



## ORIGINAL ARTICLE



### A Study of Iranians' Innovations in Pharmacology from Jondi Shapur to Shiraz School

#### Abstract

Iranians were one of the first nations who made great efforts in medicine and the treatment of diseases and ailments and improved their knowledge and awareness in this field through the passage of time. The religious and mythological books of Iran refer to some physicians who used herbs for the treatment of the patients. To study and improve their knowledge of medicine, Iranians established the first medical centers like university and hospital of Jondi shapur, and they tried to present their breakthroughs in the field of medicine and treatment through the translation of the books of other nations, educating physicians, and interaction with the other countries of that time. Subsequently, some people even preferred the treatment methods of the physicians of Jondi shapur to Indian and Greek ones'. After Islam, some Iranian families like Baqtiashu found their way to Bani Omaye and Bani Abbas caliphates' courts, owing to their knowledge of medicine and their special capabilities in the realm of sciences. These people also played a big role in the translation movement. While providing medical services and curing the caliphates' diseases, Iranian physicians also wrote some books on medicine and treatment and it was through this action that countless Iranian names of medical herbs were introduced in the pharmacology books of the Islamic era. And later these books became the basis for Islamic medicine. In the reign of Al Booyeh, thinkers like Mohammad Ibn Zakaria Razi and Ali Ibn Abbas Majoosi made new discoveries in the science of medicine and also in the treatment methods and making of drugs - an

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unprecedented discovery which had not been made before that time. Additionally, in this period, we can see the formation of Medical School of Shiraz by some scholars like Abu Maher Shirazi.

This research, through a descriptive- analytical method and based on the original scientific and historical sources, tries to describe the role of Iranians in development and innovation in the field of drugs from Jondi Shapur School to Shiraz School in Al Booyeh period.

**Key words:** Pharmacology, Jondi Shapur, Al Booyeh, Fars, Shiraz School

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- 1- Vendidad, 1997: 1845/4.
- 2- Yasna, Hat 9, clause 4:65.
- 3- Ferdowsi, 1990 :26/1.
- 4- Vendidad, 1998: Fargard 22, clause 23.
- 5- Ibn Balkhi, 1984: 36.
- 6- Doostkhah, 1991:415-426.

## Introduction

Iranians have long been seriously working on medicine and treatment. In the religious and mythological books of Iranians, you can find three treatment methods in Ancient Iran: healing through the holy word, healing by herbal medicine, and healing through surgery. According to Avesta and other ancient texts of Iran, the first Iranian physician was called “Thrita”, the father of a hero called Garshasb,<sup>1</sup> who had good knowledge of herbal medicine and their extracts. According to Iranian mythology, Jamshid, the fourth Pishdadian king, was the first physician who could cure skin, bone, and oral diseases by the help of herbs and he is also known as the maker of opium.<sup>2</sup> According to Shahnameh, Jamshid knew herbal medicine and would cure diseases by different herbs.<sup>3</sup> In Vendidad, it is mentioned that Freydoon was also a drug maker.<sup>4</sup> Ibn Balkhi also has written that: “He extracted drugs from plain grasses and mountain bushes, which were beneficial to both people and animals, and he knew some spells that people used for treatment of diseases and so on”.<sup>5</sup> About Freydoon’s knowledge of medicine and drug making, there exist various evidences in Avestan texts, which shows Freydoon had been revered by Iranians as an efficient physician and drug scientist, as it is evident in a statement from Yasht 13, clause 131: “We admire Freydoon from Abtin family, the spiritual Faravahar, for his fight against ringworm, fever, pain , and other serious diseases.”<sup>6</sup>

Based on historical reports and archaeological data, the Iranian physicians of the ancient era, diagnosed many diseases and managed to use herbs to eradicate them, and today these herbs are still used in the treatment of diseases, some of which are thyme, bergamot, saffron, and cinnamon. Iranians had also discovered the treatment qualities of some kinds of water, and so they had been using some mixed drugs, with some water elements in, for enhancing the fertility and lacta-



tion of women.<sup>7</sup>

The establishment of Jondi Shapur University in Sasanian period in Iran was a fundamental revolution in the fields of drug and medicine. This university was the link and intersection between Iranian, Indian, Syriac, and Greek Schools, and therefore numerous books in the field of medicine and drugs from different nations were taught and translated in this university. The successful experience of Iranian physicians and druggists in Jondi Shapur was used in Al Booyeh era in Fars, and became one of the dazzling periods in the history of Iran in innovation in the realm of medical knowledge. The climate conditions, accessible paths, Fars wealth, and also the wise policies of some rulers of Al Booyeh, made this city as one of the centers for the propagation of knowledge, and this paved the way for the generation of the Medicine School of Shiraz.

The present study tries to not only analyze the status of Jondi Shapur Pharmacology School in the Islamic era, but also illustrate the role of Iranians in the maintenance of this School in the period of Al Booyeh in Fars.

#### **The Scientific Position of Jondi Shapur from the Ancient Era to the Emergence of Islam**

According to the geographic texts of the Islamic era, the city of Vah Andiv Shapur (Jondi Shapur) had been located in the east of Susha and South-East of Dezfool, halfway between Susha and Shooshtar.<sup>8,9</sup> A city whose name and fame is inseparable from its scientific-medical School and had been renowned as the city of "Hippocrates".<sup>10</sup> The first mentioning of the scientific center of Jondi Shapur in references dates back to the period of Shapur the 2<sup>nd</sup>, when a Christian physician called Teodosius, or Teodoros was in this city. It is also believed that a church was made to his honor in the city and he was the person who wrote the book of Konash (Medical Encyclopedia) which was later translated into Arabic. He made great efforts to educate his students<sup>11</sup>. Although the contact of this Christian physician with Jondi Shapur Center is not clearly known, his role in the promotion of medical knowledge in the city cannot be denied. Regarding the formation of this scientific center, Nasr states that: "The POW camp of Shapur gradually expanded, and later changed to the old sciences center. These sciences were taught in Greek, Sanskrit, and Syriac languages."<sup>12</sup> Qefti report proves this claim that Jondi Shapur had always had efficient physicians, and its people had been reputed for this craft.<sup>13</sup> To the point that in Khosro Anoshirvan period<sup>14</sup>, Jondi Shapur reached its prime, and in fact Anoshirvan's interest in medicine and his

