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## PETER PRINTING PANTS IN LINOTYPE HELL, 1993

It is 8:00 A.M., but sixty-seven-year-old Louis Felicio ignores a table laden with breakfast rolls. He is nervous and a little excited. It's been a long time since he's been in a situation like this. Uncertain about what he is supposed to do, he navigates purposefully through small knots of businesspeople making casual conversation in this suburban Denver hotel ballroom. He makes his way toward a far wall.

Lou has dressed carefully for the event, a corporate open house staged by a company located far away. He worried for days that he might not have the proper professional clothes left in his closet. He has, after all, been retired for quite a while. Ultimately he and his wife, Anne, found an ensemble of dress pants, shirt, string tie, and brown vest for the occasion.

He is a quick and lively man, lean and perhaps five feet three inches tall. Ever alert behind large, black-framed glasses, he stays frantically busy at home, taking his none too friendly bow legged little dog for brisk walks every morning, trimming his lawn, painting, and practicing on a piano keyboard in his basement until late at night. Whatever chore he does, he tends to do directly, determinedly, single-mindedly.

This morning, at one of four product demonstration areas set up around the ballroom, he settles politely and a little reverently into a chair in front of a cream-colored device, perhaps eight feet long, four feet high, three feet wide. A television, or at least something that looks like a television, sits on one end of the thing. Making sure the crease on his dress pants stays straight, he frowns and cranes his neck to look at other sleek machines along the other walls of the ballroom.

"Does any of this mean anything to you?" Lou is asked.

"The word is 'threatening,'" he grumbles.

Twenty years before, primitive versions of these machines had put him out of business. Once a union man at various New York newspapers and printing companies, Felicio made a good living, got married, helped raise a daughter, and played vibes at weddings and bar mitzvahs on weekends around the region. A second-generation Italian American, Felicio knows enough Yiddish to lead many of the bourgeois immigrants he now lives among in Denver into thinking he is Jewish. “They don’t know better,” he laughs indulgently. “But, hey, the Jews and the Italians, you know, we’re the same anyway.”

His profession was fixing clanking machines called hot-metal typesetters. They were once the crucial, largely invisible tools that made modern printing—best-selling books and high-speed newspapers, invoices, posters, claim tickets, packaging—possible. At the places Lou worked, operators typed on the great contraptions to cast letters and images in heated metal. The images were then used to print phone directories, boxes, manuals, invoices, anything. Called Linotype or Intertype or Monotype machines, the typesetters were bigger, darker, and smellier than the bright device now in front of Lou. His machines sometimes stood eight feet tall and five feet wide. From back to front, they could span six feet. At their top and inside them was a busy web of belts and pulleys. On one side hung a pot in which a careful blend of molten minerals brewed. Their huge, broad keyboards had their own language, with special “em” and “en” and burly “quad” characters that caused gears to shift, shafts to move, liquids to spill into channels and down into small reservoirs, all placed with metric precision in an open maze beyond the keyboard. Felt met rubber met metal, which met more felt. There was clanking. Air hissed or a motor briefly growled, and, right then and there inside the machine, liquid was miraculously cooled into solid. Groups of letters were forced upward through the maze and left to fall gently, with an ironically soft tinkling sound, into a shelf in a tray. In the end, the letters and words and paragraphs in the tray formed mirror images of the printed page that, one step down the production line, appeared on paper. Another craftsman bolted and locked the images securely into the tray and then carted it to the pressroom to be printed while the compositor, as the Lino operator was called, worked on creating the next page. All the casting and hissing and roaring, clacking and tinkling, locking of forms and shouting might be happening at once around a single machine as the compositor worked. He or she usually labored, moreover, in large rooms crowded with similar machines. The racket on deadline was constant and, in its own way, exciting. Lou’s job was to make sure the machines, alive and complex and finicky, never stayed broken for long. When one of them broke

down, the operator would switch on a light, and Lou would hustle through the cacophony to the scene.

