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Muriel Cooper: Design Pioneer

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Computers and technological advances significantly impacted design during the twentieth century. Designer Muriel Cooper not only kept up with these changes, but also pushed the boundaries of both print and interactive design for over 40 years. Cooper began her design career working in advertising before moving on to start her own design studio and eventually working at the Massachusetts Institute of Technology (MIT).

Cooper filled several positions at MIT including designer for the Office of Publications, professor to students from multiple disciplines, and innovator at the Visual Language Workshop. It was during her time at MIT that she made several significant contributions to the fields of graphic and interactive design. Cooper worked with other faculty members and students in the Visual Language Workshop to develop digital design software that was used for digital imaging, creating typography, and designing page layouts. She also foresaw the three-dimensional potential of the Internet and World Wide Web as an interactive medium.

Cooper had begun to develop new ways of presenting flexible content through computers in the early 1990s. Some of these innovations were so far ahead of their time that they are only becoming possible for public use today. Cooper's foresight has helped to create her legacy as a design pioneer.

Muriel Cooper's Early Life

Muriel Cooper was born in 1925 in Brookline, Massachusetts, only a few miles from MIT. She began her career as an educator by receiving a Bachelor of Science Degree in Education from the Ohio State University in 1944. Cooper then continued her education at the Massachusetts School of Art where she completed a Bachelor of Fine Arts degree in General Design in 1948 (*Means and Messages*, 2014). After college, Cooper moved to New York City to work in advertising. While there she met designer Paul Rand whom she noted as being "very

critical of my typography” (Lupton, 1994). By this time, Cooper felt that she had a “mission: design was a way of life” (Lupton, 1994). Despite her dedication to design, Cooper described her experience in advertising as unpleasant and returned to the Massachusetts School of Art to earn a Bachelors Degree in Teacher Education in 1951. Cooper would later describe her relationship with both design and teaching as being “love/hate” (Cooper, 2004).

In 1952, Cooper returned again to the design world, taking a job at the Office of Publications at MIT. Following World War II, MIT was producing a significant amount of government funded research material (Reifurt, 2004). Designer and MIT professor, György Kepes, suggested that an in-house designer would help to create higher quality material and more unified designs at the MIT Office of Design Services (*Means and Messages*, 2014). This was the first time that an organization such as a university had its own in-house design publication program. Cooper began at the Office of Design Services as a freelance designer before becoming director from 1954 until 1957 (Reifurt, 2004). While working in the publication office, Cooper spent her time trying to make technical information understandable (Reifurt, 2004). She would later say that this experience was her initial training in how design can help society (Cooper, 2004).

After six years at MIT, Cooper received a Fulbright Scholarship in Design, allowing her to go to Milan, Italy (*Means and Messages*, 2014). At the time, Milan was the center of the International Typographic Style (Weisbeck, 2014). Unfortunately, Cooper became ill with hepatitis during her trip, leading her to spend more time drawing and taking photographs (Cooper, 2004). Her photography during her time in Milan showed hallmarks of her design style, such as “abstraction, transparency, layering, and mobile viewpoints,” which would become more prominent in her later work (*Means and Messages*, 2014).

Cooper returned to the United States following her experience in Italy to start her own design studio, Muriel Cooper Media Design (*Means and Messages*, 2014). However, she experienced difficulty dealing with clients. Cooper felt that there was a disconnection between what the client wanted and what she felt they needed (Cooper, 2004). She describes these interactions as often becoming confrontational rather than a productive discussion of what actually needed to be accomplished (Cooper, 2004). This experience would influence Cooper later in her career as she developed ways for computers to make design more flexible (Cooper, 2004).

