

Proust Was a Neuroscientist



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Chapter 7

Gertrude Stein

The Structure of Language

Words are finite organs of the infinite mind.

— Ralph Waldo Emerson

BEFORE GERTRUDE STEIN was an avant-garde artist, she was a scientist. Her first published piece of writing was in the May 1898 edition of the *Psychological Review*.^{*} The article summarized her research in the Harvard psychology lab of William James, where Stein was exploring automatic writing.[†] In her experiments, she used a wooden planchette — a device normally used to try to contact the dead — in order to channel her own subconscious. Stein wanted to write down whatever words first entered her mind.

The result was predictably ridiculous. Instead of revealing the mind's repressed interiors, Stein's automatic-writing experiments generated a lot of spontaneous gibberish. She filled page after page with inscrutable sentences like this: "When he could not be the longest and thus to be, and thus to be, the strongest." What could these

^{*} Stein was a coauthor with Leo Solomons on an earlier science article, "Normal Motor Automatism," published in September 1896. However, she probably had little role in writing this paper.

[†] By the time her science article appeared in print, Stein was on her way to medical school at Johns Hopkins. At Hopkins, Stein would work in the neuroanatomy lab of Franklin Mall, a leading brain anatomist.

GERTRUDE STEIN

words possibly mean? After analyzing the data, Stein concluded that they didn't mean anything. Her experiment hadn't worked. "There are automatic movements but not automatic writings," she lamented. "Writing for the normal person is too complicated an activity to be indulged in automatically."

But Stein's experimental failure got her thinking. Even when she wrote about absolutely nothing, which was most of the time, her nothingness remained grammatical. The sentences were all meaningless, and yet they still obeyed the standard rules of syntax. Subjects matched verbs, adjectives modified nouns, and everything was in the right tense. "There is no good nonsense without sense," Stein concluded, "and so there cannot be automatic writing." Although she had hoped that her experiment would free language from its constraints, what she ended up discovering was the constraint that can't be escaped. Our language has a structure, and that structure is built into the brain.

It would be another decade before Stein converted her experimental conclusions into a new form of literature. Even Stein later admitted that her surreal writing style emerged from her automatic-writing experiments. The sentences she wrote in the laboratory inspired her lifelong obsession with words and rules, with how language works and why it's so essential to the human mind. Her art was born of her science.

Tender Buttons, written in 1912 but not published until 1914, was the first of Stein's books to attract widespread critical attention. (Her first book, *Three Lives*, sold only seventy-three copies.) *Tender Buttons* is divided into three arbitrary sections, "Objects," "Food," and "Rooms." "Objects" and "Food" are composed of short, epigrammatic pieces with titles like "Mutton" and "An Umbrella." But these objects are not Stein's subject. Her subject is language itself. The purpose of her prose poems, she said, was "to work on grammar and eliminate sound and sense." Instead of a plot, she gave us a lesson in linguistics.

Stein, as usual, advertised her audacity. The very first page of *Tender Buttons* serves as a warning: this is not a nineteenth-century novel. In place of the customary scene setting, or some telling glimpse of the main character, the book begins with an awkward metaphor:

A CARAFE, THAT IS A BLIND GLASS.

A kind in glass and a cousin, a spectacle and nothing strange a single hurt color and an arrangement in a system to pointing. All this and not ordinary, not unordered in not resembling.

This tricky paragraph is about the trickiness of language. Although we pretend our words are transparent — like a layer of glass through which we see the world — they are actually opaque. (The glass is “blind.”) Stein is trying to remind us that our nouns, adjectives, and verbs are not real. They are just arbitrary signifiers, random conglomerations of syllables and sound. A *rose*, after all, is not really a rose. Its letters don’t have thorns or perfumed petals.

Why, then, do we invest words with so much meaning? Why do we never notice their phoniness? Stein’s revelation, which she had for the first time during her science experiments, was that everything we say is enclosed by “an arrangement in a system.” This linguistic system, although invisible, keeps words from being “not unordered in not resembling.” Because we instinctively “arrange” language, it seems like “nothing strange.” Stein wanted us to acknowledge these hidden grammars, for it is their structure that makes language so meaningful and useful.

But if Stein wanted to talk about grammar, then why didn’t she just talk about grammar? Why did she have to make everything so difficult? The answer to these questions can be found in the form of another psychological experiment, one that William James liked to use on unsuspecting undergraduates. He describes the essence of the experiment in his *Principles of Psychology*, suggesting a method whereby a mind can be made aware of the structure underneath our words: “If an unusual foreign word be introduced, if the gram-

mar trips, or if a term from an incongruous vocabulary suddenly appears, the sentence detonates, as it were, we receive a shock from the incongruity, and the drowsy assent is gone.”

Reading *Tender Buttons*, with its “grammar trips” and “incongruous vocabularies,” is often an experiment in frustration. But this is precisely Stein’s point. She wants us to feel the strictures of the sentence, to question our own mental habits. If nothing else, she wants to rid us of our “drowsy assent,” to show us that language is not as simple as it seems. And so she fills her sentences with long sequences of non sequiturs. She repeats herself, and then she repeats her repetitions. She writes sentences in which her subjects have no verb, and sentences in which her verbs have no subject.