“But there were only four things that went wrong most of the time.” With mock gravity, he counts them on his thick, gnarled fingers. “One, [the Lino operator] didn’t sleep well. Two, he had a fight with his wife. Three, he had an accident coming to work, or, four, he had a tooth pulled.” Lou would listen, first to the operator and then, after eliminating human causes for the malfunctions, to the machine to find out what needed to be done.

He raises his eyebrows. “You know, I was pretty good.” It took six years of apprenticing for Lou to learn how to fix the things. He was a craftsman and an artist, somehow able to communicate with gears, pins, and levers. “Aw,” he adds with a modest wave of his hand, “you probably hear that from everyone.”

Today he is among fifty-some guests of Linotype-Hell, as the company that used to make his hot-metal patients is now called. In the twenty years since Lou last fixed one of its printing machines, the firm repeatedly changed its name from Mergenthaler Linotype to Eltra to Linotype, from Linotype to Allied, back to Linotype and, after a merger with a European firm that had a long history with electronics, to Linotype-Hell. Since its founding during the Grover Cleveland administration in 1886, it had, like Lou, assumed many adaptive forms. Sometimes they were aggressive postures and, depending on business conditions, sometimes protective: private corporation, aggressive litigator and predatory public company, diversified conglomerate, spin-off, downsized subsidiary, freestanding “hollow” corporation, and merger partner. The company had stopped making Lou’s machines in 1971, back when it was called Eltra. Now it produced cream-colored mysteries and showed them off at open houses like this one. The gathering’s theme is “Surviving the ’90s,” which is puzzling to Felicio, who did not survive the ’70s. Told the devices around him are graphic workstations and proofing mechanisms and drum scanners, he smiles without parting his lips and raises his eyebrows again.

He turns to listen to a pleasant young woman showing off a nearby machine. During the next hour he endures with tolerant good humor other product demonstrations, slide shows, and alien gibberish about “dot gain” and “integrated films.” In a darkened auditorium, he hears about “RGB colors.” One presenter talks of “pre-media.” Printers, Lou finds out, are no longer compositors. The only printers in the slide show he watches are mute computer accessories, filled with toner and run by electricity, and lacking teeth that might occasionally need to be pulled. Reporters, editors,

and designers now worked in cool, hushed rooms, and casually did for themselves what Lou and squads of other tough guys once scrambled to do amid barely contained chaos. Their devices and the cables that connected them were maintained by “system administrators,” a fresh, well-compensated lot fully and often immodestly aware that the species could barely communicate without them anymore. Lou and his fellow Lino operators used to carry themselves in the same way.

“A lot of people died” in the computer revolution, he recounted later that day in the parking lot, one hand shielding his eyes from the sun.

For Lou, the carnage started one day in the mid-1960s. Working in the composing room at a newspaper in New York, he had been frustrated by a mechanical problem and finally called in an expert from Linotype to look at it. “This guy pulled out this little thing and, *whoop*, he hooks it up and, just like that, he knows what the problem is.” Lou’s hands shoot upward in memory. “He made the adjustments and was gone. I saw that thing [it was an oscilloscope] and I knew it was almost over. I went home to my wife that night and said, ‘It won’t be long now.’”

He was right. In 1971, Felicio was working at a business, huddled in a New York City colony of five other printers, that specialized in pharmaceutical printing. “One day I go out and see somebody’s just thrown their (hot metal) machines in the dumpsters.” He puts a hand to his cheek to suggest his shock and his eyes widen. “I thought ‘wow,’ and I ran across the alley and took the machines to use for, you know, spare parts and things. Little did I know that, three months from that very day, we’d throw out all our Linotype machines too.”

His employer brought in new devices called phototype machines and then laid off most of the staff, including Felicio.

