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EUGENE GARFIELD

INSTITUTE FOR SCIENTIFIC INFORMATION[®]
3501 MARKET ST., PHILADELPHIA, PA 19104

Is Shorthand the Route to Success in Science or Anything Else? Part 2. Shorthand Technology—From Stenotypy to Computer-Aided Transcription

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In the first part of this essay, I considered the history and development of the major shorthand systems.¹ This second part will deal with the impact of tape recorders, dictation machines, and other technologies on shorthand today.

As I noted in part one, the introduction of shorthand into the office followed the rise of industrialism in the latter half of the 19th century. As businesses grew larger and more complex, the volume of record-keeping, correspondence, and other paperwork increased. This increase created opportunities for a new force of clerical workers, including women. The arrival of the typewriter in 1873 accelerated the influx of women into the previously male domain of office clerical work. As Rosalie Silverstone, City University Business School, London, points out, it was believed that women could manipulate typewriter keys more easily than could men.² Although there was initial resistance to female intrusion into the workplace, an increasing number of women found employment as office workers as the 19th century ended. Silverstone cites the 1901 British Census, which listed 55,784 female "commercial clerks," as compared with 17,859 in 1891.²

In addition to typing, women used shorthand skills to find office work. By learning to type and take dictation, a woman could secure a good job, although employers usually paid women lower salaries than men.

Of the 811,190 stenographers and typists listed in the 1930 US Census, more

than 95 percent were women.³ According to a 1938 National Occupational Conference report on the stenography profession, employers were more likely to hire female stenographers because they thought that women would be less likely to seek promotions than would men, and women thus would concentrate on their present work.⁴ Dictation seemed to account for a major portion of secretarial work in that era. One 1934 survey of the secretarial profession showed that employers and secretaries rated stenography, taking and transcribing shorthand notes, very high on a list of 21 secretarial duties.⁵

Today, in the face of modern dictation machines and word processing equipment, the use of shorthand is declining. Exactly how much it is declining is not certain. The Gregg Division of McGraw-Hill Company, New York, publishes and distributes Gregg shorthand instructional materials. Their figures show that shorthand is still very much in demand in the workplace. A survey of 1982 graduates of the Executive Secretarial School, Dallas, Texas, showed that 81 percent of the school's graduates were using their shorthand training on the job.⁶ Another study, undertaken by San Antonio College, Texas, in the fall of 1981, noted that 68 percent of the businesses that were surveyed required shorthand skills when hiring secretaries.⁶

Other studies have reached different conclusions. A survey of British secretaries, by Silverstone and Rosemary Towler, City University Business

School, compared the use of shorthand in 1970 and 1981. The study determined that, while 81 percent of secretaries reported using shorthand in 1970, only 53 percent were doing so in 1981. The decline was attributed to a rise in the use of dictation machines.⁷ The authors noted that some employers continued to use shorthand as a screening device when hiring secretaries, whether or not the skill would be used on the job. Employers often interpreted shorthand proficiency as indicative of proficiency in other areas, such as spelling and grammar.⁷

Studies in the US have reported similar findings. A study of Alabama businesses by Helen E. Clements, University of Alabama, determined that two-thirds of the respondents did not require shorthand skills for their secretaries, although some firms did use shorthand as a screening device for applicants.⁸ Another study, by Shirley Ann White, Arizona State University, Tempe, surveyed businesses in Baton Rouge, Louisiana. White found that applicants could adequately fill half the secretarial positions identified without being proficient in shorthand. The study noted, however, that shorthand speeds of 80 to 100 words per minute were desirable and even necessary for the top-level secretarial positions.⁹ Barbara Hurley, director of placement development, Katharine Gibbs Schools, New York, makes a similar observation. She notes that while the use of manual shorthand is down, employers still require proficiency in shorthand in their top-level positions, such as executive secretary.¹⁰ Gibbs instructors have not decreased the amount of time spent on shorthand training. Hurley notes, however, that Gibbs schools will double the time spent on training in machine dictation in 1985, since their studies indicate that employers are demanding this skill.

