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COMING NEXT ISSUE

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"An outstanding network of state highways is essential to the future growth of California's economy."
—Governor Edmund G. Brown

Front cover:
Car and boat on trailer on ramp, with city skyline in distance, symbolizes the mixture of recreation and urban development in the city of Long Beach. See story on page 18. Photo by Sam Smith, District 7 Headquarters, Los Angeles.

Back cover:
Scene is view from Highway 395, Conway Summit, just north of Mono Lake, looking toward the High Sierra, through magnificent groves of aspens in this vicinity. Photo by John Meyerpeter, Headquarters Photo Lab.
The highway engineer's primary concern is moving traffic in safe and economic ways, but the environmental needs of our community must also be recognized. Our job is to face both the highway user and the environmental needs head-on. A training program is needed, and it is the responsibility of the Division of Highway Education to develop such a program.

A free press will not get the job of the highway engineer done. The press often wants to report on the mistakes and failures of the highway administrator. If the environmental needs are given the same emphasis as the highway needs, the public will begin to recognize the importance of the highway in a balanced way.

We need to recognize the importance of aesthetics in highway design. The highway engineer must accept the responsibility of recognizing the qualities that make one environment different from another. The highway engineer's primary concern is moving traffic in safe and economic ways, but the environmental needs of our community must also be recognized. Our job is to face both the highway user and the environmental needs head-on. A training program is needed, and it is the responsibility of the Division of Highway Education to develop such a program.

A free press will not get the job of the highway engineer done. The press often wants to report on the mistakes and failures of the highway administrator. If the environmental needs are given the same emphasis as the highway needs, the public will begin to recognize the importance of the highway in a balanced way.
Good highway design includes rounded cuts, attractive signs, and open vistas to add interest for the traveler.

Motivation is not the primary problem. Engineers in Planning, Design, and Construction have always been attentive to the appearance of their projects. However, the majority of highway engineers and technicians need to be told specifically what part they can plan in this beautification movement. The immediate program dealing with specific details reaps quick results in public acceptance. A long-range educational program, however, will be required in building of another dimension to add to function and economy—aesthetics.

District 10 has been quick to recognize the problem and the needs. The first action by the district engineer, J. G. Meyer, was to appoint a “scenic highway committee.” The committee was composed of representatives at the senior level from Maintenance, Construction, Traffic, Right of Way, and the Design Departments. The committee was given complete freedom to formulate its own method of operation, responsibilities, and limitations.

The following general guidelines were formulated after the first meeting of the committee:

1. The committee’s activities should not be limited to the scenic highway system but should encompass all highways in the district.
2. On the district level the committee should concern itself initially with details both in design and construction since it appeared that the sum of the details will show results in the shortest possible time.
3. The second phase of our studies should encompass the long-range planning aspects of route selection.
4. The first task was to evaluate our present highways both by observation and by study of available material.
5. Prepare and execute some kind of educational program within the district based on our evaluation of existing highways.
6. Prepare some type of standard and guidelines for all departments.

As a method of operation to evaluate our existing highways, the committee has made a field trip once a month to study, discuss, and photograph both good and poor details. The collection
On realignment, old paving, unsightly structures, and unnecessary piles of dirt should be cleared away, the ground smoothed, and return of natural growth of trees and shrubs encouraged.

Instead of sharp cuts, slopes should be rounded to eliminate tunnel effect and to fit slopes into natural contours.

The committee has helped to stimulate others in being more critical of their past work. This has been evident in every department.

The committee has been in existence for only two years, but the results are already evident. Its first efforts were directed toward projects under construction. Almost everyone was eager to cooperate. Although the changes made during construction on the various projects were within the project fiscal allotment, the end product in some cases was beyond expectation and served to point out that in this field of aesthetics much can be done at small cost.

Let's step back and take a quick look at a few of the details District 10 has considered as a starting point for a long-range program in our attempt to improve our highways from an aesthetic standpoint.

1. Fit the Environment
   - In a rural area this means that, regardless of the height of cuts or fills, the natural ground should appear to begin at the edge of the shoulder, not at the right-of-way line. If the highway is built on flat land, the slopes should be flat. Ditches should be nonexistent or at least very flat. If the highway begins at the edge of the shoulder, not at the right-of-way line, the natural ground should appear to be a part of the highway. This is the first step in making the right-of-way a part of the community, not a part of the roadway. In rural areas, the natural elements of the country, not the country itself, should be preserved. The committee should do its best to preserve the country the highway should not destroy.
   - The committee should be aware of the highway's impact on the natural environment. The committee should be aware of the highway's impact on the natural environment.
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2. Color slides resulting from these trips are used by the committee for further study. The slides will have additional educational value.

ILLUSTRATIONS BY LOU BAKER
In general, the slopes should be flattened and rounded. The slopes are permanent. The trees will grow anew. The slope, however, can be warped to save a particularly fine specimen or group of trees. This philosophy must vary, of course, with the location, giving full consideration to the type and age of the trees. The U.S. Forest Service has been very helpful in this respect. They are interested in the long-range planning program for the forest areas. Certainly the Forest Service should be brought into the picture in the early stages of a project.

Interception ditches at the top of cut should be held to an absolute minimum since they interrupt the continuity. If a ditch must be lined with concrete, native soil should be broomed in while it is still wet, or asphaltic emulsion should be sprayed on for a camouflage. There is little more disrupting to the scene than a white stripe through the green belt adjacent to a highway.

Remove Old Pavements
There are many places in this state where not only does the old pavement show, but also the pavement before that. Even the poor pavements of many years ago leave an almost permanent scar on the countryside. Remove the old pavement, remove the old culverts, fences, and signs. Fill the old cuts and remove the old fills. Then seed the entire area. This has been done in District 10, and the cost has been surprisingly small.

Horizontal and Vertical Curves
Lengthen them! Seldom do short vertical or horizontal curves fit into the landscape. In rolling country the vertical curves should be longer than the tangents between them. This will produce lines that flow rather than jerk. If a curve radius must be short, be sure to lengthen the superelevation transition. This tends to ease the visual abruptness of the curve and prevents the unpleasant, warped appearance so often seen on multilane highways.
The highway, as a continuous, almost never-ending strip, must be held together by its continuity. The higher the speed of travel, the more important this becomes. Changes along the highway and changes in the highway itself should not be abrupt. Not only should visual abruptness be eliminated from the highway alignment, but the visual abruptness should be held to a minimum in all features of a highway: The importance of continuity reaches into every facet of highway design and construction: A smooth-flowing fence rather than one that follows every minor high or low spot on the ground. A right-of-way line that either curves or is on short tangents with small angle points. Edges of pavement that don't jump in and out. Special Features should be ever present and take advantage of each of these. A smooth-flowing fence reaches the highest freeway standards. The advantage of a smooth-flowing fence is not only to the highway, but also to the property owner. The smooth-flowing fence fits the highway better than any other form of barricade or protection. Be ever aware of those special points of interest—an exceptional view, an interesting formation, a group of trees or rocks to break the monotony, an interesting historic feature. Take advantage of each of these. A view of a city's industrial area to some people, to others, a view of the countryside. Remember, a view of the countryside, as far out as you can see, on our highways, is one that is not often seen. It is often on the freeway, along the edges of the roadway. Contour grading of interchanges is important. A much smoother effect which adds the height and grace to the design. A single, continuous grade for all should be avoided. Rather than several short sections, one long, continuous grade should be the rule. For parking or maneuvering, a short piece of land can add to a community's excitement. A short piece of land added to a community is important. A more gradual approach is used for this purpose. This would be easier to construct, and the highway would be easier to construct. The graded section of the highway should be held to a minimum.
Dramatic rock formations should be left in place to add interest to the route.

Rock Outcroppings

If a rock outcropping appears on a slope, work around it. It will probably look much more natural to leave it in place than it will to remove it. This is especially true in an area where rock outcroppings already appear in nature.

Daylight Cuts

From an aesthetic standpoint, a through cut should be avoided whenever possible. A through cut is not only unpleasant from a visual standpoint, but it leaves much to be desired from an emotional standpoint. While the claustrophobic reaction is usually mild, nevertheless, it is an undesirable play on the emotions of many people. Whenever a cut can be widened, the slopes flattened, or one side daylighted, this undesirable emotional reaction can be eliminated.

Highway Hardware

In many cases, the highway engineer is his own worst enemy! There is little beauty in a multiplicity of signs, signals, lighting standards, and guard markers. We should do what we can to subdue or eliminate these facilities. Keep in mind, the fewer the signs, the greater the impact of the remaining signs. In a forest area, a natural wood guide marker may be the answer. The wood post will hold the reflector just as well as a steel post. Maybe the elimination of the white paddle is the answer. The paddle is of little value in the daylight, and the reflector is all that can be seen at night. Also, in a forest or in rural areas unpainted wood posts should be used. They do just as good a job of holding a sign as a painted one. Not only are they less obtrusive, but they are less expensive. Other hardware should be painted a soft color to blend with the background. The backs of all signs should be painted. This renders them less distracting, thereby adding to the safety of the highway. Whenever possible, place signs back to back on the same posts.

