

ORIGINAL ARTICLE

Neurology in medieval *regimina sanitatis*☆☆

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Abstract

Introduction: In medical mediaeval literature some works about dietetics stand out. Dietetics, as a separate branch of medicine, not only includes food or drinks but also other environmental factors influencing on health. They are known as *regimina sanitatis* or *salutis*, and specially developed in the Christian west. They generally consisted of a balance between the Galenic "six non-natural things"; factors regulating health and its protection: environment, exercise, food, sleep, bowel movements and emotions.

Methods: After reviewing the sources and defining the different stages of this genre, we have considered three of the most out-standing mediaeval *regimina*, the anonymous *Regimen sanitatis salernitanum*, Arnaldo de Vilanova's *Regimen sanitatis ad regem aragonum* and Bernardo de Gordon's *Tractatus of conservacione vite humane*. In them we review references to neurological disease.

Results: Though not independently considered, there is a significant presence of neurological diseases in the *regimina*. Dietetics measures are proposed to preserve memory, nerves, or hearing, as well as for the treatment of migraine, epilepsy, stroke or dizziness.

Conclusion: *Regimina* are quiet representative among medical mediaeval literature, and they show mediaeval physicians vision of neurological diseases. Dietetics was considered useful to preserve health, and therapeutics was based on natural remedies.

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PALABRAS CLAVE

Dietética;
Medicina Medieval;
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Regimina sanitatis;
Regimina salutis;
Res non naturales

La neurología en los *regimina sanitatis* medievales

Resumen

Introducción: En la literatura médica medieval destacan unas obras sobre dietética, entendida como alimentación, así como otros factores presentes en el entorno de las personas y que pueden influir en su salud. Se conocen bajo el término de *regimina sanitatis* o *salutis*, regímenes de la salud y conocieron un especial desarrollo en el occidente cristiano. Atienden, por lo

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general, al equilibrio entre las 'seis cosas no naturales', factores para regular la salud e impedir que se pierda: ambiente, ejercicio, alimentos, sueño, evacuaciones y emociones.

Metodos: Tras revisar las fuentes de estas obras y definir las etapas evolutivas de este género literario, nos centramos en tres de los más destacados *regimina* medievales, el anónimo *Regimen sanitatis salernitanum*, el *Regimen sanitatis ad regem aragonum* de Arnaldo de Villanova y el *Tractatus de conservatione vite humane* de Bernardo de Gordon. En ellos revisamos las referencias hechas a patologías en la esfera de la neurología.

Resultados: La presencia de la neurología en los *regimina*, aunque no considerada de forma independiente, es destacada. Así, los textos revisados proponen medidas dietéticas para preservar el funcionamiento de la memoria, los nervios, la vista o el oído, así como para el tratamiento de cefalea, epilepsia, apoplejía o vértigos.

Conclusiones: Los *regimina*, textos muy representativos de esta época, nos ofrecen la visión de las enfermedades neurológicas del médico medieval occidental, y cómo este recurría a la dietética para preservar la salud, y a los remedios ofrecidos por la naturaleza para combatir la enfermedad.

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Introduction

The *Regimina sanitatis* or *Regimina salutis* (health regimes) represent a literary genre that can be found throughout the mediaeval world of medicine in its three main geographical locations: Islam, Byzantium and the Christian West. These manuscripts reflect very well the heritage handed down from Greek and Roman medicine, known as mediaeval Galenism. They essentially deal with the importance of dietetics for good health. Within the three branches into which, according to Celsus, medicine was divided after the age of Hippocrates (*diaetetica*, *pharmaceutica* and *chirurgica*), dietetics covered a wide field and implied actions referring not only to the regulation of food and drink, but also exercise, work, relaxation and use of certain medicines. It could be applied for the treatment of the sick, or also be adapted to the healthy with a view to maintain good health, as a kind of *regulae vitae*.

