DOCUMENT RESUME

ED 330 358 IR 053 522

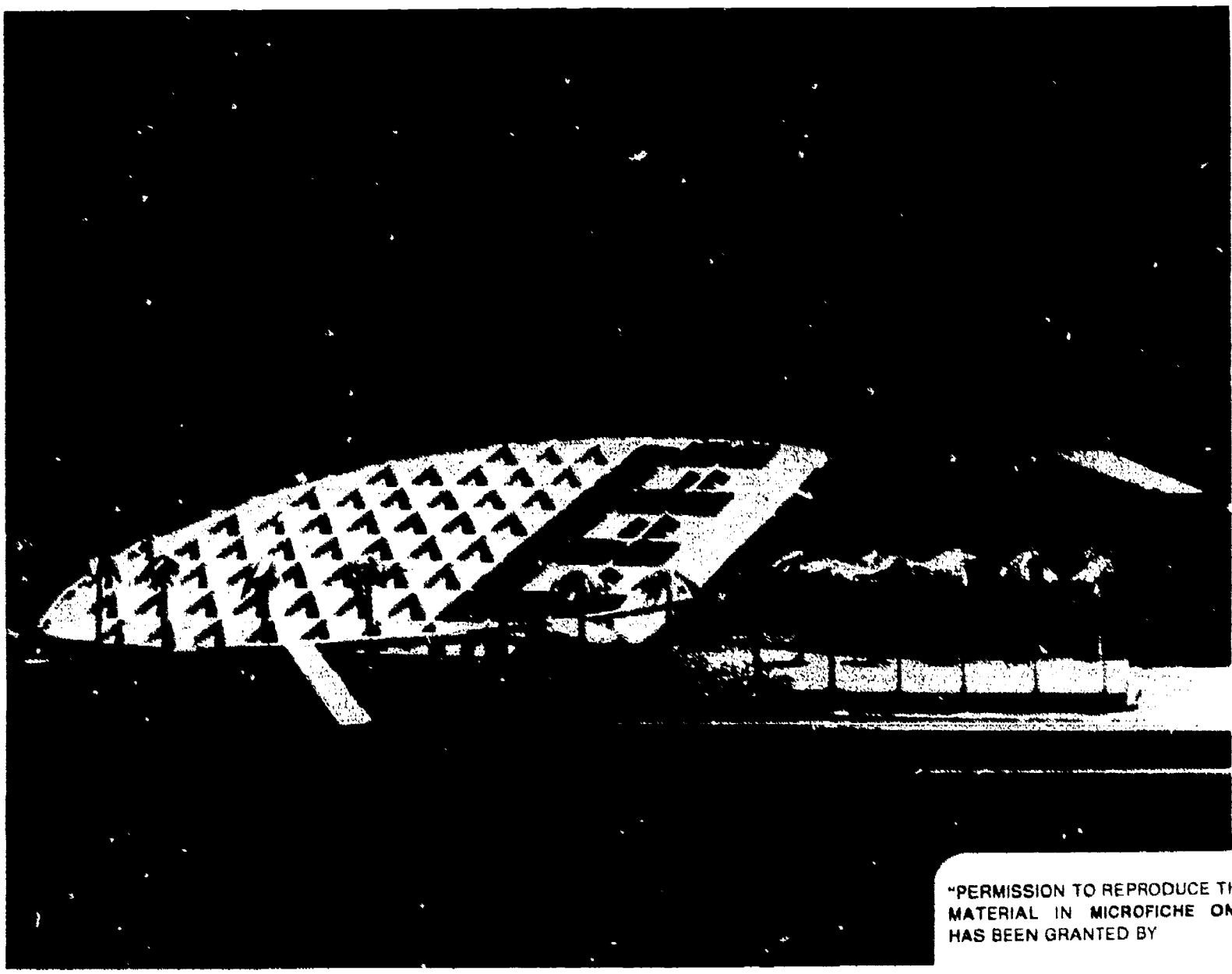
AUTHOR	Aman, Mohammed M.
TITLE	The New Bibliotheca Alexandrina: A Link in the Historical Chain of Cultural Continuity. Occasional Paper 3.
INSTITUTION	Wisconsin Univ., Milwaukee. School of Library and Information Science.
REPORT NO	ISSN-1050-8147
PUB DATE	90
NOTE	22p.
AVAILABLE FROM	University of Wisconsin-Milwaukee, School of Library and Information Science, P.O. Box 413, Milwaukee, WI 53201 ($12.00 prepaid).
PUB TYPE	Historical Materials (060) -- Reports - Descriptive (141)
EDRS PRICE	MF01 Plus Postage. PC Not Available from EDRS.
DESCRIPTORS	*Ancient History; *Architecture; Area Studies; *Building Design; Facility Planning; Greek Civilization; Library Collections; *Library Development; *Public Libraries
IDENTIFIERS	*Egypt; Greece

ABSTRACT

The first universal library in history, the Alexandrian Library, was established in the fourth century B.C. in Greece and disappeared in the third and fourth centuries A.D., according to various accounts. In an attempt to preserve Egypt's historical heritage, the Egyptian government has decided to build a new library in its place--the Bibliotheca Alexandrina. The new Alexandrian library will be a public research library whose purpose and collection will be designed to enrich the cultural development and heritage of Egypt, the Mediterranean region, Africa, and the Arab world. It will provide a link to the world's major research libraries utilizing all modern forms of technology for the acquisition, storage, transfer, and dissemination of information. The library is scheduled to open in 1995. This report presents the history of the ancient Alexandrian library, accounts of the Alexandrian librarians, the library collection (which represented writings from a variety of civilizations), and theories about the library's demise. Descriptions of the new Bibliotheca Alexandrina's mission statement, its proposed site (Alexandria, Egypt), organizational structures and functions, collection subject orientation, automation details, and its International School of Information Studies (ISIS) are presented. Details of the international architecture competition, which determined the winning architectural design of the new library, include a description of the competition's theme, a list of the judges, and the cost estimates of the project. (20 references) (MAB)

The New Bibliotheca Alexandrina: A Link In The Historical Chain Of Cultural Continuity

by Mohammed M. Aman, Ph.D.



University of Wisconsin-Milwaukee
School of Library and Information Science
Milwaukee, Wisconsin

Occasional Paper

3

The New Bibliotheca Alexandrina: A Link In The Historical Chain Of Cultural Continuity

by Mohammed M. Aman, Ph.D.

Dean and Professor
University of Wisconsin-Milwaukee
School of Library and Information Science

January 1990

The front cover is a model of the award winning design. It combines the symbolic beauty of the sun rising from the sea conveying the idea of a new beginning, with the functionality needed in a truly modern library.

Introduction

In the annals of man's cultural and scientific history, three cities are often mentioned as the meeting places of scholars, scientists and artists: Rome, Athens and Alexandria. A major center of science, philosophy and art, Alexandria was also the major link between the East and the West. It was, as its founder Alexander the Great wished, a meeting place for eminent representatives of Egyptian, Grecian, Persian and other cultures. It was in such an intellectual climate that the first universal library in history, which also served as a research institute and a museum, came into being at the beginning of the fourth century B.C. By the middle of the first century B.C., the Alexandrian Library had in its possession close to half a million manuscripts, which were classified and organized by highly sophisticated methods. This enormous warehouse of knowledge was for a long time the essential source of information for many generations of scholars until its disappearance in the third and fourth centuries A.D.