Right-of-Way Width

Experience has shown that seldom are our highways situated on an adequate width of right-of-way. What appears to be ample during the design stage seems always too tight after construction. Consideration should always...
Where terrain permits, a very wide median is much more satisfactory aesthetically. The median can be left virtually undisturbed in its natural state, cuts and fills can be kept on a smaller scale, and both roadbeds fitted into the contours more easily. More can be accomplished toward future planting—especially to screen planting where necessary. A little additional right-of-way width is often desirable to include a group of trees or a rock outcropping. The area between the top of cut or toe of slope should act as a buffer zone. Often a little extra right-of-way will preserve a view. Always assume that the slope, curve, and grade can be kept on a smaller scale, and both roadbeds fitted into the contours more satisfactorily than in the relatively free of the early highway planning stages than in the design and location of our scenic highway program.

**Final Cleanup**

This is one of the most important operations on a project, but unfortunately, it is often overlooked. This is the frosting on the cake. All areas should be shaped and all debris removed. This includes the removal of all construction stakes. These are only a few of the details that are being given close examination. They do, however, illustrate what we in District 10 are looking for as a stop-gap program. This is only one facet of the total program planned for District 10. It is, however, the portion of the program that will show results in the shortest possible time. It is also the portion of the program most easily understood and most quickly accepted by all concerned.

**Future Program**

As this initial program takes shape, the district scenic highway committee will be able to devote time and effort to the aesthetics of highway planning in this area. The guidelines are necessarily general. They must be flexible enough to cover all highway planning situations—urban, rural, mountain, and valley. Opinions are diverse on the aesthetic development of these areas. Sensitivity to the needs of the communities involved is necessary if it is often overlooked. This is our planning has been attuned to the desires of the local communities. This is one of the most important operations on a project, but unfortunately, it is often overlooked. This is the frosting on the cake. All areas should be shaped and all debris removed. This includes the removal of all construction stakes. These are only a few of the details that are being given close examination. They do, however, illustrate what we in District 10 are looking for as a stop-gap program. This is only one facet of the total program planned for District 10. It is, however, the portion of the program that will show results in the shortest possible time. It is also the portion of the program most easily understood and most quickly accepted by all concerned.

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tern of land ownerships to minimize the creation of small odd-shaped parcels that are difficult to use and often detract from the appearance of the surroundings. Among other items that are considered are the boundaries of school districts, locations of public facilities, and zoning. The general plan of the community and outlying unincorporated areas is also an essential source of information in the planning process. Thus, a thorough knowledge is developed of the geography and general makeup of the community so that the highway may be integrated with the local scene rather than forced through it.

The local community will generally direct attention to sites of historic value early in the planning stage. What may appear to be a pile of junk or even vacant land to a stranger may be a site of some historic event or a last link to a past era dear to the heart of the local community. Although many of us admire the shine and glitter of newness, others prefer the patina of time. This may seem somewhat removed from aesthetics; however, the reactions on one's emotions are just as real, just as strong, as the emotions that come into play when viewing a beautiful scene. In this instance, the emotions are experienced by the community rather than the highway user.

In rural areas, every effort is made to achieve compatibility with the area through which the highway travels. This is of prime importance to both the highway user and the highway viewer. In rolling or mountainous areas, a curving alignment can be used effectively to conserve existing features of the terrain. As the alignment for a new highway is being developed, consideration is given to the view from the roadway itself and possible roadside vista points and rest areas for the enjoyment of the traveling public.

Aesthetic excellence has its birth in the highway planning stage and is often inherent in the highway location. In the following stages of design and construction, close attention to aesthetic details will ensure a completed product in which all contributors can take pride.

District 10 has produced some notable examples of aesthetically pleasing highways in the past. The district scenic highway committee's efforts will contribute to even better results in the future as it reviews and gives advice on each highway project from the start of planning through the completion of construction.

Although it may mean some loss of natural vegetation, the practice of "daylighting" to give travelers an unrestricted view of natural grandeur is highly desirable for adding dramatic values to the highway.
Our critics say that we destroy natural beauty without feeling because we are insensitive to beauty. I say we are employees of the Division of Highways—and our priorities are transportation and safety. We must build straight lines. If curves are more natural, we will build long-radius curves. Wherever possible we replace the natural beauty of the terrain with man-made beauty. Our critics say that we should build scenic highways, not freeways. I say that user benefits are one of several factors we consider but that we try to do our best at conserving this rich heritage. We recognize the natural beauty of California—of the sturdy oaks and stately eucalyptuses that dot our landscape in any direction we look—of the pines, the Monterey pine, a live oak, a redwood tree, a California poppy—of the Queen of the Missions—of the ever changing scenery. We are aware of the natural beauty of California than the average person because we are employees of the Division of Highways in early 1980's. It is the proper mixture of the four ingredients—safety, efficiency, economy and beauty—for each particular project which opens up some magnificent possibilities for some time and we have some good examples of aesthetic highways to show for our efforts. A few of these are Highway 1, which precedes it. We are fortunate to have it so opportunely to reprint our previous 1977 article on high-ways build our highways as short and necessary—to a person than to a tree. As highway engineers we quote statistics on lives lost and many injuries prevented by building a scenic highway; 'we quote statistics on many lives will be saved and how much time will be saved and how many injuries we quote are employees of the Division of Highways in early 1980's. It is the proper mixture of the four ingredients—safety, efficiency, economy and beauty—for each particular project which opens up some magnificent possibilities for some time and we have some good examples of aesthetic highways to show for our efforts. A few of these are Highway 1, which precedes it. We are fortunate to have it so opportunely to reprint our previous 1977 article on high-ways build our highways as short and necessary—to a person than to a tree. As highway engineers we quote statistics on lives lost and many injuries prevented by building a scenic highway; 'we quote statistics on many lives will be saved and how much time will be saved and how many injuries prevented by building a scenic highway.' We are aware of the natural beauty of California—of the sturdy oaks and stately eucalyptuses that dot our landscape in any direction we look—of the pines, the Monterey pine, a live oak, a redwood tree, a California poppy—of the Queen of the Missions—of the ever changing scenery. We are fortunate to have it so opportunely to reprint our previous 1977 article on high-ways build our highways as short and necessary—to a person than to a tree. As highway engineers we quote statistics on lives lost and many injuries prevented by building a scenic highway; 'we quote statistics on many lives will be saved and how much time will be saved and how many injuries prevented by building a scenic highway.'
State Route 1 along edge of Santa Lucia Mountains in Monterey County, better known as Big Sur Country, is first route to be taken into the state scenic highway system.

Our critics say that we have too much authority and therefore fail to do what the “public” really wants. I say that we must be, and I think that we are, willing to sit down and discuss our designs with anyone and everyone. We must have public acceptance for the highway program. We have a great deal of experience working with advisory groups, and we must always be willing to work with them. We must also realize that we are responsible for the design of state highways and be willing to make hard decisions when there is an honest difference of opinion between our advisors and us. We must listen with openness to the advice and council of others and, equally important, accept our responsibilities with courage and conviction. Our critics, our detractors or our advisors need not defend our highway designs—it is Mr. Womack and you and I who must defend them. Let’s not be in the position of looking at a mistake in design after it’s built into a job and say, “We didn’t want to do it this way, but the advisory committee wanted it.” Rather, let us say under such circumstances, “We are responsible, we will correct it and we will learn by this mistake.”

Our critics say that we can do a better job of aesthetic design—and I say we can do a better job. On this point I agree. For example, we can still improve upon our contour grading at interchanges by better handling of open drainage ditches or exposed drainage pipes and junction boxes. We can reduce the number of “things” we stick in the ground and entirely eliminate the orange survey markers that stick out like a sore thumb on scenic highways. We can insist that bridges are designed to eliminate the abutments or piers adjacent to the shoulders for both beauty and safety. We can design wider medians, split-level roadways and wider rights-of-way when appropriate. We can widen cuts and eliminate through cuts. We can strive to get better-than-minimum design standards especially for sight distance. We have done well in District 5—we can do better—and I say we will do better.

The State Highway Engineer sitting in his Sacramento office saying that we will do better will not make it so—but it is an important beginning. The district engineer standing here before you saying that we will do better will not make it so—but it is an essential ingredient. The aesthetic training course you are about to participate in will not make it so—but it is a step in the right direction.

How then can we do a better job? It will be done by you—by the same people who have designed, constructed and maintained the greatest highway system known to man. You will sharpen your technical tools, expand your creative ability, and I hope generate a great deal of enthusiasm for meeting the challenge of more sophisticated highway engineering—highway engineering that provides the best possible blend of safety, efficiency, economy and beauty in every job you turn out.
In the Air

What's Up -

By Eric P. Grant
Man has finally come to recognize that air is a valuable natural resource.

Either we conserve it or, as one eminent UCLA meteorologist warns, "Civilization as we know it will disappear within 100 years." The amount of air available to sustain life on earth is comparable to one coat of varnish on a child's world globe.

Today 70 percent of all Americans live on less than 10 percent of the land. Almost everything we do, from cooking food to driving an automobile, dirties the air.

Or to put it in more personal terms, not one of us would think of dumping his household trash in the middle of the living room. Yet this is exactly what we are doing to our atmosphere every day when we dump the wastes from home, industry, and transportation into the skies. Then we turn around and breathe this aerial "garbage."

We should really not be surprised that we have polluted our air in California. It would be surprising if we had not. The state grew in the 1930s and 1940s from agricultural economy to a great industrial complex centered in five or six sprawling metropolitan areas.

Take the automobile, for instance. We have 11 million in the state using between 18 and 20 million gallons of gasoline each day. The internal combustion engine which powers our vehicles is relatively inefficient. We lose into the air 10 percent of the total fuel we buy, or nearly 2 million gallons a day.

