Analyzing Einstein's handwriting

Ryan Dahn

26 August 2021

A handwritten letter featuring the famous $E = mc^2$ recently sold for more than a million dollars. But what does Einstein's handwriting tell us about the man himself?

More than 65 years after his death, Albert Einstein continues to fascinate—to the extent that a 1946 letter he wrote containing the famous $E = mc^2$ equation recently sold for nearly $1.25 million at auction (see figure 1). Even Einstein's handwriting has achieved pop culture status: A few years ago, after diligently poring over hundreds of Einstein manuscripts, typographer Harald Geisler transformed Einstein's cursive into a computerized font.

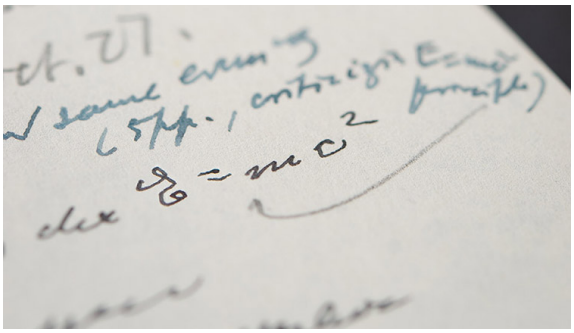


Figure 1: Dated 26 October 1946, this letter from Albert Einstein to Polish American physicist Ludwik Silberstein is one of only four instances in which Einstein is known to have handwritten the famous $E = mc^2$ equation. The letter sold at auction in May for $1,243,708.

The Einstein font may seem like another piece of Einstein-related kitsch, analogous to dorm room posters of the famous physicist sticking out his tongue. Yet dismissing Einstein's handwriting as just handwriting would be imprudent. Aside from being worth thousands or millions of dollars at auction, Einstein's handwriting is a microcosm of his turbulent life.

German cursive

Handwriting was far more important in Einstein's day than it is now. Typewriters were only just becoming commonplace when Einstein came of age around 1900. Most communication remained handwritten, which meant that learning to write by hand cleanly and legibly was a crucial life skill. Einstein would have devoted much of his time as an elementary school student learning how to write in script. Repetitive handwriting exercises in copybooks were the name of the game. Einstein spent most of his early childhood in Munich, but such an emphasis on handwriting was not particular to Germany. Where Einstein's education differed was in the number of scripts that he learned. Along with print writing and a cursive like the one still sometimes taught today, Einstein would have also learned another cursive script particular to the German-speaking world: *Kurrentschrift*, or Kurrent script, often referred to today as the "old German script." As shown in figure 2, the letters of the Latin alphabet in Kurrent look quite different from the Latin cursive that some readers may recall learning in elementary school. The Kurrent alphabet is famously tricky to decipher; most native German speakers today cannot read it, and historians like myself love to complain about it.

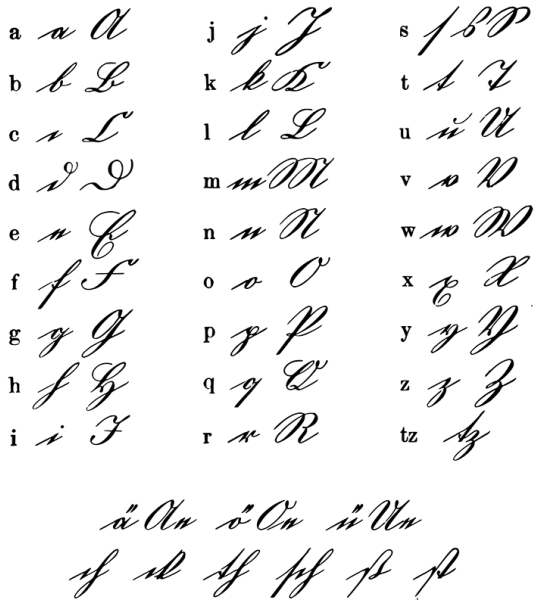


Figure 2: The German alphabet in Kurrent script. Students at German schools were taught this alphabet or its derivatives until 1941. At bottom are letter combinations including ch, ck, th, sch, and st, which are very common in German.



Figure 3: The first lines of the book of Genesis in the copy of the Gutenberg Bible held by the Berlin State Library. The Gutenberg Bible was printed in a blackletter font; the elaborate illuminations were added by hand after the pages were printed.

