

# Merv

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**Release Date:** March 2005  
**Publication ID:** 4077

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## MERV

Merv is the city which dominated the province of Khurasan in today's Turkmenistan. Early Islamic geographers recorded a great economy based upon thriving farming and irrigation: a highly organised system of upkeep, a system of irrigation canals and a dam above the city with the supply of water regulated and measured by a metering device.<sup>1</sup>

Under the Abbasids Merv continued to be the capital of the East. It is to the period of 8<sup>th</sup> to the 13<sup>th</sup> century that the great prosperity of Merv belongs.<sup>2</sup> In the latter half of the tenth century, when Muqaddasi, the geographer, knew Merv, a third part of the suburbs was already in ruin, and the citadel was in no better state, however, in the next century, the citadel gained in size and importance under the Seljuks.<sup>3</sup> By the 11<sup>th</sup> century Merv was a great commercial centre of the Oriental type, bazaar, traversed by two main streets, the centre of the market roofed by a dome, shops for artisans, money changers, goldsmiths, weavers, coppersmiths, potters etc. It was an administrative and religious centre, containing mosques, madrasas, palaces, and other buildings.<sup>4</sup> The dome of the mausoleum of Sultan Sanjar, one such place, was of turquoise blue, and could be seen a distance of a day's journey away.<sup>5</sup>

One of Merv trademarks was its textile products, silk grown in abundance, and also a school for its study. The region was also famed for its fine cotton and exports, whether of raw products or manufactured and sent to different lands.<sup>6</sup> Merv was one of the great emporiums of the caravan routes between western and eastern Asia, including to China, which meant that gradually trade and urban activities became the source of wealth rather than agriculture.<sup>7</sup>

Yaqut al-Hamawi, the famed geographer (d. 1229) spent two years studying in the many libraries of Merv which he admired.<sup>8</sup> According to him, there were ten wealthy libraries in the city around 1216-1218, two in the chief mosque and the remainder in the madrasas.<sup>9</sup> Yaqut was in Merv for three years collecting the materials for his great geographical dictionary, for before the Mongol invasion the libraries of Merv were celebrated.<sup>10</sup> *'Verily but for the Mongols I would have stayed and lived and died there,'* he writes, *'and hardly could I tear myself away.'*<sup>11</sup> Among others, he mentions the two libraries of the Friday mosque, namely the Aziziyah with 12,000 or so volumes, and the Kamaliyah.<sup>12</sup> There was also the library of Sharaf al-Mulk, in his madrasa, and that of the great Seljuk wazir Nizam al-Mulk.<sup>13</sup> Among the older libraries were

<sup>1</sup> C. E. Bosworth: Merv; Encyclopaedia of Islam; New Series; vol 6; pp. 618-21.p. 618.

<sup>2</sup> G. Le Strange: *The Lands of the Eastern Caliphate*; Cambridge University Press; 1930; pp. 401 ff.

<sup>3</sup> G. Le Strange: *The Lands*; p. 401.

<sup>4</sup> C. E. Bosworth: Merv; p. 619.

<sup>5</sup> For Merv topography, see G. Le Strange: *Lands*; op cit; pp. 397-403.

<sup>6</sup> R.B. Sergeant: *Islamic textiles up to the Mongol conquest*; Beirut 1972; pp. 87-90.

<sup>7</sup> C. E. Bosworth: Merv; op cit; p. 619.

<sup>8</sup> C. E. Bosworth: Merv; op cit; p. 620.

<sup>9</sup> Yaqut al-Hamawi in J. Pedersen; *The Arabic Book*, (1928) translated by Geoffrey French; Princeton University Press; Princeton, New Jersey (1984), p. 128.

<sup>10</sup> G. Le Strange: *The Lands*; op cit; p. 401.

<sup>11</sup> G. Le Strange: *The Lands*; p. 401-2.

<sup>12</sup> G. Le Strange: *The Lands*; p. 401-2.

