



## THE MEDICAL HERITAGE OF MEDIEVAL ARMENIA. ITS THEORETICAL AND PRACTICAL VALUE IN THE LIGHT OF MODERN SCIENCE

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### Abstract

Based on an analysis of the works of prominent Armenian philosophers of the V-VI cc. Davit Anhaght and Yeznik Koghbatsi, as well as a study of the scientific heritage of medical schools of Ani, Cilicia and Amasia: “The Gagik-Hetoumian Medical Book” (X-XIII cc.), “Consolation of Fevers” by Mekhitar Heratsi (1184), “Useless for the Ignorants” (1478-1482) by Amirdovlat Amasiatsi, the author evaluates their contribution to the theory and practice of the medical science from the point of view of present-day medicine.

The author found fragments of an ancient Armenian translation of Galen’s currently lost treatise “De anatomia mortuorum”, as well as two new versions of “The Gagik-Hetoumian Medical Book” in Mashtots Matenadaran and other collections of Armenian manuscripts.

The study of handwritten medical books has shown that for centuries Armenian folk and classical medicine had accumulated valuable experience on treatment of a number of diseases (allergies, infectious diseases, tumors, atherosclerosis, nervous system and mental diseases).

**Keywords:** Armenia, medieval, hospital, medicine, manuscripts, plants and minerals

Medicine is an inseparable part of the ancient Armenian culture. Its roots come from deep in the past. Relying on folk medicine and its sources, it accumulated the experience and knowledge of many generations of Armenian physicians on the curative properties of plants and animals as well as minerals. Archaeological data of Urartian and earlier epochs are evidence of the high level of the medical arts in Ancient Armenia.

In 301 A.D., Christianity became the state religion in Armenia. Monasteries were founded at the sites of ancient pagan temples and the first hospitals were established. According to Armenian historians Pavstos Buzand and Movses Khorenatsi (V c. A.D.), Catholicos Nerses the Great had homes built for lepers,

invalids and the insane in different parts of Historical Armenia. The measures taken by Catholicos Nerses the Great are reflected in the decisions of the Armenian Church Council of Ashtishat in 365 A.D.: “[It is necessary] to prevent the spread of infectious diseases by founding special leper-houses, hospitals for the sick, and homes for invalids and the blind” (*Melik-Tangyan N., 1903<sup>#</sup>*). Private hospitals existed in Armenia as early as the III c. A.D. Thus, in 260, Aghvita, the wife of the Armenian nakharar (feudal lord) Souren Salahouni, donated her own monies to have a home for lepers built at the site of the Arbenout curative mineral waters (*Hovhannisyan L., 1946-47*). Meanwhile, the first home for lepers in Europe was founded only 300 years later.

Armenian folk medicine, which has a history of some 3000 years, created a rich treasury of medicaments. In ancient times, the medicinal

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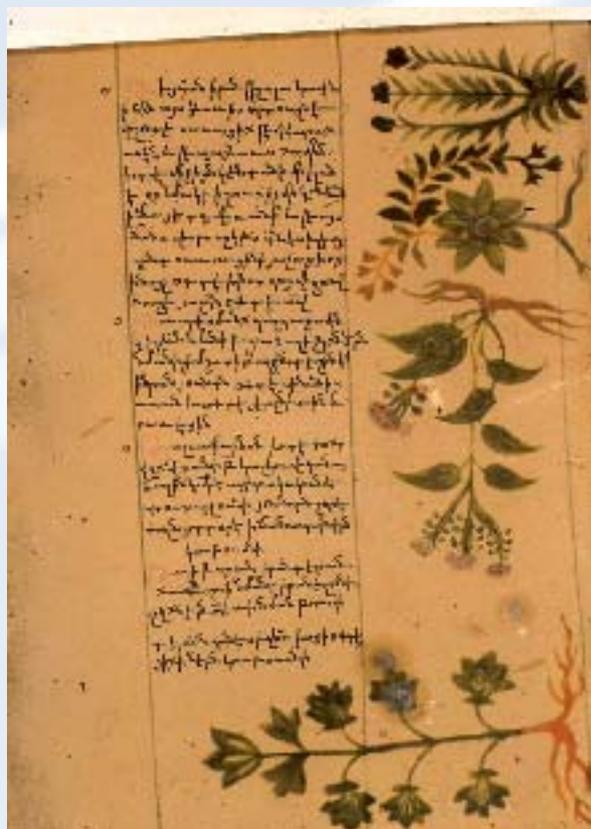


Fig. 1. Medicinal herbs used in Ancient Armenian phytotherapy. (Mashtots Matenadaran, MS. 6594)

herbs of the Armenian Highland were especially well-reputed. Those herbs were exported to the East and to some countries in the West. Such ancient writers as Herodotus, Strabo, Xenophon, Tacitus, Pliny the Elder and Dioscorides, when discussing Armenia, also mentioned its natural remedies. In his work "Anabasis" Xenophon wrote about aromatic wines of Armenia, its fine beer, almond oil, sesame seed oil and turpentine, as well as fragrant perfumes (Xenophon, 1951).