The irony of the loss is not only its smog potential, but its cost. The loss costs California car owners $666,000 every day of the year. To that must be added the cost of the damage done to humans and crops—a staggering figure.

Getting rid of auto-created pollution is an expensive proposition, but actual savings can be shown when they are related to the cost of installing control systems on motor vehicles.

In California we have an ideal climate in most places—abundant sunshine, mild breezes, moderate temperatures. These are mixed blessings.

It is California's sunshine which chemically converts the automobile exhaust materials and other pollutants of nitric oxide (NO) and unburnt hydrocarbons into organic ozonides which have the characteristic sweetish ozonelike odors of smog—but it is the nitric oxide and the resulting nitric acid which cause the insidious irritation and plant damage.*

A layer of warm air, stretching over the Pacific from the Hawaiian Islands, acts as a lid, trapping the pollution-filled cooler air below. This air cannot disperse until the temperature inversion is broken or it stays at a fairly high altitude.

Let us talk for a moment about smog's effect on health.

![Photo of Santa Ana-Hollywood freeways in Los Angeles, made on a clear day, shows large number of vehicles traveling freeways. State now has 11 million registered vehicles, will have 18 million by 1980. California can have more such clear days when control systems go on most cars in urban centers.](image)

We know, of course, about the terrible disasters of Donora, Pennsylvania, in 1948 and London, England, in 1952 and 1962 when thousands were stricken by severe smog and many actually succumbed. Fortunately, such a tragedy has never befallen California. But we know the eye irritation we feel on a smoggy day. And we know the nauseous feeling that comes over us when we drive through smog for any length of time.

The U.S. Public Health Service has confirmed the link between air pollution and increases in respiratory ailments. Emphysema, once an obscure disease, has grown to major proportions. Studies show that women between 18 and 30 living in metropolitan areas have a 400 percent greater incl-
The chilling recital could go on and on. The average housewife has to clean her windows, wash her clothes, and wash her bed linen because of the air toxins in the air. The menace of auto-created smog becomes more pronounced in California as our car population continues to grow. The State of California became involved with auto smog in 1959 when Governor Edmund G. Brown requested the Legislature to direct standards to reduce air pollution from vehicles. The lawmakers followed this action in 1960 by establishing the Motor Vehicle Pollution Control Board. The Air Pollution Control Board, under the direction of A. J. Haagen-Smit, professor of biochemistry at Caltech, proved that automobile fumes, in the presence of sunlight, converted to smog. Up until that time, Angelenos had blamed everything else under the sun for the pollution plague.

Since the automobile does not observe county boundaries, the problem is statewide. An automobile traveling from San Francisco to Los Angeles, for example, is a little smog "factory," leaving behind its trail of contamination in every county through which it passes.

California is not sitting idly by while the problem multiplies. It is the first state to permit strong local air pollution control districts with their own rules and regulations. Nine of these in 14 counties are working hard to stem industrial and domestic waste.

The percentage of lung cancer deaths in California is lower than those living in rural areas. There are still other losses. California agriculture suffers approximately $132 million in crop damage every year because of smog, including destruction of crops, poorer quality, slower growth, and less production. Citrus tree experiments at Upland dramatically illustrate the differences between fruit produced in filtered air and fruit struggling for life in smoggy air.

Smog will peel paint from buildings, rot rubber, and corrode metal. How much more frequently does the average housewife have to clean her windows, wash her clothes, or wash her bed linen because of the air toxins in the air? The menace of auto-created smog becomes more pronounced in California as our car population continues to grow. The State of California became involved with auto smog in 1959 when Governor Edmund G. Brown requested the Legislature to direct standards to reduce air pollution from vehicles. The lawmakers followed this action in 1960 by establishing the Motor Vehicle Pollution Control Board. The Air Pollution Control Board, under the direction of A. J. Haagen-Smit, professor of biochemistry at Caltech, proved that automobile fumes, in the presence of sunlight, converted to smog. Up until that time, Angelenos had blamed everything else under the sun for the pollution plague.

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The Chrysler cleaner air package controls carbon monoxide and hydrocarbon emissions by providing optimum burning conditions in the cylinders.

**POSITIVE CONTROL**—This "closed" positive crankcase ventilation system is approved for installation on both used cars and on new cars. Shown at right is the operation of the system during adverse conditions of high speed or extreme acceleration with a worn engine, when "blowby" tends to exceed the capacity of the original system.

of total unburned hydrocarbons (raw gasoline), while the exhaust contributes 60-65 percent and all of the carbon monoxide. A small amount also comes from fuel tank and carburetor evaporation.

The State MVPCB tackled both the crankcase and exhaust emission problems, but the former offered the greater prospect for simple solution. Automotive men had known for a long time about a breather tube from the crankcase to the air cleaner used by British car manufacturers and the U.S. Army for years to keep dirt and dust from working their way into the engine and to prevent sludge formation in the crankcase. Adaptation of this system for crankcase fume control, therefore, seemed logical.

Approved crankcase devices have been on most new California automobiles since 1961. Many are factory equipped, while thousands of other vehicles have added the devices under state requirements at time of ownership change. Today at least 6 million registered California vehicles are thus equipped, preventing the addition of 300,000 gallons of unburned gasoline from entering the atmosphere every day.

But the main problem still remains exhaust emissions. The 1966 model vehicles now being sold in California are virtually smog-free.
If every one of Los Angeles County's 7 million residents could step into a '66 model tomorrow instead of the polluters they now drive, smog in that area would be trimmed by 70 percent.

The story of exhaust control began in 1961 when the Motor Vehicle Pollution Control Board published its standards and criteria for operation of the systems. Basically, they said that hydrocarbons (raw gasoline) must be reduced to 275 parts per million of air and carbon monoxide to 1.5 percent by volume. This was a high dive into the relatively unknown field of "parts per million" chemistry.

To the everlasting credit of private initiative, dozens of America's largest and most reputable manufacturers decided to enter the race for the exhaust control market in California with the investment of millions of dollars in research and their finest engineering talent.

The problem was one of the toughest technological challenges they ever faced because of the necessity of fitting more than 500 different makes and models, operating under a variety of driving conditions, and in various stages of upkeep. Not only that, the devices had to meet other criteria of safety, heat, noise, efficient operation, longevity and, of course, cost.

The Chrysler Cleaner Air Package, approved in November 1964, and now going on all 1966 Chrysler products sold in the state, is an engine modification system consisting of a modified carburetor, a slightly altered distributor, and a sensing valve to control spark adjustment during deceleration. The carburetor has lean fuel jets, a modified choke calibration, and the idle set to lean adjustment. The distributor is so arranged to provide spark retard while the car is idling.

"Heart" of the system is a special vacuum-operated valve, mounted between the distributor and the carburetor. The valve senses the change in manifold vacuum when the car decelerates and "instructs" the distributor to provide the maximum spark advance at this time to provide efficient burning and thus reduce hydrocarbon and CO emissions.

The air injection reactor system, now being used by General Motors, Ford, Rambler, Kaiser Jeep, and some International Harvester station wagons, was approved by the MVPCB in July 1965, in time for installation on 1966 models. The system is the result of the greatest crash program ever undertaken by the automobile industry.

It works on a different principle from the Chrysler CAP. It consists of a pump which sends a supply of fresh air through distribution tubes to each exhaust port in the cylinder head. There are also modifications to the carburetor and distributor. The fresh air hits the exhaust gases as they exit the exhaust valves. The chamber and distribution of the丽江 are also modifications to the chamber and distribution of the丽江. There are no through distribution tubes in the air injection reactor system. In some respects, the system is like having an "afterburner" in the exhaust manifold, or, to put it another way, the system is similar to adding air to a smoldering blaze; the oxygen speeds and completes the combustion process.

Both systems do require some minor periodic maintenance, but no more than recommended by the manufacturer in the car owner's handbook to assure proper timing and carburetor adjustment.

Actually, if the car owner follows the manufacturer's recommendations, he will not only be helping to reduce deadly auto fumes but also assuring himself a longer-lasting, smoother-operating automobile.

Today, state-OK'd exhaust systems on '66 models in California are preventing the contamination of the air by 80,000 gallons of hydrocarbons and 1,200 tons of carbon monoxide every day.

The efforts of the California Motor Vehicle Pollution Control Board, and the devices that are going on vehicles, have done and will continue to do an effective job of controlling vehicle pollution in the State of California. Other areas of state activities have also contributed greatly to the elimination of air pollution in the State of California.

There is no peer in the country for the California Highway System. Although there are those who will question its efficiency at 5 o'clock on some weekdays, it goes without saying that it is the best state highway system in the country, and one of the best in the world.
means of moving masses of vehicles anywhere in the world. This efficient moving of traffic has had its beneficial effects on air pollution:

First, the basic premise of freeway construction is to move traffic rapidly at sustained speeds. We know that emissions from a motor vehicle are 20 times higher on deceleration than on cruise. It should be very evident, therefore, that with the increased traffic flow resulting from our excellent freeway system, emissions are substantially reduced.

Second, one of the premises of freeway construction in California is to provide a means for traffic to circumvent metropolitan areas. This prevents motor vehicles from becoming involved in congested metropolitan areas, where smog is most severe. Although it doesn't eliminate pollution, it spreads it out over a wider area and therefore minimizes concentrated impact on the metropolitan center.

