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Harnessing Light and Motion: The Experimental Diazotypes of Otto Piene

ABSTRACT

In 1958, the German artist Otto Piene, one of the founders of the international art movement known as Group Zero, began creating a series of artworks in various media using a group of hand-fabricated cardboard stencils. With these stencils Piene created paintings; "smoke drawings"; and dynamic room environments, which he called Light Ballets, by projecting electric light from both static and motor-driven sources through the stencils onto the walls of a darkened room. One particularly innovative use of the stencils was to create a group of contact photographs by allowing sunlight to pass through the stencils onto a piece of diazotype paper beneath it. Of these works, *Untitled (Light Ballet),* 1959, in the collection of the Museum of Modern Art, exemplifies the creative use of the diazo process by a visual artist. The identification and characterization of the medium were addressed through limited scientific analysis. An interview with the artist provided invaluable information about the details of his techniques and the evolution of this work as well as its condition and importance. Display restrictions will play an especially critical role in the long-term preservation of this unique photograph.

INTRODUCTION

In 1998, the Drawings Department and the Department of Photography at the Museum of Modern Art (MoMA) jointly acquired *Untitled (Light Ballet)*, 1959, (71 x 99 cm) by the German artist Otto Piene (fig. 1). As it was a joint purchase, the object officially entered the Museum's collection with two different media assignments: the Photography Department accessioned it as a "direct positive, silver-stabilized print" while the Drawings Department simply characterized it as "photosensitive paper." The work ultimately arrived in the photography and paper conservation lab to clarify this discrepancy and to assess its condition. Ultimately neither assignment was determined to be correct.

The typical diazotype support is a lightweight, smooth-surfaced, machine-made wove paper. The recto has discolored slightly, most severely at the edges, while the verso remains much whiter and brighter, an important identification characteristic of diazotypes (Kissel and Vigneau 1999). The image has a somewhat continuous tone ranging from light violet along the edges to a rich, deep black-violet in maximum density areas. Under the microscope, it can be seen that the image material is embedded in the substrate with distinct spots of color noted in the midtones (fig. 2).

The work is not in pristine condition. The primary damage is a tideline from an aqueous solution in the lower left corner, resulting in planar distortions concentrated in this area. The image material has migrated with the tide-

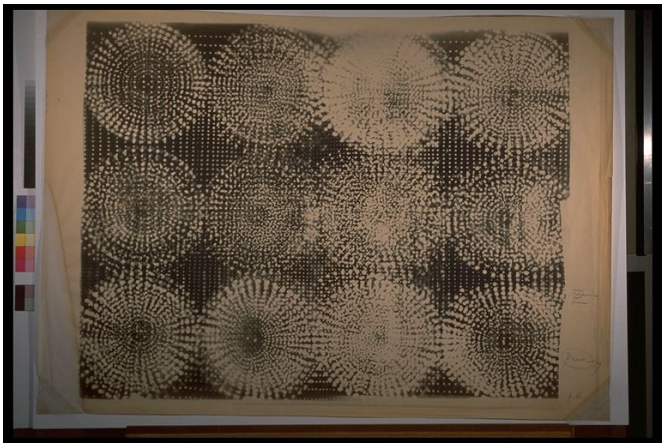

Fig. 1. Otto Piene, *Untitled (Light Ballet),* 1959, Diazoprint, (71 x 99 cm). The Museum of Modern Art, #781.98.

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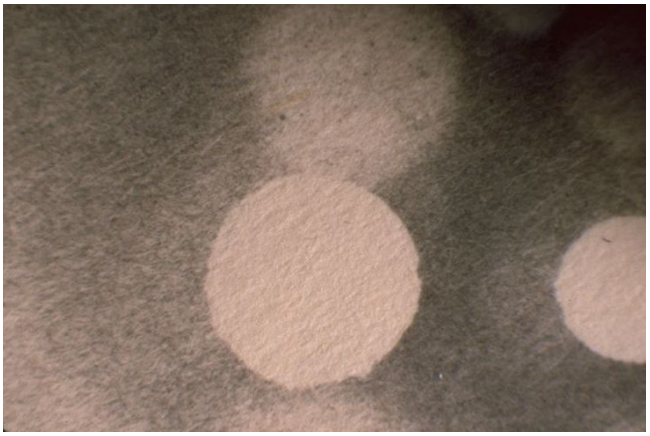

Fig. 2. Otto Piene, *Untitled (Light Ballet),* 1959, Diazoprint, (71 x 99 cm). The Museum of Modern Art, #781.98. Detail at 30x magnification.

line leaving behind an area that is noticeably brighter than the unaffected areas.

