

**The Arab-Islamic Civilization's Cross Points through which Sciences Transferred to West of Europe (Late 4th century AH = 10th century AD)**

معايير الحضارة العربية الإسلامية إلى الغرب الأوروبي وبعض العلوم التي انتقلت إلى أوروبا  
أواخر القرن الرابع الهجري = القرن العاشر الميلادي))

**Dr.Fatima Salim Al-Tarawneh**  
**University of Petra**  
**Hashemite Kingdom of Jordan.**  
**drfatrawneh@yahoo.com**

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**Abstract:**

This study aims to shed light on the most important countries through which Arab-Islamic civilization sciences transferred to Europe in the Middle Ages. The three countries of concern were: The Levant, Sicily, and Andalusia. These crossing countries paved the way to the emergence of the "Renaissance age". Many Europeans sent their children to learn in Arabic institutes, especially the Andalusia institutes earlier than the beginning of the scientific thrive in Europe. The drive behind such move was to enable them convey several sciences from Muslim scholars, such as translation, philosophy, mathematics, linguistics, etc. Undeniably, these sciences left their cultural and educational mark in Europe in particular and the whole world in general.

**Keywords:** Civilization, West of Europe, Arabs, Muslim Scholars, Sicily, The Lavent, Crusades

## الملخص

جاءت هذه الدراسة لتسليط الضوء على اهم المعابر التي انتقلت عن طريقها الحضارة العربية الاسلامية إلى أوروبا في العصور الوسطى، إذ أن انتقال العلوم والثقافة الإسلامية إلى أوروبا- وهو الانتقال الذي مهد لما عُرف بـ ”عصر النهضة”- كان من خلال ثلاثة معابر أساسية: هي بلاد الشام، وصقلية، والاندلس. إذ ان كثير من الأوروبيين أرسلوا أبناءهم ليتعلموا في المعاهد العربية، وخاصة معاهد الأندلس؛ وكان ذلك حتى في عصر متقدم على العصر الذي بدأ فيه العلم العربي يغزو أوروبا، ونقلوا علوم عدة عن العلماء المسلمين؛ كعلم الترجمة، وعلم الفلسفة، وعلم الرياضيات، وعلوم اللغة وغيرها. والتي تركت أثراً معرفياً وثقافياً في أوروبا، لم ينكره الأوروبيين.

الكلمات الدالة: الحضارة، الغرب الاوروي، العرب، العلماء المسلمين، صقلية، بلاد الشام، الحروب الصليبية.

## Introduction

The emergence and spread of Islam after the Islamic conquests played a major role in the progress of Muslim Arabs in various types of science. The Islamic civilization played a prominent role in providing Europe with the science and knowledge on which Western civilization was later founded. Europe was able to transfer these sources of knowledge through three main crossings countries: The Levant, Sicily, and Andalusia.

The importance of this study stems from the fact that Islamic civilization peaked in the 4th/10th century, and remained at this high

level until the 17th century, preserving its Arab Islamic identity. This was not confined to one region of Europe. This study is also important because it sheds light on the crossing countries through which the Islamic civilization transferred to Europe. Therefore, this topic is considered one of the most important subjects of study among scholars in Europe who are specialized in the Islamic civilization. In fact, many conferences, and scientific meetings attended by European professors and specialists revolved around Islamic civilization and its transfer to Europe. The novelty of this study is that it sheds light on this topic at this time when the civilizational conflicts between East and West have reached a clashing point.

During the Crusades (1096-1291 A.D./489-690 Ah), which are regarded as an extension of the idea of a long and bitter conflict between the eastern and western worlds, the Europeans came out in secret under the banner of the Cross trying to invade the Islamic countries under the pretext of protecting Europe from Islam. At this stage, the conflict took on a new unprecedented shape, namely, the "international character". This is mainly because most of the Western European peoples of the Catholic Church, which is claimed by the Papacy, participated in these crusades.

This study also confirmed that adapting to Western society does not necessarily mean abandoning the Islamic identity which is one of the foundations of Western civilization.

This study comes to answer some questions, including:

What are the most important crossings countries through which Arab-Islamic civilization has transferred to Europe?

What are the most important Arab-Islamic sciences that transferred to Europe?

What intellectual influences have influenced European civilization?

Did the Renaissance begin in Europe, was it in the 10th century due to the movement of translation and transfer of Arabic through from the Levant, Andalusia, and Sicily, or was it in the 16th century?