Although dictation machines may have replaced manual shorthand to some extent, it appears that machine dictation is still not universally accepted

by managers and executives. This is, at first glance, surprising, considering how long such machines have been around. The first commercially manufactured dictating machine, in fact, was introduced by the Columbia Graphophone Company, Bridgeport, Connecticut, nearly 100 years ago. As Carl Heyel, Business Equipment Manufacturers Association, Washington, DC, points out, the device was powered by a foot-driven sewing machine treadle, and it recorded sound on a cylinder of beeswax and paraffin.¹¹ (p. 19) The machine appeared on the market in 1888, the same year that John Robert Gregg first published his shorthand system. Columbia Graphophone later became the Dictaphone Corporation, a manufacturer of modern dictation systems.

Although early dictating machines were primitive and bulky, technological improvements brought greater streamlining and efficiency. Today's machines, many of which incorporate microprocessors, are highly sophisticated and versatile. Yet, according to Randi T. Sachs, assistant editor, *Administrative Management*, dictating machines remain "consistently underutilized."¹² A national survey by the Administrative Management Society, Willow Grove, a suburb of Philadelphia, Pennsylvania, determined that 81 percent of the businesses that responded own dictation equipment of some kind.¹³ However, according to a report by Datapro Research, Delran, New Jersey, as few as *one-third* of the dictation systems installed may actually be used.¹⁴ In other words, many companies invest in dictation systems that subsequently gather dust because they are unused by management.

One reason for the neglect of dictating machines, according to the Datapro report, is that dictating to a personal secretary is a sign of prestige for an executive.¹⁴ Managers and corporate officers are reluctant to surrender this privilege even though it sometimes inefficiently engages two people for a job that could be done by one. Another reason cited by

the Datapro report is "mike fright." Some people are nervous when speaking into a microphone. Rather than using dictation to compose a memo or report, executives rely on a method that is familiar and comfortable to them: writing in longhand. Gail Modlin, Gregg Division, McGraw-Hill, estimates that as much as 60 percent of business correspondence is written in longhand.¹⁵ According to *Modern Office Technology*, other executives avoid dictation equipment because they fear that the machines are too complicated or too expensive to use, or because their colleagues do not use them.¹⁶ Secretaries, too, often object to working with dictation equipment, complaining about the uncomfortable headphones or resenting the fact that their hard-won shorthand skills are not being used.

The preference for longhand composition is not confined to business executives. Even some professional writers find that the physical act of writing with pen and paper is indispensable to the creative process. Novelist Graham Greene, who dictates his work only after laborious composition by hand, is one such writer. He explains: "At its most splendid, writing can be compared to the process of sculpting. It begins with shaping, and then there is much reshaping, and at some point the manuscript reaches the stage at which I can dictate it into a tape recorder. Some authors type their works, but I cannot do that. Writing is tied up with the hand, almost with a special nerve."¹⁷

On the other hand, proponents of machine dictation argue that dictating has many advantages over longhand composition. Communications consultant Auren Uris, for example, believes that dictation can lead to sharper, more organized thinking, better writing, and increased productivity.¹⁸

John D. Gould, IBM Research Center, Yorktown Heights, New York, has compared dictation to written composition. He hypothesized that dictation is an acquired skill that requires a good

deal of time and practice to master. He then compared subjects who were experienced at dictation with novices. Both groups were asked to write and dictate a variety of routine and complex business letters. Gould noted that, although the experts were about 20 percent faster than novices in dictating complex letters, there was no appreciable difference in the time that both groups spent on routine letters. Gould also took into account the comparative quality of the written and dictated letters and found that the quality was similar. In most cases, judges were unable to determine whether completed letters had been written or dictated. In general, Gould concluded that dictation does not take a long time to learn. Although years of practice appears to bring some improvement in dictation skills, the improvement is not as pronounced as Gould had hypothesized.¹⁹

Gould also did an interesting study on the differences between dictating and speaking. Dictating is a form of composition in which you use your voice to compose something that someone else will read. When you speak, you compose for someone to hear. Gould noted that composing spoken messages appears to require less time than dictating or writing.^{20,21}

Of course, speed and quality are not the only considerations when comparing longhand composition or face-to-face dictation with machine dictation. Cost is another important factor. According to a survey by the Dartnell Institute of Business Research, Chicago, Illinois, the cost of dictating and transcribing a business letter reached \$8.10 for 1984, more than double the 1974 cost of \$3.41.²² That estimate includes labor costs for executives and secretaries, materials and mailing charges, and other incidental costs. For a letter dictated on a machine, however, Dartnell puts the 1984 cost at \$6.08, \$2.02 less than face-to-face dictation. Presumably, the machine frees your secretary to work on other tasks. However, this is simplistic be-

cause it does not deal with your capacity to produce words. You can reduce costs by doing less, but you may also be less productive.

