Publications Watch

By Andrew J. LePage

Notes on recent books and articles pertaining to SETI and bioastronomy.

Journal of the British Interplanetary Society (JBIS)

November 1995, Volume 48, Number 11

This issue of JBIS is devoted to exobiology. Edited by Salvatore Santoli, it is the fourth in a series of issues on this topic since 1992. The first of the seven papers presented, "SETI Programmes All Over The World (and Further Out)," is a summary of SETI programs written by Jean Heidmann of the Paris Observatory. It gives an excellent review of the SETI landscape after the U.S. Congress cut funding for SETI in October of 1993. In addition to present Earth-bound efforts, Heidmann also explores concepts in "extra-world" SETI possible in the 21st century. He gives special attention to using the lunar farside as a base of operations for future SETI in the ultimate effort to shield sensitive receivers from the ever growing radio noise that frustrates ground-based SETI programs today.

Another paper of interest would be "Interstellar Travel Through Magnetic Wormholes" by Claudio Maccone of the G. Colombo Center for Astrodynamics in Italy. In this article, Maccone explores some recent advances in the General Theory of Relativity that could allow for Faster-Than-Light (F.L.T.) space travel. In particular he determines how to create a Morris-Thorne Wormhole without resorting to the use of enigmatic "exotic matter." Through a detailed, fully referenced derivation, he shows how a wormhole could be created using a very strong, static magnetic field. Such "micro-magnetic-wormholes" could be created in the laboratory to demonstrate this concept that could one day be adapted to FTL space travel.

Other papers presented in this issue include the following:

"A Multi-Attribute Utility Analysis on the Location of an Earth-Based Analog for Habitation on Planetary Bodies" by Dawn R. Mitchell and Larry A. Stauffer

"Controlling Laser Chaos" by Jurgen Parsi

"The Use of Currently Unknown Near-Solar Objects in Facilitating Interstellar Missions" by Robert M. Zubrin

"Epistemology of a Paradox - Discussing ETI Through the Evolutionary Impulse Paradigm: We Are Not Alone, But Few and Far Between" by Mark D. Nussinov and Salvatore Santoli

"Exobiology, SETI, Von Neumann and Geometric Phase Control" by P.A. Hansson.

Journal of the British Interplanetary Society (JBIS)

January 1996, Volume 49, Number 1

Subtitled "Practical Robotics for Interstellar Missions," this is the first part in a series of issues of JBIS on this topic. The seven papers presented in this issue address various concepts and technologies required for interstellar travel. "Ad Astra!" written by Dr. Robert L. Forward gives an thorough review of the various proposals for interstellar transport. He ends his paper by presenting a list of 18 topics that require further study before interstellar travel becomes a reality.

Echoing the recent philosophy of "smaller, faster, cheaper," Gregory L. Matloff presents an interesting concept in robotic interstellar flight in "Robosloth: A Slow Interstellar Thin-Film Robot." Matloff's suggestion of building enormous light sails with an integrated, light weight thin-film instrument payload may offer our best chance of exploring beyond the confines of our solar system with only modest improvements in current technology.

Other papers presented in this issue of JBIS include:

"Infrared Inferences of Planetary Systems Among the Nearby Stars" by Jeffrey van Cleve, George Rieke, and Dale Cruikshank

"Space Communications Technologies for Interstellar Missions" by J.R. Lesh, C.J. Ruggier, and R.J. Cesarone

"Leaps of the Imagination: Interstellar Flight and the Horizon Mission Methodology" by John L. Anderson

"Use of Parabolic Solar Concentrators to Improve the Performance of an Interstellar Solar Sail" by Gregory L. Matloff

"Are We Ready?" by Carl B. Pilcher

Science News

November 18, 1995, Volume 148, Number 21

"Searching for Other Worlds, A Planetary Odyssey" by Ron Cowen, pp. 332-333

With the recent discovery of the first bona fide extrasolar planets, programs to search for more have received increased attention. This article explores a handful of the many projects currently underway or in various stages of development. Along with a review of the Doppler spectroscopy techniques responsible for most of the recent discoveries, there are discussions about the recently started survey of 60 nearby stars using a new interferometric astrometer at the Palomar Observatory. This device detects Uranus-size bodies at distances of 5 AU or more from its primary. For those interested in more direct techniques, the state of the technologies needed to directly image extrasolar planets is explored. Soon, it may become possible to detect Jupiter-sized planets around the nearest stars using 10-meter class telescopes equipped with the latest adaptive optics systems under study. Eventually, large space-based interferometers will be required to obtain images of earth-like planets orbiting the nearby stars.