The Crossings Countries of Arab-Islamic civilization to the European West (Late 4th century AH = 10th century AD) and the most important science that transferred to Europe

In Arabic, the word "civilization" originates from the root verb "to attend". Also, it is said that civilization is linked to villages, rural areas, and houses, other than the Bedouins' life whose people who live in the badia (Ibn Khaldun, 1988). The word is used to denote the complex society that most of its members live in cities and practice agriculture unlike Bedouin communities with tribal structure who move from one place to another searching for water and pasture. (1) The modern industrial society is a form of civilization (Toynbee, 1984).

(Ibn Khaldun) (2) also defined civilization as "an art of luxury and the mastery of the artifacts used in kitchens, clothes, buildings, mattresses,

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(<sup>1</sup>) Arnold Toynbee, *Civilization in the Scale*, translated by Amin Mahmoud al-Sharif and review of Muhammad Badran, Arab Books Revival House, 1984, p. 18.

(<sup>2</sup>) The founder of sociology and a Muslim historian from Africa. During the Hafsid period, which is currently Tunisia, left a legacy whose influence continues to be extended today. (Ibn Khaldoun) was born in Tunisia in 1332. He is the founder of sociology and the first to put it on his modern foundations. He has reached impressive theories in this science about the laws of urbanism and the theory of nervousness. He put theories for building countries, phases of its construction, and fall. His views and theories were

and other necessary household luxury needs" Ibn Khaldun", (1988). Ibn Khaldun's books on civilization is among the most important intellectual influences that affected the thoughts of some European philosophers who later wrote about Arab civilization (Lapica, 1980). Some of them even quoted Ibn Khaldun in his works such as { Oswald Spengler},( fico) (3)

Atiat defined it as an expression of all the achievements of man's intellectual, emotional and physical works in order to achieve self-identity, achieve the progress in his society, and contribute to the human process (Atiat, 1997). In this definition, the author encompasses the various activities that aim at achieving greatness on earth. The definition also demonstrates the contribution of nations to

preceded by several centuries later by a number of famous scholars such as the scientist Spengler. (Ibn Khaldun) is considered one of the most important historians and sociologists and the author of the introduction known as the introduction of Ibn Khaldun. Which is the Imran of the world, and what the urbanization presents from the conditions ... and the nervousness and varieties of human fluctuations ... "See: Abd al-Rahman Ibn Khaldun, the introduction of Ibn Khaldun, which is the first part of the history of Ibn Khaldun called Diwan Al-Mubtada and the news in the history of Arabs and Berbers and those of their contemporary who have The Greater Sultan, Al-Matn Al-Matn Khalil Shehadeh, Revision of Suhail Zakar, Dar Al-Fikr, Beirut 1988, Part 1, p. 219; see also: Nevin Juma, Philosophy of History, p. 21; George Labika, Politics and Religion at Ibn Khaldoun, Arabization: Musa Wahbi and Shawqi Al-Farabi, Dar Al-Farabi, Beirut 1980, pp. 47-48.

(<sup>3</sup>) Fico ( 1668 - 1774): Italian thinker and historian from Naples. He learned ancient Latin and Greek languages and studied literature, rhetoric, philosophy, theology and legislation. He traveled throughout Europe and had a deep philosophy which was taken by some philosophers such as Spengler and Toenby as the basis for their studies. See: Atiyat Abu Al-Saud, Philosophy of History at Fico, Al-Maaref Establishment, Alexandria 1997, pp. 8-10, pp. 17-25, 47, 55-67.

the enrichment, development, and advancement of human societies. Civilization in its Islamic concept is mainly an ideal vision of life, as every Muslim, and every Islamic society, seeks to achieve this vision, and works to highlight it and develop it so that it remains alive in the conscience, actions and sufferings of human beings (Durant, 1964).

The interest in the Islamic civilization by Europeans, in the context of cultural friction, has increased making Montgomery explain why Europe's interest in studying the influence of Muslims in Europe, especially at present, has increased the coexistence between Christians and Muslims, Europeans and Arabs, in one open world. Islamic history has resulted in a state of sanctification without regard to some of its disadvantages, which has lost part of its reality and great impact. (Farouk, 2008)

Arab-Islamic culture has spread in the Western world, accordingly, European scholars studied the original Arab sources, and found them to be a great scientific heritage. They have worked on these resources deeply and analyze them with scrutiny and diligence. Arabs and Muslims represented modern science in every sense of the word. They were and pioneers in modern scientific curricula. (Asiri, 2016). The European intellectuals, and scholars, gained more than just information from the Arabs, they also acquired the scientific mentality in all its experimental and inductive approaches. Therefore, the Europeans found in the Arab-Islamic heritage and in Arab-Islamic culture their desired need, and then they worked on published it. (Montgomery, 2006).

