

Multiplying the Associations: David Smith and Modern Paints

Richard Mulholland

ABSTRACT

The American sculptor, David Smith is widely known for his welded steel constructions, but his work is also characterized by an enduring conversation between drawing and sculpture. Although it has for many years been assumed (erroneously) that Smith only used a self-created mixture of egg yolk and black ink in the abstract calligraphic drawings that he made during the 1950s, new research has demonstrated that in fact Smith utilised a variety of modern paints and resins to nuance his work on paper. The following article illustrates Smith's use of modern paints by touching briefly on a number of examples where Smith used the expressive potential of alkyds, acrylics and vinyl paints in his work, and discusses the importance of their identification both for their preservation and for the enrichment of our understanding of his work.

Introduction

David Smith (1906-1965), almost single-handedly redefined American sculpture in the 1930s, and challenged the authority of those who heralded the new era of American abstract art solely as a triumph of painting. He is widely known for his welded steel constructions - a technique of art making that he introduced to America in 1932 - but the eclectic visual language that he used throughout his career ran from the biomorphic forms of Surrealism to the proto-Minimalist structures found in his late work.

Smith's work is characterized by an enduring conversation between drawing and sculpture, and for the majority of the abstract calligraphic, gestural works on paper that Smith made throughout the 1950s, he used a medium of his own invention - a mixture of black Pelikan drawing ink and egg yolk. (FIG 1) Smith undoubtedly chose this medium as much for its longevity as he did to exploit the viscosity of the medium, and its ability to produce deep and lustrous blacks. The result was a drawing medium that could be used expressively in thick impasto on paper that would, unlike oil paints, dry quickly and not cause staining to occur.

Smith stated that he used this unusual mixture in a lecture in 1952, the transcript of

which has been widely published in the literature. On the one hand this is fortuitous for the conservator and historian seeking a deeper insight into Smith's work. It is information after all that comes to us directly from the artist's own authority. On the other hand, this statement has also led to a widespread and erroneous assumption amongst writers on Smith that all drawings he made in the period 1950 until his death in 1965 were created in this egg ink medium. Research by the author has demonstrated that this is fact this is not the case.¹ Smith was in fact considerably more experimental in his choice of drawing media, and as is discussed below, used a variety of modern synthetic paints in his work that were clearly chosen both for their practical working properties and for the subtle nuance of effect that could be achieved with their employ.

This technical approach to Smith's works and the investigation into the reasons behind his choice of substances and processes to express his vision certainly serves to enrich of our experience of his work. However, in discussing the varied meanings behind what we call modern paints or synthetic resins during the period in which Smith was working, and utilising the tools of scientific analysis to characterise them, we gain an important means of understanding the physical condition of these works, their degradation, and how as Conservators we might approach the care of works in such media.

Modern Paints

In 1956, David Smith wrote to Helen Frankenthaler, "this has been my best year".² It was a year that marked several important landmarks in his work and career, while at the same time expanding his vocabulary of technique through experimentation with new media. Exhibitions of his work began to create significant income for the first time, and in the same year, the Museum of Modern Art (MoMA) mounted its first retrospective of his sculpture. After 1956, Smith began to work more frequently in series, and on concurrent works in different media. He also moved toward a truly industrial mode of working, both in terms of his production and also in the materials he used. It was at this moment of change in both working procedure and creative fervour that Smith began to use synthetic paints more frequently in his drawings, often mixed with, or in conjunction with the black egg-ink he had used since 1952.

Smith's engagement with these new media at this moment was certainly due in

part to the increased availability of synthetic paints after the Second World War, and certainly to the introduction in 1949 of the acrylic as a medium into the artists' paints market. Although many of Smith's contemporaries (Jackson Pollock most notably) were introduced to the expressive possibilities of synthetic paints through the experimental workshops of the Mexican muralist, David Alfonso Siquieros that were held in New York in 1936, it is likely that Smith encountered these paints at an earlier stage. Working as a welder at a Studebaker factory as a young man in 1924, he would have been introduced to industrial automobile paints, and certainly by the time he was working as part of the War effort welding locomotives, he would have been acutely aware of the properties of such paints.

