

## **The Transmission of Arabo-Islamic Sciences into Western Europe with special Reference to the Role of Sicily**

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The rise of Islamic faith in the seventh century initiated waves of conquest and expansion at the expense of the Byzantine and the Persian empires. The first phase of expansion, associated with the Arabs, extended from the death of the Prophet Muhammad to the end of the Umayyad Caliphate in Damascus. In their attempt to spread the Law of God among mankind, the Muslim Arabs annexed vast territories embracing Syria, Egypt, Northwest Africa, Spain, Persia, Iraq, the Indus Valley and Samarqand. Thus by the middle of the eighth century A.D. the Arabs had attained their maximum expansion and their subsequent raids and wars (in Sicily, Italy and France) were but the last ramifications of the Arab exodus and hence could add but little by the way some territory.

For the Christians of Western Europe, the Arab dominance over older centers of world civilization was a scourge of God inflicted by another barbarous people.<sup>(1)</sup> Yet unlike former ones, the Arabs were not to be easily assimilated by the peoples they conquered. On the contrary once Islam struck root among the conquered people it tended to become a lasting phenomenon within the Islamic world or *Dar al-Islam* except in the Iberian peninsula.

The resounding Muslim victories were due partly to the sense of mission that the new faith had triggered off, and partly to a high military efficiency reinforced by a blossoming new world civilization.

When the Arabs emerged from their desert, though equipped with a revealed religion whose message encompasses all aspects of human life both what man does and what he makes,<sup>(2)</sup> they had as far as science is concerned a lot to learn from their subjects. The first tracts of land that the Arabs had conquered, extending from central

Asia to Spain were destined to become the heartland of *Dar al-Islam* where the message of Islam was consolidated and where Islamic sciences were cultivated and developed. There the Muslim Arabs became heirs to the intellectual legacy of ancient civilizations such as those of Greece, Persia and India. The interaction of Islamic ideals and the intellectual traditions of "Antiquity" gave birth to Arabic sciences and Islamic civilization with Arabic as the main language of learning and communication "Islamic sciences", to quote Professor Seyyed Hossein Nasr, "came into being from a wedding between the spirit that ensued from the Quranic revelation and existing sciences of various civilizations which Islam inherited and which it transmuted through its spiritual power into a new substance, at once different from and continuous with what had existed before it" (3).

Islam did not simply act as transmitter over which the science and the wisdom of the ancient world passed to mediaeval Europe as is claimed by some. In some respects Islam acted as a catalyst synthesizing various scientific traditions and integrating them within the boundaries of the Quranic norms. "As a matter of fact", argues Professor S.H. Nasr, "nothing could be further from the truth, for no idea, theory or doctrine entered the citadel of Islamic thought unless it became first Muslimized and integrated into the total world view of Islam. Whatever could not make its peace (*salam*) with Islam was sooner or later dispelled from the arena of Islamic intellectual life or relegated completely to the margin of the tapestry of Islamic science" (4).

As early as the eighth century the Arabs became aware of the intellectual attainments of the peoples they had conquered or encountered. In Syria, Egypt, Iraq and Persia, the Muslim Arabs began to acquire the sciences of the ancient civilizations. One of the principal first translators through whom Christian doctrine and Greek thought were acquired was St. John of Damascus (d.748 A.D). St. John, a Syrian scholar, was proficient in Aramaic, Arabic and Greek. Among his works is a dialogue with a "Saracen" on the divinity of Christ and the freedom of human will.

But the most important intellectual awakening in the history of Islamic civilization is associated with the Abbasid Caliphs under whose patronage translations ( especially between 750-850 A.D.) from such languages as Syriac, Greek, Pehlavi and Sanskrit were made. During that century Arabic translations of the principal works of Aristotle, Ptolemy, Neo-Platonic commentators, the medical writings of Galen, and Hippocrates, Indian mathematical science and Persian literary works were made available to Muslim scholars. Special academies such as *Bayt al-Hikma* of the Caliph al-Ma'mun were actively engaged in the process of translation.

