

1300s

Lapis lazuli from a mine in present-day Afghanistan makes its way via the Silk Roads to Europe. The ultramarine pigment it produced is so expensive and striking, artists use it primarily to depict the divine.

1459

Rao Jodha builds Jodhpur's Mehrangarh Fort. It overlooks a city with distinctive cobalt-blue walls, which may have indicated upper-caste homes or pest-control for termites. It's still known as the Blue City.

1706

Finally, a modern synthetic blue. German Prussian Blue — dark, strong, stable — makes its way into Japanese woodcuts, Kalighat watercolours, fabrics and, by 1889, Van Gogh's *Starry Night*.

1748

Officers of the British Royal Navy are required to wear a very dark blue as part of their uniform. People start calling it navy blue. It is later adopted for men's suits, to impart the same sense of trust and authority.

1824

A French chemist devises a formula to mimic ultramarine. French Ultramarine Blue looks rich, but is cheap. The art world and commercial world pounce on it.

1859

Indigo farmers in Bengal, protesting poor working conditions and generations of debt, lead an uprising against the British. The Indigo Commission investigating the mutiny observes that, "not a chest of Indigo reached England without being stained with human blood".

name," says Laila Tyabji, co-founder of the crafts organisation Dastkar. The dye is made with the leaves of the *Indigofera tinctoria* plant and produces a rich, deep blue, the envy of the world. In the late 1500s, France and Norway tried to ban it, in an effort to support homegrown pigments. Europe and the American colonies warred over it for the next two centuries. "Greatly prized, it brought great riches but also suffering," says Tyabji. The British forced farmers in Bengal and Bihar to switch from growing food crops to cultivating indigo. The system thrived on generations of bonded labour. So when cultivators joined the Indigo Revolt in 1859, global indigo trade came to a halt. Indigo plantations in Champaran in Bihar are where Mahatma Gandhi launched his first satyagraha in 1917. "Natural indigo almost died out, only to be revived recently with new interest in natural dyes and eco-friendly processes," says Tyabji. In south India, home to the largest plantations, the farmers call the crop Neel Atha or Blue Mother.

Japanese indigo

Deeper than the Indian version, it's made by fermenting the dried green leaves of the *Persea tinctoria* plant. It made a robust dye for peasants' cottons in the Edo period (1603-1868), when only the rich wore silks. Samurais loved the dye's anti-bacterial properties. It's still handmade and prized in Japan today.

Prussian blue

This blue was created by accident, in 1706 Berlin, when red-dye ingredients in the workshop of dye-maker Johann Jacob Diesbach accidentally came in contact with animal blood. The rich blue found takers as far away as Japan, where printmaker Hokusai would use it for the waves in *The Great Wave off Kanagawa* (1820). Picasso used it liberally during his Blue Period. It's more than paint — doctors administer pills containing the dye to patients with heavy-metal poisoning. The pigment is also sensitive to light. In 1842, a process involving the pigment and semi-transparent paper allowed copies of line-drawings to be created. Architects found it perfect for drafting building plans. We still call them blueprints.

Ultramarine

This is perhaps the only pigment in history that has cost more than gold. Ultramarine was created using lapis lazuli, a semi-precious stone that was mined in present-day Afghanistan and reached Europe in the 13th century via the Silk Road. It was rare and labour-intensive to mine. And because the blue it produced was so striking,

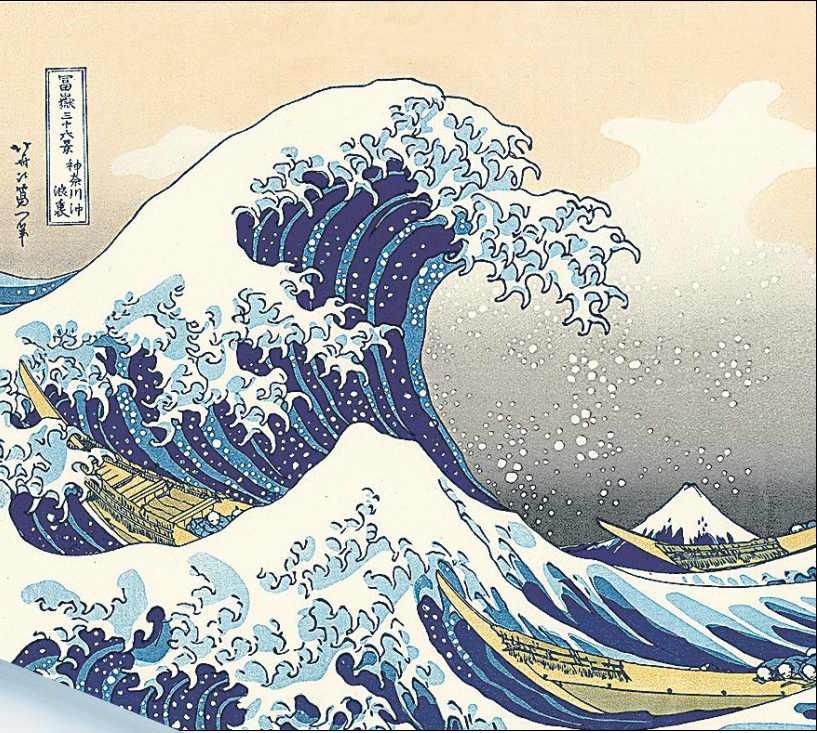
artists reserved it for the most hallowed subjects — heaven, the divine, the Virgin Mary. Michelangelo couldn't afford it. It left Vermeer in debt. Commoners were banned from wearing clothes dyed in it (they couldn't have afforded them anyway). For centuries, Europeans tried to replicate the colour cheaply. Then, in 1825, French chemist Jean Baptiste Guimet heated up kaolinite, sodium carbonate and sulphur to produce a synthetic version. Artists, understandably, rejoiced.

