

BEES AND THEIR PRODUCTS IN PHARMACOLOGY IN THE PAST

G. FOLCH

SPAIN

It is but natural that man been attracted by bees and their products since olden times.

Given the fact that their habitat is much different from that of other animals, it is obvious why man became interested in them and started to collect information about them. Possibly, by instinct or by a mere accident he came across honey, tasted it, and from then on, knowing its taste, he has been looking for it and used it as food.

The oldest information about honey goes as far back as the neolithic age. In 1921, Hernández Pacheco found various paintings in the Cave of Spiders at Bicorp, Valencia. He said that for understanding the significance of one of the paintings found by him one had to take into account that bees used to build their nests in rock crevices; swarms were abundant in Paredon de la Rebolla, in the rocks close to the cave in which the paintings were found, and even at the time when they were discovered it was a current practice of peasants, on cold winter days, to descend on ropes and ladders, down the rocky walls, for taking the combs.

Obviously, the scene we refer represents harvesting of honey. A man with a basket in his hand climbs up a rope to a comb, and seems to enter inside it. The artist reproduced the scene with great mastery and very simply, with a realistic impressionism which brings to the fore many details including the bell shape of the recipient, its typical handle which attests to its belonging to the neolithic age, as well as to the fact that this practice and the use of bee products are very old indeed.

Centuries have then passed before the first historical evidence about bees, honey, or wax but a fact is very significant: in the oldest written documents known – the clay slabs of Mesopotamian culture, dating as far back as 2700 B.C., honey is mentioned as being used as medicine.

Approximately 1,000 years later, in Egypt, the papyrus of Ebers was written, one of the most important sources informing about the Egyptian medicine, wherein honey and wax are mentioned.

In the Hindoo civilization, honey and wax are mentioned to have been used in the composition of preparations for curing various affections, and the God of Sun Azwin is considered the discoverer of honey. Very interesting is the fact that they used for Krishna and Vishnu the name of Madhumaskha, deriving from the name of the bee, may be in reference to the industriousness and order characteristic of these Gods.

The Greek mythology admits that Jupiter was fed by the bees of Ida mountain, with the honey which they produced on purpose.

The northern mythology speaks about God Odin in relation to honey, with which he prepared a brew which had the power to turn any mortal who would drink it into a poet – may be thinking of the sweetness of poetry.

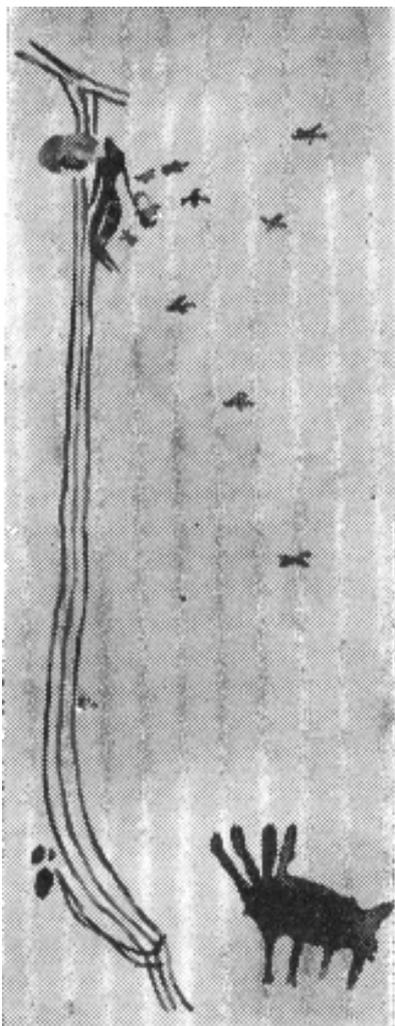
With respect to rearing of bees and use of their products, no precise data exist about their origin: a Greek legend says that Aristateus, the King of Arcadia, showed to his subjects how to take swarms. Aristateus, a shepherd and keeper of bees is assessed to be the son of Apollo and Cyrene.