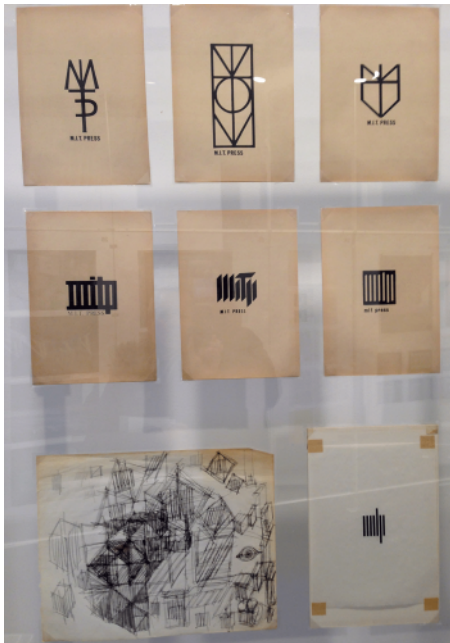


Figure 1: MIT Press Logo Concepts

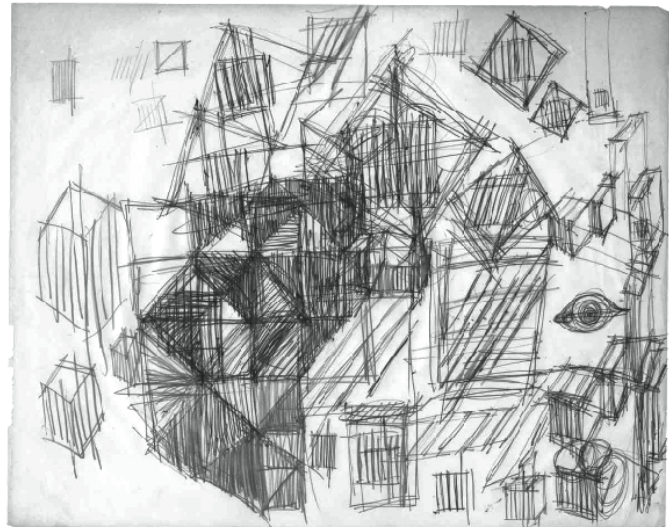


Figure 2: Brainstorming Sketches for MIT Press Logo

During Cooper's time with her own studio she once again designed publications for MIT. Paul Rand suggested Cooper to design the logo for the newly reorganized MIT Press (*Means and Messages*, 2014). A number of sketches and early drafts of Cooper's design remain to show her

process in creating the logo (Figures 1 and 2). She experimented with rearranging the letters M, I, T, and P into interlocking configurations to create a symbol rather than standard typography. The images in the middle row of Figure 1 show an interesting progression of the logo from figurative to abstract. The logo on the left appears to be made of a custom slab-serif typeface. Cooper then used the counters and negative space between letters to form six vertical rectangles. In the middle logo, she took the concept in another direction, creating an almost black letter typeface. Again, Cooper uses strong vertical lines in the logo, however unlike the first logo, the only horizontal line present is the cross stroke on the T. The logo on the right is very close to being the final option that the MIT Press used. This logo combines the vertical negative spaces from the first logo with the vertical letterforms from the second logo to create an abstracted abbreviation MITP.

The final version of the logo is not only made of abstract letterforms, it also represents books on a bookshelf. Cooper's development of the logo is also visible in a page of sketches and doodles that she had drawn (Figure 2). It appears that she was experimenting with different ways of representing books in three-dimensional space (MIT Press, 2014). Several of these sketches clearly show similarities to Cooper's final logo design. Carroll Bowen, director of the Press at the time, praised Cooper's design for its appropriateness to the organization. Bowen stated, "The basic materials were supplied but intelligence and imagination...produced the end result, information with elegance" (*Means and Messages*, 2014). It seems that this same principle would have guided Cooper as she worked to make dense scientific material understandable to a wider audience.

