

## ANCIENT EGYPT – Science

*Frederic Will, Ph.D.*

**Ancient and modern in science** The great discoveries of Western science, in the 16<sup>th</sup> and 17<sup>th</sup> centuries, followed by the technology revolutions of the early 19<sup>th</sup> century, rapidly established the impression that science and even the scientific attitude were products of fairly recent western society. The fact is, of course, that both in Asia and the West studies of the natural world, and of the uses to which we can put it, were widespread, and of value and interest to their people. In some instances—say in mathematics and astronomy—the discoveries made in antiquity were to be influential in shaping western scientific skills.

**The Egyptian achievement** The scientific discoveries of the ancient Egyptians have on the whole remained part of what we greatly admire about those people, and about their ability to build a classical civilization. For historical reasons—the channels by which historical know how passed from the classic civilizations to our modernity—the achievements of the Egyptians remain to us as a source of awe and inspiration, rather than as a functioning element in post 17<sup>th</sup> century Western scientific thinking. That awe and inspiration, however, sustain and stimulate us.

**Engineering** We marvel today at the magnitude of the Pharaonic pyramids, and the brilliant engineering of them after a long haul of stone blocks for hundreds of miles. Even more daunting, than the materials transportation issue, has to have been that of elevating the heavy materials, for the pyramid construction, from ground level to the upper levels of the completed structure. The stepped pyramid of Zoser, 2600 B.C.E., consisted of six levels, and rose to over 200 feet; ‘the oldest sizable stone structure in the world.’ The Great Pyramids of Gizeh were initially cut from the cliffs on the eastern bank of the Nile, then floated across the river during the annual floods, and dragged up temporary ramps to their pre-arranged positions. ‘The oldest and largest of the pyramids, that of Cheops, consisted of 2.3 million blocks, each averaging 2.5 tons in weight.’

**Medicine** Egyptian achievements in medicine are amply documented for us by a large number of medical papyri, which record the Egyptians’ considerable knowledge of the human body and of its ailments. The first Medical School was in operation in the early third millennium B.C.E., headed by a woman doctor; the first successful surgeries—2700 BC.E.—were carried out not much later. Reading the papyrus literature we are startled by the list of ailments—the whole catalogue—for which medicines and treatments are prescribed.

**Mining** The Egyptians developed effective mining operations along the Nile, in copper and gold, and even, in the late period, iron. (The working conditions in the mines were dreadful, a one-way ticket to death.)

**Agriculture** In agriculture, the Nile itself was permitted to be the great regulative planter, guaranteeing, from its alluvial flood plains, an abundance of fruits and vegetables. Skillful arrangements of irrigation channels, and of shaduf-like devices for water transfer, from one level or basin to another, combined to assure the most precise possible control over the river—which did its part by flooding on the same day every year.

**Astronomy** Egyptian astronomers were, from the First Dynasty on, close observers of the positions and movements of the stars. Their observations enabled them to align the greatest Pyramids to the cardinal points of the compass; while the great Pyramid of Cheops was aligned to the pole star, a distant but precisely chosen point of reference. (The identification of the planets with specific deities provided an extra impetus, a religious one, for mapping the heavens.) The risings and settings of the planets were carefully calculated—Eratosthenes (276-195.B.C.E.) measured the size and circumference of the earth—and at the Great Library in Alexandria (3<sup>rd</sup> century B.C.E.-30 B.C.E.) many of the most renowned astronomers of the ancient western world carried out their studies.

**Domestic sciences** Engineering and medicine take their place with a rich diversity of techno-practical domestic skills—paper-technology, book-roll creations, cosmetics, pharmaceuticals—to create for ancient Egyptian culture a dynamic profile, three millennia long, which is easily belied by the static image left behind to us by a culture of massive pyramids. Pharmaceuticals were usefully available, preserving and practicing ancient curative recipes,

which relied on discoveries made as early as the third millennium B.C.E. Both men and women wore make-up created by crushed galena and malachite, mixed with animal fats; a product intended both to promote beauty—female beauty was literally viewed as holy—and for skin protection in the desert heat. Paper was made by soaking strips of papyrus, soaking them, and gluing them together until they formed rolls (scrolls when unfolded) which could be shelved in library book niches.

### **Readings**

Clagett, Marshall, *Ancient Egyptian Science*, vol. 2, *Calendars*,

*Clocks, and Astronomy*, Philadelphia, 1995.

Nunn, John, *Ancient Egyptian Medicine*, Norman, 1996

### **Discussion questions**

Did the ancient Egyptians distinguish between science and technology? If so, did they recognize some queen of the sciences, that stood out above all?

The ancient Egyptians viewed beauty, as in female beauty, as a form of the holy. For that reason, they put more than ordinary emphasis on the importance of make-up. We too stress the importance of make-up. Does that emphasis retain, for us, any of the ‘holy’ implications of female self-beautification?

In the West, during our 19th century industrialization of science, manufacturing became one of the potent expressions of the power of the scientist—working in steel, working in concrete, working with electric power. Did Egyptian science lead to new ways of promoting industrial production?