During the early years of the World Wide Web, designers were forced to work within the narrow range of typefaces commonly installed on the computers of their end users. Since then, several techniques have emerged for embedding fonts within web content or for delivering fonts to end users when they visit a site. In one approach, specially formatted fonts are hosted on a third-party server and then downloaded by users; designers pay a fee for the service. Another approach implements the `@font-face` rule in CSS, which can download any kind of digital font hosted on a server; only typefaces licensed for this use can be accessed legally via `@font-face`.

WEB FONTS 1.0

Verdana was designed by the legendary typographer *Matthew Carter* in 1996 for digital display. Verdana has a large x-height, simple curves, open forms, and loose spacing.

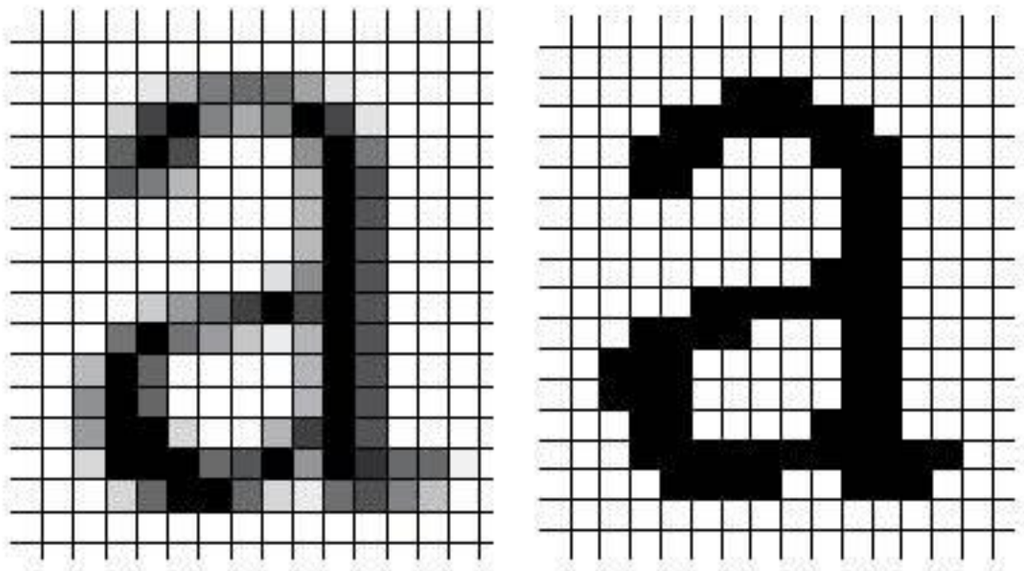
Georgia **is a serif screen face built with sturdy strokes, simple curves, open counters, and generous spacing. Designed by Matthew Carter in 1996 for Microsoft, Georgia is widely used on the web.**

VERDANA AND GEORGIA, *released in 1996 by Microsoft, were designed specifically for the web. Prior to the rise of font embedding, these were among a handful of typefaces that could be relilably used online.*

