

## SEEKING NEWER WORLDS: The Future of Exploration

By Stephen J. Pyne

Come, my friends,  
Tis not too late to seek a newer world  
- Tennyson, "Ulysses"

### One Lump, or Three?

Exploration history, too, has its lumpers and splitters.

There are those for whom the long saga of geographic exploration by Western civilization is continuous and thematically indivisible. The Viking landers on Mars are but an iteration of the long ships that colonized Greenland. The Eagle, the Command Module orbiter, and Saturn V rocket that propelled the Apollo XI mission to the Moon are avatars of Columbus' Niña, Pinta, and Santa Maria. The "new ocean" of interplanetary space is simply extending the bounds of the old. The ur-lumpers would go further. The historic eruption of European exploration was but the most recent device to carry humanity's expansive hopes and ambitions; its origins reside in the genetic code of humanity's inextinguishable curiosity. Even more, space exploration shares an evolutionary impulse. Through humanity, life will clamber out of its home planet much as pioneering species crawled out of the salty seas onto land. The impulse to explore is providential; the chain of discovery, unbroken; the drivers behind it, as full of evolutionary inevitability as the linkage between DNA and proteins.

Still, a counter-case exists. What expands can also collapse. Ming China launched seven dazzling voyages of discovery, and then shut down all foreign travel and prohibited multi-masted boats. Medieval Islam sponsored great travelers before shrinking into the ritual pilgrimage of the haj. The Norse spanned the Atlantic, then withered on the fjords of a new world. Moreover, plenty of peoples stayed where they were: they lacked the technological means, the fiery incentives and desperate insecurities, or the compelling circumstances to push them to explore beyond their homeland. Like Australia's Aborigines, they were content to cycle through their ancestral Dreamtime, and felt little urgency to search beyond the daunting seas or looming peaks. A walkabout was world enough.

In this perspective, what matters are the particulars - the cultural conditions that prompt and sustain discovery. What is commonly called "geographic exploration" has been, in truth, a highly ethnocentric enterprise. It will thrive or shrivel as particular peoples choose. There is nothing predestined about geographic discovery, any more than there is about a Renaissance, a tradition of Gothic cathedrals, or the invention of the electric light bulb. From such a perspective, the European era of exploration that has dominated the past five centuries is simply another in a constellation of cultural inventions that have shaped how peoples have encountered a world beyond themselves. It will, in time, pass away as readily as the others; European-based exploration may yet expire, even after 500 years, perhaps exhausted like the cod fisheries of the Grand Banks. Space exploration may prove to be a defiant last hurrah rather than a daring new departure.

I'm a splitter. My own premises are these: that exploration as an institution is an invention of particular societies; that it derives much of its power because it bonds geographic travel to cultural movements, because it taps into deep rivalries, and because its narrative conveys a moral message; that, while unbroken, the trajectory of a half millennium of exploration by Western civilization can be understood best within the context of three great eras; and that the future of exploration may become a reversed mirror-image of its past.

## Islands in the Mist

Why three eras? Why not four, or eight? Why any at all? History is messy, and exploration history, with its perpetual disputes over prediscovers and rediscovers, messier still. So consider, as an index of exploration, the case of Pacific islands. None were known empirically to Europe prior to the Great Voyages. While some discoveries, particularly by the Portuguese, were no doubt hoarded as state secrets, the dates of discovery for most are reliably known. Plotting those discoveries by 50-year increments yields three fairly distinct periods.

The first coincides with the classic voyages of discovery, led by Portugal from the west and Spain from the east. Every island is new: discovery is rapid and relatively easy (if anything done by ship in those days can be considered easy). Between 1500 and 1550, mariners discovered some 32 islands. They found fewer in the next 50 years, and half as many again in the next 50. By the mid-17th century the long wave has exhausted itself. Some 75% of the discoveries occurred over roughly 75 years.

An explanation for the odd curve, a peak followed by a rapid decay, is simple. Mariners were not searching for islands but for routes to the great entrepôts of the East. They found islands along the way, and once they plotted out the best paths, they had scant incentive to keep at sea. The latter discoveries happened from miscalculations or accidents - storms, for example, that blew ships off course - or, as the Dutch become more expansive in their plans to outflank the Portuguese, a scattering of islands that they chanced upon. There was no reason to randomly rove the seas. Explorers had completed their task, had hewed routes to the riches, and the discovered islands had been, as it were, the chips that scattered to the side.