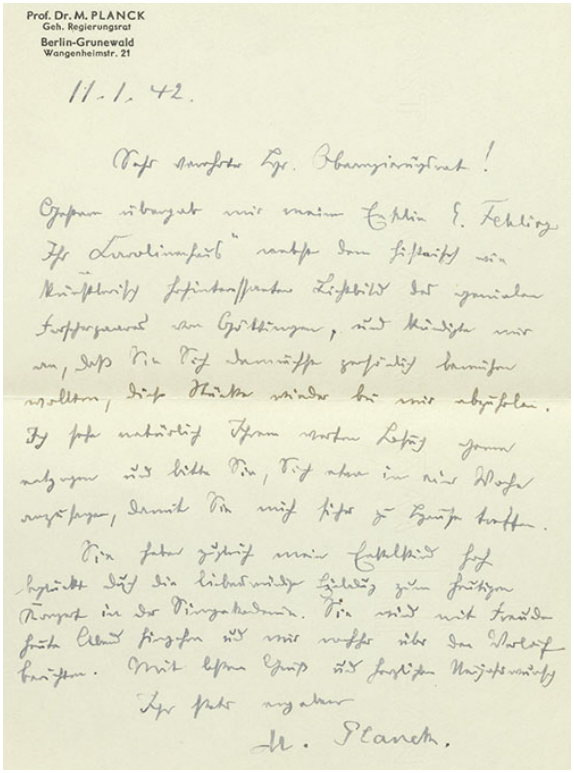
It is a beautifully florid, loopy script, which—frankly speaking—also makes it highly impractical. Many of the letters look similar. The lowercase s and h look very different than they do in Latin script—in Kurrent, the two letters extend both above and below the line on which they are written. Adding to the confusion, the s and h also look alike. And if the handwriting was sloppy or rushed, lowercase e, r, m, and n can look almost identical. Because German's system of grammatical cases often involves distinguishing among the articles der, den, and dem, among others, the similarities among those letters in Kurrent often make it hard to parse the meaning of a sentence—especially for nonnative speakers. The uppercase letters are similarly frustrating: L, B, and C can look alike, as can J and T. (Pro tip: If you ever come across an uppercase letter in Kurrent that you can't decipher, it's probably a G.)

Why did the German-speaking world have two different handwriting scripts? The answer goes back to the Middle Ages. Around 1150 a new script, blackletter (also called Gothic), emerged from various lowercase scripts. If you've ever seen a medieval manuscript, you've likely seen blackletter. When the printing press was invented, in the 1400s, the first printed books—including the Gutenberg Bible—were set in blackletter type (see figure 3).

Not until the Renaissance did the predecessor of modern handwriting emerge. At that time, humanists such as Petrarch (1304–74) became interested in the writings of the ancient Greeks and Romans. They combed through monasteries in search of the earliest known manuscripts of various ancient texts. Erroneously believing that those manuscripts, which had been written in the early Middle Ages, reflected the typeface of ancient Rome, they developed a new script known as Antiqua. By the late 1700s, derivatives of Antiqua had gradually replaced blackletter typefaces in Britain and the rest of Western Europe. You're reading the present article in an Antiqua-based font. (Blackletter types do survive in special cases: Newspaper mastheads like those of the New York Times, for example, use such fonts.)

But in the German-speaking lands and in the Nordic countries and the Baltic states that were heavily influenced by German culture, the use of blackletter type—in a form known as Fraktur—persisted through the 19th century. Most German-language newspapers, for example, were printed in Fraktur until after World War II. Kurrent persisted as the handwritten counterpart to

Fraktur. Counting uppercase and lowercase letters as separate alphabets, Germanophone students had to learn how to read eight different alphabets: the Antiqua typefaces we use today, Latin handwritten cursive, Fraktur typefaces, and Kurrent script.


Prof. Dr. M. PLANCK
Geh. Regierungsrat
Berlin-Grunewald
Wangenheimstr. 21

11. 1. 42.

M. Planck.

Figure 4: A letter from Max Planck dated 11 January 1942. Planck's Kurrent handwriting, which he used only when writing to other native German speakers, is famed among historians for its illegibility. Many scientists of Planck's generation used Kurrent until their death.

Einstein and Kurrent

Most of Einstein's writings were composed in Latin cursive, including the letter auctioned off recently. But his earliest correspondence was written in the old German script; he used it almost exclusively until he was in his mid 20s. Interestingly, Einstein abandoned his use of the old German script in the annus mirabilis year of 1905. That May, Einstein wrote a letter in Kurrent to his friend Conrad Habicht announcing the four annus mirabilis papers. By July 1905 he had switched to Latin script and would never again use the older one. Why did Einstein switch scripts? As far as is known, he never spoke publicly about that decision, but there were likely two reasons. The first was practical. Although all foreign scientists of note in that era were able to read German—which was one of the major languages of science of the day, along with English and French—they struggled to read letters written in Kurrent. Even scientists who used Kurrent with fellow German speakers, such as Max Planck and Erwin Schrödinger (see figure 4), would write to their foreign colleagues in Latin cursive (but still in German, of course).