<sup>13</sup> G. Le Strange: *The Lands*; p. 401-2.

those founded by the Samanids, and one in the college of the Umayyidiah; also that in the Khatunyah College and that which had belonged to Majd al-Muluk.<sup>14</sup>

Merv produced one of the earliest and greatest scientists of Islam Ahmad ibn 'Abdallah al-Marwazi (Marwazi means from Merv) best known as Habash al-Hasib (the calculator) who flourished in Bagdad and died a centenarian between 864 and 874. He was an astronomer under the Caliphs al-Mamun and al-Muttasim.<sup>15</sup> Habash made observations from 825 to 835 and completed three astronomical tables, the best known being the *mumtahn* (tested) tables, which may be a collective work of al-Ma'mun's astronomers, for there was a whole team involved in observation at the court at the time.<sup>16</sup> Apropos of the solar eclipse of 829, Habash gives us the first instance of a determination of time by an altitude (in this case, of the sun); a method which was generally adopted by Muslim astronomers. He seems to have introduced the notion of "shadow," umbra (versa), equivalent to our tangent, and he compiled a table of such shadows which seems to be the earliest of its kind.<sup>17</sup> One of Habash's son, called Djafar was also a distinguished astronomer and instrument maker.<sup>18</sup>



The ruins of Kyz Kala with the Sanjar Mausoleum in the background  
(Source: <http://www.angelfire.com/rnb/bashiri/Turkmenistan/Kyzkala.jpg>)

A lesser known scholar also from Merv is Saghani, who was a mathematician and astronomer attached to the Buyid observatory in Baghdad.<sup>19</sup> Mathematically, he followed up the work of the Banu Musa, tackling the

<sup>14</sup> G. Le Strange: *The Lands*; p. 401-2.

<sup>15</sup> G. Sarton: *Introduction to the History of Science*; The Carnegie Institution; Washington; 1927 ff; vol I; p. 565.

<sup>16</sup> G. Sarton: *Introduction*; I; p. 565.

<sup>17</sup> G. Sarton: *Introduction*; I; p. 565.

<sup>18</sup> For more on Habbash and his accomplishments, consult:

-H. Suter: *Die Mathematiker und Astronomer der Araber*, 1900; pp. 12, 27.

-J.L.E. Dreyer: *A History of Astronomy from Thales to Kepler*, Dover Publications Inc, New York, 1953.

-C. Schoy: *Liber den Gnomenschatten und die Schattentafel*, Hanover, 1923.

<sup>19</sup> G.Wiet; V. Elisseeff; P. Wolff; and J. Naudu: *History of Mankind*; Vol 3: The Great medieval Civilisations; Translated from

problem of trisecting the angle, which had preoccupied the ancient Greeks.<sup>20</sup> He was particularly versed in mechanics, and constructed, if he did not invent, the instruments he used for his astronomical observations.<sup>21</sup>

Also coming from Merv is Ibn Ahmad Al-Kharaqi, the name al-Kharaqi refers probably to the place Kharaq (or Kharak) near great Merv and he too was called al-Marwazi. He died in Merv in 1138-1139. He was a mathematician, astronomer, and geographer, whose works included: (1) *Muntaha al-idrak fi taqslm al-aflak*, the highest understanding On the division of spheres, (2) a development of Ibn al-Haitham's astronomy; *Kitab al-tabsira fi 'ilm al-hai'a*, a shorter astronomical treatise; (3) *Al-risala al-shamila*, the comprehensive treatise, concerning arithmetic; (4) *Al-risala al-maghribiya* (the Magribi treatise); the last two are lost.<sup>22</sup>

