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How one colour blue us away

Blue highlights across history

2900BCE

The earliest known samples of a synthetic blue pigment we now call blue frit are used in a tomb painting in Egypt. The hue was made by heating quartz, lime, a copper compound and an alkali, and binding the mix with a natural gum or egg.



2500BCE

The Ancient Egyptians use blue extensively in murals, sculpture and ritual objects. Lapis lazuli produced a deep rich blue, a glass compound was used for a paler blue, and a cobalt-silica mix yielded a black-blue.

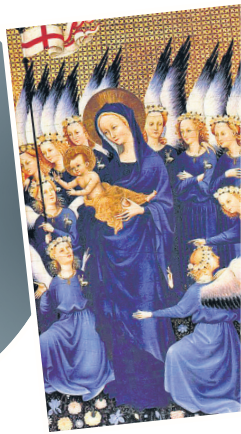
2400BCE

Traces of indigo dye from this period have shown up in artefacts from the Indus Valley Civilisation. The dye was probably used on fabrics.



1215CE

Blue-and-white porcelain, using cobalt from Iran, is prized by the Mongol rulers of the Yuan Dynasty. The later period, Ming, is what gave these distinctive ceramics their name.



A pigment of our imagination

Blue is rare enough in the natural world. Now, paintmakers say they're running out of raw materials for the synthetic version too. The colour is an integral part of modern life — it's in our plastics, paintings, public profiles and protests. How did this shade end up infusing our world?

{ PRIMARY SOURCE } A WORLD OF BLUE SHADES

Paints that are palette pleasers



Natural blue is rare. So the quest to create a manmade pigment in this shade, first done using minerals and later with chemicals, has been long and challenging. "Blue has been valuable right from the start," says Kaustav Sengupta, fashion-trend analyst and colour researcher. Check out the more famous blues and how they've coloured our world

Egyptian blue

It shines bright in tombs and on artefacts even after 4,500 years. Ancient Egyptians produced blue pigment from calcium copper silicate, using it to highlight facial features and costumes on murals, as well as in sculptures, seals and beads. This blue shows up in paintings in ancient Greece, India, and Rome. The recipe has been lost with time.

Maya blue

It's on Mayan and Aztec murals and pottery. It hasn't faded yet, but use of the sky-blue hue disappeared as the Europeans colonised Central America. We know the Mayans mixed clay with leaves from the indigo plant, but the rest of the recipe remains a mystery.

Indian indigo

"Indigo blue was introduced to the Western world from India in the 12th century, hence the

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Y our world is about to get a little less blue. Last month, Dutch paint manufacturer AkzoNobel announced that the pandemic has affected supply chains, causing a shortage of key tints and ingredients required to produce some shades of the colour. The world is readjusting. Trend forecasters, interior designers and fashion houses will pivot to different segments of the rainbow for the next few seasons. And blue paints for cars, homes and other commodities might cost a bit more.

This isn't the first time that blue has made global forces jittery. "This colour has a special place in history; it's been influencing trade winds right from the start," says Kaustav Sengupta, a fashion trend analyst with a doctorate in the colour psychology of India.

Consider, for a moment, how little of the natural world is blue. There's no blue pigment in the sky or the sea. What we perceive as blue is merely the shortest wavelength of light scattered across the air and reflected in water. Even the blue on most plants, butterflies and birds comes from a similar optical illusion. Studies show that in most languages, blue was among the last colours to be given a name — the sea is "wine-dark" in Homer's *Odyssey* (7th or 8th century BCE). Even the Sanskrit *śyāmā*, a term typically used to describe the cosmos or divinity, refers more to a quality — a rich, deep darkness — than an actual hue, much like the Chinese *qing*.

So it's no surprise that unlike mineral reds, charcoal blacks and ochre yellows, blue minerals have been harder to source, the recipes for their dyes complicated and highly prized. "But once we managed to produce blue, it kind of took over the party," Sengupta says. It started out as a marker of social status — reserved only for images of kings, nobility and gods. It caught the eye immediately, and it spread quickly across cultures.

THERE IS LITTLE BLUE IN NATURE: NONE IN THE SKY OR THE SEA; EVEN THE BLUE ON MOST PLANTS AND BIRDS COMES FROM AN OPTICAL ILLUSION

signifies the cold setting on any temperature scale.

"Indigo dye pits, foul-smelling but able to produce lustrous blues in dozens of shades ranging from soft cerulean azure to deepest blue-black, are springing up again across India," says Tyabji. And far from its lofty beginnings, deep blue is showing up as boilersuits, housekeeping uniforms and Dalit-rights activism. "It's become the colour of protest, activism and the underclass," says Sengupta. "A different kind of blue connotes luxury now — the minty cool aqua variation."

