Look at all those swirling patterns in a Pollock painting. *Richard Taylor* asks whether they're satisfying more than your aesthetic self

SPLASHDOWN

IF THE Jackson Pollock story hadn't happened, Hollywood would have invented it. In a drunken suicidal state on a stormy night in March 1952, the painter laid down the foundations of his masterpiece *Blue Poles* by dripping household paint from an old can onto a canvas rolled out across the floor of his barn. "The modern painter," Pollock later claimed, "cannot express this age, the airplane, the atom bomb, the radio, in the old form of the Renaissance . . . each age finds its own technique." His technique may seem odd, but its results have stood the test of time. The Australian government bought *Blue Poles* in 1972 for a spectacular two million US dollars — then the highest price ever paid for a modern American painting.

Today, patterns on canvas are all that remain of Pollock and the abstract expressionist movement he characterised—he was one of the last great painters in one of the last great movements in modern art. But what meaning do his swirling patterns hold now for the artist? Why did he use his peculiar method and what was its secret? Strangely enough, there may be a simple but surprising mathematical explanation for his work's enduring appeal.

In Pollock's "drip and splash" technique, the painter poured streams of paint in continuous trajectories across the canvas. The lines reflected his gestures and movements as he walked around, and gave a two-dimensional "fingerprint" of his three-dimensional motion. Pollock controlled the character of the lines by manipulating physical and material variables, including the viscosity of the paint, and the height, angle and speed of pouring. He would work and rework a typical canvas over weeks or months, building up an increasingly dense web of trajectories until finally he decided the pattern was complete—or, in his language, "concrete".

This drip-and-splash technique can be traced back to 1942 and the studio of the German painter Max Ernst. Ernst, continually on the lookout for new artistic methods, described his procedure as follows: "Tie a piece of string, one or two metres long, to an empty tin can, drill a small hole in the bottom and fill the tin with fluid paint. Then lay the canvas flat on the floor and swing the tin backwards and forwards over it, guiding it with movements of your hands, arms, shoulder and your whole body. In this way surprising lines drip onto the canvas."

Ernst was interested in "psychic automatism", the liberation of the imagination and expression of the unconscious, and he hoped that hidden images would emerge from the swirling trajectories—a theme close to all surrealist painters' hearts. Ernst didn't realise, however, that his paint pendulum was an interesting device quite aside from any unconscious expression that it might unleash.

When left to swing on its own, the container moves on an elliptical path and spirals slowly into the centre. This is a stable and predictable motion, and the paint makes a similarly regular pattern on the canvas. But pendulum motion needn't be so simple. As scientists discovered in the 1980s, the very same pendulum can descend into the unpredictability of chaos if it is given a nudge every now and then, at a frequency slightly lower than the one at which it swings naturally.

To physicists, chaos is an irregular motion that arises from fully deterministic forces. Its defining characteristic is extreme sensitivity to starting conditions—even a minuscule change in the position of the container, for example, leads very quickly to a radically altered trajectory. Tiny differences are amplified quickly, and so make the long-term behaviour of the swinging can completely unpredictable.

Does chaos have anything to do with the appeal of Pollock's paintings? One way to find out is to use a version of Ernst's simple bucket to generate some "paintings". By applying precise kicks to the bucket using electromagnetic driving coils, its motion can be tuned from being non-chaotic, where the trajectories are elliptical and do not depend heavily on its initial launch conditions, to being fully chaotic. Helped by British artists from the Manchester School of Art and physicists at the University of Nottingham, I have generated two distinct categories of drip trajectory paintings, and asked a team of observers to judge their visual appeal.

Since Pollock's paintings are built from many crisscrossing trajectories, these pendulum paintings also feature a number of trajectories generated by varying the pendulum's launch conditions. Non-chaotic and chaotic drip paintings look rather different (see Diagram, above). For comparison, the bottom panel is a section of Pollock's "Number 14".

Art of chaos: non-chaotic and chaotic paintings (upper panels) differ. The latter recall Pollock's "Number 14" (bottom)

In the survey, I asked people to identify whether chaotic or non-chaotic patterns were the most "visually appealing". The trajectories were deliberately presented as patterns rather than art, so the judgment was pure "pattern recognition" rather than appraisal of artistic value. The results? Out of the 120 people I questioned, 113 (well over 90 per cent) preferred to look at drip patterns generated by the highly chaotic system. It seems that people visually prefer the drip trajectory patterns generated by the most chaotic system. Perhaps, then, Pollock's success lies in the chaotic process he used to make his patterns?

Chaos may also enter into Pollock's paintings by another route—the dripping of the paint. In 1984, a study of a dripping tap showed that if the rate was adjusted properly, the flow of the fluid could be chaotic. That is, the drips don't come regularly, but in a haphazard and unpredictable fashion. Pollock may have done something similar with his paint. So the two processes by which paint reached Pollock's canvas—the motion of the container and the dripping—each had the potential to be either non-chaotic or chaotic, and so mimic human striving for regularity and order or, alternatively, nature's chaos.

The abstract expressionist movement heralded the arrival of the "action artist", for whom the act of painting is a "happening" and the painting itself a record of the event. At the time, Pollock said his concerns were with "the rhythms of nature". Could he have been so in tune with nature's processes and people's desires to see patterns generated by them that he harnessed chaos to capture the essence of nature? □

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