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Expert report on type fonts used on asbestos labels

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KAZAN, McCLAIN, LYONS, GREENWOOD & HARLEY
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Credentials in typography

I am an Associate Professor of Graphic Communication at California Polytechnic State University, San Luis Obispo, California. I teach, among other subjects, Advanced Digital Typography.

My career in academia is eleven years. I was first hired as a lecturer to teach a class in color theory, color measurement, and color management. Since that initial hiring, I was hired first as a full-time lecturer, then as an Assistant Professor. In 2011 I was given a promotion to Associate Professor, and was given tenure at the University.

I have a Bachelor's degree in Graphic Communication from California Polytechnic State University, San Luis Obispo, 1975. I also have a Master's degree in Industrial and Technical Studies, also from California Polytechnic State University, San Luis Obispo, 2006.

As an undergraduate in the Graphic Communication Department, I was curator of the Shakespeare Press Museum, lead pressman on the school's daily newspaper, and I excelled in my typography courses. I was, at the time, a capable Linotype operator, and was skillful in operating the Ludlow Typograph headline setting machine. I also became skillful at the imposition, pagination and lock-up of metal type for printing. These processes, which were quickly being replaced by more modern technologies, gave me an excellent foundation in typography.

In the years before becoming a professor at Cal Poly, I was a business owner, an author and a consultant to the graphic arts industry. My very first business was called the *Teenage Print Shop*, which I started prior to being a teenager at the age of eleven. For that first business, I used hand-set metal type and a small printing press to make cards and announcements. I ran the business through high school, and always had pocket money as a teenager.

While in college in 1973, I started my second business, Tintype Graphic Arts. I ran the company until 1992 when I left to begin a career as a consultant. I had sold the business to a larger printing company who continued to run it for another decade.

My next business, Tintype Graphic Arts, was primarily a typesetting company. Over its many years of operation we used every typesetting technology from hand-set metal type to machine-set metal type, then photographic typesetting, cathode-ray-tube typesetting, and ultimately, laser-imaged typesetting. We were among the first wave of adopters of "desktop publishing" with the acquisition of a Macintosh computer, an Apple LaserWriter printer, and a Linotronic PostScript imagesetter. I became an industry expert in the operation of PostScript imaging devices, and I began a career of educating others in my industry on the advantages of these new technologies.

Tintype was one of a small number of typesetting companies who were in possession of the entire Linotype type collection, a diverse assortment of type fonts for use on our phototypesetting machinery. At the time there were about 3,000 fonts in that collection. At one point I was able to identify almost all of them on sight.

Today there are hundreds of thousands of type fonts, and I no longer claim to be able to identify many of them, but I still retain my skills of typographic identification, and I maintain a network of friends who help me when I get stuck. I also use software to find the occasional font.

I teach *Advanced Digital Typography* at Cal Poly, a course for seniors in our baccalaureate program who have an interest in the finer points of typography. In that course I teach typographic history, type design,

and typographic application. This includes the identification, classification and analysis of type fonts and typographic characters.

As part of my academic work I am also the Faculty Advisor to the Shakespeare Press Museum, a working museum of 19th century printing equipment at Cal Poly. Our students learn about the history of type and printing, and they learn how to use the printing machines in our museum. Each year I require my advanced students to spend two weeks learning how to set type by hand, and to print on our antique presses. I believe that this experience helps them to understand modern typographic challenges.

I have also taught myself how to design digital type fonts. Over the past six years I have redrawn a dozen type fonts from metal and wood type in the collection of the museum. When finished, these fonts will be put on sale by the Ascender Corporation. Our sales agreement will provide some funds to Cal Poly whenever a font is sold. Proceeds, if any, will be used for scholarships for students who work as curators in the museum.

