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The Impact of Islamic Science and Learning on England

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THE IMPACT OF ISLAMIC SCIENCE AND LEARNING ON ENGLAND

Von Grunebaum tells that "Modern Muslim society as a whole is lamentably ignorant of the origin, development, and achievements of its civilisation. This ignorance," he continues, "is due partly to a defective educational system and partly to absorption by the adjustment problems of the moment. Moreover, scientific research methods have not yet found universal acceptance."[1]

This last statement raises two interesting issues. First, the obvious: Muslim society, as a whole, has no idea of the impact its civilisation has exerted on the modern world, on modern science and civilisation. Hardly will it occur to most Muslims that the English speaking world, which dominates our modern civilisation, mainly via America, had at some point acquired its learning and science from the Muslims. Second, and equally obvious: if the Muslims themselves ignore their contribution, why should others acknowledge it for them? Hence, a general great silence issues from the English-speaking world, as well as from other speech communities, about the Islamic contribution to their scientific revival.

This paper seeks to address the aforementioned issues. Obviously it is not going to say everything; more able minds can attempt that. What is offered here is just an outline of how Islamic civilisation impacted on the rise of science and learning in England, and on aspects of English architecture.

In order to do so, what is required, first and foremost, is a brief outline of the condition of both civilisations, Muslim and English, and the sharp contrasts between the two, so as to appreciate fully the scope of the Muslims' impact.

Contrasts between Islamic and English societies:

"The glimmering lamp of knowledge was sustained when it was all but ready to die out. By the Arabians it was handed down to us," says Draper.[2] His brief statement means nothing, or everything if it is substantiated. Scott, Haskins and Metlitzki help in this respect to highlight the dire state of learning and civilisation in the West, including England, and how it was the Muslims who kept learning and civilisation alive, before they passed the light of knowledge as Draper says.

Tenth century Andalusia, Scott tells,[3] was traversed in every direction by magnificent aqueducts; Cordova was a city of fountains; its thoroughfares, for a distance of miles, were brilliantly illuminated, substantially paved, kept in excellent repair, regularly patrolled by guardians of the peace. In London, in contrast, there were no pavements until the fourteenth; at night the city was shrouded in inky darkness; that it was not until the close of the reign of Charles II (17th century) that even a defective system of street lighting was adopted in London. The mortality of the plague is a convincing proof of the unsanitary conditions that

[1] G.E. Von Grunebaum: *Islam,* Greenwood Press, Publishers, 1961. p.185.
[2] J.W. Draper: *A History of the Intellectual Development of Europe*, 2 vols, George Bell and Son, London, 1875. Vol I; p. 390.
[3] S.P. Scott: *History of the Moorish Empire in Europe*, 3 vols; J.B. Lippincott Company, Philadelphia and London, 1904. vol 3; pp 518-21.

everywhere prevailed; the supply of water was derived from the polluted river or from wells reeking with contamination.

Back in Spain, Scott pursues, the annual receipts of the state from all sources under Abd-al-Rahman III, in the first half of the tenth century exceeded three hundred million dollars; the revenues of the English Crown at the close of the seventeenth century were fifteen million. The inhabitants of England at the death of Elizabeth were about four million; the population of Muslim Spain six centuries previous to that date could not have been less than thirty million. In 1700, London, the most populous city of Christian Europe, was only half as large as Cordova was in 900, when Almeria and Seville had each as numerous a population as the capital of the British Empire eight hundred years afterwards. At the dawn of the eleventh century the Muslim dominions of Sicily and Spain presented a picture of universal cultivation and consequent prosperity, where industry was promoted and idleness was punished; where an enlightened spirit of humanity had provided asylums within whose walls the infirm and the aged might pass their remaining days in comfort and peace. Six hundred years afterwards what are now the richest and most valuable agricultural districts of Great Britain were unclaimed and uninhabitable bog and coppice, abandoned to game and frequented by robbers; and one-fourth of the inhabitants of England, incapable of the task of self-support, were during the greater part of the year dependent upon public charity, for which purpose a sum equal to one-half of the revenues of the crown was annually disbursed. In the middle of the tenth century, there were nine hundred public baths in the capital of Moorish Spain; in the eighteenth century there were not as many in all the countries of Christian Europe.[4]

With regard to learning, England, like other lands of Western Christendom, was in a lamentable condition. The chief centres of culture, Haskins tells, were the monasteries, islands in a sea of ignorance and barbarism, saving learning from extinction in Western Europe at a time when no other forces worked strongly to that end.[5] "When we remember," Lane Poole observes, "that the sketch we are about to extract from the records of Arabian writers concerning the glories of Cordova, relate to the tenth century, when our (English) Saxon ancestors dwelt in wooden hovels and trod upon dirty straw, when our language was unformed, and such accomplishments as reading and writing were almost confined to a few monks, we can to some extent realize the extraordinary civilisation of the Moors."[6]

From what his friends told him of England, Adelard, the first English scientist, on whom plenty more further down, gathered that: "violence ruled among the nobles, drunkenness among the prelates, corruptibility among the judges, fickleness among the patrons, and hypocrisy among the citizens; mendacious promises were given lightly, friends were invidious, and almost all whom one met courting favours. The coming anarchy of the reign of Stephen was on its way. Nothing seemed more distasteful to Adelard than to submit to this `misery'. Being unable to avert `this moral degeneration,' he decided to ignore it, holding a unique consolation-his enthusiasm for *Arabum studia*" (Arab Studies).[7]

Adelard returned to England "in the reign of Henry, son of William,'' having left it before 1100 to spend seven years learning in the Muslim East. His *Quaestiones Naturales,* which he composed for the benefit of "his nephew," praises Muslim learning, in contrast with his feeling of misery about learning in England. *The*

[4] S.P.Scott: History; op cit; pp 518-521.
[5] C.H. Haskins: *The Renaissance of the twelfth Century*, Harvard University Press, 1927: 32-4.
[6] S. Lane-Poole: *The Moors in Spain*; Fisher Unwin; London; 1888. pp. 129-30.
[7] Dorothee Metlitzki: *The Matter of Araby in Medieval England*, Yale University press, 1977. p.13.

