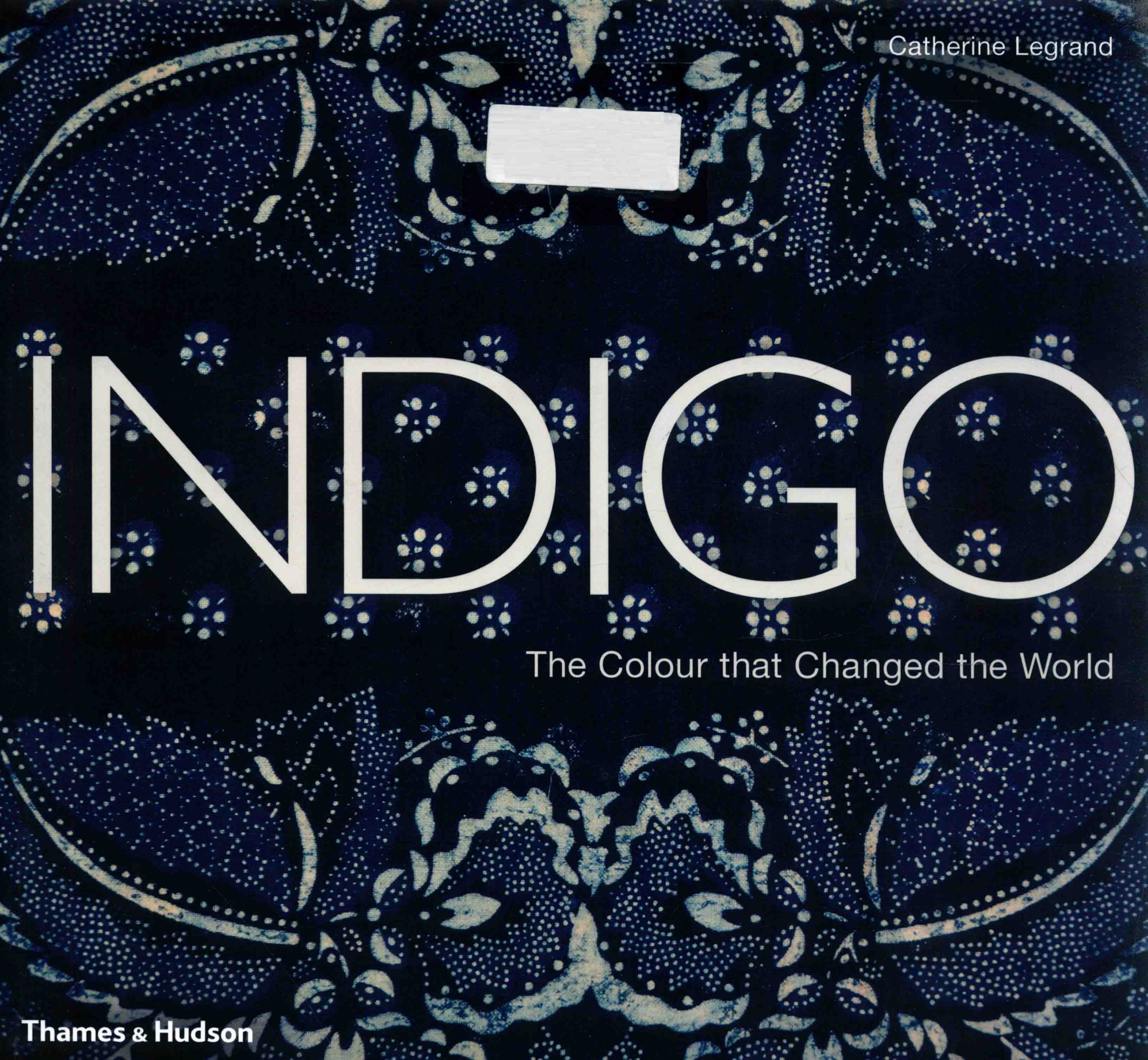

Catherine Legrand

INDIGO

The Colour that Changed the World

Thames & Hudson

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With 510 illustrations in colour

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Opposite (from top to bottom): Nîmes fustian; mattress ticking; Japanese kasuri; *Guizhou batik; Vietnamese hemp cloth; Gujarati* bandhani; *embroidered cloth from Fes; Dogon* pagne; *Guatemalan skirt; Nigerian* pagne.