- 7- Taj bakhsh, 1996: 394/1-395.
- 8- Istakhri, 1994:83
- 9- Moghaddasi 1982:611.
- 10- Brown, 1958:37.
- 11- Ibn Nadim, 1987:536.
- 12- Nasr, 1980:28.
- 13- Ibn ghefti, 1992: 183-184.
- 14- Doostkhah, 1991, Hat, 531-579.



support of scientists, and the expansion and the development of the scientific and research center of Jondi Shapur was the main reason behind this huge success. In this period, many books of medicine were written and translated by Jondi Shapur teachers and scientists. For example, Serjis Ras Al-Eini, translated many books on medicine and treatment from Greek into Syriac language. He played an important role in the development of medicine and treatment. Also Beyadeh wrote the book "Almakul and Almashrub".<sup>15</sup> According to existing resources, the first link between Iranian medicine to Indian medicine dates back to this period of time, as Borzuyeh, the physician or maybe the head of Jondi Shapur was sent to India and through this interaction between the two countries, medical herbs and medical information and treatment entered Iran.<sup>16</sup> In that period of time, Rome Empire closed Athens, Alexandria, and Al-Roha schools and led to the immigration of these schools' teachers and their taking refuge in Iran.<sup>17</sup> In fact, the number of Indian, Greek, and Syriac physicians and druggists in this period is estimated to reach to 120 people.<sup>18</sup> It is said that in the 20<sup>th</sup> year of the reign of Khosro Anoshirvan (550 A.D), Jondi Shapur's physicians, upon the request of the king, engaged in discussion and debate over medicine and treatment in a gathering. And renowned physicians from all over the country came to Jondi Shapur and later their speeches were compiled into a book. This medical society was held by Gabriel from Baqtiahu family as the head of this community<sup>19</sup>. The writings about this society clearly demonstrates the deep knowledge of physicians of Jondi Shapur. It can be said that this society was one of the first gatherings of medical scholars in the world. The physicians in this university with different nationalities like Greek, Indian, Syriac and Iranian all cooperated in scientific activities, and through this a mixture of Greek, Syriac, Iranian, and Indian knowledge emerged. By the passage of time, Iranian scholars relying on their own knowledge and experience stripped the field of medicine and treatment out of the impact of Greek and Indian medicine, to the point that some people preferred the medical methods and treatments of Jondi Shapur physicians to those of the Greek and Indian physicians, and many people from different communities admitted to the superiority of Iranians in the field of medicine and drugs.<sup>20</sup>

#### **Jondi Shapur Druggists from the Entrance of Islam to Abbasid Era**

After the entrance of Islam into Iran and the collapse of the central state, there appeared a scientific stagnation for a

- 15- Ibn Abi Usaibia, 1965:339.
- 16- Olirey, 1995.
- 17- Farshad, 1987: 2/75.
- 18- SafiZadeh, 2003:824.
- 19- Ib ghefti, 1992: 184-185.
- 20- Kristian: 2000:536.



while and studying and analysis of sciences were delayed to some other time. Although some research refers to the destruction of libraries and scientific centers at the time of Arabs' conquest of Iran,<sup>21</sup> other researchers have doubts about this event - based on both historical evidences and rational thinking. The emphasis of the Quran verses on the spread of sciences in "Al-Aqra" Sura , verses 1 to 5; "Al-Qalam" Sura , verse 1; and "Al-Mujaadila" Sura, verse 11 are examples of logical reasoning behind these researchers' claim. Also, Quran mentions the superiority of the seekers of sciences and their dignity (Taha, 114: 20).<sup>22</sup> There are different verses in Quran about plants and their nutritional value in human diet and in the treatment of diseases, one of which is the story of Jonah.<sup>23</sup> Also, the holy Quran mentions the names of some fruit with treatment qualities such as pomegranate, grapes, fig, and olive.<sup>24</sup> In this regard, there exist some traditions, quoted from Prophet Mohammad (PBUH), such as: "Science is divided into two groups: the knowledge of body and the knowledge of religion".<sup>25</sup> He has also stated that "Allah has not created any disease, for which He has not created their cure either."<sup>26</sup> Taking the above-mentioned subjects, it could be said that these verses and traditions had profound influence on the Arabs' scientific community.

Another factor that attracted Arabs to medicine and pharmacology, was their interaction with the scientific center of Jondi Shapur, because amongst Arabs there were some physicians like Harith Ibn Kalde Saqafi and his son who had learned medicine and treatment in the medical center of Jondi Shapur.<sup>27</sup> Besides, amongst Omavi Caliphates there were some people who were interested in medicine and sciences, and some of them paid attention to this discipline because of their personal aims. To meet their own needs, they had to engage in translating and quoting scientific texts, and in this field they needed the assistance of Iranian scholars. The prominent physicians of Jondi Shapur had a special role in the translation movement and transfer of medical science to the Islamic world. As a matter of fact, the Iranians' contact and interaction with Omavi court was scarce though undeniable, as even the Christian physician of Damascus court , appointed to this status by Moavieh, was from Jondi Shapur.<sup>28</sup> Based on references, the first translation in Omavi period, belongs to Khalid Ibn Yazid Ibn Moavieh, who seriously engaged in Greek sciences and medicine and translated many medicine books into Arabic, which were used by Arab students. In fact, most of these books were translated into Arabic by Iranians, especially by Jondi Shapur graduates, and entered the Islamic world.<sup>29</sup> Saleh Ibn Abdolrahman and Serjun Ibn Mansour are

