Plants, remedies and apothecaries

The Medieval Garden of the Monastery of Pedralbes

Compared with wild and untamed nature, the "closed off" garden or *hortus conclusus* is seen as a space ordered and dominated by man. Inspired by this garden, the medieval cloisters added a mystic symbolism to it, associating it with an earthly paradise, to the heavenly Jerusalem, to the figure of Mary and the soul. This space, enclosed by walls, a place for the monks and nuns to meditate and gather in, became a flower and fruit garden whose paths led towards a central fountain; the fountain of life, a symbol of earthly and heavenly life.

In many medieval monasteries, one part of the cloister was handed over to a medicinal garden, called a *herbularius* or *Garden of Simples*. Not for nothing was it that during the medieval period many studies in plant classification were carried out in the shelter of the monasteries.

The exhibition **"Plants, remedies and apothecaries. The Medieval Garden of the Monastery of Pedralbes"** offers an opportunity to see at close quarters a complex and elaborate science that developed across centuries, based on the principals of Greek medicine and the contributions of Islamic Arabic culture, and which takes nature as the starting point for its actions. This knowledge was handed down via various books and treatises commented upon, copied and translated into different languages century after century. In medieval Barcelona, the doctors and apothecaries –many of them well documented– had a wide knowledge of the curative properties of various animal and vegetable products, as well as the medical preparations suitable for each illness. And not only this: in the city's apothecary's one could buy the necessary substances or prescriptions.

The recreation of a hypothetical, medieval herbarium in the monastery's cloister is a key part of the exhibition. There you will find many examples of the plants the Sisters must have grown or acquired from outside in order to prepare remedies for their sick colleagues, in accordance with the principals and medical treatises of the time.

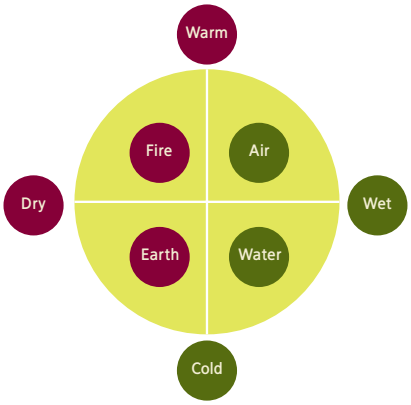
1. Medieval medicine and pharmacology.

The classical tradition and the arab legacy

Medieval medicine inherited its basic principles from Greek medicine developed during classical antiquity. Traditionally, Hippocrates (circa 460 BC – circa 370 BC) is attributed with founding Greek medicine, for which reason it is known as Hippocratic medicine. It is a science based on observation and reasoning of the different components of nature and its phenomena and takes as its starting point the principle that all things are made up of four basic elements: air, water, earth and fire.

This medical wisdom, inspired by Hippocrates, was systematised in the Roman era by Galen (circa 130 AD – circa 200 AD), who exercised a strong influence over medicine until the 16th century. According to Galen, a good doctor had to base his scientific method on experience and his capacity to reflect.

already described by Hippocrates: air, water, earth and fire. These four elements emerged from the combination of four fundamental properties forming juxtaposing pairs: cold and warm, dry and wet. Thus, water was the combination of cold and wetness; fire, of warmth and dryness; air, of warmth and wetness; and earth, of cold and dryness.



The Theory of Humours

Galenic medicine incorporated the theory of humours, which is also based on the principle of the four elements

In order to describe the human body, galenic medicine used these "four elements" to identify the "four humours" or substances that made up living beings: blood,

yellow bile (or choler), black bile (or melancholy) and phlegm. Each of these humours was formed by a mixture of the "four elements", but one was predominant. Health and illness depended on the balance or imbalance of these "four humours". Bearing in mind that all this is based on the idea that humours were bred in the body from food, the cure had to consist in recovering the lost balance of the humours through, in the first instance, diet and, in the second, pharmacology; surgery was to be used only as a last resort.