Cobalt blue

Louis Jacques Thénard's pigment, created in 1802, was based on cobalt aluminium oxide and yielded a weaker, milky blue. This durable shade, however, turned out to be great for painting watercolour skies.

Cerulean blue

First made commercially available in the 1860s, it became a favourite with the Impressionists for skies, and of course the ponds of Monet's water lilies.



International Klein Blue

French artist Yves Klein 19, sprawled on a beach with two friends in 1947, when they decided to divide the world amongst them. His friends picked the air and the land. Klein took the sky. He's spent his career trying to capture that spread, working only in blue since 1957. He created a matte ultramarine, patenting International Klein Blue in 1960.

Gharda blue

Thank Indian chemist and entrepreneur Keki Gharda for giving India a blue to call its own. In the 1960s, amid a ballooning foreign-exchange deficit, he found a way to cheaply recreate German Phthalogen Brilliant Blue, a colour used in school uniforms. Gharda Blue, was his venture's first big success. Gharda, 80, now helms a conglomerate worth Rs 3,000 crore, covering agro-chemicals, polymers and public-health products.

YInMn blue

Chennai-born American scientist Mas Subramanian's chance discovery, in 2009, of the first new blue pigment in more than 200 years hit a new milestone this year. Tubes of YInMn blue went on sale. Artists say it's a true opaque blue, making ultramarine and cobalt blue look greener in comparison.

Tiff blue

The iconic, luminous pale turquoise created by Tiffany & Co's cofounders in 1837 was trademarked in 1998. This year, artist Stuart Semple recreated a matte version, Tiff Blue, and put it on sale in 150ml tubes as a stunt. Each tube cost \$28 and they were quickly sold out.

RACHEL LOPEZ

(Clockwise from extreme left) Cobalt-blue waters in Renoir's *The Skiff*; ultramarine in Vermeer's *Girl with a Pearl Earring*; Prussian blue in Hokusai's *The Great Wave Off Kanagawa*; Tiffany & Co's robin's-egg blue jewellery box. IMAGES: SHUTTERSTOCK & WIKIMEDIA COMMONS

{ Q & A } SHATADEEP MAITRA, CO-CURATOR OF INDIAN BLUE



Blue pops out of a Cubist-inspired work by Ramkinkar Baij (top) and KCS Paniker's painting of India's backwaters. DAG

'How you see blue reflects how you see life'

D elhi's DAG gallery didn't set out to capture the zeitgeist with its new show. But days after Indian Blue: From Realism to Abstraction opened to the public in October (it's on until December 1), came the news that paintmakers might be running out of synthetic blue pigment.

DAG's show was intended to be a sweeping look at the colour — 150 works that covered abstracts, landscapes and portraits, history paintings and figurative narrations. What it has become is a rare look at our tenuous hold on the material world and man-made solutions. Shatadeep Maitra, who curated the show with art historian Giles Tillotson, says it's rare for shows to focus on a single colour. Excerpts from an interview.

What made DAG focus on a single colour, blue, for a whole show?

For us, blue was an obvious choice because of the colour's symbolic relevance to India and its overarching presence in our art. The show traces the many changes that took place in modern Indian art through the use of blue. The exhibition spans three historical genres — colonial-era academic art, landscape and figurative art, and abstraction in the 20th century.

What roles have shades of the blue family played in the visual world?

Blue is a soothing colour. It can be loud and silent at the same time. It does not threaten, but it demands your attention. That's perhaps why it is so popular around the world today. Indian Modernists have been pushing the boundaries of the colour for some time. KCS Paniker's 1954 painting of the backwaters of southern India is a great example. Not only is the river blue, but also the trees, bushes, land and people. Another work, an undated Cubism-inspired Ramkinkar Baij painting, shows a rooster perched on a table. Viewers find the meaning behind a work (or draw their own conclusion) from the artist's imagery. So the way you see blue in any painting is also a reflection of how you see it in life.

