INDUST

11 *November 1960* *$1.50 per copy*

Product Testing

The 22 New Cars

Machine Tool Review

HIGH DENSITY
POLYETHYLENE
PROFIT PARADE

TAKE A LOOK AT THE WHOLE PICTURE

These plastic products share one point in common

These products offer concrete evidence of manufacturers who have realized the profit-making opportunities to be found in high density polyethylene from W. R. Grace & Co. New products . . . better products . . . products that last longer . . . cost less to make . . . products with greater sales appeal . . . products that complete a product line—all can start with Grex High Density Polyethylene. If you have an application for high density polyethylene—or think you have—it will pay you to call Grace.

Grex is the trademark for W. R. Grace & Co.'s Polyolefins.

W.R. GRACE & CO.
POLYMER CHEMICALS DIVISION
CLIFTON, NEW JERSEY

Date of 1960 Advertisers' FIRST Advertisement in INDUSTRIAL DESIGN

Allied Chemical Corporation	1957
Aluminum Company of America	1956
American Cyanamid Company	1956
American Nickeloid Company	1956
Anchor Plastics Company	1956
Apex Coated Fabrics, Inc.	1957
The Art Center School	1956
Arvin Industries, Inc.	1959
Athol Manufacturing Company	1954
Atkins & Merrill, Inc.	1960
Bohn Aluminum & Brass Corp.	1960
Borg Warner Corporation	1960
W. H. Brady Company	1960
Bridgeport Brass Company	1960
L. E. Carpenter & Company	1960
Celanese Corporation of America	1954
Chicago Molded Products Corp.	1959
Clapp & Poliak, Inc.	1956
Coating Products, Inc.	1954
Columbus Coated Fabrics Corp.	1955
Conforming Matrix Corporation	1960
Continental Felt Company	1959
Corning Glass Works	1954
Crane Plastics Inc.	1960
Croname, Inc.	1955
Dayton Rogers Mfg. Company	1960
The Dow Chemical Company	1956
E. I. DuPont de Nemours & Company	1955
Eastman Chemical Products, Inc.	1955
Enjay Company	1957
Faultless Caster Corporation	1960
Foster Grant Company, Inc.	1960
General American Trans. Corp.	1956
Glass Laboratories, Inc.	1959
Goodyear Tire & Rubber Company	1960
W. R. Grace & Company	1959
Harrington King Perforating Co.	1956
Hercules Powder Company	1956
Hooker Chemical Co.	1960
Integrated Ceilings & Grillework, Inc.	1960
International Nickel Company, Inc.	1958
Theodore S. Jones & Co.	1960
Kimberly Clark Corporation	1959
Knoll Associates, Inc.	1954
Lambert Engraving Company	1960
Lundstrom Laboratories, Inc.	1960
Luxo Lamp Corporation	1959
Masonite Corporation	1955
McLouth Steel Corporation	1955
Mearl Corporation	1960
Metal and Thermit Corporation	1960
The Meyercord Company	1955
Herman Miller Furniture Company	1960
Molded Fiber Glass Body Co.	1955
Monarch Aluminum Mfg. Co.	1954
Monsanto Chemical Company	1956
National Society of Interior Designers	1960
Newbury Industries Inc.	1960
Olin Mathieson Corp.	1960
Park Nameplate Company	1956
Pyramid Mouldings, Inc.	1959
Revere Copper & Brass Co.	1960
Rigidized Metals Corporation	1954
Rohm & Haas Company	1956
Seven Arts Book Society	1960
Sharon Steel Company	1960
Simoniz Company	1959
Steere Enterprises, Inc.	1960
Union Carbide Corporation	1957
U.S. Rubber Company	1955
U. S. Steel Corporation	1959

ID

INDUSTRIAL DESIGN *will have a*

40% Advertising Gain in 1960

Practically unheard of 25 years ago industrial designers today play an ever-increasing part in the design of everything from airplanes to pens. Their potent voice in determining what goes into the products they design accounts for the substantial 40% gain in advertising.

The following publications have recently reported the importance of industrial designers:—

Business Week
Dun's Review
Du Pont Magazine
Fortune
Newsweek
Printers' Ink

———*and the following Company heads have recently so stated*:—

Ray E. Estes Jr. *Vice President, United States Steel Corporation*
Albert E. Forster *President, Hercules Powder Company*
Frank L. Magee *President, Aluminum Corporation of America*
Robert K. Mueller *Vice President, Monsanto Chemical Corporation*
Chester M. Brown *President, Allied Chemical Corporation*
William H. Lehmberg *President, American Felt Company*

Companies who have recognized industrial designers as a strong buying influence through the use of our advertising pages in 1960 are listed at the left.

INDUSTRIAL DESIGN *18 E. 50th Street, New York 22, N. Y.*

the magazine for the men whose decisions today sell the products of tomorrow

NOVEMBER, 1960 VOLUME 7 NUMBER 11

INDUSTRIAL DESIGN

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

CONTENTS

Coming

IN DECEMBER—The 7th Annual Design Review

IN JANUARY—AEC project; complete design of major traveling exhibit

COVER: Peter Bradford's rendition of a Warner & Swasey turret lathe at the Machine Tool Show in Chicago (see page 86).

FRONTISPIECE: St. Peter's in Rome turns into an eerie moonscape in Sam Gallo's plaster-cone architectural plan made from paper cups (see page 70).

PUBLISHER *Charles E. Whitney*
EDITOR-IN-CHIEF *Ralph Caplan*
MANAGING EDITOR *Betsy Darrach*
ART DIRECTOR *Peter Bradford*
TECHNICAL EDITOR *Arthur Gregor*
ASSOCIATE EDITORS *Ann E. Ferebee*
Ursula McHugh
Richard Moss
ASSISTANT EDITOR *Leslie D. Gottlieb*
ART ASSISTANT *Maude Dorr*
EDITORIAL ASSISTANTS *Sandra Leff*
Susan Resen
BUSINESS MANAGER *Alec E. Oakes*
ADVERTISING DIRECTOR *Paul R. Kane*
CIRCULATION MANAGER *Eugene E. Herrman*
ASSISTANT TO THE PUBLISHER *Sven K. Martinsen*
PRODUCTION MANAGER *Frank Peregrin*

ANNUAL DESIGN REVIEW *Deborah Allen*
WEST COAST CORRESPONDENT *Judith Ransom Miller*

PUBLICATION OFFICES Whitney Publications, Inc.
18 East 50th St., New York 22, N. Y.
Charles E. Whitney, President and Treasurer
Jean McClellan Whitney, Vice-President
Alec E. Oakes, Vice-President
Paul R. Kane, Vice-President
Herbert T. Ettala, Secretary

ADVERTISING OFFICES

New York 18 East 50th Street
New York 22
Telephone PLaza 1-2626

Chicago Archer A. King & Company
416 North Michigan Avenue
Chicago 11, Illinois

Atlanta Robert L. Watkins Associates
583 Eight-O-Five Peachtree Bldg.
Atlanta 8, Georgia

Los Angeles The Maurice A. Kimball Co., Inc.
2350 Beverly Boulevard
Los Angeles 57, California

San Francisco The Maurice A. Kimball Co., Inc.
681 Market Street
San Francisco 5, California

Tyler, Texas Weaver, Incorporated
P. O. Box 3143
Tyler, Texas

INDUSTRIAL DESIGN is published monthly by Whitney Publications, Inc., 18 East 50th Street, New York 22, N. Y. Subscription price $10.00 for one year, $18.00 for two years, $24.00 for three years in the United States, Possessions and Canada. Rates to countries of the Pan American Union are $12.00 for one year, $22.00 for two years, $30.00 for three years. Rates to all other countries are $14.00 for one year, $26.00 for two years, $36.00 for three years. Price per copy $1.50 in U.S.A., Possessions and Canada, $2.00 to all other countries. Second-class postage paid at New York, New York.

Member of the Audit Bureau of Circulation

Member of the Associated Business Publications

DOW

NEWS ABOUT PRODUCT DESIGN AND MATERIALS

Thanks in part to modern plastics, today's product designers are able to come up with solutions to design problems that would have been impossible a decade ago. The success of their efforts points up the increasing importance of communication between designer and plastic producer. Here, on these pages, are a few ideas that were born of this communication . . .

FROM FLAME THROWERS TO SOAP DISPENSERS... PLASTICS SOLVE DESIGN PROBLEMS!

New flame-thrower shroud, prepreg molded with Dow epoxy resins, retains its shape, dimensions, protective qualities under extreme operating conditions!

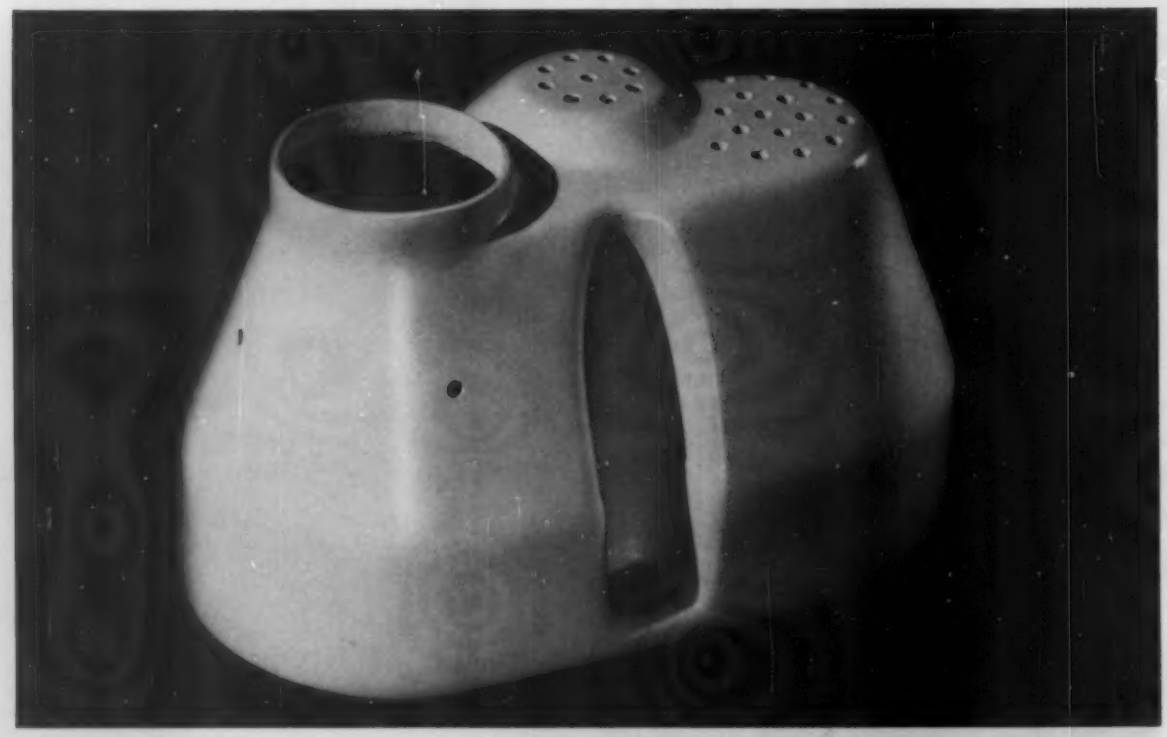
Designing weapons for our military forces is similar in many ways to designing products for the consumer. Both designs must be functional, with emphasis on durability and reliability, and both designs are most successful when they utilize materials best suited to the job requirements.

But where consumer products are designed with an eye to the cash register, weapons are designed to protect, and *must* perform, literally, as though a life depended on them! Such is the basic requirement of the flame-thrower shroud pictured below.

The shroud is a one-piece reinforced molding using Dow epoxy resins. These resins give the shroud its high-impact strength-to-weight ratio, superior resistance to dents, resistance to corrosion by the flammable chemical, and high heat resistance.

Also a factor is the economy of molding. The complex configurations, holes, fillets, rounded edges are formed in the mold, clean cut and precisely located. This eliminates punching and drilling operations, speeds final assembly, reduces the number of costly operations. The result: strength, durability, economy, appearance, and an extra margin of safety.

Dow epoxy resins are also used in plastic tooling, reinforced plastics, electrical potting and insulating materials, adhesives and coatings. Special filled epoxy systems have been utilized for concrete resurfacing and highway skid-proofing.

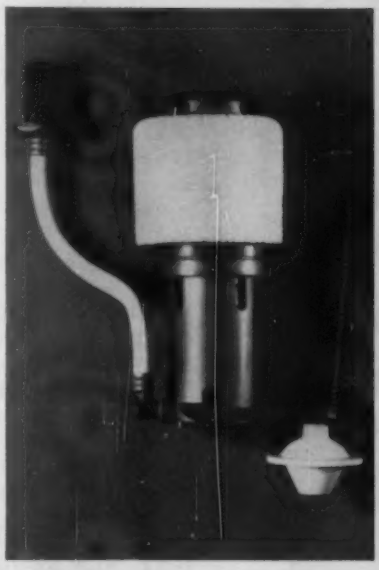


They are distinguished by hardness, toughness, dimensional stability, and resistance to solvents and other chemicals.

Designers who direct their efforts toward products with sales appeal also have a challenging assignment. Here's how Dow plastics help solve design problems for a garbage disposal unit, a soap dispenser, and a toilet tank refill and flushing unit.

"Whisper-quiet" shredding and grinding is a sales point featured by the manufacturer of this sleek new model sink-type garbage disposal. And the "silent treatment" is achieved by a cushioning inner lining of expandable polystyrene in bead form, foamed-in-place by the manufacturer. The attractive, high gloss outer casing is molded of Styron® 475—a high-impact formulation of Dow polystyrene. It resists heat, food acids, and can be molded or extruded in almost any color.

Another design is this toilet tank refill and flushing unit. Molded of Styron 475M for high impact and easy flow, the casing will withstand a lifetime of underwater service without rusting, corroding or warping. Even the screw threads are molded of Styron—proof of its exceptional molding characteristics. The float mechanism takes advantage of the buoyancy of Styrofoam®—Dow expanded polystyrene. Styrofoam won't crumble or flake in use, and won't support mold growths.



Dressing up an old favorite. This newly designed soap dispenser—for either powdered or liquid soaps—has an injection-molded case of high-impact Styron 475. The main objective behind the design— ". . . to create an economical, highly functional unit sufficiently upgraded in appearance to stimulate maximum employee use." Stability, impact strength, chemical resistance, and moldability in a wide choice of colors were the contributions of Styron. And the smooth, glossy surface is easy to keep clean.

MAY WE WORK WITH YOU on a design problem involving the use of plastic materials? The complete facilities of the Dow plastics research and development staff, and the marketing and merchandising department are at your service. Drop us a line. THE DOW CHEMICAL COMPANY, Midland, Michigan, Plastics Merchandising Department 1727BR11.

See "The Dow Hour of Great Mysteries" on NBC-TV

THE DOW CHEMICAL COMPANY

Midland, Michigan

DOW

IN THIS ISSUE

Fischler

Gallo

Muller-Munk

Cumberford

Stan Fischler, who writes about Alan Murray's space inventions (page 76), is a reporter for the New York *Journal American,* where his beats include general feature and editorial writing, transit and City Hall news reporting, and a daily sports and weekly skating column. He also covers ice hockey for *The Hockey News, Sport Magazine, Hockey Pictorial* and other publications in the U. S. and Canada. It was via an assignment on the skating circuit that Mr. Fischler stumbled onto the Murray story two years ago. A skater-interviewee tipped him off to one of Murray's many "space" inventions—the space skate.

Sam Gallo, who did the paper sculpture shown on pages 68-71, makes his living by using paper in another way — he is a promotional writer. The paper sculpture began one day when he was idly contemplating a stack of Lily cups, began experimenting to see how many things he could do with cone shapes. Encouraged by the results, he built giant cones of heavy art paper, then moved on to sheet brass, duplicating many of his paper-cup creations in metal. Mr. Gallo, a graduate of Oberlin College, spent three post-graduate years hitch-hiking through Europe and the Near East. His longest "lift" was from Damascus to Baghdad and back again across the Syrian Desert.

Peter Muller-Munk, whose lectures to European businessmen appear in excerpted form on page 52, is about as international as a designer can be. In Ankara, Turkey, Peter Muller-Munk Associates set up a handicraft-design office manned by Turks trained by the PMMA staff. Another PMMA office in Israel, operating since 1956, designed, among other things, the first complete supermarket in the Middle East. And he is one of the founders of the International Council of Societies of Industrial Designers, was its first president, and is now chairman of the board. Mr. Muller-Munk came to the U. S. from Germany in 1926, and after an initial stint as a silversmith with Tiffany, established the first industrial design department in an American university at Pittsburgh's Carnegie Tech. He left after nine years to form his own organization; among the best known of his clients are U. S. Steel, Bell and Howell, and Westinghouse.

Robert Cumberford, who discusses the 1961 cars (page 60), writes on cars for the major automotive magazines and other publications, and has collaborated on a book about sports cars. An industrial designer, Cumberford left Art Center to go with GM Styling, later planned an automobile design program for a Japanese firm. This past year, in a front room on the second floor of a garage in New York's East 70's, he has been working on a prototype of a Formula Jr. fiberglass racing car which he hopes eventually will go into production. He also has another current hope—to go to Brazil to study the automotive needs of underdeveloped countries. And he is learning Portuguese with that in mind.

S. L. Fahnestock, Manager of Design, Aluminum Company of America

ALUMINUM IS FORM

e.g., imaginative designers with new forming techniques make aluminum sheet a STRUCTURAL material

You—Sam, what do you mean by *structural?*

Fahnestock—Well, look at this chair designed by Jay Doblin's student, *Takatsugu Sugiyama.* (Photo below right.) The curved aluminum sheet is the load-bearing frame as well as the surface you sit on. This chair does have a simple support structure underneath, but the Doblin "people chairs" (below left) have no frame at all!

You—How about that shelter in your photo?

Fahnestock—It's all sheet. No frame.

You—One piece of metal?

Fahnestock—No, it's made in sections. Cut, bent, seam-welded. It's too big to stamp in one piece. However, they *are* stamping some very large items in one piece now, such as aluminum boat hulls.

You—Aren't the forming costs extremely high when you're working with sheet?

Fahnestock—They can be if you need big dies. But look again at the bus shelter. No compound curves, hence, no dies. Just bend the sheet around simple jigs and weld it together.

You—What's this new hydroforming process I've heard about?

Fahnestock—That's another way to reduce die cost. You have only one die—the female. The male die consists of a rubber diaphragm backed up by fluid at high pressure which forces the aluminum sheet into the shape of the female die.

You—Hmmm.

Fahnestock—Actually, there are a great many tricks of the trade for designers like yourself to utilize. For example, you can stiffen the sheet with corrugations or indentations that also become a decorative element.

You—Do you think that eventually *all* sheet will be used structurally?

Fahnestock—No—but as a designer who favors functional simplicity, you should tend to *look with suspicion on frames . . .* and see if there's a way to get the necessary strength and rigidity from the sheet itself.

You—Well that's something to think about. What kinds of sheet do you specify for structural use?

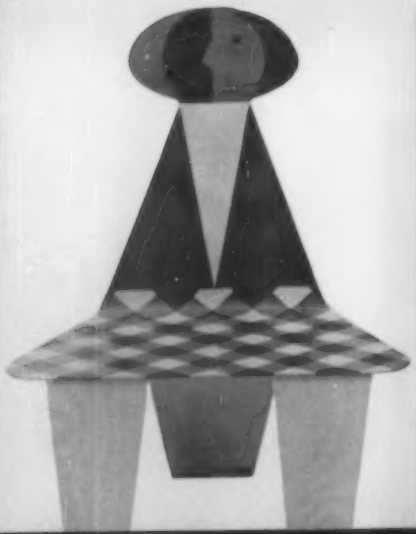
Fahnestock—All depends. Alcoa supplies sheet in an almost infinite combination of alloys, gages, tempers. The idea is to use the cheapest combination that will do the job.

You—Then how do I know which combination to specify?

Fahnestock—That's what I get paid for. You develop the basic idea and Alcoa will work with you. Call or write me at: Aluminum Company of America, 1971-L Alcoa Building, Pittsburgh 19, Pa.

ALCOA ALUMINUM

ALUMINUM COMPANY OF AMERICA



30,000 WAYS TO GIVE YOUR PRODUCT A NEW LOOK—*with Colovin Vinyl Metal Laminate*

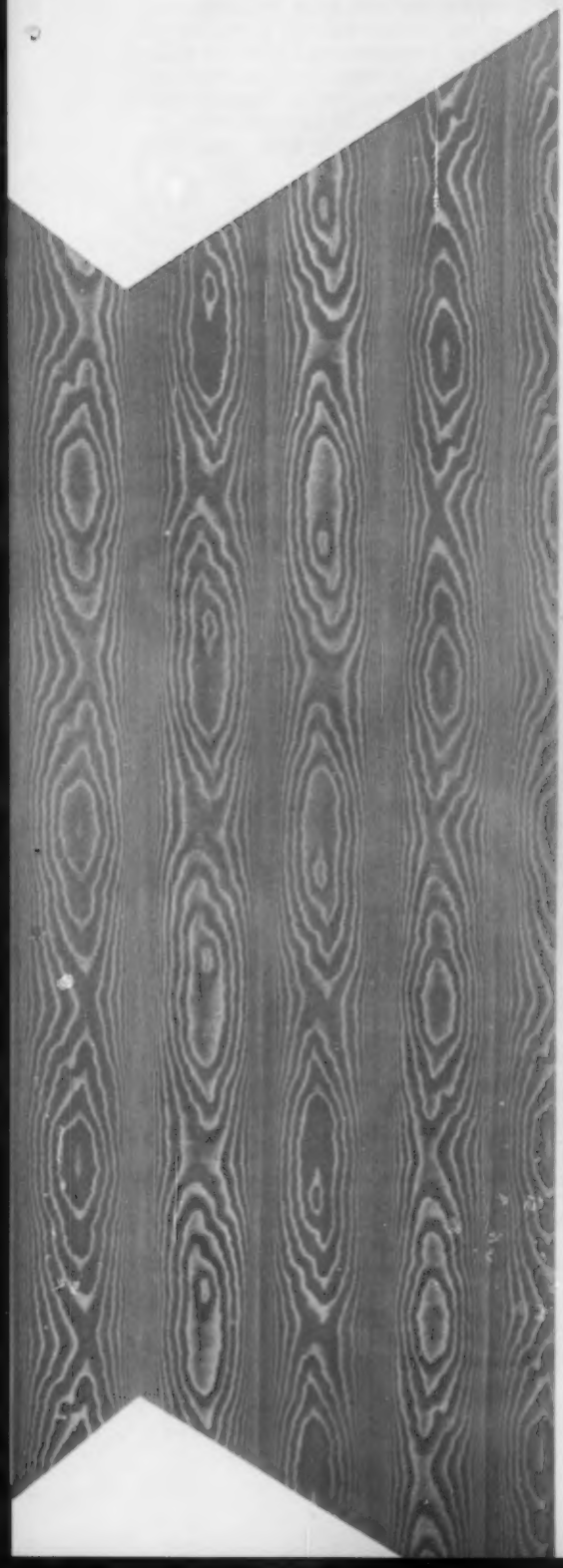
■ COLOVIN VINYL METAL LAMINATE in over 30,000 colors, patterns and textures gives your product the look you want! It can be laminated to steel, aluminum, or other non-ferrous metals—even to many non-metal bases. And when laminated to metal, you can form it or machine it as precisely as metal alone without damage to coating or bond. And because it's a pre-finished metal and can be fabricated on existing machinery, it eliminates costly finishing, labor and facilities. It's an exciting finish that can give your product a real merchandisable difference!

For more information on COLOVIN VINYL METAL LAMINATE, write for your copy of "Colovin Meets Metal."

COLUMBUS COATED FABRICS • COLUMBUS 16, OHIO

Colovin

vinyl metal laminates



LETTERS

Annual Design Review Re-viewed

Sirs:

Your Annual Design Review entry form reads:

Name of product:
Manufacturer:
Address:
What is it?
Where in the New York area can we see it?
Materials:
Fabrication methods:
Supplier of raw material, etc.:
Fabricator:
Finish and color:
Dimensions:
Approximate price:
etc.:

Is it conceivable that the ADR entry form could stand re-designing?

As a practitioner in this ever widening profession it seems to me that ID's categories are too neatly compartmentalized. Limiting entries to "products, packaging, and graphics as applied to corporate identity" is less than most industrial design offices carry on their letterheads.

As a possibility toward defining the scope of next year's Annual Design Review, may I suggest polling those of us who are working practitioners in the field? I think it would make interesting and significant reading to see the answers to two questions: 1. In your opinion what does the profession of industrial design encompass. 2. What design categories would you like to see established for next year's Annual Design Review?

Leon Gordon Miller
Industrial Designer
Cleveland, Ohio

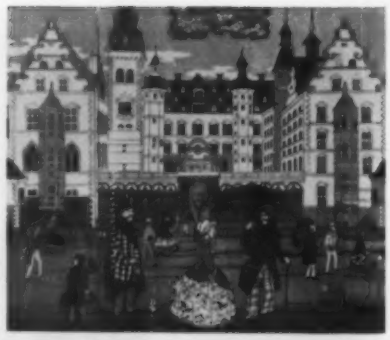
More Denmark in America

Sirs:

We are always expecting something new and interesting when we buy the wonderful magazine INDUSTRIAL DESIGN. There is always stuff to remember, material to widen our horizons—in other words, educational reading. But as in all other world wide information, it happens that once one stops the reading one has to look twice.

As an example . . . may I ask you to find the issue of July 1960, No. 7, please find page 18 and take a look at the Japanese painting and the copy about "A Busy City in America." Then take a look at the enclosed copy of a tourist brochure from my home-country Denmark.

I am sure you are making the same remark as we were: Identical Tweens!



Above, Hiroshige's Busy City in America

Below, Fredericksborg Castle, Denmark

Every tower, every window, the buildings and even the perspective is a copy, and because I know the beautiful Castle, I can tell for sure that the two buildings to the sides also are belonging to the spot of Frederiksborg.

The Western world through Eastern eyes, yes, but in this case, I think it is not too much to ask: "Is this a joke, a cartoon, or is it a true example of the Japanese way of copying everything to minor details, no matter what it is and what they call it?

Don't you think it is worth while to make a research to find out how a thing like this can happen?

We will be very happy to learn your opinion and comments, and could you give us Mr. Hiroshige II's address in Japan, then I think we will honor him at Christmas with a nice greeting and a colored picture from the wonderful old castle of Frederiksborg in Denmark.

Thank you very much.

Jorgen Pedersen
Scandinavian Designers
San Francisco, California

The print—executed in the 19th century—is part of the Emily Crane Chadbourne Collection of Japanese prints belonging to the Art Institute of Chicago. Since Hiroshige II is no longer available to answer questions, his motivation in depicting a busy city in America with a drawing of leisurely Frederiksborg Castle will have to remain a mystery. Perhaps, after returning to Japan from his Western trip, when he sat down to label his prints he simply mixed things up a bit.—Ed.

A savory issue

Sirs:

It's been a long time since I have picked up a business magazine and couldn't put it down. But this morning's mail brought your terribly exciting October "New York" issue, and I have put it down just now, for the first time, only to write this letter of commendation.

INDUSTRIAL DESIGN has always been an attractive magazine to me, both as an insatiable reader and as public relations counsel to industrial design offices. But with the New York issue, you have hit a high-water mark. What photographs! What writing! What layouts! Introducing the feature with untitled pictures was imaginative and, I suspect, original.

