GENERAL STONE'S ELEVATED RAILROAD
Portrait of an Inventor
MARK REINSBERG

The bearded gentleman from the backwoods who exhibited his "Safety Elevated Railway" at Philadelphia's Centennial Exhibition in 1876 deserves recognition. He was, for all practical purposes, the inventor of the passenger monorail. His single-rail system was the first of its kind actually to be built and put in commercial service, carrying people, charging fares, and maintaining regular service for a reasonable length of time.

The thing was a marvelous engineering makeshift, a mid-Victorian illustration of Jules Verne fiction. The little locomotive had a ludicrous profile, like a steamboat's pilot house perched on a boxcar. It drove a giant trolley coach with bi-level seating, outside walkways and a drooping monitor roof. Balanced like saddlebags on a fence rail, the vehicle glided back and forth across a ravine on the fair grounds, conveying passengers at three cents a ride.

It looked unsafe. Railroaders scorned the idea. A skeptical yet tolerant public called it the "one-legged" railroad. But the contraption ran for six months, well-patronized and without a recorded accident.

Through no particular fault of design, it failed its major oppor-
tunity. And apparently that is the destiny of monorails. In almost all aspects — promotional, technical, financial — General Stone's Elevated Railroad set a lasting pattern. In transportation lore, his brainchild has remained the bridesmaid, never to become the bride.

The same aura surrounds the monorails of our own day, whether the amusement ride of Disneyland, the white elephant of the Turin exhibition, the hangover of the Seattle World's Fair, the “wild rice” of the Tokyo Olympics, or the unredeemed promise of the most recent New York World's Fair.

The man who gave rise to this syndrome has been dead now for sixty-one years, in limbo, no doubt, with his invention. He was Roy Stone, a lumber operator from western New York State and Pennsylvania who had achieved Civil War fame and the rank of brevet brigadier general (Volunteers) as a leader of the hard-fighting Pennsylvania “Bucktails.” He was born on October 17, 1836, in Prattsburg, New York, a village of fifty dwellings then undergoing a transition from lumbering to farming. He was the only son of Ithiel V. Stone, a lumberman originally of neighboring Seneca County, whose prosperity grew as he migrated westward, first to Steuben County, finally to Allegany County. There I. V. Stone became Supervisor (mayor) of the village of Cuba. He brought up his son in the business, sent him to Union College, and left him heir to thousands of acres of timber in the oil fields of Pennsylvania.

Roy Stone was a handsome, active man of five-foot-nine who took pleasure in good food, good talk and good cigars. His manner was well-bred and he dressed conservatively, yet there was a certain flair. People said he had “a personality winning in a rare degree . . . an enthusiasm that was contagious.” When over-tired he suffered from an old service wound which put limits on his driving energies, providing a physiological safety-valve which he rather needed. One contemporary called his face “peculiarly noble and attractive,” and photographs of the young military hero agree. Full-bearded, with dark brown hair, fair skin and blue eyes, Stone looked and (we are told)

2 Died Aug. 5-6, 1905, in Mendham, N.J. The only biographical sketch published during Stone's lifetime appeared in Samuel P. Bates, Martial Deeds of Pennsylvania, T. H. Davis & Co. (Philadelphia, 1875), 855-59. Of the obituaries, the most detailed and reliable was written by Stone's former assistant, M. O. Eldridge, MS in library of Bureau of Public Roads, Washington, D.C. Neither this nor numerous newspaper obituaries refer to the monorail episode. Where not otherwise attributed, facts about Stone are derived from military records in Stone's Pension file, documents of the U.S. Department of Agriculture, Office of Road Inquiry (both in the National Archives), and tax, real estate, probate, and census records of the respective counties.
acted the part of a leader of men. But in the postwar setting of his choice he was an isolated man. In the 1870's he was encamped in the forested wilds of Cattaraugus County, New York, along the headwaters of the Allegheny River.

It was deer territory, a hilly plateau lacking in dramatic features yet lovely for a hunter or a lumberman to behold. The white pine forest was almost gone, but the scraggy hemlock remained. The groves of hemlock stood so dense in places that high noon could be mistaken for twilight. The woods were full of yellow birch and beech and hard maple. Hickory and sweet birch, chestnut and elm, basswood and the cucumber tree were found in abundance there. One also could find white ash, red maple, yellow poplar and black cherry.

The hardwoods, however, had small worth compared to the pine and hemlock. After the Civil War, as pine grew scarce, New York and Pennsylvania lumbermen began marketing the hemlock lumber they had once ignored, now declaring it "the best that can be obtained for the framework of buildings." Moreover, the bark was separately salable, as an astringent used by leather tanneries. By the standards of the time it was big business and General Stone was a backwoods merchant prince.

