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John Martin Lee

How to design and create  
custom or repro interiors

Over 300 step-by-step photos  
and a gallery of examples



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**John Martin Lee**

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**On the front cover:** Beautiful upholstery is the finishing touch for a hot rod. *John Lee*

**On the back cover:** Two examples of integrated upholstery design. The custom upholsterer at work. *John Lee*

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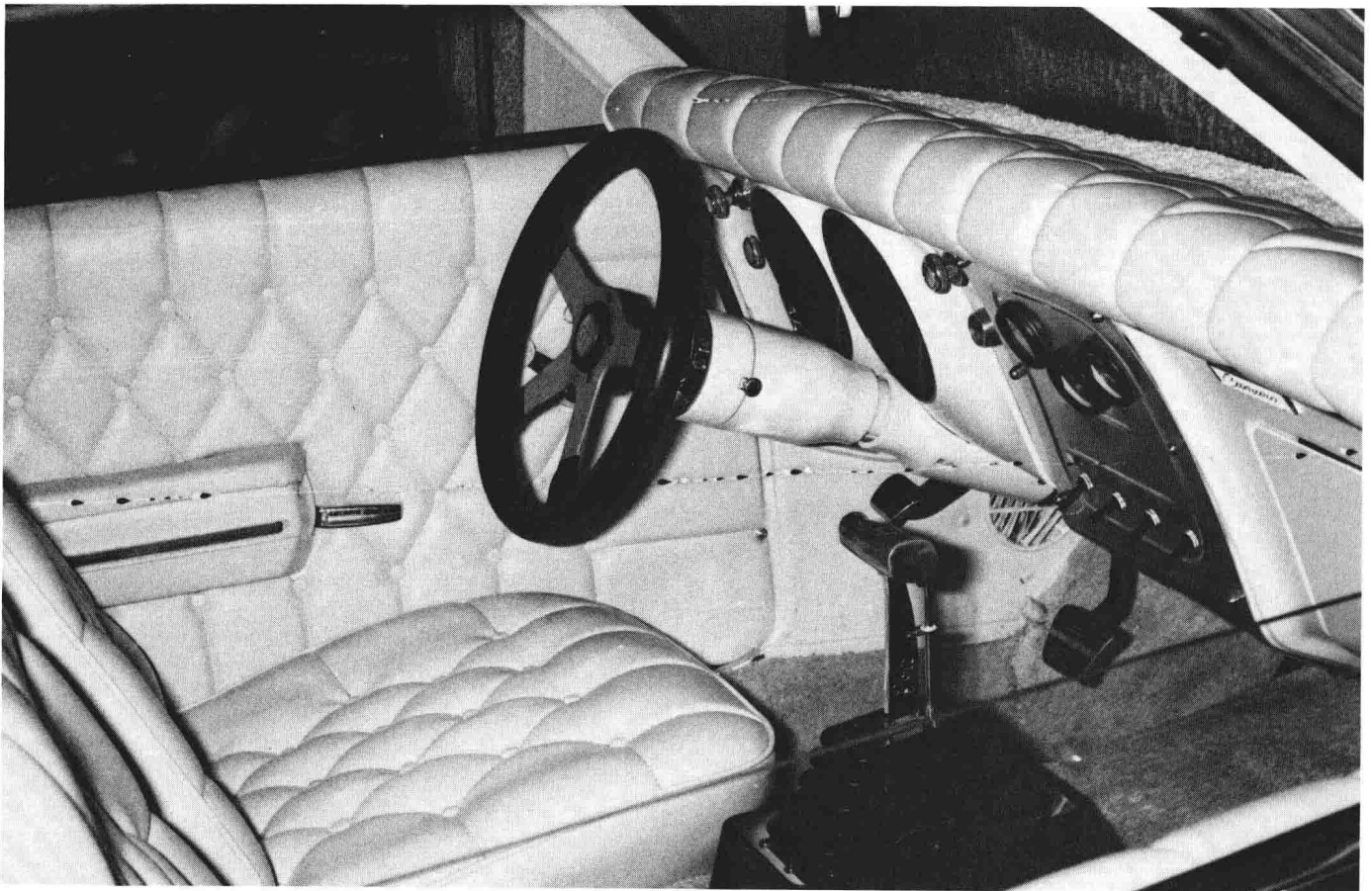


# Introduction

In the past twenty-five years I have had the opportunity to photograph hundreds of customized cars and trucks. The results of these photographic efforts have turned up, at some point, on the pages of automotive hobby magazines. That kind of public recognition of their efforts and talents is one of the rewards these

builders seek when they have spent months and years creating a car according to their concept of what a car should be.

