

SPACE

1889



GDW

THE CONQUEST OF SPACE

IT WAS the inventive genius of Thomas Edison that first harnessed the power of the ether, and made space the new frontier for the nations of Earth. In March of 1868, in Boston, Thomas A. Edison attended a lecture by Professor B. Etienne Moreau of the Sorbonne, on the subject of the luminiferous ether. Edison's many questions and pointed insights of a practical nature prompted Moreau to invite the younger man to talk with him, and so they sat in the lobby of Moreau's hotel for hours, engrossed in technical discussion.

As a result of this discussion, Edison came up with a notion of an Ether Flyer, a device which could "sail at speeds heretofore undreamed of through the lumeniferous ether, and reach any point on the globe in a matter of hours." Edison built a model immediately, and tested it. It did not move, and the young inventor was devastated. He wrote of his failure to Moreau, who considered the problem, and concluded that air was the culprit. Matter embedded in the ether causes drag, he reasoned, and the interaction of the ether and the air was too much for the prototype engine to overcome.

Tests, with small models in an evacuated chamber, showed that air was indeed the problem, and that if the machine could be lifted to a height of 24,000 feet or more, the atmosphere was thin enough for the engine to overcome its drag. Edison constructed a model and applied for a patent in October of 1868.

Skeptical patent officials demanded a demonstration, and Edison decided to use a hydrogen balloon to lift his invention into the air, and to fit his invention with a clockwork piloting mechanism and 250 pounds of magnesium powder, rigged to explode on impact with the moon, his target. The flash of the magnesium's detonation would serve as proof of the machine's arrival.

On 27 November, 1868, before a com-

mittee of witnesses and an astronomer (who was to observe the machine with his telescope) Edison launched his greatest invention. The astronomer soon reported the appearance of a trail at a height of 30 miles above the surface of the Earth. The trail got fainter, and the astronomer eventually lost it. Edison anxiously awaited the detonation of the magnesium, spelling the astronomer at the telescope.

Early the next morning, in the chill Maryland dawn, a bright flash appeared in the Moon's *Mare Tranquillitatus*, remaining visible for several minutes, and witnessed by Edison, his friends, the astronomer, and the representatives of the patent office. Edison was ecstatic.

The patent for the Edison Ether Flyer was granted on 3 December, 1868, and Edison announced the formation of a company to build a larger flyer, capable of carrying passengers. The announcement was met with laughter in most scientific circles, and was the subject of several bitterly satirical cartoons in *Punch*. Edison finally managed to gather together a number of backers for an electrifying venture...a trip to Mars.

THE FIRST VISIT TO MARS

MARS WAS chosen as a destination for Edison's expedition because it was the closest suitable world. Earth's Moon was eliminated because it had no atmosphere to support the safe landing of the flyer (or so it was believed then).

A gigantic hydrogen balloon was constructed to Edison's specifications, capable of carrying the ether flyer, two passengers, and supplies for the trip. The balloon would carry the flyer high enough to enable the ether propeller to take hold, and would insure a safe landing at the destination. Power was provided by electrical storage batteries. To refresh the air, Edison took along numerous green plants.

Edison would go, of course, accompanied

A CHRONOLOGY OF MAJOR EVENTS IN THE HISTORY OF THE EXPLORATION OF SPACE

1868

FIRST WORKING Ether Flyer mechanism demonstrated.

1870

EDISON MARTIAN Expedition pilots a primitive Ether Flyer to Mars, and returns.

1872

FIRST BRITISH foothold on Mars with the establishment of the Permanent British Quarter in Parhoon.

1873

EDISON LOSES patent suit against Armstrong Ether Flyer Company. Both firms compete vigorously in design and construction of spacecraft.

1874

ARMSTRONG EXPEDITION to Venus fails to return.

Belgians, French establish enclaves on Mars.

1875

COLLINGSWOOD EXPEDITION to Venus fails to return.

1877

LONDON TIMES Venus Rescue Expedition fails to return.

1878

GERMAN ETHER Dirigible lands on Venus, and discovers fate of the first three expeditions.

1880

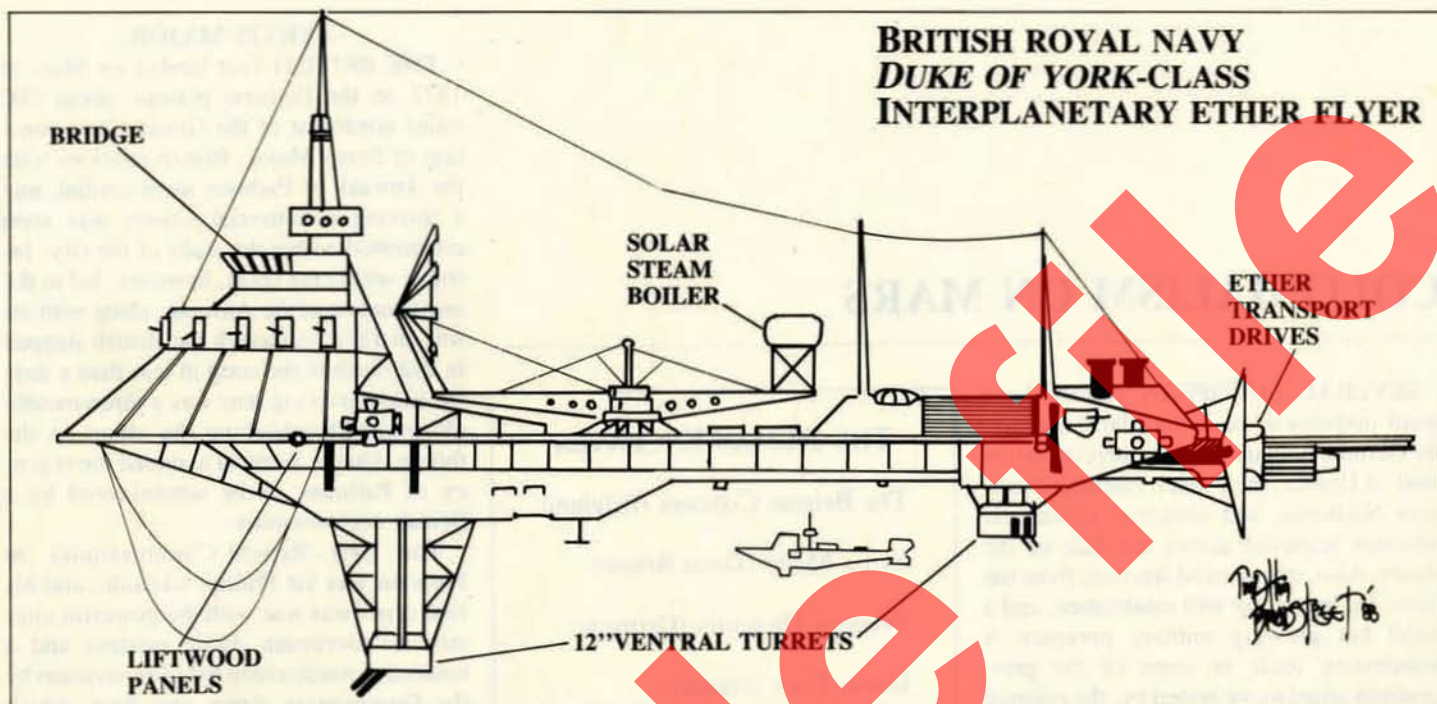
GERMANS ESTABLISH colony on Venus.

1885

EDISON ETHER FLYER patent expires. The Golden Age of space exploration begins.

1889

INTERNATIONAL RED CROSS uses Aerial transports to fly in aid after Johnstown flood.



by Jack Armstrong, a Scottish explorer and soldier-of-fortune with academic degrees in chemistry and geology. Armstrong was selected by the expedition's financial backers.

The expedition departed on 6 January, 1870, and arrived on Mars on 9 March. The balloon was damaged during the landing, and the expedition would have been stranded forever were it not for the serendipitous fact that Mars was inhabited.

Edison and Armstrong landed just outside the city now known as Syrtis Major, and were taken prisoner by the local potentate, Amraamtaba IX. Armstrong soon learned the language, and Edison impressed the Martian ruler with his tremendous technological knowledge.† The pair were soon freed, and Edison was provided with the materials necessary to repair his balloon, and to generate the hydrogen needed to fill it. Within months the repaired flyer was ready to carry Edison, Armstrong, and a curious Martian back to Earth. The return trip was without incident, and the expedition landed safely outside of Cincinnati, Ohio on the seventh of August, 1870.

The Earth was electrified. Edison and Armstrong received fame and fortune. Within a year, dozens of companies were manufacturing *Edison Flyers*, and flyers of several nationalities were soon making regular trips to Mars.

†As a result of Edison's visit, Martians to this day think half of all humans are deaf.