Justus, when speaking about the Spanish king Gargores envisaged its use as food and medicine.

Virgil, in one of his Georgics specifies that the best method for obtaining a swarm is to kill a young bull and leave it to putrefy in a hut. "Next spring", he says "worms will emerge which will turn into bees". By this he only wished to remind of Dyonissus (Bacchus): when being attacked by Titans he turned into a bull to frighten them but was smashed by them and in order to relieve he turned into a bee. This legend is illustrated at the tomb of Kilderic, king of Francs of the 5th century, where three hundred bees are sculptured around a bull's head. This attests to the fact that bees were known by several peoples.

Without being able to state precisely when man began to keep bees, we know that some peoples of the East and Middle East used to place hives on the tombs of those who distinguished themselves by bravery during their life. We point out this custom because historians in the last century frequently mentioned that where personalities were buried bees made nests, and whether the respective person had any relation with medicine, they said the honey in the tombs there had an excellent curative effect.

Why did these people place the combs on tombs? There are several possible interpretations: first, the bees defended the tomb from the attack of enemies or robbery with the same zeal as they took care of their combs and queen, the swarm rushing upon anyone who dared to violate the tomb. Other people believed that, just as in other civilizations, the dead were buried together with foodstuff for their travel in the kingdom come, the swarm located on the tomb being meant to supply them food. Most frequently, the bees were considered as the symbol of immortality, because they were considered as spirits or winds wandering from place to place, but never died: therefore, by putting swarms on tombs people wanted to show that the lessons taught by the buried during their life would be always remembered and their memory would be everlasting.



*The famous painting in the
Cave of Spiders*

According to Swiss folk beliefs bees are the souls of the dead people.

The bee was chosen by noblemen for their coat of arms, as a symbol of industriousness and order, - as with Urbano IV.

After this brief introduction describing prehistoric data and mythological legends, we shall approach the problem scientifically.

The oldest scientific data about bees and their products were supplied by the founder of zoology Aristotle who describes them amply in his "History of Animals".

He deals, with bees in six books, speaks about their species, their life, how they reproduce themselves, assesses that there existed a king – not a queen, and speaks of wax, honey, propolis and sandarac.

About honey he says that bees collect it from the air especially when the constellations appear in the sky and when the rainbow wraps the earth. He assesses that usually honey is not produced before the Pleiads are high in the sky.

We think Aristotle was the echo of a popular belief which kept existing for a long time after his death, and obviously existed already long before him.

The honey taste was due, according to him, to the fact that it was either the tears or perspiration of heavenly bodies, which fell on the earth like rain for making the life of people less bitter or for sweetening it.

In order to prove that honey does not originate in flowers, Aristotle says that the combs were filled in one or two days as the people say, and in autumn – although flowers exist – bees do not collect honey which they would have done not to starve if honey had been obtained from flowers.

Nevertheless, in another paragraph he contradicts himself: "The bee collects honey from all flowers with calix, and from all flowers whose sap is sweet". Although we should think that the Stagirite might have admitted that the sweetness would be due to the aroma fallen from the sky and concentrated in saps or accumulated in corolas.

On the contrary, he considers wax as being collected from flowers and from the tears of trees, just as propolis – as a variety of wax – a purified wax -, and sandarac – "a kind of food which is much similar to wax by its hardness".

Aristotle assesses these products as having curing properties, and recommends propolis for contusions and suppurating wounds, and when mentioning the two kinds of honey he admits to exists – the white and reddish one – he says that the first is the best and very efficient in eye affections and in curing wounds.

Hippocrates, the most famous Greek physician, the quintessence of the Hellenic medicine, was of the opinion that nature must be supported in its curing properties: for this, nothing is more adequate than to use the natural, simple products, honey included, which he recommended to sick people either eaten as such or diluted with water or wine from which melicraton and oenomel respectively were obtained.

