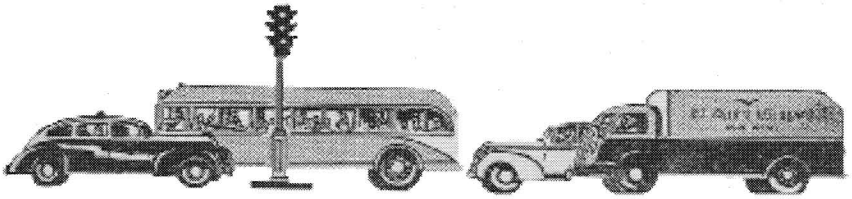


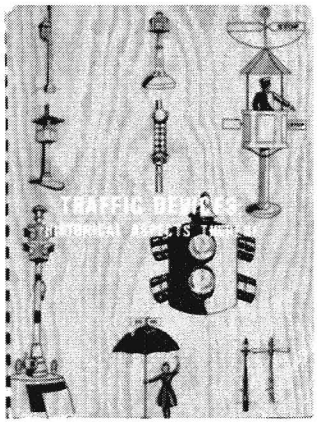
Transportation Topics and Tales:

Milestones in Transportation History

in Southern California

By John E. Fisher, P.E. PTOE

Shortly after I joined ITE (Institute of Transportation Engineers) in 1972, I purchased the ITE publication, Traffic Devices, Historical Aspects, Thereof. While this publication was rich with traffic device history on the East Coast and Mid-West, there was little history regarding traffic control in the Southern California.



1971 ITE Publication of Traffic Devices: Historical Deices Thereof
Graphic—8094

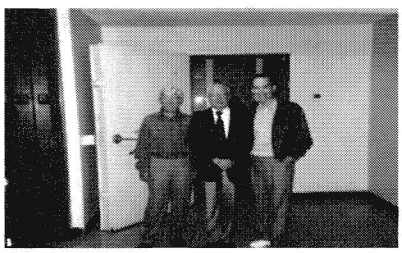
Did you know Los Angeles was the home of the first pedestrian activated signal?

Later, in 1987, I came across a 1937 photograph of a prominent intersection in Los Angeles. It was Wilshire Boulevard and Western Avenue, which was claimed to be the busiest intersection in the world, with 41,000 vehicles during the peak eight hours (a 1929 count). Certainly, the vintage cars and well-dress shoppers of the time provided an interesting contrast with the casual look and the relatively indistinctive cars of today. But what really caught my eye was the traffic control–a diamond shaped Stop sign and off-center lane treatment.

Wilshire Boulevard at Western Avenue, 1937
Graphic—5037

To find out more about this intriguing traffic control, I contacted retired Assistant General Manager, Hugh Gilman, who had worked with pioneering Los Angeles traffic engineer, Ralph Dorsey. Gilman's recollections led me to the City archives, old magazine articles, and eventually to a meeting with Ralph Dorsey's son, Frank. Frank gave me his father's 32 years of saved newspaper clippings relating to traffic control, spanning the years 1922 to 1954.

This multitude of clippings turned out to be a treasure chest of information which traces the history of transportation and traffic control in Southern California. As I assembled photos and written information over the years from old-timers, old publications and vintage documents, I began to see how, in many cases, Southern California and Los Angeles in particular were in the national forefront in traffic engineering. Los Angeles had the busiest intersections in the world, the first interconnected signal system, the first simplified traffic code and the first pedestrian activated signal.



Left to right: Frank Dorsey, son of pioneering traffic engineer Ralph Dorsey; Deane Terry, the first person with an engineering degree in the Los Angeles Traffic Department; and Hugh Gilman, the first person with any degree in the Los Angeles Traffic Department.

Graphic - 3128

Table of Contents

The Beginning of Motorized Transport in Southern California

Since the beginning of recorded history, the human race has depended on animals - horses, mules, camels and oxen - for long distance transportation across land. Such was the case in Southern California. Los Angeles and other settlements along El Camino Real were accessible only by horseback and stagecoach. That would begin to change with the efforts of a person who would become known as the "King of Transportation," Phineas T. Banning.

Banning was a mule skinner, stagecoach driver and entrepreneur in a freight transportation company after arriving in San Pedro in 1851. He built trade routes to Ft. Tejon, Yuma, Tucson, and Salt Lake City and used his San Pedro wharf as the base for his shipping business.

Did you know Phineas T. Banning was known as the King of Transportation?

Soon he would achieve greater successes. When a storm ripped apart his San Pedro wharf in 1857, he built a new one a few miles to the south. He then transformed a marsh land, known as "Goose Town," into a shipping wharf at the end of what is now Avalon Boulevard. Around that wharf, he carved out a town that he would call New San Pedro. He would later rename it Wilmington, after the capital of his home state of Delaware.

In 1865, he began two two-year terms to the State Senate and was focused on seeking funds to build Los Angeles' first railroad. In the grander scheme of things, he believed that a railroad would revive Los Angeles after the national economic collapse resulting from the Civil War. But on the personal level, he would greatly gain from this effort to transport goods from the Wilmington wharf to the young city along the "river on wheels." His bill passed the Legislature in 1868 and a $225,000 bond for the San Pedro and Los Angeles Railroad was approved by Los Angeles voters by a mere 28-vote margin. Conflict of interest notwithstanding, Banning was a major stockholder in the railroad and was awarded the construction contract.

On October 26, 1869, the first railway in Southern California opened along the 22-mile Dominguez Route ending at what is now Commercial Street. In 1873, the line was sold to Southern Pacific to entice them to extend the national rail network from San Francisco to Los Angeles. This linkage was realized in 1876.

Soon thereafter, Banning improved the wharf into a deep water port where large seagoing steamers would dock. Banning's seaport was eventually absorbed by the Port of Los Angeles and the "King of Transportation" also would become known as the "Father of the Los Angeles Harbor." The linkage of the City with the national rail network, the development of the wharf into a harbor and the accessibility between these two points was the catalyst which activated the transformation of Los Angeles from a dusty pueblo to a major metropolis.

During the automobile era, a road was built alongside the Dominguez Route and is now known as Alameda Street. Due to the growth of the County, numerous grade crossings were added thus resulting in collisions, delay and deteriorated freight operation. In April 2002, the Alameda Corridor was completed which rebuilt Banning's railroad below the street network. This national model of freight transportation permanently reaffirmed Banning's vision of a "river on-wheels."

The first railway in Southern California opened in 1869.

Los Angeles and the Transcontinental Railroads

In 1869, railroad workers drove the Golden Spike in Promontory, Utah, joining the Union Pacific and Southern Pacific railroads into a continuous transcontinental route. Later that year, Phineas T. Banning built the first railroad in Southern California between Downtown Los Angeles and San Pedro. From those accomplishments arose the vision of connecting Los Angeles to the rest of the nation via the new rail network.

Graphic 1022

In 1873, Bannings' railroad was sold to Southern Pacific to entice it to extend its line southerly from San Francisco. That vision would be realized on September 5, 1876 when the Golden State's own golden spike connecting Northern and Southern California was driven at Lang Station in what is now Santa Clarita. The first station was sited at the "cornfields" southerly of the junction of the Los Angeles River and the Arroyo Seco. In 1888, the SP moved to the Arcade Station on what is now Central Avenue at 5th Street. Later, it moved to an adjoining site to a station known as Central Station.

Did you know that Los Angeles was connected to the transcontinental railroad network in 1876.

The Atchison, Topeka and Santa Fe railroad reached Los Angeles in 1885. In 1893, it opened its stylish Moorish station called La Grande on what is now Santa Fe Avenue between 1st and 2nd Streets.

The third and final railroad, the Los Angeles Terminal Railway, reached Los Angeles in 1891. It was eventually sold to Union Pacific. Its station was located on 1st Street just east of the Los Angeles River. The station burned down in 1924 and Union Pacific relocated to Central Station.

As the City grew, the rail lines would share the right-of-way used by trolleys and automobiles. In 1915, after years of conflicts and fatal accidents, discussions got underway regarding a joint terminal and new track location. This resulted in a decade-long court battle. Finally, the presidents of the three railroads agreed and voters approved a new joint (union) station in 1926. Finally, on May 3, 1939, Union Station opened its doors. This station, with mission revival architecture and streamline modern interior design elements, featured ornate 52-foot ceilings, hardwood waiting-room chairs, giant chandeliers, decorative tiles, two courtyards and the grand Harvey House restaurant. Soon 64 passenger trains a day were passing through with romantic names like the Chief, Super Chief, Sunset Limited, Lark, Golden State, Desert Wind and the City of Los Angeles.

However, as jet travel became available in the 1960's, passenger train travel at Union Station declined rapidly to just seven-passenger trains per day. In addition, long distance trucking impacted the railroad's freight business. In 1967, the Harvey House restaurant closed and in 1971 Amtrak took over passenger operations.

But today, Union Station again is Southern California's primary transportation hub with Amtrak, Metrolink, the Metro Red Line, the Metro Gold Line, taxicabs, and bus lines converging on it daily. It serves as a symbol and reminder of the rail transportation network connections of the late 19th Century which transformed Los Angeles from a town of 10,000 to the center of the nation's second largest metropolitan area.

Early Transit Systems in LA

In 1869, Phineas Banning completed the first railway between Downtown Los Angeles and the San Pedro wharf. In 1872, Los Angeles County voters approved a measure to subsidize the construction of the Southern Pacific line to Los Angeles. It would arrive four years later.

Citizens then turned their attention to local transportation. What would emerge was a succession of railways powered by horses, cables and then electricity.

The first horse-car lines on railroad tracks began operating in 1874.

Franchises for the first two horse-car lines on railroad tracks were granted in 1874. The "Sixth and Spring" line, 2-1/2 miles long, began operation that year, followed by the "Main Street" line in 1875. This line would last until 1897.

Meanwhile, in San Francisco, a manufacturer of steel cables, long used in the mining industry, was developing new uses. One was for the ski lift. The other was for transporting a car up the steep, inclined streets of San Francisco. The first one began operation August 1, 1873 along Clay Street. The system involved a large steam engine in a conveniently located power house which was able to pull the cable.

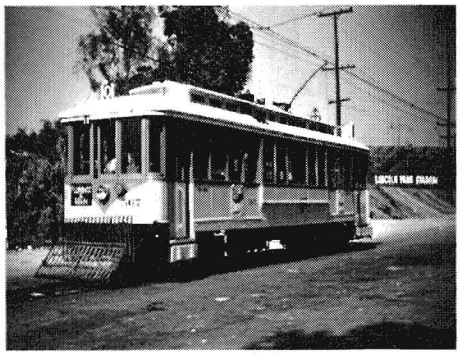
The Second Street Cable Railroad began operation in 1885.

The concept eventually reached Los Angeles. On October 8, 1885, the Second Street Cable Railroad began operation and was built primarily to sell lots west of the Downtown area. As soon as the lots were sold, the system was allowed to deteriorate and was abandoned four years later. Other cable lines included the Temple Street Cable Railway and the Los Angeles Cable Railway, later known as the Pacific Railway Company. By 1891, the Pacific Railway Company operated over 20 miles of line. However, by 1893, its cable operation was discontinued. The Temple Street line lasted until 1902.

The first experiment with overhead electric lines occurred on January 1, 1887. It ran along Pico Boulevard to a real estate development. It was unsuccessful and was replaced by horse cars. However, the generation and reliability of electrical power underwent rapid improvement and by the beginning of the 20th century there would be electric lines running to the beaches, Pasadena and other population clusters. Electric lines would become the primary form of transit for the next half century.

Yellow Cars and Red Cars

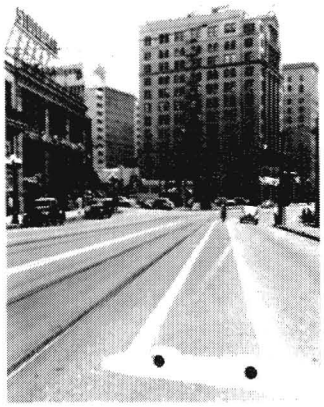
The Red Cars and Yellow Cars comprised the world's largest inter-urban railroad system and shaped Southern California in the early part of the 20th century. Both were the entrepreneurial efforts of Henry Huntington.



Yellow Car near Lincoln Park

Graphic - 6011

Henry was the nephew of Collis P. Huntington, who helped develop the Southern Pacific Railroad. In 1895, Henry developed the first segment of the Los Angeles Railway (LARy), a narrow gauge (3' 6") line. The original line ran from Downtown Los Angeles to Pasadena. LARy provided mostly local service to the developed communities and business districts adjacent to and near Downtown Los Angeles. The cars were painted yellow and generally operated in the middle of streets where patrons would board from narrow islands within the street.



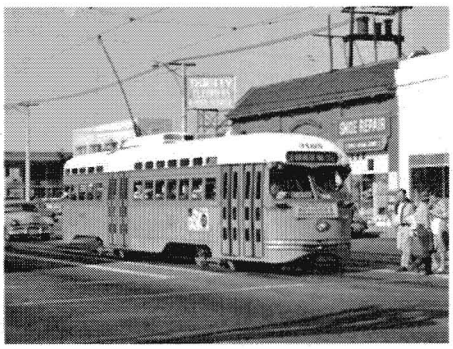
"Safety Zone" for street-running Yellow Cars

Graphic- 6013

Yellow Car

Graphic - 6013

Henry Huntington then proceeded to develop the Pacific Electric Railway (PERy). Huntington purchased 72 separate local lines, most of them with narrow gauge track. He rebuilt them to standard gauge (4' 8 ½") track and reassembled and extended them during the first decade of the 20th century. The first Red Car line began operation in 1902 along Long Beach Avenue and Willowbrook Avenue, the alignment of today's Metro Blue Line. Red Cars generally ran in exclusive rights-of-way, although some lines operated within streets.



Yellow Car

Graphic - 6032

During its heyday, LARy covered 316 miles of track, while the PERy covered 1,164 miles reaching from the San Fernando Valley on the north to Balboa on the south and from Santa Monica on the west to Redlands on the east. This rail network encouraged and shaped the growth of hundreds of communities in Southern California. Together, the local and regional rail transportation systems covered near 1,500 miles, the most extensive system in the nation.

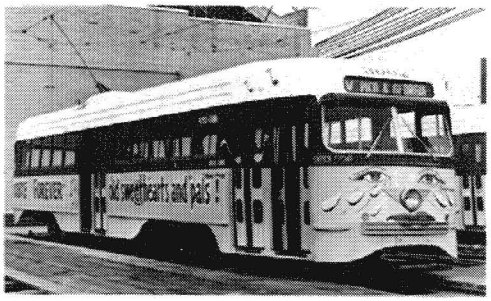
Yellow Cars and Red Cars, *continued*

Patronage on the Red Cars rose to a peak of 109 million annual passengers in 1924. However, ten years later it had declined to just 54 million, less than half of the peak patronage. During World War 2, patronage rose again in response to gasoline and tire rationing. However, it declined sharply after the War.

Operation of the Yellow Cars under the Metropolitan Transit Authority

Graphic - 6018

In 1945, Los Angeles Railway was sold to National City Lines which marketed the service as Los Angeles Transit Lines. The last Yellow Car made its final trip on March 31, 1963. In 1953, Pacific Electric Railway was sold to Metropolitan Coach Lines. The last of the Red Car made its final run in the Spring of 1961 along the Long Beach line where it started 59 years earlier. In 1958, the private transit systems became publicly operated under the new Metropolitan Transit Authority, which would be succeeded by the Southern California Rapid Transit District, the Los Angeles County Transportation Commission and finally the Metropolitan Transportation Authority.



Final day for the original Yellow Car system.

Graphic- 6037

Yellow Car

Graphic - 6013

It would be three decades later before rail transit would have a renaissance in Los Angeles.

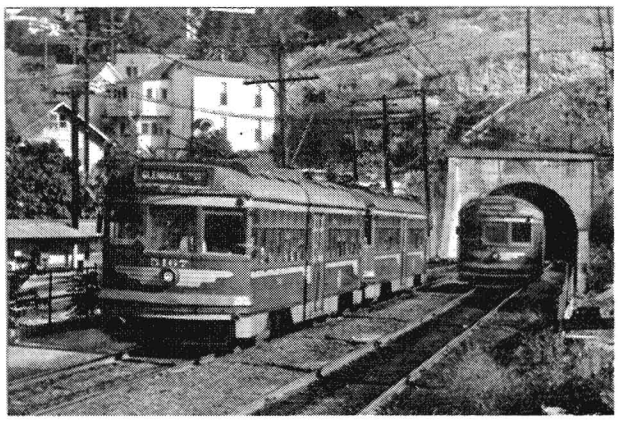
Red Cars on Sunset Boulevard in Echo Park

Graphic - 3006

Pacific Electric Red Car on Glendale Line headed for Downtown

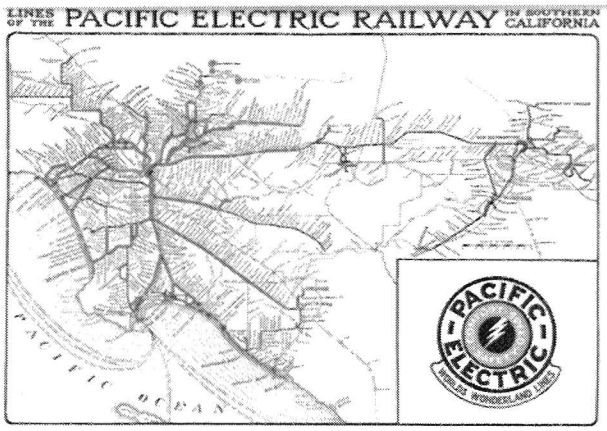
Graphic - 3100

Yellow Cars and Red Cars, *continued*



Red Cars and the 1925 tunnel portal southeasterly of the intersection of 2nd Street and Lucas Avenue

Graphic - 3101



The extensive Pacific Electric System

Graphic - 5032

The first line of the Pacific Electric Red Car system, which later became the alignment of the Metro Blue Line.

Graphic - 6022

Enhanced Safety Zone for Yellow Car Service

Graphic - 6076

The Evolution of Public Transit in Los Angeles

Since the early 1900's and lasting half a century, there were two major, privately-operated electric railway systems serving Southern California. The primary one was the Pacific Electric Railway which was an inter-urban system in mostly dedicated right-of-way. It covered metropolitan Los Angeles, the San Fernando Valley, the San Gabriel Valley, coastal cities in Los Angeles and Orange Counties and most cities in between. Its trains were known as the Red Cars. The other system was the Los Angeles Railway Company, an urban street car system covering Downtown Los Angeles and nearby areas such as Eagle Rock, Highland Park, Vernon, Huntington Park, and Inglewood. Its trains were known as the Yellow Cars.

As communities grew, there was a gradual decline in ridership coupled with an increase in the number of grade crossings. As a result, the effectiveness of these systems were reduced due to the delays and collisions at crossings. The owners were not financially able to make capital expenditures that might improve and preserve the lines, such as grade separations, improved terminal access and updated equipment. Thus, new lines used motor buses and some lines started to be converted to motor buses. Although this conversion was delayed somewhat by World War 2, it accelerated rapidly in the years after the War.

The Red Cars and Yellow Cars served Los Angeles for half a century.

In 1944, the Los Angeles Railway was sold and renamed as Los Angeles Transit Lines and, in 1955, converted most of its trolley lines to bus operation. Meanwhile, the privately-operated Pacific Electric ceased operation in 1953, and a new private company, Metropolitan Coach Lines, acquired its passenger service franchise and motor coach equipment. In the process, many service lines were abandoned since they were not profitable. As a result, transit service was much less accessible than it had been in the prior decade.

Metro was created in 1993.

In response, the California Legislature decided that the time had arrived to establish a public transit agency to serve Los Angeles County. On March 3, 1958, the Metropolitan Transit Authority (MTA) began operation after the acquisition of the properties of the Metropolitan Coach Lines and Los Angeles Transit Lines. Other, smaller lines were acquired, as well, although a few municipal lines would continue to operate complementary to the MTA system. The consolidation resulted in operating efficiencies.

During this transitional period from private-to-public operation of public transit, it was expected that fare box revenue would be able to cover all transit related costs.

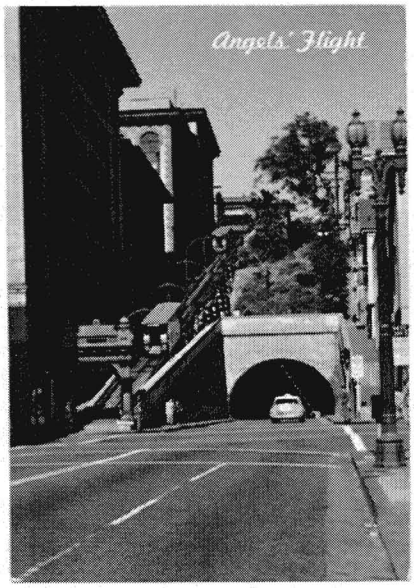
For awhile it was feasible to meet all operating expenses of the conventional surface transit system due to the efficiencies of the consolidation. However, it was not financially feasible to build a true mass rapid transit system with fare box revenue alone.

In 1964, Congress passed the Urban Mass Transit Act which provided for capital grants of up to two-thirds for transit capital improvements. However, the MTA had no mechanism to provide matching funds. Thus, the Legislature created the Southern California Rapid Transit District (SCRTD or RTD) as the successor to the MTA on November 5, 1964. The RTD was authorized to propose to the electorate a rapid transit program to be financed by general obligation bonds. Several proposals were offered only to be turned down by the electorate. Finally, in November 1980 Los Angeles County voters approved Proposition A, which increased sales taxes by one-half cent, for the purpose of improving and developing a multi-modal transit system. Ground breaking for the construction of the Metro Red Line subway system occurred in September 1986, after federal funds were secured to match local funds.

Meanwhile, the Los Angeles County Transportation Commission, an agency created in 1976 primarily to program local transportation funds, was planning and constructing the Metro Blue Line. During the latter part of the 1980's, duplication of effort and rivalry among the two transit agencies became apparent. In order to resolve this problem, the Legislature created the Los Angeles County Metropolitan Transportation Authority (MTA) as the successor to both the SCRTD and LACTC, on April 1, 1993.

Angels Flight Story

It is one of Los Angeles' true landmarks, a link to the past and a vintage form of transportation. It is our last remaining funicular railroad known as Angels Flight.



The setting of Angels Flight in the 1950's

Graphic - 6010

At the turn of the 19th century, the area southerly of 1st Street and easterly of Hill Street was changing from residential to commercial development. A new City Hall was being built on Broadway between 2nd Street and 3rd Street making this area the business center of the City. Just to the west, there were magnificent Victorian mansions on Bunker Hill, owned by the socially prominent families of Bradbury, Coulter, Crocker, Larronde and Widney. However, due to the steep incline, many other families located elsewhere.

In 1901, the boring of the 3rd Street tunnel was completed which provided quicker access to the area west of Bunker Hill. However, it didn't link up with Bunker Hill itself. It was at this time that Colonel J. W. Eddy considered the possibility of a funicular to Millionaire's Row at the top of Bunker Hill.

James Ward Eddy practiced law in Chicago, became a close friend of Abraham Lincoln and campaigned for him. When the Civil War erupted, Eddy enlisted in a battalion recruited to protect the nation's capital. He would later serve in the Illinois state legislature, then as a construction engineer for the Mineral Belt Railroad in Arizona, and as a surveyor for the Kern River and Los Angeles Electric Power Company. At age 69, he ventured again by taking the risk of financing and building Angels Flight.

The City granted him a franchise to run an electric cable railway along the 3rd Street right-of-way between Hill Street and Olive Street. However, fearing that the new railway might be considered a monopoly, the City required Eddy to construct a free stairway on the north side of the 3rd Street right-of-way. The stairway consisted of 123 steps and ten ramps and landings. On December 31, 1901, the new railway was officially opened.

In the manner of fine railway cars, the Angels Flight cars were named "Olivet" and "Sinai" and were painted a "saintly" white. An archway greeted passengers at the Hill Street entrance while a canopy covered the plaza at the Olive Street summit. It was fancifully called Angels Rest and featured a 100- foot observation tower equipped with a *camera obscura.*

Angels Flight Story, *continued*

The grand homes on Bunker Hill eventually fell out of fashion, then into disrepair and finally would become rooming homes. The Community Redevelopment Agency (CRA), created to redevelop Bunker Hill into a high-rise office center, proceeded to buy and demolish homes as they became vacant. In 1962, they took title to Angels Flight and by 1966 owned virtually all properties on Bunker Hill.

Due to the regrading of the Hill that occurred with redevelopment, it was necessary to close Angels Flight on May 18, 1969. The CRA promised to someday rebuild Angels Flight and that promise was fulfilled 27 years later on February 24, 1996, one-half block to the south.

It would run five more years, just shy of its centennial, when a malfunction resulted in the death of a passenger on February I, 2001. It remained closed for nine years. During the closure, the braking and mechanical systems were redesigned to reflect the original design. Finally, on March 15, 2010, the icon of transportation nostalgia, Angels Flight, resumed operation.

The original setting of Angels Flight

Graphic - 7025

Angels Flight on the Olive Street side

Graphic—7032

The Funicular Transit Systems

Within a short span of 15 years, electric rail lines replaced the cable car lines which replaced the horse car lines which replaced horse wagons. Thus, the cable cars were perceived as yesterday's technology. But its demise was declared prematurely.

The concept of using cables for incline railways became popular as a means of lifting passengers up very steep grades. The concept consists of two counter balanced cars which move up and down on parallel tracks. Much of the load of each car is balanced by the load of the second car with the engine handling the unbalanced load and friction. In the alpine regions of Europe, these systems became known as funiculars. The song, "Funiculi, Funicula", composed by Luigi Denza in 1880, celebrated the funicular up the slopes of Mt. Vesuvius.

Postcard for Angels Flight

Graphic - 6031

Incline railways were suitable for the hillside areas adjacent to Downtown before the automobile age provided an alternative mode of access. There would be five vintage funiculars in the Los Angeles area. The first and most dramatic was the Mt. Lowe Railway, which extended 3,000 feet from Rubio Canyon to Echo Mountain northeast of Pasadena. It began operation on July 4, 1893 and was abandoned in 1939. It would be the only one outside of the City.

One existed for a short period in Playa del Rey circa 1904 near Vista del Mar, southerly of Culver Boulevard. It was abandoned when a hotel at the top of the hill burned down.

Another funicular was the Los Angeles and Mt. Washington Railway, extending 2,900 feet along Avenue 43 between Marmion Way and Hotel Mt. Washington. It began operation in 1909 and was abandoned in 1919.

A third funicular was the Court Flight Railway along Court Street between Broadway and Hill Street. (Court Street used to exist along the east-west alignment between the Department of Water and Power John Ferraro Building and City Hall.) It was constructed in 1904 and was abandoned in 1944.

The fourth and most enduring funicular was Angels Flight. It was aligned along the south side of 3rd Street and extended westerly from Hill Street. It started operation on December 31, 1901. Service was suspended on May 18, 1969 and the cars and trucks were retained in storage. On February 24, 1996, it was reopened a half block to the south, but closed again on February 1, 2000 after a malfunction and passenger death.

There was another operating funicular for the Victoria Station restaurant at Universal Studios in the 1970's. However, it was more of a tourist attraction than a necessary mode of travel.

The Creation of Commuter Rail in Southern California

The railway system in the United States was developed by private entrepreneurs. By 1869, the system reached both coasts and on September 5, 1876 it reached Los Angeles. Before long, there would be three private rail lines linking Los Angeles with other cities - Southern Pacific, Union Pacific and the Atchison, Topeka and Santa Fe (Sante Fe). After many years of operation, they finally consolidated their three separate passenger terminals. The site of that union was named Union Station, which opened May 3, 1939.

Trains were the most viable mode of intercity passenger travel until jet travel emerged in the early 1960's. As passenger travel declined, these rail carriers were left with a few useful lines for transport of cargo but many more lines no longer were needed for passenger travel. As a result, the rail lines started selling off parcels of their land to developers of warehouses and a variety of industrial uses. In 1971, the federal government, under the name, Amtrak, took over passenger operations on these private rail lines.

Union Station opened May 3, 1939.

In March 1989, Southern Pacific Railroad indicated its intention to auction its extensive Southern California right-of-way, rather than sell it one parcel at a time. Shortly thereafter, Santa Fe became involved in discussions regarding the sale of its right-of-way. Just before these discussions got underway, both Riverside County and San Bernardino County passed sales tax measures for transit improvements which involved commuter rail. Just after the discussions began, California voters approved three rail bond measures, Propositions 108, 111, and 116 in June 1990.

Metrolink opened October 26, 1992 with 112 miles, 2.5 lines and 11 stations.

Very suddenly, a new vision was formed of a new regional commuter rail network, to be formed from the remnants of the historical national network. Along with that vision was a sense of urgency and belief that it was indeed achievable within a short time frame. In October 1990, the transportation commissions of Los Angeles, San Bernardino and Ventura Counties purchased the Southern Pacific right-of-way for $450 million, under an interim joint powers agency. The next month, voters of Los Angeles County approved Proposition C while voters of Orange County approved Measure M. By August 1991, the joint power authority would include Riverside and Orange Counties and the Southern California Regional Rail Authority (SCRRA) was established.

In January 1992, small but critical lines from Union Pacific were purchased, which would allow direct access into Union Station. In June 1992, Santa Fe finally agreed to sell its extensive right-of-way for $500 million. With this purchase, all of the vital lines were under public ownership, such that a five-county regional rail transit network was possible. Modern rail cars were purchased and miles of track were replaced. The five-county system, named Metrolink, opened October 26, 1992, with 112 miles, 2.5 lines and 11 stations. Today, it has 383 miles, 7 lines, and 51 stations, and 34,000 daily riders.

It was an incredible fete to conceive, negotiate, purchase, plan, and build a regional system in just 3-1/2 years. This was due to several factors. First, there was the opportunity, first announced by Southern Pacific Railroad. Then there was the enthusiasm and leadership by Neil Peterson the Executive Director of the Los Angeles County Transportation Commission. Then, of course, there was the hard work and skillful negotiations with the railroad executives by Richard Stanger, the first Executive Director of SCRRA, and numerous others. Certainly, there was the political imperative to deliver the system prior to the 1992 general election. But, most of all, the primary factor was the ability to avoid an extensive environmental process.

The environmental process was streamlined through a variety of ways. Time-consuming studies were avoided by not using federal funds. Only state and various county funds were used. Further, the California Environmental Quality Act was amended a decade earlier to categorically exempt railroad rights-of-way. However, since stations were outside of railroad rights-of-way, this presented a dilemma. In order not to complicate the Metrolink construction efforts, cities were requested to seek environmental clearances, design and build stations where they wanted access to the system. This arrangement continues to this day and allows cities to co-invest in the success of Metrolink.

Standard Railroad Gauge

I came across an article a few years ago which explained the dimensions used in both the world's most efficient transportation system and most advanced transportation vehicles. I'm referring to the United States standard railroad gauge of 4 feet 8 ½ inches between rails (center to center). The answer is not what you might expect!

Did you know the standard railroad gauge is based on the dimensions of Roman chariots?

The standard gauge is an odd number. Why not 4 feet or 5 feet even? The first explanation is that British expatriates built the first U.S. railroads just as they did in England where railroad travel originated. A further explanation is that the first rail lines in England were built by the same people who built the pre-railroad tramways and used the same gauge.

But why did they use that odd gauge for the tramways? It is because the people who built the first tramways used the same jigs and tools used for building wagons.

So why did wagons have that odd wheel spacing? The answer is that they tried to match the wheel ruts on some of the old long distance roads in England, as any other spacing would tend to break the wagon wheels.

Okay, but who built those old rutted roads? The first long distance roads were built by Ancient Rome and the initial ruts were created by the Roman war chariots. Since all of the chariots were made by Ancient Rome, they were of a uniform width. Since then, all subsequent wagon wheels used the same width so that their wagons would not be damaged.

Thus, the standard railroad gauge, used for most freight rail and transit rail systems, is based on axle dimensions of the Imperial Rome war chariots.

In fact, the large booster rockets attached to the sides of the main fuel tanks of space shuttles are based on the standard railroad gauge. That's because the booster rockets are manufactured in Utah and shipped to the launch site. The railroad line from the factory passes through a tunnel in the mountains just slightly wider than the track itself. Thus, the width dimension of the world's most advance transportation vehicle also is based on the size of the Roman war chariot.

But what governed the size of the Roman was chariots? Well, if you can recall the scenes of old Kirk Douglas and Charlton Heston movies, the chariots were pulled by two horses. Thus, the chariots were made just wide enough to accommodate the aggregate width of two war horses.

So, in summary, the major design dimension for both the most efficient surface transportation system and the most advance transportation vehicle is based on, well, a horse's rear.

Jitneys, A Recurring Idea

There is an idea that is suggested every few years and then discarded until the next time. It's the concept of jitney service and it was invented here in Los Angeles.

In 1915, Mr. L. P. Draper was driving his Model T Ford along Wilshire Boulevard. He saw a group of people waiting for a trolley car and decided to transport anyone who would ride with him for a "jitney", the slang term at that time for a 5 cent piece. The idea quickly caught on and within weeks hundreds of jitneys were operating along the Yellow Car lines. Within months, the idea spread throughout the nation and eventually the world.

