

ALEXANDRIA: THE GREATEST CENTRE OF LEARNING IN THE ANTIQUITY

There was science before there were scientists. Science (from Latin '*scientia*', from 'scire-know') as an organized body of thought is generally considered to have begun with the Ionian school of Greek philosophers about 600 BC. Ionian was a member of ancient people inhabiting Attica (the territory making up the city-state of Athens in Classical Greece), parts of Western Asia Minor (now in Turkey) and the Aegean (Sea) Islands between Greece and Turkey in pre-classical times. Discoveries or inventions prior to 600 BC were nearly always examples of technology, since they were specific devices or techniques. Albert Einstein (1879 - 1955), Nobel Laureate in Physics, 1921, rightly said: "Imagination is more important than knowledge". This imagination did get a productive, inspirational and meaningful framework and language in Alexandria. That is why the centres of learning in Alexandria were the greatest in the antiquity (from Latin '*antiquus*': former or ancient). The ancient city of Alexandria (Egypt) in the Nile delta on the southern coast of the Mediterranean sea was founded by Alexander the Great (356 - 323 BC) in 332 BC. The library and museum were initially built by his general - Ptolemy I Soter ('Saviour': c.366 - c.283BC), King of Egypt and later greatly extended by his son, Ptolemy II Philadelphus (308 - 246 BC) with the collaboration of Demetrius (b. 350 BC) of Phalerum, their advisor.

Alexandria was the capital of the Ptolemies (304 - 30 BC) and was the centre of Hellenic and Jewish culture. Alexandria was one of the greatest cities of the classical Hellenistic world (323 BC to 30 BC) and remained the capital of Egypt till 641 AD.

THE MEDICAL SCHOOL

Alexandrian medical school went beyond Hippocratic medicine (Hippocrates, c.460 - 377 BC), for in Alexandria, knowledge of the human body became an essential prerequisite for medical practice. It was here where first human dissection was routinely carried out and the alliance between medicine and anatomy persisted in Greek medicine as long as the Hellenistic influ-

ence persisted. Medical ethics was also integrated into the teaching of medical sects. In the Hellenistic age, Alexandria and Pergamum (Asia Minor - now in Turkey) were leading research centres for scientific investigations. Facilities of a library and the resources of scientific collections were available to scholars.

From 300 BC until around the time of Jesus Christ, all significant biological advances were made by physicians at Alexandria. One of the outstanding of these men was Herophilus (fl.300 BC : fl= '*floruit*', Latin, indicating when a historical figure lived, worked or was most active), who dissected human bodies and compared their structures to those of other large mammals. He could also be called the father of comparative anatomy. He described the brain in detail as the centre of the nervous system and the seat of intelligence. One of the venous sinuses in the brain is named after him - *torcular Herophili* (wine-press of Herophilus). He was the first to name duodenum and to count the pulse. Based on his knowledge, he wrote a general anatomical treatise (best at the time), a special one on the eyes, and a handbook for midwives.

Erasistratus (fl. 300 BC), a younger contemporary and reputed rival of Herophilus, who also worked at the museum at Alexandria, studied the valves of the heart and the circulation of the blood. He suspected (but did not see - no microscope in those days -hence not at all possible to see) small interconnecting vessels between arteries and veins and hence the presence of capillaries.

Galen (131 - 200 AD) of Pergamum, a Greek physician and the 'Medical Dictator', who practiced medicine in Rome during the middle of the 2nd century AD, also studied medicine at Alexandria. He never performed human dissection. His knowledge of anatomy was faulty.

Surgery was also practised, by operation at Alexandria. Bladder stone diseases were treated by operation at Alexandria. As time went on, the fame of Alexandria declined and the empire of Alexander was superceded by that of Rome. This opened a new field of Greek medicine. As the Latin poet - Horace (65 - 27 BC): Quintus Horatius Flaccus, rightly said:

"Captive Greece took Rome captive."

THE LIBRARY

It was the first library in the world (Latin: '*liber*' means book). At one time (3rd century BC) it was reputed to have contained 7,00,000 papyrus manu-

scripts. It was a secular centre of learning. A showcase of classical learning, the Alexandrian library was originally housed in the Mouseion, an arts and science complex that included laboratories and conservatories, as well as a zoo and the library itself. It was the greatest library in the classical antiquity.

Aristotle's (384 - 322 BC) library at the Lyceum in Athens is said to have formed the model for that established at Alexandria. The founders aimed to collect the whole body of Greek literature in the best available copies, arranged in systematic order, so as to form the basis of published commentaries. Its collection of *papyrus* (paper made from water plant) and *vellum* (fine parchment made originally from the skin of calf), scrolls are said to have numbered hundreds of thousands. Situated in a temple of the Muses called the Mouseion, it was staffed by many famous Greek scholars and writers, who included the grammarian and poet Callimachus (died 240 BC), Eratosthenes (died c.194 BC), the philosopher Aristophanes of Byzantium (died c.180 BC), and Aristarchus of Samothrace (died 145 BC), the foremost critical scholar of the antiquity.

Both museum and library were organized in faculties with a president-priest at the head and the salaries of the staff paid by the King. A subsidiary daughter library was established c.235 BC by Ptolemy III in the temple of Sarapis, the main museum and library being in the palace precincts, in the district known as the Bruchesium. It is not known how far the ideal of an international library - incorporating not only all Greek literature but also translations into Greek from the other languages of the Mediterranean, the Middle East and India - was realized. Certainly, the library was in the main Greek; the only translation recorded was the *Septuagint*. The *Septuagint* is a Greek version of the Hebrew Bible (or Old Testament), including the *Apocrypha*, produced in the 3rd and 2nd century BC (Origin: from Latin - '*Septuaginta*' - seventy, because of the tradition that it was produced by seventy-two translators working independently).