Then, in the mid-18th century, after nearly 150 moribund years, the process rekindled: Europeans begin encountering new islands. But these are new Europeans - British and French, mostly - entangled in fresh rivalries, and they have novel purposes. They come as emissaries of the Enlightenment, they are keen to explore nature's economy for its exotic wealth and commercial wonders, they carry naturalists eager to catalog the Great Chain of Being, trace the contours of the world ocean, and draft a new mappa mundi, and they haul artists and literateurs avid for lush tropical utopias. They search out the blank spots of the Pacific. They seek unknown islands as ends in themselves. A great age of circumnavigators commences, of which the three voyages of Captain James Cook are a prime exhibit.

The number of known islands explodes. More islands are discovered in 70 years than in the previous three centuries. But this, too, quickly expires. They reach the last island, Midway, in 1859. Then nothing; and it is a nothing all the more profound because the voyagers have revealed all that exist. By the onset of the 20th century, not only have explorers exhausted the dominion of Pacific islands, the Enlightenment itself has begun to crumble before the intellectual tremors and metaphysical termites of Modernism. For the Pacific Ocean, a second age of exploration ends with traffic in guano and copra, excursions by tourists, adventurers, and anthropologists, and color prints by Gauguin.

How, then, might there be another era? Because mariners went below the deep swells; they traveled by submarine and surveyed the hard-rock topography of the deep ocean by remote sensing devices. They discovered a vast realm of volcanic islands - guyots - that had eroded and subsided beneath the surface. In a few brief decades, an exploring science mapped 596 new Pacific isles. These were more Pacific islands than Western civilization had discovered since Vasco da Gama first landed Portugal at the gates of the Indies. More powerfully, the context of discovery revived with another global rivalry, this one begun in World War II and accelerated during the Cold War; with another intellectual syndrome, the curious culture of Modernism; with another revolution in technology.

The Cold-War competition beneath the waves complemented almost perfectly the better-known competition for the high ground beyond the Earth's atmosphere. Space exploration was

part and parcel of this same Third Great Age of Discovery. If islands are a reliable index, three eras might equally characterize the vast sweep of Western exploration since the natal times of Henry the Navigator.

### **Triangulating the Three Ages**

The Great Age of Discovery opened with centuries of false dawns. Part of the difficulty is disentangling exploration from other forms of travel; from migration, walkabout, exile, wars of conquest, trading expeditions, reconnaissance, long hunts, great treks, missionizing, pilgrimage, tourism, and just plain wanderlust. Roman merchants had contact with the Canaries and Cathay. European pilgrims trekked from Hibernia to the Holy Land. Franciscan scholars trudged to the court of the Great Khan. Each age of expansion, every expansionist people, experienced a burst of discovery about a larger world. What made events of the 15th century special was that these exploring contacts did not end in a rapid contraction. They became welded to a revived Expansion of Europe that would stretch over half a millennium; they bonded with revolutionary epochs of learning and political reform. They became institutionalized. Exploration became the outward projection of internal unrest that would not let the momentum long languish.

The Great Voyages began cautiously enough. That Portugal pioneered the practice should alert us to the process' uncertain origins and its often desperate character. There was little in Portuguese history from which someone might predict, in 1450, that it would leap across whole seas and over unknown continents, establish the world's first global empire, and create the raw template for European expansion. Yet that is precisely what happened. For several hundred years, exploring nations sought to emulate the Portuguese paradigm, whose outposts survived until the 21st century. Within a generation, it came to be said that it was the fate of a Portuguese to be born in a small land but to have the whole world to die in.