VENUS

ALTHOUGH EXPEDITIONS were sent to Venus as early as 1873 (using British-made Armstrong Flyers), the first one to return was the German-backed *Heidelberg* expedition of 1878. The Venusian magnetic field, it was discovered, was of an unusual intensity and flux; it radically accelerates liftwood decay. Within days of landing, the first three expeditions found their flyers would not leave the ground. Germany, unable to obtain large quantities of liftwood, was forced to make use of dirigibles as the lifting means for their Ether Flyers. Ger-

many has dominated the exploration of Venus since that time.

Venus is a world of perpetual overcast and heavy rainfall. The dense jungles of the lowlands produce many plants, for which there is great demand on Earth by dye-makers, drug companies, and florists (the Cytherian Orchid is especially valued for its beauty and fragrance). The lowlands are also home to varieties of giant lizards, called dinosaurs, and to the savage lizardmen. Humans find the lowlands unbearable, and stick to the few highland plateaus, where life is more bearable, and the sun can occasionally be glimpsed through the overcast.

A SCIENTIFIC DISCUSSION OF THE LUMINIFEROUS ETHER

PRIOR TO the 19th century, the corpuscular theory of light was generally accepted. Certain theoretical problems prompted important scientists (among them Benjamin Franklin) to advance the wave theory of light, summarized as: "Light is in the ether the same as sound is in the air."

The Luminiferous (light-bearing) Ether was essential to the wave theory of light. Ether was light's medium, like water for waves and air for sound. By 1868, Professor Moreau was perhaps the world's leading expert on the ether, and he summarized the theory in the introduction to his book *Promethean Promise*:

"The Luminiferous Ether is an infinitely hard, infinitely elastic underlayment to the physical universe. It is by virtue of the Ether that light, gravity, and magnetism can travel through the universe, all three being forms of energy that express themselves as waves in the medium."

Edison's practical inventive nature took these theoretical considerations of the nature of light, and produced a practical device which used them. His Ether Flyer worked by creating an electric propeller (the Ether Propeller) which creates waves in the ether and pulls the flyer along behind them. The interaction of the propeller with the ether produces a faint glowing trail behind the flyer, not unlike that of a comet.

COLONIALISM ON MARS

SEVERAL EUROPEAN powers have small outposts or bases on Mars: notably, the German military and commercial station west of Umbra, the French research facility in Nilokeras, and numerous diplomatic missions scattered across the face of the planet. Also, commercial interests from the Earth are becoming well established, and a small but growing military presence is manifesting itself in some of the principalities allied to, or bribed by, the colonial powers on Earth. Only two significant tracts of territory are held by European states on Mars, however: the Belgian Coprates and the Crown Colony of Syrtis Major.

THE BELGIAN COPRATES

THE BELGIANS first sent an expedition to Mars in 1876 and followed it with several more in short order. The early expeditions were ostensibly exploratory in nature, but were heavily protected by Belgian soldiers. The purpose of these expeditions was to study and explore the Great Coprates Rift Valley, and if the inhabitants of the valley were suspicious of the "true intentions" of the Belgians, subsequent events do little to contradict them. By 1884 there were frequent skirmishes between the Belgians and "Coprates"[†] up and down the length of the valley.

The Belgians vigorously protested the practice of American arms merchants selling the most modern rifles to the Coprates, a complaint that had little impact on American public opinion, and none whatsoever on the arms trade. In any event, the American arms merchants could point with

[†]The collective term "Coprates" has been applied to the inhabitants of the valley by the Belgians, although there are virtually no ethnic, linguistic, or cultural similarities between the inhabitants of the Upper and Lower Coprates Valley, the approximate dividing line being the shattered lowlands of Melas Lacus.

THE HUMAN ENCLAVES

The Belgian Coprates (Belgium)

Syrtis Major (Great Britain)

Western Dioscuria (Germany)

Idaeus Fons (France)

Hecates Lacus (Russia)

Thymiamata (United States of America)

Euxinius Lacus (Japan)

some moral justification to the fact that, insofar as modern arms might drive the Belgians from the valley, many would consider that a good thing. Although news reports were scarce from the Coprates, those which made their way out indicated that Belgian colonial rule there was even more brutal and bloody than in the Congo on Earth, if that was possible.

By 1889 the Belgians had completed the conquest (for it was nothing less) of the Great Coprates Rift Valley, and an uneasy peace had settled there. The flood of refugees into Tithonius, Ophir, and Aurorae Sinus, and their frequent forays back into the valley to raid Belgian gumme plantations, threatens to spread the violence. The Belgians, in return, have begun to undertake reprisal raids and punitive expeditions into neighboring territories. All of this fans the fires of antihuman prejudice throughout Mars. The atrocities committed by the Belgians are used as further evidence by the Worm Priests, Ground Cleansers, and other fanatical groups of Martians, of the need to drive the red devils off the face of Mars forever.

SYRTIS MAJOR

THE BRITISH first landed on Mars in 1872 on the Parhoon plateau, about 500 miles northwest of the Grand Canal junction of Syrtis Major. British relations with the Anwaak of Parhoon were cordial, and a thriving commercial colony was soon established within the walls of the city. Intrigue within the court, however, led to the assassination of the Anwaak, along with his son, in 1878. Although the British stepped in and crushed the coup in less than a day, the next surviving heir was a three-month-old infant. Establishing the infant on the throne, Queen Victoria assumed the regency of Parhoon, to be administered by a British commissioner.

The first Regent-Commissioner to Parhoon was Sir Phillip Adelaide, and his first crisis was war with the powerful city-state of Gorovaan. Only grudges and a tenuous dynastic claim led to an invasion by the Gorvaangian Army and fleet, which gave the British and Parhoonese a common foe to fight together. The Gorovaangian War was a complete success for the British, witnessed the combat baptism of the Parhoon Rifles,[‡] ended in the annexation of Gorovaan to Parhoon, and cemented very strong ties between the British and Parhoonese.

In 1880 war again broke out, (The Second War of the Parhoon Succession) and this time saw British regulars in the field since Britain was formally at war with Syrtis Major and its client states. The conclusion of the fighting saw Syrtis Major, Haatt, and Avenel incorporated as the Crown Colony of Syrtis Major. Parhoon and Gorovaan continued to be ruled by the Commissioner-Regent, who was also the Governor General of the colony. By 1882 both Moeris Lacus and Meepsoor were treaty dependencies of the colony. The "punishment" of Shastapsh in 1884, followed by an overland campaign in 1887, brought that city-state reluctantly under British rule. In a very short time the British had carved out a colonial empire of considerable dimensions. In contrast to the Belgians, the British have maintained fairly good relations with their Martian subjects, particularly the Parhoonese and Meepsooris. The Martian canal princes to the south fear them, however, and engage in endless intrigues to end their tenure on Mars.

[‡]Now the First Battalion, Queen Victoria's Own Martian Rifles (The Parhoons).

THE RED CAPTAINS

BY THE late 1870s there was a small supply of human ex-officers on Mars who were completely captivated with its exotic culture and environment, so much so that they began making their way as private citizens. Most of these men combined their military and aeronautical skills with a natural bent toward adventure and soon became a small brotherhood of human captains of Martian ships. The Martians called them the "Red Captains," because to a golden-skinned Martian a European's complexion is ruddy to the point of being red. They are accepted by the piratical Cloud Captains of the Shistomik Mountains as equals, albeit grudgingly, and are hated and feared by the High Martians of the Astusapes and further west.

The British captains are the most numerous of the Red Captains, and their outward independence does little to mask their basic loyalty to the crown. In many respects they occupy a place similar to that held by the Elizabethan Sea Hawks, and in a fairly short time they have largely displaced gunfighters as the most popular subject for American dime novels. The most famous of the Red Captains, and the one who has come to symbolize their essential panache, is Burnaby.

BURNABY

FREDERICK GUSTAVUS BURNABY was born to well-to-do parents on March 3, 1842. He attended all the best schools (Bedford Grammar School and Harrow Public School), and at the age of 16 became a cornet in the third regiment of the Household Cavalry. His interests were many, but mainly they focused on travel, particularly travel by air. At the age of 22 he made his first balloon ascent, and would go on to make a total of 19 balloon excursions. The first trip to Mars in 1870 electrified him with excitement and, already an officer of the British Aeronautical Society, he became a frequent

writer in the pages of the *Times* on aeronautical matters.

