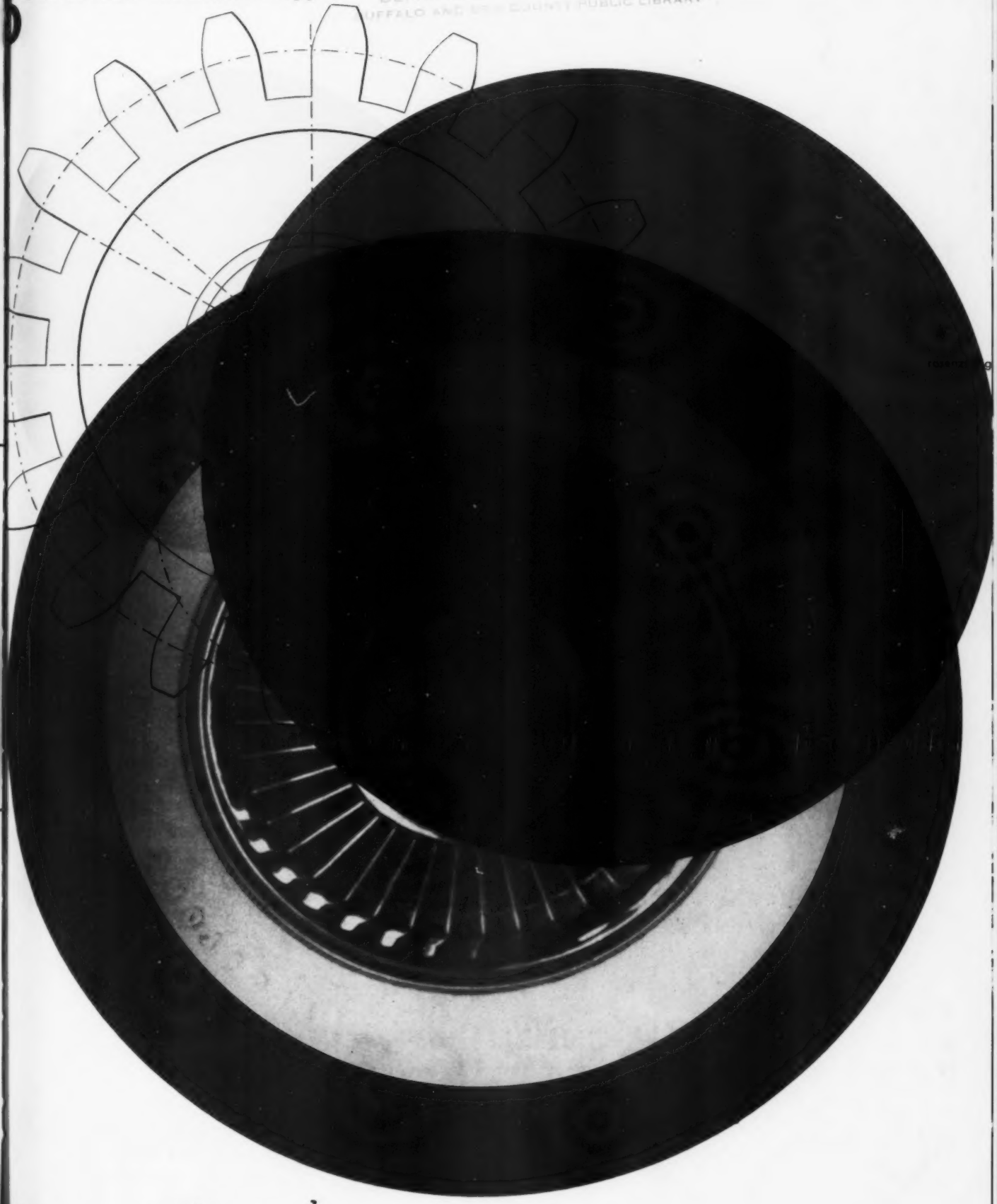
INDUSTRIAL DESIGN

October 1955 two dollars a copy



Design in Detroit a special report on design in a major industrial center

the new vinyl-to-metal laminating process?

Larger families... more rough 'n tumble in the back seat.
Smaller taxicabs... more knocks and scrapes from suitcases and boxes.
Increased stationwagon registrations . more scuffs and bruises from bigger, shifting packages.

These three trends emphasize the importance of new protective materials like Marvibonded metals. Marvibond* is the new laminating process that permanently bonds vinyl sheeting to practically any kind of metal.

Seat backs and frames

Marvibond vinyl-to-metal laminates...

- **can't rust, rot or corrode!**
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- **can't chip, crack, or craze!**
- **are scuff- and stain-resistant!**
- **are clean, comfortable, easy to maintain!**

Prefinished sheet metal! Marvibonded metals are laminated before forming. Neither finish nor bond is affected by bending, crimping, drilling, embossing, punching, or drawing.

Practically any surface effect! High finish or matte finishes, leather-like grains, marble patterns, prints, weaves, and sculptured appearances can be achieved economically.

Marvibonded laminates can be used where sheet metal is used...dashboards, window trim, door panels, truck cabs, and other automotive interior components. So, why not consider what the Marvibond process offers in beauty, protection, serviceability, extra sales impetus and real production economies? For technical data and samples, and the names of licensed Marvibond laminators in your area, please write—

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VOLUME 2 : NUMBER 5

INDUSTRIAL DESIGN

A bi-monthly review of form and technique in designing for industry. Published for active industrial designers and the design executives throughout industry who are concerned with product design, development and marketing

CONTENTS FOR OCTOBER, 1955

Frontispiece:
Wheel within a wheel: *The semi-circle of Detroit's Grand Circus Park forms an axle from which Washington Boulevard, Woodward and Madison Avenues spray out toward the Detroit River. The river itself, viewed from the opposite direction, is a hub for the six major spokes that carry Detroit traffic north, east and west. The effect of the wheel and the city that fostered it on U. S. industry and design is the subject of this special issue.*

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in this issue...

Cobo

Gessell

Reuther

Gehrke

Winter

Miriani

Gruen

Yamasaki

Stonorov

Van Leuven

Saarinen

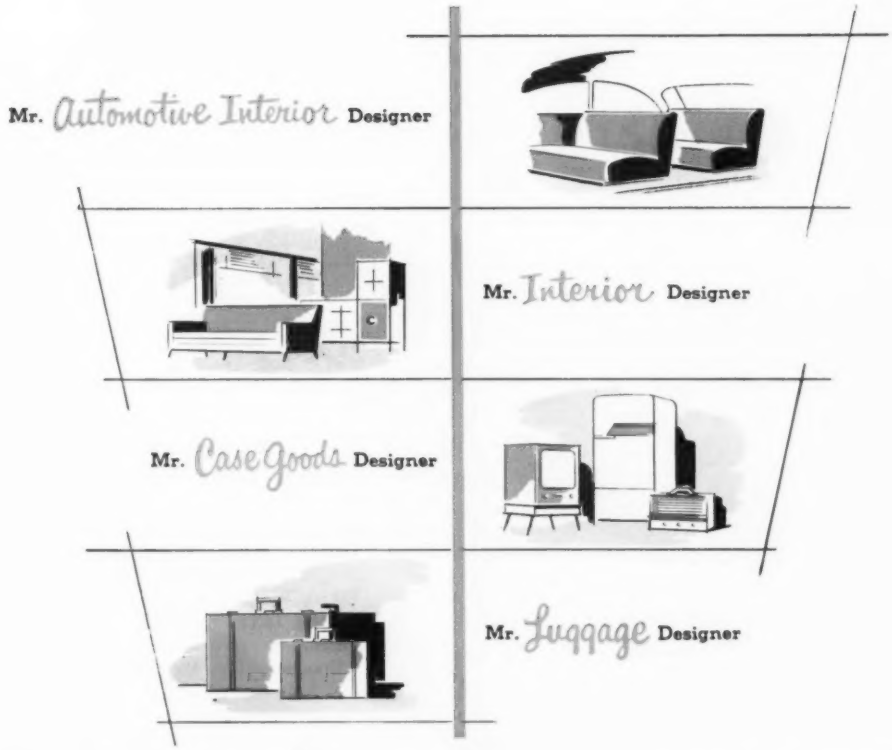
Among the many individuals whose projects and accomplishments have contributed to the portrait of Detroit in this issue, as they have to the face of Detroit itself, (and who have not been shown elsewhere) is a group of prominent civic leaders and architects:

Detroit's energetic Mayor, **Albert E. Cobo,** has been particularly instrumental in unifying the efforts of business, labor and citizen's groups toward the comprehensive housing, civic, roadway and parking redevelopment programs that are now underway in the city, and particularly progressive in the use of design in all of these multi-million dollar projects. Mayor Cobo is head of the Citizen's Committee for Redevelopment, which was responsible for the city's acquisition of the 50-acre site on which the Gratiot-Orleans redevelopment will go up (page 43). The committee's executive leaders are (left to right): Chairman **Walter J. Gessell,** real estate broker; **Walter P. Reuther,** President of the CIO United Auto Workers, and in charge of Planning and Design for the Committee; **Walter Gehrke,** mortgage banker, in charge of finance; and **Foster K. Winter,** Treasurer of J. L. Hudson's, who acts as keeper of Legal Matters for the committee. At the far right is **Louis G. Miriani,** President of Detroit's Common Council, who with Mayor Cobo appointed the Committee members.

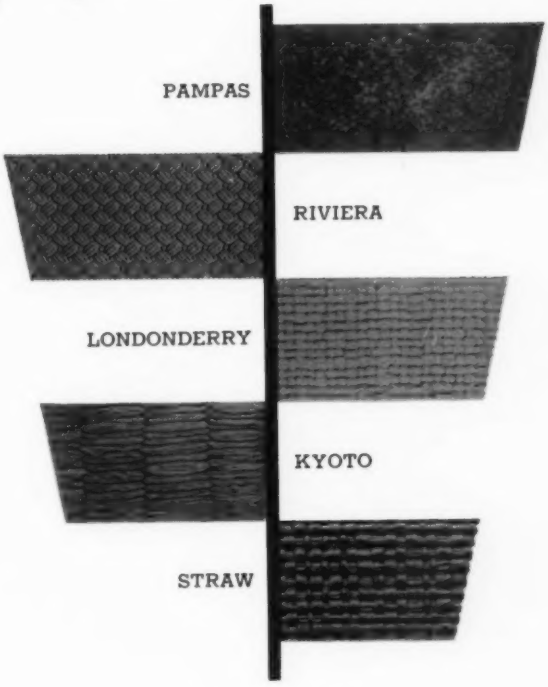
When it came to selecting architects to create a master plan for the redevelopment, the committee composed its own team of experienced planners: **Minoru Yamasaki,** as a partner in the Detroit office of Yamasaki, Leinweber & Associates, has been responsible for a number of outstanding houses, schools, and commercial buildings in the Detroit area. Born in Seattle and a graduate of the University of Washington, Yamasaki's experience has included teaching at Columbia, and work in the New York office of Wallace K. Harrison, and with Raymond Loewy Associates as chief architectural designer. **Oscar Stonorov,** who began his architectural practice in Philadelphia in 1932, is pictured in a non-architectural pose at the left. He is Consultant to the Philadelphia Planning Commission and to the Philadelphia Redevelopment Authority. A specialist in housing, he has been responsible for some 10,000 project units.

Third member of the Gratiot-Orleans team, and architect of Detroit's famous Northland (page 42), is **Victor Gruen,** head of Victor Gruen Associates, with offices in New York, Detroit and Los Angeles. Viennese-born Gruen began his career in Europe designing store fronts and interiors; his American firm of architects and engineers, launched in 1937, makes a specialty of large-scale planning projects and shopping centers. **Karl Van Leuven, Jr.,** one of the principals of the Gruen organization in Detroit, studied and worked in California before joining Victor Gruen Associates 15 years ago.

Eero Saarinen, architect of the vast Technical Center for General Motors (page 45) and planning consultant for the waterfront Civic Center, has been associated with design in Detroit since childhood. His father, the renowned architect Eliel Saarinen, created the Cranbrook Academy of Arts in Bloomfield Hills, and was consultant on waterfront redevelopment plans (unrealized) over a period of 25 years in pre-Cobo Detroit.



Are you familiar with NEW NYGEN* TOLEX?



. . . the most unusual—yet—the most practical **supported** flexible vinyl plastic material on the market today.

NYGEN Tolex is available in a wide range of weights, patterns and colors for every design application—from automotive upholstery and furniture to luggage and small case goods.

NYGEN Tolex is especially suitable for such automotive interior applications as headlining, upholstery, crash pads and door panels.

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*Reg. Trade Mark—The General Tire & Rubber Company. NYGEN Tolex is also *stocked for immediate shipment* in the rich, new *Pampas* leather effect.

NEWS

The executive committee of the IDI in Detroit discuss their forthcoming exhibit.

IDI will hold Detroit exhibit

"Design in Detroit" will be illustrated by display of Detroit products

At a September luncheon, the executive committee of the Detroit Chapter of the Industrial Designers' Institute decided to launch an exhibition of Detroit products to tie in with this special issue of ID. The committee members are Ladd J. Orr, Anders and Orr Associates; H. Creston Doner, Libbey-Owens-Ford Glass Company; Walter B. Ford II, W. B. Ford Design Corporation; Carl Reynolds, Chrysler Corporation; Carl Sundberg, Sundberg-Ferar; Robert Alexander, Department of Art, Michigan State University; Edmund Anderson, American Motors Corporation; David Wheeler, General Motors Styling Section; Aarre K. Lahti, School of Architecture, University of Michigan; William L. Mitchell, General Motors; and Virgil M. Exner, Chrysler Corporation.

As the picture above shows, the committee has selected a graphic motif, designed around the initials of the organization and of the exhibition, to use as a theme in posters and background murals. It was created in the Department of Design and Color of Libbey-Owens-Ford Glass Company under the direction of H. Creston Doner. The definite date has not yet been announced, but the display is intended to take place sometime within the next two months.

At the same meeting the two educators, Aarre K. Lahti and Robert Alexander were elected to become co-chairmen of the Program Committee for the 1955-56 activities of the Detroit Chapter.

IDI announces new headquarters

National office opened in New York and Executive Secretary appointed

The Industrial Designers' Institute announced the opening in July of their new national headquarters at 18 East 50th Street, New York City. In charge is Henry Hagert, National Executive Secretary, who is being assisted by Miss May O'Connor. Mr. Hagert is a founding member of IDI, an elected fellow, and was previously National Secretary. Formerly with RCA, he will devote his time to coordinating IDI's fast-growing activities and help chapter heads and members to keep in touch with each other through this central office.

Designers will exhibit in Chicago

IDI and ASID members join forces to arrange a show of products

In order that it be installed in Illinois Tech's new Architecture-Planning-Design building, the second annual Chicago Area Industrial Design exhibit has been scheduled for November 9-18. Chairman is Stowe Myers, who was on the executive committee last year. He will be assisted by Herbert Carpenter, Waltman Associates, Joseph Mango, Banka-Mango Design, James Teague, Painter, Teague and Petertil, and James Garry, Reinecke and Associates.

Sponsored by the Chicago chapters of the American Society of Industrial Designers and the Industrial Designers' Institute, the display will cover products designed by members of both organizations and recently put on the market. Advisors are: Ted H. Koeber; William Goldsmith, president of the ASID Chicago chapter; James Hvale, president of the Chicago IDI, and William Winterbottom.

Educators will confer in person

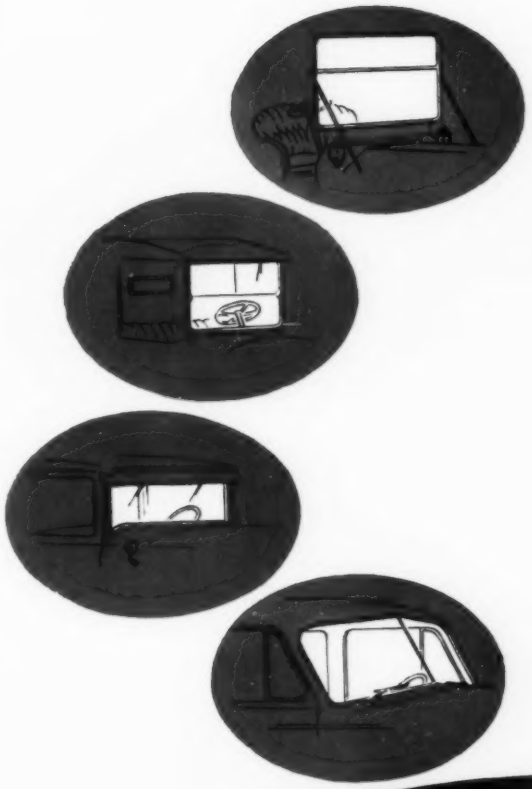
ID *and Philadelphia Museum School are arranging an education conference*

Plans are underway to hold a one-day conference in Philadelphia on November 16, jointly sponsored by INDUSTRIAL DESIGN and the Philadelphia Museum School of Art. ID's survey of education in the June issue suggested the idea to Joseph Carreiro, head of industrial design at the Museum School, who is taking action on a program which will bring together educational leaders and selected visitors.

Hank Parker

At work in the new IDI national headquarters in New York are Elizabeth Dralle, National Secretary, Henry Hagert, National Executive Secretary, and May O'Connor.

Look what's happened to the glass in cars!



The pictures tell part—and *only* part—of the story of what's happened. Behind this advance from propped-up pieces of plate glass to the sweeping Panoramic Windshield is the research and engineering of one company in particular.

Most of the new ideas in automotive glass first became realities in the development department of the Libbey·Owens·Ford Glass Company. Some were fairly easy. Others took years of research, experimenting and testing. All have been successful.

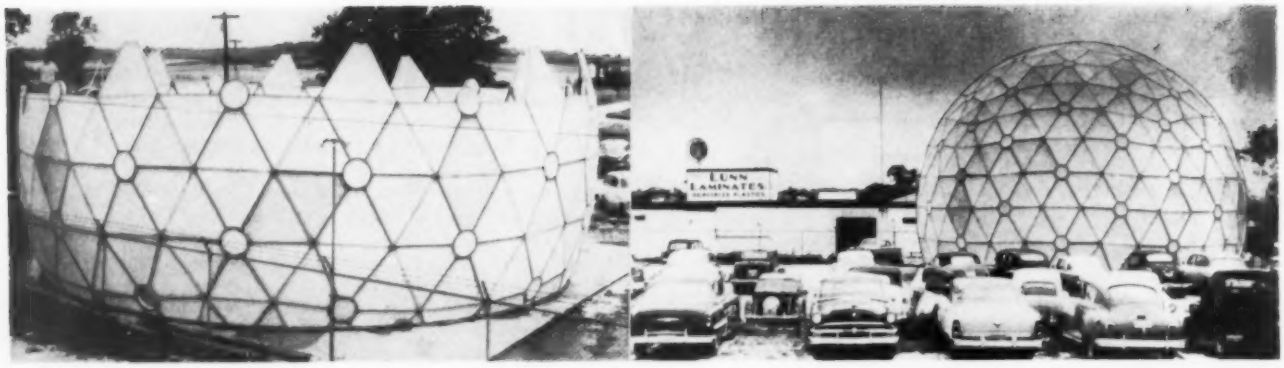
Where will the next great advancement come from? Look at this record and judge for yourself!

1. L·O·F was one of the pioneers in the manufacture of safety glass for automobiles.
2. L·O·F actively participated and contributed to development of Hi-Test, the superior polyvinyl butyral plastic bond for safety glass.
3. L·O·F pioneered volume production of the one-piece and two-piece curved windshield, and the compound curve for back lights to fit streamlined design.
4. L·O·F pioneered E-Z-Eye, the safety plate glass with the neutral blue shaded windshield for passenger cars.
5. L·O·F developed the great new Panoramic Windshield, the style setter for the future.

Cars which have the added advantage of L·O·F's glass developments are: Buick, Cadillac, Chevrolet, Oldsmobile, Packard, Pontiac, Studebaker. So have many trucks and buses.

LOF GLASS **LIBBEY·OWENS·FORD** *a Great Name in Glass*

TOLEDO 3, OHIO



Fuller designs first geodesic structure in plastic

Circles and polygons of laminated Fiberglas, 363 parts gasketed with neoprene, make up the newest of Buckminster Fuller's geodesic constructions. Built by Lunn Laminates, Inc. of Long Island, New York, this sphere 55 feet in diameter, four stories high, is said to be the world's largest rigid plastic structure. It can withstand wind velocity up to 200 miles an hour, although it is much lighter than a conventional dome, weighing only six tons. Assembled in 288 hours, it will be used as a military shelter.

Designers go abroad

Five design firms will give technical aid to foreign craftsmen

Under the auspices of the International Cooperation Administration, five design firms—those of Peter Muller-Munk, Russel Wright, Walter Dorwin Teague, Dave Chapman and Smith, Scherr and McDermott of Akron, Ohio—will survey handicrafts in Asia, Africa and South America and advise local governments how to apply their country's native skills.

Walter Dorwin Teague has already left for the Near East where his major stops will be Cairo and Athens, and Russel Wright will leave in December for Indonesia, Formosa, Vietnam, Cambodia and the Phillipines in the Far East. Each advisor will follow about the same procedure: first, survey the assigned locale in terms of the available handicrafts, skills, material and tools; then, visit the country and see them in use; return to the U. S. and make a report on what could be done to redesign products and increase local and world markets. They may also assist in the organizing of guilds and setting up distribution centers. Russel Wright is taking with him a designer of home furnishings and another, who designs women fashions, to advise on American markets.

The program, which is being supported by the State Department, is exclusively concerned with handicrafts, not with any machine-made products. As the Wright office explains their objectives: "In design, we will advise according to traditional motifs what products might be developed for a wider area. These may be ceramics, fabrics, rugs or jewelry. We will not 'hot house' industries which never existed, but try to point out how a native craft can produce more efficiently and market more profitably."

Fiberglas showroom opens

Display of fabrics is designed to encourage the use of Fiberglas

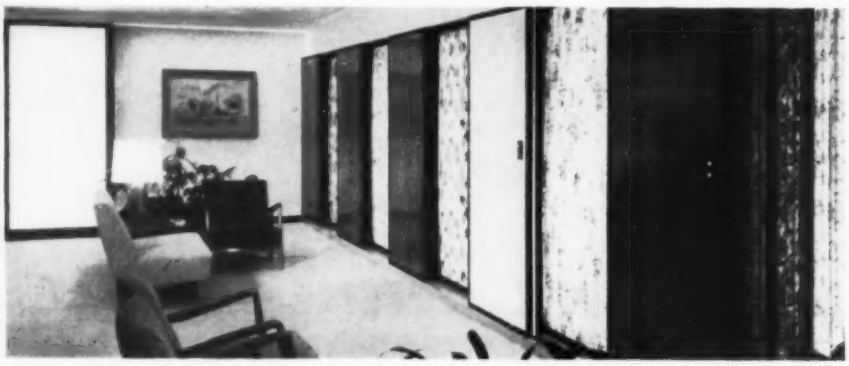
A Fiberglas Fabrics Shop in midtown New York, designed by Maria Bergson Associates to display a representative collection of new weaves and prints, has been open to the public since September 19.

Owens-Corning Fiberglas Corporation are the yarn suppliers, the fabrics themselves having been designed by 35 different convertors—Knoll Textiles, Inc., Covington Fabrics Corporation, Norman Trigg, Inc. and others. The display is intended to demonstrate to other specialty weavers the range and variety of the material and to supply architects and decorators with examples from which to choose.

Fiberglas has been used to show Fiberglas to best advantage. Behind the wood-panelled sliding doors which run the length of the main display area are panels of translucent Fiberglas plastic sheet with back and front lighting. Each fabric, stretched on a sliding aluminum frame, may be pulled out in front of the lighted panel for individual inspection.

In a windowless room in the Owens-Corning New York headquarters, one wall of Fiberglas fabrics in a rainbow range of shades and colors serves both to dramatize the fabrics and, by clever lighting, to give the illusion of a drapery before a windowed area. And, for even more flexible viewing, three custom-designed trapeze bars installed in the ceiling may be poised at any level to show the new fabrics.

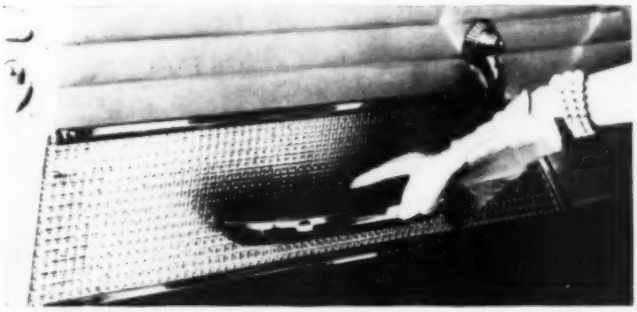
Russel Wright is proposing to Panama a survey similar to the ICA project.



Blending with the neutral decor of the Fiberglas showroom is a ceiling made of Fiberglas stria acoustical tile. Hung on a suspension system, the tiles are interchangeable.

Here's how style-conscious car designers get beauty and economy with new Du Pont MYLAR*

UPHOLSTERY Strong, untarnishable metallic yarns made with Du Pont "Mylar" give automobile upholstery dramatic new beauty. Upholstery made with "Mylar" is long-wearing . . . easy to clean.



PANELING "Mylar," metalized with aluminum, then bonded to vinyls and embossed, is used on car doors as a decorative, protective panel. "Mylar" can be metalized in a full range of colors.

SEAT TRIM Used as automobile seat-welt trim, "Mylar" gives an extra touch of interior beauty while providing tough, economical protection against scuffing and wear.

Style-conscious designers are achieving new beauty . . . new economy in interior car trim work by using Du Pont "Mylar" polyester film. This thin, tough, transparent film can be metalized in a full range of subtle colors. Bonded to a backing, then embossed, metalized "Mylar" offers a rich variety of decorative side-door-panel inserts, seat-welt trim, upholstery, and kick panels. One designer estimates that these new dramatic effects with "Mylar" resulted in a saving of 40% over the material formerly used!

"Mylar," used as a decorative surfacing material, is highly resistant to abrasion. What's more—it's stainproof . . . oil and grease have no effect on "Mylar." There are no pores to catch and hold dust and dirt . . . wipes clean without smearing. Other uses now in development include wall surfacing, counter tops, leather goods, book covers, kitchen appliances.

These profitable uses of "Mylar" are examples of how one industry is taking advantage of this plastic film. "Mylar" offers an unusual balance of properties bringing about improved products and lower costs in a wide variety of fields. Besides its exceptional tensile and dielectric strength, "Mylar" is resistant to chemicals and moisture . . . has outstanding thermal properties over a wide temperature range.

It's very possible that this versatile film can be used to your advantage—just a little creative research may show you where. Mail this coupon for your free copy of a fact-filled booklet that tells you more about "Mylar."

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SID holds annual conference

Three day meeting in Washington will discuss buying and automation

For the first time inviting outside guests to attend, the Society of Industrial Designers will hold their 11th annual meeting at the Hotel Woodner in Washington D. C., October 6-8. Topics of the three days will be: "The Psychology of Buying" by Jean Otis Reinecke: "The Dynamics of Industrial Design" by Peter Muller-Munk; two roundtables, "Designing Industrial Equipment" moderated by Robert H. Hose and "The Effect of Automation on Industrial Design" moderated by Dave Chapman. General Georges Doriot of the Harvard School of Business Administration and architect Eero Saarinen will also give addresses, all of which will be summarized in the December ID.

The society changes its name

At the beginning of the conference the Society of Industrial Designers will officially announce their new name: the American Society of Industrial Designers. The change, Peter Muller-Munk explained, was brought about by the society's increasing participation in international work such as the Trade Fair exhibitions this year which were shown in Liege, Belgium, Paris, and Barcelona, Spain, where it became obvious that the nationality of the organization should be distinguishable from others.

BecVar

Gerbereux

Hose *Muller-Munk*

Reinecke

Chapman

Shown above are: BecVar, to be president, 1955-56; Gerbereux, incumbant treasurer, and four of the speakers in the ASID conference.

ASID elects new officers

The American Society of Industrial Designers has announced officers for the coming year: Arthur N. BecVar, President; Jay Doblin, Vice President; and Kenneth Van Dyck, Secretary. Eugene W. Gerbereux continues in office as Treasurer. Dave Chapman, Henry Dreyfuss and Walter Dorwin Teague have been elected to the Board of Directors for 3-year terms.

Technical conferences are coming

Automation in October and packaging in November are being planned

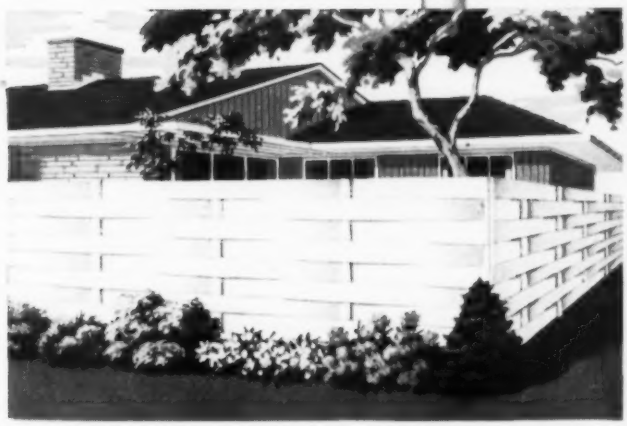
The American Management Association plans to hold a definitive review of automation at the Hotel Roosevelt in New York City from October 10-12, with the first day of the meeting devoted to the practical problems of design and redesign for the new era in manufacturing. Wallace E. Brainard, Hughes Aircraft Co., N. Smith, Jones & Lamson Machine Co. Paul Maker, Bryant Chucking Grinder Co., David and Charles F. Hautau, Hautau Engineering Co., will speak on applying automatic controls to gauging and quality control.

The Society of Plastics Engineers, Inc. has arranged a one-day symposium on November 16 at the Hotel Statler in New York on the topic of plastics for packaging. Speakers from 11 major material suppliers will discuss plastic processing, and a leading designer and a buyer from a supermarket chain will sum up merchandising.

Experimental kitchen at a California fair includes Servel built-in refrigerator

The Arts in Western Living exhibit at the Los Angeles County Fair (September 16-October 2) featured an experimental kitchen with built-in gas ovens and a gas refrigerator, an experimental model, which the kitchen's designer, Robert W. Kite, has installed as an architectural unit in a yellow tile wall. The horizontal refrigerator, designed by Walter Dorwin Teague and custom-built by Servel, Inc., has a capacity of twelve cubic feet and has three sections—a freezer unit equipped with an automatic ice-making device and two units for regular food storage. Simultaneously the Frigidaire division of General Motors has announced plans to manufacture next year entire kitchens as integrated units, modular in construction, in a choice of colors.

Basket-Weave Fencing



Weatherproof Homasote — cut into fence panels 8″ x 8′— woven on poles 4′ apart—another example of the great adaptability of this *universal* insulating-building board, the oldest and strongest on the market.

Indoors and outdoors—in sizes from inches each way up to 8′ x 14′—both professional designers and laymen have already discovered more than 100 uses for Homasote.

Today this famous board is available in five thicknesses (from $^{15}/_{32}$″ to $1^{7}/_{8}$″) and in a wide variety of sizes and densities... We have engineers and architects — long experienced with our products — whose services are available to you without obligation. May we cooperate on a specific current problem? May we send you literature broadly descriptive of Homasote in all its present forms? We invite your inquiry to Department K-20.

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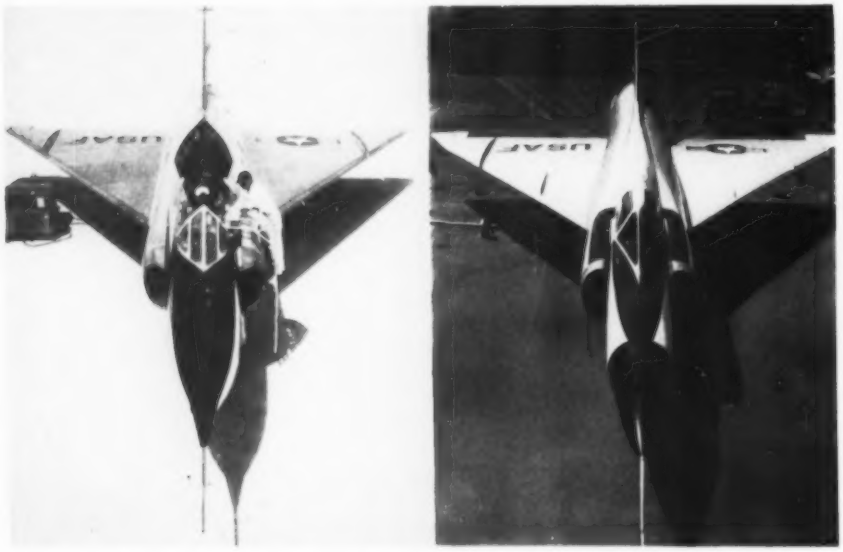
TRENTON 3, NEW JERSEY

YMCA campers rough it in style

Students at IIT's Institute of Design have been working on an experimental shelter design project for the Young Men's Christian Association of Chicago. Outcome of their effort is the structure above, which was designed by three students—Robert Mestrovic and George Wolf of Chicago, and Robert Turner of Massachusetts. Designed with an "A" frame, the building is constructed on a concrete slab with an inside floor space of 16 x 20 feet. It provides sleeping space for nine, with storage areas built into the base angles. The six roof units—five of corrugated aluminum, one of Fiberglas—can be assembled on the ground, then tilted into position. Plywood doors open out at either end of the shelter, and glass fiber screening keeps out insects.



Waspwaist aircraft slips more easily through the sound barrier

The National Advisory Committee for Aeronautics has just made public the news that Convair's F-102A all-weather jet interceptor has been restyled for sound engineering reasons. The prototype (left) had a straight fuselage; the production version has been nipped in to resemble a coke bottle. The principle, discovered by Richard T. Whitcomb, NACA research scientist, is called the area rule; cutting down the cross-section area of the fuselage provides a way to reduce the sharp drag rise that occurs at transonic speed. The area rule may have considerable influence in the designing of jet aircraft.

Long Course—Short Conference

The Art Center of the **Museum of Modern Art** is giving a course entitled "Elements of Design," which is intended for non-professionals and for professionals who are interested in brushing up on the fine arts and refreshing their techniques. Alexander R. Stavenitz will head the course, which will consist of lectures, slide talks and workshop experience in 2 and 3-dimensional organization. The course begins in late October, runs until January; and it will be given again in the spring.

People

Melvin Best is a faculty member of the Industrial Design Department of the University of Southern California, head of his own industrial design firm, and a manufacturer of ceramics. His firm, Best Studios, Inc., has just moved to a new large plant in Temple City, California.

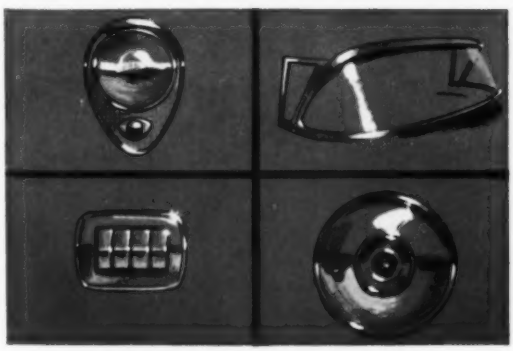
Peter Quay Yang and **James Stuart Ward** have announced the establishment of their new industrial design office, Peter Quay Yang Associates, Inc. The new firm's address is 175 Fifth Avenue, New York. **Laurence Scacchetti,** formerly with Voorhees, Walker, Smith & Smith, is joining **Kelly & Gruzen** as an Associate and will serve as Office Manager and Chief of Production. **Leon Gordon Miller,** Cleveland designer, has been retained by Timely Lighting Company to design their new line of fixtures. **Professor Norman N. Barish** has been named chairman of the department of industrial and management engineering at the New York University College of Engineering.

The Colgate-Palmolive Company has announced the formation of a new department to consolidate all packaging activities. **W. T. Egan** (right) has been appointed Director of Packaging, in charge of coordinating all packaging operations. Mr. Egan joined Colgate in 1916.

The International Design Conference in Aspen has announced that the time has come to elect three new members to the Executive Committee. Candidates, chosen by the Nominating Committee, are **George D. Culler,** Director of Education of the Art Institute of Chicago; **James Marston Fitch, Jr.,** Associate Professor of Architecture, Columbia University; and **Dr. Albert Eide Parr,** Director of the American Museum of Natural History. Additional nominations have been submitted, and the members of the organization will vote by mail ballot sometime next month.

modern design specifies stainless steel

McLouth
STAINLESS
Steel
for automobiles



The beautiful bright molding and trim that style your car are made of non-corrosive, easy to clean Stainless Steel. Designers of automobiles and hundreds of other products specify Stainless Steel for its many valuable properties.

For the product you make today and the product you plan for tomorrow specify McLouth high quality sheet and strip Stainless Steel.

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Detroit, Michigan

MANUFACTURERS OF STAINLESS AND CARBON STEELS

Behind this WORLD-FAMOUS LABEL

Budweiser—the largest-selling beer in history—is made by the finest brewing process on Earth. Backed by the ideals and traditions of four generations, every step is safeguarded—for quality of product, for attractive packaging, for safe delivery to the consumer.

Arabol is proud to be a member of the team of firms serving Anheuser-Busch, Inc. We are proud that Arabol Icetite Adhesives—made to the brewer's own most rigid specifications—are used to hold these famous labels in place, whether the bottles are dry or iced.

The Brewing Industry is one of a hundred in which Arabol is privileged to serve the leaders. Out of 70 years of pioneering—with 10,000 adhesives formulas developed in our five laboratories—Arabol Adhesives for a thousand end uses are in steady demand.

Somewhere in your business you use adhesives. Somewhere near your place of business there is one of Arabol's twelve plants and warehouses ready to serve you.

We invite the opportunity to submit samples for you to test in your own plant—under your particular working conditions—for your specific requirements, whatever their nature. That is the one kind of testing that assures you of satisfactory results. Your inquiry to Department 33 will bring a prompt response.

ADHESIVES ? ARABOL !

70

YEARS OF PIONEERING IN THE MAKING OF ADHESIVES

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ADHESIVES ? ARABOL !

THE **ARABOL** MFG. CO. . . . *a nationwide organization serving major users of industrial adhesives*
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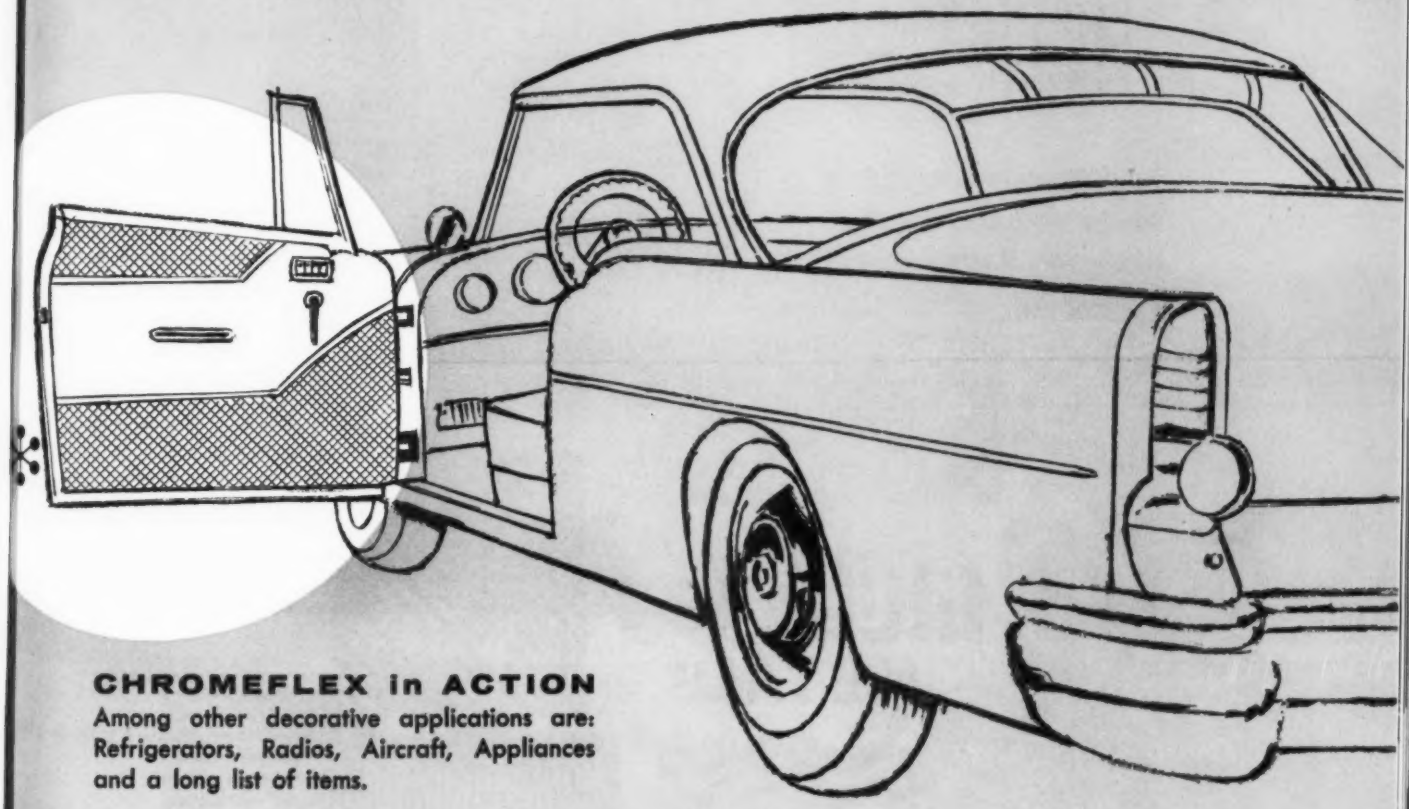
CHROMEFLEX *Beautiful Interiors*

FOR THE AUTOMOBILES OF AMERICA

And now you can give your product the new Sparkle of a brilliant metallic finish with CHROMEFLEX — the metal plastic sheeting.

CHROMEFLEX is non-corrosive, non-abrasive, fadeproof and weatherproof with unusually high tensile strength. GOLD, SILVER or Metallic Colors in widths up to 54" — Die-cut to specifications of size or shape.



CHROMEFLEX in ACTION
Among other decorative applications are: Refrigerators, Radios, Aircraft, Appliances and a long list of items.

Our representative will be glad to show you how **CHROMEFLEX** can be tailored to your product . . .

HIGH VACUUM METALS, INC., 40 Worth Street, N. Y.

"The Skating Coles," and their portable floor of Masonite Tempered Presdwood.

Punished by Professionals... Presdwood Shows Off Its Stamina

'Round and 'round they go...thrilling their audience night after night, week after week. The floor they skate on has to be strong and durable. And super-smooth, without sudden splinters or cracks. For safety's sake, they use rugged Masonite Tempered Presdwood.

The stamina of this dense, all wood hardboard is well known to many manufacturers. So are its superior fabricating qualities, its freedom from knots and grain, its ability to take and hold a great variety of finishes.

Masonite® research has developed a total of 44 distinct types and thicknesses of Presdwood®. One or several of these may be just what your product designers are looking for. Why not let a trained Masonite Sales Engineer help you find out, at no obligation, of course. Write Masonite Corporation, ID-10, Box 777, Chicago 90, Ill.

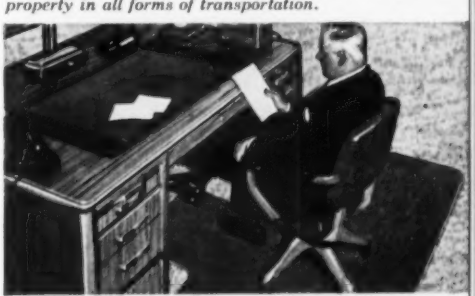
Choose This Man  He Makes The Difference

MASONITE CORPORATION

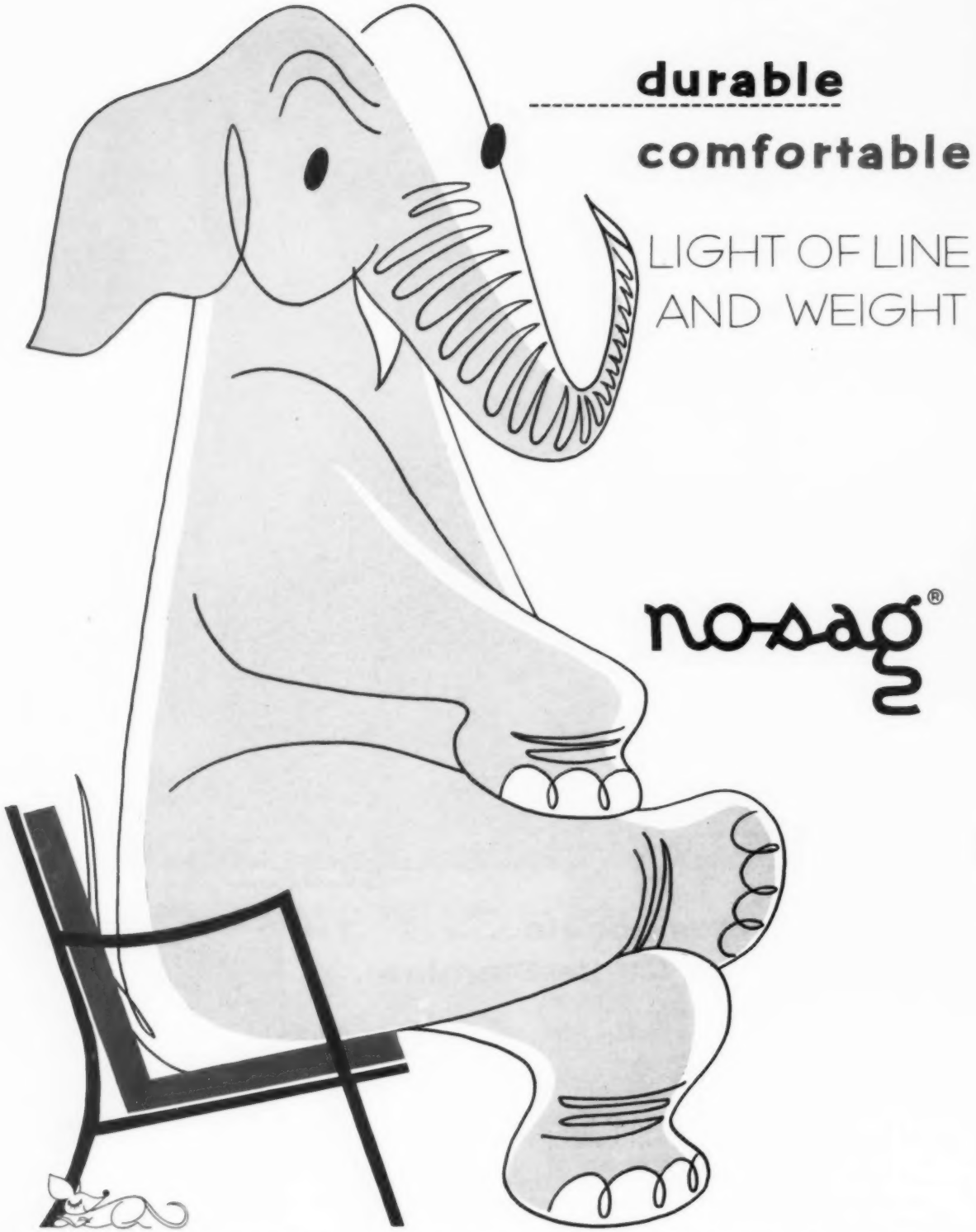
MANUFACTURER OF PRESDWOOD PANEL PRODUCTS

"Masonite" signifies that Masonite Corporation is the source of the product

Safe journey! *Presdwood products protect people and property in all forms of transportation.*



Carpet saver! *Your office chair probably has a Tempered Presdwood pad for easy-gliding comfort.*



NO-SAG SPRING COMPANY • 21590 HOOVER ROAD • DETROIT 13, MICHIGAN

75% OF ALL SPRINGS MADE TODAY ARE OF THE NO-SAG TYPE

Detroit is color crazy!

COLOR MAD indeed, are the motor makers—and the people certainly seem to like it. Flying into any city, you look down on a factory parking lot and it's a Joseph's coat of all the hues there are.

Multi-toned interiors of these brilliant new cars outdo the paint jobs—with Col-O-Vin as a reason. This is a vinyl plastic fabric that lets Detroit's stylists reproduce any color, pattern or texture.

In sedate sedans, even, Col-O-Vin gives you seats, doors, dashboards with the appeal of a style show. It is waterproof, fade-proof and stays clean with no more care than the whisk of a cloth.

That is why nearly every maker of cars is using Col-O-Vin. If *you* manufacture any product that can employ high style vinyl, write us.

Columbus
COL-O-VIN
vinyl upholstery

COLUMBUS COATED FABRICS CORPORATION, COLUMBUS 16, OHIO

CORNING GLASS

BULLETIN FOR PEOPLE WHO MAKE THINGS

CORNING GLASS WORKS, 32-10 Crystal Street, Corning, New York

Please send me the material checked below:

☐ B-83: "Properties of Selected Commercial Glassware." ☐ B-84: "Manufacture and Design of Commercial Glassware." ☐ Booklet: "Glass and You"

Name_____

Title_____

Company_____

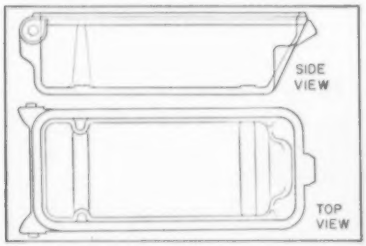
Address_____

City_____ Zone_____ State_____

Bold mold

It has come to our attention that often simplicity embraces complexity.

A good case in point: the dental tray you see pictured. It's a relatively simple outfit for sterilizing small instruments by immersion. A product of the Bard-Parker Co., it's made of a PYREX brand glass, metal, and rubber.



Our contribution to the working simplicity of this sterilizer is the glass body. Actually, this main component is a quite complex, one-piece object, *molded* of one of our most versatile glasses, PYREX brand No. 7740.

A close look at the illustration will give you some idea of the many angles, radii, ridges and such to be calculated in making the molds in which this tray is pressed. Yet, its precise tolerances allow the metal and rubber cover to fit and hinge on the glass lugs, and the inside metal tray rests evenly on the built-in glass supports for draining.

At the risk of repetition, we mention again that all this is *molded* in one piece of glass.

Which brings us to the point that under Corning's scrutiny, glass can be readily made in shapes and for purposes that may never have occurred to you as possible with so hard, durable, and seemingly inflexible a material.

(And the fact that this item is made of a PYREX brand glass and stands up to the chemical action of the antiseptic solution should not be overlooked.)

From this bold mold you can induce that glass, economically mass produced by any one of a variety of processes, may hold the answer to some ticklish design and/or production problem of yours.

For nothing more than postage you might start finding out with a booklet called: "B-84—Manufacture and Design of Commercial Glassware." It tells about blowing, pressing, multiforming, sealing, assembling glass to metal, and other factors of interest to men of practical turn. Check the coupon for your copy.

Making light of it

Campers, world travelers and those deprived of electrical illumination have long turned to portable Coleman lanterns for light.

Pressurized gasoline is burned in a thorium mantle. These light sources give off with some 300 candle power, about what you get from a 300-watt bulb.

To achieve such an output, the mantle reaches and holds at about 3,000° F.

Problem: What kind of glass chimney will stand up near this internal heat, the differential ambient temperatures, and the rugged handling such a portable light is bound to get?

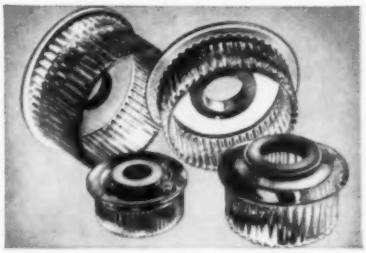
Answer: This is another example of where a PYREX brand glass solved a critical design problem, this time because of its low coefficient of expansion and high resistance to abrasion and physical shock.

For a brief rundown on the physical properties of PYREX brand glasses and other glasses, ask for our Bulletin B-83.

Godet (or how to spin a yarn)

Godet is the name given to a highly talented wheel used for spinning rayon yarn.

This intelligence by itself is neither startling nor revealing. And this picture tells you little other than that godet wheels are made of glass in dimensionally accurate intricate shapes.



Why we discourse on godet wheels (aside from the fact that we make them) lies in the somewhat unusual circumstances under which they operate.

First, viscose (cellulose solution in a mixture of carbon disulphide and sodium hydroxide) is extruded through a spinnerette into a solution of sulphuric acid. The coagulated yarn, comprised of as many as 800 delicate filaments, must then be pulled out of the acid, washed, and stretched.

Here's where the godet wheels take over. One, with a stream of hot wash solution running over it, pulls the yarn and snubs it. The other puts in the stretch.

And why glass for this chemical yarn spinning? First, there's the very important consideration of *dimensional stability*. This glass has it. Good thing, too, since any change in wheel size or shape, due to the affects of the acid, would change the wheel's peripheral velocity, and adversely affect the yarn stretch.

Moreover, the smooth finish of the glass wheels insures against fraying the fine filaments.

These wheels are also impervious to the corrosive action of both the acid and hot wash water.

And, glass is easily shaped to the complex fluted form required—in quantities, at reasonable prices.

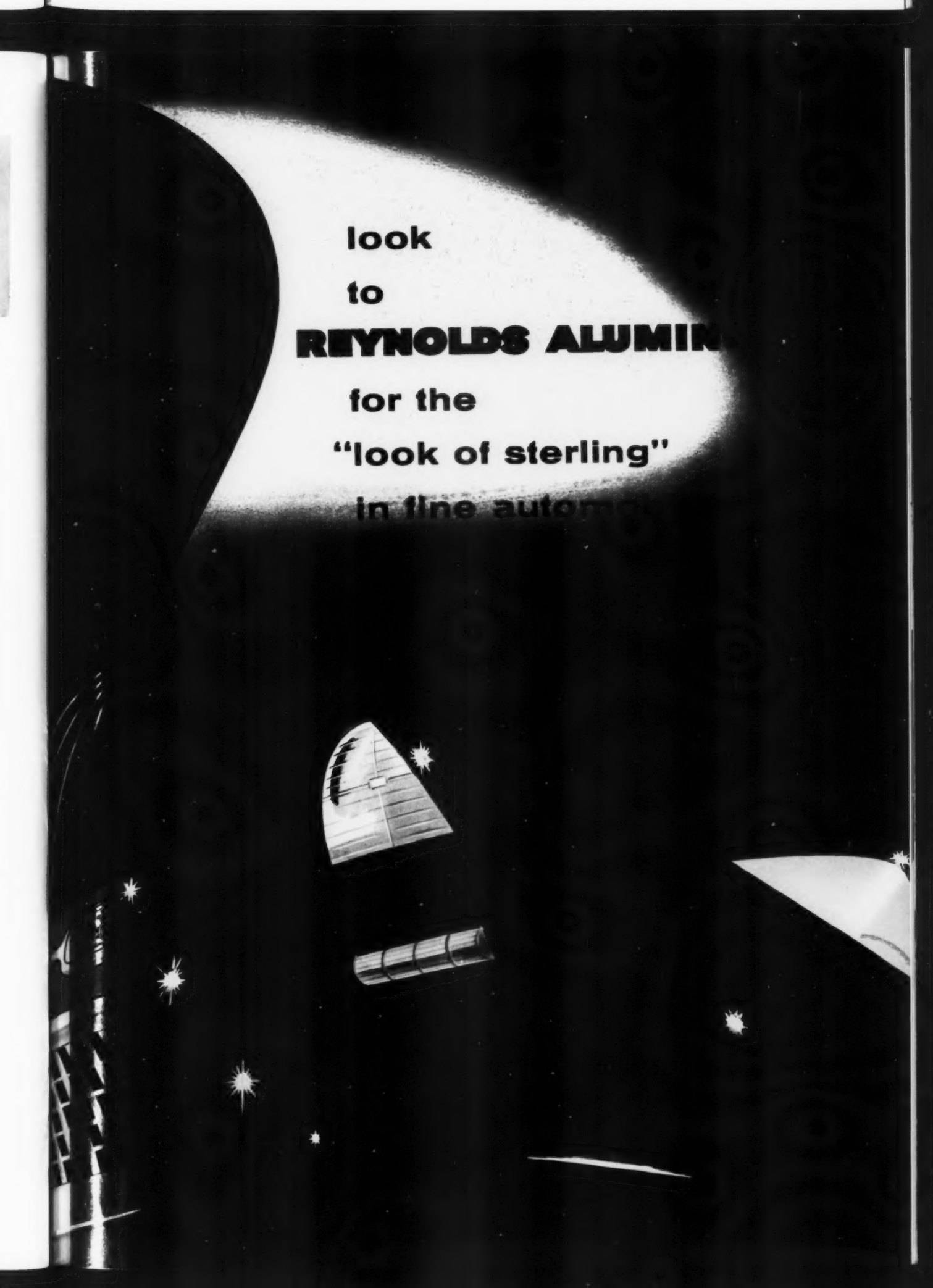
Here's a spinning example of Corning custom engineering in glass—the right balance of the right characteristics—to do a very special type of job.

More examples are spelled out in "Glass and You. "It's a good primer for learning a great deal about today's *engineered* glasses. Use the coupon. Free.

CORNING GLASS WORKS, CORNING, N. Y.

Corning means research in Glass

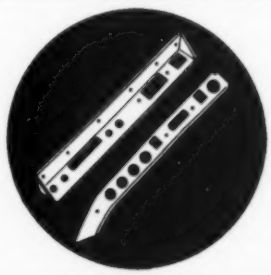
look
to
REYNOLDS ALUMIN
for the
"look of sterling"
in fine autom

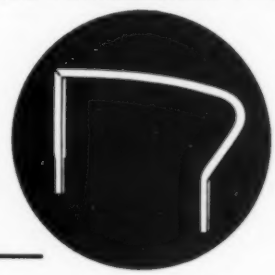


plan on

ALUMINUM

parts and trim...





for lasting beauty and fabricating economy

• There's the prestige and quiet dignity of sterling in aluminum's soft luster. And this "look of sterling" is adding sales appeal to today's fine cars. Aluminum in either its natural finish or in a wide range of special finishes stays attractive, too. It also offers light weight with great strength; freedom from rust; ease of fabrication; low cost; high electrical and thermal conductivity and other characteristics that are important in both trim applications and in hidden parts.

• Yes—from bumpers to battery cables; from door frames to distributor cap inserts; from trim strips to transmission parts—aluminum offers a combination of advantages unmatched by any other metal.

A Reynolds Aluminum Specialist will be glad to work with you to help you get the very most from the aluminum mill products you use. Reynolds extensive fabricating facilities are also at your service. For details call the Reynolds office listed under "Aluminum" in your classified telephone directory—or write *Reynolds Metals Company, 1212 Fisher Building, Detroit 2, Michigan or P.O. Box 1800 MU, Louisville 1, Kentucky.*

REYNOLDS ALUMINUM

MODERN DESIGN HAS ALUMINUM IN MIND

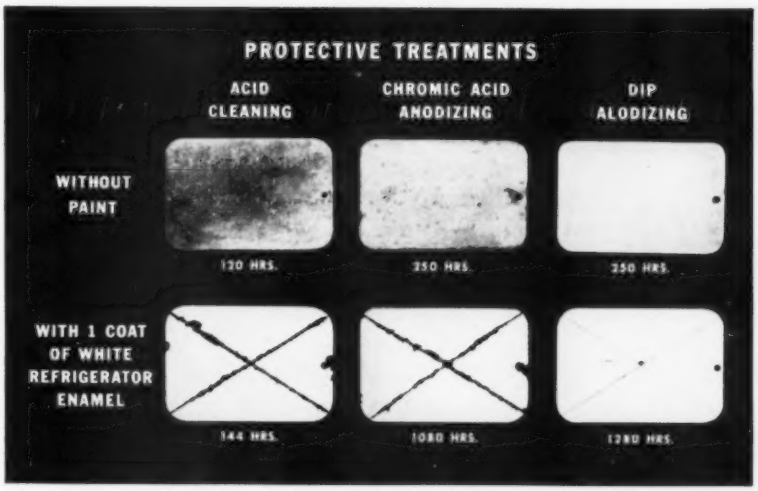
ACP technician checks Alodized test panels in Quality Control Laboratory.