In pursuing its policy of safeguarding and protecting Egypt's outstanding historical heritage, the government of Egypt has decided to build a new Library in Alexandria inspired by the glorious achievements of what was the Bibliotheca Alexandrina. The new Library will be a public research library located on the site of what is believed to be that of the ancient Library. The international community has endorsed the idea and the Executive Board of UNESCO approved a plan of cooperation which involved the United Nations and the government of Egypt. An international architectural competition sanctioned by the International Union of Architects selected a design from 524 designs submitted by architects from 77 countries. Plans are underway to secure funds for building the complex and opening it to the public in 1995.

Alexandria: Background of the City

Egypt's strategic location at the meeting point of three continents, Asia, Africa and Europe has, since ancient times, made it one of the cradles of civilization and the battle ground of armies. After the fall of Tyre, Alexander the Great marched his troops west into Egypt where he was greeted as a liberator. With a desire to unite East and West into one culture, as well as to protect his flank, he decided to settle a colony of Greek veterans there on Egyptian soil. In a vision, he was directed to proceed to the Canobic mouth of the river Nile. There "... he saw the commodious situation of the place, it being a long neck of land, stretching like an isthmus between large lagoons and shallow waters on one side and the sea on the other, the latter at the end making a spacious harbor... and ordered the plan of a city to be drawn out answerable to the place." (Fuller, E., 1959, p. 296)

This city, the first and most famous of the many Alexandrias, founded by the young conqueror, was started in the year 332 B.C. near an ancient Egyptian township called Rakota (or Rakotis). The architect who produced the plan for the city, Deinkoratis, designed the streets "so that they should be swept by the winds from the North." The main thoroughfare followed roughly the same line as Al-Hurriyah Avenue today while the next in importance, at right angles to Al-Hurriyah, ran north-south. Laid with a keen eye to gain control of Mediterranean trade, within 50 years the city grew to become the world's intellectual and commercial capital. The population of the city, under the Roman Empire, reached approximately 500,000, making it second only to Rome in size and importance.

With a history which blended forty centuries of Pharaonic culture and the Greek dynasties that began with the Ptolemies, it was natural for Alexandria to become a seat of learning which sought to combine the mysteries of the East with the science of the West. The temple of the Muses (Museion), or museum, founded there in the fourth century B.C. became the world's first university. The fame of Alexandria in the ancient world has rested to a large extent on the great library believed to have been founded by Ptolemy I Soter (reigned until 284 B.C.). It was originally conceived not as a library, but as a research center similar to Aristotle's Lyceum in Athens that was to hold the collected knowledge of the world.

Alexandria soon became an object of desire. Julius Caesar fought for his life in its streets (48 B.C.). Augustus reduced the city to near rubble in his war against Mark Anthony in 30 B.C. After a 14 month siege, Alexandria was overrun by the Arab Muslims in 641 and became part of the Muslim Empire only to fall to the Turks in 1517. In 1798, Alexandria was occupied by the French. In 1882, it was almost demolished and occupied by the British. Finally in 1936 it regained its independence.

Today's Alexandria has regained its place as one of the Mediterranean cities with a variety of cultural influences, its windows open to the rest of the world. The city is the bustling home of 2.5 million, making it the second largest city in Egypt and, coincidentally, it's also home to the second largest university in Egypt. Its harbor and shipping industries remain very active, playing a part in the city's cultural and business renaissance.

The Ancient Library of Alexandria

In describing the Glory that was Alexandria one cannot place it except in the context of the chain of events that shaped man's civilization. One can not ignore the classificatory sciences as the petrology and mineralogy, which rose in Egypt and Babylon in connection with the practical activities of mining and metallurgy. Nor can we forget the medicine and surgery of the Egyptians as revealed in the Edwin Smith papyrus, and the Egyptian calendar, which has been called the one intelligent calendar in human history, or the highly developed systems of weight and measures in use both among the Egyptians and Babylonians. In the continuum of knowledge, the Greeks owed to the older civilization not only techniques but a considerable body of scientific knowledge. However, one must agree with Farrington that "the encyclopedia of sciences constituted by Alexandrian times was, with all its limitations, far beyond anything that has previously existed and remained unrivaled until modern times." (Farrington, B., 1969, p. 18)

Scholars, both modern and classical, have been held enthralled by this ancient Alexandrian Library. An abundance of articles, books and research papers on this classic Library exist, yet recent writers have continued to write about its history. The latest of these writings include an article written by Sidney Jackson and published in the first edition of the *ALA Yearbook*. (Jackson, S., 1980. pp. 39-40) and Mustafa al-Al-'Abbadi's forthcoming book on the Bibliotheca Alexandrina to be published by UNESCO in 1990. When we put the scholars' pieces together, we can envision the greatest marvel of a city conceived with destiny in mind. "For the many who had tangible data, there was the inspiration in the idea of the physically imposing, comprehensive scholar-library, an inspiration still voiced in Renaissance writings. ...the concept of a national library was there, for the collection seemed to have developed on the principle that the Library should have a proper copy of every title in Greek." (Jackson, S., 1980, p. 32).

Those who were heir to Alexander's kingdom were also heir to his zeal in matters of education. Within two generations of its founding, its holdings were built up to over half a million manuscripts, and the Library became a major center of science and art, an intellectual meeting place for scholars of Mediterranean and Western Asian cultures. A second, subsidiary library (the daughter library) had to be built to house this large collection.

In the beginning, Ptolemy I (Ptolemios) appointed Demetrius Phalereus (Demetrios of Phaleron), who had ruled Athens for 10 years and was exiled to Alexandria in 297. As a political refugee, he was glad to find a new and influential post as counsellor to King Ptolemy I Soter; Plutarch (*de exilio 7*, p. 601F) calls him "the first of Ptolemy's friends." He is thought to have played a role in the foundation of the Museion and the Library, and he helped to pass on Aristotelian methods of scientific, historical, and literary research, of philological and literary criticism, as well as ideas and principles generally of the Aristotelian school, the Peripatos. The organization of the great royal Library at Alexandria must have been one of them, and it is in this context that we must read Strabo's statement that "Aristotle taught the kings of Egypt the arrangement of a library." (XIII 608)

As the Library's first Director, it was Demetrius' plan to divide the museum and library into departmental faculties, each headed by a salaried dean. It was his original organization, his footsteps, that were still being followed centuries later. His rules and directors were to support research and maintain the Library as a working environment for the best minds of the age. It contained ten large research halls, each devoted to a separate subject; fountains and colonnades; botanical gardens; a zoo; dissecting rooms; an observatory; and a great dining hall where, at leisure, discussions of the great ideas of the times were conducted.

Built on the side of the museum, the great Library also served as a publications office. It carried out an aggressive acquisition policy. According to Galen (In Hippocr. Ep. III, Komm. 2, 4), all manuscripts found on ships anchored in the port were temporarily impounded for as long as was necessary for them to be copied. Galen notes that the books copied were identified as being "from the ship." Well-known works, like the Greek tragedies, were borrowed from Athens against a cash deposit and were brought to Alexandria so that copies could be made; often several at a time were created by having the original read out loud while a number of scribes took dictation. The story of the Athenian 'state copy' of the texts of the Attic tragedians, which Ptolemy III Euergetes borrowed and kept, forfeiting the deposit

of 15 talents, is well known (Galen XVII 607). Galen (XV 105) also tells us that in their anxiety to complete their collections the librarians were frequently deceived into purchasing forgeries of rare texts.

There is no firm evidence on how many papyrus scrolls were in the collection of the Library in Alexandria. One estimate dating from the first century B.C. gives a figure of two hundred thousand, while other authors writing in ancient times go as high as seven hundred thousand.

When assessing what the Library must have contained it has to be remembered that a scroll could contain one short work, or it could contain several works by the same author or several works by different authors and conversely a single work might require more than one scroll. The normal papyrus roll constituting a book was about 20 feet long unrolled, 10 to 12 inches high. Such a roll could contain, for instance, Plato's Symposium inscribed on 56 "pages" of 36 lines a piece, each line being 3 to 4 inches long. The only standard feature was the length of a line, 34-38 characters, which made it easier to calculate how much to pay the copier.