By 1875, Burnaby was in the Sudan as a *Times* correspondent covering Gordon's campaign against the slavers, but soon became involved as an officer in Gordon's forces and began turning his active mind to the potential uses of aeronautics in a colonial environment. In '78 he ran for Parliament as a Conservative, but lost, and earned Gladstone's hatred. In '82 he became the first man to cross the English Channel in a steam-powered airship, which he had designed and built at his own expense. In '84, when the crisis in Egypt broke out, he requested permission to form an aerial squadron for operations against the mutineers, but was turned down. He went out on his own, however, and although his aerial steam launch did not see action, Burnaby himself was in the thick of things on several occasions. (As Burnaby was, by now, a Lieutenant Colonel in the Horse Guards, this constituted absence without leave, but no disciplinary action was ever taken.)

In the following year, with Gordon surrounded at Khartoum and Wollsley gathering an army to march to his relief, Burnaby again offered his services, and Wollsley gladly accepted. Burnaby's two steam launches (he had had a second built for the campaign) carried dispatches back and forth for months, harassed the dervish columns, and scouted ahead of the Desert Column. As the dervishes became used to the aerial vessels, however, they began devising means of bringing them under fire, and eventually the *Penelope* was badly damaged and crashed in the Nile. The *Vivian*, Burnaby's original boat, rescued the crew and later carried Gordon out to confer with Wollsley. Wollsley refused to allow Gordon to return to Khartoum, and Gordon still blames Wollsley for the fall of the city and its subsequent massacre. Although Gordon

was safe, Burnaby's single remaining boat was unable to stop the southward march of the Mahdi's victorious army, or prevent the destruction of the Desert Column.

Late in the year, the government announced its intention to step up the production of aerial gunboats, but at the same time transfer all such vessels currently in government service to the Royal Navy. Seeing this as a deliberate affront by Gladstone, Burnaby resigned his commission and retired from the Army. Actually, Burnaby was facing a forced retirement anyway due to continuing heart problems. Freed of his responsibilities to the army, Burnaby emigrated to Mars in the hopes that the slightly lower gravity there would aid his health. Upon arrival, he was immediately drawn to the Red Captains and before long was commanding his own ship (the *Penelope*, named for the vessel lost at Khartoum). Idolized by most of the younger British officers, Burnaby was also soon accepted in Martian society as well. His facility with language soon enabled him to add Oenotrian, Low and High Syrtan, and Umbran to his existing linguistic catalog of French, German, Italian, Spanish, Russian, Turkish and Arabic. Furthermore, his unusual height (six feet, four inches) and massive 46-inch chest suggested a physical similarity to Martians that became the source of numerous crude, but good-natured jokes. Although he has only been on Mars for four years, he has come to symbolize everything good about the Red Captains, and has become something of an elder statesman for them.

THE LEGENDARY FIVE

THE FIVE highest-scoring Red Captains as of January 1, 1889:

Frederick Gustavus Burnaby—Steam Ram *Penelope*:

27 prizes, 43,200 tons.

Alonzo Quinton Freer—Merchant—Steam Gunboat *Baron Lortmore*:

21 prizes, 34,900 tons.

Frederick Armand LeBeg—Screw Ram *Gloire*:

17 prizes, 21,400 tons.

Michael Paget-Smith—Gun Kite *Lismore*:

15 prizes, 16,000 tons.

Arturo Diego della Mora—Screw Ram *Gato*:

17 prizes, 12,200 tons.

MARS: THE RED PLANET

LONG AGO, the seas of Mars (which once covered perhaps 40 percent of the world's surface) dried up. Over millions of years, some of the seas' water was locked into the oxides of the rust-red Martian soil; much of the rest was trapped into the polar ice-cap cycle. The planet became a desert.

The drying of Mars spelled the end for most mammalian life forms, and with their extinction came the next step in Martian evolution: flyers. Flyers could range far and wide in search of water and in search of the prey that water would support. Evolution and natural selection favored the emergence of a particular gland, in some animals, that negated the effects of gravity. These particular animals could float in the air and control their flight with wings—flaps of skin that control the orientation and strength of their lifting gland. At the same time, some Mar-

tian plants developed lifting effects of their own, primarily as a means of spreading their seeds.

THE CLIMATIC SPASM

ABOUT 35,000 years ago, a momentary spasm (in geological terms) in the Martian climate melted enough of the polar ice-caps to fill the ancient seabeds. As the seas refilled, the proto-Martians were either driven from their habitats on the seabeds, or were attracted to the sea shores because of the plentiful water. In either case, these gregarious beings found the spark that gave intelligence, and over several thousand years established first agricultural settlements, and later trade empires all along the shores of the newborn seas. As the Martians settled into the routine of agriculture, they lost their ability to fly (whether from evolutionary processes or from a dietary deficiency is unclear).

The Brifanoon—the Age of Water—lasted about 10,000 years. Empires rose and fell. Science reached incredible heights and made everyday life one of ease and luxury. Art naturally embellished architecture and equipment. Martian technology tamed the deserts beyond the flooded seabeds: It dug canals that carried life-giving water in a network that crisscrossed the planet's surface.

Ultimately, the climatic spasm that produced the Brifanoon (and with it the rise of intelligence on Mars) subsided, and with it the Age of Water ended. Over the next 10,000 years, the seas again dried up. Every year, the shoreline moved farther out. To stem this receding tide, Martian technology was called upon to create more of the canals that had tamed the Martian deserts. Every year, more canals were dug to carry water from the dwindling seas to the existing croplands. Eventually, it became clear that a coordinated effort was necessary, and a massive project was launched to channel water from the polar icecaps to the sea-



PRINCE JINMA OF PARHOON

beds.

When the naBrifanoon—the Age of Drying—ended, the Martian civilizations had moved from their shore territories to the bottoms of the dry seabeds. Immense Grand Canals stretched from pole to pole and from seabed to seabed, connecting individual city-states that arose at the junctures of the canals.

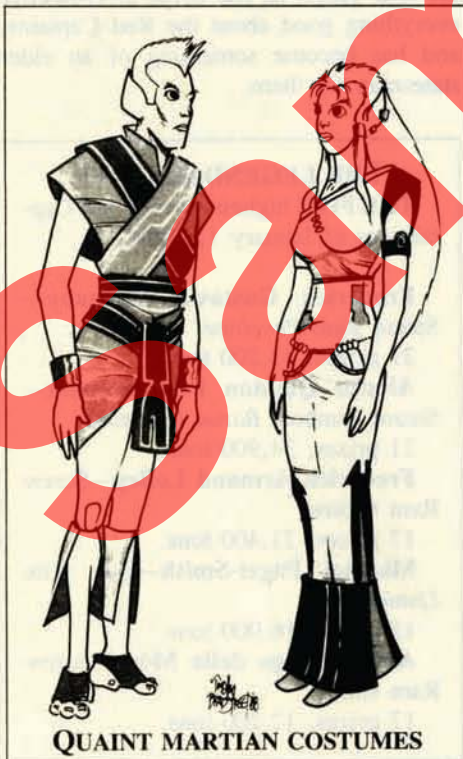
In the Martian deserts, the Grand Canals served as aquifers for land up to five miles to either side; in the seabeds, the quality of the ancient seabottom soil allowed the canals to aquify up to 50 miles to each side. The seabeds bloomed.

Yet life became harder than it had been. More work was necessary to make the seabeds bloom. Making the deserts bloom became a nearly impossible task. Populations gradually withdrew from the frontiers, and as they did, the Grand Canals of the deserts fell into disrepair. Scattered city-states squabbled over water rights, and eventually some of the seabed canals silted up and were abandoned.

By the end of the Age of Drying, Mars was a network of failing seabed canals, abandoned desert canals, and isolated city-states content to farm their own small holdings and to ignore the rest of the world.

SELDON'S EMPIRE

ABOUT 5000 years ago, Mars produced a great military leader, the equivalent of



QUAINT MARTIAN COSTUMES

Earth's Alexander the Great. Seldon II rose to power in the small mountain kingdom of Gaaryan (originally, it was the island kingdom of Gaaryan). Seldon II, already equipped with a kingdom by virtue of inheritance, raised and equipped a navy and sailed forth to clean and win the canals of Mars for the greater glory of Gaaryan. He confronted each city-state along his route of conquest, and from each he demanded oaths of allegiance and obedience. When he received them, he incorporated them into his growing empire; when they were not forthcoming, he levelled the city. A few such object lessons produced more signs of obedience than resistance.

Seldon II also provided a service by his conquest. Accompanying his warfleets were massive engineer barges that dredged silt from the canals. His constructors repaired broken locks, patched fallen levees, and cleared tangled settling pools. Where they could, they rebuilt pumping stations; where they couldn't rebuild, they built anew, although sometimes with cruder technology or makeshift devices. But by whatever means he used, Seldon II rebuilt and reopened a third of Mars' seabed canals.

Seldon travelled a third of the way around Mars in his conquests. His world empire controlled more than any emperor had ever ruled in history. The city leaders who made the oaths of allegiance to him became the Canal Princes of Mars; virtually all Martian rulers today trace their power to those original oaths made 5000 years ago.