In preparing a feature article for a magazine, I have the owner fill out a tech sheet noting all the modifications that have been made, brand names of



*A dashboard padded and finished to match the other upholstery helps complete an interior theme.*



*This custom 1951 Mercury owned by Jack Walker is an exact copy of one built in 1952, right down to the dark green and white Naugahyde interior. The headliner has alternating white and green roll-and-pleat panels running lengthwise. Seats are of the classic horseshoe design, while stock trim divides the colors on the side panels. Kick panels and carpet inserts have a diamond pattern pressed in.*

parts and components used, and giving credit to the individuals or shops that have performed various phases of the work.

These car owners often make their own living from one or more facets of the work, such as bodywork or engine building. Many times I'll find that an engine mechanic, for example, has also done his own bodywork and even painted the car himself. Or a bodyman has built his own engine and chassis in his spare time.

A lot of these tech sheets end up reading "all work by owner—except upholstery." The interior is the one phase of construction most often farmed out to a professional shop. If a wrench-turning mechanic could learn how to handle a spray gun well enough to shoot a good Candy Apple lacquer job on his or her street rod,

why, I often wondered, couldn't he or she learn to sew well enough to do the upholstery?

Maybe it goes back to the old sexual stereotypes: engine building and metal bending are masculine jobs, but upholstery involves fabric and sewing, and sewing is women's work. But if that's so, why have the most famous auto upholsterers—and many not-so-famous ones—always been men?

Certainly the special equipment necessary, or at least believed to be necessary, to upholster a car is a stumbling block. It's acceptable to buy a MIG welder to build your chassis and do bodywork, an engine stand to build the engine and a "cherry picker" to install it, but it's not acceptable to buy or rent a sewing machine to make seat covers. As we'll see later on, most of an upholstery job can be accomplished with no more than the tools found in an auto hobbyist's shop. A special sewing machine, while making the job quicker and easier, is a necessity for only a portion of the upholstering process.

Upholstery also seems to be the last and the least-planned operation of custom building a car. The owner delivers it to the upholstery shop only days before he needs it finished, and chances are he has given scarcely a thought to what he wants done on the inside. Instead of planning a theme and choosing fabrics and colors to go with it, he instructs the trimmer to "just do it like you did so-and-so's," or "I'll leave it up to you to come up with something."

What I hope to do with this book, then, is to take some of the mystery out of custom upholstery. It is a how-to book that will take you, step by step, through the commonly used techniques of upholstery and the tools involved. You will be given some direction on planning and designing your interior, steps to be mulled over in advance, just as you do in considering the car's drivetrain, styling and final color scheme. The upholstery may be the last operation undertaken, but it shouldn't be done as an afterthought.

If you choose, you should be able to follow the steps illustrated and upholster your car at home. Maybe you'll decide to do part of it and have the rest done professionally. Even if you decide not to tackle any of the upholstery job, at least you'll know what is involved—and why the trimmer you choose needs the time and money it's going to take. And, you'll have sufficient knowledge to discuss the job intelligently with the trimmer, direct him or her toward a favorite design, and choose colors and materials you'll be comfortable with for the next few thousand miles.

In the end, you may be able to save some money by doing your own work rather than paying a professional to do it, but best of all, you'll have the satisfaction of being involved in the process, not simply turning it over to someone else and hoping it turns out the way you want it to.



## Chapter One

# Auto interior design

My cousin and I have never kept in contact as closely as we should. Correspondence is usually limited to an exchange of Christmas cards.

His annual Yuletide note in 1968 mentioned that his current position in Detroit was with the styling de-

partment of Chrysler Corporation, and that he had worked on the 1968 Dodge Charger. I responded with congratulations on a beautiful job of styling the Charger; I liked it so well I'd bought one myself. He wrote back, "Thanks. I designed the bucket seats."



*A well-thought-out, complete interior. Fine work such as this requires thorough plans, color and fabric coordination,*

*and a bit of thinking ahead. In this Bel Air, the fuzzy dice complete the interior, matching the upholstery fabric.*



That statement really made me realize how much the designing of a new car is a team effort, and what a small part any one individual has in that design. It's a long way from the image of a single artist laboring late at night over a drawing board, turning creative ideas into a complete new car design, outside, inside and underneath; many people and many minds are involved in creating a new car design.

In creating a custom car for your own use and enjoyment, you have an opportunity to be that individual at the drawing board. The car you create can be the culmination of ideas that are uniquely your own. Oh, it's not that the individual elements have never been used before; they have just never been assembled in the same way you have done.

No doubt you have given a great deal of thought to your custom car—the modifications you'll make to the body, the final paint job and wheel treatment, the ideal engine and drivetrain components. Have you given the same amount of thought to the interior?

Too often, it seems, this is a part of the design that is ignored or left to chance. In one instance I observed, the owner of a beautiful, new show car and several em-

ployees of a trim shop were working frantically two days before a big show to finish the car's interior. Off to the side, the owner of the trim shop grumbled, "The bodyman has had the car for eighteen months. Now we're supposed to do the interior in a week!"