Al-Kharaqi's most important work is the *Muntaha* (first cited). It is divided into three discourses (maqala) treating of (1) the arrangement of spheres (*tarkib al-aflak*), their movements, etc.; (2) the shape of the earth, and its subdivision into a part which is inhabited and another which is not, the differences in the ascendants (tali') and ascensions (matali') due to geographical positions; (3) chronology or eras (*ta'rlkh, al. tawarikh*), conjunctions (*qiran, pl. qirana*), chiefly of Saturn and Jupiter, periods of revolution (*daur, al. adwar*)—for example, *daur al-qiran* or *'aud al-qiran* (return of the conjunction).<sup>23</sup> The *Tabsira* is shorter and covers essentially the same ground; however, it does not contain the elaborate description of the five seas which forms the second chapter of the second part of the *Muntaha*.<sup>24</sup>

Al-Kharaqi developed the theory according to which the planets are not supported by imaginary circles, but by massive revolving spheres. That theory had been expounded before by al-Khazin (not to be confounded with al-Khazini) centuries earlier, and it found its way into Western Europe through Hebrew and Latin translations of Ibn al-Haytham's treatise, *Fi hai'at al-'alam*.<sup>25</sup>

The part of the *Muntaha* describing the five seas was edited and translated into Latin.<sup>26</sup> There are also details on the works of the author in German by the excellent Wiedemann.<sup>27</sup>

Another scholar to come from Merv is a historian, his name al-Tamimi al-Sam'ani (that is, of the tribe of Sam'an, a branch of the tribe of Tamim), Taj al-Islam. He was born in Merv in 1113, travelled extensively in Eastern Islam, died in Merv in 1166.<sup>28</sup> He continued the annals of Baghdad begun by al-Khatib (second half of the eleventh century). In 1155 he undertook an extensive study of Arabic patronymics (nisba), in eight volumes, which is of great historical geographical interest, for apropos of the names of prominent persons he supplies biographical and topographical explanations, which had been collected by him in the course of his journeys, during which he had met for that very purpose a large number of learned men, a work called *Kitab al-ansab* is chiefly precious with regard to Persia, Transoxiana, and Central Asia, for which countries it

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the French; George Allen & Unwin Ltd; UNESCO; 1975; p. 647.

<sup>20</sup> G. Wiet; V. Elisseeff; P. Wolff; and J. Naudu: *History of Mankind*; p. 647.

<sup>21</sup> G. Wiet; V. Elisseeff; P. Wolff; and J. Naudu: *History of Mankind*; p. 647.

<sup>22</sup> G. Sarton: Introduction; op cit; vol ii; pp. 204-5.

<sup>23</sup> G. Sarton: Introduction; ii; pp. 204-5.

<sup>24</sup> G. Sarton: Introduction; ii; pp. 204-5.

<sup>25</sup> G. Sarton: Introduction; ii; pp. 204-5.

<sup>26</sup> by C. A. Nallino: *Albatenii opus astronomicum*; vol. 1, 169-175, Milan.

<sup>27</sup> E. Wiedemann: *Beitrage zur Geschichte der Naturwissenschaften*, 20; *Sitaungsber. der phys. med. Sozietat sur Erlangen*, vol. 42, 72, 1910.

<sup>28</sup> G. Sarton: Introduction; op cit; II; pp. 444-5.

is our principal and often only source of information.<sup>29</sup> The *Kitab al-ansab* is better known through an abridgment of it, the *Lubab*, compiled by the renowned historian Ibn al-Athir; or through a further abridgment, the *Lubb al-lubab*, by al-Suyuti.<sup>30</sup> There is no complete edition of the *Ansab*, unfortunately, and traces of the work had to be found in Ibn al-Athir and al-Suyuti (second half of the fifteenth century).<sup>31</sup> There are usual extracts and details on both author and his work in German, in Wustenfeld.<sup>32</sup>

