

The process of making the *capilé*, the yeast in the *bolo rei* cake or the chemical reactions in making *bife à Marrare*... The fourth scientific guide to Lisbon invites you to discover the science behind the city's most typical flavours. Other titles:

**1 Wandering the Streets**

Is it possible to explain the beauty of Lisbon? Perhaps not the beauty, but all the rest you can.

**2 Biodiversity in the City**

Century-old trees, dragonflies, owls and bats. A look at the biodiversity of Lisbon.

**3 Places of knowledge**

The places and institutions related to the history of science in Lisbon.

**5 Rocks and hills**

How were the hills and valleys of Lisbon formed?

**Pavilion of Knowledge-Ciência Viva**

Situated in the Parque das Nações in Lisbon, the Pavilion of Knowledge – Ciência Viva is the largest interactive science and technology centre in Portugal. Major thematic exhibitions and hundreds of interactive exhibits encourage visitors of all ages to explore and experiment the physical world. Physics, mathematics, technology and other areas of knowledge are spread over an area of 11,000 m². Science and the thrill of discovery are brought together under the same roof. Workshops, seminars, scientific laboratories and other activities make this place a house of science for everyone. Timetable: Tuesday to Friday (10h – 18h), Weekends and Public Holidays (11h – 19h) Underground and Train (CP): Oriente; Bus: 28

Coordination **Paulina Mata**.



## AN ESPRESSO, PLEASE

The term “*bica*” was born at the **Brasileira** café in **Chiado**. This café, founded in 1905, sold the “genuine coffee of Brazil”, a beverage that was still not widely appreciated at that time. In order to publicise it, they offered their customers a taste. This proved successful, and in 1908 the Brasileira opened a coffee room, a novelty that quickly became a meeting-point for the elites. It is said that in response to complaints about the quality of the coffee served to customers, the owner had it drawn directly from the *bica* (spout of the bag) so that it would have a stronger flavour and aroma. Coffee is enjoyed for its organoleptic and stimulant characteristics. This is due to the caffeine which, taken in moderation, eases digestion and relieves headaches. The foam on the top of the *bica* reflects its quality and retains the aromas. Did you know that over 800 compounds have been identified in the aroma of coffee?

**Underground Baixa-Chiado. Tram 28**



## GRILLED SARDINES

Much of Lisbon’s charm is due to its traditions. One of these is grilled sardines. Like the roasted chestnuts in winter, sardines are an essential dish in the summer, especially during the festivities of Santo António when the **traditional districts, such as Alfama**, fill up with people in search of sardines. The fame of sardines dates back to the 18<sup>th</sup> century, when they were sold by hawkers all around the city. Hawkers were surrounded by customers who brought their own bread and made themselves a cheap meal. Sardines provide high-value biological proteins, vitamins and various minerals. Being an oily fish, they are also rich in polyunsaturated fatty acids, especially Omega 3, which are good for cardiovascular health. Out of season you can find them in cans, which have been produced in Portugal since 1880. Enjoy eating sardines – your health will thank you!

**Tram 28**



## “BACALHAU À BRAZ”

It is said that there are 365 ways to cook cod in Portugal. One of the most famous, *Bacalhau à Braz*, is a typical Lisbon recipe. In fact, **Bacalhau à Braz has its origins in Bairro Alto** district, due to the creative talent of a tavern owner named Braz. The fishing of the Atlantic cod, *Gadus morhua*, by Portuguese dates from the 14<sup>th</sup> century. Since then the species has played an important role in the Portuguese diet, having received the nickname of “faithful fiend”. As it was caught in distant seas, cod had to be salted. This process prevents the growth of microbes that cause food to spoil. Certain chemical changes to the molecules of the fish also occur during the process, giving the fish the flavour that we all enjoy.

**Underground Baixa-Chiado. Bus 28**



## REFRESH YOURSELF!

The art of making refreshing home-made drinks led to the invention of “*capilé*”! This ancient recipe is for the first time mentioned in the book *Cozinheiro Moderno* (Modern Cook) in 1780. In order to prepare the syrup, make an herbal tea of maidenhair fern leaves chopped up in water, add sugar and heat the mixture until it has cooked down to the desired consistency. Finally, flavour the mixture with orange-flower water. The purpose of this herbal tea is to extract from the plant the molecules of the substances that give it an aroma and therapeutic properties. The leaves are chopped in order to break down their cell structure and make the water infusion and extraction process easier and more efficient. The sugar preserves the extract and prevents the growth of micro-organisms. Although you now know the recipe, it is always worth discovering the flavour of *capilé* at one of the finest renovated kiosks in Lisbon, such as those at Praça das Flores or **Príncipe Real**.

