The Road to Clarity

How a graphic designer and a typographer and their obsession with fonts and legibility led to a painstaking effort to clean up America's road signs, one letter at a time. **By Joshua Yaffa**

Highway Gothic
Clearview

"So, what do you see?" Martin Pietrucha 1 asked, turning around in the driver's seat of his mint green Ford Taurus. It was a cold day in January, and we were parked in the middle of a mock highway set on the campus of Pennsylvania State University in State College. Pietrucha is a jovial, 51-year-old professor of highway engineering. His tone was buoyant as he nodded toward the edge of the oval stretch of road where two green-and-white signs leaned against a concrete barrier.

What I saw, Pietrucha knew, was what we all may see soon enough as we rush along America's 46,871 miles of Interstate highways. What I saw was Clearview, the typeface that is poised to replace Highway Gothic, the standard that has been used on signs across the country for more than a half-century. Looking at a sign in Clearview after reading one in Highway Gothic is like putting on a new pair of reading glasses: there's a sudden lightness, a noticeable crispness to the letters 2.

The Federal Highway Administration granted Clearview interim approval in 2004, meaning that individual states are free to begin using it in all their road signs. More than 20 states have already adopted the typeface, replacing existing signs one by one as old ones wear out. Some places have been quicker to make the switch — much of Route I-80 in western Pennsylvania is marked by signs in Clearview, as are the roads around Dallas-Fort Worth International Airport — but it will very likely take decades for the rest of the country to finish the roadside makeover. It is a slow, almost imperceptible process. But eventually the entire country could be looking at Clearview.

1 Martin Pietrucha

The typeface is the brainchild of Don Meeker 3, an environmental graphic designer, and James Montalbano 4, a type designer. They set out to fix a problem with a highway font, and their solution — more than a decade in the making — may

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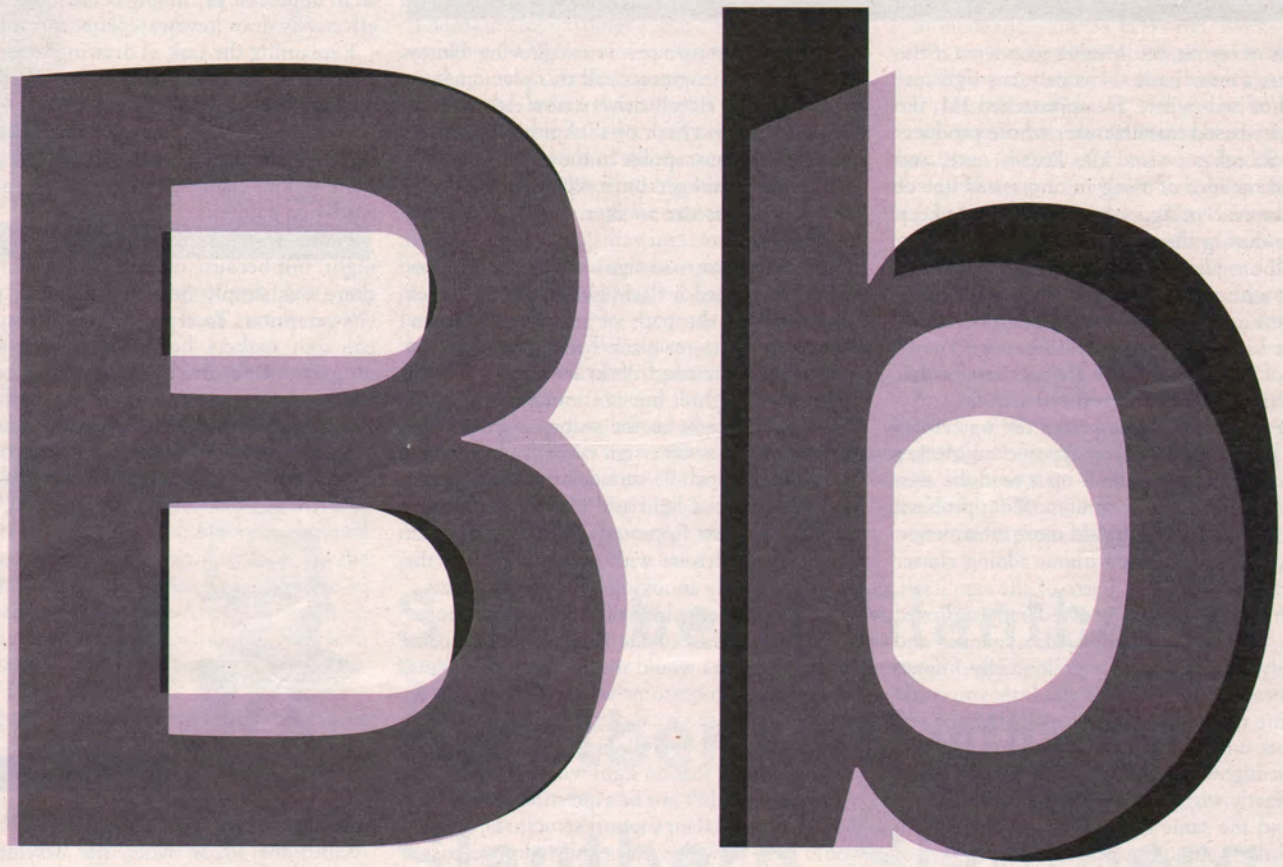

