

The Evolution of African Indigenous Science and Technology

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Abstract

The evolution of Science and Technology everywhere in the world including Africa is an age long phenomenon. Science is the systematic study of anything that can be examined, tested, and verified, it is one of the greatest and most influential fields of human endeavor. Technology on the other hand, is scientific knowledge that is put to practical ends. This knowledge is used in designing machinery, materials, and industrial processes, generally known as engineering. The concern of this paper is that in recent years, a greater volume of African countries have embraced the western science and technology as a driver of development assimilating Africans science and technology as though there was nothing like that before. This work is interested in helpful materials to explore the previous African concept of science and technology. Based on its finding, it is discovered that Africans abandoned their rich indigenous science and technology which has unfolded over the centuries since the dawn of human history like the western science and technology today. The work advanced the need for Africans to revitalize their lost heritage to complement the scientific culture of the west.

Keywords: science, technology, Africans, Africans science and technology, scientific culture

1. Introduction

African indigenous science and technology like the western science and technology has unfolded since the dawn of human history. According to Shishima, the first evidence of tools used by African ancestors is interred in valleys across Sub-Saharan Africa. In recent years, a greater volume of African countries have embraced technology as a driver of development, example of Kenya's Vision 2030 and Rwanda's rapid Information and Computer Technology (ICT) growth (1).

Shillington explains that, modern man first developed in the Great Rift Valley of Africa, the first development of tools is found there as well: The Homo habilis, residing in East Africa, developed the first tool making industry, the Oldowan, around 2.3 million BC. Homo ergaster developed the Acheulean stone tool industry, specifically hand-axes, in Africa, 1.5 million BC. This tool industry spread to the Middle East and Europe around 800,000 to 600,000 BC. Homo erectus began to use fire. Homo sapiens sapiens or modern humans created bone tools and the back blade around 90,000 to 60,000 BC, in Southern and Eastern Africa (4). The use of bone tools and back blades became characteristic of later stone tool industries (Shillington 4). The appearance of abstract art is during this period. The oldest abstract art in the world is a shell necklace dated 82,000 years in the Cave of Pigeons in Tatoralt, eastern Morocco. The second oldest abstract art and the oldest rock art is found in the Blombos Cave at the cape in South Africa, dated 77,000 years. (Ehret 22).

1.1 Science Defined

The word *science* is derived from the Latin word *scire*, meaning “to know.” Science is the systematic study of anything that can be examined, tested, and verified. From its early beginnings, science has developed into one of the greatest and most influential fields of human endeavor. Today different branches of science investigate almost everything that can be observed or detected, and science as a whole shapes the way we understand the universe, our planet, ourselves, and other living things.

Science develops through objective analysis, instead of through personal belief. Knowledge gained in science accumulates as time goes by, building on work performed earlier. Some of this knowledge such as our understanding of numbers stretches back to the time of ancient civilizations, when scientific thought first began. Other scientific knowledge such as our understanding of genes that cause cancer or of quarks (the smallest known building block of matter) dates back less than 50 years. However, in all fields of science, old or new, researchers use the same systematic approach, known as the scientific method, to add to what is known (Encarta 2009).

1.2 Scientific Investigation

During investigations, scientists put together and compare new discoveries and existing knowledge. In most cases, new discoveries extend what is currently accepted, providing further evidence that existing ideas are correct. For example, in 1676 the English physicist Robert Hooke discovered that elastic objects, such as metal springs, stretch in proportion to the force that acts on them. Despite all the advances that have been made in physics since 1676, this simple law still holds true. Scientists utilize existing knowledge in new scientific investigations to predict how things will behave. For example, a scientist who knows the exact dimensions of a lens can predict how the lens will focus a beam of light. In the same way, by knowing the exact makeup and

properties of two chemicals, a researcher can predict what will happen when they combine. Sometimes scientific predictions go much further by describing objects or events that are not yet known. An outstanding instance occurred in 1869, when the Russian chemist Dmitry Mendeleev drew up a periodic table of the elements arranged to illustrate patterns of recurring chemical and physical properties. Mendeleev used this table to predict the existence and describe the properties of several elements unknown in his day, and when the elements were discovered several years later, his predictions proved to be correct (Wikipedia). In science, important advances can also be made when current ideas are shown to be wrong. A classic case of this occurred early in the 20th century, when the German geologist Alfred Wegener suggested that the continents were at one time connected, a theory known as continental drift. At the time, most geologists discounted Wegener's ideas, because the Earth's crust seemed to be fixed. But following the discovery of plate tectonics in the 1960s, in which scientists found that the Earth's crust is actually made of moving plates, continental drift became an important part of geology. Through advances like these, scientific knowledge is constantly added to and refined. As a result, science gives us an ever more detailed insight into the way the world around us works.