The Ancient Library: A Meeting Place for Scholars and Scientists

Communications by road and sea, made possible because of Alexandria's reputation as a center of commerce, lead to more than the interchange of goods. Where cargo could travel safely, so could learned men. Alexandria became the center of Hellenistic learning as scholars came from various parts of the Empire to visit and exchange information with their fellow scholars or to study at the hands of the giants of the age like Archimedes of Syracuse. The Library was home to the fathers of scientific theories and literature who gathered in a community of scholars exploring physics, literature, mathematics, biology, and engineering. Genius flourished there. The Alexandrian Library is where humans first collected, seriously and systematically, the knowledge of the world. During these visits, discoveries such as the "Archimedes Screw" were made, changing the way people lived and worked.

Among the many world famous scholars and scientists who frequented the Alexandrian Library were teachers like Euclid (ca. 330-260 B.C.), the brilliant mathematician, who told his king, struggling over a difficult mathematical problem, "There is no royal (easy) road to geometry." It was his concept on the systematic treatment of geometry that was taught by his pupils to Apollonius of Perga (ca. 262-190 B.C.) who in turn subsequently taught at the University there. From references in Ptolemy's Almagest, it is known that Apollonius, called "The Great Geometer" by his contemporaries, introduced the systems of eccentric and epicyclic motion to explain planetary motion. His treatise, *Conics*, is one of the greatest in scientific works from the ancient world. While most of his treatises were lost, their titles and a general indication of their contents were passed on by later writers, especially Pappus of Alexandria (fl. ca. 320 A.D.). The first four books of *Conics* survived in the original Greek and the next three in Arabic translation. The only other extant work of Apollonius is *Cutting Off of a Ratio* or *On Proportional Section* , and came to us in an Arabic translation.

Among these great men of mathematics was a great woman, Hypatia (ca.. 370-415 A.D.), mathematician and astronomer, the last light of the Library. The philosopher, Synesius of Cyrene, a student of Hypatia, credited her with development of an astrotable and a planesphere (both instruments used to study the stars). Synesius wrote that Hypatia also developed a device for distilling water, an instrument for measuring the level of water, and a hydroscope (an instrument for measuring the specific gravity of water).

On the medical front, Hippocrates proclaimed the natural sequence of disease thereby holding out the possibility of combating it. Herophilus, the physiologist, firmly established that the brain rather than the heart is the seat of intelligence. It was later, during the second century A.D., when a landmark in the region's intellectual history appeared, not as a flash of genius in original work, but as the careful bringing together of various isolated pieces of information dealing with the human body. Galen visited Alexandria as well as travelling to other centers in order to be abreast of all available knowledge (Anthony, H. D., 1948. p. 56). His systemized medical knowledge was accepted as authoritative for many centuries until the discovery of the circulatory system of blood by Harvey in the early seventeenth century.

Those who looked to the heavens for study included Eratosthenes, the astronomer and philosopher, Hipparchus, who mapped the constellations and estimated the brightness of the stars, and the astronomer/geographer

Cladius Ptolemy (90-168 A.D.), who compiled much of what is today the pseudoscience of astrology, as well as inventing the techniques of map-making. (Sagan, C., 1980, p. 17)

The students of language could look to Dionysius of Thrace, the man who defined the parts of speech and did for the study of language what Euclid did for geometry.

The world of engineering had Hero of Alexandria (first century A.D.), author of several books on mechanics and *Automata*, the first book on robots, inventor of the steam engine, gear trains and the dioptra, a surveying instrument. Archimedes was the greatest mechanical genius until Leonardo da Vinci. He is credited with the invention of pulleys.

The Scholars/Librarians of Alexandria

The role of the ancient Library of Alexandria as a center of learning for the Hellenized world is equally matched by the illustrious scholars of the Museion who became its librarians. A list of Alexandrian librarians on a late 2nd century A.D. papyrus (Oxyrhynchus Papyrus 1241) gave an account of some of the holders of this eminent position. Early scholars/librarians included: Zenodotus of Ephesus, a Homer scholar and initially junior to Demetrius, seems to have been the first, around 291 B.C., to have been designated Director (bibliophylax), at a time when cataloging and translation were recognized as part of the Library routine under the beneficent eye of Ptolemy II Philadelphus, (Jackson, S., 1980, p. 32); Apollonius who, about 247 B.C., succeeded Zenodotus and preceded Aristosthenes, (Americana, vol. 17, p. 310).

The cataloging achievements of Callimachus (305-240 B.C.), the teacher of Eratosthenes and, via him, of Aristarchus, deserved the laurel wreath for bringing order to the chaos that must have been the early Alexandrian Library. Under Callimachus' term as Director, the contents of the Library were classified and listed in a catalog, the *Pinakes* in 120 books, in accordance with his rules which laid down the manner in which works should be described, often giving titles to those that had none and indicating the number of lines in each. From this catalog he extracted a bibliography of all Greek works known at the time, adding a biographical note along side the author's name. The only knowledge we have of this catalog (Pinakes, i.e. tables or lists) is through the quotations from it that appear in the classics. Of the catalog of the library itself, nothing remains. From the *Pinakes* of Callimachus it is known that the subject, descriptive and even evaluative features had been developed rather elaborately. It was Aristophanus of Byzantium (born ca 257 B.C. - died 180 B.C.) who revised and continued the *Pinakes* of Callimachus,

Four or five scrolls from the third century A.D. contain fragments of a catalog or lists of works and it is thought that some of these may have a connection with the Library in Alexandria. As yet it is too early to say if the P. Vindob or papyrus G 4061 was written in Alexandria or if its contents refer to the library catalog. We must wait for the definitive edition before we can know for sure, but what is clear is that the method used for the epigram quotations is that of Callimachus. (Harrauer, H., 1981, pp. 49-53)

The Library's Collections

The spread of information in Alexandria was dependent on the comparatively slow method of passing it on by word of mouth. Books were in rolls of papyri and could only be circulated by the laborious process of making individual copies. These rolls were handwritten, copied individually or from dictation by groups of scribes who were not scholars. The texts being copied were between 200 to 600 years old. Coming from many different parts of the Greek speaking world, they differed widely from one another with regard to the form of text, i.e. the readings, and also, presumably the orthography (letter forms), and the layout of the texts. Some of the older book rolls were written in alphabets other than the phonic alphabet which was generally in use by the Hellenistic world. The texts were written continuously, without word division, without punctuation, without accents, or any indication of long or short syllables. When one stops to consider the difficulties under which they labored, it is amazing that information could spread as rapidly as it did.

The academic and informational atmosphere at Alexandria was not confined to the museum, for the influence of this great center of thought and information was carried to various parts of the Hellenistic world by those who came to study and do research. With its universal character, the Library played a major part in the development of the Greco-Roman civilization, on which western culture is based. As mentioned earlier, several ancient texts that had disappeared

from the Greco-Roman world have come down to us via the Arabs who had translated them into Arabic, presumably from the manuscripts found in Alexandria. The Library and its city was, as Alexander the Great foresaw, an essential link in the historical chain of cultural continuity. (Bibliotheca Alexandrina, 1988)

Great Books in a Great Library

The works in the Library were not solely in Greek; the writings of other civilizations were also represented. According to legend, 70 of the most learned of the Hellenistic Jews of Alexandria were given the task of translating the Hebrew Old Testament into Greek. Each worked individually, sharing their accomplishments only when they finished. All 70 translations were said to match, even in the smallest particulars and by this miracle it was known that the translation was acceptable to God, hence the name Septuagint or translation by the seventy. Babylonian and Persian writings are also said to have formed part of the collection, as was certain Buddhist texts.