Streetcar operators who had invested significant capital to build and operate rail lines were outraged. They claimed that the jitney operators were "skimming the cream". Because jitneys threatened the viability of the privately operated public transit operators, they were outlawed in most American cities.

Advertisement for taxicab service in Los Angeles from the 1920's

Graphic - 2064

Today, publicly-operated transit systems serve a variety routes, virtually none of which recover full costs. In addition, taxicab companies are franchised and drivers are permitted to serve a variety of short, long and remote trips. Jitneys, on the other hand, would travel only the most popular routes, use the established transit stops and invite passengers to travel in uninspected automobiles by persons with unknown backgrounds. For these reasons, and in support of the authorized transit and taxicab systems, jitneys continue to be outlawed.

The City's First Road

Today, the City has 160 miles of freeway and 6,500 miles of street, which includes nearly 1,500 miles of multi-lane thoroughfares. These are the vital arteries that serve the nation's second largest City.

While you might think that the City's road system had very humble beginnings, it maybe be surprising to learn that it was commissioned by royalty, specifically, the King of Spain. The City's first road would link the presidios, missions and pueblos of California.

El Camino Real linking the California missions

Graphic - 2040

Spanish control of Alta California began in 1769 when Gaspar de Pórtola was ordered by the King Carlos III to explore and occupy new territory and establish presidios for protection. These presidios would represent Spain's claim to Alta California if challenged by England or Russia. By 1782, four presidios were established in San Diego, Santa Barbara, Monterey and San Francisco.

Traveling with Pórtola was Junípero Serra who established the first mission. He would establish nine missions and by 1823 there would be 21 missions in all. Father Serra lived an austere life and was personally committed to the mission of saving souls versus the "civilizing" Native Americans as subjects of the King of Spain for which the missions would become known. Eventually, each mission was about 30 miles apart or a one-day's journey.

In 1777, Felipe de Neve recommended the formation of two agricultural settlements to support the presidios. The settlements were to be known as pueblos. By order of King Carlos III, the first was established in San Jose in 1777. The second was established on the banks of the Porciuncula (Los Angeles River) when 44 settlers from Baja California arrived in groups from the nearby San Gabriel Mission. On September 4, 1781 planting fields and house lots were distributed to the settlers officially beginning the new El Pueblo de la Reyna de los Angeles.

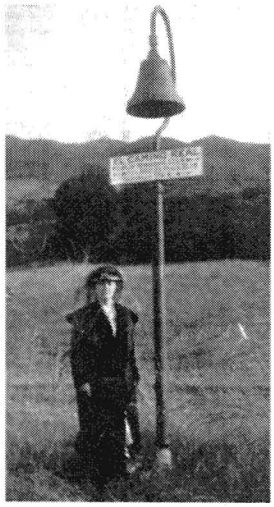
The dirt road connecting the presidios, missions and pueblos would become known as El Camino Real, which literally translates to The Royal Road, or more popularly known as The King's Highway. Today, the exact path they followed is uncertain. However, their diaries suggest that they overlooked the Arroyo Seco in present day South Pasadena, crossed the Porciuncula (Los Angeles River) near today's North Broadway Bridge, noted the tar near today's La Brea Tar Pits near Wilshire Boulevard, hiked through Sepulveda Pass and walked near present-day Ventura Boulevard. Over time, the original El Camino Real would be replaced by new paths, dirt roads, a network of paved streets and modern freeways. The route that most closely approximates historic El Camino Real is Interstate 5 between San Diego and Los Angeles and US 101 between Los Angeles and San Francisco.

The sites of the 21 missions, four presidios and two pueblos have become the major coastal cities of California and Los Angeles and San Francisco are world renowned. They can all trace their origins to California's first, best known, and most regal of highways, El Camino Real.

The El Camino Real Bells

California's first and most historic route is identified in a very special way. El Camino Real is the corridor that connected 21 missions, four presidios and two pueblos between San Diego and San Francisco during California's Spanish colonial period. Today, the corridor is marked with distinctive bells.

As cities along the corridor began to develop in the late 19th Century, there was a desire to preserve this important link to California's early years. The notion of preserving El Camino Real was first proposed by Anna Pitcher of the Women's Club of Los Angeles in 1892. Eventually, the idea would move forward under the guidance of Mrs. Armitage Forbes. She and her husband formed the El Camino Real Association in 1904 to investigate the original route and to provide distinctive markers. The marker selected was a miniature mission bell modeled after the bells of the Old Plaza Church in Los Angeles. The cast iron bells were hung from eleven-foot pipes bent at the top in the shape of a question mark. In August 1906, the first one was installed in front of the Old Plaza Church. In all, the El Camino Real Association installed 158 bells along the route by 1915.



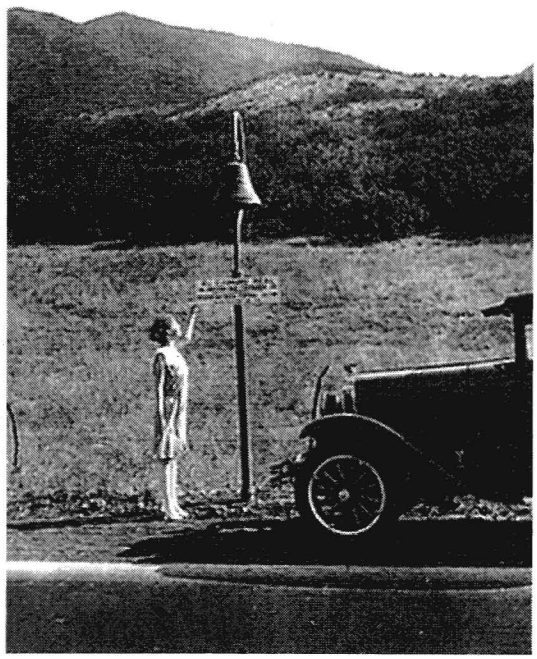
El Camino Real linking the California missions
Graphic - 2040

In time, the bells fell into disrepair and some had been stolen. From 1926 to 1931, the California State Automobile Association and the Automobile Club of Southern California assumed responsibility for maintenance and replacement of bells on the early State highways, just as they did for route shields. However, over the years theft and vandalism took its toll. Finally, in 1974 the Legislature appointed Caltrans as guardian of the bells on the current State Highway System, with the California Federation of Women's Clubs taking the lead on bells on the conventional, older roads not on the current State Highway system.

In 2000, Caltrans received a federal grant to restore the El Camino Real Mission bell marker system from Orange County to San Benito County. The bells were cast exactly like the original ones. A total of 555 bells were installed at one-to-two mile intervals along the historic route for the centennial celebration in August 2006.

The first bell in August 1906

Graphic - 8123



El Camino Real bell along US 101

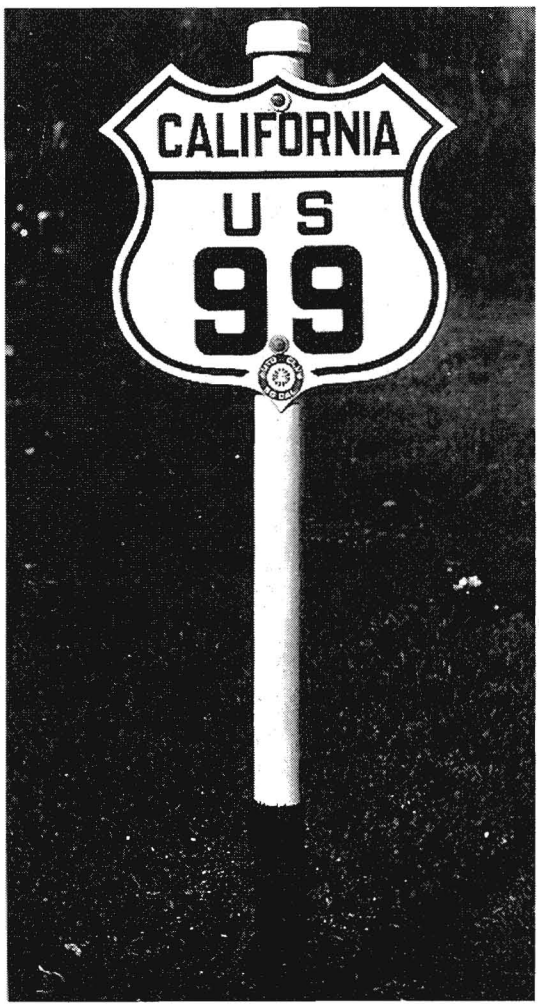
Graphic - 2041

The Roots of Our Routes

Without directional and route signs this mobile society could not exist. Today's main traveled highways and freeways are well-signed and known primarily by their route numbers. It is easy to travel across the country just by following them. However, this was not always the case. Highways have been variously identified by their historical significance, administrative numbers and several evolutions of rational numbering systems. Private citizens, automobile clubs and state highway departments have handled the sign posting functions through the years. Here is how it evolved.

Posting of route signs started as a one-time historical identification effort. Beginning in 1906, a private group began erecting distinctive mission bells on metal poles along El Camino Real. A few years later, the need to identify other routes arose as the automobile started to gain popularity. The State of California started to identify California routes after approval of initial bond funding for the birth of the State Highway System in November 1910. Although these initial state routes were given administrative identification numbers they were not posted for motorists. As a result, the Automobile Club of Southern California (ACSC) and the California State Automobile Association (CSAA) volunteered to sign these routes. Outside of California, motoring clubs headquartered on the East Coast did likewise.

Before there were highway route numbers, there were thematic names for roads.



Graphic 2043

The interstate guidance signs posted by the automobile clubs identified not only the distances and directions to cities, but also named the routes being traveled. Unlike the functional names of routes that we travel today the original cross-country routes had thematic and often romantic designations which reflected the sense of adventure that early motorists would experience. The names included Old Spanish Trail, Midland Trail, Pacific Highway, Lincoln Highway, California Banff Bee Line, New Santa Fe Trail, National Old Trails Road, and Pike's Peak O' to O' (Ocean to Ocean) Highway. The first posting of these thematic routes was the National Old Trails Road which was undertaken by ACSC in 1914. The others were completed between 1915 and 1922. Some of the signs are posted in the ACSC courtyard at 2601 S. Figueroa Street, Los Angeles.

By the mid 1920's the federal government realized that the signing of a developing national network of highways needed to be simplified and uniform. As beautiful as the thematic highways names were, the continued naming of new routes for an expanding system would be cumbersome. Accordingly, the federal government in cooperation with the American Association of State Highway Officials (AASHO) established US (United States) numbered routes which were formally adopted in 1926. Almost without exception, the thematic routes were incorporated into the US system. AASHO created a rational system of numbered routes where odd numbers represented generally north-south routes, and even numbers represented for east-west routes. Numbers increased from east to west and from north to south. Thus, US 1, is along the East Coast, while US 101 was designated along the West Coast. A distinctive black-on-white US shield was created. In California, the signs began to be posted by ACSC and CSAA in 1927 but in other areas of the country the state highway departments undertook the responsibility. In 1934, ACSC and CSAA began posting California State Highway signs shaped like a gold miner's shovel. They continued this function until 1947.

The Roots of Our Routes, *continued*

In 1927, there were only four US routes connecting Los Angeles with the rest of the nation. From the south, was US 101 from San Diego along Whittier Boulevard, Boyle Avenue, and 7th Street; from the north was US 99 along San Fernando Road; from the northwest was US 101 along 7th Street, Vermont Avenue, Sunset Boulevard, Cahuenga Boulevard and Ventura Boulevard; and from the east was US 66 and US 99 along Colorado Boulevard, Fair Oaks Avenue, Huntington Drive, Mission Road and Broadway. By the mid 1930's other US routes were added.

The Automobile Club of Southern California and the California State Automobile Association posted the first route number shields in 1927.

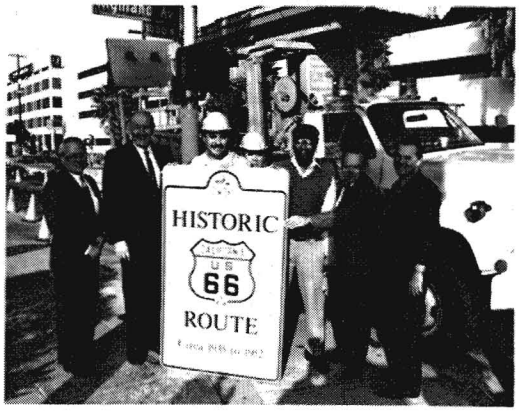
The US and California route numbering systems lasted for many years. However, in 1956 the Interstate Highway System of nationally significant freeways was conceived and a new route shield was developed. Many of the new Interstate routes were superimposed over former US routes, such as the Santa Ana Freeway, formerly US 101, becoming Interstate 5. In order to minimize the confusion of having three routes numbering systems, most of the routes in California were renumbered in 1964. By 1969, the Interstate and California numbered routes would replace most of the US numbered routes in California. Today, US 101, the Hollywood and Ventura Freeways, is the only survivor of the initial numbered highway system in Los Angeles.

Graphic—3025

The Main Street of America

America's Main Street was the backdrop of a major epic, lyricized in a hit song, romanticized in a weekly television series, rhythmicized in an instrumental, and included in the title of a major service station chain. The California Legislature designed it as the first special highway of its kind. The highway passes through the heart of Southern California.

The story of US 66, or as it is more affectionately know, "Route 66", is also the story of our early highway system. The original route, extending from Chicago to Los Angeles, was officially designated on November 11, 1926 but has disappeared from our maps as a victim of progress, relinquishment and route simplification. Before it was US 66, it was part of the National Old Trails Road. Its links of highway would later be relinquished and reorganized in favor of Interstate Freeways 15, 40 and 210, the Pasadena Freeway, a portion of the Hollywood Freeway and Santa Monica Boulevard. Only a relatively short reach of Foothill Boulevard near the Los Angeles County/San Bernardino County line retains the number with the designation, California 66. Although it has virtually disappeared from maps, its memory lives on with continued commemoration.



LADOT installs unique Route 66 Signs on Santa Monica Blvd.
Graphic - 7011

Route 66 was first acknowledged in the 1940 movie classic, "The Grapes of Wrath" starring Henry Fonda. It showed "Okies" during the Great Depression trying to escape the Dust Bowl devastation of their farmlands by heading west. As they made progress in reaching each new state the film showed the US 66 shield with the name of that state on top.

In the late 1940's, Nat "King" Cole recorded the Bobby Troup-penned song with the catchy lyric, "Get Your Kicks on Route 66". The song described traveling through each major city between Chicago and Los Angeles.

In the early 1960's there was a weekly television series called "Route 66". Staring George Maharis and Martin Milner (later of "Adam 12" fame), it used the highway as the background setting for a variety of adventures as they traveled from town to town. The theme music for the television series was a smash hit by Nelson Riddle. It was a highly-produced, fully orchestrated instrumental and one of the finest highway cruising tunes ever recorded.

At the terminus of Santa Monica Boulevard at Ocean Avenue the City of Santa Monica has a plaque which dedicated Route 66 as Will Rogers Highway. The naming reflected an affection not only for the 20th century humorist from Oklahoma, but also for a route which literally and figuratively transported a person of humble origins into the hearts of Americans.

A chain of service stations in the late 1960's hoped to capitalize on the mystique of Route 66 with their Phillips 66 stations. Their logo displayed the US route shield. Apparently, the management was unaware of route simplification enacted in 1964 which would result in a renumbering of routes throughout the United States. By the 1970's Phillips 66 disappeared faster than the route itself.

The Main Street of America, *continued*

There were several routes through Southern California reflecting the improvement in roadways. The original 1926 route followed Colorado Boulevard, Fair Oaks Avenue, Huntington Drive, Mission Road and North Broadway to 7th Street (US 101). Around 1935, the route was extended westerly along Sunset Boulevard, Manzanita Street, Santa Monica Boulevard, and Lincoln Boulevard to Olympic Boulevard (junction of US 101 Alternate). Between 1935 and 1939 the routing between Pasadena and Downtown Los Angeles had several interim changes during the construction of the extension of Figueroa Street and its tunnels (now the northbound lanes of the Pasadena Freeway). By 1941 the routing was along Colorado Boulevard, Arroyo Parkway, and the Arroyo Seco Parkway. Ten years later the new Hollywood Freeway replaced Sunset Boulevard as a link of the route.

The original terminus of US 66 was at the intersection of 7th Street and Broadway. Later, the terminus would be at the intersection of Lincoln Boulevard and Olympic Boulevard..

You may feel a sense of nostalgia in driving portions of the original route. Imagine the country before freeways at a time when reaching the West Coast was a manifest destiny. After traveling through Illinois, Missouri, Kansas, Oklahoma, the desert areas of Texas, New Mexico, Arizona and California and passing through the Cajon Pass you enter Southern California. As you drive along the Foothill communities you start to develop a sense of passing through a special gateway. Appreciate the landscaped median of Huntington Drive. Observe the architecturally preserved business districts of Pasadena, South Pasadena and Lincoln Heights. Look in awe at the beautiful arch bridge of Colorado Boulevard over the Arroyo Seco. Enjoy the scenic drive through Highland Park. Note the art deco style portals and stone-and-mortar walls of the northbound lanes of the Arroyo Seco Parkway through Elysian Hills and imagine it as a two-way Figueroa Street. Observe the magnificence of the towers in Downtown Los Angeles and continue further west. View the linear park and fountains in Beverly Hills and continue until you reach and end of old US 66 at the intersection of Lincoln Boulevard and Olympic Boulevard. As you arrive at this point at the foot of beautiful Santa Monica Bay you can't help but have a feeling that you've reached your ultimate destination. Undoubtedly, you realize you're not in Kansas anymore.

Huntington Drive, Figueroa Street, Broadway and the Arroyo Seco Parkway were part of Route 66 at various points in time.

Figueroa Street, A Preview of the Future

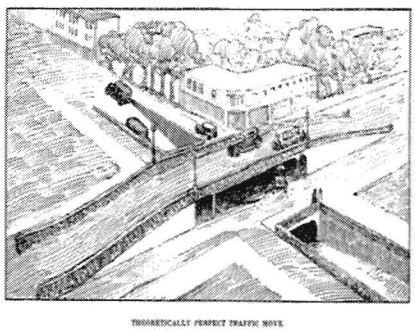
Although we may recognize it as just another arterial street, Figueroa Street was once the longest street in the City, the site of the first interchange and the beginning of the freeway system.

Construction of the Figueroa Street tunnels

Graphic - 4075

Prior to the dawn of the 20th Century, it was known as Grasshopper Street and marked the western edge of Downtown. Its northerly terminus was a residential street ending in the Elysian Hills and now known as Figueroa Terrace.

The 1924 milestone report, Major Traffic Street Plan, identified the need for a bypass roadway to relieve busy Broadway. Broadway was the only direct route into Downtown Los Angeles from the north and received national recognition in 1926 when it was identified as the final link of US 66. However, Broadway was severely overcrowded and its intersection at 7th Street was the busiest in the world. As a result of the severe congestion on Broadway, planning got underway to build a new road parallel to Broadway through the Elysian Hills and across the Los Angeles River. Due to the immensity of the project it proceeded in many stages.



An early (1925) concept of grade-separated roadways

Graphic - 3075

Tunnels

The first stage was to extend Riverside Drive to the south and extend it over the Los Angeles River, ending at San Fernando Road. This was completed in 1929. Then, three tunnels were mined through the Elysian Hills between Solano Avenue and the edge of Los Angeles River in 1931. From the end of the most northerly tunnel, the new roadway was extended to join the Riverside Drive bridge over the Los Angeles River. We know this extension today as the transition road from the northbound Arroyo Seco Parkway to the northbound Golden State Freeway. At this point, one could access Figueroa Street from Broadway and Solano Avenue, turn right travel through the three tunnels curve to the left then turn sharply right onto the Riverside Drive bridge over the Los Angeles River. In 1935, the fourth tunnel was built.

The original three Figueroa Street tunnels in 1931.
Graphic - 8055

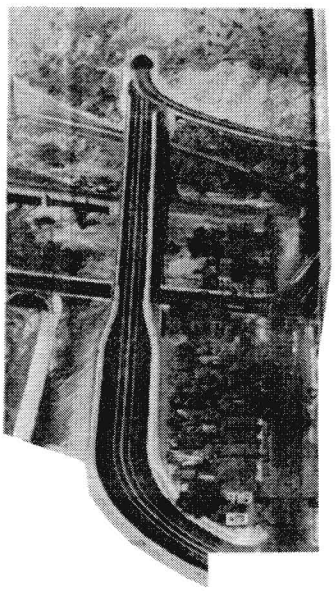
Directly Across the Los Angeles River

In recognition of its emerging importance, the new roadway was incorporated into the State Highway system. Dayton Avenue (northerly of San Fernando Road), Pasadena Avenue (northerly of Avenue 39) and Annandale Boulevard (northerly of York Boulevard) were renamed Figueroa Street. Northerly of Downtown, the consolidated and renamed segments of Figueroa Street would replace Broadway, Mission Road, Huntington Drive and Fair Oaks Avenue as the new official alignment of US 66. In 1937, Figueroa Street was extended from the most northerly tunnel, directly over the Los Angeles River connecting with renamed Figueroa Street opposite Avenue 22 in a sweeping 90-degree curve. State funds were used for this project.

Figueroa Street, A Preview of the Future, *continued*

Into the Civic Center

Finally, in 1939 the bypass roadway of Figueroa Street would reach Downtown Los Angeles. The roadway was extended southerly from Solano Avenue to a point north of Alpine Street to join the older extant segment of Figueroa Street. The extension included a grade separation at College Street. This last segment was funded in part, from the federal Public Works Administration Program. With completion of the extension to Downtown it became the longest street in the City, extending from B Street in the Wilmington community to Colorado Boulevard in the Eagle Rock community, 31 miles in all, with 24 miles within the City. The segment northerly of Sunset Boulevard became the new alignment of US 66, while the segment southerly of Sunset Boulevard would become part of US 6.



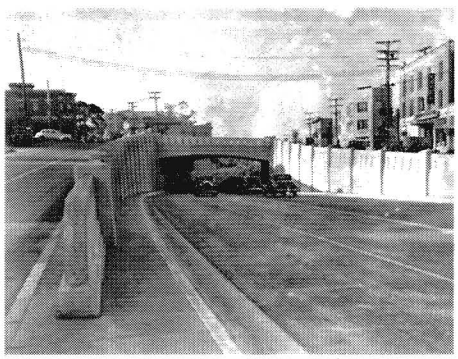
Completion of the Figueroa Street bridge over the Los Angeles River, 1937.

Graphic - 1020

As part of the extension into the Civic Center, a grade separation was constructed at Temple Street. It was noteworthy for being the first diamond interchange to be built in Southern California and perhaps in the Western United States. At the time it was constructed, it connected with the terminus of Flower Street. In the early 1960's, Flower Street was truncated northerly of 3rd Street due to Bunker Hill redevelopment and the construction of the headquarters for the Department of Water and Power.

The Figueroa Street bypass road is a fine example of function with artful design. A close examination of the College Street and Temple Street bridges shows simple but attractive designs with distinctive relief features. The walls of the Temple Street grade separation and the rounded lines of the Los Angeles River bridge abutments hint of the Streamline Moderne era. In contrast, the portals of the four tunnels proudly show the City seal in art deco scalloping and remind us of the Jazz Age and the City's aspirations.

From conception to completion, the Figueroa Street bypass road was a 15-year effort. But while the tunnels, grade separations and diamond interchange seemed like the conclusion to the City's greatest public works project to date, they merely anticipated the beginning of a new system of roadways. From Figueroa Street evolved Arroyo Seco Parkway, the Cahuenga Boulevard Parkway and the freeway system. Much of the original alignment of the expressway portion of Figueroa Street, from College Street to Avenue 22, remains intact today.



Construction of the Figueroa Street grade separation and diamond interchange at Temple Street.
Graphic - 8046

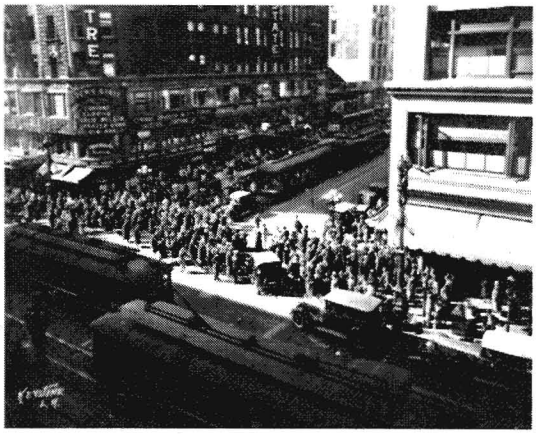
Construction of the Figueroa Street bridge over the Los Angeles River.

Graphic - 8040

7th Street and Broadway

The intersection of 7th Street and Broadway in Downtown Los Angeles was the crossroads of the Western United States in the 1920's. Broadway was the only direct route into Downtown Los Angeles from the north and northeast, while 7th Street was the only direct east-west route. It was the primary entertainment center with twelve theaters between 3rd Street and Olympic Boulevard to see vaudeville shows and the silent silver screen. It was also the primary retail district and home of the major department stores for Southern California.

In 1924 it was documented to be the most heavily-traveled intersection in the world with 504,000 persons crossing the intersection in 24 hours. This included 200,000 persons in streetcars, 35,000 persons in automobiles, and 269,000 pedestrians. This volume exceeded those in London (Hyde Park Corner – 478,000), New York (5th Avenue and 42nd Street) and Paris (Place de l'Opera – 384,000). In 1930, this volume would reach an astonishing 750,000 persons passing through daily. In 1926, Broadway (ending at 7th Street) was designated as the most westerly segment of the original routing of US 66, while 7th Street was designated as part of the original segment of US 101.



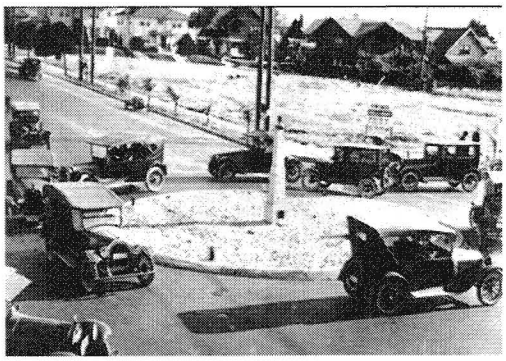
The busiest intersection in the world in 1924

Graphic - 3057

By the end of the 1920's, the City's population would reach 1.2 million, a 12-fold increase in 30 years. The rapid rise in City population, the sharp increase in automobile usage and the challenging traffic situation at 7th street and Broadway called for innovative solutions. In October 1920, the first experimental automated traffic signals were installed on Broadway. Also, in January 1925, the nation's first ordinance regulating pedestrians became effective in Los Angeles. In addition, by 1926 the nation's first network signal timing strategies were developed in Downtown Los Angeles. The innovative strategies in response to this traffic situation marked Los Angeles as being at the national forefront in traffic engineering, control and management.

5th Avenue of the West

It began as an exclusive, residential area named after its developer. It became the classiest street in Los Angeles, was called the 5th Avenue of the West and was proclaimed to be the state's most famous boulevard. It has been reinvented in terms in land uses served and transportation modes accommodated. It is Wilshire Boulevard.



Wilshire Boulevard and Western Avenue traffic circle, 1922
Graphic - 4075

Henry Gaylord Wilshire was a colorful man of many pursuits. He was an avid socialist and founded a radical paper, the Weekly Nationalist. He married money, inherited money and lost money. His last ill-fated venture before his death in 1920 was the sale of an electric health belt called the "I-on-a-co". Although he had his ups and downs, he was right on target with his development assessments. He stated, "I have no doubt that...Southern California will be the most thickly settled part of the American continent."

In 1895, the flamboyant Wilshire followed up on that vision when he developed a secluded residential tract west of the swamp-turned-lake in what is now MacArthur (formerly West Lake) Park. Through the tract, bounded by 6th Street, 7th Street, Park View Street and Benton Way, he cut a gravel boulevard with a 120 foot right-of-way through the middle. He named it after himself.

Wilshire Boulevard at Western Avenue, 1929
Graphic - 3075

Estate homes and residential hotels of comparable beaux arts design continued to be built by others through the first two decades of the 20th Century, several blocks to the west. During the early 1920's this secluded area, that lacked street car access, continued to be a prime location for upscale apartments houses and residential hotels, including the Ambassador Hotel. Thus, it was logical that it should be zoned for residential purposes only. In 1924 it became the first street in the nation to use neon-lighted signs to identify the names of the apartment houses.

The opening of the West Lake Park final link of Wilshire Boulevard in 1934.

Wilshire Boulevard would enter a new phase. After World War I when automobile use rose dramatically, the area became far less secluded. Business interests then saw a new vision for Wilshire Boulevard, based on the redevelopment of 5th Avenue in New York and the recent development of North Michigan Avenue in Chicago. They lobbied successfully to have Wilshire Boulevard rezoned for commercial development. In April 1926 the reach between Park View Street and Western Avenue was rezoned and widened shortly thereafter. Soon, the Town House Hotel at Commonwealth Avenue, Bullocks-Wilshire at Westmoreland Avenue, the Brown Derby restaurant at Alexandria Avenue, the Pellissier (Wiltern Theater) building at Western Avenue, and numerous other architecturally distinctive buildings would join the posh apartments and churches built just a few years earlier. The lively mix of distinctive buildings and activities led to it being called the "5th Avenue of the West."

5th Avenue of the West, *continued*

Further west, the famed Beverly Hills shopping district started to develop after the opening of the Beverly Wilshire Hotel in 1925. Further west still, A. W. Ross converted bean fields between La Brea Avenue and Fairfax Avenue into the "Miracle Mile", with Zigzag and Streamline Moderne buildings. Finally, the Janss Investment Company laid out an attractive low-scale retail village in 1929, between the boulevard and the new Southern branch of the University of California, and named it Westwood.

Congestion on Wilshire Boulevard near Hoover Street, circa 1940
Graphic - 4087

In 1934 the "manifest destiny" for Wilshire Boulevard would be reached when construction through West Lake Park was completed. The completion of the missing link divided the lake but connected both sides of the park by a tunnel. At the dedication, Mayor Frank Shaw declared Wilshire Boulevard "...California's most famous thoroughfare." Upon completion, Wilshire Boulevard connected the central business districts of Los Angeles, Beverly Hills and Santa Monica, extending 16 miles from Grand Avenue on the east to a park overlooking the Pacific Ocean on the west.

The Brown Derby restaurant on Wilshire Boulevard at Alexandria Avenue
Graphic - 5026

As a result of the commercial and retail development, Wilshire Boulevard evolved again. While popular as an upscale retail street, Wilshire Boulevard became the first automobile-oriented street in Southern California. This was evident by the lack of trolley lines and reinforced by the 1929 Bullocks-Wilshire department store, the first to have a parking lot and grand valet entrance at the rear of the building. Its status was confirmed by a 1928 count which plotted the traffic volumes along Wilshire Boulevard. At the intersection of Wilshire Boulevard and Western Avenue over 74,000 vehicles per day would pass through, making it the "heaviest automobile intersection in the world". It would hold this title for 20 years.

The 1929 Bullock's Wilshire department store at Westmoreland Avenue
Graphic - 5031

So rapid was the increase in traffic and so great the magnitude that Wilshire Boulevard became a laboratory for pioneering traffic control innovations. At Western Avenue a traffic circle was installed in 1922, to be replaced by an "American Bobby" traffic signal in 1924, to again be replaced by an Acme semaphore traffic signal in 1926. In July 1930, Wilshire Boulevard became the first street in Los Angeles to be striped with a painted centerline and approach lane lines. In 1931, it became the first street to use tri-light signal heads and the first street outside of Downtown to have interconnected traffic signals. In 1937, off-center operation to provide an extra lane in peak directions was implemented. (Although it was successful from a traffic flow perspective, the City Council banned the operation in 1940 after business district protests.)

5th Avenue of the West, *continued*

Traffic relief would finally come in 1948, when the widening and opening of nearby Olympic Boulevard was completed. Within the next decade, other streets parallel to Wilshire Boulevard, such as Beverly Boulevard, 3rd Street, 6th Street and Pico Boulevard also would lose the "cumbersome" operation resulting from at-grade trolley operations and serve as through traffic boulevards to further relieve Wilshire Boulevard.

Wilshire Boulevard's fashionable Miracle Mile

Graphic - 4003

Wilshire Boulevard would see a new phase after its evolution from residential street to retail street to automobile street. The grand boulevard that became exclusive due to the lack of trolleys has, ironically, become Southern California's premier transit street. Today, it is served by local buses of the Metropolitan Transportation Authority and Santa Monica Municipal Bus lines. In addition, the Metro Red Line subway and the future Purple Line subway are aligned below Wilshire Boulevard. Finally, it accommodates the transit hybrid, the Metro Rapid bus. It carries more transit patrons than any other street in Southern California.

Although its glamour has been tarnished somewhat, Wilshire Boulevard still remains the state's most famous thoroughfare. The Bullocks-Wilshire, May Company and Pellessier buildings have been adaptively re-used and are nationally-recognized art deco landmarks. The churches still have active congregations. Hancock Park remains the classiest residential neighborhood of old Los Angeles. The Miracle Mile has been rediscovered as an active traditional retail district and has become a museum center which features the prehistoric La Brea Tar Pits. The Beverly Hills shopping district is the most exclusive one in the nation. Movie premiers are held in Westwood Village. Finally, the neon signs have been re-lighted atop the apartment buildings in Henry Gaylord Wilshire's original tract. Perhaps the analogy should be reversed to state that 5th Avenue is the Wilshire Boulevard of the East.