In his "Materia medica", Dioscorides, the famous herbalist of the ancient world, a Cilician by origin, referred to the Armenian varieties of plants, which in his own words were outstanding for their remarkable curative qualities (Vardanyan S., 2000). "The best cluster cardamom", he wrote, "is the Armenian sort with its golden, yellowish stem and delightful aroma" (*Pedacii Dioscoridis Anazarbaei*, 1610) (Fig. 1).

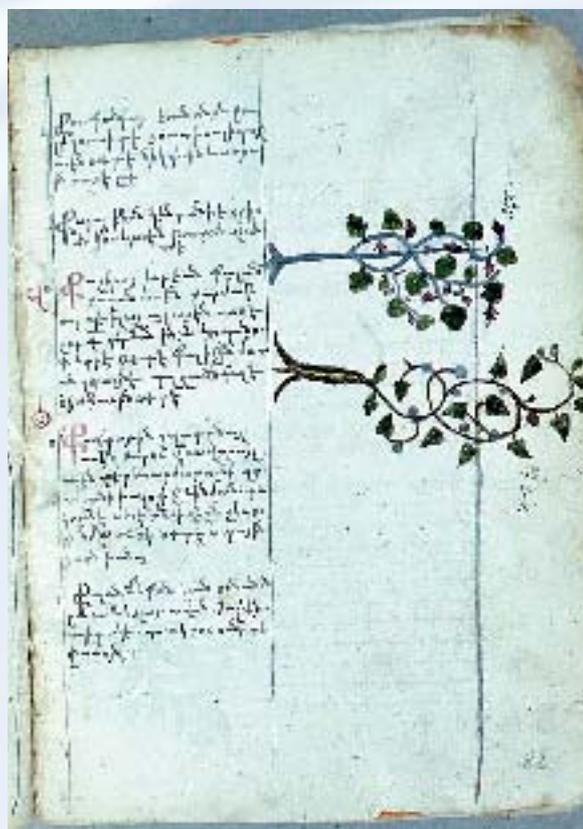


Fig. 2. Medicinal herbs used in Ancient and Medieval Armenia (Mashtots Matenadaran, MS. 6594)

In ancient times, Armenia as well as Media was considered the native land of a number of valuable gum-producing plants, the well-known laserwort (*Laserpitium*) being among them. Its curative properties were highly appreciated by the Romans, as witnessed Pliny the Elder in his "Natural History" (Pliny, 1961#).

Armenian historians provided much important information on medicine in Ancient Armenia. Movses Khorenatsi, the "father" of Armenian historians, wrote that King Vagharshak (II c. B.C.) had orchards and flower gardens planted in the swamps of Tayk and Kogh (*Khorenatsi M.*, 1913#). In those flower gardens, medicinal herbs were grown and reproduced, as mentioned by another V c. historian, *Ghazar Parpetsi*. "[In the valley of Ararat] there are various roots of plants," wrote Parpetsi, "which are used by skilled physicians to prepare quick-curing plasters and liquid medicines for internal use

in treating those who have long suffered from diseases" (*Parpetsi G., 1908#*).

Remarkable curative hormonal properties of certain plants, for example, the snake bryony (*Bryonia dioica*), black cumin (*Nigella sativa*) and campion (*Lychnis L.*) brought about worship of these plants in Armenia, the ancient expressions of which have been preserved in Armenian folklore (Fig. 2).

In ancient times, such mineral remedies as Armenian clay, Armenian stone and Armenian saltpeter and soda were in great repute, as were compounds of mercury, iron, zinc and lead. Armenian clay (*Bolus Armena*), containing aluminum silicates and iron oxide, was used in the treatment of inflammations, allergies and tumors, and likewise of hemorrhages and poisoning. The clay was known to Galen and Ibn Sina. The latter wrote in his "Canon": "Armenian or Ani clay has a remarkable influence on wounds. It is especially beneficial against tuberculosis and the plague. Many people were saved during great epidemics, since they were in the habit of drinking it in wine diluted with water" (*Ibn Sina, 1954-1961#*). Even today, Armenian clay is widely applied in folk medicine.

