**WHY MARS? EXPLORING MARS AND THE NATURE OF HUMAN CIVILIZATION.** B. M. Jakosky, Laboratory for Atmospheric and Space Physics, University of Colorado, Boulder CO 80309, USA (jakosky@argyre.colorado.edu).

Astronomy in general, and planetary science and Mars exploration in particular, are fields of study that have relatively few practical applications. There certainly are ways in which these fields can provide relevant and practical information, including finding near-Earth objects to help protect the Earth, studying the martian atmosphere as an analog to understanding terrestrial climate, or doing comparative planetology that will help us to understand the geology of the Earth and its history. However, it is clear that these issues are not the ones driving exploration of the solar system. The fact that there is such tremendous support for these programs by NASA, the government, and especially the public suggests that other factors are at play.

In particular, it seems likely that the driving factor is the exploration value of the space program. Our society appears to derive substantial satisfaction from trying to understand their origins. This includes the origin of the universe, the origins of stars and planets, the origin(s) of life, and the evolution of each of these.

In addition, we can look at the nature of science to better understand the issue of exploration. It is clear that the science that each of us is doing will be obsolete relatively quickly (some more quickly than others, perhaps). That is, studying Mars or any of these other areas involves continually obtaining a deeper and deeper understanding that supersedes previous knowledge. Within only a decade or less in some cases, our work will have been replaced. Even most of the greatest scientific achievements of the past have been superseded. This suggests that it is the scientific process that is most important, rather than any particular collection of scientific facts.

These two issues combine to help us understand the nature of science and its relation to society at large. The fact that we as a society are trying to understand the world around us, and the fact that it is the process that seems important rather than the derived facts themselves, again indicates the importance of exploration in our society. Through this exploration, we are trying to understand what the universe contains and how we interact with it. In essence, we are trying to understand our “place” in the universe and, through this, what it means to be human.

There certainly are fields of science for which this is not correct, such as finding a cure for cancer or developing an understanding of greenhouse warming. However, the fields of pure science are to some extent separate from the applied sciences. Although one can argue that some basic research will have application and will dramatically change our world, and that we cannot predict ahead of time in which fields this will occur, this is somewhat misleading. Certainly, we are not exploring Mars with the hope of finding some practical application. Even those for whom Mars represents a place to go for resources or to allow humans to expand into the universe, the driver appears to be the exploration of the unknown, the moving out into the universe.

The bottom line is that exploring Mars, and in broader context exploring the solar system and the rest of the universe, is a part of the picture of understanding our relationship to that universe. These activities take their place along with, for example, exploring the nature of the atom, exploring the oceans, moving into near-Earth space, and even exploring the arts and humanities; each of these is an activity pushes back the limits of humanity in some way, and thereby helps to define the meaning of being human.