But the secret of Stein’s difficulty is that it doesn’t drive us away. Rather, it brings us in. Her words demand a closeness: to steal sense from them, we have to climb into them. This forced intimacy is what Stein wanted most of all, since it makes us question how language actually works. When suffering through her sentences, we become aware, she said, of “the way sentences diagram themselves,” of the instinctive nature of syntax. Stein’s inscrutability returns us to the grammar lessons of elementary school, when we first realized that the sentence is not simply the sum of its words. “Other things may be more exciting to others when they are at school,” Stein wrote, “but to me undoubtedly when I was at school the really exciting thing was diagramming sentences.” In her writing, Stein wanted to share the thrill.

It would take psychology nearly fifty years before it rediscovered the linguistic structures that Stein’s writing had so assiduously exposed. In 1956, a shy linguist named Noam Chomsky announced that Stein was right: our words are bound by an invisible grammar, which is embedded in the brain. These deep structures are the secret sources of our sentences; their abstract rules order everything we say. By allowing us to combine words into meaningful sequences, they inspire the infinite possibilities of language. As Charles Darwin de-

clared, "Language is an instinctive tendency to acquire an art." The genius of Stein's art was to show us how our language instinct works.

Picasso's Portrait

After finishing her automatic-writing experiments in William James's lab, Stein started medical school at Johns Hopkins. She spent her first two years dissecting the brains of embryos, chronicling the intricate development of the nervous system. She learned how to cut away the cortex and preserve the tissue in toxic vats of formaldehyde. When Stein wasn't in the lab, she enjoyed boxing and smoking cigars. Everyone said she was an excellent scientist.

Things began to unravel when Stein started her clinical rotations. "Practical medicine did not interest her," Stein would later write. She confessed that "she was bored, frankly openly bored." Instead of studying organic chemistry or memorizing her anatomy lessons, Stein stayed up late reading Henry James. She was inspired by the first murmurings of modernism and started making her own medical notes notoriously inscrutable.* As one professor remarked, "Either I am crazy or Miss Stein is."

In 1903, just a semester away from graduation, Stein moved to Paris. She settled in with her brother Leo, who had an apartment at 27 rue de Fleurus. Leo had just purchased his first Cézanne painting — "Anyone can buy paintings in Paris," he told Gertrude — and was beginning to enmesh himself in the local art scene. Gertrude made herself right at home. As she wrote in *Everybody's Autobiography*, "I joined him and sat down in there and pretty soon I was writing."

* In a typed letter to a professor about her anatomical drawings of the brainstem, Stein filled her prose with typical eccentricities and "errors": "They [the drawings] clear away the underbrush and leave a clear road. I had so much difficulty in understanding the conditions from the text books that I felt such a clarifying [clarifying] process to be much needed. Not that XXXXX the books do not all tell the truth as I know it but that they tell so XXXXXXXX much that one is confused..."

Her early work was influenced by the artists who lingered around the apartment. *Three Lives* was inspired by a Cézanne portrait. Her next book, *The Making of Americans*, emerged from her relationship with Matisse. But Stein was closest to Pablo Picasso. As she wrote in her essay *Picasso* (1938), "I was alone at this time in understanding him because I was expressing the same thing in literature."

Their relationship began in the spring of 1905, just as Picasso was becoming bored with his blue period. Gertrude Stein asked him to paint her portrait. The painter couldn't say no; not only had Stein's Saturday-night salons become a magnet for the Parisian avant-garde (Matisse, Braque, and Gris were normally there), but Gertrude and her brother Leo were some of his earliest benefactors. Their walls were lined with his experiments.

Picasso struggled with Stein's portrait as he had never struggled with another painting. Day after day, Stein returned to Picasso's apartment high in the hills of Montmartre. They talked while Picasso carefully reworked the paint on the canvas. They discussed art and philosophy, William James's psychology, Einstein's physics, and the gossip of the avant-garde. In Stein's autobiography — mischievously titled *The Autobiography of Alice B. Toklas* — she described the making of the picture:

Picasso had never had anybody pose for him since he was sixteen years old. He was then twenty-four and Gertrude had never thought of having her portrait painted, and they do not know either of them how it came about. Anyway, it did, and she posed for this portrait ninety times and a great deal happened during that time . . . There was a large broken armchair where Gertrude Stein posed. There was a little kitchen chair where Picasso sat to paint, there was a large easel and there were many very large canvases. She took her pose, Picasso sat very tight in his chair and very close to his canvas and on a very small palette, which was of a brown gray color, mixed some more brown gray and the painting began. All of a sudden one day Picasso painted out the whole head. I can't see you anymore when I look, he said irritably, and so the picture was left like that.



