SCIENCE AND MATHEMATICS IN THE ARABIC MANUSCRIPTS OF NIGERIAN REPOSITORIES.pdf

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The Arabic manuscripts heritage is considered a treasure of source materials on the cultural life of Nigeria, and a window that opens the country. From the long contact between the central Sudan and the wider Muslim world, aspects of education, literature, ideas and religion gradually penetrated into the region through North Africa across the Sahara. This way, the various aspects of literary tradition were first institutionalized in West Africa through Timbuktu following Al-Azhar tradition from Egypt. This same intellectual tradition spread to Kanem Borno and Hausaland as far back as the sixteenth and seventeenth centuries where Islamic literary works emerged famous and popular among the people of the region. This paper seeks to look into the rich collections of the Arabic manuscripts related to these golden centuries as they were preserved at the Arewa House Centre for Historical Research and Documentation, Ahmadu Bello University, Kaduna Nigeria. It focuses on a study of those manuscripts related to scientific and mathematical knowledge, such as medicine, astrology, geomancy, talismanic, astrology, etc. The paper specifically presents the manuscript as some of the contribution of these non-Arab scholars and writers on the subject of Magic Square in the area of Mathematics and traditional medicine.
In recent years, the issue of recovering and preserving manuscripts in Nigeria has assumed more relevance especially in the programme of Universities and other Centers of intellectual activity. The Arewa House Centre for Historical Documentation and Research, Ahmadu Bello University, Kaduna Nigeria, established in 1970, has been engaged in such activities, particularly as it concerns the Northern Nigerian intellectual heritage, part of the results of the works, Arabic Ajami Manuscripts covering many subjects are now preserved in the centre as sources materials for understanding the reach heritage of the people of the area. This paper is a contribution to this endeavor to further explores some of the manuscripts which relate to knowledge of Science and Mathematics, among non-Arab scholars of the areas. The focus is on the manuscripts related to Magic Square as the rallying point for all other scientific manuscripts recovered and preserved in the Arewa House Kaduna for brief description. The magic square is a numerical grid formation that has a magical meaning. The magic square consists of a grid that forms at minimum three columns and three rows for a total of nine cell squares. The values in the cell squares, if added vertically, horizontally, or diagonally, must match for it to be a truthful Magical Square.

**Brief History of Magic Squares**

A very brief history of Magic Square begins by showing that the magic square has a rich history, which most likely journeyed from China to India, then to the Arab countries after which it moved to Europe. Magic square is almost as old as human civilization. According to some researchers, the history of Magic Square started with a Chinese legend. In this legend, a giant tortoise surfaced from the River Lo in central China around 4000 years. (AA Abiye & Co.2002)
The earliest appearance dates back to China around 2200 B.C. A Chinese legend claimed that while the Chinese Emperor Yu was walking along the Yellow River, he became aware of a tortoise with a unique diagram on its shell. The Emperor decided to call the unusual numerical pattern Lo shu. Magic Square in China have been used in various areas of study, including astrology, divination, philosophy, natural phenomena, and human behaviour. (Eugenia V E, 2004)

In India, the 3×3 magic square has been a part of rituals since c.1500-c. 500, and still is today. Magic Square were used in the conventional mathematical context, alchemical and medicinal recipes as well as a magical means. In the Arabic speaking Islamic nations, the mathematical properties of Magic Square were already developed by the 9th and 10th century A.D. The magic square known in Arabic as waqf appeared in Islamic literature at around 9th century A.D. It was attributed to the writings of Jabir ibn Hayyan in the Jabirean corpus, and used as a charm to ease childbirth. Thabit Ibn Qurra was a famous Harranian Sabian Arab mathematician, astronomer, physician, and philosopher. He translated many Greek texts in Baghdad, under the Abbasid caliphate and soon wrote original works on the Magic Square in the latter half of the 9th Century A.D.

The science of Magic Square reached its pinnacle in the 11th and 12th centuries. From the 13th century, magical and divinatory applications began to replace the mathematical study of the magic square.