The transmission of ancient knowledge and the cultivation of Islamic sciences was stimulated by two factors. Firstly an inner motive or need to *know* in conformity with religious ideals as expressed in the *Qur'an* and prophetic traditions: the Prophet Muhammad had said: "the quest for knowledge is obligatory for every Muslim". Indeed Islam regards knowledge or *'ilm* as sacred, because all knowledge is basically related to an aspect of God's theophany. For this reason the pursuit of knowledge in general and education in particular has always occupied a central position in Islamic civilization. Traditional religious subjects were taught in mosques or in *madrases* or schools closely associated with them. Few of these *madrases* developed into full fledged universities around the eleventh century. There, a variety of sciences were taught.

Although the majority was of religious nature, others included philosophy, logic, mathematics and astronomy. Medicine was taught in leading hospitals. Another important scientific institution was the observatory in which both research and teaching of astronomy took place. Later *sufi* (mystic) centres were used for training and teaching esoteric sciences.

The second stimulating factor in the process of translation was the existence of religious minorities, Christians and Jews, many of whom were well versed in the languages of ancient civilizations. The translations made by non- Muslims provided some of the basic data that Muslim scholars studied and adapted to their own scientific needs in the field of intellectual sciences or *al-'ulum al-'aqliyya*. Needless to

say these minorities, as well as non-Arab Muslims made notable contributions to Islamic civilization and its scientific and literary manifestations of the early cultures with which the Muslim Arabs came to be associated, it was the Greek heritage that came to occupy most of the Hellenized Christians (and to lesser extent Hellenized Persians) constituted the bulk of the indigenous population in the central lands of Islam. Secondly in their attempt to resist the perpetual challenges posed by Christian monotheism to Islam, Arab thinkers found in Greek dialectics (and in Platonics, Neo-Platonic, and Aristotelian traditions) a means by which to achieve their objective. In consequence they came to appreciate and assimilate their achievements in the fields of medicine and science as well.

The huge output of the translation movement resulted in widening scientific interest as displayed in the authorship of numerous books and treatises. Many of these translations of ancient heritage contained a lot of original contributions in the form of commentaries and continuations. Such was the case in the works of *Qustā b. Lūqā* (b. 835), Hunayn b. Ishaq (d.873) and his son Ishaq (d.910), and many others.

However by the middle of the tenth century independent Arabic writings on philosophy were authored by al-Kindi (d. 850), al-Fārābī (d.950), Ibn Sina (d.1037), Ikhwan al-safa (ca. 970), and Abu Hamid al-Ghazali (d. 1111); on mathematics by al-Khuwarizmi (b. 844) and Thabīṭ b. Qurra (d.855) and on medicine by Ibn Masawayh (d.859) and al-Razi (d.c.923). Impressive contributions were also noted in the works of Yahya ibn abi Mansur (d.831) al-Battani (d.918) and al-Biruni (d.1048). The last named scholar, who read Persian, Arabic, Turkish, Sanskrit, Hebrew and Syriac made significant contributions in the domain of natural sciences. After medicine, mathematics and astronomy, Muslim scholars excelled in chemistry, the most important in this respect were al-Razi and Jabir b. Hayyan (VIII c.)<sup>(5)</sup>.

This list is but a mere indicator to the works of some leading scholars. The total production is both impressive and comprehensive, it embraces the transmitted sciences (*al-'ulum al-naqliyyah*), the

religious sciences, Arabic grammar and literature, as well as intellectual sciences just alluded to. Some of the leading Muslim scholars were quite at home in more than one scientific domain; some *have* left their imprint in philosophy, medicine, natural sciences as well as religious subjects. To those scholars a study of philosophy (was not unrelated to the medical and natural sciences).<sup>(6)</sup> Hence the same book often included both science and philosophy. Confronted with the interaction of the translations of pre-Islamic sciences, and the immense body of religious sciences, Muslim scholars embarked on the categorization or classification of those sciences in order to establish a hierarchy of knowledge and to bridge the gap between revelation and reason or religion and science.<sup>(7)</sup>