- 21- Zarrin Kub, 1957:96-97.
- 22- Quran, Taha Sura: 20-114.
- 23- Tabatabaee: 1997:17/164.
- 24- Tin, 1; Nahl, 11; Abas,29; Anam, 99& 141.
- 25- Majlesi, 1983:6/220.
- 26- Bokhari, 2008:10/113.
- 27- Safa, 2005: 47-48.
- 28- Ibn Abi Usaibia, 1970: 24/2-25.
- 29- Ibn Taqtaqi, 2010:161.



two of these scholars.<sup>30</sup> Omar Ibn Abdolaziz was also one of the other Omavi caliphates who earned fame in compilation and translation of medicine books. In Sham book treasures, he found a medicine book written by “Qeis Ibn Aron Ibn Aayan”, which is considered as one of the best in old medical encyclopedias. This precious and unique work was translated into Arabic by “Maserjuyeh”, the Iranian physician living in Basra in the early years of Marvan Ibn Hekam’s reign.<sup>31</sup> In fact, it is likely that the scarce information about the Omavi interactions with Iranian scholars and also the silence of the existing sources and references over the activities of these scholars at that time was due to this fact that Damascus as the center of Omavi Caliphate had established close affinity with Greek civilization from many years prior to Islam, and its geographical proximity with Romans’ conquered areas in the East justified this lack of evidence. Therefore, Omavi court and seekers of knowledge around caliphate circle could not have strong ties with further lands than the caliphate in Iran. On the other hand, Bani Omaye did not value other nations except the Arabs and they considered themselves superior to non-Arab communities. They said: “We brought you prosperity by sword, and dragged you to the Heaven by chain. We endangered our lives and put ourselves to death for your salvation. And no blessing is more than this when someone like us endangers and sacrifices their life for you.”<sup>32</sup> The offensive behavior of Bani Omaye with non-Arab nations is evident in literary and history books, and illustrates just a part of cruelties and brutalities of this family. Undoubtedly, in the biased atmosphere of Bani Omaye State, Iranians were not allowed to freely and appropriately manifest their talent and genius in different fields of sciences.

#### **Druggists of Jondi Shapur in Abbasid Period**

When Abbasid state came to power (132 A.H), Islamic caliphate built closer and broader relation with Iranians.<sup>33</sup> Since Iranians played a key role in the Abbasid’s coming to power, they got involved in all the affairs and decisions of the caliphate and the State, and naturally by the aid of their old civilization, strove to spread the knowledge of sciences and crafts. Even the Abbasid caliphates were influenced by this Iranian atmosphere.<sup>34</sup> In this period, caliphate was relocated to Baghdad from Damascus and thus near the scientific center of Jondi Shapur, and then most thinkers of this university were invited to the Islamic capital and made this place a kind of science center.<sup>35</sup> These scholars played an important role as inheritors of Jondi Shapur and were considered as the link between the ancient medicine and drug science on the one

30- Ib ghefti, 1992:442-444.

31- Ibn Jaljal, 1970:130-131.

32- Ibn Abdarbe, 1988: 377/3.

33- Hetti, 2001: 359.

34- Halabi, 1986: 51.

35- Sarmadi, 1998: 1/221.



hand and the sciences of the Islamic era on the other. The first official relation between the caliphates and Iranian scholars dates back to Mansour's time in 148 A.H. At that time, Mansour caught a disease and Baghdad physicians were unable to cure it, because Baghdad at that time was not a scientific center yet and did not have any efficient and reliable physicians. Apparently it was through the guidance of some Iranians working in caliphate's court, who were acquainted with Jondi Shapur physicians, that Jorjis the head and the great physician of Jondi Shapur, the writer of many important books on medicine and treatment was invited to Baghdad to treat the caliphate.<sup>36</sup> It is said that he was the first physician that had translated some books from Greek into Arabic for Mansour.<sup>37</sup> He also wrote a *Konash* (medicine encyclopedia) of which there is no evidence today (cited, 332). He was extremely respected by the Caliphate. Nevertheless, he did not stay in Baghdad and returned to Jondi Shapur after a while and sent Isa the son of Sahar Bakht, one of the greatest physicians and druggists of Jondi Shapur, to Baghdad. Afterwards, great numbers of Jondi Shapur physicians and graduates emigrated to Baghdad one after another and owing to the caliphates' support, succeeded in founding Islamic Medicine there, and they received such glory in Baghdad that nobody would pay attention to any physicians outside the circle of Jondi Shapur. Isa Ibn Sahar Bakht translated into Arabic three essays amongst the reviews that Jalinus (Galen) had written on Hippocrates' "Alfosul".<sup>38</sup> He also wrote a book titled as "Qavi Al-Adviye Al-Mofradah Ala Al-Horuf" (cited, 500). In 190 A.H. Gabriel, the son of Baqtiashu, upon the request of Harun Al-Rashid (170-193 A.H) and inspired by the structure of Jondi Shapur hospital, erected the first hospital in Baghdad called "Al-Rashidi" and invited some physicians and druggists like Masooyeh from Khuzestan, Jondi Shapur to this newly-founded hospital.<sup>39</sup> After the foundation of Baghdad hospital, some other hospitals were built in other cities.<sup>40</sup> According to Algud, most of the hospitals in Islamic era were built following the pattern and plan of Jondi Shapur hospital.<sup>41,42</sup> Gabriel, like other members of Baqtiashu played a big role in the transfer of medical knowledge to the Islamic world and the translation of Greek and Syriac scientific texts into Arabic. Following his recommendation, Caliphate Harun Al-Rashid sent a group to Rome Empire for gathering the Greek medical texts, and then he financially aided the translators to translate these ancient writings. He also continued these scientific efforts in Ma'mun period as well.<sup>43</sup> For instance, requested and encouraged by Gabriel, Honayn Ibn Issac was one of the renowned physicians and