2. Branch of Science

Classifying sciences involves arbitrary decisions because the universe is not easily split into separate compartments. Science is divided into five major branches namely: i. Mathematics, ii. Physical sciences, iii. Earth sciences, iv. life sciences, and v. Social sciences. A sixth branch is called technology.

2.1 Technology Defined

Technology is scientific knowledge that is put to practical ends. This knowledge comes chiefly from mathematics and the physical sciences, and it is used in designing machinery, materials, and industrial processes. In general, this work is known as engineering, a word dating back to the early days of the Industrial Revolution, when an 'engine' was any kind of machine (Encarta 2009). Engineering has many branches, calling for a wide variety of different skills. For example, while aeronautical engineers need expertise knowledge in the science of fluid flow because, airplanes fly through air which is a fluid. Using wind tunnels and computer models, aeronautical engineers strive to minimize the air resistance generated by an airplane, while at the same time maintaining a sufficient amount of lift. Marine engineers also need detailed knowledge of how fluids behave, particularly when designing submarines that have to withstand extra stresses when they dive deep below the water's surface. In civil engineering, stress calculations ensure that structures such as dams and office towers will not collapse, particularly if they are in earthquake zones. Computing, engineering takes two forms: hardware design and software design. Hardware design refers to the physical design of computer equipment (hardware). Software design is carried out by programmers who analyze complex operations, reducing them to a series of small steps written in a language recognized by computers. Technology draws on discoveries from all areas of science and puts them to practical use (Kresge 201). Each of these branches itself consists of numerous subdivisions. Many of these subdivisions, such as astrophysics or biotechnology, combine overlapping disciplines, creating yet more areas of research.

Maritime: In 1987 the third oldest canoe in the world and the oldest in Africa, was discovered in Nigeria by fulani herdsman, near the Yobe river, in the village of Dufuna. It was dated 8000 years, cut out of African mahogany. Based on "stylistic sophistication", the tradition of canoe building must have gone further back in time, noted one archaeologist (qtd in Shishima 114).

Architecture and engineering: Various past African societies created sophisticated built environments. There are the engineering feats of the Egyptians: the bafflingly raised obelisks and the more than 80 pyramids. The largest of the pyramids covers 13 acres and is made of 2.25 million blocks of stone (468). Later, in the 12th century and much farther south, there were hundreds of great cities in Zimbabwe and Mozambique. These, massive stone complexes were the hubs of cities. One included a 250-meter-long, 15,000-ton curved granite wall. The cities featured huge castle like compounds with numerous rooms for specific tasks, such as iron-smithing. In the 13th century, the empire of Mali boasted impressive cities, including Timbuktu, with grand palaces, mosques and universities. Egypt's earliest known boat goes back to 5000 years. Early Egyptians knew how to assemble planks of wood into a ship hull as early as 3000 BC. Enemy vessels were to be "gripped" and boarded for hand-to-hand fighting. This negated initially superior Carthaginian seamanship and ships. The Walls of Benin City, are collectively the world's largest man-made structure and were semi-destroyed by the British in 1897. Pearce described the wall this way:

They extend for some 16,000 kilometres in all, in a mosaic of more than 500 interconnected settlement boundaries. They cover 6500 square kilometres and were all dug by the Edo people. In all, they are four times longer than the Great Wall of China, and consumed a hundred times more material than the Great Pyramid of Cheops. They took an estimated 150 million hours of digging to construct, and are perhaps the largest single archaeological phenomenon on the planet (qtd in Shishima 114).

In Southern Africa, one finds ancient and widespread traditions of building in stone. Two broad

categories of these traditions have been noted: 1. Zimbabwean style 2. Transvaal Free State style but in the North of the Zambezi, one finds very little stone ruins.