The complexity of mediaeval Islamic knowledge and the attempt to classify it is best illustrated by the academic attainments of the following scholars: al Kindi who was regarded as a philosopher, astrologer alchemist, optician and music theorist, was the first Muslim to (accomplish a system of thought based on the logic of Greek philosophy).<sup>(8)</sup> Realizing that there was a gap between Islamic thought and Greek ideas he tried to reconcile the two, he turned to this problem in his book *Fi aqasam al'ulum* (On the types of sciences). The same point was elaborately taken up by al-Farabi in his book, *kitab ihisa al'ulum* ( the enumeration of the sciences ) which had a wider impact over the curricula of Muslim universities as well as those of western Europe. AL-Farabi followed closely the Aristotelian categorization of the sciences. After studying philosophy, medicine, mathematics, chemistry and music he was concerned with the reconciliation the *Shair'a* the revealed holy law of Islam, philosophy, which he associated with the ideas of Plato and Aristotle.

Following al-Farabi's lead in logic, epistemology and metaphysics, Ibn Sina enriched the disciplines with more details. However, his most celebrated works are *Kitab al-shifa* (book of Healing) and *al-Qamun fi al-tib* (Canon in medicine). The first is a philosophical encyclopaedia based upon Aristotelian; neo-Platonic and Muslim theology. The second book embodied the specifications of Graeco-Arabic medical thought. His philosophical ideas, like those of other philosophers, were

attacked and severely criticized by al-Ghazali in his *Tahafut al-falasifah* (the incoherence of the philosophers) for their excessive reliance on rationalism.

From Muslim Spain Ibn Rushd, Averroes (d.1198) in his *Tahafut Al-tahafut* (the incoherence in the incoherence) tried to rebut al-Ghazali's charges against the philosophers. He sought to reconcile religion in *Fasl-al-maqal fi ma bayn al-hikma wa'l-shari'a min ittisal*. He was however, better known in Western Europe primarily as a commentator on Aristotle's thought. His writings had a great impact on mediaeval European thought.<sup>(9)</sup>

Amongst Muslim scholars who were influenced by pre-Islamic thought and had a profound intellectual impact on future development were al-Ghazali and Ibn Khaldun (d.1406).

Al-Ghazali was a jurist, a theologian, a *sufi* (mystic), a religious reformer, and an original thinker. His study of philosophy and his employment of Greek dialectics led to the use of logic in Islamic theology. In his major works *Ihya' ulum al-din* (the revival of the sciences of religion), *al-Iqtisad fi al-i'tiqad* and *Fatihah al-'ulum* al-Ghazali defended Islamic faith and reaffirmed that *tasawwuf* (mysticism) is both knowledge and action. As a result of his teachings *sufism* became respectable and in conformity with the *Shari'a*. Hence al-Ghazali emerged as the final authority on *Sunni* (orthodox) Islam. Excerpts of his writings, translated into Latin before 1150 A.D., had marked influence on Christian scholasticism.<sup>(10)</sup> St. Thomas Aquinas, the great Christian theologian, was indirectly influenced by al-Ghazali's ideas.

Ibn Khaldun is the example of former Muslim Hellenistic philosopher in dividing knowledge into two categories: that of the rational truth where reason is the yard stick and umpire, and that of the spiritual truth where revelation and prophecy are for ever at variance and irreconcilable. As an historian Ibn Khaldun's originality rests on his *Muqaddima*. There he argued that societies and civilizations, like moral beings, grow, mature and age. In his exposition of his cyclical view of history Ibn Khaldun was inclined to concentrate on social

phenomena. He was hence esteemed for creating a new science which approximates both sociology and philosophy of history.