It did get done. The car owner was willing to pay extra for the whole trim shop crew to work overtime, including a Sunday and a holiday, to finish the job. And the car won top honors at the show. But this episode illustrates the degree of planning—or too often the lack of it—given to the interior of a custom project.

## Types of vehicles

The kind of vehicle you're building or customizing will have an effect on the upholstery job you must plan for. It can be one of the determining factors in the choice of material and style, and it can have a definite influence on the cost and extent of work involved.

### Street rods

The most widely acknowledged definition of a street rod is that of the National Street Rod Association (NSRA), which accepts street-driven vehicles



*A modern street rod interior is likely to have body-supporting seats and conservative-colored fabric like the gray imitation mohair in Dave Tallant's street rod.*



*High-back bucket seats and consoles are at home in a street machine interior. The stereo and extra gauges are placed in a small, free-standing console in this 1955 Chevy. The gear-shift lever is between the seats.*

originally manufactured, or of a body style that was originally manufactured, up through 1948. The vast majority of street rods use late-model engines and running gear. Because of the shortage of cars from that era, many street rods are built with fiberglass bodies that are replicas of the Ford and Chevy originals of the twenties and thirties.

### **Street machines**

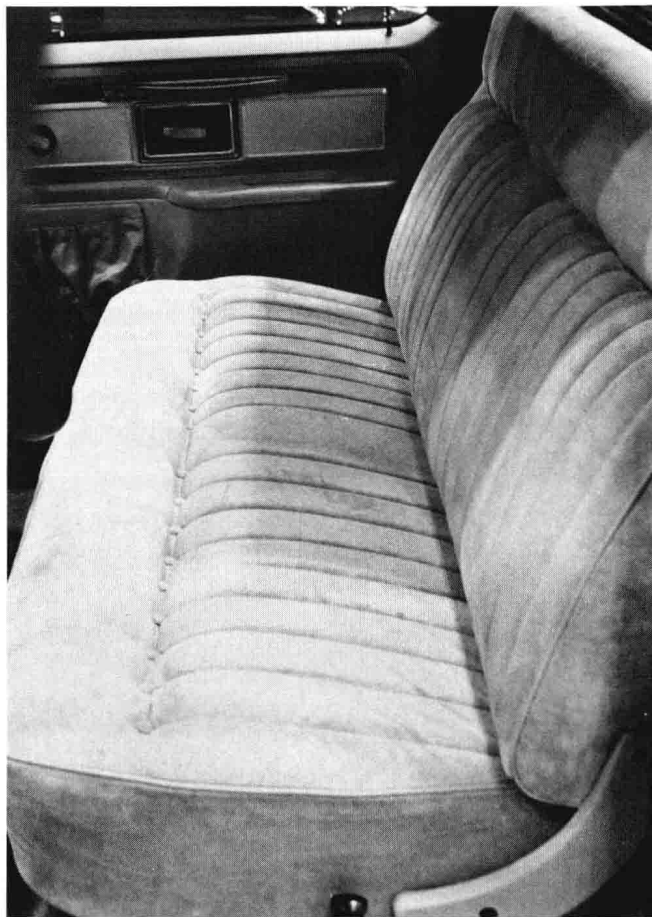
Street machines are a bit more difficult to categorize, but they are generally considered to be vehicles of post-1948 manufacture that have been modified for higher performance. This usually includes the use of later-model engines and running gear in earlier cars, and hopping up of the stock components on later models.

### **Street customs**

The line between a street machine and a custom, or a street rod and a custom, is often fuzzy. Broadly speaking, custom builders emphasize body and interior work, and altering the appearance of the vehicle more than the performance aspects. The Kustom Kemps of America (KKOA), a national association of



*Vinyl materials and gimmicks like swiveling seats are more likely to be found in a custom car. The swing-out seats were introduced on Chrysler Corporation cars in 1959. Jerry Stanley rigged some up for his custom 1951 Vicky, which has nothing but period equipment and styling throughout.*



*Pickup owners often finish their stock bench seats with new upholstery covering, such as the tan velour that replaced the original vinyl in this late-model hauler.*

custom enthusiasts, recognizes vehicles manufactured from 1935 through 1964 in its early, or leadsled, division. Those breaks overlap street rods and street machines, so it's up to the owner to decide whether his vehicle is a custom, rod or machine. Sometimes the particular event that is entered will be the determining factor.

### Pickups

Pickup trucks usually fall into one or more of the previous categories, depending upon the year of manufacture and whether the emphasis is on styling or performance. There are also organizations and activities solely for pickups, especially street-driven early Ford and Chevrolet varieties. Many are also built for special purposes such as off-road rallying, pulling contests and mud racing.

