The Robert Lepper Mural Painting: a Hidden Gem in White Hall at West Virginia University

Katelyn S. Caplinger
West Virginia University School of Art and Design

White Hall, on West Virginia University's downtown campus in Morgantown, hides a gem little known to the general population: in one of the classrooms resides a large mural created by painter Robert Lepper. Completed in 1942 and intended to represent the unity of art and science at West Virginia University, this mural is an impressive albeit easily-overlooked piece of West Virginia University history. In this study, we conducted an in-depth examination of the Lepper mural using several visual and analytical techniques, which together reveal interesting technical and artistic aspects of the work. In addition to furthering our knowledge about this historic piece, we hope to bring awareness of its grandeur to the greater university community so that it may be studied and enjoyed for years to come.

Figure 1. Robert Lepper mural painting. Photograph courtesy of the Daily Athenaeum[1]

Introduction

Robert Lepper, who hailed from Pittsburgh, Pennsylvania, was commissioned in 1940 to create the mural in White Hall, which then housed the Mineral Industries Department. He was requested to create a piece showcasing West Virginia's local industry, science and agriculture. The end result is a captivating piece, reeling with artistic skill and cultural significance. However, because this mural is not in a widely-used public space, many people are unaware of its existence. Indeed, only those who take a class in room G21 of White Hall or actively seek out the mural will ever see it.

Lepper had made a name for himself at a time when mural painting was regaining popularity within the United States. Starting in the early 1930's, murals were used nationwide as vehicles to uplift the hopes of Americans after a particularly rough economic period. These murals depicted wholesome scenes of American idealism to remind the public of their civic virtues. Under President Franklin D. Roosevelt's New Deal in the 1930s, thousands of murals were painted across the United States. They were erected in various parks and buildings, mainly in areas which were hit hardest by the economic downfall. One of the most notable instances of government-funded art installations was in the United States post offices. Lepper was one of the artists awarded such a government commission, and he ultimately established murals for post offices in Ohio, Michigan, and New York[2–5].

The mural which Lepper executed for WVU had a specific purpose—to express the unity of art and science. From a technical standpoint, Lepper utilized an atypical methodology: instead of being painted directly onto the wall, the mural was painted onto a separate canvas which was then attached to the wall. It is ultimately unknown why Lepper chose this technique; however, this method generally requires less resources, labor, and time, which may have influenced Lepper's choice. His unique artistic process became an area of

Figure 2. Lower right quadrant of the mural. An inscription on the cartouche dates the its competion (1941-42)

interest during research, as it would have been extremely uncommon to use a canvas-based approach to mural painting in the mid 1900s. In terms of media, Lepper utilized an egg-based paint, which was also a rarely-used technique at the time due to the limited availability of constituent materials.

By the 1930s, Lepper had become an established industrial designer and artist and taught at the Carnegie Institute of Technology in Pittsburgh. His "fascination with [the impact of] technology on society" and its "potential role for artmaking"[7] lead him to develop the country's first industrial design degree program. To Lepper, industry and humanity had a symbiotic relationship: during a time at which industry was becoming a more prevalent part of everyday life, the worlds of man and machine were colliding and appeared inseparable. Lepper examined this important relationship and used it as inspiration for many of his designs[6].

Because White Hall was originally home to the Mineral Science program[7] and Lepper's fascination with machines fit the school's theme, it seemed a natural choice to commission him to create the mural. Over a period of two years (1941-1942), the artist created an enormous piece which fully engulfs the front wall of White Hall's G21 classroom **(Figure 1).**

The mural painting depicts the many industries found in West Virginia, placing an emphasis on mining and agriculture. There are pipes, levers, cranes, mine shafts, trains, and technical diagrams in the painting—among them, men are shown working alongside the machines. Foliage speckles the foreground, and the iconic mountains of West Virginia can be seen on the horizon. A man and woman sit on the outer edge of either side of the painting, surrounded by crops. Overall, Lepper blends two important aspects of West Virginian life into one, picturesque unit.

Mural Materials and Techniques

Much of the information about the materials used for the mural was obtained during a mural restoration in the 2000s. This information was made available by the WVU Art Museum curator, Robert Bridges. According to curatorial records, the art medium was egg-based emulsion applied onto canvas. This choice of medium is interesting, as egg availability would have been more limited during the 1940s due to wartime efforts.

It is questioned as to whether or not the mural has naturally lost its color clarity over time. In general, painting color hues can diminish in clarity over time for several reasons. Varnish, often applied on the surface of paintings for protection, may naturally darken to a yellowish hue over time. Additionally, egg-oil emulsions are also known for darkening slightly over time. Finally, environmental factors—including light and air quality—play a large part in discoloring art[8]. Thus, it's likely that the colors on the White Hall mural have become somewhat less vivid over the eighty years of its existence.