- 36- Ibn ghefti, 1992: 217-218
- 37- Ibn Abi Usaibia, 1970: 502/1.
- 38- Ibid, 1965: 141.
- 39- Ibn ghefti, 1992: 187.
- 40- Zeidan, 1987: 608
- 41- Algood, 1992:201-202
- 42- Farshad, 1987:874
- 43- Azar noosh, 1995: 604



translators that translated some parts of Jalinus' writings into Arabic.<sup>44</sup> Gabriel's writings in medicine and pharmacology were always useful for Islamic world's physicians and druggists. He wrote a medicine encyclopedia in Syriac language, in which he benefited from Jalinus and Hippocrates' ideas, which was used by medicine students for the understanding of Greek medical and pharmacological terms.<sup>45</sup> Later even Abu Reyhan Biruni, in his book "Al-Seidana Fi Al-Teb" quoted many of his sentences on medicine and treatment<sup>46</sup> referring to this encyclopedia. It is noteworthy to mention that many Iranian scholars who continued their scientific activities, were indebted to some competent Iranian viziers like the Barmakians. This kin always tried to attract the attention of Abbasid caliphates to the compilation and translation of books from different nations. For example, Harun Al-Rashid<sup>47</sup> persuaded by Barmakians, sent some people to Rome to buy Greek works.<sup>48</sup> They also paved the way for the growth and promotion of many Iranian thinkers in the Abbasid caliphate court. For example, Yahya Ibn Barmaki introduced two Iranian physicians, Baqtiashu and his son Gabriel, to Harun<sup>49</sup> and this led to the long stay of Baqtiashu family in Abbasid court for about two and half centuries. Since Baqtiashu family were familiar with medicine and treatment and also were highly capable of translation and compilation of medicine and treatment books, they succeeded in thriving the sciences of medicine and pharmacology. In addition to this family, there were some other famous physicians linked to Baghdad State, like Masooyeh, the physician and druggist, who had worked for thirty years in Jondi Shapur drug store and gained some valuable experience. In this regard, Ibn Qefti in "Tarikh al- Hokama" states that: "Masooyeh was engaged in research and study into drugs in Shapur, one of the well-known cities of Khuzestan. Masooyeh's knowledge of diseases and their treatment had come through his hard work and practice."<sup>50</sup> Masooyeh was invited to Baghdad by Gabriel, son of Baqtiashu, who was one of the very reputed physicians in Abbasid court and also the head of Baghdad hospital.<sup>51</sup> Masooyeh's family through some generations were all physicians, druggists, and translators, one of their famous ones was Yohan Ibn Masooyeh. He was completely fluent in Syriac, Arabic, and Greek languages and translated many science books brought from Amuria and Anghare in Harun Al-Rashid time.<sup>52</sup> He was chosen as the special physician of Ma'mun and the head of Beit al- Hakameh in Baghdad. He was also missioned by Ma'mun to gather the Greek books in Byzantine.<sup>53</sup> The Abbasid caliphates trusted him so much that, as Qefti states, they did not obey any other physicians'

- 44- Ibn ghefti, 1992: 241.
- 45- Olirey, 1995: 294.
- 46- Biruni, 2004: 93,222, 259, 342.
- 47- Ibid.
- 48- Zeif,1960, 11.
- 49- Jaheshyari, 1975:289.
- 50- Ibn ghefti, 1992: 328-329.
- 51- Najm Abadi, 1996: 2/227.
- 52- Ibn ghefti, 1992: 512.
- 53- Sezgin, 2001: 3/300-303.





orders.<sup>54</sup> It has been said that in Yohan's house, some debate and discussion forums about medicine and drugs were held, in which the most efficient physicians were present, and Yohan's reputation in medicine and pharmacology was far beyond all the physicians in Baghdad.<sup>55</sup> He also wrote some monographs on medicine, and 42 written works on medicine and drugs have been attributed to him.<sup>56</sup> Many of his works were widely translated and published in different languages and were used through the centuries. The works he has written on pharmacology are as follows: 1) *Islah Al-Adviyah Al-Mos'hela*, of which some manuscripts exist in Italy and England today translated into Latin.<sup>57</sup> This work has also been translated into French.<sup>58</sup> 2) *Fi Al-Sada Va Illah Va Ouja'ah Va Adviyah Va Al-Somum Va Alajaha*, which is about different kinds of headaches, their reasons, and all the drugs for the treatment of dizziness, which came to be useful for Mohammad Ibn Zakaria Razi.<sup>59</sup>

One of the other physicians and druggists of Jondi Shapur, was called Shapur Ibn Sahl (255 or 256 A.H). He was the first person who published a book on antidotes titled as: "*Al-Qarabazin Fi Al-Bimarestaniat*". In this book, he explained about some mixed drugs, which were kept and prescribed in hospital for different diseases. He published this book under the influence of Iranian pharmacology.<sup>60</sup> This book was used from the late third century to the mid sixth century in drug stores and hospitals of Baghdad.<sup>61</sup>

Another scientist in this era was Abu Al-Hasan Ali Ibn Sahl Ibn Ribn Tabari (192 A.H), from whom Mohammad Ibn Zakaria Razi learnt the science of medicine and treatment in Rey.<sup>62</sup> Tabari is known as "Sheikh Al-Ketab", This is because he had lots of works in Persian and Arabic languages, some of which have been destroyed by the passage of time, but their names still remain. Some of his books are "*Manafe Al-Adviah Va Al-At'ameh*", "*Hefz Al-Sehat*", and "*Ferdows Al-Hekmat*".<sup>63</sup> His best work is "*Ferdows Al-Hekmat*", which is the first comprehensive medicine and drug book explaining twenty medical herbs not known by the Greeks. This book also provides the names of some drugs made by Tabari himself, which are still used today to cure some diseases.<sup>64</sup> One of the benefits of this work is that it has been written in a simple style, far from any complicated jargons or terms, which makes it useful and beneficial for both the experts in drug science and the interested public.