Mediaeval galenism

Together with Hippocrates, Galen, born in Pergamon in the 2nd century A.D., was the main figure in ancient medicine. On a solid basis of philosophy, he acquired extensive training in the medicine of his time, first in the city of his birth and, subsequently, for four years in Alexandria. On his return to Pergamon, he gained great experience by taking charge of the Gladiator School. This curriculum turned Galen into one of the world's greatest physicians, well above the standards of his age, and gave him a profound understanding of the medical resources available, as well as arousing a tireless curiosity seeking out the origin of illnesses through clinical observation and research. He was also a great teacher and this, together with the success of his medical practice among the most elite Romans, brought him great fame and respect in his lifetime.¹ A believer in the encephalocentric theory of medicine, he maintained that the brain was the centre of all human beings, capable

of thought and the co-ordination of sensations and movements. From that Galenic concept of the brain came the mental *pneuma*, the principle of life that passed into the blood to be diffused through the whole body by means of the nerves.¹ Without straying from Hippocrates's theory of humours, Galen made numerous contributions based on his enormous capacity for observation and impregnated all his texts with the finalism of Aristotelian philosophy. He felt that a state of perfect health was something that did not exist, and so human beings always had a certain predisposition to contract illnesses, based on an imbalance in the 4 humours: blood, phlegm, bile and melancholy; as a result, every individual, depending on the particular imbalance, could be sanguine, phlegmatic, choleric or melancholic. Despite this, Galen determined that established illnesses of each had a specific location, a particular organic seat. The most important merit of Galen was probably his ability to draw together, in a single body of thought, all of the medicine of his age, establishing him as the heir of the School of Alexandria.² His extremely extensive work had an enormous influence on all medicine until the Renaissance was well under way.³ In this way, The Middle Ages, in the three main poles of medical development in Byzantium, Islam and Western Europe, represented a prolongation of Galenic thought with few modifications.

Christian Europe, in the wake of the barbarian invasions, was where it was most difficult to maintain medical knowledge, restricted for long periods of time and in extensive areas, only to monasteries. However, a certain isolation from reality led them to abandon the empiricism of the Greeks and Romans, to be replaced by Christian mysticism impregnated with Germanic superstition. What was retained in the monastic setting was the provision of free medical attention, imbued with charity. Therapeutic approaches returned to the path of the simplifications enshrined in popular medicine and supernatural interpretations, and this became intertwined with the Galenic concept of *laudable pus*, a miraculous substance for preventing infection and helping with a cure.⁴

In the meantime, the texts of Galen, along with a few Greek manuscripts salvaged from the destruction of the Library at Alexandria, were translated into Syriac by the Nestorian heretics, including the outstanding author *Hunayn ibn Ishaq*, and were kept at Gundishapur, from where they contributed to the enrichment of the burgeoning Arabic medicine.^{5–7} Arabic brought the Greek and Latin texts back to the West, initially thanks to the translations produced at the end of the 11th century by Constantine the African, one of the most memorable figures at the Salerno Medical School. Subsequently, by now into the 13th century, and thanks to the efforts of the School of Translators in Toledo, these texts could once more exert an influence on Western Medicine, mainly through the centres teaching medicine such as Montpellier, Paris or Bologna.^{8–10} Galenism was reformed when, from the 15th century onwards, his texts were reinterpreted in Europe after arrival of translations of Galen's oeuvre into Greek.¹⁰

Dietetics and hygiene at the start of empirical medicine

The consideration of diet as part of the origin of illness and health maintenance is shown clearly in texts as old as the Bible.¹¹ To give another example, in the writings by Homer dated in the 8th century B.C., Podalirius, one of the physicians mentioned in his works, had a special interest in diet.¹²

In all probability, in the mishmash of magical remedies and empirical observations by the pre-Socratic authors in Classical Greece, diet, particularly for its importance to ward off disease, was one of the first incursions of empiricism into medical knowledge, starting from the observations made by these authors of the nature surrounding them.^{13–17}

Thus, the origin seems to be Greek and probably in response to the needs of athletes in training for the games; nonetheless, it soon became established as a major means for treating the sick and, later, when applied to health, as a way to avoid illness.¹⁸

The *Corpus Hippocraticum* maintains that, in the remotest origins of Mankind, people ate the fruits of the earth directly, just like the animals, but as time went by, they had learned to prepare food adequately to suit their build.⁷ In addition, the *diaeta* became a set part of the therapeutic arsenal, including not just food and drink but also physical exercise and the necessary bathing for patients to achieve a cure.¹⁹

Let us stop a moment to examine Plato's writings: his dialogues set out multiple dietary concepts very close to what we could today call the Mediterranean diet; in this way, Plato recommends eating cereals, legumes, milk, honey, fish and fruit while maintaining that sweet foods, meat and wine have to be consumed in moderation. In general, he preaches moderation in all foods and recommends people avoid excesses.¹²