2 A road sign in Highway Gothic, left, and one in Clearview.

end up changing a lot more than just the view from the dashboard. Less than a generation ago, fonts were for the specialist, an esoteric pursuit, what Stanley Morison, the English typographer who helped create Times New Roman in the 1930s, called "a minor technicality of civilized life." Now, as the idea of branding has claimed a central role in American life, so, too, has the importance and understanding of type. Fonts are image, and image is modern America.

As a teenager in Portland, Ore., Meeker ran a small business out of his parents' house making signs for local stores, cutting letters out of Plexiglas with a band saw. He majored in fine art at the University of Oregon and went on to get a master's degree in graphic and industrial design at Pratt Institute in New York. In the mid-80s, Meeker created a uniform signage system for the country's rivers and other navigable waterways for the Army Corps of Engineers. More than 200 people were drowning nationwide each year, most of them during the 30 to 40 minutes around dawn and dusk when sign visibility is especially poor. Graphic design traditionally focuses on

3 Don Meeker 4 James Montalbano

5 A simulation of how a retroreflective sign is viewed by an older driver at night when halation, or overglow, is produced. Highway Gothic, left, blurs almost beyond recognition while Clearview, right, maintains the letter forms.

problems of layout, but Meeker wondered if the issue wasn't more basic — namely, the sign surface had to be brighter. He approached 3M, the Minnesota-based manufacturer whose products include Scotch tape and the Post-it note, and proposed the idea of using an unreleased line of yellow fluorescent sign material that would keep its shine during the dark morning and evening hours. "I am just like anybody else who sees a problem with a civic issue and sets out to fix it," he told me as we sat one afternoon in the living room of his home in the Westchester County suburb of Larchmont. "I've always thought that design can be a form of social activism."

In 1989, after his success with the waterways project, the State of Oregon approached Meeker with a commission to think up a roadside sign system for scenic-tour routes. The problem sounded modest enough: Add more information to the state's road signs without adding clutter or increasing the physical size of the sign itself. But with the existing family of federally approved highway fonts — a chubby, idiosyncratic and ultimately clumsy typeface colloquially known as Highway Gothic — there was little you could add before the signs became visually bloated and even more unreadable than they already were. "I knew the highway signs were a mess, but I didn't know exactly why," Meeker recalled.

Around the same time Meeker and his team were thinking about how to solve the problem of

6 In the early days of the automobile, road signs were hand-painted in all uppercase letters.

information clutter in Oregon, the Federal Highway Administration was concerned with another problem. Issues of readability were becoming increasingly important, especially at night, when the shine of bright headlights on highly reflective material can turn text into a glowing, blurry mess. Highway engineers call this phenomenon halation 5, and elderly drivers, now estimated to represent nearly a fifth of all Americans on the road, are most susceptible to the effect.

"When the white gets hit, it explodes, it blooms," Meeker, who has the air of a scruffy academic, went on to say.

He placed two road signs side by side on his couch and shined a flashlight at each in quick succession. In the path of the moving beam, the first, a white-on-black street sign from the early 1900s, remained dark; its letters became momentarily lighter but not much brighter. As he moved the light to the second sign, a more modern white-on-blue sign taken from a nearby intersection, its whole surface brightened, sending back waves of light and giving the letters a fuzzy, white glow. Repeated at 70 miles per hour, especially for drivers with impaired vision, the effect is not only annoying but also dangerous.