Wilshire Boulevard at Westwood Village

Graphic - 3133

The Street That's A '10'

Most would not recognize 10th Street as one of the most reliable streets between Downtown and the West Side. But it is indeed.

In the 1924 Major Traffic Street Plan, 10th Street was predicted to be " . . . one of the greatest central thoroughfares of Los Angeles . . . " It was a visionary statement for a street that was continuous only through Downtown Los Angeles and only a 40 feet wide residential street westerly thereof. But during the 1920's a 100-foot right-of-way was designated for the street, a jog elimination project was planned at Figueroa Street and alignment studies were conducted.

Reversible lane on Olympic Boulevard

Graphic - 4003

Progress on developing the 10th Street arterial was stalled due to City funding constraints of the Great Depression. However, State legislation made funds available to develop designated State highways in urban areas and 10th Street was designated as future California 26. State highway status provided funds that otherwise would not have been available.

The name, 10th Street, did not suggest the class of Wilshire Boulevard, the imagery of Sunset Boulevard, nor the historical context of La Brea Avenue. City fathers brilliantly identified a new name for the street, befitting the City's pride and international prominence, as reaffirmed by its recent hosting of the 1932 Olympic Games. Because that event was the 10th Olympiad of the modern era, 10th Street was renamed Olympic Boulevard.

By 1938, major improvements were completed. The jog at Figueroa Street was eliminated. Near Alvarado Street, Hoover Street and Arlington Avenue, Olympic Boulevard was realigned away from 10th Street to provide continuity. Westerly of Lucerne Boulevard, Country Club Drive was renamed Olympic Boulevard, widened throughout and extended through the 20th Century Fox movie studio property. Further improvements were disrupted by World War 2. But shortly after the War ended, the final links of Olympic Boulevard were constructed in 1948. These links were between Crenshaw Boulevard and Lucerne Boulevard and between Centinela Avenue and Lincoln Boulevard. The latter project was built as a landscaped divided parkway with no driveways through the City of Santa Monica.

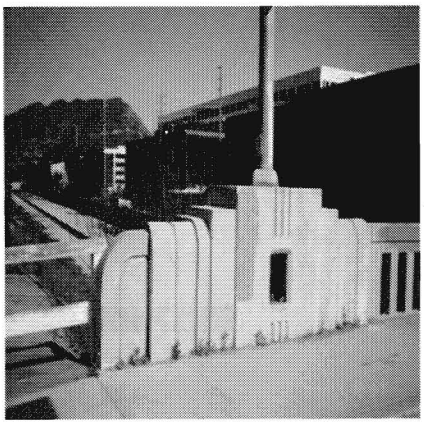
Olympic Boulevard quickly became the east-west route of choice for commuters. There was so much demand that in 1949 off-center lane operation was initiated by the City between Figueroa Street and Robertson Boulevard. This involved coning four lanes in one direction (eastbound in the morning and westbound in the afternoon) with two lanes in the opposite direction. This practice lasted until 1966, shortly after the Santa Monica Freeway, Interstate 10, was opened. Olympic Boulevard was then relinquished by the State.

Although it does have points of congestion, Olympic Boulevard often is chosen over the Santa Monica Freeway for travel time reliability. We often are asked why it flows so much better than other east-west streets, such as Wilshire Boulevard. The reason is that so much of the route was built in residential areas and reaches with few driveways. As a result, there are fewer traffic signals and minimal "friction" resulting from driveway access and parking maneuvers.

The next time you drive Olympic Boulevard think of the number, "10," the reliable alternate route to the Interstate 10 Freeway, the 10th Olympiad and 10th Street.

The City's River Bridges

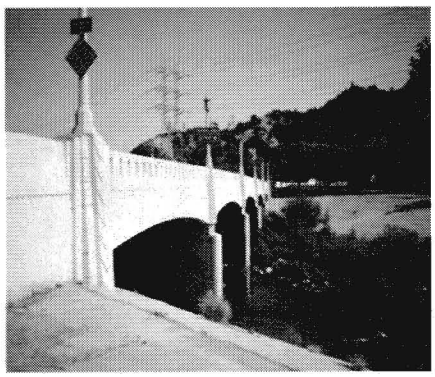
Bridges are sections of roadways that span over canyons, rivers, railroads and other streets. Most of us travel along or under a bridge en route to work and tend to notice just the pavement as we drive by. However, if we look at the bridge structure above us or from afar, we come to recognize that bridges are the most elegant sections of the City's roadways. This becomes apparent when we examine the bridges that span the City's two primary rivers - - Arroyo Seco and the Los Angeles River.



Lankershim Boulevard bridge over the Los Angeles River

Graphic - 4031

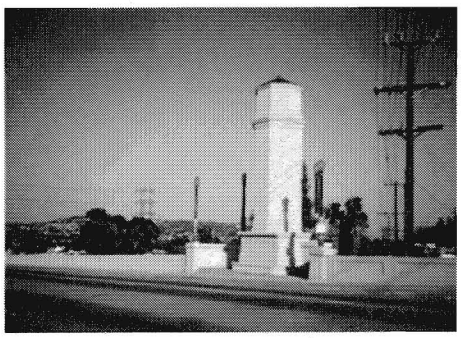
Construction of the bridges over the Arroyo Seco and Los Angeles River was perhaps the greatest public works project ever undertaken by the City. In the two-year period, 1910-1911, three bridges were constructed to accommodate the first automobiles. They were York Boulevard over the Arroyo Seco and Buena Vista Street and North Main Street over the Los Angeles River. However, they would soon no longer be adequate for the tremendous growth that would occur in Southern California. As a result, in the short seven-year time frame from 1925 to 1932, an amazing 15 concrete bridges were built to replace timber and less-substantial bridges. Two of these were constructed to span the Arroyo Seco (Avenue 26 and Avenue 60) and 13 were constructed to span the Los Angeles River - - Riverside Drive (near Victory Boulevard), Los Feliz Boulevard, Hyperion Avenue, Fletcher Drive, Riverside Drive (near Figueroa Street), North Spring Street, Macy Street, 1st Street, 4th Street, 6th Street, 7th Street, 9th Street and Washington Boulevard. All of them were designed and constructed under the supervision of Merrill Butler.



Riverside Drive bridge over the Los Angeles River near Griffith Park

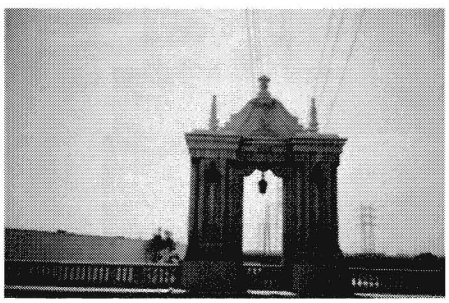
Graphic - 4039

Near the Downtown area the bridges were strategically sequenced for construction starting at the southern and northern extremes and finishing near the middle. First, 9th Street was constructed in 1925, followed by Macy Street, 7th Street, 1st Street, 4th Street and finally 6th Street which was constructed in 1932. The Washington Boulevard bridge, those near the Elysian Hills and Griffith Park and those over the Arroyo Seco also were built during the same period, but in no special sequence.



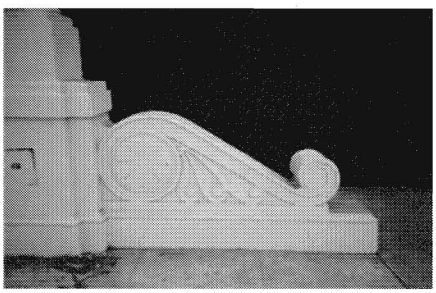
Hyperion Street bridge over the Los Angeles River

Graphic - 4027



Macy Street bridge over the Los Angeles River

Graphic - 4014

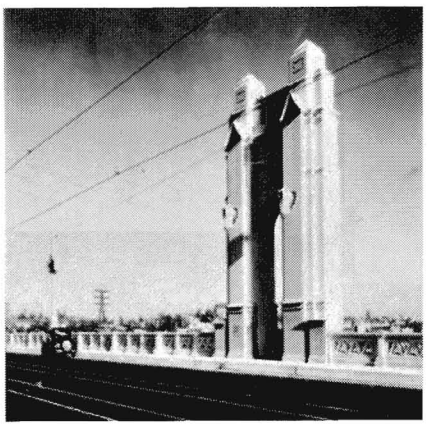


1st Street bridge over the Los Angeles River

Graphic - 4024

The City's River Bridges, *continued*

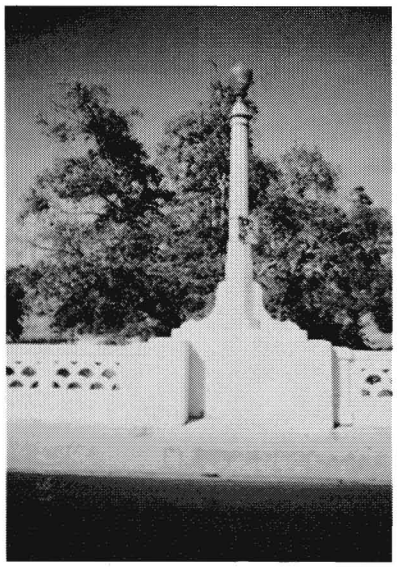
All of these bridges were of a concrete arch design. And like those in Washington, D.C., Chicago, Milwaukee and other river cities, they are among the most beautiful in the United States.



4th Street bridge over the Los Angeles River

Graphic - 4032

While many of them have traditional Beaux Arts features, each has its own distinctive design, in terms of balustrade, towers, integrated ornamental lighting and other features. The towers add a presence of grandeur. Those for the 4th Street bridge are Gothic in design, while those for the 6th Street bridge are Art Deco. The Hyperion Avenue towers have a Spanish Revival design. The Avenue 60 bridge has a whimsical fan pattern along its balustrade. The Washington Boulevard bridge shows a "men-at-work" painting, a common theme during the Great Depression, which suggests that modern industry will lead to a more promising future. The Macy Street bridge pays tribute to Junipero Serra and integrates the City seal in its towers.



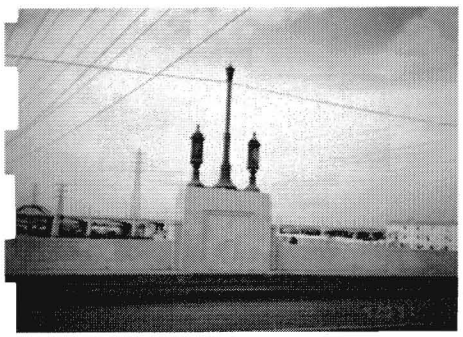
Avenue 60 bridge over the Los Angeles River

Graphic - 4074

There are many other smaller bridges throughout the City that look nearly as attractive as the ones mentioned here. But none exemplify the vision, aspiration, pride and beauty of an emerging major city more than the bridges spanning the Arroyo Seco and the Los Angeles River.

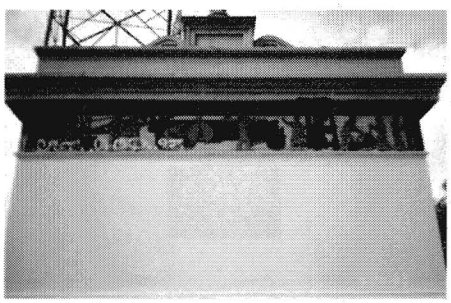
5th Street bridge over the Los Angeles River

Graphic - 4022



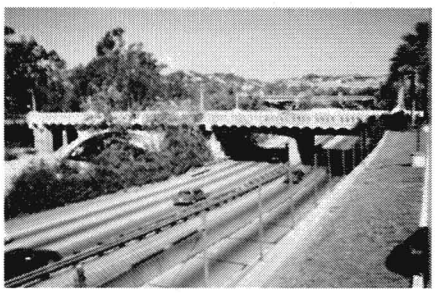
7th Street bridge over the Los Angeles River

Graphic - 4023



Washington Boulevard bridge over the Los Angeles River

Graphic - 4028



Avenue 26 bridge over the Arroyo Seco

Graphic - 4076

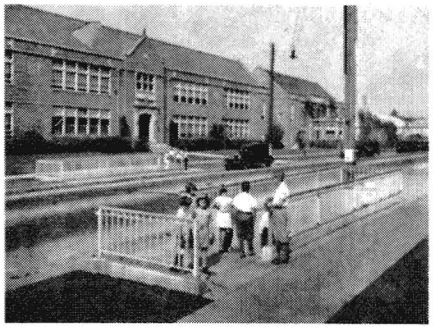
Pedestrian Tunnels

As Our civic leaders first addressed the problem of conflicts between pedestrians and vehicles by committing to a major infrastructure program of pedestrian tunnels. These tunnels were called subways and were built below major thoroughfares near schools. A few other cities built tunnels, as well.

The benefits of pedestrian subways became apparent soon after the initial installations. The first pedestrian subways, a pair, were constructed in 1918 in front of a large public school, and passed below an interurban (Red Car) railway and heavily traveled street. It became evident that the subways reduced the hazard to school children, relieved parental anxiety, and eliminated annoyance to motorists. A few years later in 1924, several small children were seriously injured in attempting to cross Sunset Boulevard at Micheltorena Avenue in front of an elementary school in the Echo Park community of Los Angeles. In response to this tragedy, the City Council financed the construction of a pedestrian subway at this location. Officials soon realized that this subway not only successfully accomplished its objective, but also saved the salary of a police officer who had been stationed at the school.

Crescent Heights Boulevard pedestrian tunnel under Olympic Boulevard
Graphic - 2054

The idea of the school pedestrian subway quickly became very popular and in the 1925 Spring elections Los Angeles voters approved a $350,000 bond issue to build school pedestrian subways. A total of 40 subways were financed from this bond. An additional 17 subways were constructed by assessment districts as part of arterial paving and widening projects. Sixteen were financed by the Board of Education, three by the federal government, one by the County of Los Angeles, and 15 by a combination of City, Board and federal sources. The California Division of Highways (now Caltrans) built the remainder as part of the construction of the Hollywood and Harbor Freeways. Over a 35-year period approximately 115 pedestrian subways were constructed, 87 of which were for safe school access.



Van Ness Avenue near Maplewood Avenue
Graphic - 8092

The design of the subways soon became well standardized after experience was gained with the initial installations. All were characterized with ornamental iron railings and the small blue-on-white porcelain enamel sign, "Pedestrians Use Subway". The interior width was six feet and the height seven feet. For drainage purposes, floors had a 1½ inch crown at the center to that water would run along the sides and collect via a sump pump recessed in the side wall. The sumps were then connected to a storm drain. For graffiti prevention purposes, the interior walls had a lumpy "spatter dash" mortar finish. Lights were recessed with a heavy wire mesh cover.

Although subways were far more expensive to build than overcrossings they were, nonetheless, the preferred facility. Only three overcrossings were built as contrasted with 115 subways. There were two primary reasons for this. First, the subways were less of a vertical obstacle then overcrossings – 9 feet versus 15 feet. The second reason is that the ascending stairways of overcrossings were perceived as unsightly fixed objects, and objectionable to nearby property owners.

In time, the subways fell out of fashion. The proliferation of traffic signals near schools provided a less expensive, albeit somewhat less effective, response to school safety needs. But more importantly, the subways, which were intended to enhance the safety of school children, were becoming recognized as being detrimental to their welfare. The subways became more frequently misused by the lower elements of society who would render them dangerous and unsanitary. As a result, many of the subways were closed part time or on an all-day basis by the removal of the ornamental iron railings, and the installation of cyclone fencing and locked gates atop the stairway walls.

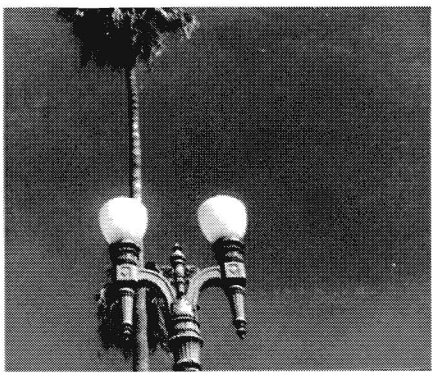
Los Angeles was unique in its commitment to infrastructure for school pedestrian grade separation. So, when you see these vintage structures near elementary schools in the older areas of the City, be reminded of a more genteel society, and the first major civic commitment to school pedestrian safety.

Enlightened Street Lighting

Today, we refer to them as "electroliers" - clean looking, tapered, galvanized steel poles with a six-foot arm holding a lamp hanging over the roadway. The flat, flared shape of the lamp is descriptively referred to as a "cobra head". Although they are not prominent street features, they provide good street lighting for today's road users.

Rampart Boulevard

Graphic - 2015

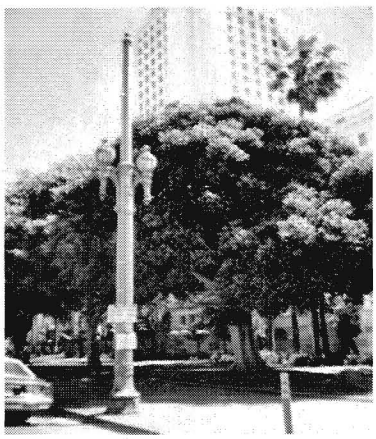


Flower Street

Graphic - 2020

Today's electroliers are the "Plain-Jane", but functionally superior, successors to a system once known as "ornamental street lighting". Unlike modern electroliers, historic ornamental street lighting has four primary features – a large base, a specially shaped shaft, a capital which crowns the shaft, and a stylized glass lamp known as a luminaire. The base, shaft, and capital are assembled along a plain conduit pipe, while the numerous ornate components of the capital are fitted together with threaded rods. The bases often are bell-shaped, with indented or raised filigree designs. The base tapers to meet the shaft which often is fluted copper sheeting. The most prominent feature, however, is the capital which often resembles a pair of Olympic torches. Finally, there is the luminaire - white glass shaped like a globe, an acorn, or an octagon and sometimes enclosed with special ribbing. Given the available varieties of bases, capitals and luminaires, there were numerous combinations that graced the streets of Los Angeles. Many still exist and you can enjoy discovering them throughout the City.

Ornamental street lighting grew out of the City Beautiful movement that embraced the notion that beautiful buildings and public works projects contributed to a more genteel society. Classical street lighting design started to appear along Broadway and Main Street in Downtown circa 1905 after electric power became a reliable utility. At that time they tended to resemble 11-foot high Greek-style columns with single globe-shaped luminaires mid block, although there were five globes at intersections. For an example of these early street lights, visit 7th Street near Flower Street or the Olvera Street Plaza.



Spring Street / City Hall

Graphic - 4070

Union Metal 1906 / Downtown

Graphic - 4053

Verdugo Road

Graphic - 4073

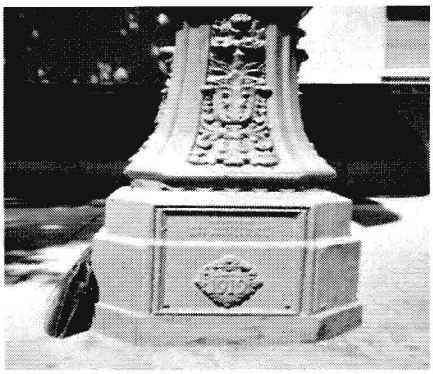
Enlightened Street Lighting, *continued*

After World War I, the heights reached 20 feet and began to use two luminaires. The first of this generation was on Broadway in Downtown in 1919. Close cousins of the Broadway lights still exist today on 6th Street near Olive Street.

1919 Broadway

Graphic - 4050

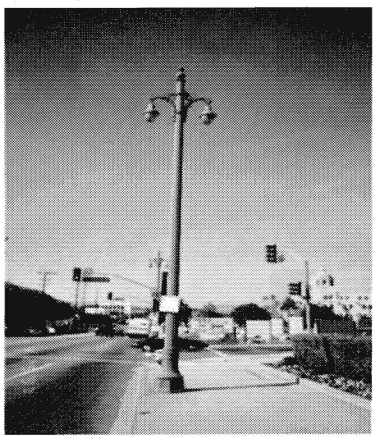
By the end of the 1920's, numerous designs became available. Lighting systems were programmed for the City's thoroughfares and each street would have its own distinctive design. A Bureau of Street Lighting was created to develop these projects. Pico Boulevard still has examples of the capital with arms shaped like a reverse curve with an offset in the middle holding acorn-shaped luminaires. Sections of Sunset Boulevard and the Hollywood business district still have the tapered octagonal lamps with spikes at each end. But the most distinctive of all the designs is the "Wilshire Lady", a cast-bronze luminaire, with an elongated semi-nude "flapper" on each of the four edges - - pure Roaring '20s! They once lined Wilshire Boulevard between Figueroa Street and Fairfax Avenue, and still exist today easterly of MacArthur Park.



Broadway

Graphic - 4035

By the late 1930's ornamental street lights grew to 25 feet and higher and began to feature the lamp over the roadway, instead of toward the sky. The first of this generation was the Olympic Boulevard Special in 1938. It features a bowl-of-fruit finial and a dragon-shaped bracket supporting the arm. Many examples still remain today on Olympic Boulevard. The overhead lamps provided illumination over the roadway and sidewalk that was superior to that provided by the torch lamps. However, the egg-shaped overhead lamps became standard and no longer were distinctive nor decorative. Further, this evolution changed the capital from an elaborate design to a simple arm. As a result, the next generation of street lighting featured only decorative bases and shafts, and on occasion, fancy brackets.



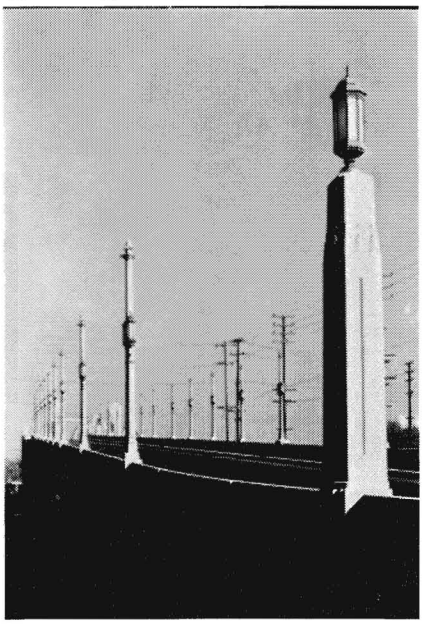
Alameda Street / Union Station

Graphic - 4002

But after World War 2, street lighting became less decorative and known simply as electroliers by the 1960's. During the second half of the 20th Century, the City proceeded to upgrade its street lighting system by removing many ornamental lights and installing modern ones. However, there was a backlash as citizens started to demand style along with illumination. As a result, ornamental street lights no longer are being replaced by cobra-head electroliers. Instead, new styles are being installed. In some situations, hybrid-systems are being installed using a combination of 40-foot tall, modern overhead lights interspersed with ornamental lighting. The first such project to do so was along Spring Street in 1992. In 2000, low-level, decorative pedestrian lighting was introduced and installed on Vermont Avenue, as part of transit-related streetscape project. In other situations, semi-ornamental lighting that reflects the style of the late 1930's is replacing cobra-head electroliers. Chinatown embraced this design in 2004.

Enlightened Street Lighting, *continued*

Nowadays, a variety of retro designs are available again and a combination of the Spring Street, Vermont Avenue and Chinatown examples have become the model for the 21st Century. Today, we now can have good lighting --- and do it in style.

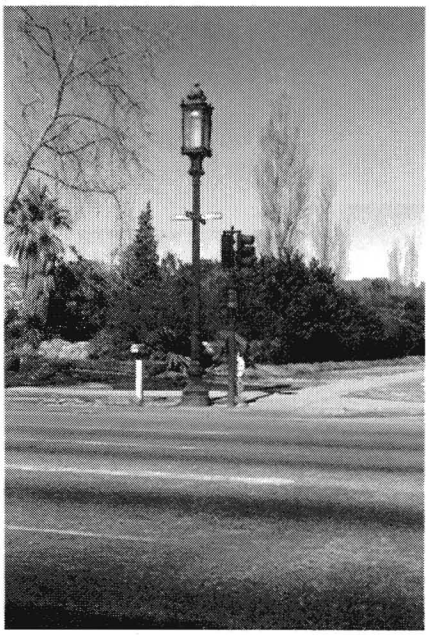


6th Street bridge over the Los Angeles River

Graphic - 4005

6th Street

Graphic - 4037

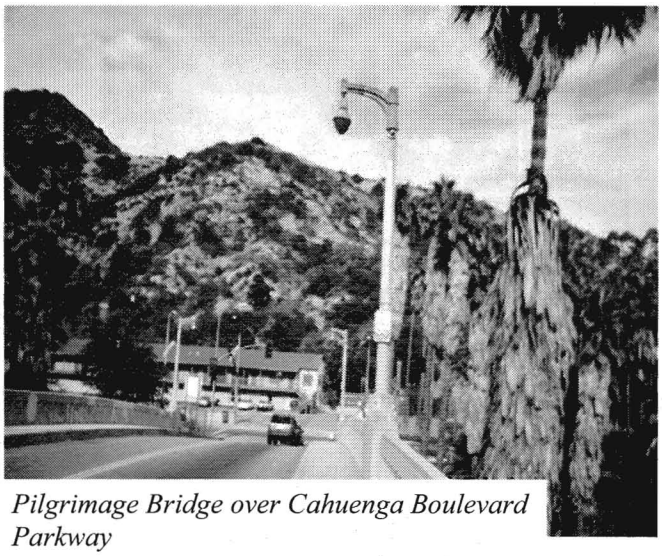


Wilshire Boulevard "Lady"

Graphic - 3086

Broadway

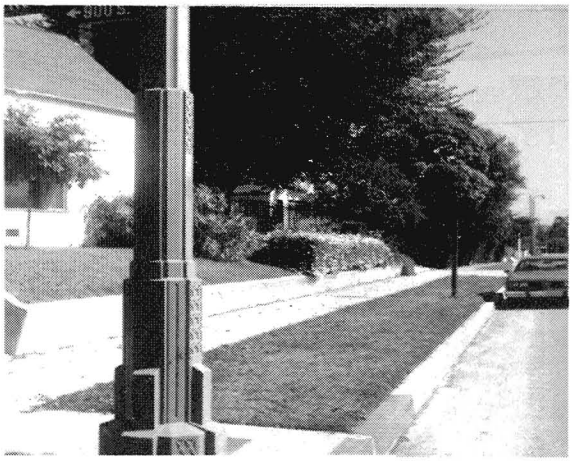
Graphic - 4035



Pilgrimage Bridge over Cahuenga Boulevard Parkway

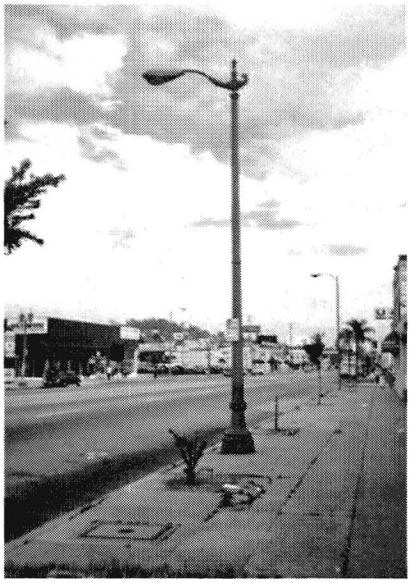
Graphic - 4051

Enlightened Street Lighting, *continued*



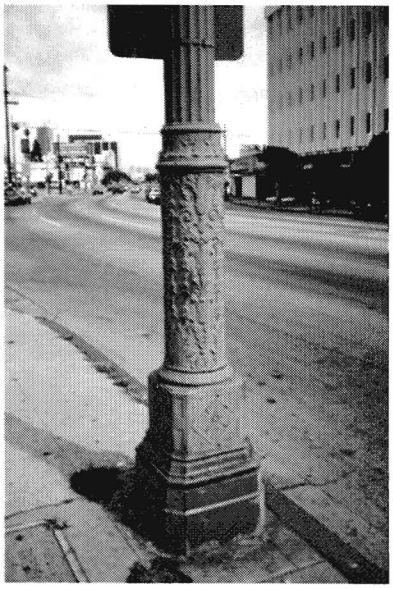
Olympic Boulevard / Country Club Drive

Graphic - 2025



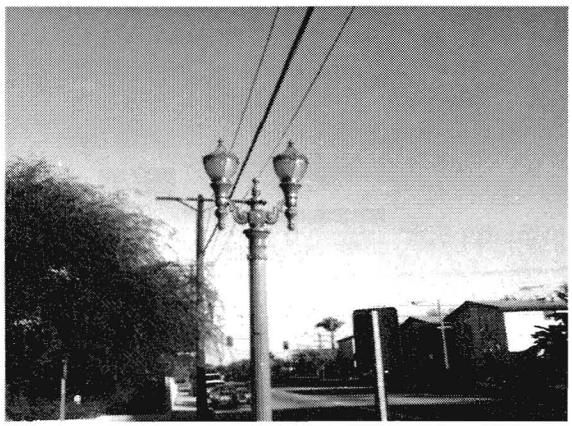
1938 Sunset Boulevard

Graphic - 4001



Olympic Boulevard

Graphic - 4042



8th Street

Graphic - 2018

Washington Boulevard

Graphic - 2021

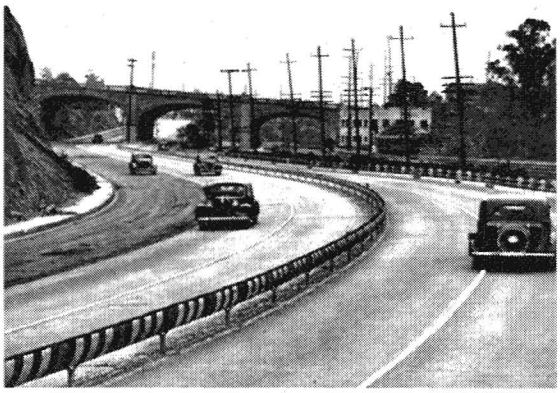
Beverly Glen Boulevard

Graphic - 2020

Ramona Boulevard, The Airline Route

Before the age of parkways and before the term, freeway, was coined, there was the "airline." The airline was one of the transitional roadways that would evolve into freeways.

Shortly after the U.S. Highway system was adopted in 1926, the State began to develop an east-west route between Redlands and Downtown Los Angeles. This route, US 99, would become the east gateway into the City. In nearby Monterey Park, Garvey Avenue was designated as part of the link of US 99. However, westerly of Atlantic Boulevard, the roadway ended. The six-mile gap would be filled by a new roadway that would connect Garvey Avenue near Atlantic Boulevard with Aliso Street at Mission Road. It was named Ramona Boulevard.

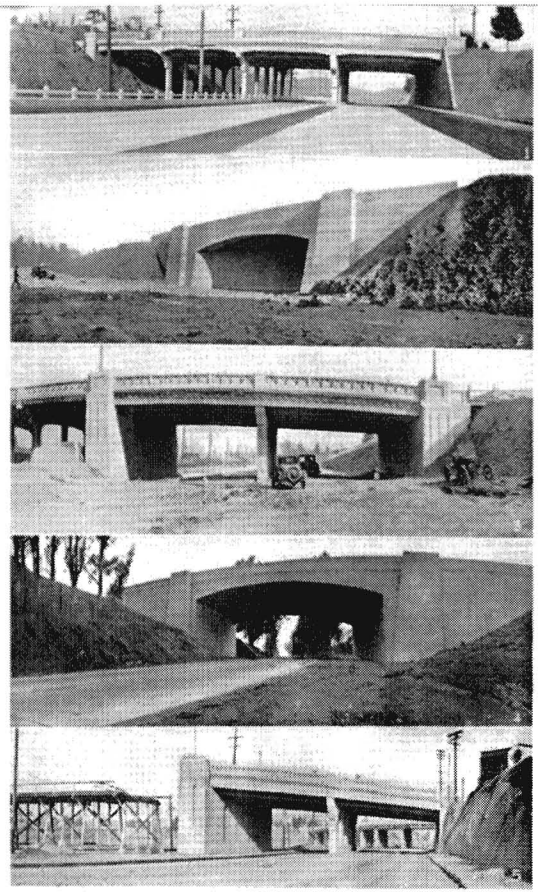


Ramona Parkway at the Macy Street Overcrossing, showing the special guard rail Graphic - 8090

Ramona Boulevard was along terrain that was suitable for grade separations, with the Pacific Electric Railroad tracks to the north and a hillside to the south. In order to accommodate the new highway, six bridges that already spanned the tracks were extended or reconstructed and two new grade separations were constructed near Monterey Pass Road. Near the west end of the project, the Macy Street (now Cesar E. Chavez Avenue) bridge, which had been built in 1910, provided another grade separation over the tracks and could accommodate a roadway without reconstruction. Thus, there were nine bridges in all with no at-grade crossings and virtually no local property access. It was opened to traffic on April 20, 1935 and was called an "airline" route by the State because motorists could "fly" without intersectional conflict at 50 miles per hour. It was the first such roadway to feature so many grade separations.

Ramona Boulevard, The Airline Route, *continued*

However, it could not lay claim as the first freeway in the West, because it lacked a key feature that would prove to be so valuable to freeway and expressway design.