Hellenistic medicine, with such representatives as Erasistratus or Herophilus, also stressed the role played by diet.¹² This was transmitted down to the Roman authors, notable semiologists,²⁰ and, in the writings of, for example, Plutarch or Pliny the Younger, this conception of diet was upheld as a lifestyle including alternation between work and leisure, or

other matters such as the choice of a home. All this, seeking at all times a balance between the different humours.²¹

Sources for mediaeval *regimina sanitatis*

Dietetics, therefore, perfectly fitted into the mediaeval conception of medicine understood as both a science and an art, something that protected the body against ailments and kept people in good health. The two main parts into which medicine was divided in the Middle Ages included theory, which tried to understand the causes of health and sickness, and a practical side that dealt with the care of the sick and the conservation of health. *Diaeta* belongs to the *pars practica*, together with *potio* and *chirurgia*. *Potio* dealt with the potions and other beverages people were advised to drink or avoid, often separately from their food with the exception of wine.²²

In this article, we will review the works included in this tradition of literature on diet and hygiene collectively referred to by the term *regimina sanitatis* or *salutis* (health regimes). These writings are characteristic of all mediaeval medical literature and particularly enjoyed a great boom in the sphere of Western Christendom. Thus, according to Nicoud,²² we can consider the introduction of specific *regimina* literature as an original element of the Roman world, but without forgetting that the underlying basis of all these writings is the whole Greek and Arabic tradition in which the care of the health through hygiene played an important role.

Most *regimina* are structured, generally speaking, around the "six non-natural things" (*res non naturales*), i.e. factors helping to regulate health and prevent its deterioration: surroundings, exercise, food, sleep, evacuations and emotions, which will be analyzed in greater depth later.²³

With some frequency, the central theme of these regimes is the corporal hygiene of an individual, generally a king or potentate, but there are also *regimina* that deal with the hygiene revolving around a particular activity, stage of life or profession, such as those dedicated to pregnancy, travelling abroad or sea voyages, and specific lifestyles such as the armed forces or a monastic life. At other times, their theme is the prevention of a particularly lethal or opprobrious disease, such as plague or leprosy.

These mediaeval *regimina* drinks were mainly from Greek and Arabic sources. As for the Greek world, they fundamentally draw on the writings of the Hippocratic school, mainly his *Regimen for acute illnesses* and *On diet*, but there is also a very notable influence by the Aristotelian school, especially through the physician Diocles of Carystus and the letter he sent to King Antigonus by way of a *regimen salutis*. Other works that also exerted a great influence on mediaeval *regimina* were the works by Galen known in Latin by the titles *De regimine sanitatis* and *De alimentorum facultatibus*, as well as the *De observatione ciborum* by the Byzantine physician, Anthimus.²⁴

The Arab world, right from its earliest times, as reflected in the work of the doctor from Baghdad, Yuhanna ibn Masawaiyh, and dated in the first half of the 9th century, concerned itself with the therapeutic qualities of dietetics.²⁵ In this initial phase, a noteworthy title is the

10th century compilation called *Kitab al-tabikh* prepared by Ibn Sayyar al-Warraq; this work goes further than a mere collection of recipes and becomes a true volume of dietary therapeutics.⁷ Focusing on the Arabic sources of the Latin *regimina*, those of particular interest in the early phase are the translations made by Constantine the African: the *Isagoge*, attributed to an Arab author known as Johanni-tius, and the *Pantegni* by Haly Abbas. Equally outstanding are also two Arabic works by the Jewish physician Isaac Judaeus, the *Liber dietarium universalium* and the *Liber dietarium particularium*²³ followed later by the *Liber ad Admansorem* by Rhazes, the *Taisir regimina sanitatis*, and works by Averroes.^{7,24} A text that took on great popularity was the *Taqwin al sihha*, by Ibn Bultun, dated in the 11th century, translations and recreations of which in the so-called "Health Tables" exerted great influence in Europe at the end of the Middle Ages.^{24,26} In al-Andalus, such figures as Ibn Wafid, Avenzoar, Maimonides, or Averroes himself, gave great importance in their works to diet as a means to acquire health and prevent disease; in this advanced society, dietary guidelines were established for different ages, biotypes or seasons of the year,²⁷ and even had recommendations for when certain illnesses appeared such as, for example, a cerebrovascular illness, or suggested a change of residence as a way of avoiding certain risk factors.²⁸