References have been made to one of the great works kept in the Library, a book by the astronomer Aristarchus of Samos, who argued that the earth is one of the planets, which like them orbits the Sun and that the stars are enormously far away. Each of these conclusions were later proven correct by modern scientists, but we had to wait two thousand years for the rediscovery. (Sagan, C., 1980, p. 20).

The "Hippocratic Collection" of nearly 70 books constituted the library of the medical school, probably at Cos, and during the third century it passed to the great Library at Alexandria, where the manuscripts were copied, corrected and kept. (Britannica, vol. 5, p. 939; Farrington, B., 1969, p. 66). There, the collection was put together in its present state, and its fortunate preservation enabled us to form a good idea of the progress of medical science in the Greek world during the two preceding centuries.

The Demise of the Ancient Library

Events surrounding the disappearance of the collection of the Alexandrian Library, like all events of history, are not very clear. It is as Barbara W. Tuchman has said, like looking through a "distant mirror." This was never more evident than when we look back into the disappearance of this noble institution. Legend stands to the fore as truths, only to merge with the shadows when the bright light of scholarship is applied.

One such apocryphal story has it that the main Library was destroyed by Julius Caesar. It is a known historical fact that Julius Caesar, in his search for Pompey, had raced ahead of his armies and had entered Alexandria with just his personal troops of approximately 3,200 foot and 800 mounted cavalry. The citizens at first tolerated the Roman soldiers, but soon they revolted against what was perceived as Roman intervention in Alexandria's affairs. Between October 48 B.C. and March 47 B.C., they managed to besiege Caesar in the small palace section of the city, totally cutting him off from reinforcements.

Ganymedes, commanding the forces of Alexandria, attempted to pollute the Roman drinking sources by contaminating them with sea water drawn from the harbor by means of mechanical water wheels. Caesar ordered his men to dig a number of wells and so discovered enough fresh water to make up the amount that he could no longer draw from the city's supplies. "The people (of Alexandria) were clever and very shrewd, and no sooner had they seen what was being done by us than they would reproduce it with such cunning that it seemed it was our men who had copied their works...." was the way this war of move and counter move was described by Hirtius, a historian and friend of Caesar (Way, A., 1964. p 15). In a determined counter attack the Roman Legionnaires were able to burn the Alexandrian fleet. The materials used in their construction, wood, pitch, and canvas burn with an intense heat. Blazing ships drifted into piers and the fire spread to the warehouse district and from there to the Library. A few years later Anthony had the Library of Pergamene (about two hundred thousand scrolls) transferred to Alexandria by way of compensation.

It seems so logical that the story often is allowed to stand without investigation. Careful historians point out that by the evidence available to us, Alexandria was, at that time in its life, a city built of stone and masonry with ample supplies of water near at hand, the most fire proof city of the ancient world. Caesar, in his work *The Civil Wars* , mentions the burning of the fleet, but not wholesale destruction, as would be expected if the fire had spread out of control to the city. Marcus Tullis Cicero was on orator, politician and philosopher of the first order. He was also a contemporary and

opponent of Caesar. It is unthinkable that he would have passed on a chance to publicly condemn Caesar for the Library's destruction yet such an attack is not found in any of his writings.

Seneca, 96 years after the fact, mentions that 40,000 books were burned in Alexandria, making no further comment on the matter. It was not until over 150 years later that Plutarch mentions the destruction of the Library by Caesar. It is believed by most of the scholars who have studied the matter that a large quantity of books, some estimates match Seneca's number of 40,000, were removed from the Library and were stored in a warehouse for shipment to Rome to be used as props in Caesar's triumphant procession. It was these books which were destroyed and through the distorting mists of time have been transformed into the entire Library complex.

The city was involved once again in a Roman civil war when Augustus chased Mark Antony and Cleopatra to the safety of its walls. After a short siege it was written by Suetonius that Augustus "reduced" the city. The term used leaves little to the imagination and can be used to sound the death knoll of the Library. Yet it seems to have survived long enough to have been destroyed by Aurelian and destroyed again by Diocletian, Roman Emperors of the 3rd century.

According to another tradition the Library, which has taken on the attributes of a cat with nine lives, was burned by a mob of Christian monks. The time was 391 A.D., after Christianity had been made the state religion of the empire. Theophilus I, Patriarch and virtual ruler of Alexandria, aroused the zeal of his followers against the pagans in general and the temple area at Serapis. Their destruction of the Library could be seen as a means of cleansing the world of the hated pagan influence, its idols, and its sacrifices. Once again the flow of events is natural and all we can do is shake our heads at the tragic loss of knowledge the world suffered at the hands of mob rule.

There are scholars, Dr. J. B. Bury among them, who doubt that the Library was actually destroyed. From their reading of the sources they believe it is clear that the temple itself was never demolished, but was transformed into a church and a monastery, only its contents were destroyed. Theophils, for all his violent zeal was a learned man and a leader of no mean ability. His overseers in Constantinople did not order the destruction of a library, they were themselves intent on collecting Christian and pagan books, but of a pagan religion. Once the trappings of the local cult of the god Serpais were replaced with the world encompassing symbols of Christianity the job was finished.

Theophils accomplished his mission by leading, what contemporary historians discribed as, his mob through the streets of the city to one specific temple, removing the great measuring gauge from that temple to the safety of a nearby church, destroying the utensils of pagan worship, and marching back through the streets parading broken pieces of the idol as a trophy, all without incidental violence. (Parson, E., 1952, p. 362) These acts show what Theophils led was a mob in name only, and that there is no reason to believe that the "waton" violence spilled over and destroyed the Library.

A final reference was made in the early 13th century to the destruction of the Alexandrian Library by 'Amr Ibn al-'As when he conquered Alexandria in 642 A.D. 'Abdul Latif al-Baghdadi alluded to a story that 'Amr Ibn al-'As asked his Caliph, 'Amr Ibn al-Khattab, what should be done with the books of the Library. The answer he received was, "If what is written in them agrees with the word of God, they are not required; if it disagrees, they are not desired. Destroy them therefore." The various scrolls were then dispensed to the city's bath houses were they were used to heat water, the whole operation taking six months to complete. According to the majority of scholars and historians there is no evidence that such an event ever took place. (al-'Abbadi, M., 1977, pp. 49-51)

So ends the list of reasons used through history to explain the Library's disappearance. A modern reason has been brought forward using the forces of economics. When Ptolemy VI of Egypt cut off the supplies of papyrus to the Library of Pergamum a new source of writing material was needed. According to tradition, King Eumenes II of Pergamum devised a new way to clean and stretch the hides of sheep and goats, making it possible to write on both sides of the material. (Boorstin, D., 1985, p . 525). This new material was then sewn together to form a codex, a modern book. It proved to be so successful that all literature was changed over to the new system. Alexandria was in no position to change its collection to the new medium and it fell into disuse. Over a period of time the collection drifted away because people no longer cared. No doubt some future scholar will use the same argument to explain the disappearance of paper in contrast to an enduring electronic medium.

In the end we will never know for sure what actually happened to the collection of the Library. What we do know is that a small part of the library structure survived the centuries, a dark and forgotten cellar of the Serabium, the

Library's annex. Some, perhaps, could look on the whole affair in a poetic way. What was once a temple and later a sanctuary dedicated to human knowledge, the Library, like mankind, grew from humble beginnings, achieved a measure of greatness, and in the end all that can physically be left behind is a hole in the ground. The home for the fathers of scientific theories, the abode of genius, the place where humans first collected, seriously and systematically, the knowledge of the world, that great Library of Alexandria is no more.

