



Innovación en el discurso científico medieval a través del *Taqwīm Al-Ṣiḥḥa* de Ibn Buṭlān (Lat. *Tacuinum Sanitatis*)

*Innovation in Medieval Scientific Discourse through Ibn Buṭlān's Taqwīm Al-Ṣiḥḥa (Lat. Tacuinum Sanitatis)*¹

Resumen

El *Tacuinum sanitatis*, obra del persa Ibn Buṭlān (siglo 5 H. / XI J. C.), sigue los contenidos de los tratados hipocráticos de los siglos V y IV a. C. Estos textos dan importancia a la dieta, entendida como el equilibrio del hombre con su entorno y de los alimentos con los ejercicios físicos. En su origen árabe, el contenido del *Tacuinum sanitatis* fue dispuesto con un innovador uso de tablas sinópticas, usadas con anterioridad en textos de tema astronómico. En el presente artículo nos ocupamos del *Tacuinum sanitatis* de Ibn Buṭlān como parte relevante de la interrelación entre el legado árabe y el desarrollo del galenismo en Europa, particularmente en la aceptación de una medicina práctica y preventiva que persigue el equilibrio humoral como garantía de buena salud. Particularmente estudiamos el contenido de la versión latina del *Tacuinum sanitatis* de Ibn Buṭlān conservada en el ms. lat. BnF 9333, versión en la que la disposición textual en tablas se ha abandonado a favor de una riquísima labor de ilustración de cada pie textual explicativo. En este trabajo exponemos los primeros resultados de nuestra investigación acerca de la innovación textual e iconográfica al servicio de las nuevas formas de comunicar contenidos científicos en la Edad Media.

Palabras clave

Ibn Buṭlān, *Tacuinum sanitatis*, Higiene y dietética medieval árabe, Galenismo, Teoría de los humores

Abstract

The Tacuinum sanitatis by the Persian Ibn Buṭlān (fifth/eleventh century) follows the contents of the Hippocratic treatises of the fifth and sixth centuries BC, emphasising the importance of diet as the balance between humans and their environment, and between food and physical exercise. We specifically study the content of the Latin version of Ibn Buṭlān's Tacuinum sanitatis in Latin manuscript BnF 9333. In this version, Ibn Buṭlān's arrangement of text in tables has been abandoned in favour of the laboriously sumptuous illustration of each explanatory footnote. We analyse the relationship between the Arab legacy and the development of Galenism in Europe, particularly regarding the acceptance of practical and preventative medicine that pursues humoral equilibrium as a guarantee of good health, and we report the initial results of our research into the textual and iconographic innovation of new ways of communicating scientific content in the Middle Ages.

Keywords

Ibn Buṭlān, *Tacuinum sanitatis*, Medieval Arab hygiene and dietetics, Galenism, Theory of the four humours

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INTRODUCTION

*'Tacuinum sanitatis in medicina ad narrandum sex res necessarias... De sex rebus quae sunt necessariae cuilibet homini, ad quotidianam conseruationem sanitatis suae, cum suis rectificationibus et operationibus. Prima sanitatis cura, est praeparatio aeris, qui cor contingit. Secunda, rectificatio cibi et potus. Tertia, rectificatio motus et quietis. Quarta, prohibitio corporis a somno, et a vigiliis multis. Quinta, rectificatio laxationis, et constrictionis humorum. Sexta, regulatio personae in moderatione gaudii, irae, timoris et angustiae. His enim modis aequalitatis erit conservatio sanitatis: et remotio istorum sex ab hac aequalitate, facit aegritudinem, Deo permittente glorioso, et altissimo*².

'... The first essential element for health is to improve the air that goes to the heart. The second is to adjust food and drink. The third is to balance activity and a sedentary way of life. The fourth is to avoid sleeping or not sleeping in excess. The fifth is to balance the expulsion and retention of humours. The sixth is for individuals to be moderate in their feelings of joy, anger, fear and anguish. Health is preserved when this advice is followed regularly. Illness appears when one of these six instructions fails, if Almighty God thus permits'.