The dazzle of the influence of Arab-Islamic culture in the European Renaissance, and in European culture and science, has made a German scholar announce this fact: "This prosperous civilization, which has flooded Europe for centuries, makes us even more astonished, as it was not a cultural extension of the remnants of ancient civilizations, it was the Arabs with their culture who created this civilizational splendor." (Hunka, 1993)

The roots of the civilized and intellectual relations between the Arabs and Europe date back to the Middle Ages. It may have been more connected and influential in the (late 4th century AH = 10th century AD), i.e. coinciding with the era of the Crusades (488-690Ah=1095-1291) (4). To be exact, it happened after the Arabs established the Arab -from their Arab peninsula —a vast and sprawling state stretching from the Indian Ocean, the Border of China eastward to the Atlantic Ocean and the borders of France in the west.

The Arabs (5) and Muslims benefited the European civilization a lot. The Arab-Islamic civilization took to Europe in many multiple

(<sup>4</sup>) It is the campaign that went from the European West to the East, after the Clermont Council held in 488 AH / 1094 AD when Pope Urban II (483-493 / 1088-1099 AD) called for a comprehensive Crusade against the East, and a number of participants participated in this campaign of the nobility and Western commoners, who took a cross as a sign they made on their clothes and they were as such called the Crusaders. The princes of Bohemand (Behind), Robert Count Flanders, Count of Godfrey and his brother Count Baldwin De Boulogne were among the princes of that campaign. See: Hassan Habashi, The First Crusade, Dr. I, Dar Al-Fikr Al-Arabi, Manial 1958, pp. 52, 68. For more, see: Saeed Ashour, History of East-West Relations, Arab Renaissance House, Beirut 1972, pp. 114 -132.

(<sup>5</sup>) The use of the words Arabs and Arab civilization in the folds of this memo came to denote the great civilizational movements that emerged in the Arab Islamic

paths which were the focal points of contact. A thing which contributed to the transfer of the Islamic knowledge heavily to Europe. Historians almost agree that the transfer of Islamic science and culture to Europe paved the way to the emergence of the so-called "Renaissance age" —. This transfer was conducted through three basic crossing Countries:

### **First: The Levant:**

The prominent British orientalist Montgomery Watt in his book "The Influence of Islam in Medieval Europe" Said: "Thanks to the efforts of Muslim scholars, it is because of them we have a more objective image in the minds of Westerners about Muslims," This quote is a clear indication of the historical footprint left by Muslims in Europe. (Montgomery, 2006).

Gustave Le Bon (6) says "the influence of the Arabs in the West was very great. This influence was transferred through crossing or cultural points of contact, the most important of which was (The Levant). The transfer continued until Europe became a city for the Arabs with its civilization afterwards. In fact, the influence of the Arabs in the East was no less influential than that in the West. We cannot realize the influence of the Arabs in the West, unless we imagine the state of Europe when the Arabs introduced their civilization to it. We can take a look at the two centuries (2nd and 3rd Hijri = 9th and 10th AD) and compare when civilization in Spain was

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state in the Middle Ages. But it is certain that many of the flags of this movement are not of Arab origin,

(<sup>6</sup>) French historian and physician who took an interest in Islamic civilization and wrote books on Eastern civilization and Egyptian civilization.



bright, the centers of culture in the West were just towers inhabited by savage nobles who prided themselves on not reading and writing". Gustav, 1956)