Portrait of Gertrude Stein, by Pablo Picasso, 1906

But the picture wasn't left like that. Stein, writing from the imagined perspective of her lover Alice B. Toklas, is a reliably unreliable narrator. Picasso actually completed the head after a trip to Spain in the fall of 1906. What it was he saw there — ancient Iberian art or the weathered faces of peasants — has been debated, but his style changed forever. When he returned to Paris, he immediately began to rework Stein's portrait, giving her the complexion of a primitive mask. The perspective of her head was flattened out, and the painting became even more similar to Cézanne's painting of his wife, which Picasso had seen in Stein's apartment. When someone com-

mented that Stein did not look like her portrait, Picasso replied, "She will."

Picasso was right. After he painted Stein's face, she began writing in an increasingly abstract style. Just as Picasso had experimented with painting — his art was now about the eloquence of incoherence — Stein wanted to separate language from the yoke of "having to say something." Modern literature, she announced, must admit its limits. Nothing can ever really be described. Words, like paint, are not a mirror.

By the time Stein started writing *Tender Buttons* a few years later, her chutzpah exceeded even Picasso's. Her modernist prose featured one jarring misnomer after another. "The care with which there is incredible justice and likeness," she writes almost intelligibly, "all this makes a magnificent asparagus." For Stein, making sense was just a comic setup; the punch line was the absurd asparagus.

As *Tender Buttons* progresses, this drift toward silliness is increasingly exaggerated. When Stein defines *dinner* toward the end of the work, her sentences have become little more than units of sound, a modernist "Jabberwocky": "Egg ear nuts, look a bout. Shoulder. Let it strange, sold in bell next herds." No dictionary will help you understand this literary disarray. In fact, using a dictionary will just make things worse.

This is because the meaning of Stein's abstract sentences — to the extent there is any meaning — depends entirely on the unreality of her words. By putting her words into ridiculous new arrangements, Stein forces us to see them anew, to "read without remembering." If "Egg ear nuts" is interesting, it is only because we have stopped understanding it one word at a time. An egg is no longer an egg. For Stein's writing to succeed, the sentence must become more than the sum of its separate definitions. There must be something else there, some mysterious structure that transcends her individual words. That something else is what makes *Tender Buttons* poetry and not just badly written prose.

And even though Stein's art was mocked and ridiculed and she had to pay her publisher to print her first book,* she never doubted her genius. At dinner parties, she liked to compare herself to Jesus and Shakespeare. Her art was difficult, she said, because it was so original, because no one had ever dared to write like her before. But hadn't Stravinsky survived the riot? Wasn't Cézanne now a cause célèbre? Didn't Jesus prove popular in the end? As Stein would later confide, "To see the things in a new way that is really difficult, everything prevents one, habits, schools, daily life, reason, necessities of daily life, indolence, everything prevents one, in fact there are very few geniuses in the world."

The James Brothers

Stein always wrote at night. With the streets of Paris quiet, she could ignore everything but herself, "struggling with the sentence, those long sentences that had to be so exactly carried out." She would compose her words in pencil on scraps of paper before correcting her composition, and copying her prose into the certainty of ink. Some nights she would write furiously fast, scribbling a page every two and half minutes. And then there were those endless nights when she couldn't write at all, and would just stare numbly at the blank page. But Stein sat at her desk anyway, stubbornly waiting for the silence to disappear. She only stopped working in the moments "before the dawn was clear," for light made things too real, too painfully distinct in their "thingness." The envelope of dark allowed Stein to ignore these distractions, focusing instead on the process of composition, the way her writing wrote itself. She would then sleep until the early afternoon.

Stein wasn't the first writer to disconnect her sentences from re-

* After reading *Three Lives*, Stein's publisher assumed that she was not fluent in English. He referred Stein to a copyeditor in Paris who could "fix" her manuscript. Stein, of course, refused to have her grammatical errors corrected. Her editor was not amused. "You have written a very peculiar book," he admonished, "and it will be a hard thing to make people take it seriously."

ality. Before Gertrude Stein converted cubism into a literary form, Henry James, William's younger brother, made a career out of writing famously verbose and ambiguous fiction. Nothing in James's later novels is described straight or directly. Instead, his prose constantly questions its own meaning. Everything is circumscribed by words, words, and more words, until the original object vanishes in a vapor of adjectives, modifiers, and subclauses. The world is swallowed by style.

It should come as no surprise that Gertrude Stein loved Henry's literature. She returned to his novels again and again, finding inspiration in his murky palimpsest of words. "You see," Stein once said of Henry James, "he made it sort of like an atmosphere, and it was not the realism of the characters but the realism of the composition which was the important thing." As she notes in *The Autobiography of Alice B. Toklas*, "Henry James was the first person in literature to find the way to the literary method of the twentieth century." She called him "the precursor."

Why did Gertrude define Henry's late fiction as the start of modern literature? Because he was the first writer to deprive the reader of the illusion that language directly reflects reality. In his novels, words are vague symbols that require careful interpretation. As a result, the meaning of every one of his sentences emerges not from the text alone, but from the interaction of the subjective reader and the unknowable work. A perfect truth or final reading always eludes our grasp, for reality, Henry wrote, "has not one window but a million . . . At each of them stands a figure with a pair of eyes."