How might the impending shortage of blue pigment affect art?

Blue is a primary pigment that creates so many colours, and it is necessary for art-making: from painting skies and water in landscapes, to creating skin tones (by mixing with browns and ochres) in figurative art, and for the abstractionist to use to their heart's desire. The thought of blue pigment disappearing is dreadful. But the shortage caused by a supply-chain issue should normalise by next year.

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like any man of science, he set out to replicate his experiment to see if it would yield the same result. It did. He had created the first synthetic blue since a cobalt was developed in France in 1807.

"There was no mention of pigments in our proposal for the grant," he says. This was an entirely separate triumph.

Subramanian named the pigment YInMn Blue after its parent chemicals, and set about acquiring a patent. Further experiences revealed that the pigment, which absorbs red and green wavelengths while reflecting blue ones had other useful properties. YInMn Blue was non-toxic. It didn't fade or release byproducts. And it was the first blue that reflected infra-red radiation, meaning a car or home painted in it would absorb less heat on a sunny day. "It's not just a pretty face," Subramanian says.

Every year since, his work has attracted more attention. The team received a patent for the blue in 2012. The US approved it for

industrial use in 2017, and for commercial use last year. This year, a small batch of YInMn Blue acrylic paint went on sale. At \$179.40 (nearly Rs 13,500) for a 36gm tube, it's more than most artists' materials cost. Yet, they sold out. Meanwhile, the professor has a new project. He's won a new grant from the National Science Foundation — this time to create a range of synthetic colours based on the YInMn principles. "These are pigments for climate change, stable paints that can help offset the heat-island effect in cities. Who thought that pigments could be used for this? It's opened up a whole field of study," Subramanian says.

The team has had success with purples and greens. But creating a bright, inor-

ganic, non-toxic, durable red has been a challenge. They've managed a deep orange. Subramanian seems sure he'll coax a red from the furnace eventually.

Colourmaking has changed the chemistry of his mind too. "It's opened me up to culture and history," he says. "At museums, I'm looking at Medieval and Renaissance works — Vermeer, Monet — and I'm wondering why they used the blues they did." His wife Rajeevi Subramanian, an IIT-Madras alumna, a chemist and an artist, uses the pigment when she paints.

Earlier this year, a first-grader sent him a handwritten note expressing delighted interest in his work. "It made me happy beyond imagination," he says. "It's not easy to understand most things scientists do. But this? Every generation is interested in it. Growing up, I wanted to be an actor. It seems fame found me anyway. And this is enough discovery for a lifetime."

RACHEL LOPEZ



1987

Sridevi shows Bollywood how sexy a plain blue sari can be, in the Mr India song Kaatey Nahi Katte.



1985

India's cricket team gives up the white jersey for a light blue kit with a yellow stripe, for that year's world championship. By 1998, the jersey is all-blue.

1984

Blue error screens debut on Windows computers. Their most famous avatar, Microsoft's dreaded Blue Screen of Death, was introduced with Windows 3.0.



1971

David Bowie turns blue eyeshadow into an instant fashion classic with the video for the song Life on Mars.



1968

Earthrise, a colour photo of Earth taken from the Moon during the Apollo 8 mission, captures the human imagination. Our world is round, small, vulnerable and so blue. The image galvanises the environmental movement.



1966

Bombay chemist Keki Gharda works out a way to locally manufacture German Blue, an expensive dye used on school uniforms, in a better quality at a fraction of the cost, reducing import pressures.



1947

The Indian flag is unfurled in a newly independent nation. Blue is the fourth colour, a navy hue for the Ashoka Chakra.

1956

Elvis Presley releases *Blue Suede Shoes* as the opening track on his eponymous debut album. The song, recorded by Carl Perkins the previous year, refers to army shoes. Elvis's version is by far the bigger hit.



1930

Phthalocyanine pigments, a class of chemicals that respond well to light, heat, acid, alkali and solvents, are developed. These, along with quinacridones from the '50s, are the colourants in today's paints, inks and the dyes in plastics and textiles.

1924

An American newspaper makes the first recorded reference to "blue collar" workers, referring to the colour of the canvas or cotton shirts and boiler suits worn by manual labourers.

1917

Mahatma Gandhi leads his first satyagraha from Champaran, Bihar, in solidarity with its oppressed indigo plantation workers.



1873

Blue jeans are born when Bavarian entrepreneur Levi Strauss and Latvian tailor Jacob Davis jointly create indigo-washed dungarees with steel rivets at the seams. Gold-rush miners love their strength and comfort. Strauss makes them in brown too. Buyers prefer blue.

1860

A new music genre emerges from America's Deep South, stemming from African-American songs of work and worship. They genre is called the Blues, from "blue devils", a term for melancholy and sadness.