In addition to medicinal plants and minerals, Armenian medicine also made use of drugs of animal origin, i.e., prepared from organs and tissues of animals, some of which were endowed with fermentative properties. Among the latter were extracts of endocrine glands, the brain, liver, the bile of certain animals, the rennet of the rabbit, as well as the "moist zufa", a plant-and-animal mixture. Ibn Sina wrote in his "Canon" on the latter: "That is the fat (lanolin), which in Armenia collects on the wool of the fatty tail of sheep dragged over spurge (*Euphorbia L.*). It absorbs the strength and milky juice of plants. Sometimes this fat is not thick and therefore it is cooked until it thickens. The fat wears away hard tumors and straightens bent bones when applied on a bandage" (*Ibn Sina, 1954-1961#*). The above-referenced medicaments, which possess antitoxic, antisclerotic and hormonal

properties, are of great interest to modern medicine. Thus, the valuable experience of folk medicine later became an endless source of development and enrichment for Armenian classical medicine.

Mesrop Mashtots created the Armenian alphabet in the beginning of the V c. (around 404-405 A.D.), thus laying the foundation for Armenian chronology. Later on, Armenian historians called that period the Golden Age of Armenian culture. Works on biology and medicine along with historical-philosophical treatises occupy a valued place in medieval Armenian literature. It should be noted that with the appearance of medical literature, the verbal traditions of folk medicine were in no way disregarded. They continued to be used for centuries, becoming the basis for Armenian medieval medicine.

At the beginning of its development, Armenian classical medicine bore the beneficial mark of Hellenistic culture. The works of such ancient greats as Plato, Aristotle, Hippocrates, Galen, Asclepiades and others were translated into Armenian through the efforts of members of the Hellenizing school of translators and had great influence upon the outlook of medieval Armenian physicians. Thus, by the end of the V c. A.D., Aristotle's "Categories" and "Peri armenias" were translated into Armenian; at the beginning of the VI c., Plato's natural-philosophical works, "Timaeus" among them, and in the second half of the VI c., "On the Nature of Man", attributed to Zeno, as well as Pseudo-Aristotle's "On the World" and "On Virtue" were also translated into Armenian (*Arevshatyan S., 1973; Vardanyan S., 1999a*).

Among these works, special attention deserves Plato's "Timaeus", in which the author tried to explain not only the laws of the universe (macrocosmos) but also those of the origin and development of man (microcosmos), based on four primary elements (*Plato, 1877#*). The theory of four primary elements (earth, water, air, fire), developed in ancient times in the works of Hippocrates and Galen, served as the

foundation of the teaching of humoral pathology, which had a great impact on the medieval Armenian medicine.

From the Greek translations of the early epoch "Galen's Dictionary" (*Greppin J., 1985*), "On the Nature of Man" by Nemesius of Emesa (*Nemesius of Emesa, 1889<sup>#</sup>*), "Anatomy" by Gregory of Nyssa (*Vardanyan S., 2006*), as well as fragments of the works of Asclepiades, Democrates and Oreibasios, have been preserved (*Vardanyan S., 1999b*). It is interesting to dwell on the fate of one anatomical treatise of Galen, its translations and its influence upon both Armenian medicine and especially anatomy of that period. It is well known that the Great Pergamer carried on the traditions of the Alexandrian school, practicing dissection and vivisection. During this entire period, Alexandria was the only center, where those methods were allowed, because of the ancient practice of mummification. Besides his books "De anatomia" and "De usu partium corporis humani", Galen wrote a special treatise dedicated to the description of dissection and vivisection methodology entitled "De anatomia mortuorum". The original of this important text was later lost. However, the great sensation of past decades was the discovery of the Arabic translation of Galen's text in two manuscripts preserved in Cairo's Egyptian National Library by Hungarian scholar Ishtvan Ormos (*Ormos I., 1993*).

It is very likely that there were other translations of Galen's texts in various languages, including Classical Armenian. Though among the works of the Hellenizing School there is no such treatise, its traces could still be seen in the works of authors of the Armenian Renaissance in Ani and Cilicia. Indeed, in 1947 famous Armenologist Levon Khachikyan found and published an interesting anatomical extract from the "Homilies" of Hovhannes Yernkatsi, in which it was written: "The experienced and wise physician, who wishes to study the human body and the state of its joints, nerves, vessels and internal organs, takes the criminal sentenced to death and kills him, causing various agonies,

and thus at the cost of one man's suffering he helps many people" (*Khachikyan L., 1947*)

Similar anatomical excerpts were revealed in the works of Vardapet Vanakan. The latter, in the form of questions-and-answers, discussed the problem of dissection and vivisection: "Question: How does the physician learn medicine? Answer: By dissecting the body or by giving wine to the hungry criminal sentenced to death and then cutting his body and observing how the wine boils in the vessels and how the blood moves" (*Antabyan P., 1977*).