ACCELERATED TESTS PROVE ALODIZING EVEN MORE EFFECTIVE THAN ANODIZING IN PREVENTING CORROSION OF ALUMINUM

Just how effectively Alodizing with Alodine® — a chemical conversion process which forms an amorphous phosphate surface — prevents corrosion of aluminum is graphically illustrated by these unretouched photographs of test panels. How each was prepared is shown — and the number of hours exposed in a standard test cabinet. In spite of the same or longer exposure to salt spray, the Alodized panels are in better condition than the anodically oxidized panels.

Alodizing with Alodine adds years to aluminum's resistance to corrosion. And because it converts the aluminum surface to a nonmetallic layer, it provides a perfect bond for painting and lacquering.

Write or call us for more information about Alodized Aluminum and its many applications.



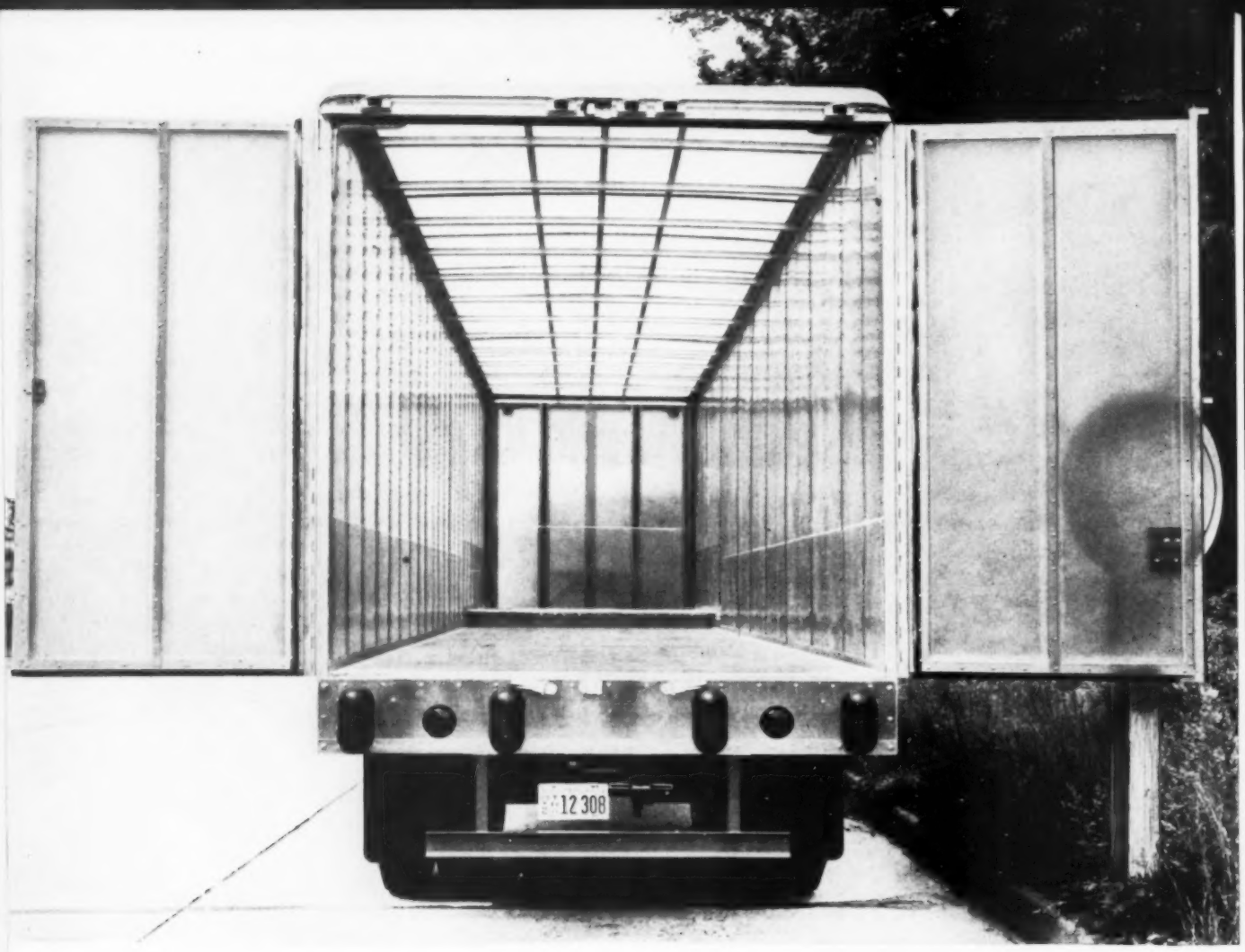
These 52S aluminum panels were prepared as indicated and subjected to accelerated tests as noted.

For maximum protection of metal and finish, use Alodized Aluminum

AMERICAN CHEMICAL PAINT COMPANY, Ambler 36, Pa.

DETROIT, MICHIGAN — NILES, CALIFORNIA — WINDSOR, ONTARIO

CHEMICALS ACP PROCESSES



Translucent Truck...

highlights the trend to reinforced plastic body construction

shippers getting greater payloads, meeting road regulations and cutting maintenance costs

(ABOVE) Interior view of Veenama-Wiegers trailer van, made of reinforced plastic panels, molded from Celanese® Marco® Resins. Approximately 3/32" thick, these panels made by Alysynite Corp. of America, have the natural translucency of reinforced plastic, permitting easy reading of shipping labels during the day, and suggesting interesting advertising possibilities on night trips.

(RIGHT) Side view of trailer which weighs 8900 lbs., 35 feet long (several feet longer than standard trailers of the same weight), and has a loading space of 2128 cubic feet. Manufactured by Veenama-Wiegers Inc., Paterson, N. J.

180,000 MILES WITHOUT REPAIRS TO APRONS OR OUTER BODY

One of three milk tank trucks now in operation for the Dairyman's League Cooperative Association. Built by the Heil Company, these tanks have a capacity of 4000 gallons, yet weigh several thousand pounds less than old-style carriers with similar capacity. The first of these trucks, in operation since October 1953, has traveled close to 180,000 miles without repairs to aprons or outer body. Heil is now building a 5000-gallon plastic trailer for Dairylea.

The trailer with the translucent body (opposite) is no one-time curiosity. It's a regularly scheduled, heavy duty truck that carries dry cargo thousands of miles every week. Certainly a truck that allows you to read shipping labels through its sides is different. But the difference that reinforced plastic construction makes is paying off for shippers in many other ways as well.

Insulated chemical carrier, built by Carl N. Beetle Co., Fall River, Mass., is two-ply. The reinforced plastic shell is sprayed with insulating material before outer jacket is installed. This tank trailer has a 3750-gallon capacity.

Look what a truck or trailer built of reinforced plastic can deliver: a body weight far lighter than conventional bodies—exchanging dead weight for greater payloads... resistance to weather, cold, heat, denting, moisture, stress, and vibration. Color may be permanently molded right into the material. Patch repairs can be made easily, quickly—on the road if necessary!

Sloping bottom tank truck designed by Brooks Cleveland, internationally known automotive designer, for shipping dairy products, chemicals, etc. Constructed of Celanese Marco Resins by Heil.

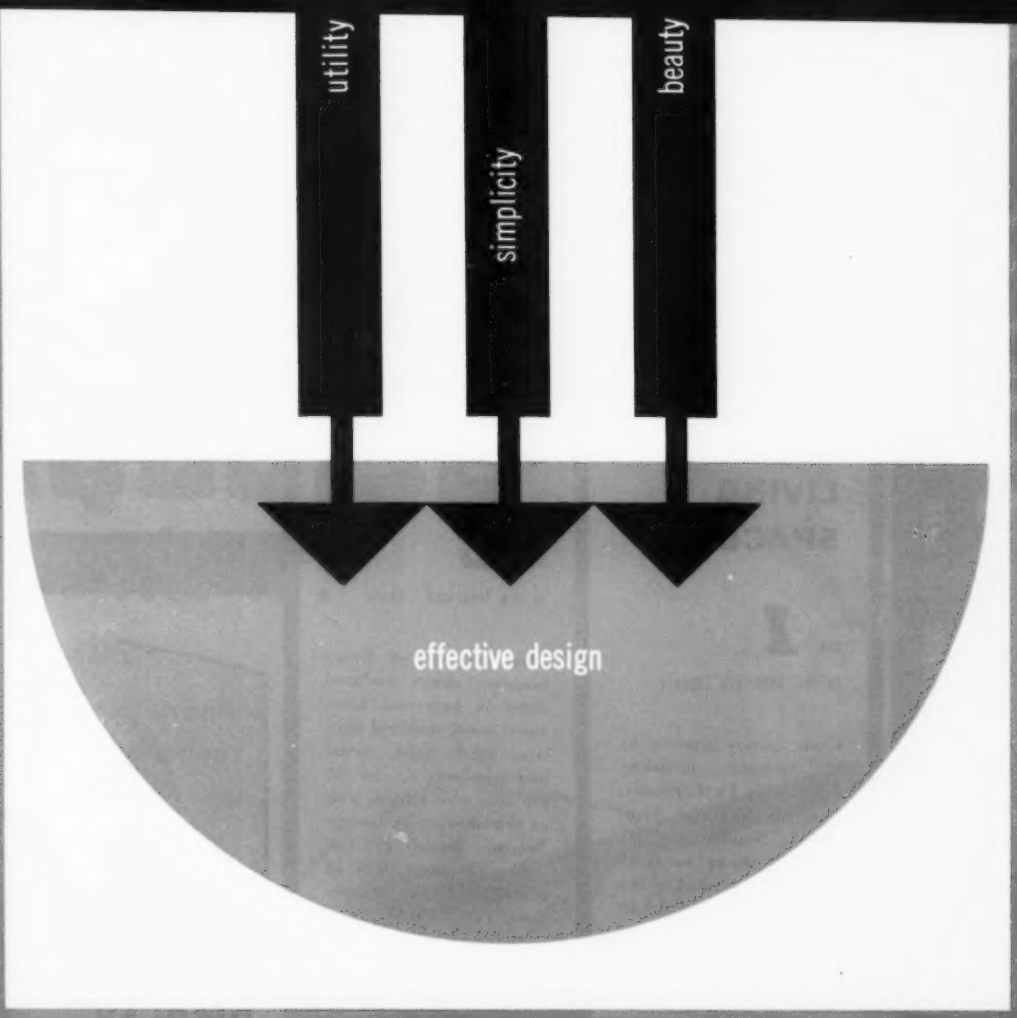
Celanese, producer of Marco* polyester resins, has pioneered in the development of reinforced plastic construction for trucks, boats, furniture, architectural panels, and many other products. If any of the plastic truck bodies displayed on these pages suggest profit possibilities for you, you can get more complete information from a Celanese technical representative.
Write: Celanese Corporation of America,
Plastics Division, Dept. 152-J,
290 Ferry Street, Newark 5, N. J.

Dairy Farm Pick-Up Tanks built by Heil Company, Milwaukee, Wisconsin hold up to 2000 gallons of milk. Their exceptionally fine vapor seal against deteriorating moisture is the result of a bond of insulation material and reinforced plastic into a one-piece unit. There are no joints or internal bracing to transfer heat. Stainless steel liner meets sanitary requirements.

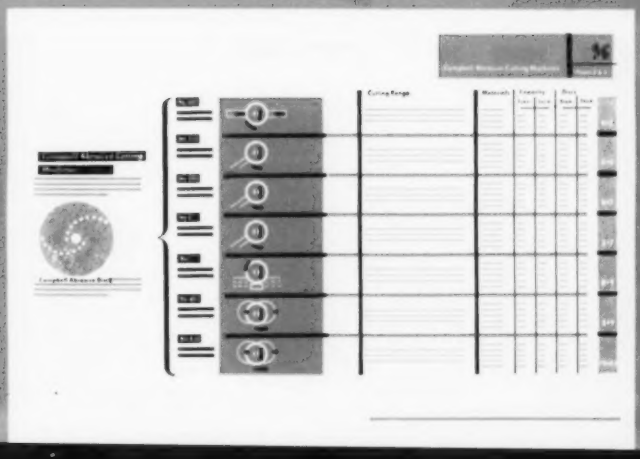
Celanese®
PLASTICS and RESINS

On Heil trucks, color, lettering, and design are incorporated in plastic mold to become permanent part of outer surface. Heil pick-up trucks are being used by dairies and independent truckers all over the country.

*Reg. U.S. Pat. Off.



Product information should be designed, subject to the usual standards——utility, simplicity, beauty. The catalog design shown below, though but one visual unit of many in a manufacturer's catalog, illustrates the application of design principles to product information. For fifty years, Sweet's has pioneered in the field of product information that best suits the needs of buyers and sellers in industry. Sweet's Product Design File is a system which gets product information into buyers' offices in convenient bound collections of catalogs. Sweet's Catalog Service,– designers, producers and distributors of manufacturers' catalogs, 119 West 40 Street, New York. Offices in principal cities. [Division of F.W.Dodge Corporation]



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in the Interiors Library

Contemporary interiors by 81 designers, including Finn Juhl, Le Corbusier, Mies van der Rohe, Richard J. Neutra. LIVING SPACES shows outstanding designs selected by the editors of *Interiors*. Edited, with an introduction by George Nelson. *Bound in full cloth*: 148 *pages*, 9 *x* 12 *inches, illustrated with* 232 *photographs. Price* $7.50.

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No. **2**

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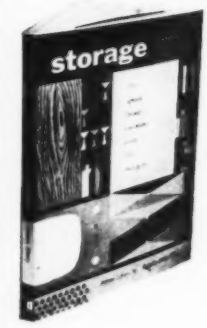
Ingenious displays that set new patterns in interior design thinking and techniques . . . in shops, showrooms, exhibitions. Edited, with an introduction by George Nelson. DISPLAY features creations of 125 designers and architects of international note. *Bound in full cloth*: 192 *pages*, 9 *x* 12 *inches, with* 312 *illustrations. Price* $12.50.



STORAGE

No. **4**

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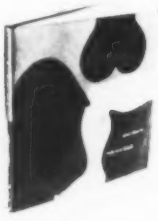
Here are the problem-solving storage ideas of 138 leading designers for facilities that can be bought or built in—shelf systems, storage walls, room dividers, unit furniture. STORAGE is edited with an introduction by George Nelson. *Bound in full cloth*: 176 *pages*, 9 *x* 12 *inches, with* 303 *illustrations. Price* $12.50.

and—the classic reference

ANATOMY for Interior Designers



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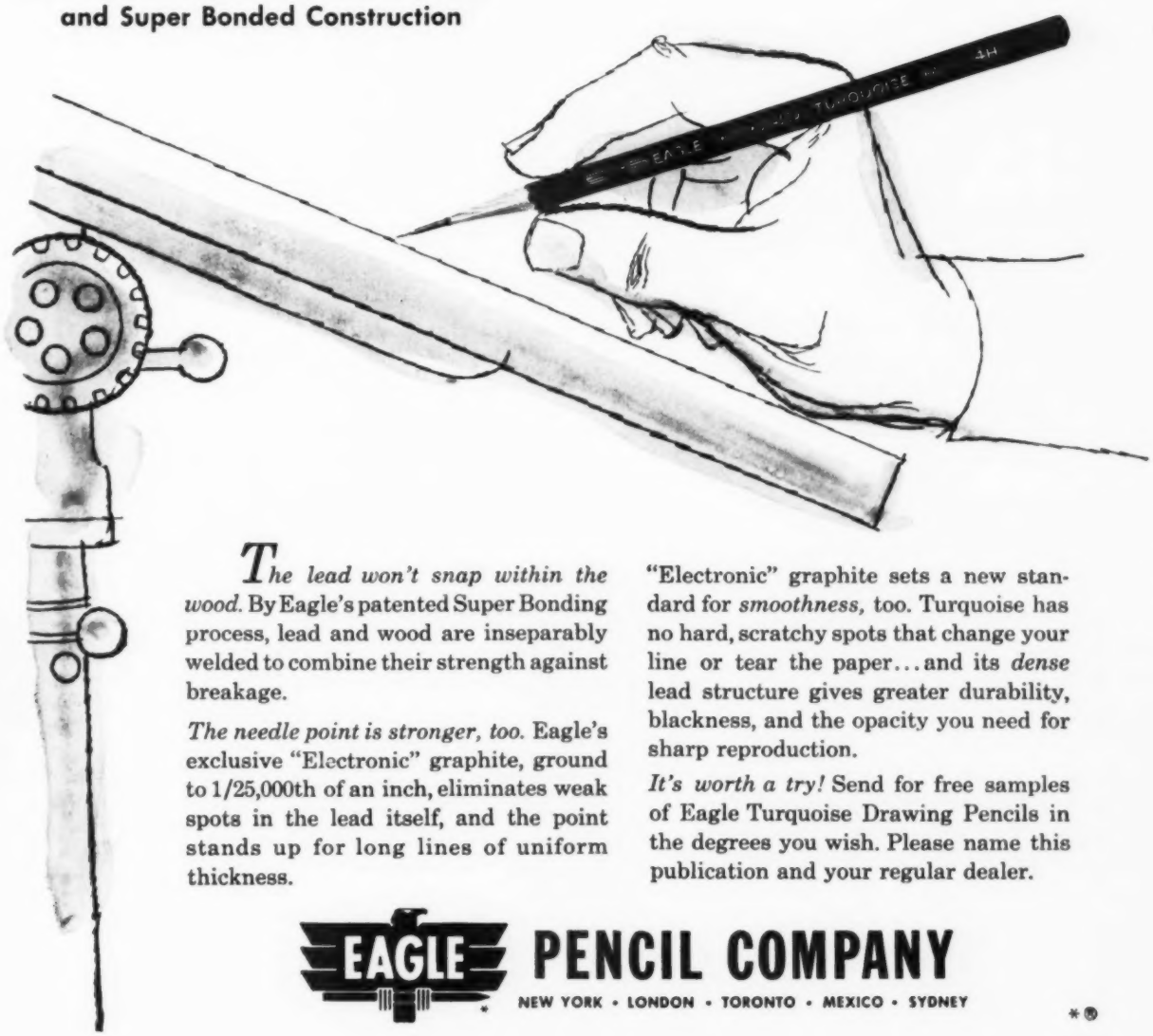

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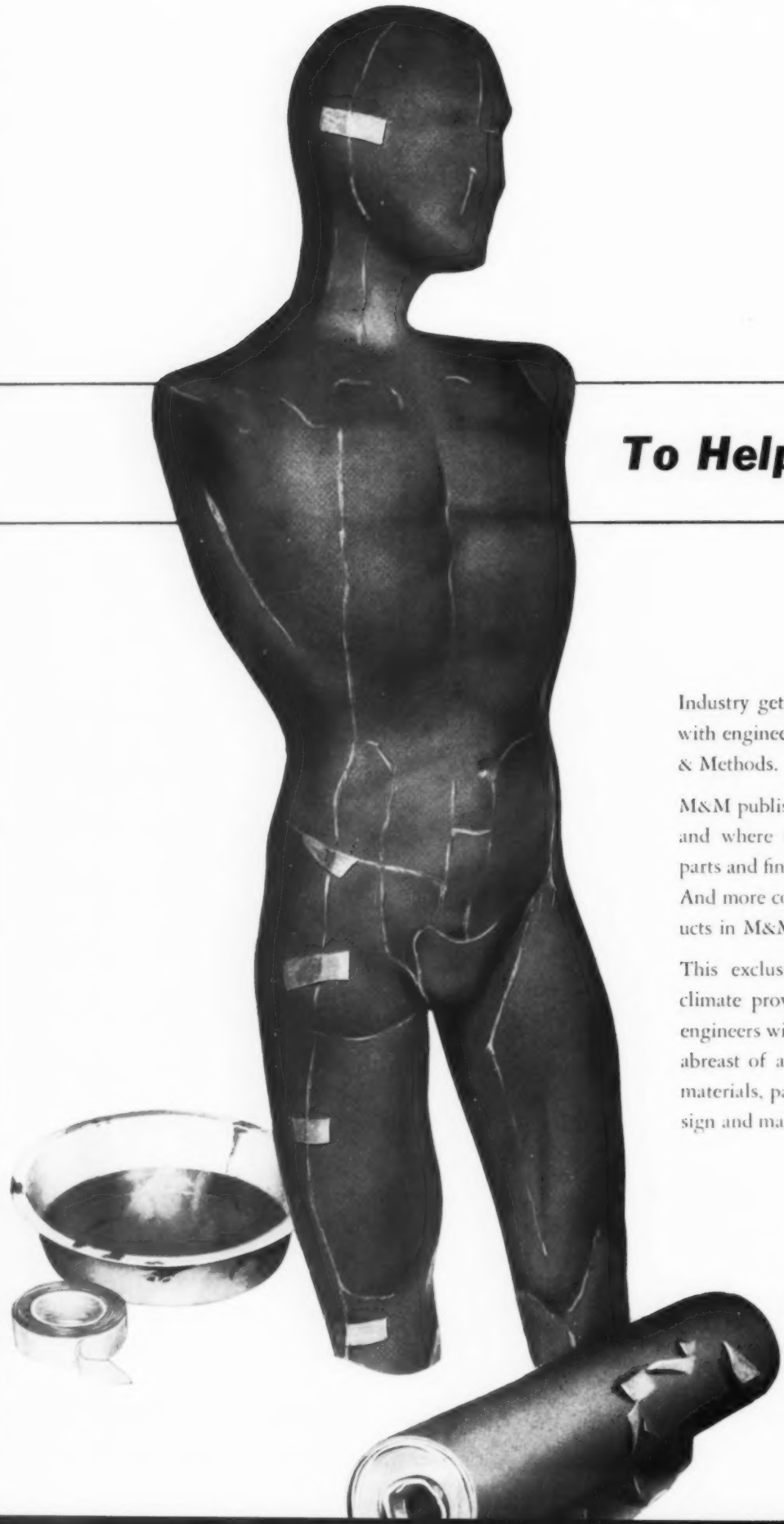


To Help Designers

Industry gets the facts on how to design with engineering materials from Materials & Methods.

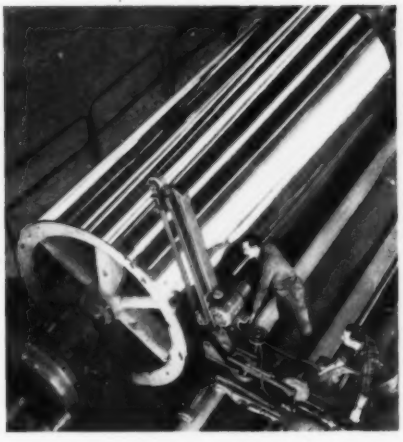
M&M publishes more information on how and where to use engineering materials, parts and finishes than any other magazine. And more companies advertise these products in M&M than in any other magazine.

This exclusive editorial and advertising climate provides industry's designers and engineers with the best opportunity to keep abreast of all developments in the use of materials, parts and finishes in product design and manufacture.

Thermoplastic impregnated cloth is easily molded into lightweight, rigid forms for patternmaking, prosthetic appliances, housings, prototypes, etc. *Included in M&M's 1955 coverage of nonmetallic materials is a 16-page special section on how and where to use industrial fabrics and fibers.*

Make Better Use of Materials

Forged aluminum wheels, squeezed out on an 8,000-ton press, are extremely strong and light in weight, and have a smooth surface that's highly suitable for chromium plating. *59.8% of the plants reached by M&M now use forgings of one kind or another in the manufacture of original equipment and other hard goods.*



Twenty-eight tons of carpet beater! Steel is the basic material in this giant carpet roller. It's 8 feet in diameter; 19 feet long. Presses and dries broadloom carpet in the final step of rug making. *In 14 or more editorial pages per month, M&M subscribers learn about new and successful applications of steels and irons.*

Materials & Methods

ABC — ABP

Materials Selection and Use in Product Design

A Reinhold Publication
430 Park Avenue, New York 22, N. Y.

Photos from Materials & Methods; courtesy: Ben Walters, Inc. (left) Aluminum Company of America (center) Lukenweld Div., Lukens Steel Co. (right)

TRANSPORTATION is one of the industries which consistently use AE products.

AE **ALUMINUM EXTRUSIONS, INC., CHARLOTTE, MICHIGAN**

Ambulance photo: The A. J. Miller Co., Bellefontaine, Ohio

Never heed a mother's good advice

We happened to overhear a lawyer the other day, addressing some friends of ours who had blithely and unaided talked themselves into a serious legal tangle before yelling for help. "I wish," he said, with an understandable note of ennui, "that people would realize that Law is not a do-it-yourself profession." We took note of this fee-less advice without consulting *our* lawyer, for it seemed safe to apply it to certain other service professions whose services, for lack of visible equipment, seem temptingly easy for the layman to emulate. Doctors need forceps as much as wrestlers need biceps; housemovers need winches and jacks; tailors need Singers (as much as singers need tailors) and dentists, at a minimum, need a good length of string. But designers, like lawyers, lack the kind of tools that circumscribe their trade. Admittedly, any designer does well to equip himself with a sharp pencil and a couple of sharp draftsmen, but his real tools are portable and largely invisible. Logic, perception, vision, imagination — some people find it painfully extravagant to purchase commodities that are inedible, unwearable, or unnegotiable.

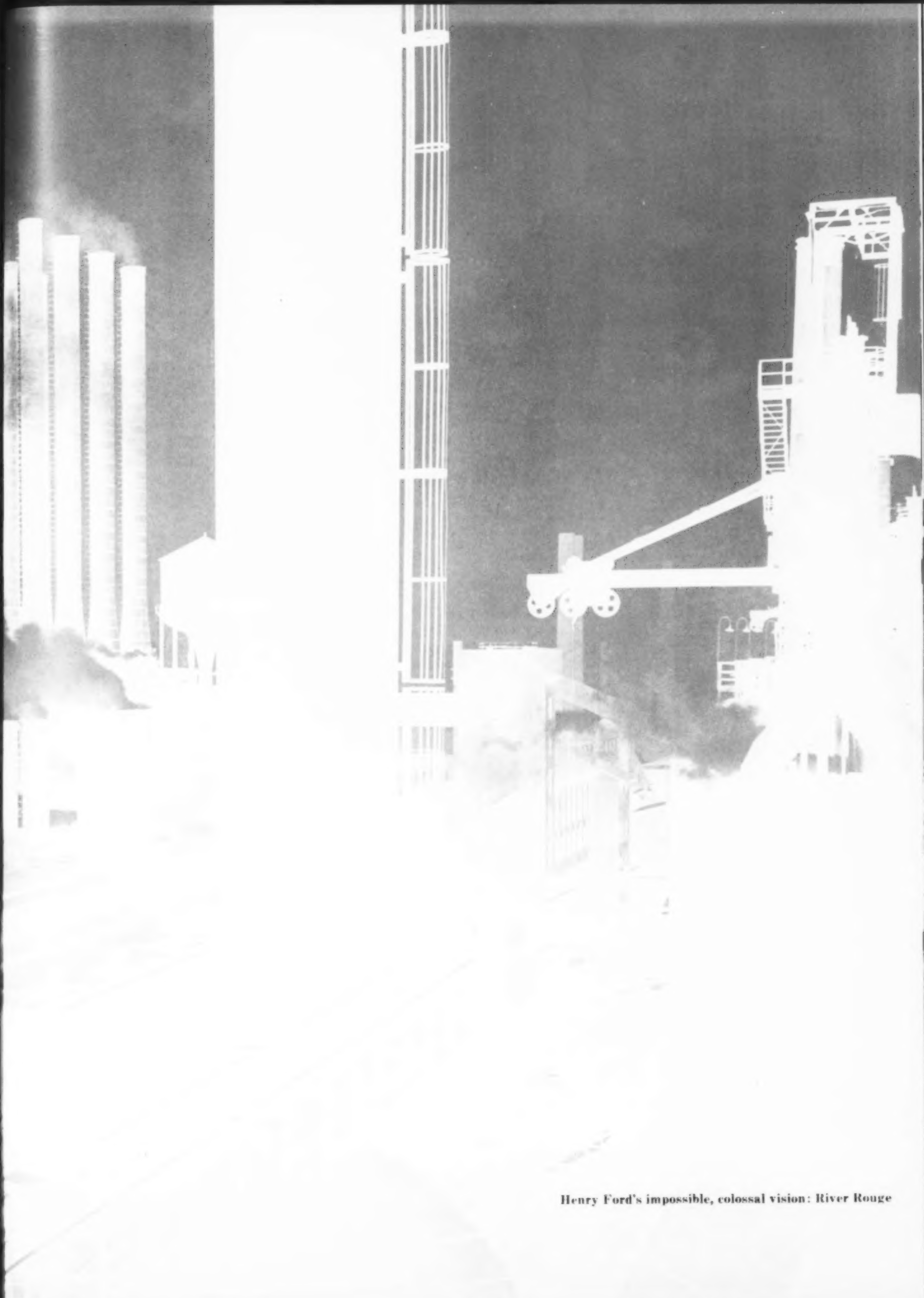
One of the prime talents in business is the talent for being a Client. The Unimaginative wouldn't dream of it; the Arrogant wouldn't dare; the Skinflint would probably spend great sums to avoid outright payment for anything so flimsy as advice. Only a Client will acknowledge his own limitations by investing in someone else's ability to overcome them.

The talent for being a Client is eclipsed only by the talent for being a Good Client. Accountants prefer to have things precise; Salesmen are reputedly partial to things saleable; Business Managers are understandingly attached to the status quo. But a Client is Good precisely because he is none of these things. His ceiling is unlimited, and his demands are unlimited, and he knows he gets value in the form of values larger than his own. A Good Client would never be caught advising a designer in the way Mrs. Rickenbacker advised her son Eddie, while he was an air squadron leader in France during World War I: "Dear Eddie, if you *must* fly, please fly slowly, and close to the ground." — *j.f.m.*

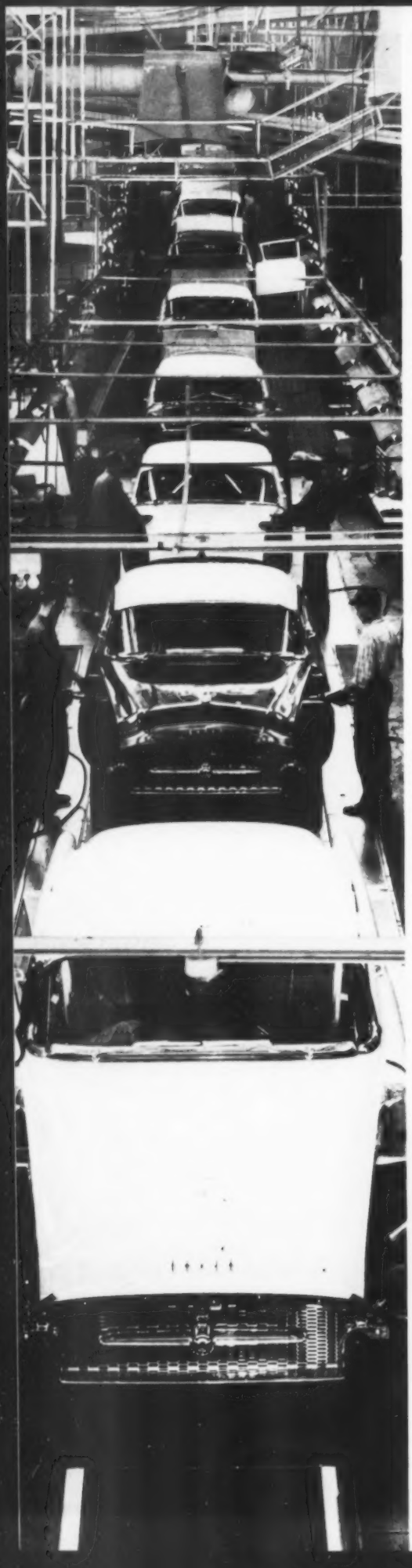
Why design in Detroit

Detroit is the center of the biggest, liveliest and most adored consumer industry in the country, and perhaps in the world. In many senses, Detroit is also the design center of the U.S.A. For one thing, the welfare of that giant industry — whose success and method of operation have a profound effect on the entire national economy — is more and more dependent on design. The Motor City is the source of a new concept about the power of design as a weapon of sales — and even as a source of obsolescence. It is the author of a rather special design idiom based on this idea. Detroit has invented a way of using creative people in a vast manufacturing scheme, a way of building design into business so that it functions with the same efficiency, the same regularity, and by the same kind of hierarchy as any other business organization. That instrument is the Styling Section; as much as mass production, mass-produced design is the brainchild that has made Detroit a prime influence on American life and business.

Aside from the automotive industry, but not unrelated to what is happening there, is the matter of design on the face of the city itself. 1955 is a boom year in Detroit, and the effects of the boom are visible like fresh scrub marks on a somewhat sooty city. New roads, new buildings, stores and cultural institutions are mushrooming, the result not of a seasonal windfall but of long-range planning involving labor and industry, government, private citizens and designers. It is no exaggeration to say that design is contributing to all aspects of the city's prosperity. The phenomenon that started in Detroit has already begun to suggest patterns for industries and industrial cities throughout the United States. How it came about, how it is being handled, and what success it is achieving will be explored in the story we tell. The heroine of the story is a city; the next 10 pages describe the heroine's visible characteristics, and introduce some of the other principals in the piece . . .



Henry Ford's impossible, colossal vision: River Rouge



Lodge-Ford intersection
(© Detroit News)

The industry that makes the wheels go round

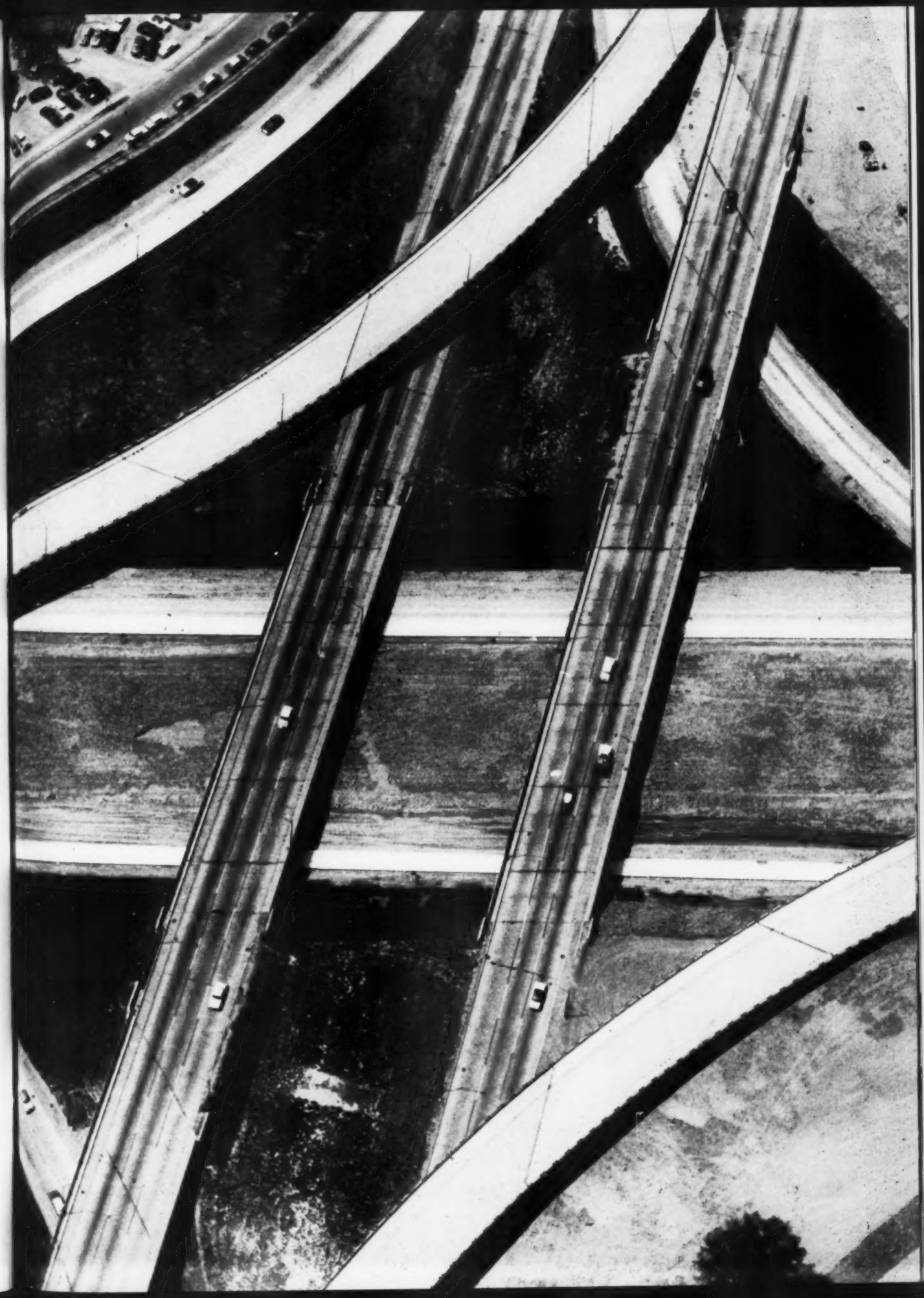
About Detroit one fact is all-important: it put the country, and then the world, on wheels. It has been Detroit's contribution not only to American production methods but to the buying power that has supported the fruits of that production; in a city of energy and motion, which values accomplishment above lofty ideals, this accomplishment counts for a lot. This year 703,000 people are employed in Detroit manufacturing activities, 43% of them in motor vehicle equipment. Though only fifth in U.S. population, Detroit ranks third in factory payrolls. The average weekly earnings of Detroit workers have risen from $91.76 in 1953 to $98 this year — a 70% rise over 1947. Between 1900 and mid-1955, Detroit produced 120,268,885 passenger cars; last year's output was 5,558,739, and an unsurpassed 7,500,000 has been predicted for 1955. However, the auto wheel, symbol of Detroit's success, is also the symbol of new problems of which Detroit industry and government are not unaware. - -

The Motor City hits the road→

In 1954 there were over 47 million passenger cars registered in the United States; 845,000 of them were registered in Wayne County, the heart of Detroit's metropolitan area and one of two U.S. counties (with Los Angeles) in which there are more cars than families. It happens that Detroit has very limited public transportation facilities; the morning flood of commuters to downtown offices and factories is primarily by car, and like many American cities, it was not laid out to cope with a motorized invasion. (As if by some esthetic pun, its plan is a half-wheel around the hub of the Detroit river, a tangle of oddly-angled intersections.) City administrators have come to grips with the job of making Detroit an easy place to get around in. Some years ago a basic traffic plan was devised to prevent jams and permit an even flow of traffic; since 1950, a vast expressway construction program has been underway. Almost ten miles of a planned 105-mile network surrounding the city are already open to traffic. When the interlocking John Lodge and Edsel Ford expressways are completed it will be possible to motor through the heart of the Motor City and out again in 15 minutes.

Parking lot, Ford River Rouge plant

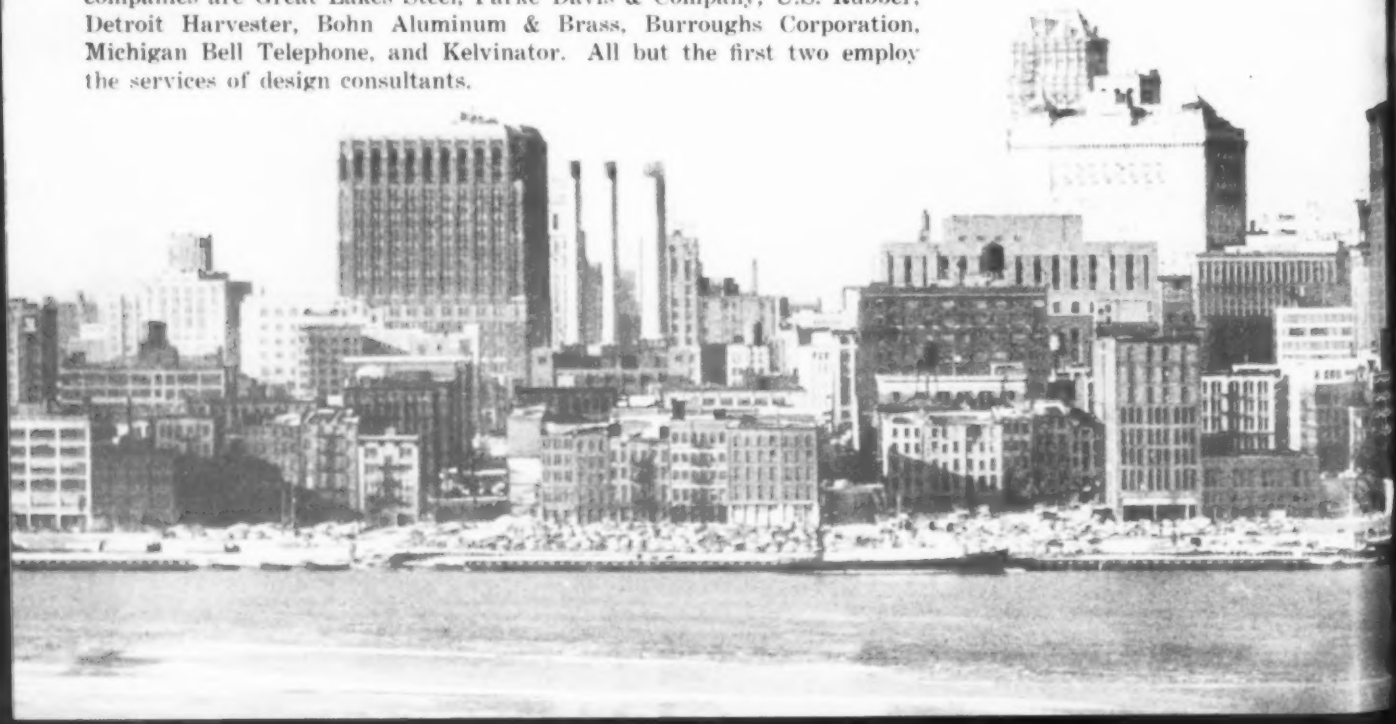
Buick assembly line



This is Detroit

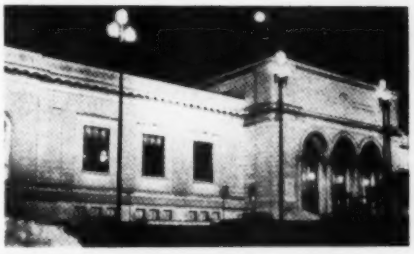
Other giants in town

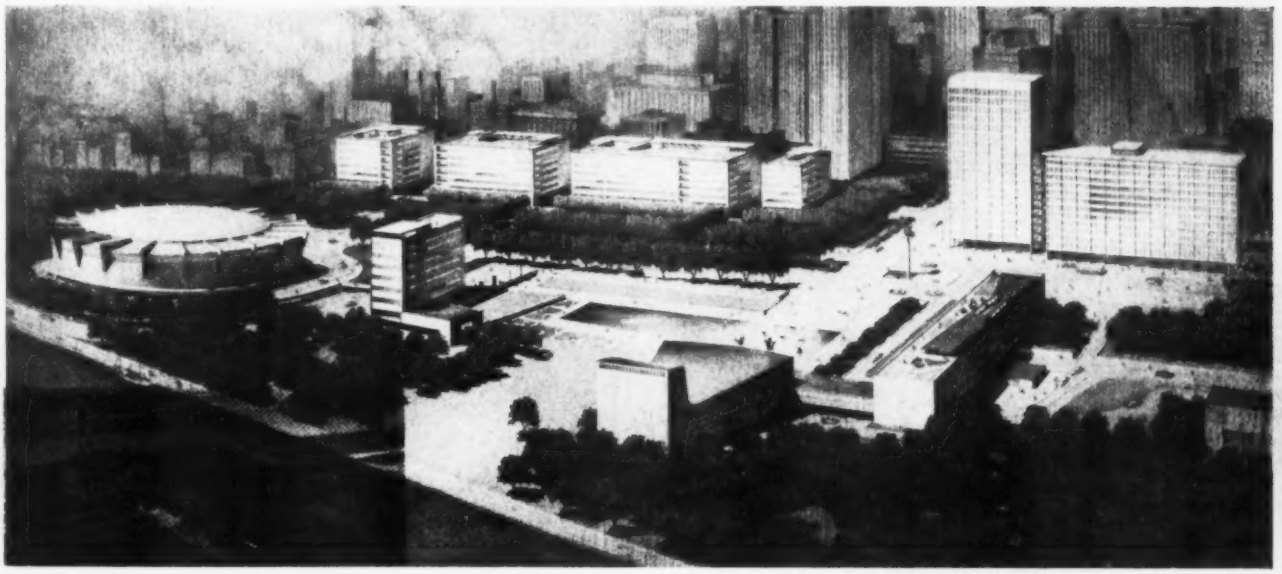
Though automotive plants have invaded every corner of the metropolis, Detroit is by no means a one-industry town. By the latest count there were some 6,058 manufacturers in the city. Many of them, of course, are kin to the major industry: machinery (85,000 employees), fabricated metal (63,000 employees), primary metal (40,000 employees), chemicals (23,000 employees). The total industrial production of the Detroit area last year was $13 billion — exceeded only by the metropolitan areas of New York and Chicago. Among the well-known non-automotive resident companies are Great Lakes Steel, Parke Davis & Company, U.S. Rubber, Detroit Harvester, Bohn Aluminum & Brass, Burroughs Corporation, Michigan Bell Telephone, and Kelvinator. All but the first two employ the services of design consultants.



Culture comes downtown

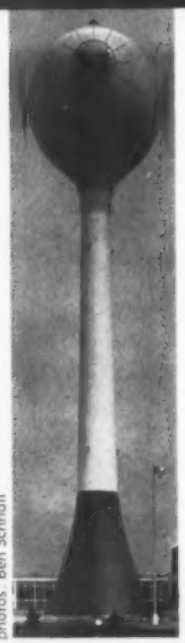
One reason that Detroit seems to bristle with activity these days is the fact that its downtown area is undergoing a $65,000,000 transformation into a cultural and civic center. Culture is no stranger to Detroit — it has two universities and many colleges, and its Institute of Arts and Cranbrook Foundation are nationally renowned — but never before has culture been so purposefully planned into the city pattern for everybody's enjoyment. The Civic Center, started in 1949 under Mayor Cobo, is transforming a 72-acre waterfront slum into a public park, punctuated by various civic buildings. The Veteran's Memorial Hall, for group meetings, and the City-County Building for government offices, are already in operation. A 2,700-seat auditorium to house the Detroit symphony is under construction, and a vast convention and exhibits hall will go up in 1957. All of the buildings were designed by Detroit architectural firms; Saarinen, Saarinen & Associates were planning consultants.





Cranbrook Academy of Art, top
Detroit Institute of Arts, bottom

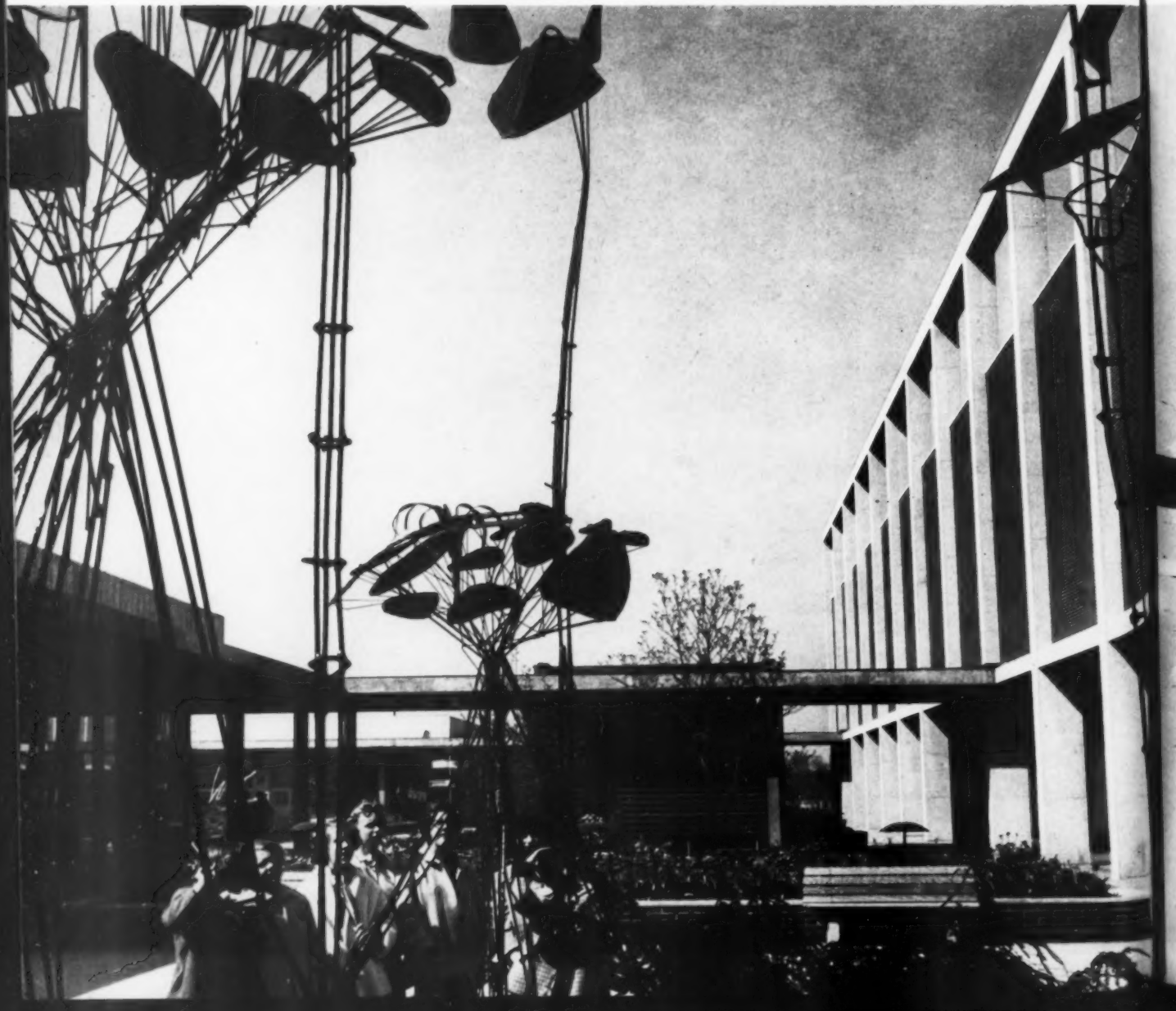
Early rendering of Detroit's new Civic Center shows a circular convention hall, later revised to include two buildings (in black). Ford Memorial Auditorium in foreground is under construction in the far right of the skyline, below.



photos: Ben Schnall

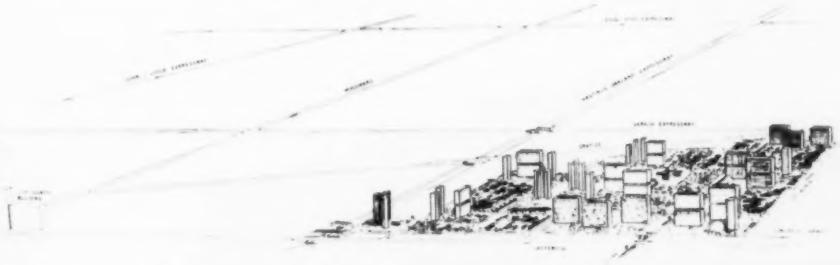
A town center in a shopper's universe

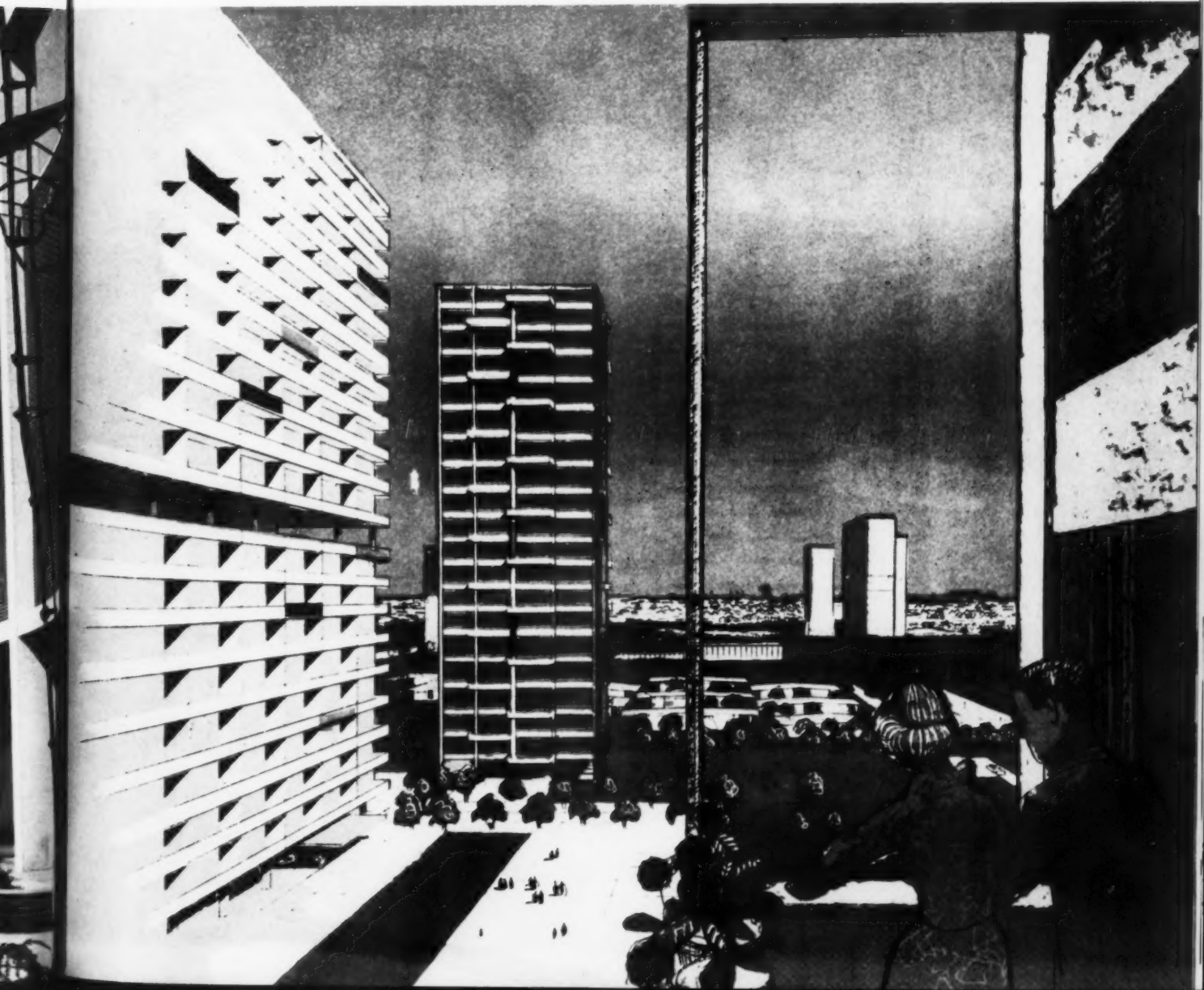
Northland, 8 miles north of downtown Detroit, came about in answer to a problem created by autos and roads: the exodus of the buying population to the suburbs. J. L. Hudson, the city's biggest downtown store, saw that its best chance of holding its own was to compete with itself in the suburbs. The shopping center that it sponsored has a unique design for merchandising. It is laid out as a series of court-like parks ornamented with benches, fountains and sculpture; the monolithic department store is at the center, and a border of 90 smaller shops delimits the courts. The spirit is so festive and the scale so human that shopping has become a kind of family recreation. Because architect Victor Gruen planned in 2 auditoriums, 8 restaurants, and public meetings rooms, Northland has also blossomed into a civic center for outlying communities miles around — at no expense to its original purpose. After a year of operation, sales at Northland were more than 50% above estimates; about 40,000 visitors pour in daily.



A suburb in the heart of the city

The Gratiot-Orleans development will give Detroit a new cityscape: it will replace a 50-acre slum with a multiclass neighborhood, a coordinated mixture of high and low buildings, economy-to-luxury facilities for all income brackets. It came about by the joint efforts of Detroit's Independent mayor, its No. 1 union leader, and prominent businessmen; the committee engaged Victor Gruen Associates, Oscar Stonorov and Leinweber, Yamasaki and Hellmuth to collaborate on planning and design. Not only is it a scheme for making city living pleasurable and holding buying power downtown; it is also a far-sighted scheme for saving the city. As Walter Reuther said to the committee, "Our industry's product has destroyed the city as a workable unit of American life. It is our responsibility to redesign the city into something livable, or we may be without our markets tomorrow."



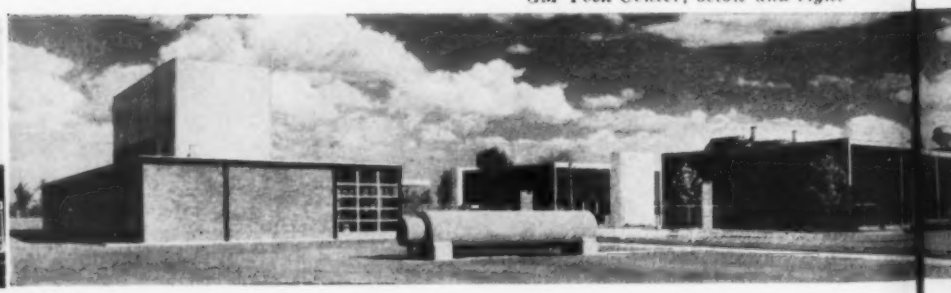


Arsenal of Design

The studio is one of the primary units by which Detroit production can be measured. There are upwards of 600 designers at work in Detroit, most of whom have been drawn there from other parts of the country. The majority are to be found in the recesses of five automotive styling sections, where their importance can be said to be even greater than their numerical strength. Some 100 of them, on the other hand, operate in a half-dozen independent design offices that serve a variety of industries throughout the country. (Of the Detroit firms included in the list at the left, there is an impressive representation of comparatively small local industries.) For years the aura of secrecy which pervaded the individual styling sections virtually excluded any interchange among the designers as a professional group. But recently the bars have been partially lowered, perhaps because of a corporate realization that creative ideas and broader design concepts are stimulated when designers get together. A new chapter of the Industrial Designers Institute has attracted members from all the offices and styling sections. Its program will include an exhibition of Detroit products (see News) and periodic symposiums devoted to subjects of professional and cultural interest.

General Motors Building

GM Tech Center, below and right

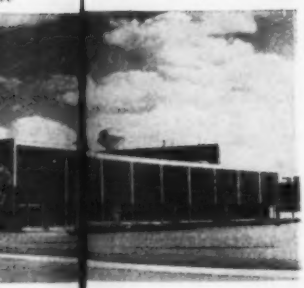


Industry embraces art

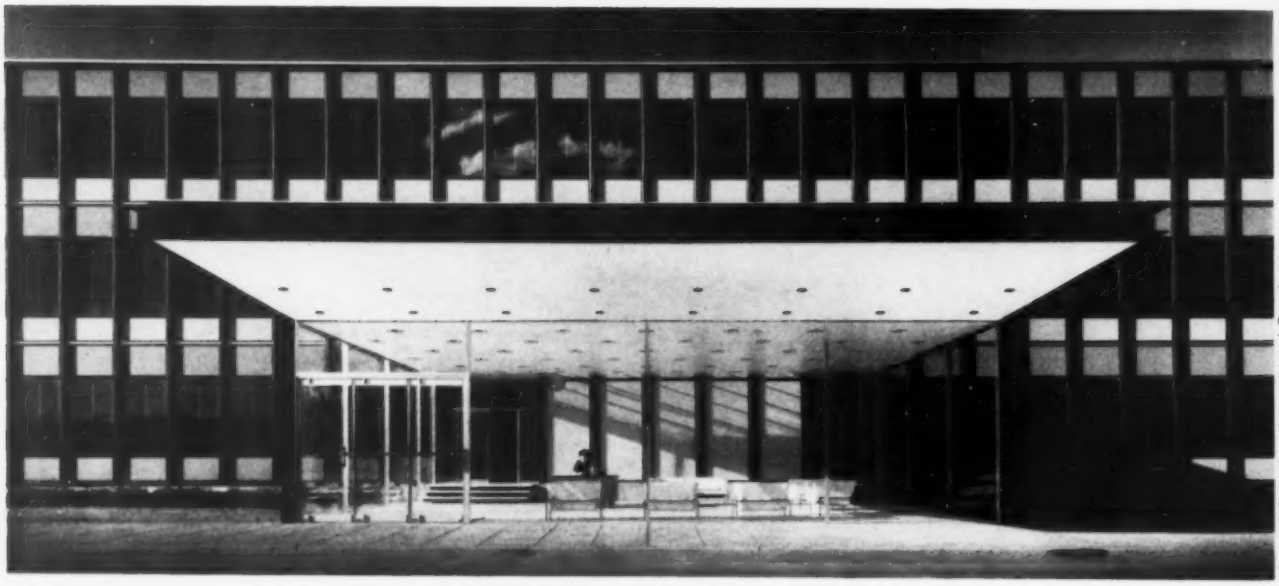
The number one architectural event in Detroit is the spectacular new General Motors Technology Center, covering a mile-square plain a dozen miles north of the city. It is architecture on an unprecedented scale — actually a complete research town where each of the five major GM research functions has its own complex of buildings, pools, landscaped squares and gardens. The 17 individual structures, low and generously spaced, surround a 1780 ft. lake and are encircled by drives and shaded parking areas. Final touches are just being put on the Styling Section — the cornerstone of a $100 million project that has been underway for a decade.