As noted earlier, dictating machines have become highly sophisticated and versatile. To combat "mike fright," many manufacturers now design their machines with telephone-style handsets, which are more familiar than are imposing microphones.¹⁴ Indeed, the telephone itself can be used in centralized systems. Robert L. Sample, associate editor, *Office Administration and Automation*, discusses such centralized systems. Using a telephone, you can dial from your desk or from anywhere in the world, and dictate a document of virtually any length.²³ The document can be stored on a multicassette unit or continuous tape loop. There are also systems that process voice-messages digitally and store documents on computer disks.²⁴

Built-in microprocessors in modern dictation systems allow the transcriber to display on a terminal screen the number of documents stored, document length, storage time left on the cassette, and other special instructions. Some systems enable users to insert sentences or paragraphs into already recorded text, just as with a word processor. Portable units also have improved, and offer choices ranging from tiny, handheld microcassette recorders to lap-sized models that will record spoken dictation or allow the user to silently type on a full-size keyboard while viewing the text on a liquid crystal display. The text is stored on a floppy diskette for later revision and printing.²³ In view of this merging of dictation technology with word processing, it is easy to conclude that technology alone has accounted for the decline of manual shorthand.

Another explanation, however, is that a shortage of qualified stenographers has, in effect, *forced* businesses to turn to dictation equipment. Cynthia C. Barnes, North Texas State University, Denton, reviews this argument. She cites a survey of large businesses in the

area of Dallas-Fort Worth, Texas. Many of the responding employers indicated that they preferred to hire secretaries with shorthand skills, but were unable to find enough qualified applicants. Employers said that they resisted using machine dictation because of its impersonal nature, but had no choice in view of the lack of stenographers.²⁵ I agree with Barnes's assessment: dictation machines have come into prominence because of a shortage of stenographers and of executives who know how to use face-to-face dictation to its best advantage.

This shortage is unfortunate. As Modlin points out, the dictation machine cannot and does not replace the human, intelligent secretary who is able to "fill in the blanks" that are left when the manager dictates.¹⁵ Secretaries do not just take verbatim dictation. They take outlines of what the manager wants included, and they must research the material and make sure that the final memo, letter, or report is correct and complete.¹⁵

The office is not the only place where technology has had an impact on shorthand. As pointed out in the first part of this essay, shorthand has also been widely used in recording legislative and judicial proceedings. Until the early 20th century, court reporters used manual shorthand to record trials and other courtroom activities. As Roger Landroth, Baruch College, New York, points out, the shorthand system designed by Isaac Pitman was especially popular for court reporting in the US.²⁶ Around 1906, however, an American stenographer named Ward S. Ireland developed the stenotype machine, a typewriter-like device that uses key strokes on paper in place of manual shorthand. With the advent of machine stenography, manual shorthand eventually disappeared from the courts.

Today's stenotype machines are largely based on Ireland's invention. The typical machine has 23 keys, with a space bar in the middle. The keys to the left, operated with the four fingers on the left hand, are used to represent the initial consonants. The keys to the right, oper-

ated by the right-hand fingers, provide the final consonants. The vowels are formed by using a row of keys at the bottom of the keyboard, and are operated by both thumbs. The keyboard design allows keys to be struck simultaneously in combination, and the machine is virtually noiseless.²⁷

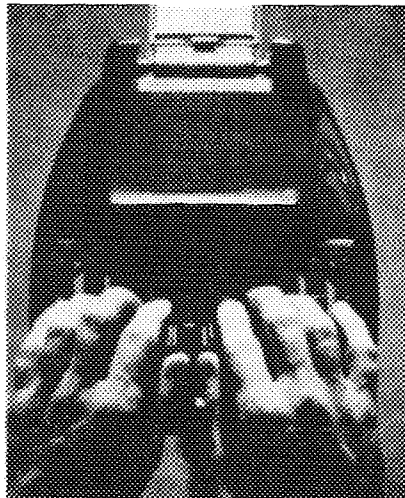
The basic stenotype "alphabet" is not rigidly applied. Stenotypists can and do devise their own phonetic code of abbreviations. Usually, combinations of letters will signify consonant sounds. "TPH," for example, is used for the initial *n* sound while "PB" stands for *n* as a final consonant. In stenotypy, therefore, the word "none" would be represented as "TPH O PB." A continuous roll of fan-fold paper 2 inches wide is fed through the machine, recording these combinations of keystrokes. Figure 1 shows a stenotype machine in operation, while Figure 2 features the keyboard layout of a typical machine.