During the course of its identification, correspondence with Otto Piene eventually led to a formal interview with him at his home and studio in Groton, Massachusetts. The Conservation Department at MoMA has begun archiving interviews between conservators and artists whose work has been part of the exhibition schedule, including Chuck Close, Andreas Gursky, and Gerhard Richter. The Piene interview answered questions about his working techniques, the evolution of this object, and provided invaluable information about the condition and importance of the print in MoMA's collection (fig. 3).

Fig. 3. The artist Otto Piene and Mellon Fellow Scott Gerson during MoMA interview at the artist's studio in Groton, Massachusetts, January 18, 2002.

THE ARTIST

Otto Piene was born in Westphalia in western Germany in 1928. Like other German children of his generation, he was required to join the Hitler Youth. At age 15, near the end of World War II, he was drafted as a "child soldier." One of his duties was to watch the night sky overhead looking out for the tiny points of light that signaled an approaching aircraft and potential enemy attack. This early experience observing the great expanse of the sky had a lasting impact on Piene and his art (Piene 1988-90).

From an early age, Piene knew that he wanted to be an artist. When he was discharged from the military in 1945, at age 17, he spent two years in a British internment camp, where he occupied himself with his watercolor box and sketchbooks. He began his formal art education in 1948 in Munich, ultimately ending up at the Art Academy in Düsseldorf in 1950, along with fellow students Joseph Beuys and the author Günter Grass, who was in the sculpture program. In addition to his visual arts education, Piene studied the philosophy of aesthetics and perception.

In Düsseldorf, Piene first encountered modern art, which had been so thoroughly suppressed as degenerate during the Nazi regime. Despite heavy wartime bombing, a vibrant contemporary art scene emerged in Düsseldorf, where Piene shared his first studio space with friend and fellow artist Heinz Mack. The studio was a large room with a gaping hole in the ceiling, as Piene described it, in the remnants of a bombed building among the ruins (Piene 1988-90).

Mack and Piene and, eventually, the artist Günter Uecker were co-founders of Group Zero, which was one of many international artists' collectives that exploded in Europe in the wake of World War II. As Piene describes it, Group Zero was not a "group in a definitely organized way" (Piene and Mack 1973), it was a confluence of artists who came together in the mid-1950s to solve the practical problem of where to display their work.

A series of one-night exhibitions and demonstrations was organized around themes such as "The Red Painting" or "Vibration." Some of the artists who participated in Group Zero exhibitions and publications included Jean Tinguely, Daniel Spoerri, and Yves Klein. While their art

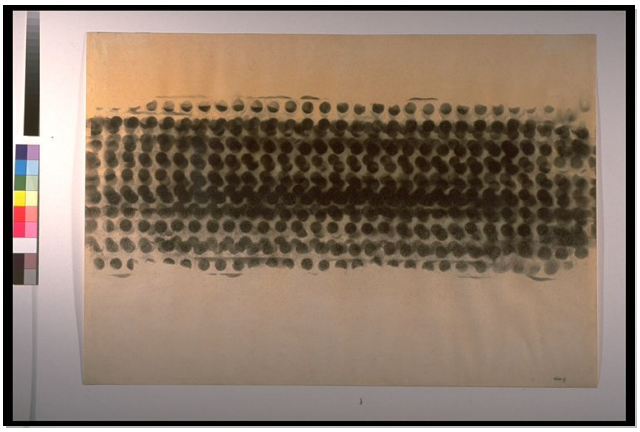

Fig. 4. Otto Piene, *Untitled (Smoke Drawing),* 1959, Soot on paper, (51 x 73 cm). The Museum of Modern Art, #19.99.

took different forms, there was a common search for discovering new artistic means and media and experimentation with technology.

STENCIL WORKS

In the late spring and summer of 1957, Piene began creating a series of hand-fabricated stencils, or in German, *rasters*. These stencils became the cornerstone of his work for the next decade. The first stencils were made using sheets of copper drilled with a pattern of holes. Later Piene created approximately forty cardboard stencils using standard leather punch irons with a range of diameters to pierce each of the panels with thousands of holes. The holes corresponded to the intersections of lines plotted using rulers and compasses in patterns that were not delineated according to a set of rigid measurements, but instead reflect different repetitions and rhythms.