The Technical Center, designed by Saarinen, Saarinen & Associates of nearby Bloomfield Hills, is an integrated interpretation of a great industry: the crisp building forms and precise detail of the glass, steel, aluminum and enamel facades convey the spirit of technology and the machine; the brilliant glazed brick end walls in nine gala colors are a reminder of craft and the skill of the hand. In industrial buildings like the Tech Center, and the Ford Administration building above, there is a significant new dimension to design-for-industry: when business is designing products to improve the life and beauty of its own operation, it expresses itself proudly and boldly in the unified language of art.

Administration
ding (model), now
construction



Model shows the 3000' sweep of the GM Tech Center around a rectangular 7' deep man-made lake. Styling Section studios and auditorium are at the far left.



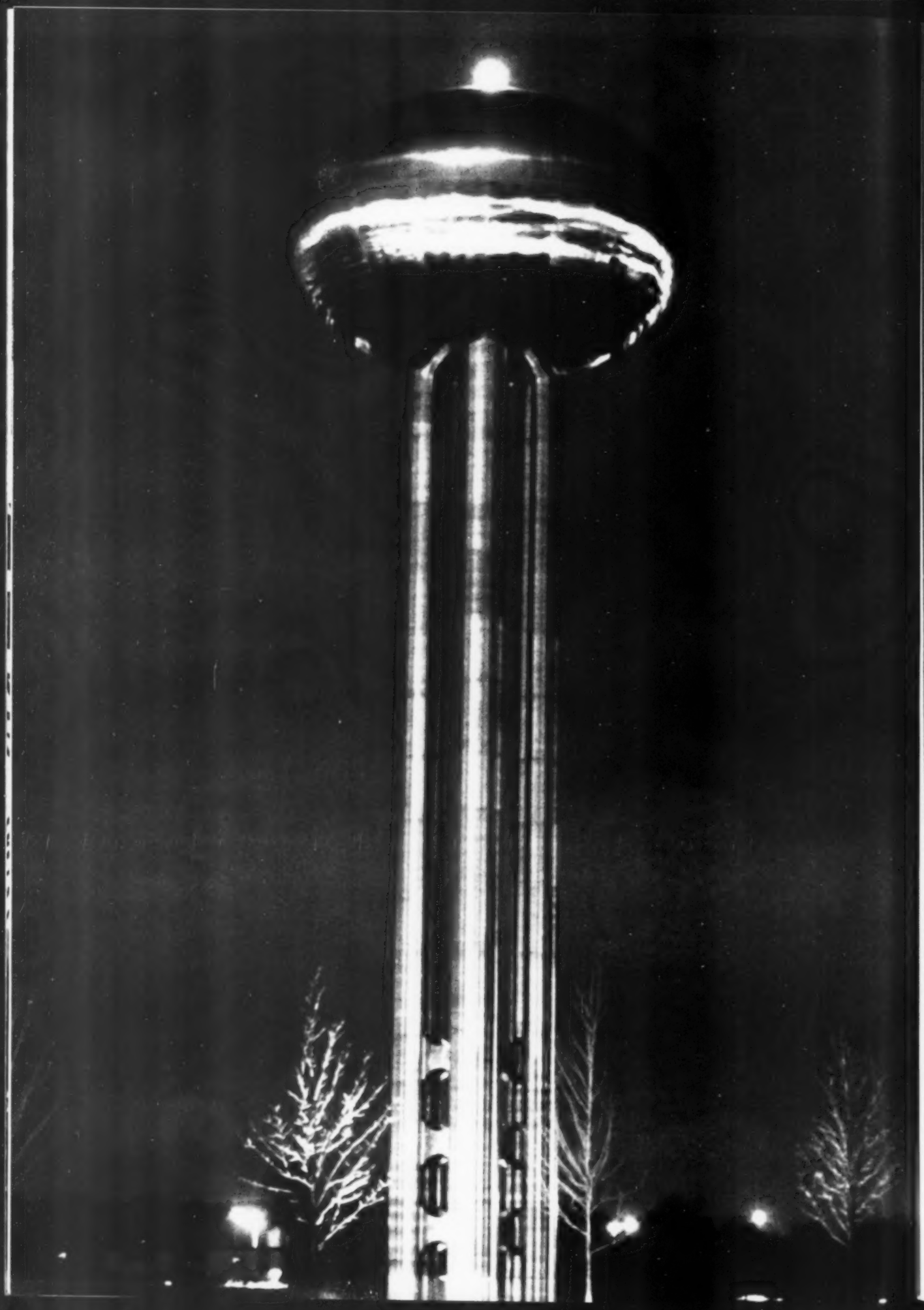
photos left, right, above: Lionel Freedman

Curtain walls of glass and porcelain are set in aluminum frames by a new method, developed by GM and the architects, using a neoprene gasket like the one that holds auto windshields in place. Modular system permits great control of daylight: full usage, as in the Process Development building above and the Engineering building at the left, or controlled usage, as in the Dynamometer building below.

→

A full wall of clear glass at one end of Mechanical Research building is flanked by red brick walls.

photos left, right, above: Lionel Freedman



the issues in this issue

To call Detroit the design center of America is to raise a kettle of questions. This is our intention; this issue is based on the questions we asked as we examined Detroit.

Our first question was obvious—how did Detroit get that way? How did design get to be so important in the world's biggest industry? In exploring the answer in the article overleaf, about the origins of the styling section, we stir up some new questions: Can business methodology be applied to a creative field, as it is in these company departments? Can the designer's talent—a talent for organizing a unified whole—be bent to a system that fragments the product in order to distribute the load of work? Does a tremendous design department guarantee success, or would the industry do better to depend on the unfettered talent of a top designer? Or is that possibly what it does now, numbers notwithstanding?

We have charted the rising influence of the stylist on pages 64-72, and industry's increasing dependence on him. The evidence may provoke you to ask whether design has actually become topheavy in Detroit today. Has the stylist, in his traditional tug-of-war with the engineer, won a battle that was never meant to be won? Has he lost touch with the functional problems that might be his inspiration? Or does his success foretell a new era in design, when materialistic America emerges suddenly as a patron of design for design's sake?

Many readers are bound to ask, "Does Detroit represent us, and our taste, and do we like it that way?" This matter of the relationship between the American and his car is a delicate one, and in probing it on pages 94-97, Eric Larrabee uncovers some reasons it is the way it is.

How does design in Detroit influence industries elsewhere? Some measure of Detroit's impact is found in the fact that four of the country's busiest design firms are in Detroit. Why are they there? Who do they work for, and how do they work? Their contributions are displayed on pages 74 to 89.

It is hard to resist asking, Where is Detroit heading, and can it change with the times? Three case studies of new vehicles at the end of this issue suggest that in Detroit, too, these questions will continue to be asked.

I D will make no pretense of delivering neat answers to the questions raised in this issue. There are too many right answers—an answer per reader per question, no doubt. The purpose here is simply to collect and present the evidence. The questions are important because they bear on the whole big question of design in American industry, and if they help our readers to find some new answers of their own, design in industry will have been served by Detroit.

by Jane Fiske Mitarachi

Harley J. Earl, a large man who directs design for the world's largest manufacturer of consumer goods, has in the past 30 years left his personal mark on some 40 million General Motors cars. To some extent he has left his mark on the cars of all GM's competitors too. Fiercely addicted to his product, (Earl loves convertibles and alternately dashes around in his spectacular Le Sabre show car and a Cadillac Eldorado, but hangs on to a '49 Buick station wagon that he has always liked), and inspired by an uncanny instinct for the likes of the masses, he has developed a unique and rigid esthetic that has influenced American car design beyond calculation. Often this influence has been direct and personal—the majority of the top designers in Detroit have worked for Earl at one time or another, and to many of them he has been the sole master from whom the trade was learned.

Yet the American car is only one of Earl's products. A more personal creation, and possibly a more important one, is an institution called the Styling Section. Styling Section is Detroit's euphemism for Design Department; it is a device for performing an essentially creative service on a mass-production basis. It has reached its apogee at GM. But the importance of the Styling Section cannot be measured solely within the automobile industry. Earl was the first designer in any major industry to become a Vice President, and to put design on a par with other staff operations. He wasn't the first designer in industry, nor is he the greatest, but even the colleagues that disagree with his methods admit that Earl was the first to put designers on the payroll—a prerequisite to the recognition of the design profession. This was not only an accomplishment on the organization chart, but one of operating significance: he was the first to sell management the idea of design as a potent sales weapon, and then to find techniques for making this conviction pay off. The first, in fact, to convince the industry of what they now believe as if it were ageless wisdom: appearance is what sells cars. In essence, Harley Earl turned design into policy at GM, and turned himself into a key person in making that policy.

Earl's dramatic qualities are dramatically evident in his stature. Tall, forceful, he looks like a man who knows where he is going and will have little trouble in getting there. He has the stature of a man who has no choice but to be a leader; as is often the case with born leaders, he has left his entourage no choice but to run to keep up with his long and determined stride. Looking more energetic than his 62 years should allow. Earl makes the most of his dramatic presence by a slow, deliberate, almost oratorically simple delivery when he wishes to make his point. The term his designers most

one man's methods and personality have affected the way an entire industry thinks, works, looks, and sells.

Harley Earl and his product: the Styling Section

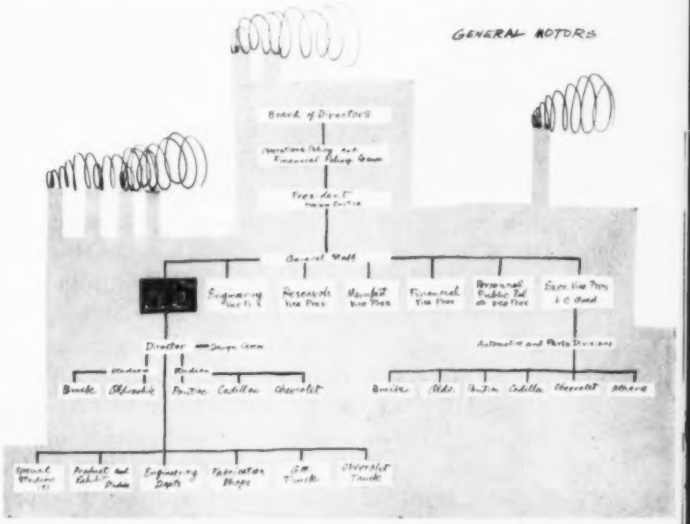
frequently apply to "Mr. Earl," as he is always known, is "master-strategist;" he has made many of his points and achieved many of his aims by his ability to handle people. His particular kind of strategy involves both diplomacy and determination, a combination which is, in fact, frequently called for in accomplishing his styling objectives over the dissent of engineers who are convinced "it can't be done." Like many strategists, Earl is responsive to and respectful of the strategy of others. Those who wish to get along with him rapidly learn that disagreement is infinitely less strategic than a constructive suggestion; and that a careless or illogical suggestion is usually worse than none at all.

The term master-strategist suggests something else about the way Earl works. His domain at GM consists of five auto studios and twelve special studios and shops; each has its own studio head reporting to the Director of Styling, William Mitchell, who functions rather like a vice president to the Vice President, Earl, who reports only to President Harlow Curtice. Earl's team at the moment totals about 850, of which about 150 are designers and creative technicians, another 100 clay modellers, 100 engineers and shop workers, and about 500 administrative help—one of the largest organizations of creative people working together in industry. Whether or not such an army is necessary to produce a line of cars is hard to say, but undoubtedly the presence of such an imposing body of skilled personnel has helped to establish styling as a solid and respectable branch of business activity. Harley Earl rules his business-within-a-business like an exemplary executive, multiplying his authority by delegating it. He seldom lifts a pencil. The studios in which the pencils *are* lifted are organized so efficiently to harness talent and channel authority that if you try to unearth one genius behind any GM design you have but one choice—the master-strategist.

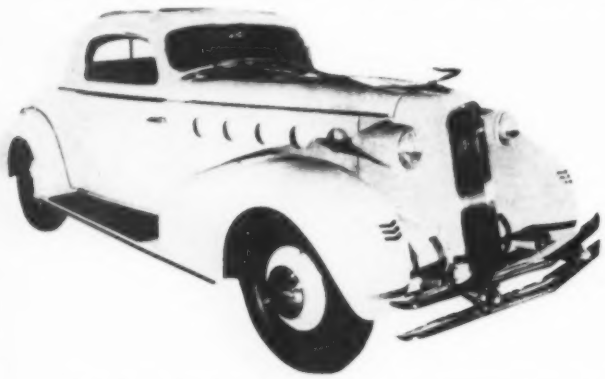
Earl's unique ability to channel the ideas of hundreds of minds into one product has been one of the major factors in the growth of the Styling Section at GM, and in the development of the character of the American car. The very use of the word "styling" is revealing —a word which is regarded as profanity by many designers because it connotes superficial beautification. One may certainly disagree with the tenets and results of styling, but one must not assume that there is anything casual about the way it is practiced in Detroit. Detroit's stylists, like any designers, have set certain definite objectives for themselves over the years; their pursuit has affected the automobile down to the core; their accomplishment has affected the products of all American industry, indirectly and otherwise.

Harley Earl's own life story is a kind of personalized synopsis of the history of automotive styling. When he started his career, there was no such thing as a Styling Section, and like most of the designers of his generation, he did not pretend to any interest in art. Before World War I he served an apprenticeship to his father, a Los Angeles carriage maker. Out of a boy's fascination for the upstart competitor, the automobile, he went on to study engineering at Stanford, and worked up a lively trade designing custom bodies on the side. There was no "design" of stock cars at the time. The car industry consisted of manufacturers and coachmakers; the former's concern was that a body be technically feasible, and the coachmakers were usually the "designers," charged with making a body to suit the manufacturer's engineering specifications. Usually the coachmaker's draftsmen were left to fill in the distinguishing details as they saw fit. Buyers who sought distinction in their cars frequently bought the chassis and ordered a special body, like a fine suit of clothes. As the coachmakers gradually converted to auto body production, they prized these carriage-trade jobs that allowed them to indulge their special fancies. Young Earl, who loved cars as a former carriage-maker could not be expected to, had his own rather emotional ideas about what a car should look like from the very start. One of his jobs in his father's plant involved checking the performance of some Earl-bodied racing cars. In the line of duty at the races, he whiled away time between rounds by sketching racers and trying out a few racy ideas of his own. This brush with the hot-rodders, though it was not allowed to express itself for many years, has flavored all of Harley Earl's designs.

After the war Earl developed a sizeable custom clientele of his own, including a number of Hollywood stars (Fatty Arbuckle was the first), some of whom he still proudly retains as personal friends. His reputation was soon nationwide; Alfred Sloan and Lawrence



Fisher were among his customers, and by a series of events that were not hard to anticipate, he was invited to Detroit in 1926 to work on the Cadillac line for Fisher Body, which had just become a division of General Motors. A year later Earl was put in charge of a department of one called the Art and Color studio —a name that accurately conveys the function that design was supposed to perform in those days. Earl was not designing complete cars—as he had been privileged to do back home—but a miscellany of interiors and details. The first car which reflected his hand was the long, boxy 1927 LaSalle, body by Fisher in the original sense. In the early '30's Earl went to Europe, and came home enamoured of the svelte, regal Hispano Suiza. As soon as he was given a chance to design a car from stem to stern, he translated this affection for fluid, sporty lines: it emerged as the 1934 LaSalle.



Not only was it a milestone in automotive character, with its smooth rounded shell, long hood and emphatically sculptured fenders, but its favorable acceptance helped him immensely in promoting design at GM. By 1938 Earl had made his point: Art and Color faded away, and the Styling Section sprang up in a central studio where it could serve all of the company's divisions. "There wasn't much to draw on except the natural sketchers," Earl recalls about his trials in building up the infant department. Yet by raiding the ranks of draftsmen, advertising artists, mechanics and born car-lovers, he managed to assemble a working staff. Styling had swollen to 300 people before World War II.

The Locked Door

One of the great innovations of the Styling Section was the establishment of an individual studio for each of the five automotive divisions: Chevrolet, Pontiac, Oldsmobile, Buick and Cadillac. This in turn was responsible for the establishment of one of the permanent rules of styling: absolute security. Until 1938, conditions in the Art and Color studio had been highly informal, with all renderings and models freely displayed in a central studio. The Locked Door that came in with the Styling Section had several objectives: to spur competition among designers working on basically competitive products; and to assure them independence from company interference, since some design groups worked up in Flint, right under the noses of their divisional clients. The Locked Door has continued to create that competition, and often to raise it to a high pitch among the studios. It has also put the man with the passkey, Harley Earl, in an extraordinarily powerful position of coordinator and sole *confidant*.

Mutual respect

One of the most influential friendships at GM was formed during the early days of the Styling Section. Harlow Curtice, the accountant of GM's AC Spark Plug Division who had risen to head the Buick Division in 1933, was—like all independent division heads—one of Earl's regular design clients. More than any member of the later management team, Curtice was exposed to Earl's thinking and influenced by his conviction that design was the secret of the car business. He also had ample opportunity to test these convictions on the balance sheet: Curtice is said to credit styling with an important part in Buick's comeback after a particularly dire sales record in the early '30's, and Earl was the designer of the "Buick you would like to drive."

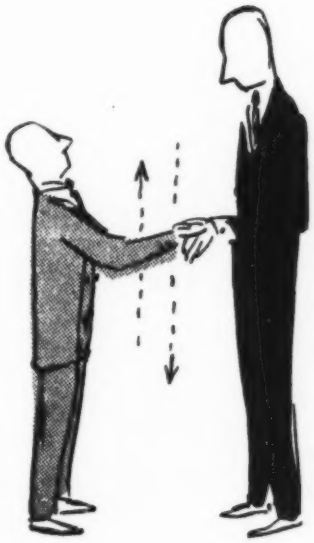
In 1948 Curtice became an executive Vice President of GM and, in 1953, followed Charles Wilson into the Presidency. Though at heart a man of figures, Curtice is keenly sensitized to design in his business, to its dollars and cents value—possibly even more. This is a credit to Earl's talent for translating designer's lingo into business-ese as easily as he converts design into hard cash; it is also a credit to Curtice's interest that he gives Earl plenty of headroom and anything he needs to do his job. Curtice himself is known to have a natural talent for picking winners—"The best shopper we ever had," Earl has called him—and would never miss the fun of participating in styling decisions. But he is fascinated not only by the fruits but by the labors of the Styling Section. Several times a week he makes unannounced visits to the studios, where he gets great pleasure out of quietly watching designers at work. His old stamping ground, the Buick studio, is still his favorite haunt.

It has been observed that the mutual respect of Earl and Curtice stands on a foundation of striking personal similarities: both have been uniquely successful in a tough and precipitous business; both are men's men, active rather than contemplative, who appear to enjoy nothing but fanatically hard work on problems of a scale that would overwhelm normal men—offset by the occasional sociality of a stag party or sporting event. Both are addicted to quick, assured decisions, and both are generally—and genuinely—regarded by their employees as geniuses in their fields. Fortunately for GM, their fields are naturally complementary.

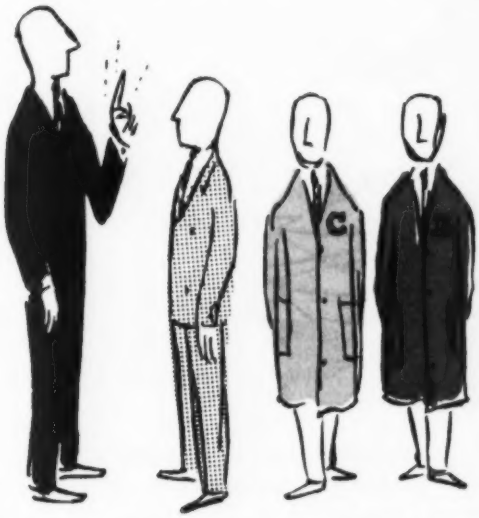
About his function at GM, Earl is unequivocable: "Design these days means taking a bigger step every year. Our big job is to hasten obsolescence. In 1934 the average car ownership span was 5 years; now it is 2 years. When it is 1 year, we will have a perfect score." Since 1927, there have been few obstacles in the road to this perfect score that Earl has not surmounted by salesmanship and performance. His handful of

How A Body Design Is Developed At General Motors

1. POLICY MEETING: The President of the Corporation, Harlow Curtice, and his top management committee decide there shall be a new body for the Chevrolet line in 195x. Present at the meeting is the General Manager of Chevrolet, and the Vice President in charge of Styling, Harley Earl.



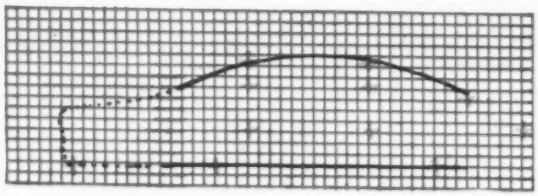
The President officially notifies Earl of the new assignment.

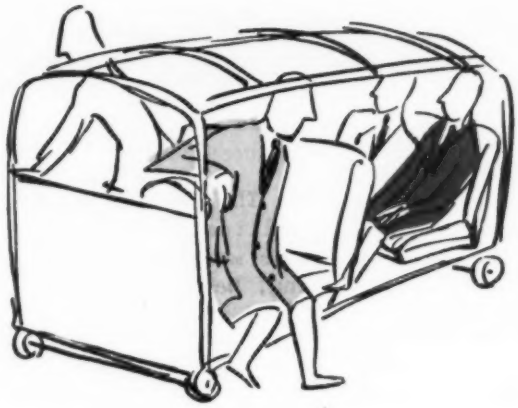


2. PRESENTATION OF THE PROBLEM: Vice President Earl calls a meeting with the Director of Styling, and heads of the Chevrolet studio (Studio C) and the Advanced Body studio, to discuss the objectives and character of the new line.

3. DIVISION ENGINEERS (Chevrolet and Fisher Body engineers) are contacted by the studio heads to obtain the latest data on new developments and technical limitations.

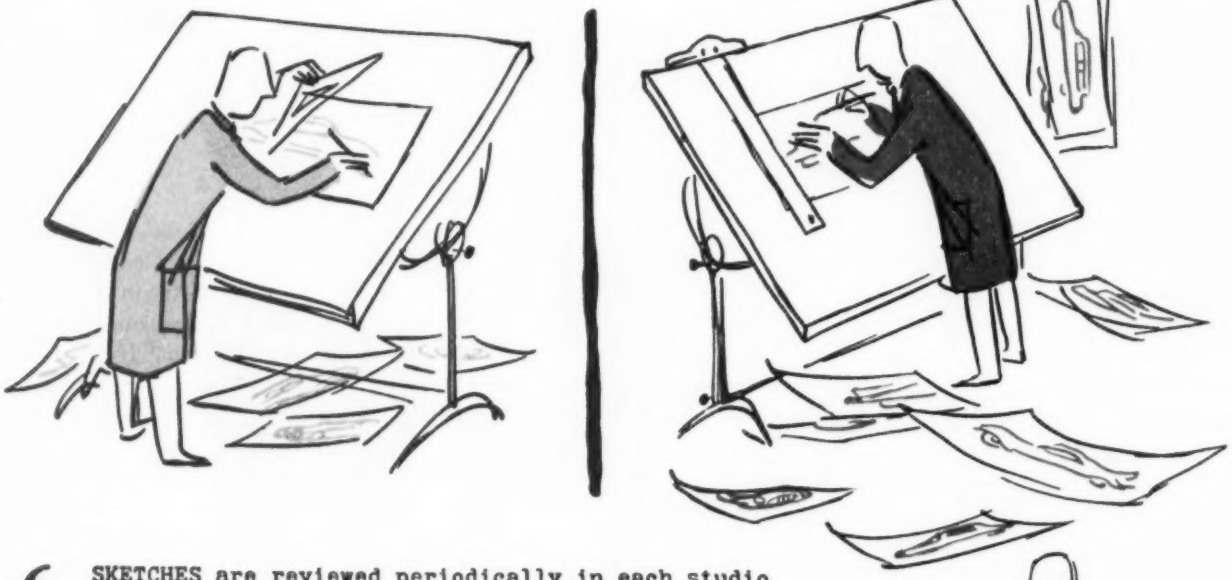
4. PRELIMINARY LAYOUT is compiled from all available engineering data, setting specific measurements for ground clearance, seating points, overhead clearance, cowl point, and overhang.



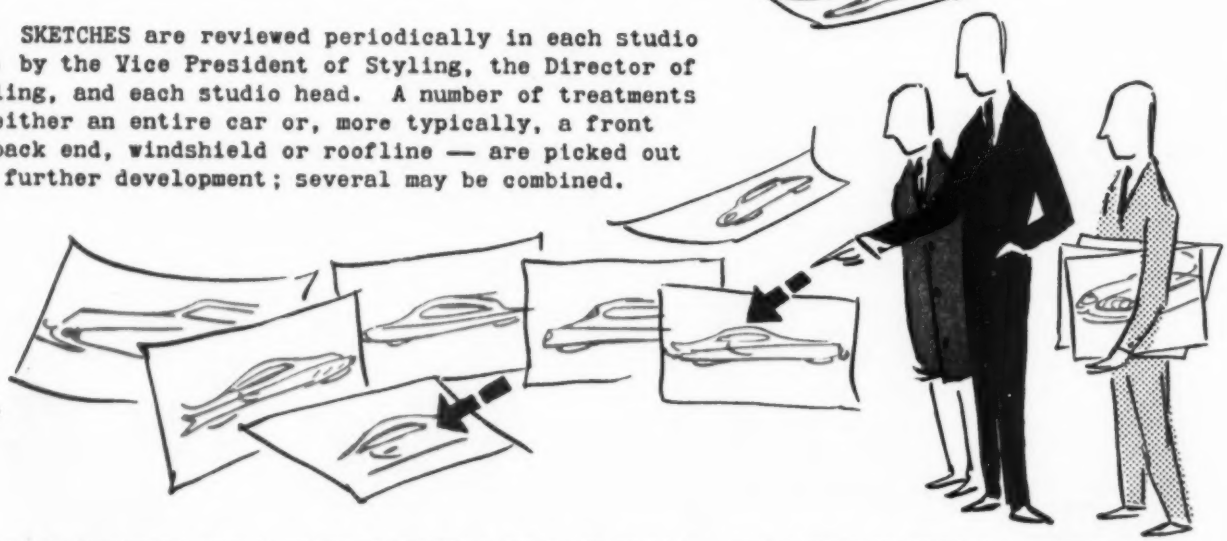


SEATING BUCK, or rough wooden mock-up, of the body section is constructed from these preliminary measurements. Designers and engineers test the measurements by climbing in and out of the buck.

5. SEARCH FOR DESIGN begins. Each studio, working independently with the preliminary layout, begins to develop sketch ideas that will lead to a new styling direction.

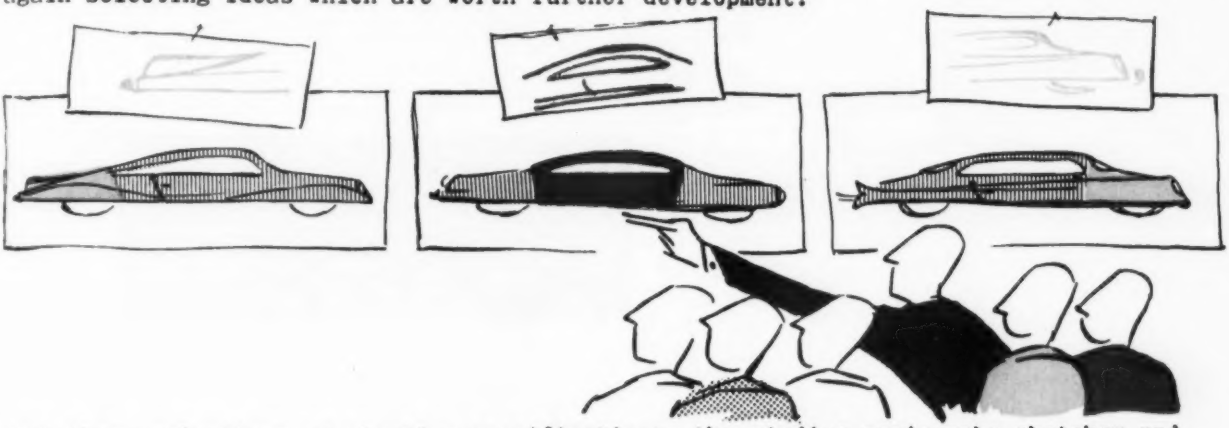


6. SKETCHES are reviewed periodically in each studio by the Vice President of Styling, the Director of Styling, and each studio head. A number of treatments — either an entire car or, more typically, a front or back end, windshield or roofline — are picked out for further development; several may be combined.

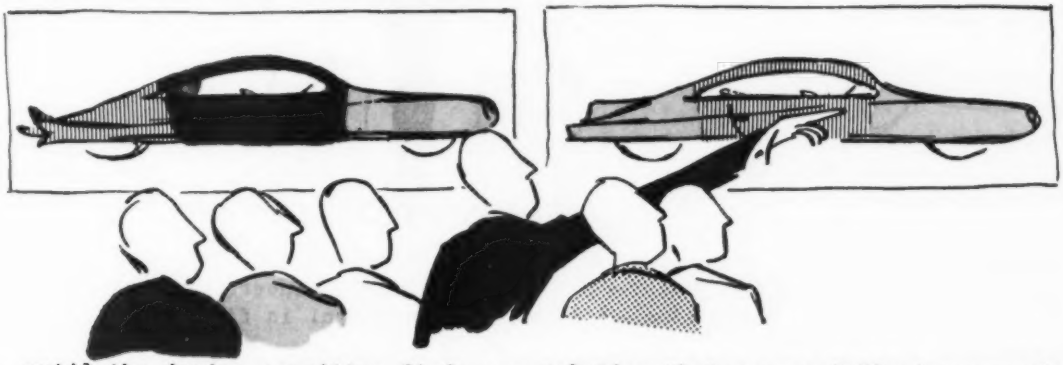


Selected features are developed further by Body studio, and often by Studio C, into . . .

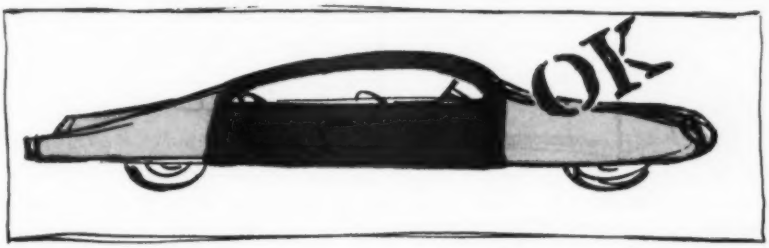
7. FULL SCALE PROPOSALS: These are reviewed by the Vice President Earl and his design committee. From these renderings they begin to isolate direction for the new line, again selecting ideas which are worth further development.



With these selections as starting specifications, the studios again make sketches and another set of full-scale renderings. Generally the Advanced Body Studio concentrates on the general theme, while Studio C develops ideas for characteristic detail. The melting-down process may be repeated 2, 3 or 4 times, as ideas from each presentation are tried in new combinations or in new ways . . .



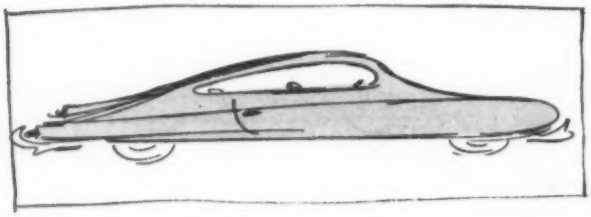
. . . until the design committee finds one solution that successfully incorporates the characteristic features it is seeking. When they all agree on one, they give it the ok.

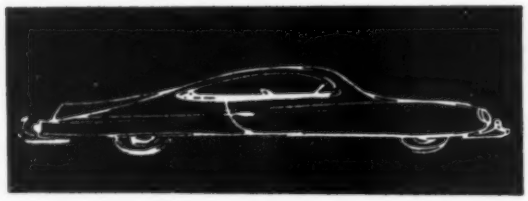


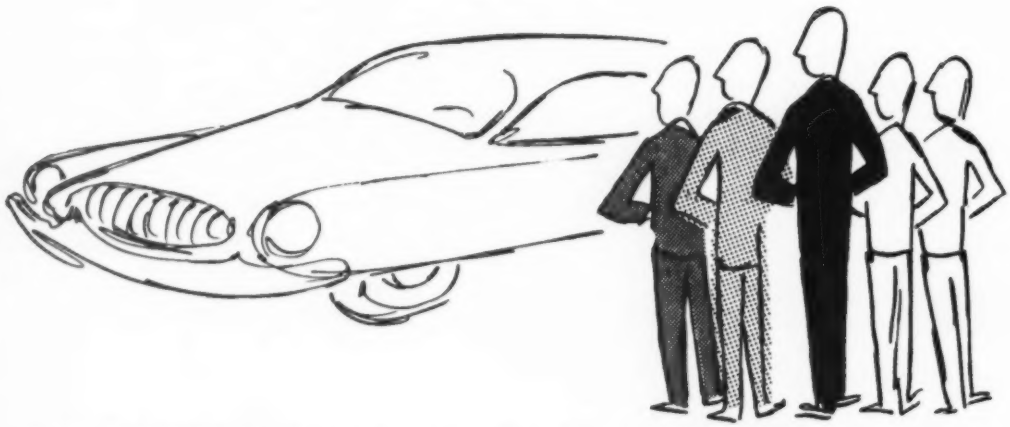
8. This is the KICK-OFF — the basic body concept on which the new Chevrolet line, and possibly other lines, will be based. With the kick-off as a starting point, Studio C designers take over and begin to rework the parts that will assure them of a distinctive product: front end, rear end, final roof line, backlight, and all details and trim.

After another round or two of sketches and full-sized renderings, the new Chevrolet proposal is ok'd by the design committee. It is time for 3-dimensional studies . . .

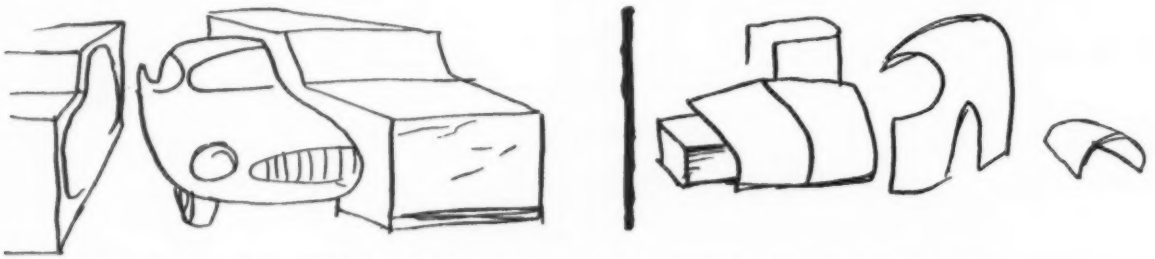
9. CLAY MODELS: Studio C begins to transform its ok'd rendering into full-scale clay model. Changes are made during modeling — frequently major ones — and all surfaces and lines are refined. An accurately measured blackboard drawing or body draft keeps pace with even the slightest change. From this templates are made, from which body dies will be produced.



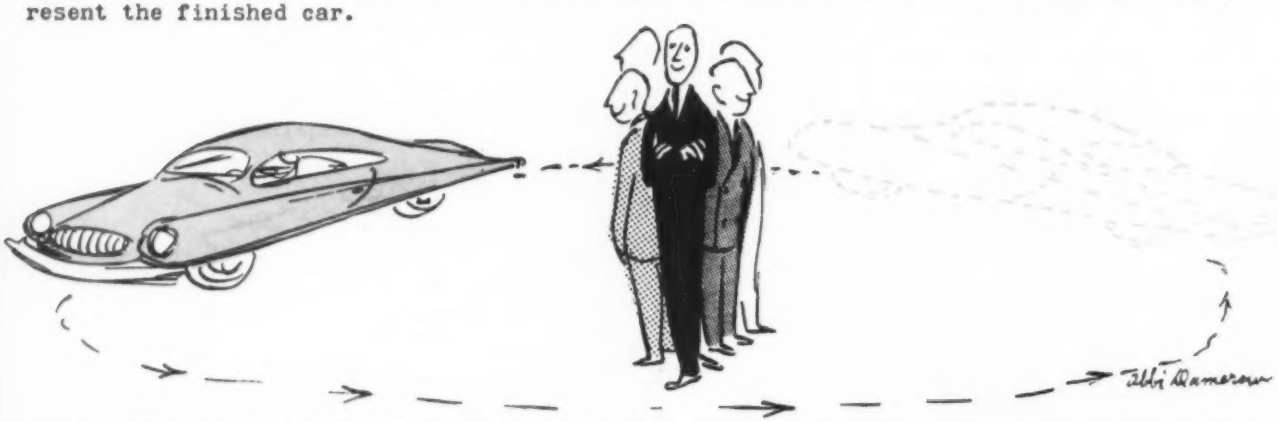




10. TOP MANAGEMENT is called in to view the finished clay model; the President, Manager and Sales Manager of the Division, and Fisher Body engineers are among those who give an ok. Changes may be suggested and made before approval is final.



11. PLASTER CASTS are made from the perfect clay model, and a final fiber glass model is made from the casts. This is trimmed and decorated to the last detail to represent the finished car.



12. Finished model is taken to the test test track to be viewed in motion in daylight. Only in natural light can highlights be accurately checked; if no problems show up, the Chevrolet is ready for production.

"sketchers" is now an enormous department in a vast new styling building at the GM Tech Center. Mr. Earl has left his oak-panelled office in the downtown Research Building to take up residence in a shiny glass promontory designed for him by Eero Saarinen, where he will reign over the colossus he created for another two years—until his scheduled retirement in 1957. At that point the answer to one question is anybody's guess: what will become of Mr. Earl's product?

How it works

To get several hundred people cooperating on as many products is no small trick; and the task of doing that has affected the organization of GM styling, and in turn the outcome of those products. All of the 17 studios are concerned with trucks, trains or autos, except for the Orientation studio for new styling employees, and the Products and Exhibits studio, which designs Frigidaire products and most of the GM exhibits and shows, and functions more or less like an independent product design office within the Section. It is mainly with the automotive styling studios that we will concern ourselves here.

GM is famous for its intensely competitive automotive divisions; the same spirit of autonomy marks the five studios which serve those divisions—which might as well be five independent design offices in a small town trying to outshine each other through their client's success. One reason, as we have mentioned, is the secrecy policy established by Earl 15 years ago. Another and possibly more important reason is a condition that is universal in the auto industry and the bane of the designers' creative existence: interchangeability. It is a well known but little advertised fact that almost all of the standard car lines are produced in pairs, because the economies of tooling require that certain body sections be used in two or more products, usually for three or more years. At the same time at GM, the five cars must all have a recognizable company character each year, yet must show a consistent, evolving individual character from year to year. Interchangeability presents a complex problem of coordination, and each company has its way of coping with it. GM has a corporate body program which tends to fan the fires of competition among the studios.

In essence, all GM cars originate in one of the special Body Studios, which function as design policymakers on the one hand, and as a general service to the auto studios on the other. To any GM designer a Body Studio assignment is a plum; its means a chance to work with complete body concepts—in experimental cars or development of new lines—as many of the more specialized designers are itching to do. Though the "body" proper consists only of the central trunk of the car, the development of a new body is begun as a problem in the development of an entire car concept. It becomes the basis of special front and rear treatments only later.

The way an Advanced Body studio collaborates with a car studio is shown on the facing insert. From the time the sketch "search" begins through the full-scale proposals and their many revisions and retrials, Earl functions as coordinator and critic, selecting ideas and treatments which gradually melt down into a design direction. When the kick-off is ok'd, the "body," which by this point is generally fairly well transformed into one specific car, is handled over to another studio, which immediately locks its doors and begin to design the remainder of their particular car—front and rear quarters, rear deck, hood, roofline, and all the brightwork and details—that create originality for its product. In these divisional studios the designer's job is more typical: it is to concentrate on the bumpers, grilles, tail lights and fender details that play such a critical part in asserting the character of each GM line.

The role of sales in this complex drama is interestingly informal. Sales, in the person of the Divisional Sales Manager, may be present at early meetings to render official opinions, if invited by the General Manager. But more often, the Sales Manager will pay only informal visits to the division studio as the new design progresses, as much to keep informed as to keep others informed of his opinions. At GM, Sales usually puts total confidence in any design direction that Styling selects, and pays attention to details only after the body program has been all but approved. It is the traditional role of Sales to demand "more chrome," and there are few exceptions among the GM Sales Managers. But the stylist's ability to anticipate this plea during rather than after the design of a car keeps Sales-modifications to a remarkable minimum.

Too many cooks?

It has often been asked of GM designers, why are so many hands needed in a creative operation? The answer is twofold: quantity, and the system. General Motors produces a complicated product, technically and esthetically. Styling must process 36 products for Chevrolet alone, and a total of over 200 automotive products when all of the variations are added up. Buick, for instance, produces four basic models, each significantly different, and each offered as a 2-door sedan, a hardtop coupe, a 4-door hardtop, as a convertible, and sometimes as a station wagon; and most of these models are offered with 6 or 8-cylinder engines. In producing all of the combinations and permutations demanded by the vast product line, no group of designers works longer hours than the GM stylists; they work against time, and frequently changes will be demanded overnight. If Earl, the design committee, management or a studio head thinks that a tail light is not right, the studio may have 24 hours in which to come up with a better one. They must make sure that a good one will turn up. Rather than risk leaving it to one designer to develop the perfect tail light for the given car, the studio heads prefer the security of having a chance to select from everyone's ideas. "After all," as one designer put it, "we design tail lights year after year. It's hard to have good ideas *every* time."

Who are they?

There is nothing haphazard about Earl's team of star players in the Styling Section. Despite heterogeneous and often unorthodox backgrounds, they represent approaches to automotive design so specific that they might be designated as generations; for in terms of experience and in terms of their aims, they describe the present and suggest the future of the General Motors style and Earl's plans for it.

The first generation, obviously, is represented by Earl himself—a descendant of the coachbuilding tradition to whom design is less a conscious act than an emotional reaction to the qualities of an object that he knows intimately. Earl's second-nature feelings about what an automobile should be ("Most of the grace of line and body in today's cars have come from nature and its creatures—nature always pleases the eye and that's what automobiles should do . . .") constitute his design sense, and the styling system he has established serves it well: it allows him to test his reactions against specific ideas until one strikes a responsive note.

The second generation is represented by the five auto studio heads: Ned Nickles of Buick, Art Ross of Oldsmobile, Paul Gillan of Pontiac, Clair MacKichan of Chevrolet, and Ed Glowacke of Cadillac. Their common qualification—and one never to be underestimated in Detroit—is a fanatic love of cars, a racer's mania for the spirit and power of a fast-moving vehicle. Some of them, like Ned Nickles, grew up as car-crazy kids in the local garage, assembling and disassembling cars to fit their notions of appearance. Others like MacKichan and Ross, found their way into the industry through related professions—engineering and advertising art respectively—and worked their way into styling on their enthusiasm for the product. Like their boss, none of them were students of design in any academic sense, nor would they necessarily acknowledge any kinship between design as they practice it on the product they love and design as it is taught in the schools today. Yet their kind of design is far from accidental, far from lacking in objectives or a regulating structure. On the contrary, it is based on some very stringent rules—the unwritten laws of car design that this generation has created over the years. It is this code which has produced what may be called a General Motors style—a style based on an incredible mastery of surface and line techniques.

Rules of the game

Styling at GM, as in all competing companies, revolves around the highlight—those lines of reflected light that occur adjacent to the major surface curves. The major highlights on today's cars fall just below the roofline and the "beltline" (or line below the windows) where the surface rolls off to a point that is tangent to a 45° angle. (The hood and deck replace the fender highlights when fenders are absent.) All cars in motion are "read" in profile, hence they are designed primarily for profile effect. This profile is technically established by the upper limits of the beltline and the upper structure, but it is read by the highlights when the car is in motion. Thus the highlight is all-important in defining a car's form, giving it length and direction, and providing inherent brilliance and decoration. It is designed as if it were a chrome accent and, by GM tenets, should be uninterrupted if possible. (The chrome spear on the '55 Ford that dips and crosses the fender line at an angle is viewed as a shocking violation of this rule.) If a line *must* cross a highlight, according to GM stylists, it should do so as close as possible to right angles, so that it becomes a statement that works *with* the curve; a non-perpendicular interruption tends to make a curve appear distorted. When the exigencies of commerce makes it necessary to create bothersome interruptions—chrome trim to outline color areas, for instance—everything will be done to preserve the highlight sweep up to and including styling gymnastics.

The chrome-trim on most 1955 GM cars has been rerouted by means of a dip or hump in the beltline, so that the chrome actually crosses very close to 90°.

The curves of the major metal surfaces involve another set of rules. Curves on GM cars work on an almost mathematical progression. The profile of the roofline, for example, rises very slightly for a given distance, then drops more sharply; a GM roofline would never turn as abruptly as the squarish-looking roof of the Ford Thunderbird, for instance. A similar ratio of curve to distance will apply to the slope of hood, although the rule will be compromised to some extent to give a more squarish line to accommodate the cooling system. Were GM to decide to introduce a low hood next year, it would probably bear little resemblance to the flat slope of the Porsche or Studebaker, but would fall off as closely as possible to the GM contour — developed over the years in order to assure a good clean curve on every form. The *idea* of a sloping hood might begin, as many GM cars do, as a fairly free and unruly experiment in form, but if the idea were retained, the slope would gradually be refined to conform to the GM style. These changes are often developed from the sweeps or templates which surface experts use to refine clay models. But the experienced designers need no templates—some of them can detect by eye an error in the curve of a roofline that is no greater than the thickness of a pencil line. Earl himself is respected for his uncanny sense of surface refinements, and his ability to foresee distortions and surface problems when design ideas are still in the discussion stage.

Aims of the rules

Rules usually have a reason, and if there is any question about the long-range objectives of the GM stylists who created the rules, it is quickly answered by a survey of their personal automobile preferences. Almost all of them drive sportscars as a matter of course.

MacKichan of Chevrolet drives his own design, the Corvette; Oldsmobile's Ross drives his show car, the Starfire. The head of Cadillac not only drives but races

Harley Earl and his experimental Firebird.

a Corvette, formerly an Austin-Healy. Ned Nickles drives a customized Buick, but is reported to have his eye on a Mercedes-Benz. Among the other members of the Styling Section, the MG-TC outsells all comers. The stylists currently drive (subject to change) 6 MG's, 3 Jaguars (XK-120), and 5 Corvettes, a Fiat, F-88 Oldsmobile, a Porsche, Volkswagen, Austin-Healy, Nash Metropolitan, and a Model T.

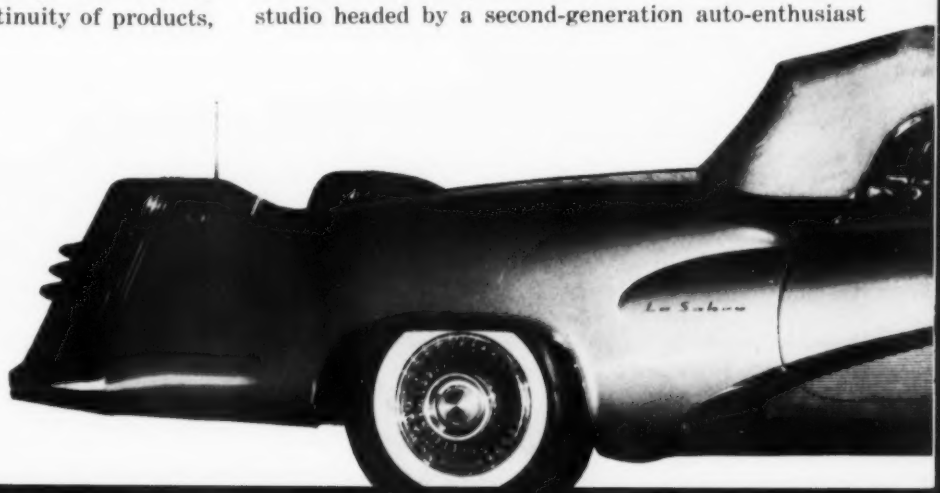
Makers of the Dream

If there is a conflict between what they drive and what they design, it is taken care of by other means. Personal objectives, as Detroit designers know, are not easy to achieve in a complex business scheme, and like other groups of normally goal-oriented human beings they have learned to vent their frustration through the customary channel: fantasy. The Dream as a design phenomenon and later a commercial commodity is another of Earl's products. He began to sketch "advanced models" in the late '30's, not only as experiments but undoubtedly as an expression of his personal objectives —the faster, racier cars he would prefer to be designing. These objectives have been singularly direct and undeviating over the past 30 years; to make a longer, lower car because "my sense of proportion tells me that oblongs are more attractive than squares." Articulate doodling of the sort Earl indulged in is second nature with all car designers—and many of them doodled their way into jobs in the early years. But Earl has elevated it to an equivalent of creativity as well. Doodling has become the Dream; the Dream equates the future to radical change, and by implication equates radical change to improvement. Much as they would prefer to be designing something sportier than a 6-passenger family car, the stylists know that change will never be too radical—it would upset the continuity of products, alienate old friends, and cost too much to boot. The change they *can* control is a formalistic one — a difference of expression within a very established concept of what an automobile should be, and has been since it began. Thus the flights of fantasy they indulge in have a very low ceiling. They rarely get as high as exploring new concepts of transportation. The stylists feel they have no choice but to pursue the pantom of a form they love — the sports car, or a reasonably practical facsimile thereof.

In this pursuit, they have proven to their own satisfaction that form can be an adequate substitute for function in the mind of the public. During his 30-year war to compress the automobile into a low, wide oblong, 6'4" Earl has not needed Customer Research to make him aware of physical discomforts. Neither has he been unaware of potential psychological advantages, and the problem of weighing out the buyer's requirements against the buyer's desires is no small part of designing an automobile. To help them in the job, GM stylists have the services of an extensive Customer Research department, but as they know too well, the consumer cannot be honest with a researcher until he is honest with himself. CR helps to pinpoint the buyer's gripes and suggestions, but the Dream Car serves a larger purpose by invading his motives. When Earl thought up the idea of personifying the dream in full flesh at the yearly Motorama, he described it as a kind of research into public reactions: give the public a taste of what the future could bring if they demanded it, and if they demand it, give it to them. But in point of fact, the Motorama Dream Cars are designed long after the production models for the next year or two have been planned and approved, so they often reflect the designs they are supposed to forecast. The Dream Car has proved to be less of an experiment in consumer taste than a tool in consumer conditioning: convince the consumer that the future lies in the direction the designer would prefer to be travelling, and before long he'll be travelling in that direction too. There is little doubt that for the makers of the dream, the Dream Car is a motivating force for both the public and the automobile. But more important than as a source of inspiration or details, it is the source of the stylists' fun.

The third generation

In spite of his natural allegiance to the man who got his job merely by uttering those three little words—"I love cars"—Earl has never failed to keep his eye on changing professional patterns. The "freshman" designers who come "well prepared by the design schools," according to Earl, have been fed into all of the studios during the past decade, and today nearly every studio headed by a second-generation auto-enthusiast



is seconded by one or more new-school designers, in whose training the automobile has been no more exalted than any other product design problem. The main source of supply for these designers are Pratt Institute, in Brooklyn, and the Art Center School in Los Angeles. Though the latter specializes more heavily in preparing an automobile designer, the former has exerted the greatest influence on General Motors. Pratt's ascendance at GM is primarily due to school's late director, Alexander Kostellow, whose idea for an industry-sponsored experimental design laboratory grew out of a scholarship program that Earl had instigated after the war, for students to study at Pratt before joining GM. Through the laboratory, GM personnel were sent to work with Pratt students on problems, and possibly to get a little insight into a designer's training too.

Kostellow's students, scholarship and otherwise, had no difficulty finding jobs at GM; but after a broad design training they often had difficulty sticking to specialized jobs designing headlights or fenders. Concerned about the turnover and the problems of exploiting their creative talent properly, GM invited Kostellow to become an advisor on orientation in 1951, and to make first-hand reports on their handling of all styling employees. Today, about 40 of them are Pratt graduates.

Crossroads

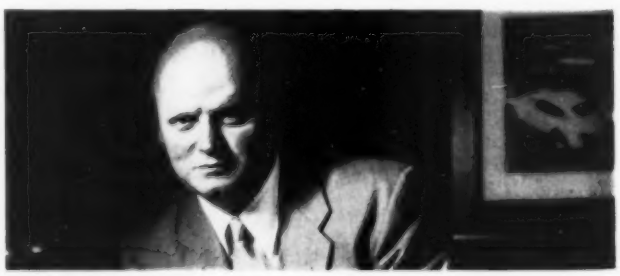
Between the two schools of thought stands an enigmatic figure in the Styling Section: Bill Mitchell. A protégé of Earl, Mitchell was hired in 1935 at the age of 23, on the basis of some sketches he happened to mail in; within six months he had become head of the Cadillac studio. Like his contemporaries, he had been raised in an aura of auto-reverence, and at a young age Mitchell had fallen in love with the classics of the time: "The Mercedes, Duesenberg, and Stutz—those cars had a kind of romance, a kind of individuality; each one was a live animal. We might be able to get some of that back into our mass-produced cars." With no hope of pursuing his infatuation professionally, Mitchell went to Carnegie Tech to study art, where he studied briefly under Alexander Kostellow in what was then a pre-Design School art department; after finishing touches at the Art Students League, he found his way into advertising, before his aimless but lucky stab at GM. Mitchell followed Earl's footsteps into the Cadillac studio and soon distinguished himself by designing the famous classic Cadillac 60 Special of 1938.

Just before the end of the war, Earl decided to launch an independent design office for non-automotive design outside of GM (page 78), and as it gained momentum a few years later he asked Mitchell to head up the office which was staffed with a number of Pratt graduates. In his year with Harley Earl, Inc., Mitchell was greatly impressed with the methods and imaginations of students trained in product design under Kostellow. He renewed acquaintance with his former teacher a year later, on his return to GM as Director of Styling, and helped Earl persuade Kostellow to direct a group in LeRoy Kiefer's Products and Exhibits studio in designing a "Kitchen of Tomorrow" for the 1954 Motorama. When Kostellow's unexpected death interrupted work on the 1955 Kitchen, it was taken over by David Wheeler, one of Kostellow's former students who was working on the project. Many other Pratt graduates have been given similarly large doses of responsibility, often on Mitchell's recommendation. Herbert Kadau heads an advanced body studio; George Pollard is in charge of the forthcoming Kitchen, assisted by Russ Dunbar; Don Hoag and Roger Crispell are assistant studio heads, in the Oldsmobile and Interior studios respectively.

End of an era?

Bill Mitchell, protégé of the master, member by experience of the second generation but respectful of the third, may know the answer to one question: what does the future hold for GM Styling, and the GM style? There is no question about one point: both will continue to aim at selling more and more General Motors products. But design policy has many facets. No one at GM seems gravely concerned that a different style, created with equal conviction and propagated by the force of numbers that backs all GM products, might not sell as well. The answer to the question of that style resides with the Styling Section, and the answer to the Styling Section's future resides with Harley Earl. When and if he completely bows out of the profession he created, it may mark the end of an epoch and a change in his product. But with customary foresight and indefatigable energy, Harley Earl is already trying to see to it that a new era is launched before an old one is finally closed.

Typical studio in the new GM Styling Building



William Mitchell

Competitive producers shift into high gear with new styling patterns

If Harley Earl is the most visible figure on the American styling scene, and the most overwhelmingly influential, he is by no means a lonely figure of a designer in the alien territory of top management. In the last few years designers in two automotive companies have joined his once-exclusive rank of Vice President; two others have been appointed Director of Design (or Styling) under the Engineering Vice President. And as the styling race has become more heated, each of the four competitors in town have souped up their styling departments with new power and prestige. In their methods of discharging this new-found power to compete against Harley Earl, Earl remains a point of reference — or a standard for deviation.

Chrysler dares to deviate

Chrysler, where progressive engineers and draftsmen from custom body shops formed the nucleus of the body design operation in the early '20's, nonetheless claims a curious priority in the history of styling: it sponsored the first "dream cars" in the first "advanced styling studio." In the mid-twenties, Chrysler took an experimental step in hiring a group of "artists" to abet the body engineers. These men, more properly called commercial illustrators, set up their easels in a remote corner of the Engineering Division, and proceeded to amuse themselves. Since no one knew quite what to do with them, the draftsmen continued to design the models while the artists dallied with beautiful sketches of expensive cars in sylvan settings nicely appointed with bathing beauties. The sketches were admired, and filed away in the department graveyard, and this aimless productivity might have continued indefinitely, had not management resurrected some of the sketches and showed them to the Board of Directors one day in 1928. The Board was more than mildly impressed by the favorable comparison between their forgotten schemes and the competitors' current models, and decided it might make better use of its artists. Plymouth and Dodge were just being introduced; the artists were instructed to abandon their upper-class fantasies and settle down to a car for middle-income drivers; they were even briefed with production information and sent back to their easels. Before long the easels became drafting boards, and the artists' colony was absorbed into the workings of the Engineering Division. By 1937 about 100 of the 850-man Division were stylists and draftsmen; two years later there were 150 of them.

In 1948, a year after Chrysler had established independent studios for its four auto divisions, Engineering Vice President James Zeder hired Virgil Exner to head an Advanced Styling Studio. A former GM designer who had later worked with Loewy on the first post-war Studebaker, Exner was given a padlocked studio and an assignment not unlike the original artists a quarter-century earlier: come up with ideas. But there was more purpose to this repeat performance. Within a year Exner produced the celebrated line of "idea cars" that publicly proclaimed a new Chrysler styling strategy that has been on the march ever since.

Exner's next assignment was to head up the important 1955 program for DeSoto and Chrysler, which was well underway when the Plymouth-Dodge crash program for '55 was begun. (see page 100). Almost simultaneously with management's decision to produce an entirely new line in double-time, Exner was appointed Chrysler's first Director of Styling. The chart overleaf outlines the relationship of Exner's studios to the Vice President of Engineering. There are now eight studios (a suburban or stationwagon studio in addition to those indicated), a subdivision that is particularly radical for Chrysler, which was until recently a highly centralized organization.