According to the National Shorthand Reporters Association (NSRA), Vienna, Virginia, experienced reporters can record continuous speech at a rate of four words a second, faster than most people can speak.²⁸ To be certified by the NSRA, reporters must pass tests with material dictated at a speed of 225 words per minute.

If you have not had experience using a stenotypist, your first encounter can be disconcerting. The best Pitman or Gregg stenographers today can only record your brilliant utterances if you slow down to about 125 to 150 words per minute. If your secretary uses Speedwriting, then it is 75 to 100 words. The qualified stenotypist can look you straight in the eye and almost look bored whenever you pause to clarify your thoughts. It is, however, a marvelous experience in free association of ideas uninhibited by mechanical devices. Indeed, when IST®'s Roe Brennan takes dictation, her relaxed state relaxes me.

Today, the NSRA has approximately 18,000 members, who report and transcribe trials, depositions, and other legal and business proceedings. These days,

Figure 1: The stenotype machine.

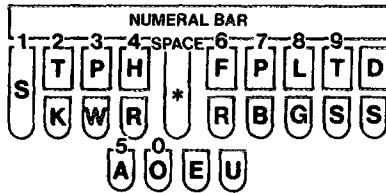


however, court reporters face competition from another technological innovation—the tape recorder. Some court systems, such as that in Alaska in the early 1960s, have switched to tape recording for transcribing legal proceedings. This trend has brought about a debate between the NSRA, which claims that court reporters provide the most accurate transcripts, and those who argue that tape recording is more efficient and economical.

One recent episode in this debate took place in the federal district court system. A 1982 study by the General Accounting Office (GAO), Washington, DC, noted that some federal courts had not adequately supervised and managed their court reporters. In some instances, according to the study, reporters were overcharging litigants and conducting too much freelance business outside the court system. The study concluded that audio recording constituted a "proven alternative" to court reporters that might result in an annual saving of about \$10 million.²⁹

As a result of the GAO recommendations, the Federal Judicial Center (FJC), Washington, DC, undertook a side-by-side study of audio recording and stenotype machine reporting. Tape recording

Figure 2: The stenotype keyboard.



equipment was installed in 12 district courtrooms. From the fall of 1982 through the spring of 1983, two sets of transcripts—audio-based and steno-based—were produced in these courtrooms. The FJC study sought to evaluate the accuracy, timeliness of transcript delivery, cost, and ease of use of the two systems.

The FJC evaluated the audio and steno transcripts on two criteria: overall verbatim accuracy and “functionally relevant discrepancies”—those differences “likely to make a difference” in the outcome of the cases.³⁰ The researchers noted that, while neither method was absolutely accurate, transcripts based on audio recording were generally more accurate. As to timeliness, the study concluded that a greater proportion of audio rather than steno transcripts was delivered within judicial time guidelines. And the majority of judges had no major complaints about the ease of using audio to play back portions of testimony. The cost of audio, according to the study, would be less than that required for steno: \$18,804 annually for one audio-based reporting system, as opposed to \$40,515 for court reporters. In general, the study concluded that audio recording could provide an accurate record of proceedings in US district courts.³⁰

The NSRA, of course, took strong exception to these findings. The association commissioned an independent evaluation by the Resource Planning Corporation, Washington, DC. The Resource Planning study sought to examine the methodology and conclusions of the FJC report. The study found “significant

flaws” in the assumptions and methodology of the FJC report, including errors in sample size, statistical tests of accuracy, and cost projections.³¹ The Stenograph Corporation, Skokie, Illinois, a manufacturer of stenotype machines, also commissioned an evaluation of the FJC report. The accounting firm of Coopers & Lybrand, New York, found flaws in the FJC cost estimates, noting that the FJC had underestimated the cost of installing and administering audio recording systems.³² The FJC, in turn, provided congressional testimony rebutting these rebuttals.