3. Some Ancient Africa's successes in Science and Technology

Despite suffering through the era of horrific system of slavery, countless contributions to the fields of science and technology was made by early Africans (Kresge 201). This ancestry culture of achievements took place at least 40,000 years ago, not many people are aware of these accomplishments as part of the rich history of Africa beyond ancient Egypt. Unfortunately, the vast majority of discussions on the origins of science include only the Greeks, Romans and other western scientific cultures. While the remarkable black civilization in Egypt remains appealing, there were sophisticated and impressive inventions throughout ancient sub-Saharan Africa as well, which had a handful of scholars. The most prolific of them was the late Ivan Van Sertima, an associate professor at Rutgers University. He once poignantly wrote that "the nerve of the world has been deadened for centuries to the vibrations of African genius" (Van 429). This indicates that Africa, like so many other ancients of the world, definitely had their brains. We shall consider these great achievements of ancient Africans in turn:

Mathematics: It is worthy of note that only a few of people know, that many modern high-school-level concepts in mathematics were first developed in Africa, as it was the first method of counting. More than 35,000 years ago, Egyptians scripted textbooks about mathematics that included division and multiplication of fractions and geometric formulas to calculate the area and volume of shapes (Woods 198). Distances and angles were calculated also, algebraic equations were solved and mathematically based predictions were made of the size of floods of the river Nile. The ancient Egyptians considered a circle to have 360 degrees. Eight thousand years ago, the people in present-day Zaire developed their own numerical system, as did Yoruba people in the country now called Nigeria. The Yoruba system was based on units of 20 instead of 10 and required an impressive amount of subtraction to identify different numbers. Scholars have lauded this system, as it required much abstract reasoning (199).

Astronomy: In the field of Astronomy, several ancient African cultures made meaningful discoveries. Many of these are foundations on which we still rely, and some were so advanced that their mode of discovery still cannot be understood. Egyptians charted the movement of the sun and constellations and cycles of the moon. They divided the year into 12 parts and developed a yearlong calendar system containing $365 \frac{1}{4}$ days. Clocks were made with moving water and sundial-like clocks were used. A structure known as the African Stonehenge in present-day Kenya (constructed around 300 B.C.) was a remarkably accurate calendar. The Dogon people of Mali amassed a wealth of detailed astronomical observations (Adams 83). Many of their discoveries were so advanced that some modern scholars credit their discoveries instead to space aliens or unknown European travelers, even though the Dogon culture is steeped in ceremonial tradition centered on several space events. The Dogon knew of Saturn's rings, Jupiter's moons, the spiral structure of the milky-way galaxy, and the orbit of the Sirius star system. They knew that this system contained a primary star and a secondary star now called Sirius B which is of immense density and not visible to the naked eye.

Navigation: The general believe by most people is that Europeans were the first to sail boats to the Americas. However, several lines of historical evidence suggest that ancient Africans sailed to South America and Asia hundreds of years before Europeans. Thousands of miles of waterways across Africa were trade routes and many ancient societies in Africa built a variety of boats, including small reed-based vessels, sailboats and grand structures with many cabins and cooking facilities. The Malians and Songhai built boats 100 feet long and 13 feet wide that could carry up to 80 tons. It is also discovered that currents in the Atlantic Ocean flow from this part of West Africa to South America (84). Genetic evidence from plants have shown that descriptions and art from societies inhabiting South America at the time suggest small numbers of West Africans who sailed to the eastern coast of South America remained there. Contemporary scientists have reconstructed these ancient vessels and their fishing gear completing the transatlantic voyage successfully. Around the same time as they were sailing to South America in the 13th century, these ancient peoples also sailed to China and back, carrying elephants as cargo. It is believed that the people of African descent came from ancient, rich and elaborate cultures that created a wealth of technologies in many areas. Hopefully, over time, there will be more studies in this area and people will know more about these great achievements.