### Restorations

Returning an old car or truck to its original condition captures the fancy of more and more people all the time. Most want to recreate the car they owned or dreamed of in their youth, so the age of restored vehicles gets younger all the time. While this book deals with custom upholstery, the techniques are the same for duplicating a stock interior. You will be choosing

original materials or those closely matching the original, rather than special fabrics, and following the original style. In fact, you may have an advantage, because upholstery replacement kits are available for many models.

### Special vehicles

There is a multitude of special-use vehicles, including racing cars, off-road race and rally machines, foreign sports cars and boats. Although some of these may have unique requirements for upholstery, the approaches and techniques discussed in this book should be adaptable to nearly all applications you may encounter.

### Use of vehicle

How you plan to use your customized vehicle will play an important role in determining the upholstery job you plan and install.

A few cars are built strictly for the purpose of traveling to car shows—and winning awards! Owners transport them in enclosed trucks or trailers so they are not subjected to soil or damage on the highway. Engines are chromed and polished, and may not ever be started lest they get dirty or greasy.

Upholstery jobs in show cars are likely to be the fanciest you'll come across. The best of materials are



*Although this Chevy Del Ray has been updated mechanically, owner Glenn George retained the stock interior and*

*exterior appearance. The square-quilted panels are red vinyl, contrasted with flat panels in white.*



used, and design and workmanship are impeccable. These jobs may include extensive extra work, such as upholstered panels in the engine compartment, underneath or on the running boards, which help the car garner extra show points. Show cars are a good place to get ideas and see the latest trends in styles and materials.

Probably most cars are customized with the intention of being driven on the street and entered in an occasional show. Some of them never get to the point of being show-worthy.

For a dual purpose like this, you have to strike a compromise, creating an interior that will be practical and wear well in daily use, but still be able to be cleaned up well enough for judging in a show. For instance, white, deep-pile carpet may look great under the lights at a show, but how well is it going to stand up to being walked on dozens of times between shows? A great set of seats with lots of heavily padded diamond tufts in black leather may not seem so great after you've sat on them for a thousand-mile trip during the dog days of summer. Are you going to open your trunk compartment to show judges and the public, or are you going to carry your luggage, tools and cleanup gear in it?

Of course, if you don't plan to show your car at all, but just use it for regular driving, your interior planning will lean more toward the practical. You'll want materials that provide the best combination of durability, comfort, easy cleaning and maintenance—with reasonable cost. Appearance will be mainly to please yourself and others who ride with you, not necessarily the show judge or the critical show patron.

Factory-original interiors are fine for vehicles in everyday use. Most of them, especially ones made of newer materials, can be maintained at a "show" appearance level with reasonable care. Auto manufacturers have spent millions of dollars researching ergonomics, or the relationship of the driver and passengers to the vehicle. A good place to start when planning your interior is to study new cars—how the seats are built, how controls are arranged, and the materials, styles and patterns employed. Then adopt or adapt these approaches for your own vehicle.

Special-use vehicles have different upholstery and interior requirements to consider. In a drag race car, for example, you may eliminate much of the upholstery to cut down on weight. The driver's seat needs to have safety built in but doesn't require as much comfort, since it's in use for only a few minutes at a time. An off-road racer also has to take safety and light weight into account, but comfort will be important to the driver spending hours behind the wheel bouncing over rocks, hills and deserts.

## Vehicle styles

No doubt you have a particular look or style in mind as you set out to customize your car. Maybe it's



*Intricate stitch work such as this is intended to win shows. This artistry is by Wayne DeCamp in his own full custom 1966 Thunderbird. The material is tan velour.*



*Black vinyl will wear well in regular use and still clean up to look good at a show. The smooth-grain black material in Jack Walker's custom Oldsmobile has a rectangular biscuit-tuft pattern with chrome buttons.*



*The plush padding and fabrics of a late-model luxury car appear in this contemporary interior. Dan and Sharon Botos transplanted dark brown velour power seats from a 1983 Lincoln Town Car into their 1957 Chevy.*



*Form-fitting, competition-style seats give a car a performance feel. These seats were specially built. Several designs are available from various suppliers in finished or unfinished form.*

taking an ordinary street driver and making it look like an all-out race car. You may be bringing a twenty- or thirty-year-old model up to date with drivetrain components from a later model, and want to install a modern interior to match. Yet another approach is to customize a vehicle as it might have been customized during a particular period in the past.

What is in vogue in the late 1980s is the smooth look. The trend for street rods is toward plain, rather than louvered, hood panels, removal of extraneous trim and the integration of headlights, taillights and license plates into the body. Finishes are monochromatic, possibly with graphics, and much of the trim is either painted or polished aluminum.