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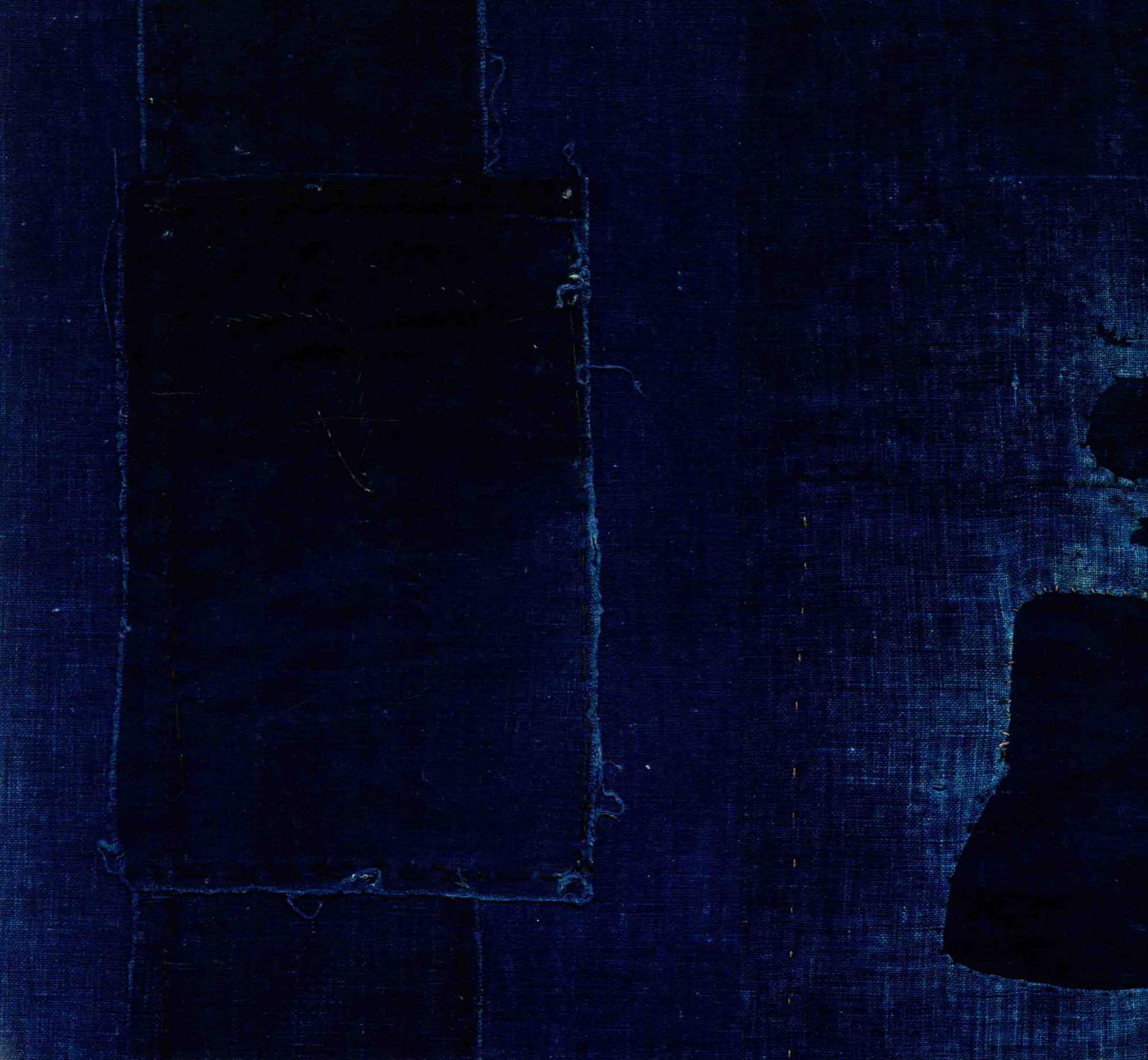


A blue journey

'Like flowing water, the world passes through you and lends you its colours for a while.'
Nicolas Bouvier, *L'Usage du monde*

To start with, it was just a colour

The dazzling blue clothes worn by the minority peoples of northern Vietnam and the intoxicating smell of their dye vats taught me otherwise: indigo is much more than a colour.

My journey through the world of indigo has taken me into the realms of botany and chemistry, of world exploration, commerce and the slave trade, of cultural identity, medicine, folk beliefs and handcrafts, delocalization and globalization, the universality of techniques and the particularity of fashions.