What happened was that exploration became – directly, or indirectly through charters - an organ of the state, and because no single state dominated Europe, many joined the rush. Geographical exploration became a means of knowing, of creating commercial empires, of outmaneuvering political, economic, religious, and military competitors - it was war, diplomacy, proselytizing, scholarship, and trade by other means. For this reason, it could not cease. For every champion, there existed a handful of challengers. This competitive dynamic - embedded in a squabbling Europe's very fabric - helps explain why European exploration did not crumble as quickly as it congealed. On the contrary, many Europeans absorbed discovery into their culture, even in some cases, writing explorers into a founding mythology, a cultural creation story. In short, where exploring became a force, something beyond buccaneering, it interbred with the rest of its sustaining society. The broader those cultural kinship ties, the deeper the commitment. Societies dispatched explorers; explorers reshaped society. Exploration became an institution. The explorer became a role.

\* \* \*

The fabled Great Voyages announced a First Age of Discovery. Its particular domain was the exploration of the world ocean; the discovery that all the world's seas were one, that it was possible to sail from any shore and reach any other. Of course there were some grand entradas in the Americas and missionaries, Jesuits especially, penetrated into the vast interiors of the Americas, Africa, and Asia. But as J. H. Parry observes, it was the world sea that defined the scope and achievements of the First Age. The mapping its littoral was the era's finest cartographic triumph.

The map reminds us that the First Age coincided with a Renaissance. The era unveiled two new worlds, one of geography, another of learning. Francis Bacon conveyed this sense perfectly

when he used as a frontispiece to his Great Instauration the image of a sailing ship pushing beyond the pillars of Hercules. The voyage of discovery became a metaphor for an age of inquiry that would venture far beyond the dominion of the Mediterranean and the inherited wisdom of the Ancients. The discoveries overwhelmed a text-based scholarship: scholasticism, that arid discourse that resulted from too many scholars and not enough texts, collapsed as new information poured into Europe like New World bullion into Spain, and like it caused an inflationary spiral of knowledge.

An age of discovery, however, demands more than curiosity and craft. It has to speak to deeper longings and fears and folk identities. The ships must voyage into a moral universe that explains who a people are and how they should behave, that criticize and justify both the sustaining society and those it encounters. The Great Voyages provided that moral shock: they forced Europe to confront beliefs and mores far beyond the common understanding of Western civilization. The Renaissance Expansion of Europe profoundly altered Europe's understanding of itself and its place in the world. There was plenty of hollow triumphalism, of course; but those contacts also inspired Montaigne's celebrated preference for the cannibalism of Brazil's noble savages to that of Versailles' courtiers, and Las Casas' excoriating denunciation of the conquistadores. They compelled an reexamination of the political and ethical principles underlying Christendom and its secular principalities.

\* \* \*

The inflection to what William Goetzmann has termed a Second Great Age of Discovery was messier than the paradigm of Pacific islands suggests. Yet the same basics apply. By the early 18th-century, exploration had become moribund; mariners did more poaching and piracy than original probing; the explorer blurred into the fantasist and fraud, the promoters of the Mississippi and South Seas bubbles, the Lemuel Gulliver of Jonathan Swift's savage satire, or with the forlorn adventures of Daniel Defoe's Robinson Crusoe, who curses a woeful addiction to adventuring that repeatedly brings him to grief. Exploring expeditions persisted largely because interlopers tried to outflank established competitors, but little new was added. Exploration seemed destined to be left marooned on the shore of a fast-ebbing historical tide.

Then the cultural dynamics changed. The long rivalry between Britain and France, the penetration of high culture by the Enlightenment, a hunger for new markets, all combined to move Europe again out of dry dock and onto the high seas of exploration and empire. The Grand Tour became a global excursion around the Earth. Perhaps most extraordinarily, the missionary emerged out of a secularizing chrysalis into the naturalist. Increasingly, scientists replaced priests as the chroniclers and observers of expeditions, and scientific inquiry substituted for the proselytizing that had helped justify an often violent and tragic collision of cultures. From Linnaeus' Apostles to expeditions measuring the transit of Venus, explorers swarmed across the Earth and often sailed around it. Over the next century every aspiring great power dispatched fleets to seek out new wealth and knowledge, to loudly go where others had not yet staked claims. Once again, the rivalries among the Europeans were as great as anything between Europeans and other peoples.