Quaestiones Naturales, in the form of a dialogue between him and his imaginary nephew, is essentially a report of Adelard's grand tour and reflects his excitement at the new scientific outlook of the Muslims which had left the Latin schools far behind.[8]

Nothing contrasts more the discrepancies in learning as the place accorded to books. Scott tells that the library of Mostandir, Sultan of Egypt, contained eighty thousand volumes, and that of Tripoli, two hundred thousand. He tells that in the thirteenth century, when Bagdad was sacked by the Mongols, the books cast into the Tigris completely covered its surface, and their ink dyed its waters black, while a far greater number were destroyed by fire. The public collections of the Caliphate of Spain were seventy in number, and the great library of A1-Hakem II, alone, included six hundred thousand volumes. The private collections of many individuals were proportionately large. In that of Ibn-al-Mathran, the physician of Salah Eddin, were ten thousand manuscripts.[9]

Four centuries later, few books existed in Christian Europe except those preserved in monasteries; the royal library of France consisted of nine hundred volumes, two-thirds of which were theological works; their subjects were limited to pious homilies, the miracles of saints, the duties of obedience to ecclesiastical superiors. Their sole merit consisted in the elegance of their chirography and the beauty of their illuminations.[10] This can be said even of the contents of the illustrious Santa Maria de Ripoll, at its height under Abbot Oliva (1008-46), from whose time we have a catalogue of its notable library of two hundred and forty six titles.[11]

Under Muslim rule, it was difficult to encounter even a Muslim peasant who could not read and write. During the same period in Europe, many great personages could not boast these accomplishments. Furthermore, from the 9th to the 13th century, the Spanish Muslims possessed an educational system not inferior to the most improved ones of modern times. They taught astronomy from globes and planispheres; they measured the circumference of the earth; they observed the motions of the planets; they calculated the density of the atmosphere; they were familiar with the natural and artificial conditions under which vapours and gases are generated.[12]

One can go on with the flowery language for much longer. It is no longer necessary, though. This contrast between civilizations is not presented for the purpose of gloating about the superiority of Muslim civilisation over that of barbarian Europe, and all aspects of such a contrast. Nor is it aimed at ridiculing Muslims today, for how low they have descended since their time of glory. Instead, its aim is to highlight the fact that it is impossible for backward Western Europe (including England, of course) to live next to a society much more evolved, and not to have borrowed from its elements of civilisation, just as today Muslims borrow from the West. Hence, the argument that one finds in most English history - that England leapt from barbarism into light through its own internal genius, without borrowing from Islam the elements which will be found in England soon after contact with Islam was made - is a preposterous notion. In the following, it is shown how England acquired many aspects of learning and civilisation from Islam.

[8] Dorothee Metlitzki: The matter; p.29.
[9] S.P.Scott: History; op cit; Vol 3; pp. 522-3.
[10] S.P.Scott: History; Vol 3; pp. 522-3.
[11] C.H. Haskins: The Renaissance. Op cit; Pp. 41-2.
[12] S.P.Scott: History; Vol 3; pp. 522-3.

Early contacts:

English contacts with Muslim learning began via a third party, Lorraine, in today's northeastern France. Contacts between Lorraine and the Islamic world date from the 9th century. A century later, John, Gorze's abbot, took his famed trip from Gorze (970-74) near Metz in French Lorraine. The trip to Spain was the result of exchanges between Abd al-Rahman III, caliph of Cordoba and the German emperor Otto the Great. On his return, John brought back with him the first elements that were going to stir the scientific awakening in Western Christendom in the Lorraine region.[13] John had just spent three years in Cordova. There, he encountered a Jew named Hasdeu who understood Latin and, of course, was acquainted with Arabic. A man of intelligence and culture, who was very deeply interested in mathematics and astronomy, John in all probability brought back with him scientific manuscripts of Islamic origin, as he did from his previous trip to Italy.[14] This is all the more certain since Cochrane notes that the original point of contact between Islamic science and the Christian West was the result of Carolingian interest in manuscripts to be found in Cordova.[15] John was certainly helped in his enterprise by acquiring knowledge of the Arabic language from the Spanish Jews who understood Latin.[16]

Studies by Haskins, Thompson and Welborn,[17] and the latter two in particular, show that mathematical and astronomical learning developed to a great extent, as a result of this aforementioned contact, and was based on Islamic sources. Thompson and Welborn show this Islamic influence in minute detail in places, needless to dwell upon here. What is important is how this learning passed on to England. Here, it is worth returning to Haskins who had stressed a crucial point, that is the role of the monasteries as islands of learning. It is through these places that Muslim learning voyaged between the two countries, carried by men of religion. Many early Muslim manuscripts in fact were located in monasteries and cathedrals. The reason for this, it must be recalled, is that at the time learning was universal, as noted above, in Islamic civilization, whereas the learned in the West were exclusively the men of religion. John of Gorze was himself an abbot.

Mathematicians and astronomers of Lorraine, now well versed in Muslim science, and the first Westerners, if we do not take into account those of Muslim Spain, began to carry their learning to England mainly thanks to one crucial factor: the preference of King Knut the Great, the English king, for churchmen from Lorraine.[18] From his time, on through many generations, scholars from Lorraine were very popular in England, and were appointed as bishops and masters of the schools.[19] Before the death of Knut, Duduc (from Lorraine) had already become bishop of Wells, Hermann, another man from Lorraine had become bishop of Ramsey; and Leofric, who had also been educated in Lorraine was bishop of Exeter (1046-1072). Under Edward the Confessor there was another group of these clerics, all of whom were interested in

[13] J. W. Thompson: Introduction of Arabic science into Lorraine in the tenth Century," *Isis* 12 (1929): 187-91.
M. C. Welborn: `Lotharingia as a center of Arabic and scientific influence in the eleventh century,' *Isis* 16 (1931) pp.188-99.
[14] J.W. Thompson: The Introduction of Arabic Science; op cit; pp 190.
[15] Louise Chochrane: *Adelard of Bath.* British Museum Press. 1994. p. 6.
[16] J.W. Thompson: The Introduction of Arabic Science; op cit; pp 189-90.
[17] Mary C. Welborn, `Lotharingia; op cit; C.H Haskins, Studies, op cit, pp. 334-35; J.W. Thompson: Introduction of Arabic science; op cit; p. 191.
[18] J.W. Thompson: The Introduction of Arabic Science; op cit; p. 191.
[19] For more details on these Lotharingians, see : E. Freeman: *Norman Conquest*; 8 Vols; Oxford 1867; and T.D. hardy: *Descriptive catalogue*, 3 vols. London 1871.

learning and many brought books with them from their own country.[20] Earl Harold, too, encouraged learning from Lorraine in England. He had travelled extensively and had discovered that the schools of Lorraine and the nearby German cities were not only much better than those of England, but also than those of France and Northern Italy at that time.[21] He appointed Walter as bishop of Hereford (1060-1079) and Gisa as bishop of Wells (c.1060). However, his most important appointment was that of Athelard of Liege as the head of the college of canons, which he established at Waltham. During the times of the first Norman ruler (1066) William the Conqueror, and following him, under William Rufus, more men from Lorraine arrived in England, including Robert of Lorraine, a distinguished mathematician who was finally made bishop of Hereford (1079).[22] Other figures included Walcher of Malvern, Walcher of Durham, Thomas of York, and Samson of Worcester.[23]

Of these latter-mentioned men, Walcher of Malvern was possibly the greatest figure of learning from Lorraine to reach England about 1091.[24] Walcher, a scholar and - of course – monk. In England he was the first native student of Arabic learning and was the first Latin critic of the work of translation from Arabic.[25] He was the first English astronomer and also the first of his nation (or one of the very first) to translate or adapt a Muslim treatise.[26] In the tables from this treatise he used Roman fractions; in the treatise of 1120 he used degrees, minutes and seconds. Walcher's tables call to mind others compiled a little later, about 1140, by Raymond of Marseilles. These were simply an adaptation of al-Zarqali's tables.[27] Walcher had observed lunar eclipses in Italy in 1091 and 1092, and compiled lunar tables about 1109.[28] Walcher had already adopted the Islamic methods of astronomical calculation and transposed them to the meridian of England.[29] He had come into possession of the astrolabe, and for the first time, in Latin Europe, on 18 October 1092, he used one to determine the time of the lunar eclipse that he had observed in Italy.[30] He had become interested in astronomical observations after experiencing the darkness of an eclipse in Italy and then discovering on his return to Malvern that the selfsame eclipse had been observed in his own monastery at a different time of the day.[31] Whatever knowledge of Arabic or Arabic terminology Walcher had had been transmitted to him by King Henry I's physician Petrus Alphonsi.[32] Walcher commenced his observations in 1090 using Roman numerals and fractions but later changed to degrees, minutes and seconds, employing an astrolabe and new methods. He had learned these from Petrus Alphonsi, himself one of the main figures to introduce Islamic learning in the Christian West,[33] which brings us to Petrus and other Spanish links.