When Stone first applied for a patent, March 20, 1875, he was thirty-eight and without previous experience in railroading or engineering as such. Except for some speculation in oil, and a short-lived partnership in a tannery, he always had looked to the lumber camp for his livelihood. No doubt, the tannery, erected in Warren, Pennsylvania, in 1867-68, had given Stone a practical short-course in steam engines and boiler plants, but any owner of a large sawmill, such as the General operated now in Cattaraugus County, could not have lacked mechanical aptitude.

There are (one should say at the outset) precious few shards of Stone's personal life for the biographer to reconstruct in this present period. No letters, diaries or other personal documents have been found to help explain the turning point in Stone's career. There is a

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3 The firm of Stone, Palmer & Co., described in John C. Perkins, Resources of the Philadelphia and Erie Region, Dispatch Steam Printing Co. (Erie, Pa., 1868), letter vii, was located at Stoneham in Mead township, where I. V. Stone had owned 1,425 acres of timber as late as 1865. When Stone sold his interest in 1868 it became Palmer, Hill & Co., and failed within a few years. See J. S. Schenck, History of Warren County, Pa., D. Mason & Co. (Syracuse, N.Y., 1887), 519-20 and 578-9. I am grateful to Mrs. Frances Ramsey for her letter of April 3, 1963, describing the Stone land holdings, and to the Warren County (Pa.) Historical Society for a transcript of the rare Perkins pamphlet.
hint that it occurred as early as 1872 and involved a short period of residence in Elmira, New York. Four railroad workshops, a Pullman plant, and the new LaFrance Manufacturing Company were located there. Unaccountably, his son Richmond was born in Elmira on November 10, 1872. And we know that the LaFrance Company was later to build his first monorail engine. But if the invention was being worked in Elmira in November 1872, it attracted no public attention.

Stone, of course, did not call his new vehicle a monorail. The word had not yet been invented, would not enter the English language for another quarter of a century. His original patent applications (Nos. 162,323 and 162,501) refer only to an “Improvement in Elevated Railways.”

Understandably so. The Elevated itself was relatively new. The one existing El, the four-mile Greenwich Street line in New York City, had been in operation only four years in 1875. This rapid transit prototype engineered by Charles T. Harvey ran on rails like a surface railroad. But the city hesitated about official adoption of the system, whose precursor had been a technical and financial failure. A trade journal observed in January 1874, that the public mind was still in a state of chaos concerning rapid transit.

The number of people in New York who think they know how to build a rapid transit railroad is, we believe, quite as large as those who are sure they could edit a newspaper or keep a hotel. It is amusing to hear some of these assert, in the most dogmatic way, principles about which the most experienced engineer would hesitate to give an opinion.

After twenty years of discussion and annual debates in the State Legislature, the City of New York, early in 1875, appointed a Rapid Transit Commission to collect information on the subject and render a decision, hopefully before the year was out. General Stone’s rapid transit proposal was one of the many alternatives now brought to the attention of the Commission.

No one was as yet in a position to say what an Elevated ought to look like. But the differences between single-rail and double-rail tracks were obviously so basic as to render the two systems incompatible. Stone was asking for a decision on the part of the Commission that would not only make him a wealthy man but would also create a technology alien to that of surface railroads. The formal opening para-

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4 Records of the Freshman Class, 1889-90, Harvard University, provide this birth date.
5 The word “monorail” was first found by Oxford English Dictionary in the Westminster Gazette, April 9, 1897.
6 Railroad Gazette, quoted by S. D. V. Burr, Rapid Transit in New York City (Chamber of Commerce of New York, 1905), 44.
graph of his patent application echoes that presumption and that challenge:

To all whom it may concern:

Be it known that I, Roy Stone, of Vandalia, Cattaraugus County, New York, have invented an Improvement in Locomotives for One-Rail Railroads . . . .

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Today, the village of Vandalia, New York, appears to be little more than a fruit stand on a secondary highway, an out-of-the-way farm community of perhaps twenty souls on Nine Mile Creek, at the edge of an abandoned Seneca Indian reservation. It was a place of not much greater importance in 1870, though a post office, for it totally escaped mention in the U.S. Census for that year. Vandalia was essentially a mill site, a good departure point in the springtime (end of March to about June first) for rafting lumber down the Allegheny. The Erie Railroad ran parallel to the river at that point, stopping to load flatcars with the output of the sawmills. Because it was a great region for hemlock, several tanneries operated in the vicinity. Greater Vandalia, by the most generous count, numbered twenty-two households, with a total population of 133. It would be hard to imagine a setting more remote from the problems of urban mass transportation.