Yet global cruises proved mostly a means to reposition explorers, who promptly moved inland. The world's continents replaced the world sea as an arena for discovery: the cross-continental traverse superceded a circumnavigation as the grand exploring gesture of the age. The pivotal figure was Alexander von Humboldt, whose five years in Latin America redefined exploration for the era. Humboldt was not the first European to paddle up the Orinoco or climb in the Andes, but he was the first of a new kind of European, such that even when explorers of the Second Age revisited sites known to the First, they did so with original eyes to novel ends. Symbolically, upon his return to Europe, he dined with Thomas Jefferson the same month that Lewis and Clark's Corps of Discovery departed St Louis. In the person of Humboldt the explorer

embodied the Romantic hero; with Lewis and Clark, a Moses-like leader of a people.

The transition matters because, as the 19th-century ripened, Europe was no longer content to remain as a trader on the beaches of the world sea. Like its exploring emissaries, it shoved and swarmed inland. Trading ventures became imperial institutions; coastal colonies became continental nations; and the politics of commerce gave way to outright conquest. Thus commenced a grand era of exploring naturalism. New scholarship, particularly sciences, bubbled up out of the slush of specimens shipped home. The returns from the earliest explorers to a particular place were often phenomenal - the scholarly equivalent to placer-mining. A revolution in geographic discovery again accompanied a revolution in learning, aptly symbolized by the simultaneous recognition by two exploring naturalists, Charles Darwin and Alfred Wallace, of evolution by natural selection.

The moral drama changed accordingly. Secularization and science translated Vasco da Gama's famous declaration that he had come to the Indies for "Christians and spices" into a cry for Civilization and Commerce. The deeper drama concerned that fraction of Europe's imperium colonized by European emigrants. These settler societies tended to look upon discovery as part of a national epic, and to honor explorers as vital protagonists - a Moses, an Aeneas - of those founding events. Their subsequent folk expansions proceeded hand-in-glove with formal exploration. These were New Worlds, premised on the prospects for a new order of society. America truly was, in William Goetzmann's words, exploration's nation; but so were Russia, Australia, Canada, and others.

Discovery metastasized. As measured by the number of exploring expeditions, a slight increase appears in the latter 18th century, and then erupts into a supernova of discovery that spans the globe. By the 1870s explorers had managed continental traverses - cross-sections of natural history - for every continent save Antarctica. With the partition of Africa, expeditions proliferated to assess what the lines drawn on maps in Berlin libraries actually meant on the ground. Exploration had become an index of national prestige and power. The first International Polar Year (1882) turned attention to the Arctic. An announcement by the Sixth International Geographical Congress in 1896 that Antarctica remained the last continent for untrammelled geographic discovery inspired a stampede to its icy shores; even Belgium and Japan sponsored expeditions. Ernest Shackleton's celebrated Trans-Antarctic Expedition was, after all, an attempt to complete for that continent the grand gesture that had crowned every other.

But Antarctica was the last: there were no more unvisited lands to traverse other than such backwaters as, for example, the Red Centre of Australia, the crenulated valleys and highlands of New Guinea, and the wind-swept Gobi. The enthusiasm for boundary surveys and natural-history excursions - for imperialism itself - waned with the slaughter of the Great War. Moreover, Modernism began its intellectual infection, a fever that turned attention of high culture away from geographic discovery. Art looked to art, mathematics to mathematics, literature to literature. The number of exploring expeditions began to decline.

Plotting them reveals the Second Age as a kind of historical monadnock, rising like a chronological volcano above a level terrain. The peak crests in the last decades of the 19th century, as exploration crossed the summit of the Second Age. Then it began a descent down the other side.

\* \* \*

The reasons for the slow bursting of this exploration bubble are many. The simplest is that Europe completed its swarm over the (to it) unknown surfaces of the planet. There was nowhere else for the Humboldtian explorer to go. Equally, there were no more lands to meaningfully colonize; instead, Europe turned upon itself in near self-immolation; two world wars, a depression, and the sudden shedding of its old imperium. By the middle 20th century Kipling's "Recessional" had become prophetic: Europe was rapidly disengaging itself from its imperial

past, and thus from the exploring energies that had, like lampreys, attached themselves to the institutions of an expansionist era. Decolonization accompanied an implosion of exploration; Europe turned inward, quelling the ancient quarrels that had restlessly and violently propelled it around the globe, pulling itself together rather than projecting itself outward. Antarctica, the deep oceans, interplanetary space - these arenas for geographic discovery might be claimed, but they would not be colonized. No one was willing to wage war over the asteroid belt or Io.

