Part III
Calculation of Astronomical Wonders

1720 CE

In the desert kingdom of Jaipur, on the brink of war, the Maharaja Jai Singh II likely would have stepped back to consider his legacy. Would he be just another of the numerous and nameless rulers to fall by the wayside of history, ground up under the gears of the Mughal empire, to be cast aside and ultimately forgotten? Posterity would likely not remember him. He had lifted his family out of a few generations of obscurity, debt, and disrepute to get to his current point of magnificence. But his line had been exalted before, yet had still descended into the near oblivion from which Jai Singh II had revived it. Just as all things ultimately decay, he and his line would also one day fade away. There was no way his now rich, but tiny kingdom would be able to resist and maintain forever—it too would fall into empire, of one kind or another.

Amazing celestial events such as comets or supernovae had always been relatively easy to track and to understand, at least on a basic level. Supernovae did not move from the fixed sphere of the stars and comets followed a basic single motion around the sun before disappearing back from whence they came. The motions of the planets and the moon, however, always presented difficulties. In particular, the strange occurrence of eclipses of the sun or moon seemed to happen with a regularity, but one curiously outside the grasp of clear determination. The sun would cover the moon or the moon the sun, in seeming patterns. But the *discovery* of these patterns proved difficult. It was this calculation that concerned Bhaskara II—the calculation of astronomical wonders, such as eclipses or planetary appearances. The elegant mathematics of India could be used to understand these complex motions, to uncover the essential pattern in which the heavens move. In this pattern lays the essence of understanding.

Jai Singh intuitively understood the connection between understanding, modeling the cosmos, and power. A robust ability is to observe and predict motions in the heavens, to track events and motions with the finest possible detail, and to express one's abilities with tools as majestic and awesome in their appearance as they were precise in their use—these were things that displayed true power. While

Jai Singh may have been dispensable as a vassal ruler, he likely thought, he could not have been dispensable as one who understood the essential motions and nature of the heavens, as one who created a ritual model of the universe, a celestial monument that would outlast the prestige and power of his line.

Although many rulers of his time must have thought this way and had these anxieties, Jai Singh II did something truly unique. He did not answer these worries with new palaces, larger harems, or stifling edicts to make himself feel more powerful in the face of ultimate meaningless by making his people suffer. He decided to stake his claim to immortality through the attempt to understand the most mysterious and fundamental of aspects of nature—the sky. He would build astronomical tools unrivaled in their enormity and beauty. He would create scientific tools as works of art and monuments to the human desire to understand. The combination of the scientific and artistic purposes of tools was an inheritance of the Islamic astronomers, whose astronomical tools were never dry and aseptic receptacles of empirical data, but objects of beauty, reflecting in their construction the essential mystery and compelling aesthetic complexity of the sky. To this conception of the artistry of nature, Jai Singh added the Indian concern with mathematics, with patterns and number, and with grandiose cosmology, expressed by his predecessors such as Aryabhata and Bhaskara II.

The result would be perhaps the greatest monuments to human understanding and the desire to learn in existence—gardens of astronomy, drawing one to contemplate the mysteries of life and the universe as easily as they could track the position of the sun or a supernova. The Vedic ritual of ancient astronomy and the distinctly Indian character of astronomy in the subcontinent had one last stand with the efforts of Jai Singh. One of his monuments itself would become witness to the decline and subjugation of a great culture, as the autonomy of the region itself collapsed in the colonial period—a dark era for the subcontinent even as it heralded the dawn of Western power.