weeks of research, by obviously superior beings from space and three weeks of "Of course, it has to be us..." as stated by the Swiss, the Russians, the Americans, the Masai, the ... then, the inhabitants of the vehicle make the decision:

We bring you greetings and farewell. Our work among you has now been completed. We have found the most advanced culture among you to be the Central Eskimo of Baffin Land.

Needless to say, consternation abounded! And I shall quote from Chad Oliver himself who commented on his own story twenty years later in 1974:

The President of the United States calls in his Secretary of State, whose name is Henry. They decide that they must consult with a social scientist, distasteful as that might be. They smuggle a sociologist in through the back door of the White House. The sociologist, being an honest man, refers them to an anthropologist. The anthropologist duly arrives, but he turns out to be a physical anthropologist. Nevertheless, he does the best he can, pointing out that anthropologists are not totally specialized. His task is to explain why the Eskimos represent the most advanced culture on Earth. This is a fairly formidable assignment, even for an anthropologist. He makes a number of suggestions, but he is also an honest man. He confesses that he really doesn't know. He points out that there is only one way to find out: we must study all of the cultures on this planet to discover what is truly unique about the Eskimos. The President realizes that this is going to cost money, and is not pleased.

The story ends by shifting to the viewpoint of the people on the starship. It develops that they picked the Eskimo more less at random. "An awfully nice chap," one observes, "but he is a bit on the primitive side." His companion concludes: "A slight stimulus never hurt anyone, my friends. By



the time they get through worrying about that Eskimo, they ought to have a real science down there" (Oliver 1974: 10-11).

This is good science fiction! It provides the reader with some basic information and a story and then it gives a slight "unexpected twist" or "double twist" and it takes the reader beyond where you originally were. Oliver, in commenting on the story after twenty years wrote "this story, of course, reflects the optimism of youth" (ibid.) and I trust the optimism is still strong. As the distinguished anthropologist Sol Tax stated in his "afterword" to a 1975 volume entitled CULTURES BEYOND THE EARTH: "even if we have no contact with nonhuman cultures in the immediate future, the models that we meanwhile make require that we sharpen THE QUESTIONS THAT WE ASK ABOUT THE HUMAN BEINGS [STRESS added] (Tax 1975: 203). Questions that we ask about human beings concerning "space explorations" or "space applications" or "space and society" can come from good science fiction or good science fact.

#### EPILOGUE

I think there will come a time when future anthropologists--whatever names they go by and whatever they call their science--will classify all of us as "primitive" people. We are primitive because we live when the human race was confined to one planet in one solar system. We are primitive because our knowledge about ourselves is both tentative and fragmentary. We are primitive in the literal sense of the term: We are living at the beginning of the human experience (Oliver 1981: 386).

This statement comes from Chad Oliver's "Epilogue" to his own 1981 publication, and he writes "Epilogue: Over the Hill or Over the Horizon?"

I would like to briefly share some numbers with you, to place certain things that I have said into some perspective: according to the Washington D. C. based Environmental Fund (1302 Eighteenth Street, N.W., Washington, D. C.), at 1:42 PM Central Standard Time on March 14, 1980, the population of planet Earth reached the 4.5 billion marker, and at that point in time the population of this planet was increasing at the net rate of 7.5 million individuals per month or 90 million individuals per year. (Since one year equals 365.25 days which equals 8,766 hours which equals 525,960



minutes, then the net increase of those individuals on this planet was approximately 171.11 individuals per minute. This "net increase" means "birth minus deaths equals net increase.")

By 9 AM Central Standard Time on May 11, 1981, the population of this planet approached the 4.6 billion point, and every minute of every day the population of Planet Earth increased by approximately 153 individuals. By November of 1981 the net increase in the population of this planet was "down to" approximately 151 per minute, but on April 8, 1982, at 10 AM Central Standard Time, the population of this planet was approximately 4.6 billion individuals and we were increasing our numbers at the rate of 168 persons per minute. Simply stated, if the population of Austin, Texas, was 536,450 individuals in the 1980 United States census, then in a little more than 2 days and 5 hours the entire "population" of Austin, Texas, will have been born somewhere on this planet, and the entire population of the State of Texas (14,228,383), third in population size in the Union, will be born somewhere on this planet in a little more than 58 days. We are increasing in our numbers at incredible rates, and I fear that very few of us realize this, and advanced technology is necessary for us all.