The New Bibliotheca Alexandrina

According to the Architectural Brief (p. 57), the purpose of the New Alexandrian Library is to return to Alexandria the glory it held in ancient times. To that end, an institution will be created that will become famous throughout the region for the quality of its services and the wealth of its resources: the object is to transport the antique to modern times.

The main objective of the new Bibliotheca Alexandrina is to establish a seat of learning that will enable it to resume its past reputation for scholarship and knowledge. In addition to all the usual facilities of a modern library, it will have special distinguishing features and particular attention will be given to branches of learning that relate directly to the historical heritage of the surrounding region.

The New Alexandrian Library will be a public research library whose purpose and collection will be designed to enrich the cultural development and heritage of Egypt, the Mediterranean region, Africa and the Arab world. It will provide a link to the world's major research libraries utilizing all modern forms of technology for the acquisition, storage, transfer and dissemination of information. Researchers, not only from Egypt but also from all countries in the region and beyond, will find not only a collection of books and manuscripts but also audiovisual and electronic media. When the Library opens in 1995, expectations are that there will be nearly 200,000 titles available, the ultimate target being four to five million, with the possibility of expansion to eight million volumes.

The Site

On June 26 .988, President Hosni Mubarak of Egypt, laid the foundation stone for the Bibliotheca Alexandrina on a site of about 35,200 square meters located adjacent to the main campus of the University of Alexandria overlooking the waterfront of the eastern port, between two streets parallel to the shore: the "Corniche", El-Gaish Avenue and Port Said Street.

The 15 kilometers long, four lane Corniche is the main traffic artery of the city, used by buses, taxis, and private cars. To the east of the site is the University of Alexandria's Maternity and Pediatrics Hospital. There will be no direct link between the Library and the Hospital. South of the site, opposite Port Said Street, are located three faculties of the University: Arts, Law and Commerce. The students of these schools are expected to be regular visitors of the Library. Port Said Street will be the main access to the Library, for users and services as well.

The future intention is to extend this new development into the peninsula which stretches out to the sea on the other side of the Corniche towards the old Mameluke Fortress of Qait Bey. The fortress located across the East Harbor was built in 1480 A.D. on the site of the ancient lighthouse which was one of the seven wonders of the world.

As part of the site, a Conference Center with a seating capacity of 2,500 has been built adjacent to the new Library. This co-habitation will be useful to the Library in its cultural activities. The Conference Center and its ancillary services were designed to be functional sub-units of the Library. As a matter of fact it was in this auditorium that the International Jury met to evaluate the 524 entries in the Library architectural design competition and it was also there that announcements of the winners were made and the exhibit of the winning designs was held.

There are a few building restrictions. The allowed height along the Corniche road should not exceed 20 meters above the street level and no more than 35 meters in a 20 meter distance from the Corniche. Allowed projection outside the street line is limited to 50% of the total length and no projection on the first 4 meters of the facade.

Organization and Functions of the Bibliotheca Alexandrina

The new Library will comprise seven divisions. An administrative council will preside over the whole of what will be an autonomous institution, with the president of the Council taking the role of Director General of the new Library. There will be close links to the University of Alexandria, even though the Library is not part of the University. These links will be evident in the make-up of the Administrative Council and especially in the role played by the International School of Information Studies which will be part of the complex.

The enclosed organization chart shows the hierarchical structure of the institution. (appendix)

A. General Services Division

This division comprises all the management's offices as well as the administrative services: secretariat, telecommunications, personnel, finance, transactions, publishing and electronic data processing.

B. Technical Support Services Division

Two types of technical services are included in this division:

- services specific to a major research library such as binding, labelling, preservation, photography, reprography, production of audiovisual materials, printing facilities, etc.
- services specific to the building: equipment office, building maintenance, security, the garage, as well as general services such as the sick-bay, staff cloakrooms and technical installation areas

C. Cultural Activities Division

Two types of activities are expected to take place in this division: temporary exhibitions (of books, engravings, photographs, paintings, etc.), and artistic productions (poetry readings, literary, scientific and historical talks, chamber music, etc.). In addition, a museum of calligraphy will trace the evolution of writing from hieroglyphics to modern characters showing all the intermediate forms which have played a role in the Middle East. The Science Museum is designed not only to exhibit scientific objects, but also to offer an area for hands-on experiments in order to attract young people. A cafeteria and a bookstore will be in the area near the entrance.

D. Library Division

The Library proper will comprise an information area, the lending section, and different search aids: access to the online catalog (OPAC), access to databases, and interlibrary loan. Books and periodicals in open access will be classed in five sections according to the following subjects: Section 1) General reference works; Section 2) Geography, archaeology, and history including pre-history with a special emphasis on the Eastern European, the Greco-Roman World, Egypt and the Middle East; 3) History of art, architecture, science, ideas, religion, philosophy, law, social and political science; 4) Language and literature; 5) Science and technology (to be developed at a later date)

E. Special Collections Division

The manuscripts and rare books section is planned designed to allow supervised consultation of precious or unique manuscripts and documents. This Division will contain sections which will house maps, music, audiovisual materials, and old engravings. The map section will contain documents such as geographic and geological maps, maritime charts, archaeologists surveys, plans of historic monuments, etc. The music section will contain musical scores and books on music in open access.

The Library's general catalog will contain the descriptions and locations of all these documents with access points by disciplines and subjects.

F. Technical Services Division

In this section, library materials will be ordered, cataloged, classified and processed for addition to the library's holdings.

G. The International School of Information Studies

It is estimated that the new Library will initially need at least 300 staff members including at least 100 professionals. Since Egypt and the rest of the region suffer from a shortage of qualified librarians and information specialists who are trained in the new concepts and techniques of information and library management, it was necessary to attach a school of information studies to the new Library.

The International School of Information Studies (ISIS) will be housed within the Library's complex. It will offer a number of graduate programs in such areas as preservation and conservation, telecommunication, information resources management, and library administration. The ISIS will have extensive laboratory facilities and will integrate the latest technology in the instructional and research programs conducted at the school. Estimated number of students to be enrolled in this exclusively graduate program is 300 and a full time faculty of 30.

H. Conference Center Complementary Services.

The component parts of the Library are of very different types and sizes.

a. The cultural activities division is sort of a showcase for the Library. It is the area in which activities for the public will take place. These areas must allow for freedom of movement and encourage the public to enter the Library. A reception desk will channel the flow of users.

b. On leaving the cultural activities division, the user reaches the library itself, via a check-point equipped with a magnetic detection system, to prevent unauthorized borrowing of library materials. There will be a supervised cloakroom at the entrance. The entrance is designed to be welcoming and gives a buffer-zone which contains bibliographic information desks for users, the circulation desk and the database searching facilities, interlibrary loans and the OPAC terminals for access to the Library's own computerized catalog. The five general sections and the four special collections, which can hold 2,000 users, may be reached from the check-point area.

c. Access. In addition to the public entrance points described above, the following points are included in the design plans:

- an entrance and lounge reserved for distinguished visitors which leads directly to the area in which the General Director's Office is located

- an entrance for equipment, suppliers, maintenance staff and other people external to the Library who are concerned with technical maintenance, mail, etc.

On the whole, flexibility within the structure is one of the main criteria of the design. This results from the consideration that future changes in library programs may necessitate the use of various spaces for functions different from those originally established. One has to foresee possible variations in the quantities of materials, users and staff of the projected Library. To reach this goal, the general layout of the building, its modularization, the adaptability of the structure, interior dimensions and centralized systems should be appropriate. Specifically:

- the floor will have a load bearing capacity of 550 kg/m^2, except where heavier capacities are indicated;
- the clear ceiling height will be at least 300 centimeters, except where otherwise indicated;
- the building must be of modular design to meet the requirements for the most efficient arrangement of bookstacks, office areas, reading spaces, partition systems, lighting, etc.
- the installed systems (partitions, lighting, air-conditioning, etc.) should be adaptable to different functions, types of space and changes in requirements.