Other reasons were cultural. The Second Age had served as the exploring instrument of the Enlightenment. Geographic discovery had bonded with modern science: no serious expedition could claim public interest without a complement of naturalists, while some of the most robust new sciences like geology and biology relied on exploration to cart back the data that fueled them. Science, particularly natural history, had shown itself as implacably aggressive as politics, full of national rivalries and conceptual competitions, and through exploration, it appeared to answer, or at least could address, questions of keen interest to the culture. It could exhume the age of the Earth, reveal the evolution of life, celebrate natural monuments to nationalism and Nature's God. Artists like Thomas Baines and Thomas Moran joined expeditions, or like John James Audubon mounted their own surveys; general intellectuals eagerly studied narratives of discovery (even Henry David Thoreau, nestled into his Walden Pond cabin, read the entire five volumes of the Wilkes Expedition). Exploring accounts and traveler narratives were best-sellers; explorers became cultural heroes; exploration was part and parcel of national epics; exploration was a means to fame and sometimes fortune. The Second Age, in brief, braided together many of the dominant cultural strands of its times.

By the early 20th century, however, this splendid tapestry was unravelling. The Enlightenment found itself challenged by Modernism's *avant garde*: in field after field, intellectuals turned to subjects that no longer lent themselves to explication by exploration. Natural scientists looked to the very large and the very small, to red-shifting nebulae and subatomic particles or molecular genes. Artists turned inward, probing themselves and the foundations of art, not outward to representational landscapes. High culture was more inclined to follow Sigmund Freud into the symbol-laden depths of the unconscious or Joseph Conrad into a heart of imperial darkness than to ascend Chimborazo with Humboldt or to trail John Wesley Powell through the gorges of the Grand Canyon. The Second Age sagged not simply from the exhaustion of closed frontiers but from a more profound weariness with the entire Enlightenment enterprise.

A fascinating question is why the bubble did not burst more catastrophically. One reason is that Western civilization did discover new lands to explore. There were the icesheets (and sub-ice terrains) of Greenland and especially Antarctica, there were the deep oceans, and of course a solar system beckoned full of wonders beyond the vision of Earth-bound observatories. As powerful instruments and remote-sensing technologies emerged, as manned vehicles and unmanned probes plummeted to the depths and beyond the atmosphere, the prospects for a revival of exploration became possible.

Yet dazzling technologies and a rekindled curiosity are not enough to sustain an era of exploration: cultural engagement also demands a sharp rivalry. Those competitive energies flourished with the Cold War. In retrospect the Great Game between the United States and the Soviet Union lasted far less than those between Spain and Portugal, or Britain and France, but the era is young, and if it does in fact mark a Third Age, some other competitors, keen to secure national advantage or prestige through sponsored discovery, may emerge. Without the Cold War, however, there would have been scant incentive to erect bases on the Antarctic ice, scour the oceans for seamounts and trenches, or launch spacecraft. The Cold War allowed a controlled deceleration of exploring energies, a complement to the British-French rivalry that help accelerate the Second Age. Two geopolitical rivals, both with active exploring traditions, chose to divert some of their contest away from battlefields and into untrodden landscapes.

But perhaps more profoundly, exploration did not wither away because the culture, the

popular culture, did not wish it to. Exploration had become not only institutionalized but internalized. This was a civilization that could hardly imagine itself as other than exploring. It forged new institutions, of which the International Geophysical Year is an apt annunciation; and in the Voyager missions, it found what is likely to endure as the great gesture of the Third Age, a traverse through the solar system. Voyagers' Grand Tour may serve for this era as Magellan's voyage did for the First and Humboldt's travels did for the Second. Voyager demonstrated both the power and peculiarities of the era.