Since New York is the nation's design capital, anyone who wants to know what design is and who its leading practitioners are and what they think need only pry your October issue away from a subscriber, if he can do it. It's an issue to savor and keep.

Jerome B. Agel
Agel & Friend
New York

Maser for maser

Sirs:

On page 108 of your September issue—in a story on the Project Echo experiment—you refer to a story in your June issue, relating to a maser built by the Hughes Aircraft Company. The implication is that the ruby maser used in the Bell Telephone Laboratories' atenna-receiver combination in the Project Echo experiment is one and the same as—or a reasonable facsimile of—that developed by Hughes. Without in any way meaning to impugn the Hughes Aircraft Company, we wish to point out emphatically that this is far from so. The traveling-wave ruby maser was especially devised, designed, and built by Bell Telephone Laboratories for its receiving system used in the Project Echo experiment.

John J. Raffone
Bell Telephone Laboratories

CELANESE
POLYMER COMPANY

Offers a Complete Service-in-Depth for Users of Plastic Materials

Celanese Polymer Company offers manufacturers, molders and product designers a comprehensive plastics service that includes assistance in application and design, plastics selection and product testing . . . laboratory and field service . . . and prompt deliveries from strategically located warehouse facilities.

Celanese Polymer Company is a Division of Celanese Corporation of America.

High, Medium and Low Density
POLYETHYLENE

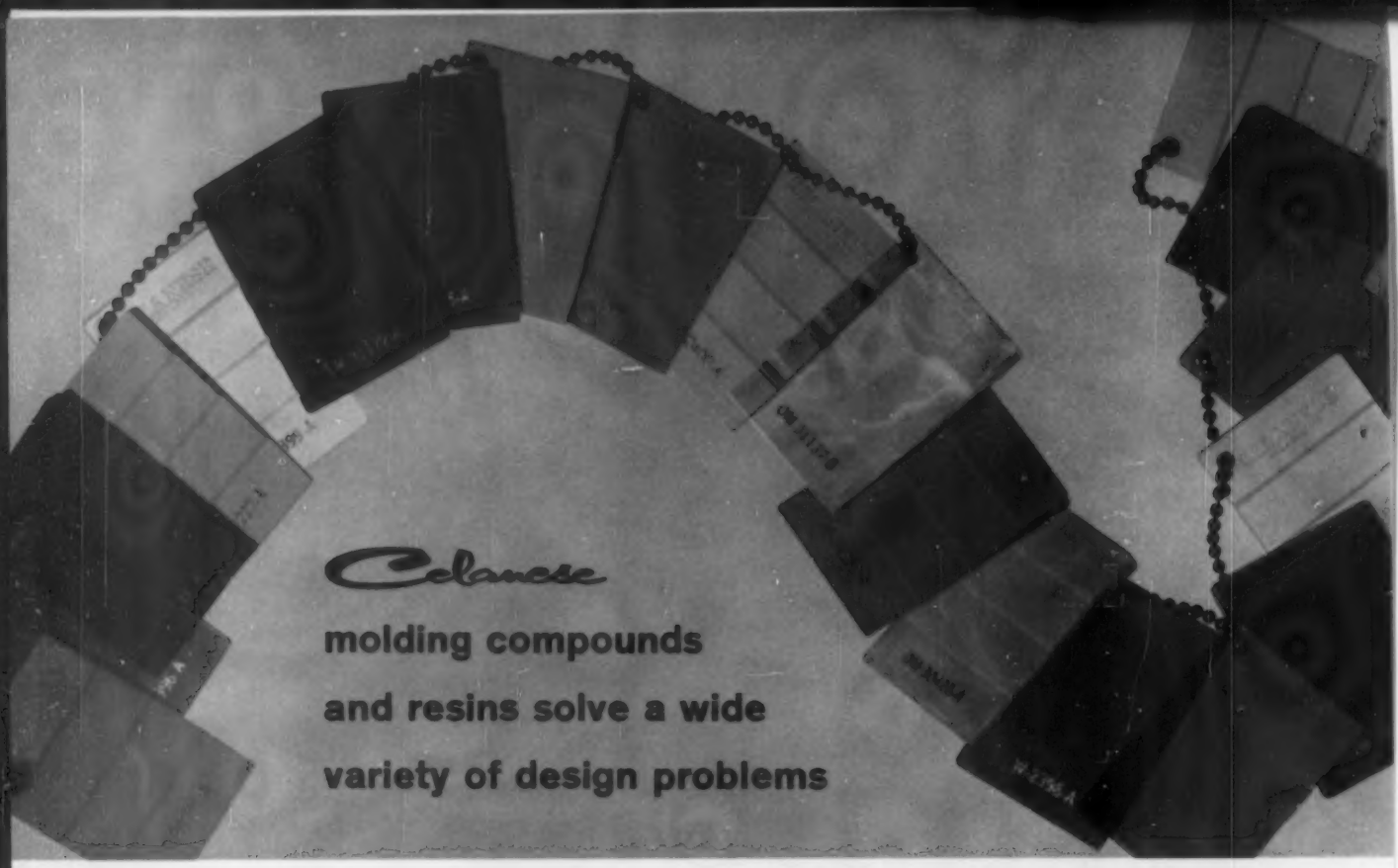
CELLULOSE PROPIONATE

CELLULOSE ACETATE

POLYESTER RESINS

Acetate, Propionate and Triacetate
CELLULOSE FLAKE

★ ★ ★
TECHNICAL SERVICE



FORTIFLEX . . . A Complete Range of Polyethylenes

Resins ranging from high to low density. There are four basic Fortiflex types: Series A, B, C, and D. Fortiflex A and B available in natural or scientifically color-matched to your specifications. Fortiflex C and D available in natural only. Applications: housewares, appliances, automotive and electrical parts, wire insulation, pipe, toys, containers, paper coating, film and sheet.

FORTICEL . . . Cellulose Propionate

Outstanding among thermoplastics for its excellent balance of properties, Forticel meets the demands of a number of automotive and appliance applications. Forticel has excellent dimensional stability, toughness, surface permanence and moldability, and is free of objectionable odor. Applications: automotive steering wheels and decorative trim, appliance and telephone housings, brush backs, dials, knobs and blow molded products.

ACETATE . . . Cellulose Acetate

Rugged, versatile, economical, Celanese Acetate is unequalled for its combination of toughness, clarity and price. It is available in a wide range of formulations and flows—in a limitless variety of scientifically matched colors. Applications: shoe heels, appliance housings, jewelry, tool handles, toys, sun glass frames, brush backs, houseware items and blow molded products.

POLYESTER RESINS

Here are the properties that speed production, cut down rejects. Celanese Polyester Resins offer fast cure, low drainage, better wet-out in hand lay-up. They are unequalled for saving time and labor on critical large area moldings. And they are outstanding for formulating and molding pre-mix and matched die parts. Applications: Boats, refrigerator doors, truck bodies, cooling tower grids, automotive and appliance parts, electronic housings, and decorative items.

CELLULOSIC FLAKES

Celanese offers cellulose acetate, cellulose triacetate and cellulose propionate flake in a variety of grades to basic industries such as plastics, sheet, film, fibers, protective coatings and adhesives. Specific applications include lacquer for paper, wire, and flashbulb coatings; film and sheeting for photography, graphic arts, and transparent packaging; molding powder for extrusion and injection molding of tool handles, tubing, and toys; and binders for color concentrates.

CELANESE TECHNICAL SERVICE

Celanese has the engineering staff to help you get the most out of plastic materials at any stage from design to finished product. This service includes: design consultation, assistance with mold design, material selection, equipment and its adaptation, pilot molding supervision and product testing.

The Celanese Technical Service Laboratory is one of the finest of its type. It is complete with actual production equipment, color matching departments, and analytical and physical testing laboratories. For the right answers to problems of plastic application, or technical information on specific plastic materials, write: Celanese Polymer Company, Dept. GK-11, 744 Broad Street, Newark 2, New Jersey.

Celanese® Fortiflex® Forticel®

Celanese Polymer Company is a Division of Celanese Corporation of America.
Canadian Affiliate: Canadian Chemical Company Limited, Montreal, Toronto, Vancouver.
Export Sales: Amcel Co., Inc., and Pan Amcel Co., Inc., 180 Madison Ave., New York 16.

Celanese
PLASTICS

THIS IS GLASS

A BULLETIN OF PRACTICAL NEW IDEAS FROM CORNING

YES, WE HAVE NO GASKETS

Gaskets cause countless problems in sight glasses, people told us.

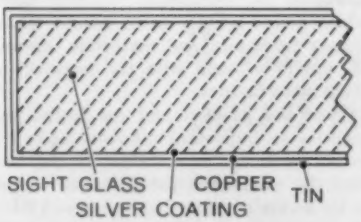
Get rid of the gaskets, we replied.

Show us how, they retorted.

So, we did.

Two ways.

One. We can and do make valve windows wherein the glass is fused directly to the metal without aid of gasket or solder. The result is a one-piece assembly with an heroically hermetic seal rated at 700 psi and bursting strength around 2500 psi.



Two. When it makes sense, we can and do metallize a glass with a base coat of silver, electroplate it with copper, and face it with a coat of tin which accepts soldering to a bezel, which we also can and do do. The finished window is rated to take 15 psi inside or out.

Since we are as versatile as the material we work with, we can pull such tricks as pressing configurations into the windows. We've already done things like bull's-eyes and indentations.

We had another job where we pressed an optical lens into a glass. The focal length of the lens is such that you get a reflection of light back to your eye, except when the unit is full of liquid, in which case you focus on the liquid itself.

Look into our windows whenever you find a gasket a nuisance, whether from temperature or pressure or corrosive environment or any of the many other conditions which tend to make gaskets a nuisance.

You can begin looking by sending the coupon.

ON ENCAPSULATING WITH PYROCERAM® CEMENT

Should you want to lift the thermal ceiling on encapsulated electronic parts as high as 700°C., you'll like what you see when you take a look at our PYROCERAM cement No. 45.

Certain people making coil cores for hot work are finding it almost ridiculously easy to meet such temperature specs while holding performance in all other areas.

The cement is almost completely impervious to vapors and chemically inert. It matches nicely to tungsten, molybdenum and other materials with a coefficient of expansion from 40 to 50 x 10^{-7}/°C.

This same cement can also be used for sealing glass to glass, metal to metal, ceramic to ceramic, or any combination of these materials.

There are two other PYROCERAM cements, both of which have a service temperature of 425°C. No. 89 lends itself well to platinum, vanadium, 50% nickel, and other materials with a coefficient of expansion 80 to 92 x 10^{-7}/°C. No. 95 is for chrome-iron stainless, Sylvania No. 4, and the like with a coefficient of expansion 90 to 110 x 10^{-7}/°C.

People who know say that the applications for this new material are ready to snowball. Perhaps if you send the coupon now, you will be first to use it in your particular field.

VYCOR® GLASSES AS WATER-GETTERS OR PROBE PROTECTORS

Put a piece of porous VYCOR brand glass into a humid environment and it drinks up 25% of its weight in moisture before becoming sated.

This has suggested its use as a substitute for desiccants to a number of people, particularly people who want a getter with unusual rigidity under stress conditions. Say, in a sealed inert-gas gyroscope, for example.

Others have seen in this same 96% silica glass a clean, long-lived semipermeable membrane.

Put one of these tiny tubes of VYCOR glass around a pair of thermocouple wires and you have a device for reading the temperature of working melts of metals or anything else that runs from 2000 to 3000°F.

The tubes will stand up from four to six seconds even under this intense heat, keeping the wires intact long enough to get an accurate reading.

Actually, in practice these tubes are emerging from metal melts marred but still intact two times out of three! Since the glass is 96% pure silica, there's no threat of contamination to the melt even if the tubes should disintegrate.

All of which serves to demonstrate just two of the many amazing properties of the VYCOR brand glasses.

There's more about the various VYCOR glasses with their varied properties and the sizes and shapes we can deliver in a bulletin which is mentioned in the coupon.

CORNING MEANS RESEARCH IN GLASS

CORNING GLASS WORKS, 5411 Crystal St., Corning, N. Y.

☐ Sight Glasses ☐ VYCOR ☐ PYROCERAM Cement

Name..... Title.....

Company.....

Street.....

City..... Zone..... State.....

BOOKS

Farina's praise faintly damned

Pinin Farina. *A monograph by Bruno Alfieri and Ferruccio Bernabo. 71 pages. Illustrated. English - Italian text. La Rinascente, via San Raffaele 2, Milan. Reviewed by James S. Ward*

Among other irritations in this exasperating little book is the absence of any explanation of why, although apparently written in 1958, it has not appeared in America until 1960. It was written upon the occasion of award of the Gran Premio Nazionale La Rinascente Compasso d'Oro for 1957, presumably as a further tribute to the thirty odd years of Pinin Farina's involvement with the form of automobiles. It's main communication fault is the almost unbelievably poor quality of the translation from the Italian, and the job of reading it would stun even the most experienced and tolerant readers of parallel or English summary translations in foreign books and magazines. When there is just enough grammatical sense to a translation, it can sometimes be fun *and* funny in its quaint unfamiliarity. But when a translation soars beyond fantasy to become as muddled as spaghetti, it requires the devotion of an *aficionado* to stomach it. More serious in this case is the English readers inability to tell whether Messrs. Alfieri and Bernabo meant or said any of these confusing and often contradictory things about the motor-car and Pinin Farina. We are left with the unprovable feeling that they *must* know what they are talking about.

Of one thing we can be sure: they *are* fans of Mr. Farina—the type of fan that destroys the intended high image of his object with nagging repetition of subjective, graceless, overpraise. Frank Lloyd Wright was one of the few "masters" whose contribution could withstand reverent barrages of this kind, but certainly we need more evidence than the compromised automobile designs Mr. Farina has left at the Nash plant before assuming that he is another.

Essentially the authors argue that Pinin Farina is one of the first in the older Italian tradition of "coachbuilders" to industrialize, and that, because of several significant trips to Detroit during his career, the present "Pininfarina" Company in Turin is a well organized model of European mass production of automobiles. We can have little objection to a European adaption of mass production process in an Italian setting. But we must take exception to applying Detroit's stagnant view of transportation to what was an esentially interesting, though not very progressive, handcraft process. Possibly this criticism would not be in order if the authors had not tried to connect Farina to the "future" of the motor-car by describing the problems of "form" to be faced when we are presented with new and more efficient power sources. Their projection, (and one must assume that it is Farina's also), still looks on the problem as an extension of the one that exists today without facing the reality that automobile transportation today miserably fails in its job of pleasantly carrying man from one point to another.

This is not to say that the winner of the Compasso d'Oro Award—the Farina-designed 1947 Cisilatalia—is not a handsome, satisfying form. It is, but aside from some of his more frankly stated racing machines, it is one of the last of his satisfying designs. The problem is that it, just like the larger error made on a crueler scale in Detroit today, is an *isolated* object, concerning itself more with what transportation should *look* like than what transportation should do (and is failing to do) for a frustrated and slow moving public.

What's behind the image

Developing the Corporate Image. *Edited by Lee H. Bristol, Jr. 298 pages. Charles Scribner's Sons, New York.* 1960. $5.95. *Reviewed by Francis E. Blod*

Historians of Twentieth Century America will one day describe this period as "the age of communications." Virtually every phase of our daily lives is touched by some form of communications altering and increasing our knowledge of life around us. Today's personal, business and international problems are said to have solutions in improved communication.

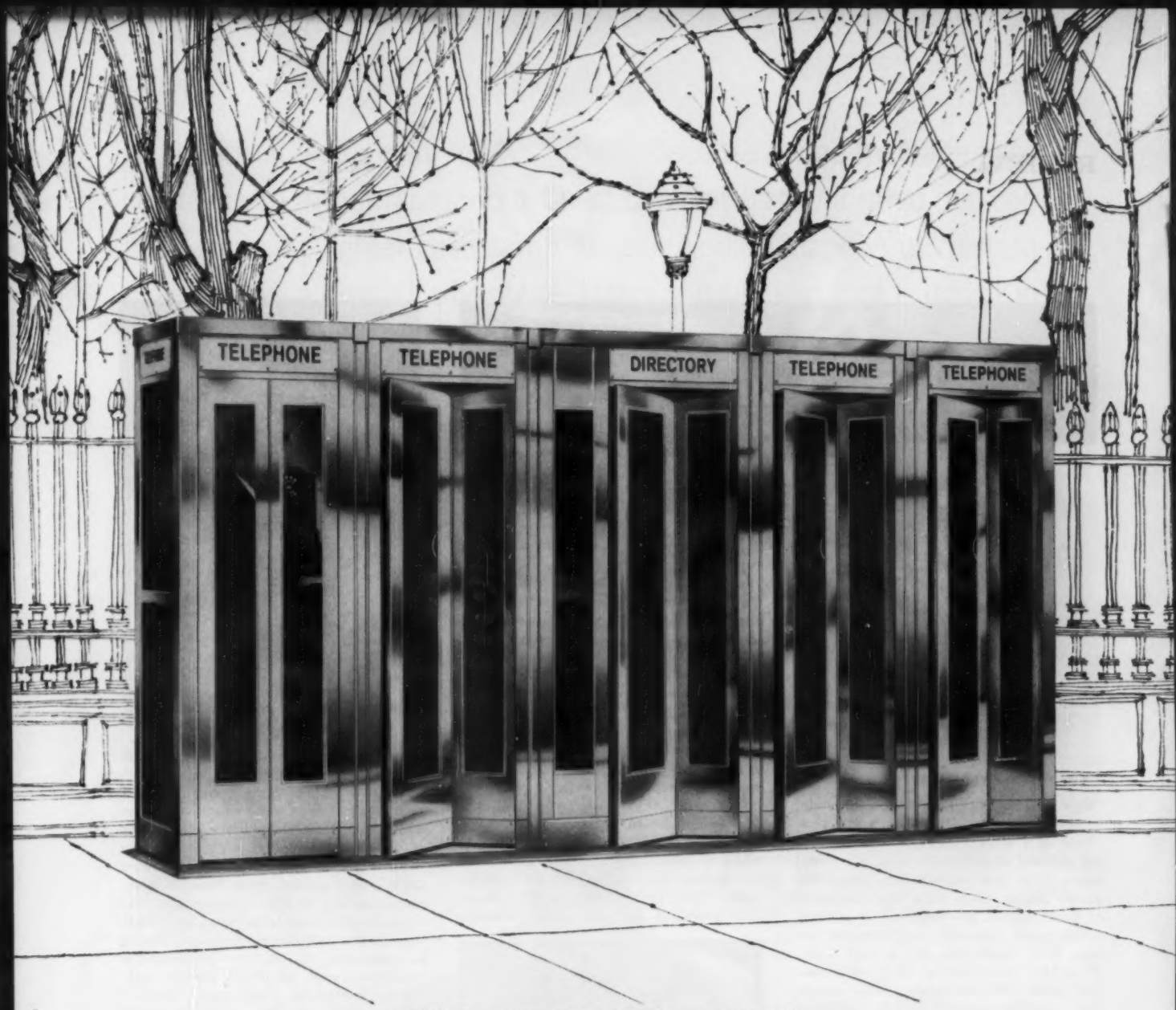
The impact and awareness of the potency of business communications has grown sharply in recent years. The increasing complexity of managing the new tools in an effort to accumulate a favorable public impression has led business to regard this activity as "developing the corporate image."

Recognizing the intricacies of developing a systematic management approach to this subject and an awareness of its need, Lee Bristol has edited a book which touches just about every area of corporate life. Mr. Bristol has resourcefully used the professional experience of many recognized authorities who point out the significance of their special fields, such as marketing, advertising, labor relations, finance, journalism. The result is a clear and forthright definition of the broad problem and a definitive text which should be of interest and value to any businessman thinking about management strategy and execution.

The designer who is responsible for the translation of this management philosophy will also find the book of interest. However, he will note that the secondary importance accorded design, in itself, fails to adequately recognize the significance of design as an influential ingredient in developing the image. Peter Schladermundt, in writing on "The Image and Design," describes the techniques he used in developing new corporate identity for Mobil and the New York Central Railroad. He covers very well such important background requirements as product and marketing policies, the corporate personality and the competitive considerations as must be expressed in a new identity. Clear and interesting examples of the identity creation process are cited. Also included are examples of corporate identity efforts by Raymond Loewy and Lippincott & Margulies.

Admittedly, proper identity is the first step to the development of an effective corporate image. However, the book generally omits reference to what is probably the most important spokesman to the public—the product itself. Importance of product or package in image building is dramatically illustrated by such examples as Volkswagon, Zippo and Coca Cola. These products are dramatic examples of corporate communication which relies heavily upon design. Their shape, mechanics and materials impress the public on sight with the integrity of their manufacture.

That the product and its design can exercise an important influence upon the corporate image is manifest in the fact that the product is the principal source of its maker's reality in the eye and mind of the public. It gives the advertising agency something to advertise; the public relations man something to relate; the stockholders something to hold. Not clearly delineated in this book is the fact that because the product is at the forefront of the marketing process, the designer must participate in the product planning activity to the degree that his efforts will help achieve management goals. A corporate image is not a goal in itself but rather the happy consequence of all elements of a marketing strategy, beginning with a management philosophy successfully realized through every available resource.



This illustration was made from a photograph taken in New York City.

If you wanted to top this design, you'd have to invent a new metal

It may seem easy to design a telephone booth, but it isn't. Especially when you consider what a phone booth has to go through: rain, hot sun, corrosive atmospheres, vandals, heavy traffic. But it is easy to select the material for the booth.

Sherron Metallic Corporation, Brooklyn, N. Y., used Stainless Steel here because no other metal can equal its *combination* of properties. It's harder than non-ferrous metal, so it won't dent as easily. It resists corrosion like no other commercially practical metal. It can be *welded* into a tight solid unit. It requires literally no maintenance because the gleaming, corrosion-resistant surface goes all the way through.

To substantially improve the design of this booth, you'd have to invent a new metal . . . one that has all the wonderful characteristics of Stainless. There's only one such metal. That's why so many designers use Stainless Steel.

USS is a registered trademark

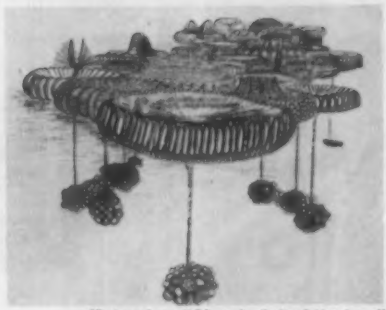
USS

United States Steel Corporation—Pittsburgh
American Steel & Wire—Cleveland
National Tube—Pittsburgh
Columbia-Geneva Steel—San Francisco
Tennessee Coal & Iron—Fairfield, Alabama
United States Steel Supply—Steel Service Centers
United States Steel Export Company

United States Steel

Use this mark to tell the public that a product is made of modern, dependable Steel.

Soleri: Horizontal long-span concrete bridge



Katavolos: "Chemical Architecture"

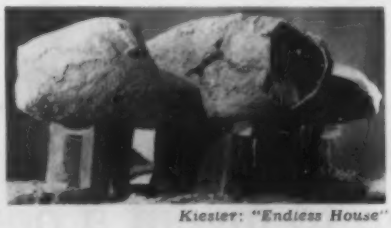
"Visionary Architecture"

"How do I work?" said Albert Einstein, in response to an interviewer's question. "How do I work? I grope." This is also the method of architects who, when real estate men and corporation presidents aren't plying them with the economics of construction, are looking for a more satisfactory physical environment for man than what they see around them. They have been looking for a long time, and, given the reluctance of the people who hold the purse-strings to patronize any architecture that questions the conventions of the age, they are likely to go on looking.

Leonardo sketched his plan for an Ideal City which was not technologically avant-garde for his time, but which, as a piece of rational urban planning, is still avant-garde for ours. From time to time since then, architects have come up with some pretty radical ideas, but in the 20th century (admittedly a restless age) their schemes for the physical salvation of mankind seem to be coming out of their sketch-books with the rapidity of pages from a press.

A selection of their gropings is now brought together in a remarkable exhibition of "Visionary Architecture," which is on view (until December 4th) at the Museum of Modern Art in New York. Conceived, organized and installed by Arthur Drexler, the Museum's director of architecture and design, it is a collection of enormous photographic blow-ups (accompanied in some instances by models) of unrealized projects by a score of contemporary architects, including most of the most famous architects of the day, as well as a number of stellar unknowns. The projects may never have gotten further than a sweeping charcoal sketch (as in Kiyonori Kikutake's 1959 proposal for a self-sufficient marine city to solve Japan's problem of too many people for too little land); or they may have gotten as far as a model (like the one for Frederick Kiesler's refreshingly "Endless House," below); but what they all have in common is that while technologically possible, they have not been acceptable on other grounds (too "far out," too costly) to the people who buy architecture. Consequently, they never got built.

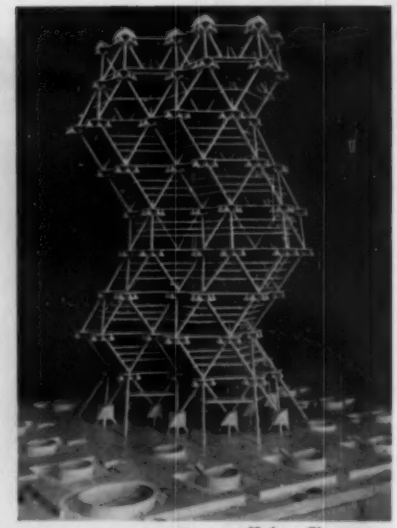
One hopes that some never will. For this exhibition of architectural dreams includes some fantasies, or nightmares, which we should no more contemplate for the future than we should be building today. Thus, for example, in 1917 Bruno Taut proposed, and drew very elaborate



Kiesler: "Endless House"

sketches showing how it could be done, to re-design the Alps (!), and in 1929, Hugh Ferriss predicted that the "Metropolis of Tomorrow" will be a massive clutter of steel and glass surmounted by Greek temples, with highways running through the 30th floors—a prospect no less grim, and scarcely more grim, than what we have right now.

These will be obvious to anyone. One suspects, however, that some of the other projects, standing in the august company of a Wright's or a Le Corbusier's idealism, are, under the surface of astonishing conceptions, hardly more than the personal caprices of confused minds. And if the show has any disappointments, they lie in Mr. Drexler's failure to suggest distinctions; neither in the installation, nor in his long and otherwise



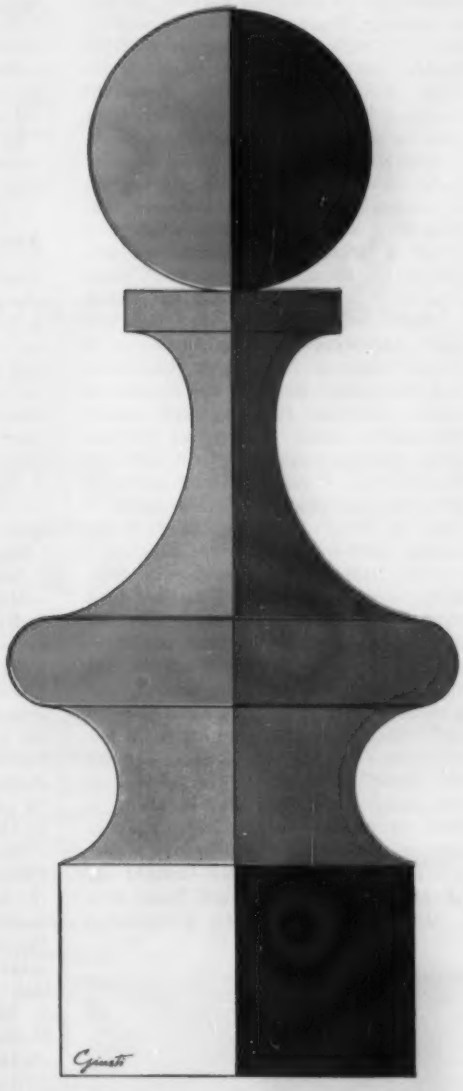
Kahn: Skyscraper

perceptive commentaries, does he distinguish between those projects which attempt to impose some harmony on the cacophony of our surroundings, and those which might merely substitute one kind of disorder for another.

