Technology

Can major U.S. cities afford new rapid-transit facilities—or afford to do without them? Los Angeles, facing this urgent question, is being urged to buy a forty-five-mile monorail line for $165 million.

Anyone for Monorail?

Last year the U.S. spent $6 billion to keep motorists supplied with new and improved roads, turnpikes, bridges, and tunnels. Almost no one questions the necessity for this immense outlay; indeed, the prevailing opinion is that the U.S. should be spending still more to keep the motorist mobile. What disturbs many transportation authorities is that, by comparison, no appreciable thought or effort is being devoted to the problem of moving people efficiently in mass rapid-transit systems.

As a generation of city and regional planners can attest, it is no simple matter to draw up a transit system that will meet modern needs. In fact some transportation experts are almost ready to concede that the decentralization of urban life, brought about by the automobile, has progressed so far that it may be impossible for any U.S. city to build a self-supporting rapid-transit system. At the same time, it is easy to show that highways are highly inefficient for moving masses of people into and out of existing business and industrial centers.

There was a period when every large city dreamed of a subway system patterned after New York's, but this period ended about 1940 with the disappearance of PWA money from Washington. Today, subways have become so costly that construction has practically stopped. Since the end of World War II new subway projects have been undertaken in four U.S. cities, New York, Chicago, Boston, and Philadelphia, but the total length of new right-of-way built underground will amount to only a little over ten miles. Cleveland is about to spend $35 million for a subway loop running only about a mile and a half. (Total mileage of U.S. subway systems: 284, not all underground.)

The only rapid-transit system that shows hope of paying its own way is some form of elevated railway. Two types of elevated system are being studied by engineers:

- A modernized, two-rail elevated (of standard gauge) that would be much less noisy and objectionable than the "elevateds" of fifty years ago.
- Two kinds of suspended monorail: one, the so-called "classical" monorail, in which cars hang freely below a single rail; and a newer "split-rail" monorail, in which cars are suspended between two closely spaced rails housed in a one-piece enclosure. (The split-rail design is sketched at the top of the facing page; details of both varieties of monorail are diagramed on page 109.)

Either the two-rail elevated or the split-rail monorail could be operated on rubber tires instead of steel wheels. The New York firm of Gibbs & Hill, Inc., which engineered the electrification of the Pennsylvania Railroad, has analyzed the various systems and inclines toward the split-rail monorail, on steel wheels, as the best alternative. (This system would be extremely quiet since the wheels would run inside a sound-deadening channel.) However, Gibbs & Hill Vice President Edward Anson, probably the country's foremost authority on monorails, cautions that no one system will be best under all circumstances. He points out that if elevated operation is needed over only part of a transit system, it may be cheaper to use a conventional, wheels-underneath system, to take advantage of low-cost surface construction wherever possible. Nevertheless, he believes the structure required by a suspended monorail is so much lighter and more attractive than that needed to support a conventional elevated train that the monorail should ordinarily win out.

Monorail economics

Until lately all discussion of monorail systems seemed academic, if not visionary. Early next year, however, the California legislature will be asked to enact legislation that may lead to the construction of a monorail in Los Angeles. Last year the Los Angeles Metropolitan Transit Authority, a state-created agency, commissioned the New York engineering firm of Coverdale & Colpitts to report on the feasibility of a monorail system running some forty-five miles from the San Fernando Valley through downtown Los Angeles and south to Long Beach. (See map, page 108.) For estimates of construction and operating costs, and over-all engineering feasibility, Coverdale & Colpitts turned to Gibbs & Hill.

When the report was issued last January it surprised many Angelenos. It indicated that the forty-five-mile monorail, without subsidy, would nearly break even, and that with a modest subsidy in the form of tax relief, it might make an