Certainly the readers of *California Highways* are well aware of the magnificent job that has been done to provide first-class highways to handle the anticipated increase in vehicle population. State Senator Randolph Collier, Chairman of the Senate Transportation Committee, and Assemblyman Tom Carrell, Chairman of the Assembly Transportation Committee, have been strong supporters of an effective freeway system. They have not, however, neglected to recognize the importance of controlling the motor vehicle. Under their able leadership, key legislation supporting and augmenting the vehicle emission device control program has been passed by the California Legislature. Senator Collier's Senate Bill 317 was the strongest legislation and most effective direction of legislative interest in this program ever passed in the United States.

The strong recognition of the health effects of air pollution and the achievement of control expressed in SB 317 probably, more than any other action by the State of California, awakened the federal government to the necessity for controlling emissions from motor vehicles.

The cooperative effort developed under the administration of Governor Brown, the Legislature, the Motor Vehicle Pollution Control Board, and American industry has resulted in a dynamic program on many fronts to protect an important natural resource, air. Although our problem will not be solved in a year or two, we know that air pollution as it existed yesterday and as it exists today will not be present tomorrow.
Oil and Water are said not to mix, but in the City of Long Beach they mix very well.

Here, in this rapidly growing metropolis of nearly 400,000 people, second only to Los Angeles in size in the great urban complex which spreads across the Los Angeles basin, oil was the prime moving force which started the city on its way to prosperity, but its development of its waterfront for industrial, shipping, and recreational use is the factor which is bringing it to the fore among the West Coast's great cities.
Aerial view of Long Beach shows relationship of city to harbor. New Pier J development in foreground, and Los Angeles River coming diagonally in from far left. Rainbow Pier with its convention center will be incorporated into the shoreline development plan (see next page).

Since Long Beach at one time was a landing place for contraband in the early days of the state's history, the famous Signal Hill got its name as a point from which signals could be shown to tell smugglers' boats when the coast was clear. By the 1880's the slowly growing town was enjoying some attention as a seaside resort, and a number of piers and hotels appeared along the beach.

It was not until the 1920's that Signal Hill was discovered to be a great dome with fabulous riches in oil beneath it, and the development of the modern city started. A little later, the Navy decided to use Long Beach as a base and the city's modern pattern was set — oil, Navy, shipping and recreation.

By World War II a fifth element — aviation — was added with the development of the Douglas Aircraft Plant and associated industries. Long Beach today is California's fifth largest city, geographically a part of but a separate entity in the sprawling Los Angeles urban complex. Its port facilities and its naval shipyard are the most modern in the U.S., but at the same time it has the world's largest municipally owned marina for small pleasure craft, and the world's largest roller coaster.

Scattered all throughout these facilities are oil wells, for the land has oil in great pools everywhere beneath the surface, in one of the earth's great fields. In the harbor area, groups of as many as a dozen or more pumps can be seen working in a long row, only a few feet apart. Directly adjacent may be a long wharf with ships loading for Japan, Ceylon, and Melbourne.

Along Ocean Avenue a dozen new or still-building high-rise structures punctuate the skyline, for the city is running short of land. Added to its unusual combination of recreation, shipping and industry, is its share in the second largest economic market in the United States.

Possibly today Long Beach's biggest business is its harbor, which has 52 modern deepwater berths, with plans for 28 more soon. Annually, over 2,000 ships call at the port, more than half of them bearing foreign flags. Cargoes through the port approximated 1.5 million tons last year, roughly valued at an average of $100 a ton, or one and a half billion dollars.

More money has been spent on the Port of Long Beach since World War II than any other in the nation with the exception of New York, but the port's history goes back to the early 1900's. At that time there were no facilities at all; the harbor, which was discovered in the city when Long Beach was named as such in 1796 the first vessel in 1796 in Signal Hill, was used mainly for the smuggling of goods into the city. The area encompassed by the harbor was then a vast expanse of mudflats and shallow waters.

Although Signal Hill had brought in a meager trickle of shipping at this time, the town was growing fast, and a number of piers and hotels were being built along the beach. The first contributions came from the federal government, for there was a growing demand for a harbor to serve the Los Angeles basin. The area was filled with farmlands, and the city was running short of land.

In 1899 the people of Long Beach approved a bond issue of $25,940,000 for the creation of a new harbor, and work began on the Mary Avenue, which was completed in 1902. The first vessels to use the harbor were lumber schooners, typical of the shipping of the times.

As time passed, more substantial bond issues were voted, and the mudflats were slowly raised with dredgings from the channels. By 1930 the harbor could berth five large vessels simultaneously. This year also federal funds were made available for construction of a breakwater, creating an outer harbor to protect the harbor. By 1932 the harbor was ready for service, and 27 more soon afterward.

Income from the wells was in the millions, but the wells brought a new problem. As early as 1940 oil was discovered in the harbor area, and since that time the oil fields have provided a new source of revenue for the city. The well field is north of the harbor, and the oil is produced by a number of large pumps and pipelines. The oil is then transported to the refinery by a long pipeline, and the by-products are used by a number of local industries.

The harbor complex was being noted for its beauty and efficiency, and it has become a major tourist attraction. The city is proud of its harbor, and it has worked hard to maintain its beauty and efficiency. The harbor is now a major center for trade, and it is one of the busiest in the world.
and in the ensuing decade the situation rapidly worsened. By 1957 an area of 16 square miles had subsided from 2 to 24 feet. So serious was the situation, the Navy was considering closing its naval shipyard on Terminal Island. Since the yard employed 6,500 people with an annual payroll of $30 million, this would have been a serious blow to the city's economy.

Consulting engineers and geologists called in to study the problem recommended injection of sea water into the subsurface area. In 1953 this plan was adopted, with installation of a pilot waterflood plant on Pier B. Subsidence continued however, and in 1957 the injections were greatly increased. By 1960 a total of 260 million barrels of water had been forced into the ground, and the subsidence was checked.

Nevertheless, the damage was enormous. In addition to the cost of water injection, subsided areas had to be built up again, and when the work was completed, the city found it was out of pocket nearly $60 millions. There was, however, something of a return for this work in that the flooding forced more oil up which would not have been recovered otherwise. This type of operation is now common in the oil fields.

Today the city boasts the largest dry cargo port on the West Coast, with a net operating profit for the port of more than $1 million each year, and revenues are constantly rising. Ports such as Richmond handle greater tonnage, but this is almost exclusively oil, carried through pipelines operated by computers, and is a relatively simple operation.

Great portions of the port have been built with fill dredged from the channels, and places where the ocean waves once rolled in unimpeded are now solid ground and long stretches of piers. Expansion of the harbor by dredging and filling continues, just as the city continues to automate cargo handling facilities, and provide the most modern equipment for moving freight.

In Long Beach Harbor today there are expensive installations for handling all sorts of dry cargo. Among the port's other claims to fame is its shipment of iron ore—greatest in the country—virtually completely automated. One company imports industrial salt which it stores on the pier in great mountains, and moves with big shovels and conveyors. Another has a 24-stories-high elevator exclusively for the movement of grain. The structure holds over 2 million bushels, which it can load into ships at the rate of 1,300 tons per hour. Mile-long freight trains from the Midwest, loaded with milo and wheat, move into position at a hydraulically operated unloader which tilts a car every three minutes and dumps its load on conveyor belts.

Pier E is fitted for super vessels—one of the few facilities in the world suitable for berthing the huge modern tankers of more than 100,000 tons being built today. Great gantry cranes move up and down Pier D loading cargo where they are needed. At the bulk oil terminal on Pier E, pipelines two feet in diameter can suck up 32,000 barrels of crude oil from the huge tankers and deliver it to storage areas.

A $3 million terminal exclusively for handling bananas is the only one of its kind in the U.S., able to take shipments directly from freighters into its processing shed. Its cranes and conveyor belts can handle 100,000 boxes of bananas per eight-hour shift into storage facilities which will take 200 carloads of fruit. About 160,000 tons of bananas are handled each year through this facility, servicing the entire western third of the U.S. and parts of Canada.

Just to the west of Pier E lies the Long Beach Naval Shipyard and Naval Base, now one of the major U.S. shipyards. One Navy crane in use here can lift 425 tons, and the drydocks can handle the largest ships.

Piggyback shipment of truck trailers to East Coast ports is expanding. One company, moving half a million tons of special cargoes annually, operates a fleet of ships which carry the company's own trailers, designed to fit snugly into the holds and on deck. Frozen foods and perishables requiring refrigeration are picked up at the customer's door, and delivered without further handling on arrival on the East Coast. Trailers have their own refrigeration which can be connected to...
Looking east on Ocean Boulevard in vicinity of Atlantic Avenue Intersection, downtown Long Beach. Villa Riviera in distance is old landmark, but other high-rise buildings are new.

June 26, 1921. First oil from Signal Hill field, Alamitos Number One well, which struck commercial oil which formed Signal Hill field. Monument has been erected to commemorate Shell Oil Company's discovery.

Coeds at Long Beach College pose to give scale to one of the pieces of modern sculpture on campus.
One of many small craft berthing facilities in Long Beach area.

Long Beach skyline as seen from harbor area.

Beaches are long and wide, with apartment buildings clustered right behind.
Old photo made in 192, shows bathing beach, amusement area, and old beach structures. This area has been entirely renovated.

Harbor area as seen from Edison Plant in 1926. Pipes are for dredging operations which even then were creating new land for harbor development.