When observing the mural up close, one may notice that the paint is applied very thinly on top of the *ground* (a base layer similar to a priming layer). From this observation, it is speculated that Lepper used a one-coat approach, which also could have contributed to creating the muted color scheme seen today. Additionally, pencil marks are visible under the paint layer in some areas, indicating both under-drawing and instances of *pentimento* (the presence of earlier paint strokes beneath upper paint layers).

Sample #	Location on painting	Sample Content	Notes
1	left edge, which appeared to be covered by frame; 45cm from bottom edge	canvas fiber, ground	examined with SEM-EDS and FTIR-ATR
2	left edge, near sample area 1; 50cm from bottom edge	blue paint and ground	examined with SEM-EDS
3	left edge, near sample area 1	red paint	amount was too small and sample crumbled, only partial analysis was performed
4	right edge, near very edge; 35cm from bottom edge	dark green paint	examined with FTIR-ATR

Table 1. Mural sample information.

Methods

The goal of this study was to find out more about the materials and techniques used in the mural's execution: how it was applied to the wall, which type of painting media was used, what the ground paint consisted of, and the type of canvas on which the painting was rendered.

A preliminary visual examination, focused on evaluating the painting's surface, was aided by a 10x magnifying lens (Triplet 10x-21mm) **(Figure 3)**. The chemical composition of the ground and morphology of canvas fibers was examined with a scanning electron microscope coupled to an energy-dispersive-spectroscopy apparatus (SEM-EDS, Hitachi 4700 coupled with EDAX Oxford) available at the West Virginia University Shared Research Facilities (SRF). The binding medium in the paint was characterized using fourier transform infrared spectroscopy with attenuated total reflectance (FTIR-ATR)[9], also using instruments at SRF.

After obtaining permission from curator R. Bridges, analytical tests were carried out on small samples removed from the painting. Sample material characteristics were examined with a digital field microscope (MiScope MP3) at 40-140x magnification under white and ultraviolet (UV) light. The UV light induces fluorescence of materials, which indicates their general composition. Four samples were collected and analyzed with the assistance of Dr. H. Szczepanowska **(Table 1)**.

Results

The preliminary visual examination revealed that the mural was applied in four large segments as the curatorial notes indicated; indeed, vertical joints are visible upon close examination. There is a line of demarcation around the edges of the mural, most likely from where a frame was originally attached. With the frame gone, an uneven, slightly tattered canvas edge is revealed. Interestingly, the areas covered by frame are lighter in color than the rest of the mural **(Figure 4)**.

Stereomicroscopy was the first analytical method applied in an attempt to understand the general composition and structure of the sampled material. All four samples were imaged, including the paint, fibers and ground. In samples 2 **(Figure 5)** and 4, the surface morphology shows the layers of paint on top of a white, chalky ground. The paint appeared shiny and reflective, which possibly indicates either an oil base or the presence of a varnish.

Figure 3: Initial visual examination of the mural. Image courtesy of Dr. H. Szczepanowksa.

Magnification of sample 1 shows the twisting tendrils of the fibers gripping onto a grainy substance **(Figure 6)**. This grainy material could possibly be the rabbit-skin glue

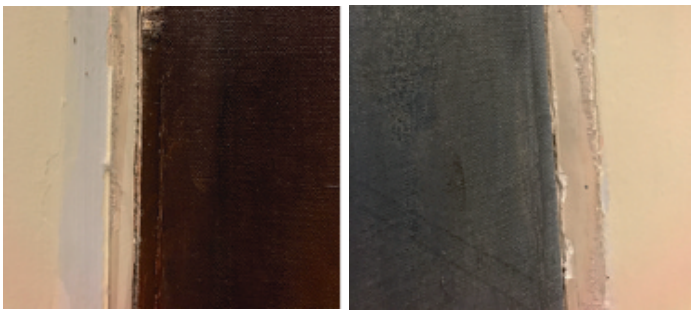

Figure 4. Left and right edges of the mural where the frame would have been attached. The difference in paint color is evident, and the edges of unpainted canvas are rugged

used to adhere the canvas to the wall. It could also be a ground under-paint, similar to what we saw in samples 2 and 4. Importantly, the morphology of the fiber on SEM micrograph shows that it is most likely a glue coating **(Figure 6)**.