L. Khachikyan and other scientists interpreted these data as evidence of the existence of dissection and vivisection in the medical schools of Cilician Armenia. This hypothesis was accepted without objection by historians of Armenian medicine. However, in light of new findings this hypothesis has some weak spots. First, it is well known that after the Hellenistic period the practice of dissection and vivisection ceased in Christian Europe and in the Islamic East. Even during the Renaissance in Europe, the state and religious attitudes towards vivisection were quite negative. No doubt, such an attitude existed also in Christian Armenia from XI to XIV cc. Therefore, it is more probable to suggest that these fragments reflected not the actual practice of the Cilician *bzheshkanots* but the old Alexandrian tradition. Armenia and Cilicia were never mentioned in these fragments. Moreover, above-mentioned fragments have a definite bookish character, in which ancient Greek authors, especially Galen, were often cited. On the other hand, our comparison of these anatomical fragments with the Arabic version found by Ormos shows their close relationship. Now there is no doubt that all these Armenian authors of XI-XIV cc. cited Galen's treatise "De anatomia mortuorum" (*Vardanyan S., 1995*). I may even surmise that one of these authors translated the Greek text in the Cilician period. Further examination of the medical, philosophical and theological manuscripts of that period might reveal other fragments of Armenian translation.

In medieval Armenian science, the ancient theory of four elements and their corresponding four humors (blood, phlegm, yellow and black bile) first appeared in the "Denial of Heresy" by Yeznik Koghbatsi (380-450 A.D.). He connected the appearance of illnesses with a disruption in the balance of the basic humors. "There are illnesses," Koghbatsi wrote, "which come about not because of sins, but because of an unbalanced nature of humors. Since man's body is composed of four elements, if any one of them increases or decreases, the result is illness" (*Koghbatsi Y., 1826<sup>#</sup>*). However, in addition to four humors, Yeznik took into consideration the influence of unfavorable external factors, such as "to eat and to drink without consideration and in excess, to abstain severely, to work in excessively hot and cold weather and other conditions bad for health". He considered these significant factors in bringing about mental illness and nervous disorders.

Like Hippocrates, who rejected the "holy" nature of epilepsy, Yeznik also considered the mental illness a result of brain exhaustion. "As a result of exhaustion of the brain", he wrote, "man loses his consciousness; he speaks to the walls, [and] argues with the wind. For that reason physicians insist that it is not the devil that enters man's body; those are illnesses of man, which they can cure" (*Koghbatsi Y., 1826<sup>#</sup>*).

Davit Anahgt (a.k.a., Davit the Invincible), the famous Armenian philosopher of the Middle Ages (end of V and beginning VI cc.), was well-acquainted with principles of Hippocratic medicine. In his works "Definitions of Philosophy", "An Analysis of the Introduction of Porphyry" and "Commentary on Aristotle's Analysis", Anahgt discussed various questions of anatomy, biology, pharmacology, hygiene and medical ethics (*Vardanyan S., 1984a*). Being very well-acquainted with the practice of dissections on man and animals in the medical school of Alexandria, he wrote: "The function of analysis is to separate a substance into the parts of which it is composed, as, for example, when one takes the body of a man, dissects the

feet, hands, head and then separates the body into bones, muscles, blood vessels, and nerves" (*Arevshatyan S., 1980*).

In the book "Definitions of Philosophy" Anahgt argued the position of stoic philosophers over justification of suicide in certain cases, such as hunger, loss of relatives, natural calamities, violation of human dignity, incurable disease and senile decay. He wrote: "Stoics said: That who kills himself to get rid of pain, when his body is spoiled by disease, is right". Thus, for example, a cynic philosopher with one-half of body being paralyzed applied to the emperor Julian: "One part of my body is dead, but another is alive. Take pity, oh emperor, on the half dead cynic and order to heal or to kill" (*Vardanyan S., 1984a*). Being true to Hippocratic "Oath", Davit Anahgt rejected suicide and euthanasia (sweet death) for patients, suffering from paralysis and other grave diseases. He wrote, "Trials, wherever they occur, do not exist for killing oneself, but to test the soul. As an experienced captain will rather be tested during the storm, so does the lofty soul fearlessly face the trial".

The age-old struggle of the Armenian people against Arab rule ended with the restoration of the Armenian state. This in turn restored the Armenian economy, brought about an increase in towns and a flourishing of crafts, trade and culture, which is characteristic of the epoch known as the "Armenian Renaissance" (X-XIV cc. A.D.). Especially favorable conditions for the development of art, science and medicine, in particular, were created in the X-XI cc., during the rule of the Bagratouni family in Ani. Schools of higher education and medieval universities were founded in Ani, Haghpat and Sanahin, where along with philosophy and the natural sciences, medicine was also a subject of study.

Medical conceptions of the Armenian Renaissance are reflected rather completely in the works of Grigor Magistros (989-1058), a contemporary of Ibn Sina. An erudite scholar well-acquainted with ancient culture in its

various aspects, Grigor Magistros Pahlavuni displayed his abilities in different branches of Armenian culture as a poet, philosopher and physician. He had close ties with scientists, artists and statesmen of both Armenia and Byzantium.

Grigor Magistros corresponded with many of them. The "Papers", of which, very fortunately, a portion has survived, give an idea of the wide spectrum of Magistros' interests as physician and philosopher (*Kostaneants K., 1910*).