## Al-Khazini

Finally, the greatest of all scholars to come from Merv was al-Khazini. Al-Khazini flourished ca.1115-ca 1130 at Merv. He was a slave boy to whom his master gave the best education in mathematical and philosophical subjects. He became a mathematical practitioner under the patronage of the Seljuk court. Of his life not much is known except for a few details.<sup>33</sup> He was very much ascetic, refusing rewards and handed back 1000 Dinars sent to him by the wife of an Emir. He lived on 3 dinars a year.<sup>34</sup> His accomplishments in astronomy can be summed up with his description of his construction of a 24 h water clock designed for astronomical purposes and for his treatise *Al-Zij al-Mutabar al-Sinjari*, (*The esteemed Sinjaric tables*), giving the positions of the stars for the year 1115/16, at the latitude of Merv.<sup>35</sup> Al-Khazini is, however, better known for his book, *Kitab Mizan al-Hikma* (the book of the Balance of Wisdom,<sup>36</sup> was completed in 1121, and has remained one central piece of Muslim physics. The treatise of *Kitab Mizane al-Hikma* was written in 1121-1122 for Sultan Sanjar's treasury by Al-Khazini, and has survived in four manuscripts, of which three are independent.<sup>37</sup> It studies the hydrostatic balance, its construction and uses and the theories of statics and hydrostatics that lie behind it and other topics. It was partly translated and edited by the Russian envoy Khanikoff in the mid nineteenth century.<sup>38</sup>

Without too much elaboration, it is important to mention that the first of its eight chapters deals with his predecessors' theories of centres of gravity, including al-Biruni, Al-Razi and Omar al-Khayam. Al-Khazini most particularly draws attention to the Greeks' failure to differentiate clearly between force, mass and weight, and shows awareness of the weight of the air, and of its decrease in density with altitude.<sup>39</sup> By looking at his predecessors' science, al-Khazini provides crucial records of their contributions that could have remained unknown or lost.<sup>40</sup>

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<sup>29</sup> Sarton II; pp. 444-5.

<sup>30</sup> Sarton II; pp. 444-5.

<sup>31</sup> Sarton II; pp. 444-5.

<sup>32</sup> F. Wustenfeld: *Geschichtschreiber der Araber*; no. 54, P. 87, 1881.

<sup>33</sup> Well documented, though, by R.E. Hall: Al-Khazini; in the *Dictionary of Scientific Biography*; vol VII, 1973: 335-51.

<sup>34</sup> R.E. Hall: Al-Khazini .

<sup>35</sup> G. Sarton: Introduction; vol 2; p.122.

<sup>36</sup> Al-Khazini: *Kitab Mizan al-Hikma*, Hyderabad; partial English translation by N. Khanikoff (1859); 'Analysis and extracts of *Kitab mizan al-Hikma* (book of balance of Wisdom), an Arabic work on the water balances, written by al-Khazini in the twelfth century,' *Journal of the American Oriental Society* 6:1-128; also Russian translation: by M.M. Rozhanskaya and I.S. Levinova 'Al-Khazini. Kniga vesov midrosti,' *Nauchnoye nasledstvo*, Moscow, vol 6, 1983; pp 15-140. See also R.E. Hall, *Dictionary of Scientific Bibliography VII*, 1973: 335-51.

<sup>37</sup> N.Khanikoff ed. p.16; in R.E. hall: Al-Khazini; *Dictionary of Scientific Biography VII*, 1973: pp.335-51.

<sup>38</sup> Al-Khazini: *Kitab Mizan al-Hikma*, Hyderabad; partial English translation by N. Khanikoff (1859); op cit.

<sup>39</sup> D.R. Hill: *Islamic Science and Engineering*, Edinburgh University Press; 1993, p. 61.

<sup>40</sup> D.R. Hill:, p. 61.