San Pedro and Point Fermin in distance.

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the ship's power once the trailer is on board, and constant temperatures maintained. Included in these loads are frozen citrus concentrates, grapes, prunes, potatoes, melons and shrimp, as well as chemicals, candy, wines, liquors, and other commodities for which the East Coast cities constantly hunger. They arrive in perfect condition, with greatly reduced shipping cost. The company is currently doubling its handling facilities at the port and has plans for larger ships carrying half again as many trailers.

But this is just a minor portion of the truck traffic which operates out of the harbor area. More than 1,000 trucking companies service Long Beach Harbor, and if all the trucks which leave the port each year were lined up bumper to bumper, the line would extend from Long Beach to Chicago. Another 1,300 truck companies serve the city, as well as three railroads, part of the facilities for which are city owned.

The Long Beach Freeway ends at the harbor, handy for truck movements taking ship cargo to further destinations. From this freeway the trucks have access to the state's great highway network. Only a few miles north of Long Beach is the San Diego Freeway, now the San Diego Highway. This route travels through dozens of southern California cities to reach the Golden State Freeway at the upper end of the San Fernando Valley. If you desire to travel east, you easily reach the Santa Ana Freeway, which you can branch off at other freeways which are part of the Interstate System and go all over the U.S.

Truck travel times have been much facilitated by the freeway system, which in turn is a great help in the rapid movement of materials coming in by ships. By freeway, travel time for trucks from the harbor area to downtown Los Angeles is now less than an hour. Only 15 minutes to the downtown area, 20 to 30 minutes to the harbor, and 30 to 40 minutes to the airport.

Currently under construction with tidal lands money is the new Gerald Desmond Bridge. This will replace the old pontoon bridge which now crosses the harbor entrance channel. It is expected to be open to traffic by mid-1927. The new bridge will provide the harbor with a new vital link with the city. The new bridge will provide the city with a new vital link with the harbor.

Biggest Long Beach payroll is Douglas Aircraft, with 30,000 employees when operating at full capacity. There are dozens of other industries as well as associated industries, as well as thousands of other jobs provided by Long Beach industry.
which visitors can drive and see the harbor's main attractions.

One of these is the Pacific Landing complex, with restaurant, boat launching, tackle shop, and sportfishing vessels of all sizes. From these facilities the city claims access to the number one sportfishing area in the world. Here too is an airplane terminal with scheduled flights by seaplane to Catalina Island.

The Long Beach Marina in Alamitos Bay, on the southern edge of the city, is an outstanding achievement with public funds. Here there are berths for more than 2,000 small craft.

A part of this marina is the Leeway Sailing Club, with over 500 junior boating enthusiasts who make up its membership. Youngsters 7-18 attend daily classes during the summer and learn good sailing techniques, good seamanship, and maintenance of sailing craft. Twice each week there are sailing competitions. In the years since 1932 when the club was founded, it has graduated more than 50,000 youngsters from 31 different nearby cities.

Certainly one of the most ambitious projects among western cities is the Pier J and shoreline development plan. With additional fill on the city's side of the Pier J portion of the harbor, the city will create an entirely new marina double the size of the Alamitos Bay Marina, plus motels, restaurants, and yacht club installations. A new bridge will extend Magnolia Avenue to give access.

The present Rainbow Pier at the Civic Auditorium will be eliminated, with extensive fill and pier construction which will provide parking, swimming, more motels, restaurants, a visitors' marina, and a number of other attractions, all imaginatively landscaped. Heart of this section will be the Civic Auditorium and the Arena seating 17,000 people, with 58,000 square feet of exhibitor space.

Included also in the Pier J plan and its associated features, eventually representing a $250 million investment, will be a shoreline drive, additional pier facilities and beach developments, and several offshore oil drilling islands. These latter will also be attractively landscaped, so that the drilling machinery will be hidden from the view of those on the shore.

Long Beach today stands on the threshold of becoming one of the West's most imaginative, water oriented cities, rivalling the charm of Italy's Venice and Turkey's Istanbul.
Twenty-six miles of single-lane concrete poured at a rate of more than 1½ miles a night and completed in 16 working nights was the recent accomplishment on a widening project on the Long Beach Freeway in Los Angeles.

The job was the first nighttime paving ever tried in District 7 and would have taken at least 35 working days to complete because of the heavy traffic using the freeway during the daylight hours.

Working at night not only eliminated interference with heavy daytime traffic but also made it possible to have longer continuous working shifts. Cooler night temperatures slowed down the often too rapid initial drying rate of the freshly laid concrete and contributed to final good paving results.

The Long Beach Freeway, six lanes prior to the widening, carries around 120,000 vehicles on an average day. To handle this growing traffic load, contracts were awarded last December to add two lanes in the median from the San Diego Freeway north to the Santa Ana Freeway interchange—some 13 miles.

However, the problems of paving during the day loomed large.

Since the new lane would be directly against the existing pavement, safety dictated that the inner fast lane of the freeway would have to be closed, funneling traffic down to two lanes in each direction and backing up traffic for the entire length of the job in both directions. Also, with normal 9 a.m. to 3 p.m. working hours (lanes could not be closed during the morning and evening rushes) little paving would be completed in any single working day.

Why not pave at night? the contractors suggested. There would be little or no interference with heavy traffic, longer working shifts and cooler temperatures—thermometers in Los Angeles can hit 95 and higher in June and July.

But night paving was pretty much of an unknown quantity, often considered but never previously adopted in District 7. The difficulties and hazards were apparent. But not overwhelming, said Rich H. Gerald, resident engineer for the state on the project. After discussion and review of signing, lighting and other safety problems, he agreed.

Night paving began June 13. Every week night from 6:30 p.m. to 6 a.m. the lane nearest the median in each direction was closed. Paving operations started about 7 p.m. after the evening traffic peak, and continued to about 3 a.m. They were followed by finishing work and application of curing compound until 6 a.m. The freeway was then opened to its full six lanes for the morning traffic wave.

The paving was laid by two crews, operating two slipform pavers. One crew started work at the south end of the project; the second worked north from about the middle of the job. Completing the new northbound lane, the two crews worked back, paving the new southbound lane.

The two pavers were supplied by a fleet of over 30 dump trucks working out of a centrally located batch plant. The pavers moved forward constantly at 16 feet per minute. The pavers included vibrators, screed and floats so that the continuous slabs 8 inches thick and 12 feet wide were fully completed after the machine passed, except for normal finishing, dragging for texture and the application of curing compound.
The work of each paver was lighted by a portable unit, diesel-power generated, carrying a bank of six 1,000-watt mercury vapor lights on a 28-foot boom. Finishers' illumination was provided by two 500-watt lights on small rolling stands.

Concern over the quality of the finished night paving proved unfounded. The Long Beach Freeway night job proved that a good paving crew with good equipment attains the same high standards day or night. Profilograph (smoothness) readings on the entire job were well within required limits.

Night paving paid the extra dividend of virtual freedom from random cracking. Pouring in the cool evening temperatures avoided the usual sequence of daytime heat expansion and subsequent contraction.

Another worry had been possible accidents during pouring operations. Rubbernecking drivers, it was feared, might slow down and be rear-ended. However, there were no injuries, no minor blow downs and no rear-ends.

Another concern had been possible general contamination. Job crews were well within specified limits. Night pouring in the cool evening tem-

Paving against existing pavement. Immediately behind paver, inspectors check concrete for grade. Ten-wheel dump truck deposits load in front of moving slipform. The only major incident directly chargeable to the night job was the blacking out one evening of portions of the Cities of Compton and Long Beach. In moving one of the light towers which illuminated the paving area, the boom snapped an overhead power cable, previously trimmed, that had just been trimmed the paving area was within a 1,000-foot radius of the light tower. However, the Cree of Compton and Long Beach in moving one of these towers chafed the cable and one evening of portions of the job was the only major incident directly chargeable to the night job.

The resident engineer and his inspectors were on 6 p.m. to 6 a.m. shifts. One of their most important duties was inspecting and advising the pouring operations. Three warning signs, each illuminated by two 500-watt floodlights, were placed at 1,000-foot intervals in advance of the pouring area. The signs, for approaching traffic, were illuminated by 400-watt floodlights. If a warning sign was not illuminated the pouring operation was not proceeding.

The only worrying factor was the potential for long delays caused by unusual traffic conditions. Night pouring put the entire job on such a schedule that any delay in the pouring area could result in delays of hours. The job was turned over to the paving crew immediately after the area was clear of the concrete.
Widening of the Long Beach Freeway is being done under two contracts. From the San Diego Freeway north to Bandini Boulevard, a 12-mile portion was awarded to Kasler Corporation and Gordon H. Ball Enterprises for $3,659,283. The second section, about two miles long, from Bandini Boulevard to the Santa Ana Freeway, is under construction by MacDonald & Kruse Inc. on a $2,833,962 award.

In addition to the new lanes, the project requires the changing of all drainage facilities, widening 12 bridges along the route, and installation of a blocked-out metal beam barrier in the median. Adding to safety and driving convenience is a two-foot glare shield atop the barrier to screen off headlights of oncoming cars. Job completion is scheduled for early 1967.
Above: Valley beauties smile as they detonate dynamite charge.

Below: Chumash Indians in authentic costumes put on dazzling display at celebration.