But any criticism of such an absorbing show seems almost gratuitous. A wonderful variety of free-wheeling architectural imaginations is on view, and worth seeing. Many of the projects are offered as answers to specific architectural problems (such as Paolo Soleri's perfectly horizontal long-span concrete bridge, Louis Kahn's laterally-braced skyscraper, and Hans Poelzig's fabulous Salzburg festival hall, all shown here), but one exception is William Katavolos's "Chemical Architecture" (above, left), which assumes the existence of substances which chemists are in the process of developing, and which implies a total revision of almost every aspect of environment. Solutions to the "problem of the city" range from Le Corbusier's 14-mile-long road-building (an extension of his Marseilles block of flats, with a road running on the roof), to the James Fitzgibbon-C. D. Sides circular "Bridge City," a vast habitation suspended across the Hudson River.—*R. M.*

Poelzig: Festival hall

You'll form it faster with Western Brass because... one machine pass can take you from brass strip or sheet to a completely formed pen cap, hose coupling, lighter case, lamp base or similar shape. And Western Brass offers a special advantage. Users will tell you that our skill in annealing and rolling actually gives them more strip per dollar... more good parts per pound. You'll make it better with ductile, formable brass. You'll make it best with "tailor-made" Western Brass.



OLIN MATHIESON • METALS DIVISION • EAST ALTON, ILL., NEW HAVEN, CONN.

Western BRASS

NEWS

Association elections

While the antic-hay of U. S. politics was gaining momentum late last month, the more decorous secret diplomacy of professional design societies quietly produced new officers for the ASID, IDI and PDC.

Raymond Spilman and William C. Renwick were elected president and vice president of the ASID; John Vassos and Leon Gordon Miller, chairman of the board and president of the IDI; and Robert Sidney Dickens and Margery Markley, president and executive vice president of the PDC (all shown above).

Other ASID officers for the coming year will be: Clarence F. Graser (manager of industrial design for IBM's Data Systems Division), secretary, and George Levaughn Payne (of Henry Dreyfuss's New York office), treasurer. Chapter chairmen Samuel Scherr (Allegheny chapter), Reino Aarnio (New York chapter) and Melvin H. Best (West Coast chapter) were named regional vice presidents of the Society.

For the IDI, Joseph M. Parriott (manager of product design for Raymond Loewy Associates) was named executive vice president; Henry P. Glass, Midwest vice president; Donald W. Brundage, West Coast vice president; Ann Franke (New York), secretary; and Carl G. Bjorncrantz (Chicago), treasurer.

Other PDC officers for next year are May Bender (secretary) and Saul Nesbitt (treasurer).

Spilman, Renwick, Vassos, Miller, Dickens, & Markley

PDC has hot time with PR

Much heat and some light was generated on the subject of "Public Relations for Package Design Consultants," at the Package Designers Council's October 18 panel discussion. The panel, held in conjunction with PDC's Ninth Annual Meeting at the Beekman Towers Hotel in New York, featured four public relations representatives and three editors, and was moderated by PDC's outgoing president, Karl Fink. The discussion was sparked by the question of whether designers should advertise spatially as well as postally. There was little discussion of what PR does for the designer, how PR people operate, and what such service costs. But heated questions from the audience indicated that they found the meeting stimulating if hardly conclusive.

Lippincott and Margulies public relations director Donald Keen started the discussion by telling the audience that they must decide themselves what their image is before public relations can project it for them. "And you don't *place* articles in any publication," he added.

Other members of the panel were Virginia Davenport Stearns, director of public relations for Frank Gianninoto and Associates; Betty Reese, director of public relations for Raymond Loewy Associates; Alice Shelley, at various times representative of four different design firms; Woodrow Wirsig, editor of *Printers Ink;* Thurston Clarke, editor of *Food & Drug Packaging,* and Ralph Caplan, editor of INDUSTRIAL DESIGN.

After introductory statements from each, moderator Karl Fink accepted questions from the audience, and the discussion quickly swung from public relations to advertising. "What is the ethical difference between sending out a direct mailing and taking a display ad?" George Reiner wanted to know. Although — or perhaps because — there was never agreement on an answer to this, much more time was spent on it than on public relations. The analogy between the doctor who does not advertise and the designer was brought up repeatedly. But there were those who pointed out that the doctor professes a calling (whether he follows it or not) to place the welfare of his patient before revenue, while the designer does not. Nor, someone else observed, is the designer licensed like other professionals.

Woodrow Wirsig accused designers of narrow thinking about the term "advertising," and said that societies such as PDC take "punitive measures" against those who advertise because, at bottom, they are afraid of the competition.

Air-supported structure

That's not really a colossal albino snail about to gobble up the clump of bushes in the picture below. It is a special building to house the Atomic Energy Commission's Atoms-for-Peace exhibit currently on tour in South America. Designed by New York architect Victor A. Lundy (and built by Birdair Structures of Buffalo, near whose plant it is shown in a "test run"), the exhibit building has no columns or other supporting structures, is blown up and sustained by air pressure. The 300-foot-long shell is formed by two "walls" of vinyl-impregnated nylon fabric spaced four feet apart and connected with stress-bearing internal webs.

To insure safety, the fabric walls are divided into eight compartments, and separate air-supply systems maintain the pressure inside the building and between the fabric walls. The structure is designed to withstand steady winds of 70 miles per hour, and occasional gusts up to 90 m.p.h.

Erected, the structure provides over 2,000,000 cubic feet of exhibition space (to house a small reactor, a gamma ray facility, a motion-picture theatre seating 330 persons, some lecture-demonstration areas and a student-teacher training section); collapsed for crating, it reduces to 5,000 cubic feet. Overall weight, including hardware, doors, frames and anchor materials, is 28 tons.

The AEC Latin America exhibition program is under the design supervision of Albert H. Woods, hired last year as consultant to AEC's Office of Special Projects. Following the showing in Buenos Aires, the exhibit will travel to Rio de Janeiro, Caracas, and Lima during the rest of 1961.

(*Continued on Page* 22)

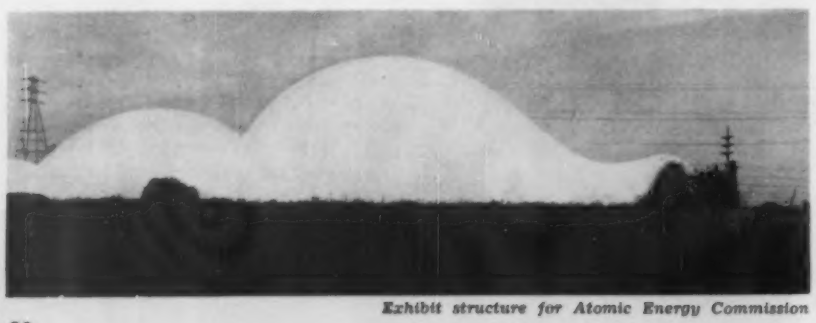


Exhibit structure for Atomic Energy Commission

H&K perforated materials

a perfect medium of

DESIGN*

for functional and decorative uses

Whether your project calls for the decorative or functional use of perforated materials, Harrington & King has the answer. You'll find a vast selection of inspired patterns available from existing dies . . . at no charge for tooling. Or, if necessary, tools for special designs will be made to order.

And, H & K can perforate the proper design, pattern and open area in practically any metallic or non-metallic material available in coils, sheets or plates . . . from foil-thin to 1" thick.

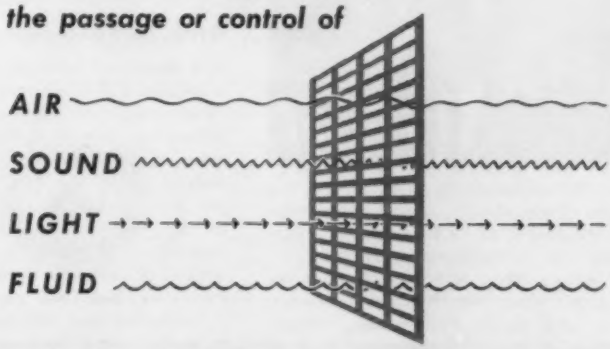
Specify H & K perforated materials on your next job—see what a difference over 75 years of experience can make!

H & K sales engineers will be pleased to work with you on your perforating requirements.

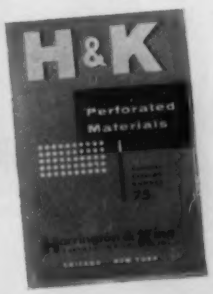
Mail coupon to nearest H & K office—today!

* Just a few of the many H&K patterns are illustrated—in reduced size.

Wherever a product requires the passage or control of



or just for their inherent aesthetic qualities, H & K perforated materials can serve you . . . best!



THE **Harrington & King** PERFORATING CO. INC.

Chicago Office and Warehouse
5664 Fillmore St.
Chicago, Illinois

New York Office and Warehouse
108 Liberty St.
New York, N. Y.

Please send me—

☐ GENERAL CATALOG No. 75
☐ STOCK LIST of Perforated Steel Sheets

NAME_____

TITLE_____

COMPANY_____

STREET_____

CITY_____ ZONE____ STATE_____

"Japan: Design Today"

Japan design show

A major exhibition of contemporary Japanese design opened October 15th at the Walker Art Center in Minneapolis under the title, "Japan: Design Today." Over 300 objects, all currently in production in Japan and including a number of craft items, were selected in Japan by Mrs. Meg Torbert, who, in collaboration with Katsuo Matsumura, designed the installation (above) with props fabricated in Tokyo. Under joint sponsorship of Walker, the Smithsonian Institution and Japan Design House (JETRO), the exhibition will circulate around the U. S. and Canada for two years.

Furniture Design Conference

Present and speaking at the Furniture Design Association's annual symposium (on the theme of "The Effect of Technology on Contemporary Furniture"), held last month in Asheville, N. C., were industrial designers Walter Baermann (left) and S. L. Fahnestock (right), flanking Bostrom Corporation R & D director A. K. Simons.

Porcelain-enamel house

Latest contribution to the development of industrial housing is Ferro Corporation's new porcelain-enamel Research House, opened this summer outside of Cleveland. Although it is an "idea house" rather than a prototype production model, Ferro regards the effort as the first experiment in prefabricated metal housing since the Lustron house went out of production in 1950.

The basic structure of the house is that of a "curtain-wall" of polystyrene foam and porcelain-enamel sandwich panels enclosing a steel frame standing on a concrete slab. The kitchen (below) features an appliance wall installation using porcelain-enameled steel rectangular tubular frames to form both the base and wall-storage sections. It accommodates the conventional appliances.

The basic difference between the Lustron house and this one, according to

Ferro research house

architect Carl Koch, Ferro's designer, is that the former was a single model designed to be repeated identically, while the Ferro house "is conceived as a series of standardized components which can be arranged in a number of ways to vary the size and plan of the completed product."

Ferro built the house (at a cost of $300,000) in cooperation with 24 other building components and materials manufacturers. It is located in Northfield Center, Ohio.

Drug, food packages sweep AIGA

The American Institute of Graphic Arts presented 100 fresh new packages at its "Packaging 1960" show, which closed October 31 in New York City. Breakdown of winning packages into product categories showed 25 in the food field (including pet food, cigarettes and liquor), and 17 in the drug industry, with another 13 in cosmetics and sundries. The heavy proportion of packages in these areas underlines the fact that package design as a marketing tool still has not been sold in many areas. Two agricultural products appeared in the exhibition, indicating manufacturers' reliance on design to help capture the suburban market.

The jury for this year's show included Francis Blod, Leo Burnett, Donald Deskey, Jay Doblin, Ralph Eckerstrom, Roy Larsen, George Nelson and William Prout, with Karl Fink as president of the show committee. Harry and Marion Zelenko designed the catalog, and Harry Lloyd the exhibition.

Rolf Harder design, "Packaging 1960"

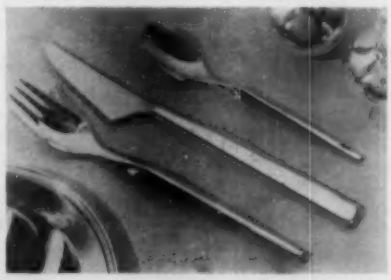
The AIGA asks those interested in submitting entries to next year's exhibition to write to headquarters, 5 East 40th Street, New York City.

Knives, Forks, and Spoons

A current exhibit of silver flatware design at New York's Museum of Contemporary Crafts marks a recent and successful instance of the American Craftsmen's Council's attempt to bring the crafts and industry together. The end-product of an international silver design competition sponsored jointly by the Museum and the International Silver Company, the exhibition includes the 22 winning designs (by as many designers from eleven different countries) selected from over 200 submissions.

The character of the designs ranges from austere simplicity to a variety of decorative motifs, but the modern approach rules throughout. Five of the 22 designers were singled out for special mention and a $1,000 award each. They were: Ainar Axelsson and Sven Arne Gillgren, both of Sweden; Menahem Berman and D. H. Gumbel, both of Israel; and Tapio Wirkkala of Finland, whose entry is shown below. International Silver will put one of the designs—the choice has not yet been made—into production some time next year, thereby helping to bring a contemporary spirit to lagging American sterling design.

A display tracing the development of eating tools complements the competition



Wirkkala's silver

exhibit, which, after leaving the Museum on December 4th, will tour the country for two years under the sponsorship of the Smithsonian Institution. This traveling exhibit will be designed by ACC president David R. Campbell.

Deadly design on tv

George Nelson will deliver a 30-minute program on industrial design for CBS's "Camera 3" telecast on November 20th. His subject is, "A Problem of Design: How to Kill People."

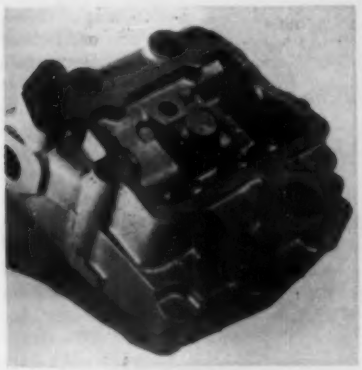
Continued on Page 24

PRODUCT-DESIGN BRIEFS FROM DUREZ

- **Smooth surfaces in metal castings**
- **Plastic in luggage pods**
- **Fast facts on phenolics**

Inside story

In an engine block such as this one, smoothness of the inner surfaces is a high-priority design problem. Any obstruction or undue roughness in the channels is likely to impede the flow of coolant through the block.

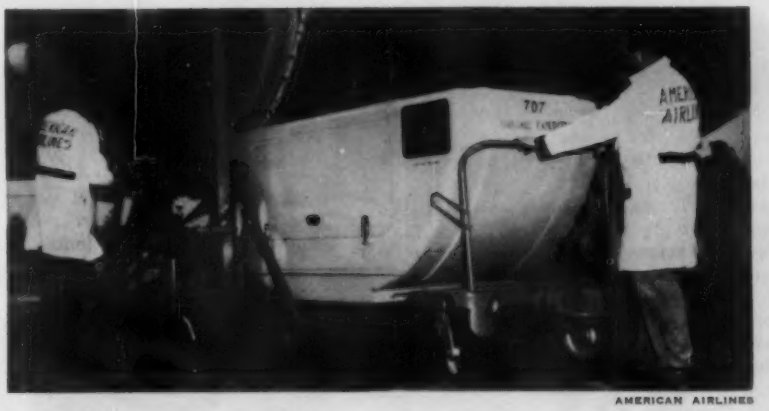


To solve the problem, more and more foundrymen are switching to a method of making castings that gives smooth, clean inner surfaces every time: shell cores.

They're getting more than smoothness. The close tolerances possible with shell cores permit holding section thickness uniform throughout the piece, and from piece to piece. In an engine block, that means better heat transfer.

Finally, most castings made with shell molds and cores need only a bare minimum of machining. That saves money.

Want to know how these better castings are made with the help of Durez foundry resins? Check the coupon and let us send you the new "Durez Guide to Shell Molding."



AMERICAN AIRLINES

It expedites

This pod shrinks time.

For people who have alighted from a jet airliner, it shortens the wait at the luggage checkout.

For the airline, it telescopes flight schedules by cutting ground time to the necessary minimum. For the men who use it to load or unload 35 suitcases at a crack, it takes much of the "lug" out of luggage.

It has to be strong, light in weight, safe. That's why it is made of Hetron® glass-reinforced polyester. Not only does Hetron match and excel the strength characteristics of other reinforced plastics; it is also inherently and *permanently* self-extinguishing. The safety is chemically locked in to stay—not obtained by dilution with additives.

Many great ideas like this one are taking shape in Hetron. They include 65-foot radomes, factory skylights, large boat hulls, outboard motor shrouds, chemical ducts and blowers, transformer housings, heavy-duty switch-gear components.

If you'd like to know more about this versatile, safe material—and who can mold it into shapes for you—check the coupon for the designer's Hetron data file.

At your finger tips

Here's the quickest way we know to compare one phenolic molding material with another. Just send for the new 16-page booklet "Facts on Phenolics." It groups the most popular Durez materials by types (general-purpose, impact, heat-resistant, electrical, etc.). It lists properties of the molding compounds and of molded specimens. It tells which MIL specs a compound is designed to meet. All you do is check the coupon to get a copy free.

For more information on Durez materials mentioned above, check here:

- ☐ Data file on Hetron, including list of fabricators
- ☐ "Durez Guide to Shell Molding" (36-page bulletin)
- ☐ "Facts on phenolics" (16-page booklet)

Clip and mail to us with your name, title, company address. (*When requesting samples, please use business letterhead.*)

DUREZ PLASTICS DIVISION

8711 WALCK ROAD, NORTH TONAWANDA, N. Y.

HOOKER CHEMICAL CORPORATION

HOOKER CHEMICALS PLASTICS

Company News

RETAINED: **Lippincott & Margulies, Inc.**, New York, by Olin Mathieson Chemical Corp. for the development of a corporate identity program, including new signature and nomenclature, for the company and its seven divisions . . . **Carl Regehr** (below), of Carl Regehr Design, Inc., Chicago, newly formed design corporation, as design counsel for the Cummins Engine Company . . . **Jaap Penraat Associates**, New York, by Hartman Marine Equipment Corp., for a transistor ship-to-shore radio-telephone . . . **Eckstein-Stone, Inc.**, New York, by IMCO Precision Products to design and execute a corporate identity program, including trademark, business forms, packaging, advertising and promotional material . . . **Jack Collins Associates**, Milwaukee, by Koss Incorporated . . . **Latham, Tyler, Jensen, Inc.**, Long Beach, California, by Beckman Instruments; Holly-General Company; Worley & Company; McClintock Manufacturing Company; and the California Museum of Science & Industry . . . **Painter, Teague & Petertil**, Chicago, by the Cook Electric Company, to serve as design consultants for all U. S. and Canadian divisions.

ESTABLISHED: **Mulholland & Associates**, Burlingame, California, by Robert P. Mulholland (below) . . . **Arthur Ross Associates**, Detroit, by Arthur Ross, former chief designer of the Cadillac and Oldsmobile studios at General Motors . . . **PMD (Product and Market Development)** at 18 East 50th Street, New York, by Norbert N. Nelson (formerly with Richards Morgenthau), to assist small manufacturers of home furnishings and accessories in the U. S. and overseas in the planning and development of products for the American market. . . . His own practice, in Bay Shore, Long Island, by **Charles A. Jerabek**, formerly Design Director of King Casey, Inc.

EXPANDING: **Van Dyck Associates, Inc.**, Westport, Connecticut, with the creation of an engineering division. The new division will be under the direction of Van Dyck vice president John Montgomery (below), former chief development engineer for the Dictaphone and Revere Camera Corporations . . . **Merendino/Greene & Asociates, Inc.**, Pasadena, California, with the establishment of a technical service division to provide an engineering and laboratory supplement. The new division will be headed by David Crenshaw, with Irvin Anderson as his assistant.

GOING PLACES: **Leon Wirch Associates** to 515 Madison Avenue, N. Y. . . . **Leo L. Fischer** to 2332 Morris Avenue, Union, N. J. . . . **Pattern Studios** to 203 North Wabash Avenue, Chicago . . . **Creative Designs, Inc.**, to 1 Riverdale Avenue, Riverdale, N. Y.

ACQUIRED: **Gene Tepper and Associates**, San Francisco, by **Michael Saphier Associates, Inc.**, New York. Gene Tepper has been made a vice president of Saphier and the San Francisco office will become the headquarters for all package and product design work.

Events

George Nelson is speaking on **"Industrial Design as a Factor in Industrial Maturity"** at a meeting of the Advertising Club of Boston on November 8, at the Statler-Hilton in Boston. The meeting, organized and sponsored by the Design Division of Boston's Institute of Contemporary Art, has as its theme "Good Design for a Better New England," and will include a one-day exhibit of Mr. Nelson's work and of the design achievements of selected New England manufacturers.

"The Four Great Makers," a two month program of celebrations in honor of the four great founders of modern architecture"—Walter Gropius, Le Corbusier, Ludwig Mies van der Rohe, and the late Frank Lloyd Wright, will be held at New York's Columbia School of Architecture in the Spring of 1961. The program will bring each of the three men and Mrs. Frank Lloyd Wright to the school for a two-week period and will include a series of seminars, lectures, broadcasts and exhibitions at the Guggenheim Museum.

"Canada Visits Philadelphia," an exhibit ranging from Indian crafts to the latest productions of Canadian industrial design, is the first of a series of international expositions scheduled for this season at the Commercial Museum in Philadelphia. One of the products on view is the Commodore typewriter (below) designed by McIntosh Associates.

McIntosh "Commodore" typewriter

"Blow Molding Comes of Age" is the topic of a Regional Technical Conference of the Society of Plastics Engineers scheduled for November 18th at the Essex House in Newark, New Jersey. Sponsored by SPE's Newark Section, the program will include the history, applications, extrusion techniques, materials technology, blowing processes, molds, and legal aspects of the subject.

An exhibition of Swedish architecture is having its first showing in the United States at the Gallery of the Octagon in Washington, D. C., now through November 27th. Consisting predominantly of large photographs and plans of the work of contemporary Swedish Architects, but including an historical section, the exhibition was prepared by the National Association of Swedish Architects and the Swedish Institute. After the close of the Washington showing, it will be circulated nationally by the Smithsonian institution.

People

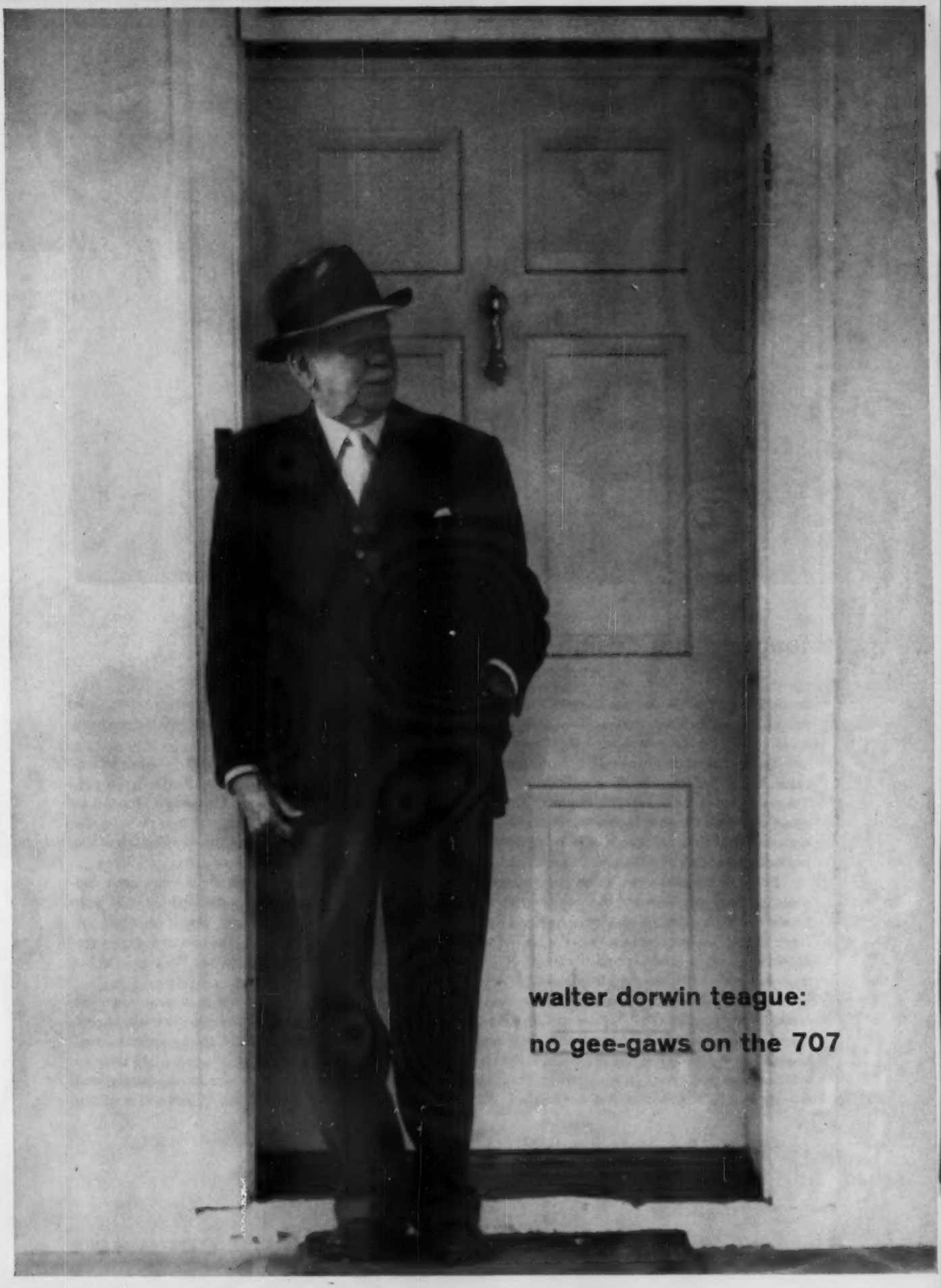
APPOINTED: **Mort L. Rothenberg** (below), as head of the New York office of Scherr and McDermott & Associates, Akron, Ohio. A former senior staff designer at Peter Muller-Munk Associates, Pittsburgh, and a design group supervisor with Donald Deskey Associates, New York, Rothenberg will specialize in product design for client manufacturers, advertising agencies, and marketing organizations. . . . **Jack Robinson**, who designed the exhibit on U. S. Performing Arts at the Brussels World's Fair, to the Exhibits and Display staff of Donald Deskey Associates, New York . . . **Paul John Grayson** (formerly senior designer with Carson & Lundin, Architects and Project Manager for Skidmore, Owings and Merrill) as Project Architect for the architectural department at Donald Deskey Associates . . . **Norman H. Hay**, as chief interior designer at Robin Bush Associates Ltd., Toronto. Hay was formerly executive director of the National Industrial Design Council and Chief of the National Gallery of Canada . . . **Eugene Joseph** as a staff designer at Leon Wirch Associates, New York . . . **Dick Karbo** (previously senior stylist with the Lincoln division of the Ford Motor Company) to the staff of **Zierhut/Vedder/Shimano**, Van Nuys, California . . . **Carl A. Gibson, Jr.** as head of the new Industrial Design program at Massachusetts College of Art in Brookline . . . **Henry C. L. Johnson** as general manager; **Wallace B. Kamens, Lawrence A. Scott**, and **Wyatt M. Benz** as account managers; and **George C. O'Neill** (former project manager of Hilton Hotels International) as account executive and hotel design and operations consultant at Lippincott & Margulies, Inc., New York . . . **Arthur J. Strauss**, of Jens Risom Design, New York, as interim chairman of the advisory board of the new Atlanta Decorative Art Center. END

Regehr

Mulholland

Rothenberg

Montgomery



walter dorwin teague:
no gee-gaws on the 707

teague talks design

In 1942 a man named Walter Dorwin Teague published "You Can't Ignore Murder," a mystery novel. It is probably the only attempt at bafflement in his long history, because Walter Teague has been making products speak clearly for themselves since the Twenties.