Seldon himself died at the height of his power in his temporary capital in what is now Syrtis Major. His son, Seldon III, succeeded him. The succession of Seldons lasted nearly 3000 years. The last of the emperors was Seldon LXIX.

But 3000 years is a long time for one government to rule. During that time, the influence of Seldon's Empire waxed and waned. In the end, the only consideration was whether the Canal Princes' tribute arrived on time...and often it didn't. The squabbles and arguments over tribute and taxes and water rights and canal maintenance caused more than one revolt among the Canal Princes. Finally, nearly 2000 years ago, the Princes unleashed their city-states' weaponry in a century long war that pitted warfleet against warfleet, army against army, and sky galleon against sky galleon. City-states were destroyed, canals were ruined, croplands were destroyed. Mars was reduced to many isolated city-

states connected by neglected canals and occasional cloudship voyages. It remained that way for nearly 2000 years...until the coming of the Earthmen.

Earthmen brought with them a vitality that Mars had not seen for millennia. Their technology, in many ways more primitive than that of the ancient Martians, was still more advanced than much of Mars' in the present day. The Earthmen arrived on a world that was content to fight small wars between small city-states; Earthmen were happy to participate for their own ends.

MARTIANS

THERE ARE three types of Martians: the civilized Canal Martians, the rugged Hill Martians, and the savage High Martians.

Canal Martians represent 35,000 years of civilization. They are consummate farmers, accomplished builders, skilled artisans, and clever diplomats. Their heritage reaches back farther than any Earth culture, and they are proud of it. Yet the Canal Martians are also a stagnant, slow-paced race. They know that their culture has forgotten more than any Earth culture has ever discovered, and they seem content with this knowledge. And as they stand content with their lot, the Earthmen are slowly taking over their world.

Hill Martians live on the edges of civilization. They are the frontiersmen of Mars, living in regions beyond the rule of the Canal Princes. The nomadic desert traders are Hill Martians, as are the Worm Hunters of the Mountains, and the rugged highland farmers.

High Martians are the least affected by civilization; they live in remote kraags and mountain tops, venturing out from time to time to capture slaves or loot passing caravans. High Martians are like intelligent apes when compared to Canal Martians, but

with a difference: They can fly! High Martians (so called for their altitude rather than their accomplishments) never lost their lifting gland and its ability to carry them through the skies of Mars.

LIFTWOOD

THE MARTIANS have long used liftwood. The earliest civilized Martians built simple rafts of liftwood to carry heavy loads or to travel deep into the trackless Martian wastes. Just as they built ships to sail the seas of Mars, they built cloudships to fly its skies.

But liftwood is both expensive and rare. It grows only in small groves on remote kraags...the same kraags inhabited by the savage High Martians. The result is constant conflict between the savages of the kraags and the shipbuilders of the canals.

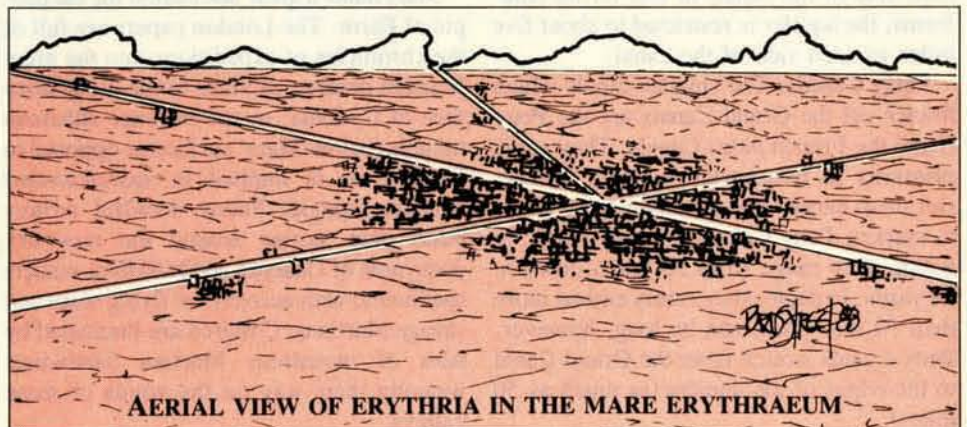
There has never been enough liftwood to meet all of Mars' needs. Expeditions to harvest logs from the kraag groves must be large and well-armed. They are vulnerable to attack at any time and from any quarter by the flying High Martians.

Once upon a time, some explorers thought that all transportation should be by cloudship, but the practical matter is that there is not enough liftwood to meet the demand. Cloudships are expensive and suitable only to fast, high demand travel. On Mars, ordinary travel is handled by the canal ships.

THE CANALS OF MARS

VERY EARLY in the rise of civilization, the Martians learned to dig canals for irrigation and transportation. Originally, they carried water and ships from the seas deep into the interior of Mars. Later, that canal digging proved invaluable in slowing the collapse of Mars during the naBrifanoon.

The canals of Mars are not what we see from Earth. Instead, we see the vegetation



AERIAL VIEW OF ERYTHRIA IN THE MARE ERYTHRAEUM



BARBARIC HIGH MARTIAN

swaths that the canals support and irrigate. The maria (seabeds) with their more fertile soil and extensive canal networks, appear dark because of the fields of agriculture they irrigate. The prominent canals of the deserts are highlighted by their narrower swaths of vegetation.

Grand Canals: Large Grand Canals are the major water carriers of Mars. Grand canals are between 1000 and 2000 yards wide, and run as deep as 100 feet. In some places, they widen into small lakes or water storage pools; in others, they narrow down to as little as 100 yards as they cut through rock faces or traverse small valleys on Martian-built aqueducts.

Grand Canals serve as aquifers on Mars. Some of the water they carry soaks into the ground and creates a water table that supports the croplands. In the ancient seabeds, this aquifer can reach as far as 50 miles to each side of the canal; in less fertile landforms, the aquifer is restricted to about five miles to each side of the canal.

Petty Canals: The smaller canals which branch off the Grand Canals are the Petty (from the French *petit*) Canals. They serve primarily as transportation links; farmers run small barges along them to carry goods to market. Petty Canals are truly small: in width, they range from 50 yards down to 10 yards; in depth, they rarely extend more than 10 feet. They can be long, however. Petty Canals stretch from the Grand Canal to the edges of the aquifer (as much as 50 miles).

Dying Canals: Age has taken its toll on the canals of Mars. Constant maintenance is necessary to keep them clear of silt and debris and to repair or replace mechanical devices such as locks, cranes, and pumping stations. In some places, the canal has silted up, creating a broad, shallow mudbank impassable by boat. Some canals are clogged by debris. Others have overflowed their banks to create vast marshes or swamp-forests. Where pumping stations have broken down, the canals are full of water only half the year (when the nearer pole produces meltwater to fill them).

Dead Canals: Some canals are truly dead. They are filled in with silt, dust, and sand, and carry no visible water. Even in these cases, however, the canal bed carries water in silent, underground channels. These dead canals can be recognized by the vegetation they support above ground: long straight stretches of green life in the arid deserts of Mars.

The dead canals are the caravan routes of Mars. Merchants use them as highways in the desert...paths to the isolated city-states of the Martian wastelands that still serve as a source of spice, liftwood, and precious gems.

THE MARTIAN FRONTIER

THE PLANET Mars is much smaller than the Earth. But much of the Earth is covered with the oceans; Mars is nearly all dry land. And the land area of Mars is about equal to the land area of all of the Earth. Much of that Martian land area is true frontier.

Much of Mars remains unknown and unexplored, even to the Martians. Earthmen, bringing their scientific curiosity and their search for knowledge and wealth, have mounted numerous expeditions to explore the vast deserts of the red planet.

Mars holds a great fascination for the people of Earth. The London papers are full of the chronicles of expeditions into the great Martian deserts: of visits to the great stone face of Cydonia, or the intricate subarean tunnels (below Mars' surface as opposed to Earth's, as is implied in *subterranean*) beneath Iapygia. Penny dreadful writers build pulp stories around the now dry dockyards of Gaaryan and hold their readers spellbound with accounts of flying ships and savage Martians. Children are fascinated by tales of monstrous Martian Sandwings weaving their way on the winds of stone valleys.

And the reality of Mars is even greater than the stories. Mars is a frontier ripe for adventure with riches for the taking. The Spanish conquistadores, who found gold laid at their feet, never encountered treasures like the liftwood, spice, and gems that Mars promises and delivers!



CLOUDSHIPS OF MARS

WITH LIFTWOOD for power, and enormous sails or air screws for propulsion, the Martian sky galleons have become an important part of Mars' worldwide civilization. But these magnificent ships are a fairly recent addition to the rich Martian culture—a culture originated by beings who had no need for flying machines.