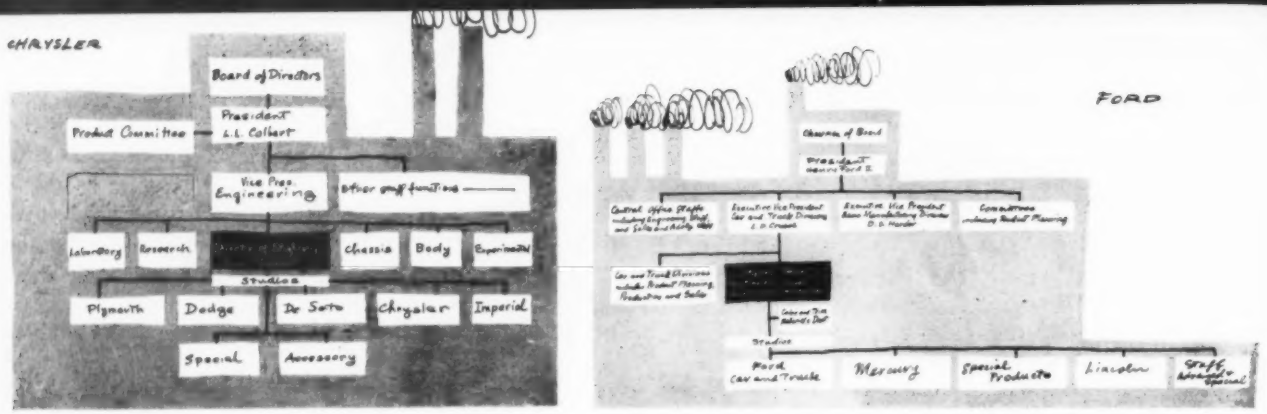
In spite of the studios' autonomy and the natural desire of each to excel, the Styling Section generates a spirit of unification. This is attributable both to the make-up of the entire corporation, and to the working methods of its Director of Styling. Organizationally speaking, the way Exner functions is not radically different from that of the superior officer at GM or in any of the other styling sections. But in practice, his is a more personal procedure that permits what Exner believes is the essence of design: one man's controlling basic proportions, silhouettes, and highlights in order to achieve continuity not only *among* the products but *within* each product. He supplies the ideas and direction before, rather than after, the designing actually begins; his designers are instructed not to improvise in search of an idea, but to pursue a pre-selected objective. The Director's role in this case is that of chief architect of a

Who stands where in the sales race

Companies	Jan.-Sept. 1954 (Registrations)	Jan.-Sept. 1955 (Production)	1954 Total
Chrysler Corp.	459,039	961,691	714,347
Ford Motor Co.	1,247,665	1,506,168	1,706,617
General Motors	2,096,206	2,898,763	2,806,589
Studebaker-Packard	74,897	137,579	134,310
American Motors	68,441	124,002	118,553
Kaiser Motors	14,814	6,679	27,014

Sales Leaders	Jan.-Sept. 1954 (Registrations)	Jan.-Sept. 1955 (Production)	1954 Total
Chevrolet	1,053,781	1,317,983	1,417,453
Ford	1,024,600	1,186,791	1,400,440
Buick	390,472	578,266	513,497
Plymouth	260,569	535,084	381,078
Oldsmobile	310,943	463,305	407,150
Pontiac	253,964	425,421	358,161
Mercury	194,873	294,432	269,926
Dodge	85,754	211,689	154,789
Chrysler	66,821	124,576	101,741

Source: Automotive News



The Styling Section

sizable community of buildings, who must lay out the plan and establish the general character of each building, and coordinate the lieutenants who execute the individual structures. It is the greatest departure from the GM system, the closest thing to one-man design in a major Detroit industry.

Ford lets out a war cry

The recent reorganization of design at Ford is a delayed reaction in the chain of explosions that began when Henry Ford II took over in 1945. The innovations in Styling, like everything else that has happened to the company in the past ten years, involve not only changes of personnel but changes of company structure: an autonomous Styling Section was established in May, with George Walker as Vice President and Director of Styling; five product line studios were formally set up, and styling responsibilities formerly held by the Engineering Division were transferred to L. D. Crusoe, executive Vice President of the Car and Truck Division.

Styling is new to Ford only in its prominence as an independent function. It has been creeping into the company consciousness quietly and slowly, but persistently, since the early '30's; the lack of acclaim may perhaps have been due to the founder's general disinterest in anything that didn't contribute specifically to a better-running, cheaper or more practical everyman's car. It was Edsel Ford, patron of the arts and lover of beautiful cars, who recognized the company's responsibility to make a good-looking as well as a well-running car for the people, and at his instigation E. F. Gregorie was hired in 1931 as the first designer in Engineering. By World War II, there were some 50 stylists and draftsmen; they worked as a corporate group, but immediately after the war individual studios began to emerge. At that time Ford first retained styling consultant George Walker, an independent Detroit designer. Walker was active in the design of the 1949, 1952 and 1955, working closely with the chief stylist in the Engineering Division. When management decided this year to establish Styling as an autonomous department, they invited George Walker to head it up; he turned over his private practice to one of his associates (see page 74) and became Ford's first styling Vice President.

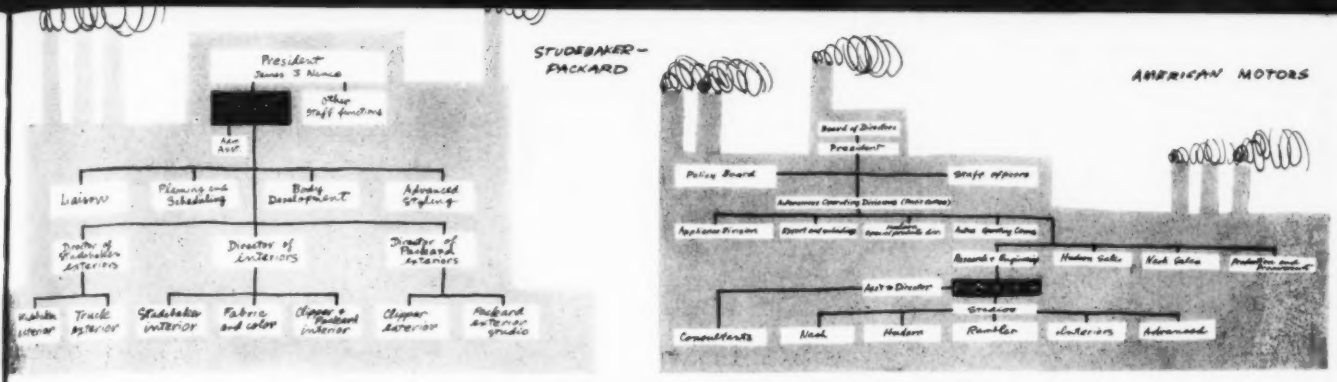
As Walker has organized it, the operation of the 800-man Styling Section is not markedly different from the GM system, with the major exception that each studio has its own advance styling group that works under the general supervision of a central advanced styling, which coordinates all future plans and works about 3 years ahead.

In following this proven Styling Section pattern with new gusto and determination, Ford has accepted the challenge that General Motors has set in terms of its styling organization as well as in terms of its styled product; and Ford has decided to meet that challenge with the same battle cry that has been raised throughout the company since Henry Ford II began his postwar offensive: Do it the way GM does it, then try to do it better.

New timetable for Studebaker-Packard

The small automotive companies, which have gradually been dwindling in numbers and growing in size, have traditionally had three areas of innovation in which to compete with their giant brothers: styling, engineering, and specialized products. Engineering has often been the elected area, because it involved the least economic gamble on the largest potential market. Studebaker has been the one independent, since the end of the war, that banked heavily on the competitive advantages of styling. Before the war Packard was another, having established its reputation in the quality car field in the mid-twenties through the talents of Werner Gubitz,

Ford's chief stylists: *Robert Maguire, Ford car and truck* *Roy Brown, Special Products* *George Walker, Director* *Eugene Bordinat, Mercury* *John Najaar, Lincoln* *Alex Tremulis, Staff advanced*



who directed Packard design until his retirement in 1942. When Packard and Studebaker merged last year, President James J. Nance was prepared to develop the styling momentum of the two companies even further as a competitive weapon. In April of this year, he announced the formation of a new Styling Section with its own Vice President — the first of the independents to put styling on a par with top staff functions. To fill the new executive position, Nance Selected William Schmidt, formerly chief Lincoln stylist and designer of the Lincoln "Futura."

Since May, Schmidt has established a department of some 100 studio heads and stylists to design Studebaker, Packard and Clipper automobiles, and Studebaker trucks. As the diagram shows, it is one of the most detailed and meticulously organized of the Detroit departments; its function is less to spur competition than to coordinate differences in the lines. The new body programs at S-P, which will not be fully visible until next year, occur in two phases: formulation of the "package" for the entire line, by Schmidt and the three directors under him, for presentation of basic proposals to management; and then execution of the ideas by individual studios in practical terms.

Body Development is directly concerned with developing maximum interchangeability and preserving common dimensions in the three lines; Schmidt not only initiates the basic concepts, but acts as a protector of the individuality of the car lines; weekly meetings of the studio leaders play an important part in this coordination.

Schmidt's major innovation is an Advanced Styling Department, which will work exclusively on developing a ten-year plan for Studebaker-Packard Products. It will be the job of this studio to act as a research department as well, keeping other studios informed of new materials and engineering advances and plotting future steps and objectives in such detail that it will act as a time-table for all S-P styling.

American Motors joins the race

At American Motors, styling received its biggest boost just four months ago: chief Nash designer Edmund Anderson was appointed Director of Styling, and a new department set up under the Vice President of Engineering. Anderson, formerly chief designer of GM's Chevrolet studio, before joining Nash in 1950, is in the process of setting up a studio system along GM lines: there will be five studios, each with its own studio head, and one advanced studio that will function as a planning and coordinating body. The major difference in the AM and GM systems — a significant one — will be one of size. The studios will be small, (five to ten men total in each) and Anderson will work closely with all of them, as well as with the advanced studio.

The reason for subordinating styling to engineering at AM is clear: Former president George Mason pioneered the idea of smaller, lighter means of transportation, and from the 1941 Nash "600" to the NXI experimental 2-seater that led to the Metropolitan, engineering has played a large part in achieving this basic transportation. Unitized construction has been Nash's answer to economy and lightness (see page 71); and it has also become the company's unique design problem, as is the problem of designing a small car.

The orientation toward solving a unique and specific transportation problem has at least helped free AM from some of the industry's design conventions: the merging of headlights and grille on the '55 models, for instance, would probably never have been ventured by the Big Three.

Before the appointment of a resident design department, consultants George Walker, (before the war), Pinin Farina and William Flajole provided design counsel to the engineers. The change of emphasis, begun after the war when George Mason decided to retain Farina, was crystalized this year by his successor, George Romney. Romney takes an active part in styling decisions in a unique fashion. An advocate of multiple judgement, he tries out the designers' proposals on employees as well as management and listens to their opinions. The characteristic fender "skirts" on the front wheels of AM cars, long a stylists' bugaboo, were finally removed this year when the stylists convinced Romney that the cars would work and look better without them. There are signs that designers at AM, last to join the styling race, will get similar backing from the president on all of their decisions from now on.

Anderson

Styling and engineering were the parents of the automobile; their relationship has been intricate, and their influence on their offspring has been gradually changing. The story of body construction shows how and why the "horseless carriage" became the "automobile" as it is known today.

Some major steps in automobile evolution →

Auto-biography

The history of automobile construction is the history of styling as well as engineering — a turbulent history that focuses attention on an interesting situation in the industry: the relation between stylists and engineers, their respective influences on the most significant offspring of American production, and the amount of dependence the industry puts on each as sales bait.

As soon as it had convinced the world that the automobile was here to stay, the automotive industry gained its momentum from offering progress. Each of the first twenty-five years saw a better motor, a stronger body, a safer tire, or more protection from the elements. It was not hard to find something new each year, and each change of style was directly related to a practical advance. By 1925, most of the engineering advantages we enjoy today had been developed, and were to some extent incorporated. Engineering still had plenty to do, of course; its immediate objectives were refinements in comfort, speed and reliability, but with a growing mass market and the need for a broader sales approach, the idea of applying "art" to engineering first came up. It was only with the introduction of styling that the objective was to instill a clear-cut expression into the automobile. (Although it is thought by many that the early unself-consciously created vehicles were the most beautiful ever made, their significant form is not that of an automobile as much as that of a modified carriage.) Ostensibly, that objective was to "streamline" the automobile. The term must not be taken literally; it was an aim for visual expression and was based on aerodynamics only briefly. What started as a "style" has long since grown into a more general styling objective of building in the impression of speed through a variety of forms. It demanded an integrated body shell, complex curves, a lower car — and got it.

When styling began to form the automobile in its own image, engineering found a new master — frequently a very arbitrary one. The purpose of engineering was to solve the problems — sometimes very complex — that styling created for it, as much as to come forth with developments that would open new doors to styling. Styling, rather than accept the technical limitations, began to demand things on the one hand, and yet was curiously blind to other possibilities that did not fit its immediate aims.

To follow the evolution of the automobile and the interrelation of styling and engineering, the major units should be treated separately. The basic parts of the automobile which have seen radical changes in engineering and styling are the frame and chassis, the body, and the powerplant.

The frame and chassis There were two completely separate basic operations involved in making early automobiles. The frame and chassis were built first and the body was added by a coachmaker. Early frames were made of wood, wood reinforced with metal inserts, tubular steel, or rolled steel. Springs were stiff and a flexing chassis was thought to be helpful in giving riding comfort. Virtually all early automobiles had open bodies.

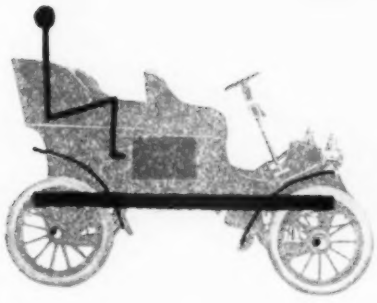
Two major developments affected the requirements of automobile frames — flexible engine mountings and the closed body, especially when the steel roof was added. For many years the engine and gear box were rigidly mounted to the frame. This added strength to the structure, but vibration was hard on the operating machinery. Flexible engine mountings relieved many engine problems, but created others. By removing the rigid support previously afforded by the engine, the front end of the frame had little torsional rigidity and cars developed wheeltramp or shimmy. Frames were reinforced as much as weight limitations would allow. The result was a frame with two side members, cross members at points of stress concentration, and sometimes an X-member. Essentially frames are the same today. They vary somewhat with the size of the automobile and the general design of the chassis, but they fall into two main categories — the X-member type and the box-section type. The box-section frame, increasingly popular since the introduction of full-width bodies, permits the stylist more freedom in lowering the car. However, an X-member is invariably added for convertibles to make up for the lack of rigidity of an open body.

One of the most significant engineering developments in the chassis, and one which had a far-reaching styling impact, was the hypoid gear. As engine speeds increased, it became necessary to lower the automobile's center of gravity, but the drive shaft was in the way. Some manufacturers introduced a tunnel in the floor for the shaft, but it was not until the hypoid or "hyperboloid of revolution" gear was perfected that a really satisfactory solution was found. With hypoid gears, which were introduced by Packard in 1926, the pinion axis can be above or below the gear axis. In automobiles, it is naturally put below.

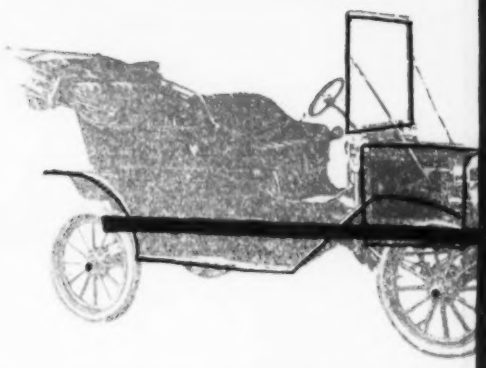
There are other ways to lower automobiles. Floor panels can be recessed below the level of the frame, but this increases the problem of the drive-shaft and transmission hump. To help counteract this, some manufacturers have rotated the transmission. In 1932, the Ford had 18 inches clearance from the underbody to the road. By comparison, the 1954 Oldsmobile hugs the road with 8½ inches clearance, and the 1956 Lincoln Continental stands about 7.2 inches.

Another major step toward lower automobiles was smaller wheels. Large wheels were important on early automobiles

1893 — Duryea Motor Wagon. *The first American gasoline-engine motor vehicle, designed and built by J. Frank Duryea and Charles E. Duryea. The single-cylinder engine is under the seat. It is steered with a tiller — a veritable horseless carriage.*



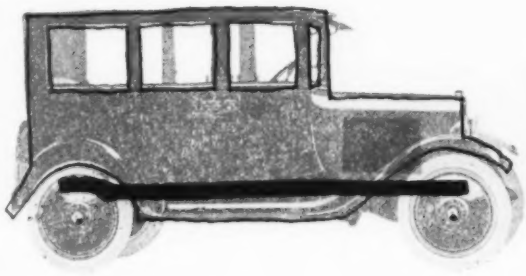
1903 — Model A. Ford. *The engine is still under the seat, but a steering wheel (on the right side) replaces the tiller. The carriage-type body has no windshield and the rectangular frame is well above the wheel axles on leaf springs. It has a wheelbase of 72 inches, and wheel diameter of 31 inches.*



1908 — Model T. Ford. *The engine has been moved fo is mounted rigidly on the frame under the hood. V large and the frame is high. A windshield has been the steering wheel moved to the left side for the firs wheelbase is 84 inches, and wheel diameter 32 inches.*

1912 — Oakland and Hupmobile *offer all-steel open veloped by Edward Gowan Budd.*

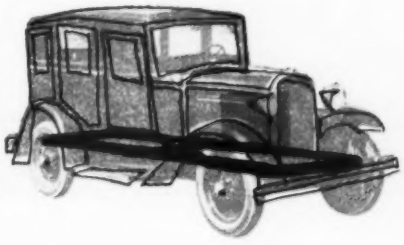
1913 — Ford *introduces the first moving chasis assembl*



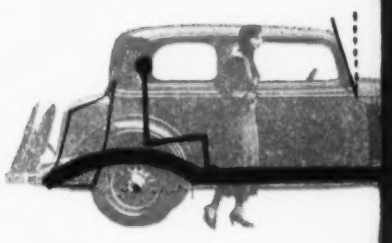
1923 — Dodge. *The first all-steel closed body gives the whole automobile much more rigidity. This advancement in body construction led to more rounded body curves and new forms for the fenders. The large wheels still extend beyond the front end, and the form of the whole automobile is still that of a box balanced directly over the wheels.*

1926 — Packard *offers the first hypoid gears which make possible lower bodies with less drive-shaft and transmission hump in the floor.*

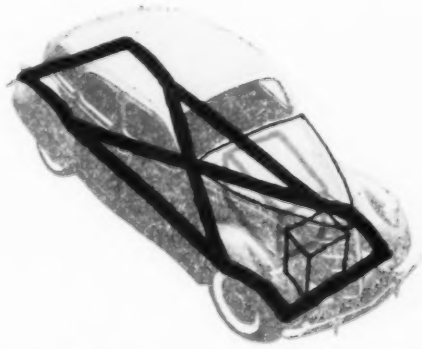
1931 — Lincoln Zephyr *introduces first "alligator" hood.*



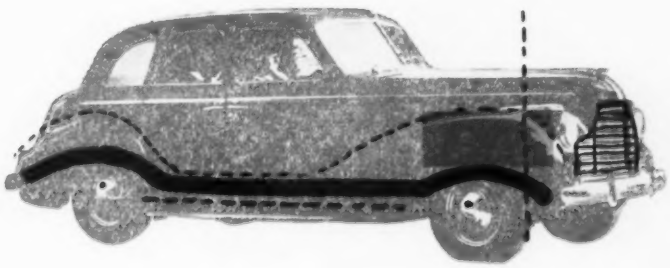
1932 — Ford V-8. *The first mass-produced V-8 engines. Front and rear bumpers are standard equipment and the fenders begin to surround the wheels, which are wire and smaller than previously (28½ inches). This Ford stands 18 inches above the ground, with 68¼ inches overall height. Some 20 major steel pressings make up the body. Its wheelbase is 106 inches.*



1933 — Buick. *The first built-in trunk makes the yond the back wheels. The front end remains bel The windshield is slanted slightly and the fenders A definite frame kick-up over the rear wheels — on most models by this time — lowered the car, g body lines. The wheelbase on this model is 127 in*



1937 — Lincoln Zephyr. *This model is distinguished by a low radiator with horizontal "cat walk cooling," though grille remains vertical. The alligator hood, integral headlights, narrow running boards, and fenders melting into the body are indications of what is to come. The windshield is one-piece. The frame is integrated with the body, making a modified arch truss-type all-steel welded structure.*



1940 — Buick. *The grille is horizontal to express cat walk cooling, and the windshield is V-type. Running boards have disappeared and the increased front overhang which balances the trunk hump is very noticeable. The rear end shows the beginning of the "notchback" style. Front fenders, now made in one piece with part of the engine side, are very similar to the 1934 La Salle, but rear fenders blend more into the body.*

1942 — Buick *introduces front-to-rear fenders, continuous with the side of the body.*

1947 — *about half quarter pa are made pressed fr inch diame*

ved forward and od. Wheels are been added and first time. The nches.
open bodies. De-

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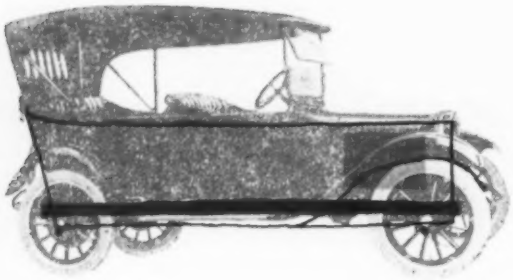
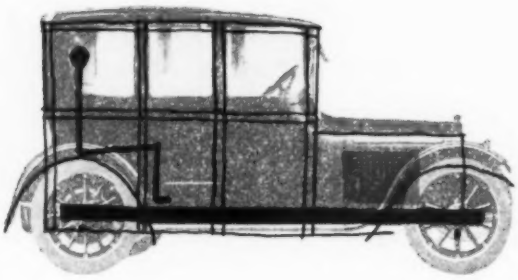
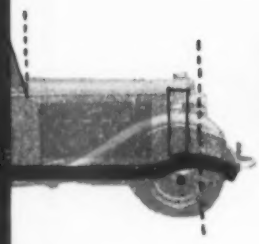


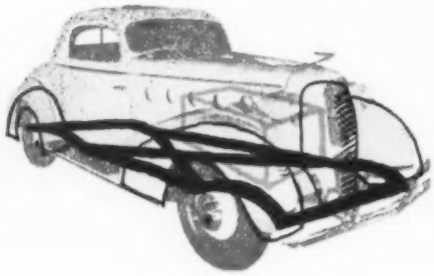
1914 — Dodge. *First mass-produced all-steel open body. The top is fabric and the windshield split. The frame is still above the axles and the engine mounted rigidly to the frame.*
1914 — Pierce-Arrow *integrates headlights with fenders.*



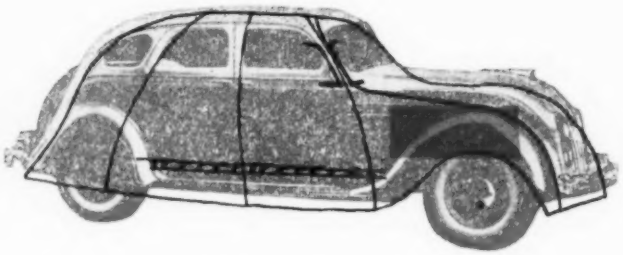
1915 — Cadillac. *The introduction of the V-8 engine led to lower automobiles and the movement of rear seats forward between the axles. The body frame is wood covered with metal. The carriage-type body permits large windows, but the beltline is high. There is plenty of headroom in this model.*
The V-8 engine made it possible to put more power in less space than with a straight-cylinder arrangement. Engines have been moved slightly from time to time, but remain in essentially the same place between the front wheels.
1917 — Paige *introduces a coupe with a rumble seat and V-type windshield.*
1921 — Mack *originates flexible engine mountings and rubber spring shackles. Flexible engine mountings demanded that frames be reinforced in front.*



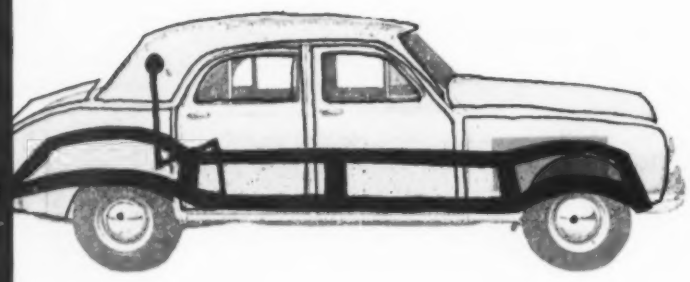
s the rear and extend be- s behind the front wheels. ders have a skirting effect. ls — standard procedure ar, giving it more graceful 27 inches.



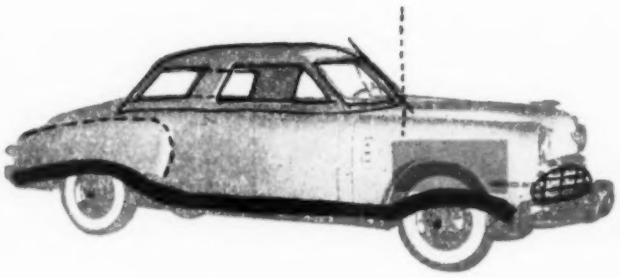
1934 — La Salle. *A designer's automobile. The fenders are sculptured and the windshield has a definite slant. The long hood has a slight overhang. A decorative grille for the first time conceals and extends the radiator, previously the most forward part of the hood. Seats are forward between the axles and lower.*



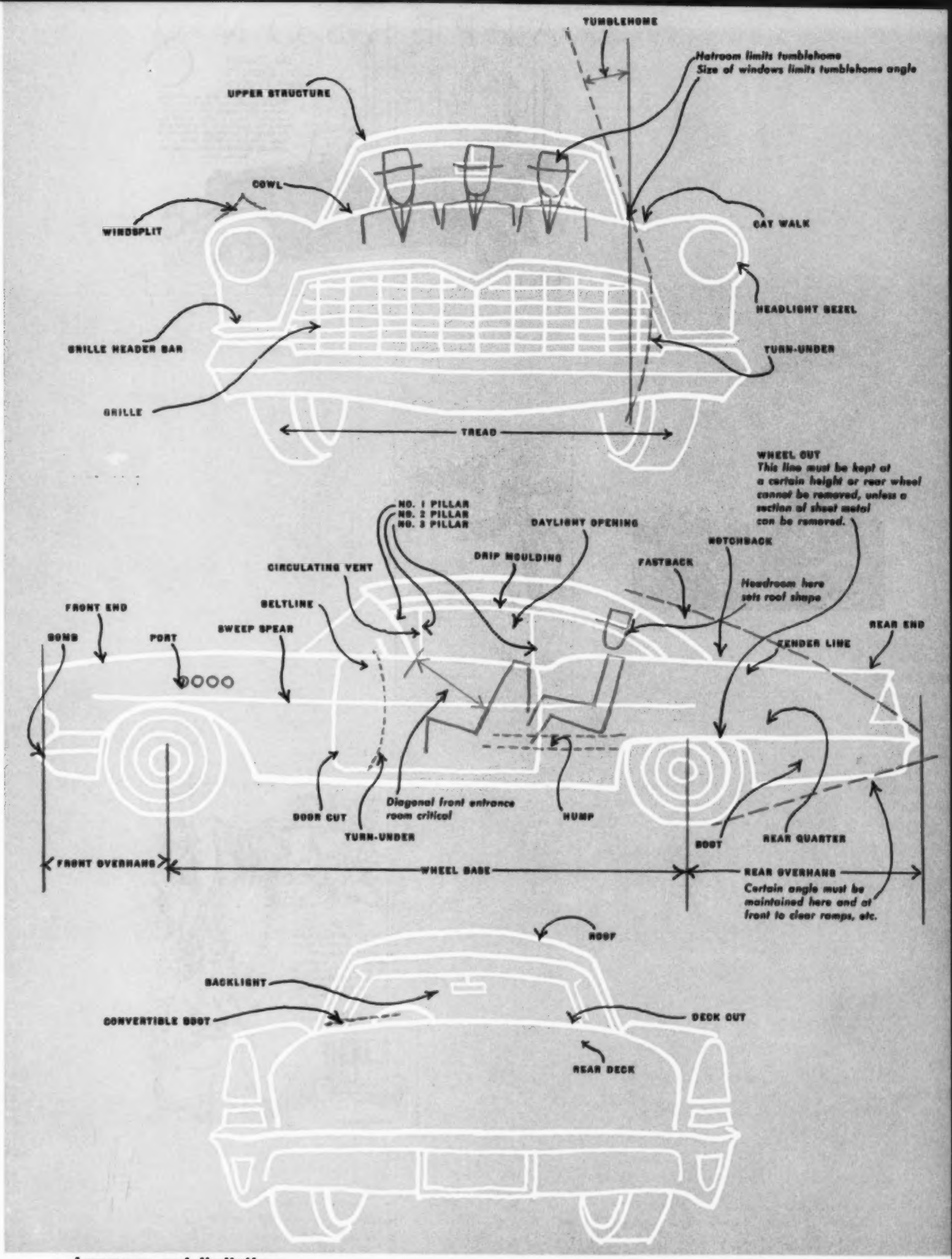
1934 — Chrysler Airflow. *An engineer's concept of aerodynamic streamlining. The V-type windshield, integrated headlights, slanted post, fastback, and front overhang contribute to the streamline effect. The airflow is the first American car with "monocoque" or integral chassis and body construction.*



— Kaiser. "Slab-sided" automobile has ten major steel pressings for the body— half compared to the 1932 Ford. Rear fenders have disappeared and the rear r panel, including the fender, is pressed from one piece of steel. Front fenders ade separately and bolted to the body. Top, hood, and rear deck lid are each d from one piece. This car is 8½ inches from the ground, its wheels have 29.2 iameters, and its overall height is 61½ inches.

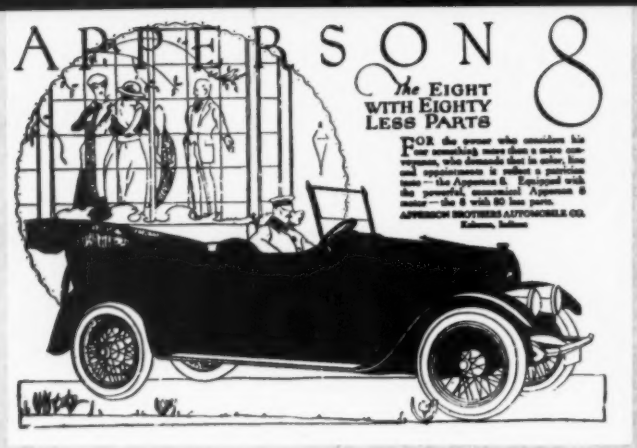


1947 — Studebaker. *Turret-top for greater glass expanse. One piece windshield has a slight curve and enlarged rear windows improve visibility. Prominent front overhang and vestigal traces of rear fenders set the decorative theme for subsequent postwar designs. Radiator grille is completely horizontal.*



Language and limitations

Although there have been many styling innovations since 1947, they are hard to catalog because most of them have been refinements and a matter of personal preference. The stylist (and engineer) finds himself faced with myriad restrictions in terms of the existing product that make radical changes in appearance difficult. Each term in this glossary of automotive "language" represents in some way a limitation. Length, width, and height are obvious for parking, comfort, and headroom. But others, such as tumblehome, upper structure, and wheel cut are either restricted themselves or create a restriction of something else.



1919

1919

1905

1910

1918

1913

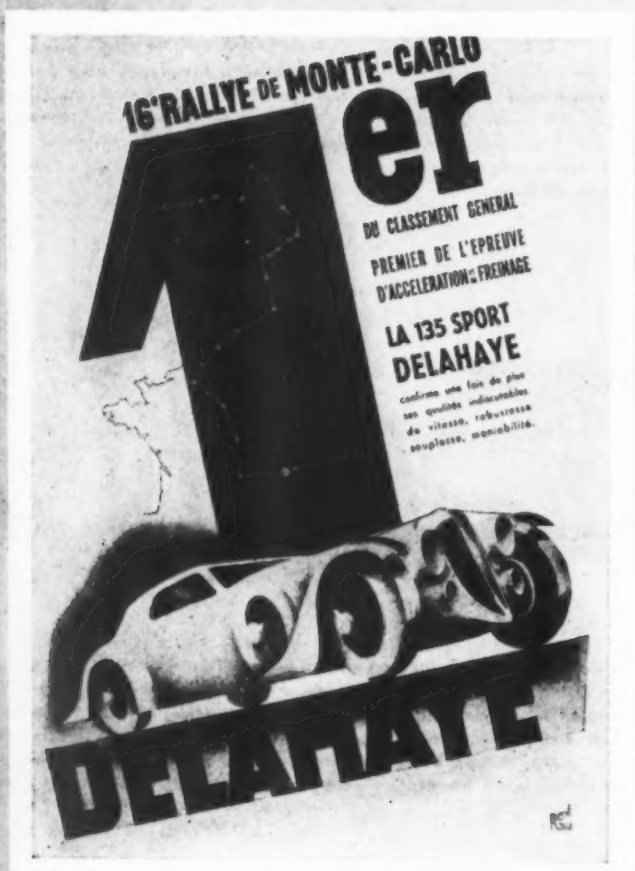
Not only has the Pierce-Arrow turned the tide of imported cars so that there are today far less in proportion than some years ago—not only that, but the Pierce-Arrow in American hands has invaded Europe, giving greater satisfaction to its owners than a native car on its native heath.

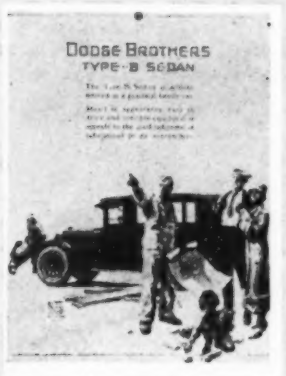
The Pierce-Arrow Motor Car Company, Buffalo, New York

1932

1929

1937





1925

1927

because roads were rough. But, as road conditions improved and the need for a lower center of gravity was realized, smaller wheels were introduced, with the additional advantages of more rapid acceleration and faster braking. Today, the diameter of wheels varies from 26 to 30 inches.

The body It has been pointed out that bodies for early automobiles were made by coachmakers, who usually started as carriage makers. They looked like carriages and the customer could choose the kind of body he wanted with all the curlicues — or lack of — to suit his taste. There was practically no standardization. Bodies consisted of a wooden frame with wooden or metal panels, which dictated straight sides and rectangular proportions. There were, of course, slight curves, but no more complex than those that could be found in horse-drawn carriages.

The revolutionary all-steel body was introduced in 1912 by Oakland and Hupmobile. After Ford developed the first moving chassis assembly line in 1913 and Dodge began production of all-steel bodies the next year, the combination of rapidly developing mass-production methods and steel bodies demanded standardization. "Automobiles" were no longer "carriages-with-motors."

Some of the major steps in body development can be seen on the facing gatefold: it is interesting to notice that, although automobiles began to change radically in appearance after 1925, there were few vital engineering advances after the first all-steel closed bodies were brought out by Dodge in 1923, a major step because the supports and panels became an integrated part of the body, adding substantially to the rigidity of the whole automobile. In addition, the all-steel closed body gave the designer greater flexibility, allowing him to put more roll into body sides, which had previously been quite flat, it enabled him to give new form to the fenders and then to bring them into the body, and eventually, as bodies became stronger, to increase glass expanses.

By the end of World War II, improvements in steel and deep-drawing methods resulted in the "slab-sided" car. Postwar "slab-sided" automobiles are made of formed steel panels, which are welded and reinforced for maximum rigidity.

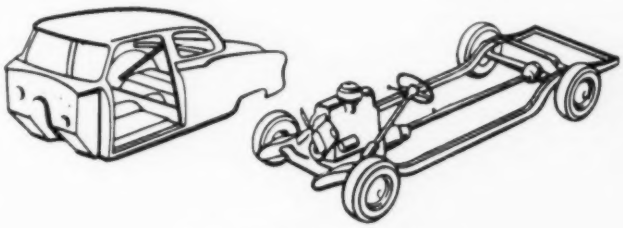
The emergence and then the disappearance of fenders as design elements was important visually as well as technically. In the late thirties, deep crowned fenders were popular, but these were gradually absorbed into the body and one of the principal means of emphasizing forward motion was lost. The slab-sided automobile often retained vestigal traces of the fender, but eventually there was no choice but to develop a new and wholly "automotive" idiom with different suggestions of motion.

The powerplant In most early automobiles, the engine was located under the seat or on a rear deck — the most logical place to put it, as it fitted very nicely under a carriage body. But, because it was uncomfortable for passengers to sit on top of the engine and because it was inaccessible for the frequent tinkerings that were necessary, a Frenchman named Levassor suggested the radical idea of putting it in front under a hood. Europe saw front-mounted engines as early as 1894, but eight years passed before they were adopted in America by Locomobile.

The advantages of front-mounted engines were immediately evident and before long all manufacturers had changed. The engine was more accessible and cooling more effective.

There were drawbacks, too. As engines grew more powerful, the front end got longer and longer. A trend that might have become grotesque was arrested by the introduction, in 1915, of the first V-8 engine by Cadillac, making it possible to get a lot more power in less space by rearranging a straight line of cylinders in two blocks of four each, placed side by side. The broad adoption of the V-8 engine in 1931, when Ford mass-produced them, opened up a whole new series of design developments. In the old cars with long hoods, the rear passengers were directly over the rear axle. This caused rough riding and high cars. Since V-type engines were shorter, the rear passengers could be brought forward to sit between the axles and the entire car could be lowered. The shorter hood and forward movement of the back seat enabled the designer to make the trunk a part of the body of the car. The projection of the trunk was smoothed off in the thirties when the "fastback" was a popular design, but as cars got lower, the "notchback" was introduced in most models as a way of retaining a sloped line. Because the engine stayed in the same place between the front wheels, the extension over the back wheels had to be balanced in the front. Therefore, the front end, with its bumper (including bombs) and grille began to extend over the wheels, making the wheels less conspicuous — more like "runners" under a moving object than the motivating power.

There are two current and important developments, each involving both the automotive stylist and engineer. One — unitized construction — was engineering-conceived and has seen but limited application in the United States. The other — the Panoramic windshield — was advanced by stylists and is now standard equipment on virtually every American automobile. The reason for the acceptance of one and the rejection of the other is generally laid to the ever present bogey—cost. But the background shows up other reasons.



Separate frame construction.

Unitized construction Although the development of the all-steel body did not change the idea that the chassis should be built first and the body added afterwards, it led to an entirely new concept in automobile construction — the monocoque, single-unit, frameless, or unitized construction. Unitized versus separate frame construction started an argument in 1934 that shows no evidence of diminishing today. Unitized construction is widely used abroad, but has never gained general acceptance in America.

The points of contention in the unitized versus separate frame construction argument are apt to be confusing, since both sides frequently claim the same advantages or give the same criticisms. Frameless advocates claim that unitized construction is lighter, cheaper, more rigid, safer, and quieter on the road. Those who speak for separate frame construction maintain that *it* is stronger, better able to stand strains and shocks, and better insulated from the road. It is recognized that the frameless car is lighter, but the margin is debatable. Regarding safety, manufacturers of unitized cars says their construction gives a cushioning effect, thereby lessening the shock that is apt to throw passengers forward into or through the windshield. Separate frame makers say that this element is vague, and they feel that the car with a frame has the advantage in collisions.

With unitized construction, stylists have two major stumbling blocks. One is the inability to make a true convertible. Nash makes a unitized constructed convertible, but the necessary rigidity is provided by a permanent overhead rail. The other problem is a limitation on the height of the beltline. The major objective of most stylists is to create a

Unitized or frameless construction

lower silhouette by reducing the apparent bulk of the lower portion and lightening the top by lowering the beltline. As a unitized frame must have a high beltline for body rigidity, it does not capture the hearts of many Detroit stylists.

The panoramic windshield Originally, automobiles had no windshields. Goggles were worn for protection. The first windshields, introduced around 1907, were straight sheets of glass. When the cloth top was added, the straight windshield gave trouble because rainwater leaked in where the windshield joined the car top. To overcome this, the glass was split across the middle and the upper half hinged so it could be tilted. After closed bodies were introduced, the windshield began to have a slant, which cut down wind resistance and helped the streamline effect. This was further advanced when the first V-type windshields appeared.

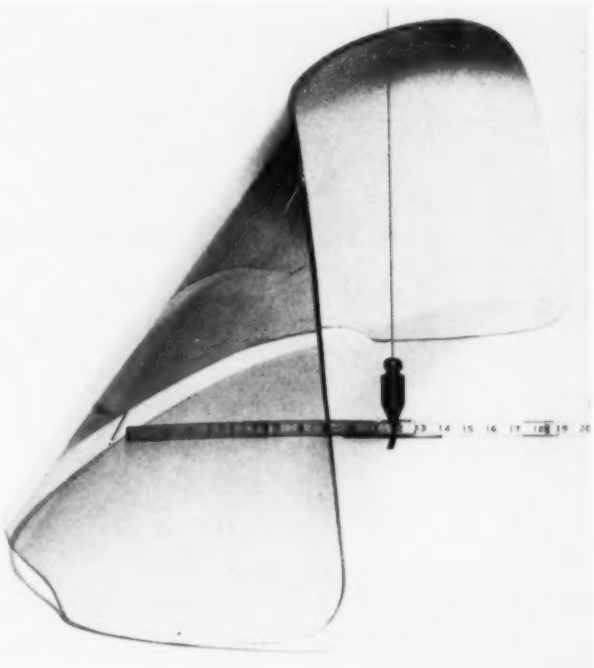
The next major step was to curve the glass. The idea came from stylists who saw an opportunity to eliminate the bothersome post made necessary by the slanting glass and lower seating arrangement. During the war, General Motors stylists asked Libbey·Owens·Ford to see what they could develop. The result was a handmade Panoramic-type windshield which was installed in the experimental Catalina, in 1950. This windshield did not come all the way around the corners. Sharper radii were introduced shortly after the war in such experimental cars as the LeSabre and the XP-300. During this period, Libbey·Owens·Ford engineers were gaining experience in the problems involved in making Panoramic windshields. They found that no mathematical formula gave the theoretical answer to the type of bend or the radius of curvature to give the necessary optical results to comply with the A.S.A. Code requirements. The chief problem was to keep the maximum field of forward vision free from sharp curvature. Looking through curved glass at a high incident angle gives a certain wedge effect on the line of vision. It was a matter of trial and error to bend the glass so the curves would clear the line of forward vision.

General Motors stylists were persistent in their desire for a curved windshield; in addition to the problem of visibility, it offered a change for a straight or even back-swept post, both of which would fit better with the styling trend. In 1950, Libbey·Owens·Ford received specification for the EE-92-1 Panoramic windshield and a request from General Motors Styling Division for a Panoramic windshield with E-Z-Eye shading. Early the following year, both windshields were delivered, but they were also handmade.

GM released information in 1952 that 1954 car models would be equipped with Panoramic windshields. Whether or not they could be mass produced was still a matter of speculation, but L·O·F found that by expanding their facilities, they could meet the production demand. Working closely with GM stylists, L·O·F engineers and technicians perfected their processes and GM's objectives were realized.

The impact of the Panoramic windshield was tremendous, and the whole appearance of the upper structure changed. Whether or not the Panoramic windshield improved vision as much as it would appear does not alter the fact that it was a major achievement for automobile stylists and glass manufacturers; and it did more than any other single development to make last year's models out-of-date overnight.

In the production of an automobile, a working relationship between engineers and stylists is essential, particularly at key stages of development. However, there is no question that industry is heavily reliant on styling for sales, just as styling is reliant on the magic wand of engineering to accomplish the miracles that yearly changes sometimes demand. Nobody knows as well as Detroit that the cycle cannot last forever. If automobile styling, as it is presently known, is beginning to find itself with no place to go, it may be that the end of a third cycle in the development of the automobile is being approached. What will come in the next cycle is a matter of speculation. Possibly it will be a new approach to the design of vehicles; possibly it will be a great new technological advance that will give the automobile and its styling an entirely new direction. Or will it be a new mode of transportation?—*d. g. m.*



dependents and independents

Detroit the producer is also a voracious consumer: each year she gobbles up 10% of the nation's output of finished steel. Michigan as a whole consumes more copper and steel than any other state (her total is greater than that of 36 other states combined) and is second only to California in the consumption of aluminum.

Detroit also consumes quantities of design, and though the exact amount used by non-automotive industries is not yet a subject of census statistics, it is safe to estimate that it is considerable. Most of it is done by four independent design offices, two of which have been in business over 20 years—longer than the majority of the styling sections. Of the clients served by these four offices, 30% are in Detroit, 20% elsewhere in Michigan, and the remaining half scattered throughout the country. The scope of the work emanating from these Detroit offices is indicated on the following 16 pages.

The consumption of materials and the consumption of design in Detroit are no longer isolated statistics, for the growing emphasis on the design of consumer products, particularly in the automotive field, has made its mark on the suppliers of materials and components. Often the effort to sell a material to Detroit begins with an effort to design a material that will stimulate the interest of the designer-customer. The story of one vendor's problem outlines the way design is invading the dependents today.


Bertrand N. Trombley
Harley H. Melzian
George V. Pisani
Walter B. Ford II


Walter B. Ford Corporation

The Walter B. Ford Design Corporation was organized in Detroit in January, 1948, to provide industry with an integrated service in product, package, graphic and interior design. A client may use these services in part for specific problems, or he may use all the services in an all-inclusive, coordinated design program. Each activity is headed by an individual specializing in that area: (left to right in photo above) Bertrand N. Trombley, Director of Product Design; W. B. Ford, President; Harley H. Melzian, Director of Graphic and Interior Design; George V. Pisani, Director of Package Design.

All four of these directors are former General Motors employees. Ford, Melzian and Pisani were in the GM Product Design Studio, where Melzian served two years as Chief Designer and Pisani supervised package design. Trombley was in the Art & Color Department of GM's Fisher Body Division, and subsequently worked with George W. Walker, doing extensive automobile styling for the Ford Motor Company.

A selective grouping of Ford designs —product, interior and package—is displayed on the preceding spread. Left to right, top row: refrigerator, automatic washer, automatic dryer, water heater, electric range, Norge Division of the Borg-Warner Corporation; heater, Bryant Heater Division of Affiliated Gas Equipment, Inc.; wringer washer, gas range, Norge.

Second row: chair for new Ford Motor Company offices; two vacuum cleaners, Kingston Products Corporation; experimental hardtop convertible car, Motor State Products Division of the Detroit Harvester Company; heater, Bryant.

Center pad: package designs for the Sanders Confectionery Company, the Burroughs Corporation, Gerard Industries, J. L. Hudson Company, Detroit Controls Corporation, Ford Motor Company, Sparton Automotive Division of Sparks-Withington Company, Ferry-Morse Seed Company; thermostats, Detroit Controls Corporation; Dishmaster, Dishmaster Corporation; rubber mat designs, Ohio Rubber Company.

Left side and front row: interiors and exhibits, Ford Rotunda; interiors, Ford Central Staff Office Building; interiors and exhibits, Owens-Corning Fiberglas Corporation; exhibits and displays, Bundy Tubing Company.

Right foreground: 20″ reel mower, 21″ rotary mower, 18″ rotary mower, Moto-Mower Division of Detroit Harvester Company.

Power mower:

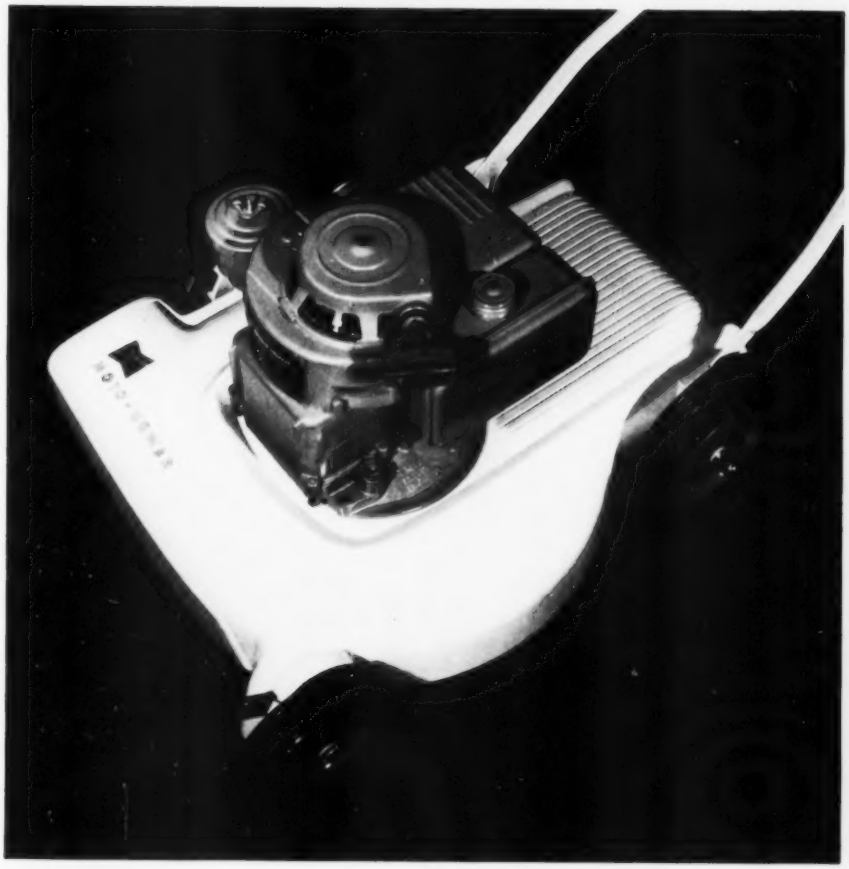
As soon as Moto-Mower became a subsidiary of Detroit Harvester in late 1953, the new management called on the W. B. Ford Corporation to initiate an overall redesign program, to find a new look for both reel and rotary mowers, for trademarks and packages. The idea was to lower fabricating costs and create a family resemblance among the various models through a common design treatment, a standard handle, and a single color scheme.

Ford's initial concept (opposite page: top, left) for the latest 21″ rotary-type was an essentially unintegrated form: the sides of the housing swept out in rigid arcs that jarred the lines of the straightforward, boxy engine deck. Another more rakish sketch proposed a lower, wider deck pan, with the engine sitting on a sweeping, elevated throne and front caster-wheels tucked underneath the corners of the housing.

The final version evolved with reduced clearance between the bottom edge of the pan and the ground, for toe safety; the engine was placed within a raised horseshoe which stiffens the stamped steel pan, catches oil and gas drippings, and makes the engine a more homogeneous part of the mower. The housing (in clay at bottom, left) developed into a successful monolithic form that cleanly knit the varied lines and bulks. Designers Ford, Fetty (now with L .H. Wilson), and Richard Karbowski are shown (top, center) touching up the final plaster model (seen finished, top, right).

Ford's latest design for Moto-Mower is a lighter weight 18″ rotary model (lower right) with staggered front wheels to reduce scalping of turf when mowing over uneven ground, and to allow closer front trimming. The color scheme for this and all Ford Moto-Mower models is light gray, for decks and handles; bright red, for engines, wheels, control knobs, and trademark decals; black, for plastic hand grips and rubber tires.

Ford rejuvenates Moto-Mower with designs for a new generation of grass cutters



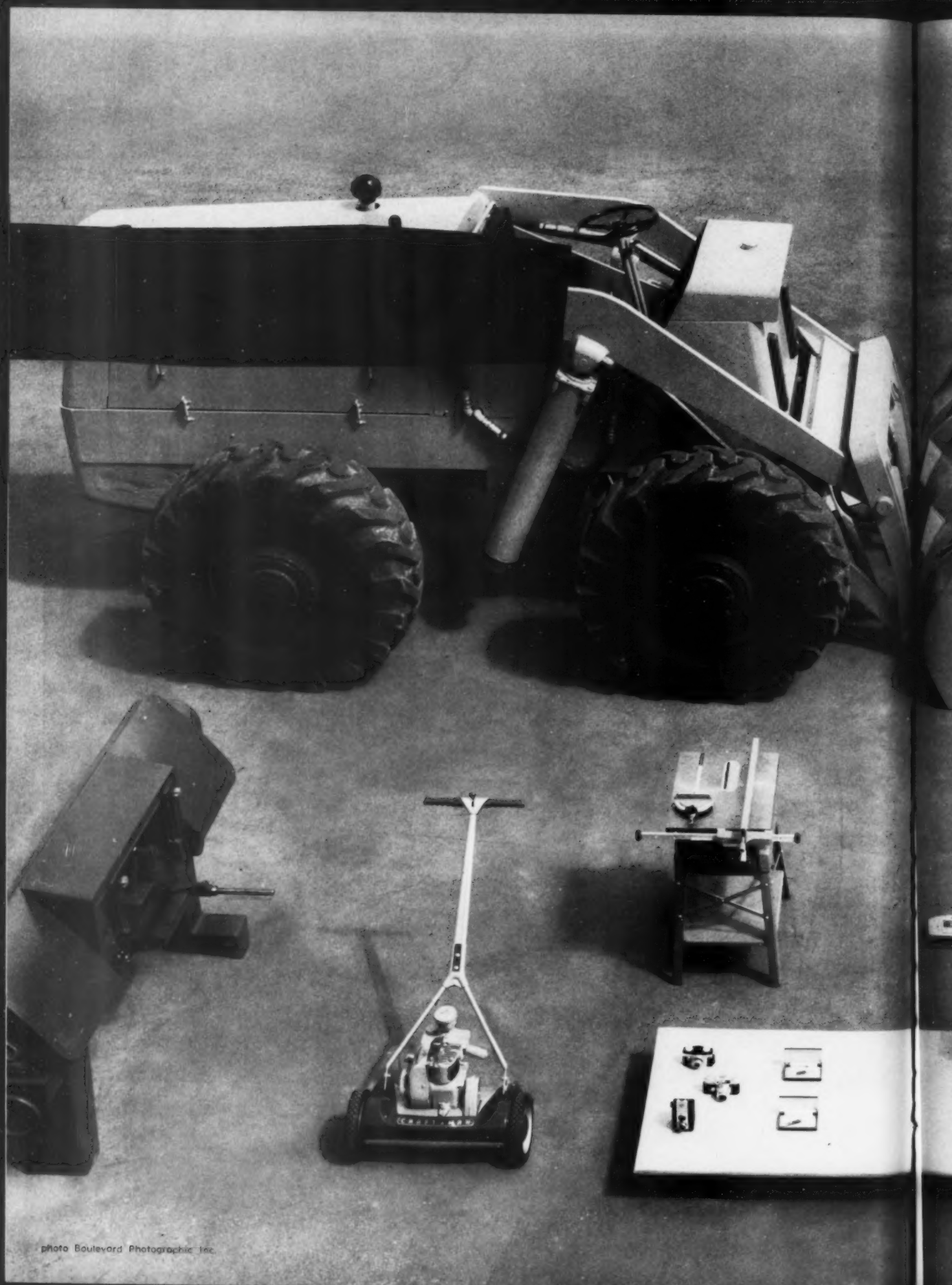
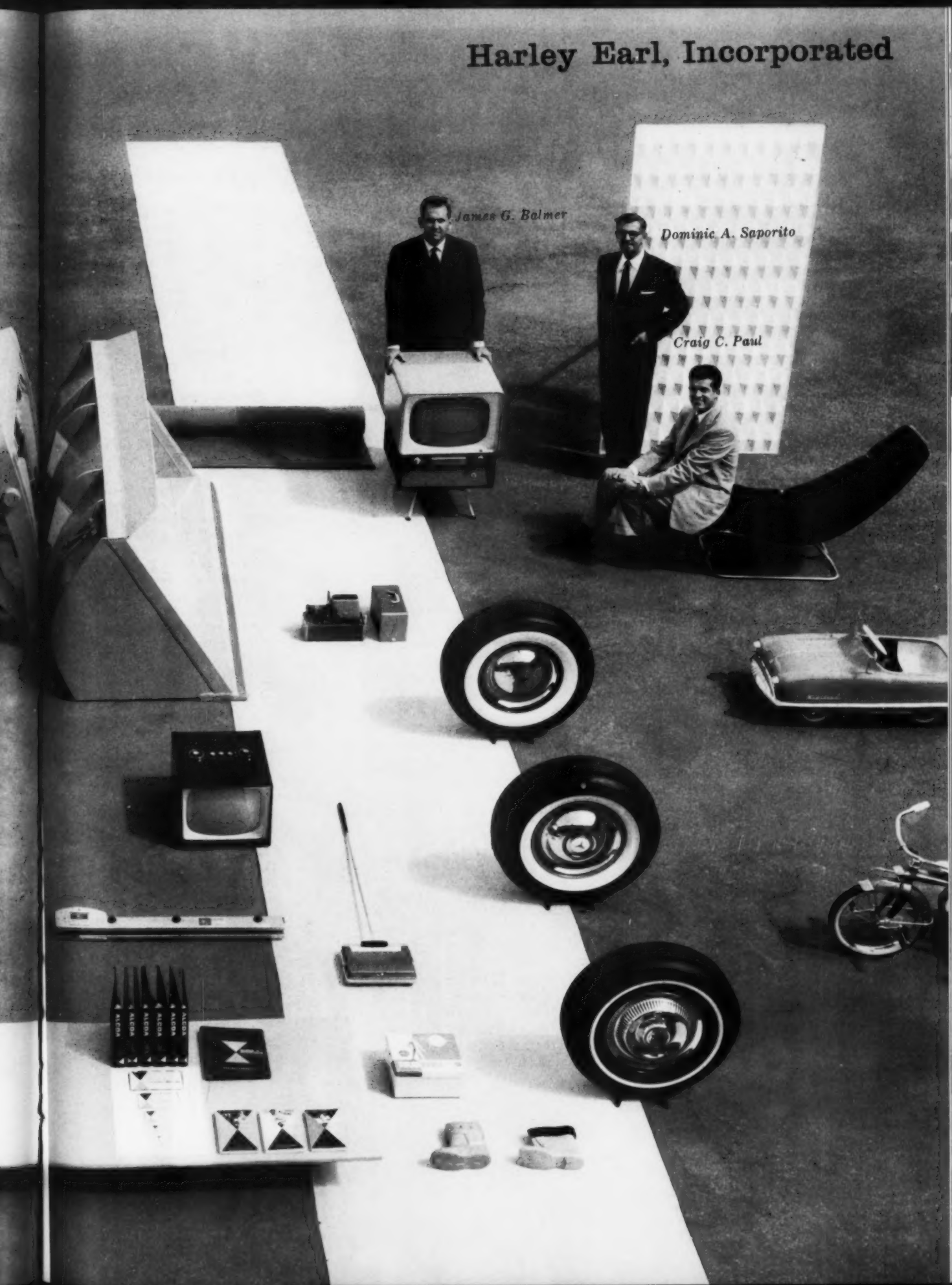


photo Boulevard Photographic Inc.

Harley Earl, Incorporated



Harley Earl, Inc. is Harley J. Earl's outpost in non-automotive design. He retains the title of Design Counsel in the 10-year-old office, which is under the direct supervision of James G. Balmer (above left), General Manager; William Armstrong, Director of Design; Dominic Saporito (above center), Assistant Director of Design; and Craig Paul (above right), Administrative Director.

In September, 1954, H. E. Inc. moved into its own building near the new GM Tech Center with a staff of 20 designers, four engineers, and three model makers; the new headquarters provides 10,000 square feet of office, studio and shop space. From its inception, this office has been oriented toward a three-dimensional approach to product design, the model shop facilities being utilized even more in the development stages than in the presentation stage of a design. A team approach seeks coordination of appearance and mechanical considerations, and, where required, mechanical arrangements are revised or redeveloped to realize desired product features. The company, therefore, assumes few *superficial* restyling assignments and rarely prepares renderings of proposed designs.

The two-page photo on the preceding spread illustrates the consistency of H. E. Inc.'s success—apt, expressive design through a wide variety of products. Left to right across the bottom: a metal-cutting bandsaw, Kalamazoo Tank and Silo Company; Craftsman power mower, Atlas Press Company; the A-4, C-4, and 40 Reflex Argus cameras; Waterman C/F fountain pens; coordinated graphics for Alcoa; Ball Band footwear and packaging, U. S. Rubber Company; U. S. Royal tires, U. S. Rubber; tricycle, Evans Products Company.

Across the middle: an 8" table saw, Atlas Press Company; Trol-E-Duct, Bulldog Electric Products Company; 17" portable TV, Westinghouse; Sweepmaster with sectional handle, Bissell Carpet Sweeper Company; Argus 300-watt projector; Kidillac, Garton Toy Company.

Across the top: 175A tractor shovel, Clark Equipment Company; Naugahyde vinyl-coated fabric patterns, U. S. Rubber; Capri swivel-base TV, Westinghouse; aluminum curtain wall panel, Alcoa; aluminum lounge chair, Alcoa.

