

Approaching Printmaking Through a Sustainability-Focused Lens

Kirstin Dunlap

AIC 621: Art, Activism, Modernity

October 16, 2023

In today's day and age, it is impossible not to reflect on the environmental impact of one's actions, regardless of the scale. Within the art world specifically, more and more individuals are going so far as to make their entire practice about the topic of sustainability and alter the ways that they create. Making work that brings attention to the degrading state of our planet is significant to continue the discourse and encourage change, but practicing sustainable methods of making is equally important.

Over centuries, how we create the materials used for art making as well as the artwork itself have changed. These changes have been for the benefit of humans, such as by increasing the efficiency of production or decreasing the toxicity of materials. It is important to notice though that by benefiting one party, the new methods may be hurting others. Here we will be looking at the historical uses of printmaking and the materials that go into it. This dive into the art of printmaking will outline which methods and techniques are most sustainable for our planet and how to move forward to create a sustainable practice.

Traditional methods of printmaking tend to fall into four categories, which include relief, intaglio, planographic, and screenprinting. In more modern times we have seen digital printmaking and that has to do with darkroom photography. For the sake of this discourse, printing, and printmaking will refer to the traditional methods, excluding those involving digital and photographic darkroom practices (Abidin et al., 2013). A factor that cannot be ignored when looking at the nature of printmaking is papermaking and the processes that go into it. While prints can take place on a variety of materials or textiles, historically paper is the most common substrate.

The oldest forms of papermaking track back to roughly 2700 BC in China where fragments of paper utilizing hemp have been discovered. China has the longest recorded history of papermaking as the practice was passed on within various communities. The papers made were largely from local vegetation that was high in cellulose. A high cellulose content made for durable paper that was ideal for large paper sheets and scrolls. These Eastern methods contrasted that of the West where papers were largely made of cloth and cordage which was largely made with cotton. The varying types worked for different purposes and both utilized local materials (Becker, 2008).

One of the most notable artifacts which includes ancient handmade papers is the first commercially printed set of books. In mid-1450 Mainz, Germany Johann Gutenberg printed over 150 copies of the Bible in Latin. This became the Gutenberg Bible which was the first book run printed fully with moveable type; utilizing what became the first form of mass-market printmaking. All of this was done on hemp paper (Becker, 2008).



Figure 1. Biblia Latina, 42 lines, (Mainz: Johann Gutenberg and Johann Fust, about 1455). On paper. British Library. CC0 Public Domain Designation (Gutenberg & Fust). Accessed October 8, 2023, <https://www.bl.uk/collection-items/gutenberg-bible>.

As time went on we began to see rags being used more and more commonly in the West. Cotton rags were to be used for clothing or household purposes until they were no longer suitable for the task. After that, the rags were to be donated to the city where the rags would be broken down and turned to pulp for papermaking. In the latter half of the 18th century, books were being produced more often for circulation and we started to see weekly and monthly magazines, all of which increased the use of materials. Paper became scarce as rags began to be harder and harder to find. Outlets began to campaign for citizens to save their rags for donation, to the point of watermarking “Save Your Rags” on common publications (Hunter, 1987).

Research into alternative materials began and many things were trialed. Among these included various plants, alternative textile recycling, and even asbestos. The most notable research was done following the observations by René Antoine Ferchault de Réaumur of wasps making hives out of wood. The bark of trees was masticated by the wasps which created a pulp-like consistency. The advantages of wood for papermaking included its large abundance, minimal weight, and a slight aversion to water in comparison to other materials (Hunter, 1987).

As the interest in periodicals grew and paper began to be somewhat more available through alternative methods became the new issue of how to print large quantities quicker and

