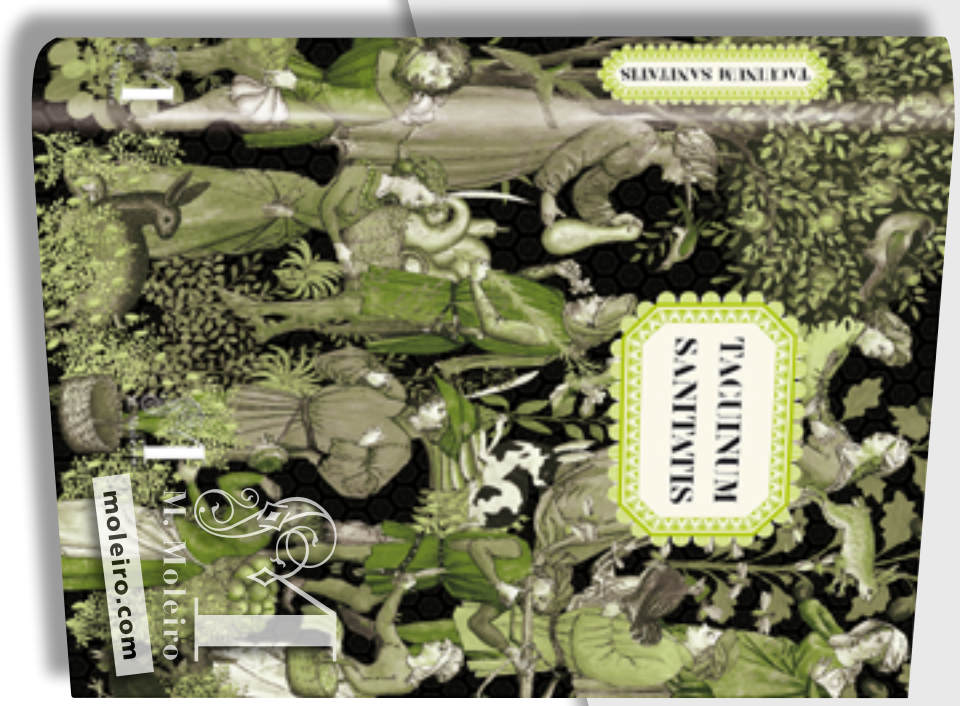


(2)

A new format

Alain Touwaide, Smithsonian Institution

A new format

As we have seen in the previous chapter, Ibn Butlān was undoubtedly extremely knowledgeable about ancient medicine, a good theoretician and learned philosopher. But he was also probably a writer and talented public speaker able to convey and uphold his ideas in a clear, straightforward manner. His violent clash with Ibn Ridwān may have forced him to arm himself well, if he had not already done so, to rid himself of an adversary who possibly proved to be tougher than Ibn Butlān expected and who was, in any case, a better clinician. Yet another indication of Ibn Butlān's skilful ability to set forth and disseminate the contents of his work is the actual form of the *Taqwīm*, and the *Tacuinum* following in its wake, both consisting of a series of tables.

The forty tables in the Arabic text each have seven rows and fifteen columns. The rows concern what we call "elements" (two hundred and eighty in all), and the columns, the criteria (fifteen in number) used to describe these elements. Each table or group of tables concerns one of the "six non-natural things" which, as mentioned earlier, affect human health with the frequency stated above.

Tabulation and compilation

Although Ibn Butlān claimed only to have created the format of the information gathered together in his work and not the information itself, he might nonetheless have adopted this layout from other scientific and even academic realms of that period, including history and the Bible and its exegesis.

Ancient treatises on astronomy did in fact associate two types of information: theoretic data of a textual, discursive nature (although they sometimes also featured diagrams and other figures depicting the problems and proofs in the text), and tables of the positions of different planets and stars used to calculate a given moment in the annual astronomical cycle or a geographic location. This format dating back to Babylonian astronomy was used by Greek astronomers. Ptolemy, for example (active in c. 130-175 AD)[1], compiled a series of tables known as the *Handy Tables*[2], a summary in a more convenient form of the considerable amount of data in his major work entitled *Syntaxis mathematica,* more often referred to as the *Almagest*[3] as it was known in medieval times.

This format was subsequently adopted by Arab-Islam astronomers. Just as Greek medical literature was translated from its original language into Syriac and then into Arabic, so was the Greek astronomical corpus assimilated into the Arab-Muslim world by means of translations[4] of not only the texts in earlier Greek handbooks but also their tables and illustrations, particularly drawings of constellations. Both the numerical data and drawings were adapted: the positions of the planets and stars to match the geographic location of the Arab world – not the same as that of the Greek world in which they were originally established – and the images of the constellations to match the pictorial language of Arab-Islamic culture.

The circle of the seven spheres and its constellations, *The Book of felicity*, f. 62

It had already been the norm in Ancient Greece to display numerical data in columns, and subsequently in the Roman world in another academic realm: chronology. Indeed, time was calculated on a macroscopic scale by means of lists of different types of landmarks in time ranging from the olympiads and the champions of different disciplines in Ancient Greece, and the high priests and priestesses of temples, to the archons and other judges and prosecutors of ancient Athens, or kings in Rome, and then the consuls and other judges elected by popular vote[5]. After the ancient Greek world was enlarged by the expedition of Alexander the Great (356-323 BC), these lists, as scattered as the data recorded in them, were gathered together in chronology handbooks establishing parallels between the different worlds whose events they recorded. The high priests Berosus of Babylon (a contemporary of Alexander the Great) and Manetho of Alexandria (a contemporary of Ptolemy I [c. 367/6-282/3 BC] and Ptolemy II [308-246 BC]: Greek kings of Egypt of Macedonian origin)[6] drew up the chronological lists of sovereigns that linked up the dynasties of the different kingdoms within the Alexandrian empire. It is undoubtedly no coincidence that both priests were in contact with the sovereigns of the kingdoms arising from the conquest of Alexandria: Berosus with Antiochus I (d. 261) whose kingdom embraced, amongst others, Ancient Persia; and Manetho with the first Ptolemies who, it will be recalled, created the library and the museum – a research and teaching centre in fact – that were the pride of Egypt until the city was seized by Arab troops in 642, albeit in a somewhat intermittent manner. It was, however, the second librarian of the Alexandrian collection, Eratosthenes (a contemporary of Ptolemy III, 276-193 BC), who created scientific chronology[7]. This astronomer – a mathematician and geographer too – created a universal chronology in which years were defined on the basis of the lists of sovereigns of Sparta and then those of the olympiad champions[8]. Ptolemy, the astronomer mentioned earlier, subsequently reproduced the tables of