I am basically an optimist, but we need inspirational thinking about the future! If one needs any "hard" data, I strongly suggest that one read or peruse or at least skim in 1980 United States publication entitled THE GLOBAL 2000 REPORT TO THE PRESIDENT: ENTERING THE TWENTY-FIRST CENTURY. The three volume report, prepared by the Council on Environmental Quality and the Department of State, was prepared under G. O. Barney as Study Director. The report begins:

If present trends continue, the world in 2000 will be more crowded, more polluted, less stable ecologically, and more vulnerable to disruption than the world we live in now. Serious stress involving population, resources, and environment are clearly visible ahead. Despite greater material output, the world's people will be poorer in many ways than they are today. ...A KEENER AWARENESS OF THE NATURE OF CURRENT TRENDS, HOWEVER, MAY INDUCE CHANGES THAT WILL ALTER THESE TRENDS AND PROJECTED OUTCOME (STRESS added) (G. O. Barney 1980, Vol 1: 1).

This "keener awareness" of "the future" can come, I honestly believe, from contemporary anthropology, good science fiction, or



good science fact. All of these can have some bearing on "Space and Society" and "Space Applications."

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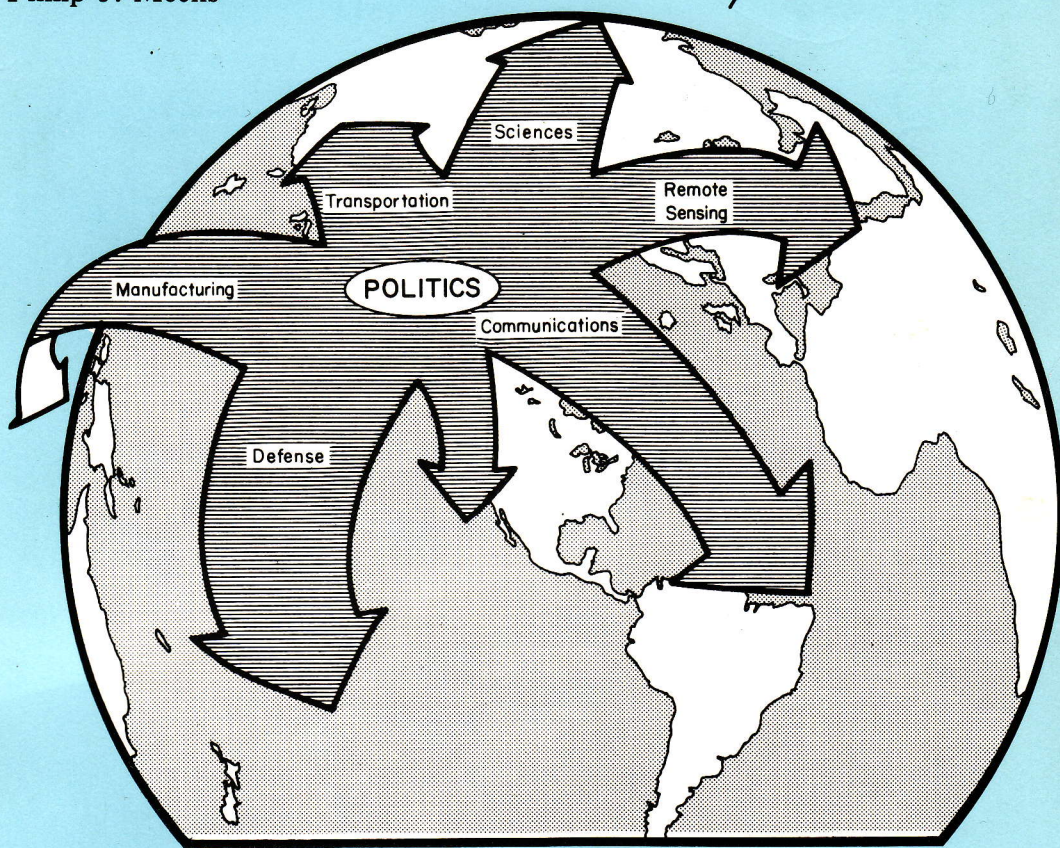
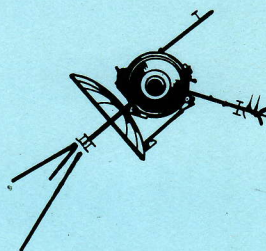


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Paul Anaejionu  
Nathan C. Goldman  
Philip J. Meeks



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