*‘The magnitude of weight of a small body of any substance is in the same ratio to its volume as the magnitude of weight of a larger body (of the same substance) to its volume.’<sup>43</sup>*

As a student of statics and hydrostatics, Al-Khazini borrowed immensely from al-Biruni and al-Asfizari.<sup>44</sup> Al-Khazini also devotes a large space to the description of various balances by his predecessors, but the focus is on what he calls ‘The Balance of Wisdom’. Al-Khazini’s own balance of Wisdom is a unique instrument. Although this balance owes to Muzaffar b. Ismail of Harat, al-Khazini added refinements, which made it into an instrument that could perform the most accurate measurements.<sup>45</sup> Such accuracy owes to the length of the beam, the special method of suspension, the fact that the centre of gravity and the axis of oscillation were very close to each other, and of course to the very precise construction of the whole. With this, al-Khazini stated that he obtained an accuracy of 1 in 60,000. His uses of this balance were for varied purposes, from ordinary weighing, to taking specific gravities, examining the composition of alloys, changing dirhams to dinars, and many other transactions.<sup>46</sup> In all his processes, he moved the scales about until he obtained equilibrium. Al-Khazini in his descriptions gives particular focus to determining the proportions of two constituents in an alloy. Hall states that Al-Khazini’s hydrostatic balance can leave no doubt that *‘as a maker of scientific instruments he is the greatest of any time.’<sup>47</sup>*

Al-Khazini also made many observations and propositions in his book which constitute some of the foundations of modern physics. Hence, he states:

*‘For each heavy body of a known weight positioned at a certain distance from the centre of the universe, its gravity depends on the remoteness from the centre of the universe. For that reason, the gravities of bodies relate as their distances from the centre of the universe.’<sup>48</sup>*

Al-Khazini was, thus, the first to propose the hypothesis that the gravities of bodies vary depending on their distances from the centre of the earth; this phenomenon was only discovered in the eighteenth century (six centuries after al-Khazini) after a certain development in the theory of gravitation.<sup>49</sup>

Al-Khazini also found that there was greater density of water when nearer to the earth centre more than a century before Roger Bacon (1220-1294) propounded and proved the same hypothesis.<sup>50</sup>

## **The Mongols and the End of Merv as a Centre of Learning and Trade**

The Muslims who were already facing the woes of the crusades (1095-1291), suffered further invasions from the east, which devastated the whole realm. In 1220, Jenghis Khan and his hordes flattened the eastern parts of the Muslim land. In just one year the Mongols seized the most populous, the most beautiful, and

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<sup>43</sup> D.R.Hill: Islamic science; op cit; 61.

<sup>44</sup> R.E. Hall: Al-Khazini: Dictionary, op cit.

<sup>45</sup> For details, see R.E. Hall: Al-Khazini.

<sup>46</sup> D.R. Hill: Islamic, op cit, p 69.

<sup>47</sup> R.E. Hall: Al-Khazini; Dictionary, op cit.

<sup>48</sup> *Kitab Mizan al-Hikma*, English translation, p.24. in M. Rozhanskaya: Statics, op cit, pp 621-2.

<sup>49</sup> Rozhanskaya; p. 622.

<sup>50</sup> Max Meyerhof: Science and Medicine, in *The Legacy of Islam*; edited by Sir T Arnold, and A. Guillaume; Oxford University Press; 1931; p. 342.

the best cultivated part of the earth whose inhabitants excelled in character and urbanism;<sup>51</sup> and inflicted all ills on them. An army under Jenghiz's son Jagtai, captured and sacked Otrar, whilst another under Jenghiz himself, burned Bukhara to the ground, raped thousands of women, and massacred 30, 000 men.<sup>52</sup> Samarkand and Balkh surrendered but suffered pillage, and wholesale slaughter; so much so that a century later Ibn Battuta (14<sup>th</sup> century) described these cities as still largely in ruins.<sup>53</sup> Through Khurasan, the Mongols ravaged every town on their march, placing captives in their vanguard, giving them the choice between fighting their fellow men in front or being cut down from behind.<sup>54</sup> Amidst the toll of destruction was that of al-Jurjaniyah dam south of the Aral Sea, which diverted the River Oxus from its course and deprived the Aral Sea of water, causing it to nearly dry out centuries later.<sup>55</sup> Merv was captured and was burned to the ground; its libraries were consumed in the conflagration. All the glories of the Merv libraries fell a prey to the flames, which followed in the wake of the Mongol sack of this great city.<sup>56</sup> Ibn al-Athir tells that the invaders set on fire the Tomb of Sultan Sanjar with most of the mosques and other public buildings.<sup>57</sup> The city's inhabitants were allowed to march out through the gates with their treasures, only to be massacred. The total slaughter cost 1.3 million lives.<sup>58</sup> Ibn al-Athir wrote