The government's highway engineers proposed increasing the size of the letters by 20 percent. But larger letters would mean even larger signs, a costly and cumbersome venture that would do little but increase visual clutter on the roadway. "You're talking about billions of dollars," Meeker said, explaining that on signs what is taller is also wider. "It wouldn't just be a question of replacing the signs and all their support structures, but you would have to widen lanes and redo overpasses to make room for these things."

Meeker wasn't working for the federal highway agency, but in his mind the problem of clutter on signs in Oregon and the federal government's concern with halation seemed intertwined. Along with researchers from the Pennsylvania Transportation Institute, a highway-research body attached to Penn State that was also interested in questions of sign legibility, Meeker again approached 3M — the manufacturer of most of the country's reflective sign material — with the idea of joint studies on the relationship between typeface design and halation.

What started as a project to organize information for tourist routes in Oregon would soon turn into an all-consuming quest, and one that marked the first time in the nation's history that anyone attempted to apply systematically the principles of graphic design to the American highway.

Road signs first appeared in ancient Rome as stone markers counting the distances to various cities in the empire. In the age of the automobile, they began popping up on the side of the road a little more than a decade after the Ford Motor Company released its first Model T. Auto clubs and state highway departments placed the markings with little thought toward uniformity or consistency, and issues of typography were barely considered. The text that did appear on these early signs was largely hand-painted and all in uppercase 6, simply because no one could effectively draw lowercase letter forms by hand.

Explaining the task of drawing letters, Meeker said: "All capital letters are either straight lines or curved lines. The worst-case scenario is pretty much 'B.'" But lowercase letters, maddening knots full of arcs and curves, present a more serious challenge to the Sunday-afternoon road-sign painter.

Hand-drawn signs were difficult to read at night, not because of the halation but because there was simply no shine to catch the driver's attention. To try to remedy this, municipal sign makers began sprinkling handfuls of coarse sand on the freshly painted letters, followed by experiments with marbles. The first truly reflective sheeting came later, in the early 1940s, when 3M introduced sign material made with a patchwork of glass beads laminated under a plastic film.

7 Dwight D. Eisenhower

Until the 1920s, when the development of die-cut technology allowed for the shaping and cutting of thin metal alloy, signs were often idiosyncratic, with layouts and typefaces varying by city and region. But as the popularity and accessibility of long-distance road travel increased, so, too, did the need for coherent nationwide standards. Federally approved fonts first appeared in the 1935 edition of the Manual on Uniform Traffic Control Devices, the bible of federal road and highway standards that dictates the size, shape and placement of road signs.

In 1956, President Dwight D. Eisenhower 7 announced his goal of an expanded Interstate System, and highway engineers worked quickly to fashion a rough alphabet by rounding off the square edges of the block lettering created during die-cut sign making. Today, there are six Highway Gothic typefaces in the official Federal Highway Administration series. Most prevalent on the modern highway is the fifth typeface in the family, Series E-Modified, and it is with this that Clearview is most often directly compared.

The letter shapes of Highway Gothic weren't ever tested, having never really been designed in

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ILLUSTRATIONS BY JENNY MORTSELL. LANDSLIDE: HULTON ARCHIVE/GETTY IMAGES.

the first place. "It's very American in that way — just smash it together and get it up there," says Tobias Frere-Jones 8, a typographer in New York City who came to the attention of the design world in the mid-1990s with his Interstate typeface inspired by the bemusing, awkward charm

8 Tobias Frere-Jones

of Highway Gothic. "It's brash and blunt, not so concerned with detail. It has a certain unvarnished honesty."

The quirky appeal of imperfection does give Highway Gothic its fans, who share highway lore and trade vintage road signs on the Internet. To highway enthusiasts like Richard Moeur, who runs a Web site devoted to traffic signs, the existing highway typeface has become evocative of the wonder of the open road. Moeur mentioned one example of the classic highway look "in the wild," as he calls it, on a stretch of Interstate 40 on the road into Flagstaff, Ariz.: "There it is, in big 16-inch letters and a 3-foot tall Interstate shield, on a sign 10 feet tall by 16 feet wide — 'I-40 WEST Los Angeles.'