Learning systems: Learning systems too began in Africa long before the coming of the European explores. In about 295 BC, the Library of Alexandria was founded in Egypt. It was considered the largest library in the classical world. Al-Azhar University, founded in 970-972 was the chief centre of Arabic literature and Sunni Islamic learning in the world. The oldest degree awarding university in Egypt after the Cairo University was established in about 961 when non-religious subjects were added to its curriculum (22). Three philosophical schools in Mali existed during her golden age around 12th–16th centuries. They are: University of Sankore, Sidi Yahya University, and Djinguereber University. At the end of Mansa Musa's reign, the Sankoré University became a fullflaged and a fully staffed University with the largest collections of books on African science. The Sankoré University was capable of housing 25,000 students and had one of the largest libraries in the world with

roughly 1000,000 manuscripts. Timbuktu was a major center of book copying, religious groups, sciences, and arts. Scholars and students came throughout the world to study in this university. It attracted more foreign students than New York University (23).

In 859 AD, Belmonte stated that, the Madrasa of al-Karaouine in Fes, Morocco, was founded by the princess Fatima al-Fihri. One of the major achievements found in Africa was the advance knowledge of fractal geometry and mathematics. The knowledge of fractal geometry can be found in a wide aspect of African life from art, social design structures, architecture, to games, trade, and divination systems (Adams 32). With the discovery of fractal mathematics in widespread use in Africa, Eglash had this to say:

We used to think of mathematics as a kind of ladder that you climb, and we would think of counting systems – one plus one equals two as the first step and simple shapes as the second step. Recent mathematical developments like fractal geometry represented the top of the ladder in most Western thinking. But it's much more useful to think about the development of mathematics as a kind of branching structure and that what blossomed very late on European branches might have bloomed much earlier on the limbs of others. When Europeans first came to Africa, they considered the architecture very disorganized and thus primitive. It never occurred to them that the Africans might have been using a form of mathematics that they hadn't even discovered (19).

The theory of binary numeral system was also widely known throughout Africa before much of the world. It has been said that this theory could have influenced western geomancy which led to the development of the digital computer (19).

Metallurgy and tools: Many advances in metallurgy and tool making were made across the entirety of ancient Africa. These include steam engines, metal chisels and saws, copper and iron tools and weapons, nails, glue, carbon steel and bronze weapons and art. Advances in Tanzania, Rwanda and Uganda between 1,500 and 2,000 years ago surpassed those of Europeans then and were astonishing to Europeans when they learnt of them. Ancient Tanzanian furnaces could reach 1,800°C -200 to 400°C warmer than those of the Romans. Most of Sub-Saharan Africa moved from the Stone Age to the Iron Age. The Iron Age and Bronze Age occurred simultaneously. North Africa and the Nile Valley imported its iron technology from the Near East and followed Near Eastern course of Bronze and Iron ages. The Ife bronze casting of a king's head currently in the British Museum (Stanley 71). In the Air Mountains region of Niger, copper smelting was independently developed between 3000 and 2500 BC. The undeveloped nature of the process indicates that it was not of foreign origin. Smelting in the region became mature around 1500 BC (137). Around this period, Africa was a major supplier of gold in world trade. While the Sahelian empires became powerful by controlling the Trans-Saharan trade routes, they provided two third (2/3) of the gold in Europe and North Africa. The Almoravid dinar and the Fatimid dinar were printed on gold from the Sahelian empires. The ducat of Genoa and Venice and the florine of Florence were also printed on gold from the Sahelian empires. When gold sources were depleted in the Sahel, the empires turned to trade with the Ashante Kingdom. Similarly, The Swahili traders in East Africa were major suppliers of gold to Asia through the Red Sea and Indian Ocean trade routes. The trading port cities and city-states of the Swahili East African coast were among the first African cities to come into contact with European explorers and sailors during the European age of Discovery. Many were documented and praised in the records of North African explorer Abu Muhammad ibn Battuta (Davidson 146). Besides being masters in iron, Africans were masters in brass and bronze. Ife produced lifelike statues in brass, an artistic tradition beginning in the 13th century. Benin also was a manufacturer of glass and glass beads, two types of iron furnaces were used in Sub-Saharan Africa: the trench dug below ground and circular clay structures built above the ground. Iron ores were crushed and placed in furnaces layered with the right proportion of hardwood. A flux such as lime sometimes from seashells was added to aid in smelting. Bellows on the side would be used to add oxygen. Clay pipes on the sides called tuyères would be used to control oxygen flow (147).