My approach is modest and this book does not claim to be exhaustive. My guides were my experience as a stylist and my curiosity as a traveller, plus one reference book – *Indigo* by writer, artist, traveller and lecturer Jenny Balfour-Paul. I tried to slip discreetly into the workshops and absorb what was happening, like a piece of cloth, soaking up blueness.

This book visits places where the ancient blue-dye traditions still survive and indigo is part of the fabric of everyday life. The journey will take us through villages and markets, to dye studios, secondhand shops and museums of ethnology, following the blue thread that links Japan to Central America via southern China, India and Mali. I could have unwound the bobbin further and included the island of Flores in Indonesia, Nagaland, Peru and Kano in Nigeria. And I could have looked back in time to the Uzbek, Yemeni, Syrian and Tunisian dyers of old. They relied solely on the natural pigment, whereas today's craftsmen are increasingly resorting to synthetic substitutes.

Indigo dyeing is a universal practice. The process unfolds in the same manner the world over, involving exactly the same steps: cultivation or wild harvesting of the plant, extraction of the pigment, preparation of the dye bath, and dyeing of the cloth or yarn. The weaver and/or tailor and embroiderer then transform the dyed cloth into garments of sublime beauty. From one end of the globe to the other, I have seen people who work with indigo as if spellbound by its potential for magical transformation.

Indigo plants from around the world

by Dominique Cardon, CNRS researcher

The *Indigofera* family (1)
Indigofera tinctoria. *India, tropical Asia.*
Indigofera suffruticosa *and* guatemalensis. *Originally from Mesoamerica, then grown throughout tropical Asia.*
Indigofera arrecta. *Originally from East Africa, then grown in tropical and subtropical Africa, Java, Indochina, Philippines.*
Indigofera coerulea. *North India, Gujarat and Sikkim, Arabian Peninsula, Oman and Egypt.*

Woad (2)
Dyers' woad, Isatis tinctoria. *Europe, Turkey, Central Asia, China, Korea, Japan.*
Chinese woad, tianqin. *China.*

The *Polygonum* family (3)
Polygonum tinctorium *Aiton. Southeast Asia, China, Japan.*

Golden Triangle indigo (4)
Rum *or Assam Indigo,* Strobilanthes cusia. *Laos, Vietnam, Thailand, Burma, south China, Bhutan, Nagaland, Bangladesh.*

African indigo (5)
Yoruba indigo or gara, Lonchocarpus cyanescens. *Coastal regions of tropical West Africa, Senegal, east Cameroon.*
Gambian indigo, Lonchocarpus laxiflorus. *From Senegal to northern Nigeria, and as far as East Africa.*

Other indigo plants from Southeast Asia (6)
Broad-leafed indigo or tarum akar. *Laos, Cambodia, Thailand, Vietnam, Burma, south China, Sumatra, Java, Philippines, Formosa.*

The *Wrightia* family (7)
Pala indigo or dyers' oleander, Wrightia tinctoria. *India.*
Lan shu, Wrightia laevis. *South China, Hainan Island, Burma, Thailand, Cambodia, Vietnam, Malaysia, Sumatra, Indonesia, Philippines.*
Mok, Wrightia religiosa. *Cambodia, Thailand, Laos, south China.*

Central American indigo (8)
Mohuitli *or* sacatinta. *Mexico, El Salvador, Honduras, Guatemala, Costa Rica.*
Azul *or* panciga *or* tinta. *Guatemala, Nicaragua, Costa Rica.*

South American indigo (9)
Urubu-retigma. *Southern Brazil. Paraguay, east side of the Andes, Central America*
Yangua *or* llangua. *Peru, Northern Argentina, Paraguay, Bolivia, non-Amazonian Brazil.*

From green leaf to blue cloth

There are hundreds of varieties of blue-dye plant. Some trail and others climb and cling on to supports. Some are sown and carefully tended, while the wild varieties are gathered in the forest or the bush. Woad is adapted to a temperate climate, whereas *Indigofera* plants are happiest in the heat of the Tropics. In her book *Le Monde des teintures naturelles*, the researcher Dominique Cardon starts her list with the genus *Indigofera*, the indigo plants to be found in Africa, India, Southeast Asia and Central America. She follows these with other indigo-containing plants such as *Isatis*, *Polygonum* and *Strobilanthes*, European woad, dyer's knotweed in Japan, Chinese woad, and *Lonchocarpus* in sub-Saharan Africa, Central America and the Amazon Basin.