Teague has rightly been called the dean of industrial design. He began as an artist in 1908 designing advertising, books and magazine illustrations. If you're old enough to remember Locomobile and Pierce Arrow ads, Teague designed them. In 1927, Eastman Kodak asked him to redesign their cameras. He made a proposal to spend one week a month in their plant observing production problems and techniques, and *then* redesign the cameras. That simple principle of knowing how a product is made, of understanding all the complexities of the production line, is still a Teague trademark. And Eastman Kodak is still a Teague client.

In the thirty-plus years since that camera assignment, Teague has explored just about every nook and corner of the wonderful world of three dimensions. He designed the classic Marmon 16 automobile in 1930, with his son as collaborator; he was on the Design Board of the 1939 World's Fair. When World War II exploded, the Navy asked Teague to perform design work on their 16-inch guns in order to eliminate possibilities of explosions caused by loading malfunctions. Today he still works for the Bureau of Ordnance. He has 120 people in his organization, a branch in San Juan and task forces scattered across the United States

Teague has designed service stations, railway equipment, plane interiors, heating appliances, business machines and machine tools, offices and furniture, showrooms and department stores, even periodicals. One of the most impressive things he has done is the Boeing 707 jet interiors. Mr. Teague recalls: "Boeing was concerned about their ability to sell the 707 because they hadn't made civilian planes for years. We convinced them to build a full-size mockup of the interior. They gave us *carte blanche* with body engineers to collaborate, and they refused to look at it until it was finished. We made it complete to the tiniest detail. It cost half a million

dollars and helped in selling most of the huge fleet now in the air. Our staff is responsible for the final interiors of the planes purchased by eighteen or more airlines, and for the interiors of executive planes purchased by the United States Government."

Whether mammoth jet airliners or chairs, a product is designed to five principles that are the *modus operandi* of the Teague organization. "First of all, the redesigned product has to work better for our efforts," Teague says. "It should be more convenient to use, more humanized. It must make honest use of the material it's made of, and it's got to be capable of being efficiently manufactured at the proper price. We assiduously avoid gee-gaws or extraneous ornamentation that adds nothing but price to the product. Finally, the design must give the user an emotional pleasure or gratification each time it is used." Selection of the right material for the job is important to each of Teague's requirements. "We endorse no material over another," Teague says. "We first look for the material that is best in keeping with the product's desired personality. Strength and durability are highly important in material selection. Then we make sure our client's tooling can handle the material we have in mind. Above all, it takes the right material to sell the product to the consumer."

Teague has used practically all materials known to man and it is no accident that a great many of his designs use steel in one way or another. "The wonderful thing about steel is its versatility," says Teague. "Its many alloys, old and new, give it adaptability that other materials don't have. Its strength, both in tension and compression, qualifies it for literally thousands of uses. And stainless steel is another reason why steel is a modern metal because it gives so many designs their contemporary look."

The moral is this: steel is an ageless metal, as much at home in the Boeing 707 and today's elegant tableware as it was in medieval days. Its enduring modernity will always be recognized and used by designers like Walter Dorwin Teague.

USS TRADEMARK **United States Steel**

designing with stainless steel

The ideal design has been described as one in which the properties of the material are fully utilized in the finished product. This ideal is difficult to achieve, and no group of materials comes as close to permitting this ideal as stainless steel.

To put it differently, no other material combines so many outstanding properties as the stainless steels. Stainless steels have high tensile strength. All are hardened and made even stronger by cold working. As a family they offer superb resistance to the corrosive effects of an enormous variety of reagents. They have unusual resistance to high temperature oxidation, and are distinguished by relatively low heat conductivity. And on top of their remarkable physical properties, stainless steel's lustrous appearance and sales appeal scarely need mention.

There are over 30 types of stainless steel today.

The history of stainless steel's use is marked by designers who turned a healthy profit with a quality material but mainly with sound ideas. They're the men who used stainless for its strength and sales appeal in toaster covers, its appearance and machinability in wrist watches, its structural properties and cleanability for truck trailer parts. Stainless steel cuts weight and adds years to the life of architectural panels; its corrosion resistance and smooth, pocket-free surface have made it the standard of the dairy industry. There are literally thousands of applications of stainless steel in which designers have utilized one, two or more of the remarkable properties of stainless steel.

By reflecting the color of its surroundings, stainless steel contributes to harmonious design.

Types 302, 410 and 430 make up 75% of stainless steel's uses.

Good design is honest design, whether it uses stainless steel or other materials. Yet the fact remains that there is no other commercial material quite as versatile as stainless steel. The applications shown on these pages are just a few of the hundreds of uses to which stainless is put every day. To learn more about stainless steel and its design properties, call our nearest sales office or write United States Steel, 525 William Penn Place, Pittsburgh 30, Pa.

Successful designers don't substitute stainless steel sections for sections of other materials. They design to stainless' unique properties.

Good design doesn't stop with function and sales appeal. It must also be capable of economical manufacture. As a comprehensive guide, send for the free book described at the right.

Stainless steels represent but a few of the thousands of grades of steel in existence today. United States Steel makes a complete line of stainless steels as well as alloy, high strength and carbon steels. Bring your design problems to us.

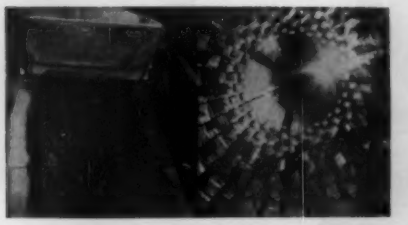
USS is a registered trademark

USS United States Steel

No Material comes close to stainless steel's versatility. By way of illustration, here are a few "opposites" that prove our point.

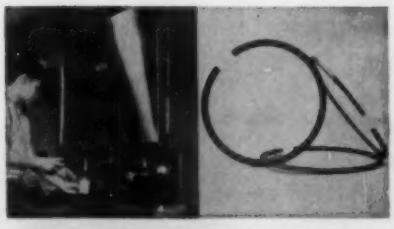
HOT. Temperatures in a jet afterburner reach 1400°F.

COLD. Stainless heat exchanger operates at temperatures as low as —443°F.



WET. Combination of moisture and coal would corrode nearly anything but stainless.

DRY. Rotary dryer is used to dry pharmaceutical ingredients.



CLEAN. Milk dispensers of stainless steel prevent contamination.

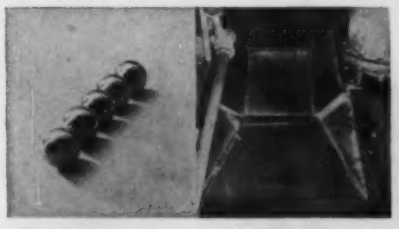
DIRTY. Stainless piston rings resist high temperature corrosion.

INSIDE. Chemical tanker needs simple wash-out for cleaning.

OUTSIDE. Stainless automobile trim stays bright and good-looking.

LIGHT. Stainless steel jewelry has a light, graceful appearance.

HEAVY. Strength and hardness of stainless combine to make safe doors safe.



ROLL. Stainless ball bearings take a lot of punishment.

SLIDE. Abrasion resistance of stainless steel makes chutes last longer.

FORM. Stainless steel wrist watch keeps time and beauty.

FUNCTION. Stainless steel muffler defies heat with silence.

WATER. Stainless sinks stay bright and beautiful.

FIRE. Stainless steel shingles inside cat crackers are red hot.

This mark tells you a product is made of modern, dependable Steel.

MOLDED PLASTICS MEET BOTH

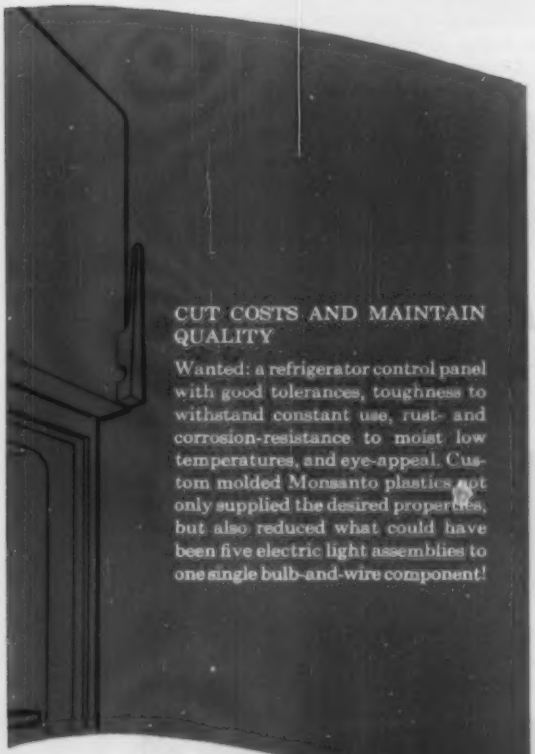
CUT COSTS AND IMPROVE PERFORMANCE

Designing this vent to be molded of high impact polystyrene, eliminated the cost of painting. A metal pinion, included in the one-piece molding, secured the vent to the conditioner housing, easing assembly. The unit is also lighter in weight, and its rust- and tarnish-proof surface is easier to clean.

IMPROVE PERFORMANCE AT NO MORE COST

By custom molding this scale of Monsanto plastics, the designer held the number of parts to a minimum, cut down weight (and shipping costs), and created an office appliance with colorful chip-proof exterior beauty, and a functional design appeal that was immediately reflected in substantial sales increase.

PERFORMANCE AND COST CONSIDERATIONS



CUT COSTS AND MAINTAIN QUALITY

Wanted: a refrigerator control panel with good tolerances, toughness to withstand constant use, rust- and corrosion-resistance to moist low temperatures, and eye-appeal. Custom molded Monsanto plastics not only supplied the desired properties, but also reduced what could have been five electric light assemblies to one single bulb-and-wire component!

Why is it that molded plastic can offer wide design latitude—the welcome freedom to develop product ideas with eye and sales appeal without sacrificing performance for price?

One reason, as demonstrated by the examples opposite, is the unique efficiencies and economies inherent in custom molded plastics. Simplified production, for instance. Multiple parts molded in one piece. The elimination of finishing steps—buffing, grinding, tapping, cementing, machining. The unlimited color choice—molded in, not painted on. The close tolerances held even in high speed mass production. The lighter weight for easier handling, lower shipping cost.

There is a wealth of plastics molding compounds with constantly improved combinations of properties, from which to select a material that will match both cost and quality end-product demands.

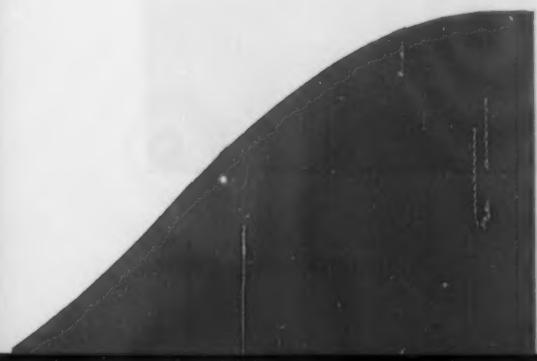
And last, there's the custom molder. Well known as a mass producer, he is much more. He knows the design capabilities of the many plastics. He can recommend the best formulation, engineer the mold to capitalize on the advantages of molding techniques. He can turn out plastics parts with unusually consistent quality, at rates to meet the tightest schedules and budgets.

As a handy guide for designers, Monsanto has developed a "Plastics Properties Calculator." Send coupon below for yours.

Monsanto supplies custom molders with molding formulations of Monsanto Polyethylene, Lustrex® Styrene, and Opalon® Vinyl, specially developed and constantly perfected to meet the widening range of design requirements.

Monsanto

MONSANTO INITIATOR IN **PLASTICS**



MONSANTO CHEMICAL COMPANY
Plastics Division—Room 722
Springfield 2, Massachusetts
Please send me a free "Plastics Properties Calculator"

Name_____

Title_____

Firm_____

Address_____

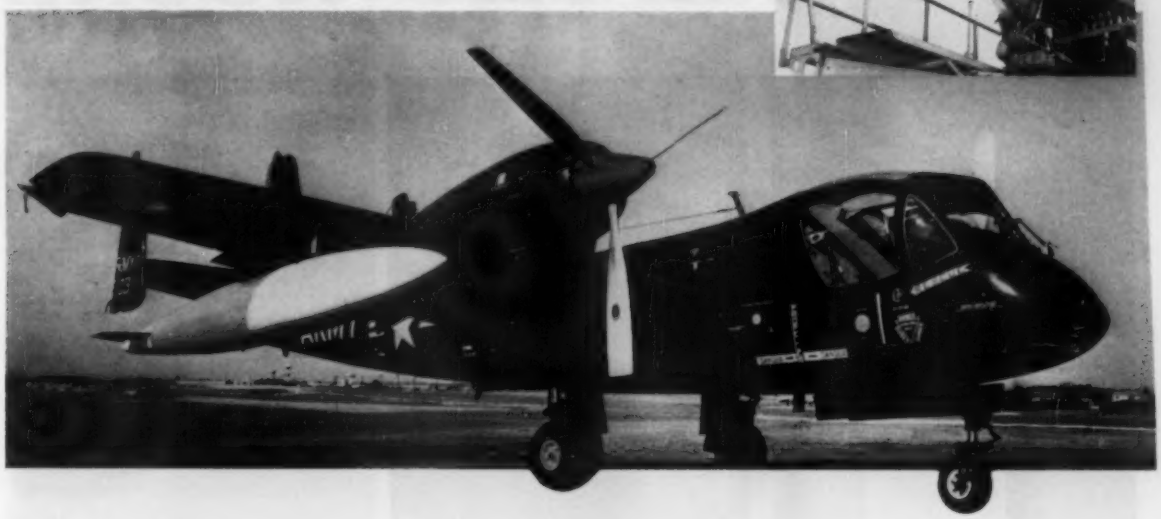
City_____ Zone____ State_____

Epoxy resin-glass fiber helicopter part is stronger, lasts 5 times longer than metal. Air deflecting contravanes, mounted directly on the engines of Sikorsky S-58 helicopters, are subjected to engine vibration. Formerly made from metal, such contravanes became inoperative after about 3 million cycles in a test machine. Now, contravanes made of glass fiber impregnated with BAKELITE Brand epoxy resin are being used in this important assembly. Manufactured by the Fibremold Division, Hampden Brass and Aluminum Company, the epoxy-glass combination has exceptional ability to dampen vibration and resist fatigue. Tests show no failures after 15 million cycles! As an extra bonus, the epoxy-glass part cuts weight 11½ per cent.

TO GAIN STRENGTH, REDUCE WEIGHT, SAVE TIME

Epoxy resin-glass cloth laminate saves 80% of cost of large laminating tool. The Tapco Group of Thompson Ramo Wooldridge Inc. has dramatically proved the merits of epoxy-glass laminate tooling. A parabolic-shaped laminating tool about 15 feet long and seven feet across was built of BAKELITE epoxy resins laminated with glass fibers. The big tool, its surface smooth and flawless, was made and placed in production in a minimum amount of time. The company claims this epoxy-glass tool saved them approximately four-fifths the estimated cost of a tool made from other materials.

Epoxy-glass "spinners" dampen vibration, maintain strength despite alternate icing and heating. Predicted long, reliable service life is one of the outstanding features of epoxy resin-glass cloth propeller "spinners" now being used on Grumman "Mohawk" airplanes. The epoxy-glass cloth "spinners" which incorporate de-icers for the aircraft's propellers possess excellent tensile strength and fatigue resistance—very important properties for a part that is subjected to severe vibration. The wire heating elements, that are laminated right in with the glass cloth and impregnated with BAKELITE Brand epoxy resin-based compound, have excellent electrical insulation. The strength-to-weight ratio of the "spinner" is high. In addition, the manufacturer, Fibremold Division, Hampden Brass & Aluminum Company, reports production costs are substantially lower.



...DESIGN IT WITH EASY-TO-FABRICATE EPOXIES

New and practical applications for epoxy resins—often in combination with other materials, such as glass fiber and metal—are being introduced by ingenious designers in many fields. No other resin commercially available offers so many advantages: exceptional strength—stronger than other plastics—even under wide temperature ranges . . . excellent resistance to most chemicals, water and weather . . . ease of fabrication that saves untold hours of production time and costs. Some of the newer applications for epoxy resins include filament winding, electrical encapsulation and embedment, and fabrication of large storage vessels and containers.

For more information about BAKELITE Brand plastics—epoxies, polyethylenes, phenolics, styrenes, and vinyls—mail the coupon today. See Sweet's Product Design File, section 2a/ui, for a list of properties.

BAKELITE and UNION CARBIDE are registered trade marks of Union Carbide Corporation.

UNION CARBIDE

Dept. F1-73, Union Carbide Plastics Co.
Division of Union Carbide Corporation
270 Park Avenue, New York 17, N. Y.

Please send me information on BAKELITE resins and suggested applications. I am especially interested in

_____

NAME _____

FIRM NAME _____

STREET _____

CITY _____ ZONE ____ STATE _____

ENJAY BUTYL

IS TOPS IN ALL-'ROUND

RESISTANCE TO TEAR AND ABRASION

Enjay Butyl offers the highest aged tear strength of any rubber . . . even after long exposure to ozone and heat! Its inherent toughness resists abrasive wear, in such applications as tires, conveyer belts, hose and other mechanical goods.

RESISTANCE TO SUN-LIGHT AND WEATHERING

Enjay Butyl has proven its resistance to ultra-violet light, ozone, oxidation, moisture and mildew. Increases life of products such as weatherstrips, garden hose, wading pools and automotive parts.

RESISTANCE TO CHEMICALS

Enjay Butyl, because of its unique and extremely low degree of unsaturation, offers excellent resistance to corrosive chemicals. The preferred rubber for tank linings, hose, seals, gaskets and other applications where exacting chemical resistance is required.

VIVID COLORS

Enjay Butyl requires no additives for quality coloring over a wide range of hues. Famous for colorability and smooth finishes, Butyl has been successfully plastic coated for special applications.

RUBBER
PERFORMANCE

DAMPING PROPERTIES

Enjay Butyl absorbs shock and vibrational energy more completely than any other rubber. Resiliency can be varied in compounding and processing. Butyl is ideal for axle and body bumpers, motor mounts and sound-deadening applications.

IMPERMEABILITY TO GASES AND MOISTURE

Enjay Butyl is tops in impermeability to gases and moisture . . . retains air pressure 8 times better than natural rubber. Outperforms other rubbers in such application as inner tubes, jar and bottle seals, hoses and inflatable goods.

ELECTRICAL RESISTANCE

Enjay Butyl tops all vulcanizable rubbers in electrical and dielectric properties . . . in resistance to corona and ozone breakdown and water absorption. Its high dielectric strength insures against electric breakdown under normal or surge voltage. Its heat resistance permits higher current flow for a given conductor size.

The outstanding properties of Butyl Rubber create new horizons for the designer, and offer to manufacturers an opportunity to utilize the qualities of rubber in applications never before possible. The unique properties of Butyl have led to vast improvement in many existing products. Technical skills will open the way to countless new uses.

Butyl is the "idea" rubber with uses stretching as far as the imagination can reach. We'll be glad to tell you all about it. Just contact the nearest Enjay office.

EXCITING NEW PRODUCTS THROUGH PETRO-CHEMISTRY

ENJAY CHEMICAL COMPANY

A DIVISION OF HUMBLE OIL & REFINING COMPANY

HOME OFFICE: 15 West 51st Street, New York 19, N. Y. OTHER OFFICES: Akron • Boston • Charlotte • Chicago • Detroit • Houston • Los Angeles • New Orleans • Tulsa

ENJAY BUTYL

Interiors Book of RESTAURANTS

Ready November 7th • the first book ever written on restaurants and their design • opens up a profitable new field of practice for you

224 pages • 9 x 12 • complete text—never before published • over 350 illustrations • 100 different restaurants and bars • work of 60 designers

Every phase of the design problem is handled
basic decisions prior to design • kind most likely to succeed • city vs. country location • what information is needed—how to get it from the client • professionals who practice in the restaurant field • how the designer is engaged and paid • all types—luncheonettes cafeterias and festive • design of

- kitchen
- dining room
- entry and public spaces
- wash rooms
- exterior
- parking areas
- signs and graphics

Order Today and Save
Pre-publication price $13.50 • Price after December 1st $15.00

Whitney Library of Design
18 East 50th Street
New York 22, New York

☐ money enclosed ☐ bill me

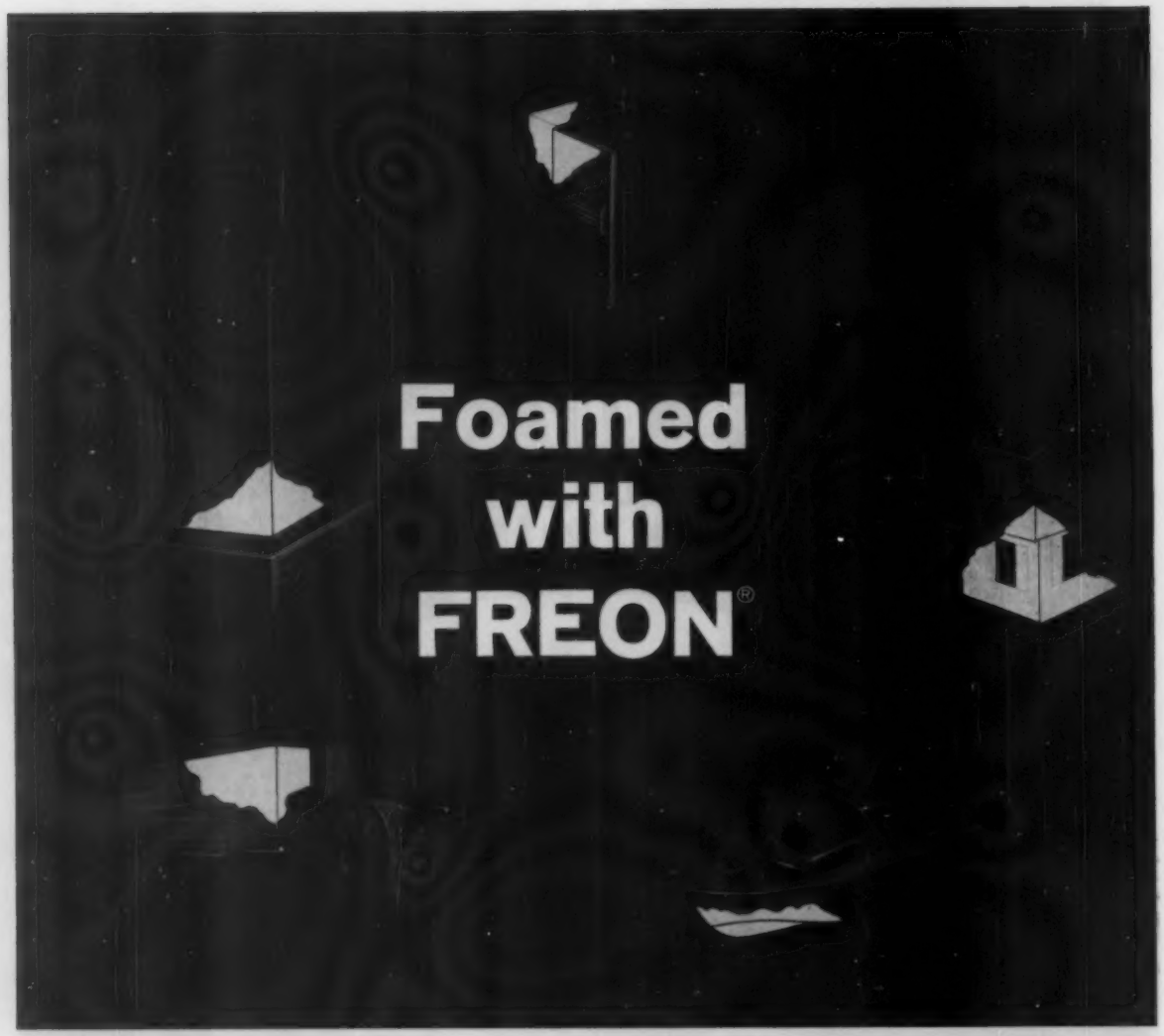
Yes, please send me a copy of Interiors Book of Restaurants as soon as it is off the press.

Name_____

Street or Box No._____ Zone_____

State_____ City_____

Save with cash: We pay postage on all domestic orders if you send money with order. Please enclose 35c per copy for orders to be sent to Canada or other foreign countries. 3% Sales Tax on orders to be mailed to New York City.



New, rigid urethane foams are filling a void in many industries

New answers to problems of insulation, structural design and costs are being provided daily by the versatile qualities of improved urethane foams—especially foams blown with Du Pont "Freon" blowing agents.

Twice the insulation possible with conventional materials of the same thickness is now obtainable from urethane foams blown with "Freon". And for the same degree of insulation, you need but half the thickness.

Surprising strength makes improved urethane foams an excellent, lightweight structural material. Adhesive tenacity bolsters this strength even more, permits use of foam for bonding purposes.

Lowered costs result from the ability of "Freon" blowing agents to produce more foam from the same base materials. The foams themselves often require just half the volume to equal other materials in performance. And you can get the installation versatility and convenience of foaming in place.

Other features—exceptional buoyancy and water resistance for marine use, freedom from rot, controllable density, vibration dampening, resistance to aging and chemical action.

Technical assistance is available from Du Pont to help you test the physical capabilities of your foams blown with "Freon", and to help you produce foams to meet your specific needs.

For more information, write: E. I. du Pont de Nemours & Co. (Inc.), "Freon" Products Div., N-2420, Wilmington 98, Delaware

FREON®
BLOWING AGENTS

DU PONT
REG. U.S. PAT. OFF.