[20] M.C. Welborn: Lotharingia as a center of Arabic; op cit; Pp 196-7.
[21] M.C. Welborn: Lotharingia as a center of Arabic; op cit; p.197.
[22] C. Burnett: *The Introduction of Arabic Learning into England*; The Panizzi Lectures, 1996; The British Library; 1997. p.15.
[23] J.W. Thompson: The Introduction of Arabic Science; op cit; p. 191.
[24] M.C. Welborn: Lotharingia as a center of Arabic; op cit; p. 198.
[25] D. Metlitzki: The Matter of Araby; op cit; p.26.
[26] G.Sarton: *Introduction to the History of Science*; 3 vols; The Carnegie Institute of Washington; 1927-48.Vol 2; p. 124.
[27] G.Sarton: Introduction; op cit; Vol 2; p. 124.
[28] G.Sarton: Introduction; op cit; Vol 2; p. 124.
[29] D. Metlitzki: The Matter of Araby; op cit; p.24.
[30] O. Pedersen: Astronomy, in *Science in the Middle Ages*, edt D.C. Lindberg; The University of Chicago Press, Chicago, 1978, pp 303-37; at p. 312.
[31] L. Cochrane: Adelard; op cit; p. 7.
[32] D. Metlitzki: The matter of Araby; op cit; p.26.
[33] L. Cochrane: Adelard; op cit; p. 7.

The Spanish Connections:

Petrus Alphonsi was a Spanish Jew convert to Christianity. He was one of King Henry I's physicians, thought to have been in England from 1112 to 1120.[34]

It was Petrus who introduced Islamic astronomy to England, and translated texts from Arabic for the first English scientists. Evidence of the astronomical contributions of Petrus Alphonsi is contained in a treatise preserved in Oxford, where he put a set of chronological tables based upon Islamic ones, including a concordance of eras for the year 1115. Also preserved at Oxford is a series of tables for the various planets and an explanation of the use of the chronological tables.[35] Most significant, though, Metlitzki notes, are the twelve dialogues (*Dialogus*) between Peter and `one Moses,' which reflect the Islamic astronomical learning that Petrus was first to carry to the attention of the Western Christians on their own ground.[36]Petrus held that the ignorant have to be educated in Islamic science and that he, Petrus, has labored hard - `magno labore.... et summo studio' - to translate Islamic works `for the benefit of the Latin.'[37] He even expressed a `sense of mission' in spreading Islamic astronomy among `the Latin in the land of the Franks.'[38]

The Muslim Spanish connection was very much diverse. In Muslim Spain, Scott notes, there was not a village where `the blessings of education' could not be enjoyed by the children of the most indigent peasant, and in Cordova there were eight hundred public schools frequented alike by Moslems, Christians, and Jews where instruction was imparted by lectures. The Spanish Muslim received knowledge at the same time and under the same conditions, Scott points out, as the literary pilgrims from Asia Minor and Egypt, from Germany, France and Britain.[39]

More importantly, many manifestations of Islamic civilisation travelled through the courts, appearing among the ruling families, who married members of the ruling monarchies of Spain (Aragon, Castile, etc). Eleanor, King Henry II's wife, is a good case. She and her entourage, `much like her grandfather and his crowd, were familiar visitors to their relatives in courts where, since knowledge of Arabic was often de rigeur, translations from the Arabic were not as important as they were in London.'[40]A daughter of Eleanor and Henry II had married into the royal family of Castile, and as the wife of Alfonso VIII of Castile and an eminent figure in Toledo, this other Eleanor (she had been named after her mother) `welcomed visitors from throughout Europe who came to Toledo to drink from its fountains of knowledge-and to take much of that knowledge back to England, France, and Germany.'[41]The ruling family members themselves spread many of the symbols of Islamic civilisation, then a mark of sophistication aped by the higher echelons, amongst the diverse courts where they inter-married as Menocal shows to very good lengths.[42]

The Spanish connection was even stronger in terms of the translation effort. It must be reminded that after the Christians retook Toledo in 1085 they came across the abundance of Muslim scientific

[34] D. Metlitzki: The Matter of Araby; op cit;.p.24-5.
[35] C.H. Haskins: *Studies in the history of Mediaeval Science*; Frederick Ungar Publishing Co. New York. 1967 ed.. P.117.
[36] D. Metlitzki: The matter of Araby; op cit; 21.
[37] D. Metlitzki: The Matter of Araby; op cit;.p.24-5.
[38] D.Metlitzki: The Matter; op cit; p. 24.
[39] S.P.Scott: *History; op cit;* Vol iii, at pp 467-8.
[40]Maria Rosa Menocal: The Arabic Role in Medieval Literary History, University of Pennsylvania Press, Philadelphia, 1987.p.49.
[41] Maria Rosa Menocal: The Arabic Role; p.49.
[42] M.R. menocal: The Arabic role; op cit;

treatises left there. The beginning of the disintegration of Muslim rule in Spain, Metlitzki observes, had finally brought the Latin and Islamic worlds into intimate contact. [43] A vast translation effort was undertaken in Toledo, as the flower of Western scholarship descended onto the town, and was organised under the patronage of the local religious authorities. This vast translation effort through the 12th century explains the decisive changes that took place during the 12th century in Western Christendom - the so called 12th century Renaissance - and the rise of university learning in the Christian West.[44] We must be reminded, here, that the crusaders were also in contact with the Muslim East exactly in the 12th century and with Sicily in the same century, which indeed shows why things changed in Western Christendom in this crucial century.