GRADE CROSSINGS ARE ELIMINATED on the new Ramona Boulevard by seven bridges, five of which are shown above. No. 1—Eastern Avenue, a reinforced, concrete girder structure which the State extended with a 39-foot, 6-inch span providing a 60-foot roadway and 2-foot 9-inch sidewalks. No. 2—Coyote Pass grade separation, a 140-foot concrete girder structure providing a 60-foot roadway and 2-foot, 4-inch sidewalks. No. 3—State Street, a concrete girder structure extended by the State with two 64-foot spans providing a 40-foot roadway and two, 2-foot, 5-inch sidewalks. 4—Monterey Pass, an 87-foot concrete girder span providing a 60-foot roadway and two 4-foot sidewalks. This structure permits Monterey Pass traffic to pass under Ramona Boulevard. No. 5—Marengo Street, a 112-foot reinforced concrete girder extension of the existing bridge. Provision is made in the next biennial budget for extending the concrete construction to replace the old section of bridge.

The missing ingredient was roadway separation. During its first 40 months of operation Ramona Boulevard experienced 77 injuries including deaths, most of which were head-on, sideswipe and abutment collisions. In response to this serious collision pattern, City Traffic Engineer, Ralph Dorsey, was able to obtain State approval of a narrow guard rail design with lights atop it to be installed in the middle of the pavement. It was successful as an interim measure and from that point forward, all high-speed designs on State Highways would incorporate a raised median and/or barrier.

In 1944, Aliso Street, the westerly extension of Ramona Boulevard was widened and reconstructed. This project, which was undertaken by the City, included a grade separation at Mission Road. In coordination with this project, the State widened Ramona Boulevard easterly to the East City Limit and constructed a four-foot wide median. Upon the completion of these projects, Ramona Boulevard was renamed Ramona Parkway. In 1954, shortly after Ramona Parkway was extended easterly of the City, it was renamed the San Bernardino Freeway. In 1970, most of the 1935 and 1944 improvements were demolished to make way for the San Bernardino Freeway and Express Busway, which featured the region's first exclusive bus and carpool facility.

Perceptive motorists can spot remnants of the earlier Ramona Boulevard and Parkway. At the Downtown end, the reach between Vignes Street and a point easterly of the Macy Street bridge is essentially intact, but minus the Pacific Electric Railroad tracks. Midway, most of the original State Street decorative bridge remains. Finally, at the easterly end, the grade separation structures near today's Monterey Pass Road and Fremont Avenue have not been altered. These remnants are all that remain of the original Ramona Boulevard, the airline route, and the predecessor to today's freeways.

The Freeways Built by the City

The 1924 milestone report, Major Traffic Street Plan, identified the need for parkways, which would later become known as freeways. The first parkways were built by the City, with all subsequent freeways built by the State. The freeways built by the City included a segment of the Arroyo Seco Parkway (Figueroa Street Bypass) and the Cahuenga Boulevard Parkway.

The Figueroa Street Bypass was proposed to relieve busy Broadway, which was severely overcrowded and had the busiest intersection in the world at 7th Street. As a result of the severe congestion on Broadway, planning got underway to build a new road parallel to Broadway through the Elysian Hills and across the Los Angeles River. Due to the immensity of the project it proceeded in many stages.

Did you know that the City built the first segments of the Arroyo Seco Parkway and the Hollywood Freeway?

The first stage involved the mining of three tunnels through the hills between Solano Avenue and the edge of Los Angeles River in 1931. From the end of the most northerly tunnel, the new roadway was extended to join the Riverside Drive bridge over the Los Angeles River, constructed two years earlier. In 1935, the fourth tunnel was built. In 1937, the roadway was extended from the first tunnel, over the Los Angeles River, and connected with the older Figueroa Street opposite Avenue 22, in a sweeping 90 degree curve. Finally, in 1939 the Figueroa Street Bypass would reach Downtown Los Angeles, by extending it southerly from Solano Avenue to a point north of Alpine Street to join the existing segment of Figueroa Street to the south.

The completion of the Figueroa Street Bypass marked several firsts. The extension included a grade separation at College Street. Another nearby grade separation was constructed at Temple Street and is noteworthy for being the first diamond interchange to be built in Southern California and perhaps in the Western United States. With completion of the extension to Downtown, Figueroa Street became the longest street in the City, extending from B Street in the Wilmington community to Colorado Boulevard in the Eagle Rock community, 31 miles in all, with 24 miles within the City. By 1948, the Figueroa Street Bypass would become part of the Arroyo Seco Parkway.

From conception to completion, the Figueroa Street Bypass was a 15-year effort. But while the tunnels, grade separations and diamond interchange seemed like the conclusion to one of the City's greatest public works project at that time, they merely anticipated the beginning of a new system of roadways. From Figueroa Street evolved Arroyo Seco Parkway, the Cahuenga Boulevard Parkway and the freeway system.

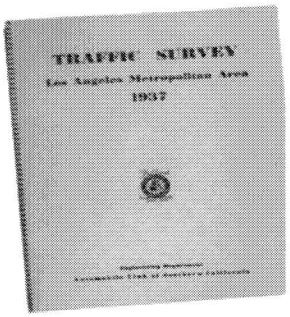
Meanwhile, a parkway concept for Cahuenga Pass was being developed by City Engineer, Lloyd Aldrich. He and his capable staff had developed quite a reputation for designing and building major public works projects, such as the Figueroa Street project and the bridges over the Los Angeles River and the Arroyo Seco. They had demonstrated their skills in designing attractive major roadway projects in undeveloped natural settings and directed their experience in developing a parkway concept for the Cahuenga Pass.

Aldrich's plan was ambitious and state-of-the-art. There would be four lanes in each direction, a width greater than any other previous highway. They designed a separation between opposing traffic flows with the Pacific Electric Railroad tracks in the middle. Bridges connecting the service roads and spanning the parkway were constructed at the Pilgrimage (now John Anson Ford) Theater, Mulholland Drive and Barham Boulevard. At the southern end of the Pass, southbound traffic destined to Highland Avenue would stay to the right, while traffic destined to southbound Cahuenga Boulevard would stay in the left two lanes and travel in a tunnel under the Pacific Electric Railroad tracks. It was destined to be a breathtaking drive with the Santa Monica Mountains on each side of the parkway, bridges spanning the canyon and landscaped separation islands between the roadways.

The first unit was opened on June 15, 1940 and extended northerly to the Barham Boulevard ramps. By January 1, 1941, the roadway was extended to terminate in a 90-degree curve connecting with the older segment of Cahuenga Boulevard near Bennett Drive. Cahuenga Boulevard Parkway, a freeway less than two miles long, was opened just one day after the Arroyo Seco Parkway was dedicated. The next phase of extending the parkway to the intersection of Ventura Boulevard and Vineland Avenue, as Aldrich had planned it, was disrupted by World War 2, and was completed by the State in 1949. In 1954, Cahuenga Parkway was altered and incorporated into the Hollywood Freeway.

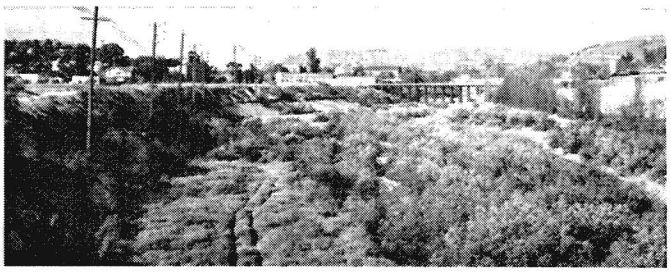
Arroyo Seco Parkway

The City's first bypass roadway designed as an alternate route to the City's north gateway was Figueroa Street through the Elysian Hills. The final features of the new roadway, the College Street grade separation and the Temple Street/Flower Street/Figueroa Street diamond interchange, showed us the future of roadway programs. While the planning, funding and construction took 15 years to complete, the undertaking marked more of a beginning than a conclusion. That beginning would be the Arroyo Seco Parkway, which was the extension of the Figueroa Street bypass roadway and the first freeway in the West.

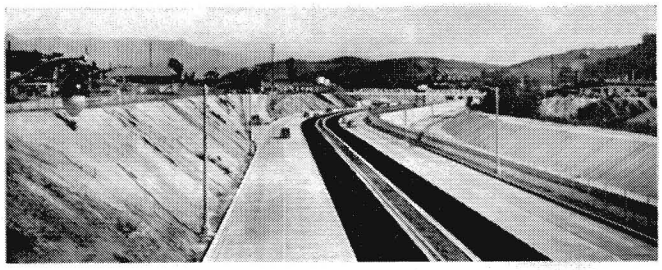


1937 report by the Automobile Club of Southern California which promoted the concept of "motorways" Graphic - 2050

The words, "arroyo seco," mean "dry riverbed" in Spanish. Indeed, the wash that extends 10.5 miles from a point north of the Rose Bowl to the Los Angeles River still lies dry most of the year. However, prior to 1940 flood waters from winter storms would gather momentum on the steep slopes of the mountains and damage downstream properties. During these times the arroyo was anything but seco.



Before the Parkway came, cottonwoods filled the Arroyo Seco.



The same spot today looking north from Avenue 26 Bridge.

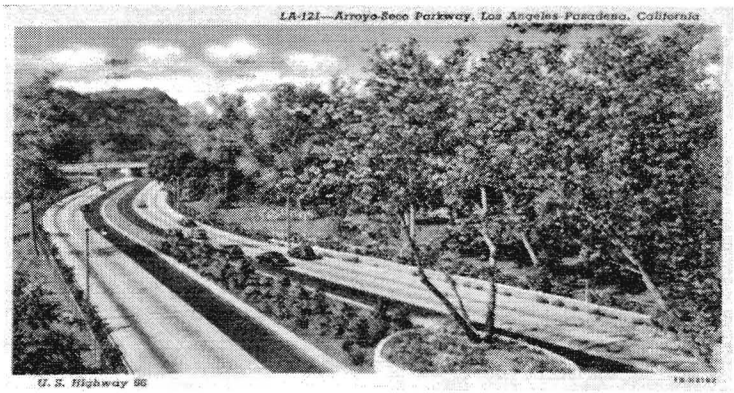
A roadway was envisioned along the Arroyo Seco as early as 1895, although motor vehicles were not envisioned yet. In 1924, the Major Street Traffic Plan proposed a parkway and the concept was approved by voters that same year. During the next few years, the Avenue 26, Avenue 43 and Avenue 60 decorative bridges were designed by the City to span the riverbed and a future 80-foot divided highway. However, delays ensued, and the roadway remained no more than a plan, due to the lack of funds during the Great Depression and controversies regarding the building of a roadway through park land.

Perhaps the delay was fortuitous, for a new concept in roadway design was emerging. For several years, the Long Island and New York areas had limited access routes in pastoral areas that they called parkways, built by Robert Moses. In 1929, the first cloverleaf interchange of two major roads was built in Woodbridge, New Jersey. In 1933, Chicago opened a portion of Lake Shore Drive, which featured grade separations and interchange ramps. Shortly thereafter, engineers began reading about Germany's autobahns. Closer to home, Ramona Boulevard (now the alignment of the beginning of the San Bernardino Freeway) had been constructed in 1935 as an "airline" route with numerous grade separations between Mission Road and Atlantic Boulevard. Finally, the Automobile Club of Southern California released a report in 1937 which showed the futility of building more at-grade roadways and recommended a new system of "motorways." Borrowing from these models, an enhanced highway design was prepared for the roadway incorporating the concepts of total grade separation, no local property access, the division of travel paths and "inlets and outlets," the terms, at that time for on-ramps and off-ramps. All that was needed was a complete funding package.

Arroyo Seco Parkway, *continued*

With the completion of the Figueroa Street bridge over the Los Angeles River in 1937 and, shortly thereafter, the availability of W.P.A. and P.W.A. federal funds, the stage was set to build a parkway. A couple of weeks after a severe flood devastated parts of Southern California, a groundbreaking ceremony was held on March 23, 1938 for a flood control channel and the parkway. The parkway would provide a direct connection between Broadway (now Arroyo Parkway) at Glenarm Street in Pasadena with Figueroa Street at Avenue 22 in Los Angeles.

The work began in stages and was undertaken by both the City and the State Division of Highways (now Caltrans). The City designed and managed the construction of the flood control channel and designed the freeway lighting, while the Division of Highways managed the construction of the parkway. The first segment was opened on January 4, 1939 and the entire segment of the original Arroyo Seco Parkway was completed on December 30, 1940, just in time for Tournament of Roses crowds. It was hailed as the first freeway in the West.



Postcard of Arroyo Seco Parkway near York Boulevard

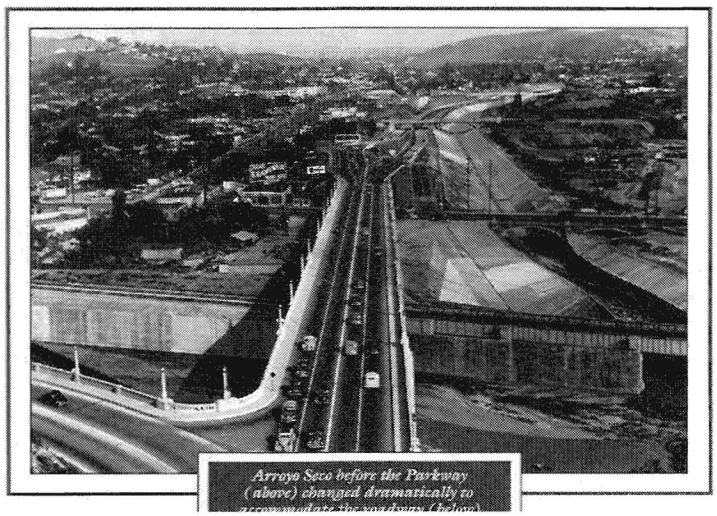
Graphic - 5051

Construction would continue for another 13 years on the segment to the south which mostly involved the conversion of the Figureoa Street bypass roadway (the one with the four tunnels) to a freeway. A new northwesterly roadway through the Elysian Hills between Avenue 22 and Castelar Street (now Hill Street) was built parallel to the bypass roadway in 1943. Upon its completion, Figueroa Street was converted to the northbound lanes of the Arroyo Seco Parkway and the new 1943 roadway was converted to the southbound lanes. In 1948, a median was installed along Figueroa Street between Hill Street and Alpine Street in order to convert it to parkway standards. In conjunction with the median, the Arroyo Seco Parkway was extended southerly to Sunset Boulevard on an alignment independent and westerly of Figueroa Street. Finally, in 1953 the highway was extended through the entire length of the four-level interchange to connect with the Harbor, Hollywood and Santa Ana Parkways.

With the completion of the 1953 project, the Arroyo Seco Parkway no longer was an extension of Figueroa Street and not just an isolated parkway drive. Rather, it was a link of an emerging "freeway system". The term, freeway, began to be used since most of the new limited-access highways were to be constructed in developed areas, rather than in park-like settings. Also, by this time, a new naming system for freeways was being adopted. The emerging freeways extending from Downtown would be named in a standard fashion after the satellite destinations to which they connected. These names would include the Hollywood, San Bernardino, Santa Ana, Pomona, Long Beach, Harbor, and Santa Monica Freeways. Accordingly, the Arroyo Seco Parkway, which had a poetic and genteel name, became officially known as the Pasadena Freeway.

For those persons who enjoyed the scenic drive through Highland Park and who noticed the decorative bridges, ornamental bridge lighting, park land, hills and riverbed, it remained a parkway. In 2010, context-sensitive improvements, including decorative walls and street lights, were installed to address traffic safety. Concurrent with the improvements, the first freeway in the West was officially rechristened, the Arroyo Seco Parkway.

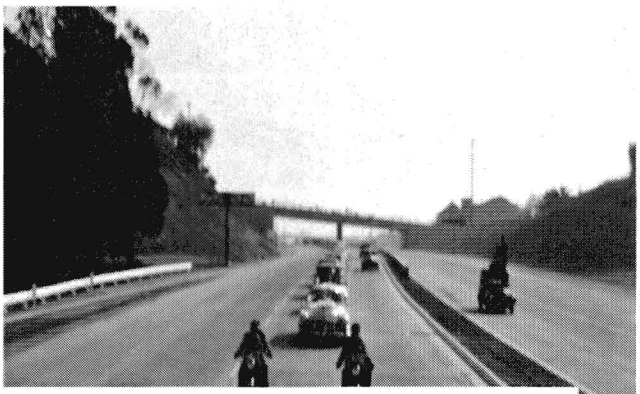
Arroyo Seco Parkway, continued



Arroyo Seco Parkway / Figueroa Street junction near Los Angeles River, circa 1941

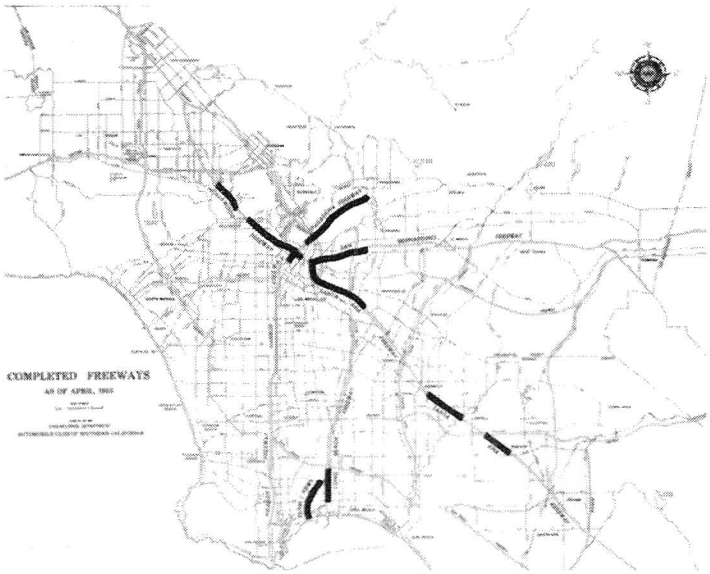
Graphic - 1035

The Four Level Interchange, the first full-Freeway interchange, circa 1951
Graphic - 3020



Opening of the first segment of the Hollywood Freeway, 1950

Graphic - 3024



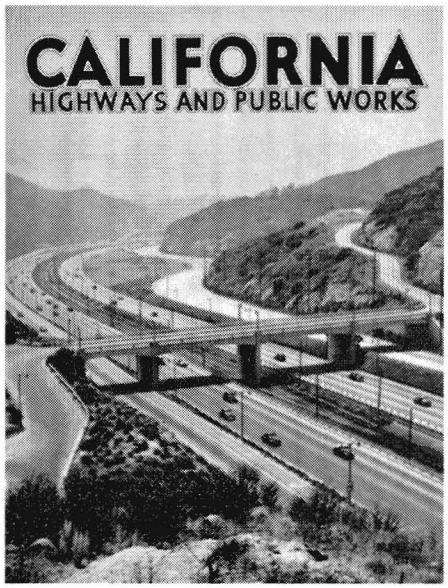
Freeway System 1953

Graphic - 1014

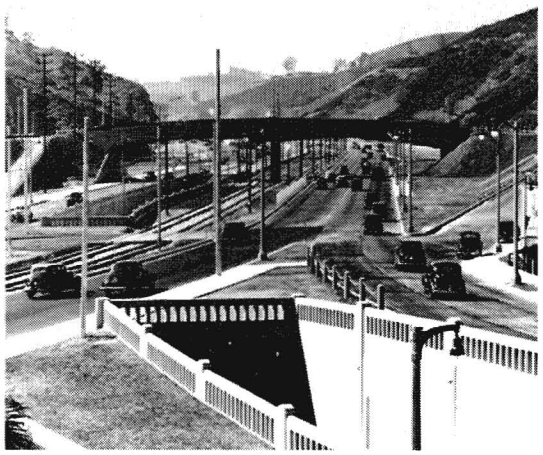
Cahuenga Parkway

Since the founding of the Pueblo of Los Angeles in the late 18th Century, Cahuenga Pass has been a primary travel route to the San Fernando Valley and points northwest. In the early 20th Century, the Pacific Electric Railroad placed tracks through the Pass. In 1910, the dirt travel path was paved. Along with Whittier Boulevard, Boyle Avenue, 7th Street, Vermont Avenue, Sunset Boulevard and Ventura Boulevard, Cahuenga Boulevard was designated as one of the original links of US 101 in 1926. In 1927, it was widened to four lanes with sidewalks and ornamental street lights. But by the mid-1930's it was inadequate to meet the needs of the growing Valley and metropolitan areas.

A parkway concept for the Cahuenga Pass was developed by City Engineer, Lloyd Aldrich. He and his capable staff had developed quite a reputation for designing and building major public works projects. During the period from 1925 to 1932 they had built (or rebuilt) the numerous beautiful bridges over the Los Angeles River and the Arroyo Seco. Between 1931 and 1935 they built the four Figueroa Street tunnels through the Elysian Hills. They had demonstrated their skills in designing attractive major roadway projects in undeveloped natural settings and directed their experience in developing a parkway concept for the Cahuenga Pass.



The original Cahuenga Boulevard Parkway near Mulhulland Drive
Graphic - 2050



Cahuenga Boulevard / Highland Avenue Grade Separation looking north near Odin Street, circa 1941

Graphic - 1017

Aldrich's plan was ambitious and state-of-the-art. There would be four lanes in each direction, a width greater than any other previous highway. They designed a barrier between opposing traffic flows using the Pacific Electric Railroad tracks. The limited access parkway would have service roads with the 1927 alignment of Cahuenga Boulevard converted as the west service road. Bridges connecting the service roads and spanning the parkway were constructed at the Pilgrimage (now John Anson Ford) Theater, Mulholland Drive and Barham Boulevard. At the southern end of the Pass, southbound traffic destined to Highland Avenue would stay to the right, while traffic destined to southbound Cahuenga Boulevard would stay in the left two lanes and travel in a tunnel under the Pacific Electric Railroad tracks. It was destined to be a breathtaking drive with the Santa Monica Mountains on each side of the parkway, bridges spanning the canyon and landscaped separation islands between the roadways.

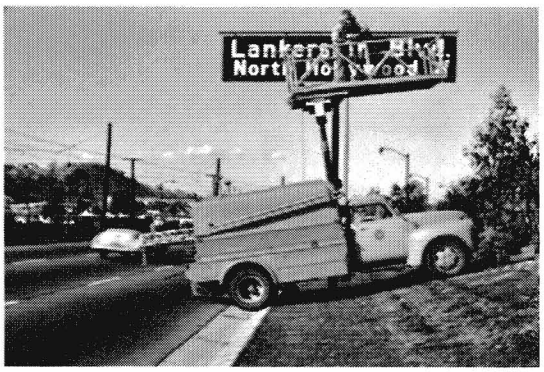
Cahuenga Parkway, *continued*

Normally, the Division of Highways would have reviewed the City's plans and modified them as their own. But a funding opportunity became available and the State allowed the City plans to proceed without delay. That opportunity was the availability of federal PWA (Public Works Administration) funds which would finance 45% of the project. The State financed 41%, the City 13% and the County 1% of the costs. To take advantage of the funds the contract was awarded in late 1938.

The first unit was opened on June 15, 1940 and extended northerly to the Barham Boulevard ramps. By January 1, 1941, the roadway was extended to terminate in a 90-degree curve connecting with the older segment of Cahuenga Boulevard near Bennett Drive. Thus, this freeway, less than 2 miles long, was opened just one day after the Arroyo Seco Parkway was dedicated. The next phase of extending the parkway to the intersection of Ventura Boulevard and Vineland Avenue, as Aldrich had planned it, was disrupted by World War 2. It was completed by the State in 1949.

Cahuenga Boulevard, circa 1920

Graphic - 8027



Cahuenga Boulevard Parkway looking northwest near Lankershim Boulevard, circa 1949

Graphic - 3039

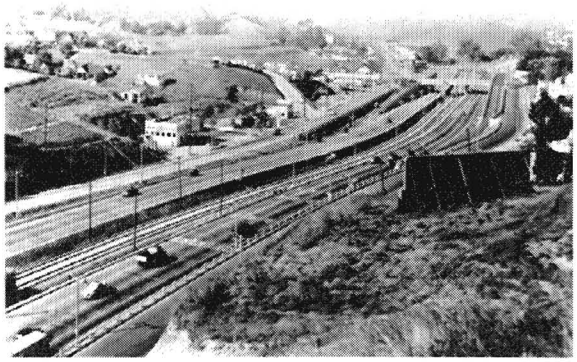
While the last phase of the Cahuenga Parkway was being completed, work already was underway on building the Hollywood Freeway. The last segment of the freeway, built in 1954, connected to the south end of the original Cahuenga Parkway. The completion of the Hollywood Freeway necessitated the demolition of the 1940 tunnel connection under the Pacific Electric Railroad tracks between the Pilgrimage bridge and Odin Street. In addition, since the Pacific Electric Railroad had ceased operation in 1944, the area that it had occupied in the median was reconstructed to accommodate traffic from northbound Highland Avenue. In 1957, when the Hollywood Freeway was extended northwesterly of Lankershim Boulevard, the northbound on-ramp, northbound off-ramp and southbound on-ramp at Barham Boulevard were abandoned. The abandoned ramps have remained preserved since that time.

Despite alterations, much of the original Cahuenga Parkway remains intact. The original ornamental street lights on the bridges still look charming. The Pacific Electric Railroad overhead cable hooks can still be seen on the bridges over the area formerly occupied by the tracks. And the ornamental design in the corners of Barham Boulevard bridge is one found on no other. After World War 2, freeway design tended to be functional and devoid of non-essential artistic features. So it was fortuitous that the freeway was built during the pre-War era and by an agency with a heritage of building pleasant-looking public works projects. Cahuenga Parkway was indeed attractive, the first segment of the Hollywood Freeway, the second freeway in the West and the freeway built by the City.

Cahuenga Parkway, *continued*

Cahuenga Boulevard in Early 1930's

Graphic - 8034



Cahuenga Boulevard Parkway terminus near Barham Boulevard, circa 1940

Graphic - 8035

Cahuenga Boulevard Parkway looking northwest near Vineland Avenue, circa 1950

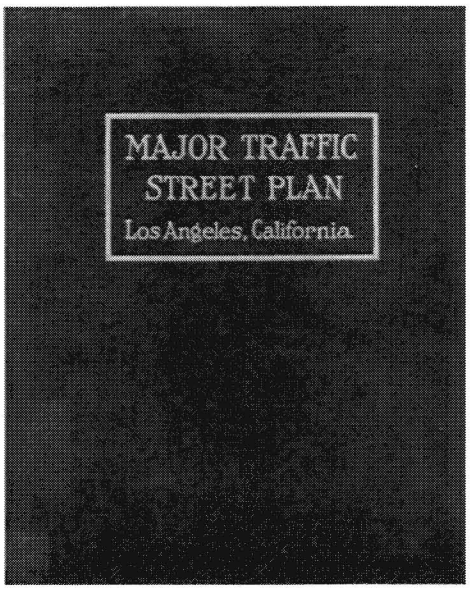
Graphic - 1017

Cahuenga Boulevard looking southeast near terminus of Parkway near Vineland Avenue, circa 1950

Graphic - 3099

The City's First Transportation Plan

In 1922, the business and civic leaders of the City undertook several initiatives to recommend solutions to the serious traffic circulation problems. Known as the Traffic Commission of the City and County of Los Angeles, but not part of City or County government, they pooled their resources and hired the most esteemed experts of the day to address traffic congestion. Their first and most successful document was the Major Traffic Street Plan, issued in May 1924.

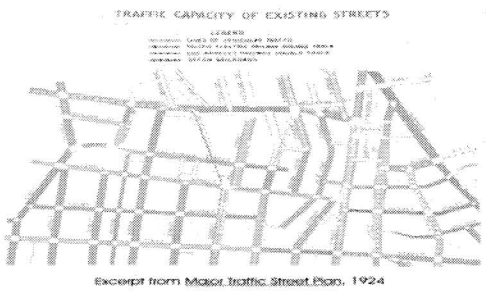


Graphic - 3079

The Major Traffic Street Plan was prepared by renowned city planners of national reputation. They were Frederick Law Olmstead, Harlan Bartholomew and Charles Cheney. Frederick Law Olmstead was the son of the planner for Central Park in New York. A technical staff also was used, including Miller McClintock, who became the premier traffic consultant of the 1920's. The report also was supported by the Boy Scouts, who counted more than one million vehicle movements in one day.

This pioneering effort documented traffic conditions and identified the need to develop a hierarchy of streets. Until that time, streets were built to provide only for their local access needs during the horse-and-buggy era. As a result, many streets were narrow, discontinuous and offset at tract lines. It also introduced the concept of the parkway, a vague term connoting a vision of scenic drives, but also implying limited access and grade separation. Finally, it identified streets that should be improved with widening, extension, connection and offset elimination.

The Major Traffic Street Plan would become the guiding force for the City's street improvement program for the next 50 years. Street widening, extensions, connections and jog eliminations would be accomplished by the City's capital improvement program, while the parkway concept would evolve to become the region's well-known freeway system.



Excerpt from Major Traffic Street Plan, 1924

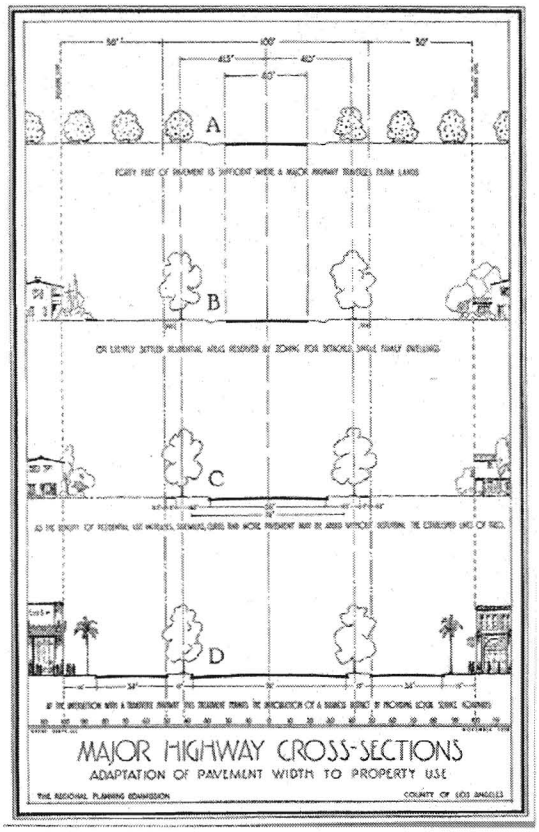
Graphic - 1016

The Origin of the County Street System

By the 1920's, Southern California had an extensive network of urban and interurban rail lines. However, it lacked a logical system of highways for carrying through traffic. Through a variety of commissioned studies and plan adoptions, a process was established to develop an orderly plan for County arterial streets.

In 1910, the population of the County of Los Angeles was 170,298. By 1930, it had grown to 2,208,492, a 12-fold increase. While the rapid population increase was occurring, civic leaders and officials were concerned with the serious consequences of subdividing so much land without the guidance of a comprehensive plan. Accordingly, on December 18, 1922, the Board of Supervisors created the Los Angeles County Regional Planning Commission. It was the first official such commission in the United States. Shortly after its creation, the County Regional Planning Commission proposed in 1923 the concept of uniform street widths to be applied throughout the County. They adopted the rounded values of 60, 80 and 100-foot right-of-way widths for local, secondary and major highways, respectively.

During the next several years, the Commission coordinated with cities in each regional area to encourage them to adopt these standard street widths, to designate major highways (generally at one-mile points), designate secondary highways (generally at one-half mile points) and require set backs by developers when subdivisions were being reviewed. This monumental cooperative effort was successful, especially in guiding those cities that would later experience their greatest growth.



Excerpt from the 1923 Los Angeles County Regional Planning Commission report on proposed standard street widths

Graphic - 1015

The resultant roadway widths were identified as 36, 56 and 74 feet, respectively, thus providing for 12 or 13 -foot sidewalks on each side. The identified operation was two, four and six "lines", respectively, of moving traffic with parking on each side.

These widths still remain with us today in many parts of the County. In the City of Los Angeles, the standard right-of-way width for secondary highways has incrementally increased over the years from 80 feet to the current standard of 90 feet. Major highways have increased just slightly to 104 feet. Local streets still have a 60-foot right-of-way.

The intended operation for these streets did not envision the yet-to-be developed left turn lane. The desire to deploy this highly desirable feature resulted in the incremental expansion of secondary highway roadway widths, reduction of sidewalk widths, narrow lane widths and selective elimination of parking, where feasible.

Land Use Zoning and Decentralization

Today, land use planning is an important policy document. It governs the potential return on investment that a landowner can realize, has traffic circulation implications and affects quality-of-life issues. The key feature of land use planning is "zoning" and the concept originated in Los Angeles. This concept would lead to the multi-center city that we know today.

Zoning was first employed in Los Angeles in 1909. An ordinance created an industrial district in the City. At the time it was an isolated law, but would later be recognized as the parent of the zoning decisions to come. The industrial zoning ordinance was challenged in a case known as the "Haddechack Brick Case". However, the United States Supreme Court upheld the City's right to regulate the use of property.

In 1925, the City's zoning again was challenged in the United States Supreme Court. This was popularly known as the "Miller Case" and challenged the right of the City to establish a single-family residence district. The challenge was not successful and the constitutionality of zoning would not again be seriously challenged, although the administration of it would be subject to discussion.

