Editorial

Papyrus: application of ancient bionics and biomechanics

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Abstract

In the Egyptian part of Nile, in its central region, there is the Karnak Open Air Museum. Nearby is the New Karnak Papyrus Institute. There, a tourist guide showed to me a process of producing papyrus, that is writing or painting surface made of a plant *Cyperus papyrus*. This process consists of: cutting a plant onto pieces, cutting them longitudinally, treating them with a hammer and roller, immersing strips into the water, arranging them alternatively at angle of 90 degrees, squeezing in a press, and drying. In this way a kind of a surface for writing or painting is obtained.

Few years ago I was in Egypt. After visiting Cairo and Giza I flew to Luxor (ancient name *Thebes*). In Karnak (part of the town of Luxor) there is a huge Karnak Open Air Museum comprising Karnak Temple Complex.

My tourist guide took me to the New Karnak Papyrus Institute which was situated in the city (Figure 1).

Figure 1 Logo of Papyrus Institute.

Papyrus grows across the Nile Delta and throughout Mediterranean region (Figure 2). It is a material that was used in ancient Egypt as writing or painting surface. It was first manufactured as far back as the fourth millennium BCE. Egyptians used pith, i.e. an inner part of a stem of the papyrus plant (*Cyperus papyrus*). It was used not only for writing purposes but also for building boats, mats, rope and other items.[1,2] So, this was ancient bionics application of papyrus.

Figure 2 Papyrus along the banks of a Nile River (photo by Michael Shade [Wikimedia Commons]).

Papyrus was relatively cheap and easy to produce. Unfortunately, it was fragile and susceptible to both moisture and excessive dryness. The writing surface was irregular so it was not easy to write or to draw perfectly. In addition, papyrus was not elastic enough to fold without cracking.[1]

While in New Karnak Papyrus Institute, my guide showed to me how ancient Egyptians produced a kind of paper from papyrus plant. There were several steps in order to obtain a sheet of writing or painting surface.

At first papyrus was collected from wet places (Figure 3). Then a stem of a papyrus was cut onto pieces of needed length and then cut longitudinally on two halves (Figure 4). Next, both halves were subjected to beating them with a wooden hammer in order to obtain flat piece (Figure 5a). After that a piece was pressed several times with a roller in order to have even, flat surface (Figure 5b).

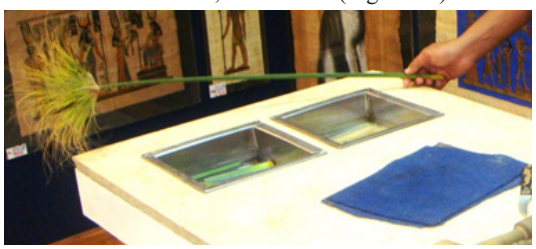

Figure 3 Papyrus plant.

Figure 4 Cutting a stem longitudinally.

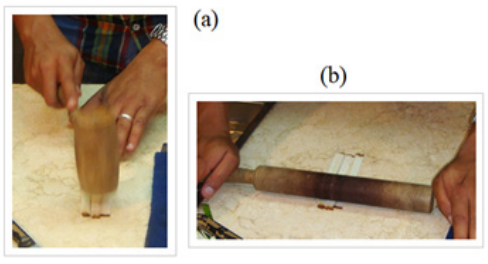

Figure 5 Mechanical treatment of a stem, by: (a) hammer, (b) roller.

Next, strips of papyrus were immersed into the water. After few minutes they were more elastic and it was easy to arrange them alternately with an angle of 90 degrees (Figure 6). When this action was accomplished the whole sheet composed of papyrus strips was put into the pressure press (Figure 7). When the proper force was applied and a sheet was removed, after drying writing or painting surface was ready to use (Figure 8).

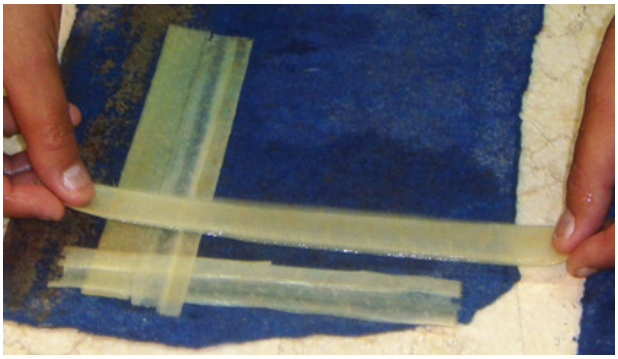

Figure 6 After immersing into the water strips of papyrus are arranged alternately.

Figure 7 Sheet of a papyrus is squeezed in the press.

Figure 8 A sheet of a papyrus after drying.

Rolled sheet of papyrus was put into the circular box (Figure 9). Figure 10 presents an example of a painting on a sheet of papyrus.

Figure 9 A rolled sheet of a papyrus is packed.

Figure 10 A painting on a sheet of papyrus.

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Conflicts of interest

The author declares that there is no conflict of interest.

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2. Cyperus papyrus. In: Wikipedia: Cyperus_papyrus. 2023.

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