EARLY DEVELOPMENT

THE EARLIEST sentient Martians who developed primitive communities and civilizations were the winged High Martians, living amidst the rocks and crags of their mountain homelands. Neither their low population nor bickering tendencies exerted any great civilizing pressure, and centuries passed without significant progress.

When environmental and population pressures finally did produce changes—many High Martians were forced out onto the plains. Away from their native environment, these plainsdwellers soon lost the ability to synthesize the essential lifting ingredients from their surroundings, and their wings atrophied. And though these Martians were the ancestors of the Martians who would build their world's greatest empires and civilizations, they were originally easy prey for their still-winged brothers in the hills. High Martians often made slaves of their lowland relatives.

It was these slaves who had the first inklings of the value of liftwood. Long ignored by the High Martians, the slaves learned how to harvest, craft, and use wild liftwood for their own purposes, and more than one lowland Martian carried its secret away in daring midnight escapes, clinging desperately to liftwood life rafts, back to the plains beneath the mountains.

Forced to make the most of limited supplies of the precious liftwood, the canal people rapidly developed shipbuilding techniques, and the High Martians soon learned that trading liftwood for the riches of the

lowland city-states was a safer and surer way to prosperity than trying to take it at spear point.

KITES—THE FIRST CLOUDSHIPS

DRAWING ON the technology of sailing canal ships, the Martians first developed wind-powered cloudships, or "kites." A kite is constructed with complicated sets of sails, much like the tall sailing ships of Earth. (With no mass production, each Martian craft is a custom-made vessel.) By using these sails, the crew can easily guide the ship with the wind at high speeds. Also, like a sailing ship, a kite has a limited ability to move against the wind by tacking back and forth across its direction of movement.

While the rigging arrangements on kites are complicated, they have the advantage of being fairly light, and thus kites can carry much more cargo than can a screw galley. Most merchant ships are kites, and the large gun kites can carry an impressive ordnance load. But at the same time, they are completely dependent on the wind direction and speed for their maneuvering power.

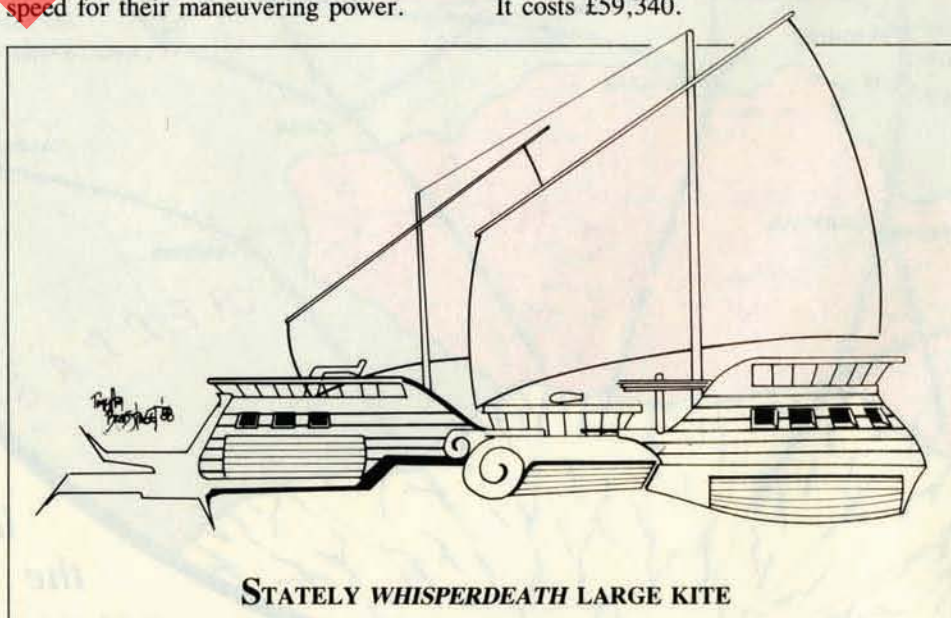
Whisperdeath-Type Large Kite

THE WHISPERDEATH is a large, heavily armored kite which has seen service in the navies of the Oenotrian Empire and some of the southern kingdoms. Because kites are so light, the larger ones can afford the extra weight of stonework armor in the hull—a very heavy luxury uncommon on Martian war vessels.

The hull is 200 feet in length, with an additional 30-foot ram in the bow. The topsails and keel extend nearly 100 feet both above and below the vessel. The topmen operate at a great distance away from the ship and often employ long ropes to swing them from position to position, especially below the ship. The stone armoring of the hull is placed in sheets between inner and outer wooden hull planking.

The ship mounts a variety of Martian weaponry. The bow mounts a single rod gun on the deck, so it may fire into three different arcs. It would be safer within the protection of the hull, but since this is a kite and subject to the wind direction, the gun would often be rendered useless if locked in a forward firing mount. Similarly, there are four heavy cannons, one on each wing and two mounted in the stern. The ship also carries some special Martian weapons: two drogue torpedoes, and two fire dispensers, one on each side of the ship.

The bridge crew of five, deck and topmen complements of seven each, and the 10 gunners combine to make a total ship crew of 29. Up to 10 marines are carried as well. The *Whisperdeath* can attain High altitude. It costs £59,340.



STATELY WHISPERDEATH LARGE KITE

Warm Winds-Type Large Merchant Kite

TYPICAL OF large merchant kites on the red planet, the *Warm Winds* Carrier was constructed in the southern kingdoms sometime in the 1850s. It has plied the air lanes since that time, being captured by pirates and rival merchants time and time again until its point of origin is in question. The ship's registry has been falsified many, many times. The kite is presently pressed into passenger and cargo service along the great canals around Syrtis Major.

By the standards of gunboats and cloudships, the *Warm Winds* is enormous, measuring almost 600 feet in length and 100 feet in width. Its rigging rises over 500 feet into the air. Designed to carry 30 passengers, it can also carry up to 2000 tons of cargo and still fly. For game purposes, the ship always has 1000 tons of cargo and is capable of flying at Medium height, as stated on its status sheet. Twenty rigging crewmen, twenty deckhands, plus six bridge crewmen com-

prise the 46-man crew. The *Warm Winds* costs £112,600.

Bloodrunner-Type Small Gun Kite

THE *BLOODRUNNER* was originally built as a present to the son of a wealthy merchant in Syrtis Major. When the merchant fell on harder times, he sold his son's toy to Shastaph for some quick cash.

The *Bloodrunner* is built on a 100-ton hull. The masts and sails take up 10 tons, and one man can easily run them (the ship is only about 50 feet long).

This vessel carries two heavy cannons, one at the bow and one at the stern of the kite. Each weapon is manned by two crewmen and can fire into three arcs: both broadsides and either fore or aft.

The bridge crew of four—combined with one topman, one deckhand, and four gunners—gives the ship a total crew of 10. The ship can only attain High altitude, but can move swiftly with the wind during combat. It costs £7600.

Swiftwood-Type Small Kite

WITHOUT HEAVY armor, a small kite can carry a surprising amount of weaponry. The *Swiftwood* type is typical of kites in the Oenotrian Empire.

The hull is only 120 feet in length, with a hooked ram built onto the bow. The rigging is made of block sails extending above the ship some 50 feet.

The kite mounts one rogue gun on the bow, a light gun and a sweep on either side, and a power grapple in the stern. The common tactic with this vessel is to fire with forward guns and broadside until past the target, then launch the power grapple and drop sails to board with the 20-marine contingent carried on this vessel. If this strategy does not seem likely to succeed, the captain has the option to ram instead.

The *Swiftwood* has a total crew of 20, with five bridge crew, three deckhands, three topmen, and nine gunners. It can attain Very High altitude and costs £20,140.

SCREW GALLEYS—**THE TRIUMPH OF MECHANICS**

MEANS OF propulsion other than sails had been in the planning stages for years. For instance, rowers below decks pulling collapsible wind scoops through the air, had been considered and even tested by Martian inventors eager to rise above the mercy of the wind, but such experiments ultimately proved impractical at best and disastrous at the worst. It was under the guidance of an enlightened warrior prince of Parhoon named Jinma, an inventor in his own right, that the first screw galley was tested. The battle against the Martian winds had finally been won.

A screw galley is dependent upon a number of turncranks—Martians put to work turning a crank shaft—most often running the entire length of the cloudship. Early versions of screw galleys relied on the crankshaft to turn the propeller directly. However, in 1871, a version was built by Prince Jinma of Parhoon incorporating a coiled flywheel. The turncranks spin the flywheel, which stores the energy necessary to power the galley. The propeller is driven by the flywheel. The improvement in crew efficiency and control of speed was so impressive that in a fairly short time the innovation had spread across the planet. It may not be coincidental that Prince Jinma received a pocket watch as a gift from an Earthman named Thomas Edison in 1870.