If diet allowed someone to keep themselves healthy, which is to say, to maintain the balance of the humours, pharmacology would permit them to correct the imbalance. Medicines, understood as substances that produced alterations in an organism, properly administered, could restore a patient's lost health. However, to achieve this required knowledge about the qualities of a medicine's components, the right way to prepare them and setting the necessary dose

Amongst the many authors who made galenic medicine known, it is worth highlighting Dioscorides Pedanius (1st century AD), the author of an immense volume on medical material, *De Materia Medica*, where he meticulously analysed all the plants, animals and minerals that could be used in the preparation of medicines.

All this Greek and Hellenistic medical wisdom was inherited, from the 8th century, by Islamic Arabic culture which preserved and perfected it through the composition of encyclopaedias and compendiums.

It is no surprise, therefore, that the first point of entry of medical science was the city of Salerno, an Italian port strategically situated at the intersection of the Islamic, Byzantine, and Latin worlds. In this city, the Salerno Medical School was established, from which came a series of doctors influenced by ancient Greek, Islamic Arabic and Jewish pharmacy, which influenced the later evolution of all European pharmaceutical science right up until the modern era.

In the field of pharmacology, Arab medicine threw up many important names, amongst which could be highlighted the doctor and philosopher Avicenna (Ibn Sina), author of *The Canon of Medicine*, in he collected the entire, earlier medical tradition and added all his own observations. The fifth volume of this huge work collects together information on pharmacology. The *Summa Avicenniana* was an important influence in Western Europe until the 18th century.

2. Simple medicines

In the Galenic tradition, substances used as cures were called simple medicines and the collected knowledge about the properties of these substances was called medical material. Modern pharmacy calls them drugs and pharmacology, respectively.

Medieval pharmacy used any substance as a medication, but the majority of remedies were derived from the plant kingdom. This comes from the fact that Greek medicine divided natural substances into three categories according to their activity: foods, drugs and poisons, meaning, substances that nourish, substances that re-stabilise and substances that altered the body's balance. In virtue of this classification, it was believed that animal substances (foods) produced a mildly, favourable action, whilst minerals altered the organism because they possessed a poisonous action. Amongst these substances were found plants, which produced an internal reaction –like minerals– but not a destructive one. For this reason plants were considered the ideal medicines.

Despite a preference for plants, all manner of things were used in the composition of medieval medicines: plants and trees, aquatic and land animals, and minerals, as well as precious stones and metals.

Simple plants show enormous diversity in all their aspects. All the parts of different kinds of plants could be used: from the roots to the fruits, the stem, the branches, leaves, berries, buds, flowers; they all possessed different therapeutic properties.

Even though an important part of the herbs used were – in origin – native, imported plants that had never been cultivated in the Mediterranean, were quickly included: pepper, cinnamon, nutmeg, ginger, etc. Of the native plants, a good number were wild, whilst others were cultivated. In fact, as time passed a tendency emerged that preferred medicinal plants that could be cultivated over those which were gathered from the wild. Cultivation allowed for better control of the plants' growth and the possibility of harvesting them at the best possible moment, factors which medieval doctors valued especially highly.

Nonetheless, the plants the ancient Greeks had identified, studied and described –in Greek– were not always so easy to relate to the plants that the medieval Latin world knew. The same thing happened to the Arab medical treatise writers when they wanted to relate a Greek plant to an Arab one. Moreover, not only was a change of language involved but also a change of geography and chronology. This meant that a large part of the work of Western,

medieval treatise writers consisted in having to re-identify plants from Greek and Arab classics, which generated a few scientific controversies.

Under the heading of medicinal plants, we should not think about the current notion that reduces them to a "few", generally native, woodland plants, but rather we must understand that medieval pharmacology searched out the therapeutic properties of all the plants it had to hand.

3. Treatises concerning "simple medicines"

Throughout the Middle Ages, many treatises about *medical material* circulated around Europe, in other words, books that described the curative properties of natural substances. They all, in a more or less direct fashion, bring together the Hellenistic legacy and the improvements introduced by Islamic-Arabic medical science.