One of the first major department stores to locate outside of Downtown - the 1929 Bullock's Wilshire department store at Westmoreland Avenue

Graphic - 5031

When the concept started to be more extensively applied, the primary recognized benefit was that of traffic congestion relief. In the mid-1920's, almost all major office and retail buildings were located Downtown and traffic congestion was substantial. Zoning was seen as a way to achieved decentralization so that similar new land uses could be encouraged to locate elsewhere, thus not further impacting the Downtown area.

By the late 1920's, major department retail stores such as Sears and Roebuck, The Broadway, Desmond, Silverwoods and Bullocks-Wilshire started to locate out of the Downtown central business district. After World War 2, decentralization of retail and office development would continue at an accelerated pace, as Los Angeles transitioned to a city of suburbs. Starting in the late 1940's, new shopping centers with major department stores and large, off-street parking lots, sprang up in Westchester, the Crenshaw District and North Hollywood. By the 1970's, larger enclosed regional malls were built at numerous new locations. Meanwhile, major office towers were established along Wilshire Boulevard, along Ventura Boulevard, and in Century City, Westwood and Warner Center.

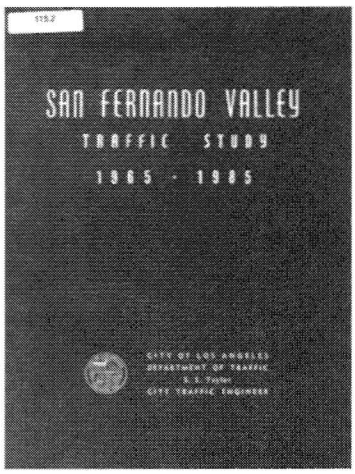
The pioneering zoning laws in Los Angeles would later become standard planning practice in other cities. Zoning, in combination with the popularity of the automobile, an extensive area and market forces, would lead to a unique setting. As a result, Los Angeles has thus become a city of many centers and the most decentralized large city in the nation.

Regional Transportation Planning

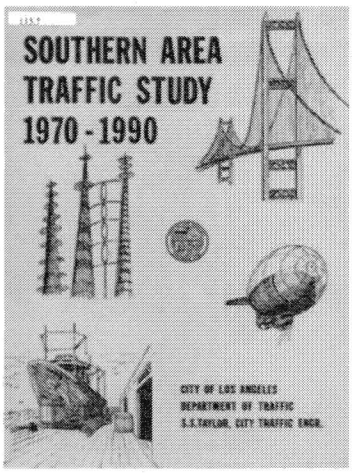
The term, transportation planning, in the first half of the 20th Century generally referred to the development of a specific highway network. However, by 1960 it became a process-oriented endeavor, with extensive data collection and processing, sophisticated computer models and a forecast of the future.

The inspiration for the new era of transportation planning was the Chicago Area Transportation Study (CATS). CATS was sponsored by the Illinois Division of Highways and the federal Bureau of Public Roads. It got underway in November 1955 and examined travel patterns in a 1,400 square mile area where six million persons resided. CATS surveyed one in every 30 households and interviewed truck operators and taxi drivers. From this information they were able to define travel patterns and characteristics with numerous charts and graphics. The information was used to develop plans for improved multi-modal facilities.

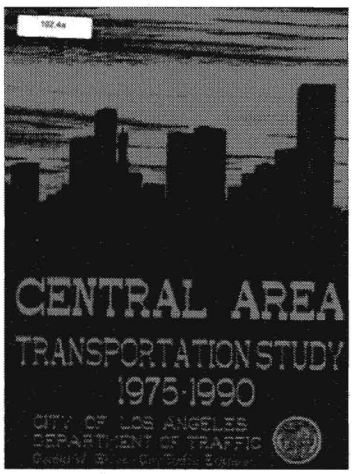
Based on the success in conducting and applying the information from CATS, a new study was launched in the Southern California area. In 1959, the Department of Motor Vehicles sent out 2.8 million trip questionnaires in Los Angeles, Orange and Ventura Counties. The next year in 1960, the Los Angeles Regional Transportation Study (LARTS) was officially launched. It was sponsored by the California Division of Highways and the federal Bureau of Public Roads. It was much larger than the CATS study and covered 9,000 square miles in five counties (Los Angeles, Orange, Ventura, Riverside and San Bernardino) including 116 cities. Like CATS, it analyzed the current travel patterns of people and goods. From that information it developed trip generation and attraction factors based on a gravity model that used inputs of population employment (retail and total), dwelling units (multiple and single family) and median family income. Then by examining population growth and land use zoning, additional trips could be forecasted. Given the tremendous potential for land development and population growth in Southern California, the output from LARTS was used to emphasize projected deficiencies and transportation needs, including a freeway master plan.



Graphic - 7012



Graphic - 7010



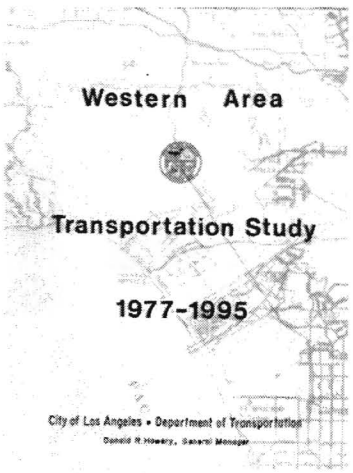
Graphic - 7013

Regional Transportation Planning, *continued*

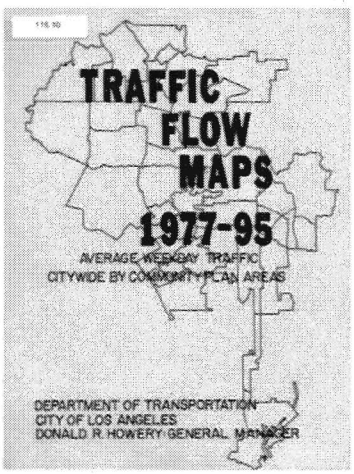
While the LARTS data was good for relatively large traffic corridors, it did not initially analyze traffic demands on the local arterial street system. In time, methods were developed to apply LARTS data at the sub-regional level. These methods led to several sub-regional studies for the City of Santa Ana, City of Costa Mesa, City of Orange, North Orange Coast, North Orange County, Ventura County, East Central Los Angeles County, Los Angeles County - Newhall, West San Gabriel Valley and several in the City of Los Angeles. Staff of the City of Los Angeles Traffic Department and later the Department of Transportation developed sub-regional transportation plans for the San Fernando Valley, LAX-Westchester, Central, Southern and Western areas.

Most of the sub-regional plans were prepared during the period from the mid-1960's through the early 1980's. None have been prepared since that time. This was due, in part, to the perception that the studies were not going to be used. Several factors contributed to this. Beginning in the early 1970's the National Environmental Protection Act (NEPA) and California Environmental Quality Act (CEQA) slowed the pace of projects by requiring a public process for the evaluation and consideration of impacts. Then there was the freeway revolt in the early 1970's where many freeways in the California Freeway Master Plan were deleted by the State Legislature due to impacts to established communities. In addition, real estate prices escalated rapidly, making it less feasible to purchase right-of-way for highway improvements. Finally, the buying power of the State Gas Tax to finance freeway development and street improvements continued to decrease due to the lack of indexing.

As a result, transportation planning, from the 1980's on changed significantly. The emphasis changed from identifying and financing major, regional transportation infrastructure to mitigating intersections impacted by site development. In some cases, "transportation specific plans" were approved in activity centers and along corridors. In those areas developers would contribute funds to a variety of transportation projects.



Graphic - 7015



Graphic - 7014

The First Simplified Traffic Code

Like many large cities in the 1920s, Los Angeles had a convoluted set of traffic laws. As automobiles made the transition from gentleman's novelty to common man's necessity, provisions were added on a piecemeal basis over the years. By 1924, the traffic code included 134 pages of legal, ambiguous and contradictory language. Because traffic safety and congestion had become such a concern, a simplified traffic code was sought.

To draft the ordinance, Los Angeles hired recent Harvard graduate and Southern California native, Miller McClintock. At the time, there were no established traffic experts in the nation. McClintock's only traffic expertise was his thesis at Harvard, which pioneered the concept that a professional, public administrative and scientific approach was necessary to solve the country's emerging traffic control problems. Six short years later, he would become the nation's most sought-after consultant and a founding member of the Institute of Traffic Engineers. He founded the Bureau of Highway Traffic, which, over the years, has been located at Harvard, Yale and Northwestern Universities.

Miller McClintock

Graphic - 8095

McClintock quickly drafted the new ordinance. It was approved by City voters and became effective on January 24, 1925. It was noteworthy for its simplification and standardization, as it condensed 134 pages into just four pages. It introduced many pioneering concepts and became the model for other municipal ordinances in California. It greatly influenced the California Vehicle Code and, ultimately, the Uniform Vehicle Code.

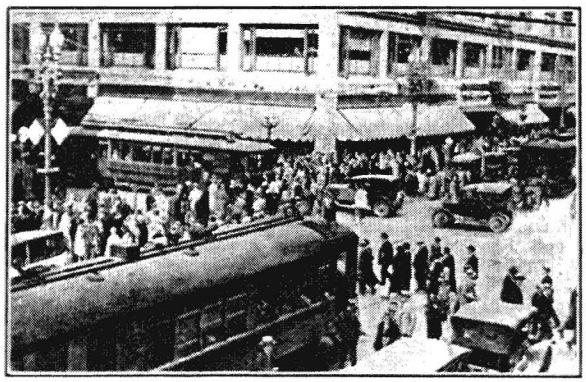
Educating the public to this first-ever code was a monumental task and innovative methods were used. In addition to newspaper coverage, the City's radio stations, only a few years old, assisted in educating the public. Every station in the City agreed to broadcast the same information regarding provisions of this new code at 8:00 p.m. each night during the week preceding the effective date of the ordinance. Each broadcast speaker was furnished with the same copy, so that if a listener tuned out one station and tuned in another, in an attempt to hear the music of the jazz and society bands of the day, he would receive the same message. Listeners, literally, were captive to being educated on the new ordinance.

The new ordinance formalized the use of painted curbs to designate special curb zones. This was viable since it virtually never snows in Los Angeles. Thus, yellow curb paint was designated for commercial loading zones and red curb paint for no parking zones. As a result, people jokingly claimed that McClintock had turned Los Angeles into a Spanish omelet. Also, it introduced and legalized right turns on red after stopping. But for the most part, the code was considered to be a pioneering pedestrian safety measure (often called the "Jaywalking Ordinance"), as it introduced the concepts of pedestrian obeyance of traffic signals, right-of-way at unsignalized locations and yellow school crosswalks.

Pedestrian Regulation

A school pedestrian tunnel program began 1918 as the first major effort to address the growing conflict between vehicles and pedestrians. Although the construction of pedestrian tunnels bas a significant commitment and accomplishment, the more complex challenge in the 1920's was controlling pedestrians where tunnels were not planned. Thus, the new challenge shifted from eliminating the conflict to managing it.

With necessity being the proverbial mother of invention, pioneering regulations were developed to address the at-grade pedestrian problem. Pedestrian conflicts in the Downtown Los Angeles of 1924, in combination with automobile and trolley conflicts, are almost unimaginable by today's standards. A count from March 1924 at Southern California's premier business district street, Broadway, tells the story. At the intersection of 7th Street and Broadway between 2 and 6 P.M., 1,000 trolley cars, 6,368 motor vehicles and 83,221 pedestrians traversed the intersection. Two blocks away at 5th Street and Broadway during that same period, the numbers were 775 trolley cars, 5,000 motor vehicles and 90,000 pedestrians. The intersection of 7th Street and Broadway still has the greatest pedestrian volumes in Southern California today, yet only 23% of that of 1924.



SEVENTH AND BROADWAY BEFORE THE JAY WALKER LAW

Circa 1924
Graphic - 2057

The practice of facilitating vehicular flow and minimizing pedestrian danger by regulating pedestrians is so universally accepted and taken for granted today that it's hard to imagine conditions prior to 1925 when no such regulations existed. Los Angeles' four-year experiment with traffic signals between 1920 and 1924 helped bring order out of vehicular chaos but did not improve pedestrian safety since pedestrians were not regulated by them. During 1924, 73 pedestrians were killed in Los Angeles, and it was estimated that 70% of all traffic fatalities were pedestrian-related. This grim statistic led to landmark legislation to control pedestrians.

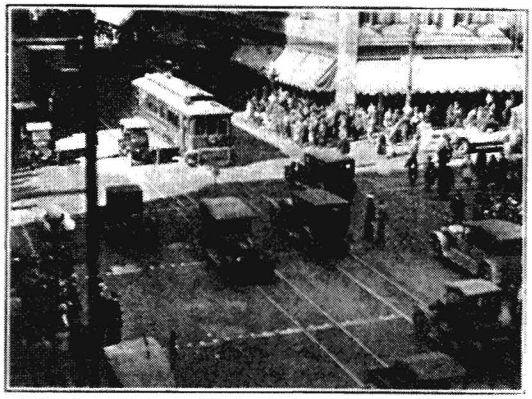
Pedestrian regulation, untested anywhere in the nation at that time, became a recurrent and controversial issue. Between 1921 and 1924 a pedestrian control ordinance was considered by the Council and Mayor on three occasions and each time it was vetoed by the Mayor. Each time it came before the Council it attracted increasing attention. Finally, sentiment had developed to the point where the Council over-rode the Mayor's veto. This third time pedestrian regulation was proposed as part of a comprehensive, new traffic control ordinance. The proposed ordinance made good newspaper copy was widely discussed by the Council and the common man-in-the-street. The ordinance, including the pedestrian regulations, was approved by the electorate in November 1924, and became effective January 25, 1925.

Educating the public to this first ever ordinance was a monumental task and innovative, if not forceful, methods were used. In addition to newspaper coverage, the radio stations, not yet even five years old, assisted in educating the public. Every station in the City agreed to broadcast the same information regarding provisions of this new ordinance at 8:00 P.M. each night during the week preceding the effective date of the ordinance. Each broadcast speaker was furnished with the same copy, so that if a listener tuned out one station and into another he would receive the same message. Listeners were truly captive to being educated on the new ordinance.

Pedestrian Regulation, *continued*

The ordinance included the following pioneering pedestrian provisions:

•Pedestrians have the right-of-way at unsignalized crosswalks (but shall raise their hand toward approaching traffic as they cross);
•Pedestrians may cross the street only with parallel released traffic at signalized intersections;
•Painted crosswalks are to be maintained as extensions of sidewalks in business districts and midblock crosswalk may be established near the middle of any block Downtown where it exceeds 400 feet in length;
•Standing or walking outside a safety zone or (painted) crosswalk in such a manner that it interferes with traffic is prohibited;
•Yellow painted school crosswalks are to be marked at identified locations near schools and shall be preceded with the yellow pavement message, "School Crossing" along with a yellow painted arrow 100 feet in advance of the painted crosswalk. In addition, where there is a "School Crossing" sign posted at a school crosswalk and a pedestrian is crossing the driver's half of the roadway then the driver must stop and wait.



SEVENTH AND BROADWAY AFTER THE JAY WALKER LAW

Circa 1925
Graphic - 2058

When the pedestrian regulations went into effect no other city in the United States had accomplished the taming of the ped as had Los Angeles. By 1930, only three other cities – Portland Oregon, Seattle Washington, and Cleveland Ohio had successfully accomplished this feat. After the first year of operation with the ordinance, 46 pedestrians were killed. Compared to the 73 killed during the year prior to the ordinance this represented a significant reduction of 37 percent.

In Los Angeles, successful pedestrian control was not accomplished by regulation and education alone. Friendly enforcement, the unique characteristics of the Acme traffic signal and its operation by traffic signal operator, Ralph Dorsey, complemented the new regulations. Police officers were stationed at the traffic signals for several years after the ordinance became effective but did not use a heavy handed approach. Like the bouncer at the cocktail lounge, the mere presence of officers encouraged voluntary compliance with the law. After a trial period the public accepted the regulations.

The characteristics of the Acme traffic signal also helped to improve compliance. The Acme signal had semaphore arms displaying the words "STOP" or "GO" that would rise to a visible horizontal position from a hidden vertical position. But each time the arms would rise a loud bell would ring out. San Francisco had bells for their Wiley signals but few other cities that had traffic signals at this time had this signal feature. Ralph Dorsey claimed that the bells were chiefly responsible for the success of the regulation, since pedestrians could not avoid hearing the changes in right-of-way assignment.

The timing of the signals also contributed to pedestrian compliance. A 75-second cycle length provided frequent crossing opportunities for pedestrians and motorists, thus making them more inclined to cross with the signal. In addition, *de facto* pedestrian clearance intervals also were provided although pedestrian heads hadn't yet been developed. Before the "GO" arms and light indications of the Acme semaphore signals were displayed there was a period of from 7 to 12 seconds where "STOP" was displayed in all directions. During this all-red period between gongs of the bell, pedestrians would complete their crossing and vehicular right-turns could filter through. For Downtown streets varying from 40 to 56 feet in width 7 to 12 seconds provided adequate pedestrian clearance.

Los Angeles had led the nation in managing pedestrian traffic. Pioneering pedestrian regulations served as a model for California and the nation by defining pedestrian right-of-way, formalizing the marking of crosswalks, establishing yellow school crosswalks and providing pedestrian clearance intervals.

Los Angeles' First Traffic Engineer

Ralph T. Dorsey was the first Traffic Engineer for the City of Los Angeles and a colorful and remarkable person. He was born in Downtown Los Angeles and received a high school education. He was the nephew of Susan Miller Dorsey after whom the high school in Los Angeles is named. He was a short, wiry man who became a semi-pro baseball player, a flyweight boxer, a miner and finally, an electrician, a trade that he learned form correspondence school. He was employed as an electrician with the City of Los Angeles when the first experiments with automated traffic signals were underway.

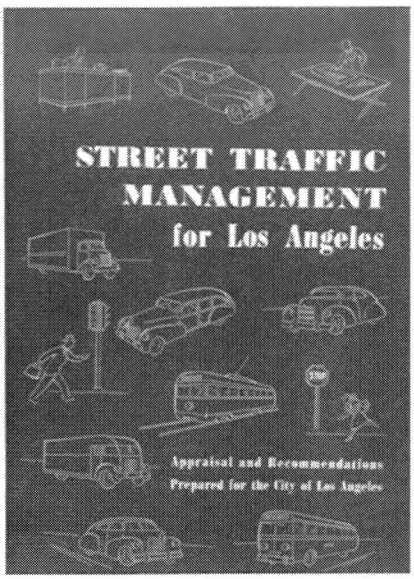
He was the inspector of the initial signal system of 31 intersections in Downtown Los Angeles. In this capacity he not only became an expert in the operation of traffic signals, but more importantly in the operation of traffic through signal timing techniques. The roots of traffic engineering lie in the art of safe and efficient intersectional traffic operation. Dorsey epitomized that art by being the first person to successfully control pedestrians, operate an interconnected signal system (with a control center), develop optimum signal system offsets, and develop 16 daily timing plans all by 1926. In 1928 he pioneered reverse lane operation, and in one case, 12th Street was operated as a reversible one-way street. Also, in 1928 he applied the first known railroad pre-emption features. He installed the first known pedestrian push button signal in January 1929.

Ralph Dorsey in the 1920s
Graphic - 5001

He had the longest tenure as the City's top transportation official. From June 1930 until his retirement in 1954 he headed the Bureau of Street Traffic Engineering, the Department of Street Traffic Engineering, the Department of Traffic Engineering and the Department of Traffic. He indeed was a pioneer, an innovator, a character and one who invented ways to keep traffic flowing long before there were standard practices.

The Evolution of Traffic Management in the City

The birth of the traffic management functions in the City of Los Angeles occurred more than 75 years ago. On June 19, 1930, Ordinance Number 66,883 created a Bureau of Street Traffic Engineering. It marked an ongoing evolution the agency responsible to traffic management.

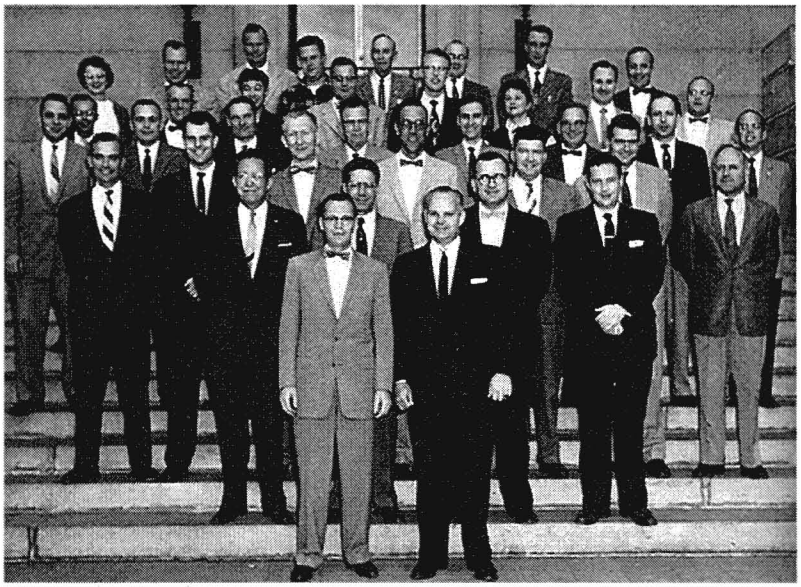


The 1948 audit which led to the Department of Traffic Engineering
Graphic - 5039

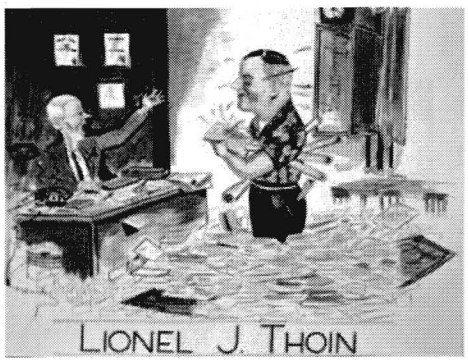
The creation of the Bureau of Street Traffic Engineering consolidated two major dispersed traffic functions – traffic signal operation from the City Electrician in the Department of Building and Safety and traffic markings from the Police Department. The Street Traffic Engineer of the Bureau reported to the Police Commission and advised them on all traffic matters.

Shortly thereafter, in October 1931, a separate Department of Street Traffic Engineering was created over the Mayor's veto. However, it didn't last long. The Mayor's view eventually prevailed as the Bureau of Street Traffic Engineering was recreated in September 1933 and reported to the Police Commission as well as the Chief of Police. During the years of the Great Depression and World War II, there was little growth in the traffic management function and the Bureau would remain through the latter part of the 1940's.

D. grant Mickle and Joseph Havennar, the 1948 audit team
Graphic - 5020

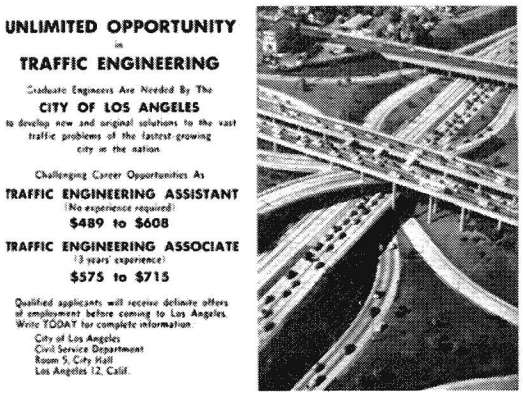


Traffic Engineering staff of the Los Angeles Traffic Department, December 1957
Graphic - 1010



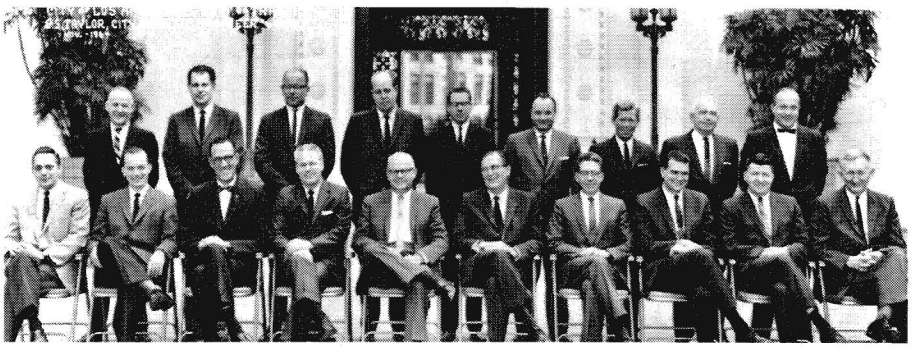
Ralph Dorsey and Jim Thoin in 1951
Graphic - 3019

However, with the major growth of the City following the war years, the City Council commissioned a study by an esteemed panel comprised of the Automotive Safety Foundation, the Los Angeles Traffic Association and the Automobile Club of Southern California. The panel recommended the creation of a separate department with broader authority. Thus, in 1949 the Department of Traffic Engineering was formed by ordinance. In June 1953, a change in the City Charter created the Department of Traffic. In February 1979, the Department of Transportation was formed by ordinance.

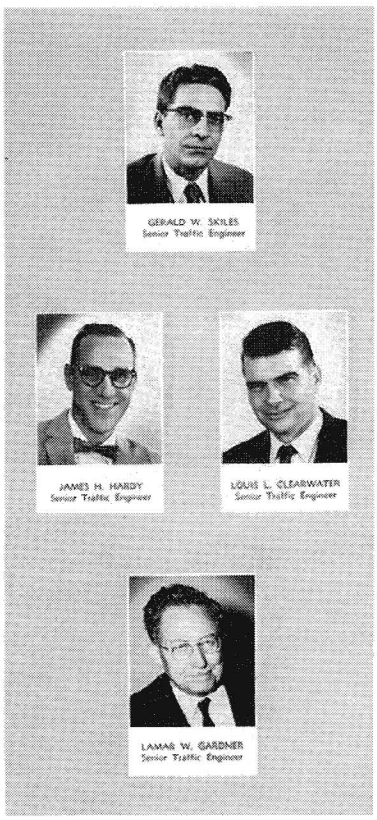


Nation-wide recruitment for professional staff
Graphic - 1012

Out of the little acorn of the Bureau of Street Traffic Engineering the branching oak tree of the Department of Transportation has grown.



Management staff of the Los Angeles Traffic department, 1964
Graphic - 3143



Senior staff of the Los Angeles Traffic Department, circa 1959
Graphic - 5047

Senior staff of the Los Angeles Traffic Department, circa 1961
Graphic - 5046

Management team of Los Angeles Traffic Department, circa 1960
Graphic - 5021

As World War I ended, the nation entered a new era of prosperity. At the same time the automobile had evolved to the point where it no longer was just a rich man's novelty but rather a working man's necessity. As a result, major cities across the nation started to witness the impacts of the automobile.

But nowhere were the impacts more intensely felt than in Downtown Los Angeles. This was because Los Angeles experienced the most rapid population increase of any major city. East Coast cities such as New York, Boston, Philadelphia, Washington and Mid-West cities such as Chicago, Detroit, Cleveland, St. Louis and Kansas City were mature metropolitan areas and experienced mild growth when the 1920's arrived. Even San Francisco on the west coast was fully developed and rebuilt by that time. In contrast, Los Angeles was expanding and growing rapidly. Its population of 102,479 in 1900 grew to 319,198 in 1910, then expanded to 576,673 in 1920 and then increased to 1,238,048 in 1930, a 12-fold increase in 30 years. In 1924, the intersection of 7th Street and Broadway was documented to be the most heavily traveled intersection in the world with more than 504,000 persons per day crossing through the intersection from motor vehicles, trolleys and as pedestrians. In 1928, Western Avenue and Wilshire Boulevard was the heaviest automobile intersection in the world with 74,000 vehicles per day. This rapid population increase called for immediate innovation and creative solutions.

Did you know that in 1928, Wilshire and Western was the busiest automobile intersection in the world?

This need resulted in innovations which would put Los Angeles in the forefront of traffic management. The first was a 45-minute limit restriction on Downtown parking in 1919. The second was an experiment with various automated traffic signals in October 1920. The third was the 1924 report, Major Traffic Street Plan which identified street improvements necessary for developing an arterial street network. The fourth early innovation of the early 1920's was the Traffic Code which became effective January 24, 1925 and which influenced the California Vehicle Code and Uniform Vehicle Code. It introduced the concept of painted curb zones, right turns on red, pedestrian rules and yellow school crosswalks.

While these innovations started to address the traffic circulation problems, there was no single organization within the City to handle traffic problems. There emerged an individual who would become a traffic engineering pioneer and the creative innovator that Los Angeles needed at the time. A traffic management organization would be built around him. His name was Ralph T. Dorsey.

Ralph T. Dorsey came from an unlikely background. He was born in what is now Downtown Los Angeles near Pico Boulevard and Olive Street. His education did not extend beyond high school, although his aunt, Susan Dorsey became a major figure in Los Angeles education. Dorsey High School is named after her. He was a small, wiry man who became a semi-pro baseball player, a flyweight boxer, a miner and finally an electrician, a trade that he learned by correspondence school. He joined the City Department of Electricity and became the foreman-in-charge of the installation of the City's first automated traffic signals.

Dorsey emerged as the City's defacto "Traffic Engineer" and "Controller" in 1925.

In 1925, the electricity function became part of the Department of Building and Safety. However, by that time, Dorsey emerged as the City's de facto "Traffic Engineer" and "Traffic Controller." This was due to his knowledge of the 31 recently signalized and interconnected traffic signals in Downtown Los Angeles. He ran them on several cycle lengths throughout the week and mastered the science of optimal signal offset relationships in a dense signal network before any other City attempted it. In combination with the 1925 City Traffic Code, and the effectiveness of the Acme signals he brought order to Downtown traffic. In 1928 the operation of traffic signals and the painting of curb lines and the coordination of parking restrictions were transferred to the Police Department. At this time, Dorsey pioneered another innovation ------ the morning and afternoon placement of stanchions on the 8th Street to provide three lanes of traffic in one direction and one lane in the other.

Beginning in 1930, a separate organization was formally formed to focus on traffic management. For 17 of the next 19 years that function would be within the Police Department. On June 19, 1930, the City created the Bureau of Street Traffic Engineering within the Police Department. This involved the transfer of the traffic signal functions from the Department of Building and Safety, and included signing curb zones and pavement markings. It was headed by Street Traffic Engineer, Ralph Dorsey. A short while later the Department of Street Traffic Engineering, headed by Chief Engineer Dorsey, was created on November 25, 1931. However, less than two years later, the function returned to the Police Department on September 14, 1933. The traffic control function remained within the Police Department until 1949.

In 1949 the Department of Traffic Engineering was formed by ordinance. However, it was becoming increasingly clear that Ralph Dorsey's prolific one-man-show-performance no longer was sufficient to meet the needs of post World War 2 Los Angeles. A team of professionals would be needed to take Los Angeles to the next level. Thus, on June 10, 1953 a new Department of Traffic was formed by Charter amendment. Recruiting then began for a new General Manager. Ralph Dorsey retired as Principal Street Traffic Engineer as Lloyd Braff came on board in January 1954.

When the Department of Traffic Engineering was formed in 1949 there were only 11 persons with an engineering title, although none had an engineering degree. The first employee with an engineering degree was Deane Terry. During the Braff era from 1954 through 1958 and continuing through the first few years of the Sam Taylor era, a major reorganization began and traffic engineering expertise was recruited from nearby cities, the State Division of Highways (now Caltrans) and other cities throughout the nation. This effort propelled Los Angeles into the modern era. Los Angeles was one of the first large city to install mastarm signals, left turn channelization, peak period parking restrictions, overhead guide signs, and state-of-the-art signal systems. Beginning in 1954, it started to develop policies for various traffic control devices, now part of the Manual of Policies and Procedures.

During the Sam Taylor era, from 1958 to 1977, the Braff introductions continued and expanded. The Transportation Planning function was introduced, district offices were added, interconnected signal system work began and systems engineering techniques created reliable data bases. In 1967, decision making was decentralized to the professional staff and the Board of Traffic Commissioners became an advisory body.

The new Department of Transportation was formed in 1979.

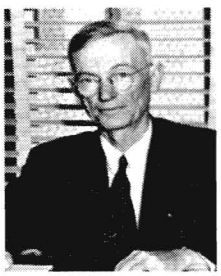
By the mid 1970's, there was a growing consensus that the problems of mobility could not be resolved by traffic control measures alone. With environmental quality laws, gasoline rationing, carpool efforts, the desire to develop a rail transit system, an emphasis on transportation systems management and the emergence of a variety of paratransit modes, it was desired to create an agency with a broader mission than that of the Department of Traffic. This would be consistent with steps previously undertaken at the federal and State levels. Shortly after S.S. (Sam) Taylor, City Traffic Engineer, passed away in March 1977, a reorganization concept was proposed. During the next two years plans were developed for the reorganization while Gerald Skiles served as the last (Acting) City Traffic Engineer.

On February 25, 1979, the new Department of Transportation was formed by ordinance, thereby consolidating most transportation-related functions into a single department. The employees of the former Department of Traffic constituted 90% of the new Department. Several employees performing transportation-related activities from the Department of City Planning, the Department of Public Works (Bureau of Engineering) and the Community Development Department were transferred. The Department of Public Utilities and Transportation was disbanded and its taxicab, community transit, and utility franchising functions were absorbed. The Off-Street Parking Bureau was annexed. The transition occurred over a period of two months. Traffic Officers and Crossing Guards were to be transferred six months later. However, due to unresolved issues regarding positions and equipment, the transfer was delayed for five years until 1984.