Historians disagree on the importance of the Crusades (488\_690 Ah=1095\_1291 AD) <sup>(7)</sup> on the Levant. Some of whom believe that they such wars constituted a passage from which Arab culture crossed to the West. While other historians believe that the Crusaders wars marched towards the Levant to fight rather than seek knowledge and culture. In reality, the crusaders in the land of The Levant were characterized for being tough soldiers only interested in remaining behind strong forts. This view is supported by the fact that the war between the Crusaders and The Muslims only ceased by expelling the crusaders once and for all from The Levant 6 (690 Ah=1291 AD). Accordingly, therefore, it is clear that they did not have as much peaceful contact with the Arabs as their European brothers who were in Sicily and Andalusia (Ashour, 1980). The Crusades campaigns also played a role in the exchange of knowledge between Europe and the Levant, particularly the maritime republics that played their part in cultural exchange. Antioch played a role in blending Arab and Latin cultures as well. During the 11th and 14th centuries, many Christians moved to the Islamic lands to seek learning, such as {Leonardo Fibonacci} (An Italian mathematician), Adelard Al-Bati (English philosopher), Constantine al-Aruba (an Arab doctor), and other European students who moved to specific Islamic

<sup>(7)</sup> The first Crusade Campaign was directed to the East after the Clermont Council in the year 488 AH / 1094 CE, when Pope Urban 11 (483-493 / 1088-1099) a comprehensive Crusade campaign on the East. See: Habashi, Hassan, 1958 AD, The First Crusade, Arab House of Thought, Manial, pp. 52-68.

science centers to study medicine, philosophy, mathematics and other sciences (Shaikh M. Ghazanfar; Maqbal, 2006).

Through the Crusades, the Westerners met with Muslims, and they transferred some plants they knew for the first time and named them by Arabic names such as sugar, rice, cotton. They learned some Arab industries such as; paper making, soap, porcelain, glass, dyes, ornaments, and drugs. Thus, the Crusades were a rich source for transferring civilization. For this reason, the West's organized attempts began to quote from the Arab's civilization. In this regard, the Arabs' advantage in these relations was the most likely, they had the elements of material and mental civilization that they could offer to Europe, while Europe until the 16th century did not have any valuable thing to add it to the Arab heritage. So that, the Europeans took more from the Arabs than they gave. They excelled at quoting from the Arabs sciences, philosophy, architecture, martial arts, industry, trade, and social life (Ashour, 1986). They were also greatly influenced by their languages, literature, and communities. In addition, the Arabs were great merchants who traded the Europeans with many goods such as spices, drugs, perfumes, and other well-known products of the East. There is a lot of evidence that Europe is influenced by the Arab heritage in many fields such as the Arabic literature. Europe was influenced by poetry of surprise, Arabic poetry, wisdom, proverbs, and Islamic stories. Many editions of the (1,000 nights) stories were translated and then published in English and French.

### **Second: Sicily:**

Sicily was the second crossing point that the Arab civilization passed on its way to Europe. The Arabs had it rid of the Byzantine

rule in 290 Ah/ 902 A.D. Then it was attacked by the Norman (8)in, who extended their full influence on it in 453 AH / 1060 AD. Because of the soft policy of the Normans in Sicily, the 12th century witnessed the emergence of a Christian-Islamic civilization in Sicily. The Normans adopted the court ceremonies, studied the literature and sciences, and Arabic was used as an official language alongside with Latin and Greek. Money was struck in the Arabic style. (Mezher, 2008).

Idrissi is considered the greatest geographer and mapmaker of the Middle Ages. He also made original contributions to medicinal botany. His greatest achievements were reflected in his book "Nuzhat Al-Mushtaq fi Ikhtrak Al'afak" which he wrote while in Sicily. His book had a profound impact on Europe (Idrissi, 1989)

Sicily remained the thriving center for the spread of Arabic sciences. The languages spoken by its inhabitants were (Greek), (Arabic) and Latin dialects, but some of its intellectuals were proficient in the language of the Arabic. The kings, (Roger I), (Frederick II), and (Charles I) brought scholars to Palermo, whatever their religion and tongue was. So that, many scholars in" Palermo, as in Toledo, began to transfer from Arabic and Greek to Latin". Frederick II and his son Manfred knew to read and write Arabic, and he wrote books in Arabic. Their works were translated into Latin. Frederick established the University of Naples in 621 Ah/ 1224 A.D., and provided it with a collection of Arabic books. The Arab philosophers had their value in his court and there was a politically

(8) The Normans, Vikings tribes: their origins from Scandinavia, invaded France and settled in Norman, the region known as (Normans), converted to Christianity and remained in France until now

friendly relation between him and Sultan (Kamel Muhammad) (615Ah- 636 Ah/ 1218-1238 A.D., the nephew of Saladin, who wrote in philosophical and mathematical matters, which made the Ecumenical Council of the Church in Lyon in 643 Ah / 1245 A.D. accusing him of secretly converting to Islam. (Maqbal, 2006; Ashour, 1986).