For the selection of plants cultivated in the medicinal garden at Pedralbes, two treatises that illustrate the diversity of medieval pharmacological knowledge have been chosen from amongst the numerous medieval works on medical material: the *Subtilitatum diversarum naturarum creaturarum libri novem* (*Nine Books on the Subtleties of the Diverse Nature of Created Things*), by Hildegard von Bingen – also known as *Liber simplicis medicinae* (*The Book of Simple Medicines*), *The Book of the Subtleties of Divine Creatures* or *Natural History* - and a Catalan translation of *The Book of Simple Medicines*, by the Andalusian doctor Ibn Wafid.

Hildegard von Bingen

She's, without doubt, one of the most interesting personalities of her time. Hildegard was born in Bermersheim (Germany) in 1098 to a Palatinate family of minor nobility, they dedicated her to a monastic life at an early age and she joined the Benedictine order. She was Abbess of Disibodenberg and founded the monasteries of Rupertsberg and Eibingen. She died in Rupertsberg in 1179.

From a young age she experienced various mystical visions that she wrote about in her work *Scivias*. She received a well grounded education, and distinguished herself as a composer, poet and author of various treatises on medicine and natural sciences. The work selected as a source for this exhibition concerns this latter field: *Nine Books on the Subtleties of the Diverse Nature of Created Things*. The book describes 502 natural elements, ordered by groups – plants, elements, trees, stones, fish, birds, animals, reptiles and metals. Each element is, firstly, qualified with a few words, amongst which are often mentioned some of its qualities – warm/cold, dry/wet – and, there follow some indications about its curative or dietary properties and some prescriptions or ways of making use of it:

> *Chap. IX. On Galangal*
> *Galangal (Alpinia officinarum and A. Galanga) is entirely hot; there is no cold in it and it has many virtues. For those with a high fever, pulverise the galangal and drink the powder dissolved in water and the heat of the fever will be extinguished. For those suffering from bad humours in the back or the side, boil galangal with wine and have them drink it hot, and the pain will cease. For those who have heart ache and heart disease, galangal in sufficient quantity should be eaten immediately, and improvement will be found.*

Although in her work Hildegard highlights the curative properties of plants and offers many prescriptions, she hardly ever gives exact quantities for the creation of remedies nor does she give detailed descriptions of the illnesses for which each drug is suited. On the other hand, she includes in the section on plants, for example: eggs, honey, salt, butter and vinegar. Despite the lack of clarity of some of its concepts, Hildegard's book is a fine example of the medical knowledge kept within the walls of the main medieval monasteries in Europe.

Abu-l-Mutarrif 'Abd al-Rahman ibn Muhammad ibn Wafid al-Lakhmi

He was practically a contemporary of the great German Abbess, but he represented another cultural tradition. Doctor, pharmacologist and student of agriculture, very little is known of his life. He was born in *Al-Ándalus* in 1008 and was living in Toledo, after having studied in Cordoba with the doctor Abu al-Qassim al-Zahrawi, known in Latin sources as Abulcasis. He died between 1067 and 1074.

It is said of Ibn Wafid that, despite his solid education as a pharmacologist, he preferred to treat patients with diet before using drugs and, if it was necessary, first with simple and later with composite medicines. His biographers attribute seven works to him, of which we are familiar with, among others, *The Book of Simple Medicines*. The selection of plants on display in the Monastery's "medicinal garden" is based on a Catalan translation of this work. The fame of this treatise is testified to by the fact that it is known not only in its Catalan translation, but also a Hebrew one and one in Latin by Gerard de Cremona.

The Catalan version of Ibn Wafid's treatise –possibly taken from a Spanish translation that was in turn, probably, taken from the Latin– is, like the Arabic original, an approximation of what the classical Greeks, above all Dioscorides and Galen, had to say about the principles of simple medicines.

The book has two, clearly defined, parts: a general introduction concerning the uses and strengths of medicines, and a descriptive list of the main simple medicines, ordered into three big groups –plants, animals and minerals. In the descriptive part of each drug, the qualities, form, parts and therapeutic abilities are explained and some remedies are mentioned, which almost always refer to Dioscorides and Galen.