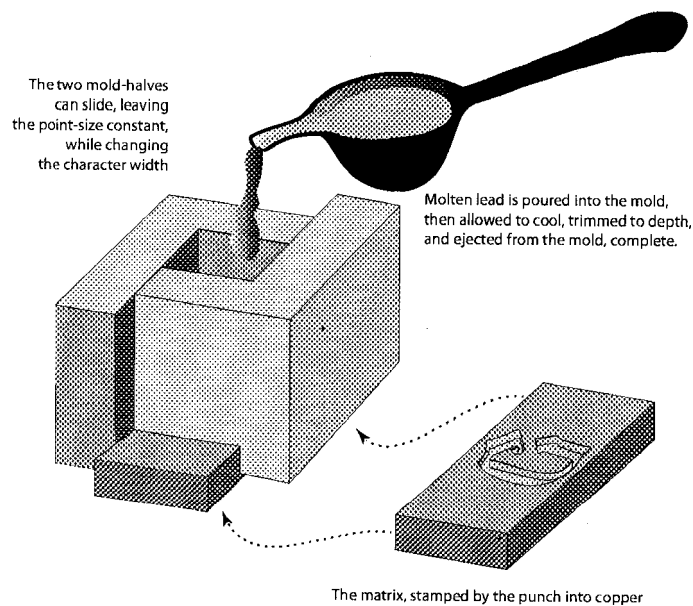
A brief history of typographic technology

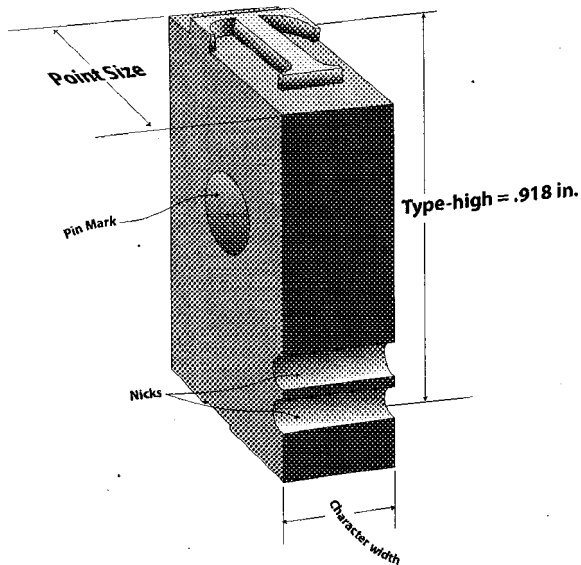
Most historians credit Johann Gutenberg with inventing movable type. The fact is that his work in type-making was predated by Chinese and Korean inventors dating almost 1,000 years earlier.

There is no doubt that Gutenberg (whose real name was Johannes Gensfleisch) developed a method for making movable type for Western Europe in the 15th century. The variability of character widths – the lower case *i* is narrower than the capital *W* – forced Gutenberg to develop a method for casting letters with a constant height, while allowing each letter to have its own width.

Gutenberg's type-making method involved a steel *punch* with a letter on it, used to create a brass or copper matrix (a mold), and a casting box consisting of two L-shaped sliding parts. The height of letters made in this casting box was constant, while the width could be adjusted for narrow letters and wide letters.

The matrix was placed at the bottom of the casting box, and molten lead was poured into the top of the box, the lead poured down into the box, and into the matrix, causing it to take on the recessed letter form as a relief at the top of each single piece of type. A person operating this device could make a single letter in about one minute, which meant that the tens of thousands of letters needed for a book could be





A single piece of modern foundry type. This one would have been cast on a modern typecaster, indicated by the Pin Mark.

cast in a reasonable period of time, though the work was certainly tedious.