The existence of Islamic culture in Sicily and the patronage of the Norman kings of science and its people provided some international support for the advancement of knowledge. The presence of Arabic and Latin combined allowed for having friendly links between Muslims and Christians and led to widespread of knowledge. (Mezher, 2017)

Roger II of Sicily used Muslim scholars, including the geographer (muhammad al-Idrissi), who drew a map of the world known in his time on a flat silver circle three meters long and one and a half meters wide, and wrote for him the book "Nuzhat Al-Mushtaq fi Ikhtraf Al'afak" that describes this map. (Aljumaiee, 2003).

### **Third: Spain (Andalusia):**

When the Arabs conquered it in the year (92 AH = 711 AD), Spain was not different from the rest of contemporary Western Europe. It was suffering from the prevalence of ignorance, delay, and chaos due to social conflict and internal strife. After the Arabs opened the country and moved it to a stage of stability, they turned to the reconstruction of the ruined cities, the revitalization of stagnant trade, and the revival of backward industry. Even under the Umayyad Caliphate, Andalusia became the richest and most populous European country. Then the Arabs chose to consolidate their authority in Spain

through science, so they turned towards caring for the arts, and sciences. Then, they felt that they were not convinced by the progress achieved by their brothers in the Levant. Consequently, they increased their abilities, made innovations and found what provided Europe with a resource that it lacked (the fifth century AH = the end of the eleventh century AD), until the Italian Renaissance in the fifteenth century. The Andalusians spared no effort in obtaining the sciences of the Islamic East through three approaches: first, summoning scholars from the East, second, sending missions from the Arabs of Andalusia to the East to study then return to Andalusia to spread their knowledge. Third, collecting books that are the most important means of scientific activity. It was said that (Hakam II) (366 AH = 976 CE) brought from the best resources of Arab works from Baghdad and Egypt so that people started in his time to read and learn until his library had a thousand books. (Ashour, 1980).

Cordoba was one of the greatest cities in the world at that time, with more than 100,000 meters inhabited by one million people. Its inhabitants were able to walk in its floodlit streets after sunset, while there was not a single public estuary to light up the streets of London at night for centuries. Thus, the ray of Arab civilization continued to shine in Andalusia, particularly in the economic, cultural, and artistic fields, until it extended to lighten western Europe (6th and 7th Hijri = 12th and 13th centuries) and beyond.

Tolerance, as one of the Arabs attributes, towards the Dhimmis (the Christians and Jews) was one of the reasons behind this great revival in Andalusia. So, the Spanish Arabists turned to use the Arabic language rather than Latin. As a result of having many Jewish disciples of Arab masters, a large school of non-Muslims was

innovated. These people serve as ambassadors among the Arabs and the Europeans who were so eager to benefit from this civilization. Both the Levant and Sicily did not contribute to feeding western Europe with the origins of Arab civilization as much as the Arabs of Spain (Andalus). They are indeed the ones who provided the abstracts of Arab thought in science, literature, and philosophy as well as the ones who introduced the Hellenic legacy to the Europeans, which was only preserved in the Arabic translations at that time. After the collapse of (Toledo) into the hands of Christians (478 AH = 1085 CE), the number of science students who studied Islamic sciences from various countries from the West to Spain increased enormously. Consequently, this move triggered a large unprecedented translation movement from Arabic and continued until (the ninth century AH = the fifteenth century). As a result of this movement, many Arabs worked in various sciences and arts, and translated some of the Greek writings such as Galen's books, Hippocrates, Plato, Aristotle and others. Among the Christian rulers of Spain who appreciated the Arab-Islamic culture was Gustave LeBon who said: "There were no irrigation systems in contemporary Spain except for the ones accomplished by the Arabs (Moqbel, 2006; Ashour, 1980; Gustav, 1956).