the Babylonian sovereigns from Nabonassar to his times. These chronological tables came after his *Handy Tables* in the manuscripts. However, regardless of how useful these lists may have been for comparisons, they were apparently never in the form of tables with several columns making it possible to see the events occurring at the same time in the different lists at a glance[9].

It was the earliest Christian authors who created this type of tabular format not only to bring the facts of the history of humanity together but also to facilitate access to the biblical texts of both the Old and New Testaments. The prototype of this sort of layout was the work of Origen (185/6-254 AD)[10]. He was born in Alexandria where he received a solid, traditional philological education which then entailed the study of classic and post-classic Greek literature, before teaching this subject himself. Subsequently, when he was transferred to Caesarea (Kayseri in modern-day Turkey), he applied his philological skills to the Bible: the Old Testament to be precise. At a time when Christians were still a minority in society and sometimes clashed headlong with Jewish communities, he sought to enable his co-religionists to defend their faith in these disputes with Jewish doctors. To do so, he drew parallels between the original text of the Old Testament used by Hebrew doctors and the four different Greek translations already in circulation at that time and known to the earliest converts, most of whom spoke Greek. It was a drawn-out task involving a series of successive phases covering several decades[11]. The outcome was the Old Testament set out in six parallel columns each containing a version of the text[12]. Some books had other versions added to the right of the sixth column. When one of these versions lacked a particular passage appearing in one or more of the other versions, the respective space was left blank.

The undertaking and its results were enormous and amounted to a collection consisting of no less than forty volumes in the form of codices (i.e., books in the format we know nowadays) and no longer rolls (we don't know whether they were of papyrus or parchment). This was the first synoptic table of different versions of a known text and, as such, it consequently inspired several imitations and other epiphenomena[13].

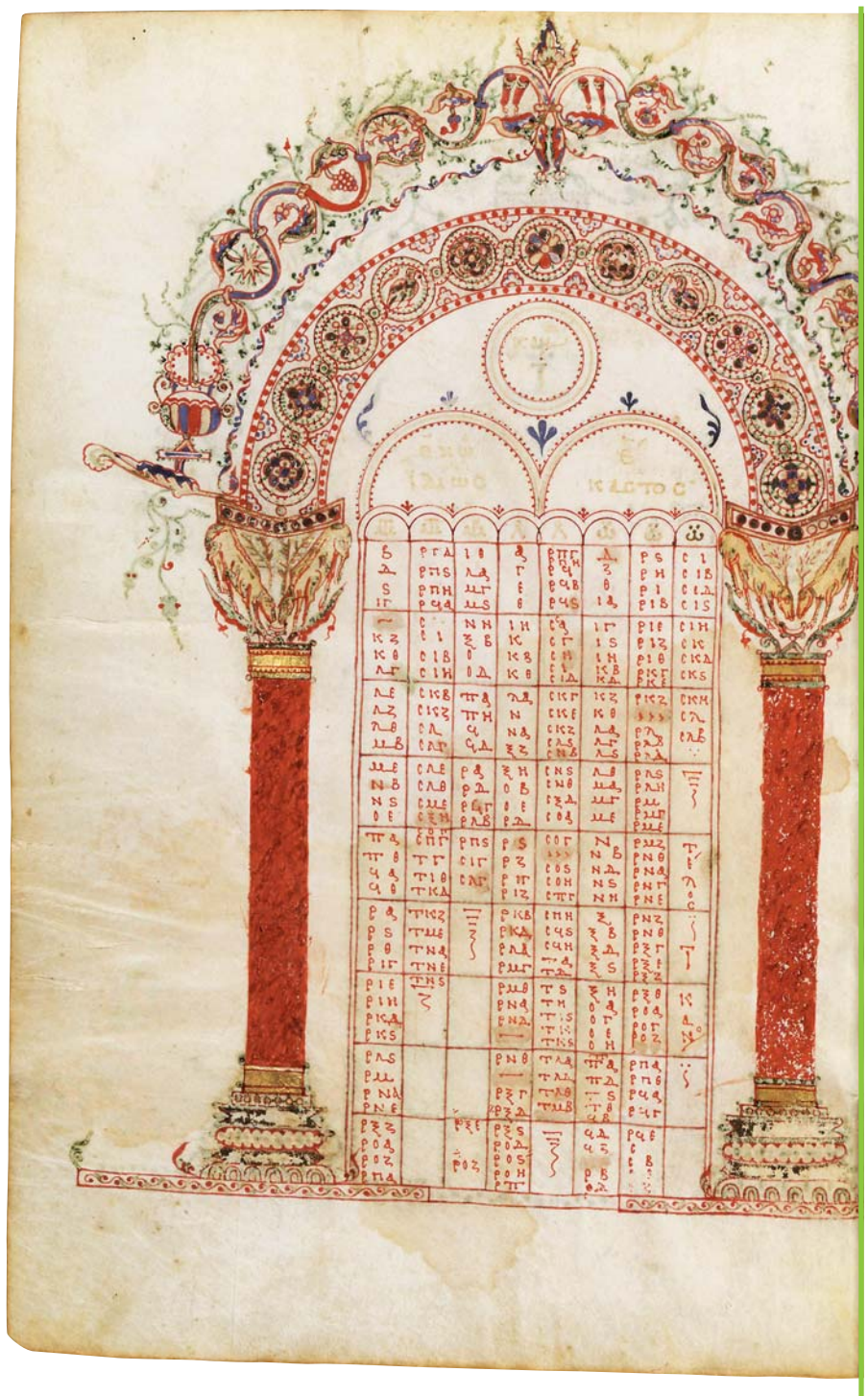
Following this, Eusebius (c. 260-339 AD)[14] of Caesarea, the place where one must recall Origen settled and produced his synoptic version of the Old Testament, also made use of this new type of presentation to which the codex, the new form of written manuscripts, was so well suited. Unlike the roll read by being unwound from one hand to the other and therefore only enabling a small amount of text to be seen at a glance, an open codex revealed a double page consisting of the verso of a folio to the left and the recto of the next folio to the right, i.e. a far larger surface than the visible part of an unfurled roll.