Many street machines and a few customs are built with similar themes, utilizing painted bumpers and trim and solid colors for a clean, integrated look. Street machines are more likely to lean toward a performance appearance with hood scoops, front and rear spoilers, and race car-style wheels.

Custom cars are more likely to be designed to recreate the style of a particular period in the past. Since the heyday of radical custom bodywork was the fifties and into the first half of the sixties, most customs reflect this era. Some capture the styles of the hobby's infancy in the thirties and forties, and others, as mentioned, are done in a modern style.

A significant segment of the street rod population also adheres to period styles. These resto-rods are virtually restored to original appearance, with all accessories, but they employ modern running gear and interior components.

And, of course, you aren't likely to be happy for long with a stark, race car interior in a street-show car. Similarly, a candy-stripe interior design from the 1950s isn't going to look right in a contemporary-styled, "smoothie" street machine. Your upholstery style has to be coordinated with the overall style of the vehicle, in the same way the wheels, tires and other components are.

Contemporary interior styling seems to follow two main themes. One tends more toward comfort and employs soft padding and plush fabrics. Seats adjust forward and back, up and down electrically, and recline so the passenger can nap. Armrests and headrests are provided, and there's deep-pile carpeting underfoot.

The other theme leans in the direction of the enthusiast, or the performance driver, with more utilitarian finishes. Bucket seats are specially designed to wrap around the body and hold it securely during sharp cornering and quick acceleration.

Electronic equipment plays an important role in the contemporary interior. Dashboards and consoles are designed to accommodate computers, digital gauges and controls for exotic sound systems. Other portions of the interior are designed with stereo speakers, air conditioning outlets and even telephones in mind.

The factors to consider in planning your contemporary-style interior are whether it will be oriented for performance or comfort and what kind of equipment you need to plan for.

Certain interior styles are characteristic of particular periods in automotive history. The thirties, forties and early fifties were a conservative period in which interiors merely accommodated passengers. Bench seats were employed almost exclusively, front and rear, although the single-seat coupe and business coupe were popular. Rumble seats were still quite common until Ford's last one in 1939.

The less expensive models were upholstered with flat fabrics, usually in dull grays and tans with widespread use of pinstripes. Luxury cars were fitted with higher-quality fabrics and had overstuffed rolled and tufted padding. Leather was common in open cars and was also the preferred material for custom jobs of the period, both open and closed. Some use was also made in custom cars of friezes more commonly found on furniture.

The mid- and late-fifties brought on a revolution in automotive styling, color and power that also caught the interiors in its grip. While seating arrangements remained as they had been, flamboyant colors and designs of the exteriors were echoed inside. Vinyls

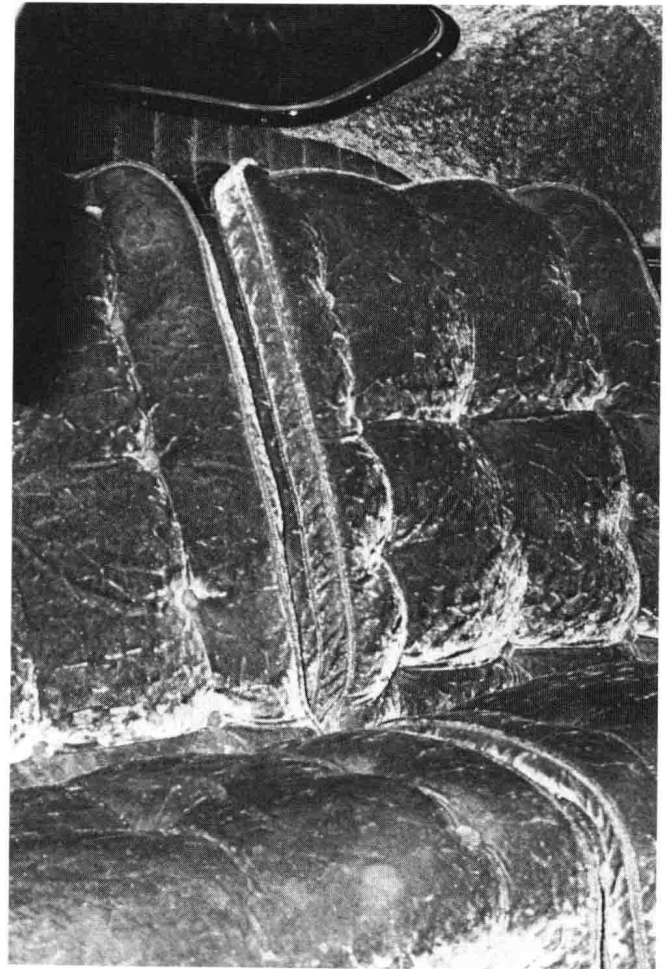


*Nylon and vinyl made for more colorful and interesting interiors in the fifties. This pleated center section is a nylon brocade, surrounded by plain vinyl in a popular horseshoe design.*

that could duplicate the look of leather were widely used in both new and customized vehicles. It seemed an interior of Naugahyde or leatherette was a must in a custom or hot rod. Nylon and rayon ushered in a whole new world of durable, colorful and comfortable upholstery fabrics.