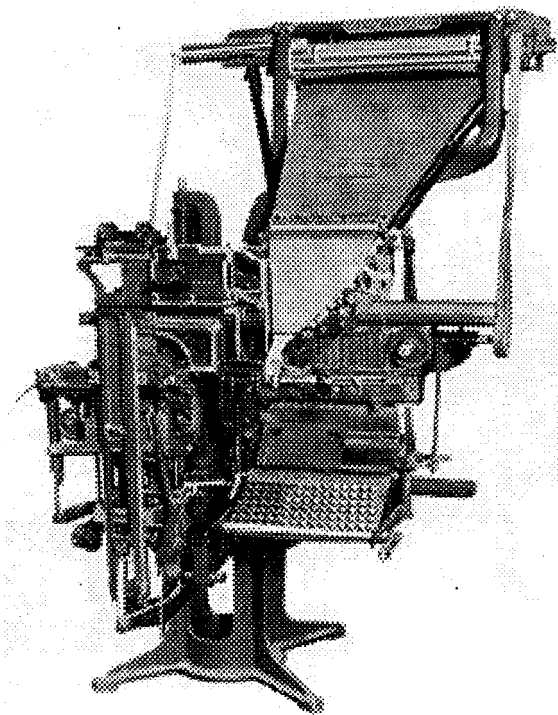
Gutenberg's method for making letters was effective, efficient, and mechanically precise. The famous Gutenberg Bible, made by him between 1455 and 1458 (historians are not sure about these dates) uses a font designed and cast just for that book. It was, and remains, a font that was adequately legible, and which was similar to the common handwriting of the scribes of the day. The Gutenberg Bible is in Latin, so the font used was more akin to the lettering of the Italian scribes than the lettering of the German scribes who used a more formal lettering style called *Fraktur*.

Gutenberg's type has a raised image, putting it squarely in the domain of *relief printing*, one of five domains in the printing industry. With relief images, ink is applied *directly* to the type, and the type is then pressed *directly* to the paper under pressure, and the image on the type is transferred to the paper. The image of the letter on the type is negative, which makes it positive when pressed against, and transferred to paper.

Gutenberg's type has a raised image, putting it squarely in the domain of *relief printing*, one of five domains in the printing industry. With relief images,

Gutenberg's process for making hand-set type was tedious. The process was mechanized in the late 19th century, and then remained essentially unchanged well into the 20th century. Typecasting machines for

making *individual* letters were made by at least two companies. Some of those machines are still functional.



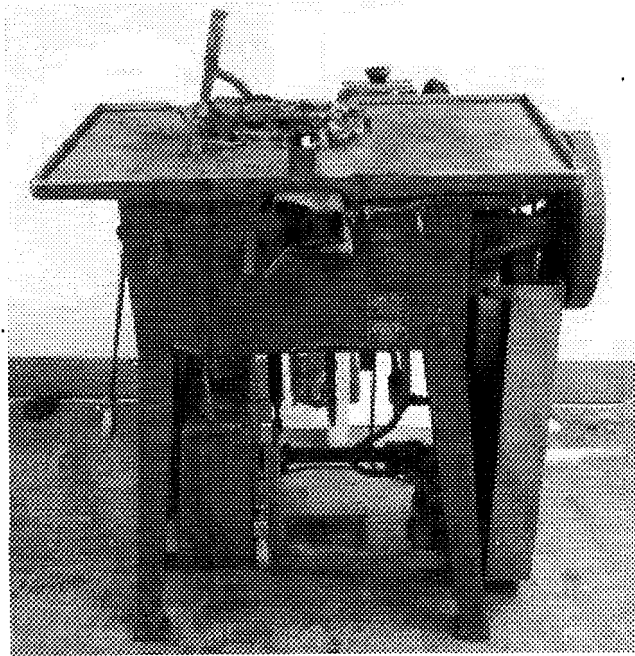
Mr. Mergenthaler's Linotype Machine revolutionized typesetting in 1886. The machine casts entire lines of relief type in one piece, making typesetting much faster and cheaper than setting one letter at a time.

The automation of type-setting

The second major typesetting technology of note was Ottmar Mergenthaler's *Linotype* machine, patented in 1886 in Baltimore, Maryland. Mergenthaler was the first to succeed at automating *type-setting*. His machine used a keyboard, with which letters were selected. Hitting a key on the keyboard caused an escapement to release a brass matrix from a magazine at the top of the machine. The matrix was then transported to an assembler where an *entire line* of type was composed as a line of matrices.

Once the matrices for the line were assembled, they were moved to a casting section of the Linotype machine where molten lead was injected into the back of the matrices, creating a solid line of relief type in one piece.