The achievements of these thinkers in Arabic literature and Islamic sciences constitute the culminating point of diversity and originality. Such an accomplishment would not have been possible without the significant role of Arabic, the language of classical poetry, the Qur'an and religious sciences. As a linguistic instrument Arabic developed technical terminologies, fine shades of sophisticated ideas of various sciences, and new capabilities beyond the range of pre-Islamic Arabic language. Within the domains of this blossoming language Arabo-Islamic sciences were nourished and perpetually sustained. Arabic became the universal language, carrier of Islamic sciences and Arabic culture and its successful propagator beyond the political boundaries of *Dar al-Islam*.<sup>(11)</sup>

Western Christendom became aware of the intellectual attainments of the "barbarous Saracens" (a term used by Europeans in the early middle ages to refer to the Arabs and the Muslims in general) only when the initial wave of Arab conquest had subsided. This was partly the outcome of contact undertaken by Christian envoys, traders and pilgrims. Such knowledge would also have been preceded in border areas where larger communities of Arab Muslims and Latin Christians intermingled. The obvious areas of communal contacts between the two conflicting polities were the Iberian Peninsula, Southern France, Sicily and Southern Italy. However, since space does not permit a detailed analysis of the impact of the Arabic-Islamic factor on these regions, I shall restrict my remarks to Muslim Spain and Sicily.

While the eastern section of the Islamic worlds was approaching its Golden Age under the Abbasids, the western section, under the Umayyads was enjoying a similar period of splendour. Here for more than seven centuries the Arabs, "the most dynamic component of the Islamic faith"<sup>(12)</sup> together with the Arabized and Islamized Berbers were able to infiltrate and interact with the Hispano-Roman culture.

'Abd al-Rahman al-Dakhil (756-788) the new Umayyad *amir* initiated the intellectual movement which made Cordova, the Umayyad capital, the most cultured city in Europe. Under al-Hakim II (961-976) who was himself a scholar and a patron of learning, Cordova attained its zenith and became a worthy rival of Baghdad. Al-Hakim spent lavishly on scholars and established twenty seven free schools in the capital. During his reign, the University of Cordova, instituted in the great mosque by 'Abd al-Rahman III (912-961) became a center of pre-eminence among educational centres of the world. It attracted students, Muslims and Christians from Spain as well as Europe, Africa and Asia. Al-Hakim invited scholars from the East to the University. Besides the University, Cordova housed a library of great magnitude. Al-Hakim's own collection which he obtained from Alexandria, Damascus and Baghdad, was said to have numbered 400,000 volumes. Many other centres of learning came into existence such as those of Toledo, Seville, Barcelona and Granada. Indeed the general state of culture reached such a high level that Dozy declared that "nearly every one could read and write."<sup>(13)</sup> It is therefore not surprising that besides class-lessons, books became of paramount importance in the dissemination of knowledge.

The Umayyad Caliphate of al-Andalus had an ethnically mixed population. The number of the original Arabs though small was augmented by their partners in the conquest- the Berbers- and the Christian converts or *muwalladun* who were assimilated into the Arab sector. The chief motive for adhering to Islam was perhaps a desire to be associated with a higher and a more attractive civilization. The rest of the population remained faithful to their Christian faith. They learned to speak Arabic and adopted many facets of Islamic culture. They were known as Mozarabs or *musta'ribun*. There was also a number of Jews in the chief cities (they had a significant role in the translation of Islamic works into European languages). Although the Spanish Christians were later to evoke the spirit of *Reconquista* for independence they seem to have accepted the mode of life that had developed in Arab Spain except its religious aspect.<sup>(14)</sup> The Arab influence among the Mozarabs is best gleaned from a passage which

occurs in the writings of Alvaro of Cordova: "many of my fellow Christians read Arab poetry and stories, and study the works of Mohammedan philosophers and theologians, not with the object of refuting them but to learn to express themselves in Arabic with greater elegance and correctness."<sup>(15)</sup>

The Muslim world was of great interest to the Mozarabs and Latin Christians as a source of a superior civilization. What intrigued them most was not its political might, military vigour or religious perceptions- which they dismissed as hostile and erroneous- it was its scholarly and intellectual achievements albeit not the Islamic aspect. To them the "Saracens" appeared in some respects as a "philosophical nation". They discovered that the "barbarous infidels" possessed Arabic translations of the wisdom of ancient civilizations particularly that of Greece. The Arabs, as we have noted earlier, translated the lofty ideas of Plato and Aristotle, the scientific data of Hippocrates, Galen, Ptolemy and many others. These translations were not left unaffected. Arab scholars advanced their own comments, elaborations and at times produced original contributions. Indeed a serious attempt was made to integrate ancient heritage and harmonize it with Islamic ideals. Thus Greek heritage was by and large transmitted in two categories: translations of Greek works with commentary and original books in Arabic by Muslim Scholars. Arab Spain was able to benefit from these cultural advances as well as its own scholarly contribution which is best illustrated by that of Ibn Rushd, Ibn Hazm and Ibn al-'Arabi.