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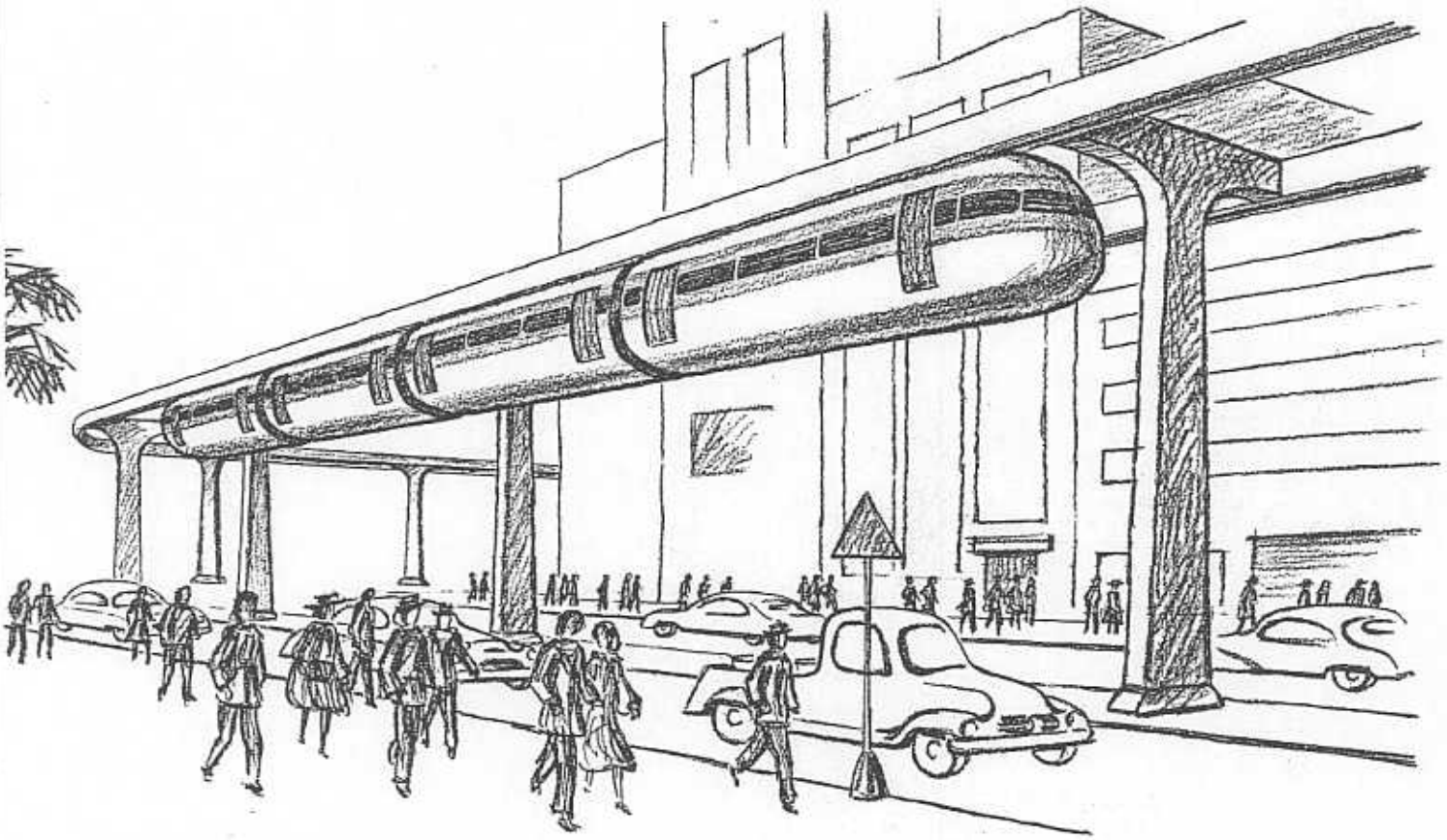
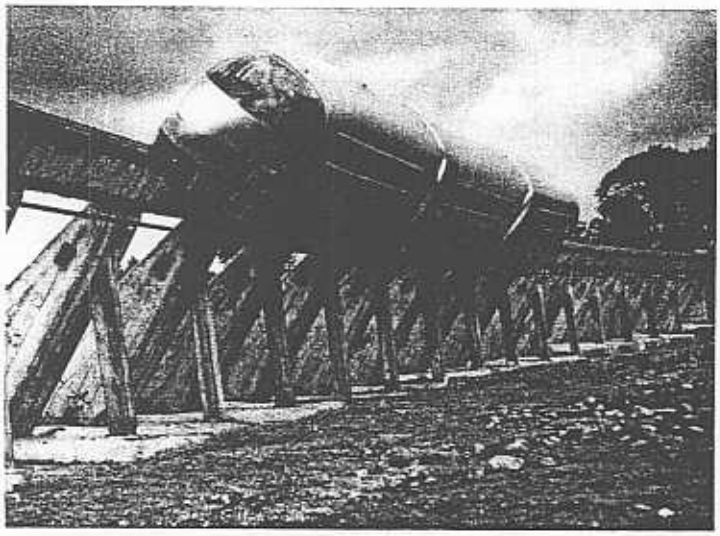
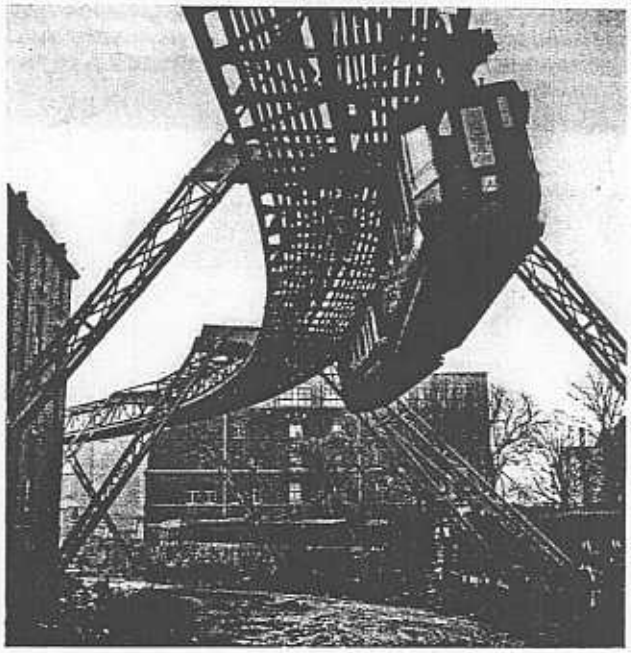