Better Things for Better Living . . . *through Chemistry*

Everyone but ourselves to blame

"Serious reading," Vance Packard states seriously in *The Waste Makers*, "requires an exercise of concentration, private imagination, and applied intelligence that takes it out of the category of spectator recreations." Packard goes on to explain that the alternative is television. He is, as he often is, half right. Another alternative to serious reading is non-serious reading, represented by books, like this one, that pretend to be thoughtful without placing any noticeable burden of thought on either author or reader. Packard keeps saying, justly, that certain of his themes "deserve exploration." Unfortunately he writes under the delusion that he is giving them the exploration they deserve. One need not question his sincerity (although one *could*, considering how much he has tried to wring out of a commercially good thing), but even as slick popularizers go, this one does not go very deep. The late Fred Allen once described Ed Sullivan as one of a new breed in the entertainment industry — the "pointers." The pointer has no talent himself; he simply comes on stage and points at people who have. Packard has now carried the technique into journalism. While he demonstrates no gift for social or economic analysis, he points to those who have—among them, William Whyte, Jr., John Galbraith, Aldous Huxley, Harrison Brown —and much of his financial success as an author is a matter of gelt by association. But just as Sullivan seems unable to tell Judith Anderson from an acrobat, Packard cannot tell the genuine authorities from the self-declared "marketing experts" that no one else takes seriously. If one of them says something immoral or preposterous, Packard soberly quotes him as though he were in the mainstream of American industrial life.

Stated briefly (Packard's own drive towards economy does not extend to the use of language), his thesis is that Americans are wasteful. This is not because we wish to be, or because we are weak, or because old values have proved inadequate to new circumstances. It is because we are *forced* to be wasteful by manufacturers, marketing people, industrial designers, advertising men, and New England dentists—in short, by everyone but ourselves. The consumer is not allowed to be thrifty because advertisers make him buy products he does not need, and manufacturers make sure that their products are not worth saving.

It is perfectly easy to reply to *The Waste Makers* with the shrill, complacent answers of those advertising and marketing men who automatically cry "foul" without looking to see where they have been hit and why it hurts. Their argument commonly runs: 1) We do *not* try to make people buy what they don't want. 2) Even if we do, they like it. 3) To move goods by strategically creating wants is intrinsic to the American way of life, and the nation's standard of living is high because of our great persuasive power. 4) What great power? If you only knew how feeble our skills are, how strong consumer resistance is, and how hard it is to sell anyone anything! These sensitive responses never amount to anything more than a catharsis for the injured. There *is* something wrong with the quality of American life, and it *is* in great measure connected to our economy. In fact the points Packard raises are so clearly valid that they triumph over the author's lack of organization, eloquence, or wit to make *The Waste Makers* a fairly convincing book despite its manifold faults. What is required,

though, is not a shrill attack on some business groups but a sober attack on the problem: a considered examination of whether some of the values that have seen us through times of scarcity must be jettisoned in time of abundance and, if so, how we are prepared to replace them.

In the meantime, there are some villains, but Packard has no powers of discrimination with which to tell villainy from convenience. He calls attention to potato peelers painted the color of potatoes so they will be thrown away with the peelings, and to furnace salesmen who posed as government inspectors in order to get householders to replace their furnaces. Obviously the first practice is deceitful, and the second fraudulent. But in the same chapter—with the apparent conviction that somehow they represent the same order of industrial evil—he deplores: breakable plastic toys, Hungarian goulash in throwaway bags, an emergency vending-machine razor to be discarded after use, disposable tents, disposable coveralls. "Steaks and other meats have appeared in disposable aluminum frying pans. When the steak is done, just throw away the pan along with the nasty old grease . . . A throwaway mousetrap . . . No messing around with the mouse. Just throw away the whole unit. You don't even have to look at the victim." That sounds like advertising copy promoting these remarkable products, but it is actually Packard complaining about them. He does not say, and perhaps does not know, precisely why he thinks these conveniences are wicked, but in a later chapter he explains that frequent purchasing "tends to disenfranchise the wife by depriving her of many traditional, time-consuming homemaking functions." Yet he must know that any time she wants to wash a greasy pan, or remove a mouse and clean the trap, she can. No one has disenfranchised the housewife; rather she has chosen convenience as fast as technology has provided it. There is indeed something alarming about the extent to which the texture of immediate experience is disappearing from American life, but it can hardly be blamed on the manufacturers for making it possible. One revealing indication of Packard's view is his lament that "Americans like to think that in the earlier days, if not today, frugality was the rule." It was. But this was not because it was good in itself; it was because goods were scarce.

Goods are not scarce here now, and *partly* because of this there is a disturbing flabbiness in American values. One of its most disturbing aspects is the tendency to look outside oneself for the cause. Thus Packard complains of "the soft, insistent commercials the youngsters hear during the weekly twenty-odd hours of television watching," without reflecting on the soft, uninsistent parents who allow their children to watch television 20 hours a week.

All oversimplified books must end with "programs," and *The Waste Makers* has a what-you-can-do-about-it section of platitudes that are very nearly as shockingly banal as the book's dust jacket, which shows "your author" (he keeps referring to himself as your author) meditating on a rock—the best-selling ascetic in Fairfeld County.

The danger of *The Waste Makers* is that the problems it purports to treat — the commercialization of American life, the conservation of resources, the role and definition of waste in a "growth economy"—are real. Treating them superficially and sensationally does not make them any less real, but it does make them much less clear. Although through most of the book he seems to think we *can't* live with abundance, Packard ends by saying, "The central challenge seems to be this: Americans must learn to live with their abundance without being forced to impoverish their spirit by being damned fools about it."

The Waste Makers shows how hard it is to do.—R. C.

Testing the product

It is not often that commuters find themselves stepping off their train onto a red carpet. Although this may mean a royal visitor is aboard, it is more likely to mean that a testing laboratory is using them as guinea pigs. If so, turnstiles may count the number of people. A testing team supervises the carpet's daily

vacuuming, weekly shampooing. Back in the laboratory, the carpet is checked for wear resistance and color fading before reports are drawn up, data are evaluated, and comparisons with competitive products are established.

In-use testing for performance, endurance, and safety is the last check before a product is released to production and to the market. The seals, tags and labels which indicate a product's endorsement by a recognized laboratory are the consumer's safeguards against exaggerated claims. At one time, the equipment with which products were tested for safety was crude and simple (the tools with which Underwriters' Laboratories started in 1894 are seen at right). Today there are hundreds of independent laboratories throughout the country, some of which (like United States Testing's Hoboken headquarters above) are equipped to test anything from baby food to missile fuels. A discussion of testing, the last stage in product design, begins overleaf. BY ARTHUR GREGOR

A wealthy young American painter a few years ago faced a common problem in an uncommon way: he wanted to exhibit his work, but did not want to part with it. He resolved the problem simply by commissioning friends to buy his paintings, and return them to the artist's studio. But this in turn created a new problem: paintings that had been "sold" were marked with a red seal pasted to the frame. In time the seals attached to the artist's work were so strong an indication of popularity that the artist actually became popular, and buyers flocked to his studio. The power of a seal of approval cannot be underestimated.

The situation of the lucky artist is of course not wholly analogous to product manufacturing: most manufacturers have neither the space nor the parental backing (nor the motive) to buy back the products they release. But in any selling situation, the seal of approval counts. It is not always the visible insignia of a firm, or a testing laboratory's official inscription. It is often just the good word that gets around. This in turn may stem from a seal's impression that lingers in the mind: the Good Housekeeping approval label seen on the tv screen and read out loud when the product it certifies is advertised; the tag that says: "Certified Washable. Do not boil or bleach." The seal can appear in a corner of a newspaper advertisement. It can be a label stating the exact percentage composition of a material. It can be a tag attached to a shirt or blouse that says: "A Wash and Wear Garment is one which will satisfactorily retain its original neat appearance after repeated wear and launderings with little, if any, touch-up ironing . . . the garment must meet the consumer demands for durability, color stability, shrinkage and bleach resistance. United States Testing Company, Inc. Unauthorized use of this tag is prohibited."

Whether or not a great many consumers actually stop to read an entire tag or seal when they purchase a garment, knitting wool, can of imported ham, or rent a floor-waxer for a day, the mere presence of the tag, or a label that spells authority, is of course reassuring and influences them. They feel secure in their purchase and the manufacturer knows that in making a selection the buyer will prefer the authorized product.

There is good reason for this. A housewife buying (or renting) an automatic floor-waxer is reasonably certain the machine will do what she expects it to do, if the product bears a seal of approval from a source she respects. Her own experience, and the word that gets around, have taught her that she can rely upon the authority of any number of independent laboratory seals. To the housewife the labels testify that the product is safe and that it works. To the manufacturer the laboratory endorsements mean the guarantee of an important sales-factor: reliability. To elicit a firm consumer endorsement and to avoid legal suits, the

manufacturer willingly exposes his products to any number of revealing tests, and the product designer takes this prospect into account.

Different testing categories

In the planning stages of a new design testing may be the least creative phase, but it is in many ways the most critical sequence of operations during pre-production—and even during production itself. What is actually put to test is not the product but the designer—the total validity of a design idea and of product planning. What good is an idea if it doesn't work, isn't safe, and won't sell? However obvious these questions, it is only by testing that they can be answered. It is during this part of product development that omissions in planning become evident and inaccurate thinking and engineering are detected by the needles and dials of measuring instruments. The extent to which the designer has been able to visualize the detailed application of his concepts is under investigation—his manipulation of space inside a tv or radio chassis, his choice of materials, his liaison with production engineering.

Testing is the confirmation of ideas and its result is data. There are four factors without which the success of a product cannot be guaranteed and for which data must be established. They are: *performance, certification of manufacturer's claims, psychometrics (the study of consumer response)*, and *safety*. Examples of these four categories—what is tested, why and how—are shown and discussed later on (pages 47-51).

The need to have a manufacturer's claims certified has already been mentioned. Certification implies that a product's capabilities are guaranteed, but before a manufacturer can submit an item for certification by an independent agency, the product's action, performance and endurance, must first be assured. Most manufacturers are capable of performing within their own facilities the tests necessary to obtain information in these areas. The performance of an appliance, for example, must obviously be tested first in a company's own laboratory and then, as the product rolls off the production lines, in quality control. All of the obvious dimensions, electrical as well as mechanical, are of course tested by companies without much trouble. Even the more difficult tests—operation at sub-zero temperature, high altitudes, vibration and endurance checks—can be performed by most large manufacturing companies in their own facilities. But there are certain performance tests for which companies have neither the equipment nor the time. And of course the validity of self-certification is always open to question. For these more elaborate and/or impartial tests, companies must seek the appropriate outside facilities that serve industry in just these areas.

What happens to the floor-waxer mentioned before if a motor winding burns out? Will it merely fail

to operate, or will it cause a fire? Or what happens when a fuse in an appliance blows? Will it cause damage, or will it only cut off the light and stop the operation of the air-conditioner or washing machine? Or how well will an electric mixer handle a batter of heavy sand? The likelihood of a housewife baking a sand-cake is admittedly not great; but the question is: can the mixer take this capacity load? Operating a product beyond the normal conditions for which it is rated is another test of the product's endurance and safety. The consumer has a right to demand that the product will not fail under various sorts of extreme conditions and the independent testing stations throughout the country see to it that these demands are met, that the products do not become safety hazards under normal or abnormal conditions.

Manufacturers will in all likelihood expose the production prototype of a new design to all sorts of acrobatics. But of course they cannot do this for every product that comes off the mass-production line. These are inspected for obvious defects but not for exact performance detail. Much can happen in the process of manufacture which may not show up in the standard quality control tests. Cheaper components could be substituted for those used with the prototype, soldering connections may be poor, the insulation between conducting surfaces may be weak. These defects will, however, show up in long-operation and endurance tests, or in any number of abnormal situations. For a product to carry the approval stamp of an authorized testing laboratory is a guarantee that the product is being spot-checked from time to time. The manufacturer does not know which sample the laboratory will test. Representatives of the laboratory will purchase samples of the product at varying intervals and in different localities. A poor component or a defect in production method will eventually come to light.

The independent laboratories

Manufacturers seek out independent laboratories for three basic types of service: *impartial evaluation, extensive facilities, safety approval required by government and local ordinances.* The impartial status of the independent laboratory makes its findings acceptable to manufacturers, customers and inspection authorities. The manufacturer also relies on its unbiased attitude when he asks its engineers to evaluate his products against competitive items. Some of the laboratories conduct extensive research and testing on consumer appeal and response. Like independent R & D services, the testing laboratories are either set up as for-profit businesses or as non-profit organizations sponsored by universities, the federal government, or business groups. The country's best known laboratory whose sole concern is public safety, Underwriters' Laboratories, Inc. (pages 45, 46) is run as a non-profit enterprise under the guidance of a board of trustees whose members are officers of stock insurance companies throughout the country. This tends to assure impartiality and objectivity. But regardless of its business structure, impartiality and objectivity are the two major products that any testing laboratory has to sell.

There are many such laboratories throughout the country. The American Council of Independent Laboratories, an association made up of for-profit groups, lists 78 members in its directory published in 1958. Collectively these laboratories employ several thousand chemists, engineers, biologists, physicists, metallurgists and technicians. Another directory, "Standardization Activities in the United States", published by the U. S. Department of Commerce this year lists 350 organizations sponsored by government agencies and various business and/or professional organizations.

Laboratory accessories are approved for accuracy by comparing new item (hydrometer) with master standard. At U. S. Testing.

One of the largest and most diverse of independent for-profit laboratories is the United States Testing Company, Incorporated, Hoboken, N. J. with branches in Boston, Philadelphia, New York, Memphis, Dallas, Los Angeles, Denver, Tulsa and Brownsville, Texas. The company has a total staff of about 500 and last year its scientists, engineers and technicians worked on 5000 different accounts, evaluating or certifying products, processes and materials. Underwriters' Laboratories, Inc., is the largest of the non-profit groups. Headquartered in Chicago, the organization has branches in New York, Santa Clara, California and Northbrook, Illinois. The company's 850 employees service 9200 factories and millions of products carry the familiar UL safety label. A discussion of these two organizations as examples of independent laboratories serving U. S. industry follows.

United States Testing Company, Inc.

In 1880 the textile industry in the U.S. needed a testing laboratory capable of checking the behavior of raw silk in various climates. The need for impartial investigations of that sort led the industry to underwrite a silk conditioning and testing house operated as a non-profit laboratory. This was the beginning of the U.S. Testing Company, and it continued to test only textiles until Dr. Daniel E. Douty, of the U. S. Bureau of Standards, became its director in 1920. Under his direction the laboratory expanded into other fields, at first into investigations of other materials and eventually into engineering testing and product evaluation.

In contrast to another independent for-profit industrial service, Arthur D. Little, Inc. (ID, June, 1960),

whose main operating strength lies in its *staff's* great versatility in all phases of technology, the main resource of U. S. Testing is its physical resources—its immensely diversified testing equipment and systems. Staffed by men who are experts in evaluation, the firm concerns itself primarily with two questions: how does a material, product or process behave under certain conditions, and why? To arrive at this in terms of measured responses, the company has over the years built machines that will measure and compare almost anything. The instrument and apparatus division (other departments are a research section, a textile section, certification, a psychometrics division, an engineering department) develops and builds test equipment and systems for its own industrial use as well as client facilities. This division calibrates a total of 950 laboratory accessories—thermometers, flasks, etc. (see page 44) for chemical analysis and other testing. They also build test machines for the pharmaceutical industry. One, called Accep-tron (at right), checks whether or not a tablet containing a formulation of iron filings has its quota of them inside — it rejects or accepts the tablets by magnetic recognition.

The growth of this and similar industrial services is of course proportionate to the growth of industry itself. Since the war the company's engineering division has been active in work on electronic products and every type of appliance. They evaluate household appliances (vacuum cleaners, washing machines, ranges, freezers, refrigerators, air conditioners); industrial equipment (compressors, generators, engines, production machinery, aircraft components); and in their psychometrics division (page 49) test consumer response to appliances, cigarettes, packages, food, advertising copy, logos and trademarks and lettering. Their clients (among them Owens-Corning Fiberglas, RCA, GE, Campbell Soup, Philip Morris, Bulova Watch, CBS, Book Manufacturers' Institute, and many, many other corporations, large and small) come to them for any number of reasons: to make use of the laboratory's special equipment, to relieve themselves of temporary overloads, to use U.S. Testing's high standard of impartial inquiry for the certification of hose, shirts, cigarettes, books, appliances. The laboratory has an active sales force that sells the organization's facilities and its unbiased scientific attitude—an attitude very much in evidence at the company's Hoboken headquarters where, in spite of a rather conservative and old-fashioned industrial building (page 43) an atmosphere of independence, seriousness and dignity reigns.

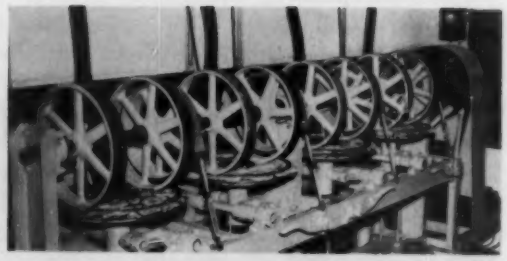
Underwriters' Laboratories, Inc.

In contrast to the investigations into product performance and quality carried on by services such as U.S. Testing, Underwriters' sole concern is in testing a product's safety. Unlike U.S. Testing, this famous laboratory started out as a non-profit organization in 1894 and has remained so. It originated during the Columbian Exposition in 1893, the Chicago Fair. One of the main attractions of the Fair was its lighting: it was the first time that Edison's electric lighting system was used on a truly grand scale. But the spectacle presented equally unprecedented hazards. Never before had so many fires broken out in so many places in so short a period. The insurance carriers of the Fair, the Western Union of Fire Underwriters, were understandably alarmed and engaged a Boston engineer, William E. Merrill, to look into their cause. Merrill found the new lighting system was the culprit and suggested that widespread use of it be controlled: materials and insulation should be checked, components tested in operation before being put on the market. The necessity for such safety measure was immediately recognized by local authorities throughout the country and a year later, in 1894, the insurance companies founded the Underwriters' Laboratories in Chicago (page 43) with Mr. Merrill as director. For the first years the laboratory was subsidized by the National Board of Fire Underwriters, but by 1913 it was sufficiently well established to go out on its own. Incorporated as a non-profit organization in the state of Delaware in that year, the financial support shifted from the insurance companies to the concerns served by the fire prevention service.

Laboratories also build special equipment. U. S. Testing's Accep-tron checks quality of medical tablets.

Underwriters' Laboratories today remains a service devoted to the safety interests of the public. These interests are protected by local ordinances requiring that merchandise that may present a safety hazard be inspected for safety by an authorized agency. Any product not so inspected may therefore be ordered off the shelf in localities where these rules hold (and they do in many parts of the country). Since most mass-produced items are merchandised nationally, a vast percentage of them passes through the rigor of a UL inspection (pages 50, 51).

Engineers and scientists at Underwriters take nothing on faith. A bullet-proof glass intended to protect bank tellers is shot at with various firearms from various distances. A fire-proof safe will not only be inserted into a blazing fire; to simulate the conditions of a building collapsing in a calamity, the hot safe will be dropped onto bricks and concrete to make sure it will protect its contents. A tv set will be run at full operating conditions until the temperatures have stabilized. It will then be checked for proper insulation resistance of all conducting parts; leakage from an-

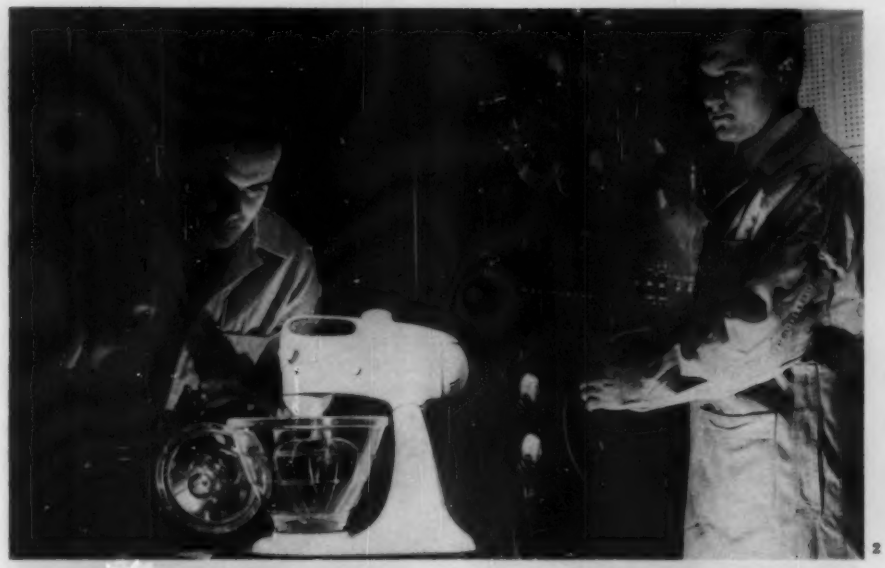


1

tenna and all metal parts to ground will be checked to make sure the set is not a shock hazard. Abnormal conditions will be simulated — short-circuiting tubes and other elements — to see that under failure the set will not break out into flames. These are only some of the tests given a tv set during a full sequence of normal and abnormal tests. And many other types of goods are tested with equal rigor.

How do manufacturers know what is required of their products — how they must be made, what components and materials must be used — in order to stand up against Underwriters' scrutiny? Underwriters publishes its standards and makes them available to manufacturers; designers would do well to avail themselves of these when working on a new design. In them design engineers, production and inspection foremen find, in the case of electric washing machines, for example: standards on mechanical assembly, protection against corrosion, supply connections (the type of cord which may or may not be used), internal wiring, motors, overcurrent protection, and many other checkpoints. A product sample submitted by a manufacturer to Underwriters for checking is measured by UL against the same standards. (Incidentally, UL welcomes consultation with designers and engineers at work on a new design if they have any question on any standard.) But checking a sample unit is not all that is required to get UL's approval. When they undertake to check an item they also contract to spot check every approved product as long as it is being manufactured. As a guide for inspection authorities and purchasers all UL approved items are listed under product type and number and/or the manufacturer in lists such as: Electrical Appliance and Utilization Equipment List, Hazardous Location Equipment List, Gas and Oil Equipment List, Building Materials List; Accident, Automotive, and Burglary Protection Equipment Lists; Fire Protection List, etc. These lists are published annually by UL and are kept up-to-date by bi-monthly supplements. Items are listed under two types of inspection services which UL assigns depending on the nature of a product: re-examination, and label service. Label service is assigned to products difficult to manufacture to given standards and which require closer inspection. For products inspected under the label service, only the manufacturer's name is listed under the appropriate product classification. This indicates that he is authorized to affix the label to those items which on close examination at the factory have been found acceptable by Underwriters. Under the re-examination service the manufacturer is allowed to apply the "re-ex" marker—the familiar UL in a circle. Whatever type of service a product is under, absence of the manufacturer's listing—and under label service, lack of the label—means to the consumer that a product is not UL approved.

Performance is the first thing to be measured



2

3

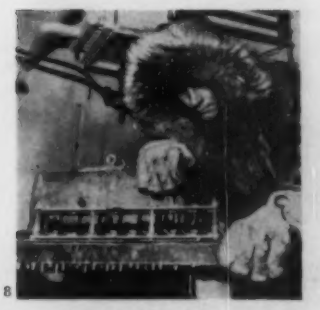
4

5

6

7

Performance tests precede all others in product evaluation, for the success of a product's performance is what certification affirms. Most manufacturers have their own facilities for testing performance and endurance, but rely on outside services for their special facilities and for their impartiality in comparing products. U. S. Testing can handle many testing problems with its special equipment: A carpet-wear-testing machine (1) conducts comparative abrasion tests on carpet samples by subjecting them to the wearing action of leather abrasive surfaces. The vibration of a household mixer (2) is tested with a strobe light. To measure the heat distribution of a kitchen range (3) thermocouples record "hot-spots" on various locations on the range. The vibration characteristics of a sewing machine (4) are measured by a sensing device. The strength of denim is checked in what the laboratory calls a "ball burst test" (5). Sometimes a product evaluation requires endurance tests for which a special sequence of tests has to be devised. U. S. Testing has contracts with a number of book manufacturers to test the wear and tear and lifespan of books: they are placed in specially designed tumblers where the books are given a rough workout, then the tensile strength of the binding is checked (6) to determine the force necessary to pull the entire book from its covers. Toys are tested for safety and endurance: to determine the force necessary to detach a doll's leg from its body, the doll is given a tug that exceeds a child's capabilities (7). U. S. Testing engineers also simulate Arctic conditions when studying the brittleness of a new synthetic formulation at —70°F. (8).



8

Certification testing means policing a product

1

2

3

4

5

6

Engineers at U. S. Testing occasionally refer to their certification service as "Follow-up Policing". It is an apt description. Certification at U.S. Testing is based on a continual quality audit—a type of service that began during the 1920's when a consumer movement accused some manufacturers of short-changing their buying public. In an attempt to salvage consumer trust, some concerned companies went to U.S. Testing, proposed to submit their products to the independent service for a comprehensive test program of all of the product's end use characteristics. Once a product was approved, the manufacturers proposed to use the laboratory's name in support of their advertising claims. This U. S. Testing permits, provided 1) *that initial performance tests cover all areas of end-use;* 2) *that a continuing monthly audit be conducted. U. S. Testing checks products under the certification program for performance, economy of operation, materials, durability, ease of repair, safety characteristics. These are carried on for such products as home appliances, women's hose, socks, cigarettes, shirts, watches, even diamonds. Some of the tests conducted as part of these programs are shown on this page.* 1) *Defective condition of stretch yarn (left) is compared with normal condition (right).* 2) *Wear resistance of boys' socks is checked in device that simulates abrasion.* 3) *To test the stretch endurance of hosiery, a stocking is given a flexing test.* 4) *A smoking machine collects and analyzes the tar and nicotine of different brands of cigarettes.* 5) *Additional equipment used to collect the mainstream of cigarette smoke.* 6) *A Kymograph records such smoking characteristics as volume duration of puff and interval between puffs.*

Psychometrics analysts measure response to visual stimuli

1

2

3

U. S. Testing's psychometrics division conducts studies of human response to products and packages. The division is made up of four psychologists, two statisticians and three home economists; in addition to visual tests of packages and flavor tests of food, alcohol and beverages, the group conducts experiments to determine the motives underlying a given choice. At testing stations throughout the country (one of its consumer response centers is located in New York's Port Authority building), the experts invite the public to list their choice of appliances, cigarettes, whiskey bottles, cereal packages, beer labels, etc. Appliances are evaluated for appearance and function against competitive products; packages are checked for readability, attention value (relative effectiveness in a competitive situation), apparent size (the effects of labels and design on size), apparent quality (which of two cans of soup costs more and tastes better, judging from the appearance of the package). Before starting a project the psychometrics group prepares a statement of the test objective and draws up a testing program in accordance with the nature of the product. The clients (designers or manufacturers) review the proposals before the program gets under way. U. S. Testing has consumer test stations throughout the country. Some of the tests are shown here. 1) *Flavor testing of cigarettes and soups to check brand responses.* 2) *Panel evaluates the effectiveness of washed shirts marked Wash - and - Wear.* 3) *Division simulates supermarket to check consumer's response to new*

4

packages. 4) *Part of division is physiological laboratory where such factors as brain waves and metabolic rate during sleep are studied.*

Safety-tests guarantee that products are not potentially harmful to operate

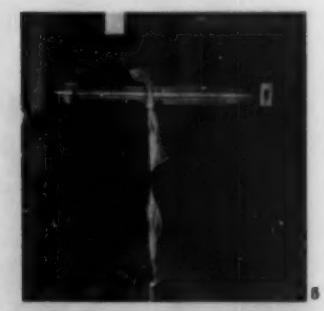
1

2

3

4

Underwriters' Laboratories affix their valuable label — or permit manufacturers to do so — after merciless investigation has proven a product to be free of fire, shock or casualty hazards. To determine a product's fire-security they simulate not only normal in-use conditions but devise abnormal ones. The floor-waxer (1) *is run over a waxed surface until a constant temperature level is reached in the motor. The motor is then subjected to dielectric tests to make certain no insulation breakdowns will occur. Similarly, the tv set* (2) *is run for about seven hours at 120 volts to make sure no failure of any sort will result during the temperature test. To guarantee a tv screen's implosion resistance, the glass is struck with a metal ball* (3). *Other tests will include measuring leakage of metal parts to ground for shock resistance, and short-circuiting circuit elements to find out if the materials used will catch fire under excessive heat. The heat given off by an electric heater is measured along the surface of the wall in which the unit is installed* (4), *and the fire-resistance of another model is checked by letting a piece of cheese-cloth* (5) *fall across its surface. (In this example the cloth was set on fire and the unit failed). Underwriter's Chicago headquarters is equipped with large fireproof areas where the flame resistance of building materials* (6) *can be determined. Occasionally UL's technicians must build a roaring fire to test the endurance of products marked fire-proof: a safe* (7) *is moved inside a conflagration for a determined length of time; after the fire is extinguished and the safe is opened, its contents must still be uncharred or the safe will not get UL's fire-proof approval.*



5

6

7

Report to Europe

BY PETER MULLER-MUNK

Excerpts from three lectures by an American invited by the European Productivity Agency to explain to European businessmen what design can do

Quite frankly, the decision to come here to tell you about what I have learned about industrial design in the United States in the almost 30 years that I have been practicing, has been one of the most difficult decisions of my already normally difficult career. To begin with, I am only too well aware of the fact that *I* still have something to learn every day about industrial design, and this platform, therefore, gives me an artificial authority which embarrasses me. Furthermore, I realize that I probably cannot quite avoid being taken as the spokesman for my colleagues. And this might not be the first time that they disagreed with me.