There are many plants that contain indigo and there are many terms for indigo – indigotin, indican, *añil*, *nila*, *xiquilite*, *gara*, *landian* and *ai* – but all the plants contain (and all the terms refer to) the same dye.

A colour that is both invisible and insoluble

Who, we might wonder, was able to guess that concealed within the fibres of certain green leaves lay the deepest and most mysterious blues? How did a Chinese dyer and a Mexican weaver and a woman dyer in Mali – thousands of miles apart – each discover a recipe for extracting the pigment from their local dye plant and succeed in fixing the colour in the fibres of a textile? We have no answers to these questions. And the queen of all dyes is still more mysterious, since the dye matter itself – indican in the indigo plants and isatan B in woad – is actually invisible.

The first stage in the dyeing process consists of extracting the pigment by steeping the leaves in water or by crushing them. Once the dye matter has been extracted, the fibres have to be impregnated with it and the dye has to be fixed. The pigment, however, is insoluble and needs to be transformed into a soluble substance by molecular deconstruction within the dye bath. This soluble substance is once again colourless: it is the oxygen from the atmosphere that will give it its final blue colour. So, what takes place here is a double chemical operation, which entails the breaking down of a molecule followed by its reconstruction.

A bath of fresh leaves

This is the method practised for domestic use by certain mountain peoples in Asia such as the Akha, the Lanten, the Naga and the Miao. The fresh leaves are left to steep in water. As they decompose, bacteria begin to multiply and these bacteria secrete enzymes that encourage the production of indoxyl (which is colourless) though hydrolysis of the indigo molecules. Once the leaves have been removed, ash lye and lime are added to the water to stabilise its acidity in preparation for the actual dying. The fibres of the cloth or garments soaked in the dye bath become impregnated with indoxyl. When they are removed from the water, the oxygen from the atmosphere causes the indoxyl to precipitate directly on to the fibres. The method is quick but its major drawback is the feeble concentration of the dye bath: the clothes have to soak for hours and between each immersion the cloth must be exposed to the air. The result is a carefully choreographed sequence of cloth being endlessly lifted out of and lowered into the dye bath.

Extracting the indigo by steeping

With a view to producing large quantities of natural indigo, the ancient technique of steeping formed the basis of a large-scale operation on the indigo plantations run by the former colonial powers: in India, the southern United States, the French colonies of Saint-Domingue, Martinique and Guadeloupe and the Spanish colonies in Mexico, Guatemala, El Salvador and Honduras. The method is still practised at a handful of indigo production sites in the Indian states of Andhra Pradesh and Tamil Nadu and in Bangladesh, El Salvador and the Isthmus of Tehuantepec in Mexico.