Since its formation, the Department of Transportation has grown, evolved, assumed additional responsibilities and increased services to meet the changing needs of the nation's second largest city. During the first five years, 1979-83, bike lanes and paths were developed, and the preferential parking program began. During the period 1984-88, the initial ATSAC demonstration project became operational, the Olympic Games were successfully hosted, a coordinated parking management program was implemented, transit services were inaugurated, school bicycle safety education began, Metro Rail coordination was initiated and the Traffic Action Team was formed. During the period 1989-93, the speed hump program began, the first Metrolink station was constructed and a bicycle coordinator was designated. During the period 1994-98, traffic during the Northridge Earthquake was successfully managed, Adaptive Traffic Control was successfully deployed, the Santa Monica Freeway Smart Corridor was inaugurated and the Smart Pedestrian Warning was developed. During the period 1999-2003, the Transit Priority System was launched, streetscape projects were developed and neighborhood traffic management projects were started.

There have been eleven directors of the traffic management function in the City of Los Angeles, as follows:

Ralph T. Dorsey	- June 1930 to January 1954
Lloyd Braff	- January 1954 to December 1957
S.S. (Sam) Taylor	- January 1958 to March 1977
Gerald W. Skiles (Interim)	- March 1977 to February 1979
Donald R. Howery	- February 1979 to December 1987
S. E. (Ed) Rowe	- December 1987 to February 1993
Thomas K. Conner (Interim)	- February 1993 to December 1993
Robert R. Yates	- December 1993 to June 1997
Thomas K. Conner	- June 1997 to June 1998
Frances T. Banerjee	- July 1998 to February 2002
Rita L. Robinson (Interim)	- February 2002 to June 2002
Wayne K. Tanda	- July 2002 to October 2005
Frances T. Banerjee (Interim)	- October 2005 to March 2006
Gloria J. Jeff	- March 2006 to September 2007
Rita L. Robinson	- September 2007 to present



Ralph Dorsey
Graphic - 5000

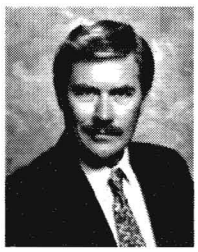
Lloyd Braff
Graphic - 5003

S.S. (Sam) Taylor
Graphic - 5005

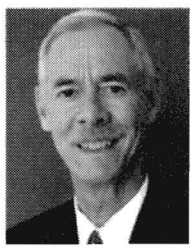
Gerald W. Skiles
Graphic - 5019

Donald R. Howery
Graphic - 5010

S.E. (Ed) Rowe
Graphic - 5011



Robert R. Yates
Graphic - 5012



Thomas K. Conner
Graphic - 5013

Frances T. Banerjee
Graphic - 5015

Wayne K. Tanda
Graphic - 5016

Gloria J. Jeff
Graphic - 5056

Rita l. Robinson

Headquarter Sites of LADOT

LADOT and its predecessor agencies have occupied several sites and have moved several times. The moves reflect the growth of the Civic Center and the evolution of the Department of Transportation.

The Department of Transportation is now located in the state-of-the-art Caltrans building.

The old Bureau of Street Traffic Engineering, part of the Police Department, had occupied Room M-60 on the mezzanine level of City Hall. This room was adequate for the administration and engineering staff of a bureau of only 90 persons as of January 1946. However, in the City's post-war expansion the Bureau's size grew to 300 persons and by 1949 new quarters had to be identified.

When the Department of Traffic Engineering was formed in 1949, the 12th floor of City Hall became its headquarters. The staff could hardly fill the room. Although this would remain the headquarters, a temporary satellite office was established at 6501 Fountain Avenue in the late 1960's to house most of the engineering staff. This relocation relieved City Hall overcrowding until City Hall East could be constructed. Upon the return to City Hall in 1976, the Depart-

When the Department of Transportation was formed in 1979, new floors were added. One was the 16th floor of City Hall, occupied by employees transferred from the former Department of Public Utilities and Transportation. The other floor was 760 City Hall East which was occupied by employees transferred from the Transportation Engineering Division of the Bureau of Engineering. By this time there were over 500 employees and the expanded senior staff of the new Department of Transportation experienced somewhat crowded conditions on the 12th floor of City Hall.

There were new sites added in 1984 when the Department's size grew to 1,100 employees. The administrative staff of the newly formed Office of Parking Management (OPM) temporarily was located at 316 West Second Street. A few months later, OPM was located to the new City facility, the C. Erwin Piper Center. At the same time, the Transportation Engineering Division was relocated around the corner to 205 South Broadway. The Department was told that the move was temporary for six months. However, that estimate was turned out to be off by 20 years.

In 1989, the Whittier Earthquake caused damage to City Hall. Although the damage was minor, the earthquake focused attention on the seismic safety of this icon City structure. On January 17, 1994, the Northridge Earthquake caused major damage throughout the City, including visible wall damage to City Hall. The inescapable conclusion was that City Hall needed a $300 million seismic retrofit. A plan was developed to vacate City Hall and relocate all affected City offices. Thus in March 1995, the Department of Transportation moved its now very crowded headquarters of 46 years to leased office space at 221 North Figueroa Street. Although the building amenities at Figueroa Plaza have been outstanding, the location has not been within walking distance of City Hall and lunch options have been limited.

As the seismic retrofit of City Hall was nearing completion, a relocation "stacking" plan was developed. But due to the size of LADOT, it was excluded from the small floors of City Hall. In the meantime, City Hall East was occupied by departments that had been there for many years. As a result, during the 10-year period, 1995 to 2005, LADOT occupied multiple Downtown offices and had no permanent home. However, through the persistent efforts of General Managers Frances Banerjee and Wayne Tanda, LADOT was able to locate to the new state-of-the-art Caltrans building. Many of the satellite offices that emerged during the last 40 years were consolidated to this site. Until at least the year 2025, this will be the "permanent" LADOT headquarters.

The Origin and Evolution of Traffic Officers

Traffic Officers trace their origin to sworn Police Officers. Beginning sometime in the early part of the 20th century, Police Officers were deployed at Downtown intersections to assign right-of-way to the new automobiles, pedestrians and trolleys. As automated traffic signals began to be introduced, they would change the signal timing at the controller with a hand-held switch. Over the years, they also would be used to facilitate left turns and to keep closely-spaced intersections clear.

Time limit parking enforcement in the 1940's
Graphic - 5038

Sworn Police Officers also were used to enforce parking restrictions, beginning in 1919 with 45-minute time limit restrictions in Downtown. When parking meters began to be used in the City in 1949, they enforced meter violations, as well.

In time, it was desired to dedicate sworn officers to the more serious crime functions of investigation and prevention. Thus, civilian position titles were created within the Police Department. They included Parking Control Checkers in 1959 for parking enforcement and Traffic Control Officers in 1967 for directing intersection traffic.

During this period, the Parking Control Checkers drove three-wheeled motorcycles and most of them were female. They were often called "meter maids," a popular yet demeaning term. On the other hand, the Traffic Control Officers were exclusively male. In recognition of these artificial barriers and gender bias the two classes were consolidated in 1974 to the new class of Traffic Officer.

Intersection control and aid in the 1920's
Graphic - 8101

Due to their role in enforcing traffic and parking regulations, they remained with the Police Department. However, the Police Department emphasis was crime fighting, whereas the Department of Transportation's emphasis was parking supply and congestion relief. As a result of this realization, Traffic Officers were transferred from the Police Department to the Department of Transportation in 1984 to emphasize their role in facilitating traffic circulation and parking. This transfer had been envisioned when the Department of Transportation was formed in 1979. The so-called Brophy Study conducted for the City in 1982 outlined a plan for consolidating on-street parking, off-street parking, parking enforcement and intersection control into a more efficient entity. This consolidated entity became the Office of Parking Management. The transfer of the Traffic Officers nearly doubled the size of the Department. With the part time crossing guard staff considered, the Department tripled in size.

Parking enforcement, circa 1950
Graphic - 3043

Although traffic signals were incorporated into the ATSAC system, the need for Traffic Officers to be deployed to reinforce signal control continued. At the same time, the City's success in managing traffic during the 1984 Olympic Games, Pope John Paul's visit in 1986 and the 1994 Northridge Earthquake demonstrated their important role in managing traffic during planned special events and emergencies. In addition, they have expanded their role in removing abandoned vehicles. Since 1969 they were allowed to impound vehicles illegally parked or abandoned on City streets. This would expand to include impounding abandoned vehicles on private property.

Today, their role is viewed not just as one of enforcement and also in terms of quality-of-life. Their responsibilities in parking enforcement help to ensure the viability of business districts. Their duties with respect to intersection control helps to avoid gridlock. Their efforts in event management help the City celebrate community, regional and nationally prominent events. Finally, their duties in removing abandoned vehicles from streets and private property help to remove blight and restore the livability of the communities.

The Origin of Traffic Control Signs

Traffic control signs in Southern California are more than a century old. In 1905, guide signs started appearing across the County of Los Angeles.

Wooden guide sign

Graphic - 2028

The Automobile Club of Southern California had been formed five years earlier and was dedicated to promoting the needs of auto enthusiasts. An outgrowth of this promotion was the posting of directional guide signs along the few extant highway links in Southern California. The first signs were wooden and were posted between Santa Monica and Downtown Los Angeles. They showed community names, mileage and directional arrows. The County contributed funds for the manufacture of the signs.

The initial signing effort was very popular. Soon, they began placing signs throughout the Southern California area guiding motorists to Riverside, San Bernardino, San Buenaventura, Santa Ana and San Diego. In 1913 porcelain enameled steel signs became the norm, and they were manufactured for the Auto Club by the California Metal Enameling Company of Los Angeles, known as CAMEO. By that time business leaders and real estate developers were eager to promote travel to Southern California. They convinced the Auto Club to lead the effort in guiding motorists from the East Coast to the Southland, as the National Old Trails Road was nearing completion between Kansas City and Los Angeles. In 1914, 4,000 signs were posted along the route.

Warning signs from the 1940's

Graphic - 2029

During the 1920's and 1930's their efforts expanded to include parking signs, Stop signs, warning signs and U.S. Highway and State Highway shields. In 1930, they started to use glass reflector buttons on the text. In time, however, the traffic control capabilities of governmental agencies developed to the point where this private, but publicly spirited, organization had to re-evaluate its sign posting practices. In 1930, the City of Los Angeles became the first in California to manufacture and post traffic control signs. In 1947, the State assumed signing functions on State Highways, as well. In 1956 local agencies took over all sign posting activities.

"Slow, Watch For Curves"

Graphic - 4012

The origin of sign posting can be seen in the courtyard of the Automobile Club of Southern California at 2601 South Figueroa Street. And in a few small cities you can still find CAMEO parking signs and black-on-white guide signs with the "Auto Club So. Cal" and bell logo at the bottom.

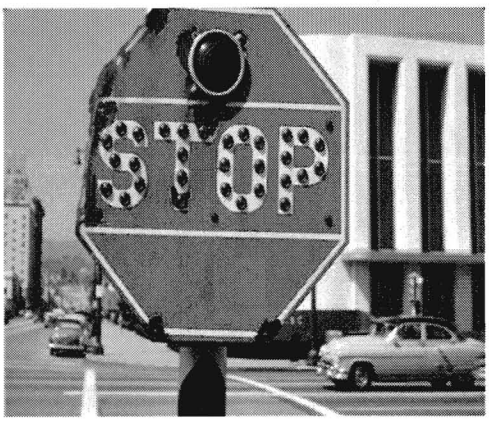
The California Stop Sign

California is the only state in the nation to have always had red Stop signs. All other states have used yellow Stop signs.

Pre-1927 Stop sign by the Automobile Club of Southern California
Graphic - 2027

In 1924, the First National conference on Street and Highway safety recommended white on red for Stop signs. The Automobile Club of Southern California (ACSC) and the California State Automobile Association (CSAA) responded by developing a porcelain enamel "Boulevard Stop" sign with white letters on a red background using the established diamond shape.

In 1927, the American Association of State Highway Officials (AASHO) developed a manual on signing for rural areas. This manual adopted the octagon as the shape for Stop signs. But after much debate, yellow was adopted as the background color for danger, caution and Stop signs. The red color for Stop signs was rejected, due to inadequate visibility at night. ACSC and CSAA then adopted the octagonal shape but not the yellow color for Stop signs. They addressed the concern for night-time visibility by the use of glass button letters. California thus refused to join the rest of the nation and was the only state to retain the red Stop sign.



City of Los Angeles Stop sign, circa 1950

Graphic - 3013

Ultimately, the holdout state was able to gloat when in 1954, the MUTCD changed the color of the Stop sign from red or black on yellow to white on red.

Yellow Stop Sign advertisement from 1949

Graphic - 8110

Freeway Guide Signing

Guide signing to and from freeways developed into an art form in Southern California during the 10-year period from 1949 to 1959. The developments during this period would set a standard for other major metropolitan areas.

Modern "butterfly" sign versus the traditional Auto Club sign on the Santa Ana Freeway at Ramona Parkway (San Bernardino Freeway), 1949
Graphic - 8111

The modern format used white upper and lower case letters on a black background. Initially, 12 inch upper case and eight inch lower case letters were used but they were eventually increased to 18 inches and 12 inches, respectively. The first modern signs in Southern California were developed by Al Hutchinson and Gerald Skills and were installed in April 1949 on a section of the Santa Ana Freeway. With this modern signing, motorists could determine sufficiently in advance where to exit a freeway.

Meanwhile, by the mid-1950's, Los Angeles witnessed the completion of early segments of its legendary freeway network radiating from Downtown. First, there was the completion of the first generation of the San Bernardino Freeway in 1943. This was followed by the Hollywood Freeway in 1951, the Santa Ana Freeway in 1952, the Pasadena Freeway in 1953 and the Harbor Freeway in 1954.

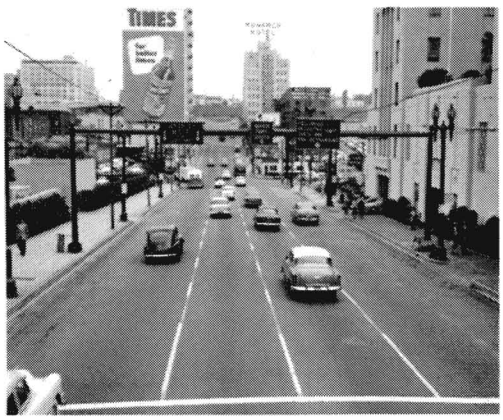
Off-ramp sign on the Santa Ana Freeway, 1950

Graphic - 8112

Shortly after the Downtown freeway network was constructed, a dilemma was realized for motorists trying to enter the freeway system. Motorists visiting the Downtown area were not able to know which streets had access to the freeway and were not sure whether to be in the right or left lane. At a "diamond" interchange, a motorist would have to be in the right lane to travel in one direction along the freeway and in the left lane to travel in the other. However, where "loop" ramps existed, freeway access would always be from the right lane. A "hook" ramp could be accessed from the left or right lane. Where there was a combination of ramp types, access to both directions of the freeway could be from the right lane, the left lane or both. In the cases of 3rd Street and 5th Street approaching the Harbor Freeway, access is from several lanes. How was a motorist to know in advance which lanes have access to a freeway?

Freeway Guide Signing, Continued

Beginning in 1955, the City of Los Angeles started to install overhead freeway guide signs. The first ones were installed on the 3rd Street and 5th Street approaches to the Harbor Freeway. The early signs had white letters on a black background, all capital letters and external lighting. By 1958, a reflective green background started to be used with upper and lower-case letters. Hutchison and Skiles were now with the City of Los Angeles and helped to guide efforts to develop sign formats that would assist motorists in accessing the freeways.

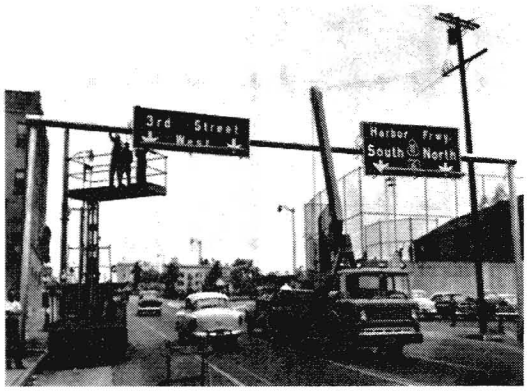


First overhead freeway guide sign, on 5th Street, circa 1955

Graphic - 1029

What emerged out of these initial installations was a new concept in traffic management. The concept involved two types of freeway guide signs on any freeway approach. The first sign is to provide "lane assignment", so that motorists may know far enough in advance which lane or lanes to be in. The second set of signs is to convey "action" in order to show where a motorist is to turn to access the freeway. Lane assignment signs show down arrows (meaning "this lane") or have word messages such as "RIGHT LANE". Action signs show horizontal or diagonal arrows. Action signs could be overhead or roadside mounted. In 1959, a program was launched to provide signing for the freeways within the City of Los Angeles. The first project was for the Hollywood Freeway in the Hollywood area where 22 roadside signs and 8 overhead signs were installed. The program continued through the 1960's.

Eventually, the California Traffic Manual and the federal Manual on Uniform Traffic Control Devices would prescribe these signs. It all started from the "lane assignment/action" concept for freeway access signing, pioneered by the City of Los Angeles.



Overhead guide sign on 3rd Street, circa 1957

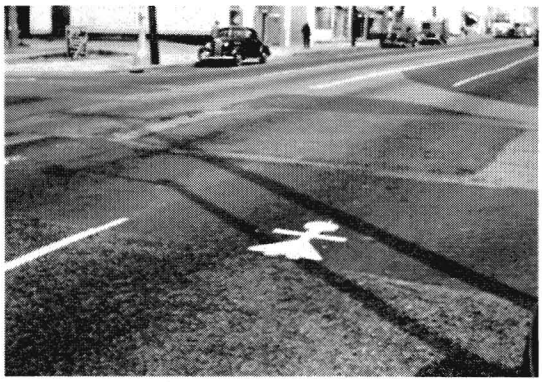
Graphic - 1047

Safety Slogan Signs

Over the years there have been numerous attempts, through signing and pavement markings, to appeal to the conscience of motorists to drive cautiously. All have been well-intended and their unusual formats immediately attracted attention. However, all of ad hoc installations soon were forgotten. Several are illustrated. Some were installed at a single location while others were widely installed.

One sign that was posted throughout the City of Los Angeles circa 1975 was the "? Speeding?" sign. This was followed in 1976 with signs that were posted at the entrances to the City stating "Safe Drivers Proceed". Some were supplemented with another sign stating "Others Go Back".

Graphic - 3026

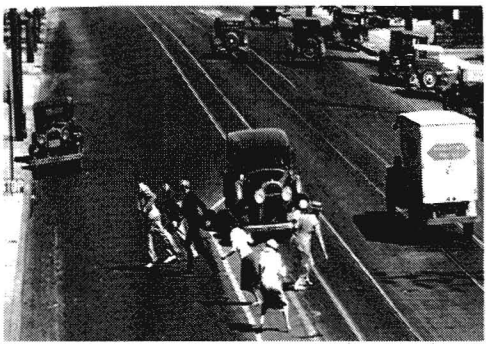


Unique pedestrian pavement marking

Graphic - 3007

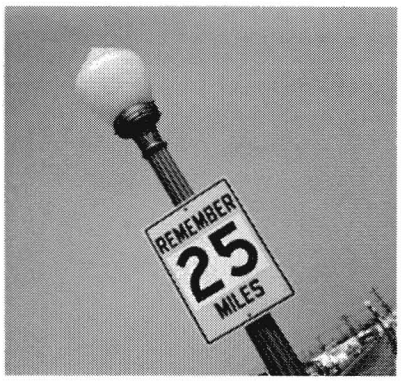
Unique pedestrian pavement marking

Graphic - 3008



Staged safety photo

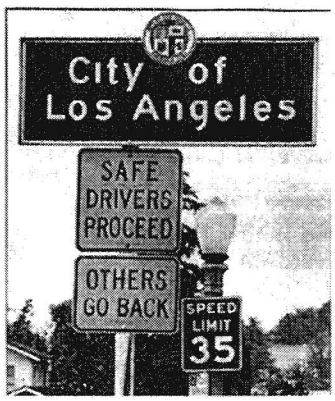
Graphic - 2046



Graphic - 3046

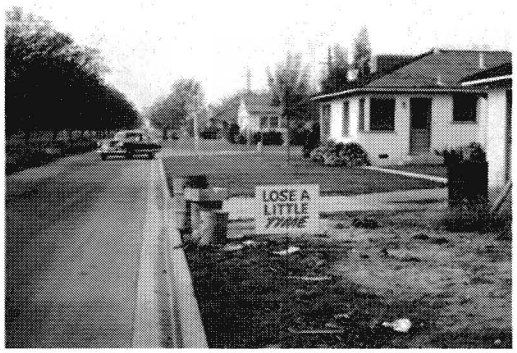
Safety Slogan Signs, Continued

In 2004 the Watch The Road safety education campaign was launched, which featured catchy safety slogans and graphics. This slogan appeared on posters on the back of LADOT buses, on bumper stickers on the back of City vehicles, on lawn signs in residential areas and on traffic related changeable message signs. In addition, a few spots were heard on radio and on television. To remind road users to be cautious and to reflect on the safety slogans, signs were installed throughout the City with the legend "Watch The Road". Alone, the sign had little meaning. But in combination with the safety slogans it was part of the most comprehensive and effective safety education campaign undertaken to date.



City Limit Signing, circa 1975

Graphic - 8095

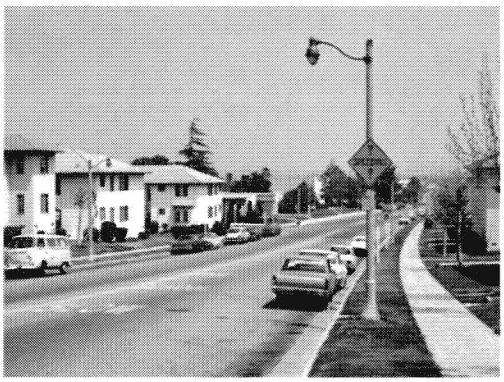


Graphic - 3016

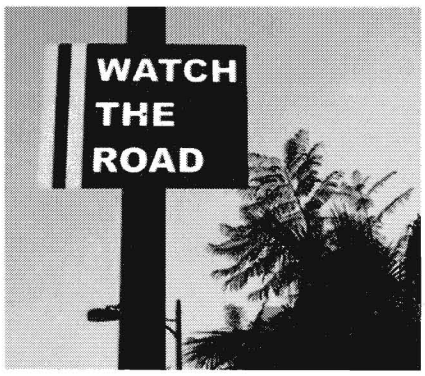
Graphic - 3033

San Vicente Boulevard near Bundy Drive

Graphic - 3055



? Speeding ? Sign, circa 1975.



From the 2005 Watch The Road campaign

Graphic - 8118

Street Name Signs

Today in the City there are over 178,000 street name signs, one on each near-side right approach to every intersection. Street name signs have appeared in numerous formats beginning over a century ago. The following is a chronology:

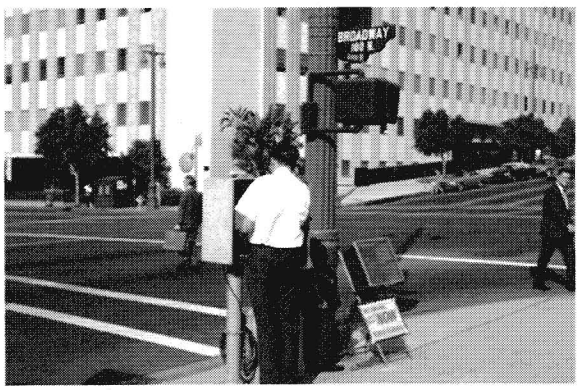
Circa 1928 signs

Graphic - 4062

Early 1890's to 1945: Wooden signs with hand-stenciled painted white capital letters on a painted dark blue background were the first types of street name signs used. At first, they were used for all streets, then later for non-commercial streets.

Early 1920's: Metal porcelain enamel blade signs with white capital block letters on a dark blue background started to be used in commercial areas. In some cases they were installed in the curb face.

Circa 1928: Metal porcelain enamel box signs (trapezoidal cross section) with the same format as above, were used with the name appearing on both sides. A decorative ornamental iron curlicue was attached on top.

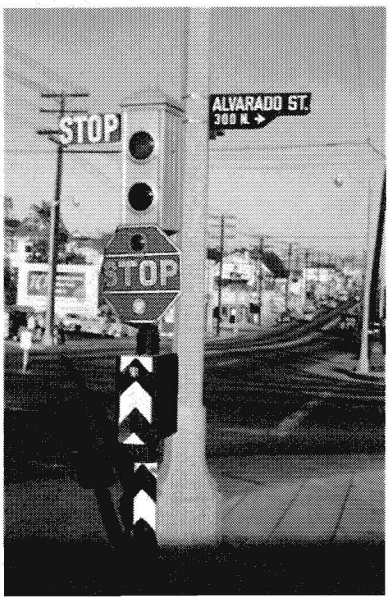


Circa 1940 sign

Graphic - 3021

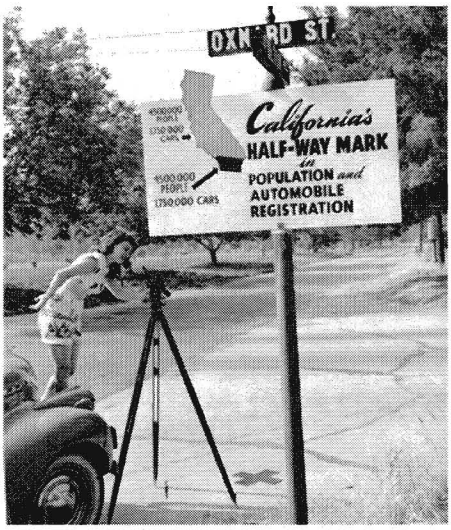
1938-41: Same as above, but with two differences. The box shape is rectangular and the address number is shown and flagged below in the middle.

1946-62: This is known as the "shotgun sign". The block letters have a variable width depending on the length of the name. The address is flagged below to the left edge of the sign. A cast-iron finial is mounted atop the street name sign post, which is made of heavy-gauge, surplus boiler pipe.



"Shotgun" street name sign

Graphic - 3001



Wooden street name sign

Graphic - 2051

Street Name Signs, *continued*

Wooden street name sign

Graphic - 3044

Circa 1970 sign

Graphic - 2020

1963-66: The Department of Traffic inherits the responsibility for street name signs from the Bureau of Street Maintenance. At that time there are 32,000 wooden signs and 79,000 porcelain enamel signs in various formats. Street name signs are maintained but there are no new formats.

1967-73: The Department of Traffic is the first in the nation to develop a street name sign using standard but reduced sized upper and lower case letters. Reflective white letters on a dark blue, enameled background are used on an extruded aluminum blade. There is white outlining on the sign. A separate address plate is attached. Signs are posted on the near right side.

1974-85: Same as above, except a reflective blue background is used.

1986-2006: Glass-embedded reflective white letters on a dark blue enameled background are used on a box shape metal sign. The street designation and address appear in smaller text on the same panel.

Street name signs atop an Acme signal

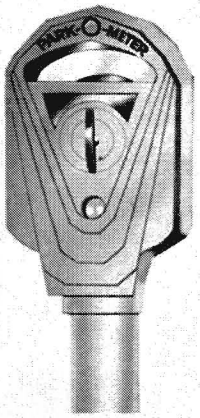
Graphic - 8058

Circa 1982

Graphic - 5023

The First Parking Meters

The idea behind parking meters goes back to 1933 when Carl Magee was chairman of a traffic committee of the Oklahoma City Chamber of Commerce. In spite of enforcement efforts, nearly 80% of cars parked in the downtown streets parked all day. As a result, merchants experienced declining sales and the Chamber was concerned.



1935

In July 1935 One Hundred and Fifty (150) PARK-O-METERS were installed in Oklahoma City, Oklahoma. It was the World's first parking meter installation.

Graphic - 1006

Magee and professors from Oklahoma State College offered $500 in prizes to engineering students who could help develop a working mechanical timing device. After the contest, four other individuals developed the concept further and formed the Dual Parking Meter Company in 1935. In July 1935, Oklahoma City installed the first parking meters, 150 in all.

For just a nickel, a motorist could park for one hour and at the conclusion, a red flag would pop-up. The red flag would enable parking enforcement officers to easily determine when the time had expired, thus encouraging turnover. It was soon realized that parking meters could be used not only to provide parking turnover but also to set aside funds for off-street parking spaces. The coins retained in the canister could be collected and programmed for off-street parking lots. It was an ideal solution.

The first city in California to use parking meters was Long Beach in November 1936. San Diego tried them in 1941. However, most cities installed them after World War 2. Prior to this time, most of the retail centers were located in central business districts that were well served by trolleys. However, in the postwar period, suburbs developed and the privately operated trolleys no longer were financially viable to serve these suburban shopping centers. Thus, shoppers started arriving by cars and using all available curb space. As a result, the use of parking meters became popular in retail districts after World War 2.

Circa 1945

Graphic - 1011

Despite their benefits, they were controversial at first. In 1940, 1942 and 1946 parking meters were defeated in Los Angeles. Opponents questioned the "moral right" to rent out City streets financed by taxes and owned by the public-at-large. However, the opposition was overcome and the first meters were installed along Lankershim Boulevard and Magnolia Boulevard in the North Hollywood community in June 1949. Later that year, they were installed in the Van Nuys community.

They became quite popular and grew from 1,800 in 1949 to 27,000 in 1977 and then to 41,000 today. The demand has leveled off in recent years since virtually all of the older retail areas have been covered. Today, parking meters require several nickels, as the rates are as high as $4.00 per hour in some parts of the City. New models are capable of receiving credit cards. In addition, there are pay stations for an entire block that use no meter heads at all. But despite these enhancements their function remains the same – maximizing the availability of existing parking and financing future parking.

Off-Street Parking

To a motorist, convenient parking at a destination is an essential part of a vehicle trip. To a retail outlet or commercial development, success is highly dependent on the availability of parking. This concept of providing convenient parking was first realized in 1917 in Los Angeles by an enterprising immigrant from Italy, named Albert Pansini.

The original 1917 sign for Savoy Auto Park.

Pansini once observed a peg-legged man who, for a small fee, would watch over cars parked at the curb. At that time, owners of motor vehicles tended to be the more affluent members of society who could afford that service. But as the motor car transitioned from rich man's novelty to common man's necessity just after the Great War, more and more people needed parking to conduct business and shop Downtown. Pansini envisioned that he could accomplish on a grander scale the custom service that was provided by the man with the wooden leg, by providing security for many parked cars parked at one site. To accomplish this vision, he leased an empty lot on the northwest corner of 4th Street and Olive Street in 1917 and advertised parking for five cents. At first, his idea was so novel that he had no customers for the first five days. But the idea caught on and by 1926 his Savoy Auto Park company was operating 40 lots.

Suburban commercial development would soon recognize the value of providing off-street parking. In the late 1920's the first suburban department stores started to provide parking next to or behind their outlying branches, such as Sears in Boyle Heights and in Hollywood. The most elegant example of this was the 1929 Bullocks-Wilshire building on Wilshire Boulevard at Westmoreland Avenue, which featured art deco wrought iron gates and a porte cochere with a transportation mural painted on its ceiling. After the Great Depression and World War II, the first wave of regional shopping centers were built and featured expansive lots for parking. They included the centers in Crenshaw, Westchester and North Hollywood (Valley Plaza).

At this same time, the City started to become involved with off-street parking as a joint venture with the private sector. Beginning in June 1949, parking meters were installed in North Hollywood (Lankershim and Magnolia Boulevards) and in the Van Nuys Civic Center a few months later. Their first benefit was to ensure parking turnover in combination with time limit parking restrictions. Their ultimate benefit was to provide a revenue stream for off-street parking. Within the next decade, City off-street parking lots would be acquired in North Hollywood and the Van Nuys Civic Center where funds had been generated. The first City off-street parking facility was an above-ground structure at 14401 Friar Street in Van Nuys, which opened in 1955.

The most dramatic parking facility during the early post-World War II era was the Pershing Square underground parking garage. The Downtown core had long needed a major off-street parking facility, much larger than that which could be provided by the collection of Savoy Auto Park and other private parking lots. The idea of building an underground parking garage below Pershing Square was inspired by the Union Square Garage San Francisco, reportedly the first isolated underground garage in the United States which opened in 1942. It too was built below a public park. The Pershing Square Garage was completed in 1953 and included 1,800 parking spaces. Although the City allowed it to be constructed below a public park, no City funds were used in its construction.

Off-Street Parking, *continued*

Today, there are over 100 City operated off-street parking facilities. Most of those built before the 1980's are lots owned entirely by the City. However, as Los Angeles transitioned to a built-out City with ever-rising land values, it became increasingly difficult to finance the acquisition of land and the construction of structures. As a result, since the 1980's limited parking meter revenue funds have been leveraged with developer funds. Thus, the newer facilities tend to be joint ventures with developers and the private sector, where public parking is provided in addition to that required to satisfy the parking needs of adjacent development. The most glamorous example of such a joint venture is the underground parking for the Hollywood/Highland Center.