Subject Orientation of the Collection

The new Library will have a capacity to hold up to five million volumes and 1,500 periodical titles. On opening day, it is expected that no less than 200,000 volumes will be in the new building, along with 1,500 periodical titles.

Accordingly, the project consultants recommended that the Alexandrian Library should, as part of its first phase, collect in the following subject areas: Egyptian art history from the Ptolemic area to the present; Greco-Roman archeology, epigraphy, papyrology; Greco-Roman languages and literature; Oriental monachis, Hellenistic antiquity, oriental patrology; the marriage of Egyptian and Greek civilizations, the birth of Coptic Christianity, the influence of Islam, Arabic and Islamic literature; culture and civilization of the Mediterranean region, its languages and literatures; Middle Eastern geography; transmission of classical heritage; history of science and medicine in the ancient world; and modern and contemporary history of the region. It is hoped that the Library will gradually emerge as the repository of all valuable materials on the history and culture of the region, providing a stable environment for the safe guarding of valuable manuscripts and rare books gathered throughout Egypt.

The primary collection development objective will be to provide those books, periodicals, pamphlets, newspapers, microforms, archives, manuscripts, government documents, technical reports, maps, multi-media and other information sources needed to support the Library's mission. Attention during a later phase will be given to science and medicine. The Library will also provide some materials to meet the basic and recreational reading needs of the general public including materials for children and young adults.

Electronic publishing has allowed many libraries and centers of learning the capability to produce publications not available through regular publishing channels. The Library is expected to fill the vacuum which exists in Egypt and the Middle East with current and comprehensive national bibliographies. This bibliography will be supplemented by access to a wide variety of databases produced throughout the world and available through teleinformatics.

The Organization and Management of the Library

The University of Alexandria, which donated the site, will provide technical and academic support to the project, but the Alexandrian Library will be an autonomous "public organization" having its own legal identity. A Board of Directors, members of which will include eminent public figures in Egypt, will lay down the policies of the project which will be implemented by a Director-General. A Chief Librarian will be responsible for the internal functioning of the Library.

Computerization

When the planners suggested that the Library of Alexandria should be automated, they were obviously inspired by the idea that the Library should become one of the most modern research libraries, using the advanced tools of information technology to facilitate in-house operations as well as the provision of information to scholars and researchers.

The system should be able to handle Arabic, Greek and Roman characters and conform to internationally accepted standards. As part of the Library automation effort, the system will also create a computerized union catalog of the holdings of all faculty libraries within the University of Alexandria as well as the Municipal Library of Alexandria. It is expected that the system will be an integrated system combining all functions within the Library including: cataloging, acquisitions, circulation, serials, OPAC, reference and information, and administration. The Library will also provide portable databases, e.g. CD-ROM, as well as online access to remote databases.

The International School of Information Studies (ISIS)

As part of reviving the long established and glorified tradition of librarianship in the ancient civilization, the Alexandrian Library will contain within its walls, an autonomous graduate school of information studies, which will confer degrees up to the doctorate in various fields of information and communication sciences. The Dean of the School will come directly under the authority of the Rector of the University of Alexandria.

The International Architecture Competition

International competitions have become established traditions in the architectural community, which view them as a sort of an intercultural Olympiad. These competitions are the best way to provoke the emergence of architecture for our time, avoiding an arbitrary selection. With so many architects facing the challenge of designing what they consider to be the ultimate in style and function, a client is able to get a building which would not only meet present and future needs but wh.. .h also makes a statement.

The architectural community has become passionately interested in these competitions. Generally these contests can be expected to draw in the neighborhood of 500 participants from more than 50 countries. It was felt that an international competition, under the sponsorship of the International Union of Architects (IUA), would give the project the international recognition it deserves and when there were 524 entrants from 58 countries, it was seen that this new Library was viewed as one of the most important undertakings of the close of the 20th century.

The competition for the design of the Bibliotheca Alexandrina was launched in September of 1988, and by November of that year, more than 1,300 applications were registered from 77 countries.

The Theme

The architectural challenges posed by this project were numerous. The City of Alexandria, established at the time of Alexander the Great, has gone through centuries of transformation which should be reflected in the construction of the Library. The site must permit pedestrian links to both the University of Alexandria campus and to the Peninsula across the street. The building should present itself to the sea and the city's beautiful circular harbor, yet the environment to the North is aggressive and noisy. The building entrance should be open and welcoming, yet noise must be excluded because the Library should be a place of calm to encourage serious academic research and study.

Because there was no physical image or remains of the ancient Library, there was no reference or point of departure from which an image could be derived. Architects were asked to submit designs that would have the impact and presence to remind people of the glorious days of Alexandria and the role its Library played in the preservation and transfer of knowledge from the East to West. The Library being constructed in the 20th Century would be an entirely new entity, a "rebirth" that would be a cultural focal point and an artistic landmark.

The Jury

An international Jury of nine members was sanctioned by the IUA and UNESCO early in 1988. Its members were:

Mohammed M. Aman, Ph.D., Dean and Professor, School of Library and Information Science, University of Wisconsin-Milwaukee and **John Carl Warnecke** of Warnecke Associates from the U.S.A.; **Jean-Pierre Clavel**, Chief Librarian Emeritus, Lausanne University Library, Switzerland; **Francois Lombard**, Architect and Representative of the IUA; **Fumihiko Maki**, Architect, Japan; **Franco Zagari**, Professor of Architecture at the Faculty of Architecture in Rome, Italy; **Mohsen Zahran**, Ph.D., Professor of Architecture from the University of Alexandria and Executive Director of the General Organization of the Alexandrian Library, Egypt; **Ahmad Helal**, Ph.D., Chief Librarian, Essen University, Federal Republic of Germany and **Jan Meissner**, Architect, France. Both Dr. Helal and Mr. Meissner were reserve members of the Jury and were selected to replace two other Jury member architects, **Charles Correa** from India and **Pedro Ramirez Vasquez** from Mexico, who were unable to attend.

In its first meeting, the Jury elected as chair, John Carl Warnecke, an internationally known architect. His achievements include the design of Lafayette Square surrounding the White House in Washington, D.C., the Memorial and Grave Site for the late John F. Kennedy in Arlington, Virginia; the Hirst Office Building on the Capitol Hill; the Stanford University Library and the Library of the Naval Academy and the campuses at Berkeley and Santa Cruz. Elected as vice chairs were Fumihiko Maki and Dr. Mohsen Zahran, and as Rapporteur, Francois Lombard.

Professional advisers and reserve Jury members were: Harry Faulkner Brown, Architect, U.K.; Dr. Ahmed Helal, Librarian, FRG; and Jan Meissner, Architect, Poland.

Adjudication Procedures

Prior to the Jury's meeting, the Technical Committee met in Alexandria from July 23 to 29, 1989, to register, organize and exhibit the designs in preparation for the Jury's arrival. The Jury began its work on September 17, ending on the 25th. The Jury was sensitive to the enormous amount of research and analysis undertaken by all entrants to the competition and to the high quality of most of the design and presentations.

During the first days, projects that the Technical Committee judged as insufficient or not complying with the program regulations were reevaluated. Fifty-five of these were reentered into the competition. The 236 remaining projects were analyzed and the number further reduced to forty-five. In addition to a well functioning library, the Jury's main concern was to select a project with a strong symbolic image. That image was to express the roots of Egyptian and the Mediterranean civilization. The challenge to architects was to give a striking, modern interpretation of a public building. At the same time it was to take into account the permanent characteristics of the area, i.e., the permanent skyline of the city, climatic conditions, human behavior and cultural sensitivity. The feasibility of the library to be built and maintained was also considered.

