Bruce Medalist Profiles

Giovanni Virginio Schiaparelli: The Fourth Bruce Medalist

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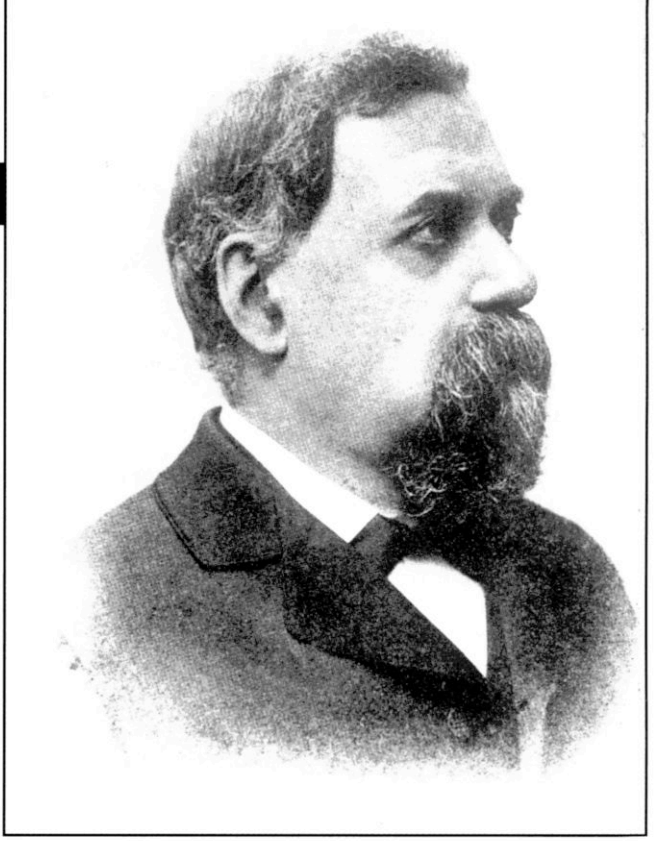

Giovanni Virginio Schiaparelli
14 March 1835 — 4 July 1910
1902 Bruce Medalist

(Photograph courtesy of the Yerkes Observatory, University of Chicago)

Best known today as the "discoverer" of the nonexistent canals of Mars, Giovanni V. Schiaparelli (pronounced skya•pah•rel´•lee) deserves better treatment. Indeed, in bestowing the medal, 1902 A.S.P. President John Dolbeer noted that

> "Schiaparelli would rank with the foremost astronomers of our time if he had never published a paper on Mars or made a drawing of the planet. Not one of the three gold medals he holds, nor of the two Lalande prizes, was awarded to him for his studies on Mars. In fact, the gold medals were bestowed upon him before his work on Mars began."

After graduating in hydraulic engineering and architecture from the University of Turin in 1854, Schiaparelli taught mathematics and continued his studies in languages and astronomy. He showed such interest and ability in the latter that the government of Piedmont (Italy was not yet one nation) sent him abroad to prepare for an astronomical career.

In Berlin, he studied astronomical theory and geography, meteorology, physics, and terrestrial magnetism as well. He spent another year learning observational techniques from Otto Struve and F. A. T. Winnecke at the Pulkovo Observatory in Russia. On his return to Italy in 1860 he became second astronomer at the Brera Observatory in Milan. Two years later he became director, a post he held until he retired in 1900.

Aside from the discovery of the minor planet (asteroid) Hesperia, Schiaparelli first achieved renown for his work on comets and meteor showers. After extensive observations of a bright comet in 1862 and theoretical studies of tail formation, he proposed that there was a repulsive force from the Sun which, along with gravity, was responsible for the observed tails. (Today we know that both the Sun's wind of charged particles and its radiation pressure help produce the complex tails we observe in comets.)

By the 1860's it was known that several meteor showers recurred annually, and that each appeared to come from a particular radiant point in the sky. The mid-November showers, which had produced spectacular displays in 1799 and 1833, came out of Leo, while the showers of about August 10 were from Perseus. Several astronomers had suggested a connection between these showers and comets, but proof was lacking.