While Aristotle was the most noted naturalist of the Greek people, Pliny was of the Romans; in his "Natural History" he extensively describes the bees and their products.

About propolis he says that "it is very efficient as a medicine", "has a pleasant odour and many people use it just as they use galbanum".

In chapter XII of book V he dwells on the origin of honey, stating inter alia: "Honey comes from the air and in most cases at the same time with the apparition of stars, especially at the height of Canicula and not too long before. Vergilia stars appear in the morning; so that at dawn, the leaves of trees have drops of honey on them". He insists on this, saying that when somebody has a walk at dawn "his clothes will be smeared and his hair sticky", and that honey "is either the exudation of the sky or a sort of sap of stars, or a juice released by the air".

And just like Aristotle, who said that bees have only a collecting role, Pliny says that this sap is sipped by bees which fly in search for it in the grass and trees, introduce it into their stomach, and regurgitate it subsequently, thus being mixed also with the juice of flowers and moved so many a time... that it contains "a suaveness of celestial nature".

In chapter XIV, in describing the kinds of honey, he assesses that the one produced in a certain period of time is mostly a medicine. "After the appearance of any star, especially of the noblest ones and of

the rainbow, whether storms do not follow but the dew is moderately heated by sun rays, what is produced is not honey but medicines with blessed properties for eyes, wounds and other internal organs". This is a proof that Aristotle's thinking was not only preserved but also amplified. Admitting that it was good for internal affections, he points out: "And if it is preserved until Canicula appears and if fortunately on the very same day also Venus, Jupiter or Mercury stars appear, as it happens often, there is nothing lighter and better for delivering people from diseases and preventing death than this divine nectar".

The influence of astrological concept concerning medicine and medicines is obvious, according to which curing properties were due to certain stars, the astral influx being assumed to have such a great power as to prevent death.

The edition I consulted for this paper was that completed in the XVIIth century by Geronimo de la Huerta, according to whom honey is very efficient for removing the dim from eyes, for curing wounds, for easing chest pains, for removing spots from the face skin, and for maintaining good health in old age.

It is interesting to mention that in Book XXI, Chapter XIII of his work he dwells on the poisonous honeys including also that of Heracleia of Pontus which was used for killing three companies of soldiers of Pompey, and he assumes this quality was due to plants mentioning rhododendron.

He says that at Caudi, in Monte Carma, there were no flies, the honey produced there being never touched and therefore it was used as medicine. About the wax of Corsica and the Punic one he says that they were very efficient as medicine.

While Pliny dealt with bees and their products as a naturalist, his contemporary Dioscorides did it as a physician. According to him, it has the property to clean, to open the pores, and induce humor, reasons for which he recommended it for curing wounds even when serious, for curing herpeses, delusions and ear sores, for re-making the prepuce of the circumscribed men, for making sight clear, for curing throat sores, and for easing discharge of urine and cough. He assesses honey as being an antidote against snake and rabid dog bites and champignon poisoning. Also, he points out the efficiency of honey in killing fleas and nits. (We must take into account the fact that the comment we used is of the VXIth century, and some ideas might not have been advanced by Dioscorides.

In conclusion, honey is considered as a panacea.

It is a known fact that Dioscorides's work was a gospel for the physicians and pharmacutists of the Middle Age and Renaissance periods. It is on it that they relied on in their formulae. Therefore, one should not be surprised that honey was frequently used as a medicine, due to his intrinsic properties; but the physician and pharmacist have soon discovered other ones, which made it be used together with numerous medicines. One of them is its properties of sweetener and of agglutination.

One has always tried to avoid the not too pleasant taste of medicines, the sweet taste being preferred. And, although the authors quoted above knew what sugar was and that it was obtained from sugar cane they considered it as a rare product, and did not yet know to crystallise sucrose.