*For several years, I put off reporting this event (of the Mongol invasion) I found it terrifying and felt revulsion at recounting it and therefore hesitated again and again. Who would find it easy to describe the ruin of Islam and the Muslims....? O would that my mother had never borne me, that I had died before and that I were forgotten! Though so many friends urged me to chronicle these events, I still waited. Eventually I came to see that it was no use not complying. The report comprises the story of a... tremendous disaster such as had never happened before, and which struck all the world, though the Muslims above all. If anyone were to say that at no time since the creation of man by the great God had the world experienced anything like it, he would only be telling the truth. In fact nothing comparable is reported in past chronicles.... Those they (the Mongols) massacred, for a single city whose inhabitants were murdered numbered more than all the Israelites together. It may well be that the word from now until its end... will not experience the like of it again, apart perhaps from Gog and Magog. Dajjal will at least spare those who adhere to him, and will only destroy his adversaries. These (the Mongols), however, spared none. They killed women, men and children, ripped open the bodies of the pregnant and slaughtered the unborn. Truly: we belong to God and shall return to Him; only with Him is strength and power.<sup>59</sup>*

<sup>51</sup> B. Spuler: *History of the Mongols*; London, Routledge & Kegan Paul, 1972. p.31.

<sup>52</sup> W. Durant: *The Age of Faith*, Simon and Schuster, New York; 6<sup>th</sup> printing; 1950; p.339

<sup>53</sup> Ibn Battuta: *Voyages d'Ibn Battuta*, Arabic text accompanied by French translation by C. Defremery and B.R. Sanguinetti, preface and notes by Vincent Monteil, I-IV, Paris, 1968, reprint of the 1854 edn.

-Ibn Battuta: *Travels in Asia and Africa*; trsltd and selected by H.A.R. Gibb; George Routledge and Sons Ltd; London, 1929.

<sup>54</sup> W. Durant: *The Age of Faith*, op cit; Chapter XIV; p.339

<sup>55</sup> N. Smith: *A History of Dams*, The Chaucer Press, London, 1971; p. 86.

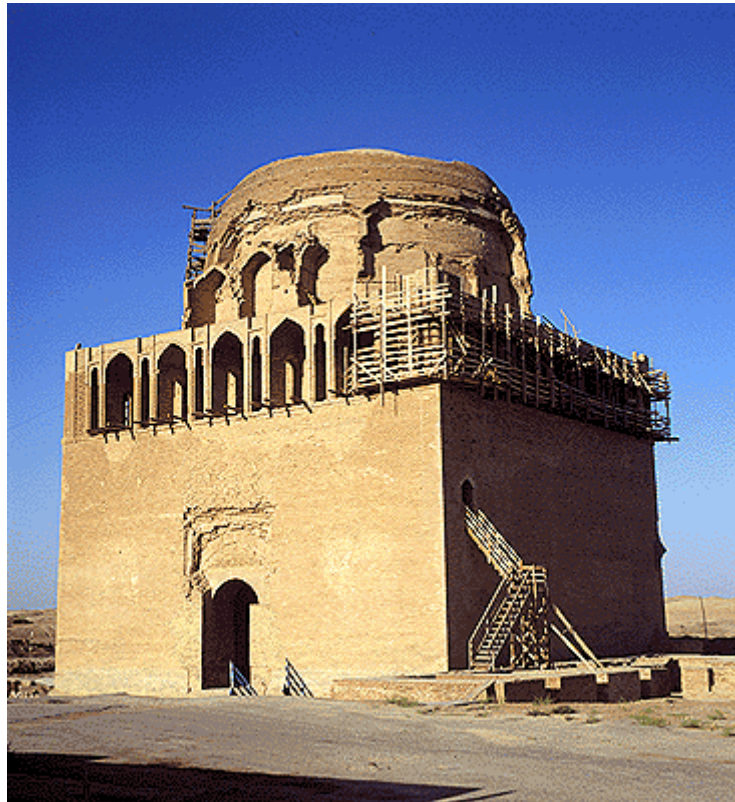
<sup>56</sup> G. Le Strange: *The Lands*; op cit; p. 402.