The evolution of the *regimina sanitatis* as a literary genre

In the mediaeval west, this genre, containing the works of Greek and Roman classics as well as the influences indicated above, had its roots deep in the early mediaeval epistles on "hygiene" and the writings known as "dietary calendars". The Hygienic Epistles are brief texts with practical contents that include hardly any theoretical considerations, and deal mainly with two subjects: leeching and hygiene; the collection can also include the work cited above by Anthimus. The "dietary calendars", on the other hand, are short works on hygiene detailing what should be eaten and when.

Three main periods should be distinguished in the development of the *regimina sanitatis* in the mediaeval west.

Stage one

This runs until the middle of the 13th century and is considered as the prelude to a diet-based literature. The dissemination and use of the first of these necessarily rudimentary volumes date from the start of this century, in some cases as treaties on hygiene mentioned in manuscripts from the early Middle Ages and partly or entirely devoted to dietary matters. It is difficult to give a simple general definition of these treaties on hygiene, as the "science of diet" was concerned with keeping good health, but also touched on some therapeutic aspects. In addition, the texts from this period differ greatly from one to another in terms of style and general structure and so it would be impossible, according to Nicoud,²² to group these works from the early 13th century under the name of *regimina sanitatis*.

In the second half of that same century, the influence of Arab treaties on the *regimina* becomes evident. This was

the time when the *Liber de conservanda sanitate* was composed by Juan de Toledo, with the peculiar feature that he makes no mention of the 'non-natural things' as such, probably because it was written so early on and its dependence on Avicenna's *Canon*.²³ The subsequent influence of this text was such that, as late as the 17th century, Jerónimo de Mondragón translated the original Latin into Spanish.²⁴ Another work from this time is *Regimen* by Aldobrandino de Siena, a very long and complete work written, surprisingly for its time, in French rather than Latin. These treatises, as we have said, fall somewhere between prevention and therapy, covering both dietary precepts and therapeutic practice.

The *Regimen sanitatis Salernitanum*, also known as *Flos medicine*, belongs to this period.^{29–31} It is an anonymous work written in verse attributed to the School of Medicine in Salerno as a whole. The use of verse, often present in medical literature from the Middle Ages for its advantages of easier rote-learning, synthesis and concision, or the greater guarantee that later versions of the text are complete,³² is not common in *regimina* until the second half of the 14th century, when rhyming forms were adopted as a new expressive vehicle in this kind of work, coinciding with the progressive popularization of *regimina sanitatis*. Despite being dedicated to the King of England, *Flos Medicine* does not really deal with the personal hygiene of any individual in particular, but rather gives general advice and the dedication responds solely to a *topos* common in this style of literature.

Also in verse is the *Libellus de regimine vite et sanitatis* by Bellino Bissolo, a moralizing didactic poet from Milan. Although this work has on occasions been considered an exercise in erudition by a poet rather than a health manual, it is truly a guidebook for daily life and an interesting compendium of general and dietary advice for good health, such as the healthiest food to eat in each season of the year, the need for moderation at meal times, when exercise is most useful or the suitability, or otherwise, of daily hygiene applied to different parts of the body, such as the hands or the face.

Stage two

This first stage was followed by the flourishing of dietary literature, which lasted into the first half of the 14th century. The treatises composed in this period dealt with 'non-natural things' as their guiding principle but they do not limit themselves to their examination; rather, they also contemplate such other aspects as the prevention of disease and the conservation of health. The genre's maturity is visible in the emergence of specific regimes drawn up for certain individuals, generally sovereigns or other socially notable figures, and therefore adapted to their bodily characteristics. These *regimina* are added to the other variant of the texts about hygiene, the general regimes that already existed in the previous periods and continued to be written at this time.

The works composed in this period include the *Regimen sanitatis ad regem aragonum* by Arnaldo de Villanova, intended for King James II of Aragon, and the *Tractatus de conservatione vite humane* by Bernard de Gordon, a general regime. These two texts, the most characteristic of

this the most representative period of the *regimina*, will be discussed at length later when we analyze their references to neurological pathologies.