Dioscorides had an influence with respect to the materials used. The great Galen was remarkable in preparation of complex medicines – in his two widely spread works "De Compositione Medicamentorum".

Although also other authors existed in that period, as for example Scriborius Largus who made the first list of recipes, the Middle Age pharmacy was based on Dioscorides and Galen, their works were copied many a time, and the science of medicines included the comments on their knowledge. Both admitted honey as a medicine, not as a simple one but as an essential component of complex medicines, a group of medicines which were used very often, electuaries and other preparations, formulae which we could consider as the quintessence of the mediaeval pharmacopoeia.

Honey was so reliable that the two most renowned medicines Triarca or lectuarium teriacal magno and Mitridate were prepared mainly from honey to which other simple substances were added, which varied according to authors, but honey was the basic component.

Worth mentioning are the hydromel or melicraton on which Hippocrates, Galen, Dioscorides, Paul of Aegina, Nicolas Mesue and many others dwelt so often – medicines full of what we could call a harmonious medico-pharmaceutical poetry.

As for wax, it was Galen who created the cooling ointment which in our times is called cold cream, whose basic component is this product of bees. Moreover, honey was used in two pharmaceutical preparations – melites and oxymelites which existed in pharmacopoeia till the first three decades of this century.

We can ascertain that up to the XIXth century every pharmacist in the world had to prepare, and always with pleasure, the rose melite or rose honey, a preparation which had, we could say, a romantic taste, as the sweetness of honey blended with the pleasant scent of roses of Alexandria.

Honey was highly appreciated by the Arab people; an evidence in this respect are the texts which circulated in the XIVth century under the title "The medicine of the Prophet" – including general precepts of life – one of which runs: there are four things which work miracles: to drink honey, to behold the water, to behold the green colour, and to behold a beautiful appearance.

We suppose that the miracle done by honey referred to its curing properties, because whatever pleasant its taste, it could by no means be compared with the sensations produced by the other three.

It is known that the Arabs spread the sugar cane in western Europe, as well as the methods of obtaining sucrose and its use in pharmacy, new pharmaceutical preparations being created – syrups and “robs”. So, honey was no more the only sweetener for medicines, but it was further used: some pharmacutists prepared syrups and “robs” with honey, not only for its sweetening capacity but also for its intrinsic properties.

An example in this respect is Mesue, the Arab called “the holy teacher of pharmacutists” because his teaching was considered to be holy by all who learnt to prepare medicines from him, who not only described honey but also used it very much.

Thanks to him, the first pharmaceutical books of the School of Salerno – the books on antidotes of Nicolàs, of the Renaissance period, and the writings of Manlius of Bosco, of Pedro Benedicto Mateo from this country, the first pharmacopoeia in the world, the list of recipes of Florence, the Catalan and Aragon pharmacopoeia of the XVIth century – mention honey and wax.

Honey was such an important product that in Concordia Aromarotium Civitatis Cesar Auguste of 1546, the first composition described in Mesue’s account on gems and honey.

Speaking about the school of Salerno, we do wish to mention Trotula de Rugero, representative of woman intelligence in the Middle Ages. She also used bees and honey in her beauty preparations.

For assuring the stability of lip-sticks she prepared them with beet and pumpkin juice, rose water, and honey.

For dying hairs, she recommended to heat bees in a metal recipient, to triturate them with oil until they turned into a glossy pomatum and to apply it on hair.

In the same period, the work “Tacuinum Sanitatis” was written, which also dwelt on honey; a very fine engraving illustrates how were bees reared in the Middle Ages.

The first pharmacy work written in Castilian language was “Modus Faciendi” of friar Bernardo de Laredo, in the XVIth century.

One can see in it how much attention and care was required for honey when used in pharmacy: besides the indication to be the best and lightest in colour, he also tried to settle it, with much care during the operation both as concerns the quantity of water and honey – not to boil it too much, because coction for a long time makes honey to be less laxative -, and as concerns the fire, so that honey “boils in small bubbles, and without smoke”, and “an egg white must be added to it” to clarify it.