Lou caught on with a couple of more firms but he was losing his grip. In the past, whenever Linotype would improve its machine in some way, his union, the International Typographical Union (ITU), would dispatch a member to learn about it. Then he would return to the shop and train his colleagues. But now the ITU was sending members to learn to use equipment with space age names like VAX, Photon, and Autologic. What had been mechanical and electromechanical now was mathematical, dependent on the propulsion of invisible light particles, tripped by alphabets measured in binary ones and twos. The members tried to describe what they learned to Lou, but it didn’t work well. This stuff was just too different.

Lou worked here and there on Linotypes and Monotypes still in operation and even fixed a few phototypesetters, essentially faking it. “I felt un-

easy because my knowledge was minimal. The industry was moving so fast electronically. We were encountering machines we were unsure about how to repair.”

After many of the New York type houses went to phototype in the 1970s, certain laid-off union members could draw a partial salary from the International Typographical Union for a while. Lou was one of them. The only catch was that “you had to sit around the union rooms.”

The craftsmen would mope around the union offices, reading or playing cards while they awaited rare calls to go out on jobs. One day, Lou recalls, a union official emerged from his private office, looking rushed and harried, holding a manila envelope. Lou happened to be the first person the official saw. “‘Excuse me,’ he says, ‘do you want to take this downtown for me?’ You know, like a messenger. I said ‘okay’ and I took it.”

The next day, the same official had a parcel to go downtown. Not wanting to impose on Lou two days in a row, he asked the man sitting next to Lou if he’d make the trip.

“The guy says, ‘no way! I’m a Lino operator. I’m no messenger.’” So Lou took the parcel. And the next day, the official asked yet a third union member to take another message. “And the guy says, ‘no way I’d do that. I’m a compositor!’ Like it was an insult.”

On Friday, the union official asked Lou to come into his office. To a man who’d gotten little but bad news recently, the invitation was ominous. “I figure, uh-oh, I messed up somehow.” The official instead offered Lou a job as a maintenance man around the union hall.

He jumped at the opportunity. “I figure I gotta put bread on the table. That’s how I got myself a job. Why?” He leans forward, whispering emphatically and patting his chest. “Because I put my pride in my pocket.

“A lot of guys couldn’t do that. The compositor I told you about? Well, he died a year or so after that. I think it was because of his pride. You can’t just go from being a [professional] to sitting around without something to do.”

“Those were something,” he says politely of the strange new machines as he moves with the crowd at the Linotype-Hell open house into the lobby for refreshments.

Most of the other guests in the lobby are younger than Lou, perhaps in their thirties or forties—salespeople, company owners, and “technical people,” a company sales rep explains as she stops by to say hello. Many know finance and computers and marketing. They are not, she adds, “you know, Peter Printing Pants types.”

The sales rep grimaces in her next breath, realizing she may have offended Lou.

“You know,” Lou’s companion urgently whispers to him, trying to make him feel better as the embarrassed saleswoman moved into the crowd, “these people are threatened, too.”

He smiles politely again, mostly because he always smiles politely when he is unsure what else to do.

But the prosperous attendees around him truly are threatened. The printed word did not stop tilting when Felicio left it. In fact, it mutated wildly at ever faster rates as new machines appeared. Then those machines changed and were replaced. By the time Lou walked into what he soon joked was Linotype hell, the business was rudderless amid frenetic technological upheaval. Something called digital printing, for example, was rising. Phenomenal new \$600,000 devices as revolutionary as Gutenberg’s created brilliantly colored pages one at a time, economically, without film and without ink. Clerks and finally customers themselves ran them. Many of the guests at the open house probably knew of once-successful businesses that had bought a new tool and then died for want of laborers who could operate it efficiently or of capital to match the daunting investments of their competitors. Amortization tables for their expensive, short-lived equipment didn’t work anymore. Business school didn’t describe the commercial carnage they were experiencing; there wasn’t time to depreciate the equipment—pay for it—before it was outgunned by a newer technology. Just a few years earlier an obscurantist “postscript language” reached the market and in twenty-four months had obliterated the value of all their investments in all previous generations of type machines. Then more tools came: scanners that made their big darkroom cameras obsolete and computerized controls that made multi-million-dollar presses uncompetitive. Each month, manufacturers unveiled new machines at coming-out parties in overcooled hotel ballrooms like this one, amid bagels and croissants and vacuum-sealed plastic containers of juice. Linotype-Hell alone, the saleswoman told Lou that morning, introduced at least twenty new products a year. Nevertheless, there were rumors around the open house that Linotype-Hell itself was also in trouble.