Other regimes produced in this period include the *Regimen* for Antonio de Flisco de Maino de Mainieri, an individual regime dedicated to a clergyman called Antonio de Flisco and composed in 1339, as well as a general regime by the same author, written in approximately 1330.

Last stage

This is characterized by the generalization of the *regimina*. It begins in the second half of the 14th century and extends to the whole of the 15th century. The authors in this period are clearly dependent on what was written in the preceding period and, in most case, simply reproduce the ideas of their predecessors. This last stage is marked by the proliferation of anonymous *regimina* and *regimina* written in Romance languages, mainly French or Italian, and in German. Among these, special mention must be made of the part dedicated to the *regimen sanitatis* in *Sevilana medicina* by Juan de Aviñón, or the *Trattato utilissimo circa la conservazione de la sanitate* by Hugo de Siena. The anonymity so frequent in the *regimina* from this period is a logical consequence of the generalization of mediaeval literature on the topic of hygiene and these works are generally characterized by a low level of science. They are often mere repetitions of the commonplaces contained in Avicenna's *Canon* or even just copies of extensive fragments from previous *regimina*. One outstanding hallmark of these late *regimina* is their brevity and their tendency to be very schematic: many of them occupy only two or three sheets on their respective manuscripts and they are limited to a simple list of products that must be eaten or avoided, as in the work by Gerardo de Solo. However, some very long *regimina* were also written during this last stage of the evolution of these health-based writings. These include one attributed to Benedictus Resguardatus de Nursia, published during the Renaissance, or those by Barnaba de Reggio and Chunrardus Ernstensis.

The *genre* persisted until well into the Renaissance, at which point the most noteworthy text is, for example, that by Luis Lobera de Ávila entitled *Banquete de nobles caballeros*, written when he was appointed Chamber Physician to the Emperor Charles V.²⁴

Sex res non naturales

Among its hypotheses to explain the origin of illnesses, Galenism considered things to be either *res naturales*, belonging to the nature of the body, *res non naturales*, that did not belong to the nature of the body and influence health from outside, or else *res contra naturam*, which caused illnesses.

The handling and balance of the *res non naturales*, proposed as dualities, constituted the basic principles of mediaeval hygiene.²³ This classification, although used by Galen, was systematically set out in the subsequent Arab literature, mainly in the *Canon* by Avicenna. The review of these six dualities will be conducted based on the *Regimen*

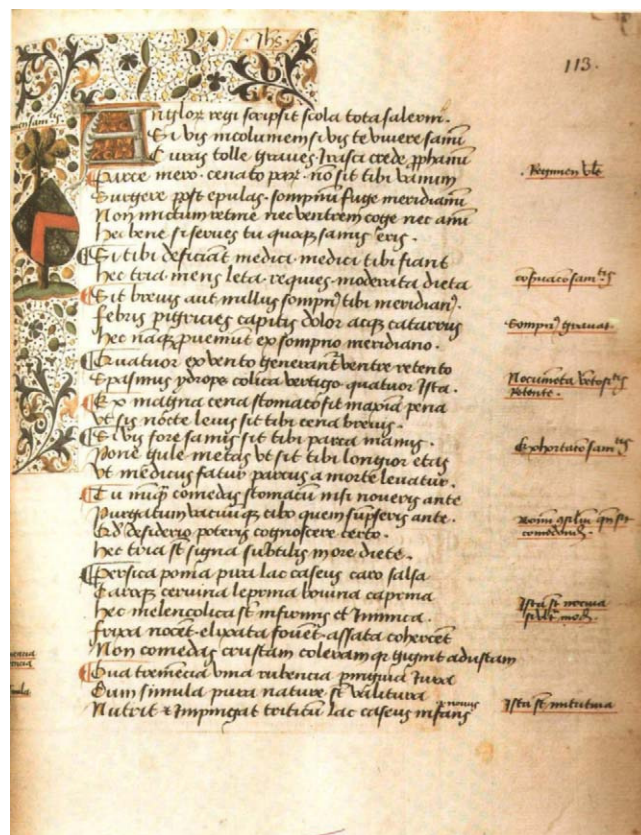


Figure 1 *Regimen Sanitatis Salernitanum*. Manuscript PARIS, BNF COD. LAT. 6931.