Let us return to the English translators for Metlitzki notes that, en par with other parts of the world, `the transmission of Muslim science to England is in full swing' with Robert of Ketton, Daniel of Morley, Roger of Hereford, Alfred of Sarechel, and Michael Scot who continued Adelard's aim of `Arabum studia scrutari' (Scrutiny into Arabic studies).[45] Most of these Englishmen went to Spain in search of astronomical and mathematical treatises and took an active part in the systematic work of translation in which Christian, Mozarab (Chistians formerly living under Muslim rule), and Jewish scholars collaborated at Toledo and other seats of learning in the valley of the Ebro and the region of the Pyrenees. [46]

Our focus here is on Robert of Chester, also known as Robertus Castrensis, Cestrensis, Retinensis, Ketenensis, Ostiensis, Astensis, Anglicus; Robert the Englishman, Robert de Retines. He was an English mathematician, astronomer, chemist, and translator from Arabic into Latin.[47] He lived in Spain about 1141-1147; was archdeacon of Pamplona, Navarre, in 1143; and lived in London about ll47-1150.[48] He translated a number of treatises, notably one on alchemy (1144), one of the earliest works of its kind to be imported from Islam into Christendom. However, he is chiefly remembered because of his versions of the Qur'an (1143), and of al-Khwarizmi's algebra (1145).[49] He was a man of higher intellect and was attracted by the more scientific side of Arabic learning. Witness his translation of a treatise on the astrolabe, his compilation of tables for the longitude of London (1149) derived from those of al-Battani and al-Zarqali, and his revision of the tables translated by Adelard of Bath. His main claim to our esteem, Sarton says, however, is his translation of the algebra of al-Khwarizmi (1145).[50]

Before saying more on this, it is interesting to note that before then he was commissioned, together with Herman the Dalmatian, by Peter the Venerable, the Abbot of Cluny, in France, to make a translation of the Qur'an, the first ever, far from perfect, and not for good intentions, either, Peter's aims being to study the text so as to make a more sustained attack on Islam.[51] The abbot of Cluny could not have made a better choice for his purpose, for both Robert of Chester and Herman the Dalmatian were well versed in Arabic, and they also had

[43] D.Metlitzki: The Matter; op cit; p.30.
[44] See For instance: C.H. Haskins: Studies; op cit; The Renaissance of the 12th century, opcit; etc.
[45] D.Metlitzki: The Matter; op cit; p.30.
[46] D.Metlitzki: The Matter; op cit; p.30.
[47] G.Sarton: Introduction; vol 2; p. 175.
[48] G.Sarton: Introduction; vol 2; p. 175.
[49] G.Sarton: Introduction; vol 2; p. 115.
[50] G.Sarton: Introduction; vol 2; p.126.
[51] See M.T. D'Alverny: Deux Traduction Latines du Coran au Moyen Age in *Archives d'histoire doctrinale et litteraire du Moyen Age*; 16; Paris; Librairie Vrin; 1948; in La Connaissance de l'Islam dans l'Occident Medieval; edt by C. Burnett. Varorium; 1994; pp 69-131.

access to Muslim `chests' - *armaria* (libraries joined with mosques) and had gathered an abundance of material.[52] We know from Robert himself that he was deeply engrossed in astronomical and geometrical study when he was interrupted by Peter. [53]

By 1145 Robert was again deeply engaged in mathematical and astronomical work. In that year, he was in Segovia translating al-Khwarizmi's *algebra* which, like his translation of the Qur'an, broke completely new ground in Western Christendom.[54] The Book of *Algebra and Al-Mucabola* (of `making whole' and `balancing') introduced the name and function of a new branch of mathematics: algebra, from Arabic *jabara*, to restore.[55] The name of the author, al-Khwarizmi, was itself becoming a new concept from the opening sentence (`Dixit algoritmi') of another of his works, the *Arithmetic*. The concept is algorism. [56]It was a fundamental landmark in the history of that subject, as it may be considered the beginning of European algebra, Sarton notes.[57]

Robert was also the first to use the word sinus (sine) in its modern sense.[58] In his translation, Robert copied even Al-Khwarizmi's introduction:

> *`Praise be to God, beside whom there is no other.' Here ends the book of restoration and opposition of number which in the year 1183 (Spanish era) Robert of Chester in the city of Segovia translated into Latin from Arabic.* [59]

Two years later, in 1147, Robert was back in London, writing, like Adelard, a treatise on the astrolabe, which by now was the standard trademark of every English `Arabist'.[60]

France and England:

One of the connections between France and England, other than the aforementioned Lorraine, was through Aquitaine. Aquitaine was a part of the English crown in France. As a boy, Richard the Lionheart had been brought up in Aquitaine, in the south of France where, as Glubb shows to great length, the influence of Muslim culture had been strong.[61] The ease of Richard's relationships with Salah Eddin was doubtless largely due to the growing extension of Arab manners in Western Europe. `In the same manner today, a Syrian or Iraqi diplomat would mingle easily with Americans in the United States, if he had been educated in the American University of Beirut,' adds Glubb.[62]

There were three great schools in Paris at the beginning of the 12th century, Sarton tells us:[63] that of the cathedral of Notre Dame, that of the canons regular of St. Victor, and that of the abbey of St. Genevieve

[52] D.Metlitzki: The Matter; op cit; p.31.
[53] D.Metlitzki: The Matter; op cit; p.31.
[54] D.Metlitzki: The Matter; op cit; p.35.
[55] L.C. Karpinski: *Robert of Chester's Latin Translation of the Algebra of Al-Khowarizmi*; New York; 1915.
[56] D.Metlitzki: The Matter; op cit; p.35.
[57] G.Sarton: Introduction; op cit; vol 2; p.126.
[58] G.Sarton: Introduction; vol 2; p.126.
[59] L.C. Karpinski: *Robert of Chester's; op cit;* p. 125.
[60]C.H.Haskins: Studies; op cit; p.122.
[61] J.Glubb: *A Short History of the Arab Peoples*; Hodder and Stoughton, 1969.
[62] J.Glubb: A Short History; op cit; p.179.
[63] G. Sarton: Introduction; op cit; Vol II. p..351

across the river. All contributed to making Paris the leading intellectual centre of Christendom, ` a city of teachers,' but it is chiefly from the cathedral school that the university sprang in a gradual and imperceptible transformation. By 1170 the university was taking shape. University learning, as already noted, was fundamentally based on the translated material from Arabic. In Paris, Sarton informs that the earliest college was established about 1180 by an Englishman, Josce of London. Little by little, masters and students grouped themselves in four faculties: arts, theology, law, and medicine.[64] The connections between Paris and the foundation of the English universities have been studied by a variety of sources, some such sources telling more on how Islamic learning was passed between places,[65] others telling how the very system of Muslim higher learning was passed on.[66] These sources also show how Paris gave birth to Oxford University, which itself gave birth to Cambridge, the first two English Universities. That is where the influence of Paris ends, for as we shall see further on, as did Daniel of Morley, the other great early English scientist, learning in Paris was stale and moribund, and he could hardly wait to leave the place for the more exciting Toledo where Muslim learning ruled. Daniel himself would teach at Oxford, and would certainly supply it with its first books of science, which of course he had imported from Toledo.[67]

The French city of Montpellier had remained a major centre for the study of Muslim medicine, but also Muslim astronomy due to its proximity to Muslim Spain, and also the large presence of learned Muslims and, above all, Jews with Islamic learning.[68]Montpellier moreover was an offshoot of the first university of Western Christendom, Salerno, which burst into life in the late 11th century after the arrival of Constantine the African, who brought with him a whole cargo of medical books from Qayrawwan in Tunisia, which he translated, and which triggered the beginning of medical higher learning in Western Christendom.[69] Montpellier attracted students from other parts to the study of the subject as early as 1137. One such student was Robert the Englishman (not Robert of Chester who flourished in the previous century), who flourished in France, Montpellier (c. 1271;) and who wrote a treatise on the astrolabe (*De Astrolabio canones*) and a treatise on the quadrant.[70] Both astrolabe and quadrant are Muslim instruments par excellence. Also worth mentioning is Gilbert the Englishman, who was the author of many medical writings, by far the most important being the compendium (*or Lilium medicinae)*. It is a very comprehensive outline including good pathological descriptions and two chapters on the hygiene of travel very much inspired by Muslim works. [71]