Magic Square was introduced into Europe in 1300AD by Manuel Moschopoulos, Greek Byzantine scholar. He wrote a mathematical treatise on the subject of magic squares, building on the work of Al-Buni who preceded him. In contrast, his work
was purely mathematical of the Arabic scripts of the numerous practices employed in the medieval Islamic world to foretell future events or discern hidden things which astrology was by far the most popular. Its primary use was in the preparation of horoscopes. These were intended to indicate the influences of the stars and the planets on a person either at birth or at other times in his or her life, though horoscopes were also commonly used to determine the wisdom of undertaking a particular course of action.

The next most popular form of divination was known in Arabic as 'ilm al-raml ('the science of the sand'), which came to be known as 'geomancy' in medieval Europe. Unlike astrology, geomancy did not require astronomical observations and calculations. Instead, divination was accomplished by forming and then interpreting a design, called ‘geomantic, Magic Square played an important role in talismanic designs.

The first appearance of such squares called a (wafq) in Arabic literature also occurred in the alchemical writings attributed to Jabir ibn Hayyan. This early magic square was recommended as a charm for easing childbirth, and it is thought to have been of Chinese origin. It was a 3 x 3 magic square, consisting of nine cells with the numbers 1 to 9 arranged with 5 in the center so that the contents of each row, column, and the two diagonals added up to 15. This particular magic square had its own Arabic name: buduh, after the four letters occupying the four corners of the square (b-d-wa-h). In subsequent years Islamic writers developed a variety of methods for forming Magic Square of higher order, with 4 x 4, 6 x 6 and 7x7. Squares being particularly popular.
Pic 1-4 showed the examples of Magic Square

The case of West Africa and Northern Nigeria

In West Africa there was also substantial interest in Magic Squares, which were interwoven throughout West African culture. The squares held particular religious importance and were adorned on clothing, masks, and religious artifacts. In the
early 18th Century, Muhammad ibn Muhammad al Katsinawi (d. 1741), a well-known astronomer, mathematician, mystic, and astrologer in Muslim West Africa, took interest in magic squares. In one of his manuscripts, he gave examples of, and explained how to construct, odd order Magic Square (Kani 1998).

Documentary evidence showed that, it was in the 17th Century that Hausaland, particularly, Katsina began to produce their own class of intelligentsia who could match the standard of the luminaries in central and western Bilad al sudan. Manuscripts were discovered in the collection of Alhajj Umar Falke (d 1962) a Tijjani scholar from Kano in the North Western University Illinois Chicago USA. (Kani 1998).

There were series of cross fertilization of ideas between centres of knowledge in the Western Sudan, but particularly Timbuktu, the Ahir region in which Aghades happened to play a leading intellectual link. These links were established with the Maghrib and Egypt and beyond. Similarly, there were links to Borno Empire with a number of Ulama like Muhammad b. Sabagh b. Muhammad b Al Hajj b. Baraka b. Ibrahim Al Katsinawi, popularly known as Ibn Sabagh or in Hausa Dan Marina (died 1641 AD) (Hunwick 1994). He played prominent role in areas like Kurmin Yan Ranko in Katsina, and Yandoto in the present Zamfara State of Nigeria. It was by then natural that the scholars in Hausaland could move from one centre to another and from one scholar to another seeking knowledge and exchanging ideas and experiences. There is every evidence to suggest that the scholars of Yandoto and Katsina had become already famous in the field of mathematics and other related subjects like the occultist sciences, mainly Ulum al-Alwafaq (Magic Square) Ulum al Hurif (letter Magic) under ‘Ulama of Katsina and Yandoto. This
placed many of them in position to manipulate the knowledge for the purpose of controlling many affairs of the society. (Kani 1998).