Medicine: Many treatments we use today were employed by several ancient peoples throughout Africa. Before the European invasion of Africa, medicine in what is now Egypt, Nigeria South Africa and Ghana, were more advanced than medicine in Europe. Some of these practices were the use of plants with salicylic acid for pain (as in aspirin), kaolin for diarrhoea (as in Kaopectate), and extracts that were confirmed in the 20th century to kill Gram positive bacteria. Other plants used had anticancer properties, caused abortion and treated malaria and these have been shown to be as effective as many modern-day Western treatments. Furthermore, Africans discovered ouabain, capsicum, physostigmine and reserpine. Medical procedures performed in ancient Africa before they were performed in Europe include vaccination, autopsy, limb traction and broken bone setting, bullet removal, brain surgery, skin grafting, filling of dental cavities, installation of false teeth, what is now known as Caesarean section, anesthesia and tissue cauterization (Filer 37). In addition, African cultures performed surgeries under antiseptic conditions universally when this concept was only emerging in Europe. Ancient Egyptian physicians were renowned in the ancient Near East for their healing skills, and some, like Imhotep, remained famous long after their deaths (38). Herodotus remarked that there was a high degree of specialization among Egyptian physicians, with some treating only the head or the stomach, while others were eye-doctors and

dentists. Training of physicians took place at the Per Ankh or "House of Life" institution, most notably those headquartered in Per-Bastet during the New Kingdom and at Abydos and Sais in the late period. Medical papyri show empirical knowledge of anatomy, injuries, and practical treatments. Wounds were treated by bandaging with raw meat, white linen, sutures, nets, pads and swabs soaked with honey to prevent infection, while opium was used to relieve pain. Garlic and onions were used regularly to promote good health and were thought to relieve asthma symptoms. Ancient Egyptian surgeons stitched wounds, set broken bones, and amputated diseased limbs, but they recognized that some injuries were so serious that they could only make the patient comfortable until he died. Around 800, the first psychiatric hospital and insane asylum in Egypt was built by Muslim physicians in Cairo. In 1285, the largest hospital of the Middle Age and pre-modern era was built in Cairo, Egypt, by Sultan Qalaun al-Mansur. Treatment was given for free to patients of all backgrounds, regardless of gender, ethnicity or income. Tetracycline was being used by Nubians, based on bone remains between 350 AD and 550 AD (38). The antibiotic was in wide commercial use only in the mid 20th century. The theory is earthen jars containing grain used for making beer contained the bacterium streptomycetes, which produced tetracycline. Although Nubians were not aware of tetracycline, they could have noticed people fared better by drinking beer. They must have consumed it because it was rather tastier than the grain from which it was derived. They would have noticed people fared better by consuming this product than they were just consuming the grain itself. In 1937, a South African, Max Theiler, developed a vaccine against Yellow Fever (39). The first instances of domestication of plants for agricultural purposes in Africa occurred in the Sahel region c. 5000 BC, when sorghum and African rice (*Oryza glaberrima*) began to be cultivated. Around this time, and in the same region, the small Guinea fowl was domesticated. Other African domesticated plants were oil palm, raffia palm, black-eyed peas, groundnuts, and kola nuts. African method of cultivating rice was used in North Carolina introduced by enslaved Africans. African rice cultivation was a factor in the prosperity of the North Carolina colony. Yam was domesticated 8000 years BC in West Africa. Between 7000 and 5000 BC, pearl millet, gourds, watermelons, and beans, and farming and herding practices were spread westward across the southern Sahara. West Africans were probably the first people to start using the method of fish lines and hook in fishing. The hooks were made of bone, hard wood, or shell between 16,000 and 9000 BC. Between 6500 and 3500 BC, Knowledge of domesticated sorghum, castor beans, and two species of gourd spread from Africa to Asia, later pearl millet, black-eyed peas, water melon and okra to the rest of the world. Pottery was first made in the Sahel around 9000 to 8000 BC, making it one of the earliest region of independent pottery development (41).