This is the *incipit* of the *Taqwīm al-ṣiḥḥa* (*Tacuini sanitatis*) by Ibn Buṭlān in the Latin version³. Man needs six things to enjoy good health. Firstly, a specific quality of air. Secondly, appropriate food and drink. Thirdly, a combination of activity and a sedentary way of life. Fourthly, neither too much nor too little sleep. Fifthly, humoral equilibrium. Sixthly, moderation in feelings.

One of the characteristics of the humanist movement is a renewed interest in hygiene and public health. In all likelihood medicine is the discipline that sheds most light on the social and cultural behaviour of a period through the transmission of knowledge, because it explores the root cause of illness—by contributing name, gender, social status and age—and establishes a diagnosis and guidelines to be followed regarding the sick and their environment. At the same time it provides information about dietary habits, hygiene and disease prevention or sexual behaviour, among others⁴. The study of medicine is undoubtedly a good way to discover medieval society.

The majority of medical texts written in Latin stem from the writings of Galen. These are abbreviated studies or studies with commentaries, which were eminently practical, the translations of which were

circulated among students of medicine. However, although many of these summaries were bad translations, their authority was undisputed.

From early on the Arabs knew about Greek medicine, promoting it considerably by translating the main contents into Arabic. Once this medical literature based on Galenic theory had been translated, adapted and combined with Arabic thought and considered as such from the eighth to the ninth centuries, it arrived in the Western world after the eleventh century thanks to the first Arabic translations into Latin. Already in the eleventh century—two centuries earlier—, the Arabs fostered medical training and disease control in hospitals.

In this article we focus on Ibn Buṭlān's *Taqwīm al-ṣiḥḥa* (*Tacuinum sanitatis*) as a vital part of the interrelation between the Arab legacy and the development of Galenism in Europe, particularly regarding the acceptance of practical and preventative medicine that pursues humoral equilibrium as a guarantee of good health⁵. We specifically study the content of the Latin version of Ibn Buṭlān's *Taqwīm al-ṣiḥḥa* in Latin manuscript BnF 9333. In this version, the arrangement of text in tables has been abandoned in favour of the laboriously sumptuous illustration of each explanatory footnote. We draw attention to the iconographic development of the text, which in the Sicilian and Viennese Latin versions abandons content layout in the form of tables in favour of magnificent illustrations with a brief explanatory text in the footnote.

TACUINUM SANITATIS. AUTHOR, ORIGINAL ARABIC AND LATIN TRANSLATION

Ibn Buṭlān⁷, a Christian physician born in Baghdad and deceased in Antioch between 1063 and 1068⁸, reported his theories in the *Taqwīm al-ṣiḥḥa* (*Tacuini Sanitatis* in the Latin version, literally "Tables of health") in the early eleventh century⁹. Little is known about Ibn Buṭlān, but thanks to his correspondence we do know that he studied medicine and philosophy with Abū al-Faraḥ 'Abd Allāh b. al-Ṭayyib. Around 1047 Ibn Buṭlān left Baghdad and travelled to Cairo. In that city he met rival physician Ibn Riḍwān (998–1061), who was less cultivated and original than Ibn Buṭlān from an intellectual perspective, but who possessed greater knowledge of science and practical medicine. Problems arising from Ibn Buṭlān's authoritarian nature forced him to leave Aleppo for Antioch. He then visited Laodicea and Jaffa. In 1049 he returned to Cairo, where his enmity with Ibn Riḍwān turned to violence, according to extant accounts¹⁰. In 1054 he settled in Constantinople, at a time when the plague was decimating the population. Just one year later, he withdrew to a monastery in Antioch, where he died¹¹.