What has not happened is a new knitting together of exploration and high culture. Instead, popular culture has filled that void, but in ways that resuscitate the images and narrative templates of previous eras. Star Trek, for example, is the voyage of the Beagle with warp drive. Enthusiasts show conestoga wagons trekking to Mars, prairie schooners propelled by solar wind. But popular culture can be fickle and selective. The first Star Trek movie imagined a Voyager spacecraft returning to Earth, stuffed with a universe of wonders, reporting to its "creator." Ten years later, Star Trek V opened with a bored Klingon commander blasting a Voyager probe as space junk. Exploring the galaxies needed a story as much as dilithium crystals. With neither a rambunctious imperialism nor an eager Enlightenment, the Third Age must, for now, continue its downward declension.

### **Boldly Going Where No One Is**

There are good reasons, then, for considering the Third Age – our age - as continuous with its predecessors. Yet it is also different; and those differences matter. Most intrinsically, the Third Age is going where no one is or ever has been.

The geographic realms of the Third Age are places where people cannot live off the land. In Antarctica they can at least breathe. In the deep oceans, beneath the icesheets, or in space, they can survive only if encased in artificial life-support systems. These are environs that offer no sustaining biota. There is little reason to believe that much more thrives beyond Earth. These geographies remain, for all practical purposes, abiotic worlds. They propel exploration beyond the ethnocentric realm of Western discovery, but also beyond the sphere of the human and perhaps beyond the provenance of life.

This is a cultural barrier to exploration, in comparison to which, the limiting velocity of light may prove a mere technological inconvenience. The reason goes to the heart of exploration: that it is not merely an expression of curiosity but involves the encounter with a world beyond our ken that challenges our sense of who we are. It is a moral act, one often tragic, a strong-nuclear force that bonds discovery to society. It means that exploration is more than adventuring, more than entertainment, more than inquisitiveness. It means it asks, if indirectly, core questions about what the exploring people are like.

This was unavoidable in the past because almost all previous encounters had involved people. Exploration meant the meeting of one people with another, the transfer of knowledge and experience from one group to another. Most of the world Europe did not discover except to itself. Almost every place that could have people did have them; and those indigenes proved indispensable. They served as interpreters, translators, native guides, hunters, and collectors. Explorers often succeeded to the extent that they borrowed from or emulated the peoples who already resided in these (for-Europe) far and foreign realms. What Europe did was to stitch these separate someones together into a vast cosmological quilt: its voyages of discovery were needles and threads that joined geographic patches into new patterns.

The Third Age has no such option. No one will live off the land on Demos, go native on Titan, absorb the art of Venus, the mythology of Uranus, the religious precepts of Mars, or the literature of Ceres. There will be no one to talk to except ourselves. Discovery will become a colossal exercise in self-reference. The paradoxes that so inform Modernism - how to reconcile

observer with observed - will shape our appreciation of space exploration. Ironically, Modernist art, literature, and philosophy can outfit exploration with the intellectual kit it will need to survive such alien scenes. They can provision it to move beyond the landscapes of earlier eras of discovery.

The good news is that the coruscating ethical dilemmas of so much earlier exploring and empire-building will disappear. No group need expand at the expense of another. Ethnocentricity will vanish: there is only one culture, that of the explorer. There is no exo-ecosystem to foul. With no distinctively human encounter possible, there is no compelling reason for humans to even serve as explorers. As long as other life or cultures are not present, there is no ethical or political crisis except whatever we choose to impose on ourselves. Beyond the Earth there may well be no morality as traditionally understood, that is, as a means of shaping behavior between peoples. The morality at issue is one of the self, not between the Self and an Other.

The bad news is that exploration's moral power - the tensions, awful and enlightening both, that are involved in a clash of cultures - also vanishes. The price of ethically sanitizing exploration is to strip it of compelling human drama. Planetary probes become technical challenges, to make machines to withstand the rigors of space travel, a technological equivalent to extreme sports, like white-water kayaking in Borneo or NASCAR's Daytona 500. The space program becomes a kind of national hobby, a jobs program, or a daytime TV soap opera. But the matter gets even worse.

In past ages, discovery had to be done by people. There was no other option by which to learn the languages, to record data and impressions, to gather specimens, to meet other societies and translate their accumulated wisdom. It is impossible to imagine the great expeditions of the past without considering the personality of individual explorers who inspired, collected, witnessed, fought, wrote, sketched, exulted, feared, suffered, and otherwise expressed the aspirations and alarms of their civilization. But it is entirely possible to do so now. Not only is there no Encounter between people, there need not even be a human Encounterer. People do not have to be physically present at the discoveries of the Third Age, and there are sound reasons for arguing that they should not be.