One of his letters was addressed to Kyriacos, the Byzantine physician, who had lectured in Ani on the physiology of the digestive organs. During the discussion, the Greek physician, replying to a question asked by Grigor Magistros, said that nothing whatsoever interested him, outside his narrow sphere. In his brilliant letter of reply, Magistros exposed such a one-sided approach and, in the light of ancient natural philosophy, he explained the close affinity existing among natural phenomena. Grigor Magistros was not only fascinated by theoretical aspects of medicine, but was also a skilled practical physician. In a letter to the abbot of the Sevan monastery, he wrote about a disease afflicting Gagik, the last King of the Bagratouni dynasty. In other letters, he described smallpox,

which his own son had been infected with or gave sensible instructions to Sarkis *vardapet* who suffered from liver disease. Thus, in Grigor Magistros we find an experienced physician with a fine professional sensitivity, well-versed in clinical medicine and especially in phytotherapy. Such an intellectual atmosphere promoted the development of the secular sciences and, of course, medicine. It was in Ani, during the peak of the Bagratouni rule that original studies on problems related to pharmacology, pathology and clinical medicine, the so-called *bzheshkaran*-s (medical books) first appeared. Unfortunately, the author's name of the famous *Bzheshkaran*, which was written during the rule of "the victorious King Gagik", has not been preserved. Later, in XII c., it was edited in Cilician Armenia by Hetoum Sebastios, the elder brother of well-known scholar Nerses Lambronatsi, thus becoming the Gagik-Hetoumian *Bzheshkaran* [Gagik-Hetoumian Medical Book] (Fig. 3).

Starting from the second half of the XIX c., the Gagik-Hetoumian Medical Book attracted the attention of Armenologists (*Hovnanyan G., 1897*). Most of them identified the aforementioned "victorious King Gagik" as Gagik I (r. 990-1020), the celebrated representative of the Ani Bagratounids. Until 1985, only two copies of this text were known to Armenologists, i.e. the XII c. paper manuscript in Jerusalem (codex 370) and the XIII c. parchment manuscript in Venice (codex 1281). We succeeded in discovering two full versions of this famous *Bzheshkaran* in manuscript collections of Mashtots Matenadaran (codex 9837) and Bibliotheque Nationale de France (codex 245) (*Vardanyan S., 1985*).

Vahram Torgomian mentioned that the author of this medical book of Ani was Grigor Magistros (*Torgomian V., 1923*). However, when we compare the grandiloquent grabar (written language) of Magistros' "Papers" with the simple Middle Armenian language of this *Bzheshkaran*, it is difficult to agree with Torgomian. More likely, the author was one of



Fig. 3. Medieval Armenian physicians examining a patient (*Gagik-Hetoumian Medical Book, Venetian Mekhitarists Library of St. Lazarus, MS. 1281*)

Magistros' contemporaries, another splendid representative of Ani medical school. The author called himself a pupil of Hellene teachers, but a study of his book showed that he was at the same time closely tied to the essence of Armenian medicine and to the cultural customs and traditions of Armenian people. The editor added the following two new sections to the original text of the Gagik-Hetoumian Medical Book: a shorter version of Mekhitar's "The Consolation of Fevers" and a medical book on pathology and clinical medicine by an unknown Cilician physician. Torgomian suggested that the author of the last section was also "Mekhitar the Great," whose "Pathology" as well as many other works were lost in the Middle Ages.

The Gagik-Hetoumian Medical Book exerted a deep influence on the development of medieval Armenian medicine. Starting with Mekhitar Heratsi, who included the fourth chapter on prognostics from the Gagik-Hetoumian Medical Book in his "The Consolation of Fevers", other Armenian medieval physicians also quoted extensively from this medieval encyclopedia, which was for them as authoritative as Ibn Sina's "Canon". To some extent, it was regarded as a national resource, from which generations of Armenian physicians drew vital information.

It is not at all accidental that the aforementioned Gagik-Hetoumian Medical Book was published in Cilician Armenia. After the fall of the Bagratounids in 1045, the Roubenid Cilician state became one of the political and cultural centers of medieval Armenia. Later, in 1198, the Roubenid Kingdom was established, where Armenian intellectuals (poets, musicians, painters, scientists and physicians) gradually gathered. In Hromkla, in the patriarchal chambers of Catholicos Nerses Shnorhali (1166-1173) and Grigor Tgha (1173-1193) and in Sis, the capital of the Roubenid and Hetoumid Kings, conditions were favorable for development of the natural sciences and medicine consistent with the spirit of the Armenian Renaissance.