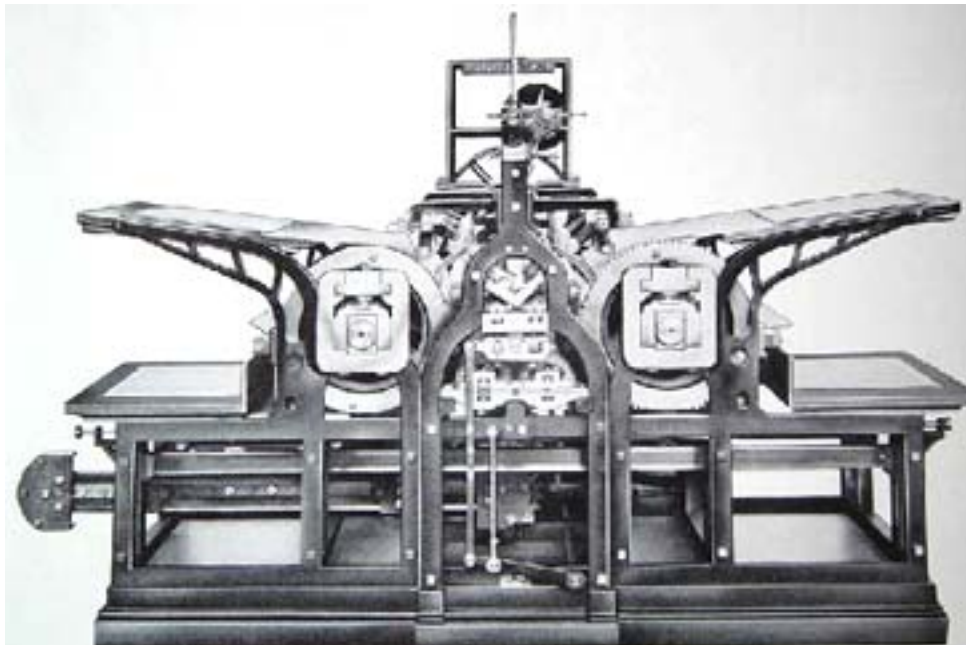


Figure 2. Koenig's steam press. Stock-Allen, Nancy. "Cylinder and Steam Powered Presses." *Graphic Design History*. Accessed October 15, 2023. http://www.designhistory.org/BookHistory_pages/Letterpress.html.

more efficiently. At the time, pages of text and images were created by hand via wood or lead type and plates. These elements had to be collected, organized, inked, and pressed by hand numerous times over to obtain the necessary copies. The process was then repeated for each page of a publication. This task of pressing and collating copies was laborious and time-consuming. This is when we saw the first automated printing press designed and created by Friedrich Koenig in 1814 which was steam-operated. Koenig's press soared in popularity for large outlets. Later models of Koenig's presses even allowed to print on both sides simultaneously as well as cut and fold the pages (Stock-Allen, 2023).

Much like traditional methods of papermaking, traditional printmaking is also thought to be Green and quite low-waste compared to modern methods ("Printmaking and the Environment", 2023). Looking back, one of the first methods of printmaking was woodcut printing. Through this process, marks are made on wood which then has ink applied to the surface. Ink prints everywhere that mark making has not occurred. This method of printing involves a biodegradable matrix and was traditionally done on rice paper and using water-based inks ("Printmaking and the Environment", 2023). Before the 20th century, printing was largely used commercially for the reproduction and distribution of written word and illustrations remarking history, news, books, and more. Around the time of the Industrial Revolution, we saw many innovations within print with an increase in mass literacy and interest in scientific research. The next big change happened in the nineteenth century when printing began to be used more and more for artistic practices (Abidin et al., 2013).

With this expansion in printmaking also came new methods to keep up with demand, and commercial ability, and make the practice marketable. All of which included a push towards creating manufactured materials that could be made in abundance for sale and use. Thus surfaced a higher use of "chemicals PVC ink which releases microplastics into the air and water, and non-degradable materials as well as producing more waste." To take this one step further, the containers required to store these harsh materials are also deemed waste in the process because interaction with the chemicals makes the containers unable to recycle or compost ("Printmaking and the Environment", 2023).

Let us now take a look at various printmaking methods and the products used for each. Within Intaglio printing, acid resists, acid baths, powders, and solvents are all used to create etched markings within a metal plate. Screenprinting uses acrylic inks which contain the aforementioned microplastics, as well as photo-sensitive emulsion which requires the use of harsh chemical cleaners to remove. One of the most notable waste-forming aspects of print is the rags which are used to clean surfaces covered with oil-based materials. The typical method of cleaning is to use rags with mineral spirits to break down the oils. The rags are reused within studios until they can not accept any more material and then must be discarded in specific flammable containers. These rags cannot be treated and recycled and therefore end up in landfills full of flammable material, posing a large environmental risk (Arau-McSweeney, 2019).