Lou uneasily said “wow” when told of the pace of change, but the industry’s captains as well as its soldiers were unmoored by it. A short while earlier the head of one of the world’s biggest printing firms had portentously—and none too logically—resolved that half his corporation’s earnings by the year 2000 would have to come from services it had not yet in-

vented. His quote was widely repeated in trade magazines and at conferences as proof that all bets were off. Most of the almost 50,000 firms that identified themselves as part of the printing industry at the time were small. Many of their owners now confessed without much prodding that they were confused and worried. They feared electronic bulletin boards, broadband television, compact discs, and multicolor laser printers. Something called the Internet was supposed to be threatening them soon, though few at the time could say exactly how. However, they were pretty sure that paper, disparagingly called “treeware” in the same computer journals that dismissed the difficult art of writing and preparing knowledge as “premedia,” was dying out.

The printed word would go with it. By 1993, words on paper were only one among many vivid, instantaneous communications media. Big and mature, the business that produced them no longer grew quickly. Where revenues in the New Age cable TV business, headquartered on that day just a few miles from the open house, grew at 15–20 percent a year, printing sales grew at 2–3 percent. Its prestige and the content it produced were faded. In the prior five years, the industry’s ranks had thinned dramatically. Almost 10 percent of the printing firms in the United States had died suddenly. Most were phototypesetting companies that replaced the hot-metal companies at which Lou worked just a dozen years earlier.

Worse was on the horizon. Just a few weeks before the open house, another study—released in Dallas in yet another powerfully air-conditioned hotel ballroom—predicted an additional 20 percent of the nation’s printers would be out of business by the turn of the century. With them would go perhaps a third of the employees in this particular industry that was, in the sum of all its big and small plants across the land, at that moment still the nation’s fourth-largest employer.<sup>1</sup>

If history’s lessons remained true, something more important than an industry might be ending.

For every time the *way* media were produced changed in the past, politics shifted. So did economics. Migrations and emigrations followed; even mating habits changed sometimes. It is hard to trace how one particular tool—the telegraph, the radio, a device that made printing cheaper—directly led to one particular change; but all hell seemed to break loose when a new communications device superseded an old one, or even when the nitty-gritty manufacture and distribution of old media changed.

Lou looks away, then down. He wets his lips, considering the notion that something more than unemployment resulted when the unglamorous

manufacturing of glamorous communications changed. Ultimately the idea seems immodest to modest Lou. He shrugs as if to suggest his companion might be, well, overstating the case.

“I lost my job,” he explains. Happens all the time. “That’s the price of progress.”

A little later, his companion thought up a better rejoinder than the pre-verbal sputtering he actually offered. As in physics, energy is released when a new tool adds speed or mass to human interaction. Each time we learn to create information faster, new facts and impressions pile onto old ones. The sheer weight and mass of our knowledge grows. Just as the physicists predicted, heavier objects move faster. And with the accelerating physical speed and heft of information comes momentum: images and ideas and data crashing into, propelling, stopping, and altering each other’s paths, usually in unpredictable ways. Old elites lose their monopoly over certain kinds of information. New groups join or supplant them. Their new governments reallocate land and water, and cede privilege. Then a German patent clerk might happen to read about Asian timekeeping devices. Still more energy is released. “When information from previously unrelated sources is structured in a meaningful way,” former patent clerk Albert Einstein once noted, “human beings are capable of thinking thoughts that were previously unthinkable.”