Mergenthaler's invention was revolutionary,



The Ludlow Typograph, made between 1912 and about 1989. The Ludlow was a companion to the Linotype machine, not a competitor. This machine was used to set large type for headlines. It was slow, but effective.

advancing the speed of typesetting to an impressive new level, and in turn reducing the price of printing without compromising quality.

The Linotype machine was made from 1886 until 1979, when it was finally discontinued. The Linotype Company is still in business, now licensing their designs as digital fonts.

For headline type -- too large to be cast on the Linotype -- a second line-casting machine was used. Called the *Ludlow Typograph*, the machine used hand-assembled brass matrices held in place with a screw in a *composing stick*. Once the matrices for a headline were assembled in the composing stick, the stick was placed on top of the machine, and molten lead was injected from underneath, causing a line of type to be cast as one piece. Typographers would then assemble the body (text) type cast on the Linotype with the headlines cast on the Ludlow to make up complete pages.

Revolution in the '60s

In the mid 20th century, various inventions changed the complexion of typesetting, moving it from the realm of cast lead characters and relief printing, and into the realm of photo-mechanical printing processes which were becoming popular in the 1950s and 1960s.

There were three generations of technology that comprised mid-20th century typography. First came *phototypesetting*, which used a combination of electromechanical and photographic components to expose individual letters onto photographic emulsions.

The second wave of technology used digitized type fonts imaged directly onto photo paper or film with a cathode ray tube. Called *CRT typesetting*, the benefits were speed and sharpness. These machines were used largely by newspapers, who needed a large volume of type in a short period of time.

The third generation -- *laser typesetting* -- used digitized type fonts and a laser beam for exposure. The laser changed everything, providing tremendous exposure intensity and extraordinary resolution. The pinpoint precision of a laser makes resolutions of mere microns possible. Laser exposure systems are still in use today.

Typography on the asbestos labels

The machinery used on the asbestos label (UCC 61) was the Ludlow Typograph, and the fonts are identified in the caption of that image on page 6.

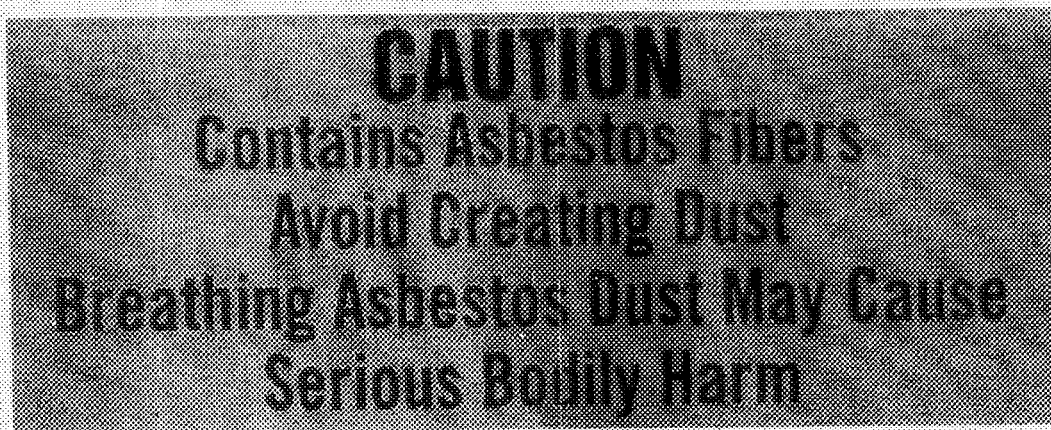
Without seeing an original label, I cannot determine how this label was printed, but the type was made in metal, then either printed directly on paper, or alternatively printed onto a white "proofing" paper, photographed on a process camera, and reproduced by offset lithography for the final labels.

The Ludlow machine was made from 1912 until the late 1980s, and the type fonts in question were designed in the late 1930s. The typesetting for the asbestos label could, therefore, have been produced

anytime between about 1939 and 1989. It is also possible that the type could have been set on a working Ludlow machine more recently than the end of the Ludlow Typograph company. These machines were commonly used throughout the 1970s and '80s. Some Ludlow machines are still working today.