It was for this reason that most German scientific journals were printed in Antiqua, not Fraktur, having shifted to the former by the middle of the 19th century.

But there was probably a second reason for Einstein's handwriting change. Around 1900, the German Empire was roiled by a culture war. International avant-garde trends in art, literature, music, and architecture coexisted in an uneasy tension with Germany's global imperialist ambitions.

Handwriting and typefaces were drawn into the culture war. During the 19th century, Antiqua typefaces and Latin cursive gradually made inroads in educated German society. (Other countries that used Fraktur, like the Nordic countries, largely began shifting to Antiqua in the late 19th century as well.) The Grimm brothers, for example, were famous advocates of Antiqua fonts. The fonts gradually became associated with the liberal intelligentsia and were often seen as a signal that the writer was more international in outlook.

Predictably, that trend provoked a backlash from conservatives, particularly among the advocates of ethnonationalist theories that foreshad-

owed Nazism. The "Antiqua–Fraktur dispute," as it became known, culminated in a heated debate in the imperial German Reichstag on 4 May 1911, during which a proposal to begin instruction of young children in Antiqua and Latin cursive received 85 votes in favor to 82 against. It nevertheless failed because the 397-member body failed to reach a quorum. In other words, a majority of the German Reichstag chose to dodge the question. (The Antiqua–Fraktur dispute was not a historical outlier; similar battles over potential reforms to handwriting or typography were occurring during this period in what are now Turkey, Russia, and China.)

To be sure, there were exceptions to the general rule that conservatives preferred Fraktur and Kurrent and liberals preferred Antiqua and Latin script. Before 1933, most German-language newspapers of all political leanings were printed in Fraktur. Thus many of Einstein's pre-1933 popular writings were typeset in Fraktur. Older individuals who grew up with Kurrent—including prominent intellectuals like Planck and Sigmund Freud—often kept writing in it.

In any event, choosing a handwriting script became an increasingly political act. Given Einstein's pacifism and his abhorrence of German militarism and nationalism, it seems highly probable that Einstein switched to Latin cursive in 1905 for political reasons as well as practical ones. Despite living in Switzerland at that time, he likely wanted to signal to foreign colleagues that he was tolerant, open to international communication, and not a rabid German nationalist.

Einstein's handwriting

After the shift, Einstein's handwriting remained remarkably consistent. It very much resembles the cursive still taught in some schools today.

Some Germans in Einstein's time who shifted to writing in Latin script incorporated Kurrent-style letters or flourishes into their Latin script—most commonly a little divot above the lowercase u, which in Kurrent was meant to distinguish it from n and m. But Einstein made a clean break from Kurrent; his Latin script lacks any traces of the old German script in it. He even stopped using the eszett (β), the special German letter denoting the combination of a "long s" (f) and a "short s" (the lowercase s used today). (The "long s" is not unique to German; it was used in English until the early 19th century and is visible on older handwritten documents such as the Declaration of Independence.) Most Germans who switched from Kurrent to the Latin script retained the eszett in their handwriting, and it is still used today in printed and handwritten German. The funny extra loop on Einstein's uppercase E isn't from Kurrent; it's just one of those handwriting quirks that make us all distinct.

What happened to Kurrent and Fraktur? Ironically, it wasn't the Allies' victory in 1945 that led to their demise but a decree by the Nazis themselves. Although many Nazis despised Antiqua, Adolf Hitler did not. Fraktur and Kurrent were too provincial for his megalomaniacal visions. If the Germans were to be the master race, he argued, conquered peoples would need to be able to read their language—and how could they do so if German was printed and written in a script that was so hard to decipher? At the height of his power, in January 1941, Hitler issued a decree to phase out Kurrent and Fraktur. Absurdly, it claimed that the scripts had been invented by Jews. Attempts to bring back instruction in Kurrent in postwar West Germany went nowhere, and communist East Germany had no interest in resurrecting a script associated with conservative nationalists. Today most German speakers can't read the script at all.

Ryan Dahn is the books editor at Physics Today. A historian of science, he studies 19th- and 20th-century physics in the German-speaking lands. He is working on a biography of German physicist Pascual Jordan tentatively titled Nazi Entanglement.