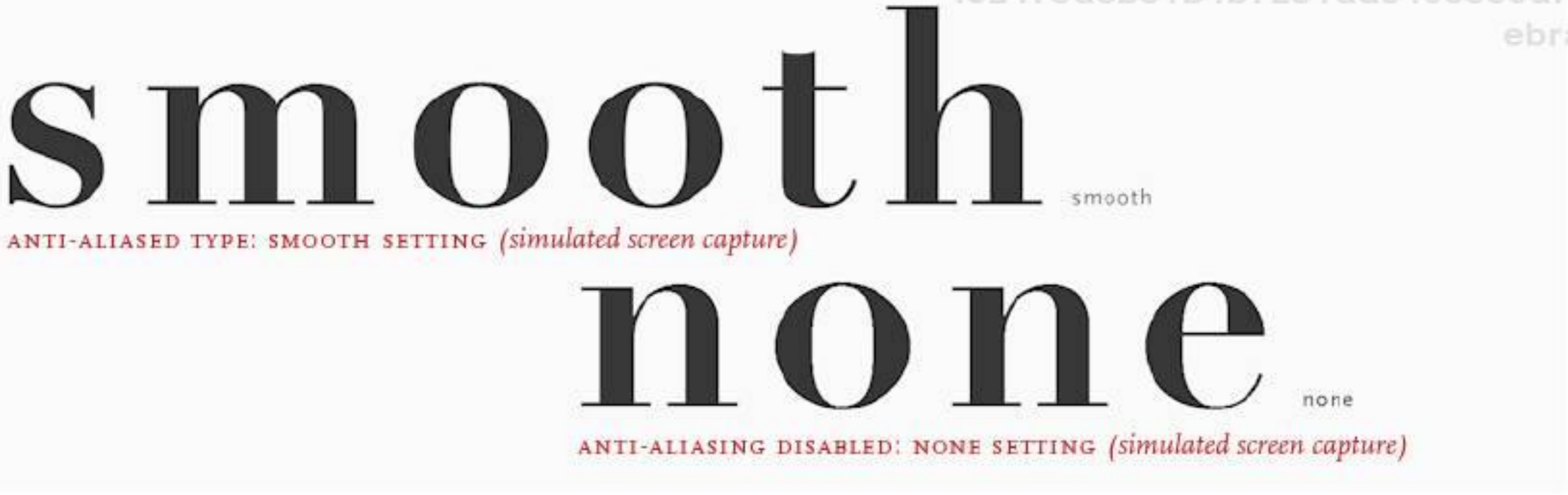
FONT EMBEDDING Screen shot, detail, 2009. Typefaces: Greta and Fedra, designed by Peter Bilak/Typotheque. *In 2009, the digital type foundry Typotheque launched a pioneering service that allows designers to display Typotheque fonts on any website in exchange for a one-time license fee. Typotheque's Open Type fonts, which support global languages including Arabic and Hindi, are hosted by Typotheque and accessed using the CSS* `@font-face` *rule.*

BOBULATE Website, 2009. Designed by Jason Santa Maria for Liz Danzico. Typeface: Skolar, designed by David Brezina/Typetogether. *This site design uses Typekit, a third-party service that delivers fonts to end users when they visit a site. Typekit deters piracy by obscuring the origins of the font. Designers or site owners pay a subscription fee to the service.*

Anti-aliasing creates the appearance of smooth curves on screen by changing the brightness of the pixels or sub-pixels along the edges of each letterform. Photoshop and other software packages allow designers to select strong or weak anti-aliasing. When displayed at very small sizes, strongly anti-aliased type can look blurry. It also increases the number of colors in an image file.



ANTI-ALIASED LETTER BITMAPPED LETTER



ANTI-ALIASED TYPE: SMOOTH SETTING *(simulated screen capture)*

ANTI-ALIASING DISABLED: NONE SETTING *(simulated screen capture)*

LETTERSCAPES Website, 2002. Design: Peter Cho. *Simple bitmapped letters are animated in three-dimensional space.*

BITMAP TYPEFACES

Bitmap typefaces are built out of the *pixels* (picture elements) that structure a screen display or other output device. While a PostScript letter consists of a vector outline, a true bitmap character contains a fixed number of rectilinear units that are displayed either on or off. True bitmap characters are used on devices such as cash registers, signboard displays, and various small-scale screens.

Most contemporary bitmap typefaces are not true bitmaps. They are drawn as outlines on a grid and then output as PostScript, TrueType, or OpenType fonts. Thus they can be easily used with any standard layout software. Many designers like to exploit the visible geometry of pixelated characters.

