DO THEY PLAY CHESS ON JUPITER?

by Dr. Franklin R. Ruehl Jr.

To put forth this question, of course, presupposes the existence of advanced life on the Jovian giant. The question could equally well have been asked of Mars, Venus, or any of the other planets with which we have an acquaintance. Civilizations have most assuredly developed beyond the pale of earth's atmosphere, and it only logical to examine the evidence for their existence among the members of our own solar family before attempting to answer the question posed.

Originally, astornomers believed that Mercury's rotational and orbital periods (i.e. its day and year) measured identically 88 terrestrial days, meaning that this minuscule sphere constantly revealed the same face to the sun while its opposite number was forever kept hidden in cosmic bleakness, resulting in the development on the planet of an entire gradation of temperatures ranging from absolute zero to the boiling point of zinc (770 F), with the optimum for life's evolution within the context of Mercury's atmosphere lying somewhere therein. A contrary argument hypothesized that any atmosphere would migrate to the coldest recesses of the planet by virtue of the principle of entropy (maximization of energy dissipation), so that the attractive, warmer areas would be devoid of any gases. But a counter-argument rebutted that only one-third of the planet would be blacked out, allowing some measure of atmosphere to extend into the tepid sectors.

These debates had to be modified when it was recently discovered that the rotational and orbital times are barely perceptibly out of phase, with the consequence that all Mercurial regions are bathed in sunlight, perhaps to a degree that has boiled away all of the planet's atmospheric gases. Further elucidation will be cast on this problem when Mariner 10 flies by Mercury during the spring of 1974. Until then, the prospects for life's existence on this innermost planet will remain in abeyance. (Editor's note: After this was written Mariner 10 surprisingly discovered Mercury has a thin atmosphere, despite weak gravity, and a faint magnetic field, despite slow rotation.)

Venus, long referred to as earth's sister planet because her diameter so closely approximates our planet's (7600 and 7900 miles, respectively), has always been thought to have the potential for harboring life due to its noticeably thick atmosphere. Unfortunately, both Russian and American probes that penetrated Venus' cloud cover detected surface temperatures in excess of 550 F, hardly conducive to the survival of life forms we are familiar with. Yet, some varieties of life might still flourish under such inimical conditions. Beyond that possibility, however, another intriguing hypothesis has been propounded: the cooler strata of the Venusian atmosphere itself serve as the habitat of suspended life forms that thrive in the heavy clouds. While totally alien to our own earthbound experience, it is a concept that must be accepted as entirely feasible. And, even if no living species have yet evolved in Venus' rich atmosphere, the passage of time alone will inevitably allow us to witness such development.

No other planet has received as much attention regarding the prospects for life within its domain as the red planet, Mars. Although the so-called Martian canals have yet to be clearly accounted for (the common belief being that they constitute optical illusions), recent Mariner probes have discovered an equally promising surface feature, a vast river tributary system that dwarfs any found on earth. Even if now dead, it proves that water or liquid carbon dioxide at least once flowed on the planet.

At the poles, both ice caps that alternately expand and recede with seasonal regularity and liquid beneath them have been identified. As carbon dioxide is unstable in the liquid state, normally sublimating from the solid to the gaseous state, a tangible possibility exists that the fluid is actually water, which might, as ice and snow, melt during the Martian spring and summer to give vitalization to some form of life. Of course, evidence of any liquid whatsoever is encouraging, being immediately associated with life.

Also of significance are the planet's periodic color changes, with green and brown hues waxing and waning with synchronized consistency, which signify the presence of at least primitive life specimens (algae, fungi, lichens), but we are more concerned with the maximal possibilities, not the minimal ones.

Since Mars' atmosphere is only 10 percent as dense as earth's, its surface is bombarded constantly and heavily by both cosmic rays (primary as well as secondary) and meteors, a fact which would lead the natural forces of selection to drive any advanced life forms either underground or underfluid in time. There Martian beings would develop bulging eyeballs, exaggerated breathing apparatuses, and other characteristics peculiar to