Nevertheless, I am proud that I, together with other American and European designers such as Raymond Loewy, Walter Dorwin Teague, Henry Dreyfuss, Dave Chapman, Misha Black and Sigvard Bernadotte, have participated in building the new profession of industrial design until today, at least in the U.S.A., it is an acknowledged factor in our economy.

I realize very well that our American economy, particularly as it expresses itself externally, is not by any means to everybody's taste. One of the greatest handicaps for an American abroad is that he is either admired for accomplishments which are often neither yet accomplisher nor necessarily very admirable, or that he is taken as a symbol of an uncivilized materialistic way of life which, in actuality, is really not nearly as primitive or unrewarding as it appears on the surface.

It would be much better, therefore, if we forgot all about appearances—a difficult task I admit—and instead looked for the true motives and tried to understand the methods which make for prosperity, for happiness, and for a little security. If we can agree on this approach, then it will not matter very much whether you like or dislike our refrigerators, our furniture, our frozen foods, or even our automobiles. What remains important are the methods which enable us, and can enable you, to produce and sell quality mass products to larger and larger markets. There are many elements which are essential to this process—good industrial management, good engineering, good quality-control and labor relations, intelligent pricing and distribution; but all of these will remain ineffective in our competitive modern economy until industrial design has been included in the total product development and marketing policy.

Let me admit that our American industry did not always, and does not always today, understand the importance of industrial design. Many of our corporations thought they did not need it until their more successful and informed competitors taught them that they did. I am also ready to confess that, 25 years ago, we industrial designers did not always understand management's problems as well as we do now. The mutual respect with which industrial management and industrial design work together today is the result of experience which has taught both of us that we need each other. And it would indeed seem wasteful if European industry had to go through all of the frustrations of American industry before it is ready to treat industrial design as a real partner instead of as merely a decorative mésalliance.

Of course, there has always been design—primitive or educated, humble or elegant. A Greek vase, a Spanish tile, Venetian glass, English and French furniture, German armor—all the million-and-one tools and objects of civilization had to be designed before they could exist; and it is their design which has helped them to survive in our museums and collections, long after their specific usefulness has disappeared. The best examples, however, of such treasures of our past all have one thing in common—they combine an immediate image of their usefulness with an expression of quality and of imagination, which together continue to give us enjoyment, pleasure and satisfaction.

If you don't mind my saying so, I sometimes feel that our modern motivation research is really trying to discover nothing much different than merely those qualities in a product which make it desirable. Between you and me, is it possible that perhaps our ancestors knew more about this than we do? Might we perhaps not get further if, instead of trying to psychoanalyze the innocent public, we attempted to find out first what and how we can give a toaster, an electric computer, or a milling machine the kind of character and beauty which will motivate their users to appreciate their functions and to get satisfaction from their operation? I, therefore, do not accept the premise that the responsibility and relationship between the producer and the user have been fundamentally changed by the machine. Our methods of production, distribution, and consumption—yes, they have indeed changed and will continue to change. I can see very little difference, however, between the relationship of Leonardo de Vinci to his very demanding ducal customers and the Olivetti operation in the Milan of 1960; except that perhaps even the Olivettis might acknowledge that unlike Cesare Sforze, they have not yet found their Leonardo.

By separating the problems of contemporary economics, technology, and management from the problems and products of our craft-oriented individualistic tradition, we only succeed in erasing that continuity of history in which the past nourishes a constructive and balanced understanding of the present. In considering automation, electronics, or supermarkets as isolated phenomena in time, we lose all perspective. It is easy to become frightened and disorganized if we really feel like Adam at the beginning

of time, but are also trying to run a factory which produces 10,000 light bulbs every 24 hours.

What we sense in the products of a Cellini, a Fabergé, or a Chippendale is the element of quality which their design gave to the form and function of their material. Nothing has changed in the ability of people to respond consciously or unconsciously to design as the one element which gives to one product the aura of quality and of value, while without it, it remains nothing more than a dull tool or an oppressive machine.

There is one thing, however, which does indeed make our situation quite different from that of our grandparents and great-grandparents. We do not have to go very far back in history to find ourselves in a milieu in which the designer was also his own producer and even his own sales manager. Depending on his talents as a designer, his command of craftsmanship in the use of his tools and materials, and his ability and luck in attracting sufficiently powerful or numerous patrons, he had the necessary assets to run a successful business.

It is against this background of a person-to-person exchange between designer and customer that we were catapulted into the industrial revolution. All of a sudden, and at an often frightening pace, all our own standards and methods of product evaluation were turned upside down. Quantities took the place of qualities; technical ingenuity took the place of design; contact between maker and purchaser became impersonal; comfort took the place of pleasure; and, finally, production became an end in itself.

You see, until recently you gentlemen of industry tried and often succeeded in combining the functions of the producer and the patron. Industry produced what it had decided the people should have and what industry had found most easy and profitable to make, and there it ended. As long as demand for the basic amenities of life remained ahead of supply, this classic recipe of industrial materialism worked like a charm. But the patron of today is no longer a single influential or intimate figure, but an anonymous composite of mass needs and preferences. It is no longer production, no longer even engineering, which has the final decision on what and how much of what to make. It is the consumer—that product of democracy—who passes judgment on our automobiles, our lawn mowers, and our washing machines, and who quite literally votes on whether he will allow us to remain in business or not.

Industrial design has been called the consumer's voice in management, and in a very practical way industrial design does indeed act as the interpreter of the consumer's needs in the product-planning process. By including design, the qualitative element, in the quantitative equations of business, we have again restored the historical equilibrium between product and owner-user. By adapting old principles to modern processes we not only help to perpetuate the noble traditions of our past, but we are also helping to lay the foundations of a new culture for our own self-preservation.

II

I chose the title "Industrial Design as a Function of Management" because unless industrial design is accepted on that level you had better not experiment with it at all. We have gone through a long period of evolution in the development of industrial design in the U. S., but we did not really grow up and become effective on a nation-wide scale until management accepted us as a partner in its policy-making function. The battle for this position is by no means won, and even where it is, our territory must be watched and defended continuously; for as one of the youngest partners on the management team, we are still the ones most easily overlooked in the conventional protocol of the establishment. While of course it is only too true that industrial design can never succeed without the fullest cooperation of engineering, marketing, production, and sales, it is even more true that it must be able to work on a management level before it can really prove what it can do. The reason for this is that industrial design must have access to the entire body of corporate information and planning and must be able to contribute to it. One of the gravest mistakes made by otherwise well-educated members of top management is to isolate industrial design in a neat little sphere of its own with only the vaguest avenues of communication with the so-called essential protectors of corporate success, accounting, engineering, advertising, etc. The results of such privileged isolation do industrial design more harm than good. Industrial design must not be treated as a luxurious pet or a cultural extravagance to be paid for out of the excess profits of art-conscious presidents. It has to earn its pay and it has to be used because it is necessary to insure consumer acceptance, necessary for competitive advantage, necessary for corporate propaganda, and, of course, necessary for corporate sales and profits.

I realize that there are serious obstacles to the acceptance of industrial design as a policy-making activity. It requires the re-evaluation of some traditional managerial functions and the willingness to make room at the top for a new voice and a new kind of approach to the definition of corporate planning. The resistance to such a change in the established order is largely psychological, having its roots partly in inertia, partly in ordinary jealousy, and partly in misunderstanding and ignorance of the parties involved. But industrial design must be able to assemble and digest all information which might have a bearing on product planning. This means that the industrial designer must be able to move freely across the departmental borders, collecting data not only from the president, but from the vice presidents and the department heads, be they in sales, research, in production, or in engineering. The industrial designer, in order to fulfill his function as the consumer's voice in management must, therefore, be permitted to investigate product prospects not only vertically from top to bottom within the corporation, but horizontally within the external market influences which will determine product acceptance.

While you can learn a great deal about industrial design at many good colleges and universities, the real education and maturing can come only through practice, and in practice it is the employer who is responsible for giving the employee a fair chance to prove himself. It is no excuse to complain about lack of experience, unless you have made it possible to get the experience. Far too many executives

who say that industrial designers just do not understand their problems have never taken time to acquaint the designer with these problems.

Now I admit that before industry can be expected to reveal its secrets it must be reassured on at least two points:

1) It must be assured that the industrial designer can really comprehend confidential information and be able to make intelligent use of it, and,

2) That the discretion of the designer can be trusted.

Although the need for a close relationship between client and designer seems obvious enough, I am led to believe that it is not yet customary in Europe. If that is true, then I can only encourage you to change your habits, to open up and delegate authority, and to distribute your confidence more liberally. The sooner you relax your rules in your own executive group about what you consider business secrets, the more quickly will you build a really responsible and enthusiastic organization. There is no excuse for complaining about political or economic isolationism if you continue to practice it at home.

Equally important to an atmosphere of frankness and confidence between management and industrial design is the designer's own security and discretion. An acknowledgment of this responsibility in the U. S. is the rule that no reputable designer can serve two competing clients simultaneously. Without the absolute respect for, and enforcement of, this principle of professional conduct, our clients would be without protection from the most mercenary industrial espionage and the industrial designer would have no basis for his insistence that privileged information be shared.

I have been given to understand that the principle of exclusive service for one company in a given industry has not yet been accepted in Europe. I have also been told that most European designers cannot survive on the fees they receive from only one client per industry. More interestingly yet, it is said that some manufacturers here prefer their designers to be on the payroll of a competitor as well, because this might help them to get some first-hand inside information on what the other fellow is doing.

I cannot believe that this state of affairs can last, and the sooner it is over the better! You cannot serve two masters at the same time, and it makes a mockery of the appeal for mutual cooperation and confidence if the knowledge gained is revealed to a competitor.

Now let me assume that I have made some progress in convincing you that industrial design cannot operate under any of the traditional management functions, that it must be integrated parallel to them and be able to move freely between them. There still remains the problem—and it is a very important one — of how industry should go about engaging industrial design.

First, of course, you must start with a clear picture of your own product development program based on the type and the average number of new product introductions distributed over, let us say, the next three to five years. Add to that the life expectancy of your standard products in relation to competition and economic trends, and their sales curves over the past two to five years. Are your products leading in sales? Have they reached their peak of acceptance? How soon will they need to be revitalized to maintain or better their present sales performance? What new developments are being worked on by research and engineering, and are you satisfied with your product's cost-to-profit relationship? In other words, before you can decide what kind of design experience you need, and what in general terms a design budget should be, you had better first take an inventory of how much design and what kind of design you need.

All right, then, let us imagine that you have made a proper analysis of where you are today and where you want to be tomorrow. After you have done this, I think that in nine out of ten cases you will agree that you cannot afford to take the risk of entrusting your first contact with design to a beginner—no matter how earnest or how talented. He could not possibly have the experience and the authority to understand your problems or to hold his own with the mature members of your management group. Not only will such gifted apprentices do you more harm than good, but in a short time they will themselves become bitter and discouraged by failure and lack of respect. No, it is as unfair as it is unrealistic to both yourself and to them to put your design requirements into inexperienced hands.

How should a designer be found? I recommend that for your first experience with designers you get acquainted with the professional societies of industrial designers in your country: investigate their members' work; interview those who appear to have the qualifications and experience which would fit the kind of work you have in mind; get references; and invite the candidates to visit with you and the other officers of your company who would be concerned with their work. By all means, the duties and responsibilities you will expect the designer to discharge should be clearly defined and explained to him. This procedure will very quickly eliminate those designers whose talents do not fit your needs.

III

Let us assume that you have discovered a designer with just the experience and the personality which you and your board of directors specified, and that this paragon of virtues is available at a price you can afford. Of course, it is a little bit more than you wanted to spend, but then your offer was also a bit less than you were prepared to pay.

Given equal candidates, is it wiser to attach one of them to your permanent staff, or had you better consider marriage with a consultant?

I am the first to admit that in many cases a professionally, financially, and organizationally secure designer attached to a corporation occupies a marvelous position. He enjoys that day-to-day contact and knowledge of corporate problems which no outsider can quite attain. He can act as liaison and buffer between other designers and his own management, and he can see to it that accepted design proposals are not prostituted beyond recognition by engineering, sales, or production. Such a person, with acknowledged status in the corporation and with a real understanding of the short- and long-range duties of industrial design, will be welcomed by everybody.

It is significant that the most effective internal design departments in

the U. S. are those of General Motors and General Electric Corporations. One look at the product range of these two corporations will show you that here, indeed, well organized and capably led internal design is almost a necessity. Even here, however, outside consultants are frequently called in to add a more independent point of view and to stimulate design thinking.

If your company manufactures not just one product-line but many different ones, if its product development program must maintain a constant pace of design distributed over different subsidiaries and focused on different markets, then you need a Design Director or Design Coordinator in a recognized position in your management structure. He should then be allowed to decide whether your company needs a design department of its own or whether it might be more economical and better policy to work with one or more consultants. In industries where specialized technical knowledge is really essential—such as, perhaps, in furniture, toys, or chinaware—a tolerant expert can do a great deal in introducing new ideas into conventional procedures.

What I am proposing is this: design must have management status before it can do you any good. Now, if your production and marketing policies are such that they can support a full-time design director and design department, that is your answer. It takes a pretty big and diversified corporation, however, to be able to afford "on the premises" design of comparable quality and cost to what a capable consultant has to offer.

On the other side of the ledger, I believe that the design consultant has certain assets of his own. His position on the outside of the corporation gives him an independence and a detachment from the daily pressures of business, which help him maintain a broader view and a more impersonal perspective than he could if he were an employee. The consultant has "distance," and his ignorance of all the thousand and one little bits of tradition and of specialized knowledge is one of his strongest assets. He can, and he should, bring a fresh point of view to bear on the problems of his mixed clientele. He contributes experience of many industries and of many different situations, whereas the specialist remains restricted by too much specialized knowledge.

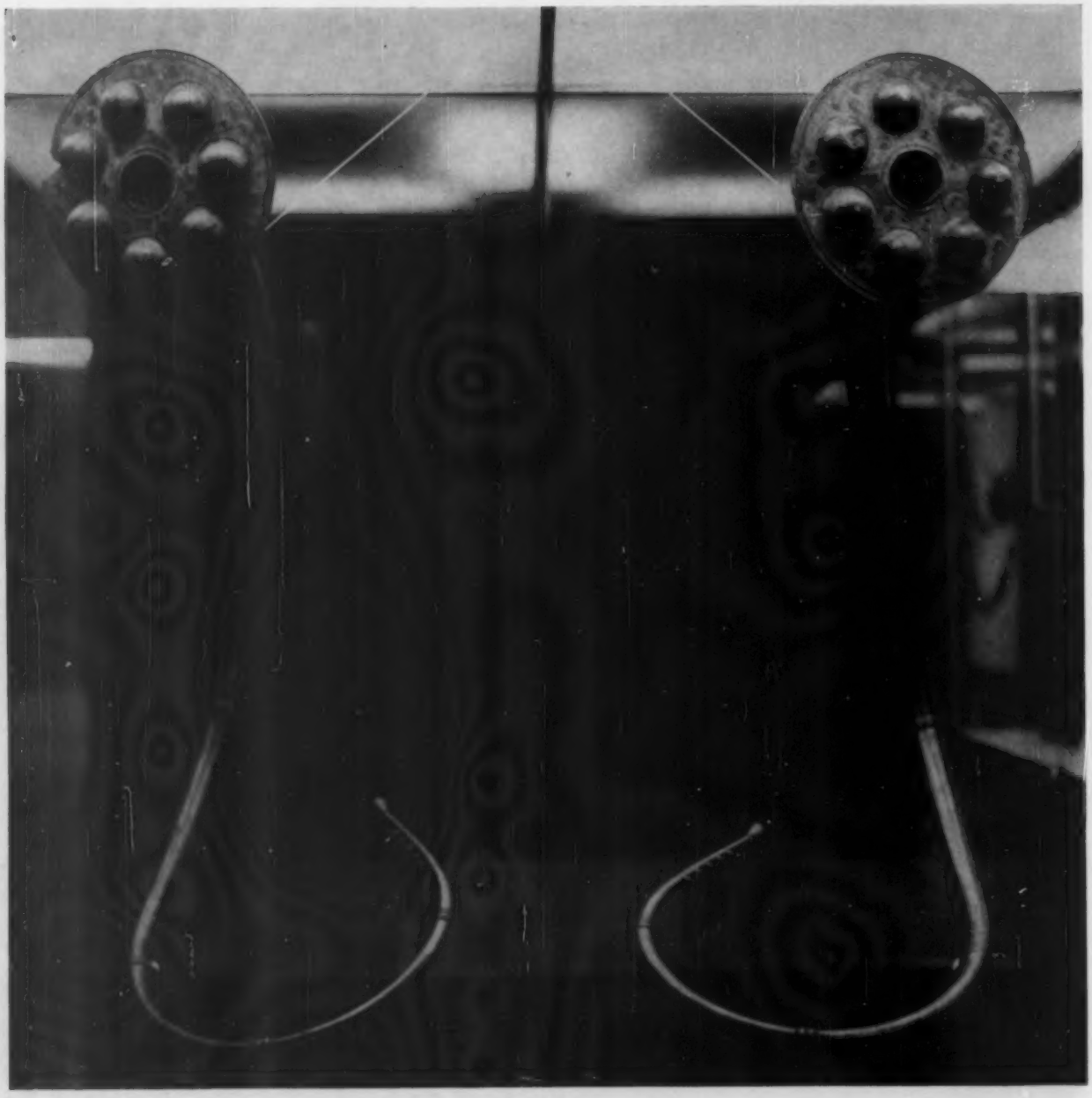
The consultant is essentially a problem-solver and a coordinator of information; he is not a technician engaged for the solution of specific limited objectives. It is a mistake to engage a consultant when all you really want is a sketch for a little fancier radiator grille for a farm tractor. It is the breadth of his experience and his ability to look at a product, a product-line, or a corporation from a fresh and unrestricted point of view that give the consultant his *raison d'être*.

Instead of looking for a designer with a background in your own field, I would, therefore, advise you to do just the reverse. As a matter of fact, with very few exceptions, the designer who has gained most of his experience in your own industry would appear to be perhaps the worst investment. If, on the other hand, you find that the consultant whom you are interviewing has, over a period of years, successfully solved a wide variety of always-new industrial problems, then you can assume that he can be trusted to do as well by you. So it is diversification, rather than specialization, that you should be looking for in a consultant—a broad view, broad experience, maturity, and considered judgment. To such a man and to his organization you should give your full confidence; and you must accord to him the authority and respect of an equal. Be careful, therefore, of flatterers and of those who always come up with the easy answers. Honesty and the courage to defend his convictions in the face of opposition—these are among the most essential attributes in a consultant.

In looking for a consultant, you should consider the size of his office or organization in relation to the problems which you want solved. And do not consider only the problems at hand. They are often the easiest ones and usually consist of what you and your board of directors have decided are problems of such vital urgency that they finally induced you to spend money on industrial design for the first time in your history. A manufacturer in search of a consultant should also consider his future needs. After the first product has been designed, is that the end, or will that be only the beginning for a steady succession of redesign and new product development? What other areas of your corporate activities may need design attention? How about your trademark, your exhibition program, and your packages? Look at your total position and try to find a consultant who has the experience and capacity to serve your total needs.

In trying to form an opinion on how much to spend on design, one method might be this: try to estimate the sales volume of the product to be designed, and figure somewhere between one and one-half and three per cent of gross volume for design. Or try to relate design to a certain percentage—ten to twenty per cent, perhaps—of research and engineering budgets. Another method might be your own evaluation of the influence of design on your total sales forecasts. If you are a manufacturer of table crystal or of chinaware, design might easily determine sixty or seventy per cent of your sales. On the other hand, if your products are diesel locomotives or micrometers, design might rate no more than twenty to thirty per cent of your company's trade acceptance.

The ways to find out about designers are not complicated at all, although it is still surprising how many executives, who are perfectly at ease when they investigate an advertising agency, a tax consultant, or a corporation lawyer, are diffident and helpless when it comes to industrial design. For very little money you can subscribe to the three or four industrial design magazines, which will help to give you a good idea of the profession, of its most active members, and of its philosophy and problems. One of the easiest approaches to our profession, which is not used nearly enough, is the contact with the professional societies of industrial designers and with the government-supported agencies for the development of industrial design. From such organizations you can get impartial information and advice. They know their members—they understand your problems. They have reference libraries and contract forms. They will arrange interviews; in fact, they are just about the ideal intermediary between the designer in search of a client and the executive in search of a designer. END



The crowds streaming through the current **Danish exhibit** *at New York's Metropolitan Museum seem to confirm the continuing popularity of Danish design in the U. S. — on one recent Sunday guards had to begin clearing the hall a half-hour earlier than usual to get everyone out by closing time. The displays of modern furniture and furnishings draw the most obvious attention and questions ("Where can I buy it?), but the historical exhibits contributed by numerous museums and private owners, provide a rare chance to see the antecedents of Danish Modern. Although the show does not pretend to be definitive (understandably the better-forgotten periods have been forgotten) it is representative of the best of Denmark's 18th and 19th centuries, Renaissance, Middle Ages and pre-history (for example, the left- and right-handed Viking ceremonial horns, above). Finn Juhl designed the clear, simple setting to underscore the harmony of Danish design.*

1

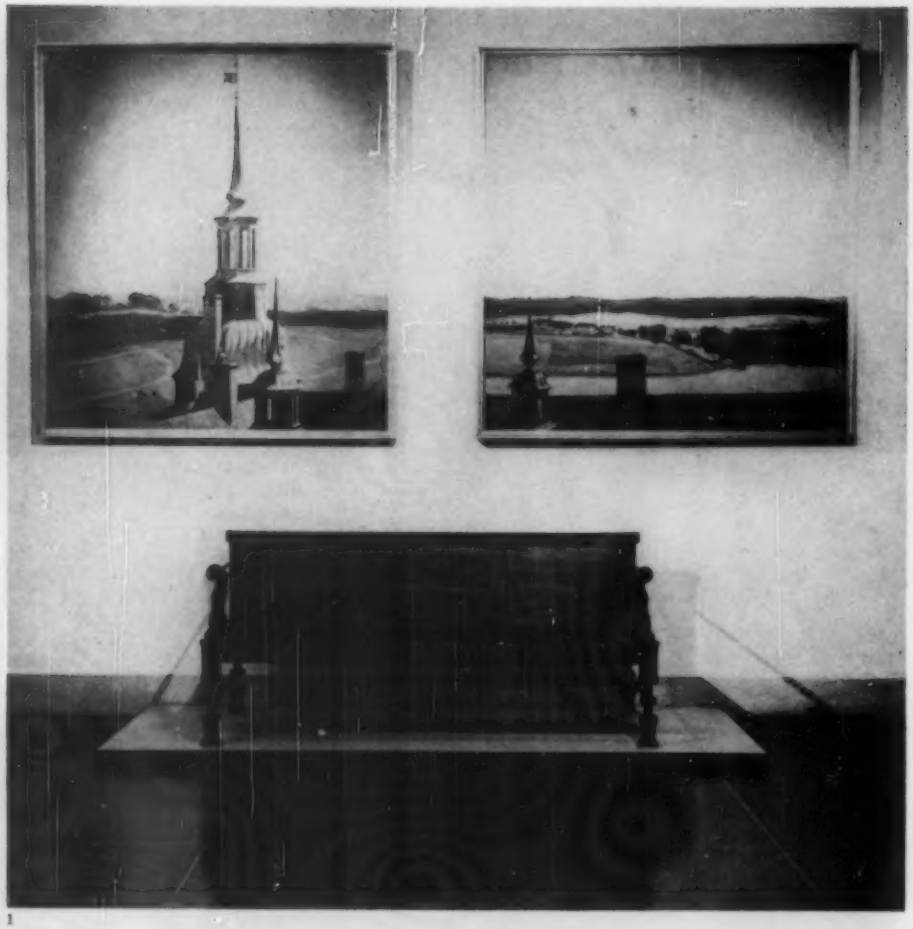
2

The whimsical dragon (1) courteously supporting St. George's horse while the saint stabs him to death, was carved by Hans Bruggemann, a South Schleswig artist. Medieval sculpture in Denmark was largely under German influence—Claus Berg, the most prominent artist of the period, was from South Germany. In peasant art, and in remote regions, decorative forms continue from one century to another with striking vitality and a few recur in Danish Modern. A delicate bridal crown, ca. 1520 (2), found under the floor of an old house, recalls the classic acanthus leaf. Benedict Narfasoni's chair (3) of 1550 borrows motifs from the early middle ages which can still be found in Icelandic wood-carving today, and the brightly painted spinning chair (4) closely resembles a recent design by Poul Kjaerholm, with three legs and a circular arm rest (ID, February, 1960). Similarly, the 19th century chair (5) made of coiled wisps of straw bound together with thin strips of wood reappears in a 1958 design by Torsten Johansen made of cane. The 18th century painted wood crucifix (5) hanging above is framed by two buxom, blushing redheaded mermaids.

4

3

5



1

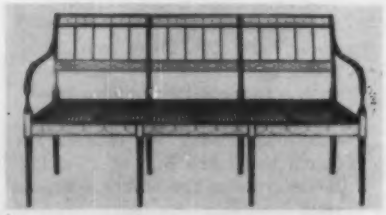
Foreign influences played a major role in 18th and 19th century Danish art, which flourished with the opening of new industries and craft centers. In 1722, the Kongesgade faience factory was started, typically producing the bishop's bowl (3). England

2

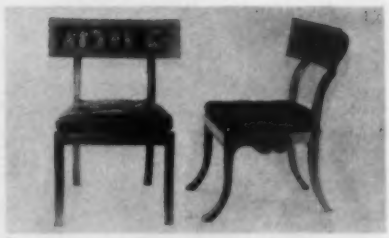
was influential in furniture styling and the Royal Furniture Store, 1777, imported British materials and models. A high-back chair (2), ca. 1710, follows a 17th century English style; a bench of 1800 (4) reflects the "satinwood" fashion; and a tea

3

urn, 1808, (6) echoes a Sheffield design. Neo-classicism appears in a Greek chair (5), 1790, and a sofa with sphinxes (1) by Jorgen Roed, 1840. In this period the exotic mixed easily with the native—the realistic Frederiksborg landscapes (1) by Christian Kobke hung in his father's house opposite two neo-classic reliefs (not shown) by Thorvaldsen.

