A Better Pencil

Readers, Writers, and the Digital Revolution

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OXFORD UNIVERSITY PRESS
2009
I grew up writing by hand. Most of the students in the classes I teach used pencils and pens at first, as I did, but many of them came of age in the digital age, and with a keyboard in hand, they’re ready to write. Even those who didn’t start using a computer until high school have become so used to the technology that they don’t bother looking at the manuals when they get new hardware or a new program. They just press the switch, click an icon, and start working. When asked whether computers or traditional writing instruments seem to provide a more direct connection between brain and page, more of them pick the keyboard than the pencil.

It’s not surprising that those of us who grew up with ink-stained fingers think of computers as harder to master than ballpoints. Nor am I surprised that, when I ask my students to write on clay tablets, they find the ancient technology unnecessarily complex and cumbersome, and they feel relieved when they’re allowed to go back to their writing tool of choice, the keyboard. That’s because, once we have mastered them and use them regularly, our word technologies—both apparently simple ones like pencils and clearly complex ones like word processors—become automatic and invisible. We don’t notice our writing machines until something goes wrong:

- The pencil point breaks.
- The lights go out.
- The computer freezes.

There’s one thing we can depend on with word technologies: like any machinery, they are sure to fail at a critical juncture, at which time, to echo Willy Loman’s wife, Linda, attention must be paid:
The pencil must be sharpened.
The candles must be located.
The unsaved file must be reconstructed from human rather than digital memory.

Sometimes repairs aren't in the cards, and we have to go to Plan B. Of course, if we were already on Plan B when the disk crashed ....

We learn from our word technology failures. Once burned by a lost file or a darkened house, we take precautions, at least for a while. After the disaster, we back up our work on the computer every five minutes. Or we make sure that there are batteries and matches, flashlights and candles stashed where we can actually find them next time.

Everyone has lost a digital file or an important piece of paper, and with any writing technology, archiving doesn't always seem worth the time and trouble. With computers, as with paper, one's intellectual life becomes risky business, ever at the whim of power surges, equipment failures, and magnetic storms, and we know that technology still leaves us vulnerable to the loss of our words.

We don't need spilled coffee and bursts of static discharge to remind us how fragile those words are, and we don't have to wait for a word technology to fail in order to remind us that we depend on it. A less stressful way to consider how automatic our customary ways of processing words have become is to try writing with an unfamiliar technology.

Before paper, before parchment, before papyrus, writing on clay was one of the main ways that writing got done. Initially, accountants in ancient Iraq kept their "books"—records of inventory and sales—on both sides of clay tablets the size of credit cards. Later still, Sumerian scribes began recording contracts, laws, inscriptions, and, eventually, more narrative sorts of legal, historical, sacred, or literary texts on larger tablets, many of them about the size of the writing paper that we use today (Robson 2007). But nowadays, while some people still carve words in stone, nobody writes on clay. Even though backyards around the world are full of clay that could be made into cheap, serviceable writing tablets, contemporary writers don't want to deal with the messiness of digging up the clay, getting out the impurities (not to mention the earthworms), and adjusting the moisture content. Of course writers don't make their own paper either, preferring to go out and buy it. Since writing-quality clay is not available at most office supply stores, and considering the issues that surface when I ask my students to write with it, clay doesn't seem poised to make a comeback as a major writing medium.

A cuneiform clay tablet from Sumer, ca. 2041 BCE. Unlike writing on paper, where the color of letters and background contrast, clay writing, like all carving, is essentially monochromatic. With letters and background the same color, the light source must be positioned to create contrasting shadows, thereby increasing legibility. Photograph courtesy of the Spurlock Museum, University of Illinois at Urbana-Champaign.

In the box on the next page is the assignment that I give to my students in our writing-on-clay workshop (the students work in groups of three or four, but readers are invited to try this by themselves, at home).

Though a few of my students throw pots or sculpt, most of them haven't used clay since they were children, and they think of it primarily as something to play with. For the exercise, I give the students modeling clay that comes in brightly colored sticks. The students, perhaps momentarily transported back to the carefree days of preschool, spend some time choosing the color they
WRITING ON CLAY

Each person will receive 4 ounces of nontoxic modeling clay; a short, pointed wooden skewer; and a length of a 3/4" hardwood dowel. There is wax paper to protect the surface of the table. Use the premoistened towelettes to clean your hands when you are done.