By Charles F. Gustafson
A century ago the Simi Valley was isolated, remote, almost inaccessible. A rocky trail led to the San Fernando Valley to the east. To the west, north and south were hills, high mountains, sandy stretches of virtual desert.

Once a day, to serve the scattered ranchos, a branch of the famed Butterfield Stage ran from Santa Barbara through the valley and over Santa Susana Pass to a connection with the main line near what is now Pacoima.

Today, in the Simi Valley, the hills, the high mountains and the sandy stretches remain. The trail to the east is a two-lane highway which twists over the pass on an alignment selected in 1915. But the last Butterfield stage ran long ago. There are no successors . . . no passenger trains, no buses, no form of public transportation.

You motorize, if you settle in the Simi now. In 1966, forty thousand people have. And more come all the time.

The word Simi is from the Chumash Indian *shimiji*, said to mean fleecy white clouds. The Chumash were hunters and fishermen who also scratched a few crops into the soil and ranged the coast and inland areas south from about present San Luis Obispo. But the valley name of Simi is just about all, aside from a spectacular array of paintings on cave walls high in the mountains, that remains of this gentle tribe which inhabited the area prior to the coming of Spanish soldiers and Franciscan fathers early in the 19th century.

In the 1850's the valley was part of a large Spanish rancho owned by the de la Guerra y Noriega family of Santa Barbara. Then the railroad rate wars of the 1880's brought hundreds of immigrants from the eastern United States. Farmers raised hay and grain, sheep, cattle and blooded horses. Orchard crops included apples, peaches, pears, figs, plums, olives, pomegranates. Great vineyards supplied grapes for locally famous wines.

During and after the rate wars, prospective settlers of Simi Valley land were carried by stage from the rail line at San Fernando. The trip over the pass was described as a hair-raising experience, with the screams of terrified lady passengers echoing from the canyon walls as the stage drivers, cracking blacksnake whips, urged their beasts through the steep and narrow defile.

This tranquil, fertile plain of unspoiled natural beauty, ringed on all sides by its mountain guardians, preserved its rural atmosphere all through the 1940's. Population in 1950 barely exceeded 3,000.

State sign route 118 threaded Santa Susana Pass amid a scenic background familiar to all western movie fans. Los Angeles Avenue ambled through the small settlements of Santa Susana and Simi and west to the coast between walnut and citrus groves, orchards of apricots and peaches, fields of tomatoes and peppers. Sheep and cattle grazed on the green hillsides.

Then, in the late 1950's, the spillover from the bursting San Fernando Valley swept through the once quiet pass. By 1960, population had reached 8,100. In July, 1962, it had leaped past 15,000; in July, 1963, 24,000. In July, 1964, 33,800. In December of 1965 the population of the Simi Valley was estimated at well over 40,000!

In the years 1960-65, the Simi Valley was rated the fastest growing section of Ventura County, itself one of the nation's leading growth areas. In the 12 months preceding July, 1965, population jumped 24.7 percent—and this was the smallest percentage increase for any single year since 1960. In five years, the Simi Valley showed an overall population increase of about 550 percent, or an average 110 percent per year.

The number of cars on the road soared in pace with population figures. Since the area lacked public facilities, every adult needed personal transportation for work, shopping, recreational and cultural pursuits; in short, for every activity which took him beyond the confines of his own half-acre.

Two-lane Route 118 (Los Angeles Avenue) continued to be the only continuous east-west route through the valley. In 1965 traffic density on this once quiet roadway showed daily traffic counts at such typical intersections as Erringer Road in Simi, 27,900; at Kuehner Drive near Santa Susana, 27,300; on the other side of the pass at the junction with Route 27, 23,500.

But the real bottleneck was the highway through Santa Susana Pass. Improved and widened to provide passing lanes on the upgrade at several points, it followed of necessity the multiple switchback alignment established a half-century earlier. Precipitous terrain permitted only minor improvements in its traffic-handling capacity.

Of the 18,000 people in the Simi Valley who go to work every day, less than 1,500 are employed in the valley itself. Most travel to jobs in the San Fernando Valley.

As the traffic load built up, the resulting twice-a-day congestion on the highway and through the pass caused time and money and tempered the enticing advantages of the semirural valley. Even between rush hour periods conditions were less than ideal. On weekends, more and more Simi Valley residents tended to stay quietly at home, and found that friends and relatives on "outside" tended less and...
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Presence provided additional funds for

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A vigorous campaign was mounted
to create the local industry that could
support the valley. If they could
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After the booming report echoed down the lovely valley, war and hunting dances by the Many Trails Club representing 30 Indian tribes continued through the morning. The visiting dignitaries once again seated themselves in the jouncing Conestoga wagon and set off for the invitational luncheon which ended the groundbreaking ceremonies.

But throughout the Simi Valley itself the “Open Door to Opportunity” celebration never faltered for a moment. Carnivals, rodeos, community dances, moonlight trail rides and barbecues; flower shows, hobby and crafts fairs, outdoor art exhibitions—all were part of the tumultuous gala which enthusiastically welcomed the advent of the long-awaited Simi Valley Freeway.

To achieve present-day standards in its leap across the mountaintops, the Simi Valley Freeway has of necessity abandoned altogether the 1915 alignment through Santa Susana Pass. The result is one of the largest projects the Division of Highways has undertaken in Ventura County. Earthmoving statistics are impressive: Excavation of more than 8.5 million cubic yards of earth for roadway (some ripplable, much requiring blasting). Over 34,000 cubic yards for structure excavation. The compacting of 108,200 square yards of original soil.

To withstand the crushing weight of fills ranging up to 220 feet in depth, reinforced concrete drainage structures of special high-arch design are being built. In some areas, the unique rock strata require a 3-to-1 slope. The right-of-way at its widest point is 1,100 feet from top of cut to top of cut.

This initial project to conquer the rugged and picturesque Santa Susana Mountains is on schedule for opening to traffic late in 1968. Immediate construction includes 1 1/2 miles of four-lane highway on Santa Susana Avenue north from Devonshire Street, as an extension of Route 27 (Topanga Canyon Boulevard). This work, to relieve traffic congestion on the existing two-lane roadway, will be completed by the end of 1966, joining the present pass road just south of its “S” curve over the Southern Pacific rail tunnel. Subsequently, this extension will climb an 8-percent grade to an elevation of 1,232 feet at the interchange of Route 27 and the Simi Valley (Route 118) Freeway. Construction also covers grading work for 0.7 mile at the east end of the project to a point north of Variel Avenue to “balance out” the project.

Crossing the mountains, the new freeway marches up a 3.6-percent grade to reach its highest elevation at 1,568 feet virtually on the Ventura-Los Angeles county line. A short distance west, near the point where an access road to existing Los Angeles Avenue soars 30 feet overhead, the six-lane freeway begins its descent on a 5-percent grade to the Keuher Drive project limit.

In the Ventura County “hard rock” terrain, even the new and powerful single-shank rippers on the job cannot cope with the rock density. So, day after day, the jagged hills which once echoed only to the soft tread and twanging bow of the Chumash hunter now resound to the deafening chatter of 3-inch holes being air-drilled to a depth of 15 feet, followed by overnight blasting.

Near Keuher Drive, scrapers climb 32-percent grades and descend them again to deposit fill hundreds of feet below the loading area. Dragging their pans down the steep slopes, the huge scrapers are enveloped in clouds of dust and the white smoke of metal biting deep into hard rock.

Building the Simi Valley Freeway’s next section west from Keuhner Drive—through level terrain to Tapo Canyon Road in Santa Susana—is expected to be funded in the 1967-68 fiscal year budget. Completion is planned for late 1968 to coincide with the opening to traffic of the initial project through the mountains. The next extension of Route 118 will be to First Street in Simi.

Meanwhile, to relieve valley internal congestion, Los Angeles Avenue is being widened from two to four lanes from Smith Road, near the east ascent of the pass, to Tapo Street in Santa Susana, 3.3 miles. Similar widening of a five-mile stretch between Tapo Street and Tierra Rejada Road is scheduled for completion in mid-1967.

An alternate route from the Simi to the Conejo Valley and Route 101 (Ventura) Freeway will also be open to traffic in the late fall of 1966. This federal aid secondary highway project will extend Olsen Road from the vicinity of Thousand Oaks to the Simi Valley’s Madera Road. Traversing presently inaccessible country, Olsen Road’s scenic attractions will rival those of the spectacular Santa Susana Pass country.

The Simi Valley Freeway will carry its first traffic through Santa Susana Pass in late 1968. But its impact on the economic future of the communities of Santa Susana and Simi will be felt far beyond. It has long been discussed and eagerly anticipated in every circle.

Simi Valley leaders are well prepared to meet the challenges inherent in economic expansion. Time and again in the past decade they have planned and successfully executed the programs which have met the realities of a truly fantastic growth.

A population of 85,000 in 1970, and approaching 200,000 in 1985, is the conservative forecast of demographers speaking from the basis of today’s 40,000-plus population. Growth like that means homes for thousands of new young families. New residential developments. New shopping centers. New and expanded educational, cultural, and recreational facilities. And, above all, to make it economically feasible, new industry.

Simi Valley in its remarkable 15-year growth from 3,000 to over 40,000 people has attracted a young population. Currently 70 percent of the residents are under 35. One-third of the population goes to school. Over 30 percent are under 10, only 3 percent over 50. These young families, 4.3 persons per home, average an annual income of $8,100. It is expected that young and growing families like these will make the major contribution to the valley’s growth in the next two decades.