Suspended monorail is sketched above as it might look gliding through Los Angeles. Following a design favored by Gibbs & Hill, the cars are suspended through a slot in the bottom of a girder-like enclosure. The new system, called a "split-rail" monorail, is shown in detail on page 109, along with the "classical," or single-rail, monorail.

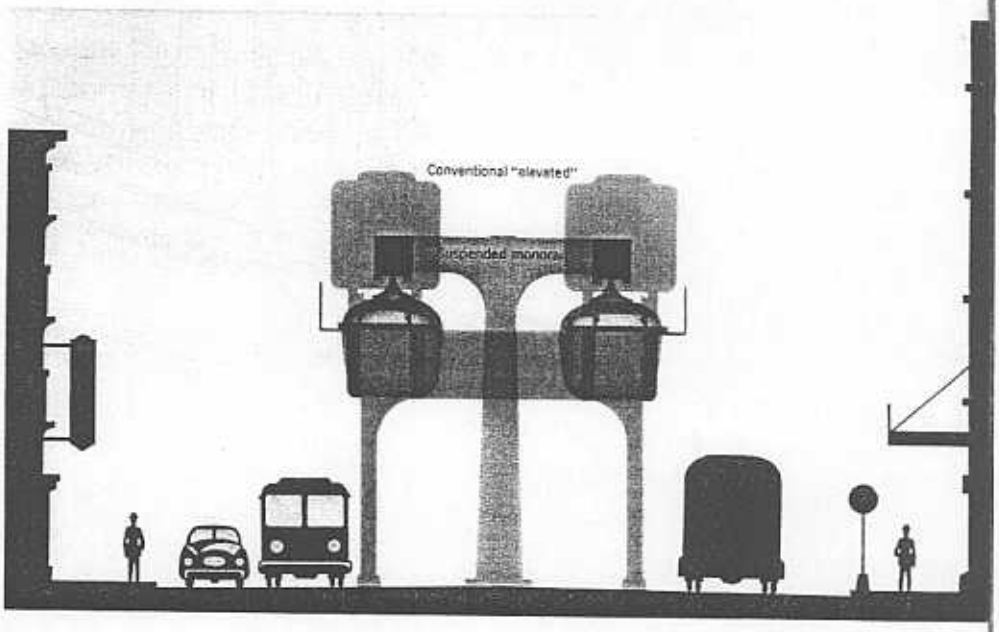
Saddlebag monorail, below, is favored by Axel L. Wenner-Gren, Swedish millionaire, who recently provided $2,400,000 for this working model near Cologne. Not far away, in the Rhineland city of Wuppertal, is the famous nine-and-a-half-mile monorail, right, which has been running successfully since 1901. Few if any American transit experts believe the "saddlebag" has a future in the U.S., but a number suspect that a modern suspended monorail might meet the needs of some cities.