With France was the other link: the architectural link and its Islamic sources. It is worth noting how Sir Banister Fletcher praised the Muslim style that had `reached peaks of accomplishment that rank high among man's achievements.'[72] Equally, in his book *Architecture,*[73] William Richard Lethaby (1857-1931) summarises the qualities that the `Arab' style represented for him: `elasticity, intricacy and glitter, a

[64] G. Sarton: Introduction; op cit; Vol II. p..351
[65] C.H. Haskins: Studies; op cit; C.Burnett: The Introduction; op cit; etc.
[66]George Makdisi: On the origin and development of the college in Islam and the West, in *Islam and the Medieval West*, ed. Khalil I. Semaan, State University of New York Press/Albany. 1980.
J. Ribera: *Disertaciones Y Opusculos*, 2 vols. Madrid 1928.
[67] See C.Burnett: The Introduction; op cit;
[68]W.M. Watt: *The Influence of Islam on Medieval Europe*, Edinburgh University Press, 1972. pp. 66-7.
[69] Constantine the African and `Ali ibn al-Magusti: *The Pantegni* and related texts, eds C. Burnett and D. Jacquard, Leiden, 1994.
[70] G. Sarton: Introduction; op cit; Vol II; p.993
[71] G. Sarton: Introduction, Vol II, pp. 520-1.
[72]Sir Banister Fletcher: *A History of architecture*: 18th edition, revised by J. C. Palmes: University of London, The Athlone press, 1975. p. 415.
[73]W.R. Lethaby: Medieval architecture: in *The legacy of the Middle Ages*, edited by C.G. Crump and E.F Jacob: Oxford at the

suggestion of fountain spray and singing birds'.[74] More remarkable to Briggs is the incontrovertible fact about Muslim architecture, that in all countries and in all centuries, it retained an unmistakable individuality of its own.[75]

Hence the great appreciation for the Muslim style, the traces of which are to be found in England and at all epochs. Throughout her work, Cochrane has emphasised and repeatedly referred to expert sources, including John Harvey and Christopher Wren, to show how Gothic came initially from the Muslims. It is needless to go into the details of the manner of transmission, which have been expertly dealt with by other articles on this site. Thus keeping the matter brief here, Cochrane reminds that the building of purely Gothic churches had been preceded in the 11th century by the occasional use of pointed arches, which happened in Monte Casino, before the idea was pursued at Cluny (France).[76]

From Chartres and the Ile de France, Durant explains, the Gothic style swept into the French provinces and crossed frontiers into England, Sweden, Germany, Spain, and at last into Italy. French architects and craftsmen accepted foreign commissions.[77] England welcomed it because she was, in the 12th century, half French, `the Channel but a river between the two sides of a British realm.'[78] The transition from Romanesque to Gothic, Durant pursues, was almost simultaneous in England and France. About the same time that the pointed arch was being used at St. Denis, (1140) it was appearing in Durham and Gloucester cathedrals and at Fountains Abbey and Malmesbury.[79] Henry III (1216-72) admired everything French, envied the architectural glory of St Louis's reign, and taxed his people into poverty to rebuild Westminster Abbey.[80]

Cochrane also touches upon the Islamic linkage of geometry and construction and its resulting impact on the West, observing how careful study of pre-Norman churches in England, so many of which have skew chancels, shows that builders found it difficult to achieve true rectangles.[81] She notes how the transition in England was rapid following the First Crusade in particular.[82] Sicily, too, had its great impact in this area as in others.

Sicily and the Norman impact

Part of the Muslim influence in Sicily is here outlined by Scott. [83] He tells how Oriental craft, refinement, and learning were able to supply the deficiencies of whose existence `the rude and unpolished Western adventurers were thoroughly cognizant.'[84] The Muslims stood high in the confidence and favour of the Norman princes. Muslim councillors stood in the shadow of the throne; they collected taxes and administered the public revenues. They conducted important negotiations with foreign powers, whilst their

Clarendon Press, 1969 edt, pp 59-93. p.250.
[74] John Sweetman: The Oriental Obsession: Cambridge University Press, 1987.p.203.
[75] M. S. Briggs: Architecture, in *The Legacy of Islam*, edited by T. Arnold and A. Guillaume, Oxford University Press, first edition, 1931, pp 155-79. p. 157.
[76] L. Cochrane: Adelard of Bath; op cit; p. 64.
[77] Will Durant: *The Age of Faith,* Simon and Shuster, New York, 1950. p. 882
[78] Will Durant: The Age of faith, p. 882
[79] Will Durant: The Age of faith, p. 882
[80] Will Durant: The Age of faith,:p. 882
[81] L. Cochrane: Adelard of Bath; op cit; p. 63.
[82] L. Cochrane: Adelard of Bath; op cit; p. 64.
[83] S.P.Scott: History; op cit; vol 3; pp 27-9.

impress on the customs of social and domestic life was deep and permanent. The prevailing language of court and city alike was Arabic.[85] The Cadi, retaining the insignia and authority of his original official employment, was an important member of the Sicilian judiciary and was frequently the trusted adviser of the monarch. Muslim institutions, with the powerful influences resulting from their universal adoption, thus maintained an overwhelming preponderance throughout the provinces of the Norman kingdom. Even in Apulia and Calabria, the original seat of the new dynasty, the same conditions prevailed. The crucifixions and the mottoes of Muslim rulers were impressed together upon the coinage of the realm, where eminent prelates owed investiture, rendered homage, and paid tribute to the secular power and where Muslim dignitaries, not infrequently, took precedence over Papal envoys.[86] Hence there was a very strong Islamic influence permeating administration and institutions, at all levels and in every sphere.

