

Artist: Pablo Picasso

## LES DEMOISELLES D'AVIGNON

AS THE 20th century dawned, Paris was seething with new ideas. They were batted about in cafés, discussed in newspapers and analysed in literary magazines. As in the rest of Europe the city's culture was dominated by the avant-garde: an intellectual movement that questioned all forms of knowledge, in particular classical intuitive notions of space and time. At the same time, Pablo Picasso began work on a painting that would change art forever.

It is well known that *Les Femmes d'Alger* marked the birth of cubism exactly one century ago, but it is less known that much of Picasso's inspiration came from science, technology and mathematics.

Picasso took a keen interest in photography, which he saw as a technology that allowed one to play with space. He was well aware of the work of such cinematography pioneers as Étienne-Jules Marey – who developed a technique for making multiple exposures on a single photographic frame – and Eadweard Muybridge, who explored motion through a series of frames.

At the cinema, Picasso and his circle of friends – most of them not artists but literati who kept him well informed of the latest scientific advances –

witnessed special effects conjured up by Georges Méliès, who was famous for taking bodies apart and reassembling them in bizarre ways.

X-rays, discovered in 1895, bolstered Picasso's belief that what you see is not always what you get. He arrived at the same conclusion after seeing the work of primitive Iberian sculptors, who represented not what they saw but what they knew.

In composing *Les Femmes d'Alger*, Picasso employed these revelations. Its images resemble nothing we see in the world, but are assembled from body parts seen from different perspectives or as a result of multiple actions caught on a single frame.

The painting is laid out like a motion picture in five frames of increasing geometrisation: from the Egyptian-Gauguinesque figure on the left, through the middle figures (fusions of French conceptual art and primitive Iberian sculpture), to the strange angles of the figure on the right, to the “squatter” beneath her – the figure that underwent the most extreme transformations in Picasso's hundreds of preliminary sketches.

Picasso's notion of viewing an object from several perspectives at once also grew out of his fascination with four-dimensional geometry. Early in 1907, he was introduced to an insurance actuary

called Maurice Princet who had a keen interest in advanced mathematics. Princet joined Picasso's bohemian circle, hanging out with them in bistros and taking part in their hashish-smoking sessions. In June 1907, Princet visited Picasso's studio just when the artist had become stuck on how to proceed with *Les Femmes d'Alger*.

Princet showed Picasso a book by Esprit Jouffret about complex polyhedra in four dimensions. To illustrate his results, Jouffret had projected these objects onto the two-dimensional plane of the paper in order to show them from

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different perspectives in succession – like walking around an object. Picasso was amazed. Jouffret was a friend of the polymath Henri Poincaré, whose now classic book *Science and Hypothesis* was all the rage.

In smoky bistros, Princet gave informal lectures on Poincaré's book to Picasso and his gang. Picasso was particularly struck by Poincaré's suggestion of how to represent an object in four dimensions by projecting a succession of perspectives. With a nod to Jouffret's book, Poincaré wrote that geometers do this

playfully all the time. Why not project multiple perspectives all at once, Picasso wondered.

It was while viewing an exhibition of African masks that Picasso experienced a moment of illumination. What Princet had been trying to teach him about geometry suddenly made sense. Earlier he had discovered that he needed to fuse French conceptual art and primitive Iberian sculpture – now he understood how to add multi-dimensional geometry to the mix.

The result was the face of the squatter, a projection from the fourth dimension, in which front and profile views are seen simultaneously, her head swivelled 180 degrees. The seeds of cubism had been planted.

Two years earlier, another unknown iconoclast – also spellbound by Poincaré's *Science and Hypothesis* – had published his first paper on precisely the same topic: the nature of simultaneity. Perhaps it is not surprising that Albert Einstein in Bern, Switzerland, and Pablo Picasso in Paris should both have been working on the problem of space and time. After all, it was at the very core of the avant-garde. ●

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