From this work, one concludes that honey was the major component in many medicines, and that the pharmacist had to have great quantities in store.

In the 1513 edition of this book, an extra text was added – curative secrets – including various recipes for treatment of a number of affections. Many of them contain honey. We shall only cite the “Unique secret for healing ulcerated cancer, even when in most delicate parts”, because the honey recommended to be used had to be extracted from white combs and without violence, “or, more precisely, to be the cleanest of the existing ones; honey must be mixed with a great frog – after being left to dry and turned into thino powder, with alum stone added, after which the mixture is left to ferment and dry until it has the consistency of an ointment”.

The precautions in choosing the honey and the care with which it was handled are evidences of the great value they were granting to this product and of the attention paid to possible alteration which could cause degradation of its curative properties.

Time was going on and in spite of the fact that sugar was more and more widely spread, honey did not lose its importance, on the contrary syrups were prepared either with sugar or honey – with no difference, honey being sometimes considered even better in this respect, as shown in the Pharmacopoeia of Valencia of 1601, entitled “Oficina Medicamentorum”. With respect to syrups it points out that the preparations with honey must be boiled not too long, which helps them adulterate less and prevents them from putrefaction. Preserves, loochs, syrups, preparations, troches are pharmaceutical forms recalling the recipes of times past, in which the physician used all his knowledge, which the pharmacist prepared with love and care, and which the patients used with confidence in their components and in the mystery of their Latin names, of wise people devoted to the art of curing – all contained honey.

As for wax, it was the essential component of cerates, and it was also indispensable in preparation of ointments and cataplasms.

We do not believe that in the XVIIth century honey was used without knowing its properties. Thus, a scientist of that time says: “you add honey in medicines and think that it is for sweetening, but you are wrong as things are more complex. It is added, possibly for preventing putrefaction, or for making the medicine more tasty. But, could we not assume that, given its properties, honey eliminates the extra moisture of medicines or acts as a viscous substance making medicines thicker, in order to make their passing to the outside more difficult?” In comparing the properties of honey with those of sugar he asks himself: “which of them is colder? Which one has more regenerative properties?” It is obvious that honey was used as any other simple product, so that those concerned with medicine and preparation of medicines could make use of all the possibilities of action of a pharmaceutical preparation.

But honey was not accepted only by scientists. The people had always considered it as an excellent medicine which they used for various affections.

One of the most widely spread books of popular medicine was the "Treasurestore of the Poor" attributed to Pope John XXI or to his physician, written in the XIIIth century, book which was still published in the XVIIIth century. The book was used where no physician existed, in far away places, and – as its title indicates – by poor people who could not afford paying a physician.

This book recommends honey in its remedies, and considers that it has almost miraculous properties: healing of bites, fistulas, hydropsy, ear and throat sores, diseases of women and men, headaches, eliminates intestinal parasites, heals the genital organs with diaper rash, of men after lying with women, etc., even leprosy, arthritis, and other numerous infectious diseases.

In conclusion, for the people, honey has been a nostrum for centuries; they put all their hopes in it, and if they could not cure all the affections, at least they managed to prevent them getting worse because of the secondary effect caused by other pharmaceutical preparations. Together with providing a sweet substance to their body, they were toned up, thinking that they used the nectar of the sky collected by bees.

In the XVIIth century, two Frenchmen, Lemery and Pierre Pomet, wrote the best books of medicine.

Lemery, a pharmacist and remarkable teacher of chemistry, says in his Dictionary of Drugs that honey was made up of various substances collected by bees from flowers and carried in their stomach to the hive where they regurgitate it. He points out that the bees changed the substances collected, lending them a pleasant aspect and quality.