Textile: According to Breunig, Egyptians wore linen from the flax plant, which were beaten and combed. The priest and pharaohs wore leopard skin. The ancient Egyptians used looms as early as 4000 BC. Nubians mainly wore cotton, beaded leather, and linen. Nubia was also a center of cotton manufacturing. Cotton was domesticated 5000 BC in eastern Sudan near the Middle Nile Basin region, and cotton cloth was being produced. The textile of choice in the sahel is cotton. It is widely used in making the boubou (male) and kaftan (female), a style of West African clothing. By the 12th century, the so-called Moroccan leather, which actually came from the Hausa area of northern Nigeria, was supplied to Mediterranean markets and found their way to the fairs and markets of such places as Normandy and Britain (461).

Communication systems: Writing systems of Africa, the use of town criers, iron cymbals, hollow wood and gunshots etc was wide spread among the Tiv and most African cultures.

Warfare: African military systems dates back to 1800–1900, the ancient Egyptian weaponry include bows and arrows, maces, clubs, swords, scimitars, battle axe, spears, shields, and scabbard. Body armor was made of bands of leathers and sometimes laid with scales and sleeves. Horse drawn chariots were used to deliver archers into the battle field. Weapons would be made initially with stone, wood, and copper, later bronze and iron were used (199).

Nile Valley: Ancient Egypt imported ivory, gold, incense, hardwood, and ostrich feathers, while Nubia exported gold, cotton/cotton cloth, ostrich feathers, leopard skins, ivory, ebony, and iron/iron weapons. Aksum exported ivory, glass crystal, brass, copper, myrrh, and frankincense, but imported silver, gold, olive oil, and wine. The Aksumites produced coins around c. 270 BC, under the rule of king Endubis, Aksumites' coins were issued in gold, silver, and bronze (101).

Trade and Commerce: The Ghana Empire, Mali Empire, and Songhay Empire were major exporters of gold, iron, tin, slaves, spears, javelin, arrows, bows and whips of hippo hide. They imported salt, horses, wheat, raisins, cowries, copper, henna (colorants), olives, tanned hides, silk, cloth, brocade, Venetian pearls, mirrors, and tobacco. Some of the currencies used in the Sahel are as follows: 1. Paper debt or IOU's were used for long distance trade. 2. Gold coins were also in use. 3. The mitkal (gold dust) currency was also in use. The equivalent of gold dust that weighed 4.6 grams equals 500 or 3,000 cowries. 4. Square cloth, four spans on each side, called chigguiya was used around the Senegal River. In Kanem Borno, a cloth currency called dandi was in widespread use as the major currency (Willie 323).

Carthage imported gold, copper, ivory, and slaves from tropical Africa. Carthage exported salt, cloth,

metal goods. Before camels were used in the trans-saharan trade pack; animals, oxen, donkeys, mules, and horses were utilized. Extensive use of camels began in the 1st century AD. Carthage minted gold, silver, bronze, and electrum (mix gold and silver) coins mainly for fighting wars with Greeks and Romans. Most of their fighting forces were mercenaries, who had to be paid. Islamic North Africa made use of the Almoravid dinar and Fatimid dinar, gold coins. The Almoravid dinar and the Fatimid dinar were printed on gold from the Sahelian empires. The ducat of Genoa and Venice and the florine of Florence were also printed on gold from the Sahelian empires. The Swahilis served as middlemen, they connected African goods to Asian markets and Asian goods to African markets. Their most in demand export was ivory, ambergris, gold, leopard skins, slave, and tortoise shell and imported from Asia oriental pottery and glassware. They also manufactured items such as cotton, glass and shell beads. Imports and locally manufactured goods were used as trade to acquire African goods (324). Trade links included the Arabian Peninsula, Persia, India, and China. The Swahili also minted silver and copper coins. Numerous metal objects and other items were used as currency in Africa. They are as follows: cowrie shells, salt, gold (dust or solid), copper, ingots, iron chains, tips of iron spears, iron knives, cloth in various shapes (square, rolled) etc. Copper was as valuable as gold in Africa, but Copper was not as widespread and more difficult to acquire, except in Central Africa, than gold. Other valuable metals included lead and tin. Salt was also as valuable as gold, and because of its scarcity, it was used as currency.