<sup>57</sup> G. Le Strange: *The Lands*; p. 402.

<sup>58</sup> Browne: in W. Durant: *The Age of Faith*, op cit; p.339

<sup>59</sup> Ibn al-Athir: *Kitab al-kamil*; ed K.J. Tornberg; 12 vols; Leiden; 1851-72; vol 12; pp. 233-4.





Mausoleum of Sultan Sanjar

An enormous 27X27 m cube which is crowned by a dome of 17.28 m in diameter  
(Source: [http://stantours.com/gallery/tm\\_gal\\_her\\_san\\_01.html](http://stantours.com/gallery/tm_gal_her_san_01.html))

When Merv was visited in the 14<sup>th</sup> century by Ibn Battuta, it was still in great ruin.<sup>60</sup> Mustawli also saw that it was still largely in ruins, and the sands had begun encroaching.<sup>61</sup> Hafiz Abru adds that the Mongols had broken down all the great dams and dykes, which under the Seljuks had grown in number, and carefully seen to, in order thus to regulate the irrigation of the oasis; now everything lapsed into a desert swamp.<sup>62</sup>

However, what is remarkable today is that we find in Western history, generally great praise for the Mongols, their destructive prowess of the Muslim world is actually praised by such historians. The worst cases are found amongst modern historians who rewrite history. There is no need to name here such historians who are still at work, we have enough instances of those away from the working scene, and how they look at the Mongol devastation of the Muslim world. Thus, Saunders, tells us:

*‘The Mongol massacres, genocide, perhaps arose from mixed motives of military advantage and superstitious fears. By massacres they hastened the surrender of other places and speeded the conquest. However merciless their rage for destruction, after a decent interval, they commonly permitted the rebuilding of the cities they had burnt and ruined...’<sup>63</sup>*

<sup>60</sup> G. Le Strange: *The Lands*; op cit; p. 402.

<sup>61</sup> C. E. Bosworth: *Merv*; op cit; p. 621.

<sup>62</sup> G. Le Strange: *The Lands*; op cit; p. 402.

<sup>63</sup> J.J. Saunders: *The History of the Mongol Conquests*; Routledge & Kegan Paul; London; 1971. p. 56,

Which is false, for Saunders takes the exception to make it the rule, for all accounts talk of devastated places, in their near totality, which were in ruins centuries later. Wiet et al also tell us that Jenghiz Khan's

*'means were still limited, but he had on his side the moderation and the deliberation of a great leader and, above all, a magnificent army, the exploits of whose horsemen, incomparable bowmen and seasoned warriors take their place in history and legend.'*<sup>64</sup>

Then Wiet and his group do raise a point:

*'What legend portrays so exultantly, however, the chronicles reveal as a grievous ordeal for the city-dwellers of Asia. The Mongols, lagging behind the other barbarians of Asia in their development, did not know what to do with the towns. On the principle that only terror is profitable, only the steppe livable and only the way to heaven valuable, they pillaged, destroyed and massacred. The list of their conquests is a litany of disaster: the marvellous cities of Bukhara, Samarkand, Nishapur, Baghdad and countless others were razed to the ground and their inhabitants slain.'*<sup>65</sup>

Just then they excuse the Mongols' deeds on the grounds that:

*'The sword, however, fell only on those who offered resistance. Those who welcomed the Mongol as a liberator...escaped the terror.'*<sup>66</sup>

Which is a plain distortion, for most of the places that were devastated surrendered without a fight. It is also a flat contradiction to say that only those who fought were slaughtered and then to acknowledge that all the inhabitants, including women and children were slaughtered.