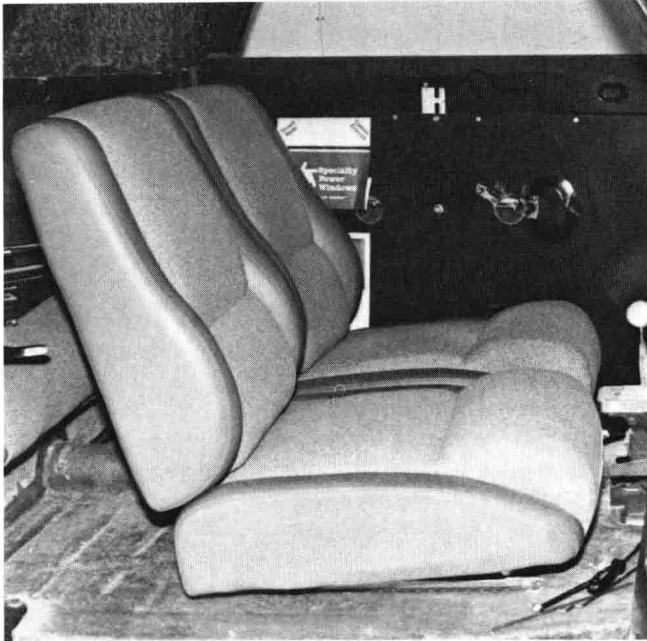
Changes in materials were more evolutionary than revolutionary during the sixties, but they were applied to some quite different interior designs. Influenced by the likes of the Chevrolet Super Sport, Chrysler 300, Pontiac Grand Prix and Ford Mustang, the bucket seat phenomenon was in full swing. The focus on performance mandated that a modified car have bucket seats and a floor-shifted transmission, and probably a center console, too.

The buckets-and-console trend continued into the seventies and branched out into several variations. Emphasis on safety brought headrests, first of all, and later the high-back seats with an integrated headrest.



*Crushed velvet was one of the new fabrics that changed upholstery styles in the seventies. The crushed finish is created by wadding up the material and squeezing it in a press when it is still hot from the manufacturing process.*





*Seats by Tea's Design are set into this street rod during the building process to determine fit in relation to other components. The seats, which come finished in a choice of wool, Dacron, vinyl or leather, will determine the choice of materials and styles for the rest of the interior.*

This arrangement tends to put up a wall between front- and rear-seat passengers, which was further emphasized as opening rear-quarter windows on two-door cars were replaced with fixed "opera" windows. The rear seat became more of an enclosed, confined compartment.

Advancement in fabrics in the seventies created the nylon velvets and velours that came into wide popularity with both manufacturers and custom trim shops. Vinyls also advanced, with new perforated, breathable materials, making vinyl seating more comfortable. The popularity of leather was also revived, particularly for luxury models and for street rods which became increasingly sophisticated.

## **Scheduling the interior work**

When in the building process should interior and upholstery work be done? There is no rule, but the important thing is to have this work scheduled along with the other work being done. You can't determine ahead of time the exact day or even the month, because there are too many variables that can force a change, but you can put the interior work into a sequence with the other tasks. That way it need not delay completion when everything else is done and you're eager to get behind the wheel. Planning ahead will also ensure that you have the necessary funds in your budget at the correct time.

Generally, interior work is left until the last, and for good reasons. The car is going to be surrounded by dirt, dust and grease as mechanical and bodywork proceed, and that's not a good environment for new upholstery. You're probably going to need access to the inside panels, floor, firewall and glass as you work, so the upholstered panels and seats will need to be removed anyhow. And you surely don't want the interior in place while you're painting doorjambs, window moldings and the dashboard. It's pretty hard to ensure that upholstery can be totally protected, even if only the exterior is being painted.

While you won't want to install new upholstery and leave it vulnerable to damage while you do the rest of your work, you can schedule the work at about any stage and then wrap the components in plastic or some other protective covering, and store them in a safe, dry place for installation when the rest of the car is completed. Upholstery work is something you can do in the house in the winter when you can't be in the garage wrenching on the engine or outside sanding on the body. It's also a task that can keep the project moving while you're waiting for parts or for a shop to complete some other operation.

## **Components and details**

The principal reason for customizing a car or pickup is to personalize it, to make it a statement of the owner's character and his or her ideas of what a transportation vehicle should be. Auto manufacturers make machines for the masses. Individuals may choose to drive them the way they come, or change them to suit themselves.