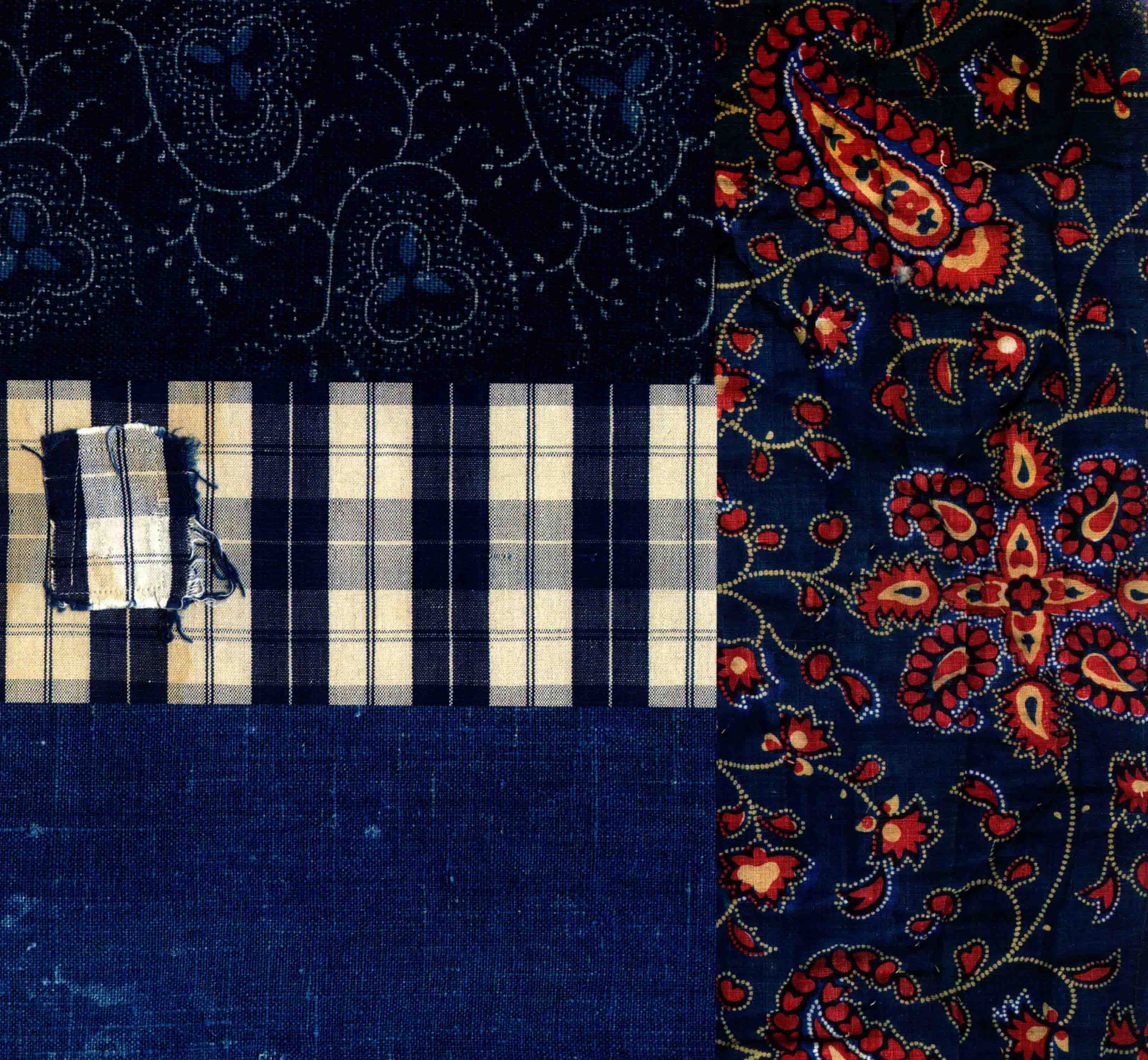
The leaves are left to steep for about twelve hours in a cistern full of water, known in the former French colonies as a *trempoire* or *pourriture*. By a process of enzymatic hydrolysis, the leaves decompose into sugars and molecules of colourless indoxyl. Once the leaves have been removed, the liquid is transferred to a second cistern, which was known as the *batterie*, and stirred vigorously. Through the increased supply of oxygen, the indoxyl molecules group together in pairs to produce indigotin, which is deposited in the form of a blue sludge on the bottom of the cistern. Collected in a third basin (the *diablotin* or *reposoir*), this sludge is filtered, drained and dehydrated. The resulting blue pigment, compacted in squares or blocks, or reduced to a powder, is light, easy to keep and readily transportable. Some minority groups in southern China use the same extraction process, but instead of drying out the pigment they prefer to keep it in a wet state by storing it in buckets or airtight jars.

Extracting the indigo by drying or composting

In this method, the fresh leaves are crushed and composted to form a sticky paste that is drained and shaped into balls. This is the process that was used to make woad cakes throughout Europe during the sixteenth century, particularly in the Languedoc region of France. The balls of dried black pulp sold in the markets of West Africa are made in the same way. Their indican content is so low that they are often used in combination with a vat of synthetic dye. In Japan, the leaves of dyer's knotweed, ground and then fermented, produce a light, dry, long-lasting substance called *sukumo*, which is stored in large bales.