#### **Iranian Druggists in Al Booyeh Period**

Alongside with the beginning of the decline Of Abbasid caliphate in the early third century and its increasing trend in the

- 54- Ibn ghefti, 1992: 512.
- 55- Ibn Nadim, 1987: 526.
- 56- Sezgin, 2001: 3/302-303.
- 57- Moslehi Shad, 2010: 192.
- 58- Sezgin, 2001: 3/303.
- 59- Ibn ghefti, 1992: 512.
- 60- Zarrin Kub, 1983: 60.
- 61- Ibn Nadim, 1987: 528.
- 62- Farshad, 1987: 2/676-678.
- 63- Sezgin, 2001: 3/310.
- 64- Tabari, 2012: 214& 617.



fourth century (Hejira), the demise of scientific development in Baghdad and the decline in scientific centers of the Islamic world began. Factors such as scant attention of the caliphates to sciences, weakness in the caliphate system, and the competition between the political figures contributed to this demise in the scientific movement. In the wake of the fading star of science center in Baghdad, other Islamic nations also faced the same movement, and therefore the emigration of great thinkers and scientists to other nations began.<sup>65</sup>

Various factors played a part in the spread of sciences in general and also in spread of medicine and pharmacology sciences in Fars in particular. The cultural background of this province, which was recognized as one of the main centers of the Iranian civilization both in pre-Islam and post-Islam eras, prepared the ground for the revival of sciences in the age of Islamic civilization. Regarding the spread of the knowledge of drugs, the role of the nature of Fars cannot be ignored. The versatility of the climate and suitable geographic conditions had made this province as one of the most renowned ones for its vegetation and especially for the growth and cultivation of medical herbs. Moghaddasi mentions the names of some medical herbs like rhubarb, saffron, Anzuret (the gum from a prickly tree with laxative qualities) and some animal products which had been very useful in the treatment of diseases.<sup>66</sup> The trade paths and the sea routes of Fars linked to the remote lands had made it possible to trade different drugs and medical herbs. Owing to its proximity to the Persian Gulf, Fars was one of the important centers of trade with different lands for centuries, trading various items, one of which had been the trade of drugs and medical herbs. Morocco, Spain, Egypt, Yemen, India, and China were some of these centers having such a trade with Fars.<sup>67</sup> Furthermore, the revival of old roads of Fars, especially the roads to Isfahan and Khuzestan and also to Baghdad in this period of time facilitated the trade and increased the wealth of different social classes and also contributed to the attraction of scholars and the spread of sciences. In fact, the safety of roads enhanced by Al Booyeh reign over Rey, Baghdad, and Shiraz multiplied the importance of Shiraz as a scientific center and a place for the immigration of scientists. Evidently, the role of Al Booyeh's way of governing and its impact on the transfer of scientific heritage of Iranians should not be denied. As a matter of fact, religious and political laxity, honoring the scientists, and gathering different books were common conduct of some Al Booyeh rulers.

The Period of Al Booyeh coincides with the most dazzling age of full-scale scientific, cultural, and social transforma-

65- Zarrin Kub, 2007: 40, 43.

66- Moghaddasi, 1982: 2/629.

67- Metez, 1983: 2/502.



tions in the history of Islam. This family, in fact, were the inheritors of the efforts of the preceding Muslim scientists, and through their supports of the scientists and scholars made a contribution to the growth of sciences and knowledge and the kindling of its flame. In this era, Booyeh rulers like Azad Al-Doleh Deilami (338-372 A.H) credited their own state with scientists, philosophers, and literary men. In fact, Azad al-Doleh had provided a private room in his court for scientists and scholars so that they could engage in the matters of their interest far from the others' eyes in private.<sup>68</sup> Moghaddasi mentions a huge library, in which any scientific book written till that period was kept by Azad al-Doleh.<sup>69</sup> The literary and knowledgeable viziers of that State put great efforts into educating scientists and thinkers and strove for the spread of sciences and culture. In the book of "the History of Tabaristan" Ibn Isfandyar, states that: "It should be known that in the Islamic State, no king ever had the same authority, vastness of Empire, great influence and power of decision-making, glory, and the dignity of Azad Al-Doleh. At that time, he was renowned for his grace and wisdom. It seems as though the world was pregnant with all sciences till his era, when it went through labor and gave birth ...".<sup>70</sup> According to sources, the presence of famous scholars and the provision of scientific and entertaining facilities for them in Azad Al-Doleh time is a living proof for his influential role in flourishing the Islamic renaissance. In fact, it was in this period that the translation movement and writing of books was resumed and many of the medicine books were translated by the graduates of Jondi Shapur School. They not only translated the books on medicine and treatment, but also took advantage of the translation of Greek works on medicine and made a discovery of the new things in this field, and also they analyzed the accuracy or inaccuracy of information in medicine and treatment texts written by Greek physicians like Jalinus and Hippocrates.<sup>71</sup>

By the assistance of scholars, Azad Al-Doleh managed to establish schools, libraries, and medical and treatment centers like the hospitals in Shiraz, Rey, and Baghdad, which were run in the same way as Jondi Shapur hospital and benefited from all the medical equipment and different drugs.<sup>72</sup> There were many physicians engaged in practicing medicine as well as teaching in the hospitals at that time. This period can be compared to Sasanian era and the efficient and renowned physicians of Jondi Shapur, as in this period of time there were also experienced and competent physicians in Azadi Hospital in Shiraz, as well as in hospitals of Rey and Isfahan who left precious books on medicine and treatment. As it was said, the physicians of Jondi Shapur, by moving

- 68- Kremer, 1996: 215.
- 69- Moghaddasi, 1982: 2/641-642.
- 70- Ibn Isfandyar, 1987: 140/1.
- 71- Zeidan, 1987: 274/3, 277.
- 72- Ibn Moskooyeh, 1997: 6/477.



to the hospitals of Baghdad, helped to flourish the science of Iranian medicine and treatment (which was the inheritor of the medical sciences in Mesopotamia, India, Egypt, and Greece and also an integrator of these sciences), and founded and spread the sciences of medicine and pharmacology in the Islamic land. Likewise, the physicians of Azad Al-Doleh's time who were reputed in Iran and working in the hospitals of Shiraz, Isfahan, and Rey were a turning point in medicine and treatment.