Henry's literary philosophy reflected William's psychology. In his 1890 textbook *The Principles of Psychology*, William declared that "language works against our perception of the truth." Words make reality seem as if it is composed of discrete parts — like adjectives, nouns, and verbs — when in actual experience, all these different parts run together. William liked to remind his readers that the world is a "big blooming buzzing confusion," and that the neat concepts and categories we impose on our sensations are imaginary. As

he wrote in his *Principles*, "It is, in short, the reinstatement of the vague to its proper place in our mental life which I am so anxious to press on the attention." At the time, critics quipped that William wrote psychology like a novelist, and Henry wrote novels like a psychologist.

Unfortunately, by the time Stein began writing in the Parisian darkness, modern literature and modern psychology had parted ways. While modernist writers pursued Henry's experiments, becoming ever more skeptical of the self and its sentences, modern psychology turned its back on William's view of the mind. A "New Psychology" had been born, and this rigorous science had no need for Jamesian vagueness. Measurement was now in vogue. Psychologists were busy trying to calculate all sorts of inane things, such as the time it takes for a single sensation to travel from your finger to your head. By quantifying consciousness, they hoped to make the mind fit for science.

William didn't think much of this New Psychology. He believed that its reductionist approach had lost touch with what reality *felt* like, privileging the mechanics of the brain over the "infinite inward iridescences" of the conscious mind. The fashionable obsession with measuring human sensations neglected the fact that every sensation was perceived as part of a whole process of thinking. (As William wrote, "Nobody ever had a sensation by itself.") To prove his point, William used language as a metaphor: "We ought to say," he wrote, "a feeling of and, a feeling of if, a feeling of but, and a feeling of by, quite as readily as we say a feeling of blue, or a feeling of cold."* Just as we ordinarily ignore the connecting words of sentences, focusing instead on their "substantive parts," the New Psychologists ignored the "transitive processes" at work in the mind. This was their crucial mistake. Sentences need articles and adverbs,

* Stein would later turn James's idea into a work of art. In her long and virtually impregnable poem "Patriarchal Poetry," Stein tried to call attention to all the parts of language that we usually neglect. And so she wrote a stanza all about adverbs: "Able able nearly nearly nearly nearly able able finally nearly able nearly not now finally finally nearly able." And a stanza about prepositions: "Put it with it with it and it and it in it in it add it add it at it at it with it with it put it put it to this to understand."

and the mind needs thoughts to connect its other thoughts together.

Stein would never forget William's philosophy. She told Richard Wright that "William James taught me all I know." He remained her hero until the end of her life: "A great deal I owe to a great teacher, William James. He said, 'Nothing has been proved.'" James once visited Stein's apartment in Paris and saw her walls full of Cézannes, Matisse's, and Picassos. As Stein described it, "He looked and gasped, I told you, he said, I always told you that you should keep your mind open."

Stein's writing was a unique amalgamation of William's psychology and Henry's literature. Like the James brothers, she realized that sentences are practical abstractions. We give the world clarity by giving it names. Unfortunately, our names are pretend. When, in *Tender Buttons*, Stein asks, "What is cloudiness, is it a lining, is it a roll, is it a melting," she is questioning what *cloudiness* actually means.* After all, clouds are evanescent wisps, and no two are identical. So how can the same word describe such different things? Whereas realist writers before Stein had tried to pretend that our words neatly map onto the world, Stein called attention to the fact that words are subjective and symbolic. They are tools, not mirrors. As Ludwig Wittgenstein once said, "The meaning of a word is its use in the language." In her pugnacious prose, Stein tried to make words completely useless. She wanted to see what parts of language remained when words meant nothing.

The New Psychology that William James fiercely resisted didn't last very long. The brain failed to disclose its subtle secrets, and psychology grew bored with measuring the speed of the nervous system. By the 1920s, scientists were busy trying to empirically explain the mind from the *outside*; the brain had become a black box. This new approach was called behaviorism. According to the behaviorists, behavior was everything. There was no idea, belief, or emotion

* As Shakespeare observed in *A Midsummer Night's Dream*, we "give to airy nothing / A local habitation and a name."

that couldn't be restated in terms of our actions. The world consisted of stimuli to which we responded, like animatronic machines.

The experimental evidence for this grand hypothesis was based on the work of two psychologists: Ivan Pavlov and Edward Thorndike. Pavlov worked in Russia, and Thorndike worked at Columbia University. Both demonstrated that rats, cats, and dogs were eminently trainable. Using positive reinforcement (a few morsels of food), Pavlov and Thorndike conditioned their hungry animals to do all sorts of stupid tricks. Rats would endlessly press levers, dogs would drool at the sound of a bell, and cats could learn how to escape labyrinthine mazes. The behaviorists believed they had explained the process of learning.