Sanitatis Salernitanum (Fig. 1), a work on which an analysis has recently been published of its references to neurological pathologies.^{29,30}

Environment

Many *regimina* begin by discussing the action exerted on mankind by everything surrounding us, mainly such factors as *aer*, the seasons, and the home or place of residence. The *Regimen sanitatis Salernitanum* does not include any chapter on this element; a considerable group of the manuscripts subsequently handing down this text refer to the environment, although these works are not very reliable from the point of view of textual criticism.

Physical exercise

This refers to the duality of movement/rest, guided by the idea that a healthy life requires alternation between exercise and rest. Within the notion of exercise, mediaeval authors usually include work and recommend walking above all. Baths and massages complete the elements of hygiene related with this duality and were included among the 'six non-natural things' by Arab and Latin Galenism. Nonetheless, in some cases, bathing was considered a procedure to eliminate certain harmful substances, such as perspiration, and is included in the 'fifth non-natural thing', regarding

the hygiene of bodily waste, as happens, for example, in the *Regimen sanitatis Salernitanum*.

Food and drink

According to the *regimina*, in order to preserve good health, it is very important to take care of what was eaten and to find a way to ensure good digestion. On this point, particular importance is given to amounts and the authors usually appeal to sobriety, as can be seen on various occasions in the *Regimen sanitatis Salernitanum*, for example in the rhyme included in line 5: "Refrain from pure wine, dine little..."; or in lines 20–21: "Copious suppers cause stomachs the greatest discomfort. / To sleep well, dine little", and in lines 23–24: "Rein in your appetite to live a long life. / As doctors have noted: lean people live longer".

It is common for some chapters in the mediaeval *regimina* to be devoted to the study of the different foods making up human diet, generally considering bread, legumes, fruit and vegetables, meat, fish, dairy products and eggs. The drink most considered in these sections was usually wine.

Sleep

This refers to the duality of sleep/wakefulness. Sleep is considered beneficial for health, as it is attributed three functions: the first, the cooling of the deepest parts of the body through a change in the temperature of the viscera, mainly in the two organs dealing with the digestion, the stomach and the liver; this is the way to facilitate the first and second digestion. In addition, it kept the internal members moist by condensation of the vapours emerging from the nutrition organs. Finally, sleep was considered to allow the *virtutes animales* to rest. The *regimina sanitatis* insisted on the need to rest at the most appropriate times and usually roundly condemned afternoon naps. Thus, for example, the *Regimen sanitatis Salernitanum* says: "...avoid napping"; "Nap little or not at all. / Fever, indolence, headache and catarrh: / all these ills come from napping" (lines 13–15).

Hygiene of bodily waste

The duality of emptiness/fullness is the fifth 'non-natural thing', considering the need for balance between these two poles in order to achieve health. Among the substances that needed to be voided, mediaeval medicine distinguished between the waste coming from the three physiological digestions, certain substances produced by other organs, such as sperm, and, finally, the humours, which could be transformed in the blood or in the specific receptacle of each one and required for their evacuation a whole series of techniques such as phlebotomy, cupping, emetics or purges. The *Regimen sanitatis Salernitanum* also devotes numerous chapters to this hygiene of waste and included remedies to correct constipation or diarrhoea, as well as diuretics; it also discusses perspiration as a means to flush out waste substances and a considerable part of the work deals with phlebotomy and emetics, as well as enemas and suppositories.

Emotions

Mediaeval medicine postulates a very close connection between body and soul, manifested in the doctrine of *accidentes animae* or *passiones*, defined as emotions originating in the soul that are visible in the body. In this sense, the *regimina* on health advise avoiding anger or rage and trying to stay happy. The *Regimen sanitatis Salernitanum* presents some reflections of these recommendations in its opening verses: "Shake off serious worries, getting angry is harmful".