Abu bakr Mohammad Ibn Zakaria Razi (251-313 A.H) was one of the outstanding physicians of that time who contributed a lot to the development of medicine and treatment. He had some works on medicine and its branches.<sup>73</sup> The number of his publications on different sciences exceeds 200, of which the most significant ones are: "Al-Havi, Al-Qulanj, Al-Mansouri, Al-Shamil, Qavas Al-Ashya, Al-Ibdal/ Ibdal Al-Adviyeh, Man la Yahzar Al-Tabib/ Teb Al-Foqara, Resala Fi Dava Al-Mos'hel, Al-Adviyeh Al-lati Tanfa Al-Qei va Al-Is'hal, Aqrabazin, Al-fosul Al Teb/ Al-Morshed".<sup>74</sup> Razi had been studying Chemistry before medicine and owing to his great knowledge of this subject was able to use many chemical materials for the treatment of diseases and in making drugs.<sup>75</sup> He believed that chemical drugs had the same value as natural drugs and tried to use them too. He also introduced some new equipment and tools for making drugs, because besides some tools for mashing, grinding, and so on, some other tools were also needed for doing some processes like evaporation, distillation, sublimation, etc on mineral drugs. These new tools and equipment are discussed in the book "Ser al-Asrar".<sup>76</sup> He has named some drugs, never prescribed by the physicians before. For instance, for curing smallpox, Razi has prescribed some drugs which prove his efficiency in medicine and drug science. Also for the prevention of development of smallpox into the eyes, he would prescribe powder, suppository, and drops. Mentioned in the book "Aljadri and Al-Hasba" (smallpox and measles), for the prevention of the effects of these diseases on eyes, he would use two kind of drugs.<sup>77</sup> He also would use some different kinds of kohl for improving the sight and easing the pain in sore eyes.<sup>78</sup> Moreover, to treat eye disease, he made some bar called "Arab soap", known as Razi soap as well, and he wrote a book titled "Resala fi Al-Adviya Al-Ein va Alajaha" on treatment of eye diseases.<sup>79</sup> In his book "Aljadri and Al-Hasba" (smallpox and measles), he mentions the names of two drugs, which are applied to the eyes for the prevention of the effects of these diseases onto the eyes. Razi had lots of innovations in the science of drugs, one of which is "Alcohol" as an anti-

73- Ibn Nadim, 1987: 53-532.

74- Ibn Abi Usaibia, 1965: 416-422.

75- Tabatabaee, 2009: 127.

76- Razi, 1965: 8.

77- Ibid: 16-17, 21-22.

78- Ibid: 17-18.

79- Ibn Abi Usaibia, 1965:427.



septic material.<sup>80</sup> He was the first person who discovered the laxative quality of Mercury. He also used Mercury as a balm to treat skin diseases and infections. He also introduced the balm of Lead bleach in his books about drugs,<sup>81</sup> which was known as “Razi Bleach“ in the fourth century (Hejira).<sup>82</sup>

Abu Al-Hasan Ali Ibn Abbas , known as Majoosi, is another great physician and druggist of Iran who played a really influential role in medicine and treatment. He was the student of Abu Maher Mosa Ibn Sayyar Qomi<sup>83</sup> who was a renowned Iranian physician and the author of “Kamel Al-Sana’e Al-Tabiye/ Al-Maleki”, a book which was published to the honor of Azad Al-Doleh Deilami. This book was published in three volumes in Arabic, including two main parts: The first part is Scientific Medicine, the second Practical Medicine. Each part of the book contains ten articles, the whole book covering twenty articles, and each article contains some sections. This book was a comprehensive encyclopedia on medicine referred to by physicians for the treatment of all diseases to find causes and effects of diseases, their diagnosis, and prescription of right drugs for their treatment. In fact, the twelfth article of this book containing 57 sections is a comprehensive compilation on pharmacology.<sup>84</sup> At that time, many people were suffering from eye diseases and for their treatment physicians used some drugs. Ali Ibn Abbas like other physicians of the time tried to treat eye diseases. In his book, he writes: “Eye is a sensitive part and for its treatment no strong drugs should be used nor any big amounts of drugs should be entered into it. It should be tested whether its disease is due to the heat of the sun, dust, or smoke, and its treatment can be done by wiping out these factors.” This book was very important for the physicians and druggists of that time.

Like Ahvazi Majoosi, Ibn Mandooyeh was also considered as one of the best physicians in Al Booyeh, who was working in the hospitals at that time, enjoying a big reputation. He was first working in Isfahan hospital at the period of Al Booyeh, and his famous family were also residing in Isfahan. Mandooyeh was the student of Abi Maher as well as Majoosi. Then, he started practicing and teaching medicine in the Great Isfahan hospital, he also published a great Konash (Encyclopedia) which was immensely used by the physicians.<sup>85</sup> It could be said that Ibn Mandooyeh, amongst all the physicians of Isfahan, was the trailblazer and founder of Isfahan School. He has left more than forty seven pieces of work including: a treatise on maintaining health, a treatise on body tune-up, and works on the structure of eye layers, on the quality of food digestion, on colic, on the treatment of bladder, etc. in his works, his book “Kafi” was so popular and

80- Razi, 2010: 24.

81- Ibid, 2013 72-73.

82- Algood, 1992: 291.

83- Ibn Abi Usaibia, 1965: 277.

84- Majoosi, 2009: 3/121.