**Bus 773, 790**



## “PASTÉIS DE BELÉM”

A lot of pastries had their origins in ancient convents of Lisbon, but few are so widely appreciated as the famous *pastéis de Belém*. These custard tarts began to be sold near the Mosteiro dos Jerónimos following the closure of the monasteries after the Liberal Revolution. Since 1837 they have been made according to the convent’s original secret recipe. A key part of the tart is the casing of puff pastry which is ingeniously moulded to form very fine concentric layers. This is only possible because of gluten, a network of flour proteins that strengthens the layers. In order for the layers to take shape, the batter is repeatedly rolled out with butter between the layers, and then heat, air and steam complete the job. Try them in **Belém**.

**Bus 28, 201, 714, 727, 729, 751. Tram 15**



## “PEIXINHOS-DA-HORTA”

The delicious *peixinhos-da-horta* (literally “little fish from the garden”) have nothing to do with fish. The name probably derives from the fact that they look like little fried fish. Made with cooked green beans that are dipped in batter and deep-fried, *peixinhos-da-horta* are traditional in Lisbon as both a side dish and a tasty appetiser. Try making them! This is a good excuse to visit one of **Lisbon markets**, like the famous **Mercado da Ribeira**. But a word of advice: don’t let the oil get too hot, because this changes its molecular structure, forming substances that are bad for your health. Did you know that *tempura* was introduced into Japanese cuisine by Portuguese missionaries? The humble *peixinhos-da-horta* were most likely the origin of this popular Japanese dish.

**Tram 15, 18. Underground Cais do Sodré. Bus 28, 714, 732**



# Guide 4

## IN LISBON, DISCOVERING SCIENCE AND TECHNOLOGY TASTES OF THE CITY



The flavours of Lisbon are based on local products and the particular way they are prepared, but also in new ingredients brought here by foreigners. Lisbon has always been a meeting-point for people from all over the country and the world, who brought with them new habits and cultures. But the Portuguese have also exported typically Portuguese flavours and culinary techniques to other parts of the world, such as the Japanese *tempura* and *kasutera* cake, which are probably derived from our *peixinhos da horta* (deep-fried green beans) and *pão-de-ló* (sponge cake). All recipes have their own science, and they often require an experienced hand – like that of a chemist in the laboratory producing emulsions, extracting aromas, concentrating solutions or transforming some compounds into others. To speak of the flavours of Lisbon also entails describing the physical and chemical processes that make them possible and so appetising. In the end, culinary art also involves a lot of science.



## ANYONE FOR “FAVA-RICA?”

Sold in the streets of old Lisbon by women carrying soup pots on their heads, *fava-rica* was a very nutritious and popular soup made of dried broad beans. The *fabaceae* (bean family), in which the broad bean is included, have a high protein content due to symbiosis with the *Rhizobium* bacteria in the soil. These bacteria, found in the root nodules of the plants, convert nitrogen from the air into compounds used by leguminous plants to produce proteins. In various parts of the world the *fabaceae* have been an important alternative to animal protein sources. Testimony to this is the fact that many prominent Roman families got their names from the most common *fabaceae*: Fabius (*faba* – broad bean), Lentulus (*lenticula* – lentil), Pisus (*pisum* – pea) and Cicero (*cicer* – chickpea). Although *fava-rica* has now disappeared from the streets of Lisbon, there are still places where the original recipe can be tasted, such as the **Restaurante Forno do Alfarrabista** in Mouraria.

Underground **Martim Moniz**



## “GINJINHA”...

... with or without “them”. “They” are the cherries, which may or may not be served with the *ginjinha* – a delicious morello cherry liqueur with century-old traditions. Paulo Moreiras, in his “*Elogio da Ginja*” (ed. Quidnovi), says: “because it was costly to produce, (...) it soon became a bourgeois drink.” Later it gradually began to appear in taverns and bars, becoming a national treasure, especially in the bohemian circles of Lisbon where poets and fado artists referred to *ginjinha* in their works.” A good example of this is the fado “*Vou dar de beber à dor*” by Amália Rodrigues. The morello cherry, *Prunus cerasus*, originated in Asia Minor and then spread throughout Europe. As it is a non-climacteric fruit, it has to be picked when fully mature, since it does not matures off the branch. In Lisbon, be sure to try a *ginjinha* in one of the special taverns in the Rossio area.

Underground **Rossio**. Bus **36, 91, 400, 745**



## GOING OUT FOR “ISCAS”

The early-20<sup>th</sup> century resident of Lisbon would go out for a meal of *iscas* (pork liver). The ultra-thin slices of liver used to be cooked by Galician cooks in huge iron frying-pans that were never washed “apart from when the cooks went to Galicia, in order to ruin the reputation of the replacement cook”. Iron rusts, giving the food an unpleasant taste. But when the pans are heated with oil, the oil polymerises, forming a protective layer that keeps the iron from coming in contact with water, thereby preventing rust. Look out for Iscas in one of the traditional tascas of Lisbon.