Heavy equipment:

If the material handling items on the opposite page have a clean and stalwart look, and a distinguished family resemblance, it is directly attributable to an overall design program promoted in a manufacturing line by the firm's president. The firm in this case is the Clark Equipment Company; its president, George Spatta; and the design consultants (since 1951), Harley Earl, Inc. Tooling must be held to a minimum in low-volume production of this sort, which accounts for the simple break press fabrication of many of the parts. This simplicity has been honestly expressed throughout the line.

The 175A Tractor Shovel originated with Clark engineering. H. E., Inc. designers proceeded three-dimensionally from layouts by Clark engineers. They produced a series of clay and wood mock-ups that evolved into a final clay and wood scale model (top, left). Then they made an exact scale model with a working hydraulic system (top, center) which accurately demonstrated the action of bucket and linkages and is still being used by Clark as a sales tool. From the Earl models and their own engineering details, Clark developed full-scale prototypes for testing (top, right) and then went into production.

The sturdy, simple X-70 Lift Truck (lower left) is a prototype for a forthcoming line of lift trucks that H. E. Inc. will design.

The cab for the T-24 Crane (center, right) and the crawler shovel (bottom, center) replaces the cab on an old line (bottom, right) which Clark inherited when they took over another heavy equipment company. In the old model, engine air emptied into the cab; the operator suffered from engine fumes, noise and heat and had poor visibility. Earl designers turned the engine 90° on its base and isolated the engine area. These changes provided an outside exhaust and cab insulation. The more compact housing made room for a rear view window.

a complete family of material handlers is H. E. Inc's assignment from Clark

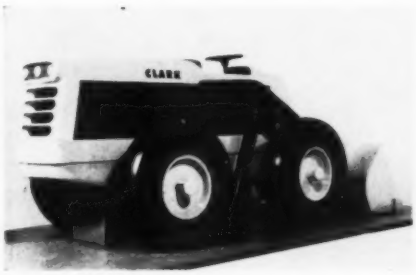


photo Boulevard Photographic Inc.


Lawrence H. Wilson
Lawrence H. Wilson
Kenneth A. Hopkins

Lawrence H. Wilson Associates is the design office that was directed until recently by George W. Walker, who transferred his independent business to his associates upon being elected Vice-President in charge of Styling of the Ford Motor Co. Before the war Walker served as design consultant to Ford. His is one of the oldest independent design firms in the Midwest, having begun operations in 1929.

Mr. Wilson (above center), an associate of Walker since 1942, was chosen to head up the new office. He attended Case Institute of Applied Sciences and is a graduate of the Cleveland Institute of Art. After some years in custom furniture and interior design, he opened his own office of industrial design in 1932, later becoming head of the design department at Norge and then joining Walker as senior associate. His active partners now, all former Walker associates, include Kenneth A. Hopkins (above right), Harold D. Fetty (above left), John William Mason, Keith D. Kitts, Adaline H. Piazza, and Sally Ann Seymour.

In terms of Detroit, L. H. Wilson Associates is not large, with 9 designers, and an effort is made to capitalize on this by maintaining the closest possible relationship among member designers, most of whom are also account executives, responsible to the clients.

The large photo on the preceding pages presents a selection of Walker-Wilson designs for past and present clients. Left to right, top row: water heater, Duo-Therm Division of the Motor Wheel Corporation; range and refrigerator, Admiral Corporation; furnace jacket, National U. S. Radiator Corporation; wall oven and surface burner unit (both shown in typical "built-in" situations), Admiral; oil burner, Duo-Therm.

Second row: aluminum wheel cover, Gar Wood Industries, Inc.; radiator (behind wheel), National U. S. Radiator; room air conditioning unit and deep freeze, Admiral; two gas heaters, Duo-Therm.

Third row: horizontal sliding window of extruded aluminum, Alcasco Division of Detroit Gasket & Manufacturing Company; phonograph and TV-radio-phono combination, Admiral; canister vacuum cleaner, Eureka-Williams Corp.; upright vacuum cleaner and attachments unit, Eureka-Williams; boat steering wheel, Sheller Manufacturing Company.

Bottom row: three radios, Admiral; clocks, Westclox and Seth Thomas Divisions of the General Time Corporation; Ten Key and Director adding machines, duplex subtractor, Burroughs.

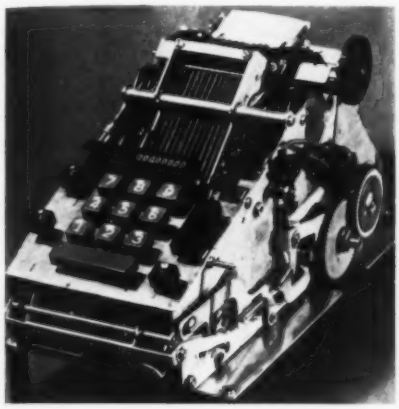
Adding machine:

The Burroughs Corp. recently decided to add a small, lightweight adding machine to their line. After extensive development, Burroughs engineering came up with a satisfactory ten-key mechanism (opposite page: top, left) and presented it to the Wilson Associates with a number of packaging requirements: the housing was to be clean, with a minimum of bright accent; it must provide ample protection for the delicate mechanism; it must be small and easy to move or carry; there must be good vision of the printing area in front of the platen; there must be easy access to the mechanism for servicing; the keys must be easily operable.

Wilson designers launched into a series of sketches, and the first concept to be considered was a case long enough to cover the paper roll (second from top, left) This and two more abbreviated models (one of which is second from bottom, left) were rendered in clay, painted, and presented at a joint meeting of management, sales, and marketing. The elongated, roll-enclosing version was rejected because it made paper changing too difficult and the housing larger and more costly than necessary. A lighter, more angular look was preferred (bottom); and a final model was made with revisions suggested at the meeting (a narrower twirler, for instance), and again submitted to management.

Upon approval, a case of two die castings was decided upon, facilitating two-tone color effects in a "hard-dull" paint finish. Beige was settled upon for the base casting, and the upper housing is finished in gray or any of three pastels. Finally plastic keys were sized and shaped according to operator test findings, which disclosed, among other things, that round keys are easier on an operator's sharpened fingernails; another product (right), designed and manufactured in Detroit, was ready for a nation-wide market.

Burroughs provided a ten-key mechanism, and Wilson Associates provided the sculpture




Sundberg-Ferar
Carl W. Sundberg
Montgomery Ferar,


FEDERAL
MOTOR TRUCK
CO.

Sundberg-Ferar Inc., in its 21 years, has lifted itself from a two-man design office with one account—plastic radio knobs for a company whose account they still retain—to one of the busiest independent offices in the country, with accounts like Sylvania, Whirlpool and Sears, Roebuck.

Two years ago, S-F built their own building in Royal Oak, ten miles from downtown Detroit, and a staff that includes 36 designers works there now. A branch office in New York has been open for 18 months, with Richard Figgins, Clarence Zierhut and Moto Shimano (above, left to right) comprising the design staff.

The variety of Sundberg- Ferar's design output, from Seeburg juke boxes to IBM brains, is demonstrated on the preceding pages. Left to right, top row: Packard Hardtop 400, Packard Motor Car Company; Federal Truck, Federal Motor Truck Company.

Second row: ironer, wringer washer, automatic dryer, automatic washer, Whirlpool Corporation; Coldspot Freezer, Coldspot refrigerator, Kenmore electric range, Kenmore gas range, Sears, Roebuck & Company.

Third row (in front of wringer washer): compressor, DeVilbiss Company; Kenmore roaster, Sears, Roebuck.

Fourth row (starting in front of compressor): gas unit heater, Carrier Corporation; table model "hi fi," console TV, Sylvania Electric Products, Inc.; Craftsman power mower, Sears, Roebuck; table model TV, Sylvania; built-in oven, Preway, Inc.; water cooler, Temprite Products Corporation; oil space heater, Preway, Inc.

Fifth row (in front of power mower): radio clocks and table radios, Sylvania.

Sixth row: ice cube maker, Carrier; luggage, Shwayder Brothers, Inc.; Jet 99 vacuum cleaner, Landers, Frary & Clark; panel board switch unit, Square D Company.

Seventh row (starting in front of vacuum cleaner): air compressor, vaporizer, air pressure regulator, four spray guns, regulator valve, DeVilbiss; electric motor, Louis Allis Company; five types of electric controls, Square D.

Eighth row: folding chair, Shwayder Brothers; portable stove, "hot pot," Universal Coffeematic, automatic toaster, Mix-A-Blend, Landers, Frary & Clark; Kenmore knife sharpener, Sears.

Bottom row: waffle iron, sandwich grill, standard and travelling steam irons, table model food chopper, quart and pint thermos bottles, Landers, Frary & Clark; Harmony House plastic dishes, Sears, Roebuck; electric blanket, Landers, Frary & Clark; dental lamp, Pelton-Crane Company.

Washer-dryer:

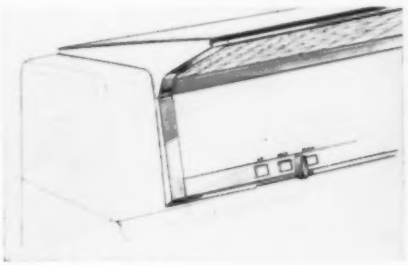
Sundberg-Ferar's design problem on Whirlpool's 1956 matched washer and dryer was to dramatize more fully the lighted backguard and the "Guide Lite" control dial, both prominent selling features in the 1955 model (opposite page: top, right). Initially the designers tried to utilize the old console, and the first four sketches (opposite page, left) show various overlay escutcheons and lighting ideas applied to this old console shape. Whirlpool engineers subsequently informed Sundberg-Ferar that the price of the whole assembly could be reduced considerably if the timer dial were placed at a 45° angle, which meant that a standard timer could be used instead of the custom timer used in the 1955 design.

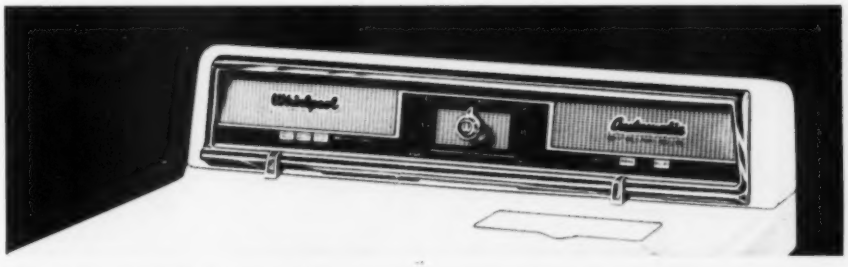
In the fifth sketch (left, bottom) the panel has been tilted back to achieve the 45° angle, but the designers decided that this cut away too much of the old stamping. A more economical solution was to switch to an entirely new backguard assembly with a die-cast escutcheon and painted end caps. After cost analysis, the die-cast escutcheon was superseded by an assembly unit of end caps and rolled sections.

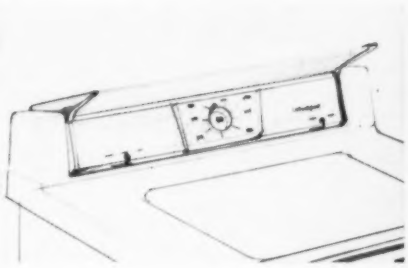
Sundberg-Ferar wanted to inject more drama into the "Guide Lite" dial's indication of the washing cycle. After exploring optics, they found a way to get a point of light on the various red plastic rectangles that indicate the phases of the washing cycle, and to use the same source of light to illuminate the calibrations on the dial edges. Then they laid a fluorescent light across the top of the recessed, chrome-trimmed panel.

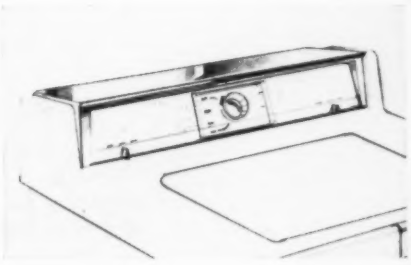
Some 100 rough sketches, 12 air brush renderings, and three wood models were produced in the Sundberg-Ferar plant as this unit took shape. After minor adjustments on the final model to accommodate it to company assembly-line methods, the 1956 Imperial (far right), Whirlpool's deluxe, was released for production.

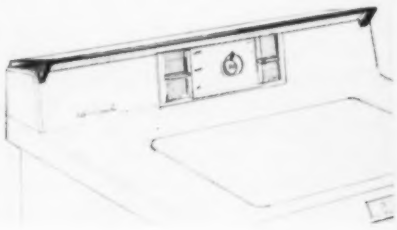
S-F and Whirlpool collaborate to produce a more salesworthy laundry console

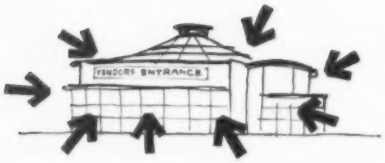












Ford styling building

Styling *sections of Ford, Mercury and Lincoln each have stylists who specialize in developing interiors, including the seating assemblies, and all interior areas to be trimmed.*

How dependents get the inside dope

The selection of color and trim for a new Mercury shows how styling affects the supplier industries.

One of the busiest men in Detroit is Hermann Brunn, manager of the Color and Trim Department of Lincoln-Mercury. What keeps him busy, besides the daily round of conferences about new models, is an incessant stream of vendors, or U. S. manufacturers' representatives, of which there are hundreds stationed in Detroit. Over 70 of them, selling anything in textiles, leather, plastic, trim, paint, or flooring materials, visit Hermann Brunn regularly throughout the year. Averaging 15 appointments a week, Brunn culls thousands of samples each season before he and his staff start to select the raiments for a forthcoming model.

Brunn, scion of a famous coachbuilding family who came to Ford as a body designer 15 years ago, likens the job of Color and Trim to furnishing a house, though the job is complicated by the number of surfaces, the amount of wear, and the matter of color coordination. The job starts with a drawing of a new interior from the Mercury styling studio, indicating trim patterns for all surfaces. As soon as exterior paint colors have been tried first on model cars, then on full-scale cars, and approved by management, Brunn selects matching or mating interior color schemes; then begins the big job of picking out exact interior materials from the samples he has on hand, or in mind.

Life of a salesman

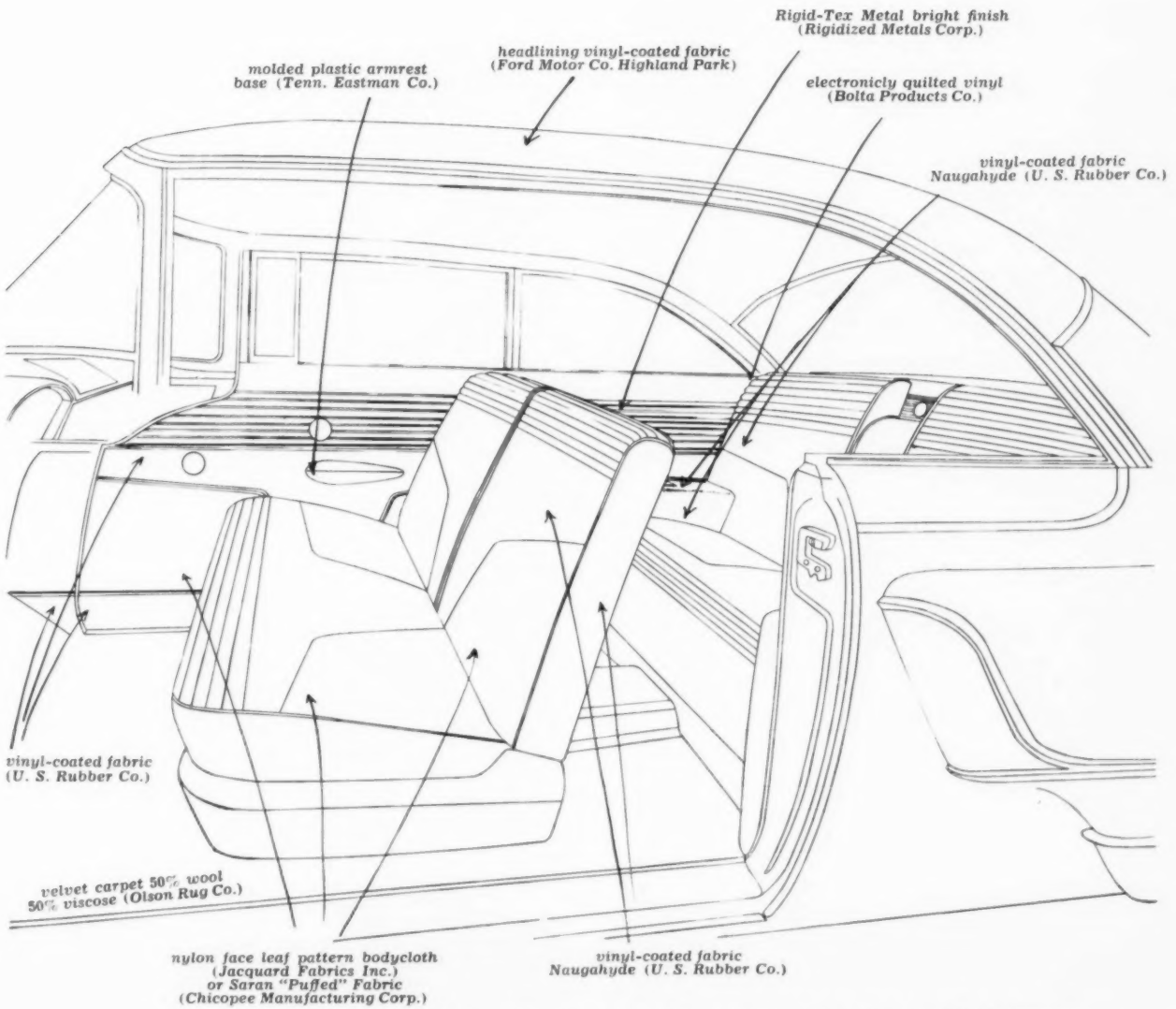
The life of a Detroit vendor is not an idle one. Though his beat may be only a half-dozen men like Hermann Brunn in a half-dozen companies, his schedule is crowded with his three main duties: preparing, driving and waiting. Distances in Detroit being what they are, he often needs an hour to get to an appointment; when he arrives, the stylist with whom he has carefully made an appointment may have been called unexpectedly to a meeting—giving him an hour or two in the Vendor's Room to catch up on paperwork.

Preparation is even more time consuming. It starts when he "cons" the home office on what his market may be buying next season—advice based on a discreet blend of gossip and verified fact—and is followed by regular checks and "crits" of the new line. When samples are ready, he plans his campaign, makes his appointment, and prepares to wait. He isn't waiting for a quick sale—materials are rarely approved without extensive development with stylists into something exclusive. At best he hopes for a positive reaction, a helpful suggestion. Failing that, he withdraws and prepares another approach.

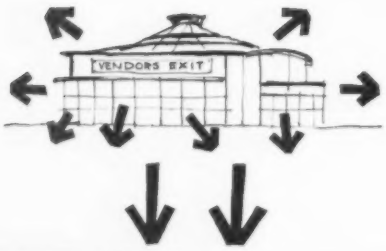
The big drive to design distinctive and luxurious auto interiors in the past few years has rubbed off on the suppliers. All Ford vendors now maintain their own designers, and the stylists draw heavily on them for new pattern and texture ideas. If a vendor thinks his sample line is sure-fire, he may take the company designer along on an appointment, to get the stylist's impressions and suggestions—as Douglas McCord, Chicopee Mills' textile designer, accompanied vendor Harold Brown on a visit to Hermann Brunn late in 1953. Chicopee's Saran fabrics, which had been widely used in auto seat covers, made their upholstery debut in the 1951 Mercury station wagon. Brown was counting on some new patterns to put Saran into the 1955 Mercury line. Brunn liked Saran's coolness and durability, but felt that the flat weaves had been overdone by the seat-cover market. It would be texture in 1955—or no sale. What the vendor and the designer then cooked up in order to swing the order is shown on the next two pages.

Color and Trim *receives its directives from Mercury, as from all studios, in the form of a drawing (below) indicating trim areas. Models of seating assembly are prepared to analyze problems.*

Color Chip Board *contains samples of all available hues of exterior enamel, which are tried on clay models before full-scale cars are painted. Here Brunn discusses interior color selections.*

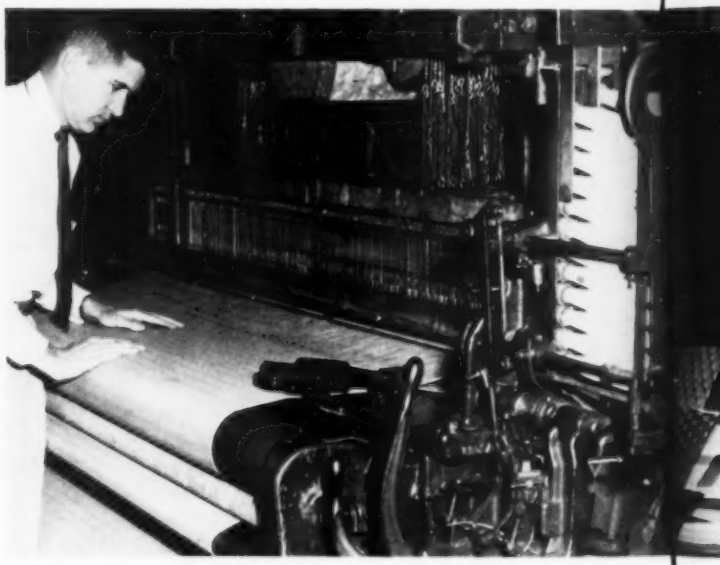


1955 *Mercury interior trim rendering as specified by Color and Trim department.*



1. **Discouraged,** *Chicopee Mills' salesman, Harold Brown, and Douglas Mc. ord, chief designer, talk over their unsuccessful visit to Mercury stylist Hermann Brunn in* 1953. *The flat weaves of their synthetic fabric, Saran, didn't spark Brunn's interest.*

2. **Remembering** *an old radio grille sample in his office, McCord dug it up for Brown. Though it was primitive, Brunn thought the unusual "puffed" weave had possibilities. McCord then persuaded Vice President Nicholl that it was worth developing.*



3. **Differential** *shrinkage to produce a seersucker-like texture demanded a radically different weaving technique. McCord and production men in Cornelia, Georgia, worked on four test looms for two weeks till they finally got a satisfactory "puff."*

4. **Results** *were shown to Brown by McCord, who, directly on the loom, had designed new weaves, twills and herring-bone, in different weights and colors, some sparkling with metallic threads. The differential shrinkage created a resilient texture.*

How one vendor turned "No" into an order

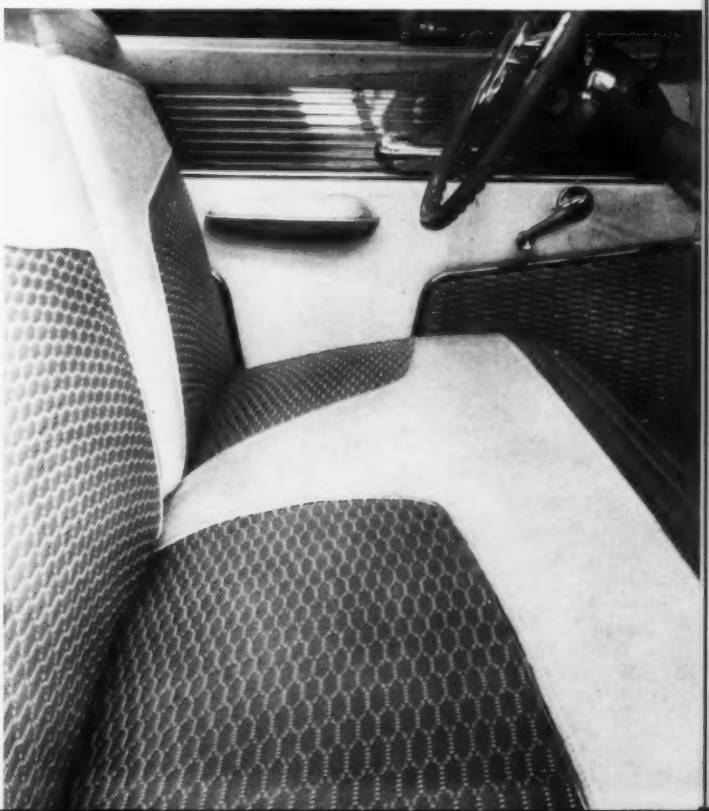
Chicopee gambled on design and development to meet stylists' demand for a new kind of fabric

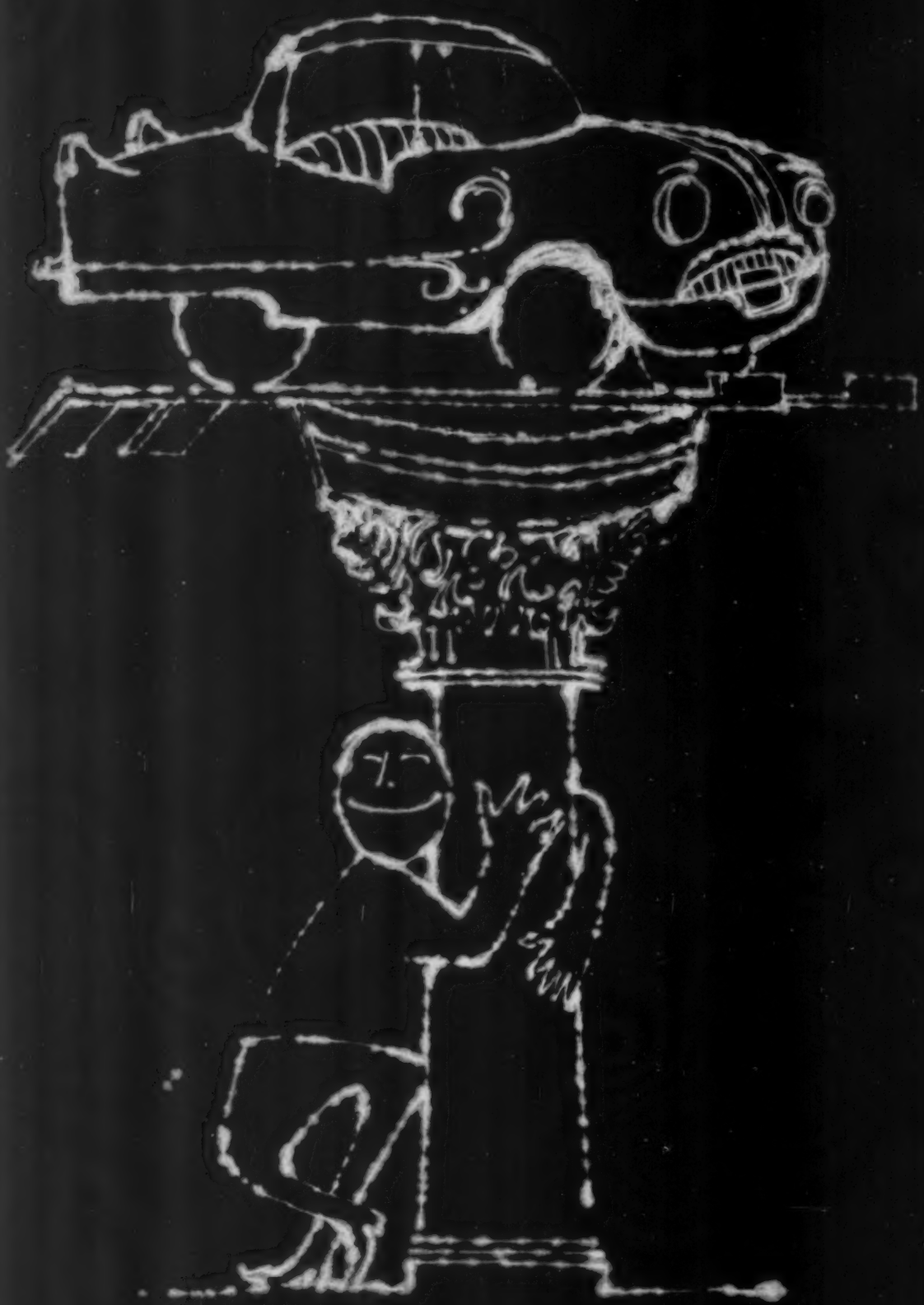
5. Time *for the* 1955 *orders was running short when Brown presented the redesigned Saran fabrics to Hermann Brunn at Mercury. He and his color and trim stylists were enthusiastic, and asked Chicopee to adapt designs to Mercury's needs.*

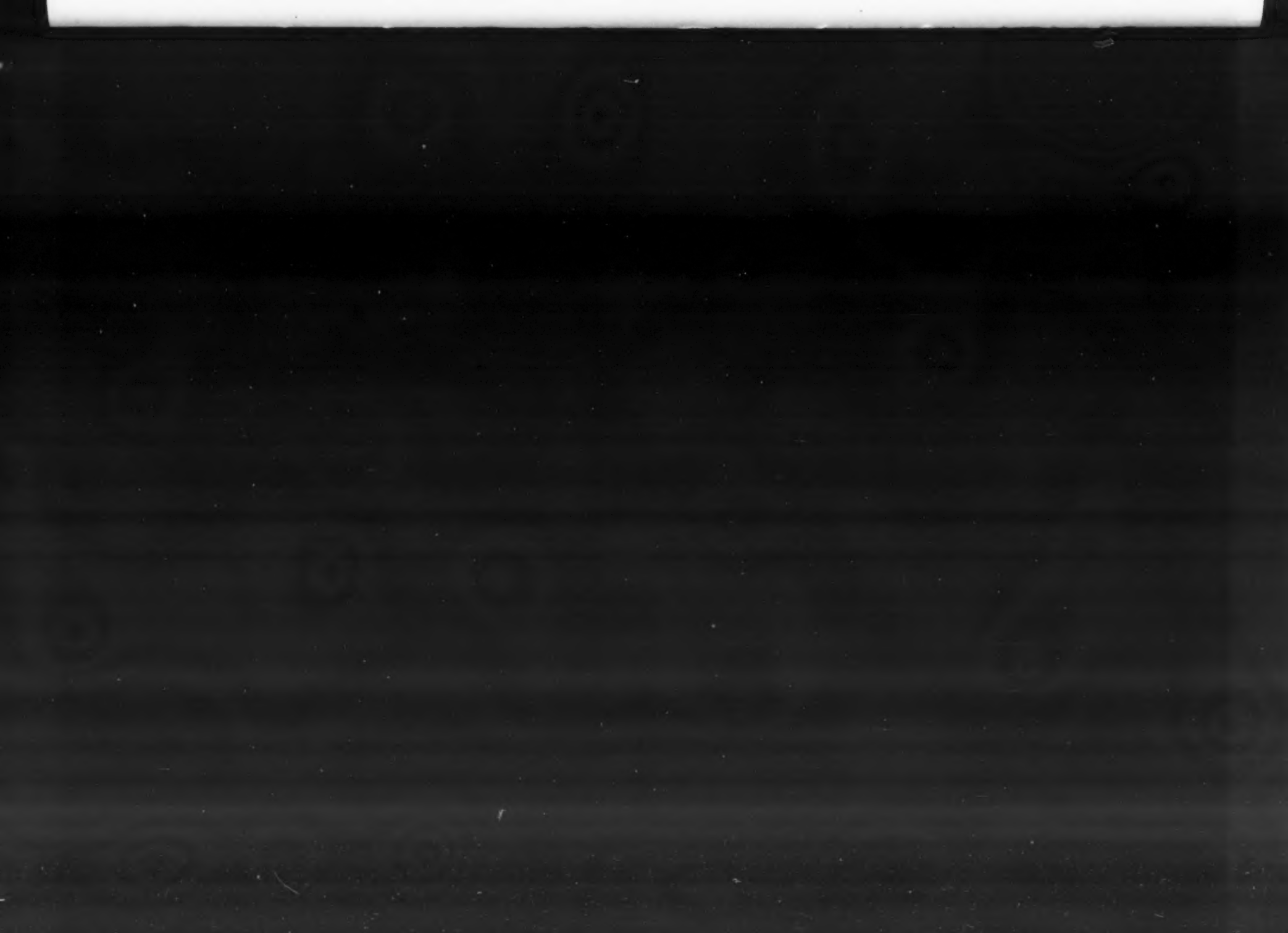
6. Refining *and perfecting the sample which Mercury had selected, McCord worked hard while the order was being negotiated. He was now assured that the weaves had good potential; the experiment gave Chicopee a strong production lead.*

7. Rigid tests *were made on the new fabric in Mercury labs, then on mock-ups of the* 1955 *seating assembly. An executive of the Ford Division spotted the Saran weave. Impressed, he ordered a different "puff" design for four Ford models.*

8. Entire *Montclair line of the '55 Mercury sports Saran,* 2½ *yards per car. The Georgia plant is filling orders for* 1956. *Chicopee's investment in design development has already netted orders of* 400,000 *yards at* $3.90 *a yard on Mercurys alone.*







Eric Larrabee

AUTOS AND AMERICANS:

The Great Love Affair

How Detroit can run a Heavy Industry on the Soft Winds of Whim and Romance

Americans are in love with the automobile. They reserve it a place of importance in their lives denied to all other objects, denied even to themselves. It is murderous, demanding, and impractical—and for all that it is beloved. Society has been revolutionized to make the automobile more at home. Where other interests challenge it, they are brushed aside; where functions for it do not exist, they are invented — until it has become essential in fact as well as fancy. America without the automobile is inconceivable.

When Secretary of Defense Wilson said that what was good for General Motors was good for the United States, he was only committing the blunder of preaching what most Americans practice. The making and consuming of consumer goods is our agony or our triumph, depending on your angle of vision; but from any point of view it is our characteristic activity. Among all American consumables, the automobile is the dominant piece of hard goods. It sets industrial style and tempo. The source of our postwar prosperity lies in the suburbs, which in turn rely on the car. Even its minor merchandisers may become Cabinet members.

Behind this massive love affair lies the love of the individual for his individual auto, yet in many ways he loves it not so much in human isolation as in concert with countless others. No one need puzzle for very long to conclude that to Americans the automobile is a symbol, but it is sometimes puzzling to decide what it is a symbol *of*. Obviously it represents power and mobility, both spatial and social, and it is a good grading device in the confused system of prestige that grows up among a mobile people. Obviously, too, there are elements in its design which have more than a little to do with sex. Yet none of these explanations can of itself explain the stranglehold the automobile has on American affections. Assembled a fragment at a time, they piece together a picture of a people whose Puritan principles conflict with their non-Puritan performance.

Stand at night, on a corner in a strange town, and watch the cars go by. What is there so poignant in this? A sense of private destinies, of each making his own choice, of being independent of everything but statistics. The car owners choose — or think they do — when to stop and start, where to go. The automobile opens a vista of escape: for the adolescent, from parental planning; for the Negro, from Jim Crow; and for others, from less formal restrictions on their freedom of movement. Thus they are liberated to the loneliness (and perplexity) of their independence, and thus travel on the highway at night acquires its overtones of adventure and sorrow.

It is easy to make fun of the emotions that attach to an automobile, and to other vehicles — ships, steam engines, jet bombers, trolley cars. Voyaging was always equivalent with romance, and the image of the journey was the image of life. To depart, say the French, is to die a little. The wanderer, far from home, was both to be pitied and feared. But it is a long way from the ox-cart to the station wagon. Industrialism brought mobility within the reach of its middle classes; it domesticated the dreams, in a way, and in another filled the dreams of domesticated people with the symbolic cars and planes and trains that psychiatrists so often come upon. Automobiles are Freudian symbols both in an aesthetic and a clinical sense.

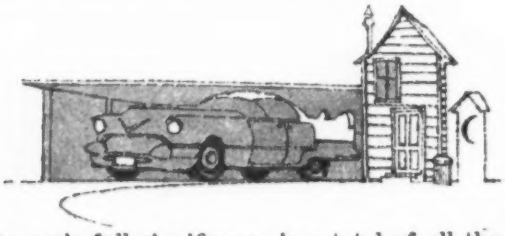
But they are far more importantly symbols of a turning point in the industrial process. The auto is not just another means of transportation—not just more powerful, more flexible, or more manageable than its predecessors. As an invention, it might have remained no more than that — and did, in fact, as long as the Horseless Carriage was still nothing but an eccentric substitute for the Horse. The release of the automobile's potentiality into its new and natural domain was primarily the achievement of Henry Ford, who recognized that it was not a technological gadget but an agent of social revolution. His statement that history is bunk was another way of saying that history is at the mercy of genius, and the automobile as we know it is the proof of how right he was.

Ford made the car available, in quantity, to ordinary citizens. For the first time they were able to purchase a single device which expressed, to an undeniably glamorous degree, the industrial civilization of which they were not yet fully members. The archetypal Model T combined the prestige of a "carriage," the traditions of national rootlessness and Yankee tinkering, and the exhilaration of having a personal power plant under your personal foot. Its owner immediately ceased to be a proletarian of industry and became able to visualize, in a tangible way, the possibility of sharing and enjoying its fruits. And the car, in a country built on cars, was soon a certificate of citizenship.

It is no wonder, then, that the automobile is the focus of emotional intensities. It entered the scene at a time when Americans were electric with aspiration and it too inevitably became highly charged. Machinery is rarely neutral, but it is least neutral in a context where great demands are made on it and great expectations entertained. The automobile is an emotional object not only in America but everywhere people have discovered that things need not be always as they are. If the auto

has adopted extreme shapes in our country, it has done so because this is where it has enjoyed the most extreme opportunities.

The opportunities have arisen, of course, because of the nature of the love affair. The adorer, like a tiny slave to his enormous, shiny master, has learned to lavish on it time, attention, and affection; he redesigns his continent and his life around its whims and wanderlust, sacrifices his cities to its indifference, dedicates his open country to its insatiable hunger for space. Since it is not for his personal good that these demands are made, they are both easier to make and to meet. He can do for a symbol things he cannot do for himself. It often looks like a heavily one-sided affair, but in fact his love is requited. The auto gives him back as much as any paramour: self-completion.



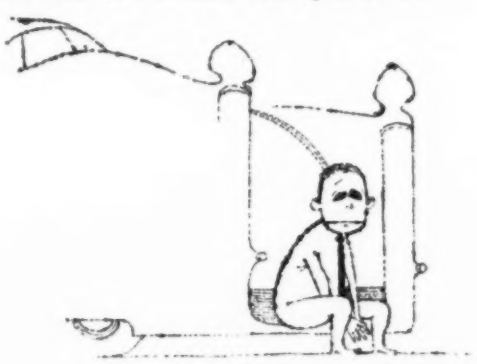
The car's full significance is a total of all the roles it has in the life of a people seeking ways to escape from Puritan dreariness, and then finding ways to conceal from themselves what they are doing. The success of Detroit has come from understanding this, or at least sensing it and acting accordingly. Most writers, designers, and other students of the contemporary scene look with dazed incomprehension on the progress of the automobile from its beginnings as a no-nonsense solution of a practical transportation problem to its present apotheosis as a piece of wildly imaginative metallic sculpture. Not so Detroit, which has learned how to power a heavy industry on soft winds, and to rejoice in its own inconsistencies.

Detroit's discovery of how to exploit its customers' fragile and unadmitted motives—their feelings about color and shape, their latent capacities for fashion and symbolism — was made possible (and was, at the same time, vigorously resisted) by Mr. Ford. He would give them any color they wanted so long as it was black. But as soon as they saw that the stream of cars was unending, they began to want the one thing he was unprepared (and, on principle, unwilling) to give them — which was style. His revolution had been so successful that he had brought it down around his own head, and his reluctant conversion to the Model A was a tragic confession of defeat. The idea of the yearly model won out over the idea of the objectively sound and desirable car, of a final emotional commitment to one object.

Yet the new doctrine of institutionalized fickleness, had he only been able to see it that way, was a logical extension of his own. Henry Ford was a man obsessed by time. As a boy he repaired watches. Riding with Barney Oldfield, he hunted speed records. As a rising manufacturer, he haunted the assembly line, shaving off seconds from the mass-production process. As a multi-millionaire, he collected the past — which he had done more than anyone to destroy — and brought it to Dearborn, to put in his museum. He understood production as a process, rather than an attempt to make money or things (he hated bookkeepers and banks), and he dreamt of a car that would be made out of plastics or other organic materials, so that we would no longer have to depend on nonrenewable resources like minerals and could merely use up automobiles and throw them away. But for consuming goods he had no talent — no appetite, no envy, no curiosity. His imagination was unequal to the world he had himself created, a world that permits people — by consuming more than they need — to ignore the pinched, utilitarian sparseness from which he sprang and never quite escaped.

"Indeed," as Christy Borth of the Automobile Manufacturers' Association has said, "it was not accidental that most of the pioneers in this field of endeavor were from the farms and the small towns of the land. They knew, by bitter experience, the grinding drudgery and the appalling loneliness which were the most characteristic attributes of rural life in America . . ." The automobile was not the gift of riches; it was only a first and partial increment. For many customers, it not only *could* be a symobl for the unattainable panoply of wealth, it *had* to be. It was all they were going to get. The car had to contain everything. Not only did it have to have "features" that would lure customers from varied social strata, and satisfy a variety of whims within a family; it had to do the same within the individual, and carry the tonnage of both his actualities and his potentialities — including his hopes for higher taste and class.

But it had to do all this without seeming to be permanent, or to take itself too seriously. Since the automobile is really *not* a substitute for the country estate it drives up to in the ads, it cannot pretend to the stability of real distinction. And, since no one likes to think that a mere vehicle is the peak of one's achievement, the American automobile also had to look temporary, with the shadows behind it of subsequent models, year after year, stretching to the horizon — and not look, like a Rolls or a Bentley, as though it stood for a terminal point in time. Ford, a Puritan of Puritans, had started his countrymen down the unmarked road of learning how *not* to be Puritan, of learning to spend time as well as save it, of learning to live with the abundance he had showered upon them.

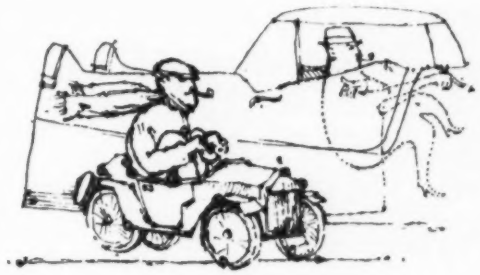


Once something becomes easier to make than it is to sell, its style assumes a paramount importance. Style entered the scene to the degree that sales were attributed to the intangibles. By solving its production problem (and having its labor problem solved for it, by the unions), Detroit took the automobile away from the engineers and conveyed it into the hands of the designers — a transfer described in greater detail elsewhere in this issue. Under their guidance, it rapidly began to change and grow into a new entity, which would embody impermanence, escape, mobility, and even more whimsical values. There was no prototype for this kind of design, even among its own ancestors. The principle was tacitly accepted that no one really knew what a car looked like.

In this admission lay freedom of an absolutely unprecedented kind, and it has led to many extravagances of baroque excess that help tell us why the car has turned out looking as it does. In becoming responsive to public motives, however, auto design runs the risk of entering a permanent state of nervous irritability; for the many intangibles of sentiment become tense and anxious when they are molded in heavy-gauge steel. The desire for increasing bulk and speed in one's private car is surely not neurotic in itself; but when this desire is blown up to several tons, a few hundred horsepower, or twenty feet of fender and released on the highway in a hundred thousand facsimiles, it certainly begins to *look* neurotic. The desire to sit further and further away from a larger and larger engine, on the other hand — though as a human foible it may be no less reasonable than the desire to smoke filter cigarettes — has started a trend to the lower and longer that will have to stop somewhere. An engineer, or anyone who looks seriously at holiday-weekend death statistics, would somehow want to re-arrange the greatest obstacle to vision, the engine. But it remains in front, just as airplane passengers still face forward, because the defiance of risk is more necessary than discretion to anyone who drives or flies at all.

Another effect of this freedom from design precedent is to smudge the boundaries between one category of product and another. Once it stopped trying to look like anything in particular, the automobile could appropriate motifs from other forms of locomotion, whether real or imaginary — wherever they were identified with speed, modernity, or mechanical precision. It became exposed, if only in psychological terms, to competition from the commercial airlines, so that cars had to outdo electric toasters in the pursuit of superfluous streamlining. Currently a customer may not *really* want to drive a rocket ship — in fact, he may not *really* want to drive a Thunderbird — but he can safely sample the aura of White Sands or Banana River by having a design "based on" the Thunderbird for his ordinary old Ford. There can be multiple connections; he can be allied to the past by his hardtop, with its echo of convertibles and roadsters from his youth, and to the future by his dashboard, with its look of an alarm clock combined with a control panel. Similarly, of course, confusions slop over in the other direction, and we need not be surprised at the proliferation of Cadillac V-emblems on refrigerators or that most recent blessing, the two-tone ball-point pen. A shift from monotone to technicolor — another aspect of the retreat from Puritanism — inevitably takes place in more than one area at once.

There is increasing haziness, too, in the distinctions between one car and the next. While it was still outgrowing its European origins, the American automobile clung to remnants of the European tradition of sharp product differentiation. As the Franklin had once been the car for doctors, Chrysler was the car of the staid and engineering-minded, probably readers of *Consumer Reports;* Ford was the car of youth; and so on. Aside from the obvious identifications — like Cadillac with the *nouveau*-not-so-*riche* — these are now increasingly swallowed up in a similarity of objectives, as many manufacturers sacrifice their special audiences to a tenuous claim on the vast, unspecialized audience served by Buick and Chevrolet. The effect is one of blurred boundaries between products, classes, sexes and individuals. The lines of class remain clearly drawn only by the foreign sports cars, and even here they are becoming whimsical: I have been assured by a Hollywood movie producer that among his friends a Jaguar ranks an MG, but that both are outranked by a Hillman Minx convertible, which is supposed to show that you don't really give a hoot what anybody thinks.

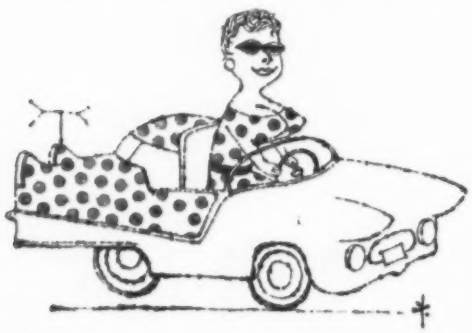


One aspect of the growing conformity among cars is the fact that they *all* continue to look a little crazy. Perhaps they look no crazier than the road-scape they are most often seen against — the ribbon slums of America that link cities together and that no one seems to mind or to notice. Perhaps, too, they seem to their owners and designers no crazier than the purposes they are put to. The damn thing might as well look crazy as long as it's going to act crazy. Commuting by car is irrational and irresistible in about equal proportions. It is just as much effort as waiting for a bus or walking a few blocks, but it is not publicly defined as effort. It is attractive precisely because it is unnecessary. The car is an instrument of revolt against the very *idea* of chores and inconveniences, regardless of their reality. To be splendid and irrational is of its nature.

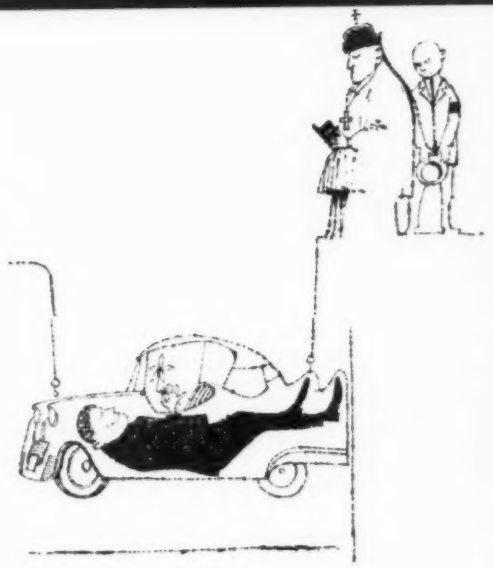
Here, too, the remote and uncontrollable nature of the design may almost become a sales point. Just as the

prospective customer can use the rational arguments against one choice (no trade-in value, can't be serviced, etc.) to defend the cherished irrationality of another choice, he can dissipate his sense of guilt about buying so patently useless an object as a new Pontiac by telling himself that he has no control over the situation, and might as well relax and enjoy it. "They" ought to do something; just as "they" ought to do something about traffic, or make it easier for him to start his fluid drive on a cold morning or change a tire on a dirt road. Similarly, if he is a New Englander upset by Midwestern gaudiness, by the Detroit vulgarity of offering him beer instead of champagne at a coming-out party, he can justify himself to a slightly uneasy conscience by remembering that it is democratic to give in and not indulge one's resentment.

Long ago the designers seem to have realized that making the customer's conscience slightly uneasy was part of their job. They quickly learned that you couldn't ask him what sort of car he'd like, because he didn't know. And they learned (after the early abortive experiments with streamlining) to commit themselves in advance only on a style leader, rather than a whole line of cars, in order both to ask him and to tell him what was coming next (and also reassure him that the company was "thinking ahead"). They learned also to hire sophisticated researchers, who could use "depth" interviews and make some sense of the results. But most of all they learned to use design itself as a way of reaching out to the consumer and grabbing him by the scruff of the neck, of adding an aesthetic kicker that would make him stop in his tracks — as Holly Whyte of *Fortune* put it in his classic study of "The Cadillac Phenomenon" — and think, "The hell they say!"



Sexual symbols naturally lend themselves to this technique of attention-grabbing. So do the curiously ambiguous features that make you wonder whether cars are intended to please men or women. Some designs seem to be increasingly frilled and chintzy, though this may be less an indication of what it seems than of the "homogenization of the sexes," as the sociologist David Reisman calls it. (I am greatly indebted in this article to many of Mr. Reisman's ideas about automobiles.) Perhaps current cars reflect a period in which men are softer, women are cruder. Perhaps, with engines becoming so absurdly powerful, men now find it possible to exercise on their cars an interest in fashion which must otherwise be suppressed. In any event, there is



much mingling of motives. One psychologist has reported that adolescent boys, for example, who believe it wrong to start dating until they have cars, often become so involved in the care and upkeep of the machines that they have little time left for their dates. Young people, since they tend to take symbolism at face value, are more likely than any other class to be exploited by the automobile — and to come to regard driving and owning one as a good in itself.

Where automobiles will eventually lead us, in the flight from Puritanism, we can only surmise. The journey has just begun. Apparently the point has already been reached where the automobile serves as the agent of an all-encompassing refinement in American society, as a sort of chromium lace curtain to cover up differences and deficiencies that would otherwise be awkward to deal with. It is democratic in its refusal to assert style leadership by setting genuinely aristocratic tastes that then filter slowly down; quite to the contrary, through market research it makes style filter up from below, or brings to the top of its management hierarchy a man like Harlow Curtice, who does not need market research since he himself is a perfect Mr. Average.

Yet the automobile serves also a pair of purposes that may someday be viewed as valid: it has taught its owners to consume, and its makers to produce, for an economy in which the strictures of historical scarcity no longer apply. It has made waste through overconsumption one of the indispensable gears of that economy, and has made it socially acceptable as well. The promises of an era of endless abundance may be spurious; we may be extrapolating from the symptoms of prosperity a future that will never arrive. But we are already having difficulties in assimilating the abundance that is already upon us. If we are to prepare for the possibility that abundance may increase, we will need all the experience we can get with the improbable, or even the impossible. And here the lesson of the automobile is unequalled in usefulness — for a world in which the American automobile is possible is a world in which anything is possible.

case studies

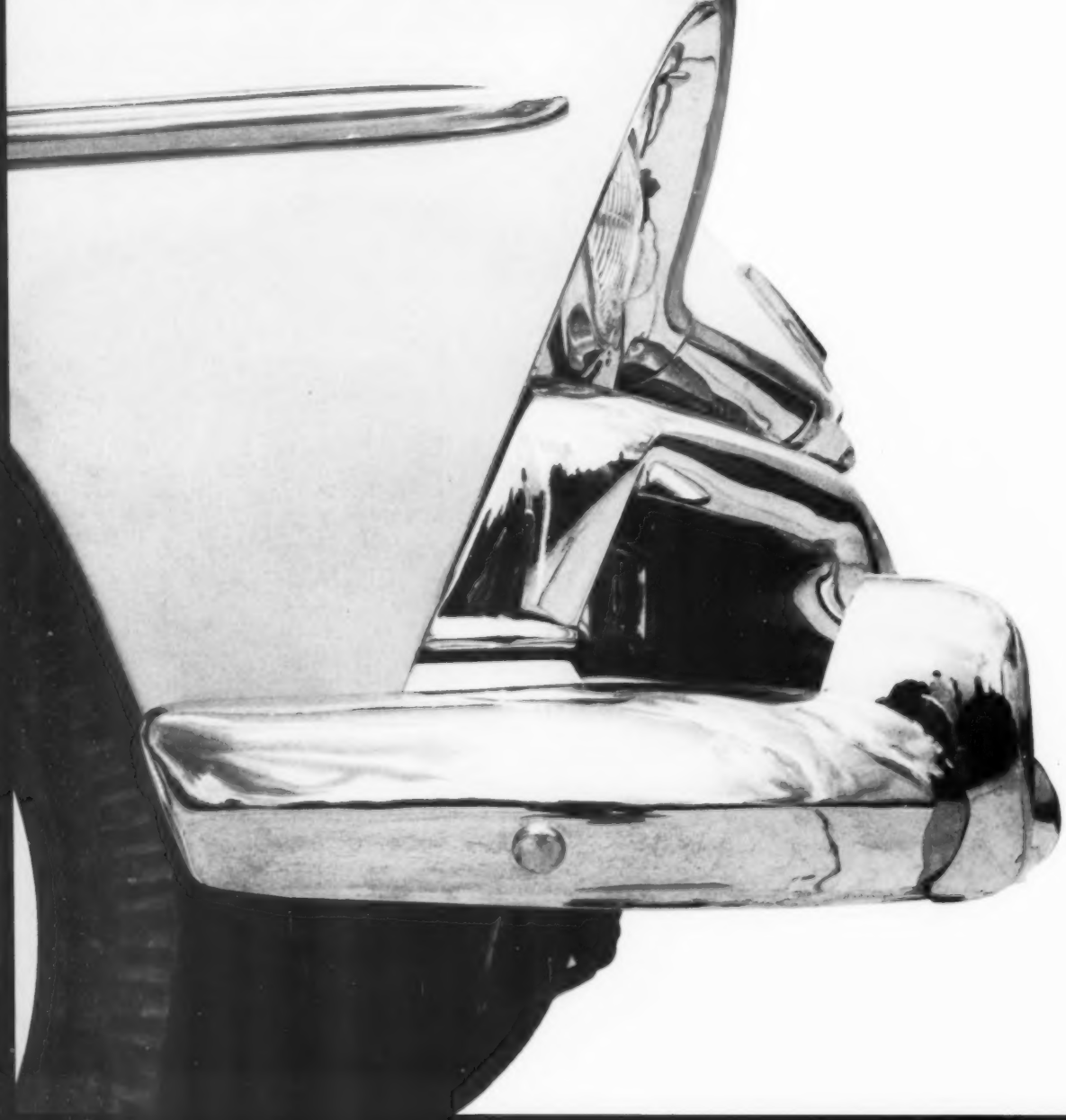
Which way is Detroit headed? How will the forces within the styling sections array themselves from now on, and how will this affect the business of designing and selling automobiles?

Obviously, the answers to these questions are a matter of concern to industries other than those in Detroit, other than those that depend on Detroit. Manufacturers in every field have always watched Detroit like a business barometer — and today they are watching it like a tactical guide.

What they stand to learn from Detroit is not tricks or style, but method: how market objectives are formulated, how they are backed up with organizations and people, how those people approach their problems, how and why they succeed or fail.

On the following 20 pages we unfold three case studies of significant Detroit products, as a way of focusing on the design thinking in each of the Big Three, and projecting it slightly into the future. Detroit will probably never change its tune. But it may very well change its cadence, for one thing is sure: as long as design makes the wheels go round, Detroit can't afford to stand still.

CASE STUDY: **Plymouth '55**



An unprecedented policy giving new freedom to designers pays off for Chrysler

That sharply canted, confident-looking nose on the left, which is now nudging Buick for the Number 3 spot in U. S. car sales, reflects the designing hand of Virgil M. Exner (above), Chrysler Corporation's Director of Styling, who, in inaugurating the "forward look" for 1955, brought the entire company as well as the Plymouth from a losing spot in the sales race.

What happened was a piece of major styling surgery, not a mere nose-lifting job. As a result of Exner's program, Chrysler's five cars — Plymouth, Dodge, De Soto, Chrysler and Imperial — were completely changed. And it all happened within a period of time which is generally considered barely adequate for a single model.

For years it had been Chrysler's policy never to build new cars for the sake of a model change; every development had been based on sound engineering changes alone, and the company prided itself on having no fancy trim — just well-built cars with comfortable seats and plenty of headroom. But in 1952 they began to count their lagging percentage of the market and realized that the public was definitely buying cars on appearances as well as engineering — bigger, lower, glassier automobiles which seemed to offer more for the money. Chrysler began to realize it could no longer afford to consider Styling an incidental corner of Engineering and Sales.

How Exner met the challenge and forged a new path for Styling in the company is significantly different — in design terms — from the way a new car is created in other companies. We will illustrate this by following the evolution of the Plymouth in some detail in this story.

Preparation

L. L. "Tex" Colbert, who was made President of Chrysler in 1950, called a meeting in early summer, 1952. Colbert and A. vanderZee, then Vice President of Sales, had recently made a tour of the dealers and had heard their complaints about the Chrysler line: no fully automatic transmission; too high-priced for the competition; and "too conservative" in body styles. The group consisted of relatively young division heads to whom Colbert was delegating more authority; the Vice Presidents of engineering, sales, manufacturing, finance; chief engineers in charge of chassis and body design and Exner, who had come to head an "advance style" group in 1949; and was then in charge of the program of '55 designs for De Soto and Chrysler on a normal 3-year schedule. Meanwhile word had leaked out of a radical change at Ford. All agreed that what they needed were new designs for Plymouth and Dodge too in '55. But could it be done on such short notice?

They turned to Exner, whose designers had only begun to project future Dodge-Plymouth ideas. Exner asked for full cooperation and greater design freedom than on any previous assignments. Though the cost was high, a $250 million investment, and the timetable was tight, 15 months, and the policy unprecedented, they told Exner to go ahead.

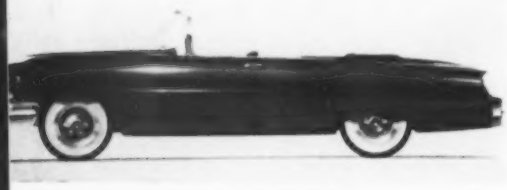
The "Forward Look"

For the biggest project of his career, the newly appointed Director of Styling was not unprepared. He had begun in 1933 at the General Motors Styling Studio, later had worked for Raymond Loewy on the 1947 Studebaker, and had already been responsible for many "idea cars" at Chrysler. These reflect what might be called Exner's "arrow theory" of car design: a front lower than the rear and pointed forward, giving an effect of power and push. Since the eye follows the direction of thrust, Exner prefers the look of a jet nose, for example, to the high tilt of a motor boat.

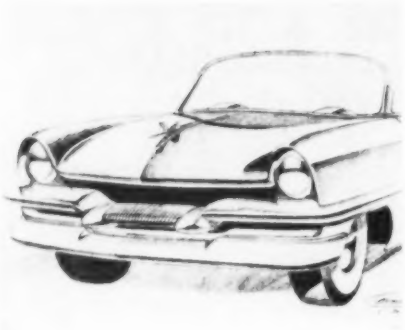
His basic conviction is that a car should look "like a car, not a boat, or a refrigerator on wheels." The body should be sculptural, not a series of slabs with a lot of overhang. Slightly bowed sides and curved edges are more graceful and more thrusting. Thus Exner had a very clear idea of the kind of automobile design that he wanted. With pencil sketches illustrating these general aims, he briefed the studio heads and gave them the goal of a "slim, fleet line." Then the styling staff went to work making sketches, each one trying to produce the key drawing which would define the direction of the new line. By this method Exner served personally as an "advanced body studio," giving latitude to the various individual studios to develop whole designs within a broad objective.