FTIR analysis of drawings by Smith from 1952 and 1959, for example, indicates that he was certainly using industrial and domestic alkyd paints in drawings certainly as early as his first egg-ink drawings, and probably throughout the 1950s. However, although the medium is found in many of his painted sculptures, Smith did not make widespread use of alkyds on paper or other synthetic paint until after 1956. One might speculate that Smith's increased use of synthetic paints after this year in particular was influenced by another significant event that occurred in that year – the death of Jackson Pollock. Pollock was certainly the most influential and successful American abstract painter of the period, and more importantly, the painter arguably most associated with the use of household synthetic paints, which he had used extensively in the classic drip paintings of 1947-51. Smith moved in the same New York social circle as Pollock, they had similar aims, and the work of both artists was promoted ardently by the critic Clement Greenberg. Although we can only speculate that Pollock's death was of some influence in prompting Smith to make more widespread use of synthetic paints after 1956, there are compelling relationships between the practices of both artists that cannot be ignored.

The synthetic paints that Smith appears to have preferred fall into the three categories: acrylics, alkyds and (poly) vinyl acetates (PVA). There is some evidence that he made use of nitrocellulose paints in his later spray painted works, but these are more likely to have been co-polymer resins in mainly alkyd formulations. There appears to be no evidence to suggest that Smith used nitrocelluloses directly in his drawings or paintings. Alkyds, acrylics and vinyl based paints in Smith's work appear to have

been sourced as industrial or domestic paints. However there are a significant number of works created around this period in artists' acrylics.

The earliest drawings by Smith in artists' acrylic paints appear to have been made in 1956 where Magna tube paints were identified by the author in the drawing *Untitled*, 1956. Acrylic was first introduced as a medium for artists by the painter Lenny Bocour in 1949. Bocour used the Rohm and Hass resin, Paraloid F-10, an n-butyl methacrylate polymer, mixed it with pigments and sold under the brand name Magna. The paints were marketed as a faster drying alternative to oils, and they were quickly taken up by a new generation of painters, such as Helen Frankenthaler, Kenneth Noland and Morris Louis, who discovered its potential for creating large scale colour field paintings, often on unprimed canvas. In 1953, only three years before Smith began to use Magna in his drawings, Clement Greenberg, Kenneth Noland and Morris Louis visited Helen Frankenthaler's studio in Greenwich, Connecticut, and witnessed her painting Mountains and Sea in Magna on unprimed canvas. This was the impetus for both Noland and Louis who subsequently used the technique in their own paintings. Smith's receipts indicate that he ordered a substantial quantity of Magna in 1956, and Magna tubes were discovered by the author at Smith's Bolton Landing studio in 2006. (FIGURE 2) Magna has not been identified specifically in any drawings by Smith before 1956, but it seems likely given that Greenberg, Noland and Frankenthaler were amongst Smith's closest friends at this point, that they may have exchanged technical information which led to Smith's experimentation with the medium.

Smith also created several drawings in acrylic emulsion (dispersion) paints, which was introduced to the market by Permanent Pigments under the brand name Liquitex in 1956. (FIGURE 3) In this case, he seems to have experimented with the medium almost as soon as it was available. The drawing, AΣ80-12-57 (1957, David Smith Estate) was found to be in acrylic emulsion paint, and there are several other examples of the use of the medium in drawings made in 1957. Interestingly, Smith appears not to have continued using acrylic emulsion paints after initial experiments during this year, and there may be a number of reasons why this was the case.

The painter, Robert Motherwell, also working with acrylic emulsions in the 1950s and 1960s noted that Liquitex's colour range was limited and that they had a tendency

to be chalky. He stated that they were “inexpensive, good colours ... Liquitex as we know it now when it’s mixed with water behaves like gouache. It’s opaque and chalky.”³ Looking at Smith’s earlier egg-ink drawings and drawings in alkyd and Magna, it is clear that he enjoyed the various tensions between matte, gloss and lustre that could be achieved with these paints. In this case, the early acrylic emulsion artists’ paints may simply have been too matte and gouache-like for his work.

Also in 1957, Smith produced a series of works on paper in which he mixed a vinyl-based solution with a purple or black ink. The media analysed in the drawings: *ΔΣ82-12-57* (1957, David Smith Estate, FIGURE 4), and *Untitled* (1957, Harvard Art Museum), were found both to contain a vinyl-based resin when analysed using Pyrolysis GCMS and FTIR.⁴ The fact that *ΔΣ82-12-57* is part of the same series as *ΔΣ80-12-57* in acrylic emulsion discussed above demonstrates that he was likely experimenting with the same form in drawing but attempting to achieve different effects using subtly different media.

PVA emulsions and solutions were certainly available by this time. However, the possibility of a PVA emulsion does not explain the marbled appearance of the media, in which it is clear that a mixture of a water-based ink and solvent based paint or resin was used to create an immiscible, mottled effect. Since PVA easily forms a homogeneous mixture with other water-based media such as ink, it is unlikely that this effect could have been achieved with a medium based on that resin.