LoResNine LoResNine

LoResTwelve LoResTwelve

LoResFifteen LoResFifteen

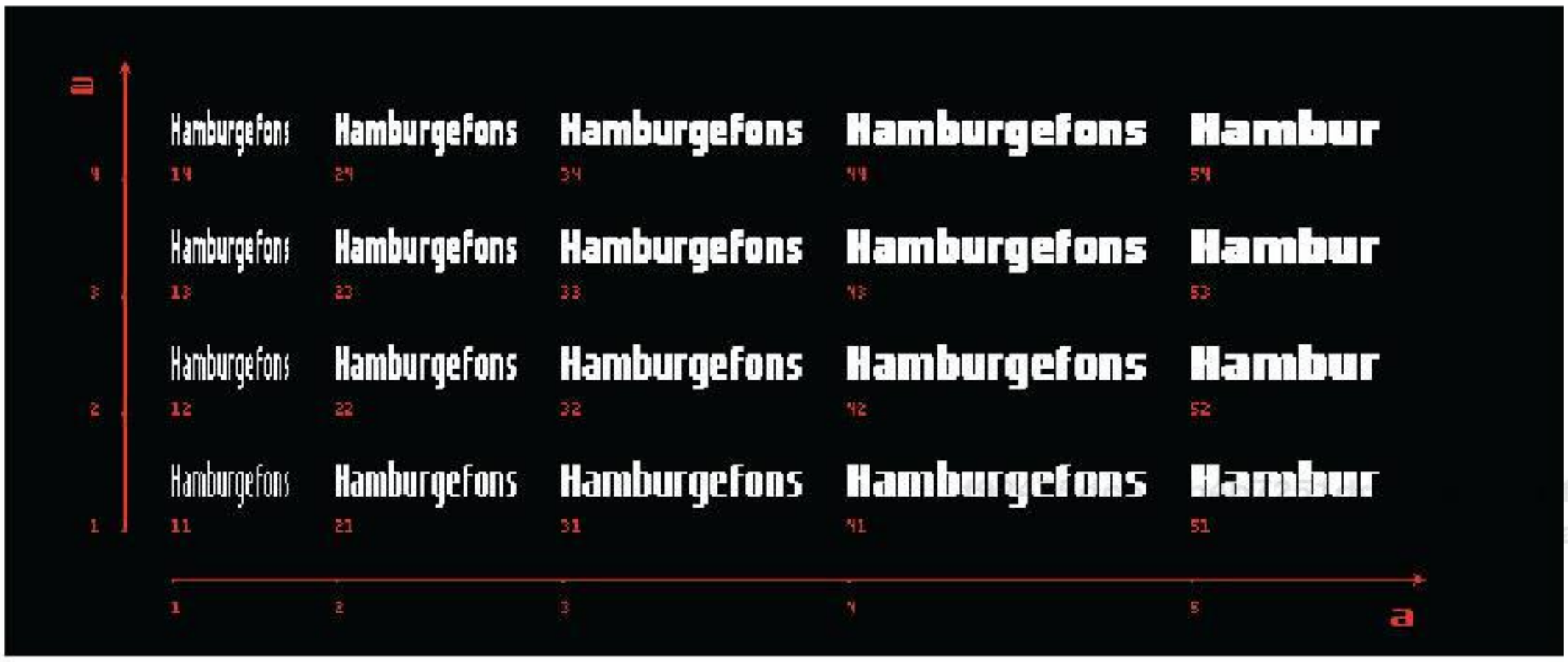
LoResTwentyEight LoResTwentyEight

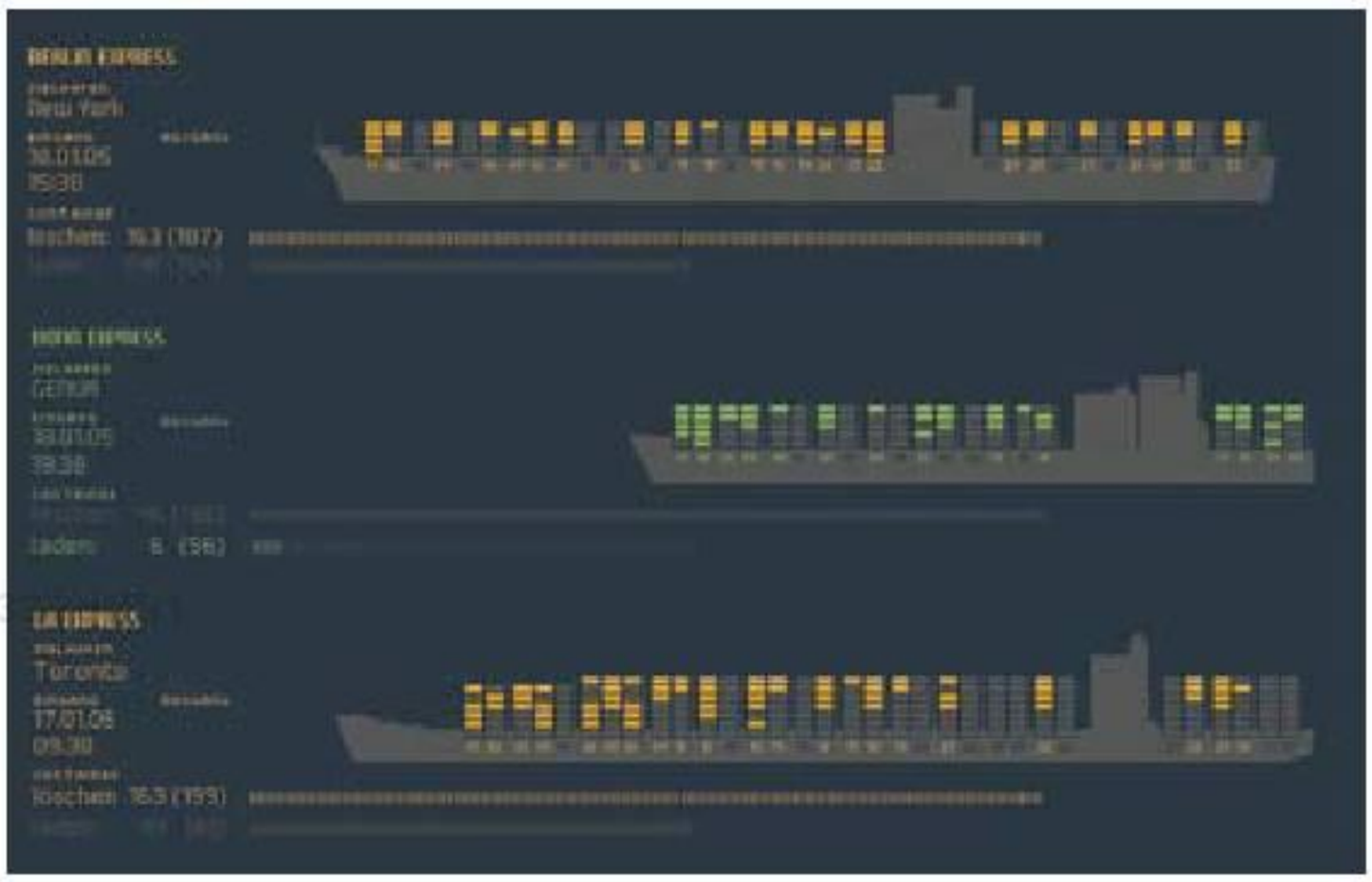
Set at size of root resolution (9, 12, 15, and 28 pts)

All set at 28 pts

LO-RES NARROW, *designed by Zuzana Licko, Emigre. Released in 2001, the Lo-Res type family is a collection of outline (PostScript) fonts based on bitmap designs created by Licko in 1985. Lo-Res Narrow consists of a series of different sizes, each one constructed with a one-pixel stroke weight. Thus Lo-ResTwentyEight Narrow has dramatically lighter and tighter forms than Lo-ResNine Narrow, which gets blockier as it is enlarged. Designed for display on screen at low resolutions, a bitmap font should be used at its root size or at integer multiples of that size. (Enlarge 9-pixel type to 18, 27, 36, and so on).*

NIJHOF & LEE Receipt, 2003. *This cash register receipt, printed with a bitmap font, is from a design and typography bookstore in Amsterdam.*





ELEMENTAR, *designed by Gustavo Ferreira in 2009 and distributed by Typotheque. Elementar is a bitmap type family consisting of dozens of weights and styles made by manipulating common parameters such as height, width, and the degree of contrast between horizontal and vertical elements. Elementar is suitable for print, screen, and interfaces. It is inspired by Adrian Frutiger's Univers type family.*