Thus Islamic civilization performed the role of a teacher and inspirer to mediaeval Europe in a wide range of subjects such as philosophy, medicine, mathematics, astronomy, astrology, chemistry as well as its own literature and notions of eschatology and piety.

It was from Arabic and Mozarabic Spain that Islamic culture was transmitted into Western Europe, Mozarabs, Jews and in some cases Arabs were engaged in rendering it into Latin. The first translations were made in Catalonia in about the tenth century. In Barcelona, between 1116 and 1138, the Italian Plato of Tivoli assisted by the Spanish Jew, Abraham ban Hiyya, called Savsorda *Sahib al-*

*Shurta* translated Arabic works on astrology and astronomy including the astronomical tables of al-Battani. About the same time Toledo, which was reconquered from the Muslims in 1085, became the principal channel of such activities. Under the auspice of its archbishop Raymond I (1126-1151), the "Toledo school" attracted a number of scholars from different parts of Europe. Among the leading translators were Dominicus Gundisalvi (d.1181), archdeacon of Segovia, and Gerard of Cremona (1114-1187). They were assisted and advised in linguistic matters, respectively by the converted Jew John Avendeth Ibn Da'ud, Johannes Hispanus) and the Mozarab Galippus (Ghalib). Although Latin scholars availed themselves of the services of Mozarabs and Jews who were erudite in Arabic they produced a number of translations independently.

Dominicus Gundisalvi was the chief translator of philosophers like al-Farabi's *Liber de scientis, De intellectu*; al-Kindi's *De intellectu*, al-Ghazali's *Maqasid al-falasifa*, Ibn Sina's Metaphysics, physics and others. Gerard of Cremona had rendered into Latin the whole range of Hellenistic-Arab science. He translated Ibn Sina's *Canon of medicine*; al-Fraghani's version of Ptolemy's *almagest*, Euclid's elements; al-Farabi's commentary on Aristotle and various treatise of Aristotle, Galen, Hippocrates, Thabit b. Qurra, al-Khuwarizmi, al-Razi, al-Kindi and al-Zarqali about seventy works in all.

Among members of the "Toledan school" were three Britons: Adelard of Bath, who after visiting Syria and Sicily translated in 1126 the astronomical tables of al-Majriti based on al-Khuwarizmi and some works of Euclid and Abu Ma'shar, Robert of Chester produced (with the help of the Slav Herman the Dalmatian) in 1143 the first Latin version of the Qur'an, and independently al-Battani, and Michael Scot (d.c.1136), who studied and worked in Toledo, translated al-Bitruji's astronomy, al-Hay'ah, Aristotle's *De coelo et mundo* with Ibn Rushd's commentary, he translated similar works- later in Sicily.

A second group of translators, at first under the patronage of another archbishop of Toledo, Rodrigo Jiménes de Rada (1170-1247) and then continued in the court of Alfonso X, the Wise, here Herman the German made translations of Aristotle, al-Farabi and Ibn Rushd, and in 1256, Egidio de Tebaldis of Parma and Pietro da Reggio

translated the astrological treatises of Ibn Abi'l-Rijal and Ptolemy's *Quadripartium*. The last notable Spanish translator according to Professor Francesco Gabrieli was Arnold of Villanova (d. 1312). He translated medical works including those of Ibn Sina and Galen.<sup>(16)</sup> This is but a brief indication of a long list of translated material.