One of the first uses Eusebius made of the synoptic principle was a two-tome world chronology completed in the early years of the 4th century AD[16]. Drawing upon the plentiful resources of the libraries of Caesarea, he used chronological lists of the type mentioned above and created, in the second volume of his chronology, synoptic tables of the history of humanity which he called canons. Eusebius applied Origen's tabular format to history in order to create parallels between the biblical history beginning with Abraham and the history of the different regions in the world in proximity to or where the biblical events took place: Assyria, Egypt, Israel, Persia and Greece. He did not, however, stop there but carried on as far as Roman times.

In addition to *Church History*, about the emergent catholic church, he penned another work that extended the scope of Origen's tabular format even further. Whereas Origen had restricted his work, if that is the correct term, to the Old Testament, Eusebius applied it to the New Testament, mainly the four gospels for although they covered the same events, they did not really match. To enable them to be read in parallel, Eusebius divided them into a certain number of sections of text and gave each a number. He then drew up tables stating the number he had given each passage in the four gospels narrating a particular happening[17].

This new type of instrument was exploited to the full by Jerome (c. 347-419 AD)[18], famous mainly for his Latin translation of the Bible done in 391-405[19] from, he said, Hebrew. He probably used the textual instruments created by his predecessors (particularly Origen's six-column version) which he built upon

to make the compilation system itself. He did in fact have access to a splendid library and although he often claimed to work from memory, he in fact consulted the sources of Origen's model and went on to produce a comprehensive exegetic work[20].



It is undoubtedly highly likely that the tabular layout of information of any sort had a considerable impact on the production of knowledge from that period onwards, and all the more so since, during the years from Origen to Jerome, manuscripts underwent a profound transformation from scroll to codex, it being easier to consult synoptic tables in codices than in scrolls. Such tables did in fact make it possible to establish links between material from different sources, following which they helped make compilations linking such information, by means of a structured synthesis, to material perhaps set forth in a different or scattered manner, and also probably giving information which, if not incompatible at first sight, lacked any obvious connection. In short, it was a way of organising intellectual work and revealing the links between ill-assorted information. Arising at the junction of a transformation of the manuscript and intellectual demands stemming from the development and defence of a new religion underpinned by textual evidence, the tabular layout quickly became a heuristic instrument. The outcome was an extraordinary association of phenomena making it possible not only to transform intellectual work and make it more productive but also, and above all, to create a text-based culture.

However, this way of gathering and organising information, no matter how effective it may have been, was apparently not turned to account in the realm of medicine prior to the Arab-Islamic world and the times of Ibn Butlān. In the Greek world, in fact, medical data was more often than not set forth in encyclopaedias consisting of a linear series, as one might say, of chapters each on a given subject grouped together in major subject areas such as surgery, gynaecology and obstetrics, pharmacology, toxicology and ophthalmology. The order of the chapters in each of these major sections depended on the inherent criteria of each discipline[21].

The encyclopaedia method introduced into the Arab world by translations of Greek scientific works, was adopted by many authors. One good example is Avicenna's *Canon*, to be addressed later herein. The

◀ Table of concordance of the four Gospels, *Gospel Book*, f. 6v
▲ Table of the snakes, *The Book of theriaca*, f. 25

tabular form did not appear until Abū ᶜAlī Yahyā Ibn ᶜIsā Ibn Jazla (d. 1100 AD)[22]. This contemporary of Ibn Butlān compiled some forty-four tables each consisting of a double page bearing the description and treatment of eight illnesses (giving a total of 352). From the 12th century onwards, the tabular arrangement also appeared in the realm of materia medica and even featured illustrations. It can be seen in a manuscript dating undoubtedly from the late 12th century (Paris, Bibliothèque nationale de France, Arabe 2964), containing a treatise attributed to Galen about the cure-all theriac was said to be[23]. Several systems of illustration were used: one divides the pages into three sections each containing the portrait of a physician; another divides the pages into six sections each featuring the image of the plant whose medicinal properties are analysed in the text; and yet another whose pages had up to thirteen such sections, in a vertical rather than horizontal layout, each containing a picture of a snake. This final layout is all the more remarkable because in another manuscript with the same text (the Vienna codex mentioned below) these snakes are depicted in a more traditional manner in a part of the page reserved for this purpose between the lines of text. Either way, the illustrations occupied the bottom part of the section, and the name of the physician, the plant or the snake the upper section, sometimes with a text. The first type of illustration can also be seen, albeit to a lesser extent, in another copy of the same text dating from the early 13th century AD (Vienna, Österreichische Nationalbibliothek, A.F. 10). Subsequently, in the 14th century, the table system spread to other scientific realms too[24].

Ibn Butlān explained in the introduction to the *Taqwīm* why this layout was chosen:

> "We will set out this information in tables we have made because the public is tired of the protracted expositions of scholars and their many essays on the subject. What the public seeks from science is, in fact, help and not demonstrations and definitions. Hence in our work we have sought to shorten long dissertations and, on the contrary, we have brought together [briefly] notions scattered [in literature]. The layout alone is our work (…)"[25].