Hullcutter-Type Large Screw Galley

THE *HULLCUTTER* design sacrifices speed for additional firepower—a commodity found necessary when dealing with large, armored British vessels.

The hull is nearly 200 feet long, with 21 turncranks below deck. The ram is mounted to the bow and ends a solid wooden keel.

The *Hullcutter* is armed with a lob gun, two forward-mounted rogue cannons, one rear-mounted rod gun, and two side-mounted heavy cannons.

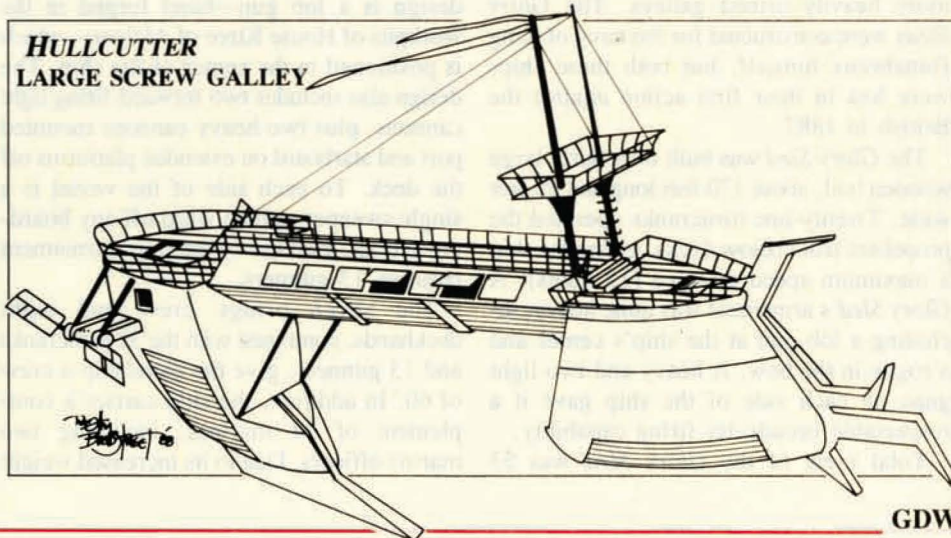
The crew totals 50, with seven bridge crew, seven deckhands, 21 turncranks, and 15 gunners. The ship also carries 10 marines, one of which is a marine officer. The ship can reach High altitude and costs £46,800.

Clearsight-Type Small Screw Galley

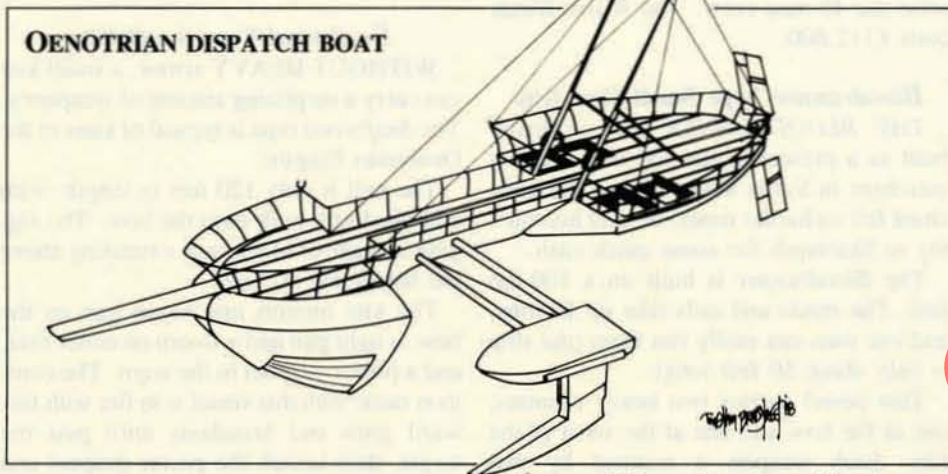
THE *CLEARSIGHT* design incorporates a large number of turncranks to give it a remarkable speed for a screw galley. Of course, the design sacrifices heavy armament to make room for the additional men needed to run the cranks and to accommodate the weight of the cranks themselves.

The hull is less than 100 feet long, with the characteristic connected large bow and stern sections. Twelve massive turncranks churning constantly below deck give the ship a speed of 25 knots. The four light guns mounted on the deck each face into a different arc of fire to cover all approaches. The crew totals 26 men. A *Clearsight*-type vessel can reach High altitude and costs £12,800.

**HULLCUTTER
LARGE SCREW GALLEY**



OENOTRIAN DISPATCH BOAT

**Small Bird-Type Small Screw Galley**

THE *SMALL BIRD* is built on a small, 140-ton wooden hull. The ship is powered by six turncranks, but because the ship is so small, these are located on the upper deck instead of below (as they would be on a larger screw galley). The turncranks give the vessel a top speed of three (15 knots).

The design is built around a single large rogue gun, mounted in the bow of the ship. In addition to the main weapon, two sweepers are mounted, one on either side of the ship, to take care of antipersonnel needs. The crew totals 17. The ship can reach Very High altitude and has a value of £13,000.

Glory Sled-Type Screw Galley

THE HIGH MARTIAN LORDS of the various kraags have recognized the firepower and maneuverability of their British opponents. In response to that threat, they have made several attempts to construct heavier screw galleys to better oppose the British ships.

The *Glory Sled* design is typical of these more heavily armed galleys. The *Glory Sleds* were constructed for the navy of King Hattabranx himself, but both these ships were lost in their first action against the British in 1887.

The *Glory Sled* was built on a fairly large wooden hull, about 170 feet long and 35 feet wide. Twenty-one turncranks operated the propellers from below decks, giving the ship a maximum speed of three (15 knots). A *Glory Sled's* armament was quite heavy, including a lob gun at the ship's center and a rogue in the bow. A heavy and two light guns on each side of the ship gave it a respectable broadsides firing capability.

Total crew of the *Glory Sled* was 53

sailors and 12 marines. It could only reach High altitude and was appraised at £44,840 by the Admiralty Prize Commission.

Fenian Ram Screw Galley

THE *FENIAN RAM* was originally commissioned by a Martian in the employ of an Irish separatist. Construction of the ship was begun in exchange for 20 bars of gold, a small fraction of its value. When nearly completed, the Irish revolutionaries made their move, seized the ship, and made good their escape under cover of darkness. The *Fenian Ram* has been harrying British activities on Mars for some time, and is crewed by Irishmen and Martian mercenaries, hiding out somewhere in the Meroe Badlands.

The *Fenian Ram* is a large screw galley, measuring almost 250 feet in length and about 45 feet in width. As its name suggests, its structure is built around a solid keel and a bow-mounted metal and wood ram which is designed to puncture either a wooden or metal hull. Thirty-two turncranks work in the hold of the ship.

The *Ram* is heavily armed. Central to its design is a lob gun—hand forged in the workpits of House Ktree of Alclyon—which is positioned in the center of the ship. The design also includes two forward-firing light cannons, plus two heavy cannons mounted port and starboard on extended platforms off the deck. To each side of the vessel is a single sweeper to help ward off any boarding actions. Full use of the ship's armament requires 13 gunners.

The seven bridge crew and eight deckhands, combined with the 32 turncranks and 13 gunners, give the cloudship a crew of 60. In addition, the ship carries a complement of 24 marines, including two marine officers. Due to its increased weight

the *Ram* can only attain an altitude of High, but has a top speed of four (20 knots). The *Fenian Ram* carries no special weapons.

The *Fenian Ram* is a one-of-a-kind vessel. Had it ever been purchased, it would have cost £51,600.

Sky Runner-Type Screw Galley

THE FIRST *Sky Runner*-type ship was constructed as a gift from a Princess of Umbra to her lover, a general in the armies of Syrtis Major. Its original designer, a slave himself, was in turn sold off to the shipyards of Alclyon, where a group of similar ships were commissioned over the next several years. The *Sky Runner* is still possessed by General Smyrtra, but its sister ships have been traded and sold all over the red planet.

The *Sky Runner* is built on a wooden hull which measures 150 feet long and averages 30 feet in width. The *Sky Runner* has no ram in the bow—instead, it sports a carved bust of the Princess of Umbra.

The ship is armed with one rogue gun which can fire forward and to both broadsides. There is an extended gun platform on each side of the hull which houses a heavy cannon that can fire forward, astern, and into its respective broadside.

The *Sky Runner* has a crew complement of 32. The ship can attain altitude up to Very High and has a top speed of four (20 knots). It is valued at £25,600.