It didn't take long before scientists applied the behaviorist logic to humans. A rat was a dog was a person. With time, the human brain came to be seen as a reflex machine par excellence, an organ exquisitely sensitive to stimuli and response. In this reductionist framework, the mind was nothing but a network of conditioned instincts. We were completely free to be entrapped by our environment.

Obviously, this new approach to human nature begged a lot of questions. One of the first concerned language. How do children learn so many words and grammatical rules? (A two-year-old, for example, learns a new word every two hours.) Though we are born without language, within a few years our brains become *obsessed* with language. But how does this happen? How does a complicated and convoluted system of symbols hijack the mind?

The behaviorists weren't stymied for long. By the 1940s, they had explained away language as yet another creation of stimuli and response. According to behaviorist theory, parents provided the formative feedback that led children to correctly conjugate verbs, add on plurals, and pronounce words. Infants began by associating things with sounds, and then, over time, learned to combine those sounds into sentences. If someone looked at a red rose and said, "Red," that "verbal behavior" was merely a reflex prompted by the

stimulus of redness, which his parents had taught him to associate with the proper adjective. If he said, "Rose," that was merely summarizing the collection of stimuli underlying roseness. Children learned how to speak like rats learned how to press levers. Words reflected sensory associations. Language had been solved.

B. F. Skinner, the psychologist who most sincerely applied the behaviorist work on animals to humans, even tried to explain literature in terms of stimuli and response. In 1934 Skinner wrote an essay in the *Atlantic Monthly* entitled "Has Gertrude Stein a Secret?" In the essay, he argued that Stein's experimental prose was really an experimental demonstration of behaviorism. According to Skinner, Stein was merely expressing the automatic verbal responses that we have to any specific stimulus. Her art was just involuntary reflex, the mutterings of an "unread and unlearned mind."

Stein objected fiercely to Skinner's critical theories. She believed that her writing was proof of the opposite psychology. "No, it is not so automatic as he [Skinner] thinks," she wrote in a letter to the editor of the *Atlantic*. "If there is anything secret it is the other way. I think I achieve by [e]xtra consciousness, [e]xcess, but then what is the use of telling him that . . ." While Skinner assumed that all of Stein's sentences were under "the control of a present sensory stimulus," most of Stein's descriptions celebrated a world too absurd to exist. In *Tender Buttons*, when she defines "Red Roses" as "a pink cut pink, a collapse and a sold hole, a little less hot," she knows that none of her words refers to anything factual. The color pink can't be cut and holes aren't sold. Buttons are never tender.

By flirting with absurdity, Stein forced us to acknowledge what Skinner ignored: the innate structure of language. While the behaviorists believed that grammar consisted of lots of little rules that we learned through parental nagging and teacher feedback, Stein realized that the mind wasn't so constrained. There was no grammatical rule that required us to call the rose red, or to not write "pink cut pink." After all, she made a living out of combining words in all sorts of unprecedented ways. No one had taught her how to write. The shock of the new — Stein's inexhaustible ability to invent origi-

nal and ridiculous sentences — was what the behaviorists couldn't explain.

But where does this newness come from? How does the structure of language generate such a limitless array of possible expressions? Stein's startling insight was that our linguistic structures are *abstract*. Although Skinner argued that our grammar mandated specific words in specific contexts, Stein knew that he was wrong. In her writing, she shows us that our grammar only calls for the use of certain *kinds* of words in certain *kinds* of contexts. In *Tender Buttons*, when Stein describes "A Red Hat" as "A dark grey, a very dark grey," she is demonstrating this cognitive instinct. Although we rarely talk about red being gray, there is no linguistic rule prohibiting such a sentence. As long as the nouns, verbs, and adjectives are arranged in the right syntactical order, then any noun, verb, or adjective will do. We can describe the red hat any way we want. The same syntax can support an infinite number of sentences, even though many of those sentences would be meaningless.

This is an extremely weird way of imagining language. After all, the purpose of language is communication. Why, then, would its structure (syntax) operate independently of its meaning (semantics)? Aren't structure and function supposed to be intertwined? But Stein's dadaistic art declared that this wasn't the case. She defined language not in terms of its expressive content — her writing rarely makes sense — but in terms of its hidden structure. When meaning was stripped away, that is what remained.

Noam Chomsky

On September 11, 1956, at a meeting at MIT of the Institute for Radio Engineers, three new ideas entered the scientific canon. Each of these ideas would create a new field. All three would irrevocably alter the way we think about how we think.

The first idea was presented by Allen Newell and Herbert Simon. In their brief talk, they announced the invention of a machine capable of solving difficult logical problems. Essentially, their program-

ming code translated the language of philosophical logic into computer-speak, finding engineering equivalents for logical tricks such as syllogisms and if-then statements. In fact, their machine was so effective that it solved thirty-eight of the first fifty-two proofs of A. N. Whitehead's and Bertrand Russell's *Principia Mathematica*. It even found a more elegant proof for one of Russell's problems. Intelligence had become "artificial." The mind had been faked.