Senna is called sana in Arabic. And Galen says that: It is useful for illnesses of melancholy when one is raving, and for cracks in the hands and feet, and for hair that is falling out; and for lice and headaches and [it is useful] for the kidneys and for the body's bladders and [it is useful for] epilepsy, and it is hot and dry and tastes bad and purges melancholy and choler and comforts the heart when it is mixed with other medicines that are useful for this, like violets and roses. It is to be administered as a drink with a dry weight of one coin or a cooked weight of 5 coins. Ar-Razi (or Rhazes) says that it may be smoked and that senna purges sullen humours and that it is useful for the kidneys and for rashes and that, in each case, it must be administered as a drink, with a weight of between 4 and 7 coins.

In contrast to Hildegard, the details given by Ibn Wafid are endorsed by references to his sources and the quantities are often specified in a more precise manner. It is, undoubtedly, a fine example of Islamic-Arabic and, especially, *Al-Andalus* medical science.

4. Composite medicines: preparation methods and techniques

Galenic medicine not only used a great variety of substances, it also combined them in an enormous diversity of medicinal forms and methods of application. This same diversity is documented in medieval Europe, above all after the arrival of the Islamic Arabic treatises.

The self same problem mentioned in relation to simple medicines and identifying how the Greeks handled them is also found with composite medicines. The preparation of the same drug varied from author to author and, apart from the name, it makes it very difficult to know what kind of composite medicine is being talked about and what its ingredients are. The more complex a medicine was, the easier it was for its composition to be modified between one author and another, one school and another, from one place to another.

As an example, from a similar time and place, let's look at the same prescription according to two different sources: the *Concordie Apothecariorum Barchinone* (1511), the first pharmacoepia from Barcelona that attempts to fix the composition of the principal drugs in the city, and the *Liber In Examen Apothecariorum* (Pere Benet Mateu, a Barcelona apothecary, 1495), a manual aimed at helping apprentice apothecaries to pass the masters' examination with ease.

GREAT APOSTOLIC PLASTER

Concordie Apothecariorum Barchinone	*Liber In Examen Apothecariorum*
golden lead oxide	*golden lead oxide*
ammonia resin	*ammonia resin*
calamite stone	*calamite stone*
red wax	*red wax*
rosin (colophony)	*rosin (colophony)*
oak mistletoe	*oak mistletoe*
propolis	*propolis*
mastic	*mastic*
crushed incense	*manna*
turpentine	*turpentine*
burnt copper	*burnt copper*
bdellium	*bdellium*
galbanum	*galbanum*
red myrrh	*red myrrh*
astragalus	*astragalus*
copper scoria	*lime*
marjoram	*marjoram*
birthwort	*birthwort*
fresh horehound	*fresh horehound*
opoponax (sweet myrrh)	*opoponax (sweet myrrh)*

During the Middle Ages, a dozen large antidotaries which collected prescriptions for the main remedies were doing the rounds of Europe. Amongst these treatises on composite medicines we can highlight, for its introduction here in Catalonia, the Mesue antidotary –the name by which the Assyrian doctor Yuhanna ibn Masawayh is known– the Nicolau antidotary, Arnau of Vilanova's antidotary, the fifth book of Avicenna's canon, the Rhazes antidotary, etc.

In these antidotaries were collected a great variety of medicinal forms, some of which are still around today:

- **Preparation**: medicinal substance made up of various ingredients (preparations of kermes oak, sweet musk, salep, galangal, cashew nuts, swallows, antidotes for emmenagogue, tansy or strawflower, mithridate, Venice treacle, etc.)
- **Electuary**: thick, medicinal paste made with powders, pulps etc, mixed with honey, syrup and other substances (aromatic electuary, rose-scented electuary, bud electuary, three peppers electuary, etc.)
- *Lauq:* syrupy medication administered orally (poppy *lauq*, *scylla lauq*, cabbage lauq, etc.)
- **Syrup**: medicinal beverage obtained by heating sugar and water with medicinal substances (rose julep, violet julep, lemon peel syrup, alpine grape syrup, Byzantium syrup, mint syrup, etc.)
- **Grape Syrup**: a medicinal beverage obtained by boiling and evaporating grape must with medicinal substances (gooseberry grape syrup, alpine grape syrup, etc.)
- **Oxymel**: medicinal beverage based on honey, water, vinegar and medicinal substances (scylla oxymel, pure oxymel, etc.)
- **Eyewash**: a medicine for application to the eye area (Rhazes' white eyewash)
- ***Trochiscus***: a Galenic medicine made up of small, irregular cone-shape lozenges obtained from drying a watery paste, in which the medicine is contained (*trochiscus* of a preparation of spiced civet, *trochiscus* of a preparation of musk civet, rose and eupatorium *trochiscus*, succi *trochiscus*, etc.)