In other work of his, Course of Chemistry, on which we shall dwell more extensively, he assesses that honey contained the most balsamic substance of various flowers, collected by insects. Reminding of old concepts he says that it was called manna. He points out that it was widely used in previous times both as food and medicine, and cites mulsa water, melicraton, apomel, and oenomel.

Pomet, in his "Treatise of Drugs", calls the bees honey flies; recalling the old belief according to which combs can be produced by burying a dead animal, he dwells on the work of a countryside minister "Treatise on Honey Flies", published in Paris, in which the author tells a strange story:

"Master Virgil seemed to me reliable enough for asserting a valid belief, and therefore his word was sufficient for me to make an experiment, an unhappy one as I almost poisoned the whole village!"

According to what Virgil said, the author killed an ox, took its skin off, and as tomb, he put it into a great wood barrel with four windows facing the four cardinal points, with the aim – as Virgil asserted – "of providing for thousands flies to emerge "....." The King emerges from the brain, the workers from the stomach, the drones from the belly, the kings wage battles with their neighbours on the sea and land, lead the armies in the battles, reward their captains and generals, punish the cowards, and track the deserters and shoot them "..... and added thousand other absurdities which many people believed and still believe now. Instead of thousands of swarms of honey flies, thousands of worms emerged, which stank so unbearably that they seemed to infect the entire village; the village seemed to be threatened by pest".

We must take account that it was the XVIIth century, the century of Galileo, Newton, Descartes, and Boyle, when experiments were usual and hypotheses were confronted with evidences, and a countryside minister, hampered neither by his surplice nor his function, tried to find out the truth. In repenting himself, he attacks Virgil, but in his place we would surely have blamed the Latin poet more sharply.

The name of the minister is not known but he reminds us of another minister Spallanzani, who, one century later, was in search of truth without fear of consequences and of the theory of spontaneous generation, which was considered unimpugnable because Aristotle had accepted it, and Nedam and Buffon supported it, which brought him many troubles.

We said that already Lemery did no more believe that honey was the dew collected by bees from plants, as he was a learned man, a scientist, a pharmacist.

Pomet, although an expert in drugs, was not a critical mind and therefore he admitted honey as being the dew collected from plants – although he lived in the same period -; he mentions three kinds of honey: the virgin or white honey obtained by leaving it to freely dip from combs, the honey extracted from combs by pressing them, and the yellow honey, obtained by heating the combs.

It is the period when medicine was applying to chemistry for help. Therefore, it is not surprising that in his "Course of Chemistry" Lemery refers to it as an imperfect process, which he tries to perfect by chemical processes. He describes the distillation of honey for separating the water, spirit, and oil in honey from its terrestrial components. Vials, retorts, funnels, sand fire, moderate fire for several hours, served for separating water from honey, which was efficient in making the hair grow by dipping the comb into it and by tapping the hair root with an imbued sponge, everyday. By introducing the rest in an alembic, oil was separated, and a good appetizer was obtained which was used in saleps lending them a pleasant sourish taste. By rectifying the spirit, an oil was obtained, which was used for clearing older ulcers, for removing superfluous flesh, for bone caries.

In the retort, he said, a black, very spongy, readily inflammable substance remained, of which nothing more could be extracted.

Lemery does not only recommended how to extract what was most useful in honey, but stirs those with inclination towards alchemy, holding that the supporters of the mastery of Hermes were searching into honey for gold, because of its yellow colour and the universal spirit they considered it to be imbued with – as it was extracted from the substances of flowers in which they assumed that the spirit was concentrated.

Pomet agreed that, when well rectified, the spirit of honey decomposed the gold and lead. He did not only distil honey, but also wax in order to separate the oil, fluids, and salt, recommended the oil for tumors, dry pains, and chest chaps.