"That sense of possibility has always meant a lot to me," he says. "For some, a sign is just a utilitarian object. For others, it's a symbol of connectivity."

Meeker initially assumed that the solution to the nation's highway sign problem lay in the clean utilitarian typefaces of Europe. One afternoon in the late fall of 1992, Meeker was sitting in his Larchmont office with a small team of designers and engineers. He suggested that the group get away from the computer screens and out of the office to see what actually worked in the open air at long distances. They grabbed all the roadsigns Meeker had printed — nearly 40 metal panels set in a dozen different fonts of varying weights — and headed across the street to the Larchmont train station, where they rested the signs along a railing. They then hiked to the top of a nearby hill. When they stopped and turned, they were standing a couple hundred feet from the lineup below. There was the original Highway Gothic 9; British Transport 10, the road typeface used in the United Kingdom; Univers 11, found in the Paris Metro and on Apple computer keyboards; DIN 1451 12, used on road and train signage in Germany; and also Helvetica 13, the classic sans-serif seen in modified versions on roadways in a number of European countries. "There was something wrong with each one," Meeker remembers. "Nothing gave us the legibility we were looking for." The team immediately realized that it would have to draw something from scratch.

Two designers working with Meeker, Christopher O'Hara and Harriet Spear, set out to create the new typeface, initially based on hand-drawn traces of Highway Gothic. "We wanted to take out the goofiness, to restore some sort of rational relationship to type design," O'Hara told me. "There are a lot of things about it that don't make any sense." O'Hara and Spear started by opening the font up, carving out the cramped interior areas of the letters that trapped light and gave Highway Gothic its notoriously fuzzy quality.

The first indication of success came a few months later, in January 1993, when Meeker took O'Hara's early sketches to Penn State for some human testing. He showed the drawings to Pietrucha and his colleague Philip Garvey, a researcher with a background in human psychology. In Clearview's first public test, Garvey sat in an office chair in the basement of the Pennsylvania Transportation Institute, with Clearview displayed on a computer screen at the opposite end of the long hallway. To simulate halation, they turned off all the lights and blurred the letters on the monitor. Clearview certainly looked better, but could they prove it?

Intrigued by the early positive results, the researchers took the prototype out onto the test track. Drivers recruited from the nearby town of State College drove around the mock highway. From the back seat, Pietrucha and Garvey recorded at what distance the subjects could read a pair of highway signs, one printed in Highway Gothic and the other in Clearview. Researchers from 3M came up with the text, made-up names like Dorset and Conyer — words that were easy to read. In nighttime tests, Clearview showed a 16 percent improvement in recognition over Highway Gothic, meaning drivers traveling at 60 miles per hour would have an extra one to two seconds to make a decision.

Word of the Penn State tests soon reached the Texas Transportation Institute, which conducted its own tests and then requested 25 computer disks with Clearview for further testing. "I knew we were onto something," Meeker says. "But we were still too raw. We needed some polish." He began asking around for recommendations in the tightly knit world of type design. A friend mentioned the name of James Montalbano, an upstart type designer who had already received some renown for drawing custom fonts for magazines like Glamour and Vanity Fair.

Montalbano, now 53 years old, works from a studio on the top floor of a brownstone near the Brooklyn waterfront. He has close-cropped hair and constant stubble, as well as the lumbering, punch-you-in-the-ribs demeanor of a high-school woodshop teacher, a job he in fact held for a year after graduating from Kean University in Union, N.J. In kindergarten in Jersey City, he was scolded for his stubborn insistence on drawing two-tiered lowercase "a"'s. But it wasn't until he took a continuing-education class with the type designer Ed Benguiat at the School of Visual Arts in Manhattan in the late 1970s that Montalbano discovered his talent for creating his own type.

At their first meeting, a hot, muggy day in the summer of 1995, Meeker came to Montalbano's apartment to show the early sketches of Clearview. "It was stiff — there wasn't any sort of grace to it," Montalbano told me last winter of his initial impressions of the raw typeface. The stem weights were inconsistent, meaning the font looked bolder in some letters and lighter in others, and the baseline levels of the letters were uneven, giving it a wobbly, slightly boozy look. Montalbano recalls interrupting Meeker's impassioned presentation. "I don't know much about all this legibility theory," he remembers saying. "But I do know about poorly drawn type." He was hired immediately and set to work to sculpture Meeker's initial drawings into a complete, sellable typeface.

