

**Science and Technology in the Atlantic Triangle: Retention,  
Exchange, and Innovation**

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Introduction to African-  
Surinamese History 1

## Introduction

The virtual threads of a gigantic spider web spans the Atlantic Ocean with anchor points in abandoned forts on the West African coast, along the shores of the Caribbean Islands and American continent and in historic ports in major cities in Western Europe. Human trafficking has displaced tens of millions of Africans from their homeland, labor migration brought African and Caribbean migrants, working hard to improve their financial situation and the quality of their lives, to colonial capitals, repatriation and relocation tempted numerous Africans from the diaspora to return to the continent.

While artistic and cultural expressions like music, storytelling, rituals, spirituality, and language often dominate discussions of cultural retention and knowledge exchange, this paper delves into the lesser-explored realm of science and technology to examine if and how this knowledge has been utilized and adapted in new environments. The history of science and technology in Africa is very rich, reflecting a tapestry of indigenous innovation and external influences.

The African continent, often overshadowed in global narratives of scientific progress, has a storied past of technological advancements that predate many Western civilizations. Also, the Caribbean region has been a place of knowledge production often founded in resistance and the struggle for social justice. Furthermore, capitals in Western Europe became a breeding ground where intellectuals from the continent and former colonies produced and exchanged new concepts from a decolonial point of view.

With the understanding that the folk hero from the Akan region, as introduced in Anansesem reemerged in Anansitori in Surinam and kuentanan di Nanzi in Curacao and even stepped on theater stages in London and Amsterdam as Anansi the spider and Anansi de spin, it would be no surprise that science and technology which originated in African communities travelled the same route. Although some information might have been lost in translation between the Akan language group, creole languages, like Sranantongo and Papiamentu, and the Western Germanic language group (especially Dutch and English) enough knowledge moved back and forth along the spider web to build an exceptional and valuable body of knowledge in the global landscape of science and technology.

## The History of Science and Technology

Africa boasts a long and impressive history of scientific and technological innovation. Often overshadowed by Western narratives, the continent's contributions span millennia, from the earliest tools to complex social systems. The continent holds the record for the world's oldest known stone tools, found in Eastern Africa.

In their article “Interconnecting History, African Indigenous Knowledge Systems and Science” the authors Gloria Emeagwali and Edward Shizha write:

*“We also know that as early as one hundred thousand years ago, there were the beginnings of written symbolic language in the form of triangles and horizontal lines, also in ancient South Africa, based on the geometrical engravings that have been found. The discoveries of Blombos in the South African Cape, point to the earliest evolution of abstract design, creativity and symbolism in the world and marks some of the earliest documentation of African Indigenous Knowledge to date. What is clear from these discoveries is that the knowledge evolving within the continent from this early period was aimed at problem solving and involved specific trial and error experimentation and goals.”*

Moreover, the Lebombo bone is a bone tool made of a baboon fibula with incised markings discovered in Border Cave in the Lebombo Mountains located between South Africa and Eswatini, dated 43000 years old. According to The Universal Book of Mathematics the Lebombo bone's 29 notches suggest:

*"it may have been used as a lunar phase counter, in which case African women may have been the first mathematicians, because keeping track of menstrual cycles requires a lunar calendar."*

Furthermore, Claudia Zaslavsky describes in Africa Counts significant early breakthroughs in Mathematics on the African continent including an account of ancient Egyptian mathematics as well as a look at several centuries-old African societies.

Although other people have tried to deny it, as George M. Bob-Milliar clearly writes in his article “Africa’s Contributions to World Civilization”:

*“There seemed to be a general acknowledgement among some European scholars that Africa has not contributed anything or much if anything, to world civilization. This notion of Africa not contributing to world civilization is further heightened by the so-called Hamitic hypothesis, which attributes any form of cultural advancement and attainment to white people’s ingenuity.”*

But across Africa, civilizations flourished with remarkable feats of science and engineering. The pyramids of Egypt, some have withstood the test of time, stand as testaments to their mathematical and architectural prowess. The sophisticated irrigation systems of Kush, and the complex and thriving cities of Great Zimbabwe, demonstrate advanced planning and knowledge of materials. Furthermore, African societies made significant early contributions in astronomy. From the ancient Egyptians to later communities in West Africa. The Dogon people of Mali possessed knowledge of Sirius B, a star invisible to the naked eye. Astronomy involves a study of the universe, including the earth’s position and its movement in relation to other bodies in space.