The library's editorial programme included the establishment of Alexandrian canon of Greek poets, the division of works into 'books' as they are now known (probably to suit the standard length of rolls) and the gradual introduction of punctuation and accentuation. The compilation of a national

bibliography (Greek - '*biblion*' - book) was entrusted to Calimachus. Though now lost, it survived into the Byzantine (Eastern Roman empire) period (330 - 1453 AD) as a standard reference work of Greek literature. The great research institute of the Alexandrian museum and library was founded and maintained by the long succession of Ptolemies in Egypt from the beginning of the 3rd century BC. The museum and library survived for many centuries but were destroyed in the civil war that occurred under Aurelian in the late 3rd century AD, the 'daughter library' was destroyed by the Christians in 391 AD.

IMPORTANT COLLECTIONS

During the 3rd and 2nd century BC, *Corpus Hippocraticum* (Hippocratic collections of about 60 - 70 works) was passed from the medical library of Kos (Cos) island - birthplace of Hippocrates - to the great library of Alexandria, where works were edited and made available to scholars. Prominent among the *Corpus* were:

1. *Epidemics* (7 books written by at least two authors)
2. *On the Sacred Disease* (Epilepsy)
3. *Prognostics: Airs, Waters and Places*
4. *Aphorisms* - a collection of 412 short counsels regarding diagnosis, prognosis and treatment.

The scholars at the library of Alexandria edited the manuscripts of the speeches of the famous Greek Orator, Demosthenes (384 - 322 BC).

Alexander Aetolus (fl.c. 280 BC), Greek poet of Pleuron in Aetolia catalogued the Greek tragedies in the library of Alexandria. Nothing remains of his own tragic writing except the title of one play - *Astragalistae* (The Dice Players).

Its librarians, among them Archimedes (c.287 - 212 BC), the Greek scientist, and the most celebrated of ancient mathematicians, Aristarchus of Samothrace (c. 215 - 145 BC), Greek grammarian and critic and librarian for over 30 years, had collected works of, among many others, Greek philosopher, Plato (c.427 - 347 BC), Macedonian philosopher, Aristotle (384 - 322 BC), Athenian historian, Thucydides (c.460 - 400 BC), Greek tragic dramatist,

Sophocles (c.496 - 406 BC), Greek tragic dramatist, Euripides (c.480 - 406 BC), Hippocrates (c.460 - 377 BC), Father of Modern Medicine, and the great geometrician Euclid (c.330 - 260 BC), often when these authors were still at work. The library also acted as a publishing house, copying manuscripts for distribution throughout the ancient world. It aimed to house every book and thus all the knowledge in the known world, mainly Greek. Critically speaking, it was a Greek national library and not an international library— no works of any other parts of the world, viz: India, China, Japan etc., in the antiquity were known to have been compiled. Communication was not easy in those days, of course.

THE TRAGEDY

The library with its fabulous collection was burned several times: accidentally during Julius Caesar's (100 - 44 BC) siege of the city in 48 BC (it was rebuilt by Mark Anthony, who made a gift of 200,000 manuscripts to Cleopatra), in 272 AD by order of Emperor Aurelian – Lucius Aurelius Aurelianus (215 - 275). In 391 AD it was again burned by Christian fanatics enraged by the cult of 'seraphis' and the pagan books held in the library, and finally, by the Islamic Arabs, in 638 AD during the reign of the second Caliph, Hazrat Omar (581 - 644 AD). Omar is meant to have said:

“if the writings of the Greeks agree with the Koran, they are useless and need not be preserved, if they disagree they are pernicious and ought to be destroyed”.

The books were used as fuel to heat the city's 4,000 baths for six months. Thus many priceless treasures of learning were destroyed. Such, then, were the blows levelled at science and medicine by the early Christians and Muslims.

It needs to be mentioned that 'seraphis' is a compound deity, combining the names and aspects of two Egyptian gods - Osiris and Apis, to which were further added features of major Greek gods such as Zeus and Dionysus. The god was introduced to Alexandria by Ptolemy I in an attempt to unite Greeks and Egyptians in common worship. Pagans are people holding religious beliefs other than those of the main world religions, especially Christianity. Greeks and Romans were all pagans in the antiquity.

A magnificent new library has recently been built. Alexandria is trying to regain its former glory.

THE EPILOGUE

History is nothing but a dialogue between the past and the present. It is an uninterrupted landscape, where past, present and future coexist in a dynamic fashion. In principle, same trends dominated in the past, still dominate in the present, and will surely dominate in future in the birth of great centres of learning. They all start from a scratch - a small beginning and then flowering with time. The centres of learning at Alexandria in the antiquity were no exception. Plato's Academy (387 BC) - the first university in the west, and Aristotle's *Lyceum* (around 336 BC), both in Athens, *Gurugrha* (Teachers' lodge) in Taxila (400 BC - c.130 AD), and Nalanda, a full fledged Buddhist monastic/residential international university (5th - 12th century AD) in Ancient India, the academy of scholars in Qi State (318 BC) in China, also probably in other parts of the world in bygone days - all had a very humble beginning. The same trend rules the waves of the centres of learning in the contemporary world. The library, the museum and the research institute were initially established in the precincts of the Ptolemaic palace, and from there transmitted their glow to the Mediterranean world in the antiquity, which attracted the best talents of the day to Alexandria.

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