Although he places more emphasis on the ease with which the work can be consulted, Ibn Butlān nonetheless associates the tabular layout with the gathering of different notions in what is apparently a

reference to the use of the table in preparing the work. This is perhaps a reference to the concepts of Christian intellectual tradition that our author may have been familiar with, particularly since he lived in Constantinople and in the Near East. Regardless of the method used to compose the work, the declaration of intent concerning his research and the resulting work contrasted sharply with the writing practices of Greek medical literature recently introduced into the Arab world by means of translations.

The ensemble known collectively as the *Corpus Hippocraticum* is in fact a heterogeneous collection of treatises of different types and periods, the earliest of which date back to the late 5th century BC[26]. Whereas those attributed to the school of Cnidus as it was known on the promontory of the same name (the Reșadiye peninsula in present-day Turkey) are mainly handbooks about diagnosis and therapeutics[27], those from the so-called school of Cos – which in fact encompassed the disciples of Hippocrates himself – were real clinical records describing the evolution and, in the best instances, treatment of patients[28]. There are, however, also works from the same period of a more strictly literary nature[29]. These are theses designed to illustrate a theory in a competitive world in which specialised knowledge was asserting itself and in which obtaining consensus and, consequently, social recognition were guarantees of quality[30]. Literature and rhetoric contributed to the success of and conviction about a thesis, particularly when it was a matter of positioning medicine within the framework of knowledge being constructed at that time and the acknowledgement of the ensuing activities[31].

Galen's immense work of a later date was not to be outdone, although different issues were at stake. In second- and third-century Rome, it was no longer a matter of imposing the need for rational medicine and the professional body practising it with the ensuing social status, but of triumphing in a society in which competition was the rule[32]. The market was undoubtedly enormous, stretching from the court of emperors themselves, the nobility and persons of lower rank with colossal fortunes and very successful businesses to countless citizens of more ordinary status with families and households of slaves, and the everyday attention to health they should receive. Successful treatments and bold surgical interventions combined, when necessary, with miraculous remedies involving many rare and expensive ingredients undoubtedly helped physicians make their mark on this society, by establishing a reputation and attracting a well-to-do clientele who spared no expense. But this was not enough. It was also necessary to give duly announced public demonstrations of anatomy, give speeches with impeccable rhetoric and write theses intended to refute competitors' theories. Plus, of course, the personal ambition of a man like Galen, who wrote about countless areas in medicine, medical and scientific philosophy, epistemology and deontology and even introductory teaching and didactics.

To this original literature, particularly in the 6th and 7th centuries AD, the school of Alexandria subsequently added a massive corpus of explications, with countless systematic glosses and paraphrases involving definitions, etymological and lexical elucidations, divisions, references to earlier authors, comparisons of different opinions and other philosophical and logical nuances[33].

Simplifications

The Arabic translations of Greek medical literature produced in the Arab-Islamic world of the 9th century covered not only works of a drier nature such as Dioscorides' *On materia medica* mentioned earlier but also all the more discursive writings listed above, be they by Hippocrates, Galen or the school of Alexandria. Consequently it is no surprise that Ibn Butlān, coming after the protracted period during which Greek science was assimilated into Arab-Islamic scientific and medical culture, opted for a more factual presentation, stripped of rhetoric but brimming with the information necessary for patients, set forth in a simple, straightforward manner in which the desired information could be quickly located and was directly understandable and applicable, without being hampered by useful theoretical considerations. This is indeed the aim Ibn Butlān announces in the preface: "(...) our aim is to make it easy to consult [the work] (...)"[34].

It hardly mattered that Ibn Butlān had, in his own words, written his work for sovereigns well versed, he said, in consulting synthetic documents of this nature, for this type of declaration was not rare and often intended to win the patronage of a powerful person at a time when scientific activities were funded not by institutions but rather personal wealth or the backing of a patron. In this instance, any positive fallout from the social acknowledgement of the protégé's scientific activity was reaped by the patron, thereby asserting his authority even more.

No matter how much he was driven by positive concerns – ease of reference and convenience – Ibn Butlān's choice nonetheless had negative consequences, even if the tabular method undoubtedly helped compile information. All the underlying theory of medical recommendations, advisable rules for living and other advice was, in fact, lost for theoretical considerations were removed, leaving only practical applications. It is easier to understand this arrangement by imagining the *Taqwīm* to be the practical explanations in a diptych whose other part is a theoretical text explaining the concepts upon which the advice in the *Taqwīm* is based. But it is nothing of the sort, even though the canons do explain the information in the tables to a certain extent.

This way of presenting information was not, in fact, invented in the *Taqwīm*: it also appears in the Greek medical literature of that period, in what is known as *Iatrosophion*[35], Greek for a compendium of therapeutic prescriptions. Although it is more often used to describe recent works from the 19th or even the early 20th century, it can also be applied without the slightest anachronism to the therapeutic literature emerging in Byzantium in c. 6th and 7th centuries.

At that time medicine underwent a profound transformation in Byzantium. Until then it had been the flagship of ancient philosophy, bringing numerous elements together in an organised synthesis stretching from anthropology to the analysis of matter mentioned earlier. After emperor Constantine (born in c. 275 and emperor 306-337 AD) adopted Christianity as the state religion and the ensuing gradual Christianisation of Byzantine society – including its literature, science and culture – it became difficult for medicine to maintain its privileged status at the pinnacle of the pyramid of knowledge. Its materialism and resulting determinism were hardly compatible with belief in a divine plan of which humanity was the object, not the actor and even less the creator. Moreover, knowledge itself was not the prerogative of a promethean type of human effort but a gift given freely by God to all believers[36].

This new concept of medicine was embodied in a more accomplished manner in the 4th century, however, by the twin brothers Cosmas and Damian who received their medical and therapeutic knowledge directly from God and not human teachers, and made no charge for the treatment they provided[37]. At a time when the persecution of Christians by the civilian authorities was still rife, news of their cures reached the authorities. The two healers were arrested, brought before justice and ordered to renounce their faith and make a sacrifice to the gods of the Roman empire, which they refused to do. They were martyred and became the object of a healing cult with several churches across the Byzantine empire, including one in Constantinople itself. In the 6th century, emperor Justinian (born in c. 482, emperor 527-565 AD), who closed Athens university in 529 for being the stronghold of pagan philosophy, visited the church of the two saints in Constantinople personally in search of a cure for an ailment that the medicine of scholars had failed to remedy.

