The quest for knowledge, and acknowledging the validity of that quest, is a powerful purpose for humanity. To know who we are and from whence we came is at the root of that purpose. Our generation, as with every previous and future generation, has a role in this unfolding human story. We do not yet have anything like a complete picture of our origins and nature, but we now know they are rooted in their cosmological context, and that Mars in particular has something important to reveal on that subject. In realizing this, we have come far. The path to Mars has been long and winding, but now we are on the right track, hopefully on the verge of uncovering its ancient legacy and discovering what it has to tell us about life. If one day we manage to kneel in the dirt of Mars, it will be on behalf of those throughout time who pondered the nature of that red point of light in the sky, in honor of the many Mars explorers over the centuries since Brahe and Kepler; and in reverence of all people—past, present, and future—whose entitlement it is to know the truth of their origin and nature.

Mars exploration is about us, not just about Mars. In this respect it is inherently valuable to each and every one of us. And it is especially valuable because it represents such a significant, all-encompassing search regarding our own origins, life on Mars itself, a generalized picture of biology, and a cosmic context for life.

Finding microbial life on Mars is not mandatory for success. By having a reason and opportunity to ask the difficult questions, and a means to seek answers, we can make progress in understanding our nature; and Mars is capable of providing all of these. It is the quest itself that slowly drags us ever further from our incomplete view of our nature and Earth’s context in the grand scheme. We have been asking questions for many generations and now, through the exploration of Mars, we have a means of finding some of the answers.

We are already well on our way. From tentative evidence of life within Martian meteorites spring-boarding the discovery of hitherto unknown microorganisms on Earth, to having to dig deep—physically, analytically,
and philosophically—on Mars itself to pursue difficult yet far-reaching questions about a planetary context for origins, all such efforts have already reaped rewards. We also know that we will learn so much more by fully deciphering Mars’ true legacy from the planetary scale to the molecular level over four billion years—whatever it turns out to be. Our hope, of course, is for the greatest prize of all—that of uncovering evidence of prebiotic chemistry, and fossilized evidence of ancient life, or even of current microbial life. Such findings will rank among the most profound discoveries of all time, providing direct insight into our origins, a cosmological context for all life, and a generalized understanding of the intricate workings of biology. In all of these ways, Mars is truly a stepping stone that may help humanity to uncover its own ancient heritage and see itself in the broadest natural context.

After many false starts, we are now on the right path toward understanding Mars. It is a planet sharing a complex birth and early history, perhaps similar to its sister planets, Earth and Venus. Patient and painstaking analysis of the Mariner and Viking data led to our first clear picture about Mars and prompted a more sophisticated and mature return. And while most of the work has still to be done, what we have learned since the arrival of Pathfinder has not only validated our instincts but also revolutionized our understanding and perception of Mars as a planet of significant past and present complexity, where perhaps—just perhaps—life may have arisen and may even persist today.

While we do not yet have those answers, one result of cosmic significance has now been confirmed: Mars is a watery world. We now know that for millions of years in its early history, water played a significant role on a planetary scale as surface liquid and ice, within subsurface aquifers, and probably within hydrothermal settings. Furthermore, the story of water on Mars is not some strange coincidence. On considering the enormous range of planetary scenarios across even our own Solar System, the possibility of water on Mars within a planetary setting that is quite similar to Earth warrants serious attention. Mars may have evolved within the early climatic conditions that brought about the type of water-based chemistry that is conducive to life as we know it. Certainly the evidence of wide-scale internal planetary activity and global tectonic and volcanic activity all point to such a possibility. The debate concerning the presence of water on Mars is now over, and we must turn our attention to determining the precise conditions under which it existed and the chemical activity that supported it.

The consequences of this result are still only dawning on us. And although we must be cautious of running ahead of ourselves regarding the connection between the presence of water and the possibly of life on Mars, let us