In order to determine the chemical composition of the paint, EDS analysis was performed on several samples **(Figure 7)**. The presence of iron in sample 2 was likely a result of Prussian blue in the blue paint, while the detection of calcium and titanium in samples 1 and 2 was consistent with traditional calcium-based grounds (titanium is typically used as a white pigment)[10].

One of the most interesting findings from the SEM-EDS analyses was a high presence of lead in sample 4, which came from a section of red paint. The use of lead in paint was largely outlawed after the 1940's due to its toxicity. Therefore, we can infer that this area was not retouched during the mural's restoration.

The vibrational spectroscopy of FTIR-ATR permits detection of organic-based compounds in a chosen sample. It depicts the 'finger-print' regions of a sample as spectra, which can be compared to known samples to determine different constituent compounds of an unknown sample[9]. However, the interpretation of the FTIR analysis proved to be more challenging than other techniques used during this study; during the search for comparative spectra which could be relevant to samples studied here, one reference was found for egg-yolk[11]. In sample 4, the peaks from region 1700-1500 cm^{-1} are listed by several authors as characteristic for egg yolk[12,13]. Though quite small in our own sample, they were indeed present. All authors also indicted that clarity of spectra is obscured when additives are present. Because Lepper used a ground, various pigments, and organic adhesives, no clear conclusion was possible at the time of testing **(Figure 5)**.

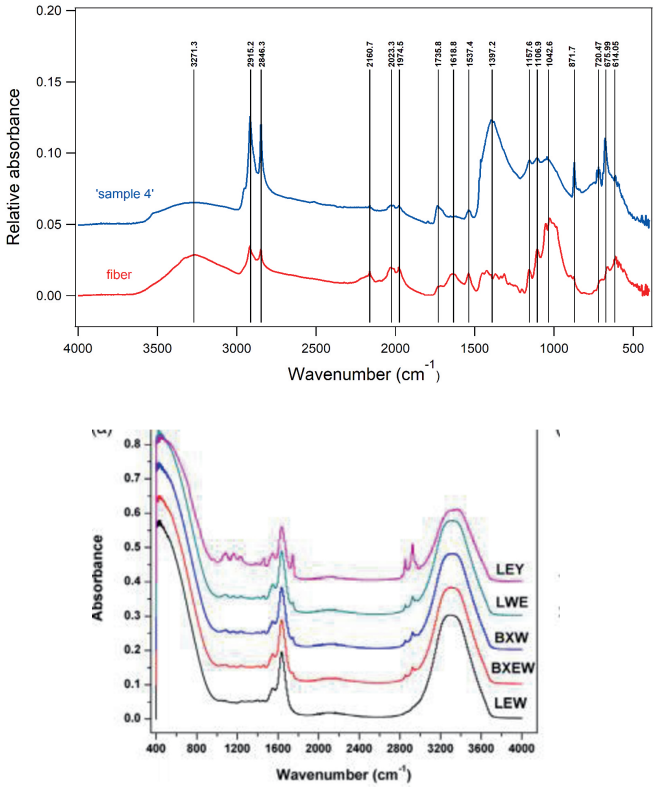

Figure 5. FTIR-ATR spectra of samples 1 and 4 (top) and reference samples (bottom). characteristic peaks are in the region 1600-1700 cm^{-1}. Bottom spectra (LEY, LWE, etc.) show peak characteristics for all egg components from published study[13]. LEY, liquid egg yolk sample

Conclusions

This study brings to light the intricacy of the Robert Lepper mural painting at West Virginia University. A thorough examination revealed details of the mural's construction, materials, and renovation. However, further analysis is necessary to draw definite conclusions as to the type of art medium. Importantly, this work provides proof that works of art such as the Lepper mural are