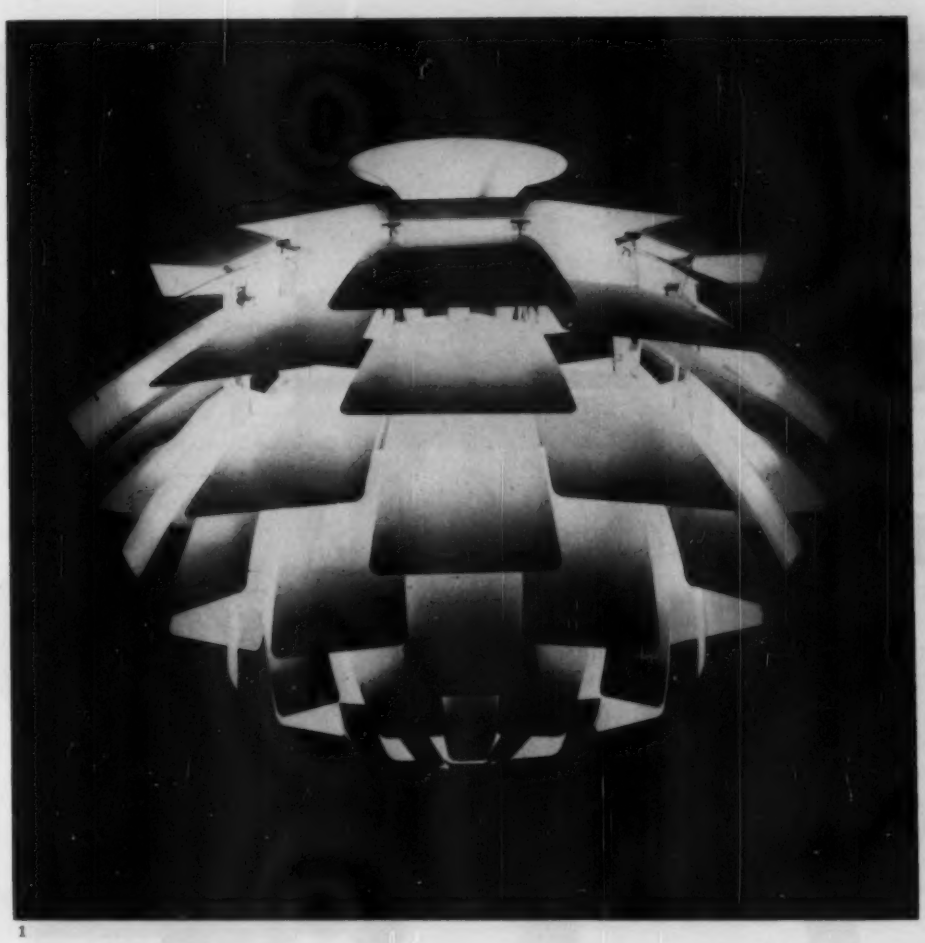


4

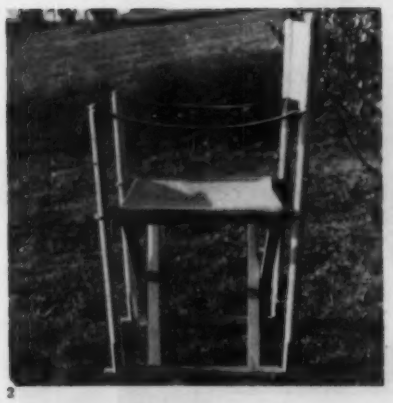


5

6



1

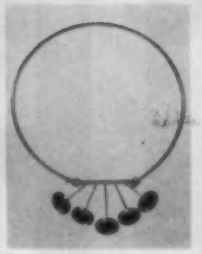


2

It was not until the 20th century that Denmark evolved a style of its own, perhaps largely due to the filtering of a modern industrial esthetic through a craft or semi-mechanized production. Sometime after World War I, there was a movement among skilled craftsmen to become patrons of artists—they engaged painters, sculptors and architects to design products for better market appeal, and their excellent workmanship is often devoted to the creations of one designer. Because of this, each product takes on the quality of a work of art both in concept and finish, and Danish design is characterized by several striking personalities such as Poul Henningsen, whose unique lamps (1) are immediately identifiable. As new materials such as stainless steel, plastic (see Kristian Vedel's bowls 3), or molded plywood are introduced, they inherit the discipline developed in more traditional materials. In silver, for instance, the high standard of excellence has been carried from Georg Jensen (1886-1935), whose decorative designs (6) are often touched by art nouveau (4) (Compare with Arje Greigst's jewelry, 5, of 1957) to the expressive shapes (7) by sculptor Henning Koppel, 1969, and stainless steel production. Danish design still relies on quality, not novelty, for appeal, and Interna, a new furniture company, has just begun to produce a 1933 design by Mogens Koch (2).—*M. D.*

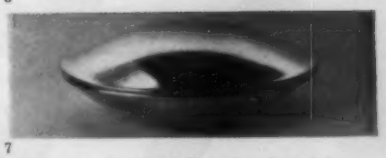
3

4

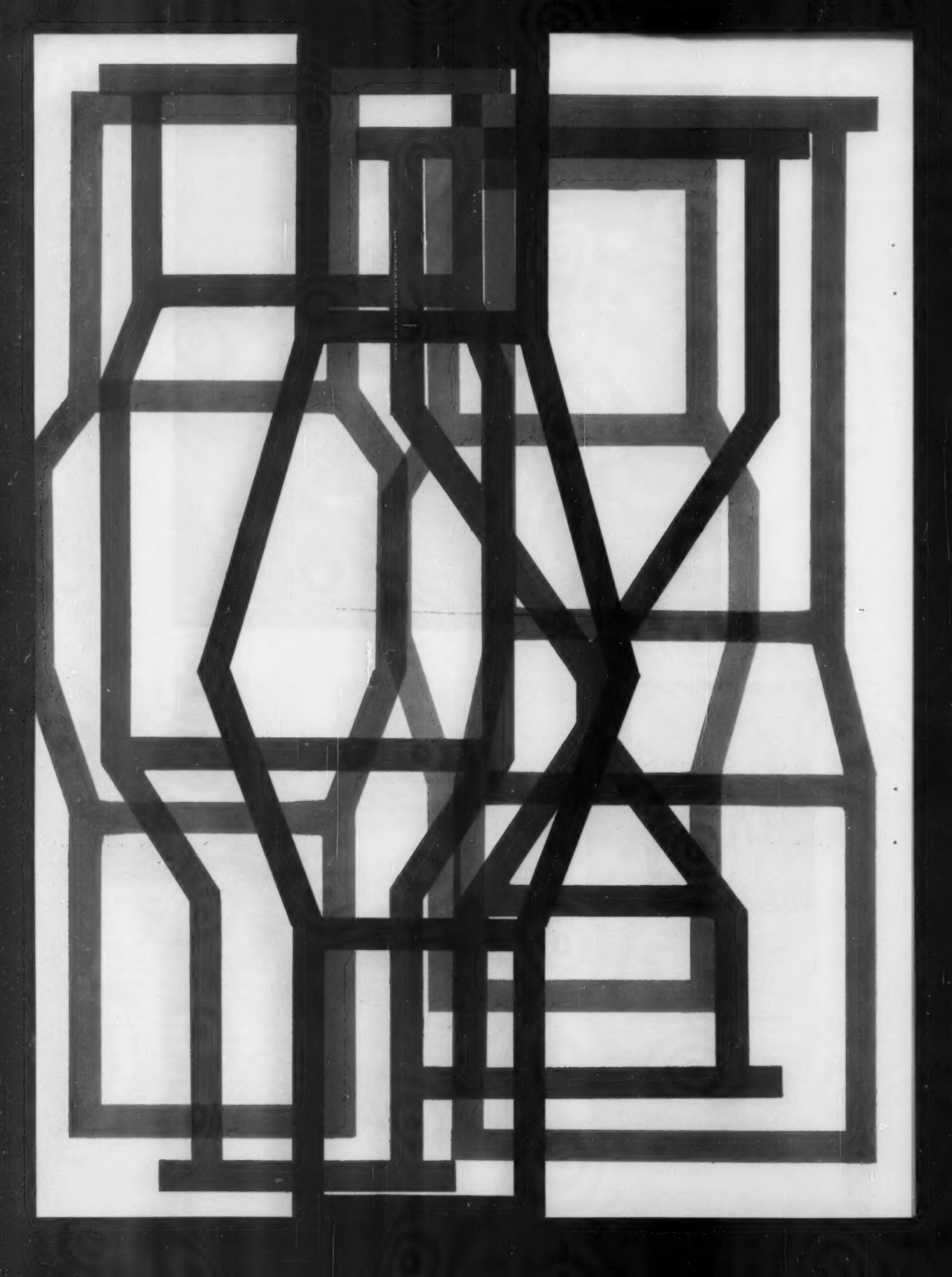


5

6



7



WILL DAVID BEAT GOLIATH?

There is no question that the success of imported cars in this country has shaped the current American automotive product. Fossilized ideas on the nature of the market have been shattered by forces too strong to ignore or deflect. Although the imports found no clientele in the classes already occupied by U. S. cars (no large European sedans, for instance, have enjoyed substantial sales volume in this country), European cars did find, and fill, empty slots—classes long ignored or never imagined by Detroit. Americans were eager to buy true economy cars, pure sports cars, logical utility cars, and small luxury cars. The new cars from Detroit this year were designed to compete in the last three of these classes, and generally they compare very well with their European counterparts. No U. S. manufacturer has yet been willing to challenge the small economy imports, but there is no reason to believe that they can't or won't.

Accompanying the acceptance of new classes by Detroit is a radical rearrangement of the old ones. Dodge and Mercury models are in direct price-tag for price-tag competition with Fords, Chevrolets and Plymouths, with identical size and performance. And all five are hard-pressed on the new market. They are undercut in price by utility compacts, outdone in sheer luxury by the more expensive compacts. Middle-price cars face similar problems, and most makes protect their market positions by offering compacts under the same make-name.

One consequence of the introduction of so many new cars is that the number of distinct, individual models being offered is at a post-war peak. Without considering the various body styles or price-series, there are 32 models to date, with the probability of several more to follow during the current model year. With so many separate designs required, Detroit stylists have begun seriously to search for new forms. The essential box shape of the new utility buses, for example, does not allow the use of fins, a long hood or deep sheet metal reliefs, and the cost restrictions on basic compacts also exercise a check on styling exuberance.

One aspect of the search for a new line which should be of concern to every designer is the impending debasement of the respected and once useful design term, *classic*. In one case American Motors had no money to spend on restyling the standard Rambler. Their solution: leave the car alone, but call it "Classic." Ironically, the word is rendered in tasteless script and applied in chrome to the fender of each car. This may be just an amusing conceit, but another case of misuse may be more serious. Chrysler Corporation stylists apparently ran out of ideas, not money. A fortune has been spent to bring back from appropriate oblivion some characteristic features of old cars: separate headlamps, separate tail-lights and (simulated) visible spare tires. This, they have proudly announced, is Classic Design.

Classic or not, there is still too much effort devoted to pure styling, not enough to rigorous, thoughtful *design*, with the result that each year there is less to say about the new cars that has not been said many times already. Styling considerations still take precedence over safety, although more and more safety researchers are taking the point of view that while inferior drivers may cause accidents, it is inferior car design that is responsible for the severe results, in human terms, of so many accidents. There have been improvements, but there are still no specific safety provisions for children in any car.

Now that the automobile industry has been forced to compete in areas long left unexplored, perhaps the same pressures can also force an acceptance of design instead of style. At least a few cars this year offer hope. The Chevrolet and Ford buses break new ground in the U. S. The Pontiac Tempest was the star of last month's *Salon de l' Auto* in Paris, appealing with its simplicity to a sophisticated audience. New kinds of cars are still needed, but judging from the activity it may not take long for the needs to be filled.

The compacts, biggest news in the 1961 *cars, may also grab the larger share of the market* BY ROBERT CUMBERFORD

Left: an interpretation of car frames, a vanishing breed in America.

Dodge Dart *Dart is really a Plymouth in a Hallowe'en mask. It is gaudy, and not at all neat.*

Chevrolet *Subdued in surface and reduced in size, the 1961 Chevrolet is far more sensible than previous models. Thoughtful change in chassis allows a larger trunk. Gas tank and spare wheel are over axle.*

Mercury *Mercury is smaller and simpler than it has been in years. Use of the Ford body shell is a sound and successful practice.*

Plymouth *The Plymouth consumes more space than it can utilize. Sheet metal undercuts add bulk, reduce useful volume of the trunk.*

Ford *Sobriety of form and reduced size give 1961 Fords a pleasing aspect. Expensive models suffer from excessive chrome trim.*

Popular standard class: The cars in this class are "standard" in every way to the average American. These are the cars by which he judges all others: in price, in size, in performance. They are the inheritors of the former "low-priced three," and in some ways (excluding price) might still be so considered, since the Dodge Dart is Plymouth-based, and the Mercury is Ford-based. A minimum of 50 per cent of all 1961 American cars will be from this class. An enormous range of options for all five makes it possible to produce a near-infinite number of cars without making two alike. All five makes are available with six or eight cylinder engines, manual or automatic transmissions. And of the five, only the Chevrolet, with its rearranged and roomier rear compartment, departs from the conventional package layout.

Pontiac *Emphasis is on length, apparent and real; exaggerated rear overhang is the penalty.*

Chrysler *An after-image of the Fifties, the 1961 Chrysler retains a long hood, huge fins and massive bumpers. Yet it is supposed to be an everyday car. Not this year.*

Buick *The profile of the 1961 Buick is particularly good, though the aggressive points at both ends are a little frightening. The restrained side trim is noteworthy, and the coupe top is an outstanding one.*

Rambler Ambassador *Heavily restyled, the Rambler Ambassador is neither contemporary nor attractive.*

De Soto *1961 may be the last year of De Soto's life. Sales are low, and the styling of this car is not likely to increase them. The impression of heaviness is oppressive.*

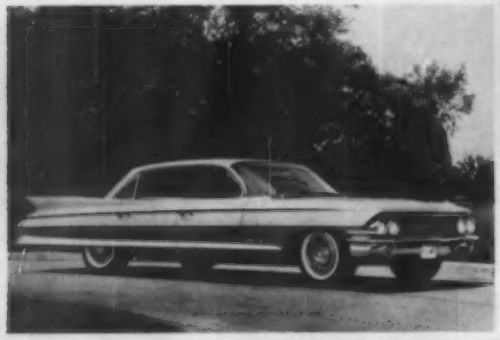
Dodge Polara *What not to do till the designer comes.*

Oldsmobile *The sloping tail contraverts the theory of fins, gives a long look. The deck is clean, but too much chrome below it eliminates any possibility of real elegance.*

Medium-priced class: Cars in this class are fighting hard for survival. They are squeezed from all sides, by the popular standard cars, by the luxury compacts, even by the prestige cars. Last year the Edsel disappeared from the group, but it will not have been the last to do so. General Motors cars have an edge on competition, because they span the price range of the whole class, and because they enjoy a good reputation with previous owners. Every name in this class, except De Soto and Chrysler, is represented by an alter ego compact, a hedge against the inevitable demise of the over-large car.

Imperial *Because its lamps are separate from the body surface, the Imperial is called a classic design. It is not.*

Cadillac *Still the strongest proponent of fins, Cadillac offers them in reduced size this year. The rear seems to owe something to earlier Lincolns.*



Lincoln Continental *Impressively reduced in overall dimension, the Lincoln enjoys a distinguished profile, but the front end is disconcerting. A more restrained grille would help its dignity.*

Luxury-prestige class: There are only three members in this exclusive club. The idea that great size is a necessary concomitant to luxury is on the wane. A noteworthy example is the Lincoln Continental, which is 14 inches shorter than its predecessor. Even Cadillac is rumored to have a new "compact" ready to be introduced in the near future. It may be, however, that these changes in size are intended more to stimulate new interest in the luxury class than to effect real improvements. New techniques are undercutting many of the advantages of these cars; and many small cars equal their performance.

Corvair *The new Lakewood wagon is intriguing in layout. The engine uses space most wagons waste, and the entire length of the vehicle is available for carrying loads.*

Plymouth Valiant *For 1961 Valiant has a new hard-top coupe. Revised trim is clumsy and disorganized.*

Ford Falcon *Little changed, nicely done, the Falcon is unexciting, even bland. It has tremendous appeal to a large segment of the public, perhaps because it is so inoffensive.*

Rambler American *In view of pious pronouncements on excessive styling by American Motors officials, the new skin for the Rambler American indicates that the truths about design which were heard from AMC were only advertising ploys, commitments not to be honored when it was financially possible to get back into "the styling race."*

Studebaker Lark *The new squared roof is an apt change; dual lamps and new side trim are not.*

Pontiac Tempest *The Tempest is the most interesting car this year. It is mechanically sophisticated, simple and robust. The four-cylinder engine puts it in the utility class, although it is not small. With the optional aluminum Buick V-8 it is a luxury compact.*

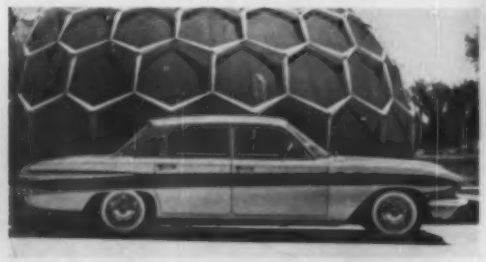
Family/utility compact class: These are the cars that ought to be standard. They are modest in size and power, and if they are not modest in price or styling, they should be. Cars in this class should not have to bear the burden of signifying status. They should, in fact, be intended for ordinary, unglamorous day-to-day transport, and be designed to show that intention. The two most successful cars in this class in 1960, the Falcon and the American, were conventional and unassertive almost to the point of being anonymous. For 1961 the American has been restyled (and overstyled, in the big-car manner), but the almost unaltered Falcon remains a sound example of the basic U. S. car. Interesting mechanically, the Corvair sedan lacks room. The new Tempest 4, which shares the Corvair body structure, should have really impressive performance, but again there is the handicap of skimpy interior space, despite a long wheelbase. The Lark is not as easy to drive as others in the class. The Valiant is roomy and has good performance, but is expensive, and heavy.

Oldsmobile F-85 *Hood and fenders of the F-85 are modeled carefully. Forms are subtle and precise. The upper structure of this body is good.*

Studebaker Lark Cruiser *Luxury Lark is built on station wagon chassis with 113-inch wheelbase. It is still a very compact car, shorter than the Corvair sedan.*

Rambler Classic *What's in a name?*

Buick Special *The Special is most elaborate of the compacts, and closest to its parent line in styling. The side surface is complicated.*

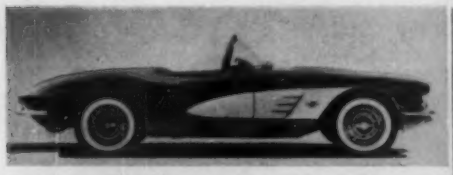


Dodge Lancer *Structure and mechanism of the Lancer is identical to the Valiant. Grille design is similar to the 1960 Pontiac. Result: most aggressive-looking luxury compact.*

Comet *Conventional restyling of the basic Falcon structure turns it into the Comet. A longer wheelbase and a Thunderbird roof are prestige features which give luxury.*

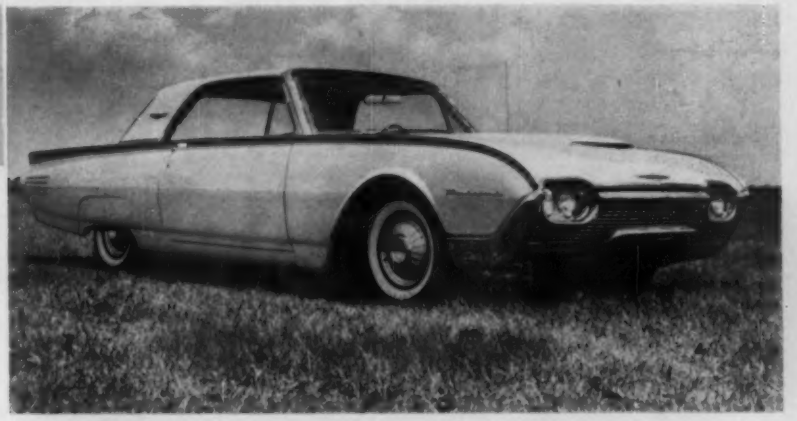
Luxury compact class: These cars are often referred to as "second generation compacts." They might be more accurately assessed if they were considered as realistic versions of middle-price dream cars. In size, the luxury compacts are close to the dimensions of the 1949 models which carried the same make-names. All these cars share major components with other models from the parent corporation. Thus the Oldsmobile F-85, the Buick Special and the Pontiac Tempest V-8 share the Corvair's body shell, and all three use the same basic engine. Similar relationships exist for the other cars in this class, although the Rambler Classic shares its body shell with a larger, non-compact car. The luxury compacts may be even more important than the utility compacts in changing automotive tastes in the U. S., since they will reach more influential people. Also, their buyers will exercise real freedom of choice; they could have a larger car for the same price.

Grand touring class: The Italian phrase *gran turismo*—grand touring—has gained currency as a descriptive term for automobiles which are neither racing cars nor touring cars, but which combine some attributes of both. Oldest U. S. car in the group, the Chevrolet Corvette has slowly evolved from a pretty but rather useless "dream car" into one of the ten fastest production cars in the world, widely respected as a road car, and feared as a racing competitor. The Thunderbird has changed character completely since the first two-seater was offered, but it remains the most sought high-prestige model in America. Chevrolet's Corvair Monza is closest to the European conception of a GT car. It is adequate for four people, but luxurious for two. It is small enough to be handled easily, but can make long trips at accelerated tempo. Already it is the most popular Corvair model, which may influence other compact-makers to adapt their cars to this special market.



Corvette *The Corvette is in its ninth year, a car fully matured mechanically, adolescent in styling. The new rear sets a standard the older portions of the car cannot meet. Each part has been restyled at a different time, and the whole lacks unity.*

Corvair Monza *Monza Grand Touring is refined in minor details. Notice that the exhaust pipe no longer protrudes through the rear grille.*

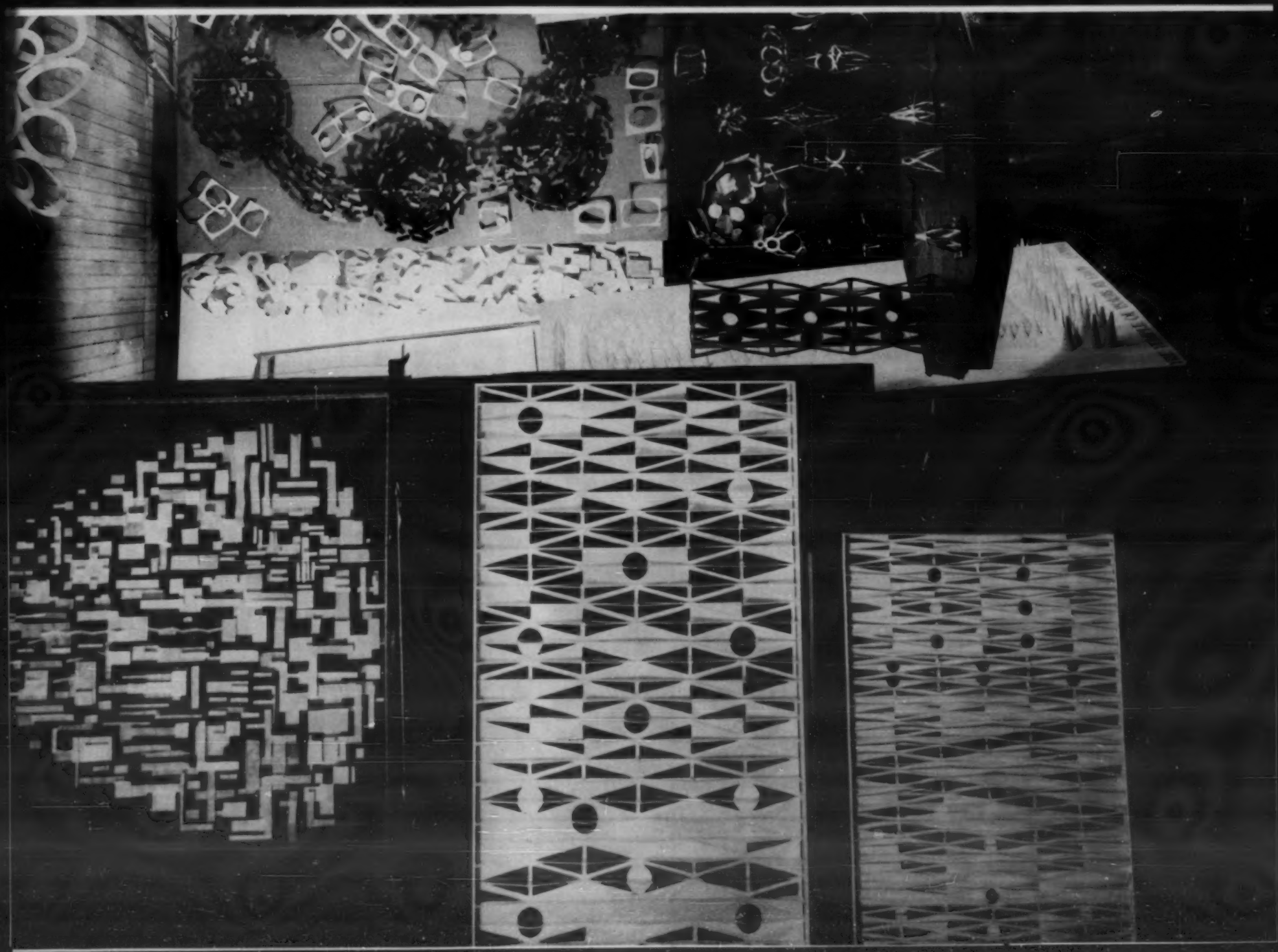


Ford Thunderbird *Radical lines and proportions make the Thunderbird 1961's wildest design. It surely heralds the future front-wheel-drive designs from Ford Motor Company.*

