

17 of 17 DOCUMENTS

# The Washington Post

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The Washington Post

August 1, 2010 Sunday  
Bulldog Edition

### Setting sail for the final frontier

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**SECTION:** OUTLOOK; Pg. B07

**LENGTH:** 811 words

#### VOYAGER

Seeking Newer Worlds in the

Third Great Age of Discovery

By Stephen J. Pyne

Viking. 444 pp. \$29.95

For those 30 or younger, the journey is now ancient history, having originated before they were born. As summer was coming to an end in 1977, two spacecraft were launched from Cape Canaveral, Fla., outfitted with a bevy of instruments to take a grand tour of the outer planets. NASA was taking advantage of a planetary alignment that comes only once every 176 years. Stephen Pyne chose now to write about these probes, Voyager 1 and 2, because he views them as potent symbols of a third great age of discovery.

The earlier eras were forged by European rivalries -- first the great oceanic explorations during the Renaissance and then the more scientific ventures in the 18th and 19th centuries, such as Darwin's voyage on the Beagle. But the third epoch transcends "anything humanity has known before," Pyne writes. "It would reach beyond sordid politics and the blinkered ambitions of its originating time and place."

That's a weighty mantle for Voyager to wear, I thought upon starting the book. Why not choose, as the avatars of this age, the robots roving over Martian deserts or the Apollo program that took men to the moon? Pyne, an environmental historian at Arizona State University, answers that question -- and much more -- in this fascinating and beautifully written chronicle. Much like Ferdinand Magellan's bold, world-spanning journey, Voyager was one of those "moments of exploring that . . . fuse place, time, discovery, and yearning." The Apollo program, contends the author, "went nowhere, withdrawing to the virtual solipsism of the space shuttle and a near-Earth space station." But the Voyagers

found new moons, planetary rings, erupting volcanoes and potential sites for extraterrestrial life. It was the grand gesture.

Despite the title, "Voyager" is not a detailed, straightforward account of the project. What makes this book unique is Pyne's combination of history and philosophy as he reflects on the role of exploration in human society. Throughout its pages, the Voyagers' passage through the solar system is compared and contrasted with terrestrial expeditions of the past. Even the most passionate aficionado, who devoured every digital bit sent back by the Voyagers, will find this overview enriching.

Occasionally a comparison can be prosaic (in volume, each Voyager was roughly equivalent to Columbus's NiÑa), but more often they are poetic and engaging. A Voyager rounding Jupiter, for example, is likened to Vasco de Gama swinging around the Cape of Good Hope. Only this time we found "hurricanes the size of Earth's Moon that lasted for centuries; stormy eddies that roiled past like boiling Mississippi; trade winds that would shred and crush sailing ships." De Gama caught the austral westerlies to hurl him past Africa; the Voyagers were boosted gravitationally as they sailed from planet to planet.

Once Voyager 1 flew past Jupiter and Saturn, it headed out of the solar system. It was Voyager 2 that completed the full grand tour, arriving at Uranus in 1985 and Neptune in 1989, so far out that it took four hours for its data to reach Earth. Remembering only the glorious images, I was surprised to learn how close the Voyagers came to disaster in flight -- jammed platforms, misdirected antennas, failed receivers -- all either fixed or worked around by ingenious engineers. For that matter, before launch some scientists argued against including cameras at all, believing them a waste of payload. Thankfully, others prevailed, perhaps taking a lesson from the second age of discovery, when Thomas Moran's stunning paintings of Mammoth Hot Springs helped push Congress to declare Yellowstone a national park. Those remaining home want "not just shared data but shared meaning: not merely the eyes of discovery but its poetry," writes Pyne.

According to Pyne, the golden era of the third age is now turning to silver, where more focused work replaces inspiration: The Magellan probe goes to Venus, Galileo to Jupiter, Cassini to Saturn. What comes next is difficult to predict: Perhaps millions will gain the opportunity to virtually explore, as technology progresses. Or maybe there will be renewed competition among spacefaring nations, harking back to the first age.

Whatever the outcome, the Voyagers are still on the job. Now past Pluto, the stalwart pair are "sounding" the depths of space and have enough power to send back their findings until 2020. Only last year the probes detected the presence of magnetic fields that are holding together an interstellar cloud through which the solar system is now passing.

Hardly ancient history after all.

Marcia Bartusiak is executive director of the MIT Graduate Program in Science Writing. Her latest book is "The Day We Found the Universe," on the birth of modern cosmology.

**LOAD-DATE:** August 1, 2010

**LANGUAGE:** ENGLISH

**DISTRIBUTION:** Maryland

**GRAPHIC:** IMAGE; Nasa/associated Press; An artist's conception of Voyager I's encounter with Saturn on Nov. 12, 1980. The spacecraft came within 77,174 miles of the ringed planet.

**PUBLICATION-TYPE:** Newspaper

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