A Savoy Auto Park in Hollywood

Graphics - 5001

Mushrooms, Dots, Gaps and Tracks

Of all of the traffic control devices, pavement markings are the most ubiquitous. They identify the center of the roadway, provide lane separation and delineate crosswalks. Stones, metal, concrete, paint and thermoplastic stripes all have been used to guide road users. In the City of Los Angeles approximately 2,200 miles of street have pavement markings. But this wasn't always the case.

Metal pavement marking from the 1920's

Graphics - 3125

Metal Mushroom

Graphics - 5018

The first known delineation in the world was on an ancient road between Mexico City and Cuernavaca, Mexico. In the 1500's the center of the road was marked with white stones, not too dis-similar to the oval roadway in MTA's Patsaouras Plaza.

The first known painted centerline in the United States was applied in 1911 in Wayne County, Michigan. Edward Hines was a highway commissioner there and after witnessing a near head-on collision between a horse-drawn wagon and an automobile, he proposed white centerlines on various roadways. After these installations, collisions dropped dramatically.

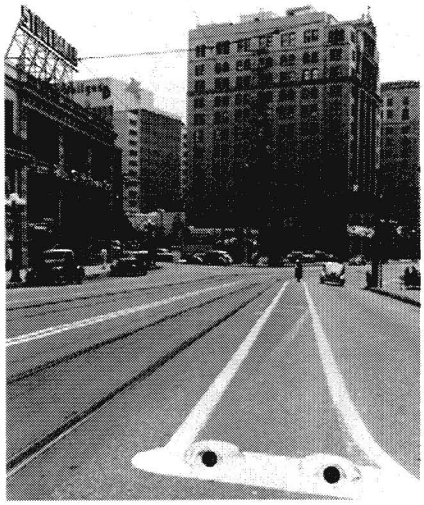
In California, the inspiration for the first centerline occurred in 1917 when Dr. June McCarroll was driving to visit a patient and a truck forced her off the road. She took her idea to the Riverside County Board of Supervisors and then to the Chamber of Commerce. They politely listened but took no action. So she took matters into her own hands, literally. That year, she printed a four-inch wide line, two miles long along Indio Boulevard. For the next seven years Dr. McCarroll wrote letters, campaigned for painted lines and developed support from various Women's Clubs. Finally in 1924, the Legislature authorized the painting of center lines on State Highways and in the Fall of 1926 the first centerlines appeared.

In the City of Los Angeles, dome shaped metal markers were first installed in the early 1920's to delineate crosswalks. They were applied in the wet concrete and held by a thick pin. Soon thereafter they were used on a limited basis to delineate center lines and lane lines. Today, 80-year old markers are preserved next to an elementary school at the intersection of 2nd Street and June Street in Hancock Park. Super size versions of these markers were used to simulate raised island and were known as metal mushrooms.

In 1915 several marked crosswalks were installed on Broadway. Beginning in 1925, school crosswalks began to be painted in yellow. Curbs were painted red for no stopping zones and yellow for commercial loading zones. These later became California standards. In July 1930, the new City of Los Angeles Bureau of Street Traffic Engineering started painting centerlines and approach lane lines. The first streets so striped were Wilshire Boulevard, Figueroa Street and Ventura Boulevard. In the early years lane lines were solid. However, as a World War 2 conservation measure, the Division of Highways (now Caltrans) temporarily repainted lines with 25-foot gaps between 15-foot stripes. After the War, the broken lane line was judged to be sufficient and has remained dashed ever since.

Mushrooms, Dots, Gaps and Tracks, Continued

One of the more permanent forms of pavement markings was white concrete. When the Sepulveda Boulevard tunnel below Mulholland Drive was completed in 1935 it was delineated with a double white concrete centerline. White concrete also used crosswalks use to delineate the crosswalks at the intersection of Hope Street and Temple Street.



Delineation of a trolley "safety island"

Graphics - 3120

"Metal Mushrooms" used to delineate a flush island

Graphics - 3031

In 1953, Dr. Elmer Botts, with the California Division of Highways invented a semi-spherical raised pavement marker made of reflectorized concrete. These became known as Botts dots and first appeared on a stretch of US 99 outside Fresno in 1955. They have been the main form of striping on freeways ever since.

Around 1940, the California Division of Highways used diagonal pavement arrows painted between a painted median to emphasize that vehicles should not cross the pair of double yellow lines. These diagonal arrows evolved into the diagonal markings which have the same meaning today.

Around 1955, the Department of Traffic became one of the first public agencies to start using thermoplastic, which has a life of five to 15 years. At first, it was used for crosswalks in order to reduce the disruptions to traffic associated with the annual repainting of the parallel lines. Later, it was used for the eight inch white lines which delineate left turn lanes, so that the paint truck could avoid having to make another pass after painting the yellow median area. By the mid-1980's the City began converting all painted striping to thermoplastic. Los Angeles is the only city to use thermoplastic for all in-street pavement markings.

By the 1960's striping became more colorful. In 1961 double white centerlines became double yellow in order to provide a more distinguishable marking to reduce head on collisions. Dashed centerlines for two lane streets were converted to yellow beginning in 1971.

Today, there are many sub-categories of pavement markings - painted curb zones, transverse markings, (limit lines, crosswalks and chevrons), pavement messages ("Stop Ahead") and striping (lane lines, centerlines). And then there are the materials - paint, thermoplastic, ceramic raised markers, plastic raised reflective markers and light emitting diodes in a variety of housings. Finally, there are a variety of stripes, including centerlines, lane lines, edgelines, barrier lines, "cat-tracks" (through intersections) and "elephant tracks" (for trap lanes). As the demands and expectations of the transportation profession has increased so has the sophistication of this most vital traffic control device.

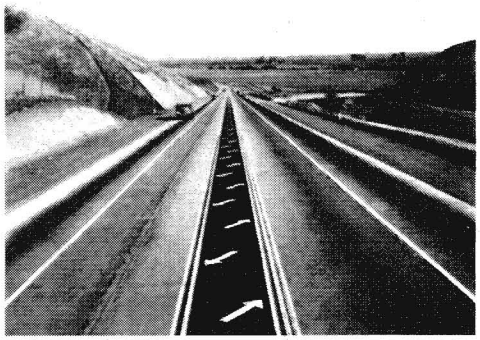
Mushrooms, Dots, Gaps and Tracks, Continued

Crosswalk painting with a brush, circa 1950

Graphics - 3097

Pavement message maintenance using a brush, circa 1950

Graphics - 3017

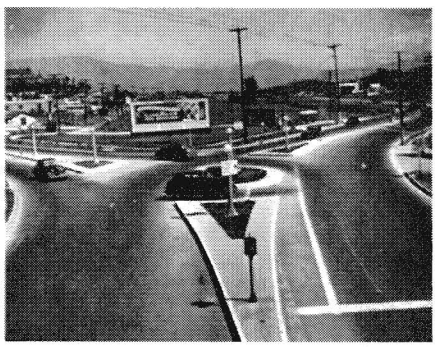


Asphalt-formed diagonal arrows used to separate opposing flows

Graphics - 8089

James Jackson, first markout foreman for the City of Los Angeles

Graphics - 3035



Channelization and markings at the "Y" intersection of Alhambra Avenue and Valley Boulevard

Graphics - 8091

Left Turn Pockets

Although the concept is simple and taken for granted, left turn lanes are one of the most effective of all traffic control measures. Today, in the City of Los Angeles there are approximately 11,000 left turn pockets and 400 miles of two-way left turn lanes.

The first striped left turn "pocket" lane reportedly was installed on a park road in Chicago. The term, "pocket", refers to an added lane preceded by a reverse curve entrance and is analogous to the added storage area of a pants pocket. This first installation was a well-kept secret as only a few were installed in the nation prior to World War 2.

After the War the idea took off. As the California Division of Highways (now Caltrans) embarked on a post-War State Highway improvement program, divided highways became the standard.

La Tijera Boulevard near Knowlton Street, looking north, March 1956
Graphics - 3030

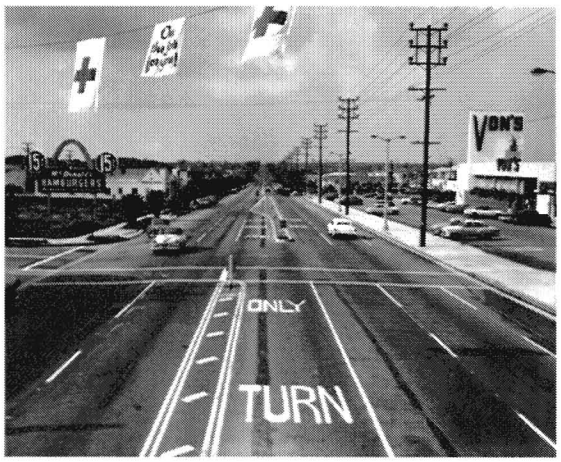
At critical intersections left turn bay designs were carved out of the raised median. These bays or pockets provided a storage area for vehicles to wait and turn left as gaps in opposing traffic appeared. One of the first designers of left turn pocket designs for the Division of Highways was Alexander L. Hutchinson, who would later become Deputy City Traffic Engineer for Los Angeles and President of the Institute of Traffic (now Transportation) Engineers. The first State Highway in Southern California to feature left turn bays was Olympic Boulevard between Centinela Avenue and Lincoln Boulevard, a project completed in 1948.

The first left turn lane in the City of Los Angeles was installed for traffic northbound on Crenshaw Boulevard at the May Company driveway north of Santa Barbara Avenue (now Martin Luther King Jr. Boulevard) in 1947. Like those under construction on Olympic Boulevard, it was installed within a raised median. Ralph Dorsey proclaimed it, "the safest method of executing left-hand turns know to engineers".

Left Turn Pockets, Continued

The presence of Red Car and Yellow Car rail transit tracks on many arterial streets through the early 1950's precluded consideration of striping, since left turning vehicles would have been positioned in the path of opposing trains. In addition, striped left turn lanes (with no raised median) were thwarted by an interpretation by the Los Angeles City Attorney's Office. It claimed that a double center line could not be offset, so as to allow a center left turn lane, because a center line had to be marked in the center of the roadway. But by 1954 the City of Pasadena sandblasted and restriped Colorado Street (now Boulevard) to provide left turn lanes at each intersection. Pasadena's one mile project between Arroyo Parkway and Mentor Avenue was completed in March 1954. It was immediately well received and was extended another 2½ miles to the east city limit three months later. Other jurisdictions took notice and the City Attorney's opinion softened.

In March 1956 the City of Los Angeles began a program to restripe all streets at least 66 feet in width with painted left turn pockets. Most of the installations occurred following street resurfacing, while a few others were undertaken with sandblasting. The first project of this program was La Tijera Boulevard from Knowlton Street to Freeman Avenue (now La Cienega Boulevard). This was followed by Van Nuys Boulevard near the Van Nuys Civic Center. After the projects on wider boulevards were implemented attention eventually focused on narrower thoroughfares where left-turn pockets could be provided if parking near intersections were prohibited.



La Tijera Boulevard near Knowlton Street, looking south, March 1956
Graphics - 3058

The conversion of striping to provide left turn pockets along hundreds of miles of the thoroughfares has proven to be the single most effective traffic control measure to improve travel reliability, reduce rear-end collisions and reduce sudden evasive lane changes.

The Development of the Two-Way Left Turn Lane

The presence of Red Car and Yellow Car rail transit tracks on many arterial streets through the early 1950's precluded consideration of striping, since left turning vehicles would have been positioned in the path of opposing trains. In addition, striped left turn lanes (with no raised median) were thwarted by an interpretation by the Los Angeles City Attorney's Office. It claimed that a double center line could not be offset, so as to allow a center left turn lane, because a center line had to be marked in the center of the roadway. But by 1954 the City of Pasadena sandblasted and restriped Colorado Street (now Boulevard) to provide left turn lanes at each intersection. Pasadena's one mile project between Arroyo Parkway and Mentor Avenue was completed in March 1954. It was immediately well received and was extended another 2½ miles to the east city limit three months later. Other jurisdictions took notice and the City Attorney's opinion softened.

In March 1956 the City of Los Angeles began a program to restripe all streets at least 66 feet in width with painted left turn pockets. Most of the installations occurred following street resurfacing, while a few others were undertaken with sandblasting. The first project of this program was La Tijera Boulevard from Knowlton Street to Freeman Avenue (now La Cienega Boulevard). This was followed by Van Nuys Boulevard near the Van Nuys Civic Center. After the projects on wider boulevards were implemented attention eventually focused on narrower thoroughfares where left-turn pockets could be provided if parking near intersections were prohibited.

Southern California's first Two-Way Turn Lane in May 1960 on Wilshire Boulevard, easterly of Fairfax Avenue. Graphic 3104

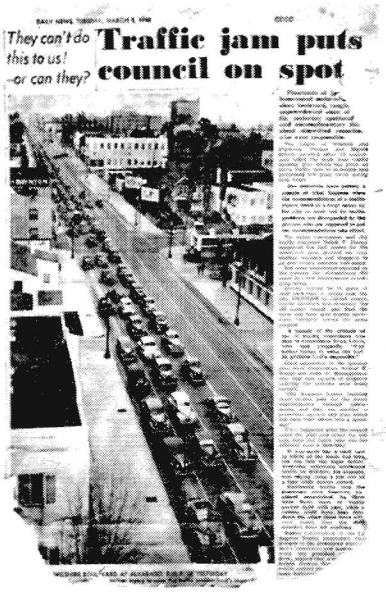
The conversion of striping to provide left turn pockets along hundreds of miles of the thoroughfares has proven to be the single most effective traffic control measure to improve travel reliability, reduce rear-end collisions and reduce sudden evasive lane changes.

One of the primary methods of yesteryear used to handle peak period traffic flows was the use of reversible lanes. It was the most effective measure available at a time when there were no freeways, one-way streets, left-turn lanes or ATSAC signal system. Los Angeles was the primary pioneer for this treatment.

Wilshire Boulevard at Western Avenue with reversible lanes, 1937
Graphics - 5037

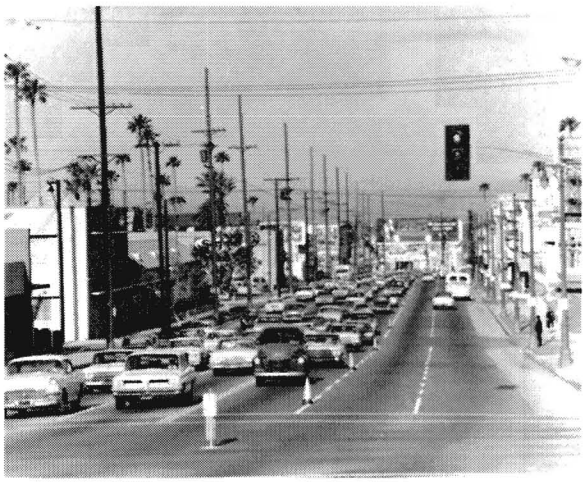
It was the brainchild of Ralph T. Dorsey and it was first tested on 8th Street in Downtown Los Angeles in 1928. In the morning, three lanes would be provided eastbound and one lane westbound. During the evening it was reversed with three lanes westbound and one lane eastbound. Metal-based stanchions were initially used to delineate the temporary division between opposing traffic flows, and after 1950 the new traffic cones were deployed.

In 1937, this treatment was implemented along six miles of Wilshire Boulevard. It was immensely successful. However, with Wilshire Boulevard as the premier retail street of Los Angeles, it needed to serve local circulation needs as well as accommodate through traffic. As a result, the operation was overturned three years later by the City Council. During the years prior to World War 2, reversible lanes were installed twice daily on 17 streets.


They can't do this to us! —or can they?

Traffic jam puts council on spot

Wilshire Boulevard at Western Avenue with reversible lanes, 1937
Graphics - 5037

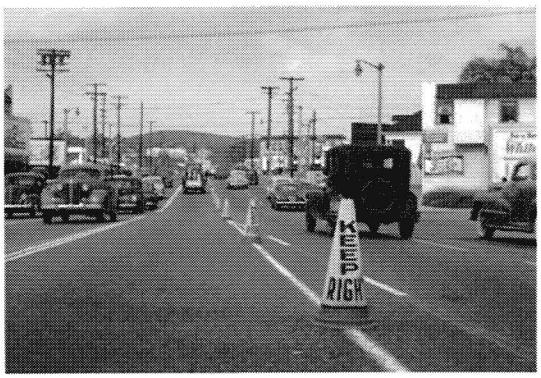


Reversible lane operation along Olympic Boulevard
Graphics - 2062

One of the first advertisements for traffic cones
Graphics - 1018

Reversible Lanes, Continued

After World War 2 they were used to provide capacity in future freeway corridors. In 1948 reversible lanes were used on Figueroa Street and on Castelar Street (now Hill Street) in Chinatown at the entrances to the Arroyo Seco Parkway (now Pasadena Freeway). The intersection of Sunset Boulevard and Figueroa Street became the most heavily traveled intersection in the country. Around 1949 they were deployed along six miles of Olympic Boulevard, and this treatment lasted until 1966, a year after the Santa Monica Freeway was completed. With the reversible lanes, Olympic Boulevard carried more volume than any other street in the country. From 1953 through 1958 the Sepulveda Boulevard tunnel below Mulholland Drive operated with a reversible lane until the San Diego Freeway was opened through the Sepulveda Pass.



Reversible lane operation along Figueroa Street, south of Sunset Boulevard, looking north, circa 1949
Graphics - 3011

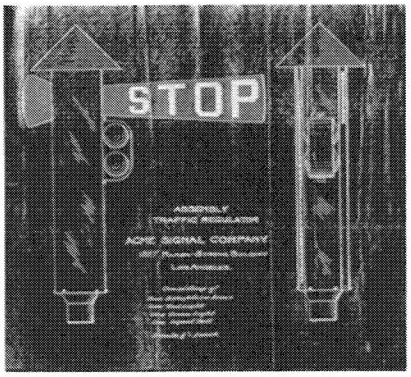
Reversible lane operation on Alameda Street near Union Station
Graphics - 2060

By the 1960's, this operation started to be used with less frequency. As with Wilshire Boulevard, merchants objected to the left-turn restrictions which accommodated the added lanes. Then, significant capacity improvements were made with one-way street conversions, extensive restriping for left-turn channelization and the emerging freeway network. Finally, the expanding ATSAC system resulted in increased flexibility in responding to peak flows. During this period, extensive suburbanization and decentralization created new traffic patterns with less pronounced directional peaks. As a result of these operational and land use changes, this daily manual operation was phased out. The last long-running street to have this operation was Highland Avenue from approximately 1954 to June 1994. The operation was temporarily discontinued during the Metro Red Line construction but never resumed.

Today, there are only two streets in Southern California that operate with weekday reversible lane operation. The first is on 4th Street over the Los Angeles River, which was implemented in May 1997. The second is the Sepulveda Boulevard tunnel below Mulholland Drive, which resumed operation in 2008, a half century after the operation was discontinued. Both use electric overhead signs and a reversible lane striping pattern.

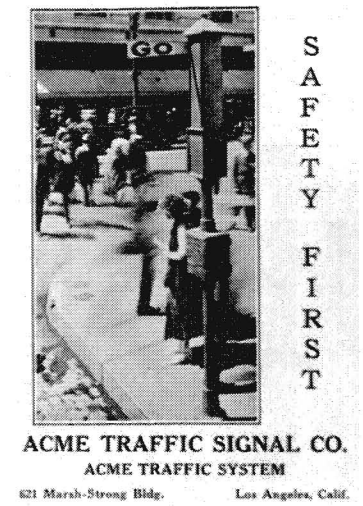
The Acme and Other Vintage Traffic Signals

Manually-operated traffic signals first appeared in Salt Lake City in 1912, then in Cleveland in 1914, followed by San Francisco (1915) and Baltimore (1916). However, the most extensive experimentation with a variety of vintage (pre-tri-light) traffic signals occurred in Southern California.



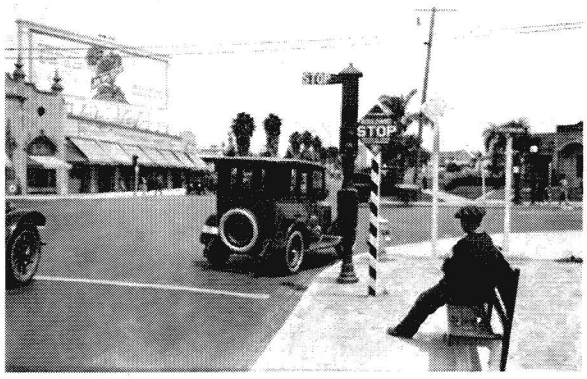
The original Acme signal contract for the City of Los Angeles
Graphic - 3138

In 1917, Frank J. Husbands of Los Angeles received a patent (No. 1,236,441) for what would later be known as the Acme Traffic Signal. In October 1920 in Los Angeles, experimental automated Acme signals, with red and green lights, "Stop" and "Go" semaphore arms and bells, were installed at five locations along Broadway between 3rd and 7th Streets. The experiment was successful and by 1923, there were 31 of these signals, all interconnected, throughout the Central Business District. It was the most advanced signal system in the world at that time. It was adopted as the City's standard signal in 1924.



The first Acme signal style, circa 1924
Graphic - 1026

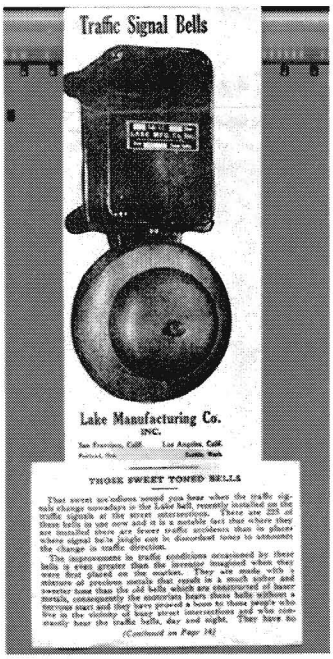
Meanwhile, between 1921 and 1924, the City of Los Angeles experimented with other vintage traffic signals. Also, between 1928 and 1931, nearby jurisdictions experimented with other novel traffic signals that were invented, patented and deployed, each on a limited basis. Manufacturers of these devices included Griswold (American Bobby), General Electric (Novalux), Adco, Waterhouse and one by the Automobile Club of Southern California. A traffic signal with foldable arms was patented by Garrett A. Morgan in 1923. However, he sold his rights of his invention to General Electric and his device was not deployed. Like the Acme, these experimental traffic signals usually featured bells, mechanical rotation to display "Stop" and "Go" messages and placement either in the middle of the intersection or in the near-right position.



The second Acme signal style, circa 1926, on Wilshire Boulevard at Western Avenue
Graphic - 1021

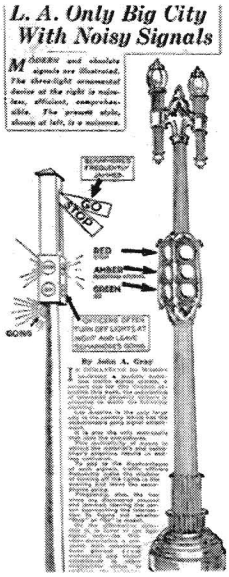
The primary Acme style, circa 1928
Graphic - 2042

But the Acme lives on! One surviving and operable Acme is retained by the Department of Transportation. Another is on display at the Smithsonian in Washington, D.C. Three Acmes are located at the Orange Empire Trolley Museum in Perris, California, and a few are held by collectors. Period movies use replicated Acme signals to represent Los Angeles in the 1930s and 1940s, such as "Who Framed Roger Rabbit" and "Devil in a Blue Dress". Finally, the MGM/Disney Theme Park in Orlando, Florida immortalizes the Hollywood and Wilshire Districts by replicating nostalgic scenes and art deco buildings from the 1930s. At the intersections in this miniature city setting, they included Acme traffic signals to put the finishing touches on the theme.

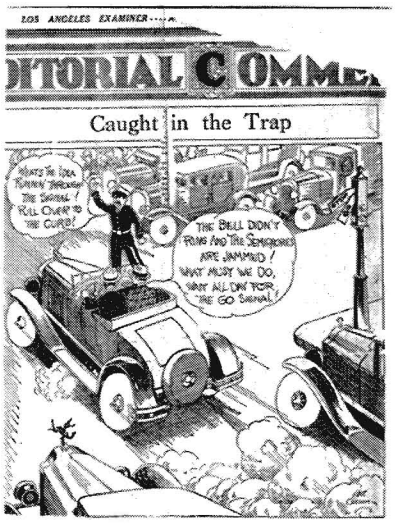


Acme signal bells
Graphic - 3141

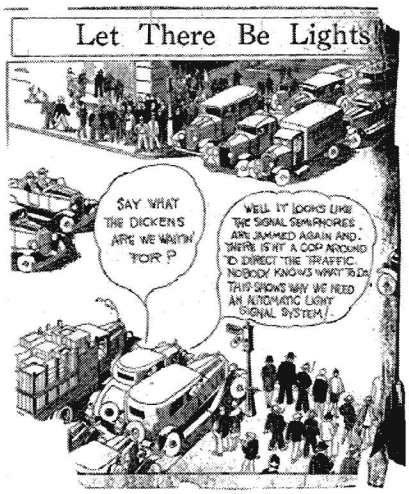
Acme cartoon, illustrating signal birds
Graphic - 3065



Anti-Acme editorial cartoon
Graphic - 3064



Anti Acme Editorial Cartoon
Graphic - 3066



Anti-Acme editorial cartoon
Graphic - 3067

Anti-Acme editorial cartoon
Graphic - 1031

"American Bobby" signal at Wilshire Boulevard and Western Avenue, looking north, circa 1925
Graphic - 1032

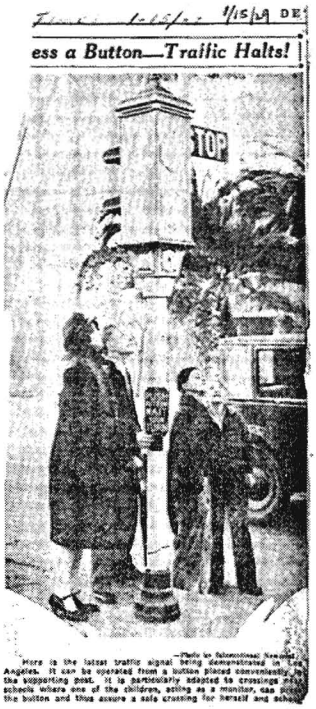
"Waterhouse", the vintage signal of the County of Los Angeles on Santa Monica Boulevard at La Brea Avenue
Graphic - 1025

Adco signal on Washington Boulevard at MGM Studios
Graphic - 3084

Auto Club signal at Adams Boulevard and Figueroa Street
Graphic - 8042

Pedestrian Push Buttons

As it is today, school pedestrian safety in the 1920's was a primary and emotional issue. Pedestrian tunnels had been built to provide conflict-free walking for students near several schools. However, at most schools Boy Scouts and safety monitors would assist students across main thoroughfares when police officers were not available. Because the assisted crossings did not prevent all school pedestrian collisions, the public demanded that more be done.


ess a Button—Traffic Halts!

STOP

Here is the latest traffic signal being demonstrated in Los Angeles. It can be operated from a button placed conveniently on the supporting post. It is particularly adapted to crossings near schools where one of the children, acting as a monitor, can press the button and thus assure a safe crossing for herself and others.

Detroit newspaper photo

Graphic - 1030

Ralph Dorsey, the City's first traffic engineer, observed that the relatively new invention of the traffic signal heretofore had been justified at intersections on the basis on vehicular volumes only. He had analyzed City accident statistics for the first 10 months of 1928 and concluded that there were no school pedestrian deaths where signals had been installed. He reasoned that signals should also be justified based on pedestrian volumes and helped to perfect a push button to activate a stop signal for the main thoroughfare to allow students to cross more safety. In November 1928 the Board of Education became aware of Dorsey's experimental device and officially expressed skepticism that children could successfully operate it. They urged the City Council to delay any such installation and suggested that a demonstration project be developed with adults first.

Dorsey could see the bureaucratic scenario unfolding before him–that his innovation in school pedestrian safety might be thwarted. Fortunately, the holiday season would intervene and the Board of Education request to the City Council would flow slowly through the City Clerk, Council Committee, Board of Commissioners and Dorsey's office. The clock was ticking and Dorsey became energized. By the time the official request reached his office he responded on January 14, 1929 that a pedestrian activated signal had already been installed at the intersection of Figueroa Street and Meridian Street, in front of Luther Burbank Junior High School. Accordingly, he politely, if not assertively, responded that the request be received and filed, which frustrated school and elected officials. But as history has shown, Dorsey's instincts were right, as the first installation was an unqualified success in precluding accidents involving school pedestrians. A few months later 15 new "self serve" signals were installed adjacent to schools and soon they became a standard traffic control device for school age and adult pedestrians.

The installation of January 14, 1929 would mark the world's first operating pedestrian push button. Although the popular culture has changed since 1929 the same characteristics of leadership, innovative spirit and can-do attitude remain part of our Departmental culture today.

Every Man His Own Cop

Pedestrians can now act as their own traffic officers with the invention of a new street crossing device by Ralph Dorsey, Los Angeles traffic signal engineer, which is now being tried out. Operated by a push-button, this work-it-yourself signal halts traffic with stop arm and red light for 15 seconds, giving the pedestrians time to cross the street, then it automatically reverts to the "clear" position. Twenty-five seconds must then elapse before another pedestrian can again halt traffic. Photo shows pupils from the Luther Burbank Junior High School in Los Angeles operating the new device.

Los Angeles newspaper photo

Graphic - 2059

Graphic - 8106

Mid-block Pedestrian Traffic Signals

Los Angeles has a unique operation with respect to mid-block pedestrian traffic signals. It works well and others throughout the nation are taking notice.

The City's landmark traffic code became effective on January 24, 1925, and was the first to regulate pedestrians.

The mid-block pedestrian traffic signals have their origins with the City's landmark traffic code which became effective on January 24, 1925. That code established simplified rules of the road and was the first-ever code to regulate pedestrians. One provision of that code allowed crosswalks to be established "... as near as practicable of any block in said Central Traffic District exceeding four hundred (400) feet in length." The rationale behind this provision was that the north-south blocks Downtown had intersections generally at one-eighth mile intervals (660 feet), whereas the east-west blocks had intersections at half that spacing. In addition, the north-south streets Downtown were the primary retail streets serving a substantial number of pedestrians.

In time, it was realized that prominent traffic control devices were necessary to help motorists recognize the presence of mid-block crossing pedestrians. Beginning in 1960, pedestrian signals were installed at the Downtown mid-block crosswalks. However, they only displayed the "Don't Walk" message when vehicles likely were approaching and the signals at the adjacent intersections displayed a green. The pedestrian heads were dark instead of showing a "Walk" message when the adjacent signals for vehicular traffic displayed red.

In 1974, an experiment was conducted for the mid-block crosswalk on Main Street in front of City Hall. At this time, yellow beacons facing vehicular traffic were added and flashed when pedestrians were allowed to cross during the dark pedestrian interval. The dark pedestrian signal was shown since the flashing beacons advised motorist to be cautious but not necessarily to come to a full stop. However, pedestrians found this feature to be confusing. In an effort to try to overcome the confusion, the Department installed 9" x 12" signs reading, "Cross with Caution When "Don't Walk Goes Dark."

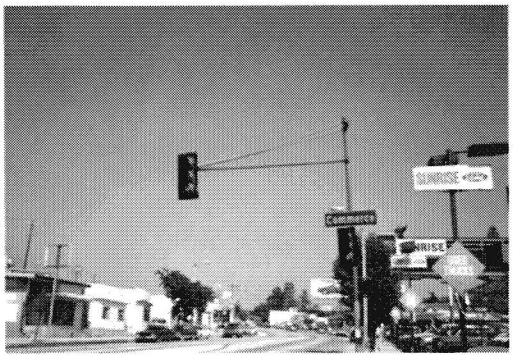
One year later in 1975, the operation was upgraded for more positive control and included full pedestrian signals, pedestrian push buttons and mastarm signals. With this evolution, motorists would see a green, yellow and flashing red. The flashing red was shown when pedestrians received a "Walk" indication. The idea was innovative, since it required that all motorists stop, but only as long as necessary to allow pedestrians to pass. This system provided clearer right-of-way assignment for pedestrians yet minimized undue delay to motorists who traverse multiple traffic signals in commercial, retail and civic center districts.

However, this type of control was not nationally recognized and language in the Manual on Uniform Traffic Control Devices (MUTCD) was interpreted to prohibit its application. Also, the mastarm traffic signal poles had been placed where the prior beacon poles had been, and thus were not visible to motorists stopped at the crosswalk. Beginning in 1988 the Department of Transportation started to provide a minimum 50-foot separation between the stop line at the crosswalk and the mastarm signal, so as to ensure visibility of the signal at all times.

Recently, the MUTCD language that prohibited the flashing red operation was deleted. In addition, a recent national study showed that the operation has exceptionally high motorist compliance. Today, there are 114 mid-block pedestrian traffic signals in many areas of the City, providing safer mid-block crossings while minimizing motorist delay.