The first works he created using the stencils were paintings. These were executed by pouring and manipulating a mixture of very stiff oil paint onto a canvas through the stencils, much like ink squeezed through a silkscreen with a squeegee. Unlike a silkscreen, however, the paint application through the stencil was not uniform. When combined with appropriate lighting, the resulting irregular quality of the raised dot pattern expressed the sense of vibration and visual activity that the artist sought. Additionally, Piene used the stencils to direct soot from a burning candle or lamp onto a paper support to create his ethereal "smoke drawings." As it rose in the gentle wave of the heat currents, the soot was deposited locally on the sheet of paper above (fig. 4).

At this time, Piene began to experiment with electric light—light being the sum of all colors—as an artistic medium by shining it through the stencils onto a wall to create static "light paintings." From these simple light works evolved more complex environments which filled entire rooms with light and music. They were known as Light Ballets. The kinetic dance of light was projected from mechanized lamps through stencil boxes and accompanied by jazz recordings of musicians such as Thelonius Monk and Dave Brubeck or Piene's own compositions.

LICHTGRAPHIKEN

Piene wanted to capture the transient experience of the projected light in motion, which led him to a particularly innovative use of the stencils: the creation of a group of contact photographs, which he named *Lichtgraphiken*, "light graphics." As he described it: "The Light Ballet inspired me to use paper and sunlight, instead of electric light, toward a lasting record of the projections that in motion or in superimposition formed interference patterns" (Piene 2002).

He made this group of approximately fifty photographs, like the one in MoMA's collection, by exposing a photosensitive paper through the stencils. Piene had never formally studied photography and was looking for a photographic system that was flexible and affordable. He had many friends who were architecture students so the diazotype paper was familiar to him. It had the added benefits of being readily available and, equally important, cheap.

Piene experimented with every stage of the process, from the method of exposures to the development. Improvisation and spontaneity were essential to the final conception. First he cut sheets of the photosensitive paper to size and spread them on the floor or on tables in direct sunlight. The stencils were placed on top and then exposed to the sun. Occasionally multiple stencils were used consecutively on one piece. The MoMA object roughly corresponds to the size of one of Piene's standard stencils, which were about 80 by 100 centimeters.

Sometimes the exposure length was arbitrary but could last anywhere from ten minutes to three hours or more. In our interview, he remembered setting up an exposure, leaving the studio to tend to various activities, and ending it when he returned (Piene 2002). Over the period of a multi-hour exposure, as the sun moved across the sky, there was a natural variation in the angle of the light source, which is reflected in the final image. Piene also shifted the stencil slightly during the exposure to prevent a static duplication and to produce an 'offset' quality to the dots (fig. 5), which he refers to as 'visual interference' (Piene 2002).

Piene created a system to process his diazotypes himself rather than send them to a commercial outfit where they would be treated in anonymous machines. As he described it, "The results of my exposures were entirely uncertain to me. The developing was as necessary to the adventure as the timing and choice of stencils" (Piene 2002). He want-

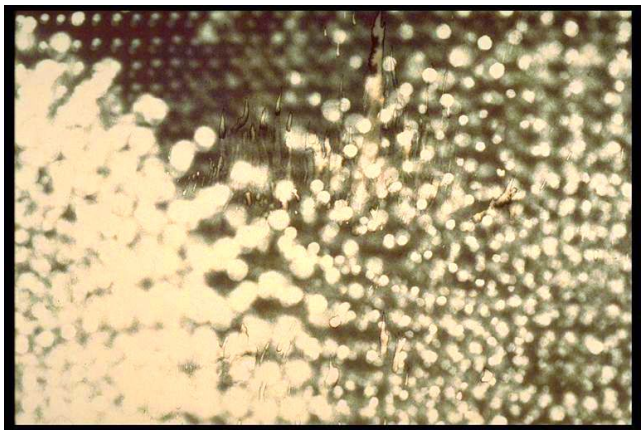

Fig. 5. Otto Piene, *Untitled (Light Ballet),* 1959, Diazoprint, (71 x 99 cm). The Museum of Modern Art, #781.98. Detail of area showing offset quality of dots called "visual interference."

ed to be able to watch, direct, and/or interfere during development to attain rich modulations in the final print.

Thus, he constructed a shallow wooden processing container approximately 125 centimeters by 150 centimeters and about 15 centimeters deep. He created a vapor chamber with plastic sheeting (fig. 6) into which he poured, as he called it, a "pail of a fairly powerful ammonia solution" (Piene 2002). The overwhelming burning sensation that the fumes caused as he breathed them remains a vivid memory for him. A grid of wooden strips over the ammonia solution supported the exposed diazotype paper, face-up, as it was developed by the vapors. During these operations, Piene shifted and repositioned the paper, again to manipulate the outcome of the final product. It is possible that the tideline damage on MoMA's piece may have occurred during this step if the paper fell into the ammonia solution.