Cooper Takes the Helm at MIT Press

By 1967 Cooper began working at the MIT Press as its first design director for all publications (*Means and Messages*, 2014). She had hoped that working for an organization in-house would help her to avoid many of the struggles she had experienced with clients in the past. However, she found that this was not the case, as many authors came to her with preconceived ideas of how their work should be published (Cooper, 2004). Once again experiencing frustration at the disconnection between designers and clients, Cooper began to consider how technology could alleviate this problem. Cooper would later research and develop methods of incorporating computers into the design process. By making design more flexible, computers allow designers to quickly make changes based on client feedback. This technology could have helped Cooper to reduce the distance that she felt between herself and her clients.

Despite Cooper's frustrations, she produced a prolific amount of work while at the MIT Press, designing over 500 books (MIT News, 1994). She won awards for at least 100 of these designs (MIT News, 1994). Possibly her most famous work was *The Bauhaus* by Hans M. Wingler. The book was previously published in Germany. However, Cooper completely redesigned the book for publication at the MIT Press (*Means and Messages*, 2014). Although Cooper redesigned the book, the German edition did affect the size of the volume. To save money, the color plates from the German edition were used for printing the MIT Press version of the book (Reifurt, 2004). This resulted in the book being over 14 inches vertical and 10 inches horizontal when closed.

Cooper's design for *The Bauhaus* was based on the International Typographic or Swiss Style. The layout primarily follows a three-column grid format, with content occupying the middle and right column of the page. This layout leaves a significant amount of white space on

many spreads of the book. Furthermore, each chapter typically begins with a double page spread with only the chapter title on one of the pages. This luxurious use of white space is further emphasized by the large size of the book itself. While the use of white space follows the typical Swiss Style, Cooper may also have intended for it to break up the content on the oversized pages. Despite the significant use of white space in the page layout, Cooper omitted spacing between paragraphs of text. This leads to significant blocks of text on some pages that are overwhelming to read.

Overall, Cooper used the white space, geometric grid, and large page size to create a varied experience for the reader. While some pages are nearly blank, others feature full-page images. The full-page images emphasize important persons and works, however, they also seem confrontational due to the scale of the book. Cooper created a film version of *The Bauhaus* by photographing each spread of the book and compiling it into an animation. She would later use the film in classes to show students that the design of a book can be understood in some sense even after a rapid viewing (*Means and Messages*, 2014). Cooper explained the pacing of the book with the following “All of my books explored implicit motion. *The Bauhaus* was designed both statically and filmatically with a mental model of slow motion animation of the page elements” (*Means and Messages*, 2014). This concept of designing a print book as if it were a film in motion would no doubt influence her later concepts that fused design and technology. Reifurt (2004) makes the point that the film seems to reference the future where design and publishing becomes much faster like the animation of her book, *The Bauhaus*.

Cooper also designed the book *Learning from Las Vegas* while working at the MIT Press. The book discusses the architecture of Las Vegas, which Cooper tried to mimic in her design. The original version of the book came wrapped in an opaque gold sleeve filled with typography.

Some pages feature an overwhelming number of images packed together. Cooper also made some unconventional typographic choices. Unlike *The Bauhaus*, she used a large amount of leading between lines of type. Figure numbers are placed above the lines of text they refer to, rather than in line with it. There are also sections of type with very little spacing between words. In addition, the title page features headlines that wrap around the contours of a large central image. These devices can create an almost disorienting experience for the reader. These unconventional choices were Cooper's way of translating the overabundance of visual imagery and signage in Las Vegas into book form (*Means and Messages*, 2014). The authors of *Learning from Las Vegas* did not agree with Cooper's take on the book. They were so taken aback by the design that later printings of the book did not feature Cooper's design (*Means and Messages*, 2014).

By the mid-1970s, Cooper began teaching a class entitled *Means and Messages* with Ron MacNeil, a physicist at MIT (*Means and Messages*, 2014). The course was meant as a way for students to explore the relationship between graphics and technology. Although the class was part of the architecture department at MIT it included students from a number of other fields including visual art, humanities, and sciences (*Means and Messages*, 2014). Cooper meant for the class to be a way for students to experiment freely while gaining hands-on experience. By having the students actively create, she shortened the brainstorming stage of project planning where she felt students acted too cautiously (Reifurt, 2004). The concept of teaching a class as a workshop also went back to the Bauhaus idea of learning through design and production simultaneously (Reifurt, 2004).