First, prepare a clay tablet to use as a writing surface. Then, with the stylus provided, or any other implement you may have on hand, each member of the group should try the writing assignment. Each group will be given a different exercise from the following list:

1. Transcribe the following passage (just the Latin, not the English translation):
   Caesar exspectavit dum legati ad castra venirent. Antequam legati ad castra venirent, legiones eduxit. Caesar legatos laudavit, quod ad castra venissent. Caesar legatos laudavit, non quod ad castra venissent, sed quia legiones exspectabant. Legatos laudavit, quippe qui socii fideles essent.
   [Caesar waited for the envoys to come to the camp. He led out his legions before the envoys could come to the camp. Caesar praised the envoys because they had come to the camp. Caesar praised the envoys, not because they had come to the camp, but because he was waiting for his legions. He praised the envoys since they were faithful allies.]

2. Draw a map showing how to get from where you live to class. Make sure that you label streets and landmarks, and give any directions that a visitor might need to follow that route.

3. Write a short clay-mail to a friend describing how to prepare a clay surface for writing.

4. When Hamlet asks, "To be or not to be, that is the question," what exactly does he mean?

5. Create a short, illustrated advertisement for your favorite soft drink.

want to work with even before they begin. Occasionally there's friction if a participant doesn't get his or her first-choice color. That in itself is a reminder that, given the chance, writers will focus on the artistic elements of writing as much as on the content. Perhaps Shakespeare favored a certain kind of No. 2 quill? Perhaps the scribe who carved the Rosetta stone patronized a particular chisel maker?

The writing-on-clay workshop brings into relief several other aspects of the writing process that writers normally take for granted. As they go about their assignment, students consider these issues:

- how writing—whether on clay or on computers—forces them to deal with the technology at the same time that they are trying to get the writing done;
- how technology affects the content of their writing as well as the writing process;
- how the type of writing they are doing influences the technology they are using;
- and finally, how the technology affects the way that they read a document or text.

FORMING THE PAGE

The first task the workshop participants face is to prepare a writing surface—something writers using contemporary word technologies don't have to think about: paper, disks, and LCD monitors come ready-made and ready to use.

Despite efforts to recycle, contemporary writers tend to treat paper, so easy to come by, as disposable. However, clay, while abundant, is not a renewable resource. Reforestation provides new trees and eventually, more paper, but creating new clay is not really an option. The earth's clay deposits form slowly from the weathering of many kinds of rocks. Even if the process could be accelerated, the supply of rocks on earth remains finite. This really isn't anything to be concerned about, even in the long run. It would take a lot of clay writing to use up the available supply, but a planet whose inhabitants wrote on clay instead of paper or computer disks could, in some wild science fiction scenario, find itself literally written out of existence. Of course, earthlings would run out of room to store all those clay tablets long before we ran out of clay to write on.

Unlike paper, clay doesn't come ready-to-write. Workshop participants receive their clay in the form of a stick about the size of a quarter-pound of butter. When using an unfamiliar word technology, writers tend to model what they do on their experiences with more conventional technologies, and workshop participants first flatten out their clay to form a writing surface that resembles a sheet of paper, insofar as a lump of clay can be worked to look...
like paper. For the same reason (i.e., we expect the new to connect to the familiar), most writers didn’t switch to computers for their text processing until those machines were able to mimic the black-on-white typed page that writers were used to.

Some clay writers flatten their clay with the heel of their hands, then roll it out as if preparing dough, using the dowel as a rolling pin. Others apply dowel to clay without flattening it first. They have to press much harder to do this, but initial hand-flattening gives the clay less of a squared-off shape; the choice appears to be an easy-to-form circle, which then needs squaring to look like paper, or a rectangle requiring more physical pressure and less tintering later on. Occasionally a student will use a straight edge to replicate lined paper in clay, only to find that the lines, which for paper keep the writing even and enhance its legibility, get in the clay writer’s way and make reading much more difficult.