Mounting an indigo vat

The blue pigment in the form of powder, composted balls, *sukumo*, paste or synthetic indigo provides the basis for preparing the dye bath. Dyers call this stage 'mounting a dye vat'. They use all kinds of receptacles – ceramic pots, wooden barrels, recycled petrol cans, plastic tubs or cement basins – which are known by the general term 'vats'. These are often buried in the ground, since earth and sand both act as thermal insulators and help to keep the dye bath at a constant temperature. Unlike other dyes that impregnate textile fibres either directly or with the help of a mordant, indigo pigment cannot do this because it is not soluble. In order to dye cloth or yarn, the indigo molecule has to be reduced chemically in an alkaline solution, which converts it to leuco-indigo, or indoxyl, a soluble and colourless form of indigo. The water for the bath is frequently filtered through wood ash and reducing agents and bacteria are added. In the pages of this book, we will see that each dyer possesses his or her own recipe, some adding lime, some sodium carbonate, rice alcohol, sake, molasses, starch or even urine. When hydrosulphite (sodium dithionite), a powerful reducing agent, and caustic soda (sodium hydroxide) are added to the dye bath, this speeds up the reduction process and the indigo dissolves faster. Although it is polluting, this technique is widely used for dyeing with both natural and synthetic indigo. The pigment is precipitated on to the fibres of the textile, and the cloth, which is a greenish colour when it emerges from the dye bath, turns blue under the effect of the oxygen in the atmosphere.



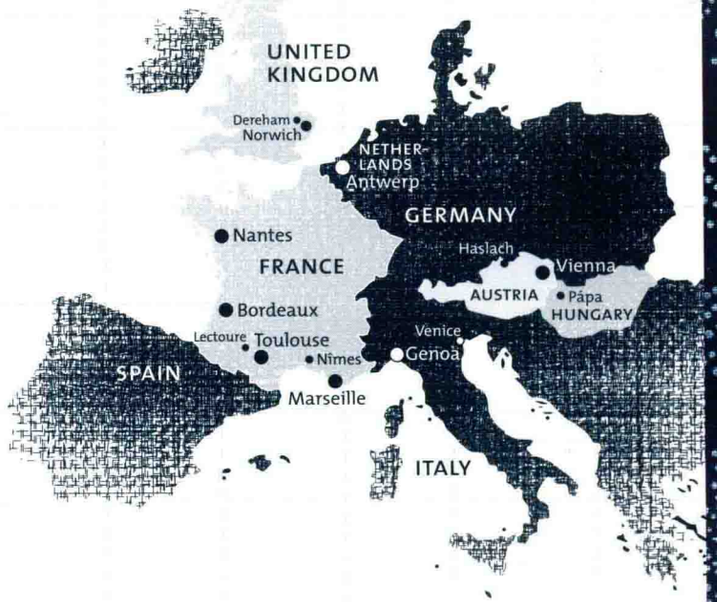
RIVAL BLUES

EUROPE

A European blue dye

'Nothing in nature is worthless, that was what the dyer Master Lucas taught his pupils: every plant possesses virtues that it is incumbent upon us to know and cultivate. There are some that heal wounds, some that whiten teeth, and some that make pots gleam like the sun. Others give our food a delicious aroma. But the most valuable, in my eyes, those that adorn my garden, are the plants that impart colour.'
Olivier Bleys, *Pastel*

Woad was cultivated and utilized from earliest antiquity and for centuries was the only available source of blue dye in Europe. It was only thanks to Marco Polo and the discovery of the trade routes to the Far East that Europe began importing indigo.



Woad: cattle food or medicine?

Dyers' woad, *Isatis tinctoria*, belongs to the cruciferous family, which includes not only dye plants but also mustard, turnips, radishes, rape and a variety of cabbages.

It grows wild on embankments and wasteland and is identifiable by its large umbels of yellow flowers in spring; they smell of honey and in the autumn form pods shaped rather like drop earrings. The plant is a biennial, with oval, fleshy leaves growing in a tight rosette around the central stem and looking rather like a head of lettuce. It is a useful fodder plant because its leaves appear fairly early in the spring.

Before it was known to be a dye, woad was listed in herbals as a medicinal plant. The therapeutic properties of its roots and leaves were already known in the ancient world and woad was used to treat jaundice, disorders of the spleen and skin complaints. It was recognized as having anti-scorbutic, antiseptic, diuretic, astringent and skin-healing properties. In his writings, Julius Caesar described the ancient Britons' habit of smearing themselves with blue dye as a means of intimidating the enemy, but we might offer a different explanation: by daubing on their warpaint were they perhaps hoping to gain medicinal protection?