The most famous Scholar produced by the Katsina schools and who made great impact in Hausaland and the entire Biladal Sudan was Muhammad b Muhammad Dan Rankawi al Katsinawi al Fulani (d. 1741). Al Katsinawi’s fame in the area of Ulum al-Alsrar, al Awfaq and al Jafir (divination) went beyond the borders of Bilad al –Sudan to Egypt and al Hijaz where Abdur rahman al Jabarati described him in his book called Ajaib al A-shar fì al- Tarajim wal al-Akhbar as the cynosure, the theologium, the ocean of learning, the sea of knowledge, the unparalleled, the garden of science and disciplines, the treasury of secret and mysticism (Al Jabarati 1960). Muhammad al-Katsinawi was reported to have studied with many famous ‘Ulama’a in Hausaland and Borno before leaving for Makka and Madina. He later settled in Egypt, where he died and was buried there (Al Jabarati 1960)

Notable among Al-Katsinawi’s teachers in Bilad al-Sudan were Muhammad b Sulayman B Muhammad al- Wali al_Barnawi l Baghirmawi .al Sheikh Muhammad Bindo, then Al- Sheikh Hashim and al-Sheikh Muhammad Fudi for whom al-Katsinawi had acknowledged that he learnt a lot (Al- Jabarati 1960). In the book onAja’ib al-Asrar fì al-Tarajim al Akhbar , it was mentioned that Muhammad al Katsinawi owed his success in mastering Ulumul Huruf , al-Awfaq and the sciences of calendar ( al-Mawaqt ) in the genre of Maghribian system of calculation and ‘Ulum al “Asrar according to its harf and waqfi methods credited to Sheikh Muhammad Bindo. He was also said to have studied under the feet of Sheikh Muhammad Kuru in Borno prior to his departure to Hijaz. It was this Sheikh who acquainted al-Katsinawi with certain acquisitions in the sciences of ‘Ulum al-Asrar and al Raml (geometry) and ‘Ilm al Hisab (Al Jabarati 1960) . The pursuit of
these disciplines by this Katsina Sheikh is an indication of the degree to which some scholars of *Bilad al- Sudan* had attained in the area of esoteric sciences which he first acquired from Muhammad Bindo (Hunwick, J.O.(1994)).

And, among the scholars also are Sheikh Al Tahir b Ibrahim b Harun b mali al Fullani al Fullati al barnawi al Tarazi al Fayrammi known as Dahiru Feroma d after 1158 =1745-6 (Musa 2009) and Sheikh Muhammad Raji B Ali b Abubakr (b. 1790, d.1282/1865) Muhammad Raji regarded as the founder of the Islamic scholarly tradition in Adamawa among his works the book on Astronomy called *Taqribun-nazami li Sheikhina Ibn Fodio* (Musa S, M. 2009).

However, he travelled in search of knowledge and wrote travelogue (*rihla*) describing his intellectual trips and experiences. He performed the Pilgrimage to Makka in 1730, it was in Makka that al-Katsinawi started to write some of his encyclopaedic discourses in the area of occultish sciences and astronomy. The book titled *al durr al manum wa khulasat al sir al – Maktum fi ‘Ulum ala- Talasim w al-Nujum* was described by al-jabarati as a voluminous work consisting of a *Muqaddimat*. It was said the book was completed by the author in Egypt in 1146 (Hunwick 1994). The other important book written by Muhammad al-Katsinawi, was *Kitab – Bahjatul ‘Afaq wa ‘Idah al-lubs wa al- Ighalaq fi ‘Ulum Huruf wa al-Awfaq* (Kani 1998). It deals with science of letter –magic’s manipulation of such a complex esoteric disciplines that had endeared him to some notable scholars in Egypt who developed special interest in the world of occult Al-Katsinawi therefore stroved in order to unlock the secrets of the natural and supernatural world, or the physical and metaphysical sphere. One of such scholars who were taught by Muhammad al-Katsinawi was al-Jabti al-Kabir who was said to have studied...
‘Ulum al-Awfaq, ‘Ulum al-Kast wa al-Bask (the science of Fraction and Numeration with al-Katsinawi (Kani 1998)

The efforts made by late M.A. al-Hajj to recover manuscript from Katsina in 1963 on behalf of University of Ile-Ife Nigeria had resulted among other things in the recovery of many manuscripts bearing on astrological, astronomical and arithmetical disciples. The mere reflection on the titles like Hisabal- Jummal fi al Zawaj, Adad Ayyam al Shahar, Ma’arifat al-Buruj, Nubbdha a n al-sinin Tarhil al shams kifayal al- Nisab and al-Nujum wa –fusul al- sanna may indicate that Katsina probably more than any other area of Central Sudan, with exception of Borno, was and is still leading area of mathematical, astronomical and occultish sciences (Kani 1998). Many of Al-Katsinawi writings in the field of astrology, astronomy, the science of secrets are extent in different archives, libraries and museums in Nigeria and beyond.