General Stone, it scarcely need be said, was Vandalia's leading citizen. Eight or ten households were directly dependent upon his enterprise. He had arrived in 1868-69 with his wife, four-year-old daughter, and title to 976 acres of forest that once belonged to the Holland Land Company. To the Cattaraugus County historian it qualified as primitive territory. To the young Mrs. Stone, it was out-and-out wilderness.

Mary Elizabeth Marker had spent the main part of her childhood in Blairsville, Indiana County, Pennsylvania, where her father owned a large inn. When she was in her early teens her family had moved to

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7 Based on 1870 Census enumerators' lists, and the large-scale maps of the townships of Allegany and Carrollton in Beers' Atlas of Cattaraugus County, N.Y., 1869. The village lay on both sides of the township line. On the Carrollton side I find the name, "Vandalia Switch." The 1881 Rand McNally Atlas (based on 1880 Census figures) gives Vandalia a population of 129. Vandalia was practically ignored by county historians. Franklin Ellis, History of Cattaraugus County (Philadelphia, 1879), 443-4, has a paragraph about Stone's enterprise, with inaccurate dates. A source of unpublished information was Mr. Harold V. Phearsdorf, a lifelong resident of Vandalia, whose farm occupies the site of General Stone's camp.
Pittsburgh. There her father managed the Scott House, a commercial hotel overlooking the Allegheny.

From her room she had watched the tumultuous river traffic — raucous steamboats up from the Ohio, flatboats from Tidioute stacked high with rumbling oil barrels, endless lumber rafts floating by with rough-mannered raftsmen aboard, flamboyant in their red shirts, shouting, cursing, laughing, making music.

In fiction, such a girl would fall in love at fourteen, from a distance. He would be a handsome, bearded raftsman from the north — a gentleman, really — who would stop at Scott House because it was convenient to a lumber yard which bought his merchandise. He would converse with her father and smile at her, absentely.

She was sixteen when the Civil War began. In real life, her raftsman reappeared, saluting her now as the captain of a company of recruits he had brought downriver from the Wildcat district, the Raftsmen’s Guard, on its way to Camp Curtin to enlist.

Again in fiction, she would see him off with his men on the night train to Harrisburg. As even proper girls have a right to do on such occasions, she would kiss him for the first time on the station platform. At that moment, for the first time, he would become fully aware of her.

On furlough, a year later, he did in fact return to her. He was a Major, a hero of the Seven Days before Richmond, twenty-five years old and about to become a Colonel, authorized to recruit his own brigade. Within a few weeks they were married.

To Mrs. Stone, Vandalia was fulfillment of a romantic destiny. There is even a story that her husband purchased some timber from the Senecas, who erected a tepee in which the Stones stayed until a permanent house could be built.

The firm was known as the Roy Stone Company. The General conceived of himself not as a lumberman or a mill owner but as a manufacturer. His products were peeled hemlock bark for the tanneries, and planks and squared timber which his men rafted down the

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8 Located corner of Duquesne and Irwin (Seventh). Benjamin D. Marker was proprietor of Scott House c. 1858-63. He was owner of “Marker House” in Blairsville, Pa., 1853-58. The assumption is that he resided in Westmoreland Co., Pa., prior to then, and that his daughter Mary was born there, possibly in Hempfield township, about 1845. See John W. Jordan, History of Westmoreland Co., Pa., Lewis Pub. Co. (New York, 1906), 86-87 and 474. Also Westmoreland Co. Deeds, Book 29, pt. 2, 29-31; Indiana Co. Deeds, XXIV, 149, 151-52.


10 Pittsburgh Gazette, Aug. 5, 1862, editorial page, col. 1; Aug. 15, 1862, marriage announcements.
river to markets in Pittsburgh, Cincinnati and beyond. In his versatility he may well have made other products, such as staves and headings, or spokes and felloes, or pickets, poles, slats, hoops, helves or lock stocks. There were limitless possibilities. For a merchant of Stone’s reputation, credit was no problem. Whatever cash he needed to finance the enterprise was readily forthcoming from Boston investors on a fifty-fifty share of the profits from specified tracts of timber. At some point he acquired a silent partner in Boston by the name of Luther Hill. Ultimately, he employed some thirty hands, paid one of the highest real estate assessments in the county, and lived in a grand and eccentric style in the scenic foothills north of the village.