The prolific scientific and medical activities of Mekhitar Heratsi were connected with Cilician Armenia and its medical school. He was already called "Mekhitar the Great" by his contemporaries and certainly thereafter by physicians of later periods. Everybody considers him as the founder of medieval Armenian medicine. He played the same role in Armenian medicine as Hippocrates did for Greek, Galen for Roman, and Ibn Sina for Arabic medicine. He gathered, studied and deduced from the experience of the past in classical and folk medicine, creating works that have retained their value until even today.

The necessary preparatory work was done by anonymous Armenian physicians, those



Fig. 4. Mekhitar Heratsi and Catholicos Nerses Shnorhali (Mashtots Matenadaran, MS. 7046)

precursors of Mekhitar Heratsi, who translated the scientific heritage of Greek, Roman and Arabic physicians and created a number of works of their own, mainly on pharmacology and therapy. However, this all was not enough for a serious, demanding scientist like "Mekhitar the Great." This is how he characterized the existing conditions in Armenian medicine at that time, in the preface to his work "The Consolation of Fevers": "I, Mekhitar Heratsi, insignificant among physicians, have been since childhood a follower of wisdom and the art of medicine and having studied Arabic, Persian and Greek Science, saw, by reading their books, that they mastered the perfect art of medicine, according to the first sagest philosophers, that is, the prognostic, the essence of medicine; while among Armenians, I did not find the like, but only about treatment" (*Heratsi M., 1832<sup>#</sup>*).

Leaving his native town of Her (present-day Khoy, Iran) in the first half of XII c., young Mekhitar departed for Cilician Armenia, where he received his medical education and the honorary title of *bzheshkapet* (doctor of medicine). As a result of rich, prolific work in science and medicine, the Armenian *bzheshkapet* had, by the 1160s, attained great fame in medicine. He was a close friend of Catholicos Nerses Shnorhali, who dedicated to him one of his natural-philosophic poems entitled "On the Heavens and Its Stars". It was during this period that he wrote his studies on the anatomy of man, biology, pathology and pharmacology. Unfortunately, a great portion of these works, like that of the tragic fate of Armenian people, is lost forever. Only individual fragments are found in the manuscripts of later physicians, preserved today in various collections (Fig. 4).

In 1180s, Heratsi began the main work of his life, "The Consolation of Fevers", for which he steadfastly gathered material over a long period of time. He not only read the works of ancient Greek and Arab physicians, but also roamed over the marsh-ridden valleys of Cilician Armenia studying the malaria widespread in those areas, as well as other contagious diseases.

It was not at all surprising, therefore, that this work was a center of attention for all those concerned with the welfare of people. Primarily among them was philosopher and poet Grigor Tgha, the Armenian Catholicos, who encouraged and aided the *bzheshkapet* in all aspects of his work.

"The Consolation of Fevers" reflects the world-outlook of Mekhitar Heratsi as a great scientist, particularly his spontaneous materialistic approach to the essence of fever-causing factors. This resulted in his unique, so-called theory of "moldiness," which explained also the origin of tumors. Besides unfavorable physical etiological factors, well known to ancient and Arabic authors (such as Hippocrates, Galen, Ibn Sina and others), for the first time in the history of medicine he suggested a new idea of "mold" as a living factor. Levon Hovhannisyan, a prominent scholar of the Armenian medical history, wrote: "It is an irrefutable, objective fact that up to the pre-microbiological period, no physician ever used such a term to describe the essence of infection, one so close to the truth, as did Mekhitar Heartsi" (*Hovhannisyan L., 1946-47*).

Heratsi classified fevers into three categories: "one-day", "moldy" and "wasting" (i.e. consumptive). In this case, however, our *bzheshkapet* was guided by intuition when he separated "one-day" fevers, which do not fit within the boundaries of humoral pathology. To explain their pathogenesis he referred to the pneumatic theory of ancient authors. Here, however, the main point is that the experienced physician did not overlook some "unusual" features of the course of the disease. This serves as a basis for us to suppose that in the "one-day" fever group, he described a few kinds of allergies: physical, chemical and alimentary.

In the "moldy" fever group, Heratsi included a number of contagious diseases widespread in the Middle Ages such as malaria, typhoid fever and septic diseases, the plague, smallpox, and measles. The extensive experience of the great *bzheshkapet* enabled him to clarify the contagious nature of fevers. It was only later in the

XVI c. that in Europe famous Italian physician Girolamo Fracastoro developed these ideas in his work "On Infection, Infectious Diseases and Their Treatment" (1546). It is interesting to note that in the group of "moldy" fevers Armenian *bzheshkapet* included the "six-day" fever, which according to Hovhannisyanyan and Avagyan could be identified with familial Mediterranean fever or "the Armenian disease" (Hovhannisyanyan L., Avagyan V., 1938).

As for the "wasting" (consumptive) fevers, which correspond to different clinical forms of tuberculosis, in Mekhitar Heratsi's opinion, they are caused by emotional disturbances, over-exhaustion, malnutrition, i.e. factors, which even today medicine considers highly significant in the pathogenesis of tuberculosis.