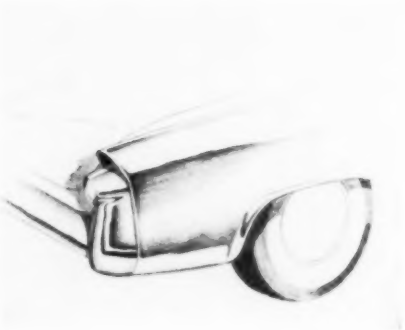
An Exner "idea car": Chrysler D'Elegance

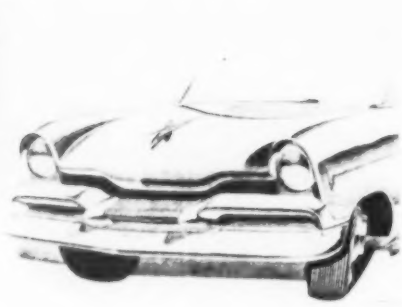
Top, early Plymouth studio sketch.



'55 Dodge showing interchangeable parts, also used as basis for Plymouth.







Above, in early versions the fender cant is slight; below, the cant increases.

Above, the rear begins at a low and tapered point; below, a study with bumper.

Plymouth front and rear change radically, as the "slim, fleet line" is defined.

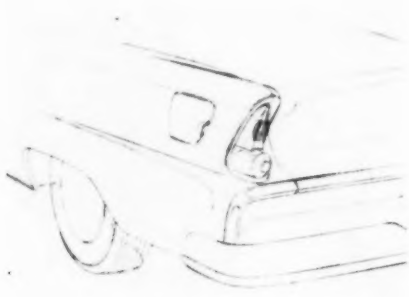
Because tooling requires a certain amount of interchangeability on the production line, Plymouth and Dodge (and this is also true of their competitors) must share a central body element. Exner felt that the Dodge sketch was closer to his concept than the Plymouth candidate (top, left). He liked a less static cowl and door treatment and the forward-thrusting pillar rather than the vertical one. It is interesting to note that both designs show a wraparound windshield which had previously been used only on experimental cars; General Motors was developing its version at the same time and put it on the market first in 1954. Exner's windshield is distinctive; it moves the whole pillar back and retains the slope, the angle contributing to the tumblehome effect which he also wanted in his curved body scheme. Taking that standard section, as illustrated above on the finished Dodge, stylists at Plymouth and Dodge struck out from there in independent directions.

Since it affects the slope of the hood, the sub-structure of the door, the beltline and common points of joining to the hood, this is a very influential section, though, as the final Dodge and the Plymouth illustrate, it is adaptable to highly individual end products. Working around this basic structural shape and Exner's general concept, Plymouth stylists began on the areas which were to distinguish their car, developing the main proportions of the design, relating them to the established pillar width and slope, the windshield dimensions and the height of the beltline at the pillar.

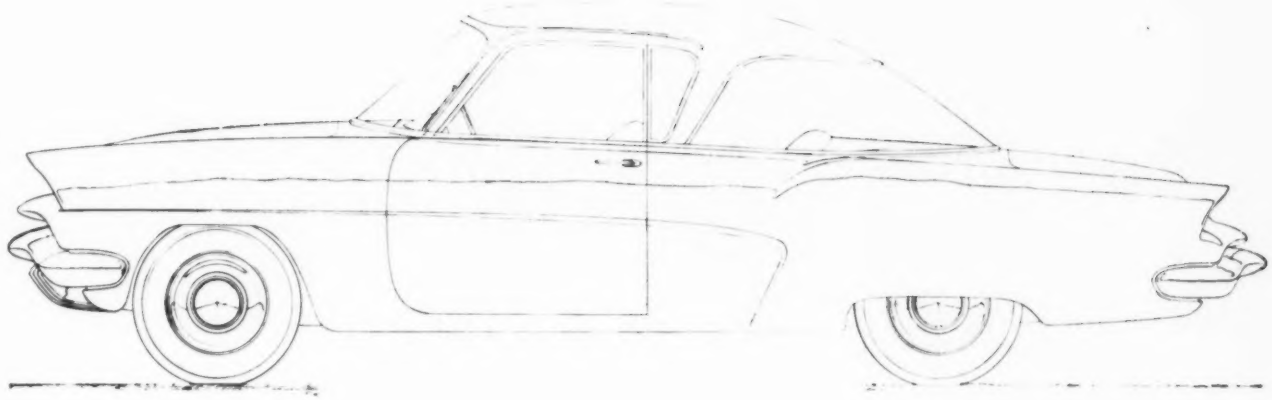
The crucial phase: front and rear

Testing their ideas constantly in sketches and on 3/8 clay models, Plymouth stylists began to consider specific front and rear designs. Exner encouraged them to slope the hood downward and to keep trimming the rear. At this point, as the sketches show, the cant of the front fender, and the divisions of the grille, make three distinct bands.

The cant later is lower and sharper.



The rear later has the forward slant.



The designers were concentrating on balancing the main areas and establishing a direction of thrust. When the hood line became too low and downcast, Exner checked that trend and had it raised. Another problem was the degree to which the tail should be narrow and pointed. It started from a low point and continued to deepen, and it, too, had three elements during the first phase. After about eight weeks they paused, put their ideas together; the side view above sums up what they saw. Although radical changes were to follow, the sketch does contain the essentials: a sloping hood flanked by a flat fender line which drops off to a decided, though modest, tapered rear fin; a curved body section and a horizontally sloping deck. The "poised and eager" look that Exner and his staff were striving for is already perceptible.

Late in 1952, about six months after they were begun, the 1955 designs in full-size clay models were wheeled out for executive inspection. Neither management nor Exner was entirely satisfied that the Plymouth was "hot" enough, particularly at the front end. Production on the major body panels could go ahead while the stylists worked overtime drastically changing the fenders and the hood line. Exner's idea was to create a more pronounced reverse angle treatment; he referred back to the arrow. Accordingly, they increased the fall-off of the hood in order to get more of a wedge shape; and, by progressive stages (see left page), they sharpened the cant of the front fender until it was no longer chopped by the front metal but made one continuous line; the final grille design was later fitted into this scheme. The rear was raised to balance the new downward thrust and to create a symmetrically bowed beltline; the deck was lowered slightly and modeled to avoid flatness; and the tail was shaped more simply, its angle too, accentuated — down at the end and upward from below.

Two among candidates for the Plymouth grille, these were rejected.

The finished car expresses the convictions of its designers

A mock-up in plastic, ornamented like the actual car, was taken outdoors for the final test. Daylight revealed one problem: the rear quarter area near the tail light seemed to sag because of the way the highlight on the fender fell. The expensive die had to be remade, but the error could hardly have been detected without the daylight test.

For the finishing touches, color and trim, Plymouth designers had to work out their version for a two-tone year. Some auto manufacturers paint according to construction breaks; Plymouth follows the school that creates color areas by following the trim lines, but fairly conservatively, on the Belvedere.

By November 1953 the entire Plymouth design was OK'd by the same executives who had launched the big gamble only 15 months before. A year later the car was unveiled for press and public and the verdicts began to come in, entirely verifying management's faith in its designers' convictions. By July 5, 1955, Plymouth output came to 426,186 cars compared to 219,984 at the same time in 1954. All Chrysler cars

⅜ model of near-final design (top) was followed by full-scale 2-door model. 4-door production model (below) is almost identical.

and the public responds

came up in sales, but Plymouth and Chrysler most spectacularly.

The '56 model, to be unveiled later this month, will have one major change. The fin has been raised and tapered to pitch the rear decidedly higher than the front of the car, giving the Plymouth an even closer resemblance to an arrow. If the '56 moves as fast as the '55, selling two to one compared to the immediately pre-Exner models, the judgement of the Director of Styling may continue to gather momentum in an engineering-minded firm.

Plymouth's wraparound, retaining slanted post, juts out only slightly.

'56 Plymouth sports enlarged fins.

CASE STUDY: **Continental Mark II**

with silverspoon styling, Ford grooms its contender for a gilt-edged market

No automobile design in Detroit has ever had quite such an aura about it as the new 1956 Continental. Car-lovers have been awaiting it with the same brimming emotions of a body of loyal subjects waiting for an heir apparent to the throne. For many months the Continental-Confidential stories have circulated. They have talked mainly around the subject, for the secret has been guarded well—though not *too* well.

Now it can be seen. As of October 5, 1955, the car's on the road. And *this* is what they have done with the spare tire.

Although the design story behind the Continental hasn't been nearly as confidential as the design itself, it bears reexamining in terms of the finished car. The effort to launch a successor to Edsel Ford's 1939 original (below) spared no expense and followed a logical path of development. Once the Special Products Operations got under way, beginning in June 1952, it grew into a division of the Ford Motor Company in its own right, with a new plant and 600 employees planning for a limited production of 2500 Continentals a year. The designers were conscious from the start how much depended upon the stellar qualities of their design. The legend of "the queen" was both an asset and a handicap; it was rather like MGM trying to groom a successor to Garbo from the cradle.

Like father, like son

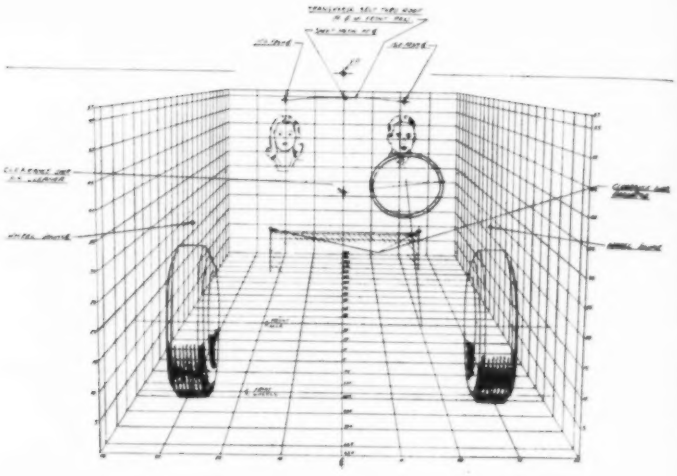
The first Continental was Edsel Ford's personal car. In contrast to the general trend of American styling in 1939—a short hood, a long greenhouse, no rear deck and a spare tire concealed in the trunk—it followed the lines of European sports cars which had taken Ford's fancy: a long hood, short greenhouse, short deck, and, he insisted, though his stylists winced, a spare tire on the outside of the trunk. These features in themselves did not create a beautiful car, but their rhythmic integration in clean, harmonious curves did. The superb automotive proportions of the Continental were immediately recognized. So enthusiastic were Edsel Ford's friends in Florida that they gave him 200 unsolicited orders at any price. Without having intended it at all, Ford began producing a limited number of custom-built Continentals, altering the design to a certain extent until 1948 when the model was discontinued in an economy move. Although new versions were designed in 1949 and '50, they obviously lacked the qualities which would reestablish the classic symbol, and were rejected.

Meanwhile young Bill Ford, manager of Special Products Operations, who at 14 had witnessed the Continental's unprecedented success in Florida, had been wanting to recreate his father's car, not its form, necessarily, but its classic excellence in contemporary form. It was his committee which defined the styling objectives of what was then called the X-1500 program in a report dated January 22, 1953.

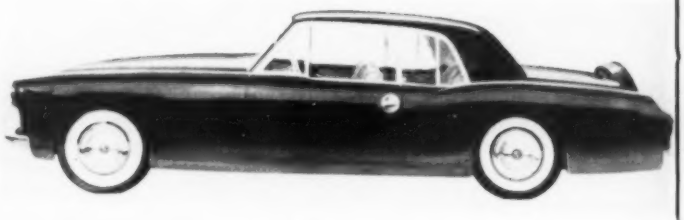
The "Modern Formal" Theme

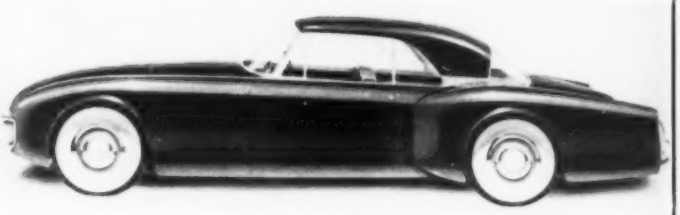
Ruling out the "ultra-modern technological car" because of cost and limited practicability, the report defined two basic styling directions: "Modern Informal . . . soft continuous, streamlined surfaces which have a rakish, spectacular appeal. . . . Carried to extreme it emphasizes increased use of chrome, massive front and rear-end treatment, and continuous rub rails, jet scoops, etc. . . . Styling gadgets replace the clean, sharp body lines which are the hallmark of a lasting, classic design." "Modern Formal," on the other hand, is a "functional, enduring design emphasizing an air of distinction and elegant simplicity. The beauty of this design lies in its proportions and fundamental composition of line and form." Needless to say, the committee favored "Modern Formal" and summed up its objective as "product prestige through esthetic appeal of this car to the 'carriage trade' . . . not only as a work of art, but as a symbol of affluence." Its design was to be determined by the outcome of the competition shown on the next spread.

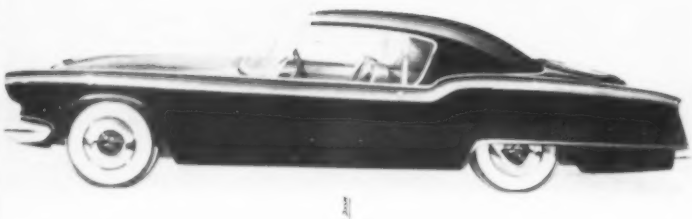
1939

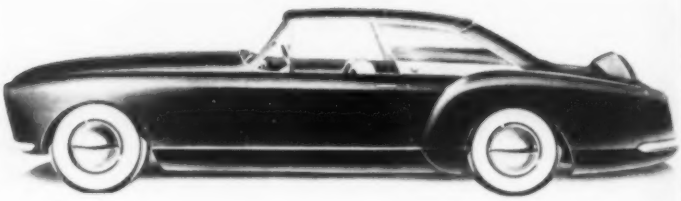


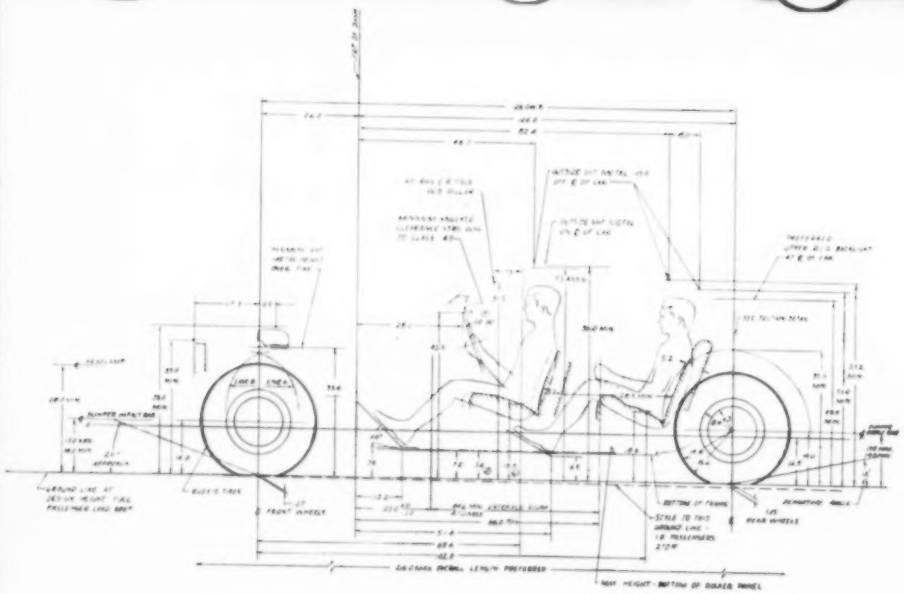
The jury considered a whole fleet of Continental proposals . . .

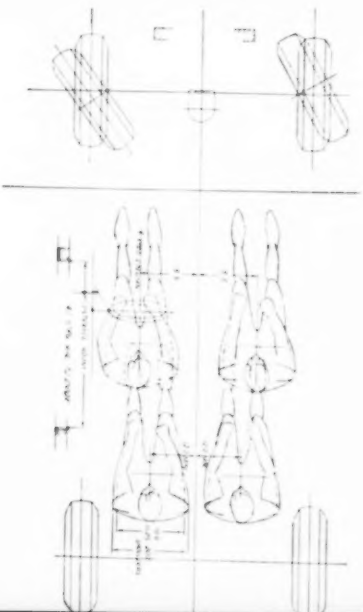


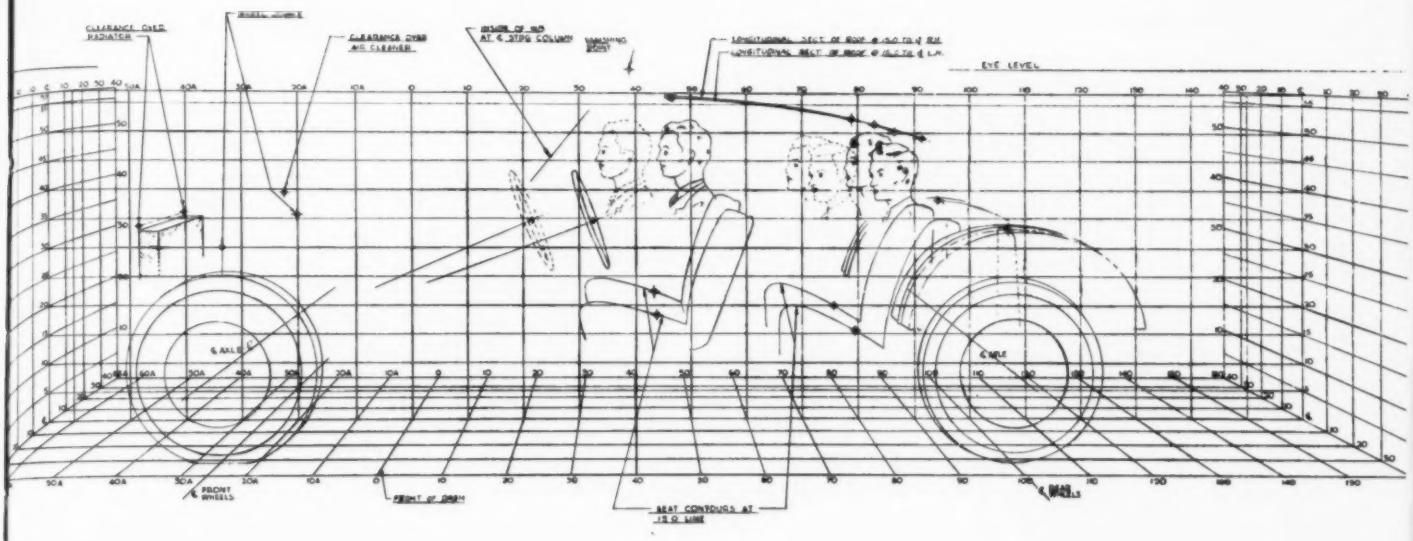


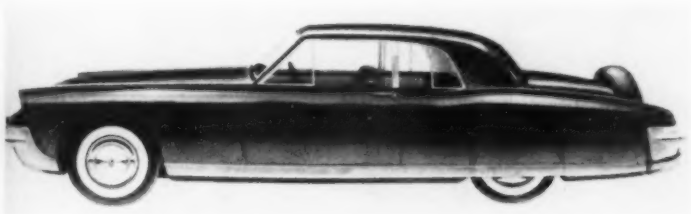


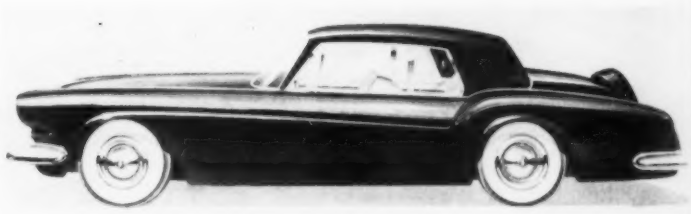


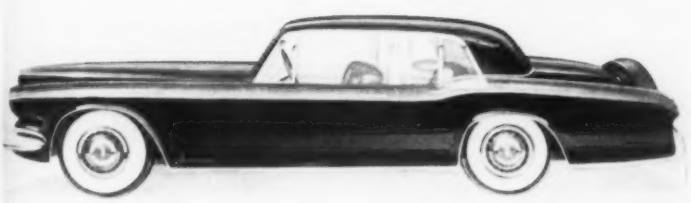


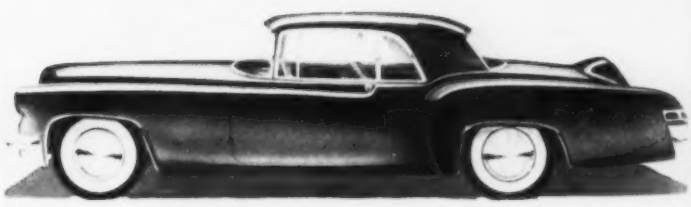


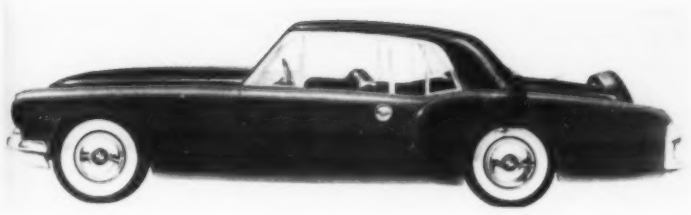


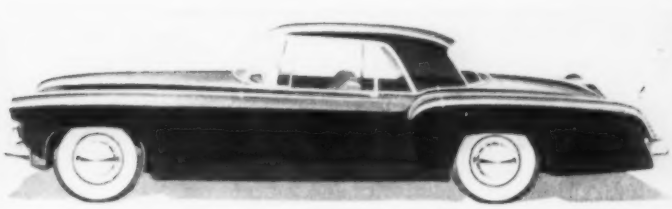








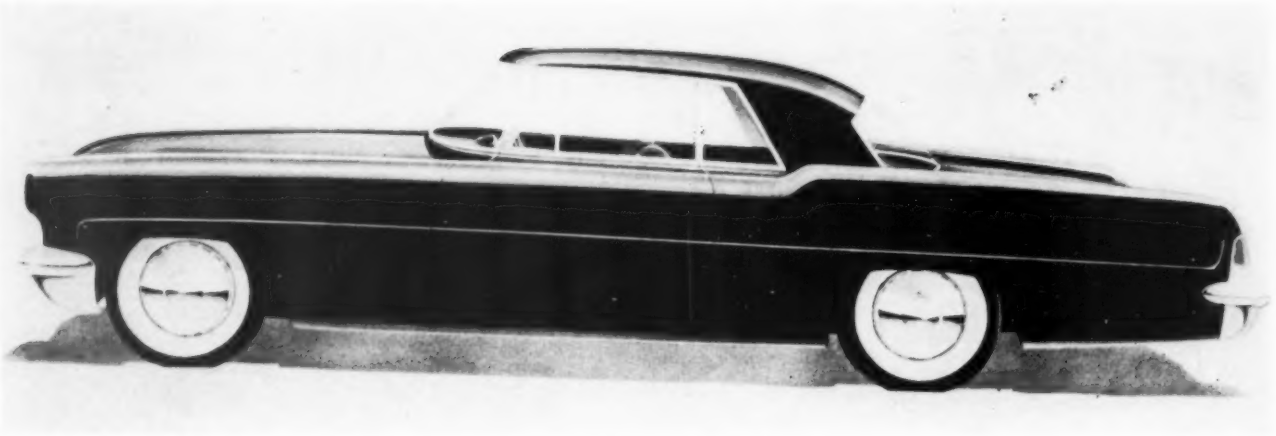




With the stipulation that the car must perpetuate the elegance of the original in a 1956 idiom, the Special Products Division hired four outside design offices to submit ideas and compete with Bill Ford's hand-picked team: John M. Reinhart, chief stylist; Gordon Buehrig, chief body engineer (designer of the famous 1936 Cord); and Harley F. Copp, Chief Engineer.

This team and the consultants, Walter B. Ford, Vincent Gardiner, George Walker, and partners Miller and Grissinger, all of Detroit, were given a grid package containing the same engineering specifications for three possible seating arrangements. All were required to adhere to 7.2″ ground clearance, 126″ wheelbase, 56″ height and 77½″ width, as well as certain chassis measurements and other mechanical limits, as the illustrations show.

Six months later, their proposals, rendered in the same size, views and color so that no design could exaggerate highlights or perspective, were displayed as anonymously as they are above for a showing to the top Ford executives who were to act as a jury. Bill Ford conducted this committee individually through the proposals; they saw the Continental features adapted both sportingly and sedately. These showed considerable variation within the given long, low specifications: in the placement of a spare tire; the fender treatment (some with a bulge, some omitting fenders); and also in the pitch of the nose. Their preference inclined toward nothing obviously extreme, however; the unanimous choice was one of three done by Bill Ford's team, two of which are shown in the last column above, and the winning one on the next page.



Ford's winning sketch epitomizes the low horizontal concept of automobile design.

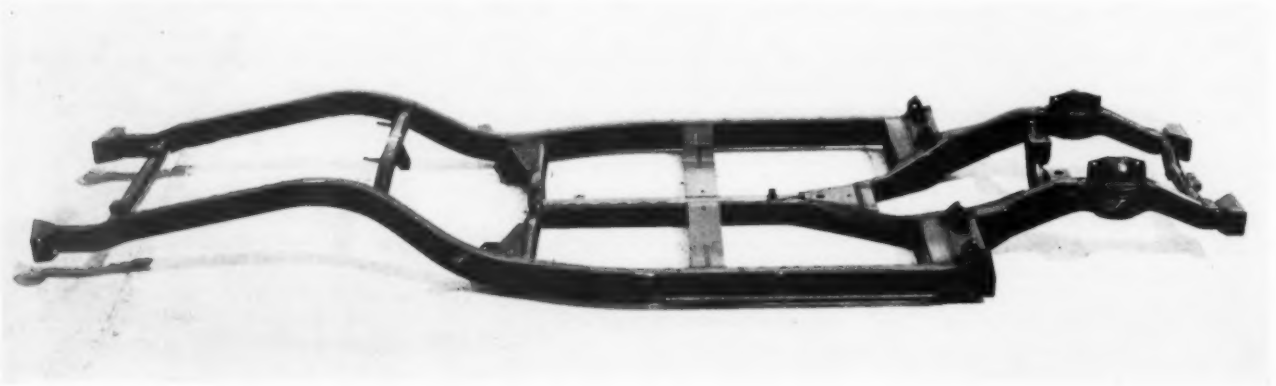
After the jury's verdict, Ford's team was free to develop and refine its proposal . . .

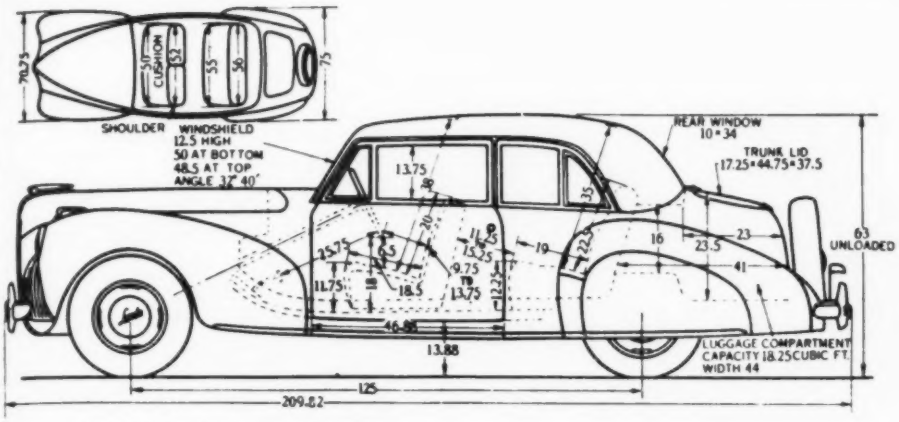
Ford's team arrived at their chosen design by progressive stages. Never losing sight of the original measurements, they took the basic Continental ingredients and evolved them through many schemes, designing the car, as they later realized, through all the years that it had not been in production. An earlier proposal (see previous page, last row) still retained a rear fender and a spare tire on a short deck. They decided that although this might have been suitable for 1953, the 1956 car must be more strongly horizontal. The chosen sketch (above) has sharper edges, square-cut wheels, and is almost a straight line and a perfect slab, except for the slight kick-up suggesting the rear fender.

During eight months, while they carried out the sketch through the stages of clay models and mock-ups, the designers avoided any outside ornamentation, and even threw out some decorative air vents which they liked when they turned out to be unnecessary in the ventilation system. They intended that everything about the car serve a useful purpose. Major changes were the curving of the line along the body to correspond with the fender treatment, and the "chignon" suggestion of the spare tire added from an earlier scheme.

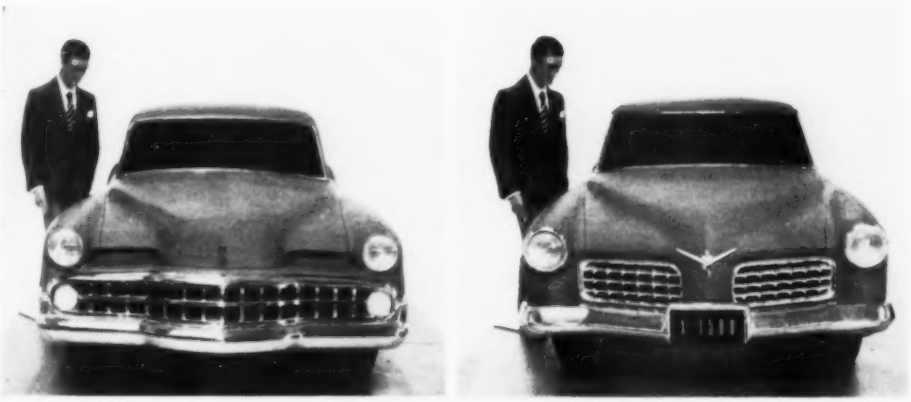
Although not quite as "pure" a design problem as Edsel Ford's, who had only his own preferences in mind, the development of the Continental Mark II did give unusual leeway to its designers, who had only to satisfy their own standards and those that they felt represented the Continental's market. There was no pressure from Sales to alter any detail, to add any piece of chrome. The concepts of the two automobiles, as represented at the top of these pages, are, of course, vastly different. Obvious points are the absence of articulated fenders, the greatly increased window area and rear overhang of the 1956 and its lower ground clearance—only 7.2″ compared to 13″ in 1940. The 1956 stylists directed their main efforts toward creating a model that would *look* even longer, wider and lower than it actually is. While the 1940 is designed as a poised object, the 1956 is designed as a moving one. The original was also created in terms of a balanced ratio of parts as, for example, the short trunk is rounded out by the weight of the spare tire, a succinct vertical that balances the long hood. In the 1956 the parts are continuous; one is designed to flow into another and create the long, unbroken line which is the ultimate expression of the contemporary horizontal school of automobile design — a style which this original sketch epitomizes even more effectively than the finished product on the next spread.

To get the lowest possible car, a special ladder-type, tubular frame was developed by Continental engineers.





Lincoln-Continental Coupe 1939



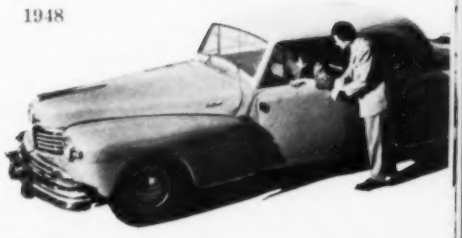
The small twin models with different grilles date from the early days of the X-1500 project before the jury selected one of William C. Ford's designs. The final grille follows the refinement of the one on the right. Above, Ford checks a 3/8 Mark II model.

1940

1942

1946

1948



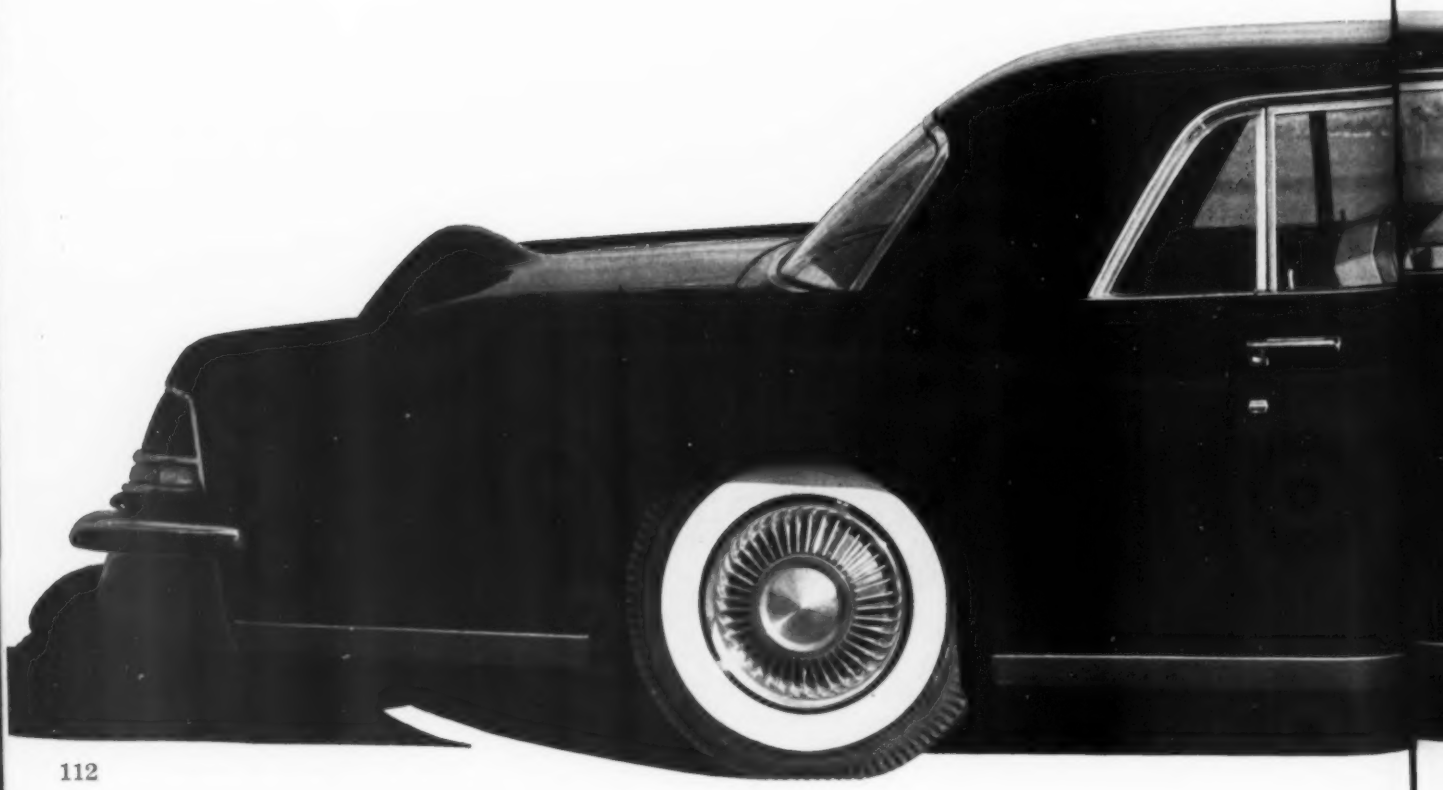
The finished Mark II reflects high finish and high purpose

Now unveiled, the Continental Mark II stands in all its gleaming perfection, ready to be scrutinized. Its makers provided silverspoon styling conditions in an effort to make it as distinctive on today's market as its forebears were on yesterday's. Its designers' aims, "to create not only a work of art but a symbol of affluence," were lofty indeed, and they demand that the success of these aims be weighed in their own terms—by the highest standards.

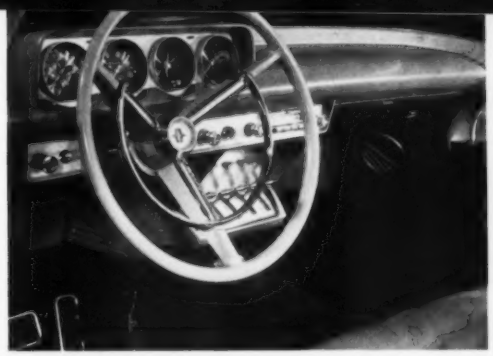
The phrasing suggests that they thought "symbol of affluence" the more difficult objective to achieve; if this is so, then the designers have succeeded well, for there is no question that the car looks expensive. The rigid restraint in the styling of the crest, wheel covers and grille, and especially the instrument panel, has the gleam of a tray at Tiffany's. Adding to the gleam are Scottish leathers and the most durable paints, treated with four double coats of lacquer, an oil bath and hand-sanding. Besides a great deal of handwork done by suppliers, 90 man-hours of assembly and a 300-horsepower engine go into each hardtop coupe, which is then stored in a plastic bag.

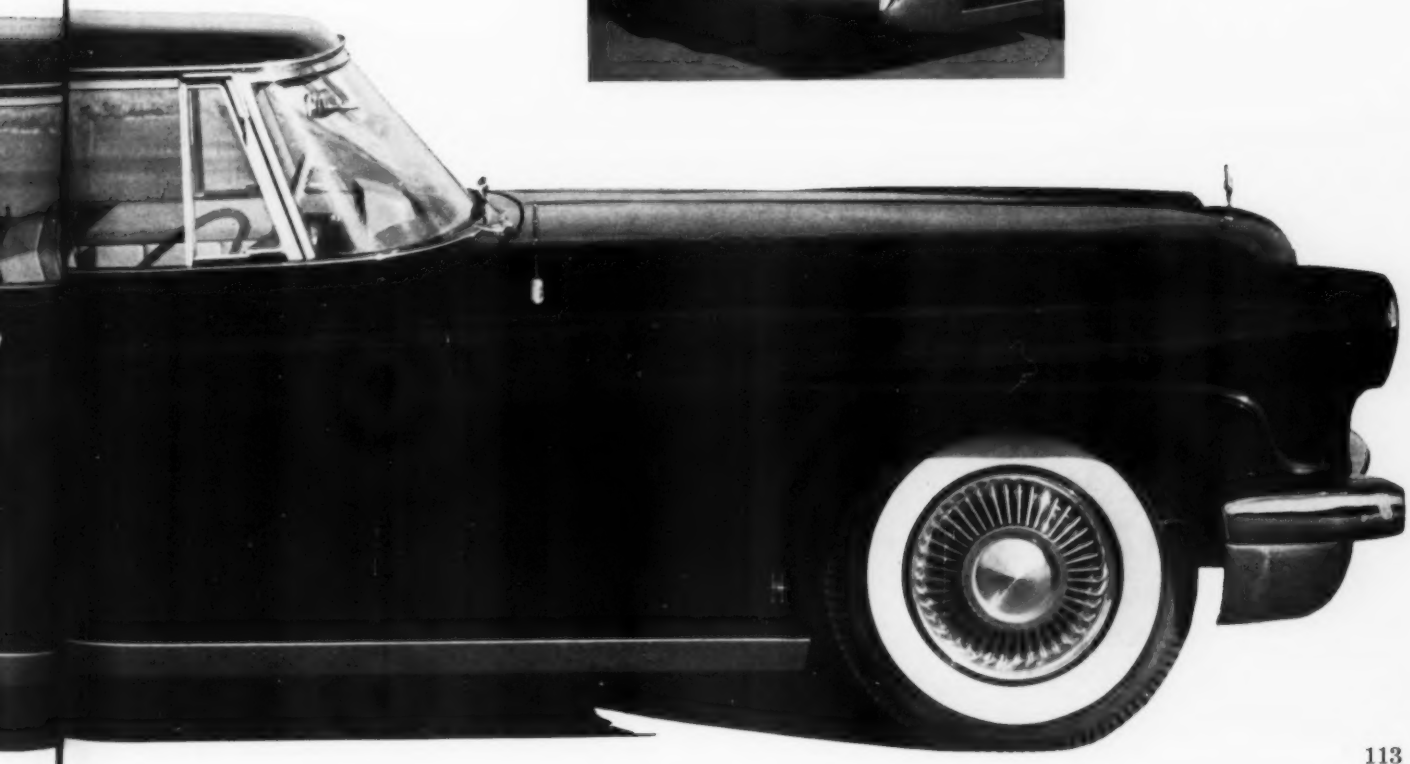
And there is no question that the car will sell. The sales department has 50% more orders than it will ever fill. From one town in the Texas Panhandle came 12 checks—11 for $10,000, and one from a skinflint who sent only $5,000. A doctor in Kansas sent in a three-page autobiography and a letter of recommendation from the governor of the state. Sales hasn't decided yet whether he'll get one. Then there's the Hollywood problem—whether to sell a Continental to an upstart like Marlon Brando or only to seasoned veterans like Clark Gable. In the American marketplace, there can be no success as great as a Hollywood feud for prestige.

But as for "not only a work of art," the designers have perhaps both understated and overworked their objectives; the character of the Continental Mark II is less distinguished than its workmanship. This may be attributable to an overscrupulous avoidance of the errors of other schools of design in an effort to attend the requirements of good taste. The careful repetition of the beltline in the body modelling looks deliberated upon; the discreet use of chrome on the underbody tends to cut off the natural roundness of the line; the wraparound of front and rear metal, though restrained, belongs undeniably to an idiom that does not care about restraint. But more serious than the minor points of detail is the unresolved conflict between an old and a new idiom, most clearly dramatized by the rear of the car. The exaggerated

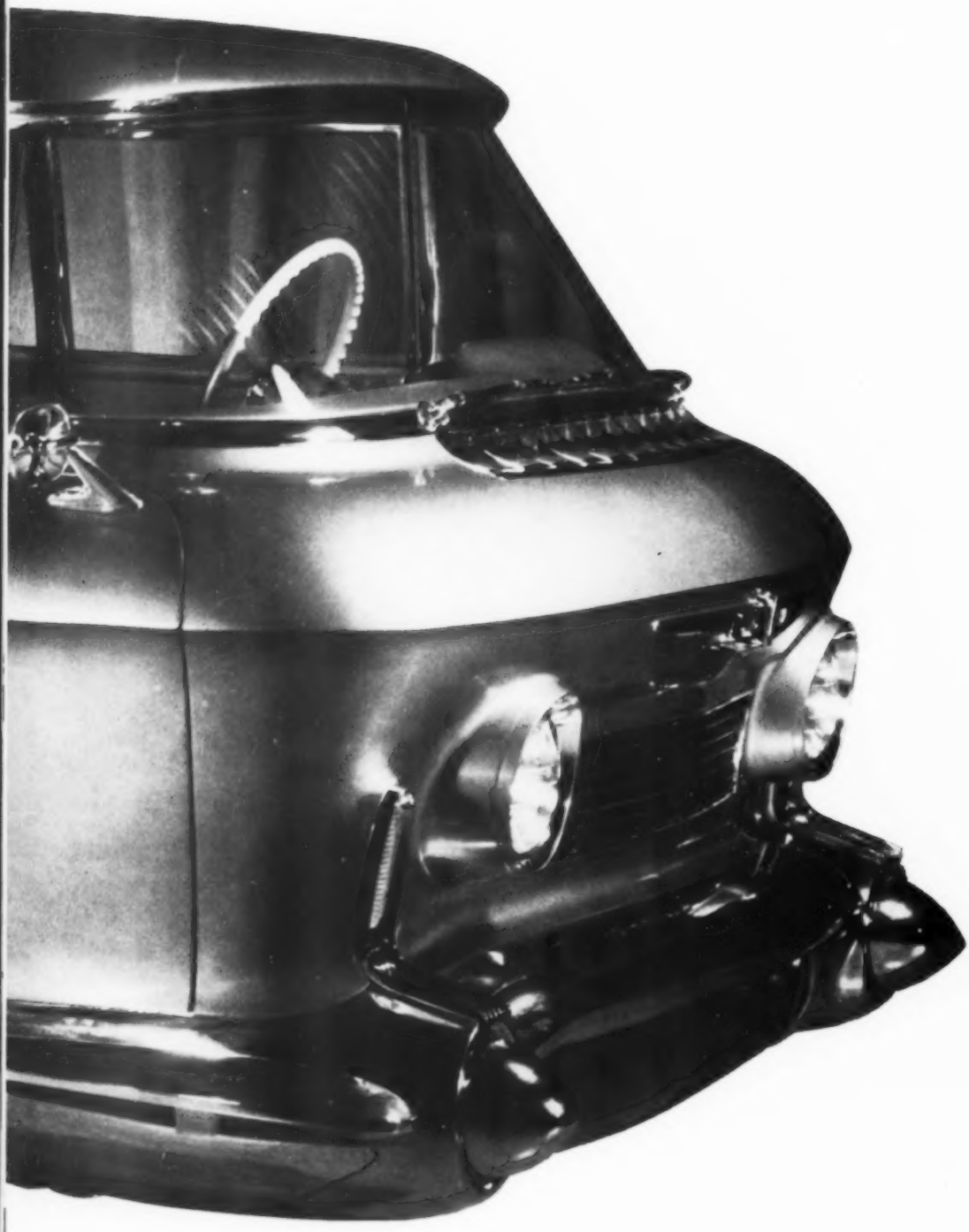


rear overhang of the 1956 idiom is part and parcel of an uninterrupted horizontal line. The addition of the spare tire as a coy vestige rather than as a working element seems to indicate a last-minute lack of faith in this horizontal concept which, if carried out, might have given the car a truly regal bearing. The vertical line of the tire, however, belongs to a more moderately proportioned rear end that calls for weight and termination. In this conflict the designers met their stumbling block. A work of art requires more than high purpose and more than the tasteful avoidance of error. It requires originality, sufficient vitality to go beyond the cliches—even those that are symbols of good taste—and to arrive at a fresh statement. Somewhere in their zealous attention to the details of a successful symbol of affluence, the designers lost track of that vitality.





CASE STUDY: **Universelle '56**



A dream truck arrives via a new styling method

Chevrolet Carryall

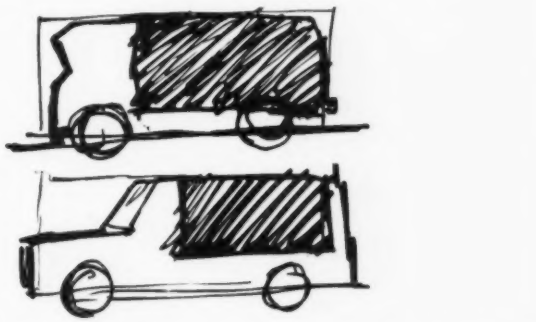
Volkswagen bus

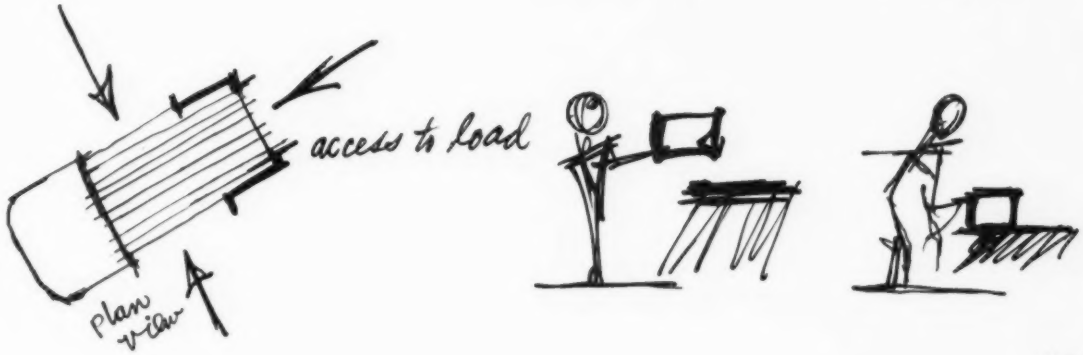
At the 1955 Motorama, when the low, snub-nosed General Motors Universelle took its place beside the Cadillac Brougham, the La Salle II and other sleek, experimental vehicles, the public saw its first "dream truck," glamorously decked out in copper-tone lacquer. It looked like a bus, worked like a truck and could run like a station wagon. The first radical change in truck design since World War I, the Universelle stirred up so much interest that GM decided this year to go into production. Since a show car is seldom put *in toto* on the market, the design story of the Universelle is a significant one; it also represents a new experimental approach at General Motors.

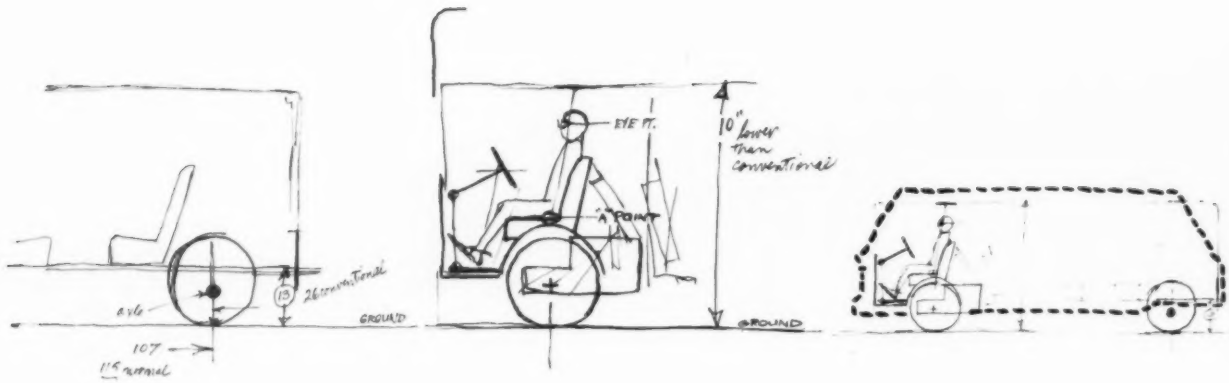
The styling of the Universelle took place under nearly ideal conditions; the sky was as blue and as wide open to invention as in one of Professor Arnold's seminars at M.I.T. Interestingly enough, the Universelle's chief designer, Charles Jordan, was once a student of Arnold's before being hired by Harley Earl, Vice President in charge of Styling. The Eggomobile, a vehicle for the mythical planet, Arcturus, had been devised by just such "creative engineering" as Jordan used on this more earth-bound problem.

Lively suggestions from Jordan and his team, seconded by Lou Stier's and Bill Lang's truck studios, aroused management's interest in having a show truck for the 1955 Motorama. They gave Jordan a clean slate, told him he could be as fanciful as he wished. Considering the neglected possibilities in truck design, Jordan and his colleagues decided that theirs would be a very practical sort of novelty; there was plenty of room to improve upon the ordinary, old-fashioned half-ton truck.

They drove around in the Chevrolet Carryall, a station wagon on a truck chassis; and in a new Volkswagen bus, a neat, 9-passenger, 1½ ton load-carrying vehicle with a 4-cylinder engine in the rear. They noted the assets of both, but were determined to imitate neither. Instead they started from scratch and, consciously forgetting any existing body shape, panel delivery, pick-up or stake, they thought out their objectives, as the sketches show: 1) to carry a maximum payload in a minimum package size; 2) to provide complete access to any part of the load; 3) to give the driver bus visibility and passenger-car comfort. How they proceeded, step by step, is shown on the next pages.







The chassis begins to take shape from back to front

The objectives of the Universelle were approached from the rear. For easy loading, the designers decided, a low, flat floor was required. The only way to achieve it would be to transfer to the front the rear differential, which normally protrudes above the rear axle. By assuming that a dropped axle was possible (later provided by engineering), and eliminating the drive shaft, Jordan and his designers figured that they could achieve a minimum floor level 13" from the ground—14" below average. This also meant a restriction; they would have to put the engine somewhere at the front and use a front-wheel drive.

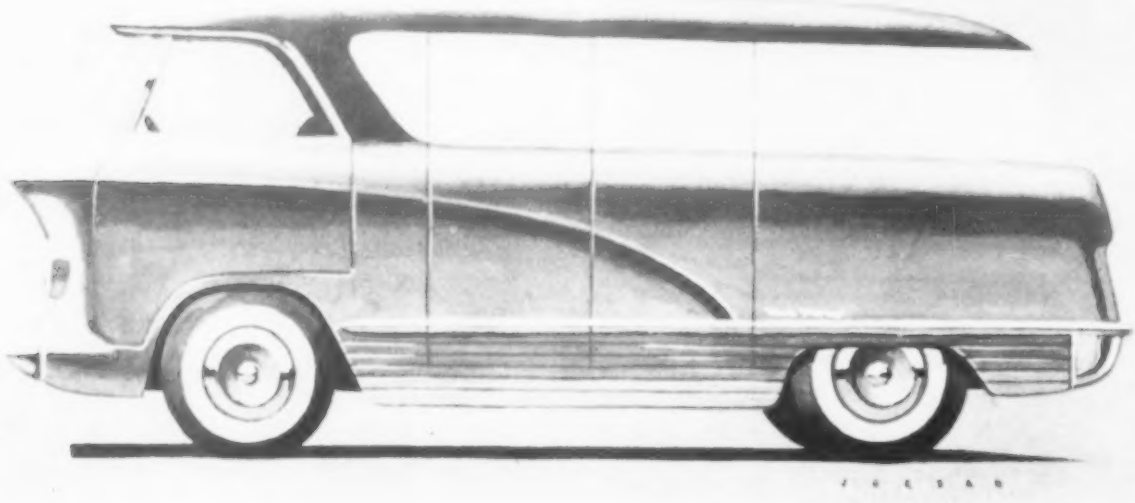
Next they tackled the front end. At first it looked as though they would end up with an excessive front overhang if they were to give the driver the desired visibility, sacrificing some of the compactness, which was also an important objective. Then they figured out a way to compromise: move the seat out of normal driving position to a higher position over the front wheels, the relative lowness of the driver being a secondary consideration here. They tentatively laid out their front wheel house and placed a full-width driver's seat across the truck on top of the wheel house; this assured volume enough for an accessible engine compartment with good air circulation. By adding up the dimensions of the wheel, wheel house, seat, driver and head clearance, they established the overall height of the truck: it turned out to be 10" below the present GMC panel delivery truck.

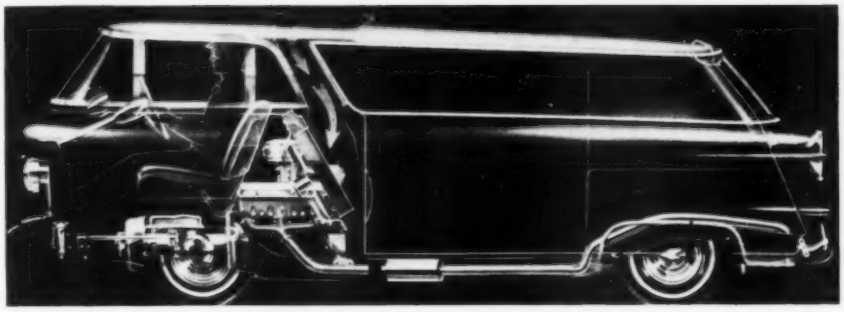
Having established this front end concept, and tested it with a "rough and dirty" mock up, the designers faced a new problem: how to cool the engine? Placing the radiator core in front of the driver was mechanically too complicated; it would also add to the front overhang. They considered placing the core vertically beside the engine and ducting the rammed-air cooling system through the number one pillar and the door, but this, they found, would require door and pillar to be unreasonably thick. The final solution was to place the core behind the driver near the engine, cock it an upward angle and, instead of using rammed air, pull air in through the roof by fans.

The designers then knew that their truck would have greater versatility as an enclosed than as an open vehicle; they decided to develop it as a kind of panel delivery truck.

The remaining structural variable

Early rendering has a higher, more square silhouette.





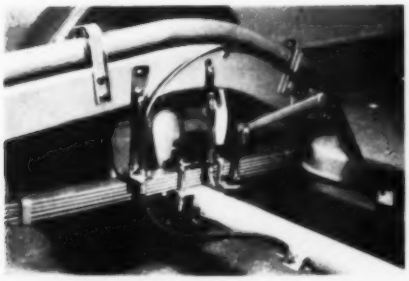
Driver's position is unorthodox compared to other trucks; Universelle is lower, shorter.

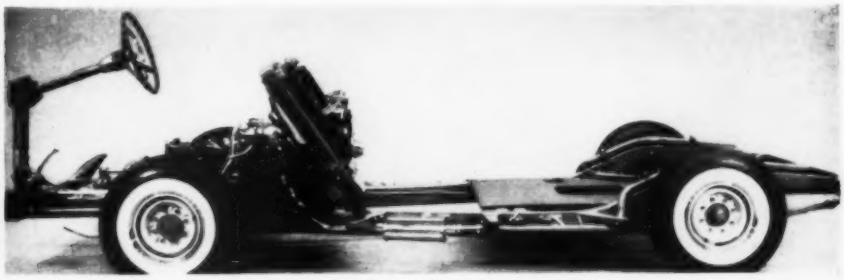
was the wheelbase. Front dimensions were fixed, with a minimum overhang. They had also set the minimum rear overhang according to the best weight distribution and to insure good traction for the front wheel drive. Taking the established front and back dimensions, they placed them on a normal half-ton wheelbase, filled in a hypothetical middle area and discovered that their space-saving devices had resulted in too much capacity for such a light frame, in fact, a full ton. The next step was to cut down; they shortened the truck 10″ more through the center and ended up with a slightly greater load volume than the ½ ton GMC panel truck, and the wheelbase fell into place at 107″. The Universelle is longer than the Volkswagen bus, whose wheelbase is 94.5″—as well as lower and shorter than the conventional delivery truck at 115″.

The chassis was complete; it remained for the designers to enlist the help of engineers in working out the details in the placement of the engine. The wheel turned out to be practicable at only 15″ in diameter, using the smallest tires in production, 8.00 by 13, though their load capacity is 1,050 lbs. per tire. The tread is spacious, from center of left wheels to center of right, 62″, providing good stability.

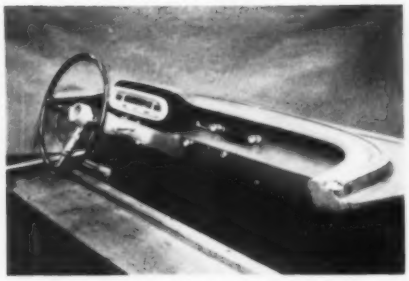
Another unusual feature came about in the interest of the driver's comfort since, unlike the ordinary panel truck, he would have to ride directly over the front wheels. Torsion bar suspension springs were installed in the front, similar to the Volkswagen bus and common to many foreign cars, although they are just beginning to make headway in American cars.

This phase of the Universelle represents what Jordan calls "more than skin deep" styling, the down-to-earth engineering fundamentals which had to be worked out in order to fulfill their objectives in size, loading capacity and a new ease in truck driving. From the establishing of the basic layout and dimensions, Engineering and Styling worked closely together on such innovations as the dropped axle, the rooftop cooling system for the engine and the torsion bar springs. Even the steering wheel had a special treatment. Styling wanted it to be at the same angle to the driver as an automobile steering wheel rather than at the nearly horizontal, awkward angle in a bus. Engineering provided a comfortable steering wheel, using an L-shaped shaft.





The completed chassis shows how a new lowness was achieved.
Above left, the inside view of the dropped axle.
Below, close-up of torsion bar suspension springs.

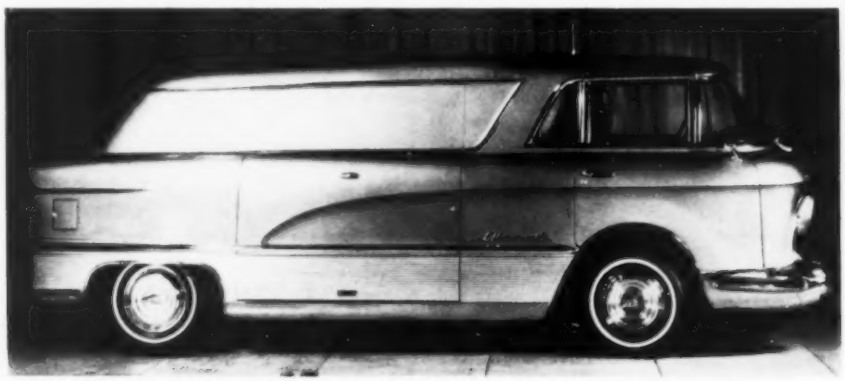

Clay models provide tests for visibility, knee clearance and ground clearance.