2. *Tacuini sanitatis Elluchasen Elimithar ... De sex rebus non naturalibus, earum naturis, operationibus, & rectificationibus publico omnium usui, conseruandae sanitatis, recens exarati* [Author: Ibn Buṭlān]. *Albengnefit De virtutibus medicinarum, & ciborum* [Author: Ibn Wāfid]. *Iac. Alkindus De rerum gradibus* [Author: al-Kindi]. Ed. Johannes Schottus. France-Strasburgo, Argentorati apud Ioannem Schottum Librarium, 1531. University of Granada. <http://hdl.handle.net/10481/10199>, 5.
3. MS. lat. BnF 9333 and Johannes Schottus ed., Strasbourg 1531. The original Arabic begins in the same way. Elkhadem 1990.
4. Laín Entralgo 1981, pp. 3-17 and Laín Entralgo 1982.
5. We should not limit our thoughts exclusively to the spread of science carried out by the Arabs of Spain, but should also consider the enormous role played by the Crusades and Mediterranean trade.
6. Bovey 2005.
7. Abū al-Ḥasan al-Mujtār ibn al-Ḥasan ibn 'Abdūn ibn Sa'dūn ibn Buṭlān. Born in the early fifth/eleventh century and deceased between 1063 and 1068. His biography is contained in Lippert 1903, pp. 294-315 and Muller 1882-1884, pp. 241-243.
8. Schacht – Meyerhof 1937, p. 52.
9. Elkhadem 1990.
10. Elkhadem 1990, p. 10.
11. For more detailed information about the life and work of Ibn Buṭlān, see in this point Conrad 1995, pp. 84-100; Brockelmann 1937-1942, p. 885; Ullmann 1970, pp. 157-158; Schacht 1960-2002, pp. 740-742; and Klein-Franke 1985.

Ibn Buṭlān's most important work is his *Taqwīm al-ṣiḥḥa*, in which the content is displayed through synoptic tables. The mise-en-page of the *Taqwīm al-ṣiḥḥa* was an innovation at the time, because it adopted the content presentation associated with treatises on astronomy¹². The *Taqwīm al-ṣiḥḥa* was written in the eleventh century, and sixteen Arabic copies have been conserved. The Latin translation, of which there are sixteen extant copies, was first discovered in Sicily in the thirteenth century and subsequently in Italy. The identity of the translator who translated the *Taqwīm al-ṣiḥḥa* into Latin is unknown, but it was definitely not Gerard of Cremona¹³. From then on, the Latin variant of the *Taqwīm al-ṣiḥḥa*, the *Tacuinum sanitatis*, was circulated in versions with or without illustrations¹⁴. Although the Latin versions were based on the writings of Ibn Buṭlān, the *Tacuinum* is only a distant reflection of the original text, which was much reduced in the longer sections containing the physician's experience and his personal opinions.

The manuscripts that preserve the *Tacuinum sanitatis* show scenes of daily life in the country and at court beneath which is placed a brief Latin text, which was gradually reduced to a mere summary at the foot of the illustration. Each article occupies an entire page and language is only used to provide a background to the scenes of everyday life. The pattern is scientific, that is, it is simple and specific, and points readers to the process they should follow¹⁵.

The inventory of the number of manuscripts corresponding to the thirteenth, fourteenth and fifteenth centuries conserved in the Latin version of Ibn Buṭlān's *Taqwīm al-ṣiḥḥa* varies according to whether or not they are illustrated. In any case, the fundamental evolution of the Latin text through the centuries has been its increasing schematisation, resulting in the virtual disappearance of the mise-en-page in the form of tables and the concentration of content in an explanatory footnote accompanying each splendid illustration.

Illuminated manuscripts of the Latin version of Ibn Buṭlān's *Taqwīm al-ṣiḥḥa*

1. Österreichische Nationalbibliothek (Vienna) MS. 2644, c. 1385¹⁷. It conserves 204 of the 280 articles of the original Arabic text. Codex 2396 and Codex 5264.
2. Biblioteca Casanatense (Rome) MS. 4182. It is a copy of the former and is entitled *Theatrum sanitatis*¹⁸.
3. Bibliothèque nationale de France MS. Lat. 1673 (late 16th century)¹⁹ and Lat. 9333 (15th century)²⁰. In addition, MS. Lat. 6977, 6977 A, 10.264 and 15.362.
4. Bibliothèque municipale de Rouen MS. 3054 (Leber 1088) and private collection²¹. It is dated around 1450 and is based on a similar model to the Casanatense manuscript 4182.
5. Bibliothèque de l'Université de Liège MS. 887 (1041). It corresponds approximately to the second quarter of the 15th century and follows the style of its predecessors²².
6. Biblioteca de la Universidad de Granada, Codex Granatensis C-67. It dates before 1450.