It was the Madrilenian pharmacist Felix Palacios who, in the XVIIIth century, introduced the chemical medicines in Spain and made their use regular; first, he translated Lemery's books, and then published the "Chemico-Galenic Pharmaceutical Palestra". In connexion with honey he says that it was preferred to sugar in preparation of many medicines which thus were better preserved, because honey contained a balsamic viscous part which healed the wounds. When mixed with digestive preparations it facilitated and helped purgation, and was more pectoral and nourishing than sugar; and, taking into account the origin of honey, there were many reasons why it should be preferred to sugar, containing the most active and balsamic substances of the plants, which bees collect, substances which could be considered on good reason the quintessence of plants.

According to him, no better panegyric to honey was possible; honey concentrated the curing virtues of these plants on which bees worked, a way by which nature lent its innermost mysteries to it.

In his work he describes numerous kinds of honey, oxyhoney, electuaries, and other pharmaceutical preparations having the formulae worked out by Galen, Mesue, Nicolàs, Pharmacopoeia Augustana, Nuremberica, and by other authors and in other works – evidences of the intense use of honey in all countries.

In his work "Palestra", he does not dwell on honey, but he uses it in cerates and cataplasms.

In the XIXth century, the "Pharmacopoeia Hispana" of 1817 is illustrative of the uses of honey and wax in therapeutics, in the first decades.

Honey is described as an aromatic sugar substance, collected from the nectar of flowers and produced by *Apis mellifica*. Wax is considered a sui generis substance, also produced by *Apis mellifica*. For the medicines with several compounds, honey is used in 23 preparations: melites, decoctions, syrups, electuaries, pills, mixtures, gargles, clysters, the hollyhock emollient, plasters like those of siliquae, ointments like those with cupric oxide, cataplasms like those with barley flour. The author recommended honey to be used in their composition, but the most surprising form are the suppositories.

The fact that honey was used as such was not a novelty, but its official acceptance: it was included in a Codex for preparation of medicines.

He describes the suppositories with honey and natrium chloride, and the irritating suppositories with honey, which besides honey and natrium chloride also included colocynth.

This pharmacopoeia recommends wax for preparation of 17 ointments and 23 cerates.

One of the most widely spread book with recipes for preparation of medicines in Spain and other countries, was the "Rational Pharmacopoeia" or the "Treatise on Pharmacy" written by the French authors Henry and Guibourt, which was translated into Spanish by Manuel Jiménez in 1830. Honey is not described in the book, but the melites: the simple one, the rose melite, the compound one, and *mercurialis annua* melite. About electuaries, the authors say they were new medicines including either sugar or honey, but do not indicate their proportions. Honey is used in preparing absorbers: of aloes, the dentrifice absorber – containing coral-red and cinnamon, cochineal and alum stone, undoubtedly a pleasant mouth-wash, the absorber with opium, and the theriac of Andromac containing over 60 ingredients: several plants – roses, pepper, saffron, myrrh, incense; animals – castoreum and adders; and minerals – sellada earth and iron sulphate.

For the preparation of the electuary of Turbet and others – described as syrups, the authors did no more indicate honey.

They recommend wax to be used in cerates for which they used a modern term – oleocerolates, for preparation of liparolates – containing fats (cantharis and lavender oils), of resinolates called so because they contain resins and other fats – that of Lucatelo, of Chiron, of Genoveva of Altea, the basilicon, of Father Pison, and others.

Wax is also recommended to be used in stearates and plasters – that of Albayalde, of Canet, of Vigo, of Nurenberg, etc.

All these preparations prove that honey and wax were absolutely indispensable in medicine and pharmacy.

In 1865, the College of Pharmacutists of Madrid – which now is the Academy of Pharmacy – which must be distinguished from the Professional College – published a Dictionary of Pharmacy which is one more evidence of what we have already stated: more than 100 formulae in it included honey, and many of them also contain active principles of chemical origin with intensive activity – copper acetate, mercury, and quinine.

Wax was also included in many cerates, plasters, and pharmaceutical preparations.

This century, in 1905, the Spanish Pharmacopoeia saw its seventh edition; a chapter is dedicated to honey which is described as a sweet product, worked out by bees, and "is harvested on a large scale in Spain".