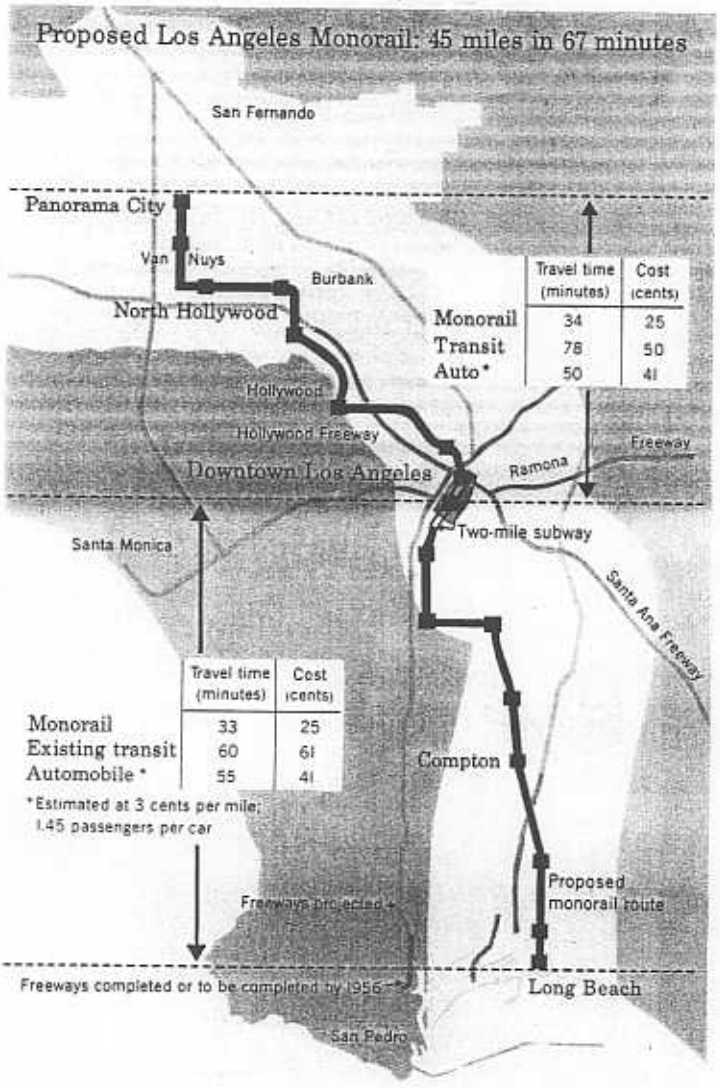




Can a Railway over a Street Be a Handsome Asset?

Proponents of the suspended monorail recognize that one of the greatest obstacles to the acceptance of their system is the poor reputation acquired by the noisy, old-fashioned "elevateds" that still rumble through parts of New York and other cities. The drawing, right, contrasts the bulky superstructure required by the El with that needed to support the Gibbs & Hill "split-rail" monorail. Even this sketch cannot convey how the old El roofed over the street and shut out light. By contrast, the only continuous structures required by the monorail are two girder-like members (roughly forty by fifty inches in cross section) supported thirty feet above the ground by piers at seventy-five-foot intervals.