Hope is not lost though for printmakers as there are ways to reduce the impact of the practice while still being able to partake in it. There are many layers when it comes to creating a more sustainable practice. Some of these include searching for alternatives to the commonly used chemical treatments that have become synonymous with the printmaking process while others focus on how one sets up the studio in the first place. To take a look at the latter method, the studio can be set up in such a way that reduces excessive waste production. Simple practices for this include saving all misprints and test prints to be used again for testing in later projects, planning artwork around materials that one already has to avoid consumerism, sharing materials and scraps with other makers, and getting creative by sourcing or making materials instead of purchasing. All of these practices would aid in lowering unnecessary consumption, waste, and industrial emissions through a simple reduce, reuse, and recycle methodology (“Printmaking and the Environment”, 2023).

It is certainly worth thinking about these processes through a chemistry-based lens where observations can be made to find alternative solutions to a task at hand. We have seen progress in the research of alternative materials such as with Keith Howard in the twentieth century. Howard is among the notable few working towards sustainable printmaking as he worked to develop “new acrylic-based grounds and non-toxic alternatives to solvents to remove ink and clean plates” within the intaglio printing process (Arau-McSweeney, 2019).

Other known alternatives include using lemon juice to replace the nitric acid bath and using a “sugar lift” to replace aquatint within etching. Methods like such are possible but do involve more irregularity and the necessity to do testings for specific studio set-ups which is why we do not see them fully replace the chemical methods, especially in large education-based settings. Being aware of the possibility of using alternatives is greatly advantageous within a personal studio or practice as we continue to make strides towards more commercialized sustainable methods.

Although it is fairly doable with the right intuition to find material alternatives for the printing process, it is slightly harder to address to sustainability of papermaking. The pulp and paper industry utilizes an exceptional amount of energy powered by fossil fuels, making it one of the largest polluter-emitting manufacturing industries. “Globally, the paper industry contributes 5.7% of industrial final energy use, and it ranks fourth largest greenhouse gas emitter and is responsible for 9% of greenhouse gas emissions of manufacturing industries” (Sun et al., 2018). Research has been done to study the emissions output of the papermaking process and concluded that on average “1 t of paper results in about 950kg carbon dioxide” (Sun et al., 2018).

Certain pulping processes cause higher emissions due to more robust fibers being used which result in more energy being required to break down the materials. Efforts have been made through government policy throughout various nations in which standards have been set to reduce emission production. These policy changes are for the larger manufacturing industry of course impacting paper production (Sun et al., 2018). Often it does take government involvement to elicit change on such a large, industrial level. This is where the importance of being aware of who your elected officials are and what policies they support. Being involved in your democracy through voting is a vital aspect of pushing for policy changes that would require industries such as the papermaking industry to curb their effects on the planet.

Returning now to the idea of creating a sustainable practice, we can look to a few individuals among many who have begun making changes towards sustainable print models. First, we will look at Timothy Frerichs, a professional artist and professor working out of Fredonia, New York. Much of his work is in the form of drawings, prints, artist books, and installations. “Frerichs has utilized his artwork to address human activity as the dominant

influence on the environmental problems plaguing Lake Erie and the Great Lakes system” (“Timothy Frerichs”, 2023). Most notably, his work was displayed at the Morgan Conservatory in Cleveland, Ohio for a solo show titled *Navigation: Lake Erie - Great Lakes* in 2021 (“2021 Navigation: Lake Erie”, 2023). The creation of the works for this show heavily utilizes materials that we found by Frerichs along the coast of Lake Erie (“Timothy Frerichs”, 2023).



Figure 3. *Stonehammer 3*, intaglio monoprint, digital, pulp painting with recycled linen, blowouts, on handmade Mitzumata paper, 12"x18", 2018. Accessed October 14, 2023. <https://burchfieldpenney.org/art-and-artists/people/profile:timothy-frerichs/>.