Gradually Latin translations of scientific philosophical and (to some extent) literary works spread to Lorraine, to Salerno and to England. Their influence in Spain and across the Pyrenees was both dynamic and fruitful. They stimulated a wide range of intellectual achievements. The Spanish Jesuit Andres was not off the mark when he enthusiastically observed in the eighteenth century that the establishment of sound learning in Europe after the decline Graeco-Roman civilization was due to Arabic culture.<sup>(17)</sup>

Though Spain was the principal channel of cultural dissemination it was by no means the only one. Some aspects of Muslim knowledge came by way of Byzantium well before the Spanish transmission was effected. The general impact of the crusades was very slight. Indeed the total output of Stephen of Antioch and Phillip of Tripoli who rendered translations in Syria during the crusades was small compared with that Toledo or Plaermo. Yet after Spain, the second important centre of cultural diffusion or mediation- by a long distance- was the Island of Sicily.<sup>(18)</sup>

The Arabs launched their first raid against Sicily from Syria in 652 A.D. Periodic forays continued up to 827 when the Aghlabids departed from Tunisia. After alternating fortunes they occupied Palermo in 830 thus obtaining a foothold in Sicily. However it took them some seventy years to complete their mastery over the island. Under the turbulent Arab governors whose hegemony lasted up to 1160, Sicily was transformed into a Muslim province within *Dar al-Islam*.

Although the Arabs achieved both political and religious dominance unrivalled for 150 years the domestic situation was rather unsettled. Three factors might have led to this result. Firstly the final authority over the island changed hands three times. Sicily was ruled by the Aghlabids from al-Qayrawan, the Abbasids from Baghdad and the Fatimids from Cairo in that order. Secondly the invading army which consisted mainly of Tunisian Arabs and Islamized Berbers were

in constant friction. Relations among the Arab fighters did not fare better. They were embittered by periodic feuds emanating from older tribal differences between the south Arabians- including the Kalbis- and the North Arabians. Thirdly, just as Spain was used as the spring board for further raids to the North so was Sicily with respect to Italy.

Shortly after the fall of Plaermo, the Aghlabids army interfered, on invitation, in the fights of the rival Lombards in Southern Italy and those of Naples in 837. In 841 they captured Bari on the Adriatic, and five years later sacked the cathedrals of St. Peter and St. Paul in Rome. The Arabs' menace was apparently so great that Pope Paul XIII (872-882) offered to pay Muslims a two years tribute. At the beginning of the eleventh century the Arabs sacked the cities of Cagliari and Pisa. In 1015 they were besieging Salerno, when a group of Normans compelled them to withdraw. These incursions, while causing great havoc, did not lead to the establishment of permanent settlements or stable Muslim government except for the two short lived emirates of Bari and Taranto.

Furthermore, the original inhabitants, the Punics, Greeks and Latin's of Sicily (unlike the Spaniards at the time of Arab conquest) offered tenacious resistance and did not embrace Islam easily. They remained faithful to Christianity and to their respective cultures. As Christians they were tolerated as *dhimmis* or protected subjects according to Islamic Law.<sup>(19)</sup>

It was only during the time of the Kalbi dynasty ( 948-1060) that the basis of a stable government were laid down and Arab culture afforded an opportunity to flourish in this polyglot island. Nonetheless the Muslims constituted the dominant class which included the using Arab elite, warriors, landowners, merchants and artisans.

The Kalbi *amirs* adorned their flourishing capital, Palermo, with attractive palaces and maintained enlightened courts. According to ibn Hawqal (947-977) the Arab geographer and traveler, Plaermo had about three hundred mosques and a similar number of public school teachers. A number of scholars were attracted to Sicily from older centers of Islamic learning. books were obtained from the East, Andalusia and al-Qayrawan. These books dealt with religious sciences,

philology, Malikite and Ash'arite writings. The books of Abu Hayyan al-Tawhidi, al-Tha'alibi, Ibn al-Muqaffa' and Ibn Rashiq were in circulation. There was also some interest in the study of philosophy, medicine and astrology.<sup>(20)</sup>

The last decades of the Kalbi regime, hitherto too engrossed in wars, witnessed the establishment of stable rule, economic prosperity (based on extensive commercial activities, agricultural development and booty) and the assimilation of Muslim sciences. The appearance of Sicilian poets and scholars was a sign of cultural majority. Cultural integration between the Arabo-Islamic and Graeco-Latin element was slowly manifesting itself. A clear illustration of this progress was the collaboration of 'Abd Allah, a Sicilian scholar proficient in philological and technological topics, in the Arabic translation of Dioscorides treatise in botany from Greek.<sup>(21)</sup>