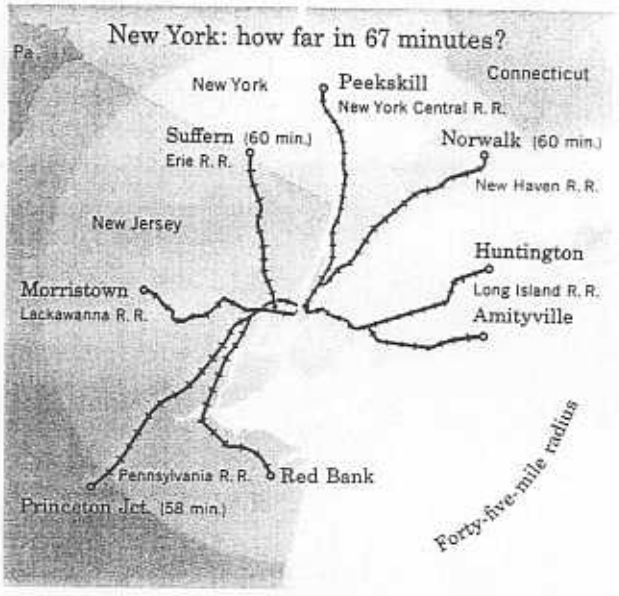


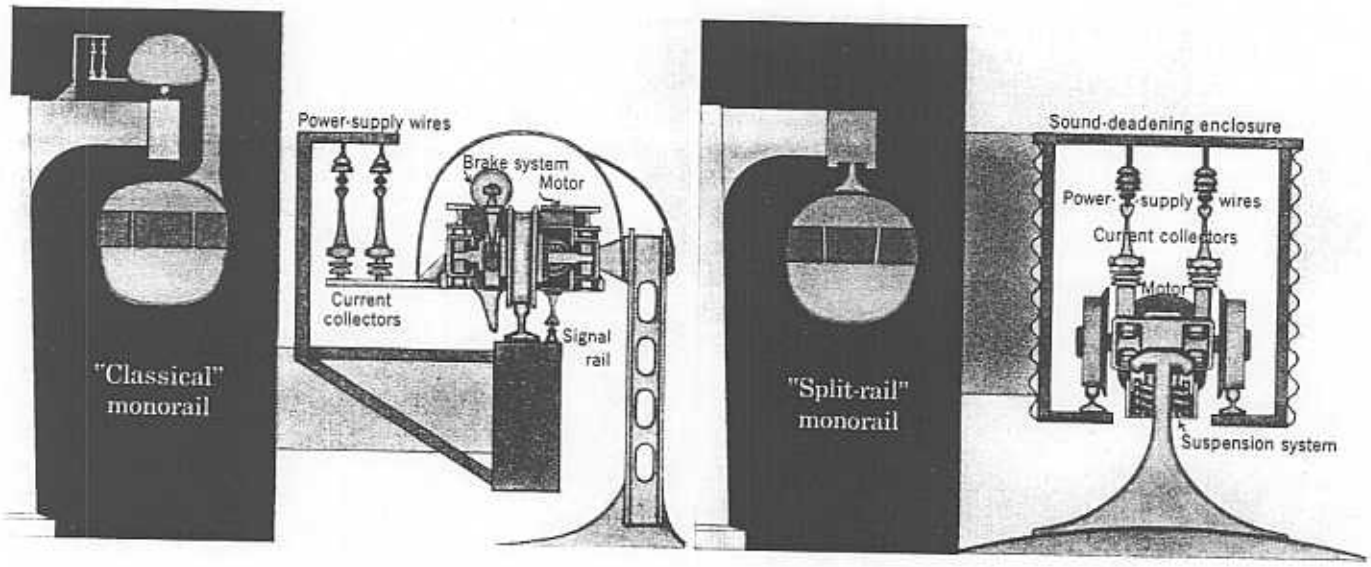


The question facing Los Angeles is whether a city that has grown great in the automobile age can get along without a true rapid-transit system. Los Angeles has recently learned that it can have a forty-five-mile monorail line (map, left) for $165 million, or a shorter line from North Hollywood to Compton for $134 million. The proposed monorail would be the fastest transit system in the world, beating both automobile and existing transit (chiefly bus) by the margins shown on the map. Except on short hauls, it would also provide a cheaper ride.

The map below indicates, by contrast, how richly the New York commuter is supplied with rail transport. But on only two roads (Pennsylvania and New Haven) and on only a few express trains can he travel more than forty miles from the center of the city in roughly an hour. (Except where specific times are shown on the map, destinations indicate distance traveled on express runs in approximately sixty-seven minutes—the running time for forty-five miles on the Los Angeles project.)

The monorail is opposed by Los Angeles transit firms, which favor a system of express buses on freeways. They argue that a fixed-rail system cannot solve Los Angeles' problem.