Cooper Moves into the Digital Age

With the creation of the *Means and Messages* course, so also began the Visible Language Workshop. The workshop brought together production equipment along with computers and other design related technologies into one collaborative space (Reifurt, 2004). This marked the beginning of the second phase of Cooper's career (Abrams, 1994). Cooper became more interested in how technology could be used as a design tool. However, she typically had others develop technologies while she filled the role of art director and innovator. She found coding frustrating due to the fact that it is not a visual process (*Means and Messages*, 2014). However, she understood the thought process well enough that she was still able to offer insights into projects (*Means and Messages*, 2014).

Cooper was also part of a team that first proposed a form of an electronic book in 1978 (Weisbeck, 2014). This proposal was meant to develop an electronic text that was more useable as compared to "the status quo of endlessly scrolling, unformatted text" (*Means and Messages*, 2014). This concept also included a complete interactive experience where users sat in a custom chair and viewed content on a screen (*Means and Messages*, 2014). This design was intended to use gesture control that required the user to only swipe a touchpad to turn pages of a virtual book (*Means and Messages*, 2014). Thinking ahead to the design of user experience was well ahead of its time as personal computers weren't even on the market yet (*Means and Messages*, 2014).

Cooper's experiences with difficult clients would influence her research because she hoped that she could finally create flexible workflows between design and production. Cooper (2004) stated that computers allowed designers to have a level of control over their projects that they haven't had since the "medieval monk." She also foresaw the potential for technology to open up the design field to people with no formal training. During a talk she noted that

computers allow office workers to create their own charts and data figures with no assistance from designers (Cooper, 2004). She realized that while advances in technology aided designers, it also forced them to rethink their role in the field. Cooper also seemed to foresee the importance of the World Wide Web. She felt that electronic media had the power to remove the distinction between “designer and artist, author and designer, professional and amateur” (Reifurt, 2004). Cooper (2004) commented in a lecture that those who took the time to understand technology would become the “leaders of the new graphic environment”.

In the early years of the digital age, Cooper was already developing her own ideas of how technology should be used to organize information. The levels of design flexibility and control that are created by computers today allow designers to experiment with hierarchy, emphasis, structure, and order in new ways. When Cooper designed the book *File Under Architecture* in 1974 she used an IBM typewriter, which allowed her to switch fonts quickly (Reifurt, 2004). While this was advanced for the time, it was still a manual process that required replacing part of the typewriter’s machinery. The computer would completely remove the manual aspect of the process, making design changes even simpler. Cooper also saw that electronic media could take these concepts even further beyond the limitations of print. Rather than photographing print pieces to create an animation like *The Bauhaus* film, she could now create 3D animations using only computer technology.

In 1994 Cooper presented an animation of a project entitled *Information Landscapes* at the TED 5 conference. The animation showed a computer interface made up of typography that moved in three-dimensional space. In this space content laid on varying planes to form actual structures of information. The design used transparency and layering to allow users to see through content to other information behind it. Blur was also used to have information come into

focus as the user approached the content in space (Abrams, 1994). In addition, a system was being developed to make the program smart so that it could change the color of type if the background changed, keeping the content legible (Abrams, 1994). This interface also used infinite zoom, which a colleague said Cooper was “fascinated by” when she first experienced its abilities (Abrams, 1994). Cooper had finally found an ideal medium for users to actually navigate through information. After seeing her presentation at TED, Bill Gates even requested a copy of the video (Abrams, 1994).

