



Gupta metalworkers made gold coins to honor the kings who owned the mines.

18.7 Metalwork

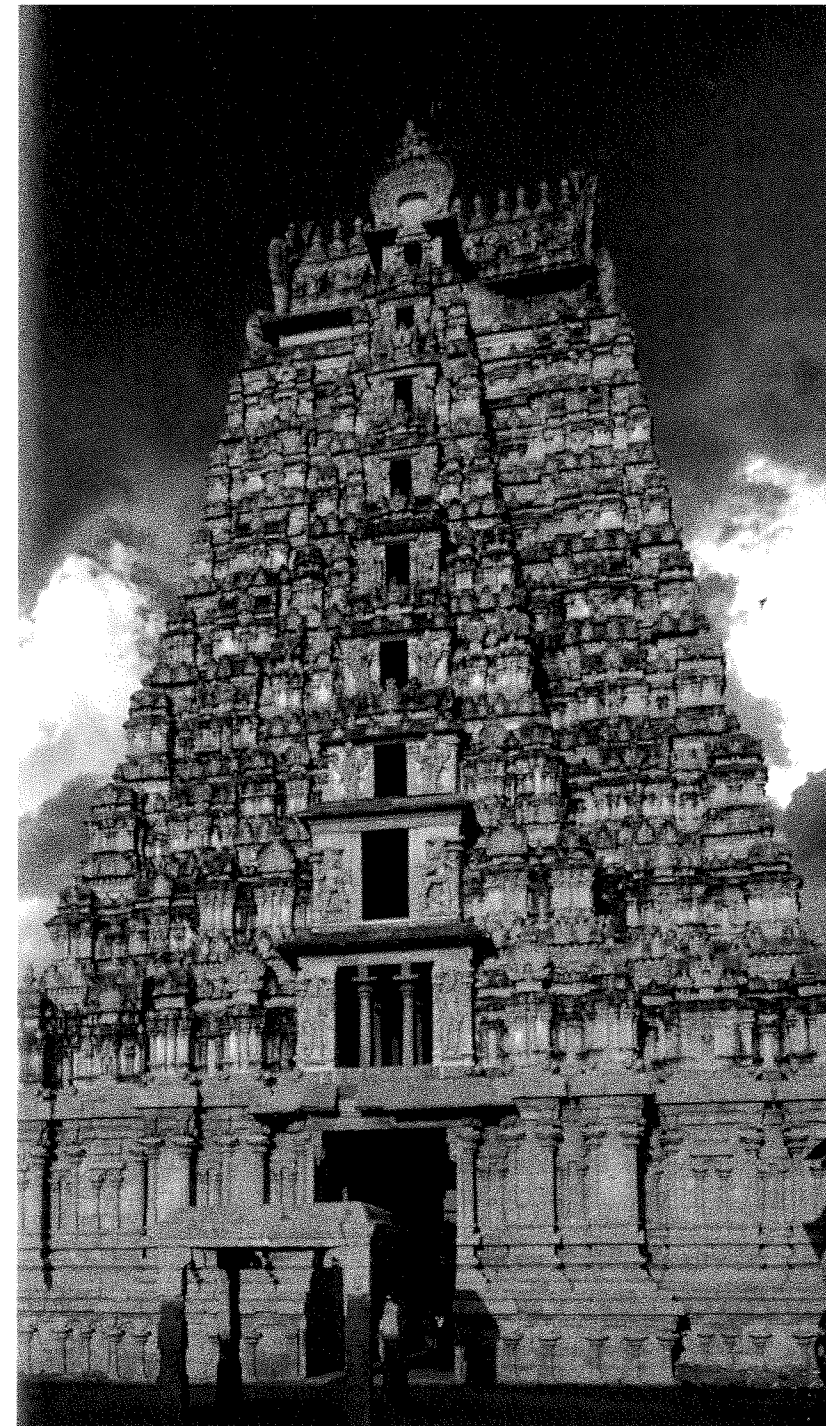
One remarkable accomplishment of the Gupta Empire was its metalwork. Gupta kings controlled huge mines of gold, copper, and iron. Metalworkers made gold and copper coins. They engraved the coins with pictures honoring Gupta rulers. The coins often highlighted the rulers' wealth and their achievements in art, politics, and war.

Gupta metalworkers were also famous for their ironwork. An iron pillar at a place called Meharauli is one example of these artisans' unusual skill. The pillar is made of solid iron. It stands 25 feet tall and weighs about 13,000 pounds. The sides are engraved with a story that describes the achievements of a Gupta emperor. The iron is nearly rust free after 1,600 years in the rain and sun. No one knows how Gupta ironworkers acquired such advanced metalworking skills.

18.8 Mathematics

Earlier Hindu mathematicians had created a way of writing whole numbers using the numerals 1 through 9. Some Gupta mathematicians made further advances, one of which was developing the decimal system. The decimal system uses ten basic numerals that have different values depending on their "place." In the number 105, for instance, 1 is in the "hundreds place" and means 100. The system also works for fractions. In the decimal 0.10, 1 means one-tenth. Note the zeros in these examples. Hindu mathematicians were the first to treat zero as a number. Many calculations are impossible without the zero.

In later centuries, Arab peoples learned the Indian system of numbers and spread it to Europe. As a result, Europeans called this way of writing numbers "Arabic numerals." A more accurate name would be "Hindu-Arabic numerals," because the system actually originated with the ancient Indians. We still use this system today.



The use of mathematics allowed ancient Indians to build complex structures such as this temple.

One of the most famous Gupta mathematicians was a man named Aryabhata. He combined mathematics and astronomy to make important discoveries. He figured out that a year was exactly 365.258 days long. He calculated the approximate size of Earth. He proposed that planets were spheres. He was one of the earliest scientists to suggest that Earth spins on its *axis*, an imaginary line through Earth's center.

Mathematics had immediate practical uses as well. For example, Gupta builders applied their knowledge of mathematics to design complex structures like the one shown above.