While some clay writers seem content with a rough approximation of a quadrilateral, others labor diligently with dowel and stylus until they’ve crafted a paper-thin sheet with a smooth surface, straight sides, and right angles at the corners. A particularly artistic participant may scalp the edges of the page. Just as some writers take shortcuts when using familiar writing technologies in order to get the writing over with, there are a few students who streamline page preparation by stomping on the clay, then writing on the flattened, irregular surface that results (they do flip the clay over so the sneaker treads are on the back). Of course, new word technologies prompt experimentation as well as mimicry, and there’s usually one student in each class who exploits the unfamiliar medium by creating innovative shapes to write on (a fish, a triangle, a miniature computer screen) or forms the clay into a stele, an engraved column, a plaque, even an inscribed Grecian urn.

TECHNICAL DIFFICULTIES

The next problem workshopers face is using the stylus to inciso letters, numbers, and shapes into the clay, which is generally more difficult for them to do than conventional writing, where ink or graphite is painted onto a paper surface. Sumerian scribes wrote cuneiform (literally, “wedge-shaped”) letters using a reed stylus that was wedged at one end and pointed at the other; a system better adapted to clay writing than the modern English alphabet, and far no student has succeeded in retrofitting the alphabet for clay technology. Workshopers do report that straight lines carve more easily and that print works better for clay than script. Cursive writing on paper minimizes interruptions of the written line, but notwithstanding the promises of National Handwriting Day, carving in the dense and sluggish medium of clay is physical labor requiring frequent lifting and repositioning of the stylus.

Finally, carving the clay raises shards, chadalike bits of clay that some workshopers carefully remove from the edges of their letters, since they interfere with reading and ruin the overall aesthetic of the tablet. Cuneiform writers, who pressed their clay instead of carving it, didn’t have to deal with such excess clay removal, a tedious process that can also blur the inscription. This problem is exacerbated by the fact that the workshopers tend to craft small letters that are easily obscured. They do this for two reasons: small is their normal pencil-and-paper printing style; plus they’re trying to fit the entire text onto one clay page that’s about half the size of a piece of writing paper, so that they won’t have to bother taking another stick of clay and forming a second clay surface. Writers, as they discover during this exercise, can be very practical.

Writing on computers initially presented technical difficulties that writers also had to deal with. Line editors, the rudimentary word processors available on early mainframe computers, gave writers a surface to work on that looked nothing like a page: a line of text on a screen, or on a sheet of thermal printer paper, instead of a continuous stream of prose. The text was not visible in its entirety until it was formatted—a process separate from text entry—and printed out.

Early typewriters were even worse in terms of letting the writer monitor the text as it was being formed; “understrike” typewriters, of the kind made by manufacturers such as Sholes and Glidden beginning in the 1870s, relied on gravity to return the type bar to its resting position. The illustration of the Yost 4, a popular understrike machine first built in 1887, shows that the type bar struck the paper from below, which meant that the typist couldn’t see what had been written without either lifting up the carriage or rolling the paper forward through the machine. Using a more complex arrangement of levers, “visible” typewriters began to appear in the 1890s. They allowed the typist to see the text as it was produced, though understrike typewriters continued to be made and sold alongside the new “frontstrike” models for many years, perhaps because their simpler mechanisms were less prone to jamming.

Computers and typewriters, much as the original eraserless pencils, did not provide for correction at the outset: they are designed with the unrealistic expectation that the writer will not make a mistake. Even more recent typewriters, marketed as “self-correcting,” like the IBM Selectric, were not able to handle “cut-and-paste” revisions without extensive retyping. But clay is reusable. Evidence from early clay tablets shows that unbaked clay was inscribed, then smoothed over and re-inscribed by students using them for
The Sholes Remington understrike typewriter (1873). Remington's first typewriters were decorated with decals, like its sewing machines, perhaps with an eye toward domestic as well as office use. Image courtesy of the History Center of Tompkins County (New York), used by permission.

writing practice, by writers correcting their mistakes, and perhaps also by anyone needing a scratch pad for their less permanent texts. In addition, sun-hardened clay tablets could be softened with water, reformed, and used again (Robson 2007).

That's not to say that writers will take reusable clay-based shopping lists to the store anytime soon, or that clay tablets offer the cut-and-paste revision techniques that make computers so attractive to today's writers. The clay writers in my workshops, like users of eraserless pencils, quickly learn to think before they write, since errors engraved in clay can't readily be crossed out or erased. Correction involves smoothing out the clay and starting over. It's difficult to smooth out a word or phrase without effacing nearby text as well, and new text can't be added without disrupting the surrounding text. It's always possible that early Sumerian schoolmasters used quick-drying clay so that, like stone carvers, their pupils would not have the luxury of changing their minds.

