Benjamin Baillaud: The Eighteenth Bruce Medalist

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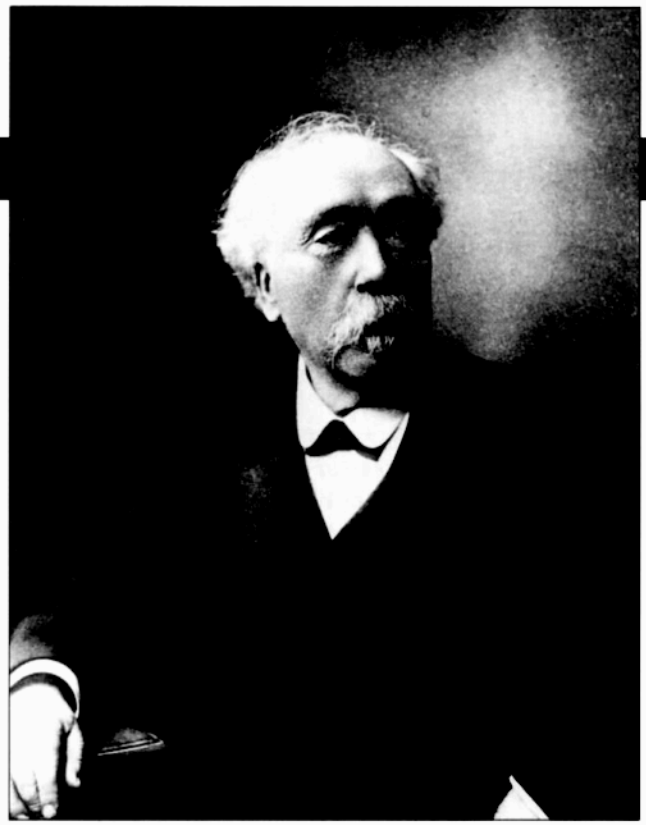

Edouard Benjamin Baillaud
14 February 1848 - 8 July 1934
1923 Bruce Medalist

(Photograph courtesy Observatoire de Paris)

As a boy he won scholarships to a leading university, where he specialized in mathematical astronomy. He finished his career as director of his country's national observatory, where he had worked as a young assistant before becoming director of a smaller observatory—and simultaneously a professor at a nearby university—far from the capital. He contributed significantly to the international Astrographic Catalogue or *Carte du Ciel* project. He was greatly concerned with timekeeping and pioneered in transmitting accurate time signals from the observatory to the nation via radio. He struggled to overcome the difficulties of running an observatory in a smoky and brightly lit metropolis, and he worked especially hard to keep the essential work going during the disruptions and staff losses caused by the First World War. Widely admired for his modesty, genial personality, integrity, and administrative ability, he was elected president of many organizations, including the International Astronomical Union. He had a long and happy marriage which produced eight children.

Does this sound familiar? Yes, every word of the above applies to Frank Dyson, the Englishman awarded the seventeenth Bruce Medal (see *Mercury*, Mar/Apr 1993), but it is equally true of his French counterpart, Benjamin Baillaud (pronounced bay´ oh).

While Dyson's career took him away from Greenwich for only five years, Baillaud directed the observatory at Toulouse, in southern France, for thirty. For much of that period he was also Dean of the Faculty of Science at the University of Toulouse, and many of his greatest achievements were in university administration. Of particular interest to astronomers was his successful establishment of an astronomical observatory on the Pic du Midi.

Mountain climbers have long known that the air is clearer and the stars appear brighter from high altitudes, and Isaac Newton suggested in 1717 that it would be useful to put an observatory at a place of "a most serene and quiet air, such as may perhaps be found on the tops of the highest mountains above the grosser clouds." Although there were a few earlier experiments on high mountains in Europe, it was not really feasible to put permanent observatories on mountaintops until the late nineteenth century. James Lick and his trustees decided to put the Lick Observatory on Mt. Hamilton about 1875, and an expedition from Harvard College Observatory made the first astronomical observations from what was then called Wilson's Peak in 1889.

Both California mountains are of moderate altitude (Mt. Hamilton, 4200 feet, and Mt. Wilson, 5700) and generally mild climate. It was not too difficult to build a road to the top of Mt. Hamilton, and Mt. Wilson had a toll road of sorts before it had an observatory.

The Pic du Midi is another matter. Beset by fierce blizzards in winter and dangerous thunderstorms in summer, it rises 2865 m (9400 ft) to a sharp and craggy summit in the Pyrenees, near the Spanish border. Yet the wind poses little problem when a telescope is pointed into it, and there are many times when the sky is spectacularly clear. Local enthusiasts began working to locate an astronomical observatory on the peak in the 1850s. Starting in 1873, a meteorological observatory and living quarters were built at the summit, walled in to protect the instruments from such "harmful animals" as "goats, shepherds, and tourists." A doughty old retired general spent seven years making weather observations

on the mountain. After avalanches destroyed early buildings it became clear that only the very top of the mountain would be safe, despite its exposure to winds and lightning and the impossibility of building a road all the way. In 1882 the French government took over the meteorological observatory, and in 1903 it was made a part of the Toulouse Observatory.