Mastarm Signals

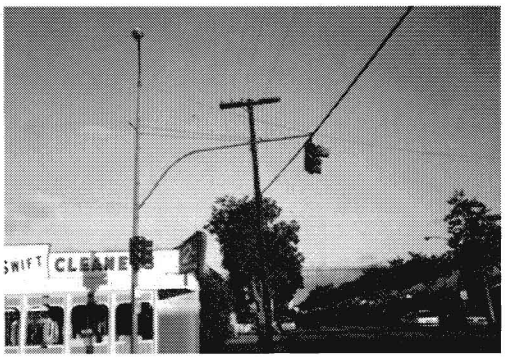
Mastarm signals suspended over the roadways of multi-laned streets is a well established, standard practice. Mastarm signals were a significant breakthrough in reducing intersection collisions.



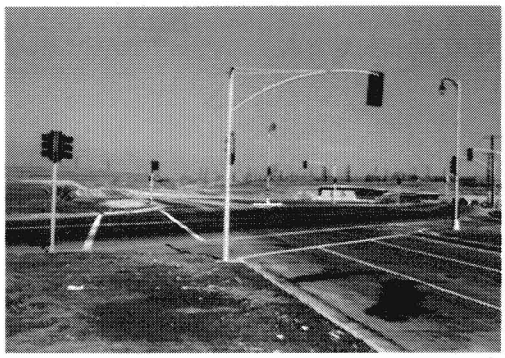
1946 mastarm at Foothill Boulevard and Commerce Avenue
Graphic - 3110

The need for overhead signals to supplement the far-left and far-right signals was recognized when trucks turning right from the cross street would intermittently block the signal displays. This led to a brief flirtation with center-suspended four-way signal heads. One was added to the extant signals at the intersection of La Brea Avenue and Wilshire Boulevard in 1938 and was successful in reducing red light violations by two-thirds. Plans were underway in Los Angeles to retrofit other principal intersections, but they were suspended due to World War 2.

Mastarms began to make their appearance following World War 2. The first known pair in Southern California was installed on Foothill Boulevard at Commerce Avenue in the Tujunga community of Los Angeles and began operation on December 4, 1946. They were 12 foot long horizontal arms supported by tie rods and still exist to this day. The first mastarms in Orange County made their debut at the intersection of Harbor Boulevard and Warner Avenue in 1960, in an effort to mitigate the limited visibility on the curved southbound approach.



Culver City manually-built mastarm on Washington Boulevard
Graphic - 3109



Traffic signal design on La Cienega Boulevard at Fairview Boulevard, circa 1956
Graphic - 5044

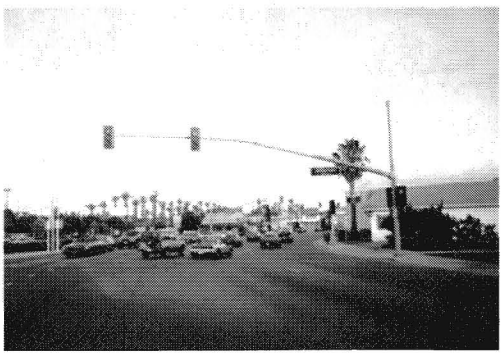
Tie rod mastarm

Graphic - 3098

Mastarm Signals, *Continued*

During the 1950's and 1960's mastarms for rigidly-mounted signals came in only two sizes - 15 or 20 feet and always with tie rods. On wide streets this length limitation led to the proliferation of median signal pole installations in order to improve visibility on wide approaches.

Trumpet-style mastarm
Graphic - 3111



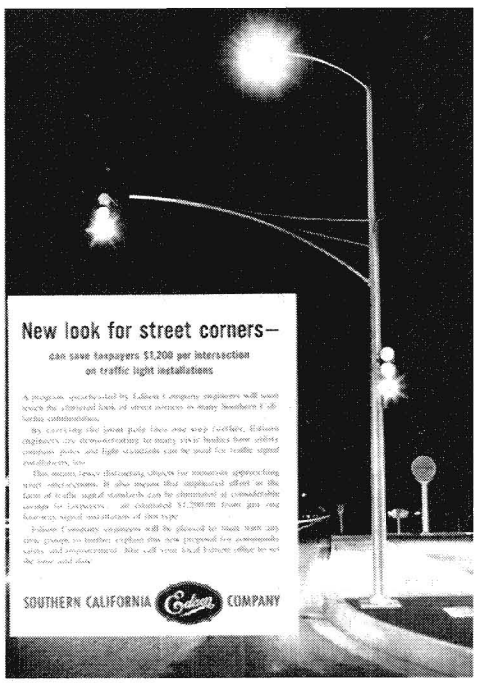
Modern, super-long mastarm

Graphic - 4080

Beginning in June 1956, the Southern California Edison Company spearheaded a program to lessen the cluttered look at intersections by promoting the mounting of traffic signal heads on electrolier standards, including those with mastarms. Soon, the larger agencies in Southern California started using combination poles. Use of these poles led to the next evolutionary step in signal pole placement. Whereas the initial tri-light signalized intersections featured eight farside heads on four poles, the use of combination poles led to eight tc twelve farside heads on eight standards, today's modern practice.

During the 1970's tie rod poles were replaced by longer, more rigic arms with three and four bolt mounting plates. Initial long mastarms were made possible by providing added support arms. One of the first "trumpet" style mastarm standards was installed at the entrance to Griffith Park at Los Feliz Boulevard Riverside Drive in August 1972. By the end of the 1970's, mounting plates were placed at ar angle, thus providing support capability for the super-long mastarms that span many of our roadways.

When the first mastarm heads were deployed, they were accompanied by a backplate, a new feature at that time, to block out ambient street lighting and lighted retail signs. When 12 inch lenses made their debut in 1955, mastarm signals featured a "super-sized" 12 inch red with the then standard eight inch yellow and green lenses. By 1958 Los Angeles adopted the 12 inch head (all three lenses) for mastarms. By 1969, all mastarm heads were converted to the 12 inch size.



First advertisement for a combination pole

Graphic - 3136

Evolution of signal heads

Graphic - 5048

Uniquely Signalized Driveways

Signalized driveways have been around for many years. Some of the aerospace and defense plants of the 1950's and 1960's had signalized driveways. By the 1970's, the number increased significantly with the opening of enclosed regional shopping malls that featured driveways connecting expansive surface parking lots and large parking structures. At many of these locations it was necessary to develop a unique signal operation.

Did you know that Los Angeles pioneered the unique flashing red display for signalized driveways out of concern for pedestrian safety?

After several of these driveways became signalized, it became apparent that pedestrians were not obeying the signals across the driveways. It was diagnosed that the reason was due to their design. Since the height of conventionally-designed apron driveways quickly rises from the street level to the sidewalk level, pedestrians do not need to step down before crossing. Thus, they lack a physical clue regarding the need to wait at the edge when driveway users are being served. This is contrasted to intersections with full height curbs where the need to wait on the sidewalk is more obvious.

Being concerned with pedestrian safety, staff of the old Traffic Department pioneered a unique signal display. That display showed a flashing red indication instead of a green when motorists were allowed to exit the driveway. A solid red was shown at all other times. The flashing red signal is the equivalent of Stop sign control and driveway motorists are obliged to stop for pedestrians before proceeding. That display reduced conflicts between exiting motorists and pedestrians.

By the late 1980's, pedestrian heads started to be deployed across the driveways, to provide explicit control to pedestrians, while recognizing that some pedestrians would still ignore them. A decade later, the yellow display was added to show the transition from flashing red to solid red. Today, developers are strongly advised to build street-type driveways instead of apron-type driveways whenever signal control is anticipated. With a street-type design, a green can be provided to driveway users. But today there still remain many locations with apron driveway signals that show a flashing red instead of a green indication. Now, you know why.

The Smart Pedestrian Warning Device

Pedestrian safety in urban areas has always been an area of public concern, since approximately 40% of all fatal traffic collisions in urban areas involve pedestrians. One area of focused attention has been the enhancement of pedestrian safety at unsignalized marked crosswalks. Although pedestrian warnings signs, sometimes supplemented by pavement messages, are used, they often are ignored by motorists, since pedestrians are not present much of the time.

In response to these limitations, the Smart Pedestrian Warning Device was conceived and proposed in July 1997 to provide a more effective response to pedestrian safety concerns. It bridges the gap between expensive traffic signal control and low cost static signs and pavement markings. The first one was completed on March 3, 1998 on Lankershim Boulevard at Arminta Street in the community of North Hollywood. This activates nearby overhead flashing yellow beacons to warn motorists that a pedestrian is stepping off the curb.

The Smart Pedestrian Warning Device uses overhead 12-inch alternating flashing beacons to warn motorists of actual crossings. Overhead beacons were deemed to be preferable to in-roadway lights due to the density of traffic on those arterial roadways where they are deployed. By providing overhead beacons, all motorists in an approaching platoon, not just the first car in a platoon, are able to see the beacons and prepare to stop. In addition, overhead beacons are not vulnerable to street excavations and utility cuts, as are in-roadway lights.

La Tijera Boulevard near Knowlton Street, looking south, March 1956
Graphics - 3058

While traditional alternating flash (push/pull) beacons were deemed to draw more attention than a single beacon, still it was desired to have a more unique appearance for the flash, such as the cutting edge look of a strobe light. LADOT staff investigated several alternatives and recommended a conventional LED yellow lens that can be programmed with a Model 2070 controller to flash multiple times per second. Conventional incandescent bulbs are not capable of such a rapid on/off cycle. The pattern selected was three pulses and an half-second pause, which repeats each one-second interval. The "alternating" beacon displays the three pulses when the other is pausing and a pause when the other shows the three pulses. This pattern, which began to be used in March 2002, was commanding.

From 1998 to 2005 passive pedestrian detection was used. Passive detection was deemed desirable so that pedestrians would not have to activate a push button and erroneously assume that all motorists would stop. The challenge was to distinguish among pedestrians starting to cross versus those either completing a crossing, walking along the street and not crossing, or standing and waiting for a bus. At first, microwave-radar detection was used. Then, video detection was tried, later to be superseded by video detection plus infra-red detection. However, the passive detection technologies could not reliably distinguish the various pedestrian movements. In addition, moving shadows from vehicle headlights and trees blowing in a breeze would activate the flashing beacons. As a result, LADOT decided to abandon passive pedestrian detection and use push button activation, instead.

Left-Turn Phasing in Los Angeles, Part 1

"Why aren't there more left turn arrows in Los Angeles?" is a recurrent question for transportation officials at LADOT. While we do have left turn arrows at 1,637 (11%) of the City's intersection approaches, we have relatively fewer than nearby Santa Clarita, Orange County and Ventura County. Why is this? As discussed in this four part article, the limited number of left turn arrows in the City is a consequence of both the period in which Los Angeles became a mature city and its signal operating philosophy.

The relative number of left turn arrows is certainly no less than what is found in other major cities that came of age prior to World War 2 - New York, Chicago, Philadelphia, Detroit, Boston, San Francisco, Seattle, etc. In these cities as well as Los Angeles at that time, much of the land was already developed and the streets were long-ago constructed with permanent improvements. Traffic controls were simple and included a few signs, painted centerlines and 8-inch signals mounted on four poles at intersections. Lane lines and pedestrian signals were a novelty and left turn lanes and mastarms did not exist.

The short mastarms (15 and 20-feet long) of the 1960's, the only lengths available at that time were not structurally capable of accommodating left turn lights.

Beginning in 1956, the City of Los Angeles Department of Traffic began a major effort to restripe streets with left turn pockets and to "modernize" traffic signals, with tall electroliers, eight signal poles at each intersection, pedestrian signals and 12 inch mastarm signal heads on 15 and 20-foot mastarms. This effort was essentially completed by 1968. This standard design, also used by the County of Los Angeles and the Division of Highways (now Caltrans) became a model for the nation that has prevailed to this day. The short mastarms, the only lengths available at that time, were not structurally capable of accommodating additional left turn signal heads. As a result, novel applications of left-turn phasing were installed by the City at only a handful of intersections. Even by 1972, only 400 (3.4%) of the City's signalized approaches had left turn arrows.

Despite the limitations with mastarms, the Division of Highways found a way to overcome them. Before the freeway network was built they operated numerous State highways along conventional streets. On many of them they constructed median islands with left turn bays as a way of facilitating traffic flow and managing access. Because long mastarms did not exist, they placed left turn signal poles on the farside island noses facing motorists in left turn lanes. The first street to feature this operation was Sepulveda Boulevard, US 101 Alternate (now California 1), between Rosecrans Avenue and Artesia Boulevard in the latter part of 1956. This method of left-turn phasing became a standard Division of Highways feature on most conventional State highways and signalized freeway ramps through the remainder of the 1950's and throughout the 1960's.

However, the City of Los Angeles was not able to follow this model, because it had only a few streets of sufficient width to install median islands. But even for those streets of sufficient width, there was not funding available to retrofit its arterial streets with median islands. Nor was access management a feasible option, given the older land use patterns and numerous driveways.

As the 1970's arrived, many suburban centers near Los Angeles started to come of age, such as the City of Santa Clarita and many areas of Orange County and Ventura County. In these areas much of the land started to be developed or redeveloped along with wide boulevards, planned neighborhoods, fewer arterial intersections, fewer driveways and off-street parking. This suburban form resulted in left turns being concentrated at intersections, thus necessitating the assistance of left turn phasing. By this time, left turn phasing was easily achievable since mastarm lengths up to 45 feet were becoming available. Left-turn phasing thus became a routine, standard feature on many suburban arterial streets in Southern California -- but not within the City of Los Angeles.

Left-Turn Phasing in Los Angeles, Part 2

As discussed in Part I, left-turn phasing in Los Angeles was a novelty, in the 1950's and 1960's, due to signal equipment restrictions and the limited number of continuous raised median islands. By the early 1970's, left-turn phasing became a routine design on State highways and suburban boulevards in areas adjacent to Los Angeles. However, it would not become a standard feature on Los Angeles' more urban streets due to the traffic signal operating philosophy that prevailed throughout most of the 1970's.

The philosophy reflected the distinct signal system that the City of Los Angeles operated. Unlike the Division of Highways, which operated signals along a few, widely spaced State Highways, the City of Los Angeles operated signals throughout a network with signal spacing at approximately 1/4-mile intervals. This type of signal network allowed 30 mile-per-hour progression to be maintained in all directions with short (50 to 70 second) cycle lengths. However, the addition of left turn arrows would require longer cycle lengths, which, in turn, would severely compromise progression. This degradation in progression was avoided by resisting requests to install left turn arrows.

Median-mounted left turn signals before long mastarms became available
Graphic - 3112

However, the resistance would not prevail, as the concept of left-turn arrows became noted by the public and became a popular, recurrent request. The public couldn't help but notice them at the many on-ramps built by the Division of Highways during the freeway boom of the 1960's. Then, in the suburban areas of Orange County and Ventura County, left turn signals, using the new generation of long mastarms, began to make their debut. Finally, the 1970's was the decade that witnessed the construction of numerous enclosed regional shopping malls and influential developers were able to have left turn arrows installed at intersections near them. The public and elected officials became more vocal in requesting and demanding more left turn signals and they still tended to be installed on an exception basis by the City, often after considerable pressure.

However, by the 1980's the left-turn philosophy would start to soften. The breakthrough was the installation of dual left-turn lanes at several major intersections in the San Fernando Valley. (The first was for traffic northbound on Woodman Avenue at Riverside Drive in 1978.) The implementation of dual left turn lanes was a relatively new concept and Los Angeles was eager to apply it as a congestion relief measure. The second factor was the realization that in most areas of the City, traffic signal density had risen to greater than four per mile; thus 30 mile per hour progression was an ideal from the past that no longer was achievable.

Left-Turn Phasing in Los Angeles, Part 3

Part 2 explained how the City's approach to left-turn phasing started to change due to popular demand for this feature. The turning point was when a judge of the Downtown federal court house could not convince LADOT staff to approve a left turn arrow for eastbound Temple Street at Main Street. He appealed to Councilman Gilbert Lindsay who forced LADOT to install it by Council motion. Having to be compliant with the mandate, but disliking being over-ruled, LADOT implemented a form of "occasional" left-turn phasing at this location in 1991 that differed in two ways from traditional left turn phasing. The first difference was that motorists could turn on the "protected" green arrow after having an opportunity to turn during the "permissive" circular green, upon yielding to opposing traffic. The second difference was that the arrow would be activated only if the queue of left-turn traffic extended four car lengths, as monitored by in-pavement detectors. This protected/permissive left turn operation with queue detection, would become known as the Los Angeles form of left-turn phasing and the model for most subsequent installations in the City.

The more receptive approach to left turn phasing has resulted in a quadrupling of left turn arrows since 1972 -- 1,650 today versus 400 then. By 2009, approximately 450 left turn arrows will be added, bringing the total to 2,100, or 14% of the City's 15,000 signalized approaches. These additional left turn arrows will be accomplished through the Department's programs involving Signal Modifications, Street Lighting and ATSAC. Most of these will be installed at major crossroads where the need for access to major thoroughfares is the greatest. LADOT's vision is to eventually install this form of left turn phasing at all intersections of two Major Highways. Currently, left turn arrows are present at 32% of the approaches at intersections of two Major Highways. However, in four years this number will increase to 61%. The ultimate goal is in sight.

Did you know that by between 2005 and 2009, there will be approximately 450 new left turn arrows added in Los Angeles?

Left-Turn Phasing in Los Angeles, Part 4

LADOT uses a unique form of left turn phasing at many of its intersections. It is know as protected/permissive left turn phasing with queue detection. It generally is installed where left turn assistance is required, but where there is no collision pattern or visibility problem. It allows two left turn opportunities, one on the permissive circular green and one, if needed, on the protected green arrow. The green arrow is activated only if there have not been a sufficient number of adequate gaps during the circular green. Thus, there is detection located four or five car lengths upstream from the stop line that activates the green arrow when traffic queues back that far. It is an operation that strikes a reasonable balance between the competing needs of left-turn motorists versus through motorists, neither of whom want to be unduly delayed.

The Los Angeles form of left-turn phasing was inspired by several previous notable installations. The first was the grand-daddy of protected/permissive left-turn phasing, installed by the City of Los Angeles Department of Traffic. The location was for southbound Vermont Avenue at the Hollywood Freeway southbound on-ramp opposite Oakwood Avenue. It was installed July 24, 1956 and is believed to be the first such operation in Southern California. It was easily installed by adding a green arrow indication to the mastarm and far left signals. Since Oakwood Avenue was a one-way street, the left turn phase was a "lagging" operation. As a result, the issue of the lack of a yellow arrow (it hadn't been invented yet) and the "left turn trap" (yellow for one direction and green for the opposing direction) was avoided.

Did you know that the first protected/permission left-turn phase was installed on southbound Vermont Ave at the Hollywood Freeway?

The next interesting installation of protected/permissive left turn operation was installed as part of a street widening project to serve motorists destined for Westwood Village and UCLA. It was installed for motorists eastbound on Wilshire Boulevard at Gayley Avenue, Westwood Boulevard and Glendon Avenue 1970. Due to the new 104-foot width of Westwood Boulevard and the short mastarms (20-foot maximum) available at that time, the left turn signals were installed on the far-side left corners and on short islands opposite the turn lanes. The four-section signal heads serving left turns displayed (from bottom to top) a green arrow, a circular green, a circular yellow and a circular red. The sequence of the operation featured a green arrow, followed by a three-second dark left turn clearance interval, a five second red, a circular green, a circular yellow and finally a circular red. The dark left turn clearance was used since yellow left turn arrows did not exist then and the circular yellow was reserved to terminate the permissive left turns. As a result, the five second red was used to provide a transition between the protected and permissive operation. In 1974, a yellow left-turn arrow was added.

Once yellow arrows and long mastarms became available in the 1970's, Los Angeles became an early user of the five-section cluster head. One of the first applications of the cluster head was installed to serve motorists destined to the southbound Harbor Freeway via westbound Olympic Boulevard at Blaine Street in September 1976.

A few months later this operation was advanced by the use of queue detection. In November 1976, eastbound traffic on Ventura Boulevard at Van Nuys Boulevard was provided protected/permissive left turn operation with a pair of detectors 175 feet upstream from the stop line. The queue detection was intended to activate the left turn arrow only when it was really needed. However, the long distance of 175 reflected the conservative policy of the time.

A few years later this writer noted an operation installed by the County of Los Angeles (prior to the Playa Vista annexation) on westbound Culver Boulevard at Nicholson Street, the road that leads to the Playa del Rey community. That operation included queue detection approximately 80 feet upstream of the stop line. I learned from Harry Parker, retired Traffic Engineer from the County of Los Angeles, that the location followed the design pioneered on the Sunset Strip a few years earlier. Queue detection was installed in the late 1960's on westbound Sunset Boulevard at La Cienega Boulevard.

Inspired by all of these pioneering efforts, it was determined to apply this operation on a more widespread basis in the City of Los Angeles. Thus, criteria for installing both protected and protected/permissive left-turn operation were developed in the late 1990's and have been refined recently. Arguably, they are the most detailed and thoughtful in the nation. Protected/permissive left-turn phasing with queue detection is approved at numerous locations annually and has become a main activity of LADOT's traffic signal improvement program.

Sabbath Signal Timing

LADOT operates specific pedestrian signals in a very special way during the Jewish Sabbath and other holidays. We call it "Sabbath Timing".

It all started around 1973 when an Orthodox Jew in the Fairfax District was cited for crossing against a pedestrian signal during the Jewish Sabbath (sundown Friday to sundown Saturday). The pedestrian had not pressed the push button. Rabbis then approached the Department of Traffic and requested that signals be timed during the Sabbath so that the Walk signals come on automatically instead of requiring the press of a push button. An automatic Walk was requested since it is against their orthodox religious practices to operate machinery or electrical devices during those times. The rationale is that believers should dedicate time to focus on the spiritual and not on everyday conveniences.

Did you know that there are over 50 signalized locations with special Sabbath signal timing?

The Department pondered the issue and decided to accommodate their need. First, the routing to the synagogue was identified and signalized intersections with push buttons were modified to go into automatic Walk during the Jewish Sabbath. Soon, rabbis at other synagogues learned of this pilot accommodation and requested similar treatment near their sites.

Today, LADOT has special Sabbath signal timing at over 50 signalized locations in North Hollywood, Encino, Tarzana, Hancock Park, the Fairfax District, Century City and other locations. For each new request, routes to the synagogue are identified that are accommodating but not unnecessarily disruptive to traffic flow. With the sophisticated controllers of today, the Hebrew calendar is programmed to recognize the weekly Sabbath, Rosh Hashanah, Yom Kippur, Sukkoth, Passover and Shavuot and to be respectful to the practices of a special community of pedestrians.

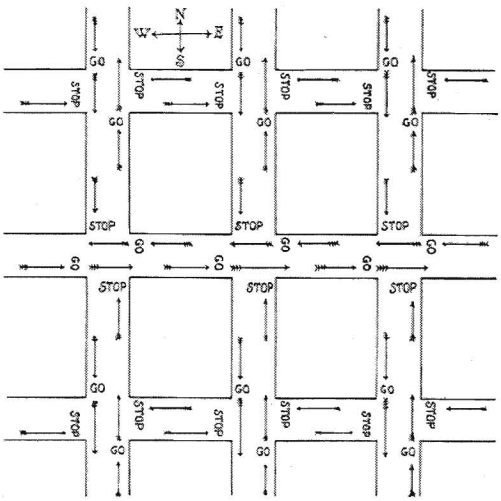
Early Methods for Traffic Signal Network Timing

Today, signal timing programs routinely are used to identify optimal offsets, which are the time differentials between the beginnings of the green displays along a route. But before the age of computer optimization models, there were guiding rules-of-thumb.

ALL THE STRINGS OF TRAFFIC ARE IN HIS HANDS

Caricature of Ralph Dorsey controlling Downtown traffic signals in 1925

Graphic - 3072



HALF "ALTERNATING" TRAFFIC CONTROL

Traffic signal network timing in 1926

Graphic - 3073

The methodology for determining offsets in a traffic signal network anywhere in the nation was first developed for Downtown Los Angeles. In 1923, Downtown Los Angeles had the world's largest interconnected signal system, 31 in all. Although the timing for each individual signal, necessary to accommodate each cross street flow, clearance intervals and pedestrian moves had been mastered, there were no guiding rules for determining the offsets. Pioneering traffic engineer Ralph Dorsey, started to experiment with offsets in the 31-traffic signal network. In December 1925 and April 1926 he reported in a City Hall newsletter (The Municipal Employee) his findings and recommendations after experimenting with offsets with simultaneous and alternating greens and reds. So advanced was his knowledge on the subject and so hungry were academicians and practitioners for information on this curious subject that his articles were widely read outside of the City. His December 1925 article was requested by the Library of Congress, Harvard University, the University of Michigan, the University of California, other educational institutions and practically every safety council and traffic bureau in the country. In time, other cities would adopt Dorsey's methodologies.

Several decades later, Los Angeles used a traffic signal timing strategy that was elegantly simple. It was developed by Maurice Olsen, known as Ole (pronounced Oh-lee). Until the 1980's most of the signals in the City has a 60-second cycle for its green, yellow and red phases. In addition, many of the signals were at 1/4-mile spacing. Traveling at 30 miles per hour, a motorist would reach the next 1/4-mile signal in 30 seconds or half of a cycle length. From this realization emerged the alternating system of "early" and "late" offsets. "Early" referred to a simultaneous green and "late" referred to a green half a cycle later. In time, virtually all interconnected signals in the City network became "Oleized" with early and late offsets.

Although the simulation and optimization models used today can refine the ways in which signals are timed, the alternating offset methods of yesteryear still work well as reliable default timing strategies.

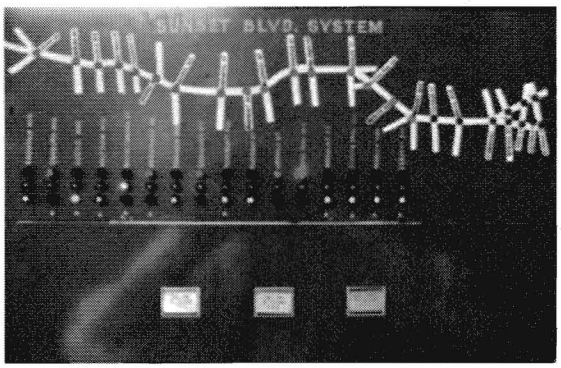
The first experiment with computer control in North America and possibly the world began operation by the City of Los Angeles, in January 1960. It was implemented along the Wilshire Boulevard corridor (between 6th and 9th Streets) westerly of the Harbor Freeway. It was extended to include the Coliseum area. Known as the P.R. (Pro Rata), system (meaning equitable distribution of green time), it featured cable interconnect, pressure pad detectors for sampling traffic volumes, three radio towers and a central computer. The radio system transmitted traffic volumes to the central computer which identified the appropriate signal timing program. The central computer would than use radio transmission to implement the revised timing at all of the controllers. The timing was shown on map with red and green light bulbs. Analog computers at that time were very sensitive to heat and humidity, thus resulting in frequent system failures. (Solid state computers would start to become available in 1964.) In addition, the pressure pad detectors were expensive to maintain and would be replaced by inductive loop detectors in 1965. The, there were difficulties in retaining the dedicated radio frequency, due to Federal Communications Commission rules. The system was before its time and eventually, the central control feature was disconnected.

Analog computer control in 1960
Graphic - 3135

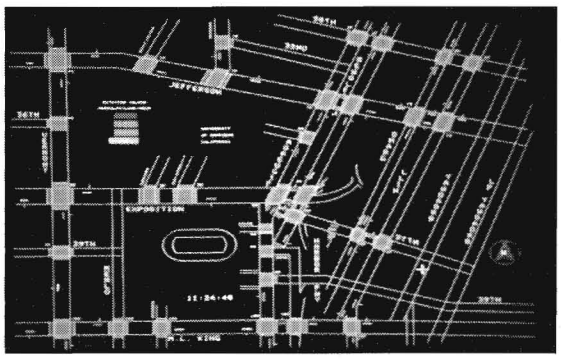
The second attempt was in 1971 when the County of Los Angeles awarded a contract to TRW to provide a second generation computerized traffic control network at 111 signals in the South Bay Area of the County. However, software and hardware problems led TRW to abandon the project.

The existence of the Hollywood Park Race Track and the recent debut of the Forum Sports Arena in 1973, led the City of Inglewood to seek a computerized signal control system. The system became operational in 1976 and was the first to utilize the Urban Traffic County System (UTCS) software developed by the Federal Highway Administration.

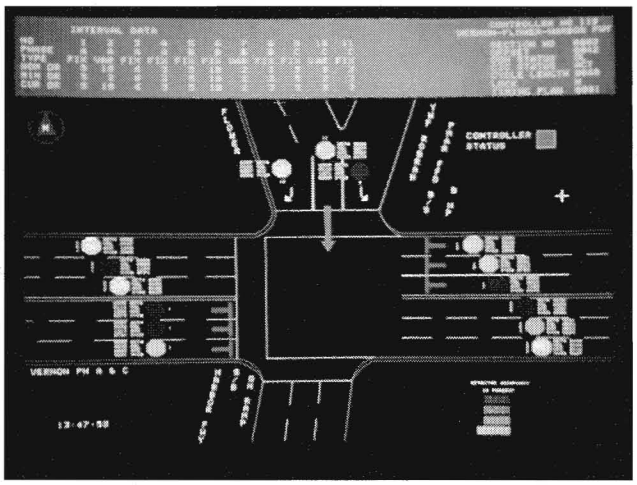
In 1984, the City of Los Angeles implemented the initial phase of ATSAC (Automated Traffic Surveillance and Control) just one month prior to the Los Angeles Olympic Games. It was the first system to extensively monitor traffic flows in a network and to automatically change timing plans in response to those flows. The ATSAC concept was very similar to that of the P.R. system. However, loop detectors replaced pressure pads, microprocessor controllers replaced electro-mechanical ones, fiber optic cable replaced radio tower transmission, digital computers replaced analog ones and colored computer graphics replaced the map with light bulbs.



The Pro Rata System along Sunset Boulevard
Graphic - 3037



ATSAC sub-system graphics
Graphic - 3146

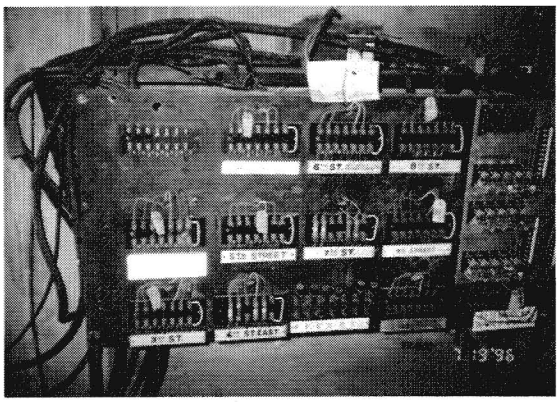


ATSAC intersection graphics
Graphic - 3149

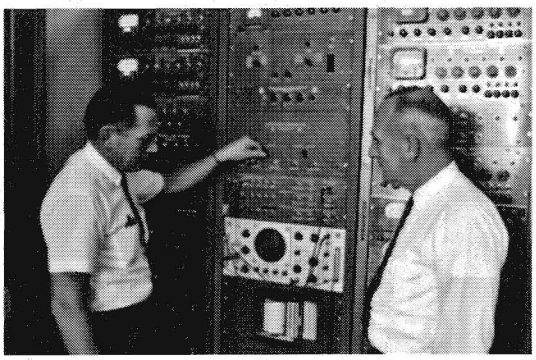
Traffic Signal Control Centers

Contrary to popular thought, the ATSAC Center is not the only traffic management center the City has had.

Acme Signal Center in Pershing Square basement, circa 1924
Graphic - 3080



Signal system control in Pershing Square room, 1952
Graphic - 3092



Pro-Rata system in Room 1200A City Hall
Graphic - 3010

The first one was operational a full 60 years before ATSAC started sensing 1984 Olympics - related traffic. It was located in a subterranean room below Pershing Square and managed 31 interconnected Acme semaphore traffic signals in the area bounded by 1st, 9th, Hill and Main Streets. At that time it was called a Central Timing Station. It was truly state-of-the-art in 1924.

Downtown was the retail and theater center of Southern California and curves were plotted showing the rise and fall of traffic flow during the day and throughout the week. Tuesdays through Fridays were considered "average" traffic days. On Saturdays, the retail stores closed at 12 noon thus creating a pronounced peak hour and very light traffic thereafter. Sundays had pleasure driving and sight seeing after church services. Then there was mania Monday, due to the surge of traffic coming to shop Downtown after seeing the large advertisements of bargains in the Sunday newspaper. Then there were the evening surges due to theater attendance. Based on all of the traffic flow fluctuations, traffic signal timing was changed 16 times per day on a scheduled basis.

The Acme Central Timing Station with its rotating cylinders and contacts would start to fall into disrepair. When Pershing Square was reconstructed in 1952 to provide underground parking, the Central Timing Station was replaced by another underground room that served as an Eagle Signal master controller for 150 signals. Later, other signals would be added along the Wilshire Boulevard Corridor. The now defunct Eagle Signal Master Controller room was last visited in 1996 and is now semi-inaccessible.

In 1960, a monitoring center was built right outside the General Manager's Office of the Department of Traffic on the 12th Floor of City Hall. The Pro Rata system featured a central analog computer that received traffic data from detectors, via radio transmission, determined the best timing plan and changed the timing through radio communication. However, the hardware was not reliable and the system was scrapped after a few years.

Not to be deterred, the ATSAC system was conceived in 1975 and the first system became operational in 1984. It has been proven to be a sustainable, upgradeable, enduring system.