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A look at the space shuttle

ned parts of the space program; it acknowledges that there are lots of things that machines simply can't do (yet), and that there's a place out there for human beings. It also ensures that there will be a continuing manned presence in space, and that it will no longer be the exclusive realm of test pilots and technicians (payload specialists will be on board the shuttle throughout the 1980's and beyond, and they need not have any special background other than that needed for their particular mission).

The shuttle also provides the ability to build large structures in space; much more about this later on.

In short, the shuttle provides a whole new range of capabilities in space, capabilities which simply were not available before.

What will the long-term benefits of the shuttle be? Well, the first assumption we have to make is that the program will be successful. The first flight went extremely well, better than even the people who planned it had expected; however the program is still fragile, and it will require several more successes before the space shuttle can be declared fully operational.

Assuming that all continues to go well, the long-term effects are staggering. Most of them sound like something out of a science fiction film but there are no fundamental obstacles to prevent any or all of them from becoming reality. Most are awe-inspiring; visions of such things as enormous space colonies and a truly Universal civilization.

Others are frightening; horrorific images of mankinds conflicts being carried beyond the earth. All are awe-inspiring, and all are possible.

The important thing to remember about the space environment is that it BIG. That seems kind of obvious, but some of the consequences of that basic fact are worth talking about.

On earth, everything is limited. The phrase 'limits to growth' has been heard throughout the past decade, describing the essential limitations on human activity. In fact, an entire philosophy of 'think small' and 'big is bad' has permeated the thinking of politicians and economists and ordinary people.

In space, there are no limits. Unlimited supplies of cheap energy are available for the asking and raw materials are available in abundance; there is plenty of room to grow in, and no environmental restrictions to speak of. (One of the most basic limits to growth on the surface of the earth is that there's no place to dump the heat form industrial activity; the resulting thermal buildup would eventually play havoc with our planet's climate. This is clearly not a problem in space, where heat can be radiated indefinitely into the universal heat sink).

In other words, space is the ideal environment for an industrial civilization to grow into. The basic problem is getting there to begin with: establishing a toe-hold in the Universe. The space shuttle may very well be that toe-hold.

How will mankind's expansion into space happen? It's hard to make any specific predictions, since it depends almost entirely on what motivates the expansion. At the moment military superiority is till the major driving force behind the space programs of the United States and the Soviet Union; this may change, but it won't change soon. Space is a strategically good place to be, and neither of the world's twin superpowers are about to forget that.

Fortunately, a military presence in space does not preclude a civilian presence as well. Looking at the history of civilization's spread around the globe, it's clear that the various military powers have generally been in the forefront; this hasn't prevented exploration and colonization, or even slowed it down. It would be nice if the news environment we're about to enter could be kept free of conflict, but it's reassuring to know that conflict won't prevent peaceful expansion and growth from taking place.

The comparison between mankind's expansion here on earth and his movement into space is an interesting one. In some ways it's very appropriate; in both cases, the exploration of a new world leads to changes in the condition of the world left behind, changes of a political, economic, and military nature. In both cases, there are long-term benefits both to the people who do the exploring, and to those who stay behind.

There are essentially three stages in the development of a new branch of human civilization: exploration, exploitation and colonization. The first stage is already well under way; unmanned probes have been sent to Mercury, Venus, Mars, Jupiter and Saturn; Uranus is the next one on the list. Our own moon has been studied with both manned and unmanned missions, and the various other objects within our solar system have been studied at length with every conceivable kind of instrument. While it's true that the process of exploration is a never-ending one, it's safe to say that is has begun.

Exploitation has also begun; the use of satellites for communications, weather observation, military photo-reconnaisance, environmental monitoring, navigation, astronomy, scientific research and countless other activities has been commonplace for decades. The use of the weightless airless environment of space for a variety of industrial processes is already being studied; the use of space in medicine is likely to be a major field of research during the coming decade.

What, then, of colonization? In a way, the first few primitive steps have been taken; the Americans successfully launched Skylab, which clearly demonstrated that human beings can perform useful work in the environment of space. The Russians have since launched a very successful series of miniature space stations, the most recent of which has been operational for several years. The next step will likely be a permanently manned outpost, with crews rotating every six months or so.

Yet this is not colonization in the strict sense. We've had outposts at the arctic and antarctic for decades, yet we hardly think of them as colonies; the people who work in those regions were not born there, and will not die there. They ar visitors, not colonists, they don't call these outposts home.

A true colony is self-contained and self sufficient, economically if not materially. A colonist considers the colony to be home, and has no intention of returning to the place of her or her birth.

Colonization of space in this sense is not likely in the near future, but is extremely likely further down the line. The resources are available in space to make a self-sustaining colony; finding willing colonists should be easy enough (I'd go). All that's needed is the commitment on the part of the world's governments, and the rest will someday be history.