Arnaldo de Villanova, in his 13th-century *Speculum medicinae* adds to these 6 *res* that he considers to be the main ones, another 6 arising out of them, namely region or place, coitus, work or occupation, play, bathing and custom.²⁶

Neurology in the *regimina sanitatis*

Although these medical texts do not consider neurological aspects independently, they contain multiple allusions to both the treatment of neurological pathologies and also, particularly in the case of the *Regimen sanitatis Salernitanum*, to the balances necessary in the *res non naturales* in order to preserve memory, the proper operation of the nerves, and sight and hearing.³⁰

There are many *regimina* to be analyzed and the investigation, and even the publication, of quite a few of these texts will have to be undertaken over the years to come. We have worked on the Latin texts of three of the most outstanding *regimina* with the greatest subsequent influence: the anonymous *Regimen sanitatis Salernitanum*, whose main neurological references have been highlighted in a previous paper,³⁰ the *Regimen sanitatis ad regem aragonum* by Arnaldo de Villanova and the *Tractatus de conservatione vite humane* by Bernard de Gordon. From these last two texts, we present here the most outstanding verses in terms of neurological pathology.

Neurology in the *Regimen sanitatis ad regem aragonum* by Arnaldo de Villanova

Arnaldo de Villanova (1238–1311) is acknowledged as one of the greatest figures in the medicine of early Middle Ages, apart from his great intellectual influence and the repercussion of his occasionally controversial religious writings. After studying in Montpellier, he practiced medicine in the household of several Kings of Aragon: Pedro el Grande, Alfonso III and Jaime II. From 1290 on, he lectured at Montpellier, with most of his medical work dating from this period.²⁴ His fame was so great that other notable works are attributed to him, such as for example the *Regimen sanitatis Salernitanum*, but also other very minor later works, which has hindered somewhat the study of his legacy.³³ He was even branded as an alchemist, which he almost certainly was not.

The *Regimen sanitatis ad regem aragonum* most probably dates from 1305 to 1308 and is structured in two parts: the first is organized around the 'six non-natural things' and the second deals mainly with the characteristics of

different foods. In addition, a distinction can be drawn with the last chapter, a kind of appendix setting out the hygienic and therapeutic measures to be observed by King Jaime II of Aragon, to whom the book is addressed, in connection with his haemorrhoids. The most outstanding feature of this work responds to its character as an individual *regimen* and it is presented in a very simple style without including any erudite citations, responding to its intended recipient, someone not versed in medicine. With this advice, his intention is for the king to reach what he calls *natural vellea*, in other words a natural old age. Despite being a *regimen* aimed at a single individual, knowledge of this work spread quickly and it was translated into other languages such as Catalan or Hebrew.^{26,34}

We cite below the main references to neurological pathologies present in the text.³⁵

The nerves

This *regimen sanitatis* warns against lemon juice, as it “notably harms the nerves and the members they form” (chap. XVI, lines 39–41).

Sight

The first chapter of the book, dealing with the effects on health of the environment and the home (*De aeris et mansionis congruitate*), Arnaldo alerts to the danger of fire for the sight, which he says is blunted (chap. I, lines 71–74). Furthermore, sight is affected, according to this *regimen*, by “sleeping with shod feet, particularly in summer” (chap. V, lines 39–42).

Memory

In this work, Arnaldo mentions a tip to preserve intact both memory and the senses of sight and hearing: “wash the soles of the feet and calm them with warm water” (chap. III, lines 18–20).

Dizzy spell

In this work, the cause of dizzy spells is attributed to “the fire that people use to warm themselves in winter” (chap. I, lines 71–75).

Headache

According to Arnaldo, sleeping moderately at night eliminates a heavy head (chap. V, lines 61–62).

Neurology in the *Tractatus de conservatione vite humane* by Bernard de Gordon

The *Tractatus de conservatione vite humane* is a text aimed at students of medicine and is therefore very different from the previous work. Also a teacher in Montpellier, Bernard de Gordon wrote his *Regimen sanitatis* in 1308, which is the fourth volume of the *Tractatus*, also called *Lilium*

medicinae. It has a complex structure, partly influenced by the *De regimine sanitatis* by Galen, as well as the Avicenna's *Canon*, the *Isagoge* and the *Pantegni*.

The neurological references are present in both the regime and in the rest of the *Tractatus*.^{36,37} We list below neurological aspects present throughout the work.

Sight

As elements harming the eyes, the *Tractatus* mentions air that is too hot or too cold and excessive brightness. In addition, it warns of the suitability of “avoiding the reading of small writing in poor light, and in dark places, avoiding coitus and fish and everything that should be avoided because it harms the head”. The eyes also suffer because of the stomach, the head or the whole body (pp. 907–908, lines 33–40 and 1–19, respectively).