Schiaparelli observed the great August shower of 1866 and showed that the Earth had encountered a swarm of small objects following an orbit identical to that of Comet 1862 III. To compute the orbit, he noted that the swarm was at the same location as the Earth every 33.25 years, and took that to be the orbital period. This period had also been derived by Yale astronomer Hubert A. Newton from the recurrence of the most spectacular August showers. Others, including Newton and Neptune co-discoverers John C. Adams and Urbain J. J. Le Verrier, attacked the problems of other showers and within a short time showed each to be the result of the annual intersection of the Earth's orbit with that of a known comet. It was Schiaparelli who named the showers the *Leonids,* the *Perseids*, etc.

In the 1870's Schiaparelli acquired an excellent 22-centimeter (9-inch) refractor and began visual observations of the planets. He received medals and prizes for his studies of Mercury, Venus, Saturn, and Uranus. He found that both Mercury and Venus rotate very slowly and concluded that they must rotate on their axes with the

same periods with which they orbit the Sun. (He was correct in stating that the planets are slow rotators, but not in his values for the periods, which were not determined until radar observations of the 1960's.)

But it was Mars which brought him the most lasting fame. The fourth planet is easiest to observe when it is near opposition, an event which repeats every 26 months. At that time, it is up all night, and its full disk is illuminated. Its distance from Earth is smallest, its angular size largest. Not all oppositions are equal, however. Because the orbit of the red planet (and that of our own) is elliptical, the distance at opposition can range from 56 million kilometers at the most favorable oppositions to more than 100 million kilometers at the least favorable. The most favorable oppositions repeat every fifteen to seventeen years.[1]

Schiaparelli carefully observed and sketched Mars during seven consecutive oppositions, beginning with the most favorable one of 1877. For the last three, in 1886, '88, and '90, he had a new 50-centimeter (20-inch) refractor, one of the largest telescopes in the world. He saw more details than any other observer, and he made the best maps of his time. He found Mars's axis of rotation and named its bright and dark spots after real and mythical continents and bodies of water. His was not the first attempt to name martian features, and he retained some of the names of his predecessors, notably the English science writer George Proctor, but it is Schiaparelli's Latin names that have been adopted by the world's astronomers.

Schiaparelli saw dark, almost straight lines, several kilometers wide and up to many hundreds of kilometers long crossing the martian surface. He called them *canali*, a term introduced by the senior Italian astronomer, Fr. Angelo Secchi, who had described them eight years earlier. The Italian word should be translated "channels," but in most European languages it came out "canals." To many people the latter term implies something artificial, and this led to considerable controversy. As Schiaparelli pointed out, a number of visual observers, among them some of the most noted astronomers of the time, had seen such features. However, Schiaparelli, with his excellent telescope, clear skies, and keen eye, saw far more than his predecessors.

Clearly thinking they were bodies of water, he named them after terrestrial rivers. He wrote, "There are no large continuous continental masses on Mars, as the entire surface of the planet is divided by many *canali* into an enormous number of islands."[2] He believed the *canali* to be natural phenomena, but he was not averse to considering the possibility that they were the work of intelligent beings.

Although many other observers saw the "canals," those with the largest telescopes, at Lick and (after 1893) Yerkes Observatories in the United States, did not. Controversy over their existence persisted for decades.

The person most influenced by Schiaparelli's work was the wealthy Bostonian, Percival Lowell. Convinced that the *canali* were indeed canals built by intelligent martian beings to irrigate their arid planet, he devoted most of the remainder of his life — and fortune — to seeking further evidence. To attain views even better than Schiaparelli's, he conducted an extensive survey before building his observatory at Flagstaff, Arizona. (Lowell was one of the first to propound the idea of what astronomers call "seeing," the quality of a telescopic image due to the unsteadiness of the atmosphere. His dictum that telescopes should be located where they can see best, rather than where they can best be seen, is now universally accepted. Lowell's views on canals and Martians were derided by astronomers, but his observatory has been productive, and one of the assistants he hired, Vesto M. Slipher, eventually became a Bruce medalist.)

Meanwhile Schiaparelli continued observing planets and measuring positions of double stars. After retirement he turned to the ancient history of astronomy. An outstanding linguist, he studied the writings of the Greeks, Hebrews, Assyrians, and Romans and collaborated on a translation of an Arabic text into Latin. His three-volume history of ancient astronomy was completed by his pupil, Luigi Gabba, more than a decade after his death. ■

1. Mars is next at opposition in late November, 1990, by far the best observing situation for the remainder of the century. — *Ed.*

2. Quoted by Samuel Glasstone in *The Book of Mars* (NASA, Washington, 1968).