All concerned agree that new industry must furnish the sinews to support the Simi’s rosy future. What does the Director of Public Works
John Erreca represented Governor Edmund G. Brown at groundbreaking ceremonies.
Plans for additional shopping centers and residential districts in the area. Retail and service establishments will increase department stores, major food markets, other retail stores, and restaurants. Development will include department stores, restaurants, and dining areas. A typical shopping center includes a food court, indoor shopping, and restaurants.

In the early 1970s, the San Fernando Valley was experiencing rapid growth, with new homes and businesses being built. The area was seeing a significant increase in population and commercial activity. The plans for additional shopping centers were aimed at accommodating the growing demand for retail and service facilities.

Details about the specific plans and developments are not provided in the text. However, the focus is on the expansion of retail and service facilities to meet the needs of the growing population.

The text also mentions the importance of educational facilities, with plans for the expansion of current schools and the construction of new ones. The Valley View Junior College, which previously served high school students, was expected to increase to at least 35,000 students by 1980. This was to accommodate the increasing student population.

Additionally, the text discusses the importance of recreation and cultural activities in the Valley. Parks, trails, and other recreational facilities were being developed to provide opportunities for outdoor activities. The new Simi Valley Community College was also mentioned, with plans for its expansion and the provision of modern educational facilities.

In summary, the text highlights the rapid growth and development happening in the Valley, with a focus on the expansion of retail, service, and educational facilities to meet the needs of the growing population.
retaining so far as possible the open rural atmosphere which, it is hoped, will continue to be characteristic of the valley.

“When the freeway comes . . .”

The Simi Valley Freeway is an important segment of a nationwide highway system which provides speed, safety, convenience and economic advantage in moving masses of people and goods. But, to the individual citizen, “when the freeway comes” has its own special significance:

To the mother whose school-age children walk quiet streets freed from fast through traffic; to the worker who finds the job precious minutes nearer; to the shopper who again parks close to favorite neighborhood stores; to the homeowner who sees his property increased in value; these are the benefits which loom large because they are daily, and personal. And perhaps it is in these terms that the meaning of its new freeway to the Simi Valley will best be expressed.
John Brown, Sr., the senior highway superintendent in District 1, Eureka, has been informally dubbed "our own Johnny Appleseed of the north." The only difference is that the roadsides he frequented are sprouting yellow lupine, not apple trees.

Brown has been working at making lupine grow on the sandy, barren stretches of roadside near Eureka for 30 years.

He became interested in using the bushy plant for erosion control when he noted the earlier success of the Hammond Lumber Company (now Georgia-Pacific) in tying down the shifting sand slopes that were located on the right-of-way for the logging railroad that once ran along the beach between Crannell and Samoa.

Yellow lupine had graced the right-of-way here since the late 1800s; it seemed to grow well in the sandy ground without much tending, and it obviously fended off the destructive forces of the ever-blowing staunch sea breeze.

Why, Brown reasoned, couldn't lupine stabilize the highway slopes parallel to the railway to the east? In his spare time, he began experimenting, with many admitted failures. Lupine, like everything else introduced to this sand-without-soil, was not always obliging.

He had precedent in his first failures, however, because John McLaren, noted Superintendent of San Francisco Parks, had the same trouble with the temperamental plant.

McLaren tried to use lupine to tie down the moving mass of sand that formed the western edge of Golden Gate Park. After he and his staff met with no success, they finally held and bound the dunes from drifting by planting bent sea grass imported from France.

In contrast, Brown persisted in his efforts with lupine. The lumber company had demonstrated that it could be done.

In time, Brown did learn how to make the lupine grow. Always involved with maintenance work during his long highways career, he found occasional help in his department. In wet weather, when the regular work was impossible, Brown sent otherwise unoccupied men out to gather lupine seedpods. Later, he sent them back to sow the seeds when conditions were right for germination.

Mr. B: A. Hemenway originally, and later Mr. Frank Coleman (both highway tree maintenance foremen, and both whom worked under Mr. Brown's supervision), also became intensely interested in the lupine and helped considerably in getting it established.

Brown's hankering to see lupine succeed was entirely personal; he had only tacit approval from his supervisors. Without any money or the spur of official administrative encouragement, Brown managed to establish several "stands" of yellow lupine. The plants, with their identifying yellow spikes of flowers, first appeared on Route 101 in the early thirties after a WPA crew had widened the road's shoulders.

Today, due to Brown's perseverance, about 35 miles of yellow lupine line the roadsides of US 101 in and around Eureka. In the summer, they make an unusually spectacular frame for magnificent Trinidad Head. On Route 1, in Mendocino County, another 10 miles of scattered lupine plantings provide a blaze of color to motorists for almost three months of the year; these, too, are Brown's work.

Mr. A. Hemenway originally, and later Mr. Frank Coleman (both highway tree maintenance foremen, and both whom worked under Mr. Brown's supervision), also became intensely interested in the lupine and helped considerably in getting it established.

The seed collecting and planting operations are not expensive. It costs from four to five dollars to gather a pound of seed, as abundantly supplied by nature. By way of comparison, the cost of each pound of lupine, as supplied by the commercial suppliers, is $25 to $35 per pound.

Even when the lupine is established, it may have other problems. Aphids sometimes attack and reduce the plants. But comment from travelers and others who saw the colorful slopes brought Brown's efforts into the limelight. Three years ago, his lupine planting was recognized by the inclusion of erosion control funds in the maintenance budget to allow for the gathering and planting of these seeds.

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Photograph of Johnny Lupine seed is framed by Lupinus arboreus, or yellow tree lupine, botanically described as a shrubby perennial, four to eight feet high. A beautiful plant with rather light green foliage and rich sulfur yellow, fragrant flowers. At left, is photo of Brown's hands holding quantity of seeds. Below is a portion of an eight-mile stretch of US 101 north of Eureka where three-year-old plants provide color throughout the spring and summer.
In September a California Division of Highways bridge engineer received the welcome news he had won $150,000 as first prize in the U.S. Steel Corporation 1966 International Bridge Design Contest. The talented winner was W. James Jurkovich, a senior bridge engineer who heads a design section in the division's Sacramento headquarters.

Second prize went to a New Jersey engineer, and third prize to a New York engineer. Of the 10 honorable mention awards, each bearing a $1,000 prize, 5 were also won by employees of the California Division of Highways Bridge Department. All the other honorable mention awards went to engineers in foreign countries.

The aim of the competition was to encourage the development of new ideas, design concepts, methods, and different uses of materials to benefit design engineers and consultants throughout the world. Entries were judged on originality of design, good utilization of steel, economy in design and fabrication, and aesthetic appearance of the total structure.

The structure, which won first prize of $150,000, is a continuous steel beam bridge that would span a four-lane freeway with frontage roads located on level ground. Although the problem was a hypothetical one, drawings for the finished design had to be so complete that a construction crew could build the structure as designed. The contest aimed to encourage the development of new ideas, design concepts, methods, and different uses of materials to benefit design engineers and consultants throughout the world.

In September, a California Division of Highways bridge engineer was W. James Jurkovich, a senior bridge engineer who heads a design section in the division's Sacramento headquarters. The competition was sponsored by the American Society of Civil Engineers and the American Institute of Steel Construction.
The California honorable mention award winners were:
- The team of Robert E. Kershaw, 1255 Rickey Drive, Yuba City, and Richard J. LeBeau, 5422 Sagitarius Way, Citrus Heights.
- Earl R. Latham, Willowbank 10A, Davis.
- The team of O. Bender, 5508 Prim Court, Sacramento, and A. P. Bezzone, 2183 56th Avenue, Sacramento.
- H. L. Payne, 1225 56th Avenue, Sacramento.
- Walter W. White, 7408 16th Street, Rio Linda.

Governor Brown commended the winners and cited their accomplishments as “proof that strong progress is being made in blending safety, beauty and economy in the state's public construction program.”

Jurkovich is a native Californian. Born in Fresno, he graduated from high school there and attended the University of California, where he worked his way through school and still found time to letter in football and track.

Upon graduation, he spent three years in the Army Engineers before joining the California Division of Highways in 1946.

He was promoted to senior bridge engineer in 1952 and heads a design section that specializes in major projects such as the Vincent Thomas Bridge near Los Angeles.

Married, he and his wife and five children reside at 2170 56th Avenue, Sacramento.
Highway Commissioner James A. Guthrie Dies

James A. Guthrie, a member of the California Highway Commission for the past 23 years, died on August 23 in San Bernardino.

Guthrie, a Republican, was reappointed twice by Governor Edmund G. Brown, in 1961 and 1965. His original appointment to the commission was made in 1943 under Governor Earl Warren. He served several terms as vice chairman.

In reappointing Guthrie for the second time in 1965, Governor Brown said: "Jim Guthrie has been a pioneer in highway development through three administrations and has played an integral part in shaping our transportation system. I feel we need his help in planning for the growth of the future."

Guthrie was born in San Bernardino in 1888 and lived there throughout his life. He was editor and president of the San Bernardino Daily Sun and Telegram for many years. Guthrie was one of the leaders in the first good roads program for San Bernardino County before the state highway system was so widespread. He pioneered in the development of the roads now known as U.S. Highways 66, 91 and 99.

Guthrie was past president of the San Bernardino Chamber of Commerce and a former director of the Automobile Club of Southern California. He was a member of the San Bernardino Daily Sun and Telegram.