Leaving to one side the edifying and, after all, anecdotic hagiography of the life of the two saints and the many tales of healings – fact or fiction, it matters little – attributed to them[38], the most significant fact is that the theoretical aspects of the ailments cures were sought for, and likewise the remedy chosen and its effect, became secondary. The two saints had never had to study medicine and therapeutics for they had received their knowledge directly from God. Similarly, neither patients praying to be healed nor physicians, no matter how well trained, posed any questions about phenomena they were unable to comprehend because they were the result of God's action.

Consequently, commonplace medical literature was modified: nosological and pathogenetic speculations were cast aside, and likewise those about how medicines work. This is precisely the aim of the *Iatrosophion*: a therapeutics handbook consisting of prescriptions for ailments in different parts of the human body, which were often classified from the head downwards, *a capite ad calcem*. Thanks to this classification together with its simple content and lack of theory, this type of work was easy to use and could be understood by anyone able to read, with no need for any special training in medicine or any other realm. This is true of the *Taqwīm* too – except as regards the *a capite ad calcem* classification – a handbook of straightforward and practical advice that could be applied to daily life by anyone.

It is probably no coincidence that Ibn Butlān was a Christian and that he stayed in Antioch on the road to Cairo after leaving Constantinople, and also in the Byzantine capital after his visit to Cairo, as we have seen on several occasions. He might have been familiar with the Byzantine medical literature that developed there and gone on to apply its principles – albeit with generalisations for he also applied it to the circumstances, activities and other factors that affect health apart from illness (i.e. the non-natural things we addressed in the previous chapter) and transformed their presentation into the tabular form.

◀ Cosmas and Damian, *The Great Hours of Anne of Brittany*, f. 173v

Mala dulcia

.IX.

Mala dulcia Complō hui m 2o. Elcō estiles 1 odorifā et mōris huiusdiuis huiusmōi ofortāt cor Nocumēt nocet nerūis Remō noc.ti cū cuccare rosato Rō gnānt modicum sanguinem Magis conuenūt colicis omnibusq; etatibus tpibus et regionibus ⁊c

Diese öpfel sein feicht im anndern grad, die besten seind die wolriechenden vnnd trückneste, stercken das Herz, schaden den Nerüen, werden doch mit Rosenzuckher corrigiert. Machen wenig geblüts, fürnemer den Colerischen, allen Personen zu jederzeit vnnd an allen orten.

Transfer and transformations

After the *Taqwīm* was translated from Arabic to Latin under the title *Tacuinum Sanitatis* as we will see in the next chapter, it spread across northern Italy in the 14th and 15th centuries and was reproduced in a dozen illustrated manuscripts which radically changed its contents and layout.

The text was abridged. Instead of the two hundred and eighty items in the original version these manuscripts have between one hundred and sixty-eight and slightly more than two hundred, as we will see below. In addition, the section about each element mentioned was drastically reduced: not only were the canons and astrological tables omitted but in general the columns fell in number from fifteen to the following five:

- nature (*complectio* in the Latin text);
- best type (*electio*);
- benefit (*juvamentum*);
- harm (*nocumentum*);
- remedy for the harm (*remotio nocumenti*).

Our manuscript also kept the information appearing in another two columns:

- effects (*quid generat* or *generant*)
- advisability (*convenit* or *conveniunt magis*) depending on several factors:
  - the temperament of the person using it, i.e. the patient;
  - the age of the patient;
  - the season in which it is used;
  - the region.

The simplifications affected not only contents, however, but also the layout: the tabular presentation itself disappeared. As a result, the details in the five (or seven) columns in the tables in the original were extracted and aligned one after another. The outcome was a series of short texts with no grammatical coordination in which the only structural element was the terms stating the sort of information, i.e. *complectio*, *electio*, etc, mentioned above. See, by way of example, the description of sweet apples in our manuscript (f. 5v):

Mala dulcia *Compl(ect)io humi(da) in 2º El(e)c(tio) e sichem i(d est) odorifera et mi(n)oris humiditatis Iuuam(e)nt(um) conforta(n)t cor Nocume(n)t(um) noce(n)t neruis Remot(io) noc(umen)ti cu(m) cucaro rosato q(ui)d g(e)n(er)ant modicum sanguinem Mag(is) co(n)ueni(un)t col(er)icis omnibusque etatibus t(em)p(or)ibus et regionibus.*

Sweet apples Nature wet in the second degree. Optimum those from Sichem, i.e. fragrant and with little moisture. Benefit they strengthen the heart. Harm they harm the nerves. Remedy for harm with sugar of rose. Effects moderate blood. Most advisable for choleric [temperaments], at any age, time and region.

◀ Sweet apples, f. 5v

In addition, the sequence of the different elements comprising logical groups in the original version – in which each table or group of tables corresponded to a logical group of products or elements that affected health – was no longer abided by. Nor is the sequence of the different groups of elements reproduced here. We will not analyse the choice of the elements and their classification here but in the next following chapter.

Besides this reduction in information, there is, however, one addition which is, in fact, the characteristic trait of the illustrated *Tacuinum* manuscripts: all the elements retained are depicted in magnificent polychromatic illustrations occupying most of the pages[39]. Beneath these illustrations are the short texts described above. Looking at the page as a whole one has the impression that these texts are the captions of the illustrations.

The subject of each of these illustrations is, of course, the element under study, be it a plant, an animal eaten as food, a drink, an activity, a feeling, rooms or even clothes. These subjects are not depicted abstractly but in their respective contexts ranging from the woods[40] and fields[41], orchard[42], vegetable gardens[43] and ornamental gardens[44] to the houses[45] and workshops[46] where the activities were carried out. The scenes themselves are not motionless but feature people[47] too, along with the tools their activities require[48], the farmyard animals of that period[49], and birds flying in the air[50].