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<sup>64</sup> J. W. G. Wiet et al: *History of mankind*, Vol III: The Great Medieval Civilisations. Part Two: section two; Part three; Translated from the French. UNESCO; 1975.; p. 218

<sup>65</sup> J. W. G. Wiet et al: *History of mankind*; p. 218

<sup>66</sup> J. W. G. Wiet et al: *History of mankind*; p. 218

## Bibliography

- Ibn al-Athir: *Kitab al-kamil*; ed K.J. Tornberg; 12 vols; Leiden; 1851-72.
- Ibn Battuta: *Voyages d'Ibn Battuta*, Arabic text accompanied by French translation by C. Defremery and B.R. Sanguinetti, preface and notes by Vincent Monteil, I-IV, Paris, 1968, reprint of the 1854 edition.
- Ibn Battuta: *Travels in Asia and Africa*; translated and selected by H.A.R. Gibb; George Routledge and Sons Ltd; London, 1929.
- C. E. Bosworth: Merv; Encyclopaedia of Islam; New Series; vol 6; pp. 618-21.
- J.L.E. Dreyer: *A History of Astronomy from Thales to Kepler*; Dover Publications Inc, New York, 1953.
- W. Durant: *The Age of faith*, Simon and Shuster, New York; 6<sup>th</sup> printing; 1950.
- R.E. Hall: Al-Khazini; in the Dictionary of Scientific Biography; vol VII, 1973: 335-51.
- D.R. Hill: *Islamic Science and Engineering*; Edinburgh University Press; 1993.
- Al-Khazini: *Kitab Mizan al-Hikma*, Hyderabad; partial English translation by N. Khanikoff (1859); 'Analysis and extracts of Kitab mizan al-Hikma (book of balance of Wisdom), an Arabic work on the water balances, written by al-Khazini in the twelfth century,' *Journal of the American Oriental Society* 6:1-128; also Russian translation: by M.M. Rozhanskaya and I.S. Levinova 'Al-Khazini. Kniga vesov midrosti,' *Nauchnoye nasledstvo*, Moscow, vol 6, 1983; pp 15-140.
- G. Le Strange: *The Lands of the Eastern Caliphate*; Cambridge University Press; 1930.
- A. Mieli: *La Science Arabe et son role dans l'evolution mondiale*, Leiden, E, J. Brill, 1966.
- M. Meyerhof: Science and Medicine, in *The Legacy of Islam*; edited by Sir T Arnold, and A. Guillaume; Oxford University Press; 1931.
- J. Pedersen; *The Arabic Book*, (1928) translated by Geoffrey French; Princeton University Press; Princeton, New Jersey (1984).
- G. Sarton: *Introduction to the History of Science*; The Carnegie Institution; Washington; 1927 ff.
- J.J. Saunders: *The History of the Mongol Conquests*; Routledge & Kegan Paul; London; 1971.
- C. Schoy: *Liber den Gnomonschatten und die Schattentafel*; Hanover, 1923.
- R.B. Sergeant: *Islamic textiles up to the Mongol conquest*; Beirut 1972.
- N. Smith: *A History of Dams*, The Chaucer Press, London, 1971.
- B. Spuler: *History of the Mongols*; London, Routledge & Kegan Paul, 1972. p.31.
- H. Suter: *Die Mathematiker und Astronomer der Araber*, 1900.
- J. W. G. Wiet et al: *History of mankind*; Vol III: The Great Medieval Civilisations. Part Two: section two; Part three; Translated from the French. UNESCO; 1975.