Nor is the case for planetary colonization truly compelling, not at present, any more than it was for Magellan at the Marianas or Peary at the pole, or those fatally premature experiments from promoters like Walter Raleigh. The theses advanced to promote outright settlement are historical, culturally bound, and selectively anecdotal: that we need to pioneer to be what we are, that new colonies are a means of renewing civilization, that the Second Age can have a Second Coming. They conveniently ignore such fiascos as the Darien debacle - the scheme boomed by William Paterson in the 1690s to establish a Scottish settlement in Panama. The isthmus would be critical to global trade, he insisted; Scotland's economic future and national identity depended on it seizing control of that geopolitical chokepoint; destiny demanded colonization. The outcome was a crushing failure that, not incidentally, bankrupt Scotland and drove it into union with England. Paterson was a visionary: in 200 years, a canal would join the two oceans across Panama. He was also a lethal crank who cost hundreds of lives and ruined a national economy. Successful settlements followed a long gestation period of reconnaissance and aid from indigenes. More likely is an era of space tourism or historical reenactment - Plymouth Colony on the Moon, Golden Goa on Venus, Magellan Tours Takes You to Phobos.

## **Beyond the Third Age**

The Third Age encompasses more than space exploration, but the Antarctic has not enough undiscovered terrain to sustain a whole era and oceanographic exploration has not yet gripped the public imagination, although it might. The future of exploration will depend on the exploration of the solar system. What might it look like?



It will look like what its sustaining society wants it to look like. The possibility exists that political contests will boil over into space, perhaps if China declares a colony on the Moon as essential to its prestige and the European Union joins the fray. There is a prospect that the search for life will take on an imaginative, even a theological cast, sufficient that a large fraction of the culture wants to pursue it among the planets. It may happen that extreme arts, brash new sciences, an as-yet-undeveloped commerce, an astro-politics, and some critical personalities will combine to kindle a Third Age Echo of the Second Age. In some form or another, a virtuous cycle is possible. But it is not likely. As Damon Runyon advised, The race is not always to the swift nor the battle to the strong, but that's where you place your money.

The most plausible prognosis is that the future will resemble the past, that the Second Age's monadnock will mark an axis around which the evolving contours will unfold with rough historical symmetry. The Third Age will resemble the early Second, though in reverse. Expeditions will slide to a new steady-state, perhaps on the order of one or two a year. These will be complicated probes, requiring years of preparation, not unlike the expeditions launched during the Great Voyages and quite unlike the brawling swarm that so inflated the Second Age. They will be targeted to some particular purpose - commercial, scientific, technological, national prowess and prestige. They are unlikely to spill out from colonization: they will rather resemble those expeditions that early established trading factories on islands or episodically visited coastlines for barter or sought out new routes. If the process thrives, there will be several rivals, not some collective United Earth Space Agency; and that institutional unrest is what will keep the pot simmering. Steadily, more and more of the solar system will be visited, catalogued, mapped, assessed. Perhaps, here and there, an outpost will appear, staffed for a few years. Reversing this trend would require an immense, global commitment that could only come from some dark necessity or irresistible rivalry, say, the discovery amid the asteroids of some mineral absolutely vital to national existence - the equivalent of the Potosi mines of Mexico, perhaps - or from Venutians announcing that they intend to colonize Mars and the moons of Saturn, and daring Earthlings to stop them.

There may even be a deeper symmetry. The Grand Ages of Discovery may themselves end. They were created, they may expire. The conditions that sustained them may cease altogether, they may no longer inspire interest as a tradition worthy of institutional support. One can even imagine a robotic Columbus, ceremoniously announcing an end to the enterprise. If the late 19th century marks a bilateral middle in this saga, that passing may happen some 400 years later, the early 23<sup>rd</sup> century, where Star Trek now resides in the popular imagination. Exploration, even of space, may then exist only in literature, history, film, and popular imagination, and in a past where no one, boldly or otherwise, wishes any longer to go.

Copyright 2003 Stephen J. Pyne