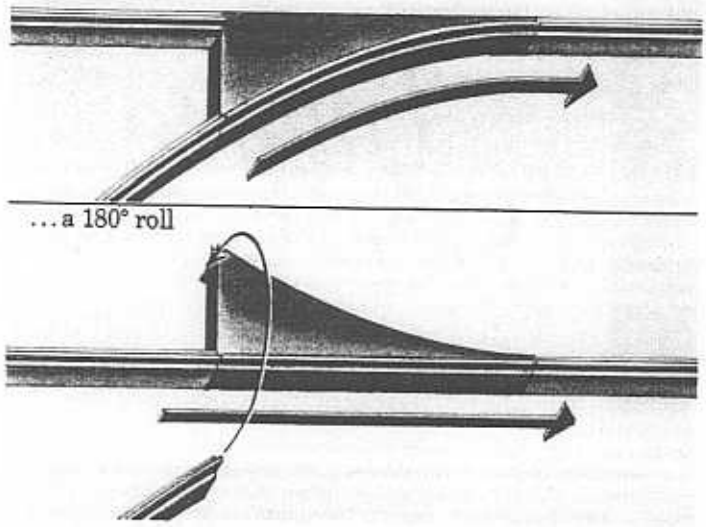




"Classical" monorail (upper left) is the lineal descendant of the German line in Wuppertal and is the type of system considered in the report made to the Los Angeles Transit Authority. Two current collectors and the running rail provide three-phase power. Cars are free to swing outward on curves.

"Split-rail" monorail (above, right) has, in the opinion of Gibbs & Hill, important advantages over the classical design. These include: quieter operation due to soundproofed enclosure; a dry track in all weather; a rail system that can be supported from either top or sides. The split-rail can also use a simpler switch than the type (left) needed by the classical monorail.

Monorail switch:



Monorail switch (left) must roll up and over in a vertical arc to permit the car hanger arms to clear when the train follows a straight course. When the switch is set for a curve, upper sketch, the straight section of rail cannot be seen because it is beneath the rolling block. Switch for "split-rail" system could be a simpler sliding or pivoting device.

Rubber instead of Steel?

Almost unknown to Americans, the French have been experimenting for many years with pneumatic-tired railway vehicles. The photograph, right, shows a rubber-tired car of recent design used on certain stretches of the Paris subway. Since it would be impossible to steer such a vehicle successfully, the car carries in the front two horizontal wheels that guide it along curb-like rails on either side. Some American engineers think guiding systems of this type could be used advantageously to permit either the split-rail monorail or a more conventional elevated railway to run on tires rather than wheels. In addition to cutting noise, the tires would permit trains to climb relatively steep grades and accelerate and decelerate rapidly.

Monorail, Anyone?

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attractive investment. The report made the following points:

▶ Construction and equipment cost of the proposed forty-five-mile system: $139 million. (Interest on bonds during construction, cost of financing, and working capital would add another $26 million.)

▶ The monorail would travel underground for about two miles through downtown Los Angeles. The subway section and two stations would cost almost $22 million, or about $11 million per mile. The remaining forty-three miles of monorail would cost only about $2,700,000 per mile, including rolling stock, power systems, maintenance shops, parking lots of stations, and all other facilities.

▶ The monorail would cover the forty-five-mile route at an overall speed of 41 mph, including time for stops at fifteen way stations. This would make the monorail faster than any other urban or interurban transit system in the world. (Average speed of New York express subways is about 24 mph.)

▶ Revenues were based on a zone fare system ranging from 20 cents to 50 cents, which would average out to about 2.8 cents per mile, or about the bare out-of-pocket cost of operating an automobile.

▶ The report estimated that the monorail would be enough faster than other vehicles (see time comparisons on map, page 108) to attract some 79 million passengers a year who would pay $23,500,000 in fares. If the system had to pay an estimated $5 million in taxes, the estimated revenues would fall about $3,300,000 short of meeting all annual charges.

▶ A shorter line (28.6 miles) from North Hollywood to Compton would probably earn just enough to break even, taxes and all.

What alternatives?

The report pointed out one vexatious problem that the monorail might have to face: suits from property owners along the right-of-way who might try to claim damage of some sort. Such suits plagued New York elevated lines for years. Presumably there is nothing to be done about this but wait for the first suit and trust that a court will decide it is not in the public interest to award damages.

All estimates in the report were based on the "classical" monorail. The report recommended, however, that competing elevated systems "should be considered." At a rough estimate it appears that a modern elevated might cost Los Angeles at least $35 million more than a classical monorail. The split-rail monorail also would cost appreciably more than the classical, but might be worth the extra money if it provided a substantially superior system.

California monorailroaders

Coverdale & Colpitts did not compare costs of competing systems for good reason: the act setting up the Los Angeles Transit Authority specifically called for a study of a "monorail" and nothing else. Since Webster defines monorail as a system built around one rail, Coverdale & Colpitts decided that even the "split-rail" monorail was ruled out. To understand why the act specified a monorail calls for a brief bit of history.