By the 18th century, Borno became the most important center of learning of Mathematics in the Central Sudan attracting peoples from adjacent areas linking this at times to the occult sciences.

There are ample evidences to prove that the scholars of Hausa land and Borno were also consulting Coptic Solar Calendars in determining their economic activities. The recovery of a book written probably in Egypt on agrarian activities, from Bauchi in 1973 points to the fact that some aspects of the agricultural sciences were being diffused in this area. The book, which is copied in a Sudanic script, contains mathematical charts dealing with agronomic activities such as the right time of harvest, the various directions of the wind, time of germination, and
the seasons during which insects appear. A conversion table to lunar months is also made at the beginning of the book as a guide for the users of the chart (Kani 1998).

The 19th century Jihad movement in Hausa land has been rightly described as an intellectual revolution which threw the door of academic pursuit open in all its ramifications. Education was a major preoccupation of the Sokoto Jihad. There is an evidence to suggest that Shaykh Uthman b. Fudi was teaching both simple and advanced arithmetic (al-Yasir wa al-Gharib) to his students. Another evidence of the incorporation of arithmetic and related sciences in the syllabi of the schools in 19th century Hausaland is to be found with Abd al-Qadir b. al-Mustafa al Torodi, grandson of Sheikh Usman B Fodiyo, and whose father shared common ancestry with Sheikh Usman B Fodiyo. He was studied medicine, astrology, arithmetic, logic and astronomy (Hunwick 1995).

According to (Bunza 2009) the Sokoto scholars established knowledge as supreme and great lever and up-lifter of the individuals and groups in the society. The question of racial supremacy of one over another, caste or class as far as they were concerned had no place in the ideals of an Islamic Society they strove to establish. Whoever excels in knowledge and science and tamed his physical environment for the service of God is superior regardless of his family or social background. Yusuf Abba 1979) argued that Fulani race, portrayed by some writers, as a symbol of power and influence is a mere fallacy and superstition, in the perception of the jihad leaders. Muhammad Bello says on this matter:

The people of Hausa corrupt our children when they tell them that their family is a family of saints and turn them from the path of learning. This is but a lie, an illusion, an error and a fallacy; for
sciences can only be preserved by learning and Mallams (scholars) are nearer to science than anyone else. (Abba Y 1979)

The concept of Mallams expressed here by Muhammad Bello was the type given to Ibn Sina,(Avecina), Ibn Khaldon, al-Jabarati, al-Razes and host of others who were stars and icons of science not only for the Muslim world but the foundation layers of the present day science and technology (Bunza M. U. 2009).

The Arewa House Arabic Manuscripts Collection

Arewa House has a long history of work in the area of Arabic manuscript preservation and has initiated many programs for the procurement and preservation of Arabic manuscripts. The initial collections were done under the pioneer Director, Professor Abdullah Smith between 1970 and 1984. (Musa & Hamman 2009)

The Current tempo of the project emerged from an International Conference on Preserving Nigeria’s Scholarly and Literary Traditions and Arabic Manuscripts Heritage in 2007 with a grant from the US Embassy in Abuja, Nigeria. Later, the Ford Foundation office of West Africa Sub-region gave the Arewa House a two-year grant, through which the following programs were successfully implemented.

However, as a result of intensive fieldwork undertaken from 2009 to date in Northern Nigeria especially, in the states of Adamawa, Plateau, Jigawa, Katsina and Bauchi, the Center collected more than 2244 original manuscripts. Also, the Centre collected about 300 copies of what was popularly known as market copies manuscripts. As noted earlier, until April 2009, Arewa House itself had only 3 handwritten original mss and 34 of the so called “Market Copies” out of 207 manuscripts other than correspondences. It is interesting to note that the situation
has now tremendously improved with new acquisitions made particularly from Adamawa (over 985 catalogue originals), Katsina (30 catalogued originals) Plateau (207 originals catalogued) and many more “Market Copies” (Musa 2016).