Armed with such knowledge, Heratsi used the experimental approach, often contrary to the scholastic point of view, and developed a complex system of cure based on the use of medicaments, especially herbs, as well as dietetic and physical methods. Faithful to the ancient principles of medicine, the Armenian *bzheshkapet* suggested conducting the treatment according to Hippocrates that is, curing "opposites by opposites". Mekhitar Heratsi considered phytotherapy the most important, based on Armenian folk medicine as well as on the experience of ancient and Oriental medicine.

In the treatment of contagious-allergic diseases, the most useful among the medicaments suggested by the Armenian *bzheshkapet* were herbs with antibacterial, anti-inflammatory and antiallergenic properties. The following herbs are used in complex prescriptions of "The Consolation of Fevers": water-lily, violet, iris, mullein, hyssop, inula, mugwort, plantain, licorice plant, meadow saffron, caper bush, mint, caltrops, thyme and many others. Besides herbs, there are drugs of animal origin (e.g. castoreum, ox bile, etc.) in those prescriptions as well as mineral preparations (e.g. Armenian clay, sulfur, zinc, boric acid, etc.). They possess tonic, anti-sclerotic, antitoxic, hormonal and many other, still hardly explored, medicinal properties.

For patients suffering from fever, Mekhitar Heratsi proposed special diets, which mainly included greens, vegetables and fruits, both fresh and dried, as well as juices and sweets prepared from them. Patients were advised to use coriander, basil, celery, okra, purslane and such fruits as pomegranate, quince, grapes, oleaster, figs, and jujube plums. The Armenian *bzheshkapet* advised giving the patient easily-digestible food, like fresh fish, chicken, meat broth, egg yolk, and milk (for tubercular patients, goat and donkey milk was recommended).

Among physical methods of treatment, Heratsi considered very important water therapy (dousing, baths), as well as cold sponging and gymnastic exercises. He also attached great importance to psychotherapeutic methods, especially the power of suggestion, using music for that purpose. Thus, during "one-day" fevers, which, in his words, come about from "worries and bitter cares," he recommended the following: "Amuse [the patient] with games and jokes, and in every way possible, make him happy. The patient should listen to the songs of *goussan-s* (minstrels) as much as he can, [and] to the sounds of strings and delightful melodies".

The study of this work reveals the high level of Armenian medicine achieved during the time of Heratsi. All this truly places the Armenian *bzheshkapet* among the first ranks of medieval physicians. In 1908, Ernest Seidel, the interpreter of "The Consolation of Fevers" into German, said: "For example, when we, without prejudice, compare Hildegard's "Physics", which was written a few decades before, with that of the [this] Armenian master, we are compelled to definitely grant the laurel of the first place to Heratsi for having basically known nature, for his consistent and individual thinking, and for being completely free of the yoke of scholasticism" (Seidel E., 1908).

The downfall of the kingdom in Cilician Armenia at the end of XIV c. and the continual wars in XV-XVI cc. between Ottoman Turkey and Persia for rule over the territory of historical Armenia resulted in decline of Armenian culture.



Fig. 5. *Portrait of Medieval Armenian physician (Mashtots Matenadaran, MS. 8382)*

During those bitter, difficult years, the classical traditions of the Armenian Renaissance in medicine were preserved in only a few cultural centers, the last brilliant spark of which were the works of the prominent physician Amirdovlat Amasiatsi in XV c. He was the heir to and successor of the Cilician school of medicine (Fig. 5).

The Armenian *bzheshkapet* was born in the town of Amasia in Asia Minor, in the first quarter of XV c. That was politically an extremely tempestuous period, when the western provinces of Armenia fell under Ottoman Turkish rule. Amirdovlat Amasiatsi was a contemporary and probably an eyewitness to the capture of Constantinople in 1453 by Mohammed II, for which in the 50's of XV c. Amirdovlat had departed from his native town and resided in this famous cultural center. Here Amirdovlat soon won acclaim as a physician and was invited to Sultan Mohammed II palace as his personal physician, receiving the honorary title

of *djarapasha ramatanin*, literally meaning "head surgeon-oculist" (Vardanyan S., 1999c).

Amirdovlat Amasiatsi was an experienced, mature physician with great knowledge, when in 1459 he wrote his first work in Constantinople "at the request of Shady-bek's son, Vard". This book was entitled "Teaching of Medicine", in which problems of embryology, anatomy, physiology, pharmacology, pathology and hygiene were presented in the spirit of the ancient physicians Hippocrates, Galen and recognized authorities of Arabic medicine, such as Al-Razi and Ibn Sina.