The psychologist George Miller presented the second idea that day, wittily summarized by the title "The Magical Number Seven, Plus or Minus Two." Miller's idea was simple: the mind has limits. Our short-term memory, Miller said, can only contain about seven random bits before forgetfulness begins to intrude.* This is why all the random labels in our life, from phone numbers to license plates to Social Security numbers, are limited to seven digits (plus or minus two).

But Miller didn't stop there, for he knew that the mind didn't really deal in bits. We are constantly re-coding our sensations, discovering patterns in the randomness. This is how we see reality: not as bits, but as chunks. As Miller observed at the end of his paper, almost as an afterthought, "the traditional experimental psychologist has contributed little or nothing to the analysis [of re-coding]." Science had ignored the way the mind actually works, the way we make sense of reality by chunking its various parts together. From Miller's casual observation, cognitive psychology was born.

The last idea presented to the lucky radio engineers that day was by Noam Chomsky, a twenty-seven-year-old linguist with a penchant for big ideas. Chomsky's paper was entitled "Three Models for the Description of Language," but it was really about how one model — the finite-state approach to language, which grew out of behaviorism — was absurdly wrong. This linguistic theory tried to

* William James, as usual, was there first. Using a handful of marbles, James had shown more than sixty years earlier that the mind could process only limited amounts of information. His experiment was simple: he picked up an unknown number of marbles and tossed them into a box. While the marbles were in the air, he tried to guess how many he had thrown. He discovered that he could actually see the number of marbles he had tossed — without consciously counting them — as long as he hadn't tossed more than five or six.

reduce grammar to the laws of combinatorial statistics, in which each word in a sentence is generated from the previous word. A noun causes a verb, which causes another noun. (Add adjectives to taste.) The specific word choice is dictated by the laws of probability. Thus, "Roses are red" is a more likely phrase than "Pink cut pink." (According to this theory, Gertrude Stein had penned some of the most improbable sentences in history.)

In his technical lecture, Chomsky explained why language is not merely a list of words statistically strung together. His argument revolved around two separate examples, both of which sounded a lot like Stein.

Chomsky's first example was the sentence "Colorless green ideas sleep furiously." According to the statistical model of language, this sentence was technically impossible. No finite-state device could ever create it. Ideas don't sleep, and the probability of *colorless* being followed by the color *green* was exactly zero. Nevertheless, Chomsky demonstrated that the ridiculous sentence was grammatically feasible. Like Stein in *Tender Buttons*, Chomsky was using some suspiciously significant nonsense to prove that the structures governing words existed independently of the words themselves. Those structures came from the mind.

Chomsky's second argument was even more devastating. He realized that any linguistics dependent on statistics — as opposed to innate grammatical structures — was marred by one fatal flaw: it had no memory. Because a finite-state device created a sentence by adding one word at a time, it remembered only the previous word in the sentence and forgot about everything that came before. But Chomsky's insight was that certain sentences contain long-distance dependencies, in which the placement of any single word is derived from words much earlier in the sentence. Chomsky used either-or and if-then statements to prove his point. For example, the sentence "If language is real, then the finite-state model is false" contains a grammatical structure that can't be computed word by word, from left to right. Whenever we see an *if* we know to expect a *then*, but not right away. Unfortunately for the finite-state approach, by the

time the statistical machine has gotten to the *then* it has forgotten all about the *if*. Although his argument was dense with linguistic lingo, Chomsky made his moral clear: "There are processes of language formation that this elementary model of language [the finite-state model] is intrinsically incapable of handling." This is because not every sentence is simply the sum of its separate words. In Chomsky's linguistics, our words are surrounded by syntactical interconnections, what he would later call the "deep structure of language."

The art of Gertrude Stein overflows with sentences that anticipate Chomsky's argument. For example, many of Stein's tedious repetitions — "I love repeating monotony," she said — actually reveal the deep structure of our sentences, the way our words are all entangled with one another. In *Tender Buttons*, as Stein struggles to define *vegetable*, she wonders: "What is cut. What is cut by it. What is cut by it in." The point of these sentences is that the same list of words can mean many different things. In the question "What is cut," the *what* refers to the thing that has been cut. However, when Stein wonders, "What is cut by it in," she is making *what* refer to *where* the cut thing is. She is demonstrating that a distant word can modify an earlier word, just as *in* modifies *what*. Of course, a finite-state device can't understand this sentence, since it computes meaning in a single direction only, from left to right. Like Chomsky's if-then phrases, Stein's sentence depends entirely upon its hidden syntax, upon the long-distance dependencies that bind its separate words together. Only a real mind can read Stein.

The Chomskian paradigm shift started that day, but it was only just beginning. Paradigm shifts take time, especially when they are written in the tortuous jargon of linguistics. Chomsky knew that before he could become right, he would have to prove everyone else wrong. His next target was the same figure Gertrude Stein had criticized more than twenty years earlier: the behaviorist B. F. Skinner. In 1959, two years after his epic but technical *Syntactic Structures* came out, Chomsky turned his review of Skinner's *Verbal Behavior*

into a thirty-two-page manifesto. Chomsky's analysis was clearly and boldly written, and it marked the start of his career as a public intellectual.