A Brief description of the contents of Arewa House Arabic manuscripts collections would provide some idea on the relation to the subject of our paper.

The Arewa House Arabic manuscripts cover a number of languages and subjects, and they are as follows:

- Variety of Languages in the Arewa House Arabic/Ajami Manuscripts Collections;

  The Languages include Arabic (2170) Hausa (250), Fulfulde (125), Kanuri (4) Nupe and Yoruba (2)

b- Variety of Contents:

1- Arabic literature, Arabic Grammar, Rhetoric, Prosody, Prose and poetry: these categories contain about 165 such as pre Islamic literature manuscripts.

2- Islamic Monotheism (Theology)/ or Tawheed/ Ilm al Kalam, Sufism, Islamic Jurisprudence (Fiqh) and all aspect of judicial cases and Ethics/ Islamic commandments: under this headings we have 624 manuscripts.

3- Some aspect of history: under this heading we have 105 manuscripts.

4- Mathematics, Mysticism/ astrology, Logic/Astronomy, Medicine and Pharmacology: under this heading we have 196 Manuscripts.

5- Holy Qur’an includes, commentaries of the Holy Qura’an: What we have here are copies of the hand written Qur’an with different caligraphic styles and decoration such as Zayyana decorated in the first, ½, ¼, and ¾ of the
Holy Qur’an, Hadith (saying of the Holy Prophet: Under this heading we have 87 manuscripts.
6- Correspondences/Mahadism: under this heading we have 38 manuscripts.
7- Azkar/Supplications/Incantations: Under this heading we have 982 manuscripts.
8- Cosmology/Ijaza/Sociology/Politics and Governance: under this we have 47 manuscripts. Musa S.M (2016)


1- Medicinal 26' 
2- Mathematics-21
3- Astrology, Geomancy, Divination43
4- Amulets, Talismanic, Charms and Occults73
5- Astronomy33

Abstract and Contents of Arabic Manuscripts on Scientific and Mathematics at the Arewa House Kaduna

1- The Manuscripts on Astrology, Geomancy, Divination, in Arabic and Hausa (Ajami), contains 43 copies of Manuscripts on local Hausa traditional alternative Magic Square such as astrology, geomancy and divination. It includes esistikharat techniques (geomancy/divination assisting people seeking to know what would happen to them in the future. Geomancy/divination in Arabic Scripts writing continues to be widely practiced by men
and women in northern Nigeria and there is specialization among practitioners
the collection contains and those who engages in this subject called masu
bugun kasa, or Malam duba.

Description of these manuscripts

The manuscripts are available in Arewa House Archives, Kaduna with
reference numbers AH/MSM/, AH/MAF, AH/GDJ and AH/GJ and they
includes original manuscripts and market copied purchased by Musa Salih
Muhammad.

Pix 1-4 is the examples of the manuscripts on geomancy, divination, and
astrology

2- The Manuscripts on Amulets, Talismanic, Charms and Occults (Secrets)
contains 73 deferent copies of Manuscripts on local traditional alternative
medicine. It is called Asirai or tibbu, in Hausa language. This contains
materials on talismanic resources, religious resources, medicinal treatment and techniques for diagnosing ailments and illnesses. These techniques include Sihr (charms or occults) assisting people seeking wealth, good health, protection from evil spirits, reconciling disputing couples, cures for women, men and children’s illnesses and men to enhance men and women’s potency and sexual performance. Amulets, talismanic, charms and occults in Arabic scripts, Arabic Language or in Ajami writing continue to be widely practiced by men and women in northern Nigeria and there is specialization among practitioners.