The idea of information in three-dimensions was groundbreaking. At the time, graphical user interfaces were primarily based on overlapping application windows. Nicholas Negroponte, another of Cooper’s colleagues at MIT, stated that with 3D typography, Cooper had “broken the flatland of overlapping opaque rectangles with the idea of a galactic universe” (*Means and Messages*, 2014). However, the interface of rectangular windows became a standard that is still widely used today. This might be due to the fact that Cooper’s experiments required a great deal of computing power that was not widely available at the time. While personal computers like the Macintosh Classic and IBM PS/1 had very little computing power, Cooper used a Silicon Graphics Reality Engine which cost \$250,000 (*Means and Messages*, 2014). During the time it took for personal computers to catch up to Cooper’s vision, the flatland, paper-like windows interface had become a standard.

Unfortunately, Cooper died of a heart attack at the age of 68, shortly after her presentation at TED 5 (MIT News, 1994). Her final major project, *Information Landscapes*, was a culmination of decades of thinking about design and innovating. As the computer revolution was just beginning, Muriel Cooper would not live to see the development of mobile technology and the World Wide Web where her ideas could be further implemented.

Cooper's Visionary Legacy

The development of the web has shown that several of Cooper's ideas about the future of information design were accurate. Websites allow information to be shared throughout the world instantly. The web has also democratized information sharing as people with no training can publish their own content online for free.

As Cooper pondered the place of graphic designers in the future, we now see that the web has created a need for designers and developers who specialize in interactive design. Cooper was primarily concerned with the accessibility and connectedness of information in her work. The Web has allowed designers to make hard data more understandable to the public through dynamic infographics using technologies such as Processing and JavaScript libraries like D3.js. Cooper's interest in transparency and layering is now possible online in parallax scrolling websites. In addition, the JavaScript library known as three.js allows designers to create three-dimensional experiences in a web browser. This gives interactive designers the opportunity to make interfaces similar to *Information Landscapes* accessible to the public. Users also have the ability to navigate through content in new ways through mobile devices with accelerometers and gesture controls. If Cooper were alive today she would no doubt have ideas for even more innovative ways to use these devices.

Muriel Cooper's legacy also lives on in the students and colleagues she worked with throughout her career. Designer John Maeda met Cooper while a student at MIT. He would later return to the school to teach classes and serve as a director of the MIT Media Lab (Meggs & Purvis, 2012). Maeda became interested in the intersection of programming and artistry. His use of technology to create art and design would influence others such as Casey Reas, who helped create Processing (Willis, 2010). Maeda's writing has also become significant in the design

world. He has written books that cover a variety of subjects, including simplicity in design and the structure of leadership roles in corporate environments.

Lisa Strausfeld was another of Cooper's students at MIT. She was part of the team that created *Information Landscapes*. Her work includes large-scale information displays integrated into the architecture of buildings (Meggs & Purvis, 2012). This integration of information and structure seems like an extension of Cooper's ideas about content in three-dimensional space. Like Cooper, Strausfeld is interested in design for industry rather than entertainment (Tischler, 2009). She designed *Sugar*, the interface for One Laptop per Child (Tischler, 2009). Strausfeld has also worked on data visualizations for the New York Times that resemble the three-dimensional projects she worked on with Cooper. Strausfeld was so influenced by Cooper that she even named her daughter Muriel (Tischler, 2009).

Muriel Cooper's influence on future generations demonstrates her importance as a visionary in the world of design. She foresaw the development of technologies before they were achievable. Although it was difficult to produce at the time, Cooper envisioned information that could be layered, three-dimensional, interconnected, and movable. While she thought about these concepts early on as a print designer, they would finally come to fruition in her TED talk presentation in 1994. The further development of the World Wide Web after Cooper's death would become the realization of her vision of information being interconnected and available in real time. It would also have helped her in creating experiences where the user learns through a dynamic visual experience that they would remember. As some of Cooper's ideas such as 3D web experiences are just becoming possible now, Cooper's influence as a design pioneer is sure to continue for the foreseeable future.

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