The Yost 4, 1894, another understrike typewriter, shows a clearer view of the understrike mechanism. The Yost had three sets of keys, one each for capitals, lowercase, and numbers. The shift key, eliminating the need for extra rows of keys, would be introduced later. Machines like the Sholes and the Yost don't jam, but the typist has to roll the paper forward in order to read the text. Image courtesy of Richard Polt.

Selectrics came on the scene in the 1960s. The IBM Selectric III, introduced in 1980, was a "self-correcting" typewriter, allowing relatively precise correction of a letter, word or short phrase, although major corrections still required retyping one or more pages. While it is only about thirty years old, and used or reconditioned machines are still available, the Selectric is already an antique. As the green inventory tag shows, the machine above is being scrapped. Photograph by the author.
THE WRITING ASSIGNMENT

The Latin transcription exercise emphasizes the difficulty of writing not just in an unfamiliar technology, but in an unfamiliar language as well (very few of my workshop students have had any Latin). The exercise is not intellectually taxing in that it is easy to type a few off-the-cuff sentences about the meaning of Hamlet, but it is slow work that replicates what many scribes and keyboarders often do: copy a text that they did not create themselves, and whose contents may be a mystery to the scribes. It’s easier to make mistakes copying such an opaque text, and harder to catch transcription errors when proofreading.

The other three writing exercises involve more familiar school-based composition tasks: providing straightforward information about something the writer knows, analyzing a literary text, or creating a display involving text and graphics. For these tasks, workshop students struggle with the genre so much as they adapt it to the constraints of the medium. For example, SparkNotes notwithstanding, even an infinite number of scribes won’t discover the meaning of Hamlet’s soliloquy in a way that fits on one side of a small clay tablet. It may not be possible to explain Hamlet’s words using an infinite number of monkeys seated at an infinite number of workstations. But for each of these topics the writer must deal with planning, drafting, and revision in a medium that is really meant not for drafts but for final products alone. The clay writers are forced to adopt more of a think-before-you-write approach, and they show less of a tendency to make major revisions once they’ve started in a particular direction.

TWENTY-FIVE WORDS OR LESS

There may be a lot of clay in the world, but there is only a limited amount in the workshop assignment. Writers on clay quickly realize that they have to maximize the amount of text they inscribe on the clay surface. They can’t turn the clay over to expose a new blank page without obliterating what they wrote in the first side. Spilling over to a second page requires additional clay (I’m always ready with more, but no one seems to want any), and it takes additional prep time as well. So workshop students economize on words and skimp on the “white space” surrounding the words they do use.

Whether they are writing on computers or typewriters or sheets of lined paper, experienced writers develop the ability to fit what they have to say into a given space, either by adjusting the margins or by expanding (or in some cases, contracting) the size of their writing. Writers who feel that they don’t have enough to say—on their assigned topic may pad their papers by adding useless words and needless repetitions, widениng their margins, scaling their fonts, or, for those who try to be more subtle about it, choosing a large font such as arial instead of a smaller one: a ten page, double-spaced paper in Arial 12 pt, type comes to only nine pages in times new roman 12 pt. (obviously, the word count remains the same).

Writing on clay challenges the scribe to estimate what will fit in the space available. Journalists are used to this kind of preplanning, learning to fit their words into the appropriate number of column inches, and certain kinds of journalistic writing—for example, news stories—are designed to be cut from the end so that they can fit into a page layout without sacrificing essential information. But that kind of writing assumes at least two copies of the text: a draft and a final version that has been cut to size.

Not much is known about the writing process of the ancient clay writers. Perhaps they too worked from drafts that could be reused after they were copied onto a final tablet that was then dried for preservation. Perhaps they planned the text in their heads, rehearsing it till they got it right and then committing it to clay. Or maybe they just wrote extemporaneously, keeping...
corrections to a minimum, letting stand any large chunks of text they may have had second thoughts about, just because correction was difficult. And maybe they stopped not when they reached a logical conclusion, but when they ran out of prepared tablets.