The geographic distribution of woad

Woad, or dyer's woad, is known in France as *guède*, although other French names for it include *gesde*, *vouède* (in Picardy) and *gaide*, *herbe du Lauragais* and *herbe de Saint-Philippe* (in the Midi), and also *pastel* and *pastel des teinturiers*. It is known as *Waid* in Germany, *guado* in Italy, *Weede* in the Netherlands, *guasto* in Spain, *nilo* and *urzet barwierski* in Poland and *ijenack* in Russia. The 18th-century French

Encyclopédie edited by Diderot and d'Alembert even suggests that the name Great Britain derives from the Celtic word for woad, *brith*.

The first archaeological finds relating to woad date to the Neolithic era and were discovered in the French cave of l'Audoste, in Bouches-du-Rhône, and in a German burial site at Hallstadt. The Aramaic extracts from the first book of *Samuel* and the Dead Sea Scrolls were also written using ink made from woad dye.

In around AD 800, in the *Capitulaire de Villis*, Charlemagne lists the territories of his empire where woad (*waisdo*) is grown. Woad was cultivated in Germany from the 10th century and blue dye was used in Jülich, Thuringia, Saxony and Lusatia. According to a 16th-century manuscript from Erfurt, the financial benefits that accrued to the three hundred villages in Thuringia from cultivating woad were so great that local merchants provided the funds to found the University of Erfurt. Today, we can still admire the splendid mansions inhabited by the gentlemen woad traders of Erfurt whose carriages were driven up and down the *waadgasse*.

In England, the low-lying marshes of Lincolnshire, East Anglia and Cambridgeshire were ideal woad-growing areas. Plantations of woad were also to be found in Somerset and in Ireland, and in Viking York a dye shop with remains of both woad and madder dating from the 10th century has been excavated.

In Italy, *guado* was cultivated in Calabria, Romagna, Piedmont, Tuscany and Lombardy, as well as in the Marches. A village near Nocera was actually named Guado due to the abundance of plantations in the region. Around Florence, locally produced woad was insufficient to meet the demands of the textile industries and dyers had to look further afield – to the ports of Narbonne and Gênes for woad from Languedoc, and later indigo from the Orient, thanks to the services of Venetian traders.

Arabs cultivated woad in the region around Seville in Spain. But it was France that was the main producer and the first European exporter of woad during the Middle Ages: fields of woad extended across great expanses of Brittany, Normandy, Picardy and Flanders. One of the many sculptures decorating the facade of Amiens Cathedral shows a group of men carrying woad cakes in their aprons: these are the Picardy woad traders, who helped to finance the construction of the building – perhaps as a way of atoning for so much wealth so rapidly acquired.

The Lauragais, in Languedoc, was the most productive region. The 'Pays de Cocagne', as it was known, became the synonym for 'land of plenty', due to the prosperity enjoyed by Toulouse woad merchants. As the splendid houses they built for themselves testify today, these merchants made a fortune in a matter of just a few years (between 1500 and 1560). They were supported in their endeavours by the king, Henry II, who encouraged the export of woad to Flanders, Spain, Portugal and England. Moreover, in 1527 the États de Languedoc succeeded in having the tax on woad transactions waived, and around this time some hundred thousand bales of crushed woad cakes were shipped annually up the Garonne from Toulouse to Bordeaux.

Woad in a box

The many uses of woad in the past were not restricted to textile dyeing: it was also made into powder for painting purposes. The illustrator of the 8th-century *Lindisfarne Gospels*, for instance, used a woad-based pigment. In addition, the soft coloured crayons used by artists and known as pastels are made from a mixture of indigotin from *Isatis tinctoria* and calcium carbonate. The technique of drawing with these crayons has itself come to be known as pastel, regardless of the colour of the crayon.

The field of blue

In his poetically titled *Théâtre d'agriculture et ménage des champs*, Olivier de Serres describes how woad was grown and harvested in 1600. The seeds, he tells us, were sown in well-manured, chalky soil in full sunshine, sometime between the waning of the February moon and the full moon in March. By Midsummer's Day, the leaves with their violet border had reached the required size and it was time to gather in the first harvest – an entirely manual operation that involved grabbing handfuls of leaves and twisting them off the plant. Further harvests took place at the end of July, end of August, end of September and, finally, at the end of October or early November. The author concludes with a few comments about the blue foam that, when dried and reduced to powder, became the *fleurée* used by artists.

Diderot and d'Alembert's *Encyclopédie* provides numerous details relating to *pastel* (woad) and indigo and lists five primary dye colours – blue, red, yellow, fawn and black – and names for some fifteen different shades of blue.