When looked at from a certain angle, it was possible to glimpse something even broader in these new thoughts: a changing of the species. In 1962, at about the time certain new tools—the television, the phototypesetter—were ascending, media philosopher Marshall McLuhan described an evolutionary version of *Homo sapiens* called Typographic Man. The beast was in its own way a successor to Neanderthal and Cro-Magnon. With his new tool—printing—Typographic Man had learned to think linearly, from letter to letter, word to word, line to line in a certain order. His predecessors learned by listening and memorizing, receiving knowledge. Typographic Man was on to something new: *conceiving* knowledge, learning by reading, sometimes without a mentor, and applying his own imagination to the written words of book culture.<sup>2</sup> This newly outfitted creature extended Euclid’s logic to everything. He fashioned logical tools, logical theologies, notions that life moved in logical, ordered patterns. Everything Typographic Man conceived and understood was conceived and understood in the same way we read: methodically, from letter to letter, word to word, until a thought emerges. Thesis, antithesis, synthesis. All that, McLuhan figured, would change as we watched more television. TV wasn’t linear.

Others saw it coming too, although not necessarily through television. For example, a wonderfully curious, driven engineer named Vannevar Bush

had headed the U.S. government's military science effort during World War II. One contemporary writer felicitously described his funding of research with seemingly unknowable results as similar to a golfer "aiming at faraway greens he cannot see." After the war even Bush was daunted by the remarkable changes he and his far-flung army of scientists had wrought. There were atomic bombs and incredible weapons, to be sure, but also the accelerated production of penicillin (we routinely lost more men to infection in previous wars than to bullets), radar, and, among the 3,000-some patented products and processes he helped create, electrical computing machines. Knowledge itself had accelerated. So the real problem hobbling the evolution of postwar civilization, he wrote in a now legendary *Atlantic Monthly* article in 1945, was that we suddenly knew so much that we could not remember or use it all.

His solution, then on some faraway green he could not see, was a sort of knowledge machine that would do away with type itself. He dubbed the faint vision memex, which in his description sounded much like the search engines we have fifty years later. But in 1945 he foresaw someone sitting at a keyboard and a screen scrolling through information—probably, he guessed, stored on microfilm—to meet the moment's need. The raw information would amount to "wholly new forms of encyclopedias" that would be printed on paper only when we needed it. "The lawyer has at his touch the associated opinions and decisions of his whole experience . . . The physician, puzzled by a patient's reactions, strikes the trail established in studying an earlier similar case, and runs rapidly through the pertinent anatomy and histology. The chemist, struggling with the synthesis of an organic compound, has all the chemical literature before him." You could fit whole libraries of data in a few drawers of microfilm, Bush noted. He went on to suggest that this ability to blaze "associative trails through ever-expanding forests of all accumulated human knowledge," choosing our own ways according to our individual needs, able to organize information in new and unprecedented and, as a result, fantastically creative ways was the key to our evolution as a species.<sup>3</sup>

By the time of the Linotype open house, it was coming true. We continue to learn by reading the printed word and applying whatever inductive or deductive reasoning we need to accomplish a goal. But we also learn by sampling thousands of brief sounds, sights, and signals. Many of them are electronic impressions, gathered each day through radio or TV or Internet flashes, half-ignored exposures, or by darting through digital memories, following whims.

We have at our disposal Bush's permanently expanding forests of accumulated human knowledge, and we can change our direction through its

scholarly and even its distasteful inventories according to the moment's mood as easily as we can by a predictable, logical pattern. We do it at ever increasing speeds. Where in the past one person communicated to many via expensive, hard to operate printing presses or even expensive, difficult to secure radio or TV station licenses, multitudes of commoners communicate easily with other multitudes.<sup>4</sup> Better yet, we need no special expertise to do it.