85- Ibn ghefti, 1992: 554.



famous that was referred to as “Qanun Asqar”.<sup>86</sup>

Abu Al-Hossein Ibn Kashkaria was one of the most prominent physicians invited to Azadi hospital in Baghdad. He was at first the special physician of Seif Al-Doleh Hamdan and succeeded in making a drug which was used as an enema for the treatment of liver diseases.<sup>87</sup>

Another great physician in Al Booyeh period is Abu Ali Hossein Ibn Abdollah, known as Ibn Cina, who published more than two hundred works in different fields, of which many have been destroyed and only a few have remained.<sup>88</sup> One of his valuable works on medicine and treatment is “Al-Qanun fi Teb”, which have been interpreted by many scientists like Imam Fakhr al-Din Razi (606A.H), Qotb al-Din Ibrahim Ibn Ali (618 A.H), and Hakim Abu Al-Faraj Yaqub Ibn Ghaf Korki (death 685 A.H). One of the medical points of great value in Ibn Cina’s book of Al-Qanun is the discussion of medicine and drugs. Ibn Cina, in 28 chapters of the second book of Al-Qanun introduces different drugs from herbs, animals, minerals, to gums, and foods (to the number of the letters of Abjad).<sup>89</sup> He explains about 800 drugs, some of which do not belong to Iran, so it is clear that he had been also familiar with the herbs from surrounding countries. Some of these drugs are not known to be what, or they might have been forgotten by the passage of time. One of these drugs introduced in Ibn Cina’s book is different kinds of soil or mud, such as Qumulia soil, Al-Karam soil, Oqritash soil, Sama’ee soil, etc.<sup>90</sup> In his fifth book of Al-Qanun, Ibn Cina mixes 64 kinds of herbal, mineral, and animal medicine and prescribes them for the treatment of some diseases. He also makes some pills from different materials and herbs, it can be said this piece of work is a complete course of medicine and pharmacology in which Ibn Cina thoroughly explains the instructions for making pills, balms, syrups, and the things like that as though he is teaching this information to his students. He also provides some valuable information on mixed drugs which still bear a timeless credit and is still considered as precious information. Another work of his is “Al-Adviyah Al-Qalbiya” which is about heart drugs and is the first and the most important work dealing specifically with this matter. In fact, some medicine books-both before this treatise and after it- had pointed to this subject as well, but the way of codification and illustration of information in this book is an innovative method not used before Ibn Cina by anyone else. Even after Ibn Cina’s era, this book still held a prestigious and invaluable status.<sup>91</sup>

The invitation of Gabriel Ibn Obeid Allah, the grandson of Baqtiashu the second, from Baghdad by Azad Al-Doleh

86- Najm Abadi, 1996: 2/670, 691-692.

87- IsaBak, 1992: 30-31.

88- Defa, 2000: 130.

89- Ibn Cina, 1983: 53/2.

90- Ibid: 171/2- 172.

91- Ibid.



to become the head of Azadi hospital in Shiraz can be considered as the first step in the formation of Medical School of Shiraz.<sup>92</sup> Since then, Azadi hospital became one of the important medical and pharmacological centers in the Islamic east. Suitable climate, fertile soil, and the existence of various medical herbs in different areas of Fars played a big part in the promotion of the science of pharmacology in Shiraz Medical School. Thanks to fertile soil, suitable climate, and the new political status, this city enjoyed a great deal of prosperity and growth. Moghaddasi mentions the names of some medical herbs like rhubarb, Saffron, Anzarut (a gum from a prickly tree with laxative qualities for the treatment of phlegm), and also some animal products from some goats which had antidote qualities and were so valuable in the field of medicine in the Middle Ages.<sup>93</sup> Also from this city, the extracts of flowers were exported to other countries like Morocco, Spain, Egypt, Yemen, India, and China.<sup>94</sup> Moreover, Azad Al-Doleh had provided good facilities for the scientists' study and research in this city. Moghaddasi points to the existence of a huge library, in which any kind of scientific book written till the time of Azad Al-Doleh was kept.<sup>95</sup> Therefore, this city was a really suitable ground for the education and presentation of outstanding scholars who later played an invaluable role in thriving the science of medicine and the birth of a new School in Islamic medicine under the name of the Medicine School of Shiraz.

Ala Shirazi (Abu Al-Ala Farsi) is one of the physicians in medicine school of Shiraz at that time. There is no exact information on his life. He was treating the troops of Azad Al-Doleh, and in one of the battles at the time of the outbreak of Malaria disease, he accidentally discovered the effect of Arsenic materials on the treatment of this disease. Owing to his precision and power of observance, he is the first person who used this drug for the treatment of Malaria more than a thousand years ago. Later he was chosen by Azad Al-Doleh as the specific physician of Sharaf Al-Doleh, but Sharaf Al-Doleh suffering from some incurable disease died and this event provoked the jealous people to accuse Ala Shirazi of his fault in the treatment. Thus, he left Shiraz for Basra and died on the way in 380 A.H. There is no published work left by him.<sup>96</sup>

Abu Maher Shirazi is another famous physician at the time of Azad Al-Doleh who tried to avoid serving the State or being close to the Statesmen and he just devoted all his life to education. He had been born in Shiraz and achieved an unparalleled success in medicine at that time. Some famous physicians and druggists were honored to be his student, some

- 92- Algood, 1992: 158-210.
- 93- Moghaddasi, 1982: 2/629.
- 94- Metez, 1982: 2/502.
- 95- Moghaddasi, 1987: 2/641-642.
- 96- Mir, 1969: 15-19.



of whom are: Abu Ali Mandooyeh, Ali Ibn Abbas Majoosi, Ahmad Ibn Mohammad Al-Tabari. It has been said that Azad Al-Doleh caught Peterigum (a kind of eye disease) and also suffered from swollen lymph nodes, and Abu Maher managed to treat both diseases in a short period of time. He had written many works on medicine including forty chapters on theoretical and practical medicine and also some reviews on the book "Oqluten" by Jalinus.(cited, 8-9).

One of the other physicians of Fars was Abu Jafar Ahamad Ibn Mohammad Ibn Abi Ash'as who was unique in understanding and interpretation of medicine books, especially in explaining and categorizing the information in Jalinus' books. He has interpreted and classified most of Jalinus and Aristotel's books and through his activities he rendered a big service to the people interested in medicine. Ha had lots of publications on medicine and pharmacology, some of which are: Al-Adviyeh, Al-Qulanj va Asnafeh va Modavateha, Al-Adviyeh Al-Manafe Menho, Al-Sarsam va Al-Barsam va Modaveteha, Ketab fi Sar, Tarkib Al-Adviyah, Al-Amraz va Al-Me'deh.(cited, 17-19).