In his famous book, "*The Civilization of the Arabs*", the French orientalist Gustave Le Bon said: "Translations of Arab books, especially scientific books, almost remained a single source for teaching in European universities for five or six centuries, and we could say that the influence of the Arabs in some sciences, such as medicine, lasted as an example till today". (In France), (Ibn Sina's) books were taught at the University of Montpellier till the end of the previous century, and the influence of the Arabs on the European

universities was so great to cover different realms such as philosophy. {Ibn Rushd} was a great arguer in philosophy in our universities since the early thirteenth century "(Gustav, 1956). As for Sicily, it was ruled by Muslims from the third century to the fifth century AH. The manifestations of the Islamic civilization there were obvious in mosques, palaces, baths, hospitals, markets, and castles, and several industries such as: paper, silk, ships, mosaics with colored marble, and extracting minerals. The cultural relations between Muslims and the people of Sicily continued after that. For example, King (Roger I) embraced the Arab culture and he was writing his decrees in Arabic and Latin. He also minted money in Arabic, Greek, and Latin on different sides of the coins. For many centuries, Europe has taught translated Arabic books in all fields in all of its universities and the Arabic language proficiency became the basic condition for the European intellectual. For example, Oxford University students mastering Arabic sometimes mocked their professor Roger Bacon if he made a mistake while translating the Arabic texts into their language. Many sciences had spread into the world and Europe in Arabic; this led to the leakage of many of its vocabulary into European languages (Montgomery, 2006; Constantine, 1983). To sum up, some of these methods played a very important role in transmitting the Arab civilization to the West in the Middle Ages. Later, the Europeans woke up from their long slumber to find themselves in an ongoing source of Arabic literature in various sciences and arts, in which they started to study and learn in different ways.

The book also states that the efforts of geography scientists varied, and their studies differed according to the trips and places they traveled to. For example, (Ibn Hawqal), (Al-Idrisi), (Al-Maqdisi), and (Al-Khwarizmi) were distinguished in drawing maps and geographical

forms. Their maps were more accurate and clearer than the European ones (Naama, 1981). Among the most important sciences that were transferred to the West was the Islamic art and Islamic architecture. The arts which inspired the European artists to decorate the ceilings with colorful pictures. They were influenced by the Islamic art to the extent they embellished the ceilings with Arabic writings despite their Islamic nature. Many of the elements that distinguished the Islamic architecture were imposed on the Christian one such as double windows, vaulted buildings, like fan vaults, multicolored sunken decorations, sculptures, and other shapes and elements. The idea of decoration was the only one that inspired the European artist since the fourth century AH to quote from and record the Arabic letters by carving on the column capitals. (Faraj, 1978).

The translated literature on geography of the Arabs into Latin during the middle ages mirrors the influence of the Arabs on Europe at that time. Actually, Europe owes the Arabs a favor for preserving the Greek geographical information which was only introduced through the Arabic books in the late Middle Ages. In a similar vein, the Arabs added a lot to this field either by sharing their important experiences or correcting the mistakes of the Greek geographers. Their passion for travelling motivated them to explore different parts from the east of Asia to Africa. The Arabs also made different trade agreements with countries that were still anonymous for the Europeans during the Middle Ages. Among the most important Muslim geographers and travelers in the Middle Ages were Al-Masoudi, Ibn Hawqal, Al-Biruni, Ibn Battuta, and Al-Idrisi. In addition to the abovementioned, there were other geographers such as: Al-Ashtari, Al-Maqdisi, Al-Qazwini, and Yaqoot Al-Hamwi. Each one of those geographers contributed a lot to the establishment of the science of geography.



Actually, these scientists need an independent research to be dedicated to them in order to discuss in details their great achievements (Naama, 1981; Moqbel, 2006). Arab books in geography have been the basis for the study of that science in Europe for centuries (Field, 1970). In particular, the Book of Sherif Al-Idrisi (T1164 A.D.). The book "Nuzhat Almushtak fi istishraf Alafaq" which is considered to be one of the most complete geographical research inherited by Europe from the Arabs. The book contained more than forty maps and was translated into Latin. For more than three centuries, the book was a major source for learning Geography for Europeans. The author of the book, Al Idrissi, was the same person who was commissioned by Roger II of Sicily to draw up a map of the world (Idrissi, 1989).

The Arabs were able to ride the seas boldly and skillfully, until they took the reins of trade between the Orient and Morocco. Their business soon led to revolutionizing some financial and commercial systems that Europe has later known because of them. (Ibn Kharda, 1988; Son of Jubeir, 1959)

Arithmetic and Numeracy have also been transmitted through these crossing points. Algebra, as well, which still retains its Arabic name in all European languages (algebra), was adopted by the Europeans from the Arabs. The role of the Arab-Islamic civilization in this field was a key one in that it shaped the world's consciousness in the field of arithmetic. (Ibn Khaldun, 1984). Bataina, 1985).