- **Pill:** a solid, round medicine taken orally (aromatic pills, composite pills, rhubarb pills, physalis alkekengi pills, astragalus pills, etc.)
- **Ointment:** a medicine made up of a mixture of fats, for external application (palm ointment, cyclamen ointment, pink ointment, alabaster and precious nard ointment, etc.)
- **Plaster:** a medicine made from a thick, pasty substance placed on a cloth that is stuck to the part of the body upon which it is applied (Arabian plaster, diachylon plaster, laurel grain plaster, Son of Zacharius plaster, mustard plaster, etc.)
- **Oil:** medicine made from the fatty extracts of certain medicinal substances or a mixture of oil and medicinal substances (sweet almond oil, hazelnut oil, apricot kernel oil, *been* oil, safflower oil, scorpion oil, etc.)
- **Wax:** externally used medicine, made basically from wax and oil (lanolin wax, sandalwood wax, Galen's wax, etc.)
- **Powders:** a medicine made by reducing various medicinal substances to powder (happiness powder, turpeth powder, Mesue's powder)

Barcelona's apothecaries also recorded other types of medication:

- **Enema:** liquid medicine injected into the large intestine through the anal sphincter, using a cannula
- **Decoction:** a type of medicine normally obtained by boiling medicinal substances in water – pomegranate decoction, camomile decoction, pumpkin decoction, etc
- **Spiced wine:** a type of medicine obtained, normally, by boiling or soaking medicinal substances in wine
- **Infusion:** medicinal brew or infusion
- ***Dressing:*** medicinal head covering
- **Poultice:** a gelatinous preparation placed between two gauzes and applied to the skin as an ointment, calming and anti-inflammatory
- **Gargle:** a liquid medicine for gargling with
- **Wash:** a medicinal preparation for cleaning ulcers, plague sores, etc.
- **Purge:** a medicine for cleaning the stomach
- **Restorative:** a medicine to invigorate
- ***Tactum* or Suppository:** a solid, cylindrical or conical medicine to be introduced into the anus, vagina or urethra

All these preparations required the learning of certain, specific techniques used by apothecaries (decoction, chopping, pulverising, ablution, infusion, distillation, sublimation, maceration, expression –the act of extracting– cooking, preparation, decanting, etc.) and the use of a particular tool.

In the exhibit "Petras Albas", in the Monastery's old Infirmary, you can see objects from the Monastery of Pedralbes related to this exhibiton.

5. Pharmaceutical practice: the especiers or apothecaries

The importance placed on drugs by ancient and medieval medicine meant that the person who made them commanded great, social importance. For this reason, in the Middle Ages, the trade developed into a specialised art in the preparation of complex, composite medicines. This professional was called, in Latin texts, *apothecarius* and, in Catalan sources, "especier" or "especiaire" (spice merchant in English), and the art that developed, "apothecaria" or "especieria" (spice selling). The "especier", known in the modern era as an apothecary, is then the medieval pharmacist.

Science and Trade

However the medieval apothecary's range of activities went far beyond the strictly pharmaceutical, combining science and trade. The apothecary sold simple medicines retail as well as preparing and selling composite medicines; he was an herbalist, but also a confectioner, druggist, stationer, and wax and perfume seller. This diversity of occupations was a result of the conception of medieval medical science itself –that one had to take care of the patient, but also one had to look after one's diet in order to stay healthy. In fact, the majority of medicinal plants were also used in cooking and, therefore, as well as preparing medicinal wine, oils and waters, the apothecary also made "clarea" (similar to hippocras) –wine sweetened with honey or sugar and scented with aromatic spices–, "aiguanaf" or orange blossom water – and rose-water, which accompanied dishes and meals, as well as perfumes.