12. Muñoz Jiménez – Aguiar Aguilar 2000, pp. 181-189.

13. Delisle 1896, p. 519 and more recently Gil-Sotres 1996, pp. 111-182; Elkhadem 1990, p. 43.

14. Moly-Mariotti 2005, pp. 41-54

15. Martínez Gázquez 1988, pp. 403-409.

16. The number of manuscripts of the Latin version of Ibn Buṭlān's *Tacuinum sanitatis* varies between seven and seventeen depending on the author. Thorndike – Kibre 1964 mention eight manuscripts between the thirteenth and fourteenth centuries; Whitthoft 1978, pp. 57-58 mentions seven manuscripts. Also Cogliati Arano 1976 mentions seven manuscripts. García Ballester 1974, p. 38 mentions seventeen manuscripts as well as Delisle 1896, pp. 532-538.

17. Facsimile edition by Unterkircher 1987 and Poirion – Thomasset 1995. See also De Battisti – Biffi 1983.

18. Facsimile edition by Serra – Baglioni 1940 and Pazzino – Pirani – Salmi 1969.

19. Facsimile edition by Berti-Toesca 1937.

20. Facsimile edition of the MS. Lat. BnF 9333 by Touwaide – König – Miranda García-Tejedor 2007. Dated between 1445 and 1451, it is a reproduction of the copy in Vienna. Päch 1950, pp. 13-47.

21. Paris –Daunay – Janick 2009, p. 1188.

22. Gobeaux-Thonet 1967, pp. 101-107; Opsomer 1991.

The first Latin edition of the *Tacuinum sanitatis* was printed in 1531 in Strasbourg at the home of printer Hans Schott under the title *Tacuini sanitatis Elluchasem Elimithar Medici de Baldath, de sex rebus non naturalibus, earum naturis, operationibus, et rectificationibus, publico omnium usui, conseruandae Sanitatis, recens exarati Agentorati apud Ioannem Schottum*. The book is dedicated to Albert of Brandenburg, Archbishop of Mainz, and also contains translations of the aforementioned *De uirtutibus medicinarum et ciborum* by Abengüefit and the *De rerum gradibus* by Alkindus²³. The second edition of these three texts was published with the addition of the *Tacuinum aegritudinum* by Ibn Djazla in 1533²⁴. Far from falling into oblivion, in the sixteenth century interest in hygiene and public health was added to the new concepts introduced by the humanists. Content in the printed editions was again arranged in tables.

TACUINUM SANITATIS. THE CONTENT

The *Tacuinum sanitatis* is a treatise on hygiene and dietetics presented as a health guide in table format. It offers a mixture of contents of classical and Arab medicine, and popular knowledge and practices, which aim to depict a perspective on disease from a rational viewpoint by providing a series of guidelines leading to improved health.

Since classical Greek antiquity, the word *dieta*/δίαιτα (diet) has a broad meaning that is not limited to nutrition, which is already made clear in the treatise *Sobre la dieta* dating from 400 AD²⁵. Diet refers to way of life, to a sustained and harmonious relationship with the environment²⁶. The treatises on hygiene and medicine of the Hippocratic Collection dating from the fifth and fourth centuries AD focus on individual diets being a balance between nutrition and physical exercise. The preference of one of these elements over another creates an anomaly and therefore an imbalance leading to disease if it is not modified and early diagnosis not made²⁷.