The result of your customizing, it is expected, will represent for you an improvement in appearance, function, safety and comfort. Everything you do to your car, inside, outside and under the hood, should be considered against these criteria.

Chances are, you already have your project car and a plan for how it's to be customized. It will be built according to a certain style, with a particular favorite powertrain, and body modifications and a finish that will set it apart from the pack. Now it's time to design the interior—not after, but before, the rest of the package is done, or at least during the process.

## **Seats**

The first element in interior design is where to sit and how to arrange the seating. The body style of the vehicle is the first determining factor to be considered. The single bench seat is the most basic, with the cushion extending the full width of the passenger compartment and accommodating two or three people. The single bench is found in coupes, roadsters, pickups, a few sports cars and some street machines in which the rear seat has been removed.

It may have a solid, one-piece backrest and even be incorporated into the passenger compartment, as

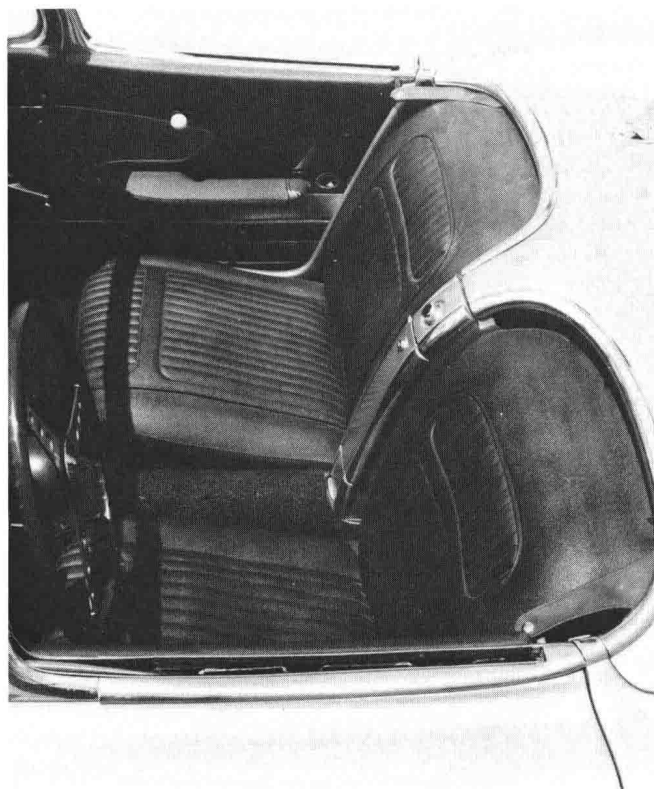


in the case of early roadsters. Backrests that are split in the center to fold forward for access to the rear compartment are found most often in early coupes.

Later styles include the split bench, which has a cushion extending full width but divided into two sections that adjust individually, and the split back, which has an armrest that folds down in the center to divide the backrest.

Modern bucket seats originated in foreign sports cars and were so called because their shape resembled a milk pail with the sides cut away. They gave the driver a cushion that matched the shape of his or her posterior and a rounded backrest that wrapped part-way around his or her torso to hold it erect and secure. The fascination with foreign sports cars after World War II led to the production of domestic varieties like the Corvette, Thunderbird, Nash-Healey and Kaiser Darrin in the 1950s. Hot-rodders and customizers began to pick up on the trend to sports car-style bucket seats, and manufacturers eventually responded. As production-line models such as the Chevy Super Sport, Pontiac Grand Prix and Chrysler 300 turned bucket seats into a trend, the seats became wider, better padded and covered in fancy leather and vinyl upholstery.

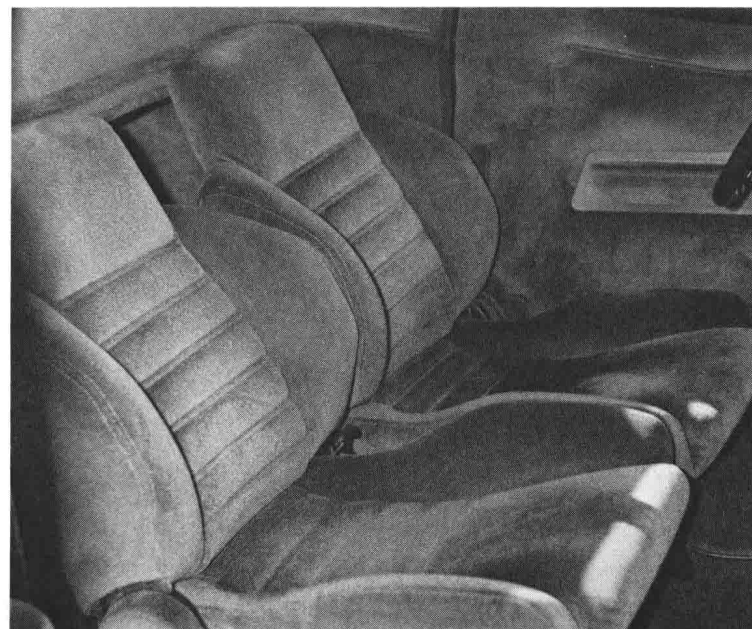
Now bucket seats show up in almost every type of vehicle. Most single- or one-passenger seats are called buckets, although the designs have gotten pretty far away from the original sports car variety. As a custom