It was Baillaud's administrative and fund-raising skills that made the Pic du Midi a major astronomical observatory. By the time he took over the Pic, he had already achieved enormous gains in the science programs at the University of Toulouse. He had greatly increased the numbers of professors, buildings, and disciplines. He had founded a scholarly journal and written an important astronomy textbook. He had acquired new instruments for the Toulouse Observatory and had kept up his own research on such problems as the orbits of Saturn's satellites. He had also completed a large portion of his observatory's share in the *Carte du Ciel*.

Baillaud and an assistant tested the site atop the Pic du Midi in 1903. They found that, "at the summit, when the sky is clear, the stellar images are always good, very often excellent, just as often wonderful... During the clear nights of the winter, ...the images are incomparably steadier than in summer...Our conclusion is that at the Pic there are no moderate images. Either they are excellent, even in mediocre weather, or they are so bad that one does not care to work." They found it easy to split binary stars only 1.2 arc seconds apart with just a 108-mm (4.25-inch) telescope. The wonderfully steady images led to the Pic du Midi becoming one of the world's leading sites for visual observations of the Sun and planets, a role it still plays today. Today's astronomers need not be mountain climbers, however; they ascend to the summit on an aerial tram.

After construction of a large dome and living quarters for two astronomers, Baillaud obtained the services of a team of soldiers to transport a 0.5-meter (20-inch) reflector and a 0.25-meter refracting guide scope, each six meters (20 feet) long, to the summit. The troops carried twenty-two unwieldy pieces of cast iron, weighing up to 700 kilograms each, up a narrow path at the edge of a high cliff. It was arduous and dangerous work, but the valiant soldiers carried their heavy burdens most of the way up in the summer of 1906 before the snows of September put an end to their labors, and the following August they finished the job.

The Pic du Midi observatory went into regular use in 1908, but by then the sixty-year-old Baillaud had been tapped for the most prestigious position in French astronomy, director of the Paris Observatory. Like Dyson at Greenwich, Baillaud became greatly concerned with the provision of accurate time to the nation and the world, and he worked on the related problem of determining precise longitude differences between observatories.

One of his first acts as director was to call a meeting of the international committee that was overseeing the Astrographic Catalogue. Twenty-two years had elapsed since the beginning of a project that was originally supposed to be completed in seven or eight. This is not surprising when we note that H.H. Turner, the director of the observatory at Oxford, estimated that Oxford's share alone cost some £34,000, the equivalent of around two million dollars today. No wonder poorly-funded observatories such as Montevideo never really got started. The French government agreed to assume the expense of publishing the ecliptic portion of the charts (photographs). Turner pointed out that if the whole sky were completed in the manner of the Paris charts, the complete stack of charts would be 82 feet high and weigh some 4,000 pounds. An excellent host, Baillaud held the entire meeting in the observatory, providing entertainment by singers from the Paris Opera and fine wines courtesy of the director of the Bordeaux Observatory. He was promptly elected president of the commission.

Baillaud also called international meetings on ephemerides and on time, the latter leading to the formation of the International Bureau of Time, with Baillaud as its first president. He arranged for the broadcast of time to Europe from the Eiffel Tower.

World War I affected Baillaud at Paris even more than Dyson at Greenwich. Although both lost most of their staffs to the military (six of Baillaud's sons and sons-in-law served), Baillaud's heroic efforts to maintain the all-important provision of time were made under cannon fire. The enormous German gun called Big Bertha fired huge shells more than 100 kilometers and aimed them at the official latitude and longitude of Paris, which were the coordinates of the Paris Observatory! Nevertheless, Baillaud, who was seventy at war's end, never failed to transmit the time.

During the war France instituted daylight saving time over Baillaud's vehement objections. "Time," he said, "is a reality independent of the wishes of man and which he has no right to touch; noon at one place is the time when the sun crosses the meridian of that place. To want noon at 11:00 is a lie. It would not be without disastrous consequences to base people's lives on a lie." He stubbornly continued to use standard time in such publications as tide tables.

International cooperation in astronomy suffered a crushing blow during the "Great War." The International Solar Union, the International Commission on Time, and the committees coordinating the Astrographic Catalogue and J.C. Kapteyn's Plan of Selected Areas were split into astronomers from the opposing sides and from the neutral countries. The scientists of the victorious powers began reorganizing immediately after the armistice. The International Astronomical Union was one of a number of such unions established in 1919, and the dignified and eloquent Baillaud was elected its first president. Since then the IAU has established universally accepted standards for everything from how to display spectra (in order of increasing wavelength, decreasing frequency) to the boundaries of the constellations and the naming of newly-discovered planetary features.

Baillaud was a modest man who never exhibited any sense of self-importance. Once the Paris Observatory director asked a young reporter who crossed the great city every day to get the temperature from the observatory whether he was paid for the task. "They give me two francs per day, but I have to pay for the métro," the youth replied.

"Good. Don't trouble yourself, my friend. Starting tomorrow you will receive the forecasts by pneumatic tube." And for the next six years the distinguished old director with the great white moustache never failed to send the daily weather data to the reporter by express mail. ■

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