#### **The Maintenance of Shiraz School after Al Booyeh**

Al Booyeh played a big role in the promotion of Shiraz School and in the maintenance of the drug tradition of Iranians. In the period of Atabakan in Fars (543-686 A. H) and the age of Mongols' reign, especially during the reign of Al Inju and Al Mozafar, the science of medicine and drug was paid as much attention as before and led to effective outcomes. At the time of the reign of Abu Bakr Ibn Sad Ibn Zangi, Mozafari hospital was founded in Shiraz, which is one of the most outstanding monuments of that time. Owing to his clever initiatives, Shiraz was safe from the threat of destruction and massacre of Mongols and gained more political and economic importance.<sup>97</sup> At the time of Amir Mobarez Al-Din Mohammad, and then Jalal Al-Din Shah Shoja (759-786 A.H), some scientific centers including a Dar Al-Shafa (clinic) was established in the same area where Mozafari hospital was located. Mozafari hospital which had turned into a ruin after the collapse of Atabakan, was ordered to be reconstructed by Rashid Al-Din Fazl Allah Hamedani.<sup>98</sup> Shah Shoja's Dar Al-Shafa had a very important role in flourishing the science of medicine and attracting efficient physicians and pharmacologists.<sup>99</sup> One of the famous physicians and druggists practicing medicine and teaching in Mozafari hospital was Allameh Qotb Al-Din Shirazi. Of his valuable works for Shiraz School, we can mention the book "Tohfe Al-Saiyeh" on general subjects of Ibn Cina's Al-Qanun and a treatise on the

97- Kaviyani Pooya, 2015: 296.

98- Fasaee, 1989: 231-234.

99- Algood, 1992: 409-410.





treatment of eye diseases.<sup>100</sup> Also the treatise “ Baras” (vitiligo) which is about skin diseases and their prevention and treatment is appointed to him.<sup>101</sup>

The Elyasis is another renowned family in Shiraz School of medicine and drug in the 7<sup>th</sup> and 8<sup>th</sup> centuries (Hejira). One of the most reputed in this family was Mansour Ibn Mohammad Ibn Ahamd Ibn Yosef Elyas who was really efficient in different fields of medicine. Vasaf has pointed to some of his medical treatments and prescription of drugs.<sup>102</sup> The book “ Kafayah Mojahediyah” is one of his valuable works, discussing both theoretical and practical medicine. In the practical medicine section of the book, he has explained about single and mixed drugs and their use in treatment of diseases.<sup>103</sup>

Najm Al-Din Mahmood Ibn Saen Al-Din Shirazi is another physician and druggist in the 7<sup>th</sup> century who has written many works on medicine. In the science of pharmacology, his famous book “Teb Qiyasi“ or “Qiyasiyeh” has four articles , two of which are about the description of diseases and their diagnosis and the other two are about how to know and make drugs with a detailed explanation on both single and mixed drugs.<sup>104</sup>

In the 8<sup>th</sup> century, Ali Ibn Hossein Ansari Shirazi known as Haj Zein Al-Din Attar rendered invaluable services to the science of pharmacology. Thanks to his fame and great knowledge in medicine and drugs, he was invited to Amir Mobarez Al-Din Mohammad Mozafar’s court and became the special physician there. His most famous work is the book “Meftah Al-Khazayen” or “exquisite powers” which is about different drugs and their classification.<sup>105</sup> This book is the first book of its kind on drugs in Persian and had been one of the most reliable sources for herbalists. Another innovation of his is his book “Tohfa Al-Khavatin” which is about women’s hygiene and make-up. In fact, he wrote this book for Badi Al-Jamal, Amir Mobarez Al-Din Mohammad’s wife, and donated it to her. This book also provides some information about drugs.<sup>106</sup>

### Conclusion

Iranians as a nation were particularly interested in medicine and treatment. They made a great revolution in the science of medicine by establishing Jondi Shapur university in the Sasanian period. Physicians and scientists of this university combined other nations’ medical and treatment practices together and this university became the link between Iranian, Indian, Syriac, and Greek Schools. After the emergence of Islam, Jondi Shapur thinkers and scholars transferred their valuable knowledge and experience in medicine and treatment to Muslims. It was at this time that prominent physi-

100- Mir, 1969: 115-116.

101- Nafisi, 1964: 1/9.

102- Vasaf, 1853: 157-158.

103- Shirazi, 1925: 425-528.

104- Ibid, 1971: 153-256.

105- Haj Zein Al-Din, 1992: 5.

106- Mohammadi et al, 2012: 207-231.



cians from Baqtiashu and Ibn Masooyeh with a rich background in medicine and pharmacology began to write books and translate ancient writings from Greek, Persian, Indian, and Syriac languages into Arabic, and made Muslims familiar with other nations' medicine and treatment methods. Moreover, a number of Abbasid caliphates, encouraged by Iranian physicians, established some scientific - medical centers like Jondi Shapur, and then some great scientists in the fields of medicine and pharmacology were absorbed to this center. After Al Booyeh's coming to power, Fars became one of the medical centers of the Islamic world and Jondi Shapur was replaced by Shiraz School. Azad Al-Doleh's time witnessed a great improvement in treatment and a big growth in pharmacology. Also, the construction and establishment of hospitals and scientific centers was one of the influential factors in the generation and development of Shiraz School of medicine. The role of Iranian physicians and druggists in Al Booyeh period was so important that it left its impact for centuries and turned Shiraz School to one of the most lasting Schools in medicine and pharmacology. The significance of this School lies in the theoretical and practical efforts of its representatives to specify the science of medicine, particularly to separate medicine from pharmacology. The experience of Fars physicians and pharmacologists in Al Booyeh period, helped Shiraz School to take roots and develop into 7<sup>th</sup> and 8<sup>th</sup> centuries.

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