The place was reached by a route still referred to locally as “the General’s Road.” Two faint tracks may be seen to diverge from North Nine Mile Hollow, across open pasture for a quarter of a mile, to the archeological traces of a dooryard. The site is now occupied by a tall, solitary, hundred-year-old balsam tree, and no other visible remains.

By all contemporary accounts, Stone’s residence was the reflection of a most unusual personality. The house was a fantasia on woodland themes. The siding and roofing were hemlock slabs with bark left on. The roof was held in place by rough, crooked posts in natural state. A Southern-style veranda, extending most of the way around, was railed and ornamented by limbs and roots of grotesque form. Several of the outbuildings were constructed in matching style, including a summerhouse and a child’s playhouse overlooking an artificial pond. Every detail of the estate, said a visitor, was “so cleverly wrought from natural growths from surrounding forests that the whole place gave the effect of having risen like a toad-stool from Mother Earth.” Guests never failed to remark on the doorbell, which produced a musical tone through an attachment to a circular saw hidden above the entrance way.\(^1\)

The interior gave further expression to the arboreal theme which, necessarily, Mrs. Stone must have admired and helped design. A great tree trunk with limbs reaching in every direction supported the black walnut dining table. Chairs were fashioned from silver birch roots and stumps. Divans and couches were wrought in fantastic patterns from crooked branches.

Despite the decor, it was possible for one visitor to recall Stone’s home in the wilderness as “uniquely elegant and palatial.” It had run-

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ning water in the bathroom — rain water piped down from a cistern the General had constructed on a nearby hill (where fossils of the Pennsylvanian period lay in abundance). The drinking water, drawn to the kitchen from an artesian well, was the purest and sweetest his guests had ever tasted, finer than the water of the Allegheny itself.

There was much fashionable entertaining of friends from Warren and Cuba. Mrs. Stone invited her widowed mother to stay indefinitely, hired two domestic servants, and gave birth to a son. The General placed a seasoned old bachelor uncle in charge of lumber production and turned his thoughts and energies to the building of an empire.

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Stone never professed to be the originator of the single-rail (or center-rail) plan. What he was doing, he said, was taking the lead in its practical development. Emphasis on “practical.”

In many impractical ways, the monorail had been talked and written about, and experimented with, for nearly two generations, not only in America but in Europe and the Near East as well. Stone may have heard, in 1872, about the odd little “Steam Caravan” intended to run in Syria between Aleppo and Alexandretta. Its rail was put atop a masonry wall. The center-wheeled locomotive was braced by leather-covered rollers traveling along the sides of the wall. Unsurprisingly, the project had never been completed.12

And even as Stone was readying the papers for his patent application, a promoter in California named Joseph S. Kohn was journeying up and down the West Coast trying to sell people on the virtues of the “Prismoidal System” invented by a Mr. Crew of Apelika, Alabama.13 And that, too, could be classified as a monorail.

It may be that the notion was subjectively original with Stone. Perhaps the idea had appealed to him irresistibly one day as all of his horses and wagons and drivers were bogged down on a muddy trail. Or in a season when the spring freshet was not sufficient to float his lumber down Nine Mile Creek to its junction with the Allegheny. In such frustrating hours, Stone might have recalled how his mother’s

13 Gilbert H. Kneiss, Redwood Railways, Howell-North, Berkeley, Calif., 1956, 65-68. Kohn’s efforts resulted in the construction of the Sonoma Valley Prismoidal Railroad, which inaugurated service in November 1876, for several miles and several months, and thus may be termed the nation’s second passenger monorail.
BREVET BRIGADIER GENERAL ROY STONE
(c. FALL 1864)
brother, Walter S. Gurnee, had founded the precursor of the Chicago and North Western Railroad in the 1850's, and retired with a fortune at a relatively early age.

The financial rewards awaiting the man who could solve New York's rapid transit dilemma awakened the inventor in many men. There were, however, two other circumstances which made that opportunity timely and attractive to the General.

The lumber industry in New York State was beginning to decline both in volume and profitability as the virgin forests were depleted and trees had to be cut down farther and farther from riverbanks, railroads and marketing centers. Stone, who constantly was reaching out to buy adjacent acreage, might have calculated the exact year in which all of the township's pine and hemlock woods would be cut out.

There was also an economic depression. The great financial Panic of 1873 had begun with a run on New York City banks and the failure of ironclad Jay Cooke & Company in later September. The stock market suffered what was then called the worst decline in its history, with losses such as that of Western Union Telegraph — down from 88 ¼ to 54 ¼ in two days' trading. Banks withheld payment. A credit freeze gripped the nation so convulsively that by early November most western railroads were refusing to carry livestock, the Rock Island suspending freight service for all other farm products as well.