As the manufacturers of the printed word gathered at the Linotype-Hell open house sensed the approach of a new digital age, it was not unreasonable to fear that soon the foundations of Typographic Man's world—his economic life, his political life, his emotional life—would pass away with the older, slower ways of communicating. Already Newton's patient, mechanical physical laws were inadequate to explain the new kinds of things people could see and imagine. Hegel's inevitable historical marches, Toynbee's clockwork cycles of history, or Keynes's patterned adjustments to the state's economic machine could not guide the politics we needed to allocate energy, knowledge, donated cells, bandwidth, vaccines, and the other half ethereal raw materials of the twenty-first century. Old notions of everlasting love and duty are increasingly inaccurate descriptions of how we actually live our lives. Instead of mating for life, we often move through a series of monogamous relationships. Instead of working one plot of land or job for decades, we migrate as independent agents from one employer to another as the moment requires or associations suggest. Emotionally, we often think of life itself as an open-ended journey of meeting speedily evolving, private needs. Much like the way we learn, we blaze associative trails through easily accessible physical and social intimacies. Amid our distractions and resources, we assemble hybrid "sampled" music and create ever larger hybrid species of our own to serve us, our health, our nutrition. Looking for more plausible descriptions of what we were seeing and doing in the kaleidoscopic maze of knowledge, we imagine random universes, game theories, and consciously impermanent, strategic alliances. We try continental currencies and global town meetings to regulate them. Our notions of authority and even our places in our families, in short, have become fluid.<sup>5</sup> Our attention span withers. With pocket-size devices and tiny phones, we develop addictions to not only games but data and the very act of communicating. The result could be a different kind of human, intellectually and emotionally, from Typographic Man, Peter Printing Pants, and his predecessors.

No one at the open house could be sure how this half-sensed unraveling began or who pulled the first thread. Lou guessed it was whoever invented the phototypesetter. Other veterans blamed the government for taxing small

businesses too much and environmentalists for regulating them too closely. Some printers saw the copier as the root of this evil. Phototypesetters blamed laser printers. The desktop publishers who used laser printers blamed manufacturers like Linotype-Hell and Xerox and computer companies, who placed cheaper, easier to use, and more amazing machines in the hands of everyday people. Everyday people, in turn, would not buy typesetting or printing or, with the advent of faxes and e-mail, mailing services anymore. Everyday people could do it all themselves. With a connection to an invisible network, they could concoct, design, and distribute writing to nearby offices and distant relatives, to Mongolia and Africa and the now looted swamps where life began, without physically moving. The means of production, long the defining property of the boss, cost about two weeks' worth of an average worker's pay on the day of the Linotype-Hell coming-out party.

For all those reasons and more, four generations of graphics businesses appeared in the last half of the twentieth century. Three immediately passed into obsolescence. As the century ended, the fourth chatted politely near the lobby refreshment cart between presentations, pretty much ignoring the polite, nervous, still animated fossil in its midst.

The event itself was of no special importance. More significant was the ominous sense of epoch-ending chaos in its hallways, walked by displaced and soon to be displaced professionals. This time the forces that produced the printed word and linear thinking and scientific method and representative government and the industrial revolution and postindustrialism finally might be crowded out by bigger, faster, stronger predators. Something, in any case, seemed about to change again.

## NOTES

1. The study was unveiled in Dallas. See Printing Industries of America, Union Camp Paper Co., Kodak Graphic Arts, *Print 2000* (Arlington, Va.: Printing Industries of America, 1993).

2. James A. Dewey, *The Information Age and the Printing Press: Looking Backward to See Ahead* (RAND Corporation, 1998), [www.rand.org/publications](http://www.rand.org/publications) (accessed August 5, 2000).

3. Vannevar Bush, "As We May Think," *Atlantic Monthly*, April 1945, [www.theatlantic.com/unbound/flashbks/computer/hushf.htm](http://www.theatlantic.com/unbound/flashbks/computer/hushf.htm) (accessed June 17, 2004).

4. This theme is thoroughly explained and explored in Dewey, *Information Age*.

5. On social organizations as products of communications tools, see David Ronfeldt, *Tribes, Institutions, Markets, and Network*, P-7967 (RAND Corporation, 1996), [www.rand.org/publications](http://www.rand.org/publications) (accessed August 5, 2000).