Finally the truck is put together and polished up for the show

Only at this point were Jordan and his design group ready to sketch the truck fully equipped for the highway. They tried out various housings on a full-scale layout. For some time they had known the effect they wanted: a style that was both chic and business-like—saucy, Jordon says, without being vulgar. A French name seemed to be called for. The XP-39 became, at the clay model stage, the *Livraison* and, finally, *L'Universelle.*

In their renderings they concentrated on avoiding the blank, boxy look, trying to break up the rectangle and give the design some direction. They introduced one strong theme with a blade: a sharp line that eases the bluntness of the front end and cuts a forward-pointing ridge, curves downward at the sides to the back wheel and unifies the area from front to back. Emphasizing even more the forward look is the downward angle of the roof profile at the rear and the slant of the side panel toward the front, with the wraparound windshield also going forward. Two side pillars, the only verticals, serve as stabilizers, suggesting a central axis. Jack-knife doors were incorporated into each side as well as the rear for quick loading action; and rub rails were designed around the whole perimeter.

The clay models show the working out of refinements in lines and shapes. At the *Livraison* stage, the profile is most restrained; by the time it became *L'Universelle*, the concave area cut out by the blade became convex and it is a bigger-looking, bulgier vehicle, not quite so neat and discreet in its look of leaping. But this final form was not arrived at until a succession of clay shapes were approved for plaster molds to be taken by the plastics engineering group.

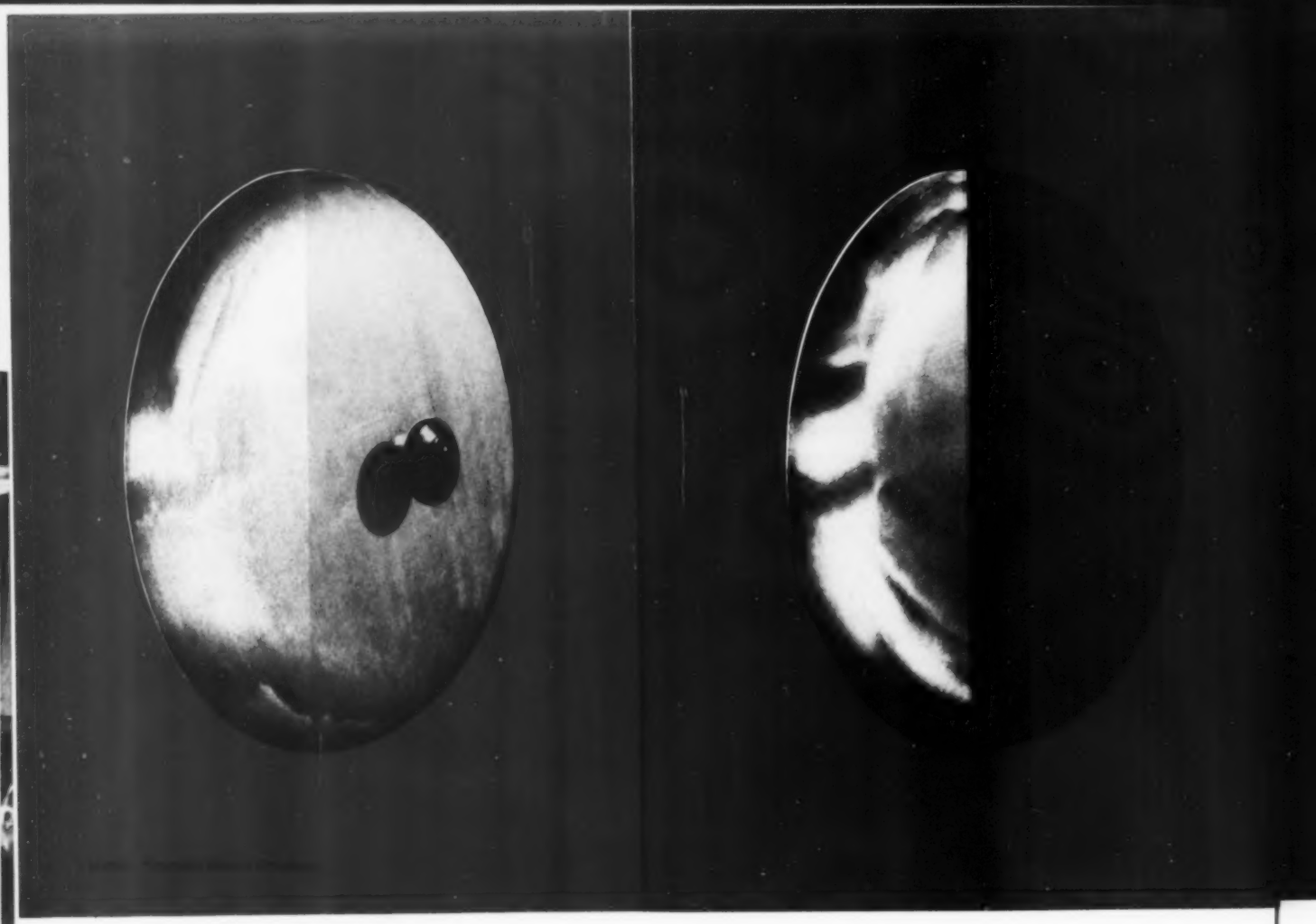


With a few engineering modifications, production of Universelles begins next year.

Specially-designed jack-knife doors open on three sides.

The show model was Fiberglas, finished in copper lacquer and made much more conspicuous with chrome trim and "dagmars." Beneath the glitter, a sensible and frankly fenderless body shape prevails. As much as it is a forward-looking truck, it is also a forerunner for GM design procedure, and possibly a highly significant one. The conventional "dream car" is essentially a search for new forms in a problem-less void. The Universelle represents a creative method which breaks with tradition not by casting about for an imaginary problem but by re-analyzing an old one imaginatively.

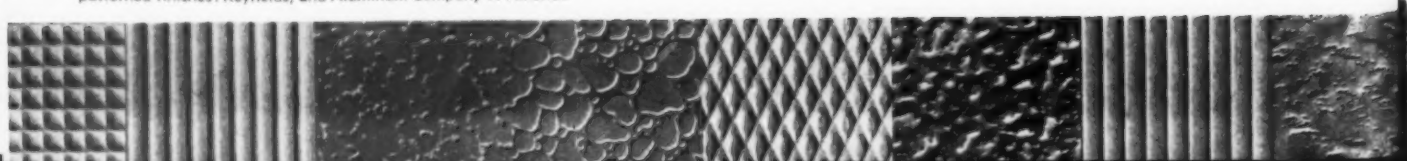
design in Detroit - the end

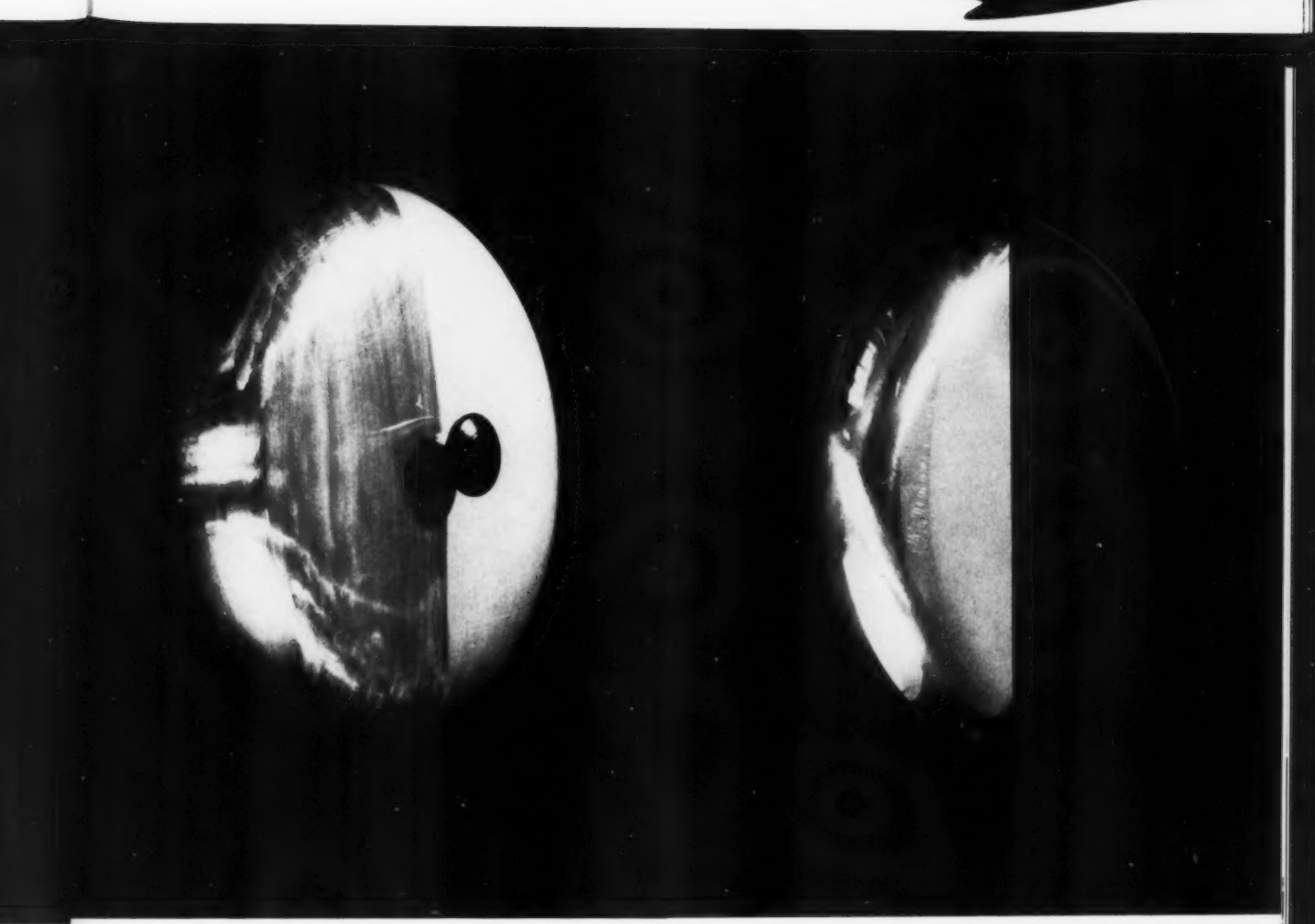


Aluminum Finishes

Some notes on the surfaces-texture and color — that are making this metal shine

patterned finishes: Reynolds, and Aluminum Company of America





As an increasing buying public becomes more conscious of appearances, the basic materials are being called upon to yield up greater varieties of texture and color. Finding ways to vary the finish of a familiar metal is not easy, but aluminum is one metal which has excelled in this respect. Its producers are more than meeting the design demands; their laboratories have more textures and colors on hand than specific requests. New ideas come up almost daily, and to keep the designer abreast of the possibilities, this article displays what is being done, and what could be done, when finishing in aluminum.

Aluminum's generally known characteristics are light weight, inherent corrosion resistance, ease and economy in fabrication. Its adaptability to a variety of finishing techniques — mechanical, chemical, electrochemical and organic — is less well known. A coating of aluminum oxide, for instance, can be made black and sapphire-hard for maximum wear resistance or perfectly transparent to protect an underlying decorative finish. Paint, lacquer and porcelain enamel systems have been developed as well, and aluminum surfaces may now be electroplated or photo-sensitized.

As the finish itself or as the basis for subsequent finishing procedures, one or more mechanical processes will nearly always be employed, and these are often the key to the quality of a product's final appearance. The common ones are:

Oiling — refinement of the basic grinding operation, using finer abrasives and softer wheels, usually the initial step in polishing;

Buffing — to bring out the metallic lustre and remove fine scratches;

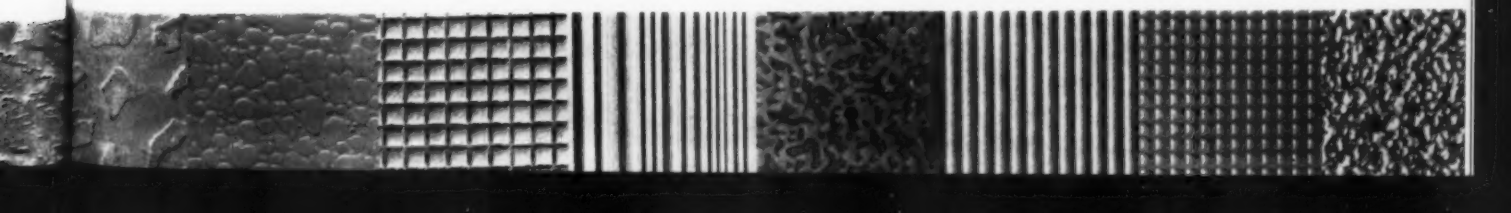
Coloring — a high-speed buffing to get glittering surfaces on trim, etc.;

Scratchbrushing — obtaining a texture of coarse lines with a wire brush (see dashboard, p. 131);

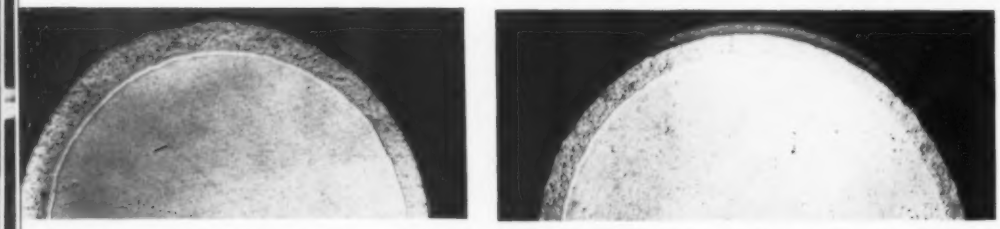
Satin finishing — scratching fine, parallel lines to achieve a soft, smooth sheen (see meat slicer, p. 131);

Patterning — applied by passing sheet or foil between engraved rolls or by embossing a finished article. Patterned surfaces (see photos below) obscure minor scratches and may be buffed, etched, or coated with tinted lacquers, opaquely pigmented paints or porcelain enamel.

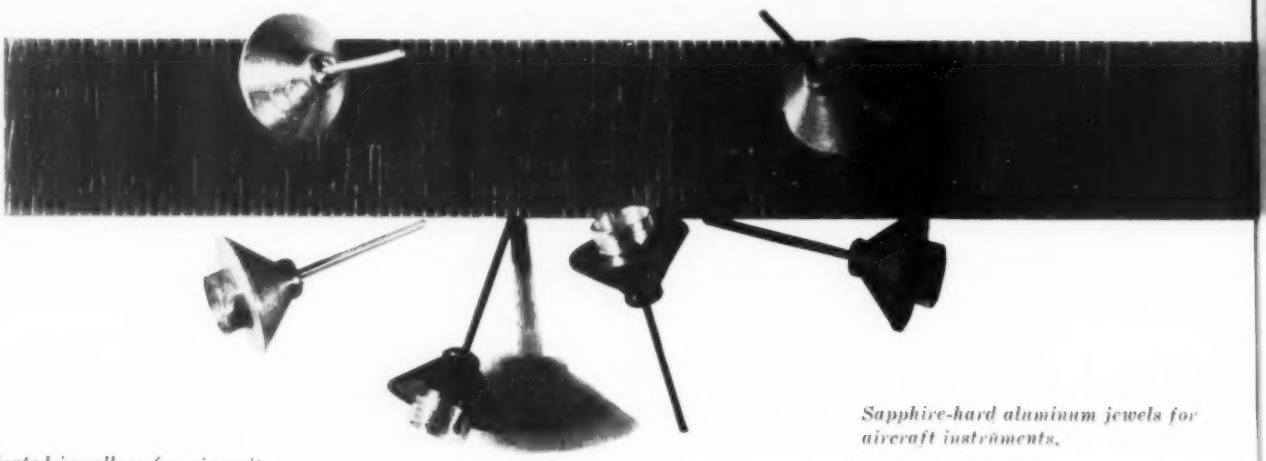
The lids above illustrate a variety of basic finishes. Left to right: a grain surface obtained with a 100-grit wheel; a buffed Butler finish (simulated etch) done with a cloth buff embedded with 240-grit emery and glue; a unit wholly polished, then the right portion anodized; and a highly buffed finish. On subsequent pages a few of the more complex finishes and some random cases will be reviewed.—*h. b. j.*



Hard Coating gives the surfaces of aluminum working parts great wear resistance

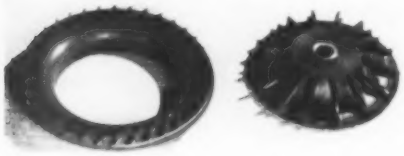


Enlargements (80X) of copper wire coated with aluminum (left), which was then Hard Coated (right). One-half of the total coating thickness is growth, a .002" coating increasing thickness by .001".



Sapphire-hard aluminum jewels for aircraft instruments.

Hard-Coated impellers for aircraft.



The aluminum objects on this page have been Hard Coated; they cannot be scratched by repeated rubbing with a sharp instrument. The Hard Coating processes are electrolytic, one variety of anodizing, which differs fundamentally from electroplating in that the articles to be treated are connected electrically as anode rather than cathode in the electrolyte. Instead of a metal being deposited *on* the article, oxygen combines *with* the aluminum to form an aluminum oxide layer that is integral with the surface of the metal. By varying the procedure and choosing suitable alloys, the anodic films become Hard Coatings, the thickest, hardest, integral skins that can be produced on aluminum (photos, top). They are about 10 times thicker and 30% to 100% harder than other anodic surfaces, giving the coated objects a wear resistance comparable to that of case-hardened steel or chromium plate, a very high corrosion resistance, good dielectric strength, and a low coefficient of friction.

Hard Coatings have opened new markets for aluminum, especially where any of the above characteristics are desired in combination with aluminum's light weight. Typical applications have been on aircraft, office machine, firearms, and orthopedic components. Their "color" is inherent, varying with the alloy and with the thickness of the Hard Coating from amber to black. Masking is possible, and areas adjacent to the Hard-Coated one may be given a conventional anodic finish. The cost for Hard Coating is about equal to chrome plating, determining factors being ease of racking, extent of masking.

Case study

THE CUSTOMER: *Kollmorgen Optical Corp., Northampton, Mass.*
THE PRODUCT: *riflescopes*
THE ALUMINUM FINISHER: *Anodic, Inc., Stevenson, Conn.*

Kollmorgen makes its riflescopes out of aluminum: the weight factor is crucial in rifle accessories. This year, for the first time, they are finishing the scopes with a Martin Hard Coating. The Manager of Sales, William C. O'Donnell, has outlined Kollmorgen's thinking on this case:

"Scope users have for years been plagued by the problem of scars and blisters on ordinary lacquered tubes, resulting from the rings used in mounting the scope to the rifle. Disassembling the scope and stripping and refinishing it at the factory can be an expensive proposition. This year, beginning with our new 4X scope, we are employing an aluminum oxide coating which we call 'Tuf-Coat' and which, in a matter of minutes, creates on the exterior of the tube a lifetime finish as tough as case-hardened steel, yet glossy and velvety smooth . . . This coating is feasible only with aluminum, because of its physical properties, and is particularly adaptable to impact extrusions because of the facility with which they may be racked during the process."

To have their "Tuf-Coat" applied to the scope components, Kollmorgen went to Anodic, Incorporated, who were issued the first commercial license by Alcoa for the Martin Hard Coating process and are devoting their entire facilities to this work.

Architecture has spurred the development of finer, tougher colors for aluminum

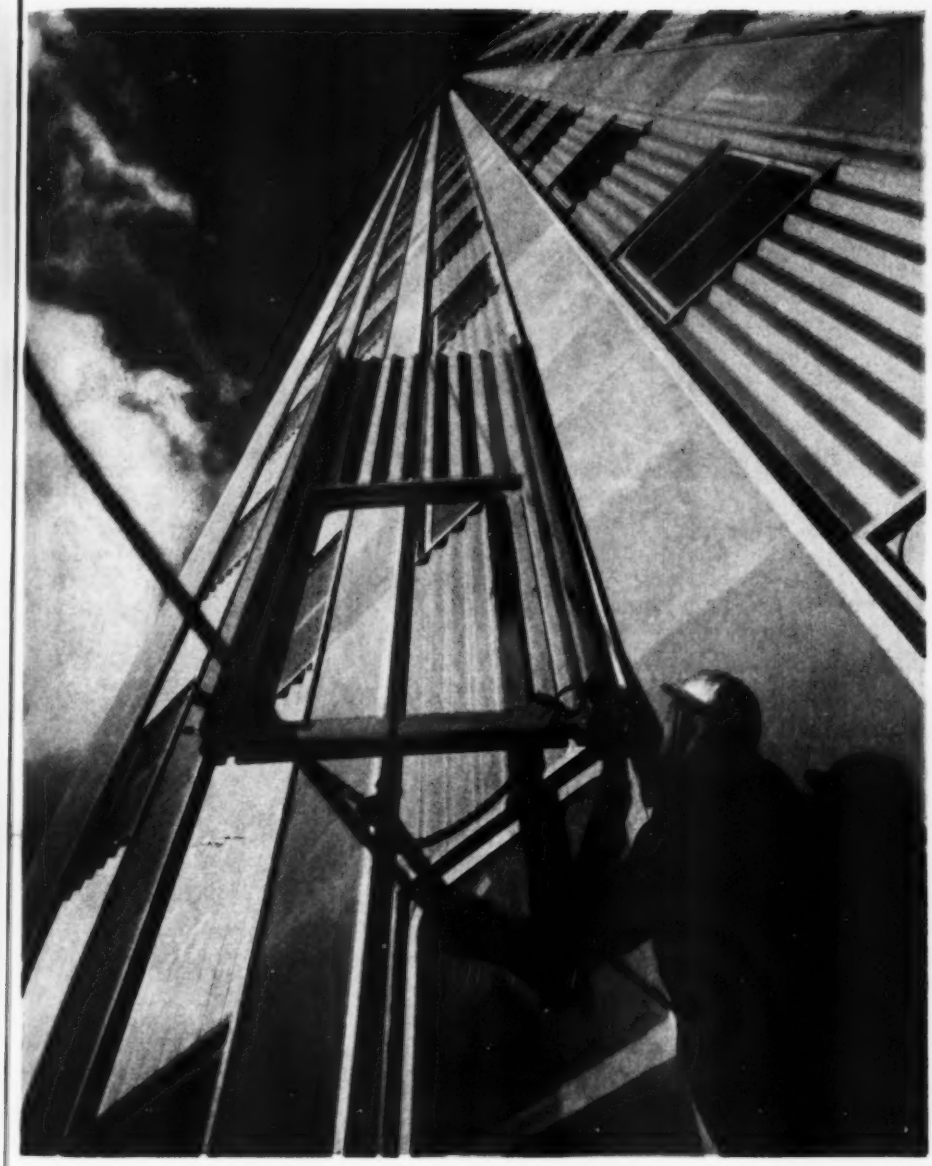
↑ Color-anodized curtain wall panels

← Installing chemically etched panels

As the use of aluminum in architecture steadily increases, new natural and colored complexions are appearing on nearly ever building that goes up with aluminum facings. The wall being erected above left demonstrates two possible finishes for aluminum: curtain panels chemically etched to a soft frost-white contrast subtly with the slightly darker mullions, which have been given an anodic, Alcoa-patented Alumilite finish.

All aluminum alloys can be finished by an anodic process; the structure and color of the resulting oxide film are determined by the alloys and electrolytic variations. Generally, to the extent that the base metal is pure, the aluminum oxide formed on its surface will be porous and colorless. This is what makes the coloring of aluminum possible; after anodization, coloring reagents are introduced into the oxide pores, which are then sealed. The transparency of aluminum oxide also accounts for the characteristic metallic appearance of anodized aluminum.

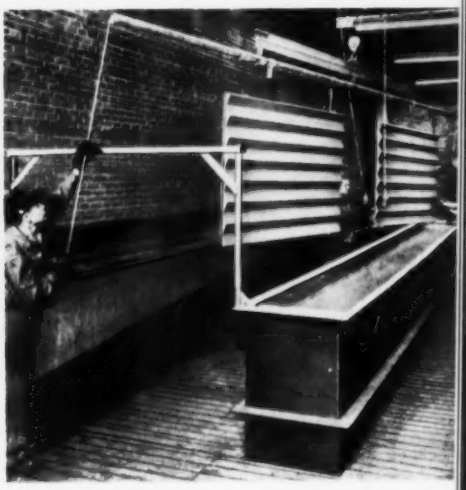
The chemical composition of the coloring matter needed for exterior exposure and the thick anodic film required for protection make the architectural colors more opaque than aluminum's usual anodic colors. Alcoa's Architectural Blue is shown above right in its first installation, a two-story Cincinnati office building; Architectural Gold is used on the building's opposite facing. Both have a deeper and richer surface quality than is popularly associated with colored anodized aluminum.



↑ *Prudential's Chicago skyscraper-to-be*

← *Window-spandrel units are set in place*

↓ *Panels are finished in Rippel's tanks*



Case Study

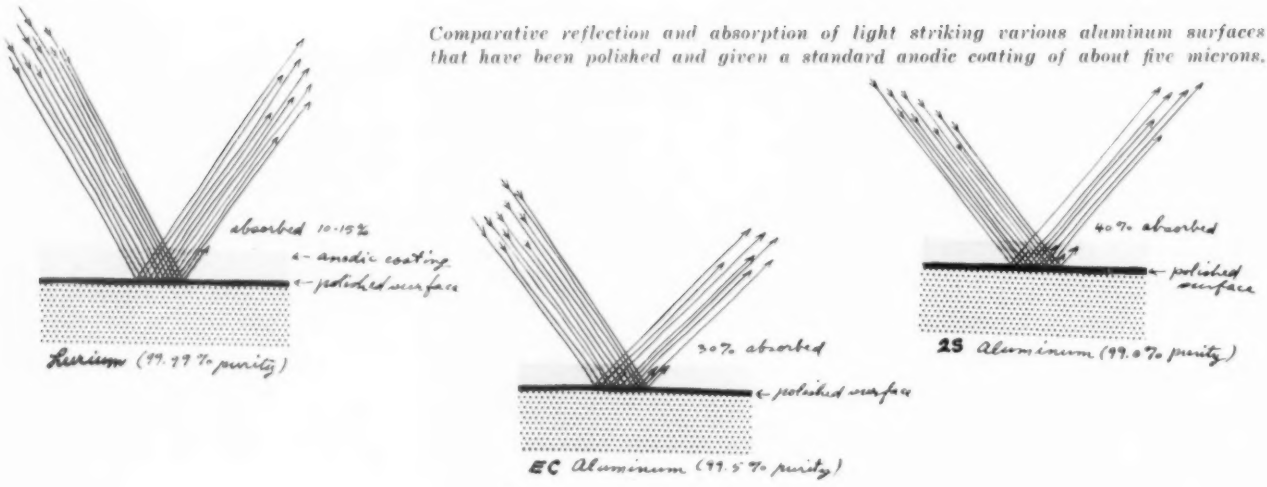
THE CUSTOMER: *Prudential Life Insurance Company of America, Chicago, Ill.*
THE PRODUCT: *curtain panels for a 41-story office building.*
THE ALUMINUM FINISHER: *Rippel Architectural Metals, Inc., Chicago, Ill.*

Prudential is paying some $40 million for a new home office in Chicago, to be the fifth largest office building in the U. S. Nearly a million pounds of aluminum are going into it, and this means a lot of aluminum finishing. Easily the largest of the finishing jobs is being done by Rippel Architectural Metals, who are responsible for the fabrication, finishing and installation of the 2,650 aluminum panels that are being set in continuous vertical lines against columns of tawny Indiana limestone. The panels are window-and-spandrel units with flanges to cap the adjoining masonry. They are completely prefabricated in Rippel's plant, where techniques are being used that permit welds to be made on the backs of the panels, preserving their surface uniformity. An anodic coating is applied to protect the lustrous natural appearance of the metal. The building is scheduled for completion in 1956, and Rippel's aluminum finish will be a distinct part of its design.

Anodized high-purity aluminum gives surface protection, high polish, colorability

This panel of standard-grade aluminum was given a satin finish by etching, then polished, high-purity Lurium was mated to it, providing a high-key decorative effect.

Comparative reflection and absorption of light striking various aluminum surfaces that have been polished and given a standard anodic coating of about five microns.



A metal's brilliance is largely determined by two things: the degree of surface polish and the structure of the metal itself. Although silver, stainless, chrome and aluminum can all be polished smooth, inherent molecular differences will produce individual surfaces on each. Furthermore, the sheen of aluminum, as distinct from the high, hard gloss of chrome or the richer reflections of silver, is altered by the clarity of the protective anodic coating.

All grades of aluminum can be highly polished, but only the high-purity alloys can maintain a high lustre after anodization because the anodic coatings produced on the purer base metals contain fewer impurities and are, therefore, more transparent (see sketches above). As the transparency of the protective film increases, less light is absorbed in it and more reflected off of the underlying polished surface. Dyes, sealed in the pores of the coating, do not substantially affect reflectivity; the light still penetrates to the surface of the metal. This accounts for the unique metallic flavor of colored aluminum products.

Alloys of the purest commercially available aluminum have been imported from Europe in recent years. Even after anodizing, they will yield reflectivities up to 90% of a silvered mirror, suggesting further aluminum applications in such areas as automobile and appliance trim, costume jewelry, and decorative building or machine panels (photo above). Because of the lack of a volume demand, high-purity was not made here until last August, when Kaiser began to produce it on a limited scale. The Fromson Orban Co. of New York offers a West German alloy tradenamed Lurium, which has a purity of 99.99%.

Case study

THE CUSTOMER: *Shuron Optical Company, Inc., Geneva, N. Y.*
THE PRODUCT: *eye-glass frames*
THE ALUMINUM FINISHER: *Oxal International, Pelham Manor, N. Y.*

One of Shuron's aluminum eye-glass frames, the Ronflair, shown with temple piece and brow bar components both raw and finished.

photos: methot

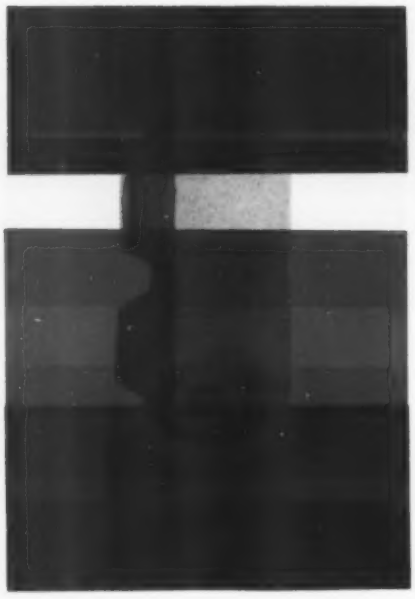
One of Fromson Orban's newer customers for Lurium is Shuron Optical, who recently switched from plastics to high-purity aluminum for many of the components in their eye-glass frames. The change was due largely to aluminum's ready colorability. Roy Marks, Shuron's Vice President for Sales, explains this:

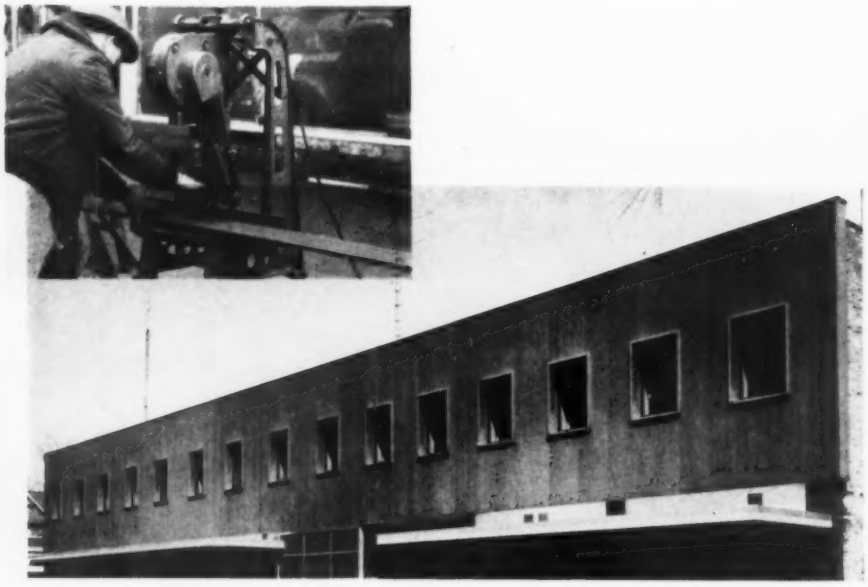
"Like many manufacturers, we hesitate to gamble on unusual and attractive colors when using plastics because of the heavy inventories of colored resins required to process such frames. If the item is not well received by the trade and the public, we find ourselves heavily overloaded with unusual and expensive material.

"Because the coloring of Lurium is the last step, literally on the frame, the inventory problem is obviously greatly reduced, and, as a result, more colors can be offered with minimum investment. The lightness, workability and adjustability of Lurium all add to its advantages over plastics and gold-filled materials."

With Lurium, Shuron has been able to obtain a higher lustre and a finer quality of finish on their frames than would be possible with the available domestic grades of aluminum. The metallic colors of anodized aluminum seem well suited to this kind of product, whose finishes do not need to imitate the somber opulence of traditional precious metals, but can glitter on their own as a gay new decoration.

Porcelain-enameled aluminum can be a rainbow of protected, high-gloss surfaces





Porcelainized aluminum panels may be sized in the field (above) and will not erode at the cut edge. They can revitalize the facing of an old building (below) by providing solid blocks of durable color.

Sample casting shows enameling of inserts, irregular planes.

It has long been apparent that a happy marriage could result from the mating of aluminum and glass, wedding the former's lightness, strength and easy workability to the latter's finish qualities of hardness, color amenability and chemical inertness. In the last few years this has been effected by du Pont chemists working with various manufacturers to develop commercial processes for applying porcelain (often called "vitreous") enamel to aluminum. An enamel composition of complex glasses is applied by spraying or dipping. The ground and cover coats are individually fired at temperatures from 940° F. to 1,000° F.

Porcelainizing increases aluminum's flexural strength and resistance to surface denting by more than 60%. Porcelain enameled aluminum may be finished in matte or gloss and in multicolor effects. It is resistant to spalling and flaking, and can be cut and mildly formed after firing.

The Kawneer Company of Niles, Mich. pioneered the use of porcelainized aluminum on curtain walls. The ability to size panels at the site of installation (photo above) and the lighter structural framing required because of reduced dead loading can mean large savings for the builder.

Monarch Aluminum of Cleveland were the first to porcelainize aluminum castings. Bosses, inserts, thick and thin areas, and irregular planes may be enameled, and masking is possible to utilize natural-finish aluminum as part of the design. A recent Monarch customer is General Electric, whose new electric skillet follows the trend to enameled utensils with a sporty coat on its exterior surface of porcelain colored turquoise.

Paint remains the ideal finish for many products

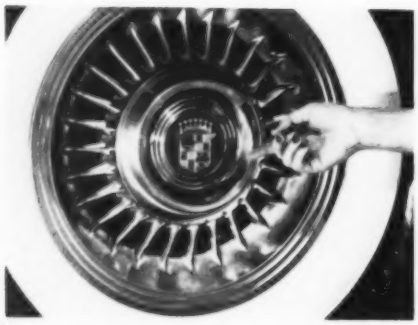
From fire helmets to aircraft, painting is often the chosen way to finish aluminum. Coiled strip and sheet (below) are prefinished with paint before cutting and forming.

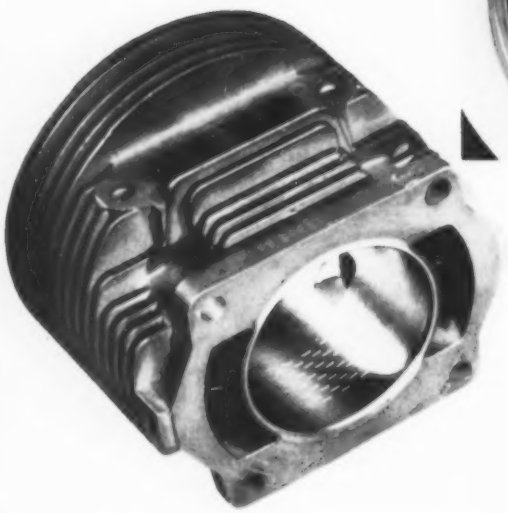
Paint, lacquer and enamel systems are common methods of finishing aluminum because they are usually the most economical means of obtaining decoration plus protection. Techniques of application follow those used for other metals. As a rule, if enamel or lacquer finishes are solely for decoration, the only surface preparation needed is thorough cleaning with a solvent. If they are to be used for protection as well, the surfaces must first be treated with phosphoric acid or chemically converted by processes such as American Chemical Paint Company's patented Alodizing.

Many aluminum products derive from sheet that has been prefinished with lacquer or enamel. Alkyd-resin-based formulations are applied to the sheet by standard printing or roller-coating techniques; the sheet is then sheared and formed into the desired shape. Aluminum bottle seals, caps, and shallow containers are typical products of this prefinishing procedure. In a like manner, coiled aluminum sheet or strip for venetian blind slats, siding, etc., and awning louvers is roll-formed after being prefinished by automatic coating and baking procedures.

Two additional ways to finish aluminum: electroplating and photo-sensitizing

Electroplating

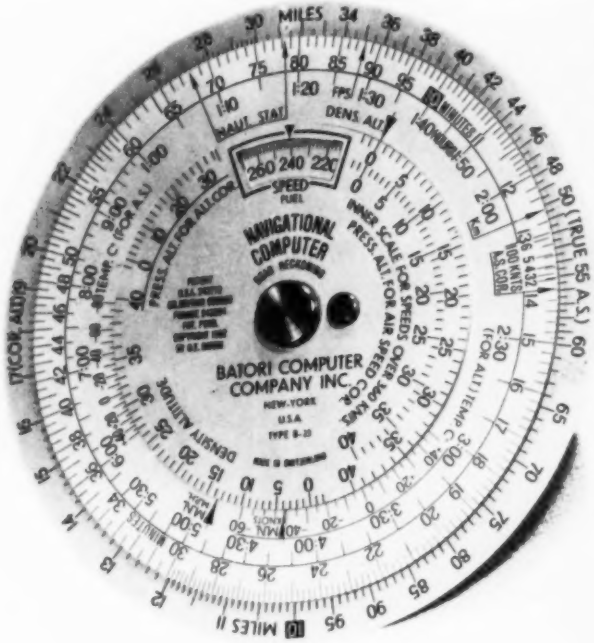




↑ Cadillac Eldorado wheel is forged bright-chrome-plated aluminum.

←Die-cast cylinder is hard-chrome-plated for wear resistance.

Photo-sensitizing



Navigational computer markings are applied photographically.

Electroplating

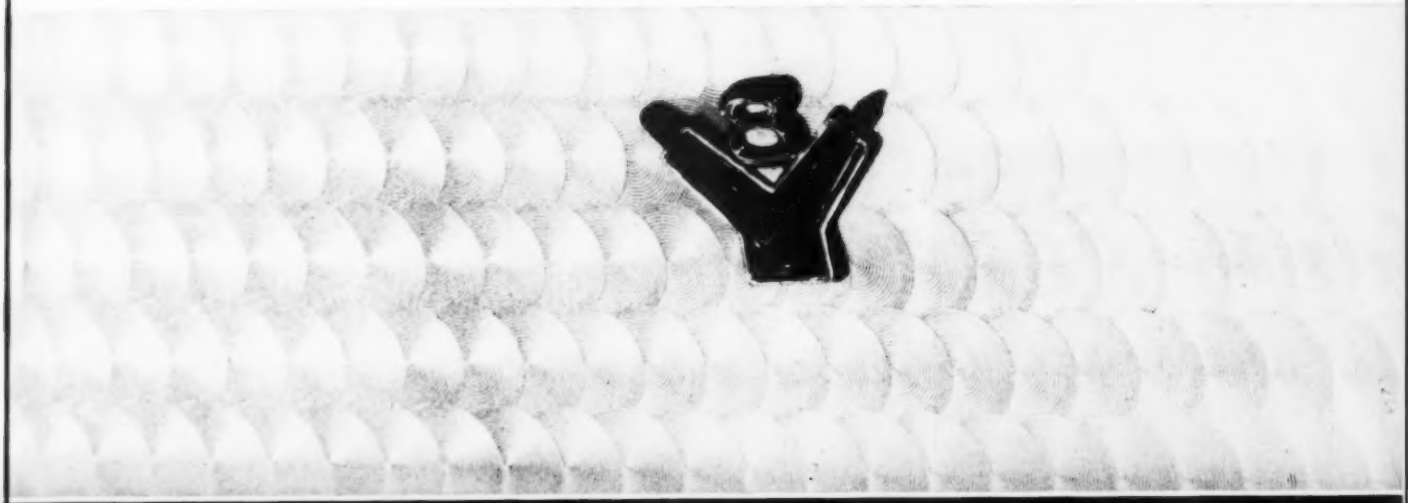
Aluminum's increasing use in industry is attributable in part to the growing number of plating procedures, for, apart from the obvious possible decorative innovations, aluminum's operational characteristics can be considerably enhanced through plating. The commonest aluminum plates and their purposes are as follows: chromium, to get a high, hard lustre or to match the appearance of mating parts; hard chrome, to reduce friction and wear; brass, to obtain a surface suitable for rubber bonding; copper, to permit soft soldering to the surface; zinc, to prevent seizing of threaded parts; silver, to improve electrical characteristics.

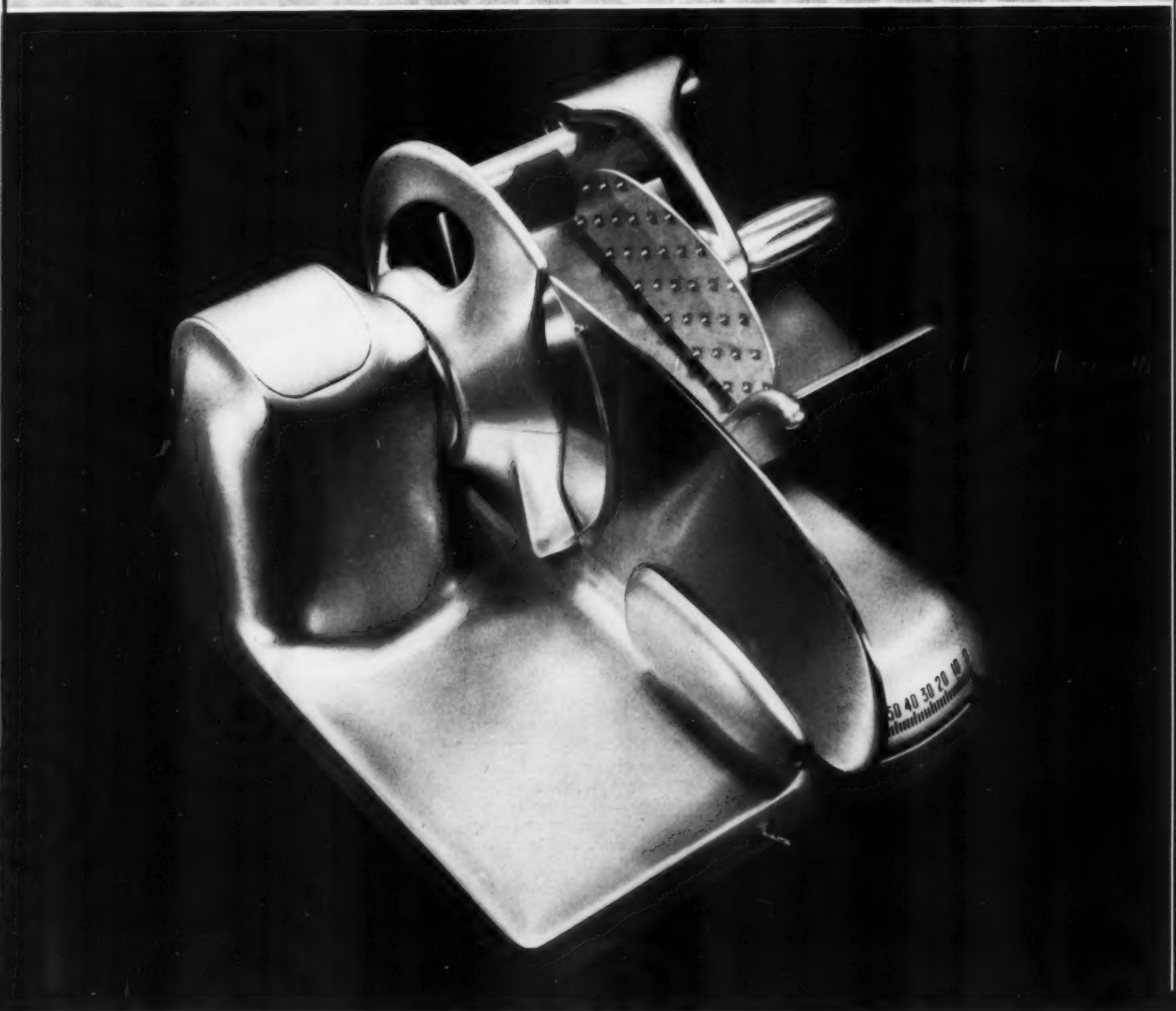
Photo-Sensitizing

One aluminum finish with intriguing possibilities is obtained by depositing light-sensitive salts in the pores of a colorless anodic film, after which the anodized metal may be used like any camera plate. After exposure and development, the photographs are sealed and coated with a clear lacquer, giving clean, heat-resistant pictures on aluminum. Uses so far have been limited to computer and slide rule scales, name plates, wiring diagrams, instruction panels, etc., but research is under way to find wider product applications.

The bulk of the industry's future finishing research, however, will be devoted not to covering or obscuring the natural surfaces but to finding more and better ways of expressing aluminum's elegant self.

Two exemplary, uniquely aluminum finishes: a dashboard panel textured by scratchbrushing; a meat slicer satin finished and anodized.





DESIGN REVIEW *A selected group of householdry from the recent Housewares Show.*

↑ **International Silver Co.** has been manufacturing 2 patterns in stainless steel flatware. Fork in middle is "Today," their newest and simplest design, by Samuel Ayres. 16-piece set, $19.95.

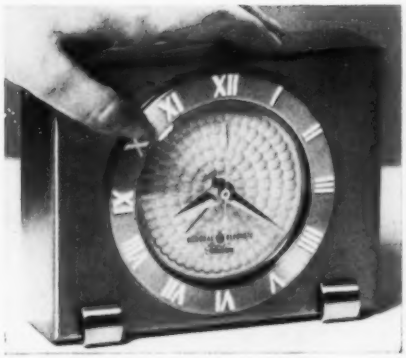
↑ **Evans International** has recently placed this sleek design in stainless flatware on the market. The pattern is called "Karla" and it is manufactured by Sola, a firm in Holland. 5-piece place setting. $5.85.

↑ **Foley Manufacturing's** stainless steel measuring spoon set comes with stainless hanging rack. Long handles (tablespoon measure is 7" long) are fine for reaching the last few olives, and the spoons are nice enough for table use. Set, 98c.

↑ **Steam-O-Matic's** iron has a new-bride-like pink handle and pink electric cord. Body is stainless steel; handle also comes in other pastels, each trimmed with gold. New feature is push-button emptying. Design by Sheldon Rutter. $19.95. First there were Cosco colors, now these pastels; the next to come will be a recently announced copper-colored steam iron from Westinghouse.

↑ **West Bend's** all-aluminum waste basket can probably double as an easy-to-clean pail or plant holder — or triple as an emergency cooking pot for corn-on-the-cob parties. Black enamel trim has colonial silhouette of quill and ink jar. $3.95; or in copper-colored aluminum, $4.95.

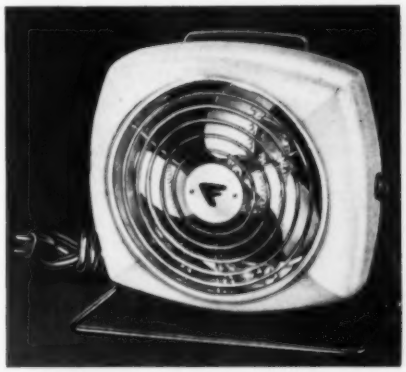
↑ **David Douglas & Co.** is the first to think of a percolator-decanter — probably not the last to design one. Coffeepot is a Pyrex server, and the percolator unit is made of aluminum. Handle is Bakelite, trim is copper. 8-cup capacity, 12″ high, $4.95.



↑ **General Electric's** electronic switch, first used in the lamp shown in last issue's Design Review, is now utilized in an alarm clock. A quick touch stops the alarm ringing and automatically turns off a bulb which illuminates the dial at night. Clock above is gold-plated preview model.

↓ **Roseville Potteries** hired Belle Kogan to design a line of vases, candlesticks, ashtrays and serving pieces, and now they are turning out handsome inexpensive pottery, most of which can compete with the best we have seen from the kilns of the handcraftsmen. Pieces, below, $5. and $6.

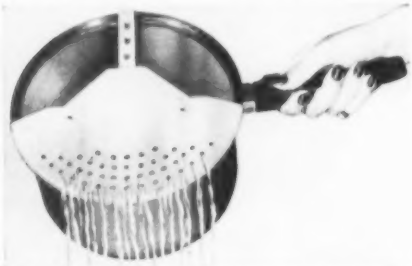
↑ **Sessions'** new clock is a 24-hour automatic timer that turns appliances on at a predetermined time, or turns them off. It has been coyly christened the "Tee-Vee"—to suggest use as a program hawk. Case is mahogany with brass trim. 5″ high, 7″ across. $24.95.



↑ **Fresh'nd-Aire** Heaterette has a swivel head mounting for fan-forced heating at any angle. Metal case has baked enamel finish in the currently "proper" pink and charcoal. $12.95.

↑ **Revere,** father of copper-bottomed stainless, presents a 1-qt. saucepan — 1-egg poacher. Breaking with tradition, this produces a round instead of a triangular egg, so that the inset ring can be used without the cup to make a bottle warmer. $5.95.

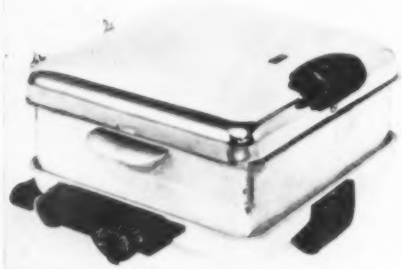
↑ **Club Aluminum's** new line of cast aluminum utensils has porcelain enamel exteriors in keeping with the new process described in the article on aluminum finishes. Sets come in turquoise or red, and are wisely designed so that enameling is not applied to an overlapping lip, where chipping would start. 10" chicken fryer, above, $8.95.



↑ **Robley Product's** Strainmaster is aluminum; it clips on to pots with 6" to 9" diameters by a self-adjusting flat stainless steel spring. This would be even more helpful in a size for the large pots that require a 3-handed housewife to hold them while draining contents. 79¢.

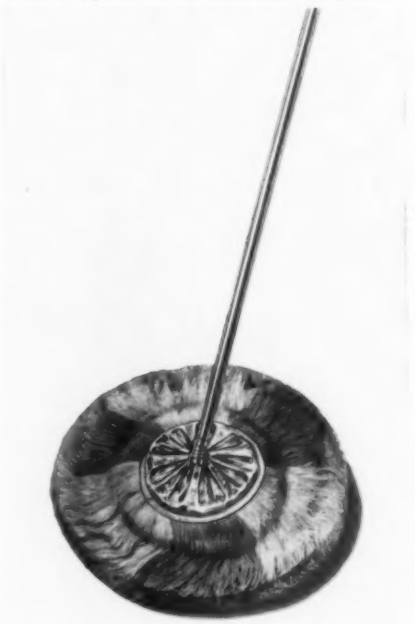
↑ **Pionair Products'** wax applicator stores a pint of liquid wax in its transparent hollow handle or dispenses it in an even flow. Four-way pad dusts, scrubs, waxes and polishes. $1.98.

↑ **General Electric's** Roll Easy vacuum cleaner has a cleaning wand that converts to a steering handle so it can be pushed or pulled like a giant pull-toy. Rubber-tired wheels have a 12" diameter, and the appliance comes in copper and turquoise. With complete set of attachments. $79.95.



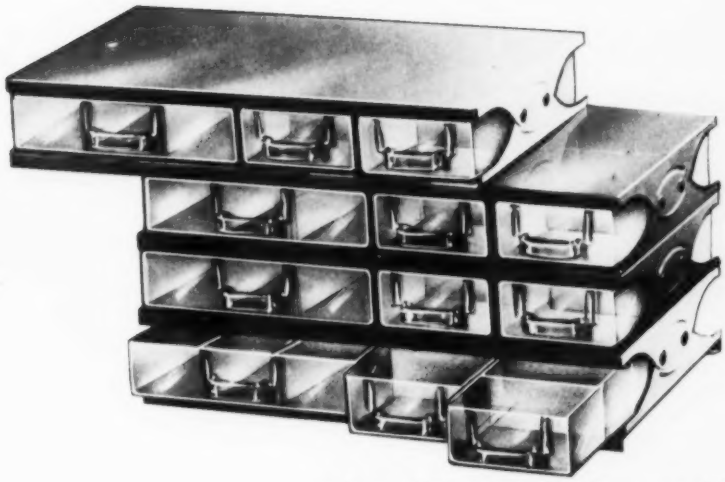
↑ **Arvin Industries'** latest, the Cook-All, really does everything but perk coffee. It can be used for baking, roasting, cooking or converted to a grill or waffle iron. Chrome-plated cooker has Bakelite handles. Designed by E. A. Farr. $29.95.

←**General Electric's Speed Kettle retains** a trace of the old-fashioned kettle — its whistle, which is probably pure sentiment since the water boils before even the busiest cook can forget it. Bottom half is stainless steel, top is copper. Handle and base are GE Textolite. Contents 2½ qts., price $18.95.



↑ **Howard** dust mop is an enormous powder puff of Nylon yarn with a rayon polishing pad in its center. The aluminum handle comes in white or charcoal, with a white, turquoise or pink dirndl. $3.99.

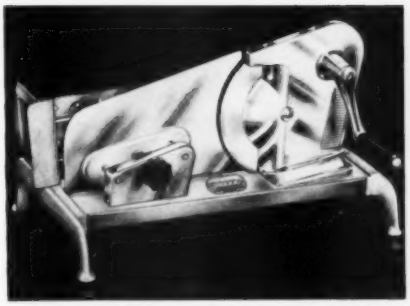
↑ **K & K Metal Works'** News-Stak is a 50-lb. capacity home paper baler of laminated fibre board. This simple solution to the paper pile problem stacks old newspapers in position for tying; drop bottom dumps a neat package. $2.98.



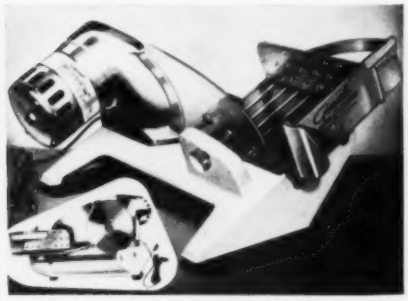
↑ **Jayem Sales Corp.'s** Stak-Ups are metal file housings with 1-piece styrene drawers. Frame comes in red, green, grey, pink and black, and the interlocking units can be piled. One typical unit — 12" x 6" x 2" deep, has 2 small and 1 large drawer, optional drawer dividers — sells for $1.59.

↑ **Cosco** folding serving cart closes to a 5" thickness for storage. Tubular steel handle-legs are chrome plated; 14" x 27" trays are enameled in woodgrain blond, gray, green, charcoal, or pink. $12.95.

↑ **National's** semi-automatic steel electric slicer sits on suction cup feet. Stainless steel serrated blade is 6½" in diameter. Size is approx. 14" x 8" x 10" high. $64.50.

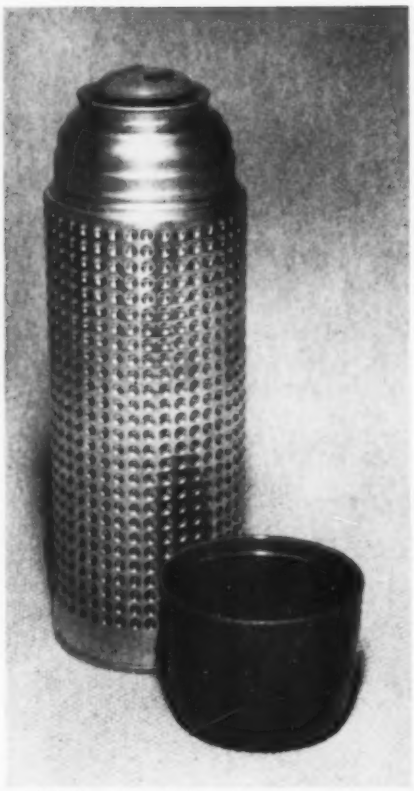


↑ **International Appliance Co.'s** "Silv-A-King" home slicer runs by arm power. Its body, and the 6½" diameter steel knife, are chrome plated. $29.95.



↑ **General Slicing** gravity fed home slicer is chrome and white porcelain enamel. 7½" diameter knife is stainless steel. This unit is completely automatic. $99.50.

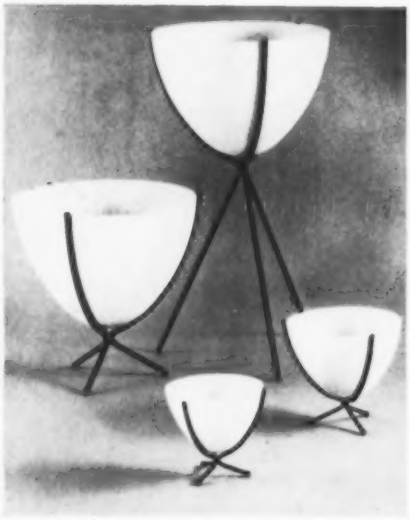
↑ **Steam-O-Matic Corp.'s** new appliance is a portable mixer and knife sharpener. Bottom and beaters are chromium plate, top part is Tenite in white, red, yellow or pink, with a matching cord. The welted rubber base protects bowls — and *sans* beaters, cushions the body when used as a sharpener. Weight is 3½ lbs., price $22.95. Also in copper with color, $24.95.



↑ **Alladin Industries'** aluminum vacuum bottle has a 1-piece case and collar to prevent the usual eventual separation, and a dimpled finish to prevent slipping. Outstanding difference in design is bottom loading. Styrene cup-set cap is yellow or red. Design by Alladin and Robert O. Burton. $3.75.

↓ **Plas-Tex Corp.** ice bucket is polyethylene with a brass collar, handle and topknot. Fiberglas insulation between double side walls keeps ice for 18 hours. Seven colors, including pink — and black, which is a new dressing for polyethylene. Design by R. Willis. $9.95.

↑ **Ideal's** new set of 8 rubber coasters has double suction rings to permit adherence to all sizes of glasses. A reverse on the usual procedure of trying for a coaster that won't stick, this is doubtlessly better than the nerve-racking coasters that cling to the glass when they shouldn't. 98¢.