Like the Hippocratic treatises, the *Tacuinum sanitatis* unveils a system based on observation and experiment for the study of disease. It makes reference to an Arabic text that contains chapters showing how to identify foods and recognising their importance, and sets down guidelines for keeping good health. Several sections are devoted to fruit, bread, pulses, meat, fish and so on, but also to dental care, music, sleep, exercise, air, water and the seasons, and to keeping a small home pharmacy.

We have discovered the convergence of various traditions in the contents of the Latin texts of the *Tacuinum sanitatis*, and we will now provide a brief outline. Firstly, there is a continued use of herbariums as well as other kinds of texts that include illustrations to transmit the names and descriptions of the herbs—or plants in general—with their medicinal properties. Among the early treatises that use this name is the *Herbarium de Apuleius Platonius*²⁸, the compiler of which remains unknown, despite the name in the title²⁹. This small Latin work is one of the first to which the expression “plant-based” is generally applied and, in the strictest sense, is a type of manual. It was published for the first time in the late fifteenth century and is followed by the Latin and German *Herbarius* and the *Hortus Sanitatis*³⁰.

These herbariums appear to derive, through Pliny, from the *De materia medica* by Dioscorides. Since classical antiquity, they were illustrated for educational purposes and not with the intention of being a treatise on natural history, but rather a book of applied science or a medical manual, as demonstrated by Herrlinger³¹. However, these images were subjected to a styling process which led to their rapid deterioration, already evident in Pliny's day (23–79 AD), and which continued until the High Middle Ages³². This led the West to neglect the legacy of classical antiquity³³ and to rescue the teachings of natural science and more specifically the tradition of plant illustrations for medical purposes, thanks to the East's interest in the sciences³⁴. Arabic miniatures dispense with the mythological element and lend more importance to detail. This makes them more realistic and provides a link with the classical

23. Al-Kindi died 870. Al-Kindi's *De gradibus* presents for the first time a theory of the quantification of the effect of drugs on the sick. See the detailed study on this work by Elkhadem 1990, pp. 46-47; and Pioreschi 2002, pp. 17-19.
24. Ibn Djazla (d. 1100), a contemporary of Ibn Buṭlān, wrote a state of the body and its diseases which imitates these tables and is entitled *Tacuinum aegritudinum*. This treatise was printed in 1533, also by Hans Schott in Strasbourg.
25. Translated to Spanish by García Gual – Lucas de Dios – Cabellos Álvarez – Rodríguez Alfageme 1986. See also García Gual 1998, pp. 63-79.
26. Bearing in mind the lifestyle and body habits addressed by the author of *Sobre la dieta*, Laín Entralgo is clear about the elements required to maintain health and prevent disease, because they establish an individual's vital activity: Laín Entralgo 1987: nutrition, social and political lifestyle habits of the city and activity, which includes exercises, walking, rest and bathing. See also Laín Entralgo 1964, p. 79.
27. Using another Hippocratic treatise, *Sobre los aires, las aguas y los lugares*, the author of *Sobre la dieta* considers that early diagnosis is necessary and that it should take into account factors such as age and sex, the salubrious nature of the home or the state of the winds, etc. In this point, see Martínez Conesa 2006, pp. 589-594.
28. In order to distinguish from the author of *El asno de oro* (*The Golden Ass* or *Asinus Aureus*), it is sometimes referred to as *Apuleius Barbarus* or *Pseudo-Apuleius*.
29. Arber – Stearn 1986, pp. 14-15.
30. Despite the proven antiquity of the content of the herbariums, it was Pope Sixtus IV's physician, Johannes Philippus de Lignamine, who published the first edition of the *Herbarium* in Rome. Soon after the appearance of the first printed editions of the *Herbarium* by Apuleius Platonius, the Latin (1484) and German (1485) versions of the *Herbarius* were published in Mainz (Germany). The 1491 *Hortus Sanitatis* is a derivative of the latter.
31. In classical antiquity, the botanical illustration of medicinal plants was made by using schemata, semi-schemata and naturalistic forms. See Herrlinger 1967, pp. 23-27. Singer was concerned with the development of this type of illustration in the Middle Ages. See Singer 1927, pp. 1-52. More recently Collins 2000 analysed the two main herbal traditions deriving from Dioscorides' classic in Greek, Arabic, Latin and the *Herbarium de Apuleius Platonius*.
32. Moreover, Pliny had already drawn attention to the frequent lack of reliability of plant images. See Plin. *nat.* 25, 2: '*Pinxere namque effigies herbarum atque ita subscripsere effectus. Verum et pictura fallax est coloribus tam numerosis, praesertim in aemulationem naturae, multumque degenerat transcribentium socordia*'.
33. Grmek 1998.
34. Campbell 2006, p. 82; Päch 1950, p. 26.