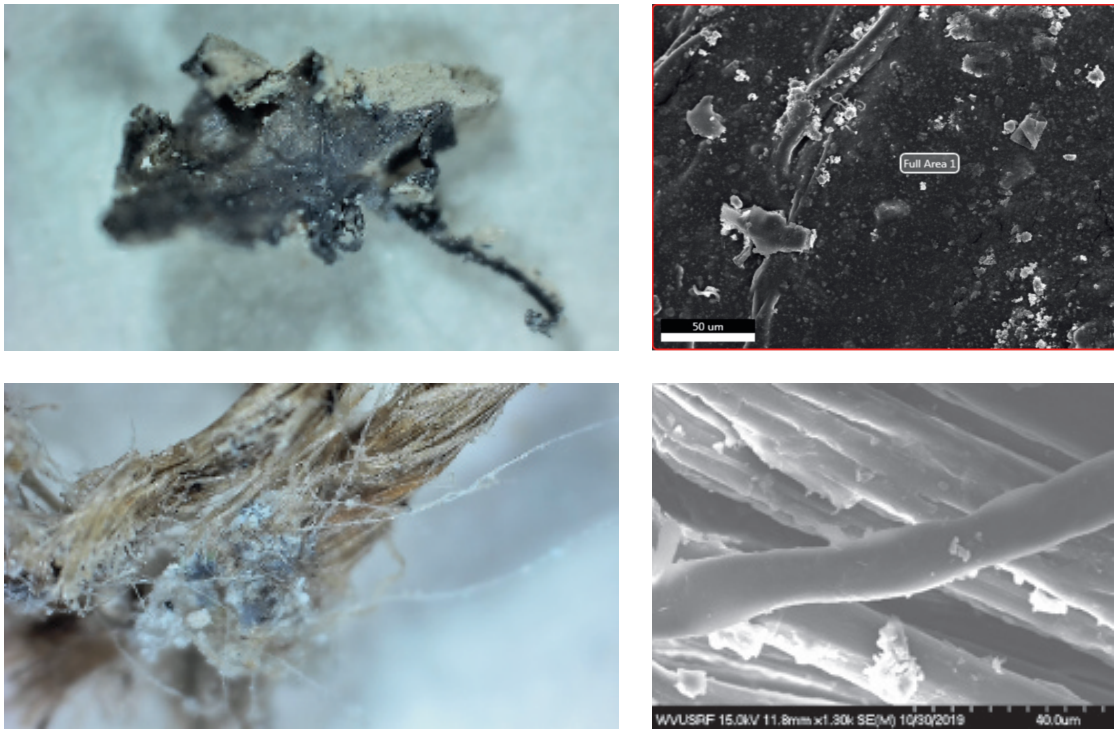

Figure 6. Microscopic examination of mural samples. (upper left) stereomicrograph of sample 2, which contained blue paint and ground, at 140x magnification. (lower left) stereomicrograph of sample 1 at 40x magnification showing fibers with small particles of ground. (upper right) SEM micrograph of sample 2 at 500x magnification showing paint surface morphology. (lower right) SEM micrograph of sample 1 showing canvas fiber morphology; lighter particles most likely represent canvas adhesive

incredibly complex and worth appreciating. The complexity of Lepper's materials ultimately validates his sincerity in striving to create a relevant, unique piece for WVU's community. By creating a mural which is both compositionally and technically dynamic, Lepper emphasized the importance of symbiotic understanding between science and art. It would undoubtedly be a shame to allow Robert Lepper's mural to be overlooked; it is hoped that the results of this project will encourage the WVU community to never let these things go unnoticed.

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Competing Interests

The author declares no competing interests.

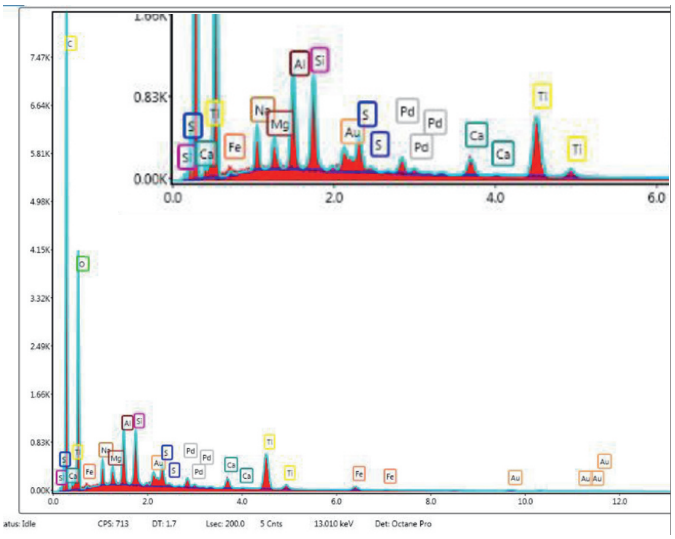

Figure 7. EDS spectra of sample 2. inset, zoomed leftmost portion of spectra

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About the Author:

Katelyn Caplinger is a proud West Virginia native from Charleston. She is a senior art history major at WVU with minors in philosophy and religious studies. After graduation, Katelyn hopes to pursue work in the field of historic preservation. She desires to help maintain and illuminate West Virginia's rich cultural heritage through the upkeep of the state's unique historical sites. Katelyn attributes her interest in preservation to her father, Michael, who has performed several architectural and environmental research projects around the state, and never missed an opportunity to impart his own wisdom onto her.

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