**Description of these manuscripts**

The manuscripts are available in Arewa House Archives, Kaduna with reference numbers AH/MSM…. It also includes some market copies purchased by Musa Salih Muhammad.
Pix 1-6 show the examples of manuscripts on talismanic, amulets occults, and charms for protection against Gun, Sword, Spear, Arrow, Knife, Armed Robbers, Club and Wild Animals like Hyena, Lion, Tiger, etc. It is to be written 3 times for seven days, then draw the talisman and wear around the waist.

3- The Manuscripts on Mathematics in Arabic Language and Hausa Ajami, (Easy Mathematical Knowledge) contains which was an introduction of Mathematic/Arithmetic for beginners, it teaches how to understand mathematic system through ABAJADA for the children.

**Description of the manuscripts**

The Manuscripts on Mathematics were in original handwritten and also there is the Market copy. The copies are available at Arewa House Archives, Kaduna with reference numbers are AH/MSM/…. it is market copies purchased by Musa Salih Muhammad
Pix 1-4 showing examples of manuscripts on begging of mathematics and arithmetical calculations

4- The Manuscripts 26 Materials on medicinal aspects, which explain the fundamental causes of sickness. It shows that the root cause of all sickness is over feeding and eating another food before the first one digests. Also, it recommends light eating habit, avoidance of eating one type of food i.e. lack of balanced diet. Similarly; it is strongly recommended that fruits and milk should be part of regular diet for the preservation of health. For treatment of poisons like scorpion and snake bites, the author recommends use of salt and water in treatment. the uses of amulets, talismanic and charms were discussed in the manuscripts.

**Description of the manuscripts**

The Manuscripts are available at Arewa House Archives, Kaduna with reference numbers are AH/MSM/… consisting of the original manuscripts and market copies purchased by Musa Salih Muhammad.
Pix 1-5 showing the some manuscripts of medicine which would cured infertility charms, obtaining knowledge, etc. this is to be written together with the verse therein on top of the talisman.

5- 33 Copies of Manuscripts on Astronomy: the subject is based on ancient sources from Greece, Iran and India. They update methods for measuring and calculating the movement of heavenly bodies, developing models of the
universe and the movements of the planets within it. Between the eighth and
tenth centuries, local rulers across the region in Cairo and other cities also
supported scientific research. At this time, scientists translated studies from
various languages into Arabic; sources taught medieval astronomers methods
for calculating the position of heavenly bodies, and for creating tables
recording the movement of the sun, the moon and the five known planets.

The traditions contained knowledge on the fixed stars, the passage of the sun
and moon through the zodiacal signs and lunar mansions, and the seasons and
associated phenomenon. This body of knowledge was refined in part because
of the specific requirements of Islam. The religion requires the ability to
correctly determine the time and direction of Makka for prayer, the moment of
sunrise and sunset for fasting during Ramadan, and for fixing the appearance
of the moon that marked the start of a new month. Another branch of research
was led by astronomers interested in a more accurate understanding of the
planets’ movements.

**Description of the manuscripts**

The Manuscripts are available at Arewa House Archives, Kaduna with
reference numbers are AH/MSM/… consist the original manuscripts and the
market copies purchased by Musa Salih Muhammad
Pix 1-6 show the different type of manuscripts on astronomical sciences, detailing about knowledge of lunar calendar, the sun, the moon and the stars.

**Conclusion:**
This paper attempted to focus on the area of scientific and mathematics in Arabic Manuscripts in Northern Nigeria with specific reference to Arewa House Arabic Manuscripts Collection, Ahmadu Bello University Kaduna Nigeria, it is also attempted to bring out the areas in which Northern Nigerian Arabic Manuscripts use Magic Square (*Awfaq*). Stressing that, the knowledge is continuously used in
occult sciences such as Amulets, Talisman, Geomancy, Astrology, Traditional Medicine and Charms. It also highlighted the issue of preservation which very little attention is given. But for some of the donors effort in the last decade
References:


Ahmad Kani, Arithmetic in the pre-colonial Central Sudan in Gloria Emeagwli (ed) *Science and Technology in African History*, Edwin Mellen, NY, 1992

Ahmed M Kani (1998): The place of Katsina in the intellectual history of *Bilad Sudan* up to 1800


Edwin 1992


Available at www.bauarchitecture.geomanticth.shtml.