"The fundamental flaw of Highway Gothic is that the counter shapes are too tiny," Montalbano told me, referring to the empty interior spaces of a typeface 14, like the inside of an "o." When viewed from a distance, and especially at night under the glare of high-beam headlights, the

Slantberg
9 Highway Gothic

Slantberg
12 DIN 1451 Mittleschrift

Slantberg
10 British Transport

Slantberg
12 DIN 1451 Engschrift

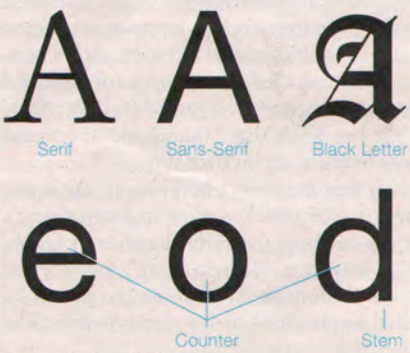
Slantberg
11 Univers

Slantberg
13 Helvetica

A comparison of the original Highway Gothic 9 with several European typefaces.

tightly wound lowercase "a" of Highway Gothic becomes a singular dense, glowing orb; the "e," a confusing blur of shapes and curved lines. Meeker puts it more bluntly: "They look like bullets that you couldn't put a pin through."

Montalbano smoothed out the rough, imprecise edges of O'Hara and Meeker's first version, widening the counter shapes even further. He understood that Clearview's success would come not from where its shapes are on the sign but precisely in where they are not — the open spaces in Clearview's letters are what make it so readable. It is as if, as Pietrucha put it that morning on the test track at Penn State, "we put the typeface on a diet" 15.



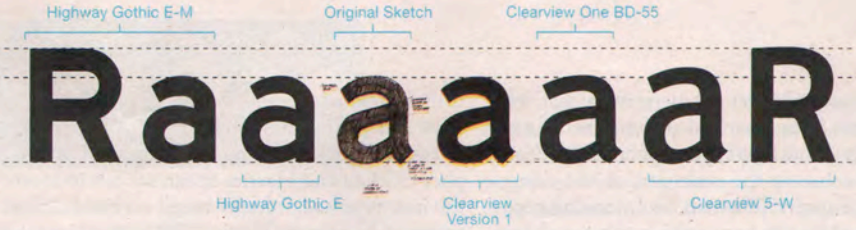
14 Some basic typographic terminology.

But selling the government on the idea of adopting Clearview as a road sign font was another matter. Over several years Meeker and Pietrucha went to meetings at the Federal Highway Administration; they would end each one by setting up a row of sample highway signs in the long hallways of the agency's headquarters. The government's own engineers were impressed with Clearview, but any immediate progress was slowed by the inevitable forces of inertia and bureaucracy in Washington. "We'd go in each time excited," Meeker says of their presentations to federal officials. "And we'd leave each time thinking, 'Why did we even bother?'"

At times, Clearview receded to the background as both Meeker and Montalbano busied themselves with other, more immediately fruitful design work. But they would keep returning to the font for minor changes: an adjustment in thickness here, a change in letter spacing there.

"Those guys are tinkerers," Pietrucha says of Meeker and Montalbano. "They were always playing around, wondering how we could optimize it. We had something we called Clearview, but was there a Clearer-view? Or a Clear-est view?"

Type is just as much about psychology as geometry. A letter's shape, its curves, the way it sits next to other letters — all these factors give a font its personality and in turn create an emotion and connotation for the reader.



12 From left to right, the evolution of Highway Gothic to Clearview.

Clearview is a sans-serif face, meaning the terminal points of its letters lack any ornamental lines, wedges and other shapes 14. It wasn't until the 1920s that sans-serif came into wide use with typefaces like Futura 16 and later, in the '50s, Helvetica 18, but they are now the typeface style of choice for any design job requiring a clean, vaguely futuristic aesthetic. The clear, pristine shapes of sans-serif fonts grab the eye in an instant, lending themselves to advertising copy and large, punchy headlines as well as highway signs. But in large blocks of text, the detailed edges of the letter forms in serif fonts give the type an easy-to-follow flow reminiscent of cursive script, making them the preferred typeface for newspapers, magazines and books.