The debate continues. J. Michael Greenwood, FJC, one of the authors of the study, points out that as a result of the FJC report, federal judges now have the option of switching over to audio recording at their discretion.³³ He notes that within six months or so of that decision, about a dozen of the 525 to 550 federal judges had switched to audio. Audio recording will continue to make inroads, according to Greenwood, although the pace will vary depending on the jurisdiction. For limited jurisdiction courts, covering traffic, family, and tax matters, audio recording is more widely accepted. In general jurisdiction courts—big civil cases, serious criminal trials, and other proceedings in which a high volume of transcripts is likely—court reporters are still favored. It is in the general jurisdiction courts, however, that the steno versus audio battle is being waged.

And NSRA officials continue to argue that court reporters supply the most accurate, reliable transcripts. Jill Wilson, director of research and technology, NSRA, points out that some states that had made major commitments to audio recording in the 1970s, including Utah and New Mexico, are in the process of switching back to steno-based reporting.³⁴ Both Greenwood and Wilson point out that the court reporting profession is nowhere near obsolete. This observation is borne out by reports from court reporting schools, where students usually receive job offers before gradua-

tion.³⁵ According to the 1984-1985 *Occupational Outlook Handbook*, the ever-rising volume of civil lawsuits and criminal trials in the US assures that court reporters will have plenty of work.³⁶ (p. 212)

One notable innovation in court reporting is computer-aided transcription (CAT), not to be confused with computed axial tomography. Previously, reporters went over their own notes and dictated them into a tape recorder. The tape was then given to a typist for final transcription. With CAT equipment, the steno machine's keystrokes are captured in digital form on a cassette inside the machine. These electrical impulses are then fed into a computer, in which the reporter has stored his or her own personal "dictionary" of stenographic abbreviations. The computer translates the text and displays it on a terminal for editing and proofreading. The transcript can then be printed on a high-speed printer. According to Thomas F. Runfola, vice president, NSRA, CAT technology has drastically reduced the turnaround time for transcripts: 40 to 100 pages of transcript per hour, as opposed to 12 per hour with the traditional method.³⁷ Not all reporters use CAT, and at upwards of \$20,000 for a typical system, not all can afford it. But NSRA officials are pleased to point out how CAT is improving the speed and efficiency of court reporting.

In discussing technology's impact on shorthand, one innovation that should not be overlooked is computerized speech recognition. Imagine the office of the future. Instead of calling a secretary or reaching for a dictation machine or telephone, you simply "talk" a document into a listening typewriter. The machine could recognize each utterance, and immediately display your exact words. Since it would be linked to your word processor, you or your assistant could easily correct this draft and then print out a perfect copy.

The problem with such a scenario, as I noted in a previous essay on the topic, is

that speech recognition machines still have a long way to go.³⁸ Many of the obstacles I discussed have yet to be overcome. There *are* systems that can recognize a limited vocabulary of isolated words from a speaker whose voice the computer has been "trained" to recognize. Irv Sher, ISI's director of development and quality control, even patented a *Vocalock* for ISI years ago.³⁹

"Universal" systems, capable of recognizing speech from any speaker, also have been designed, although their accuracy and vocabulary are inferior to speaker-dependent systems.⁴⁰ One main obstacle for researchers has been isolating single words from continuous speech, in which words run together and become indistinct. "Did you eat," for example, might sound more like "jeet" in normal speech. A commercially available system that can handle extended continuous speech has yet to appear. Research continues, however, and there have been impressive results. Researchers at Texas Instruments, Dallas, Texas, for example, have designed a speech processing system capable of recognizing limited continuous speech.⁴¹ Speech recognition systems are in use in factories and assembly lines in applications where an extensive vocabulary is not required. The listening typewriter, however, capable of recognizing continuous speech with an unlimited vocabulary, still seems quite a way off.