The Jury was looking for a building that was geometrical but excluded ordinary looking buildings with their cold industrial look. It was interesting to note that 80 projects used either the complete shape of or part of a pyramid. The Jury was constantly reminded of the experiences of the competitions at Sydney for the Opera House and in Paris for the George Pompidou Centre and the Islamic Mosque in Madrid where the winning designs leave an unforgettable impression on those who have seen them. The feasibility of construction and the ease of maintenance was also considered.

In evaluating the top ranking designs, the jury members were looking for solutions that not only met the requirements but that embodied a philosophy that captured the special spirit of the project.

First Prize Winner

The first prize of $60,000 and the right to design the building went to Snohetta Arkitektur Landskap from Oslo, Norway. An excellent solution to the program requirements, the design carries a strong symbolic image: a circle inclined toward the sea, partly submerged in the ground. The image of the ancient Egyptian sun that in contemporary terms will illuminate the world of human, library and cultural activities which complement the existing conference center. The inclined roof tilted towards the sea brings in light and offers views of the sea from the interior, while giving the impression of a continuing sea from the exterior. Seen from an aerial view it proposes the image of the sun. (Egyptian Hieroglyphs show the sun generally as a simple disc). A large portion of the Library itself is below ground. The site of the Library looks out on the ancient harbor of Alexandria, which is in the form of a circle. From the ground level it appears as a strong, cylindrical masonry form emerging from the earth. The geometrical form of the building resembles a cylinder stuck into the earth or like a new moon that will grow to a full moon. It emerges from this particular site like the rebirth of an earlier form: the ancient Library of Alexandria. The circle, about 16 meters in diameter, is not closed. Inverted triangle shapes (small pyramids) on the roof prevent direct light from entering the building. Staff areas will have balconies overlooking the Bay.

The nine level design is simple, and presents a strong statement and symbol that appears most appropriate and unique for this particular project. Once inside, the building offers staff and users alike a new concept of library physical layout and organization. Cascading levels of platforms contained within this single volume, illuminated from the roof, provide a uniform ambience throughout the various sections of the Library. A technical spine serves the different platforms. Each level allows access to its own closed stacks, giving internal flexibility. In the same structural envelope, new platforms can be added, allowing internal expansion in the Library. The ISIS is located in a triangle on the second floor closely connected to the University through a bridge. The auxiliary conference facilities are located opposite ISIS and underground

Designed as an arrow, an elevated passway links the campus of the University of Alexandria to the peninsula, traversing the cylinder; a plain solid wall, 35 meters above ground and 16 meters beneath ground level, wraps around the cylinder providing protection from the wind and sand. The wall will be covered with calligraphy of the known alphabets and music scores from around the world.

Second Prize Winning Design

The second prize of $35,000 went to Manfredi Nicoletti Group from Rome, Italy.

The model, according to the Jury, is the most elaborated project, "ready to be built." The project combines the two concerns of the Jury: image and site organization. The model presents a strong image unusual to the skyline of the city of Alexandria, a strong, massive truncated cone, which compliments the mass of the Conference Center. It is, as its designers refer to it, "a citadel of culture," which provides for a continuous uninterrupted building network with all elements of the complex gathering around a large internal court, a public Esplanade: the distributive heart of the project. Surrounding the cone, lower buildings designed on a modular basis shelter the cultural and ancillary activities and organize the site in relation to the neighboring environment. The project proposes a very functional layout for the Library, locating all the readers' spaces close to a double-layered facade designed to control the natural light. It, too, opens toward the sea.

Third Prize Winner

The third prize of $25,000 went to Architect Jose Eduardo Ferolla and his three team members from Minas Geria, Brazil. The design from Brazil came closest to being most representative of a modern approach to contextualism. A grid-patterned wall, sometimes opaque, sometimes transparent, surrounded the entire site, giving a sense of unity to the project, while leaving the Conference Center separate. The buildings, at a comparatively low elevation of three floors, organizes the site along the north-south direction, leaving exterior spaces between them in a nice relation to the interior. The very strong public access links Port Said Street and the Corniche directly in the middle of the site. General and detailed layout appeared satisfactory in respect to the various functional requirements of the program. As a counter point, the project lacked a strong identifiable image.

Honorable Mentions

Thirteen projects were selected for Honorable Mention. Those chosen for Honorable Mention receive $6,153 each. The following tables show distribution of prize winning designs according to rank and the distribution of winner designs by country.

Prize Winning - Designs

Country	Project No.	Winner Rank
Norway	90	1
Italy	252	2
Brazil	46	3
USA	23	4
Fed Rep. Germany	25	5
Fed Rep. Germany	57	6
USA	72	7
Hong Kong	84	8
U.K.	99	9
Denmark	166	10
Belgium	209	11
Italy	387	12
U.K.	406	13
Belgium	426	14
Denmark	479	15
U.K.	491	16

Special Merit

To give credit to the wide range of architecturl directions, the jury decided to nominate 18 projects for Special Merit, including one which did not comply with programme regulations.

Distribution of Winning Designs

by Country	by Prize Rank	by Number of Prizes
Belgium	two prizes	11, 14
Brazil	one prize	3
Denmark	two prizes	10, 15
Fed. Rep. Germany	two prizes	5, 6
Hong Kong	one prize	8
Italy	two prizes	2, 12
Norway	one prize	1
U.K.	three prizes	9, 13,16
USA	two prizes	4,7

Cost Estimates of the Project

From its beginning the project has received the international support of UNESCO and the United Nations Development Program (UNDP), which have thus become co-promoters. UNESCO has launched an international appeal for this exceptional project in order to meet the cost of both the building itself and the collection, which based on feasibility studies conducted by UNESCO experts, is estimated at approximately $160,000,000. About $60,000,000 is the cost estimate for the actual construction of the building complex. However, the precise cost estimate will be available after February or March 1990 pending the completion of the Preliminary Design Review. About $40,000,000 will be needed for the purchase of books and other types of library materials, of which an initial amount of $12 million will be needed to assemble the first collections.

According to UNESCO feasibility studies, approximately $1,000,000 will be needed for computerization of the Library (Tee, 1987) and an additional $3,000,000 for the establishment, and staffing of the International School of Information Studies (ISIS) and staff training (Aman, 1987). Annually, the Library will need about $6,500,000 for the annual operating costs of the Library, to be paid from local resources and endowments. (Clavel and Tocatlian, 1987).

In addition to the land, estimated at $60 million which Egypt contributed to the project, the UNDP's contribution to the prizes and the running of the international architectural competition, UNESCO has recently been able to raise $500,000 from Norway to support the Preliminary Design Review.

What Next?

The next step to be taken, now that the wining design has been selected, is to build the building. Under Mrs. Suzan Mubarak's leadership, as Chair of the International Commission for the Bibliotheca Alexandrina, contributions to the project have already been made in two categories: $60,000,000 (the estimated value of the site); and $20,000,000 for the completed international conference center, considered part of the facility. Mrs. Mubarak will continue to lead and coordinate the international efforts for fund raising and support for building and maintaining the Library. The Egyptian government is working with UNESCO on fund raising activities. An international commission of prominent international personalities such as President Mitterand, Queen Sofia, Sultan Qabus, Daniel Boorstein, Vatran Gregorian and others will convene in Aswan, Egypt early in February 1990 at the invitation of Mrs. Mubarak to come up with a plan of action. Training of the staff and development of a core collection for the Library will be proceeding in 1990 in preparation for the opening of the new building in 1995.