Science News

December 16, 1995, Volume 148, Number 25

"Some Like It Hot, Puzzling Over the Origin of a Roasting Planet" by Ron Cowen, pp. 412-413

The discovery of the 51 Pegasi B has given astronomers their

first example of an extrasolar planet. Unfortunately, it is so odd that it does not fit any of the previously developed models of planet formation. This feature reviews some of the adjustments that are being considered to explain the origin of bodies like 51 Pegasi B using the older models. One concept considered in detail was developed by Doug L.C. Lin of U.C., Santa Cruz. His proposal of how a gas giant could migrate from the outer reaches of a forming solar system to within a few million kilometers of its sun has drastic implications for the chances of finding habitable terrestrial bodies in such systems.

Science

December 1, 1995 , Volume 270, Number 5241

"The Interstellar Carbon Budget and the Role of Carbon in Dust and Large Molecules" by Theodore P. Snow and Adolf N. Witt, pp. 1455-1460

This technical article explores the authors' arguments that carbon is as much as twice as abundant in the Sun than is typical for most stars. Survey after survey is cited to demonstrate this anomalously high solar carbon abundance. The authors present evidence that the Sun's extra endowment of carbon is the result of a nearby type II supernova. Shock waves from this same event may also have been responsible for triggering the formation of the Sun and our solar system.

While the authors are primarily concerned with the effect of a solar carbon enhancement on astronomer's estimates of the prevalence of carbon dust in the interstellar medium, it may also have profound implications for the amount of carbon available in other planetary systems. Carbon in the form of carbon dioxide has played an important role in the evolution of the environments of Venus and Mars as well as the early Earth. In a planetary system with a lower, "normal" carbon abundance, the quantity of carbon dioxide may not be as great and could have a reduced influence.

The authors cite that if the primary source of carbon and other volatiles for terrestrial planets comes from comet accretion instead, the initial depletion of carbon may be partially compensated. Clearly the effects of a reduced carbon budget on the evolution of life and planetary atmospheres in other solar systems must be studied further.

"Infrared Spectrum of the Cool Brown Dwarf GL 229B" by B.R. Oppenheimer, S.R. Kulkarni, K. Matthews, and T. Nakajima, pp. 1478-1479

While the previous article may cast a long shadow on the chances of finding life and habitable planets in other solar systems, this paper in the same issue of Science should help us all feel a bit better. This paper summarizes the results of the first spectroscopic analysis of a brown dwarf. Despite the dimness of this newly discovered companion to GL 229, this team of scientist from Caltech were successful in using near-infrared spectra to detect methane in the atmosphere of this extra-solar behemoth. This constitutes the first detection of methane in the atmosphere of a non-stellar extrasolar companion. Hopefully, this bodes well for finding other important carbon-bearing molecules in the atmospheres of other extrasolar giant planets as well as their yet-to-be-discovered terrestrial brothers.

Sky & Telescope

December 1995, Volume 90, Number 6

"Nor Any Drop to Drink" by Harry Y. McSween Jr., pp. 18-23

This piece describes the latest thinking on the watery past of our neighbor, the planet Mars. Analysis of SNC meteorites, which are generally believed to be pieces of Martian crust thrown clear of the planet during cratering events, shows that some have mineral inclusions present that could only be formed in the presence of water. The isotopic assays of these samples not only provide compelling evidence for the Martian origins of these small rocks but also provides important clues to the hydrology of Mars and how it differs from Earth. The amount of water Mars is estimated to have as a result of the analysis of SNC meteorites is much less than that implied by the geological evidence. Much more work will be needed to finally pin down the Martian water abundance before we can determine if Mars is presently or could have ever been an abode for simple life forms.

"SETI Down Under, Project Phoenix Lifts Off at Parkes Observatory in Australia" by Roger H. Ressmeyer, pp. 26-27

This article gives a brief, yet unique account of the beginning of Project Phoenix operations in Australia. The most notable feature of this piece is the excellent selection of photographs taken by the author who is an editor/photographer for the world's leading digital image archive.

Next Issue of SETIQuest

VOLUME II, NUMBER 3

Editorial board member and physicist Andrew LePage examines the inner workings of Harvard University's Project BETA (Billion Channel Extraterrestrial Assay) located in Harvard, Massachusetts. Mr. LePage will prepare an indepth examination of the software, hardware and componentry used in this complex billion-channel SETI system, and will present a complete status report on the project.