In the review, Chomsky pointed out the dark flaw in the behaviorist explanation of words and rules. Language, Chomsky said, is *infinite*. We are able to create new sentences of any possible length, expressions never before imagined by another brain. This boundless creativity — best evidenced by the nonconformity of Stein's prose — is what separates human language from all other animal forms of communication. And unless we have an infinite set of reflexes, behaviorism cannot explain the infinite number of possible sentences.

So what is the proper way to conceive of language? Like Stein, Chomsky insisted that linguistics focus on the *structure* of language and not simply its individual words and phonetic tics. While linguists before Chomsky were content with classification and observation — they saw themselves as verbal botanists — Chomsky demonstrated that all their data missed the point. To see what Chomsky wanted us to see, we had to zoom out. Viewed from the lofty structuralist perspective, it suddenly became clear that every language — from English to Cantonese — was actually the same. While the words might be different, they shared the same subterranean form. Therefore, Chomsky hypothesized the existence of a universal grammar built into the brain. (As the New Testament preaches, "And the Word became flesh.") It is this innate language apparatus that lets us order words, composing them within a structure that is at once subtle and inescapable.

And while some of the details of Chomskian linguistics remain controversial, it is now clear that the deep structure of language is really an a priori instinct. The best evidence for this universal grammar comes from studies of the deaf in Nicaragua. Until the early 1980s, the deaf citizens of Nicaragua remained tragically isolated. The country didn't have a sign language, and deaf children were confined to overcrowded orphanages. However, when the first school for the deaf was founded, in 1981, the situation immediately began

to improve. The children were never taught sign language (there were no teachers), but they suddenly began to speak with their hands. A makeshift vocabulary spontaneously evolved.

But the real transformation occurred when younger deaf students were introduced to this newly invented sign language. While older students were forced to converse in relatively imprecise terms, these second-generation speakers began to give their language a structure. No one had taught them grammar, but they didn't have to be taught. Just as Chomsky's theory had predicted, the young children imposed their innate knowledge onto their growing vocabulary. Verbs became inflected. Adjectives became distinct from nouns. Concepts that older speakers conveyed with single signs were now represented by multiple signs enclosed within a sentence. Although these Nicaraguan children had never known language, they invented their own. Its grammar looks a lot like every other human grammar. Stein was right: "There is only one language."*

Once Stein realized — fifty years before Chomsky — that the structure of language was unavoidable, she set out to make that structure palpably obvious. As Stein observed in a pithy anticipation of Chomskian linguistics, "Everybody said the same thing over and over again with infinite variations but over and over again." What Stein wanted to do was see the source of this sameness, to cut words until their structure showed through.

Of course, the presence of linguistic structures is hard to reveal. They are designed to be invisible, the clandestine scaffolding of our sentences. Stein's insight was that the reader was only aware of grammar when it was *subverted*. Just as Stravinsky had exposed the conventions of music by abandoning the conventions of music, so

* Another powerful example of the innateness of language comes from studies of slave and servant plantations in which a polyglot mixture of adult laborers evolved a common communicative system to help them talk to one another. At first, these laborers spoke in pidgin, which is a rudimentary language with little in the way of grammar. However, the children born in these plantations quickly transcended the limits of pidgin and developed various creole languages. These languages differed substantially from the pidgins in that they had all the grammatical features of established languages.

Stein demonstrated the power of grammar by abandoning grammar. In her art, she often tried to see how far she could push the envelope of bad syntax, morphology, and semantics. What would happen if she structured her writing based on the sound of her words, rather than their definitions? Could she write an entire novel only "in enormously long sentences that would be as long as the longest paragraph"? Or how about a sentence without any punctuation at all? Why do we write like this, and not like that?

What Stein discovered was a writing style that celebrated its grammatical mistakes. In her most radical prose, she manages to make us conscious of all the linguistic work that is normally done unconsciously. We notice the way verbs instantly get conjugated (even irregular verbs), the way nouns naturally become plural, and the way we amend articles to fit their subjects. Stein always said that the only way to read her writing was to proofread it, to pay acute attention to all the rules she violates. Her errors trace the syntactical structures we can't see, as our "inside becomes outside."* Stein showed us what we put into language by leaving it out.

The Meaning of Meaninglessness

The problem with difficult prose is its difficulty. T. S. Eliot may have made difficulty cool when he said that poets should be difficult, but he probably wasn't thinking of Stein's *The Making of Americans*, which has more than a thousand pages of repetitive nonnarrative. Before Stein's sentences can be understood (let alone enjoyed), they require a stubborn persistence on the part of the reader. They de-

* This isn't as strange a method as it might seem. Ludwig Wittgenstein hit upon a similar method for his philosophy, which, like Stein's writing, was interested in the uses of language to the exclusion of almost everything else. Wittgenstein once said that he worked by "mak[ing] a tracing of the physiognomy of every [philosophical] error." Only by mapping out mistakes could he see how best to proceed. Samuel Beckett also subscribed to Stein's literary approach. "Let us hope that a time will come," Beckett wrote, "when language is most efficiently used where it is being misused. To bore one hole after another in it, until what lurks behind it — be it something or nothing — begins to seep through; I cannot imagine a higher goal for a writer today."

mand time and more time, and even then whole paragraphs insist on remaining inscrutable. Although Stein is often funny, she is rarely fun. Sometimes, her confidence in her genius feels like insolence.