EVALUATION AND IDENTIFICATION

Several factors contributed to the evaluation of this unusual photograph beginning with a thorough examination and detection of key physical characteristics. The identification was informed by a growing interest in and awareness of the reprographic processes commonly encountered in architectural drawing collections.

At the same time, the MoMA paper and photography conservation lab was actively investigating and working through the complex issues involved with identifying this type of material. In addition to the physical examination, the existing literature was reviewed and several conservators knowledgeable in this area were consulted. The interview with the artist also provided confirmation of the findings. Finally, an analysis of the object by x-ray fluorescence confirmed the absence of silver in the image areas.

The record of this object's history is somewhat sketchy but useful for understanding its condition. From the time it was made, the work was stored in Düsseldorf under less than ideal conditions until the mid-1960s. At that point, it moved with Piene to the United States. The piece was stored, for approximately twenty years, in a basement storage area. Minimal exposure to light and the lack of extensive exhibition lead to the conclusion that the image had not shifted or faded significantly.

One of the most critical discoveries during this project, however, was to see the condition of four other smaller diazo prints still owned by the artist. Unlike the MoMA piece, the unprinted borders on the ones at the studio had been cut down or had indications where they were to be trimmed. Two of these prints were in near pristine condition. The image tonality in the maximum density areas was practically black. The others showed discoloration and possible fading of the image material that was not dissimilar to the MoMA print. From this observation, the overall condition of the MoMA piece was reassessed: it is possible that the image material may have faded.

This new information about the potential image quality of diazoprints will play a role in future condition assessments of this material. Exhibition conditions are an essential component in the long-term preservation of this unique work. Acceptable light levels at MoMA are based on current guidelines (Wagner, McCabe, and Lemmen 2001). Accordingly, diazo prints are considered *very* light-sensitive materials with recommended exhibition light levels varying from three to five foot-candles depending on the length of display. The work of art must rest for three years between display cycles.

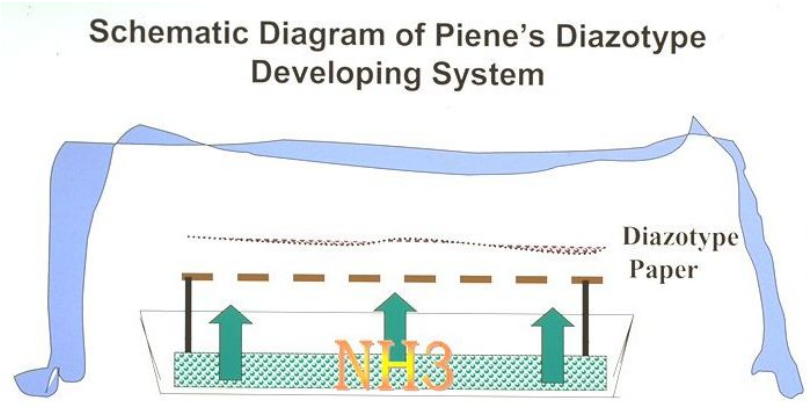

Fig. 6. Schematic diagram of Piene's diazotype developing chamber.

The course of a potential treatment remains under consideration. Spot tests indicate that the image material is not sensitive to water, so humidification and flattening are promising options worth further investigation. No treatment is also an option because, as mentioned previously, it is possible that the damage occurred during fabrication. Piene also saw

documentation of the damage during the interview and was not bothered by its visual impact.

CONCLUSION

While the diazo process was typically used by architects to copy documents and plans, the work of Otto Piene exemplifies one of the more experimental ways it was used by a visual artist. Piene himself made interesting observations on the work during our interview. He was not surprised at the apparent signs of aging. As he recounted, he was "dead poor" when he made it and in search of affordable, readily available materials. He knew even at that time that it would be at the expense of their longevity (Piene 2002).

The MoMA photograph represents a specific and significant moment in Otto Piene's career. As a fellow, director, and now director emeritus of the Center for Advanced Visual Studies at M.I.T. for over thirty years, Piene remains active in the arts. His work explores many of the same themes that remain vital to his art, namely, the relationship of humanity to the natural and physical world and to the ever expanding impact of technology.

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