The following statements reflect the feelings of close associates of Guthrie.

Robert B. Bradford, Transportation Agency Administrator and Chairman of the California Highway Commission, said: "Few taxpayers could really know how much over a 23-year period Jim Guthrie contributed to the integrity and quality of the state's highway program."

John Hertha, Director of Public Relations and the California Division of Highways, stated: "Every Californian who owns an automobile lost a friend when James A. Guthrie died. Long before his appointment to the California Highway Commission he directed much of his time toward making sure that Californians would have available to them the best possible network of state highways, county roads and city streets. He was remarkably successful in this endeavor and was also instrumental in the development of the roads now known as U.S. Highways 66, 91 and 99."

State Highway Engineer J. C. Womack stated: "California lost a real friend when James A. Guthrie passed away. Much of his adult life was devoted to public service. He was keenly interested in good roads and his constructive efforts were a positive factor in the development of our state highway system."

And from his fellow commissioners:

Joseph C. Houghteling, Sunnyvale: "It was an honor to serve on the same commission with such a distinguished Californian as James Guthrie."

Roger S. Woolley, San Diego: "James Guthrie epitomized all that is balanced and progressive in the California scene. He led an envied life that all of us should emulate."

Abraham Kofman, Alameda: "The passing of James Guthrie is a loss not only to me as a member of the commission but to each of the state's residents who is now benefiting from Mr. Guthrie's long years of service."
Alfred Heller —— “He was a dedicated public servant, a man I am proud to have known, albeit only briefly.”

Frank B. Durkee —— “Above all, Jim Guthrie stood for progress; for what he believed would be beneficial for all the people—whether it be water for San Bernardino or a freeway system for California, subject always to fair treatment for individuals or communities affected. It was an honor to have served with him.”

Franklin S. Payne —— “Jim Guthrie was one of the finest and most honorable men I have ever known. He was the most outstanding member the California Highway Commission has ever had.”

Fred W. Speers —— “Jim Guthrie was, in my opinion, one of the great men of California who truly matched its mountains.”

C. T. Leigh —— “It was a privilege to have known and worked with Jim, and continued a friendship for many years after serving on the commission.”

Robert E. McClure —— “Jim Guthrie to his many friends and colleagues—was one of the great twentieth century builders of California and truly a man ‘to match our mountains.’”

H. Stephen Chase —— “Of the many privileges coming my way as a result of service on the Highway Commission without a doubt one of the greatest was my association with Jim Guthrie. His wisdom and friendship I shall always remember and cherish.”

Arthur T. Luddy —— “The passing of Jim Guthrie has grieved and saddened me. My fondest memory will always be my association with him on the Highway Commission.”

F. Walter Sandelin —— “Jim Guthrie, he was a true and loyal crusading Son of California.”

C. M. Max Gillis —— “He possessed good qualities in unusual measure—strength, gentleness, integrity, and wisdom—a truly big man.”

John J. Purchio —— “The passing of Jim Guthrie takes from all of us in California one of its finest people and most able citizens.”

John O. Bronson —— “Jim Guthrie was a credit to the Highway Commission. He was fair and honest and used excellent judgment in his decisions.”

Harrison R. Baker —— “He was an outstanding citizen of California, one of the finest of this generation, a powerful and continuing progressive force in his community.”

T. Fred Bagshaw —— “He was great in every aspect—to his family—as a friend—as a public servant.”
In Marysville (District 03 headquarters), J. C. Womack, State Highway Engineer; Ed Miller, assistant district engineer; H. S. Miles, district engineer; H. C. Holum, reports engineer; Villard Warren, district engineer; H. C. Holum, reports engineer; H. C. Holum, reports engineer; H. Brummond, district engineer; and other engineers.

Other bidders were Fredrickson and H. Brummond, Richard Peacemaker, and E. C. Engle, construction engineers; George Bischof, resident engineers; Walter Nett, assistant district engineer; H. S. Miles, district engineer; and Parker, Brown, and Thomas.

The project was awarded to the successful bidder, Granite Construction Company, on September 9, 1973, for $5,416,296.22. The offer of $727,735.30 was low among the six bidders, and work was resumed the next day after bids were opened. The job was awarded the bid, and a full crew was moved heavy equipment within the division of highways in September.

Since the Nevada project was awarded, the successful bidder, Granite Construction Company, was awarded the bid on the same day. The project was awarded to Ed Miller, assistant district engineer, and H. S. Miles, district engineer.

The project was awarded to the successful bidder, Granite Construction Company, on November 10, 1973, for $1,121,894.86. The offer of $727,735.30 was low among the six bidders, and work was resumed the next day after bids were opened. The job was awarded the bid, and a full crew was moved heavy equipment within the division of highways in September.

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NEW USE OF SPACE

By Howard Smith

Proof that the space beneath a freeway structure can be used for other purposes is evinced in the new Public Accommodations Building in Sunnyvale. Located under the Mathilda Avenue Overhead on Route 85, the building provides public service as well as earns its cost through lease of a portion of the building to the Greyhound Bus Company.

In a dedication speech when the building was opened for use, Mayor Eugene Conrady said:

"Today we gather to celebrate the opening and dedication of what we believe is a unique public building. . . We believe it is the first project in California that takes this kind of double advantage of . . . areas in our business districts. . . To our knowledge, it is the first use of the airspace under a structure required for the efficient movement of automobiles," said Mayor Conrady.

It all came about this way. Back in 1958, the City of Sunnyvale started an urban renewal plan to clear a blighted area of family dwelling units and poor commercial buildings, one of which was the Greyhound Bus Depot. Although many months were spent in a search for a new site, every suitable location was either too expensive or not available.

In desperation, the Greyhound Company rented a large trailer for use as an interim station and placed it on an undersized, unpaved parking lot just outside the downtown business district. The waiting room consisted of two outdoor benches, and the baggage and freight were stacked in the open.

In the meantime, the City of Sunnyvale was building an overhead structure on Mathilda Avenue (Route 85) to carry traffic over the railroad tracks. Funds were provided by the city, state, and Southern Pacific Company for this project, which was opened to traffic on May 10, 1965.

One day, while the overhead structure was under construction, City Manager Thomas H. Sweeney spotted the unused land under the overhead.

"Why not put the bus station there?" he thought.

It was near acres of parking, it was only a short block away from the center of the business district, and it offered ready access to the routes traveled by the bus line. In addition, the property had already been bought and paid for.

Mr. Sweeney, with the services of Architect Byron Lundburg, proposed that the city erect a bright, cheerful building on this rather small, dark site. It would be leased to the Greyhound Bus Company and could also become a center for a number of public purposes. It provides needed restrooms in the downtown area. The building might well be the focal point of a local transportation system in the future.

Best of all, as far as the taxpayers are concerned, Greyhound's monthly rental of the building would completely pay off the $55,000 cost of construction in a number of years.

Currently being installed is a landscaped outdoor patio to provide a park-like area for relaxation.

Since the location of Route 85 along Mathilda Avenue was to be switched a mile to the west along the new "Stevens Creek Freeway," and the area was to be relinquished to the city, an encroachment permit was issued on January 20, 1965, to allow the City of Sunnyvale to build the facility.
WHAT'S UP—IN THE AIR? Eric P. Grant (3) was born in Los Angeles, received his law degree from Southwestern University and is now a member of the State Bar. He worked 5 years in the enforcement division of the Los Angeles County Air Pollution Control District. He was appointed assistant executive officer of the Motor Vehicle Pollution Control Board in 1961 and became its executive officer in April of this year.

JOHNNY LUPINESEED Marcia J. Mickelsen (4) is a native Nebraskan and a graduate of the University of Nebraska who began her career in medical public relations in Omaha. She served on the staff of the Medical World News before coming to California in 1961 to become director of public relations of a San Francisco medical center. She joined the Division of Highways as an assistant information officer in 1963.

FROM THE DESK OF R. J. DATEL Robert J. Datel (5) is the youngest district engineer in the Division of Highways. He was appointed to his present post in San Luis Obispo in 1963 when he was 38 years old. A native of Wessington, South Dakota, he received his civil engineering degree from the University of Minnesota and joined the division in 1948. The present article was originally prepared by Datel for the employees in his own district and appeared in the District 5 house organ.

AN ENGINEER LOOKS AT AESTHETICS Louis G. Kroeck (1), who was awarded the 1965 Parade magazine national award for the design of the most beautiful highway, is a native of San Jose and a graduate of the University of the Pacific. He came to work for the Division of Highways Stockton office in 1946. Now traffic engineer for the district, Kroeck has spent much of his career in design work and is a member of the California Highway Design Board. Among his hobbies he includes hiking and camping, watercolors, photography, woodworking, hi-fi, and gardening.

Louis O. Baker (2), who illustrated the article, is an architectural assistant with the Division of Highways Bridge Department in Sacramento and has sold many watercolor paintings. A native Sacramentan, he also attended school there and began his state career with the Division of Forestry in 1948. He worked for the Department of Water Resources before joining highways in 1957.

NEW USE OF SPACE Howard M. Smith (6) is an assistant information officer for the Division of Highways in San Francisco. He was born in Chicago and was an honor graduate in journalism from the University of California at Berkeley. Smith was editor of several U.S. Navy publications and was twice recipient of an armed forces press service award. He was assistant editor for Western Construction magazine from 1953 to 1954. He joined state service in 1961.
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(October 3, 1966)