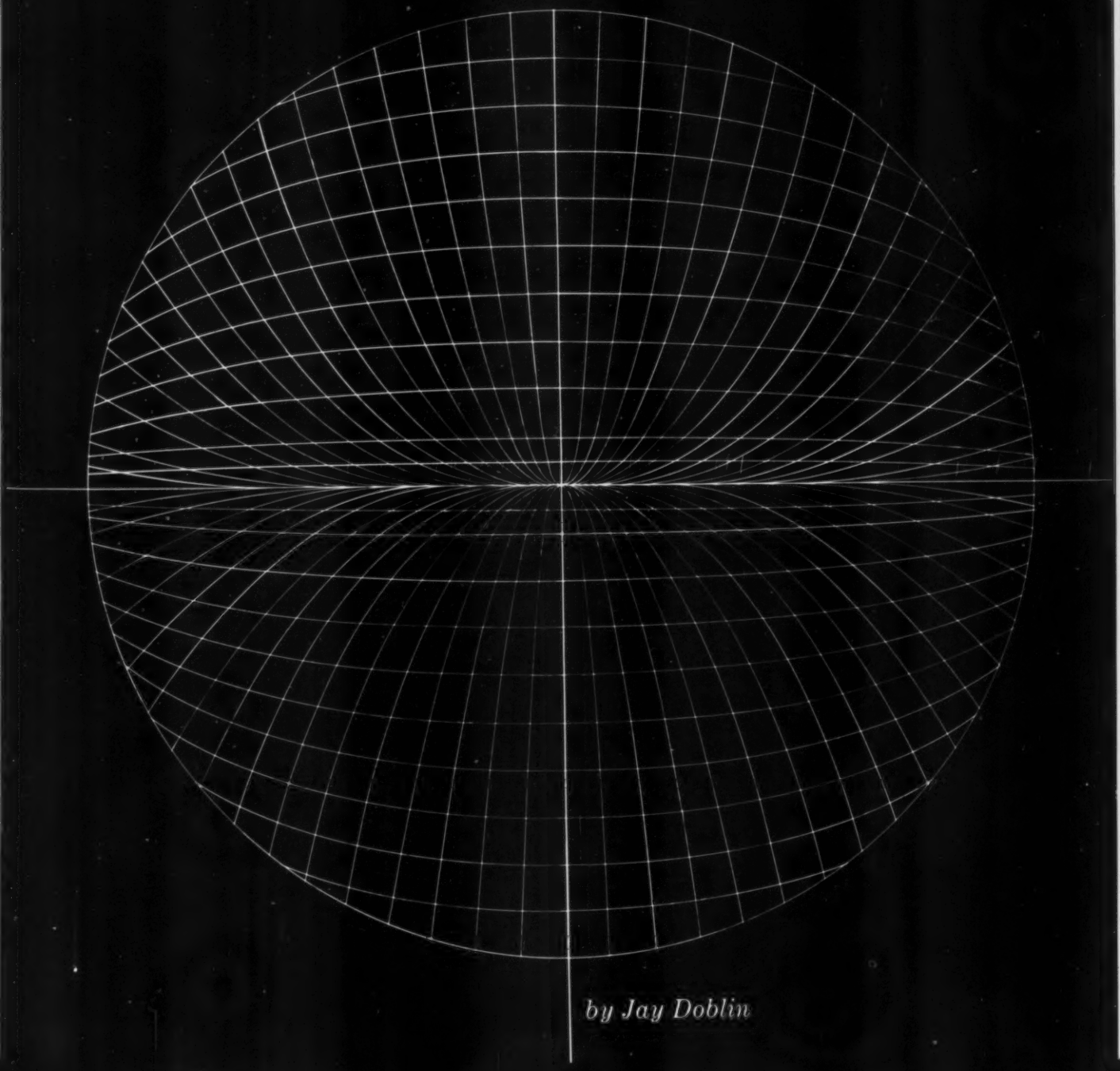
↑ **Kimball Manufacturing** deserves a nod for their bowls of Fiberglas with iron or brass tripod bases. Like the pottery on page 2 of this review, they're modest and modestly priced, a not-too-usual combination. Many colors include persimmon, pink and charcoal. Primarily for plants, they are fine for fruit, ice or cut flowers. Medium-sized bowl (9" diameter), with iron tripod, $6.

↑ **Kewanee Rite Products** tells us about a "magic" ball of perforated twisted aluminum 2" in diameter that whips a small amount of cream, aerates juices, blends sauces, etc. Simply drop into any container with makings, cap, and shake. 25¢.

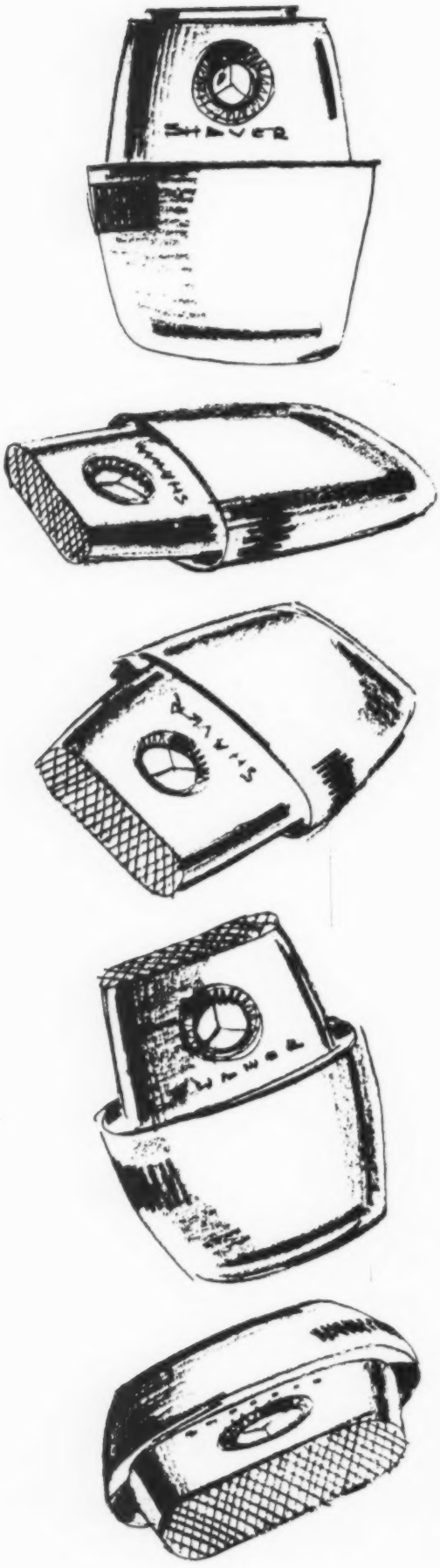
Part 6

PERSPECTIVE

a new system for designers



by Jay Doblin



Visualization

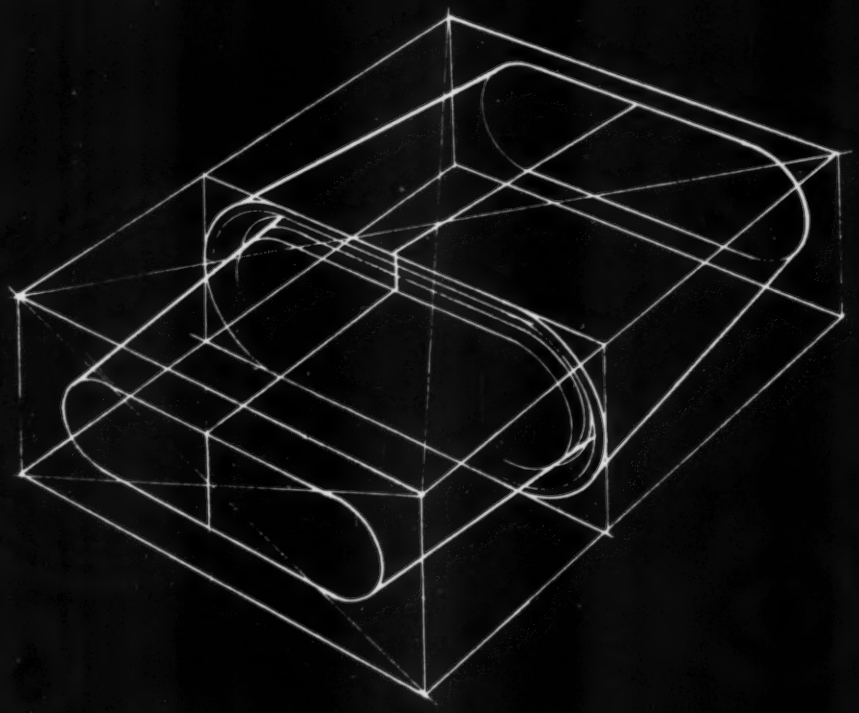
No matter how thoroughly he knows mechanical perspective, the draftsman must always rely on his own eye. Usually his first step in making a drawing is to sketch the object at various angles to help in deciding the best view. Often the "best" view is a matter of opinion, and if someone else has to okay the drawing it is a good idea to know his choice before the final drawing is begun.

At left is a typical series of preliminary sketches for an electric shaver. Each has its advantages, and any one of them might be chosen. The first would be the simplest to make because it is actually a mechanical plan view, and although it does not show the cross section, it gives the most accurate view of the face. The second shows the three most interesting sides with equal emphasis. The third shows the same three sides but emphasizes the face. The fourth is essentially a plan view, like the first, with a bare indication of the cross-section added. The final view is the least informative but the most dramatic—a shaver's eye view.

If he wants the most generally informative view the artist will probably choose the third. It is not an especially dramatic view to start with, but when the drawing is completed, the artist can turn it to find a more effective view. On the opposite page, it is shown upside down, so that the shaver seems to be floating in air instead of lying on a table. A round mat helps to spotlight it.

The cold eye

When he is constructing a perspective drawing the artist must check constantly to see that it *looks* right. The eye grows tired from looking at a drawing for a long time, but there are various ways of giving it a fresh outlook. One of the best is a diminishing glass, which makes the drawing much smaller, frames it, and gives the work an entirely new appearance, so that bad proportions or a poor choice of view show up immediately. A more complex way of checking the work, but a useful one if the drawing is to be reproduced in a smaller size, is to make photostats, particularly negatives. A simple way of refreshing the eye is to look at the drawing in a mirror, or, if the paper is sufficiently transparent, simply turning it over. When the artist is drawing at a large board, and particularly when he is seated, he should put the drawing on the wall or stand on his stool from time to time so that he does not always see the drawing in perspective. This is particularly important when he is doing a large three-point perspective, since vertical convergence is especially likely to be distorted if the drawing is always viewed at an angle.




SNAVER


SUPER

Ordinarily the artist uses his trained eye to make certain that his drawing is accurate; occasionally, his judgement tells him to violate the normal rules of perspective. His ability to do this depends on his complete understanding of these rules and his artistic judgement.

Adding a vanishing point

The drawing at the left illustrates the introduction of a vanishing point in a two-point perspective view. According to the rules we have learned, this means that the drawing extends beyond the limits of accuracy; the vanishing point should only appear in parallel perspective. Yet the vanishing point is bound to appear in a vista as broad as this, and sometimes a certain section of a drawing—a street or a line of buildings—is more effective in parallel perspective. Inevitably, there is distortion in the area around the vanishing point. It is usually not noticeable in flat surfaces like a tile floor or a building facade, but it is painfully apparent in any solid object like the cube at far left in the drawing opposite. It is a good idea to plan the drawing so that there are no solid objects in this area. No matter how carefully he plans, the artist will probably find some eyesores that can only be overcome by trial and error—by his own judgement.

Exaggeration

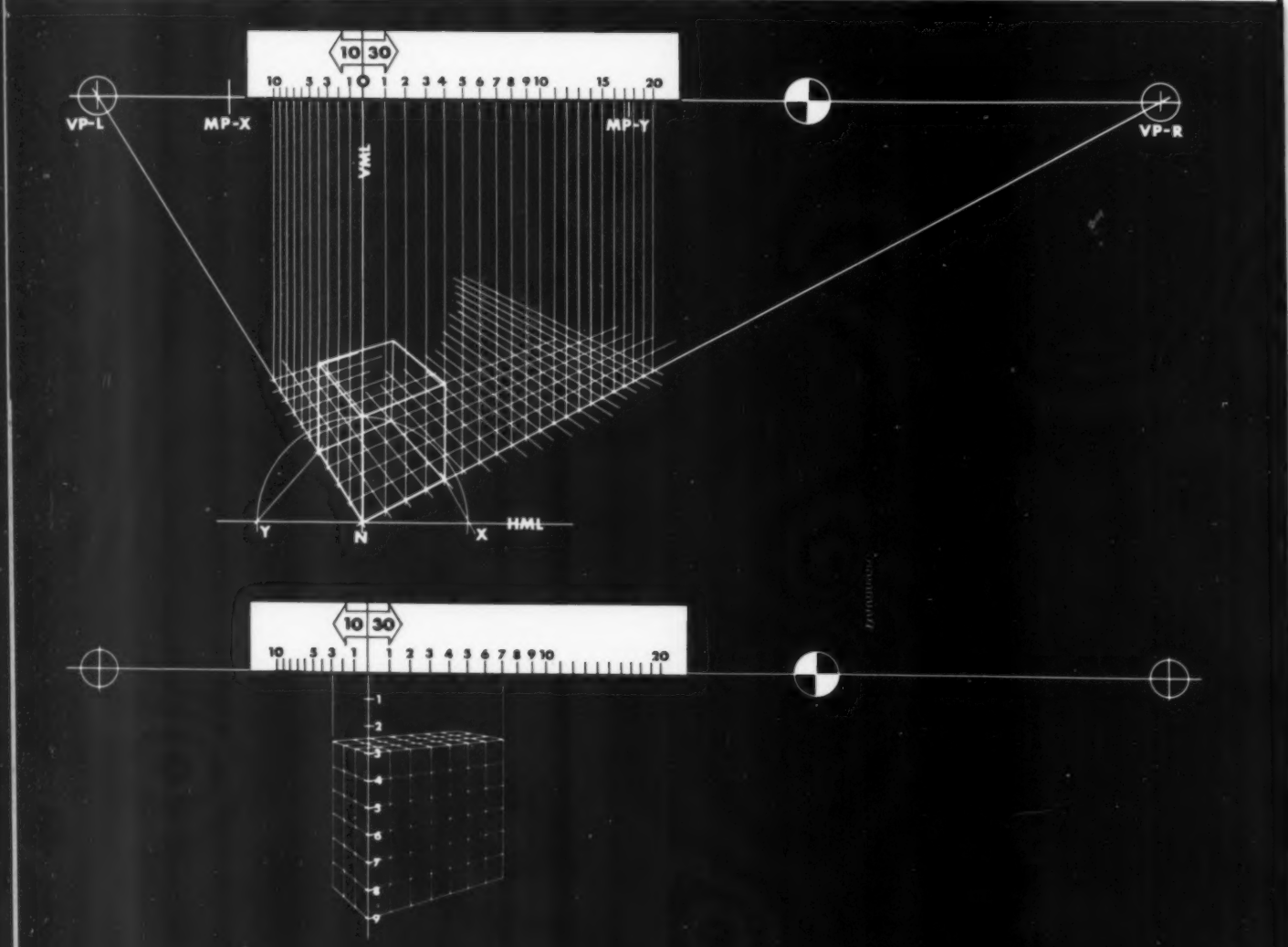
The use of the vanishing point in two-point perspective is an extreme violation of normal perspective rules. A simpler example is the use of exaggeration for dramatic effect—making objects appear bigger or smaller than they are, or very close or very distant. This is done by manipulating convergence and the distance above or below eye level. If we want to make a truck look particularly imposing, for example, we might draw it very high against the horizon and place the vanishing points close together to exaggerate the convergence. The drawing is not strictly accurate, but it has the desired effect.

Scales for direct drawing

The artist who has to make a number of drawings using the same view and the same distance between the vanishing points can save a little time on original construction by using a perspective scale. Essentially, such scales use divisions of the horizon as a measure of foreshortening. They are easy to make in any size and view, and a set of them can be a handy tool. I do not recommend their use by anyone who does not understand perspective drawing.

To make one of these scales, construct a horizon and mark off two vanishing points an even number of units apart. Construct a four-unit cube with its nearest angle close to ninety degrees and multiply it to make a vista of one-unit squares. Place a strip of paper along the horizon and project the intersections of the squares up to it, numbering them to the right and left from zero at the vertical measuring line. Note the unit distance to the vanishing points at the top of the scale.

To use the scale, draw a horizon and place the scale on it. Locate the vertical measuring line and the vanishing points as indicated on the scale. Mark off the true height of the object on the vertical measuring line; then project its depth down from the scale.



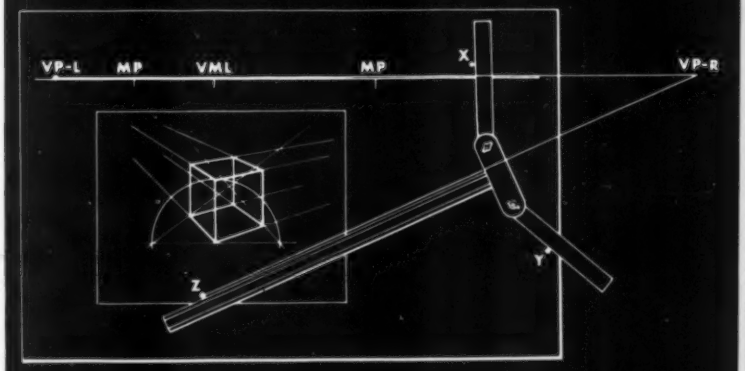
The lineaid

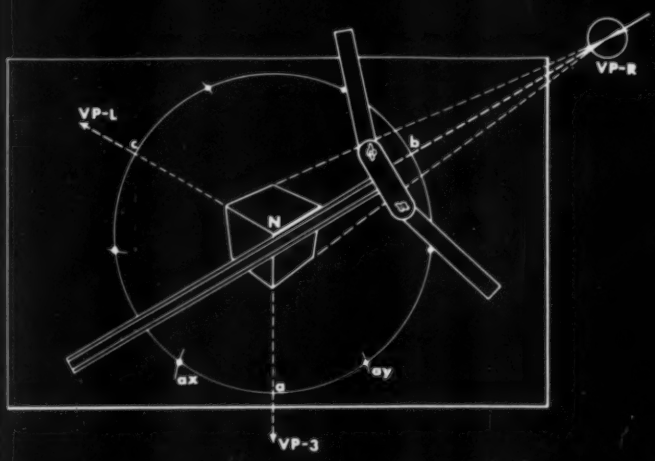
With ordinary perspective systems the lineaid is difficult to use, but with the system presented here it is very valuable, making it easy to construct a perspective view with one of the vanishing points off the table. In other words, it allows us to use an ordinary drawing board for perspective views that would ordinarily require a tremendous drawing area.

The lineaid is a long straight-edge ending in two moveable arms that can be fastened in any position. If the arms are placed against two pins set in the board, the lineaid will move up and down the board in a regular arc. The vanishing point is at the center of this arc; its position depends on the position of the arms. When the arms are at right angles to the blade, the vanishing point is at an infinite distance, and the lineaid is, in effect, a T-square. As the arms are turned, the vanishing point comes closer.

Suppose we wish to draw a 30-60° cube with one vanishing point off the table. First draw a horizon. Set the arms of the lineaid at the proper angle to give the desired distance between the vanishing points (this is not hard to judge by eye) and place two pins in the board (x and y) to hold them. Make sure that the lineaid lines up with the horizon, then rotate it down to the bottom of the drawing. Drive one pin in the left vanishing point and another against the lineaid at z. Stretch a string from these two pins and line it up with the lineaid and the horizon; the second vanishing point (*VP-R*) will be found at the apex of the string. Now divide the distance between the vanishing points with a steel tape or simply by folding the string to find the measuring points and the vertical measuring line. Since the lineaid supplies the right-hand perspective lines, we have no further need for *VP-R*.

The lineaid is particularly useful for three-point perspective, making it possible to draw a 45° cube with all three vanishing points off the table. As the illustration shows, three pairs of pins are set in a circle to provide three positions for the lineaid.





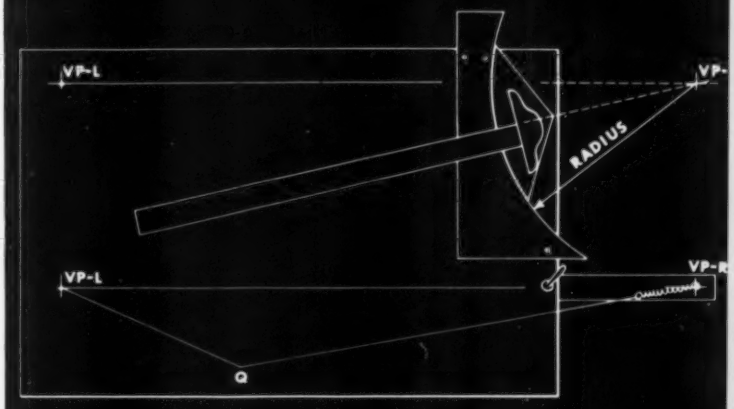
Other vanishing point tricks

In addition to the lineaid there are various home-made devices for drawing with one vanishing point off the board:

1. Cut an arc out of plastic or cardboard; fasten the inside piece to back of the T-square. Fasten the outside piece to the drawing board, taking care that its center falls on the horizon. These can be made in different sizes with their center distances noted.

2. Clamp a piece of wood to the table to hold the second vanishing point. Drive a pin into each vanishing point and stretch a wire or tough string between them, fastening the wire at one end by means of a light spring or rubber band. If a stiff enough wire is used, sketching can be done directly against it.

Special machines for drawing in perspective are interesting theoretically but usually very expensive and not much more useful than a straight-edge. I believe that the perspective system I have described makes complex equipment and special charts unnecessary. THE END



TECHNICS *a catalog of new products, materials, processes and finishes*

Doors stay closed as test car with new safety latches crashes head-on into barrier.

Safety device for 1956 Studebaker

Car doors stay closed in crashes with recently tested interlocking latch

Car doors have a tendency to fly open when an automobile is in a severe collision, and crash injury statistics show that many fatalities and serious injuries which are the result of people being thrown from cars would be averted if the occupants could be kept inside.

Studebaker design engineers have been working for over four years on the problem of keeping car doors closed under severe impact. Recently, a four-door sedan, equipped with a new interlocking type door latch, was deliberately smashed against a barrier while moving at 40 miles an hour before official observers from automotive safety organizations and police traffic experts; the latches held the doors securely closed even though the car was badly damaged and the body distorted by the crash.

With the final test successfully completed, the new type latches will be standard equipment on all 1956 models by Studebaker, according to a Studebaker spokeman.

Manufacturer: Studebaker-Packard Corporation, South Bend, Indiana

Spring pin used in faucet assembly

Cost of single-handle faucet reduced by replacing screw with spring pin

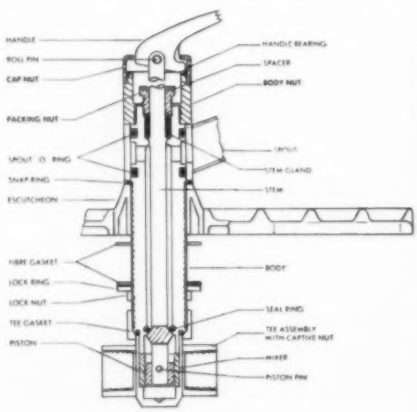
Faucets with one handle to control both temperature and volume have been known to plumbing contractors and wholesalers for about ten years. Their general acceptance, however, has been slow because of their premium price and lack of promotion. Gyro Brass Manufacturing Corporation has announced that they are now selling a single-handle faucet at a price equal to a quality two handle faucet—about $16.

With a single-handle faucet, the volume and temperature can be adjusted before it is turned on, reducing the danger of scalding. The handle position indicates temperature and will stay set even though the faucet is turned on and shut off frequently. Hot and cold water is mixed by orifice alignment without the use of springs and a pressure balance shut-off principle eliminates faucet drip. The Gyro Brass faucet is constructed without washers or seats, and the parts conveying water are brass, bronze or stainless steel.

An important factor in the reduction of the price of single-handle faucets, it is reported, is the use of a spring pin (ID August, 1955) in place of a screw in the assembly. The change in fasteners resulted in savings of production time and operations and in the cost of materials.

Originally, the design of the faucet called for a screw to fasten the handle to the stem, necessitating a milled slot in the handle and milled flats on the stem to minimize play and wear. When tests showed that the screw tended to loosen in service, the design was changed to incorporate a spring pin. The trade name of the spring pin used is Rollpin, made by Elastic Stop Nut Corporation of America. The Rollpin is passivated corrosion resistant steel, .187 nominal diameter which is designed to lock firmly in holes ranging in diameter from .187 to .192 inches. The pin is made with a diameter larger than the hole into which it is to be inserted and will lock itself into any hole drilled to normal tolerance. Because of spring pressure, the Rollpin presses constantly against the sides of the hole and resists the severest vibrations. It can be used in place of solid pins, cotter pins, or grooved, notched, knurled or serrated pins. It serves as a rivet, stop pin, hinge pin, dowel, or linkage pin. It simplifies production because it eliminates line drilling, reaming, staking, and riveting. Insertion of the Rollpin is easy by hydraulic cylinder, arbor press, or hammer. Removal is simple, and, as the pin assumes its original diameter when taken out of its hole and retains its self locking feature, it can be used over and over.

Manufacturers: Elastic Stop Nut Corporation of America, 2330 Vauxhall Road, Union, N. J.; Gyro Brass Manufacturing Corp., Westbury, N. Y.



Perspective drawings made easy

New technical drawing instrument gives quick perspectives from orthographics

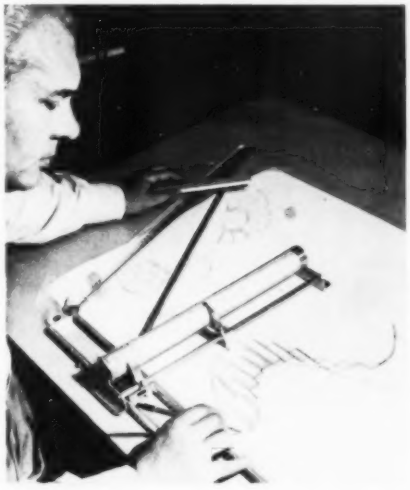
A new technical drawing instrument that is reported to make it possible for a semi-skilled draftsman to execute the most difficult perspective drawings is now being produced in America. Based on a French design by Ramon Jean Leon Negre, who spent thirteen years developing it, the Perspectograph, as it is named, accurately transcribes plans and blueprints into perspective drawings swiftly and accurately.

The Perspectograph can be used on any drawing board or flat surface and operates

on the principle of cylindrical panorama perspectives. A calibrated sweep arm and an abacus chart of curves enables the user to translate an orthographic drawing into a perspective by plotting his perspective points and connecting them. It eliminates the necessity of drawing vanishing points and construction lines. Designed to produce worm's eye views as well as bird's eye views, the Perspectograph works backwards as well as forwards, translating perspectives into orthographics.

The cost will be about $275 and the manufacturer anticipates wide application for drawing perspectives when time is a major factor, as it is in designing television settings.

Manufacturer: Perspectograph Corporation, 285 Madison Avenue, New York 17, N. Y.



Height and mobility problems solved

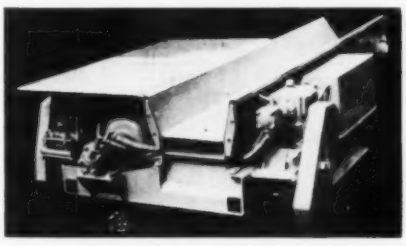
Worm-gear drive was the solution to a compact conveyor head for use in mines

The use of double-enveloping worm gear drive solved problems in the design of a new mobile coal conveyor head. With a major problem to maintain the low overall height necessary for operating in thin seams of coal underground and compactness to permit sharp turns and maneuvering in cramped quarters, engineers from The Long Company applied a crawler drive to a stationary conveyor head.

Two standard 4-inch center distance Cone-Drive double-enveloping worm gear speed reducers were selected for the crawler drive. Built by Cone-Drive Gears, Division of Michigan Tool Company, these reducers provide high load-carrying capacity in an extremely compact unit. They are driven by hydraulic motors, mounted directly on the reducers by means of adapters. The reduction rate is 30:1 and the input speed 850 rpm.

The new conveyor heads, it is estimated, cut the time required for moving from three to four hours to only 30 minutes.

Manufacturers: The Long Company, Oak Hill, West Virginia; Cone-Drive Gears, Division Michigan Tool Company, Detroit, Michigan



Low, powerful mobile conveyor head

Film viewers are redesigned

Eye strain is reduced and price lowered with new Fairchild 70mm viewers

The simplified design of the two new 70mm fluorographic viewers makes them substantially less expensive than previous models. Developed by the Industrial Camera Division of Fairchild Camera and Instrument Corporation, the new viewers are reported to give better viewing with less eye strain. They are for use in mass radiography and have two lenses 4¾ inches in diameter and set 9/32 inches apart, providing magnification of approximately two diameters. Precision ground, the lenses have practically no color fringe, cut distortion to a minimum, and are sealed against dust and dirt.

The base of the instrument houses a circular fluorescent light that provides even daylight (cold) illumination. The lamp reflector is so situated that only reflected light comes through the clear glass and the observer never looks directly at the lamp, regardless of his viewing position. Excellent scanning is obtained from a distance of about 18 inches. Other models demand close range viewing — a major cause of eyestrain.

There are two models available: one for roll film which handles 70mm film from 10 to 100 feet long, the other for 70mm cut film measuring 4" x 4" and 4" x 5". The roll film viewer retails for $180. This compares to $220 for similar instruments made previously by Fairchild which were from $80 to $100 less expensive than the nearest competition.

Manufacturer: Fairchild Camera and Instrument Corporation, Syosset, Long Island, New York

Fairchild 70mm roll film viewer.

Tape recording time increased

One reel holds almost a mile of tape made with "Mylar" polyester film as base

The development of a new and thinner tape by Reeves Soundcraft Corporation makes it possible to record over longer uninterrupted time intervals using standard equipment with regular size reels. Using Dupont's "Mylar" polyester film as a base, Soundcraft has made a tape so thin that a mile of it can be wound on a single 10½ inch reel. The Mylar base is half a mil thick, but is very stable and can be stored indefinitely without deterioration or loss of sound fidelity. A full-depth oxide coating was developed to match the non-deteriorating characteristics of the Mylar base and provide maximum protection against heat or humidity damage.

A reel of Plus-100 tape, as it is known, will run continuously for nearly nineteen hours at 7⅛ inches per second on a double track machine. In addition to the 10½-inch reel of 5200 feet which costs $22.50, the tape is available on a 7-inch reel of 2400 feet for $9.00 and a 5-inch reel of 1200 feet for $4.75. The 7-inch reel can provide as much as five hours of continuous recording at hi-fi speed of 7½ inches per second on a double track recorder.

Manufacturer: Reeves Soundcraft Corporation, 10 East 52nd St., New York 22, N. Y.

Versatile plastic-steel developed

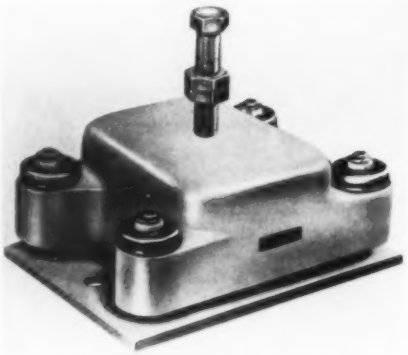
Devcon can be handled like putty but holds like steel

A new material, named Devcon and developed by the Chemical Development Corporation, has the characteristics of steel, yet is as easy to handle as modeling clay. Devcon is a combination of 80 per cent steel and 20 per cent thermo setting polymer. Until a hardening agent is added, it can be used like putty or a viscous liquid. Two hours after the special hardening agent has been added, it becomes a rigid, tough, steel-like mass. No heat or pressure need be applied.

Developed originally for use by the metal working industry for making tools, jigs, fixtures and molds, Devcon is now being used by some aircraft and automotive companies for forming or stamping dies, filling holes in castings, bonding steel to itself or to aluminum, bronze, brass, iron, or porcelain, rebuilding broken machinery, and for building up the inside of pumps, valves and other worn sections. One of the great advantages of Devcon, it is reported, is that a holding fixture, for example, which would normally involve twelve hours if it were made of steel, can be made in 15 minutes. Money, as well as time, can be saved; a stamping die that would normally cost $250 can be made in thirty minutes with Devcon for less than $50.

Manufacturer: Chemical Development Corporation, Danvers, Massachusetts

Devcon being used like putty. After hardening agent is added, it becomes a steel-like mass.



Mountings feature sway control

Unique damping, sway and thrust control attained in a vibration mounting

T. R. Finn and Company, Inc., specialists in shock and vibration control, have developed a new line of general purpose steel spring vibration mountings. It is claimed that the new design combines the superior characteristics of steel springs with unique damping and sway control advantages previously unattainable in a single mounting.

The mountings have a housing of semi-steel, containing helical steel springs, rubber thrust bumpers, nylon dampers, and a steel baseplate with sway control assemblies. A dual-purpose bolt secures the mounting to the machine and also serves as an easy means of leveling.

Self-locking sway control nuts provide stability without the need for external snubbing devices. The mountings are available with rubber-bottomed, non-walking baseplates which eliminate the need to attach them to the floor. There are 41 standard sizes, ranging in rated load capacity from 100 to 6500 pounds.

Manufacturer: T. R. Finn & Co., Inc. Hawthorne, New Jersey

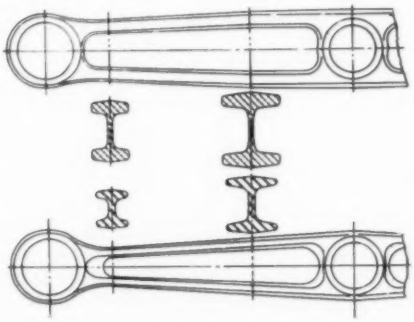
Fiberglas is used for packaging

Easy-to-handle package cushioning meets military specifications

A wide range of Fiberglas package cushioning which meets U. S. military specifications is now available for industrial use, according to Owens-Corning Fiberglas Corporation. The material is highly resilient and is designed for the protection of delicate instruments and machinery during shipment. It will not mildew or rot, is fire safe, odorless and moisture resistant. The Fiberglas cushioning material is available in variable thickness in sheets or rolls.

Manufacturer: Owens-Corning Fiberglas Corporation, Toledo 1, Ohio

Aluminum axle suspension (above) installed on tandem. Compared to steel beam (below, bottom), section depth is obviously larger.



Axle suspensions made of aluminum

Light equalizer beam saves weight — increases truck and trailer payloads

The use of forged aluminum beams for truck axle suspensions saves 120 pounds of unsprung weight in a complete heavy duty tandem. Designed and tested by Aluminum Company of America, the beam forging was made with simple dies. Developed in cooperation with the Hendrickson Manufacturing Company, the beam has greater sectional depth than one made with steel, but the light metal made possible a 50 per cent reduction in weight. This saving in weight adds to the payload of the truck or trailer.

In redesigning the equalizer beam from steel to aluminum, it was found that the part was well adapted to aluminum forging techniques. Since the 48-inch long part has three axes of symmetry, it could be made with simple forging dies. The unfinished weight of the forging is 67.5 pounds which is reduced to 60 pounds after it has been finish-machined.

The equalizer beam assures equal division of the truck load under all conditions. This is accomplished by causing all wheels to be in contact with the road surface even if one wheel rides over a bump or falls into a hole. The equalizer beam cuts road shocks in half and greatly reduces their damaging effect on the chassis and load.

Manufacturer: Aluminum Company of America, 1501 Alcoa Building, Pittsburgh 19, Pa.

Speedbins give faster assembly

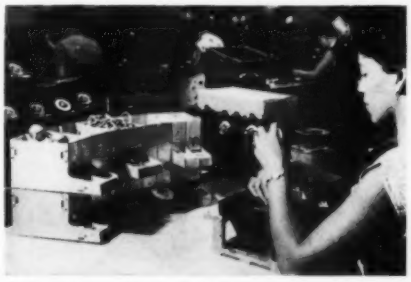
Adjustable assembly bins take advantage of normal human motions

Assembly bins whose design is based on time study and motion economy principles are now in production at the Speedassembly Equipment Company in Brooklyn, New York. Known as Speedbins, it is claimed that they result in faster and smoother hand assembly operations with less operator fatigue by taking advantage of normal, natural rhythmic movements without sharp directional changes.

Speedbins are available in kits of two sizes. Each kit gives 30 inches of bin width, with one 4½ inches high and the other 9 inches high. The bins are 6 inches deep and have a 3-inch projecting tray. Parts in the bins are gravity fed to the operator, and the rate of flow is controlled by an adjustable shutter. The bins can be filled from the back without disturbing production. Kits cost $11.50 f.o.b. Brooklyn, N. Y., for either size.

The bins can be adjusted for various part sizes and any combination put together depending on the assembly problem.

Manufacturer: Speedassembly Equipment Company, 26 Court Street, Brooklyn 1, New York



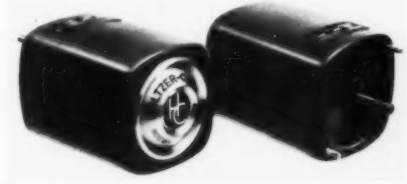
Speedbins being used in a Western Electric telephone repair plant in Brooklyn.

Efficiency is feature of new motor

Subfractional motor has new construction rotor and uniform torque

A new subfractional motor in a 3-inch diameter frame has been introduced by Holtzer-Cabot Motor Division of National Pneumatic Co., Inc. Styled by Raymond Loewy Associates, the new motor is designed for application in recording units and office appliances. Of the single-value capacitor type, it has a high efficiency rating of over 30 per cent, which results in lower temperature rise and less heat to be dissipated when the driven motor is enclosed. It has a stainless steel shaft and new rotor construction, which is completely cylindrical with no irregularities or slot openings. This promotes more uniform torque and quieter operation. The stator has slots with Mylar insulation and distributed windings. End caps are of die-cast aluminum and either ball or sleeve bearings are available.

Manufacturer: Holtzer-Cabot Motor Division, National Pneumatic Co., Inc., 125 Amory Street, Boston, Mass.



Card filing is made easy

Remington Rand's Cross-File Units put thousands of cards within easy reach

New filing units that put as many as 95,000 8" x 5" cards within arm's reach at the same time are now available from Remington Rand. Known as Cross-File Card Units and finished in Gray-Rite enamel, they are designed to give more flexibility and greater capacity in less space. They are made in 6- and 8-drawer units which house either 5" x 3", 6" x 4", 8" x 5" or punched cards.

In the 6-drawer double wing unit (illustrated), each of the 12 drawers has three trays, the equivalent of a drawer of 8" x 5" cards 72 feet long.

Manufacturer: Remington Rand, 315 Fourth Avenue, New York 10, N. Y.

Inexpensive transistor available

General Electric is producing a new line of transistors for amateurs

A transistor, designed for use by hobbyists and amateurs, has been placed on the market by General Electric. Priced below two dollars, the 2N107 is reported to be the first in a proposed series of transistors that GE will market exclusively through their distributors for use by amateurs.

The 2N107 is a PNP audio transistor and has an all-metal case which is hermetically sealed for maximum reliability by means of glass-to-metal seals and resistance-welded seams. It is a typical common emitter and has a power gain of 38db. Maximum frequency cutoff is 2.5 megacycles with the design center at 1.0 megacycles and the maximum junction temperature specified at 60°C. It is capable of dissipating 50 milliwatts in 25°C free air.

Manufacturer: General Electric Company, Electronics Park, Syracuse, New York

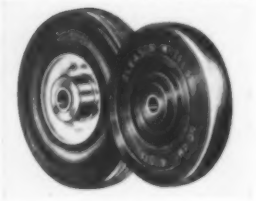
New router is versatile and inexpensive

A router for light industrial use, and inexpensive enough for home workshops, is available from the Mall Tool Company. Easy to handle and more accurate than hand tools, the new router is claimed to be very versatile for grooving, beading, dovetailing, cove cutting, carving or shaping. It is priced at $19.95.

Manufacturer: The Mall Tool Company, 7725 South Chicago Ave., Chicago 19, Ill.

Purpose and Manufacturer

Industrial wheels



Semi-pneumatic industrial wheels for portable racks, floor trucks, hand trucks, portable assembly stands, dollies, work benches, mobile testing equipment, and platform trucks. Available in 6-, 8-, 10- and 12-inch diameters.
Gleason Corporation, 250 North 12th Street, Milwaukee 3, Wisconsin

Non-slip pipe dolly

Designed to reduce pipe handling time up to 85%, dolly provides for pipe adjustment over a variation of several inches. Rollers permit rotating for either manual or automatic welding.
H & M Pipe Beveling Machine Company, Tulsa, Oklahoma

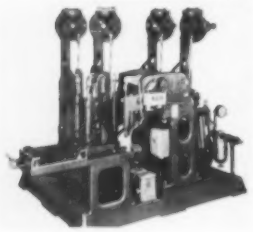
Safe crane hook

Swedish positive-locking safety crane hook, drop forged of chrome nickel steel. Designed so the body of the hook completely encloses the sling at all times. Spring loaded safety catch makes a positive lock at the neck.
The Walpole Company, 419 Boylston Street, Boston 16, Mass.

Electric screwdriver

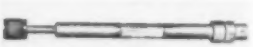
Sturdy electric screwdriver designed for accurate, speedy work. Operates with one hand control, leaving the other hand free to hold or guide material. Instant start-stop control for safe handling. Can be used on up to #10 machine screws, self tapping, ¼" machine screws.
Mall Tool Company, 7725 South Chicago Avenue, Chicago 19, Illinois

Automatic riveter



Multi-head rivet setting machine feeds and sets four rivets at a time, speeding assembly time and reducing fastening costs. The number of heads, the type of rivets to be fed and set, the distance between centers and anvil elevations can be altered to meet individual requirements.
Tubular Rivet & Stud Co., Wollaston 70, Mass.

Sliding coaxial



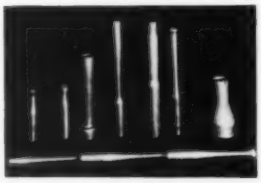
Sliding coaxial terminations to provide accurate and convenient method for evaluating residual VSWR of coaxial slotted lines.
The Narda Corporation, Mineola, Long Island, N. Y.

Rotary broach

With a cutting edge that forms a circle, Taper Shank Rotary Broaches produce perfectly finished holes.
Shearcut Tool Company, 7045 Darby Avenue, Reseda, California

Purpose and Manufacturer

Seamless tubing



High speed spinning process produces a multitude of shapes which are concentric about the axis of the tube from various alloys of aluminum, brass, copper and steel. After the tube has been spun into its basic shape, it can be formed or bent into the required design.
Hubbard Aluminum Products Company, Pittsburgh 1, Pa.

Snap-on-front

One-piece snap-on front with zero corrector for flush rectangular instruments. The instruments, except for the window area, can be supplied in any color, including black. Case dimensions are 3.80" x 3.44" and the instruments are available as d-c and rectifier-type a-c in polular ranges.
Weston Electrical Instrument Corporation, 614 Frelinghuysen Avenue, Newark 5, N. J.

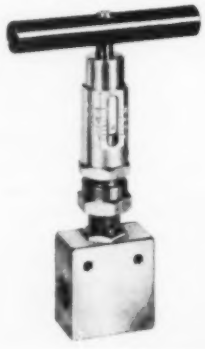
Acetate foglights

Amber-colored contact lenses which fit every type of sealed beam headlights used on passenger cars, trucks and buses convert headlights into foglights. Vacuum-formed of Celanese acetate sheeting. Retail for about $1.
FogMaster Co., 205 West 19th Street, New York 11, N. Y.

Flow rate meter

Provides visual flow rate indication in circulating, lubricating and fueling systems. 1.5 pound unit is designed to cover a flow range of 7 to 70 GPH and to operate at temperatures of —65° to +160°F. The meter is accurate to within ±2% of the specified flow rate and has a low pressure drop.
Revere Corporation of America, Wallingford, Connecticut

High pressure valve



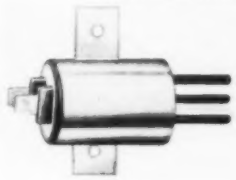
The micrometer stem in this high pressure valve can be used for bleeding and metering pressure let-down control. It permits micrometer control of all types of testing through the principle of differential screw threads. One complete revolution of the handle opens the valve .015. Micro-Valve is manufactured in all types of materials, including stainless steel, hastalloy and titanium for pressures up to 60,000 p.s.i.
High Pressure Equipment Company, Inc., 1222 Linden Street, Erie, Pa.

Purpose and Manufacturer

Transistor transformer

Miniature interstage transistor transformer for use in audio amplifiers, hearing aids, control circuits and other transistorized circuitry. Impedance of the interstage primary is 20,000 ohms, and the secondary is 1,000 ohms. Frequency response is plus-or-minus 3db from 150 to 15,000 cycles per second with .25 milliamps in the primary.
Telex, Inc., Telex Park, St. Paul 1, Minn.

Appliance relay

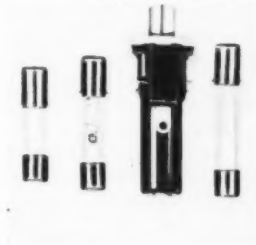


Small appliance relays for application in washing machines, dryers, dish washers, refrigerators, heat-units, air conditioners, vending equipment, electric stoves. Relays are completely enclosed in a metal case, plugged with molded Bakelite on the contact end to protect internal parts against dust and moisture.
Guardian Electric Manufacturing Company, 1621 West Walnut Street, Chicago 12, Ill.

Breakaway connector

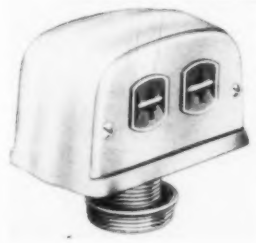
Miniature two-piece connector, insulated with Teflon, consists of a feed-through plug with pigtail terminal, and a contact receptacle. The plug is brass, silver-plated with gold flash, and the receptacle has a beryllium-copper, silver-plated, gold-flash contact.
Sealectro Corporation, 186 Union Avenue, New Rochelle, N. Y.

Fuses and holders



Littlefuse LC fuses, manufactured in a combination of three different lengths and seven different widths of bayonet locking tabs on the fuse caps. The fuse post is made to accept only the size amperage range and type in its range. Used to eliminate the possibility of over-fusing such appliances as television and radio receivers.
Littlefuse, Inc., 1865 Miner Street, Des Plaines, Ill.

Service fittings



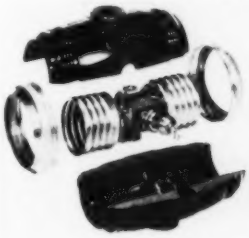
Featuring minimum housing height, standard receptacles are less than three inches high. Especially designed for installations where height is restricted by desks or free-standing equipment. The fittings are satin-finished die-cast aluminum to match with modern desk trim and office equipment.
National Electric Products Corp., Gateway Center, Pittsburgh, Pa.

Purpose and Manufacturer

Leaf-proof connectors

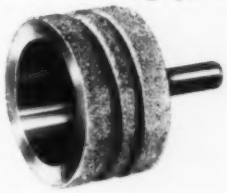
Receptacles and plug designed to insure leak-proof performance under conditions of extreme heat and pressure. They feature Hermetic Vac-Tite glass-to-metal construction and are corrosion resistant and 100% moisture and pressure repellent.
Hermetic Seal Products Co., 33 South Street, Newark 7, N. J.

Twin lampholder



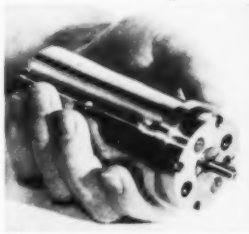
Through alternate control of two single-filament lamps of different wattage, the lampholder gives 3-way lighting for floor and table lamps. When equipped with a 50-watt and a 100-watt lamp, it will turn each on separately or both at one time for a choice of 50-, 100- or 150-watt lighting.
McGill Manufacturing Co., Inc., Valparaiso, Indiana

Edge planer



Designed for manufacturers of printed circuits, the Dia-Chrome diamond-coated edge planer incorporates a radius groove, an angular groove, and two square shoulders. Without changing tools or stations, an operator can smooth-finish a square, radius or angular edge.
Dia-Chrome Company, 722 S. Verdugo Road, Glendale 5, California

Quantizer



A shaft position quantizer with its control unit provides a standard shaft-position-to-digital converter system. A simple induction device, it has an indefinitely useful life as there are no gears or digitizing commutators to wear out. It is adaptable to any shaft and is particularly suitable for applications where a high degree of accuracy along with instantaneous shaft position is required.
The Austin Company, 76 Ninth Avenue, New York 11, N. Y.

The Vernistat

Combines the features of both a potentiometer and a variable transformer. 400 cycle, low output impedance which eliminates the need for isolation amplifiers in many applications. Weighing 10 ounces, the unit is 1.75 inches in diameter and 2.68 inches long. For use in servo systems and analog computers.
The Perkin-Elmer Corporation, Norwalk, Connecticut

Technics *(Continued)*

Zinc-rich paint protects metal

Electromechanical action of paint pigmented with zinc protects iron and steel

An addition to the family of rust-inhibitive organic coatings has been introduced by The New Jersey Zinc Company. This protective paint is pigmented with 100 per cent zinc dust and contains selected plasticized polystyrene and chlorinated rubber as the vehicle. It has been in commercial use in England for several years to provide protection on new or rusty iron and steel surfaces under atmospheric exposure or in fresh or salt water service.

Zinc-rich paint, because of its non-toxic nature, can be applied with a spray as well as a brush. It is a primer paint which is capable of making metallic contact with the underlying metal, offering electromechanical protection in much the same manner as the zinc coating in the galvanizing process protects iron and steel from corrosion. The closely packed zinc particles serve as an electrical conductor during the early life of the film. As weathering continues, zinc hydroxide and other basic zinc compounds form throughout the film and on the steel. These compounds tend to slow down the self-sacrificing action of the zinc, prolonging the life of the film.

Manufacturer: The New Jersey Zinc Company, 160 Front Street, New York 7, N. Y.

Polyurethane foam made in quantity

Synthetic cellular material has many possible applications

Football players, flyers, or housewives may find themselves using a synthetic cellular material in one or several ways. A recent development by the American Collo Corporation enabled them to foam polyurethane in continuous slabs, introducing large scale production of the material in the United States for the first time.

Known as Collo Allfoam, it is a pure synthetic and is manufactured in various thicknesses up to 8 inches and in widths up to 54 inches. As the pore structure can be varied, textures from a suede-like finish to a wide pore finish in a wide range of colors can be obtained. The material can be cut, sliced, formed and shaped with conventional tools, scissors and bandsaws, and it can be stitched, sewn, quilted, and laminated to fabrics and vinyls. Depending on the application, the density can be varied from 2 to 10 pounds per cubic foot. Although it is light, this cellular synthetic has a high compression strength and is durable.

The resistance of Allfoam to dry-cleaning solvents, oils, mildew, moths and other insects increases its possible applications to include the upholstery industry. When combined with materials from terry cloth to nylon, it can be used as linings for protective garments, slippers, belts, shoulder pads, insoles, and so forth. Rapid compressibility and slow return cycles of special grades of Allfoam make it a good shock-absorbing material for dashboard cushioning, sports equipment, and for packing delicate instruments.

The building and transportation industries may take advantage of Allfoam's thermal insulating and sound absorbing features. (The "K" factor of Allfoam is 0.033 Kilograms cal/Mh°C or approximately twice that of cork.)

The development of methods for foaming-in-place will make it possible for Allfoam to be used to fill cavities in aircraft wings, refrigerators, or boats, adding structural strength and sound insulation.

At the American Collo Corporation, one machine produces 40 pounds of Allfoam a minute. Expanding facilities are expected to increase production in the near future.

Manufacturer: Amercian Collo Corporation, 525-535 Oritan Avenue, Ridgefield, New Jersey.

Manufacturers' Literature

Heavy Metal. Fansteel Metallurgical Corp., North Chicago, Ill. 16 pp., ill. Fansteel 77 Metal is a dense alloy, 50% heavier than lead. A new booklet lists physical properties of the alloy, describes the processes of manufacturing and finishing, and contains a number of reference tables and charts.

Metallizing. National Research Corp., 160 Charlemont St., Newton Highlands, Mass. 12 pp., ill. Principles of the vacuum coating process and applications and process features are discussed; and vacuum coating equipment is illustrated and described in a new booklet.

Photoelectric Controls. Photoswitch Division, Electronics Corp. of America, Cambridge, Mass. 18 pp., ill. Automation through use of photoelectric controls for sorting, precision filling, inspecting, etc., is described with information about control sets for every industrial application.

Rubber Parts. Tyer Rubber Co., Andover, Mass. 12 pp., ill. Pictures of molded and extruded components of natural and synthetic rubber manufactured by this firm are shown, with a chart giving technical specifications on rubber and synthetic compounds and comparisons.

Spot Welder. Sciaky Bros., Inc., 4915 W. 67th Street, Chicago, Ill. 8 pp., ill. Sciaky announces, in a new booklet, their Modu-Wave air-operated press type spot welder, and explains their patented principle of operation.

Tooling Plastic. Rezolin, Inc. 5736 West 96th Street, Los Angeles, Calif. A new Mixing Chart shows the amount of tooling plastic needed for a given job.

Index to Advertisers In This Issue

Classified Advertisements

10c A WORD PER INSERTION, $3.00 MINIMUM, PAYABLE IN ADVANCE. BOX ADDRESS COUNTS FIVE WORDS.

Positions Wanted

INDUSTIAL DESIGNER, *highly creative with proven ability to increase sales. Familiar with engineering and sales promotion, Industrial Design degree, 5 years diversified experience, age 32, married. Capable of directing design program. Box ID-54,* INDUSTRIAL DESIGN, *18 E. 50th St., N. Y. 22.*

INDUSTRIAL DESIGNER—*10 years diversified experience in all creative phases of Product and Package Design Development, Engineering and Model Making. Presently employed. Seek position with a growing firm. Willing to relocate. Box ID-56,* INDUSTRIAL DESIGN, *18 E. 50th St., N. Y. 22.*

STYLIST-DESIGNER, *male, experienced covering materials as applied to automotive interiors, furniture, home furnishings, luggage, case goods, etc. Sales and promotion minded. Interested progressive end product manufacturer, converter, or other concern. Box ID-57,* INDUSTRIAL DESIGN, *18 E. 50th St., N. Y. 22.*

INDUSTRIAL DESIGN—*Capable with thorough knowledge of materials and processes. Successful experience in styling, engineering and production. Supervisory or administrative ability. Desires permanent position with progressive manufacturer. Box ID-58,* INDUSTRIAL DESIGN, *18 E. 50th St., N. Y. 22.*

Help Wanted

DIRECTOR OF ENGINEERING—*An old established company can offer an outstanding and challenging opportunity for a capable engineering executive to direct research and engineering activities. The company is engaged in the manufacture and marketing of a diversified line of established equipment in recreation, education, and defense fields. Products cover a broad range of materials, including steel, aluminum, rubber, plastics, and wood. The scope of engineering responsibilities will encompass industrial design, mechanical equipment design, materials research, and plastics and rubber product development. A Very capable mechanical engineering and chemical engineering staff is available to support the top man. The budget for these activities is approximately $400,000 annually. The man we seek must have several years of successful experience in the direction of broad engineering programs and must have held a position as chief engineer or research director for a medium size company, or divisional engineering supervisor for a large corporation. He must have a mechanical engineering degree. A very attractive salary and fringe benefit arrangements are available to the successful candidate. Location is in Midwest. Box ID-59,* INDUSTRIAL DESIGN, *18 E. 50th St., N. Y. 22.*

HELEN HUTCHINS PERSONEL AGENCY—*Specialist Industrial, Architectural, Interior Design, Decorative Arts, Trades, Home Furnishings. Helen Hutchins' long association with a leading industrial design organization insures intelligent and individualized screening of all types of personnel for industrial designers. 767 Lexington Ave., New York 21, TE 8-3070. Interviews by Appointment.*

ARCHITECTURAL AND DESIGN PERSONNEL AGENCY—MURIEL FEDER—*A personalized placement service for top level architects, designers, engineers, draftsmen, interior decorators, and home furnishing personnel. Selective contacts arranged in a confidential and professional manner. Interviews by appointment. 58 Park Ave., N. Y. MU 3-2523.*

INDUSTRIAL DESIGNER—*Exceptional opportunity for a capable industrial designer to join an old, established company which is expanding and diversifying its products in the recreation and education fields. The man we seek must have a record of successful accomplishments in designing and developing consumer products. He must be creative, have a good knowledge of mechanical principles and material usages, and be able to work with sales and manufacturing divisions to reduce costs, improve appearance and saleability of present products and develop new ones. A degree in mechanical or architectural engineering is essential. We can offer a very attractive salary and excellent working conditions. Send resume to Personnel Manager, The Brunswick-Balke-Collender Company, Muskegon, Mich.*

Miscellaneous

ASSOCIATE-WANTED-BY-SUCCESSFUL-SALESMAN — *Industrial design background, married, age 30, limited capital, seeks mutually profitable connection metr. N. Y. area. Box ID-55,* INDUSTRIAL DESIGN, *18 S. 50th St., N. Y. 22.*

October 10-12. Office of Naval Material in cooperation with all Military Services and the Department of Commerce, first joint Military-Industry Symposium on Packaging and Materials Handling. Washington, D. C.

October 10-13. National Office Management Exposition. Auditorium, Atlanta, Ga.

October 11-15. Society of Automotive Engineers' Aeronautic Meeting, Aircraft Production Forum and Aircraft Engineering display. Hotel Statler, Los Angeles.

October 13-14. Society of the Plastics Industry, Inc. New England Section Meeting. Equinox House, Manchester, Vermont.

October 13-15. Committee on Vacuum Techniques, Inc. 2nd Symposium on Vacuum Technology. Mellon Institute, Pittsburgh, Pa.

October 13-16. Audio Fair. Hotel New Yorker, N. Y.

October 17-21. National Hardware Show. Navy Pier, Chicago.

October 17-21. National Metal Exposition and Congress. Convention Hall, Philadelphia.

October 18-21. National Builders Hardware Exposition. Kiel Auditorium, St. Louis.

October 24-26. American Standards Assn., annual meeting and national conference on standards. Washington, D. C.

October 24-28. National Business Show. 69th and 71st Regiment Armories. New York.

October 30-November 11. Second Chicago Area Industrial Design Exhibition. Illinois Institute of Technology, Chicago.

October 31-November 4. The Grand Rapids Fall Market. Waters & Exhibitors Buildings, Grand Rapids.

November 3-4. Metals Casting Conference. Lafayette, Indiana.

November 3-11. International Packaging Exhibition, Paris.

November 7-9. 1955 Eastern Joint Computer Conference and Exhibition. Hotel Statler, Boston. Theme: Computers in Business and Industrial Systems.

November 8-10. Packaging Association of Canada's Fourth Canadian National Packaging Exposition and Banquet, C.N.E. Automotive Building, Toronto, Ontario.

November 14-15. TAPPI National Plastics Meeting, Brooklyn Law School, Brooklyn, N. Y. Theme: Fibres and Plastics for Laminates.

November 16. Plastics for Packaging. 1-day technical symposium sponsored by the Society of Plastics Engineers. Hotel Statler, New York.

November 23-February 20. "Built in Latin America." Museum of Modern Art, New York.

November 28-December 1. Air Conditioning and Refrigeration Exposition. The Auditorium, Atlantic City.

January 5-18. Winter Furniture Market. Waters & Exhibitors Buildings, Grand Rapids.

January 9-20. International Home Furnishings Market. American Furniture Mart, and Merchandise Mart, Chicago.

January 30-February 3. Winter Market. Los Angeles Furniture Mart.

- Traveling clock cases
- Watch or jewelry display boxes
- Upholstered furniture
- Auto trim
- Auto seat covers
- Loose leaf books
- Diaries
- Catalog bindings
- Portable radio cases
- Porch furniture
- Subway or streetcar upholstery
- Theatre seats
- Safety and electric razor cases
- Folding doors
- Truck seats
- Luggage and trunks
- Popular-priced shoes and slippers
- Motion picture screens
- Text books
- Cases for portable machines such as typewriters, sewing machines, instruments, vacuum cleaners.

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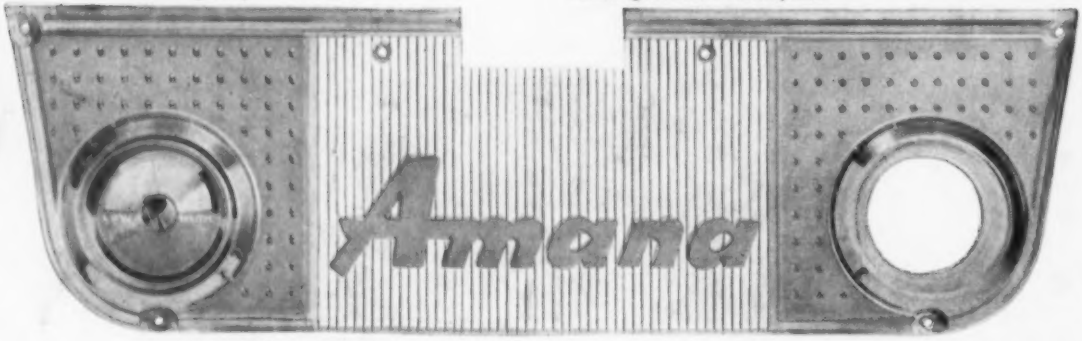

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The water-white transparency of PLEXIGLAS gives depth and brilliance to back-surface paints and metallized coatings. Colored moldings stay fresh and bright for years. PLEXIGLAS is tough, has outstanding resistance to breakage, weather and corrosion.

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Canadian Distributor: Crystal Glass & Plastics, Ltd., 150 Queen's Quay at Jarvis St., Toronto, Ontario.