The work of Frerichs is a wonderful example of holding sustainability at the forefront of their work since it is being discussed both in concept and materials. When pointing directly to the issues prevalent in Lake Erie the message is heightened by the process taken to make the work. By foraging for materials that are used within the finished work it makes it hard to ignore the blatant issues at hand that Frerichs is highlighting.

Taking the concept of sustainable printmaking many steps further is Ashlee Mays. As her thesis work when graduating in printmedia at the University of Tennessee at Knoxville, Mays set forth to open what became The Museum of Infinite Outcomes. The museum is comprised of a printmaking studio, multiple gardens, a library, and a gallery where creating takes place in collaboration with the surrounding environment. Mays established a place in which education and creativity can flourish through community organization. By using her knowledge of the practice of printmaking she was able to build a space in which substitutions were made with the



Figure 4. Artists working on their work at the Museum of Infinite Outcomes. Access October 14, 2023.

Earth's health in mind. This not only has altered Mays personal artistic practice but now operates as a space in which others can come to observe exhibitions that highlight environmental-focus works and learn how they can alter their practices to lessen their impact on the Earth.

Those at the Museum of Infinite Outcomes have continued to nourish a scene for taking in the awe that takes place all around us. "Since their humble beginnings, printmaking and scientific pursuits have walked hand in hand, both actively shaping our understanding of the world around us. The Museum continues this tradition through the production of affordable printed material and the preservation of traditional printmaking processes" ("Exhibits", 2023).

The last artist we will take a look at is Holly Greenberg, a printmaker working and teaching out of central New York. "Her personal studio practice eschews manufactured art materials in favor of harvesting invasive plants to create works of art that highlight the importance of creating native plant habitats for other living creatures" ("Holly Greenberg: Ask



Figure 5. Installation view of *Ask Me About Buckthorns* by Holly Greenberg at the Evanston Art Center. Accessed October 15, 2023. <https://www.evanstonartcenter.org/exhibitions/holly-greenberg-ask-me-about-buckthorn>.

Me about Buckthorn”, 2023). A recent work of Greenberg’s is an installation titled *Ask Me About Buckthorn* which was on display on the exterior of the Evanston Art Center in the summer of 2023. This work consisted of a mural of individual members of the community who devote hours of their lives to combat the ongoing growth of Buckthorn, and invasive species that account for one-third of the tree canopy in Chicago, IL. Greenberg has worked to highlight the necessary efforts being made to curb ever-growing vegetation that places native plants at risk (“Holly Greenberg: Ask Me about Buckthorn”, 2023).

The work does not stop with Buckthorn though for Greenberg. She has taken this same drive for environmental conservation into the studio and classroom by educating and encouraging others to partake in safe practices that keep the environment in mind. These include her pursuit to teach papermaking with foraged plants as well as focusing on a low-waste way of working within the studio itself¹.

Art is a wonderful vehicle to utilize to raise awareness or bring attention to important issues. The topic of sustainability and safe environmental efforts has grown over the past decades with a huge boom within the twenty-first century as the effects of climate change become more and more apparent. Printmaking has an interesting lineage as it began with modest materials that were often sourced and created with nearby natural resources. This was seen through many elements of printmaking from the creation of inks, substrates to carve upon, and printing paper. As the world developed towards one in which reading and writing became a common skill, printing, and papermaking became a large industry that required optimization. The advances made to produce the works more efficiently pushed the field into a territory that became more hazardous for both the individual maker and the environment.

At a time in which the fragility of the environment is evident, it is important to take consideration into how certain actions may be contributing to the cause. Through simple changes to a studio practice including planning, material management, and research into alternative methods, a printmaker can lessen their effect on the overall health of the planet. Many of these changes are about reverting to traditional methods. By setting the convenience of ready-made materials that can be bought in a store, an artist can grow a deeper connection to their art

¹ Greenberg, Holly. Verbal interview with author, September 2023.

materials and practice. A perfectly Green studio practice may feel unattainable but in fact, it can be in reach with mindful considerations. “We will always have an effect on the world, it's about mitigating the damage we do and minimizing the waste we produce. We will never be able to fully live hand in hand producing art and looking after the environment, but we can reduce the effects by having good studio practice” (“Printmaking and the Environment”, 2023).

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