My clay writers don’t have time to make a rough draft of the text on paper or on another piece of clay, editing it before they copy it onto their clay tablet. Nor are they adept at forecasting what will fit on the clay tablet they have made. If they don’t write enough they can always pad the text with extra details or simply cut off the extra clay. Shrinking text after it’s written in clay isn’t easy: it requires smoothing out the clay and starting over—and in the absence of a separate outline or draft text to copy, it assumes that the writer can remember what was written before it was obliterated.

**BUT IS IT ART?**

My workshoppers clearly associate clay with art projects, not text. That may explain why many of them embellish their writing with decorative flourishes. But many writers like to experiment with the aesthetic variables of whatever medium they are using. Workshop students form their clay into interesting shapes—occasionally, three-dimensional ones like the obelisks they’ve seen in museums. Others combine colors to vary the backgrounds. Students who finish early sometimes decorate their clay as an afterthought, sticking appliques of clay flowers, cute animals, or geometric designs onto the surface while they wait for the rest of the group to complete the task.

Even writers who think of handwriting as a chore may give special attention to their penmanship for this exercise, practicing a kind of clay calligraphy to produce not just letters, but actual inscriptions worthy of display. The most artistic writers sign their work, though they must adapt their signatures to the new medium. A bold John Hancock dashed off with a pen becomes slow and awkward when the writer must form it while fighting the resistance of the clay medium.

Although there are always writers who ignore the aesthetic elements of their clay as much as possible, plowing rapidly through the assignment just to get the words down so they can move on to something else, aesthetics plays a role in all writing technologies. About half the writers I survey acknowledge consciously developing a distinctive signature for their handwritten documents, and many pore over the various computer fonts at their disposal, balancing the demands of their document against mood and personal preference.

Even the choice of writing instrument can be aesthetic as well as practical. To readers who remember them, typewriters may have been little more than utilitarian machines for writing, as interchangeable as the various brands of No. 2 pencil. But for some writers, choosing what to type on was as personal a decision as choosing which fountain pen to use, and as we saw on page 78, some early typewriters were built as objets d’art, with decorative decals and fine wood cabinets.
In contrast to the fine art that went into designing fountain pens or early typewriters, later, mass-produced typewriters were much plainer in design: they were, after all, office tools, not home decorations. Although by the 1970s typewriters were sold in a variety of colors, the first personal computers of the 1980s were thoroughly plain in their packaging. They were utilitarian machines, or at least they would become utilitarian once users figured out how to work them. The popular IBM PC offered one color choice and one cabinet style—like Henry Ford’s promise to build the Model T in any color the customer wanted, so long as the color was black, only IBM chose a nondescript taupe.

The earlier PCs kept that homemade, Heathkit look. Even twenty years later, with personal computers an essential part of the well-appointed home as well as the office, PC design has focused on the inside more than the outside. Though color choices have expanded a bit (they come in black now), body type has remained fairly boxy. There is one glaring exception to lackluster PC design: Steve Jobs is said to have put his first computer together in his garage, giving it a very homemade look, but Apple Computers now hold onto their market share at least in part because of the flair they give to their packaging.

Packaging may sell the product, but document design in the end is the most important aesthetic quality that writers attend to, even writers who see their writing tools as merely tools. Whether it’s a drop-down menu or the hands-on physical shaping of text, all writing technologies present options that allow writers to determine the look as well as the content of their text. Just as the clay workshoppers quibble over who gets which color clay, some writers prefer colored inks to Model T black (the default ballpoint ink is actually blue), and tinted papers instead of plain-vanilla white, though they may reserve these options not for school assignments or business reports, but for more personal writing.

A working IBM PC. The original model 5150 was released in 1983, housed in the simple metal box that symbolized the plain vanilla approach to personal computing. The 5150 came with one standard 5.25-inch floppy drive, 64 kb of RAM, and a green monochrome monitor. A second floppy drive was optional. This machine above has been upgraded with two 3.5-inch floppy drives and a 20 mb hard drive. The display screen shows an early version of Microsoft Word. Courtesy of the Department of Electrical and Computer Engineering, University of Illinois; photograph by the author.