Another example, probably the earliest of its kind chronologically, came from Salerno, in southern Italy, an area hardly affected by Muslim culture, where was the role of the Tunisian Muslim converted to Christianity, Constanine africanus (d. 1087). While attached to the medical school of salerno, he produced a series of medical translations (and adaptations) from Arabic into Latin. They included the writings of Galen and Hippocrates, *Kamil al-sina'a al-tibbiyya* by 'Ali b al-'Abbas al-Majusi and *Zad al-musafir* by Ishaq al-Israili.

The period of Arab domination over Sicily was in a sense, the preparatory stage for the more notable intellectual contribution under the Normans.

In 1091, the Normans under count Roger de Hauteville completed the conquest of Sicily and made an end to the Arab rule. However, he took over the Arab system of administration as well as the basic elements of Islamic civilization in the intellectual domain and in the arts. King Roger I did not fail to realize that the "Muslims exceeded the Greeks and Latins in numbers and in talents"<sup>(22)</sup>; he treated them well, appointed some of them to high posts and drew the bulk of his infantry from their ranks. He also fostered Arab learning and surrounded himself with oriental philosophers, astrologers and

physicians. The Muslims in return, as vassals contributed to the establishment of the new kingdom and obeyed him. At the same time they continued to maintain control over trade and cultivation, which they enriched with fruits and vegetables. Arab craftsmen and artisans were employed in the construction of monuments that adorned Plaermo.<sup>(23)</sup>

By his open handed patronage of learning, sciences and letters Roger I and his successors, especially Roger II (1130-1154) and Frederick II (1215-1250), Sicily was able to get to new cultural horizons.

Thanks to its unique position as across-road of cultural currents, Arabo-Islamic and Graeco-Roman, Sicily became a medium of transmitting ancient and mediaeval legacies. This operation was facilitated by the existence of Greek and Arabic speaking Sicilians as well as scholars who knew Latin. All these factors led to the blossoming of sciences and letters in the eleventh and twelfth centuries and to its transmission to Europe in a manner similar to that of Arab Spain, albeit to a lesser extent.<sup>(24)</sup>

Prompted by a keen interest in the study of ancient sciences such as logic, astronomy, geometry, medicine and music, the magnanimous and liberal Norman Kings attracted scholars from all over the Islamic world and Europe.

While in the service of Roger II al-Idrisi (d.1166) the distinguished Arab geographer and cartographer produced two monumental geographical works: he drew a world map on a ball of silver (in addition to seventy one maps) and the book of Roger or *Nuzhat al-mushtaq fi ikhtiraq al-āfaq*. Both works were based primarily on field report prepared by observers from various lands, and on Hellenistic and earlier Islamic sources. These works marked the apogee of Islamic geography and cartography.<sup>(25)</sup>

Among scholars that gathered in Frederick II's court were William Figuerra, Lafranco Cigala, sordelle Nillus, Doxa Patrius (the Greek author) and Amir Eugenius of Palermo, who translated from Greek Ptolemys Optics and Plato's *al magest*. Probably the gem of Frederick II's translators was his own court astrologer, Michael Scot,

who had already produced notable translations at Toledo. His major production in Palermo was a Latin summary of Ibn Sina's version of Aristotle's zoology, *Abbreviatio Avicenna de animalibus*. To Frederick he dedicated his oven *magnum opus*, a book of astrology. Frederick II also commissioned Theodore, a Jacobite Christian from Antioch, to translate an Arabic treatise on falconry. This translation and another from Persian became the basis for Frederick's own book on the same subject.<sup>(26)</sup>

The Jews of Sicily, like those of Spain, undertook the translation of some important works. *Al-Hāwī* or *continens*, al-Razi's great medical encyclopaedia was done into Latin by Fraj ben Salim in 1279 and, likewise *Tahafut al-tahafut* of Ibn Rushd, by Kalonymos ben Kalonymos<sup>(27)</sup>