Nevertheless, Stein's fractal prose sets the stage for a less difficult avant-garde. "When you make a thing," Stein confessed in *The Autobiography*, "it is so complicated making it that it is bound to be ugly, but those that do it after you they don't have to worry about making it and they can make it pretty, and so everybody can like it when the others make it."

Literary history has borne out Stein's aesthetic theory. Without her original ugliness, it is hard to imagine the terse prettiness of Ernest Hemingway. When he was a reporter in Paris, Stein told Hemingway to quit his job and begin his novel. "If you keep on doing newspaper work," she said, "you will never see things, you will only see words." Stein later bragged that Hemingway learned how to write by correcting her own rough drafts. Hemingway's stripped-down sentences, drastically short and unadorned (except when they were long and ungrammatical), echo Stein's more stringent experiments. As Hemingway once joked to Sherwood Anderson, "Gertrude Stein and me are just like brothers."

Stein's own literary legacy has been shaped by her difficulty. While Hemingway's novels have inspired Hollywood movies and endless imitators, Stein's art is kept afloat by academics. If she is remembered today outside college campuses and histories of cubism, it is for a single cliché, one that is almost impossible to forget: "A rose is a rose is a rose is a rose."* Although Stein used this aphorism as a decoration for dinner plates, it now represents everything she wrote. This is the danger of avoiding plots.

Stein would be disappointed by her lack of influence. A woman of immense ambition, she hoped that her literature would save the

* "The roses under my window make no reference to former roses or better ones; they are what they are. . . . There is simply the rose," as Ralph Waldo Emerson said. He probably got the idea from Shakespeare, who has Juliet ponder the meaning of words: "What's in a name? That which we call a rose / By any other word would smell as sweet."

English language. "Words had lost their value in the nineteenth century," Stein lamented, "they had lost much of their variety and I felt that I could not go on that I had to recapture the value of the individual word." Her plan was simple. First, she would show us that words have no inherent meaning. For example, when she wrote, "A rose is a rose is a rose," what she was really trying to demonstrate was that a "rose" is *not* a rose. By repeating the noun again and again, Stein wanted to separate the signifier from what it signified, to remind us that every word is just a syllable of arbitrary noise. (As Tennyson observed, we can make our own name seem strange simply by repeating it a few times fast.) According to Stein's scheme, this act of deconstruction would allow us to reconstruct our language, to write without lapsing into cliché. She used her "rose" sentence as an example of how such a process might work: "Now listen! I'm no fool," she told Thornton Wilder in 1936. "I know that in daily life we don't go around saying 'is a . . . is a . . . is a . . . But I think that in that line the rose is red for the first time in English poetry for a hundred years."

But Stein's grand plan ran into a serious problem. No matter how hard she tried — and Stein tried very hard — her words refused to become meaningless. The rose never surrendered its stale connotations. *Tender Buttons* didn't erase the definitions of *tender* or *buttons*. The words of English easily survived Stein's modernist onslaught. After a few years, her revolution petered out, and writers went back to old-fashioned storytelling. (It didn't help, of course, that her books rarely circulated beyond the Left Bank.)

Why couldn't Stein reinvent the dictionary? Why was saying nothing so damn hard? The answer returns us to her earlier discovery: the structure of language. Because words are always interconnected by syntax, they can never say nothing. Meaning is contextual and holistic, and no word exists alone. This is why Stein's silliest sentences continue to inspire all sorts of serious interpretations. (As William James observed in his *Principles of Psychology*, "Any collocation of words may make sense — even the wildest words in a dream — if one only does not doubt their belonging together.") In a

1946 interview, given just a few months before her death, Stein finally admitted defeat. She would never save language by dismantling it, because language couldn't be dismantled. "I found out that there is no such thing as putting them [words] together without sense. It is impossible to put them together without sense. I made innumerable efforts to make words write without sense and found it impossible. Any human being putting down words had to make sense out of them."

Ironically, Stein's experimental failure, her inability to make her prose entirely meaningless, was her greatest achievement. Although she aimed for obscurity, her art still resonates. Why? Because the structure of language — a structure that her words expose — is part of the structure of the brain. No matter how abstract Stein made her writing, she still wrote from inside our language game, constrained by an instinct as deep as it is universal. The innate grammar that Chomsky would later discover was the one instinct that not even Stein could write without. "How can grammar be?" she asked herself in *How to Write*. "Nevertheless" was her answer.