The Apothecary's Art in Barcelona

In Barcelona, a potent, local, apothecary's art quickly developed. The large community of apothecaries in Barcelona was concentrated in three areas of the city: in "Llibreteria" – those days the street was rightly called "Especieria" -, on the seaward side of the square "Plaça del Born" –close to the quay where the oriental spices, which were also sold by Barcelona's apothecaries, must have been unloaded– and in the houses located between the church of Santa Maria del Pi and "Boqueria".

At these three points, but also all over the city, the apothecaries opened their workshops, clearly identifiable for the enormous shelves covering the walls which were fitted with the boxes, bottles, jars and all manner of receptacles in which the simple and composite medicines they sold were stored.

The Apothecary's Workshop

Normally the whole family, led by the head of the family, the master apothecary, worked in the apothecary's workshop. The apothecary's wife and children worked

there, but it was also possible to find servants, some in conditions of slavery, who helped their masters attend to customers, make deliveries and clean the shop.

As was the custom at the time, in many workshops apprentices could be found, young boys living in the master's house in order to learn the trade. In Barcelona, an apothecary's apprenticeship was one of the longest and lasted between eight and ten years, at the end of which the aspiring apothecary still had to pass theoretical and practical examinations in order to be able to exercise his craft.

People of every social status passed through Barcelona's apothecary shops, even the king himself, who might request certain remedies that sometimes had to be delivered to him in remote places. Very occasionally, even animals would turn up in a shop, as happened in 1378 when the count of Empúries requested a remedy for his lioness from the apothecary Francesc ses Canes, for which he prescribed purges, washes, henna, rose oil, etc.

6. The distribution of medicines: supply and self-sufficiency at the Monastery of Pedralbes

Throughout the medieval period, living conditions meant that people had need of the doctor and apothecary's help and, above all, of the remedies made by the latter. Within the walls of the monastery of Pedralbes, the community of nuns also suffered from illnesses, a fact about which they have left us some records.

The monastery performed various different functions, with nuns who were in charge of them: the sacristy was managed by a nun called a sacristan, the refectory by the cook, the bakery by the baker and the infirmary by the nurse. In the infirmary sick nuns and servants were attended to; they were visited by a doctor and a barber –at that time barbers also performed the role of surgeons and performed bleedings, tooth extractions, etc.

In 1407 the holder of the position of nurse was Sister Blanquina Mirona. Master Francesc of Pedralbes, a physician, was in charge of the nuns' health. He charged an annual salary of 440 sous for his services. The barber's tasks were performed by Ramon Degà who received 220 sous a year for his work.

Once an illness had been diagnosed by the doctor or the sick nun had been operated on by the barber, it was necessary for the monastery to get hold of the remedies necessary to cure her. The nuns used the services of Bartomeu Senós, an apothecary from Barcelona, who supplied them with many of the plants and remedies they required. This apothecary is documented as supplying simple medicines, like camomile, caraway, anise, laurel seeds, violets, cumin, Pyrenean saxifrage, fenugreek and hyssop– of plant origin – and gem salt and Armenian bole – mineral origin – but he also delivered some (very few!) composite medicines, basically enemas and sauces – combinations of spices, generally more closely linked to cooking and not to medicine at all, possibly for preparing some special meal for a sick nun or servant.

Even though we know that the nuns asked the apothecary to acquire plants that, apparently, were not at all exotic, like, for example camomile and violets, the relatively small numbers of documented purchases leads us to suppose that the nuns had other avenues of supply for medicinal plants open to them.

Despite the fact that it is not mentioned in the records, by analogy with other monasteries, it seems plausible that within the monastery, possibly in the cloister, the nuns had a garden of medicinal plants that afforded them a certain degree of self-sufficiency. It is likely that this was not the only place where they were grown, since it is probable that in the monastery's various gardens medicinal plants grew alongside vegetables and fruits destined for the table and the preparation of homemade prescriptions for the sick nuns.