The sons of Musa bin Shaker; Muhammad, Ahmed and Al-Hassan, also contributed in various scientific fields, including astronomy and mathematics. For example, Muhammad bin Musa was interested in the study and development of astronomy, mathematics,

philosophy, atmospheric science, and contributed to mechanics, while Ahmed bin Musa excelled in mechanics, where he made some moving machines, such as: cranes that were based on the idea of mechanical advantage. Many Christians also moved to the Muslim lands seeking knowledge, such as Leonardo Fibonacci (An Italian mathematician), Adelard Al-Bathi (English philosopher), Constantine the African (an Arabist doctor), and other European students who moved to the Islamic centers of science to study mathematics and other sciences. (Imam 2008; Shaikh M. Ghazanfar)

It became certain that the numerical figures in general were not known by the Europeans in the old times. Europe did not begin to use Arabic numbers until the sixth century AH = 13th century AD (Ashour, 1980). The numbers that are commonly used all over the world today are Arabic (dust) and the first book used by Europe including numbers was written in the year (260 Ah=874 AD) and printed in Islamic countries. (Fendi, 1985). Muslims created the (zero) in the calculation, which made calculations infinitely easier. Khorazmi II's books in arithmetic were translated into Spanish, and then into Latin. The translated book was carried into the German territory (Mezher, 2008; Farrock, 1979).

As for the two sciences (physics and chemistry), Abu Ali al-Basri claims that the Arabs are the founders of natural sciences, especially physics and chemistry. Abu Ali al-Hassan ibn al-Haithem (Abu al-Qasim al-Basri, 1987) was the head of the Arab scientists specialized in these fields. Although most of the important Arab works in physics have been lost, the progress that the Arabs have achieved, and how extent Europe has benefited from them is apparent. One of the most famous Arab scientists in the science of

nature (physics) was Al-Hassan Ibn al-Haytham (t. 421 Ah=1030 AD), who worked with lenses and optics and wrote several papers in the lights of the planets and in light. He was the first to use the dark room based on what the camera was manufactured (Defense, 1979).

In chemistry or alchemy, the first name of chemistry, Holmyard says in the book "The Creators of Chemistry": "The word kima stems its roots from Arabic", and the Arabs are the first to be interested in the scientific experiment. chemistry). (Faraj, 1978). Thanks to the ancient Egyptian Arab scientists who conducted amazing experiments in this field. The Arabs were able to make impressive scientific discoveries in chemistry and discovered new chemical formulations that arrived Europe and contributed to their progress (Abu al-Aly al-Mudoudi, 1979).

The translations of Jaber ibn Hayyan's books into Latin played a role in the development of this science in Europe, as Ibn Hayyan was the first to introduce the method of separating gold from silver using nitric acid. Collaborating with other Arab and Muslim scholars, he achieved a lot in the field of chemistry. In his book "The Contribution of the Arab Scholars in Civilization", Bamat states that "Arab scholars are the discoverers of gunpowder".

These were some of the most important sciences that moved to Europe and there were many sciences that were not studied such as: medicine, pharmacy, herbs, astronomy, languages and others.

### **The study concluded that:**

- 1- The above-mentioned methods were the most important ones of transmitting the Arab civilization to the West during the

Middle Ages, but not all of them. The Europeans woke up from their slumber to benefit from the Arab legacy.

2. If it were not for these crossings points that were mentioned, the various sciences would not have reached Europe, and we would not have observed the current development of Europe today.
3. The Islamic civilization has had a major impact on the Western civilization in the fields of philosophy, science, medicine, and pharmacy. It has moved and left an idiosyncratic characteristic that European masters and scholars will not deny.
- 4- The most important of these sciences is translation. The West translated many books for Arabs and Muslims, but European universities had been studying the books of Ibn Sina, Ibn al-Bitar, Ibn al-Haytham and others for six centuries.
5. What researchers have come up with, except for some European orientalist and biased intellectuals, is that Europe always benefited from its relations with Islam and its people. Also, the European Renaissance did not take place in the 16<sup>th</sup> century as was believed, but began earlier in the 10<sup>th</sup> century as a result of the initiation of the movement of translation and transport of Arabic across the Levant, Andalusia, and Sicily.

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