In 1947 George Roberts, a San Franciscan with a checkered career as a broker and promoter, latched onto the monorail idea as a solution to the transit problem of modern cities and energetically began selling stock in a firm now known as Monorail Engineering & Construction Corp. He made connections with British, French, and German groups interested in monorail systems, dealt himself into a patent-administering agency called International Monorail Ltd., and became the sole agent for its patents in the U.S.

Roberts preached the virtues of the monorail before countless California groups and in 1951 hired Ralph Merritt, a well-known Californian, to see if the RFC would finance a monorail line between San Fernando Valley and Long Beach. The RFC replied that it could not make a full-cost loan for this purpose to a private transit company (which Roberts had organized) but that it might to a public agency.

Merritt thereupon undertook to get the California legislature to set up a transit authority specifically to survey the Los Angeles problem. While Merritt had faith in the monorail, he asked that the proposed authority be free to investigate, and ultimately to operate any form of mass rapid-transit system. Immediately he ran into opposition from two groups already operating public transit facilities in Los Angeles: Pacific Electric Lines (which subsequently got out of the interurban-transit business) and Los Angeles Transit Lines—the latter 59 per cent owned by National City Lines Inc., of Chicago, which has

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transit interests in over fifty cities.

In the end Merritt pushed his proposal through the legislature, but not until he had been forced to abandon two of the original provisions: that the new authority be tax exempt, and that it be beyond the control of the state Public Utilities Commission. He also reluctantly accepted two stipulations: that the new authority limit its operations to an eight-mile-wide strip from San Fernando Valley to Long Beach, and that it limit its study to monorail (plus feeder bus lines), which, according to Merritt, private operators believed least likely to be feasible.

Subsequently Merritt was made general manager of the new transit authority, and at his request, the Board of Supervisors of Los Angeles County appropriated $100,000 to carry out an initial survey. New York investment bankers recommended that the survey be made by Coverdale & Colpitts.

Merritt believes that the Coverdale & Colpitts report amply justifies an effort to build a monorail, but he concedes it will not be feasible unless he can get the legislature to restore his original provisions: tax exemption (or relief), and freedom from Public Utilities Commission control of rates. Merritt points out that these provisions would merely extend to a rapid-transit authority the privileges universally accorded to state agencies charged with building bridges, tunnels, or water-supply systems.

Where Roberts will come out if a monorail is ever built is not clear. The Coverdale & Colpitts report clearly states that no royalties would be required to build a monorail. Roberts, who has recently been the target of much unfavorable publicity in California, professes that his firm is not interested in royalties, that it simply hopes to act as construction management engineers on a fee basis.

Are freeways enough?

While most Angelenos might admit that their city badly needs improved transit facilities, there has been no public outcry for immediate building of the monorail. One possible explanation for this indifference is that Los Angeles is one of the very few cities that have grown great since the appearance of the automobile; hence its citizens are probably more deeply attached to auto transportation than those in older metropolitan areas. To facilitate motor traffic, Los Angeles began planning, over fifteen years ago, a network of freeways, and it was the planners' hope that it would take care of Los Angeles' traffic problem.* (Cost of the freeways has been borne chiefly by appropriations from the state gasoline tax.)

Monorail proponents argue that it will never be feasible to build enough freeways to handle peak commuter loads. A modern six-lane highway, they point out, cannot (at the usual occupancy of 1.5 to 1.7 persons per car) comfortably transport more than 6,000 or 7,000 people in passenger cars per hour in each direction. By contrast, a monorail (or equivalent) could move about 24,000 people per hour in each direction. Thus the monorail, costing $2,700,000 per mile, has approximately the passenger capacity of *four* six-lane highways that would cost (together) from $6 million to over $12 million per mile.

Despite the seductiveness of these figures it is a question whether Californians can be lured out of their private cars by a monorail or anything else. In its report Coverdale & Colpitts assumes that the prime attraction would be timesaving. Thus they estimate that to save ten minutes, *all* present car drivers (and passengers) would switch to monorail; that to save five minutes, 60 per cent would switch; and that even when there was no timesaving (but usually a moneysaving) 20 per cent would switch. By applying these factors to industrial workers in the study area Coverdale & Colpitts figured that about 30 per cent of the people who now travel to work by car would switch to monorail. These diverted workers (46,600 of them) became the base passenger load from which total annual traffic was extrapolated.