Medical practices thrived as well, with ancient Egyptians known for their surgical techniques and use of medicinal plants. This practice of science and technology further developed and survived all over the African continent. A comment made in the article “African Traditional Healing and Biomedicine, A Reconstruction of Colonial and Post independence Health-Care History under Kwame Nkrumah, 1951–66” written by Samuel Adu-Gyamfi and Eugenia Anderson indicates different stages of medical knowledge production and knowledge transfer:

*“Medical care in Africa has evolved through the different epochs of history, from Egyptian medicine, which influenced Greek and Roman healing, including medical practices which spread to Africa through Islamic influence. There was also the introduction of Persian and Arabic medicine, then the Christian faith healing, which emphasized conversion into the Christian faith and promoted*

*Western-oriented biomedicine through the building of hospitals in Africa. These different epochs have shaped the continent's traditional medical history.”*

Advanced knowledge of science and technology practices have been (and still are) present in many aspects of (early) African societies, including mathematics, astronomy, physics, architecture, philosophy, agriculture, and medicine. The age-old use of fractal geometry (i.e. one of the most exciting frontiers in the fusion between mathematics and information technology) is visible all over the Africa continent in art, architecture and numerous design systems as described by Ron Eglash in “African Fractals, modern computing and indigenous design”. It draws a continuous line into the modern scientific body of knowledge.

Science and technological developments result in an expansion of the body of knowledge of a community. An attempt was made to destroy this body of knowledge within the millions and millions of captives who were forcefully transported from the African continent during the 16<sup>th</sup>, 17<sup>th</sup>, 18<sup>th</sup>, and 19<sup>th</sup> century. Exclusion, exploitation, and extermination were the methods used. The victims would bring their knowledge with them across the Atlantic, although their communities were destroyed, and they were treated like cattle. These captives and their offspring managed to keep part of the scientific knowledge alive and further develop new ways of thinking in specific academic fields.

## Cultural Retention and Knowledge Exchange

Artistic and cultural expressions like music, storytelling, rituals, spirituality, and language often dominate discussions of retention and knowledge exchange when African-Caribbean population reflects on their African heritage. Many authors have expanded on these relations: Leendert van der Valk travelled back in his book “Voudou” from New Orleans to Haiti and Suriname to finish his trip in Togo and Benin chasing the rhythms from voodoo ceremonies. Without doubt typical stories of the legendary spider Anansi are told and retold in Suriname, Jamaica, Ghana and Sierra Leone. African heritage has been observed in Suriname Winti, Brazilian Candomblé, Cuban Santería, Trini Obeah and Haitian Voodoo. Caribbean creole languages like Sranantongo and Papiamentu demonstrates the African heritage not only with specific words or phrases, but also with pronunciation and grammar.

The apparent focus on artistic and cultural expressions would give the impressions that a large body of science and technology was lost during the centuries of human trafficking and forced labor. The creativity of the captives and their offspring prevented that it happened. Maureen Warner-Lewis mentions in her article “Cultural Reconfigurations in the African Caribbean”:

*“Thus, within the ethnic communities which the enslaved established across plantation boundaries, and within their later ethnic and multi-ethnic homesteads founded in freedom, they passed on to their children and wards varieties of African knowledge: in cooking styles and food combinations, herbal skills, games, concepts of musical and vocal instrumentation and form, and cosmological frameworks. Such knowledge was not necessarily disseminated in formal, conscious modes, though sometimes it was, as in the case of santería and Abakuá notebooks in Cuba, all the same intergenerational reticence typified explication regarding aspects of religious ritual. This was in line with traditional resistance to the transfer of particular areas of mystical information, while awareness that certain forms of religious conduct transgressed European law invited the evasive strategy of secrecy. But mimesis and memory, served as bases for the continuation of certain beliefs, strategies, and lifestyles.*”

When the game Adji-Boto is played in Suriname a similar mathematical thinking is being used as has been developed in African societies, which include recursion and self-similarity. Both Zaslavsky and Eglash mention the mathematical complexity of warri games, like Awale and Oware, in their works.

Note that A large body of knowledge has been retained in the Suriname odo which are not only form of art but more a collection of wisdom grounded in experimental science. The odo in sranantongo: “te yu mati barba e bron, yu musu nati di fu yu” carries the Akan wisdom: “Wohu se wo yonko abodwese rehye a na wasa nsuo asi wo dee ho” in it.

Maureen Warner-Lewis does mention that knowledge was not necessarily disseminated in formal conscious modes which might give the impression that hardly any knowledge was retained or was used as a stepping stone for further knowledge production.