tradition that had been lost. Thus, the illustrations of the *Secreta Salernitana* connect the paintings of medicinal plants in the classical world to the *Tacuinum sanitatis*³⁵.

A second aspect that must be highlighted is the relationship between the *Tacuinum sanitatis* and the *consilia*. Both are the result of the failure to directly counsel patients on their habits and of the non-existent exchange of experiences and ideas between professionals. The genre of the *consilia* appeared in the late thirteenth century and evolved in northern Italy in particular³⁶. Given their specific structure, these texts became a literary genre, despite only revealing the professional practice of a physician who would record patients' symptoms and then send them to a colleague by letter. In this document, which was a form of instruction and a way of sharing experiences, the doctor defined and prescribed the appropriate treatment for a specific patient. Generally, the information was written *in absentia*, that is, at the request of another physician. The wording reveals a fixed model that could be modified in some cases, depending on what the physician chose to explain. It is based on four sections laid out as follows: diagnosis (*casus*), diet (*regimen*), remedies (*medicinalia*) and prescriptions (*experimenta*)³⁷. The *consilia* became doctrinal records containing an abundance of refined and learned details.

The *Tacuinum sanitatis* refers to one of the basic principles of medieval medicine, namely, the balance of the four humours that make up the human body: black bile, yellow bile, phlegm and blood. The origin of the theory of the four humours or body liquids lies in Greek philosophy and is an attempt to relate everything to universal laws. Thus, humours are frequently related to the seasons, to heat, cold, dry and damp; the signs of the Zodiac in groups of three; or to the four ages of humanity (infancy, adolescence, adulthood and old age).

Maintaining the immutability of these elements used in medical diagnosis is essential for a person's well-being. According to Ibn Buṭlān, human ailments are the result of an imbalance in any of these elements. It is therefore necessary to live in harmony with nature in order to preserve or recover health. To that end, six elements should be organised as follows: food and drink; air and atmosphere; movement and rest; sleep and wakefulness; the secretion and excretion of humours; and ailments of the spirit³⁸.

The eating habits of medieval people depended to a great extent on where they lived and on their financial situation in particular. Consequently,

some foods, like spices or sugar, were prohibitive, which generally resulted in a diet of wheat, meat or fish, depending on location, and, in some cases, seasonal greens, fruit and other vegetables³⁹.

Ibn Buṭlān had to consider these determining factors when organising his *Taqwīm al-ṣiḥḥa*, using tables structured around illustrations and text in the Latin manuscript version. The importance of both—image and text—falls directly on an aspect of nature or a basic human activity. The human figure does not prevail over the other elements because it has become an integral part of the environment. But at the same time it is an individualised component within nature as a whole.

The content of the *Tacuinum sanitatis* is structured around seven aspects, which are repeated in the same schema: *complexio* (nature), *electio* (choice), *iuuamentum* (usefulness), *nocumentum* (inconvenience), *remotio nocumenti* (solution to the inconvenience), *quid generat* (what is produced) and *conuenit* (who it benefits)⁴⁰.