Any how, probably the greatest contribution of Frederick II, also as king of southern Italy, was his establishment by royal charter, the University of Naples. Here Frederick II fulfilled his personal ambition of bringing together the three important mediaeval cultures, Arabic, Greek and Latin into an atmosphere of intellectual collaboration. He endowed the new university with numerous Arabic books, and had copies of the works translated in Sicily sent to the Universities of Bologna and Paris.<sup>(27)</sup>

Sicily also had its share in channeling Arabic technical terms and loan- words in Latin and other European language. The Sicilian role, which is more evident in terms referring to business, trade (materials and articles) and agriculture, also incorporated astronomy, astrology, mathematics, chemistry, pharmacology, medicine, philosophy and the techniques of arts and architecture, almost the full range of scientific and cultural transmission.

These loan-words covered both material and intellectual aspects of life. Although it would be difficult to gauge the magnitude of the Sicilian role in this respect, I tend to support Professor Francescco Gabrieli's view that a great part of the loan-words "can not be considered of specific Arabo-Sicilian origin".<sup>(28)</sup> Indeed whatever their origin, Arab Spain, Sicily or the crusades, they constitute an

adequate proof of the general impact of Arab culture on western Europe.

The transmission of Arabo-Islamic learning was made possible by the Arab conquest of the Iberian Peninsula and Sicily. Spain was subjected to Arab rule for almost eight hundred years during which Arab culture and Islamic faith were firmly rooted: they left indelible marks ethnically, culturally and linguistically. The Arab rule in Sicily (and parts of southern Italy) was shorter, and the cultural influence was restricted and less lasting. None the less the cultural impact was probably not less intensive than in Andalusia. The Arabs were not expelled by force from Norman Sicily and hence they continued to exert a lot of influence.

It was from these two regions that Arabo-Islamic culture was vigorously transmitted to Western Europe. Spain was the main channel of cultural diffusion.

The Greek heritage that Christian Europe keenly sought to acquire from the Arabs was already incorporated and harmonized in Islamic sciences. The Arabo-Islamic sciences were not merely an echo of Greek philosophy but a well integrated a body of knowledge, fortified by Islamic ideals, enriched by independent commentaries and original contributions. Thus far from being mere translations of the philosophical ideas and scientific heritage of Greece, the Arabs became the teachers and inspirers of ancient and mediaeval heritage to western Europe. The translation of Arabo-Islamic sciences from Arabic into Latin that occupied most of the eleventh and twelfth centuries were destined to aid in reviving western sciences and giving them new impetus.<sup>(29)</sup>

The Arabo-Islamic transmission well embraced scientific knowledge, philosophical conceptions, techniques of applied science and some aspects of form in literature and visual arts.

**Endnotes**

- (1) G. Crespi, *The Arabs in Europe*, New York, 1979, p.10.
- (2) Seyyed Hossein Nasr, *Islamic Science*, World of Islam Festival Publishing Company, Westerham, Kent 1976, p.3.
- (3) *Ibid.* p.9.
- (4) *Ibid.* p.9.
- (5) Isma'il R al-Faruqi and Louis L. al-Faruqi, *The Cultural Atlas of Islam*, Macmillan Publishing Co. New York 1986 .p. 305.
- (6) Nasr, op. cit, p.14.
- (7) Al-Faruqi and Al-Faruqi, p.305.
- (8) *Ibid.*, p. 305- 308; Nasr, op. cit., p. 14; Hitti, op.cit.,p.368.
- (9) al-Faruqi and al-Faruqi, op. cit. p. 313;S. Pines, "Philosophy" in P.M. Holt et al, the *Cambridge History of Islam*, II, Cambridge, 197- P. 659-662, (Arabiyya), *Encyclopedia of Islam*, I,pp.567- 570.
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- (20) Gabrieli, op. cit., in Holt, op. cit.; 435.
- (21) Dunlop, op. cit., p. 30; Gabrieli, op. in Holt, op. cit.; 861.
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- (23) Ibid., II, p. 438.
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