## HOT AND TASTY!

The smell of roasted chestnuts is a reminder that autumn has arrived! The chestnut, introduced in Europe 3,000 years ago, is a seed that grows inside a bur – the fruit of the chestnut tree (*Castanea sativa*). In the 17<sup>th</sup> century it was part of the basic diet of the inhabitants of the Beira and Trás-os-Montes regions. Chestnuts are a delicacy! Before cooking them you have to cut the skin, but have you ever wonder why? About half of the weight of chestnuts is water. When they are heated, the water turns into steam, which pressurises the skin of the chestnut and makes it explode.

Underground **Restauradores**  
Bus **709, 745, 759**



## “BOLO REI”

The *bolo rei* is a typical Christmas cake originated at the **Confeitaria Nacional pastry shop**, where its recipe has been kept strictly secret since the mid-19<sup>th</sup> century. The cake was inspired by the *gâteau des rois*, which recipe was brought from France by the son of the pastry shop founder and then adapted by various master pastry cooks. Did you know that in 1911, after the Proclamation of the Republic, a bill was introduced in the Parliament to change its name to “republican cake”? The cake dough is leavened by a live microbe – *Saccharomyces cerevisiae* – which was identified and studied by Pasteur in the 19<sup>th</sup> century. During the fermentation process, which occurs in the absence of oxygen, the yeast feeds on the sugars in the cake dough and produces carbon dioxide, ethanol and many other substances that give the cake its mouth-watering taste and aroma.

Underground **Rossio**



## “BIFE À MARRARE”

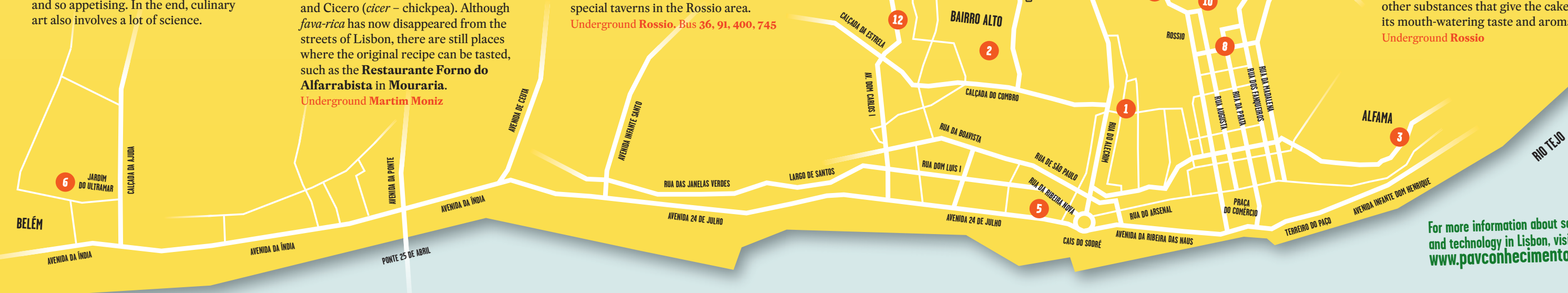
*Bife à Marrare* is one of most famous steaks of Lisbon: a top slice of beef fried in butter, served with cream sauce and chips. The recipe was created by the Italian chef António Marrare at the “Marrare das Sete Portas” café in 1804. Cooking a good steak requires a “master hand”. As the cooking temperature rises, the proteins in the muscular fibres of the steak bind together and shrink, expelling their juices – considered the “soul of the meat” by Brillat-Savarin – and making the steak tough and dry. However, the surface of the steak must reach high temperatures for the Maillard chemical reactions to occur, which are responsible for its unmistakable colour and taste. The secret lies in producing the Maillard reactions while keeping the inside succulent. At **Café de S. Bento** you can experience this famous steak prepared according to the original recipe.

Underground **Rato**. Bus **706, 727**. Tram **28**



## SNAILS HERE!

Every year, from April to September, you will find restaurants **all over the city** displaying the words “*Há caracóis*”. The people of Lisbon enjoy “petiscos” and snacks, and snails accompanied with a cold beer are one of their favorites. These molluscs have been consumed by humans since the Palaeolithic. They are an easy catch, as they travel at a speed of about 5 metres per hour. However, the main reason for consuming these animals is that they are highly nutritious, rich in proteins (approximately 16%) and mineral salts such as calcium, iron, magnesium, zinc and copper. Snails also have the great advantage of being easy to digest and very low in calories, since they have little fat or carbohydrate content. On a summer afternoon, take a break to enjoy one of the city’s most typical flavours.



For more information about science  
and technology in Lisbon, visit  
[www.pavconhecimento.pt](http://www.pavconhecimento.pt)