1. *Trees and their fruits*. This case includes all kinds of vegetables which may have a nutritional or therapeutic effect, such as cabbage or radishes, but also oregano and sage or fruits picked from trees, like grapes, and the wine produced from them. *Pira. Complexio: frigida in primo, humida in secundo. Electio: odorisa matura. Iuuamentum: confert stomacho debili. Nocumentum: nocent colyce. Remotio nocumenti: cum alleis comestis post prandium. Quid generant: sanguinem frigidam multum. Magis conueniunt nature calidis, iuuenibus, estate, in regione meridionali*⁴¹.
2. *Seasons and atmospheric phenomena*. Derivates, such as rain, storms, snow or, with very particular attention to different winds, whether from the south, north, etc., and their effects on nature. *Autumnus. Complexio: frigidus temperate in secundo. Electio: medium ipsius. Iuuamentum: gradatim procedentibus ad contraria ut calidum et humidum. Nocumentum: nocet temperatis complexionibus et dispositis ad ptisim. Remotio nocumenti: cum humectantibus et balneo. Quid auget: humores melencolicos. Conuenit: calidis et humidis, iuuenibus siue adolescentibus, calidis et humidis regionibus, aliis temperatis*⁴².
3. *Meat, fish and the use of prepared foods*. In this case the animals referenced are essentially pigs, cattle, camels and domestic fowl. But the most interesting, from the perspective of contemporary information, is the depiction of interior scenes of hanging meat.

35. Pätch 1950, p. 34.

36. Agrimi – Crisciani 1993, p. 217-259.

37. The *consilium* is distinguished from other genres of medical literature: the *tractatus* is totally impersonal; the *casus*, like the *consilium*, is an account of a private individual, the difference being that it is not requested by another person; and the *experimentum*, that is, the formula or prescription, which also concerns a specific case that is not necessarily personalised. Agrimi 1994.

38. Barbón García – Álvarez Suárez 2003, pp. 123-125; González Doreste – Aguiar Aguilar 2012, pp. 85-101.

39. For the application of the *Tacuinum* and the use of these foods in medieval and renaissance cuisine, Bowen 1995, p. 112. More recently, Rodríguez-Wittmann 2014, pp. 25-34.

40. The Latin texts are taken from MS. Lat. 9333 of the BnF.

41. Fol. 3v. Pear. *Nature*: cold in the first degree and humid in the second. *Choice*: aromatic and ripe. *Usefulness*: to alleviate weak stomachs. *Inconvenience*: they cause colic. *Solution to the inconvenience*: eat garlic after meals. *What it produces*: an abundance of cold blood. *Who it benefits*: more beneficial to a warm nature, youth, in summer and in the southern region.

42. Fol. 52v. Autumn. *Nature*: moderately cold in second degree. *Choice*: central part. *Usefulness*: it generally moves towards the opposite, that is, towards warmth or humidity. *Inconvenience*: it damages balanced complexions prone to prostration. *Solution to the inconvenience*: with humidity and bathing. *What it produces*: melancholic humours. It benefits warm and humid [temperaments], young people and adolescents, in warm humid areas; and others in temperate areas.

The images clearly show dwellings with a high level of purchasing power, whose kitchens display cuts of animals hanging or the moment of slaughter. Moreover, shops are depicted in great detail. *A. Panis opus. Complexio: calida in secundo. Electio: qui minus habet furfuris et steterit per noctem ante coctionem. Iuuamentum: optemperat uentrem. Nocumentum: inducit prurium et scabiem. Remotio nocumenti: cum copanagio unctuosus. Quid generat: nutrimentum bonum. Conuenit omnibus complexionibus, etatibus, temperatibus et regionibus habitatis*⁴³.

*B. Carnes uachine et camellorum. Complexio: calida et sicca in secundo. Electio: iuuenum exercitatarum. Iuuamentum: prestant exercitantibus se et pacientibus fluxum colericum. Nocumentum: faciunt egritudinibus melancolicis. Remotio nocumenti: cum zucharo et pipere. Quid generant: sanguinem grossum melencolicum. Conueniunt magis calidis, iuuenibus, yeme, septentrionalibus*⁴⁴.

4. *Properties of water.* The *Tacuinum* places considerable importance on water for human hygiene and health. It sets out a distinction between the different ways of using it at different times of the year. For example, for the feet, water should be warm in winter and cool in summer.