Hearing

Hearing is harmed by: the sound of tubas and large bells, slamming doors, the roaring of lions, the bellowing of bulls and similar noises. Ears are also harmed by anything entering them, such as dust, dirt, water, etc., headaches and colds (p. 908, lines 21–37).

Both sight and hearing can be improved by physical exercise causing fatigue and a moderate degree of alteration in breathing. This kind of exercise is also beneficial for imagination and memory (p. 857, lines 10–17).

Memory

If there are memory problems, it is necessary to “avoid long sleeps and smoke the head with aloe wood and amber mixed with water, as well as purge it with *yerapigra*” (a powder preparation administered as an electuary and used above all as a purgative). This remedy is also useful in the event of a dysfunction in all the senses (p. 929, lines 11–19).

Headache

If headaches and a mist over the eyes are common, it is necessary to avoid eating fish, onions, walnuts and drinking strong wine (p. 873, lines 23–26).

Among the elements harming the head, mention is also made of the wind, the rain, heat, cold, being full up, inanition, smoked foods, foods filling the head with heat, walnuts, everything oily, cured cheese, all legumes, fruit and vegetables. It is also necessary to avoid eating garlic, onion, leek, pepper and strong wine, as well as sleeping during the day or sleeping with your head bent, eating or sleeping too much, late suppers and indigestion (p. 907, lines 9–31).

Headaches may be a sign of a future illness (p. 933, lines 4–6): “pain in the head or anywhere else in the body indicates a major illness on its way. Pain is followed by disease. Where there is pain, there is sickness”.

The different types of headache are symptomatic of different illnesses (p. 933, lines 12–20): thus, a passing headache means dilatation of the pupil; if it is also

accompanied by the appearance of scotomata in the eyes is indicative of cataracts.

Headache with a fever and redness in the face and eyes, with the appearance of flashes and sleeplessness, denotes delirium.

Spasms and paralysis

If taken without restraint, wine causes spasms and paralysis (p. 880, l. 29).

On the other hand, the signs indicating spasms and paralysis are: *iectigatio* (involuntary movement) in the face, accompanied by stiffening of the limbs (p. 933, lines 26–27).

Apoplexy and epilepsy

Getting drunk runs a serious risk of suffering apoplexy or epilepsy (p. 881, lines 8–10). Another cause of epilepsy is the movement of a corrupt and malignant humour (pp. 905–906, lines 39–40 and 1–2, respectively). A still humour, on the other hand, however malicious it may be, is not harmful.

According to Bernard de Gordon, the signs of epilepsy and apoplexy are heavy eyes, dull hearing and dizzy spells. These signs may indicate, in addition to epilepsy and apoplexy, sudden death (p. 933, lines 22–24).

Obese individuals are more likely to fall ill, mainly when accompanied by a natural narrowing of veins: the people suffering from this usually end up suffering apoplexy, epilepsy, asthma, syncope and sudden death (p. 904, lines 9–13).

Dizzy spells

Melted snow causes dizzy spells, vomiting of blood and joint pain, as well as producing catarrh (p. 879, lines 22–25). As a recommendation for those who tend to suffer from dizzy spells, thisy and cataracts, he mentions eating in moderation and easily digested foods, as well as avoiding vomiting (p. 894, lines 17–19).

Nerves

The nerves are the reason for the pain that occurs “because the arms and the whole body are tensed like a bowstring and this is due to the fact that the sensitive members, such as nerves, tendons and muscles, have absorbed a large amount of matter” (p. 888, lines 7–12).

To conclude, we will refer to a preparation that Bernard recommends for purging the head, preventing apoplexy, dizzy spells and diseases of the eyes. It involves “camomile, melilot, rosemary flower and lavender cooked in white wine. The vapours from this mixture will be taken through the mouth and nose or else one or two drops of it will be taken and placed in the upturned nose” (p. 895, lines 20–27).

Conclusion

The *Regimina sanitatis* constitute one of the most outstanding genres of mediaeval medicine, reflecting, as few other

works can, the highly influential view of mediaeval Galenism in their day. The Latin texts we have reviewed are sprinkled with references to neurological pathologies and show an often very meritorious nosological approach to the understanding of these illnesses, as well as both preventive and therapeutic possibilities very closely tied to nature.

Conflicts of interest

The authors have no conflict of interests to declare.

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