The first Apple computer (1976) in a furniture-quality wooden case. Image courtesy of the Smithsonian Institution; used by permission.
Writers like to control the aesthetics of the letters they make as well as the medium on which they write. As we saw in the last chapter, many writers who put pen to paper don’t produce penmanship worthy of calligraphy, but some do manage enough control over their handwriting to produce special effects. One student I know perfected her script to the point where she was able to pick up extra cash addressing wedding and bar mitzvah invitations. Another, whose penmanship was realistic rather than artistic, and who also had an ear for parent-speak, created passably convincing “Please excuse my daughter from P.E.” notes and sold them to her high school classmates.

Typewriters never offered writers much flexibility in the way of document design. Until IBM came out with its Selectric typewriter in 1961, with its replaceable type ball, typists were pretty much confined to the Model T font that came with their machine:

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Something that looked like this (though this is actually a computer font called “American Typewriter”).

As I’ve mentioned more than once, new technologies often get a foothold by allowing us to do what we are used to doing with older technologies, only better. It was the personal computer’s ability to mimic typing that first attracted users who were not technologically sophisticated, those writers who weren’t really thinking about information processing so much as they were looking for the next big thing in typewriting. Once computer writers discovered they could replicate not just typing, but print as well, the widely used newspaper font Times New Roman became the standard. But the more recent explosion in the availability of computer fonts has given these users a machine that allows the kind of control over the appearance of a document that writers on clay, pen and ink writers, typists, and even typesetters only dreamed about. Today even the most mundane emails and instant messages come adorned with designer fonts, pictures, sounds, and even animations.

Like beginning clay writers, writers new to the computer are quick to focus on the design aspect of their text, decorating it because they can, not because they should. I once spent several days in the mid-1980s designing a sig file, the signature that can be attached to an email. This was before text and graphics could be merged, and getting a picture on an email required crafting it out of letters, numbers, and punctuation marks. I was obsessed with exploring my newly acquired computing skill, and I proudly attached this photographic to all my emails only to learn that my carefully worked visual, created on a DOS machine, displayed as complete gibberish on any Macintosh computer.

Computers, as they improved over two decades, began offering design options that allowed writers to personalize and professionalize their writing. These new choices in turn led to a proliferation of overcomplicated document presentations. The creators of personal web pages and PowerPoint presentations, two of

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My first sig file, made by arranging keystrokes and spaces, represented a quill pen, inkpot, and scroll, an ironic homage to an old-style word processor.
the newest genres spawned by the new word technology, had a particular tendency to go overboard on the special effects: scrolling banners, marching ants (a moving border resembling an old-time movie marquee), sound effects, lurid text, and background colors created a busily rococo effect that shouted, "Hey, look what I can do." Overproduced commercial emails may also avail themselves of these techniques. Nothing is more disconcerting than clicking open an ad or following a web link only to come up against a sudden wall of flashing lights and sound that makes everyone else in the office look up to see what happened. Fortunately, most texts tap the computer's potential more tastefully as writers integrate illustrations or even video clips at appropriate points in a document to reinforce or go beyond the typed words themselves.

Students produce almost all their schoolwork on computers these days, but they don't seem to be as adventurous in their academic writing as they are either with clay or with their web-based writing. Instructors may have feared an onslaught of digital versions of the classic middle school paper, heavily illustrated with clip art instead of the traditional technology of pictures cut from magazines, but what usually happens is that student writers don't experiment very much when designing their school assignments. Occasionally they will escape the plain vanilla of Times New Roman and try out Monaco or Verdana, but most of them just go with Microsoft Word's default fonts and margins.

It's not just students and teachers who are more aware of formatting these days. Typography has become a cultural phenomenon, and computer fonts are the new wine. Although cuneiform eventually developed more than six hundred symbols, it's not clear that the first clay writers discussed the merits of fonts. Typists probably didn't, either. Until recently font was the kind of obscure word that might appear on the SAT or the New York Times crossword puzzle. But today it's not unusual to come upon knots of people heatedly debating the qualities of a fine wine, but of a bold New Century Schoolbook, a peppy but unpretentious Futura, a subtly scalable, slightly sophisticated Palatino, or an art-deco Papyrus.