It must be reminded that the Normans ruled Sicily, but also parts of France, and above all England, which they had taken in 1066 from the Saxons. The intercourse between Norman Sicily and Norman England was very strong. Menocal highlights such links and how this disseminated Muslim learning between the courts: `The expansion of Norman political power in the late eleventh century and its consolidation in the twelfth and thirteenth centuries played an important role in the dissemination of learned Arabic texts in translation. The blood ties, as well as the political and cultural interactions among courts scattered from Sicily to England, with France in between, meant that there was a considerable amount of free exchange of intellectual and artistic activity much of which, in any case, tended to be carried out by peripatetic scholars and artists.'[87]

This exchange was well caught, once more by Scott, who also touches upon another crucial point here, the manner in which Muslim-Sicilian culture revolutionised established norms in Western Christendom. It is thus worth paraphrasing: `The traders who visited the remote and semi-barbarous courts of Europe, the Crusaders who from time to time enjoyed the hospitality of the Sicilian cities, the returned adventurers who had served in the armies of the princely House of De Hauteville (the Norman dynasty who ruled Sicily), all spread, far and wide, exaggerated and romantic accounts of the strange and sacrilegious customs (i.e monarchs dressing in Muslim outfits, being surrounded by Muslim advisers, conversing in Arabic, etc.) of the Norman monarchy. Ecclesiastics crossed themselves with dismay when they heard of the honours lavished upon infidels (Muslims), whose co-religionists `had profaned the Holy Sepulchre,' evoking gigantic expeditions which had depopulated entire provinces and drained the wealth of credulous and fanatic Europe. Others, whom study and reflection had made wise beyond the age in which they lived, saw, with open indifference and concealed delight, in this defiance and contempt of Popish tyranny, the dawn of a brighter era, the prospect of the ultimate emancipation of the human mind. The progress of the mental and moral changes which affected European society, acting through the intervention of Norman influence in the political and religious life of the continent, was gradual, indeterminate, and long imperceptible, but incessant and powerful.'[88]

One area of impact is again architecture, on which subject readers need to go to proficient articles in this site. Most briefly here, Henry Gally Knight in his *Normans in Sicily* (1838) had affirmed the stylistic richness

[84] S.P.Scott: History; op cit; vol 3; pp 27.
[85] S.P.Scott: History; op cit; vol 3; pp 28-9.
[86] S.P.Scott: History; op cit; vol 3; pp 27-9.
[87] Maria Rosa Menocal: The Arabic Role; op cit; p.49.
[88] S.P.Scott: History; op cit; vol 3; pp 29.

in his illustrations of Siculo-Norman, a style that was Muslim in its arches and that the Muslims, through the Crusaders, were responsible for in the pointed arch style of Continental Europe.[89]

As well outlined by Scott, the Muslims occupied a good place within Sicilian institutions and administration and soon the impact was felt in England. Haskins, hence, notes how we must bear in mind the possibility of a connexion between the Norman Domesday Book, which made an inventory of all the wealth of England in the 11th century, the first of the sort, for purposes of taxation, and for the Norman ruler to know more about his new kingdom, and the fiscal registers which the south, i.e. Sicily, had inherited from its Byzantine and Muslim rulers.[90]

Haskins enlightens on the English career of Qaid Brun (master Thomas Brown) in the English Exchequer. Thomas Brown (Qaid Brun) was a Muslim refugee from Sicily, who had to leave Sicily on the accession of William the Bad. He probably reached England by 1158, when he is mentioned in the Pipe Roll. As an official of both King Roger and Henry II, he was as a connecting link between the fiscal systems of the two kingdoms.[91] The duties which master Thomas performed in the service of Henry II (of England) are only partially known, although the substantial wages which he received in 1160 indicate that from the outset his position was one of importance. Thomas Brown sat at the exchequer table and, with the assistance of two clerks, kept a watch on all proceedings in the upper and lower exchequers. A third roll is kept by him as a check on the rolls of the treasurer and chancellor, and this role, doubtless intended for the private information of the king, Thomas carries about him wherever he goes.[92]

In his concluding remarks, Haskins refutes the claims, as made by Niese, that it was England which influenced Sicilian legislation.[93]On this point, of course, it is a miracle to find much, for the aim by the overwhelming majority of modern historians, in particular, has been to obscure the Muslim impact on this most English institution of all.

Adelard of Bath and Daniel of Morley:

The routes of influence have been looked at although one, the crusades, however essential - which could have been added - is left for a future work. Adelard of Bath and Daniel of Morley are the two most influential English scientists, not just because they were amongst the very first, but also because they brought in some fundamental elements into English, and Western, intellectual life.

Most certainly the first English scientist ever was Adelard of Bath. He could be said to have championed Islamic learning more than any other early scientist, being the most `Arabist' of all scientists.[94] He was born in Bath, studied at Tours (France) and taught at Laon (France). After leaving Laon he spent seven years in

[89]Gally Knight in John Sweetman: The Oriental Obsession; op cit; p.194.
[90]C.H. Haskins: England and Sicily in the 12th century; *The English Historical Review*: Vol XXVI (1911) pp 433-447 and 641-665. p. 664.
[91] Stubb: Constitutional History, vol i. P.408 in C.H. Haskins: England and Sicily.

[92]C.H. Haskins: England and Sicily; pp. 641-665.
[93] C.H. Haskins: England and Sicily; p. 664.
[94] See:
-L. Cochrane: *Adelard of Bath,* British Museum press, 1994.
-C. Burnett: *Adelard of Bath*, Warburg, London, 1987.
-B.G. Dickey: *Adelard of Bath*, unpublished Thesis, University of Toronto, 1982.

study and travel, and can be traced in Cicilia and Syria. He might have visited Spain and Sicily before 1116 and probably before 1109 and was in Palestine by 1115. By 1126 he was back in the West, busy making the astronomy and geometry of the Muslims available to the Western Christian world.[95]

Adelard's most important contributions were in the field of mathematics. Early in life, before he travelled to Syria and Palestine, he wrote a treatise on the abacus (Regule abaci). Later, in 1126, he translated from Arabic into Latin the astronomical tables of al-Khwarizmi, revised by Maslama ibn Ahmad al-Majriti. They included tables of sines. Thus was Muslim trigonometry, and more specifically the sine and tangent functions, introduced into the Western Christian world.**[96]**

At the time he was compiling his natural questions, Sarton informs, Adelard also wrote a treatise on falconry, the earliest Latin treatise of its kind which has come down to us. It shows no trace of Arabic influence. Thus, Adelard must have written it rather early or else he did not hear of eastern knowledge on the subject, but the matter, Sarton notes, requires further investigation.[97] He was also, Sarton tells, in all probability the "Magister A" who translated al-Khwarizmi's mathematical treatise *(Liber ysagogarum Alchorismi*). Thus, Adelard was an abacist at the beginning of his career and later became an algorist, the earliest (or one of the earliest) of them.[98] Just like Petrus Alphonsi, Adelard became associated with the court of Henry I. Both men were important in the transmission of Islamic science in both court and kingdom as well as much of the West. Both worked on the *Zij* of al Khwarizmi. Whether this was done individually, or in cooperation, cannot be proved, but it might have happened after Adelard returned from his seven year travels.[99]

Adelard's travels had begun years before, soon after his formal training in the Latin schools. He embarked on a journey, which took him to Magna Graecia and the principality of Antioch. It is this seven year journey which he describes, famously, as his quest for the *studia Arabum* (the studies of the Arabs), which he contrasts to the *Gallica studia* (French studies).