As part of this research I found only a few working Ludlow Typographs. Of those I found, only one has a type font used on the asbestos label. That machine is located in South Africa. The company in question does not have both the medium and the lighter weight of the fonts used on the asbestos label. It's unlikely that the South African firm would be able to set the type exactly as the samples show it.

Other working Ludlow machines I located closer to home do not list these specific type fonts in their catalogs. In my opinion, it is highly unlikely that the type was set recently using any of these still-operating Ludlow machines.

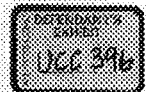
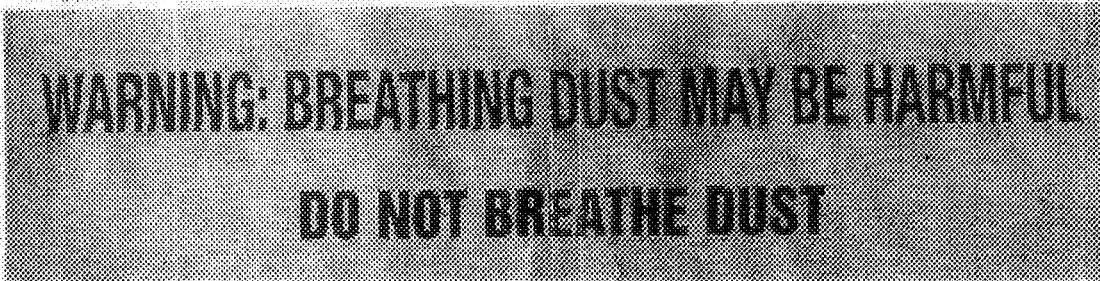


The word "CAUTION" is set in Ludlow Condensed Gothic Medium. The remainder of the warning label is set in Ludlow Condensed Gothic, a lighter version of the same font. Though the exact date of release is unknown, the font first appears in the 1939 Ludlow type specimen book. The designer is also unknown, but most of the work of the Ludlow Design Studio is attributed to Robert Hunter Middleton, the Director of the studio.

A digital version of the lighter of these fonts has been created by Steve Jackaman at International TypeFounders in Philadelphia. Called *Gothic RR Medium Condensed*, the font is a very close replica of the font on label UCC 61. It is not exact, however, as Mr. Jackaman developed the font for a more modern system of typography with greater sophistication. Following is a sample of that font:

Contains Asbestos Fibers
Avoid Creating Dust
Breathing Asbestos Dust May Cause
Serious Bodily Harm

The second example label (UCC 396) provided to me is more modern, and it uses type fonts that were designed in the 1980s. The upper of these fonts is also anamorphically distorted, something that was not easily accomplished until the advent of PostScript imaging devices in the mid-1980s. Both of the fonts on the second label are based on the font family called *Helvetica*, which was originally designed in 1957 by Swiss type designer Max Miedinger, who developed the font for the Haas type foundry in Zurich.



WARNING: BREATHING DUST MAY BE HARMFUL

This font is *Helvetica Neue 77 Bold Condensed*, redesigned in 1983 by Linotype Type Studio, New York (Set at 70% of normal width). Setting anamorphically distorted type is simple in modern typesetting systems, those created after 1984-85. I set this example in Adobe InDesign, and applied the anamorphic distortion by entering a value in the *Horizontal Scale* dialog entry in that program.

A note of caution: There are numerous versions of *Helvetica*, and many pirated versions and "look-alikes." It is possible that this font is a variation of *Helvetica Bold Condensed*, designed prior to 1983. It's impossible to tell without knowledge of the original typesetting system.

DO NOT BREATHE DUST

The lower, and bolder font is called *Helvetica Inserat*. It is also based on the original *Helvetica*, and credited to the Linotype Type Studio, New York. According to the Linotype catalog, this font was also redesigned in 1983. It is not distorted.