There are some typefaces that work for selling estate jewelry and others that seem to fit in best pushing high-tech toys. Volkswagen's aggressively plain ads for the Beetle ushered in a new era of straightforward and minimalist advertising in the '60s. "The Creative Revolution," as it came to be known in the advertising world, was set off by a few words — "Lemon" and "Think Small" were among the most popular slogans — written in Futura, a typeface chosen for its bare style that spoke to Volkswagen's message of simple claims and precision engineering 17. Decades later, in the early 2000s, a light and nimble lowercase typeface style defined the waning years of the dot-com boom. Its casual, approachable look quickly appeared in the logos of corporate behemoths like Cingular, British Petroleum and Accenture. Stodgy or irreverent, timely or timeless, typography helps establish the ethos and identity of a brand — and it can have a similar effect on the highway.

"Type on the roadway is very much like the corporate identity of a country," says Graham Clifford, a friend of Montalbano's who runs his own branding and design firm in New York.

Futura
Helvetica

16 Futura (1920s) and Helvetica typefaces (1950s).

Clifford, who is English, mentioned the ubiquity of British Transport, which has been used in his country since the late 1950s. In the decades since its adoption, it has appeared on T-shirts and in advertisements, much as Highway Gothic has come to infuse the American consciousness. Phil Baines, a London-based typographer, once called British Transport "the house style for Britain." Other countries have their own style, too. Clifford told of a trip he took with his wife, driving from England through Wales, then crossing by ferry to Ireland and up to Northern Ireland.

17 A Volkswagen advertisement from the 1960s that used Futura.

Many signs in and around Dublin were written in a quirky local script; the markers in Belfast, however, were uniformly British Transport. "The change in typeface lets you know you're in a different place," Clifford said.

It can also let you know you're in a different time. In 1941, Hitler abandoned the ornate blackletter typeface 14 that had been a text standard in Germany since the Gutenberg era. Party propaganda was then printed in a roman serif typeface, giving the Nazi regime a starkly modernist identity. "Typography is all about tone of voice," Clifford says. "Do I shout at people? Do I whisper at people? Do I scream from the rooftops? Am I talking to a woman? To a man?"

Highway Gothic conjures the awe of Interstate travel and the promise of midcentury futurism; Clearview's aesthetic is decidedly more subdued. "It's like being a good umpire," Pietrucha says, suggesting that one of Clearview's largest triumphs will be how quietly it replaces Highway

Gothic sign by sign in the coming years. "It will completely change the look of the American highway, but not so much that anyone will notice."

As Montalbano tweaked Clearview's design, a problem continued to gnaw at him. Thicker, darker letters are more recognizable on signs, but they can also lead to dense, bloblike shapes that tend to blur, especially at night — the main downfall of Highway Gothic. How could he increase Clearview's profile, Montalbano wondered, without repeating the same designs mistakes of its predecessor? The answer would come thanks to a branding crisis at the National Park Service.

Clarendon Roman
NPS Rawlinson Text

18 A typeface called Rawlinson was designed to replace Clarendon for the National Park Service.

In the summer of 1998, the park service had just received some alarming news: According to one survey, the vast majority of Americans were under the false impression that Smokey Bear worked for the National Park Service and not the Forest Service. At the time, the park service was using a mismatched collection of a half-dozen typefaces on its road signs, wayposts and other printed materials. A signature typeface, it reasoned, would help to solve its brand-recognition problem.

The park service hired Montalbano and Meeker to come up with one. After considering various existing faces, Montalbano ended up drawing a stately looking serif that he dubbed Rawlinson 18, his wife's last name. "My father-in-law worked for the Forest Service," he told me, "so I thought I'd name the park service font after him, just to keep the confusion alive."

They sent the typeface to Penn State for testing; it came back showing only a 2 percent improvement in legibility over Clarendon, the serif font in use at the time on the park service's road signs. Montalbano received a call from a worried Meeker. "We knew that no bureaucracy would ever change anything for a 2 percent improvement," Montalbano says. To increase recognition at longer distances, Montalbano tried pulling up the height of the lowercase letters, bringing them almost level with the height of the capitals. In typographic jargon, this measure is known as the x-height, based on the level of the top of the lowercase x, and even more than the shapes of the letter forms themselves, it can give a typeface an individual character.