PVA emulsions were available to artists at the beginning of the 1950s, but solvent-borne PVA solutions were introduced as early as the 1930s. PVA paints had a short-lived presence on the market in the 1940s, when Borden Co. introduced *Polymer Tempera* artists’ paints, which were based on PVA emulsion.⁵ Several artists mixed their own paints using dry pigment and PVA emulsions, as a kind of precursor to acrylic emulsion paints. Amongst these was the painter, Sidney Nolan, who began to use PVA in 1957, the same year as the series of drawings by Smith. Nolan’s description of the resin, that, “there was a point at which it bubbled and hardened, and you couldn’t use it anymore; it was like lava”,⁶ may correspond to a similar effect observed in Smith’s *ΔΣ82-12-57* (1957), whose purple vinyl based medium has a similarly bubbled surface.

The answer may be found in coatings used in several of Smith’s sculptures. Cross

sections taken in 1993 from paint from the Smith sculptures; *Zig III* (1961), *Zig V*, (1961), and *Circle III*, (1962, all National Gallery of Art, Washington D.C.) demonstrated that at this point, Smith used a yellow/green etch primer which contained a solvent-based poly (vinyl) compounds, including (poly) vinyl butyral, a resin chemically similar to PVA.⁷ There is also significant archival evidence to suggest that Smith used this resin. Smith's papers confirm that he purchased a material known as *Tuf-On Pri-met P-70* wash primer in 1962 from The Brooklyn Varnish Manufacturing Company. A product brochure sent with the invoice states that the primer was "a zinc chromate wash primer developed for ship bottoms and compounded with polyvinylbutyral resin".⁸

Of deeper significance perhaps is the fact that Smith's assistant, Leon Pratt in a 1970 interview confirms that Smith used P70, and that he enjoyed both its colour and its practical working properties.⁹ With this in mind, it is quite possible that Smith took a product that he favoured for sculpture and utilised it in his drawing.

Nudes, 1962-64

As discussed above, Smith began to use alkyd paints in his drawings as early as 1952. However, he appears to have had a resurgence of interest in it after 1959. Certainly by 1956, Smith was painting his sculptures in alkyd paint, and very likely before this time.¹⁰ In 1963, Smith began to make a large series of figurative Nude drawings on both paper and canvas in black alkyd paint (and occasionally black ink) applied with an ear syringe (FIGURE 5). The Nudes, which formed a significant part of Smith's oeuvre, reflected a figurative dimension to his work that was in opposition to the prevailing formalist view of the work of Smith and other artists of the New York School and were largely ignored until the early 1980s.

The technique itself is a direct evolution of Pollock's painting technique. Smith associated with Pollock in the early 1950s, at the time when Pollock was making his more figural black enamel paintings (1951-52), which according to Lee Krasner, were made using sticks, dried up brushes and turkey basters.¹¹ Smith's Nudes were of a much smaller scale than Pollock's black paintings, and it is probable that the larger turkey baster would not have afforded him the precise control over paint delivery that he required. The ear syringes were a tool that facilitated the production of a continuous unbroken line that was not possible using the drip from a brush or stick.

In this way Smith could work from above, as one would in drawing, and gently pour the paint from the syringe in a manner much more like the traditional pen and ink of academic Nude drawings, yet which could apply emphatic squirts of paint when necessary.

It is likely that having to work flat either on the floor or, more likely, given the average size of the canvases, on the large tables that he had set up in his painting studio enhanced the associations with drawing. Brooks Adams states that Smith's use of enamel for these drawings conveys a "low relief sculptural presence" in its pooling and congealing on the canvas.¹² Where this may be true for many of Smith's drawing media, it is precisely the lack of relief or texture in the alkyd medium that gives it the working properties desired by artists. Alkyds were and are used in industry largely because they result in an even, blemish-free finish. They can on occasion be applied with a certain amount of impasto, but this tends to cause undesirable shrinkage and cracking effects. In this instance, the balance is weighed in favour of practicality. Drawing in ink cannot easily take place on gessoed canvas, and the slow drying time of oil paint precluded that medium.

Spray Stencil Drawings, 1957-1965

In 1957, David Smith almost abandoned ink drawing in favour of drawings on paper and on canvas made using aerosol spray paint and stencils (FIGURE 6). This occurred simultaneously with a preoccupation with larger volumetric forms in stainless steel, begun in 1957, which eventually evolved into the twenty-eight sculptures forming the Cubi series. These works were created on small sheets of paper, and often large narrow canvases using metal parts, paper cut-outs, watermelon rinds, and various other found and appropriated objects used as stencils and that came from aspects of Smith's daily life and work. These works were almost certainly influenced by photograms created by Moholy-Nagy and others, but Smith was also aware of the practice of prehistoric cave painters, who would place their hands against a cave wall and blow dry earth pigments from their mouths, leaving a stencilled image of the hand behind on the wall. His library contained several books on primitive art, and of particular note, an exhibition catalogue from 1937 on Primitive Cave Art exhibition, the printed cover of which displays an example of one of these prehistoric hand prints (FIGURE 7).