This sort of illustrations was not entirely new: manuscripts featuring the Greek text of Dioscorides' *On materia medica* had small scenes with human figures[51]. The Bibliothèque nationale de France manuscript *graecus* 2179, made in all likelihood in the 9th century possibly in Syria or Palestine or southern Italy[52], does indeed depict several plants in conjunction with a person, although the meaning is not always clear. In certain instances, in fact, the figure is apparently a representation of the ailment the plants were used to remedy.

◀ German madwort and ailing figure, *De materia medica*, f. 5

▶ Lifelike scenes with human figures, *Theriaka and Alexipharmaka*, ff. 5 and 48

This is what the illustration on f. 5 suggests, showing a person lying under the plant like a shrub in the wrong proportions covering his left eye with his hand. The plant depicted, German madwort, is in fact recommended for an eye complaint in Dioscorides' text[53]. The figures in other illustrations apparently have a more decorative function. This is the case on f. 2[54] where an upright figure seems to be gathering blue flowers from a great burnet. The proportions in this image are far from exact for the burnet is a small plant at ground level.

Whereas the figures in another codex dating from the 10th century and probably from Constantinople (New York, Pierpont Morgan Library, M 652)[55] are essential in order to represent the material under study – human urine in one instance and the pitch applied to ship hulls in another – in the Athos manuscript from Lavra (Mount Athos, Lavra, Ω 75), undoubtedly from the mid 11th century and probably from Constantinople too[56], these portrayals of people are totally unnecessary[57]. They contribute to creating bucolic scenes, as in the case of the violet (f. 55v), for example, depicted with two young girls busy picking violets and putting them in a basket.

Another tenth-century manuscript probably from Constantinople (Paris, Bibliothèque nationale de France, suppl. gr. 247), the *Thêriaka* and *Alexipharmaka* by the Greek poet Nicander of Colophon (2nd century BC)[58], also contains lifelike scenes particularly with human figures[59]. Portrayed amongst mythological episodes are persons who have been poisoned, physicians and pharmacists preparing remedies, patients applying plants to their wounds, and the fortunate owners entering their garden to enjoy the tranquillity and bucolic charm of a patch of nature rid of potentially life-threatening snakes, scorpions and other poisonous animals.

An enlarged and bolder version of the timid discourse undertaken in the codex in Mount Athos is to be found in an Arabic copy of Dioscorides' work: ms. Ayasofia 3703 now housed in the Süleymaniye Kütüphanesi collections in Istanbul[60]. This large manuscript with its uncongested layout making liberal use of the page, is dated 667 of the Hegira (1224 AD) and probably originated in a Baghdad copyist workshop. The many polychrome illuminations occupy large areas of its pages, some of which are now housed in different collections around the globe. These images include landscape elements evoking the natural setting of plants, animals suggesting life in nature, scenes of plants being gathered, grape treading, the preparation of medicines, a scene of metallurgy and the extraction of a medicinal clay, pharmacies whose shelves are lined with pots and scenes of physicians' surgeries and knowledgeable discussions between physicians and their assistants. In one illustration worth mentioning on account of both the artistic mastery and inventiveness used to portray the text about a mineral identified by a river in the region where it is extracted, the artist has depicted a boat with two rowers and a helmsman and eight passengers being propelled along a river with green banks[61].

The illustrative cycle in this manuscript becomes more elaborate as the text progresses, as if the artist had gradually gained confidence in his abilities and become bolder, undertaking increasingly complex and daring compositions. To do so, he undoubtedly borrowed motifs and scenes from manuscripts with other texts, such as the Indian fables of Bidpai translated into Arabic by ᶜAbdullāh b. al-Muqaffaᶜ (d. 756/757), entitled *Kalila and Dimna*, and subsequently used as a model by Jean de la Fontaine (1621-1695). Similarly, the scenes featuring people in manuscript Ayasofia 3703 are not unlike those peppering the *Maqāmāt* by Abū 'l-Hasan al-Qāsim al-Harīrī (d. 1122) and represent all the eventful happenings in the wanderings of Abū Zayd[62]. Finally, the portrayals of physicians might have been based on portraits of philosophers such as the one of Aristotle in *Animals and their Uses* (London, The British Library, Or. 2784, f. 96) by Ibn Gibrīl Bakhtyashu' (d.1058).

The translation of images from one type of literature to another enabled the artist responsible for Ayasofya 3703 to insert into a descriptive text (Dioscorides' *On materia medica*) narrative scenes (the ones in *Kalila and Dimna* and *Maqāmāt*) like photos taken of an activity. In doing so, he transformed the illustrative apparatus of Dioscorides' treatise, converting the two-dimensional plates in the herbal into three-dimensional tales located not only in space, but also in time, even if they only convey a fleeting moment. In this way, he integrated Dioscorides' production even more into the artistic production of his time, segmenting it and fixing it even more firmly in nature, life and the human context to which he belonged. What's more, he reincorporated the work into the world from which it had been artificially extracted by the artistic convention of depicting materia medica in an abstract manner outside its natural or human context.

Returning to the *Tacuinum* with this interpretation in mind, we realise that its scenes do not merely portray the elements in the text in a lively, natural manner providing a strictly one-to-one relationship between an illustration and the respective text. They in fact contain messages extending beyond the constraints of illustrating the text. One example of this is provided by the medlar illustration on f. 7v showing a couple in fact beginning to get undressed under the tree. Surely intercourse can be the only reason. This is all the more significant because there is nothing in either the *Tacuinum* or the *Taqwīm*[63] such as, for example, an aphrodisiac property, that might have inspired a similar picture.

The same sort of suggestion is made in the aubergine illustration (f. 21) showing a couple about to kiss in sight of a shocked woman who could easily be the young girl's mother. Here again, the text did not call for such an image since it recommends this plant as a remedy for haemorrhaging (the text in Arabic mentions blood vessels) and the vomiting caused by a weak stomach (in the *Tacuinum*, whereas the *Taqwīm* does not link the two)[64].