> *'Arab' studies based on reason rather than authority.*[100]

Cochrane charts his travels, telling that it is probable that Adelard made his way to Syria via southern Italy, Sicily and Greece. In *De eodem*, which he dedicated to the Bishop of Syracuse, he mentions both Greece and Salerno, whilst in his famed *Questiones* he describes being shaken by an earthquake as he crosses a bridge at Mamistra (modern Misis) near Adana on the way to Antioch. He speaks of the bridge itself and of the whole region as shaking violently with the movement of the earth.[101] Adelard's mentioning of the earthquake, Cochrane notes, is very useful in establishing a date for his journey. The earthquake took place in 1114 and affected Anatolia, and caused great damage to Antioch, which is one hundred miles from Misis, and as far away as Edessa. It was the time of the first crusade, when the Franks were under serious threat from forces being raised against them by the Seljuk Sultan Mohammed. Roger of Salerno was Prince of Antioch and personally supervised repairs to the fortifications.[102]Cochrane then highlights some very

[95] C.H. Haskins: Studies; op cit;. Pp 33-4.
[96]G. Sarton; Introduction; vol 2; p. 167.
[97]G. Sarton: introduction; 2; p. 168.
[98]G. Sarton; Introduction; vol 2; p. 167.
[99] L. Cochrane: Adelard of Bath; op cit; p.42:
[100]C. Burnett: The Introduction; op cit; p. 25.
[101] L.Cochrane: Adelard; op cit; p. 33.
[102] L.Cochrane: p. 33.

interesting points on how Adelard witnessed the Seljuk fixing bridges damaged by the earthquake and how their techniques were soon after to be seen in England.[103]

Adelard's masterpiece is a collection of Natural Questions, which gave him the opportunity to publish Islamic knowledge on a variety of subjects. It is the result of his seven years of travel amongst the Muslims in the east, as mentioned above. When Adelard left Laon, he advised his `nephew' and his other pupils to remain there and learn all they could of philosophy as it was taught in northern France. He would travel and study with the `Arabs' and on his return they would compare notes. *Quaestiones naturales* is the resulting essay. The *Quaestiones Naturals* is in 76 chapters, each dealing with a scientific question, to explain the new knowledge which he had acquired from `his Arabs.'[104] *Quaestiones Naturales* is in the form of a dialogue between the author, who has just returned from his journeys and is still full of the new impressions of Muslim science thus gained and his fictional nephew, who has had a scholastic education in France.[105]Adelard could no longer endure the prejudice against modern science which in his time was synonymous with Islamic scholarship, especially after he had spent those seven years in study and travel in order `to investigate the learning of the Arabs as best as he could.'[106] Looking at Adelard's brief outline in Haskins[107] and his dealing with matters of plants, natural life, and geological questions, one is struck by the close resemblance they have with the works of Muslim botanists such as Al-Dinawari and Muslim geographers and geologists such as Al-Biruni, in particular. This comparative work has not been done, and to this day, Adelard's *quaestiones*, except for some brief extracts here and there, are only widely available in German, yet another crucial work the English speaking world is deprived of.

Adelard also brought back a unique enthusiasm for *Arabum studia.*[108] Adelard declared that from his Muslim teachers he had learned to put reason above authority in the matter of natural knowledge since in fact the Ancients, who now possessed the authority, had gained it only by using their own reason.[109] He says,

> *"From the Arab masters I have learned one thing, led by reason, while you are caught by the image of authority, and led by another halter. For what is an authority to be called, but a halter? As the brute beasts, indeed, are led anywhere by the halter, and have no idea by what they are led or why, but only follow the rope that holds them, so the authority of writers leads not a few of you into danger, tied and bound by brutish credulity."*[110]

Thus, Adelard had triggered a completely new approach unknown then, the use of reason rather than authority, his line the very foundation of modern scientific thinking. His works `mark a significant stage in the history of ideas,'.[111] Such eagerness and faith in human reason: `If reason be not the universal arbiter, it is given to each of us in vain.'[112]

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[103] L.Cochrane: Adelard; op cit; pp. 34-5 and fwd.
[104] *Quaestiones naturales edt Muller*
[105] E.J. Dijksterhuis: *The Mechanisation of the World Picture*; Oxford at the Claredon Press; 1961; p.118.
[106] D.Metlitzki: The Matter of Araby; op cit; p.13.
[107] see Haskins' summary on The Quaestiones in C.H. Haskins: Studies, op cit pp 36-8.
[108] D.Metlitzki: The Matter of Araby; op cit; Chapter 2: p.13.
[109] E.J. Dijksterhuis: The Mechanisation; op cit; pp.116-7.
[110] N. Daniel: The Arabs and Mediaeval Europe; p. 265-6. in *Questiones*, ch vi, on why man must use reason with which he is endowed.
[111] L. Cochrane, Adelard of bath, op cit, p. 1.
[112] G.Wiet V. Elisseeff; P. Wolff; and J. Naudu: *History of Mankind;* Vol 3: The Great medieval Civilisations; Trsltd from the

It seems that English-based scholars (i.e. the older generations), as a rule, acknowledged openly the place and influence of Islamic science. The same eagerness is found in this regard in Daniel of Morley as in Adelard of Bath. Daniel of Morley proceeded to Cordova to learn mathematics and astronomy, published the fruits of his studies, and lectured at Oxford.[113] His passion for Islamic learning is well caught in his dedication of his *Philosophia* to John of Oxford (Bishop of Norwich from 1175 to 1200), of which lengthy extracts are taken from Burnett:[114]

> *`When, some time ago, I went away to study, I stopped a while in Paris. There, I saw asses rather than men occupying the chairs and pretending to be very important. They had desks in front of them heaving under the weight of two or three immovable tomes, painting Roman Law in golden letters. With leaden styluses in their hands they inserted asterisks and obeluses here and there with a grave and reverent air. But because they did not know anything, they were no better than marble statues: by their silence alone they wished to seem wise, and as soon as they tried to say anything, I found them completely unable to express a word. When I discovered things were like this, I did not want to get infected by similar petrification.... But when I heard that the doctrine of the Arabs, which is devoted entirely to the quadrivium, was all the fashion in Toledo in those days, I hurried there as quickly as I could...'*

Daniel pursues that he was begged to return to England from Spain by his friends, but was `disappointed' with what he found. Asked by his friend the bishop about `the wonderful things in Toledo,' the teaching there, and the movements of the celestial bodies, Daniel submitted a treatise for his scrutiny. Its first book was about the lower part of the universe, its second about the higher. He then begs the reader that

> *`he should not despise the simple and clear opinions of the Arabs, but should note that Latin philosophers make heavy weather of these subjects quite unnecessarily and, through their ignorance, have put figments of their imagination veiled in obscure language, so that their unsteady floundering in this subject might be covered by a blanket of unintelligibility.'*[115]

Already in 1180, Daniel of Morley had returned to England convinced with Albu Al Ma'ashar (Albumasar) that he who condemns astronomy destroys science.[116] Like Adelard, he emphatically relies on the Muslims against the antiquated authority of ancient Christian authors. Abu Ma'ashar was, in the words of Alain de Lille, the undisputed master of stellar science.[117]

Later influence

In art and architecture, the Muslim impact on modern Western art and architecture can be seen, other than at this site, at: http://www.islamicart.com/main/architecture/impact.html

It gives a good idea of how diverse parts of the Muslim world and their masterpieces impacted upon Western artists and architects, most particularly English ones and Americans. Blair and Bloom, who are

French; George Allen &Unwin Ltd; UNESCO; 1975. p.465.
[113]R. Briffault: *The Making of Humanity*, George Allen and Unwin Ltd, London 1928. p.199
[114]In C. Burnett: The Introduction; op cit; pp.61-2.
[115] Daniel of Morley, Philosophia, ed. G. Maurach, pp 204-55; in C. Burnett: The Introduction of Arabic learning, op cit, p. 62.
[116] Daniels Von Morley Liber de naturis inferiorum et superiorum; ed Sudhoff; p. 32; in D. Metlitzki: The matter; op cit; p. 60.

referred to in the site, note that a painting such as The Reception of a Venetian Embassy in Damascus, attributed to the school of Bellini in the early 16th century, was by an artist who was familiar with the topography and monuments of Damascus.