It is the first Spanish Pharmacopoeia in which the aspect, consistency, colour and taste of honey, and some experiments are described as for example the acid reaction of its solutions which must not

precipitate with silver and barium nitrates, which must not get coloured with iodine solutions, and not turn turbid when alcohol is added; also microscopical examination is described.

The analysis and the new chemical knowledge are used in the investigation of honey. It is featured as emollient and laxative, as being used in various preparations – undoubtedly referring to melites and oxymelites, to electuaries and suppositories, as well as to the Blancard pills or those with ferric iodine.

A chapter dwells on wax – the white and yellow one. Its physical properties are mentioned and numerous analytical reactions, as well as its use for cerates of which 9 are specified; for preparation of plasters – in 14 wax being the basic substance; and for preparation of 6 ointments. Consequently, wax was used in more than 29 recipes.

In 1928, Esteve, Professor of Pharmacy at the University of Madrid, published his work in this domain. It marked, at least in Spain, the decline of the use of bee products in pharmaceutical preparations. He points out, for example, that melites degrade easily as they ferment, and that – for this reason as well as because it was difficult to obtain and its properties were not differing from those of syrups – it should be eliminated from pharmacopoeia.

In connection with cerates he says that they were widely used in previous times but they have lost credit because their use was in sharp contradiction to microbial concepts because they were very septic, that they would rather be considered as agents of infection than therapeutical agents because the germs and microorganisms of the air were easily sticking to them.

How slightly convincing reasons, and partly also not of a critical mind!

Fermentation, to which also syrups are liable when inadequately prepared, and which can be prevented by several scientific means at present. Their being sticky helps germs to adhere easily: but every creme, with any other excipient it also a good medium for pathogen germs.

These disadvantages are by no means due to honey and wax either, but to the other pharmaceutical substances included in the formula; moreover, at the present stage of knowledge, they could be easily avoided.

There are other reasons why honey and wax were eliminated from medicines. The major one is their origin, which – willing or not – makes them increasingly rare and therefore their price is higher than that of other products which – although do not have all their properties can replace them. The modern excipients – derivatives of petrochemistry with all kinds of substances being added, by adding or eliminating radicles – have replaced wax, and the sugars – honey. While they can replace them materially, they will never be able to do it psychologically. People believe in the effect which is due to their origin.

How pleasant is to take a medicine prepared with the honey produced by bees, not with sugar turned out by man!

However, neither honey nor wax have been completely eliminated as the modern pharmacopoeia still use them in various preparations which I think will exist for a long time on.

But science, still expecting to find out the remedies about which Paracelsus said that God has put in all products of nature, is constantly researching and – sometimes may be too early – communicates the results before the investigation is completed as it was the case with the preparations with royal jelly which were in fashion in the 1940-1950s – which were renounced because they were not studied thoroughly enough, but this does not mean that they are completely inefficient medically but that the respective bee product was not adequately separated and used. This is also valid for bee venom.

What a mystery is hidden in it! We are sure that, just like the products separated from snake poison – which are irreplaceable for saving people's life, stopping haemorrhages and curing thrombosis -, one day substances to which many people will owe their life will be separated from bee venom.

Not only that the history of bees and of their products has not come to an end, but on the contrary, one could say that from the scientific point of view it starts now. Science, with all its concepts, is already prepared to try to decipher the secrets of nature. What is still needed are scientists confident in conducting research, as well as knowledge, skilfulness, and patience for unveiling the mysteries of the world.

And, in conclusion, because nobody hears us, I shall make you a confidence, but keep the secret!

I am a heavy smoker, and pharyngitis has frequently harassed me. One of the best professors of laryngitis whom I consulted recommended me to drink water with honey every night, and I assure you that it was more efficient than the antibiotics I had taken previously, was much more pleasant, and what is of not less importance, it was much cheaper.