This type of interplay in illustrations is not only of a sexual nature, some are more insignificant such as the image of the cherry tree (f. 8v), for example, in which the people picking cherries are not adults as in other images but children apparently taking advantage of a tree they came across on a walk to have a feast rather than to harvest fruit to take home afterwards. Their greed is sure to make them suffer for,

as the text says, cherries cause the bowels to move. But the illustration reflects none of this. It goes without saying that this element does not appear in the Arabic text, a fact making this illustration all the more significant.

A closer look reveals that the illustrations are in fact portrayals of the properties of the elements rather than the elements themselves. The most obvious instance of this is perhaps joy (f. 102v). The image does not merely depict an apparently happy couple (possibly because the woman is pregnant), but also conveys the plenitude of nature represented by a decorative garden, several fruit trees including one laden with flowers and fruit or even lively birds fluttering through the air, and undoubtedly more than anything else, life itself (suggested by the pregnant woman). Indeed, Ibn Butlān and the *Tacuinum*'s texts specify that joy is the remedy for depression, suggested in the Arabic text by the mention of the proximity of a danger, probably suicide[65].

The fruit trees at the beginning of the manuscript also convey a similar sense of plenitude and joy of life. The images are full of details and associated figures, animals, plants and fruits (depicted in large quantities as, for example, on f. 4v, by a basket overflowing with pomegranates). The human figures taste the fruit they pick (f. 5), young men offer them to women (see, for example, the sweet apple on f. 5v), and one young woman plays with her puppy (f. 10) whilst another plays a harp beneath a date palm (f. 10v). The tones and colours of these illustrations contribute to conveying this message, with pale green hues or far warmer tones such as yellow, and create a gilded – or sunny one might say – atmosphere with warm hues.

The properties of these elements are of two types: to heat and moisten or to cool and dry. Hence whereas figs (f. 1v),

▲ Aubergines, f. 21
▼ Joy, f. 102v

grapes (f. 2) and sweet pomegranates (f. 4) are hot and wet in both the *Tacuinum* and the Arabic text[66], sour pomegranates (f. 4v) and wild dates (f. 9v) make things cold and wet because, being themselves hot and dry, they absorb these properties when given as medicine. Ripe dates (f. 10v) on the other hand are hot and wet. Their heat comes from their natural setting[67]. The illustrations of vegetables in cooler colours, however, suggest different properties, all the more so because the images are less elaborate. Admittedly, the furrows in the fields are full of plants, indicative of a good harvest. Nonetheless, the trees growing in the fields are slenderer and have no fruit, the horizon is bare, and there are no birds to be seen in this world which evokes working the land and its troubles rather than the joy of life conveyed by previous images. Consequently, leeks (f. 22), not mentioned in the Arabic text, dry things[68], whilst spinach (f. 24) is cold and wet[69]. In certain instances, the expression on people's faces indicates a strong taste and perhaps surprise and even dislike. This is what the illustration of sweet flag (f. 29v), for example, not mentioned in the Arabic text either, seems to suggest. And indeed, sweet flag heats and dries according to the *Tacuinum*.

The series of illustrations of cereals provides a clear example of this link between the images and the properties of the elements. Whilst wheat is portrayed in an image with cold tones (f. 39v), barley appears in an illustration whose predominant colour is yellow (f. 42) as in the illustration of summer also featuring the grain (f. 52). The products made of cereal, such as the barley gruel for the sick (f. 42v), are portrayed in images with different characteristics and cooler colours. And sure enough, barley gruel is classified as cold[70].

The bareness in the illustrations of poultry (ff. 66v-68v) provides a sharp contrast, and all the more so since this section of the manuscript features the only images featuring no people (ff. 66v, 67v and 68), with the exception of honey (f. 91v). Most of this type of meat is considered wet but nutritious too undoubtedly due to the natural state of these animals – they are not farmyard poultry but wild specimens as suggested by the illustrations – and therefore they heat. Following this, most of the illustrations of meat foodstuffs (ff. 70v-79v), mainly scenes in butchers, feature cold colours, although one of them does include a camel in warmer, amber tones (f. 72). All the meat in the *Tacuinum* is cold, dry or wet[71], apart from camel meat

▼ ff. 4v and 29v

(related to beef) which is hot and dry as suggested by the colour of its coat[72]. Their properties do, however, change when fried or dried in which case they heat and dry[73]. Indeed these meats are shown in scenes painted in cold tones, with cuts of dried meat in a grey colour not unlike that of snow and ice (f. 87). The same hues apart from the pink of the meat replaced by grey predominate in the images of fish (ff. 80-82v) and different waters (including snow and ice) (ff. 86-87v). Fish are naturally cold and wet[74], like water[75], apart from those full of alum, which are cold and dry[76].

Almond oil (f. 88) breaks away from this monochrome tendency. The contrast between mineral waters and almond oil is striking, with a move from cold colours to warmer, brown hues on the same double page. Following this, the cold hues are replaced by countless touches of bright colour. The sugar cane gives a clear example (f. 89v): the view of the wide, dark green field highlighted with green-grey ears, is interrupted by the two human figures in turbans and garments made of fabrics suggesting oriental origin, the same as that of the plant in fact. The fabrics are enhanced by the golden trims that seem to warm the image. Sugar cane is said to be able to wet and dry things[77], properties conveyed well in this image with its complementary hues and components.

After musk (f. 90v), the colours become warmer. The contrast between shyness (f. 95) and the summer rooms (f. 94) is striking. Whereas the former is dominated by a cold green hue, in the latter, the entire scene is warmed by an old rosewood tone. This contrast is the key to the colours in the closing illustrations for pink is the colour of the enraged lady (f. 95v). The sheet on the bed where the man lies awake is blue (f. 98v), whilst the one where the couple is making love is pink (f. 99). Although the properties of these items are not specified in the text, the series of images leads us to associate green with coldness (sleep

▼ ff. 39v and 42 ▲ f. 68

ff. 95, 94, 95v, 98v and 99





used to be seen as a loss of bodily warmth) and, on the contrary, brighter colours such as red (including different hues such as old rosewood) and blue with life.