The American landscape painter Fredric Church (1826-1900) returned from his trip in Syria and Palestine full of enthusiasm for Islamic architecture. After 1870, he designed and constructed his estate at Greendale-on-Hudson, New York, which according to Blair and Bloom, combined Alhambra motifs, simplified Hindu detail and Persian tile-work.

In 1750, Frederick, the Prince of Wales, commissioned the English architect William Chambers (1723-1796) to design an "Alhambra" for the gardens at Kew. Chambers followed his design with an octagonal pavilion in the form of a mosque, which according to Blair and Bloom, was based on `a free improvisation on the domed Ottoman mosques flanked by minarets illustrated by Fischer Von Erlach."

From Turkey, the Westerners, including the English, imported the kiosks in public gardens where coffee and other beverages were served. The new kiosks did not just serve their original function as garden pavilions but also developed into band-stands and news-stands.

From Muslim India, one of the first British artists to visit Agra, William Hodges (1746-1797), sought inspiration from the Taj Mahal. The landscape painter Thomas Daniell (1749-1840) the author of Oriental Scenery (six folio-sized parts, each with 24 hand-colored aquatint plates) was hired as a consultant to help design a British residence with such features as a bulbous dome with corner chatris and overhanging eaves, cusped arches and pinnacles. Daniell was further to inspire the architect John Nash (1752-1835) who was commissioned by George IV to remodel an unfinished structure at the Royal Pavilion.

The Alhambra also continued to inspire many, such as the British architect Owen Jones, who after many visits designed two palatial houses in Kensington Palace Gardens in the Muslim style. In 1854, he created an Alhambra Court, following the Court of the Lions, for the reconstructed Crystal Palace in Sydenham.

Another excellent work that gives good justice to the Muslim impact on modern arts and architecture in both England and America, as well as elsewhere, is John Sweetman's *Oriental Obsession*.[118] Thus, only a few instances will suffice, here, to end this work with an illustration of the far reaching Islamic impact.

In 1878, there appeared the influential book *Art Decoration applied to Furniture* by Mrs Harriet P. Spofford (1835-1921), which included a chapter on Oriental styles, amongst which the Muslim element was prominent. It was not a style, Mrs. Spofford conceded, for those `with restricted incomes,' but she thought that even in small houses one room at least might be devoted to it. She recommended `sumptuous gold threaded material' for upholstery. Fringes should reach the floor concealing all woodwork in `true Moorish style.' Preoccupation with accumulating eastern ornament was to endure after 1900. In the 1890s the `cosy corner' with sofa, cushions and tent like canopy was to become a minor rage'.[119]

[117]A de Lille in D. Metzliki: The matter; op cit; p. 60.
[118]John Sweetman: The Oriental Obsession; op cit;.
[119] John Sweetman: The Oriental Obsession; p.232.

Islamic carpets clearly provided thoughtful observers, in surprisingly various ways, with artistic lifelines, which they grasped wholeheartedly. The rugs could convey a visual rightness, which `contained' irregularity, `a primitive force which embraced sophistication.'[120] The same might be said of oriental ceramics with their ancient traditions of simple shape and investing glaze and, in the case of so many Islamic types, surface qualities of pattern and metallic reflection. Morris's friend William de Morgan also frequented the South Kensington Museum, which was enriched, along with the British Museum, with Near Eastern and Hispano-Moresque wares and Italian *maiolica*.[121] *Maiolica*, which has its story, which Sweetman traces admirably, and which demands a look at the source itself by those interested.

Sweetman devotes a whole chapter, chapter six, to what he calls: The American Story. Besides the influence of the great exhibitions, he notes, we have two further major considerations, the use of Islamic ideas of decoration by the entrepreneurs of Art Nouveau and by the newly rich, and the dedicated collecting by individuals of Islamic objects which would eventually benefit public museums.[122] Tiffany emerges as a major purveyor of oriental style, occupying a place in commerce as powerful as that of Liberty, but injecting into Art Nouveau `his predilections for Islamic art with greater creative force.' Other firms designed Muslim interiors, such as Pottier and Stymus. Tiffany alone unites `magical sensitivity in his best work to a larger than life personal legend.' One of the most memorable photographic portraits of him shows him attired as a Middle Eastern ruler wearing turban and pearls, for a grand ball in New York in 1913 (fig 142).[123]

In 1871-2 the influential Richard Morris Hunt also chose the Muslim style for the facade of his Tweedy Store, New York (fig 145), which was acclaimed not only at home but in Europe.[124]

The Alhambra (1832) as noted above, was especially acclaimed after it was brought to the wider audience by Washington Irving. It went through numerous editions in the land of its author. From the time of the welcoming review in the *New York Mirror* in June of the year of publication its success was assured.[125]It struck many imaginations, especially in the Anglo-Saxon world. Twenty years after first seeing the Alhambra, Owen Jones 1809-1874 re-created part of it at the Crystal Palace at Sydenham, his well known `Alhambra Court'.[126]The Alhambra and its decorative schemes represented a conspicuous strand of Islamic artistic influence in 19th century Britain which, through the work of Owen Jones, helped to induce important shifts of attitudes to decoration and ornament in the field of interior design.[127]

The Alhambra also, as briefly noted here to end with, struck imaginations on the continent too. The French, 19th century writer and poet Victor Hugo, in his collection *Les Orientales* (1829) claimed:

> *'Alhambra! l'Alhambra! palais que les Genies*
> *Ont dore comme un reve et rempli d'harmonies...*[128]
> *(Alhambra, Alhambra! Palace which genies*
> *have adorned like a dream, and filled with harmony).*

[120] John Sweetman: The Oriental Obsession: 182.
[121] John Sweetman: The Oriental Obsession: p. 182.
[122] John Sweetman: The Oriental Obsession: p.230.
[123] John Sweetman: The Oriental Obsession; p.233.
[124] John Sweetman: The Oriental Obsession: p.238.
[125] John Sweetman: The Oriental Obsession; p.217.
[126] John Sweetman: The Oriental Obsession: p.125.
[127] John Sweetman: The Oriental Obsession: 131.

Conclusion

Draper tells that `The Arab has left his intellectual heritage on Europe…' and `such their (Muslims) splendour, their luxury, their knowledge; such some of the obligations we are under to them - obligations which Christian Europe, with singular insincerity, has ever been fain to hide. The cry against the misbeliever has long outlived the Crusades.'[129]

It has indeed, and it is for those who are able, to look into the aspects of influence which have been only briefly touched upon here.

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