Endtime-Type Screw Galley

PERSONALLY COMMISSIONED by the Warlord of Shastapsh, the *Endtime* series of ships had at one time four members. The *Endtime* and *Forever* are both still in operation. The *Eternal Night* was lost in an aerial battle with pirates over the Nepenthes-Thoth Steppes. The *Eternity* crash-landed after a severe trim accident over that same stretch of land—only five of its crew made the dangerous trek alive.

The *Endtime* is built on a wooden hull measuring approximately 120 feet in length and 30 feet in width. It has 15 turncranks working in the hull to keep it moving and five deckhands to tend the ship in motion.

One lob gun is mounted in the center of the vessel, and a single rod gun fires from the bow. Two heavy guns are mounted on either side of the ship.

The *Endtime* has a total crew of 35. The ship also carries 10 marines, of which one is an officer. The ship can attain High altitude and a speed of three (15 knots). It costs £31,500.

BRITISH NAVAL ORDNANCE

THE BASIC ARMAMENT on the ships of the Royal Navy on Mars is the breech-loading gun. These weapons come in a variety of sizes, but principles are the same for all of them. An exploding projectile is fired through a rifled barrel; when the projectile hits another object, it explodes. The size of guns on British sky ships ranges from the one-pounder to eight-inch weapons. The eight-inch gun seems to be the upper limit for skyships that are anything more than floating gun batteries.

The Nordenfelt, Maxim, and Gardner guns are all rapid-firing weapons designed to affect the crews of opposing vessels. The Nordenfelt is the only one in use on Royal Naval vessels at present, but improvements in the other two weapons could change that in the near future. The Nordenfelt has five barrels each, fed from an individual ammunition hopper. The barrels may be adjusted to fire either individually or in a volley. When firing individually it gives the weapon a fairly high rate of fire. The Nordenfelt can continue to fire even if an individual barrel jams.

Drogue Torpedoes and tether mines are similar weapons. The tether mines are housed in liftwood buoys and left to float above a ship. (They are also floated above cities and shore batteries to provide defense against attack from the air.) Most ship-borne tether mines have a 20- to 40-pound charge which is detonated by a fulminate contact detonator. Drogue Torpedoes are hung over the side of a ship in order to attack target below the ship. British Drogues are usually made of iron and carry a 60-pound explosive charge with a contact detonator. Both of these weapons were Martian ideas, but the British have improved upon them considerably.

The Hale Rocket is 36 inches long and four inches in diameter. It is a brass tube fitted with nozzles at the bottom and filled with a solid propellant which, as it burns, discharges through the nozzles to propel the rocket. The nozzles are arranged so as to cause the rocket to spin as it flies, thus giving it a measure of stability. The Hale Rocket, standard on British ships, carries an eight-pound warhead with a contact detonator. Due to the inherent inaccuracy of these weapons, they are always fired in salvos.



HOTCHKISS
ROTATING
CANNON

The Smutts Aerial Torpedo is a wrought iron cylinder, five feet long and eight inches in diameter. It carries a 250-pound explosive warhead which is detonated by a timed fuze. The torpedo is fitted with liftwood vanes, and is adjusted for neutral buoyancy before it is launched. This allows the torpedo to maintain a relatively straight course until such time as the fuze explodes the torpedo.

MARTIAN WEAPONRY

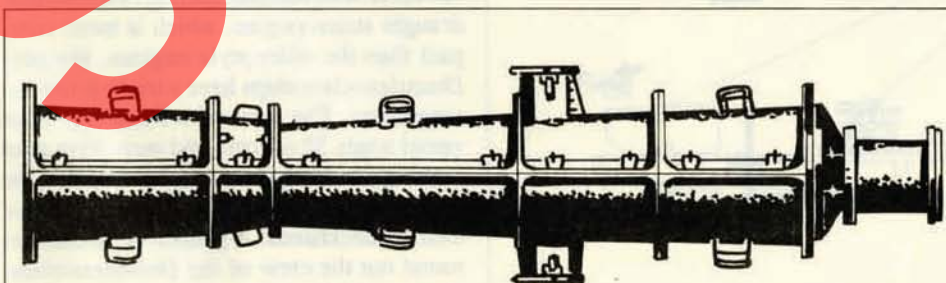
ALL MARTIAN cannons, including lob, rod, and rogue guns, are muzzleloading, black powder weapons at least 100 years behind the technology of British guns, but every Martian weapon is uniquely fashioned. Light and heavy guns are merely basic cannon. A rod gun is rifled and fires an iron rod designed for penetration. The rogue gun is the most powerful Martian direct-fire cannon. The lob gun is a huge rock-throwing mortar, but only one can be mounted on a single ship; if mounted anywhere but the ship's center, firing it would cause the ship to tip over. Sweepers are smaller, swivel-mounted grapeshot firing guns designed to clear the enemy's decks.

SPECIALTY WEAPONS

MARTIAN FIRE is similar to Greek fire and consists of burning oil that can be poured onto targets directly below the firing vessel. Accuracy is low, but the effects of a hit can be devastating. Tether mines are explosive charges with liftwood to carry them (buoying them up) and lines to guide them toward their targets or anchor them in place. Their main function is to prevent ships from passing overhead to drop liquid fire, but they have a limited attack capability as well. Tether mines are also often deployed as part of the defenses of a city or fortress. Drogue torpedoes are swung beneath the ship to hit targets below, and power grapnels on screw galleys are used to board enemy ships.



MARTIAN LOB GUN



MARTIAN ROGUE

THE ROYAL NAVY

WHEN THE British established themselves on Mars they brought with them a centuries-old naval tradition. Command of the seas on Earth had made the British into one of the most formidable powers on the planet, and the British on Mars realized the vital role that naval power would play in protecting and expanding their influence on the Red planet. It made no difference that the navies on Mars sailed the air, rather than the seas. Accordingly, the British quickly embarked on a program designed to install them as the preeminent naval power on Mars. The ancient Martian shipyards at Parhoon, which were the first to construct screw galleys, were brought under British control giving them limited naval construction capabilities until they could build their own shipyards. The British shipyards at Syrtis Major were complete by 1880, and were

unique in their ability to construct armored, steam-powered vessels. In 1881, with great fanfare, the first two ships were launched from the Syrtis Major shipyards—a pair of *Aphid*-class aerial gunboats.

The *Reliant*-class gunboat (only one of this class has been constructed) is the largest example of the gunboat. It is 220 feet long and 80 feet wide. Although the *Reliant* is not heavily armored it is virtually bristling with weapons. Four fixed mount Nordenfelts fire to each broadside. Two six-pounder guns are mounted on the foredeck firing forward and to the respective broadside. Both the starboard and port sides boast pivot mounted six-inch guns, while the stern tower has a pivot-mounted, four-inch long gun. Eight Hale rocket batteries are mounted in pairs slightly to the stern-side center of the ship. As might be expected, all this ar-

mament reduces the heights at which the ship can sail, as well as the speed. The ship is propelled by steam-driven twin screws, and maneuver and trim are supplied by large stern rudders and a keel stabilizer as is standard on all gunboats. The *Reliant* has a bridge crew of six officers and men, an engine crew of six, 16 gunners, and a deck crew of 11 men, including three petty officers. The *Reliant* also has provision for 12 marines, bringing the total normal crew establishment to 51 officers and men. The *Reliant*-class gunboat represented a deadend in gunboat construction. Gunboats were originally designed to rely on speed and maneuver in order to accomplish their goals; the heavily armed *Reliant* was not in keeping with that concept and the class was abandoned in favor of the *Dauntless*-class gunboats.

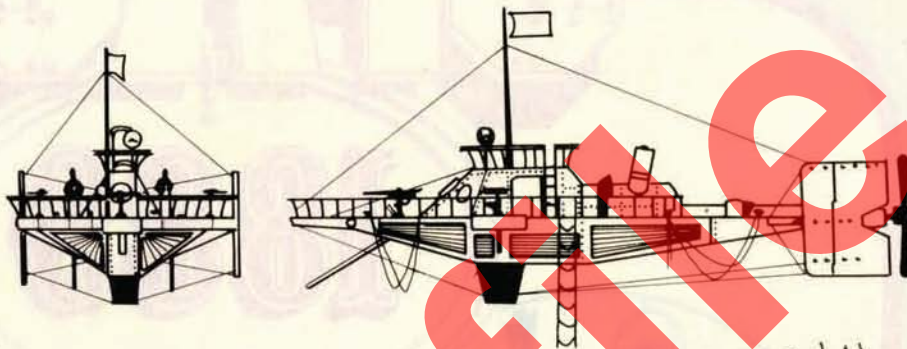
Construction on the *Dauntless*-class gunboats first started in 1884. These ships represented a return to the idea that gunboats should be high-flying and fast, but they also retained the marine complement, extremely useful in boarding maneuvers, which has proved quite valuable on the *Reliant*. Measuring 160 feet in length and 50 feet across, the *Dauntless* class also continues the custom of only lightly armoring gunboats. The firepower for these ships is provided by two four-inch long-barrel guns, two three-pounders and two Nordenfelts. A four-inch gun is mounted in the hull at the bow of the ship; while this provides protection for the gun and the crew, it limits the gun's field of fire to 90 degrees. The second four-incher is pivot-mounted on a stern tower for more flexibility in arc of fire. Two wing positions on either side of the ship boast the pivot-mounted three-inchers. The two Nordenfelts are fixed-mounted, one on each side of the ship. Trim and maneuver equipment is about the same as the *Aphid*-class; large stern rudders and a stabilizing keel. The first two *Dauntless*-class ships were twin screw, steam-powered vessels. However with the introduction of the forced-draught steam engine, which is more compact than the older style engines, the next *Dauntless*-class ships have a triple-screw arrangement. The crew of a *Dauntless*-class vessel totals 33 officers and men. Five men make up the bridge crew, four men man the engine room, 8 men are gunners, and six men are deckhands. A platoon of 10 marines round out the crew of the *Dauntless*-class. At present there are only two *Dauntless*-class vessels on Mars.