Montalbano explained this idea over lunch at a cafe across the street from his office in Brooklyn. "If a word is set in all caps, all you will see are little white rectangles," he said, scribbling a quick "HELLO" on a napkin. The word looked heavy, almost industrial.

"But this has a definite profile," he continued, and then he drew "Hello" again on another napkin, this time in a mix of upper- and lowercase letters, its peaks and curves and dips setting off all the necessary clues in the subconscious. He held the paper in front of me. As he slowly pulled it farther away, the individual letters became harder to read, but the shape of the word remained distinct. "Your brain," he concluded, "knows the shape of the word."

With an increased x-height, Rawlinson showed a significant improvement in legibility while taking up 15 percent less sign space than the heavy, powerful-looking Clarendon. "I called Don up right away and told him, 'I want to apply this same idea to Clearview,'" Montalbano said.

Meeker and Montalbano staged a demonstration a few weeks later at the Penn State test track, spending a few thousand dollars of their own money to print up highway signs with the new version of Clearview. They invited representatives from the Federal Highway Administration and transportation officials from half a dozen states. The group stood on the tarmac and stared at a side-by-side comparison of Clearview and Highway Gothic. "Signs that you'd be hard pressed to read at 700 feet were legible at 900 or 1,000 feet," Montalbano said. "People were really freaked out" 19.

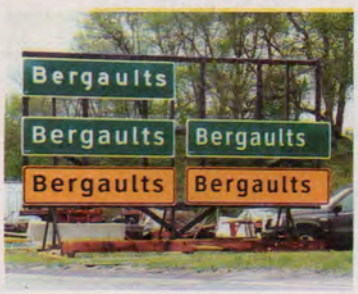
Clearview, then, had succeeded in its mission: It made signs easier to read from a distance and reduced the distracting nighttime blur of halation. But its most visible debut came not on the highway but on the oversize billboards of Times Square. On New Year's Day 2006, AT&T revealed its redesigned brand image. Clearview was featured in headlines, billboards and advertising copy, as well as on huge banners plastered around Midtown Manhattan.

The company wanted to project "a more welcoming and transparent image," says Wendy Clark, a senior vice president in charge of advertising at AT&T. For more than a decade, the company had been using Gill Sans, a leaden, staid typeface from the 1920s. Market research showed that many consumers identified the old AT&T with attributes like "monolithic" and "bureaucratic" — an image problem it hoped to fix, in part, with a new typeface.

"Clearview is approachable," says Craig Stout, a creative director at Interbrand, the agency that oversaw the AT&T campaign. "It isn't shouting at you to get your business." A year after AT&T began using Clearview for all its advertising and corporate communications, Interbrand conducted a follow-up survey, asking consumers, "Do you consider AT&T to be a technologically savvy brand?" Positive responses had doubled.

"The highway stuff is what got me into it, but it's the font's other applications that have me really excited," Montalbano says. In addition to creating a parallel Clearview type family for standard design applications, he is also working on converting it into foreign scripts. There is already a Greek version, as well as a special Latin alphabet designed for Eastern European languages. Maxim Zhukov, a Russian typographer, is adapting the type design for translation into Cyrillic. That a typeface originally inspired by a problem with tourist signage in Oregon could one day line the cavernous halls of the Moscow metro is not so much a testament to Clearview's functional, universal appeal as it is to typography's strange and enigmatic power of reincarnation. "The real life of a font is mysterious and unpredictable," Zhukov says. Certainly that has been the case with Clearview. Oregon, as it happens, has yet to adopt the typeface.

A couple months ago, Meeker's 12-year-old son, Eric, had his own unplanned encounter with the typeface. He had a homework assignment due in his seventh-grade English class, Eric told me, and in a rush, he printed a document — a fictionalized journal entry from the Civil War — from a computer in his dad's downstairs office. Hurrying out the door, he didn't notice it had printed in Clearview. A few days later, his teacher handed the assignments back. "Great job," he said to Eric. He paused, then added, "There was just something about it that made it so easy to read." ■



19 On display at the Penn State test track: Highway Gothic, top left, and Clearview, middle and bottom.

WHAT'S YOUR SIGN? A slide show of the evolution of U.S. highway signs at **nytimes.com/magazine**