Cowry Money: Cowries have been used as currency in West Africa since the 11th century when their use was first recorded near old Ghana. Its use may have been much older. Present day Morocco seems to be a major source of cowries in the trans-Saharan trade. In western Africa, shell money was usual tender up until the middle of the 19th century. Before the abolition of the slave trade there were large shipments of cowry shells to some of the English ports for reshipment to the coast. It was also common in West Central Africa as the currency of the Kingdom of Kongo called locally nzimbu. As the value of the cowry was much greater in West Africa than in the regions from which the supply was obtained, the trade was extremely lucrative (Van 423). In some cases the gains are said to have been 500%. The use of the cowry currency gradually spread inland in Africa. By about 1850 Heinrich Barth found it fairly widespread in Kano, Kuka, Gando, and even Timbuktu. Barth relates that in Muniyoma, one of the ancient divisions of Bornu, the king's revenue was estimated at 30,000,000 shells, with every adult male being required to pay annually 1000 shells for himself, 1000 for every pack-ox, and 2000 for every slave in his possession. In the countries on the coast, the shells were fastened together in strings of 40 or 100 each, so that fifty or twenty strings represented a dollar; but in the interior they were laboriously counted one by one, or, if the trader were expert, five by five. The districts mentioned above received their supply of kurdi, as they were called, from the west coast; but the regions to the north of Unyamwezi, where they were in use under the name of simbi, were dependent on Muslem traders from Zanzibar. The shells were used in the remote parts of Africa until the early 20th century, but gave way to modern currencies. The shell of the land snail, *Achatina monentaria*, cut into circles with an open center was also used as coin in Benguela, Portuguese West Africa (424).

Miscellaneous: On the Nile Valley, around 650 Calid, an Umayyad prince, translated the literature of Egyptian alchemy into the Arabic language. The earliest historical record of a reservoir pen dates back to 953, when Ma'ad al-Mu'izz, the caliph of Egypt, demanded a pen which would not stain his hands or clothes, and was provided with a pen which held ink in a reservoir and delivered it to the nib, as recorded by Qadi al-Nu'man al-Tamimi in 974 AD in his *Kitab al-Majalis wa'l-musayardt* (quoted in Van 425).

The Prospect of African Religion: According to Magesa, in spite of the declining numbers of the followers of African religion mentioned, there seem to be reasons to conclude that it will continue to be a living religion in many years to come (qtd in Shishima 122). Some of these reasons are the following: African religion continues to be the source of meaning, direction and security of the lives of many Africans, including followers of other well established religious traditions. In these last few years, there has been a revival in the practice of African religion in different parts of Africa. Today, as the spirit of religious intolerance and exclusivism is being replaced slowly by the spirit of interreligious tolerance, dialogue and mutual respect, African religion is also slowly finding its place in the orchestra of the world religions. Its true spiritual and moral values e.g., profound sense of the sacred, of the existence of God the Creator and of the spiritual world; importance of family life, its healing potentials love and respect of life, sense of solidarity and community life etc, have been recognized as part of the religious and moral patrimony for humankind. This tolerant and respectful atmosphere has given confidence and self-esteem to the followers of African religion. Many are no longer ashamed of their religious heritage, as they had been in the past. They are proud of being its heirs and consider it their duty and right to pass it on to the next generations.

4. Conclusion

Religion is an important feature which holds the society strongly by its tail. The African man feels that without religion, there can never be peace in the society and it is also responsible for man's self consciousness. Religion has played significant roles in the life of an African man both socially, politically, psychologically, emotionally

and otherwise. Wherever the African goes, his religion goes with him. He eats and drinks it symbolically as if it were real food. African religion is an original picture of monotheism. Although there are pantheons of deities in different localities, they all depend and serve the only God the father almighty. The religion was handed down to us by the Africans dearly beloved fore-fathers who were not literate enough to record all their traditional practices. It is fully integrated with dimensions of personal and collective lives as with all institutions of private and public life. This religion can enrich a person's attitudes and practices. It is open and tolerant, accommodating and has a positive sense of the world. In African Traditional society, religion and culture are the hubs around which human personality, movements and institutions are organized and pursued. The traditions of the people are rooted in religion and culture and the corporate life of the people is determined by religion. Social and political relations, unity and solidarity are regulated by divinities or spirits on grounds of appeasement, expiation, propitiation, adoration, prayers and sacrifice. Religion dominates the people's worldview in cultural, social, economic and political spheres.

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