BRITISH RELIANT-CLASS AERIAL GUNBOAT

The *Aphid*-class gunboats were the first armored vessels ever to sail the skies of Mars. These ships are only 90 feet long and 30 feet wide and very lightly armored; the *Aphid*-class being purposely kept small in order to provide a high-flying, fast-pursuit gunboat. Armament on *Aphid*-class gunboats consists of a four-inch short gun pivot-mounted on the foredeck. This mounting allows the gun a broad, 180-degree field of fire. One-pound pieces are pivot-mounted on each wing mount position, and there is a fixed-mount Nordenfelt on both the starboard and port sides. The *Aphid*-class is a driven by twin screws powered by a steam engine. A dynamo, also powered by the steam engine, supplies a limited amount of electricity which is mainly used for running lights and signaling equipment on board the ship. Trim and maneuver is provided by large rear rudders and a keel stabilizing fin. The normal crew establishment is 15 men. At present there are four *Aphid*-class gunboats in service in the British Royal Navy on Mars.

The *Thunderer*-class monitors began construction in 1884. Basically a floating battery used to engage enemy vessels at long range, only one *Thunderer*-class ship has been completed thus far. *Thunderer*-class ships boast an eight-inch gun mounted in a revolving armored turret at the bow of the ship, and a six-inch gun in a revolving, armored turret at the stern of the ship. Four Nordenfelts are fixed, two to each side, as antipersonnel weapons. Two batteries of Hale rockets round out armaments of *Thunderer* class. The *Thunderer* class usually goes into action with *Aphid*- or *Dauntless*-class gunboats. The combination of small, highly maneuverable ships, and a long range, powerfully armed vessel has proved a potent partnership. The crew of the *Thunderer*-class ships is composed of eight engineers, four bridge crew, 10 deckhands, nine gunners, two officers, and three petty officers. Twelve marines are also on board, but mainly to prevent boarding, as the favorite motion tactic has been to try and overwhelm large British ships and board them. The first *Thunderer*-class ship was being completed just as the forced draught steam engine became available, and this modern power plant was installed in the vessel. The steam engine drives twin screws and powers the gun turrets. Currently only one *Thunderer*-class ship has been built but at least two more are expected to be constructed.



BRITISH APHID-CLASS AERIAL GUNBOAT

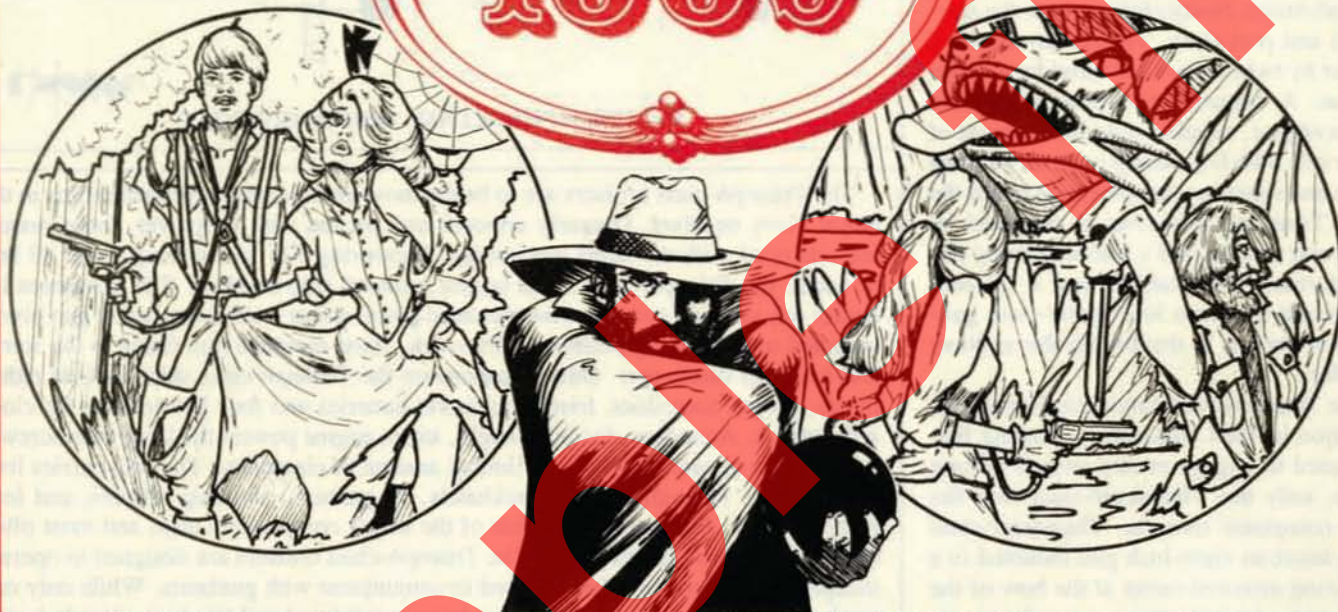
The *Triumph*-class cruisers are to be the most modern and formidable ships in the Royal Navy on Mars. Decently armored and packed with firepower, these vessels are equipped with the latest technology. Measuring 325 feet in length and 80 feet in width, the *Triumph*-class is the largest armored ship on Mars. The armament includes one six-inch gun on a bow-mounted pivot, a four-inch, long-barrel gun pivot-mounted on each wing position, a five-inch, fixed-mounted gun firing to the stern, and a Smutts discharger. Other weapons on the *Triumph*-class ships include tether mines, drogue torpedoes, four Hale rocket batteries and four Nordenfelts for close self-defense. A modern, forced-draught, steam engine powers the large twin screws, and drives a dynamo supplying a limited amount of electricity. The ship carries four bridge crew, 10 engineers, 12 deckhands, 15 gunners, two ship officers, and four petty officers. Ten marines are part of the ship's complement also, and most often employed in a self-defense role. The *Triumph*-class cruisers are designed to operate independently, but will often be used in conjunction with gunboats. While only one has been completed, several more are being considered and two have already begun construction.



THE SECOND WAR OF THE PARHOON SUCCESSION BEGINS

SPACE

1889



- Drift stately canals on diplomatic missions to the Martian lowland potentates, or escort caravans through the desert domains of the steppe nomads. Fight the winged warriors and the cloud ships of the Martian Sky Lords. Carry the battle to their mountain fortresses. The British Empire is firmly established on the red planet.
- Undertake a secret mission for the Crown on **Venus**. Elude the agents of the Kaiser; avoid capture by the German war zeppelins; most difficult of all, survive the steaming, Venusian swamps, with their savage amphibious natives and gigantic dinosaurs.
- Explore the mysterious caverns and grottos of **Luna**. Venture deep into the dark interior in search of the fabled Lunar troglodytes and their mysterious glowing medallions.
- Defeat an anarchist plot to destroy **Her Majesty's Orbital Heliograph Station**.
- Mount a flyer expedition to the heart of darkest **Africa**.

Everything Jules Verne should have written.

Everything A. Conan Doyle thought of, but never published—because it was too fantastic.

Everything you need for the adventures of the century.

Copyright©1988, GDW. All rights reserved. Printed in the U.S.A. Made in the U.S.A.

Our 15th Year



P.O. Box 1846
Bloomington, IL 61702-1846



Classic Reprints Of SPACE: 1889® In Print & PDF!

Further Victorian Science Fiction
adventure awaits you!

Eight print titles available from
Amazon.com (and other retailers)!
Twelve PDFs on e23.sjgames.com or
www.drivethrurpg.com!

For more information visit
www.space1889.com

Space: 1889® is Frank Chadwick's registered
trademark for his game of Victorian Era Space-faring.