Perhaps the most significant source for these sprayed works, however, was from Smith's workshop practice itself. When Smith made sculpture, he often worked on the floor arranging the elements of the piece by hand on white painted rectangles. When the sculptural elements were welded temporarily in place, and the sculpture was removed, the white paint would be charred by the carbon residues of the welding torch, leaving a negative image of the sculpture in white, much as one creates a stencilled drawing. Smith took these images, re-interpreted them as drawing and painting, and arrived at a technique that provided him with means to enhance dialogue between sculpture and drawing that informed his process in both.

Translating this practice to paper, Smith replaced the welding torch with sprayed paint. Initially, he appears to have experimented with watercolour and a mouth atomiser in at least one early attempt to produce a stencilled work, but in 1957 he began to use the recently introduced aerosol spray paints. This was possibly the first use of the technology by an artist.

Acrylic resins have been identified in Smith spray drawings, particularly in the metallic colours. However analytical investigation by Pyrolysis GCMS and FTIR also demonstrate that most of the spray paint Smith used was based on a mixture of resins. This is confirmed by Craig Swafford of Seymour of Sycamore, who states that at the time, acrylic resins were simply too expensive to be used alone in spray paints.¹³ Seymour spray paints typically used a combination of chain-stopped alkyd and nitrocellulose resins in their spray paints during the 1950s and 1960s.¹⁴ Seymour largely produced paint for hardware distributors, whereas paint developed by an important rival, Krylon, was directed firmly toward the artist/designer market. Smith's receipts show only a few of his spray paint purchases, but these tend to have been from automobile and hardware suppliers. Krylon spray paint cans are certainly visible in several photographs of Smith working in his studio. Though Krylon's "plastic spray" fixative was undoubtedly the first acrylic spray paint, the acrylic would have been present in a very dilute form, and given the expense of acrylic resins at the time, it is likely that Krylon colour aerosol spray paint employed a mixture of acrylic and other resins as described above.

As Peter Stevens has observed, Smith likely found the aerosol can to be a useful tool, since it could be used in one hand, like a brush.¹⁵ This informs much of our

understanding of Smith's earliest attempt to produce sprayed stencilled work. In an untitled drawing made in 1952 (David Smith Estate – FIGURE 8), Smith used black tube oils and a sprayed textural background in a orange-brown watercolour or ink. Both the liquidity and the shape of the spatter in the sprayed medium are consistent with a traditional artists' mouth atomiser, and indeed several of these tools were identified by the author on a visit to Smith's studio at Bolton Landing in 2006. It appears that Smith sprayed the paint over several hard edged stencils and then delineated the edges of the negative space left by the stencils with black oil paint applied directly from the tube. The resemblance of the drawing to the prehistoric hand image discussed above must be noted, since the yellow/orange mottled watercolour used in spray form certainly recalls very vividly the image from the cave wall that Smith had seen on the cover of his exhibition catalogue, and indeed which may have directly inspired it. An inscription reveals that Smith received the catalogue as a gift from a friend in 1951, only a year prior to making this drawing, so it is not unlikely that it had some influence in this early experimentation with the sprayed medium.

Smith's experiments using a mouth atomiser and stencils were seemingly abandoned after this work, and there do not appear to be any further works made in this manner, until the arrival of the synthetic spray drawings in 1957. There are several possible explanations. Firstly, it is likely that Smith favoured the effect of sprayed medium, but did not particularly like the technique. Delivery of paint from a mouth sprayer is by nature awkward and unwieldy. Since one end of the L-shaped device is constantly in the mouth; the other in a vessel of medium, physical movement and expressive application naturally limited. The technique seems overly awkward when one recalls the physicality in the free and gestural marks made on paper by Smith in his more typical 1950s drawings. Secondly, the method required working vertically or at least at an acute angle to the horizontal, since the sprayer had to maintain contact with the liquid and not spill. This was against Smith's normal working procedure (for both drawing and sculpture) which was largely viewed and executed from above and created on the horizontal plane. One can speculate that the advent of the spray can meant that a return to the favoured aesthetic of this earlier experiment was possible, albeit with a more simple and versatile tool that could be used expressively at any angle, create a variety of effects, and might enable more natural movement of the body.