*Nix et glacies. Complexio: frigida et humida in tertio. Electio: ex aqua dulces et bona. Iuuamentum: meliorat digestionem. Nocumentum: tussim commouet. Remotio nocumenti: bibendo antea modicum. Quid generat: desicationes iuncturarum et paralisis. Conueniunt magis calidis, iuuenibus, estate, meridianis regionibus*⁴⁵.

5. *Emotional state.* This is perhaps the most abstract section. It explains the damage caused by insomnia or imprudent actions such as anger, which can cause anxiety and changes in skin colour. In order to overcome it, other activities considered suitable include dancing, using music to induce sleep and the importance of sleep in the general well-being of individuals⁴⁶.

6. *Fabrics and clothing.* The final section covers the fabrics used to make clothes. The illustrations depict fabrics, clothing and shops in great detail.

CONCLUSIONS

Our analysis of innovation in medieval mise-en-page through the study of Ibn Buṭlān's *Taqwīm al-ṣiḥḥa* (*Tacuinum sanitatis* in the Latin version) brings a new perspective to manuscript and print textual production between the thirteenth and sixteenth centuries.

This case study illustrates the important interrelation between the Arab legacy and the development of Galenism in Europe. The content of the Latin version of Ibn Buṭlān's *Taqwīm al-ṣiḥḥa* preserved in MS. Lat. 9333 BnF is proof of the textual innovation of this celebrated work by the Baghdad physician. As we have seen, the textual layout of the Latin version manuscript of Ibn Buṭlān's *Taqwīm al-ṣiḥḥa* abandons the arrangement of content in tables in favour of a laboriously sumptuous illustration of each explanatory footnote.

Both the textual and visual content of the *Tacuinum sanitatis* offers a wealth of information and numerous details about the medicine, botany and zoology of the time, among other disciplines. Literary sources confirm an interest in diet and habits from the thirteenth century and in this respect these texts are indispensable for studying the medieval diet, clothing and fabrics used, agriculture and even aspects of architecture. This genre has a solid visual and textual discursive construction of how culture and daily life was understood in the late Middle Ages.

Furthermore, the *Tacuinum* is an illustrated medical encyclopaedia that makes a great contribution to the medicine of the late Middle Ages, providing a true picture of the common uses and customs needed to achieve good hygiene and therefore good health. The didactic nature of the combination of text and image helps the reader-onlooker learn about self-care, while its widespread circulation enables the *Tacuinum sanitatis* to be considered a real example of practical and preventative medicine that places the knowledge of classical medicine and its assimilation and reworking by the Arabs squarely in the Middle Ages. However, the complexity of the textual transmission and the iconography of the texts that constitute the genre of the *Tacuina* undoubtedly require a new revision and new analyses that will contribute to our understanding of the ways in which scientific content was communicated in the Middle Ages.

43. Fol. 61v. Brown bread. *Nature*: warm in the second degree. *Choice*: bread with a thin crust and which has risen overnight before being baked. *Usefulness*: it settles the stomach. *Inconvenience*: it causes itching and scabies. *Solution to the inconvenience*: with greasy food. *What it produces*: [is] good nourishment. It benefits all conditions, ages, periods and inhabited areas.

44. Fol. 72r. Beef and camel meat. *Nature*: warm and dry in the second degree. *Choice*: young individuals taking exercise. *Usefulness*: for individuals who take exercise and for those with problems with the flow of bile. *Inconvenience*: it causes melancholic diseases. *Solution to the inconvenience*: with sugar and pepper. *What it produces*: thick melancholic blood. It benefits more those of warm [temperament], young people, in winter and in northern areas.

45. Fol. 87r. Snow and ice. *Nature*: cold and damp in the third degree. *Choice*: of good fresh water. *Usefulness*: it improves digestion. *Inconvenience*: it causes coughing. *Solution to the inconvenience*: drinking moderately beforehand. *What it produces*: chillblains on the joints and paralysis. *Who it benefits*: it most benefits those of a warm [temperament], young people, in summer and in southern areas.

46. Rodinson 2005, pp. 7-30

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