The report estimated that only 15 per cent of all monorail passengers would be diverted from present transit lines. (It is Ralph Merritt's opinion that the transit companies might more than recoup this loss by running feeder bus lines to monorail stations.)

It is certain that investment bankers will scrutinize the traffic estimates carefully before the monorail approaches realization. John C. Kohl, director of the Transportation Institute of the University of Michigan, is among those who question the timesaving formula for estimating traffic on a monorail or any other transit system.

"The important questions," says Kohl, "are psychological. How far will people walk to and from a station? Will they be willing to drive to a monorail station and park their cars there all day? Or will they give up their cars at all to save five or ten minutes?" One California banker who is sympathetic to the monorail concedes that none of the cost and traffic studies are conclusive: "The only way to find out whether enough people will use a monorail is to build a stretch of it."

A San Francisco monorail?

Meanwhile another California group, the San Francisco Bay Area Rapid Transit Commission, has employed the New York engineering firm of Parsons, Brinckerhoff, Hall & Macdonald to make a comprehensive survey of the transit needs of the nine counties in the bay area. The mission given to Parsons, Brinckerhoff is much broader than that given to Coverdale & Colpitts, for it makes no specification of types of transit systems to be studied. (And again Gibbs & Hill is cooperating on the project.)

The San Francisco report probably will not be finished for another year, but when it appears, city planners should be able to see for the first time exactly how monorail costs compare with those of rival systems. More important, the report may also contain new viewpoints on the problem of diverting people from private cars to rapid transit. Says Walter Douglas, the Parsons, Brinckerhoff engineer in charge of the report: "The reason rapid transit has deteriorated is because there hasn't been a healthful concept under which it could operate—not because there's any lack of mechanical ingenuity to improve transit systems." END

**Los Angeles County has a greater density of automobiles—363 per 1,000 population—than any other metropolitan area in the world, and far more than such cities as New York (142 per 1,000) and Philadelphia (168).*

How to Start a Bank on a G.I. Loan

Floyd T. Bryan, an affable and energetic resident of Stephens, Arkansas (pop. 1,283), is the only veteran who ever got a G.I. loan for the purpose of founding a bank. With the loan—$5,000—he organized the Stephens Security Bank in 1946. At the end of the first day he had deposits of $100,000; deposits are now above $1,200,000, assets close to $1,300,000, and net worth is $94,000.

Bryan, to be sure, was no tyro at banking. When he enlisted in the Navy in 1942, at thirty-eight, he had had over eighteen years of banking experience, all in Arkansas, as bookkeeper, examiner, and manager. In 1944, while he was a chief petty officer storekeeper with the Seabees at Camp Peary, Virginia, he wrote to his brother, who worked in a Little Rock bank, and to a friend who was assistant state bank commissioner, asking them to suggest a small Arkansas town that needed a bank. Both chose oil-wealthy Stephens, which had no bank and whose businessmen were tired of traveling twenty miles to the nearest one in Camden. Both mentioned a serious obstacle to Bryan's project: he had no money. But Bryan figured he had some valuable intangible assets; he knew nearly everyone in banking in Arkansas, he knew banking, and under the G.I. Bill he was entitled to apply for a loan to start a business—even a bank.

Out of the Navy in 1945, Bryan took a job with the Veterans Administration in Little Rock, interviewing G.I. applicants for loans. He himself made formal application to the VA for $5,000, and his description of his project was so persuasive that in less than a month the RFC advised VA to guarantee Bryan's G.I. loan. He thereupon went to a banker who agreed to lend him the money if he could produce an additional $3,000. Bryan sold his 1940 Dodge sedan for $860 and borrowed the rest from friends and relatives. To get his charter he had to have a total of $33,000. He raised the additional $25,000 by selling stock to sixteen Stephens businessmen. He also formed a real-estate and insurance agency as an affiliate of the bank (a practice common in small Arkansas towns). When the bank opened for business on April 1, 1946, it had $25,000 capital, $8,000 surplus.

Local citizens gradually moved their accounts from Camden to Bryan's bank. Deposits increased at the rate of $150,000 a year, and in 1948 the bank paid its first dividend—$5 per share on the 250 shares outstanding. Since then a dividend rate of 20 per cent has become routine.

Bryan holds 20 per cent of the stock and, as vice president and cashier, is the bank's only salaried officer ($5,400 a year). Now fifty years old, ex-Chief Petty Officer Bryan figures that in about ten years he will be able to retire.