We do not know in what particular way or how soon the Panic of '73 affected Stone, but the depression that followed was a long one. He could not altogether have escaped its consequences for the lumber industry as a whole.

In Oswego, New York, one of the largest white pine markets at the time, the volume handled by dealers fell, year by year, from 236,000,000 feet in 1873 to 121,000,000 feet in 1876. On the Hudson River, 824,000 sawlogs were sorted in the 1873 season, against 447,000 in 1874. At the great Susquehanna River boom in Pennsylvania, 318,000,000 board feet of logs were tallied in '73, versus 181,000,000 in '74, and 134,000,000 in '76. The editor of the American Lumberman lamented, "Good mill run lots of lumber that sold readily in 1873 for $24 a thousand feet, in 1876 dragged at only $16 and $17."

For true-born promoters, a bad depression sometimes is a good

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14 Gurnee (1813-1903) was mayor of Chicago, 1851-53; he moved to New York City in the early 1860's.
lever. Probably early in 1875, General Stone approached the management of the Phoenix Iron Works in Phoenixville, Pennsylvania, with a money-making proposition. Company records make no reference to this, but one would imagine it was an offer of exclusive rights to the special triangular truss he had designed as a track for his Elevated Railway. In exchange, the General wanted help in the building of a full-scale working model.

Hard times, Stone knew, were threatening the iron masters of Pennsylvania with annihilation. Hundreds of furnaces throughout the state had extinguished their fires. The Phoenix plant, dominating a town of about 6,000 population, twenty-eight miles northwest of Philadelphia, was the largest specialty iron works in the country. It produced everything from nails to bridges in a complex covering sixty acres and employing 1,500 men when in full production. Now, Samuel J. Reeves, president of the company as his father had been, was hard-pressed to maintain a fraction of the firm's capacity.

Unfortunately for the Phoenix, in more optimistic times Reeves had committed large amounts of capital to the construction of a great new mill. "Better, more massive, and in all its parts more extensive than can be found elsewhere in the United States," the machinery had been placed in position. Then all work on the building enclosing that machinery had to be suspended. A county newspaper compared it to a "sort of cemetery where millions of dollars are buried,"

awaiting a resurrection which can only come through a resuscitation in the business marts of the nation . . . . Not a sound of the hammer or saw falls upon the ear of the visitor as he walks through its wide domains, musing upon the terrible results which an enterprising and world-renowned company failed to foresee . . . .

When Stone paid his call on the elderly industrialist he found him receptive to business-getting ideas. At fifty-seven, Reeves was a highly respected man in the industry, having served since 1869 as president of the American Iron Association. He was an inventor himself. He had designed a wrought iron post, the famous patented "Phoenix column," widely used in iron bridge construction during and after the Civil War. As Stone was well aware, this column was the basic structural support of the Greenwich Street Elevated. Moreover, the bridge-building firm of Clarke, Reeves & Co., a subsidiary of Phoenix, was already involved in studies of the rapid transit question.

Reeves listened to Stone's arguments for the single-rail system:

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16 West Chester (Pa.) Daily Local News, October 4, 1875; in scrapbook collection of Chester County Historical Society.
It was safer to ride and cheaper to build than any other elevated road. Its supporting columns required far less space at the street level. They would not interfere with surface traffic nearly as much, and were preferable aesthetically. Illustrative of the economy, his Elevated could be built on New York streets for $100,000 a mile, whereas the Gilbert Elevated line, if built on the principles of a surface railroad, would cost over $735,000 a mile.\(^{17}\) Stone (in all probability) brought with him a scale model. Reeves agreed to a test of the idea.

In the latter part of August 1875, the citizens of Phoenixville became aware of unusual activities in the new mill yard. A crew of workmen from Vandalia, New York, was erecting a long and very odd-shaped overhead structure. Even before the rolling stock had arrived it was common knowledge; this was to be a trial of Stone’s Patent Elevated Railway. In the depressed company town, dazed by wage-cuts and layoffs, there was “a rumor akin to hope, that the Phoenix Iron Company will receive the order to make this road [in New York City]; if so there will be plenty of work for a year to come.”\(^{18}\)

By Saturday, September 21, the monorail equipment was all in place. On the afternoon of that day Reeves watched the first tryout on company grounds. He was persuaded by what he saw, and ready now to give Stone’s invention his full public endorsement.

[To be continued]

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\(^{18}\) West Chester (Pa.) Daily Local News, Aug. 30, 1875.