The last images in the manuscript feature a wider palette dominated by red, orange and pink in the images concerning music (ff. 101 and 102), particularly in the latter depicting brass instruments (trumpets) with their triumphant sound. After the scene of joy (f. 102v), the illustrations concerning clothes inspire comfort (ff. 103-105). Rather than depicting the clothes themselves, the artist preferred to focus on the fabrics they are made from: varying colours of wool with a warm yellow trim for the man's (f. 103), ecru linen (f. 105v), and red, blue and pink silk (f. 104). The texture of the fabrics is also suggested: heavy wool, stiffer linen and, on the contrary, flowing silk. Whereas the wool and silk clothes are hot and dry, those made of linen are cold and dry[78].

The last image, apparently unrelated to the preceding paintings, shows a bird seller (f. 104). The figures are garbed in blue, pink and green clothes that associate all the values of the previous images: life and tranquillity but rest and sleep too. It is undoubtedly no coincidence that the man about to buy a fledgling is wearing a pink garment, symbolising life, like the bed cover of the couple locked in an embrace. The text does say that these birds are hot and dry and aphrodisiacs, with a probable link between these properties and the effect[79]. This is undoubtedly what justifies the position of this element here, bringing the work to a close on a positive note conveyed by an image brimming with a variety of colours and laden with all the valences transmitted by both these colours and the room itself and its two inhabitants. A mischievous allusion to *Tacuinum* readers!

Hence, the illustrations do not merely depict the elements analysed in the text like natural history plates. Each one tells a story limited not only to fruit picking, wheat harvesting or vegetable collection, for example, but the link between the element in question and its surrounding world (or what is known today as the environment), the link that helps explain the element's therapeutic properties. The properties of the elements enable the beholders of these illustrations to understand which substances these elements were made of, their origin in cosmogony and, consequently, how they affected health, i.e. the substances they introduced into the human body and how these substances affected it. In this way, these illustrations reincorporated into the discourse all the facts that were eliminated when the tabular format was adapted because, it will be recalled, by needing information to be reduced to simple, straightforward and almost telegraphic details, no theoretical digressions were possible.

Hence, this approach to illustration extends far beyond the usual interpretation of *Tacuinum* images for it involves a scientific dimension insofar as it restores the full meaning of the text. To be more precise,

◀ ff. 103v, 104 and 104v

it suggests all the theoretical considerations upon which both the *Taqwīm* and *Tacuinum* are based whilst reincorporating, for those able to decipher and interpret them, the explanations of the properties and therapeutic effects attributed to the elements analysed in the text.

No matter how logical, practical and reasonable this may seem, this choice did, however, call for certain abilities, not only artistic, of course, but also conceptual and scientific. But this was not the only choice possible: the artists involved in other extant and well-known copies of the *Tacuinum* opted for different illustration methods, more decorative in certain codices and plainer in others such as the Liège codex. Indeed, in the Liège manuscript, all the illustrative motifs that combine to create the context of the elements analysed in the text are in pencil and not coloured, as if they were merely suggestions or in order to highlight the elements. The latter, being the only items in colour, catch the eye.

So here we have the result of a decision by the creator of our manuscript's illustrations: a decision all the more remarkable because several substances do not appear in the other *Tacuinum* codices. Their portrayals are, therefore, original creations featuring not only fine artistic qualities but also a good grasp of the text, no matter whether it was his own work or that of a patron. Either way this understanding distinguishes him from the artist who illustrated the Rouen *Tacuinum*, who failed to create an image on more than one occasion, leaving the page blank.

In this attempt to create these images, our artist was probably not without resources. Since Dioscorides' Greek manuscripts remained in the East, their scenes were, in all likelihood, not

▼ Sour pomegranates, Liège *Tacuinum*, f. 5

available to medieval illustrators, unlike those in Arab codices which were known in the medieval world. This contact was undoubtedly not direct, however, but via stepping stones such as Sicily, particularly during the times of emperor Frederick II of Hohenstaufen (1194-1250; emperor in 1220). His treatise on bird hunting (*De venation cum avibus*) is illustrated with images of a narrative type not unlike those in the Ayasofia Dioscorides and comparable to those in the tales in *Kalila and Dimna* and *Maqāmāt*.

In addition to this external inspiration, he probably also had access to the local illustrations where he was located, consisting of a wide range of sources including the natural history encyclopaedia by Rabanus Maurus (c. 780-856), calendars, books of hours, herbals and other illustrated works in circulation in his period, and even the Fables by the Greek Aesop (c. 550 BC), scientific writings[80], hunting books[81] and medicinal collections[82] and formularies[83]. All this without mentioning the motifs comprising the miniaturists' repertory used freely in any type of book to decorate the initials, embellish boring, uninspired page layouts or compose scenes, in addition to creating title and dedication pages.

Hence, illustrations were probably not inserted into the *Tacuinum* text merely for artistic and aesthetic reasons but rather in response to the need to put back into the book all the theory it had lost, the theory providing a link between human health and the cosmos, its materials (air, water, earth and fire) and their properties (hot, cold, dry and wet). The resulting images portrayed concepts that had been eliminated from the *Taqwīm* text when the *Tacuinum* was rewritten and immediately suggested concepts to those who beheld them and, to a greater extent, those who interpreted them and meticulously deciphered the messages they contained. A sense of continuity between humanity and the world arose, a continuity sometimes interrupted and yet which could be restored by plants, drinks, activities, situations, clothes, perfumes, oils, baths and other circumstances analysed in the *Taqwīm* and *Tacuinum*. In other words, the way of life Ibn Butlān sought to convey, expressed – or illustrated one might say – by an innovative communication strategy of a visual nature.