Mas Subramanian, the India-born scientist who developed the world's first new blue pigment in over 200 years in his lab at the Oregon State University in the US in 2009, says he's not surprised that the raw material for blue pigments is becoming hard to find. His own creation, YInMn Blue is made from rare yttrium, indium and manganese oxides. "The ingredients for most synthetic blues today come from South Africa and China, so supply-chain disruptions are common," he says. "And stricter environmental regulations mean that older processes are being phased out. The US no longer manufactures synthetic ultramarine because of its sulphur byproducts, though Indian factories still make it."

The world won't be leached of blue for long. Sengupta, who consults for Nippon Paint, says the Japanese firm has enough stock for the short term, and the supply chain will be righted eventually. "The world is connected enough that we'll all experience repercussions," he says. For the next few months, blue will be the stuff of star-crossed romance, we'll be able to describe, imagine, recall and even recreate it virtually. In reality, it might be tantalisingly out of reach.

"In India blue means indigo, in all its infinite variety," says Laila Tyabji, founder of the crafts organisation Dastkar. "It is a pervading part of the Indian aesthetic, from the blue robes of Nihang Sikhs and the midnight blue kasuti-embroidered Chandrakala saris of north Karnataka brides to the blues of traditional Kalamkari paintings and the ubiquitous blue jeans."

The world loves blue. The colour shows up in the logos of 28% of the world's highest-earning companies. Blue ticks on WhatsApp make us feel seen. Blue ticks on social media handles make them seem official. Our emojis weep and laugh blue tears. Blue universally



WATCH: Getting to know blue better, with Rachel Lopez

{ ONCE IN A BLUE MOON } A NEW HUE

A discovery to dye for

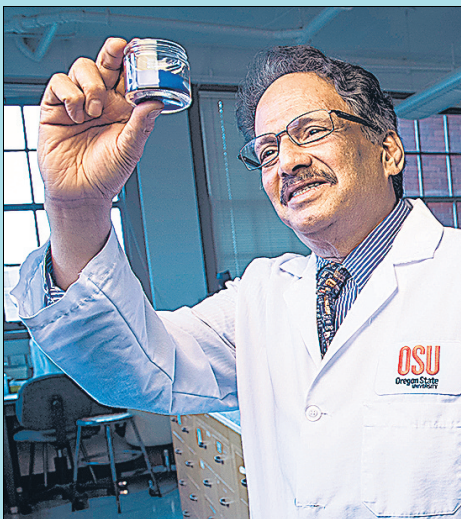
On a day he will never forget, Mas Subramanian headed to his lab at Oregon State University in the US. At the time, 2009, the world hadn't seen a new blue pigment in at least 200 years. The Madras-born professor and chemist wasn't expecting to either.

He liked chemistry. It's like "playing with the periodic table of elements", he says.

His team was using a National Science Foundation grant to research materials that could store data better. They'd been heating the chemicals yttrium, indium and manganese oxides at 1,260 degrees Celsius in the lab's furnace for 12 hours. "I was expecting it to turn black or grey," recalls Subramanian, now 67.

But when a research student drew the sample out, Subramanian's jaw dropped. The incinerated chemicals had turned instead into a clean, vivid blue. "That blue was dazzling. I don't know what four-letter words I must have used that day. I was awestruck," he says.

Subramanian was better-placed than most chemists to recognise, right away, that this was no ordinary blue. He'd worked for years with the chemicals multinational DuPont and handled a range of unusual materials. He has seen innovations in yellow and green. Blue, he knew, was among the hardest colours to create artificially — it occurs so rarely in nature. He didn't sleep that night. The next day,



Mas Subramanian with a sample of YInMn.

2021

Dutch paints conglomerate AkzoNobel announces that it is running out of ingredients to make some shades of blue, after global supply-chain disruptions caused by the pandemic. Buyers have braced for higher costs and delivery delays that are expected to last until mid-2022.

2021

VS Gaitonde's untitled oil on canvas from 1961 sells for Rs 39.98 crore, setting a new global record for highest price fetched by an Indian art work at auction. The abstract work uses shades of blue prominently.

2019

The Hong Kong police add indelible blue dye to their water cannons, staining masked protestors and making them easier to identify later. The move sparks global outrage.



2014

WhatsApp's infamous blue ticks are introduced, showing senders if their messages have been delivered and viewed.

2009

Indian-origin chemist Mas Subramanian creates the first new blue pigment in over two centuries, at Oregon State University.

2006

Meryl Streep, as fashion magazine editor Miranda Priestly in *The Devil Wears Prada*, succinctly explains how luxury trends trickle down to the public, using her assistant's cheap cerulean-blue sweater as an example. "That blue represents millions of dollars and countless jobs," she says.

1998

Jewellers Tiffany & Co trademark a shade of robin's-egg blue, a colour they have been using for their luxury-item catalogue since 1845.