*Bucket seats originated in sports cars like this Corvette. The pleat pattern is heat-pressed into the vinyl material, a technique that allows manufacturers to offer a unique style for each individual model.*



*A solid bench seat used in a pickup, early coupe or roadster. Dale Boesch chose a black vinyl bench for his 1980 Forst pickup with wide, horizontal rolls and extra padding in the shoulder and leg support areas.*

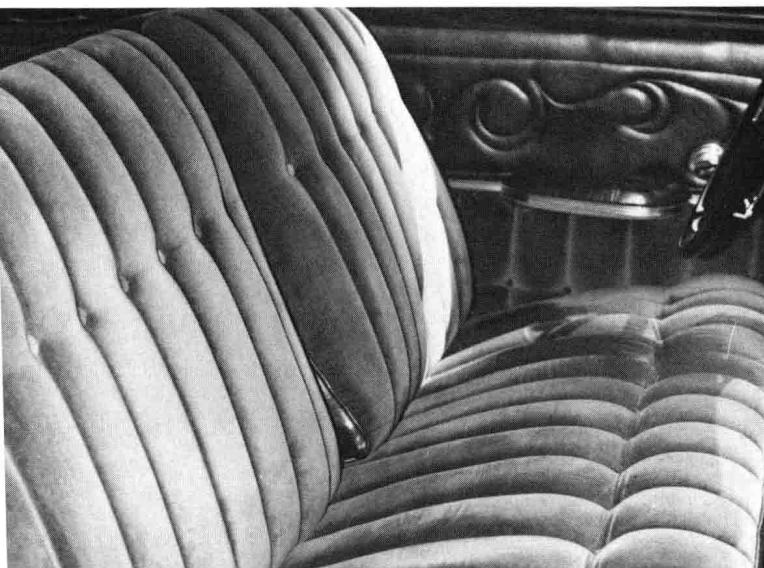


*Modern-style bucket seats are often found in street rod coupes. In building these seats for Dave Tallant's 1933 Ford coupe, Bob Sipes built up bolsters with padding to support the passengers' sides and hips.*

*Individual bucket-style seats replace the bench in this pickup truck. Bob Nordberg had these installed in his late-model Chevy with a wide console between. The wooden top of the console has cutouts for beverage containers.*

application, they are appropriate in street rods, customs, street machines and pickups.

Coupes, roadsters and pickups are restricted by space to a single bench seat or a pair of buckets. Most other cars likely to be customized are of the two-seat variety. They are club coupes (the short-top coupe body style with a rear seat, to accommodate four or five passengers), two-door and four-door sedans, two-



*A split-back bench seat is required for access to the back seat. The original one in this custom Mercury was brought up to date with mohair-like velour fabric.*

door and four-door hardtops, convertibles and station wagons.

Two-door cars may have a bench seat in front with a split back to allow access to the rear, or a pair of front bucket seats. Either of these would be appropriate for a four-door car or station wagon, which can also use a solid-back front seat, since the back doors provide rear access.

The rear seat is usually a solid bench with a full-width, one-piece cushion and a solid backrest. When bucket seats arrived, many of the sportier interior designs began to incorporate padding and upholstery that sculpted the rear seat into a semblance of buckets to match the front. The Thunderbird rear seat, which curved around into the side panels, is still a popular starting place for some customizers. In the 1950s, Studebaker Starliner hardtops had a collapsible center armrest to divide the back seat for a sporty feeling.

At the extreme, there is also the four-passenger interior with bucket seats front and rear, and a center console running between them. Dodge's 1966 Charger had this arrangement and went a step further to have either of the rear bucket seat backs fold flat to extend the length of the cargo deck that was accessible through the fastback deck lid.

There have been various seating alternatives with station wagons. The most useful from a custom standpoint is the fold-down second seat that provides a longer cargo deck. A station wagon second seat might be a consideration for a custom application in a club coupe or sedan. It offers extra space for luggage, plus the option of seating for additional passengers as the need arises.

Those are the standard seating arrangements used in cars for the past few decades, and they aren't



*Front bucket seats offer comfort in this four-door street rod. Modern body-support styling and tan velour material similar to the original mohair are featured in this Model A.*