**PROCESSING THE TEXT**

Writers in the clay workshop have little trouble reading what they wrote themselves, but when I ask them to exchange papers—or tablets, to be more exact—they find it's not easy to read their neighbor's work. For one thing, unlike print, typing, or paper and pencil writing, writing on clay is monochromatic, and readers need to position the clay tablet so that shadows throw the incised letters into relief. They must also adjust to the unfamiliar linear shape that stylus writing forces on the letters, and to the fact that many writers cram words together, making it hard for readers to sort out where words and sentences begin and end.

Early writing is not known for its readability, either. Audience awareness wasn't a high priority for the first clay writers, who didn't have the benefit of freshman composition. The fact that writing initially had no punctuation and didn't necessarily use spaces to separate one word from the next suggests two likely explanations:

1. These early writers crammed as much as they could onto each writing surface because preparing new clay tablets, animal skins, or papyrus was slow, costly, and labor intensive.
2. As Plato suggested in the Phaedrus, writing served as a reminder rather than an attempt to present new information; scribes were recording words on clay as a mnemonic or memory aid, either for themselves or for readers who were already familiar with the text.

Squeezing too much text onto a page, scroll, clay tablet, or stone slab makes it easy for readers unfamiliar with the message to lose their way, and even when writing materials are scarce, one sign that a writer has moved away from writing-as-reminder to the presentation of new material is the increased use of white space, word breaks, punctuation, headings between sections of text, comfortable margins, and other design features that facilitate comprehension.

Clay tablets are fragile: unbaked they are easily torn, while dried clay becomes brittle and prone to cracking or crumbling (according to Robson [2007], clay writing tablets were dried in the sun, not fired like pottery). Writers in the clay workshop don't have access to a kiln or a hot desert sun, and since the clay we use doesn't dry out, they face a transportation problem if they want to take their work home with them. One workshopper rolled up her clay text in wax paper, jelly-roll style, and she reported later that it survived the trip home in her backpack reasonably well. But she couldn't figure out how to display her schoolwork on the refrigerator. If she had a refrigerator with a computer in the door, she could have uploaded a digital photo of her project for display. But her campus landlord wasn't going to spring for an amenity like that, and in the end she did what most workshoppers have done, she balled up the clay, played with it while watching TV after dinner, and eventually threw it out.

Early clay writers also faced the problems of transporting, storing, and retrieving their heavy tablets. While they may have greeted with skepticism and suspicion the newer technologies of writing on parchment made from
dried animal skins or papyrus, a precursor to modern paper made from the papyrus plant—both materials were less permanent than clay or stone, and each presented its own difficulties in terms of preparation and use—enough writers recognized that it was a lot easier to write on these paintable surfaces than on clay. In addition, they were both more pliant and more portable than clay. In the end, writing on hard and heavy substances such as clay and stone was relegated to ceremonial text as writers made the switch to parchment, paper, and, ultimately, to pixels in their quest for the newest and most flexible writing mediums. But the conversion to digital text wasn’t an easy one: the first computers, which did a great job of processing numbers, presented daunting obstacles to writers wanting to process words.

Writing on clay was not the last word technology to drop off the screen. The market for parchment dried up in the late Middle Ages, and while papyrus continues to be sold as a souvenir in Egypt (Roemer 2007), paper has become the universal medium of choice for writing on soft and pliant surfaces, though thanks to computers those surfaces have become “hard copy.” Typewriters are quickly moving toward extinction, though they’re not dead yet. Although the machines have become increasingly rare in the United States, typewriters are still manufactured and sold around the world. But it is hardly a stretch to claim that sooner rather than later the people who are still typing will join the digital age and retire their machines in favor of the computer.

In fact, computers so dominate writing today that it may be difficult for the growing number of writers who have never known anything but Microsoft Word to understand that writing on screen once posed many more challenges than writing on clay. It was so difficult to write with the first digital computers that their later impact on writing would have been hard to predict. In this chapter, we will look at word processing in that pre-Word era to see how a technology that was developed without writers in mind quickly came to be used more for writing than for just about anything else.

Mainframe computers have been around since the 1940s, when the U.S. Army sponsored development of the Electronic Numerical Integrator and Computer, or ENIAC, at the University of Pennsylvania, but the computer was originally designed to replace the adding machine, not the typewriter. ENIAC reduced from days and hours to mere seconds the tedious and repetitive arithmetic calculations needed to create ballistics tables for aiming artillery shells and dropping bombs, calculations previously performed by rooms full of human “computers” working mechanical comptometers.