References

al-Abbadi, Mustafa (1977). *Maktabat al-Iskandariya al-Qadima*, Cairo: Maktabat al-Anglo al-Misriya.

Aman, Mohammed M. (1989) "Bibliotheca Alexandrina," in *ALA Yearbook 1989*. Chicago: ALA.

(1987) *Revival of the Ancient Alexandrian Library: A Study of Manpower Needs and Development and Establishment of a School of International Information Studies*. Paris: UNESCO.

(1988) "Revival of the Ancient Library of Alexandria," *Library Times International*, 4(4):50-51, January.

Anthony, H. D. (1948). *Science and Its Background*. London: MacMillan.

Boorstien, Daniel J., (1985). *The Discoverers*. New York: Random House.

Butterfield, H. (1956). *The Origins of Modern Science, 1300-1800*. New York: The MacMillan Co.

Clavel, Jean-Pierre and Jacques Tocatlian (1987). *Feasibility Study for the Revival of the Ancient Library of Alexandria: First Phase*. Paris: UNESCO.

Encyclopedia Americana (1988). Danbury, CT. Grolier, vol. 17. p. 310.

Farrington, Benjamin (1969). *Greek Science: Its Meaning for Us*. Baltimore: Penguin Books.

Harrauer, Herman (1980) " Die Neue Wiener Pinakesrolle," in *The XVI International Congress of Papyrology*. New York.

Harrauer, Hermann (1981). "Epigrammincipi auf Einme Papyrus aus Dem 3, JH, V, Chr, P. Vindob G 40611 ein Vorbericht," in *The XVI International Congress of Papyrology*. Chicago. pp. 49-53.

Hypetia; Essays in Classics, Comparative Literature, and Philosophy. Presented to Hazel E. Barnes on her Seventieth Birthday (1985). Edited by William M. Calder III, et al. Boulder: Colorado Associated University Press.

Jackson, Sydney (1980). "Alexandrian Library," in ALA World Encyclopedia of Library and Information Service, Chicago: ALA. pp. 32-33.

Mozans, H. J. (1913, 1974)). *Women in Science*. Cambridge, MA: M.I.T. Press.

Osen, Lynn (1974). *Women in Mathematics*. Cambridge, MA:, M.I.T. Press.

Parsons, Edward Alexander (1952). *The Alexandrian Library: Glory of the Hellenic World*. Amsterdam: Elsevier Press.

Sagan, Carl. (1980). *Cosmos*. New York: Random House.

Tee, Lim Huck. *A Strategic Plan for the Automation of the Library of Alexandria*. Paris: UNESCO, 1987.

UNESCO (1988). *Bibliotheca Alexandrina: Concours International d'Architecture/International Architectural Competition*. Paris.

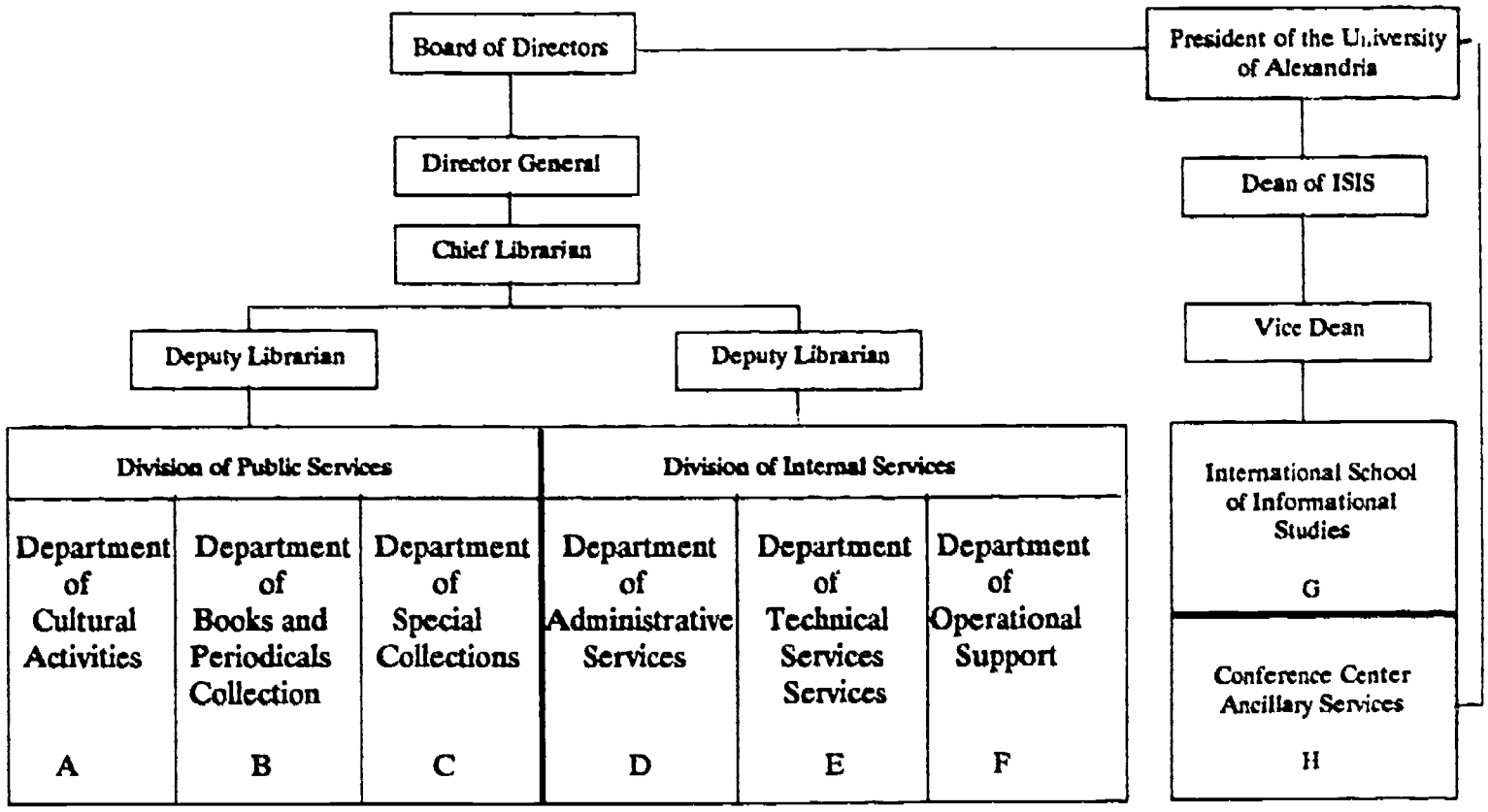
UNESCO (1988). *Bibliotheca Alexandrina: Programme Architectural et Regelement Du Concours*. Etabli par Jean-Peirre Clavel et Jan Meissner, avec le Concours de Francois Lombard. Paris.

UNESCO (1988). *Bibliotheca Alexandrina: The Revival of the First Universal Library*. Paris.

Way, A. G.(1955). *Ceaser Alexandrian, African and Spanish Wars*. London; Harvard University Press.

Williams, Henry Smith (1904). *A History of Science*. New York: Harper.

Appendix


Board of Directors
President of the University of Alexandria
Director General
Dean of ISIS
Chief Librarian
Vice Dean
Deputy Librarian
Deputy Librarian
Division of Public Services
Division of Internal Services
International School of Informational Studies
G
Department of Cultural Activities
A
Department of Books and Periodicals Collection
B
Department of Special Collections
C
Department of Administrative Services
D
Department of Technical Services Services
E
Department of Operational Support
F
Conference Center Ancillary Services
H

ISSN 1050-8147