Another work, *Untitled* (1957, Harvard Art Museum, FIGURE 9), in spray paint on canvas demonstrates a technical discovery that is echoed in many of Jackson Pollock's works. The initial application of spray paint in a matte (flat) black paint was enhanced by a gloss black spatter from the aerosol into the still wet matte paint. The solvent in the gloss black partially displaces the flat black paint underneath and exposes the white ground of the canvas, leaving a kind of halo effect around the gloss spatters. The effect was likely achieved by accident by Smith, but it is also observed in a number of Jackson Pollock's paintings for example Number 11A, Black, White and Grey, (1948). Smith's interest in the achievement of subtle surface effects in both his sculpture and drawings and the fact that he considered this work significant enough to sell to a collector indicates that he felt the work was a success.

The effect is achieved by means of two different types of modern paint. With Pyrolysis-GCMS analysis it was possible to ascertain that while the gloss black spray paint in this work was clearly an oil-modified alkyd, the matte black contained nitrocellulose resin.¹⁶ Since both paints were solvent-based, it is likely that the solvent from the alkyd black displaced the nitrocellulose black underneath, since nitrocellulose remains soluble in certain solvents after it dries.¹⁷ However, A.G. Armour et al. offer another interesting hypothesis. When a nitrocellulose paint is applied, the wet film is in a turbulent motion as a result of the evaporation of the solvent and from non-uniform surface tension.¹⁸ The no-flow point of nitrocellulose –the point at which the increasing viscosity of a drying liquid reaches the point where solids (ie. pigment) in the system can no longer move freely – is around 30-40% solids. Therefore 60-65% of the drying mechanism involves shrinkage. The solids in an alkyd system reach a no-flow point much later, at around 80% or more. In other words, an alkyd system can stay liquid for longer than a nitrocellulose system, and there is considerably less shrinkage involved in the drying of an alkyd system. This is a desirable property that helps increase the concentration of pigment. These drying differentials and motion may have been responsible for the displaced effect of the black paints on Smith's painting. Whether this was accidental discovery or carefully planned technique, such effects achieved through the use of synthetic media are seen throughout Smith's oeuvre.

Though only briefly touched upon here, an understanding of how Smith utilised modern paints in his work on paper, informed by both chemical analysis, and by

the wealth of technical material to be found in his papers, there is certainly a deeper insight to be gained into Smith's working process and thinking, and perhaps also an increased appreciation of his skill and inventiveness as an artist. Forty years after his death, we may only speculate on the ideas behind Smith's process, but studying these aspects clearly adds a dimension to his work that is not discussed in the majority of art historical writing.

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IMÁGENES:

FIGURE 1: David Smith, *Untitled*, 1958, David Smith Estate. © Estate of David Smith/DACS, London/VAGA, New York 2011.

FIGURE 2: Magna Paint tubes discovered in Smith's Studio, Bolton Landing, New York, 2006

FIGURE 3: Advertisement for Permanent Pigments *Liquitex* acrylic paints, American Artist Magazine, November 1957.

FIGURE 4: Ear syringe used to create Smith's *Nude* series, discovered in Smith's Studio, Bolton Landing, New York, 2006.

FIGURE 5: David Smith, *ΔΣ82-12-57*, 1957, David Smith Estate. © Estate of David Smith/DACS, London/VAGA, New York 2011.

FIGURE 6: David Smith, *Sketch for Lantern Sentinel*, 1961, Whitney Museum of American Art. © Estate of David Smith/DACS, London/VAGA, New York 2010

FIGURE 7: David Smith, *Untitled*, 1952, David Smith Estate. © Estate of David Smith/DACS, London/VAGA, New York 2011.

FIGURE 8: Cover of Exhibition Catalogue for Prehistoric Rock Pictures, MOMA, 1937, discovered in Smith's Studio, Bolton Landing, New York, 2008.

FIGURE 9: David Smith, *Untitled*, 1958, detail showing displacement of paint. © Estate of David Smith/DACS, London/VAGA, New York 201

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BIOGRÁFICO DEL AUTOR

Richard Mulholland is a Paper Conservator at the Victoria & Albert Museum, London. He has a degree in History of Art from Leicester University, a Masters Degree in Conservation of Fine Art from the University of Northumbria, Newcastle, and a Doctorate in Technical Art History from the Royal College of Art, London. He has previously worked as a Paper Conservator at The Metropolitan Museum of Art, New York, The Straus Centre for Conservation and Technical Studies at Harvard University, and at the Tate in London. His research interests are in the technical study of modern drawings.

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