To determine the possible effectiveness of a limited-capacity listening typewriter, Gould and colleagues designed an experiment in which they simulated such a device with a computer. The subjects, experts as well as novices at dictation, sat at a terminal and spoke into a microphone. At another, distant terminal, a skilled typist listened through headphones and typed the words, flashing them back to the subject's terminal within a second or two. The words were first checked against a vocabulary in the computer's memory. If a word was not in the vocabulary, it would not appear on the subject's screen. In this way, the re-

searchers were able to simulate vocabularies of 1,000 and 5,000 words, as well as an unlimited vocabulary. With the 5,000-word vocabulary, the subjects were able to construct sentences at the rate of about 30 words per minute, one word at a time. The system also permitted continuous dictation at a rate of 50 to 60 words per minute.

Gould assigned the subjects several composition tasks, while varying the simulator's vocabulary and using isolated as well as continuous speech. He noted that there was no significant difference in composition time or document quality between the dictation experts and the novices. The experts, however, who were business executives, were more critical of the simulator's slow speed. Although the subjects did not give the simulator high ratings in all of its modes, they did compare it favorably with longhand writing and machine dictation. The simulator allowed the subjects to see words as they were spoken, and also spared them the responsibility of spelling recognized words, which the computer handled. In general, Gould concluded that a limited listening typewriter, capable of recognizing isolated speech with a sufficient vocabulary, might be a useful, commercially viable composition tool.⁴²

Most of the "theories" and "dictation/shorthand" systems mentioned earlier fail to distinguish between the various stages of thinking/writing. These do not lend themselves equally to spoken verbalization of thought. Even if we had the ultimate thought recognition machine, it would not necessarily solve the problem. Indeed, the reason our hand-written drafts may prove to be entirely different than spoken drafts has much to do with the real differences between spoken and written discourse. While some individuals have the remarkably rare power to enunciate thoughts in precise oral verbalizations, most speakers must work from a prepared speech if they are to use time efficiently. If I dictate a reply to a thoughtful letter, the result will not be as precise and concise

as the edited version of the first draft, unless it is a thought I have expressed on many earlier occasions. But no matter how many times I am asked the same question, the context makes a difference in the reply. The age, position, and sophistication of your correspondent will determine the quality of your response. Dictation, like editing, can be enormous fun because it is a game you can enjoy when you can afford the time.⁴³

In the past, I have been fortunate to have had some remarkable assistants who could take my dictation almost flawlessly. I would allow Fran Kordowitz, Sharon Murphy, or Mary Livingston at ISI not only to execute most letters, but I would be able to sign them with but a glance. I often let them go out as "signed in my absence." Incidentally, I do not believe a letter must look perfect. If you write in a correction, it is a sign to your correspondent that you read the letter carefully and did not want to delay its delivery.

But let us return to the beginning of the dictation process. If you are a person who merely "dictates" one or two letters per day, you may find it possible to use a portable dictation machine. I have used every machine imaginable and none of them is satisfactory to me. If you are creating an occasional letter, it won't matter much which system you use.

But efficient dictation for large quantities of correspondence is best done in a session. For example, there is a pile of letters in front of you. While it is easy enough to identify each letter with an opening statement to your secretary, eventually you need to *somehow* mark or identify a particular passage. Or you may want to say "Handle this part the way we did the letter to Zilch or to Bloggs."

There is a great deal of "body" language in communication that is lost in machine dictation or impossible to verbalize. These are the metalinguistic elements. How about using a video recorder? Dictation to a video camera might improve communication somewhat. But there would be no feedback. The hidden

language you communicate by gestures would be missing. The feedback and implicit understanding by the person on the other side of your desk is vital to creating letters that really communicate. Otherwise, you might just as well delegate the entire task to someone else.

If the subject matter is highly technical, then today it would result in a double-spaced manuscript that I would edit and on which I would write in the corrections. It would be vastly inefficient to dictate most corrections because the instructions would require more time and space than the corrections themselves. How do you "tell" your secretary that she has misspelled the fourth word on the fifth line of the sixth paragraph?

It is impossible to say how long the art of manual shorthand will be able to withstand the onslaught of audiotape, videotape, and computer technology. In

many ways, it is unfortunate that shorthand, which seeks to eliminate redundancy and convey information as concisely as possible, will likely become a casualty of the "information explosion" and the computer age. It is a skill—one might even say a craft—that should be kept alive. Then again, whenever I hear prognostications of the demise of stenography, I think about Edison's prediction for the motion picture. In 1913, he said that within 10 years all school teachers would be replaced by the movie projector. Look me up in a decade and we'll see how many stenographers are still taking dictation.

* * * * *

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