## Knowledge Production in the African Diaspora

Although the knowledge wasn't always disseminated in formal conscious modes people retained it and even expanded upon existing African knowledge. A prime example can be seen by looking at the expansive body of knowledge that has been collected in the book "Medicinale en rituele planten van Suriname" by T.R. van Andel. The authors of the book have interviewed a significant number of descendants of enslaved, capturing their knowledge of medicinal plants and herbs that are found in the tropical rainforest of Suriname. Including the knowledge of how these plants need to be processed and used to cure various illnesses without using modern western medicines.

The resilience of the newly built communities to hold on to certain technologies and body of knowledge inspired them also to invent and experiment with new forms of strategy and tactics in warfare, using among others guerilla techniques. The formerly enslaved people in Jamaica and Suriname managed to hold off the English until peace treaties were signed. Eduardo Grüner's book "The Haitian Revolution, Capitalism, Slavery, and Counter-Modernity" shows that the Haitian Revolution opened a path to a different kind of modernity, with a constitution which challenged 18<sup>th</sup> century enlightenment in its core.

Whenever there was room to maneuver the formerly enslaved added to the academic fields and increased to the body of knowledge in science, medicine, and/or social studies. A noteworthy mention goes out to the Haitian philosopher and diplomat Anténor Firmin, when showed his excellent academic skills in his response "On the Equality of Human Races" to the flawed arguments and incorrect writings of Arthur de Gobineau.

The knowledge production in the fields of Pan-Africanism and Restorative Justice (including the fight for Reparation for the crimes of Slavery and Colonialism) wouldn't be on the level without a lot of people from the African Diaspora, including Ottobah Cugoano, Olaudah Equiano, Edward Blyden, WEB Dubois, Hilary Beckles and many more as explained by Hakim Adi in "Pan-Africanism, A history". Also, the decolonial theory needed intellectual giants like Aimé Césaire, Frantz Fanon and Walter Rodney to move forward.

## Twenty-First Century and Beyond

Today, initiatives like the African Union's Agenda 2063 highlight the importance of science, technology, and innovation for sustainable development.

The arrival of European colonizers undeniably impacted scientific and technological development in Africa. While some advancements were introduced, colonial structures often stifled indigenous innovation and focused on resource extraction rather than fostering local scientific progress. However, the spirit of innovation never died within Africans on the continent and in the diaspora. Since independence movements across the continent, African nations have been reclaiming their scientific heritage and embracing modern technology.

Global challenges like climate change, pandemics and the energy transformation require global solutions. The world will need resource rich African countries to play a role in these solutions. In 2024, progress in science and technology has brought humanity to the point of the possibility of nuclear warfare, space exploration and space rubble, fear for robotics and artificial intelligence. Humanity seems to have overstepped its capabilities, and perhaps definitely needs to pick up a copy of Gloria, Emeagwali and Edward Shizha; “African indigenous knowledge and the sciences: Journeys into the past and present”.

## Conclusion

The history of science and technology in Africa is a testament to the continent's capacity for innovation and its contributions to global knowledge. From ancient civilizations to modern technological advancements, African societies have demonstrated remarkable ingenuity and resilience. The exchange of scientific and technological knowledge between Africa and other regions has been a continuous and dynamic process.

The Eurocentric school of thought completely neglected the origin and development of science and technology in Africa painting the ancient Greeks as the founders of the scientific modern world. With a rigid definition of what constitutes valid scientific knowledge the Eurocentric school of thought classified the African body of knowledge as unscientific and not worth pursuing on an academic level. However, this practice couldn't erase the retention and ongoing exchange of valuable knowledge systems and new knowledge production, especially while knowledge has been implicitly stored in cultural and artistic expressions.

In celebrating the rich heritage and ongoing contributions of African science and technology, it is essential to recognize and address the legacies of colonialism and the structural barriers (i.e. exploitation and exclusion) that have hindered progress. As a result, the global economic order has restrained for centuries to invest in science and technology research and development on the African continent.

Understanding the historical context and contemporary developments in African science and technology is crucial for appreciating the continent's role in the global scientific community. As Africa continues to face challenges and opportunities in the 21st century, fostering a culture of innovation and supporting scientific research and education will be key to achieving sustainable development and improving the well-being of its people.

By building on indigenous knowledge systems, embracing modern technologies, and promoting international collaboration, Africa can continue to be a vibrant and influential player in the global landscape of science and technology.

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