In the "Teaching of Medicine" by Amasiatsi, the author's tendency to evaluate the age-old experience of Armenian folk medicine in pharmacology can also be felt, for which our *bzheshkapet* revealed deep interest all through his creative life. A brilliant expression of that was his first "Akhrapatin" written in the same year 1459. As for the "Teaching of Medicine", it was later completely rewritten by the author and enriched with new chapters on pathology and clinical medicine. The clinical section of that work demanded quite a lot of time, since Amirdovlat's next book, entitled "The Usefulness of Medicine", was completed in 1469 in Philippopolis (present-day Plovdiv, Bulgaria).

In "The Usefulness of Medicine", the author expressed his viewpoint on all fundamental issues of medicine. This medical compendium was written on the level of the best works of the time and summarized the knowledge of medieval Armenian physicians on theoretical and applied questions (Malkhasseants S., 1940). The section on clinical medicine is of particular value. Descriptions of more than 200 diseases of internal organs (brain, nerves, senses, heart, respiratory organs, liver, stomach, intestines, urinary, genital and other systems), as well as fevers, malignant and benign tumors, poisonings, etc. were provided, with methods of remedial and dietary treatment.

During the last period of his life, he created his most outstanding works on pharmacology: the second "Akhrapatin" (1481) and "Useless for the Ignorants" (1482).



Fig. 6. Species of *Opopanax* used in Ancient and Medieval Armenian medicine (Mashtots Matenadaran, MS. 6594)

A study of Amirdovlat's works showed that, although he was occupied with practical surgery, he preferred, on the whole, conservative methods of treatment (especially phytotherapy and dietetics). It should be mentioned that the Armenian *bzheshkapet* was particularly interested in pharmacology; he summarized the age-old experience of folk and classical medicine.

Amirdovlat's "Useless for the Ignorants" is an encyclopedia of medieval Armenian pharmacology with the names of medicaments given in five languages: Armenian, Greek, Latin, Arabic and Persian (Basmajean K., 1926) (Fig. 6). It contains 3500 names and synonyms of more than 1000 medicinal plants, 250 animals and 150 minerals. A study of this work by modern physicians makes possible the acquaintance with

medicaments of Armenian medicine in the Middle Ages, and first of all with phytotherapy, which was its main field. To cure all those diseases, in the cause of which the contagious-allergic factor plays a definite role, Amirdovlat used such herbs as cow-parsnip, inula, camomile, mugwort, hyssop, thyme, sweet-flag, black cumin, caltrops, and pearl plant, all native Armenian plant life. All these herbs were rich in ether oils, vitamins, plant hormones and other substances, which made for their curative effect.

By means of the same experimental methods, the Armenian *bzheshkapet* revealed the antitumoral properties of hog's fennel, field eryngo, red periwinkle, heliotrope, meadow saffron and certain other plants. According to present data, they contain coumarin and furocoumarin derivatives, as well as the alkaloids colchicine and vinblastine, which have an antitumoral effect (Vardanyan S., 1990). Amirdovlat attached great significance to those herbs, which had antitoxic (lavender, marigold, ironwort) and tonic properties (birthwort, snake bryony).

Amirdovlat used most of the above referenced plants to prevent premature aging and maintain good health and vitality. For the same purpose he used some gums of plant, animal and inorganic origin (galbanum, sagapenum, assafoetida, propolis, mumia, etc.). Amirdovlat recommended mummy, a complex natural compound formed from plant residues, excretions of animals and products of the destruction of hydrocarbons in caves of numerous countries (e.g. Iran, Afghanistan, Armenia), to heal wounds and treat tumors.

To use this vast amount of medicaments in Armenian pharmacopoeias freely and correctly, the physician not only must have had great experience and deep knowledge, but also be well-acquainted with botany, zoology, and chemistry. Amirdovlat Amasiatsi was endowed with all these qualities in a harmonious combination. He made a very significant contribution to medieval medicine, creating a library of medical works, almost all of which have been preserved to this day.

Like all great physicians, Amirdovlat was not alone in practicing his art. He created a school of Armenian phytotherapists, which existed for centuries and the influence of which can be traced in works of such representatives from the Sebastia school of medicine as Hovasap, Asar and Buniat Sebastatsis. The works of Amirdovlat Amasiatsi, in which, as in Ibn Sina's "Canon", almost all important branches of medicine are presented (embryology, anatomy, physiology, clinical medicine, pharmacology, surgery and therapy) have served for centuries as a collective medical encyclopedia. Their many handwritten manuscript copies, scattered

all over the world, prove the great interest, which medieval Armenian physicians took in Amirdovlat Amasiatsi's works.

The vast experience of Armenian folk and classical medicine in phytotherapy is now an endless source for innovation and production of pharmaceuticals in Armenia. Modern medicine today very often refers to the rich treasury of ancient Armenian medicaments in treating a number of such diseases as cancer, atherosclerosis, mental diseases, diabetes and allergies, all problems, which remain yet unsolved today (*Vardanyan S., 1984b*).

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