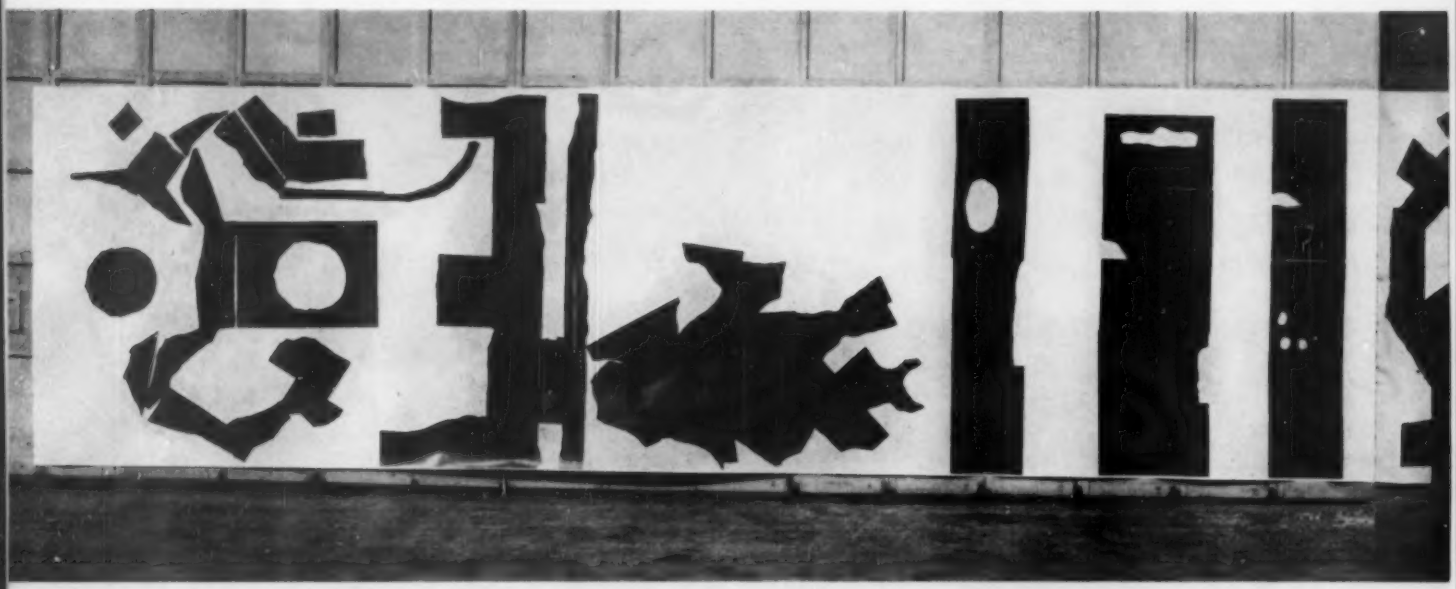
Ford Econoline Station Bus *Built on a 90-inch wheelbase—four and a half inches shorter than the Volkswagen Microbus, far shorter than any other American car—the Econoline Station Bus is still capable of carrying eleven passengers on four rows of seats: sound design. Appearance is unexciting, but functional.*

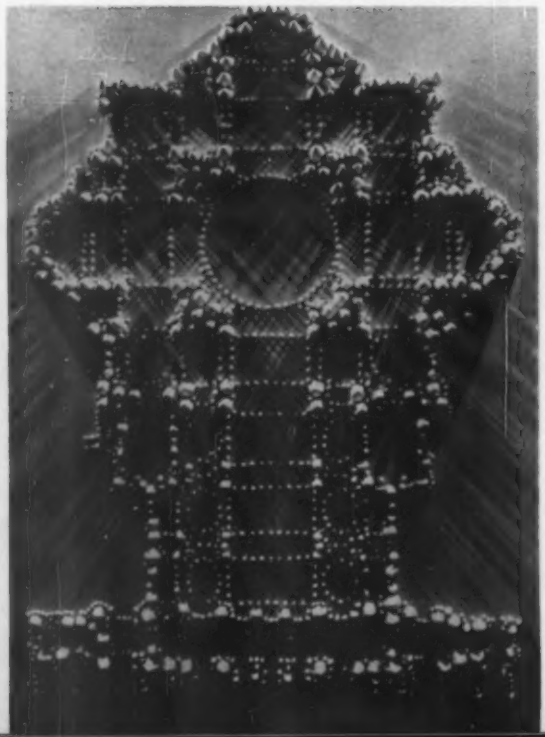
Chevrolet Corvair 95 Greenbriar *One of the best of the new breed of American cars, the box-like Corvair 95 combines virtues of the Volkswagen Microbus with robust mechanism. The handsome profile is badly served by the sculptured band around the middle, placed there in an unnecessary attempt to cut visual height.*

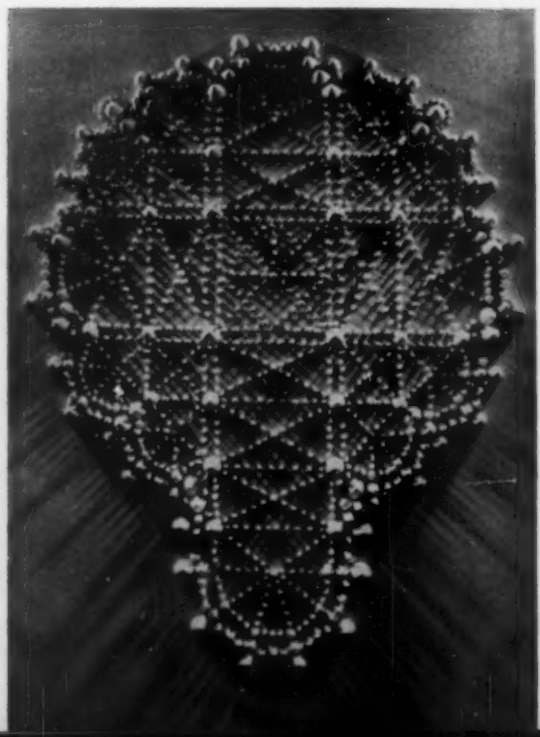
Special purpose utility class: The logical Volkswagen Microbus has been a familiar part of the American scene for seven years. Its adaptability to dozens of jobs that no U. S.-built vehicle could perform adequately overcame the prejudice against foreign products. It is not surprising that two American manufacturers are offering new cars to compete with the VW; what is remarkable is that they have waited so long to meet such an obvious need. The Corvair 95 is a worthy competitor for the VW. It shares with the German car the attributes of all-independent suspension, low loading floor, air-cooled engine located out of the way of cargo. Even the wheelbase dimension is the same, 95 inches. Ford's Econoline Station Bus, despite more workmanlike appearance, is handicapped because it does not follow Volkswagen's example. It has a high floor because of the driveshaft from the front engine; there is a large "doghouse" for engine and radiator between the front seats, and the suspension is old-fashioned beam-axle-with-cart-springs. There may be still more designs in this class.

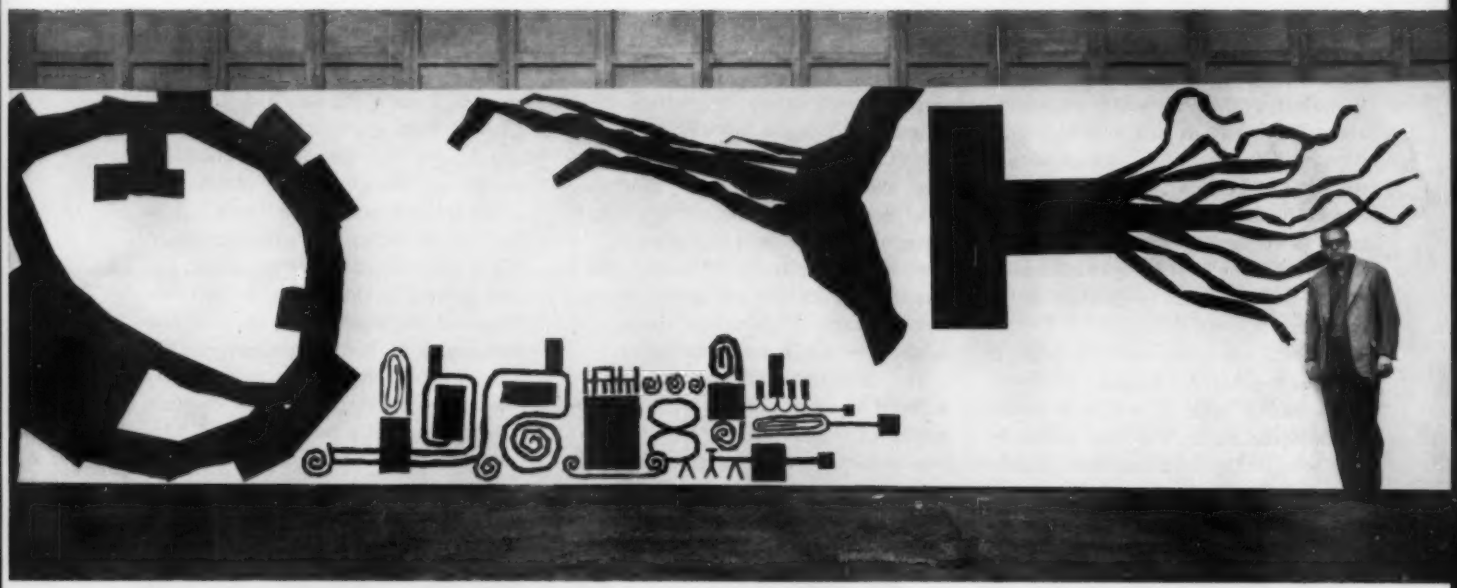


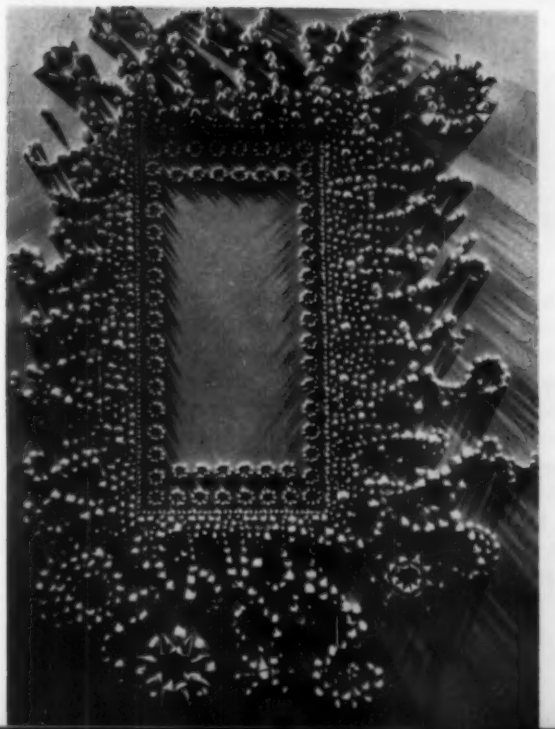
The man among the **Architectural lacework** *on the preceding page is Sam Gallo, a part-time sculptor whose work appears, as fast as it is finished in the window displays of Bonwit Teller, a New York specialty shop. After its tour of duty in Bonwit's windows, the work winds up in Mr. Gallo's garage-studio, where the photographs shown here were taken. Most of the compositions are of paper, exploited for its fragility: the chrysanthemum construction to Mr. Gallo's right (preceding page) is of colored papers resting on a network of thread strung over the peaks of cone-shaped paper cups. The same cups are also the molds for the plaster architectural reliefs (below), and even the larger panels of sheet brass or Plexiglas begin as paper cartoons.*











Above, collage of black and white paper, 60 feet long; below, St. Peter's in Rome, Liebfrauenkirche in Trier, Germany, and the Parthenon, in plan, in plaster cones.

Two inventors, *both single-minded fighters for function before form, illustrate in their own careers the obstacles that lie in the path of the true discoverer, show some ways of overcoming the obstacles, and suggest that invention is the (sometimes unloved) mother of design. Beginning here, Dr. Peter Schlumbohm; on page 76, Alan Murray.*

Dr. Peter Schlumbohm wins prizes for his designs, but he is likely to snort indignantly at the notion that he is a designer. "Inventors are original, noncompromising pioneers; designers are parasitic politicians," said one of his recent manifestoes, and, as he makes clear in the article which follows, Dr. Schlumbohm believes that design should be simply the by-product of the inventive process.

His own most famous by-product is the much-honored Chemex, an hourglass-shaped flask in which is made, its devotees claim, the best coffee in the world. Dr. Schlumbohm claims more than that. "Unfiltered coffee goes flat. Unfiltered coffee is unhealthy!" proclaims the brochure that accompanies every Chemex. Dr. Schlumbohm writes all his own promotional material, and the brochure provides a sample of his distinctive prose style—a combination of zeal, plain speaking, and laboratory facts: "To realize the importance of perfect filtration one must first understand what coffee is. The ground coffee contains only two desirable components: aromatic coffee oils and caffeine. The rest is a vile mixture of some 50 different chemicals, including such skunky stuff as mercaptan. WHY IS BOILING WATER BAD FOR MAKING COFFEE? Because it releases the coffee fats. Coffee fats are disgusting even before turning rancid. Their waxy substance just seems to seal your taste buds."

Sales of the Chemex provide the necessary support for Dr. Schlumbohm's other inventions: the Teamex teamaker, the Ohmlette electric kettle, the Tellid frying-pan lid—"products for the Chemist's Kitchen"—and a number of non-kitchen products: the Filterjet fan and the Phlebette apparatus for holding a cut potato against the jugular vein, thus improving blood circulation. None of these can be bought in stores, however. Since they are not yet commercially profitable, Dr. Schlumbohm prefers to reserve them as "Consumer's Rewards." A coupon on the box of Chemex filterpapers entitles the purchaser to send for "many startling products, too high-brow for mass distribution."

Dr. Schlumbohm first established himself as an inventor when it became apparent that he would have to leave his university laboratory and earn a living. After the first world war, he had refused to enter his father's chemical plant, resigning his share in the family estate on the condition that he should receive an allowance as long as his education continued. He reasoned that one's education is never complete, but the lawyers for his father's estate felt otherwise, and when he made the mistake of accepting a doctoral degree in chemistry at the University of Berlin, they terminated the allowance. Thirty days elapsed between notification and termination, and in this time Dr. Schlumbohm became an inventor. His student lodgings had contained no provision for refrigeration, and he had been cooling bottles with chemical salts. His formula, he discovered, had commercial applications, and for the next few years, his inventing took place mostly in the field of refrigeration.

Dr. Schlumbohm feels that only the inventor can nurture the new product with the unselfish love that will bring it to maturity, and it was his refusal to give up control over one of his refrigeration patents that forced him into the Chemex, as an emergency measure to raise enough cash to tide him over. By that time he was settled in the United States, and the first Chemex factory, which is the present one too, was one floor of a loft building on Murray Street in lower Manhattan.

He now occupies three floors, but he has no intention of growing more. When your company grows too big, you lose control to the banks, he believes. To avoid the slightest shadow of economic domination, he has never taken a bank loan, and bills are paid the day they are received. (He proudly displays a tattered manila folder marked "Accounts Payable"; it is empty.)

His factory is actually an assembly plant, where ten girls, sitting on benches at long wooden tables, unpack the glass decanters as they arrive from Corning, inspect them, wash them, add the wooden handles, and repack them. At lunchtime, they spread a checkered tablecloth, brew a pot of Chemex coffee, and eat the lunches they have brought from home. The walls are adorned with framed mottoes; many of them from the doctor's own sayings. For example:

Progress is
the inventor's battle
with the Experts
with Mrs. Jones
and with the
Chiselers . . .

Invention itself is a battle for Dr. Schlumbohm: against big business, stupidity, and pirates; and it is a battle which he fights single-handedly, without the aid of lawyers, public relations experts, or management consultants. Fortunately, he is willing to share with other inventors the cunning he has acquired through trial and error; and the article that follows is a distillation of his own experience.

BY DR. PETER SCHLUMBOHM

The business of invention

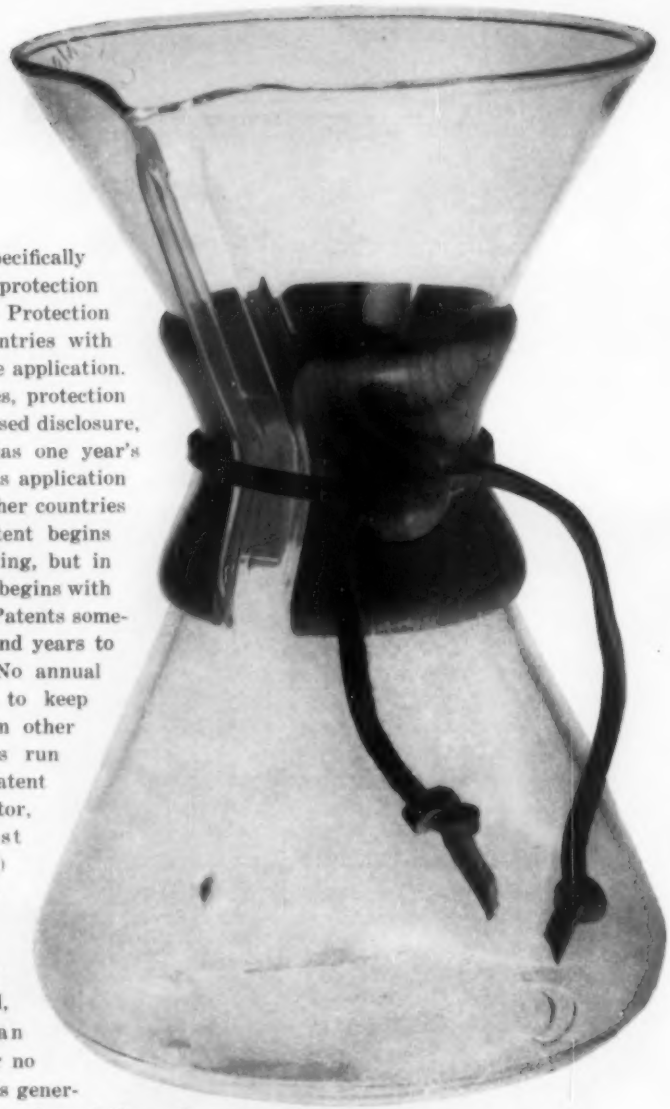
Dr. Peter Schlumbohm

The boundary line for product design is the borderline between the virility of invention and the femininity of fashion. On the territory of invention, congruent with invention, design is safe and beyond dispute. When design trespasses beyond that border, it becomes swishy and questionable. Design without any bone of invention is just whim and blubber. Design is bound to the track of invention. The conventional interpretation of design and designer implies that there is a choice, and that design can jump that track. Actually, there is no choice. There is only one solution. This is it; period. Eureka!

Invention cannot be improved by "additional" design. Invention can be improved only by additional invention. This, in turn, will automatically produce the improved design. The inventor of the wheel had no choice: he had to leave the rim intact and arrange the spokes symmetrically. The inventor of the rubber-tire wheel had no choice where to place the rubber tire. What changed the design of the wheel over thousands of years was always additional invention.

The Wright brothers had no choice: the basic invention of pushing wings against the air for a lifting effect dictated the design. Additional inventions like the jet brought along new designs, bound to the new track. Lacking the pressure of new inventions, the design of boats has not changed in a thousand years, until now the hydrafoil dictates a new design. The automobile is a ghastly example of the falsity of claims of "new design" while there had been no additional invention. Now, air-cushion propulsion opens a new track.

The poll "The hundred best designed products of modern times" offers many examples. The optical invention of O. Barnack led inevitably, without choice, to the design of the Leica. (I wish I could translate the German word *zwangslaeufig*.) The inventor of the metal tube chair had no choice, and the Breuer chair became a classic, beyond dispute. Equally, the geodesic dome of Buckminster Fuller is the inevitable form to materialize the inventive concept. In my Chemex coffee-



maker, the "hourglass" contour is dictated by the function. In the catalog I explain this in detail to the user so that he may enjoy the congruency of invention and design. The sieve-pump dictated the tubular design of my Teamex teamaker, in contrast to the squat teapot. My Filterjet fan is another example where a radically new invention leads to a mutation in design which is strictly bound to that invention.

What is "Invention"?

An invention is a new aspect of technical elements in their relation to each other, resulting in a new technical effect. The elements themselves need not be new. (Some patent laws do not concede this point.) Aluminum foil per se was known. But arranging it as a heat-insulating wall, exploiting its heat reflecting effect, was a great invention of Ernst Schmidt.

Milk may come from contented cows; inventions come from discontented individuals, and I emphasize "individuals." Even in a group of co-inventors, there is always one single man who actually had the spark of invention. The great efforts of industry to do "inventing" in assembly line style by large groups are amusingly off the beam. Yet systematic work, scientific knowledge, and mental discipline are required for the single inventor; the journalistic concept of the amateur inventor, who playfully makes an invention and a million dollars, is unreal. Edison's "two per cent inspiration and 98 per cent perspiration" still is true.

The patented invention

In countries where patent applications are examined, a patent testifies that the state did not find any earlier record of that new aspect. As *quid pro quo* for disclosing the invention, the inventor is granted a monopoly for its commercial exploitation for 17 years, a very limited time compared with the 56 years of a copyright. Of all patent laws, the USA law is the best one for the benefit of the inventor. On these points specifically it offers the best protection to the inventor: (1) Protection starts in other countries with the date of filing the application. In the United States, protection starts with a witnessed disclosure, and the inventor has one year's time to work out his application for filing. (2) In other countries the life of the patent begins with the date of filing, but in the United States it begins with the date of issue. (Patents sometimes takes years and years to be granted.) (3) No annual fees are required to keep the patent alive. In other countries such fees run up to $2,000 per patent and kill the inventor, all in the interest to big industry. (4) There is no danger of opposition by big industry prior to the issue of the patent. Abroad, such opposition can harass the inventor no end. (5) USA law is generous concerning the formulation of claims, not making them dependent on one "Main Claim." (6) The inventor can deal directly with the Patent Office; he does not have to employ an attorney.

So, then, here is the patent, and the way is free for an ideal setup. The inventor himself can build the prototype, design it true to its functions, and exclusively manufacture the product, "and the world will beat a path to his doorstep to buy the better mousetrap . . ."

Inventor, designer and manufacturer in one person: this is one sure formula, and probably the simplest formula, for nursing an idea into a well designed product, manufactured with all the loving care which only the inventor will give his invention, like only a mother to her child. Thomas Edison and many other inventors who came both before and after him have applied that exact formula successfully.

But . . .

The formula requires working capital. It is impossible to raise such risk-money without sacrificing control, and this would defeat the purpose. The best way for the inventor is to earn the money himself, with the tools of his trade: his brains and patents. Before becoming a manufacturer of products, the inventor should become a manufacturer of patents and sell his patents, by the dozen.

After all, at face value a patent is a fascinating title, especially in a country which is pointed against monopolies. A patent is transferable and becomes negotiable the day it is allowed. It is transferable internationally—gold is not. It can be split into shares or into many sovereign titles, one for each country of the Patent

Convention. By percentage royalties it is immune against inflation. It commands revenue practically in any currency requested. It truly is a fantastic fact. (I am always prepared to read headlines about its abuse by some Ivar Kreuger scheme.)

Selling patents

Selling your patents is a grotesque business. It is both fun and heartbreak; I could write a book about my experiences. With the sale of the patent, the chances for a design to be congruent with the invention fade away. The inventor is politely dismissed, and he can only shudder later at the sight of the product, which the "business man" has "designed." Approaching a big company, you run straight into two countercurrents. In each Executive's office, there is—aside from the wall-to-wall carpeting — a handwriting on the wall, which reminds him: If I do not make a decision, I cannot make a mistake. Then: NIH . . . Not Invented Here. The director of research is called in. He is on the defensive against this intruder. If he should admire the invention, his boss would say: "I thought we had a Research Department." And then, of course, there is the reflex: "When better automobiles are built, Buick will build them"—and not you outsiders. Such an atmosphere is not fertile. However, I once sold a dozen patents to a large company, at a high price. Unfortunately, the reason for this was that they did *not* intend to use them but were afraid that a competitor might do so.

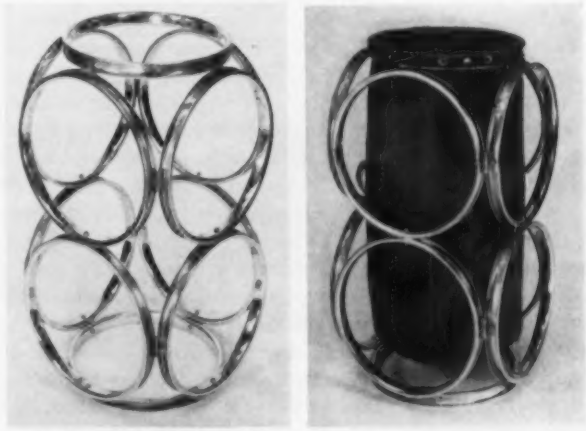
Selling your patents to private investors is easier but equally suffocating to a newborn product. You do not meet the money-man directly; he floats with his specific weight in gold in a different strata. You meet the middleman, who usually is a nobody who has been unsuccessful and now wants to be put up in business. He "knows what the public wants." The inventor to him is a nuisance and is sent away with a check. Within two years the place is bankrupt.

These years of selling your patents just as patents are a terrible waste of inventive brain; but then, caviar and patents show Nature's flair for wasting.

These are the apprentice years, to prove your mettle, to learn the ropes, to realize the Don'ts, to learn how people think and react. ("You must know your enemies," Voltaire said.) They are years in which you master the tough problem: to survive *in spite of* being the fittest.

The main result: you have acquired working capital without losing your sovereignty. A small but very healthy cell of the community is born. The quiet dictatorship of the scientist replaces the dictatorship of the illiterate, cowardly, money-greedy politician-businessman and his crutches: the Whereasses and the advertising-crazy sales-manager. Here is even a pattern for the inevitably growing revolt against the horrible waste of a free economy.

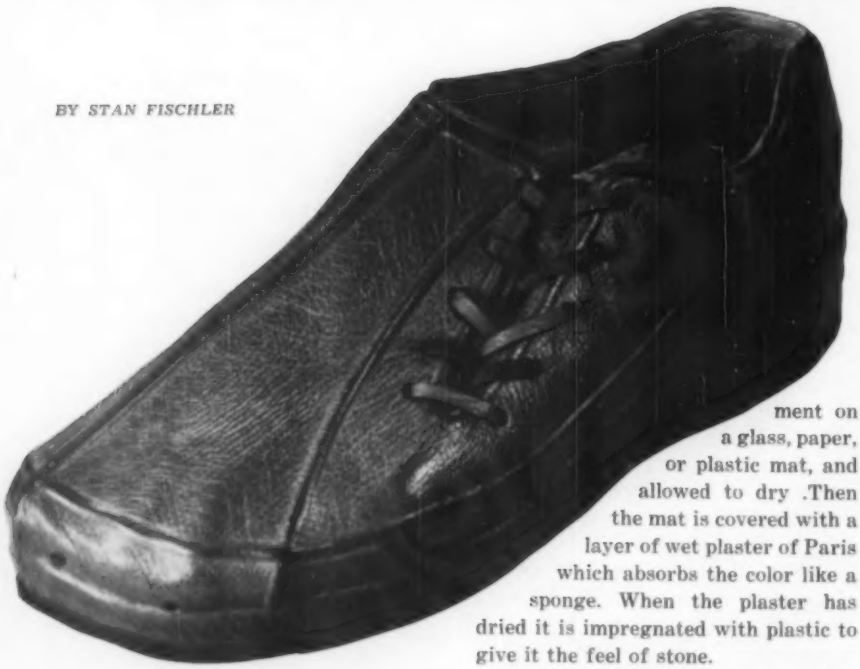
On the other hand, while there is a free economy, here is a real opportunity for any intelligent student of physics and chemistry to make the most of it and we all will benefit from it. There will be more products of good design and there will be more brains at the top.



Rimtect, a structure of bicycle wheel rims joined by angle irons, is intended for various uses: as a supporting frame for house walls, or, as above, for a duffle bag (Schlumbohm has suggested the UN use the latter as a clothes collection depot for overseas aid).

Alan Murray: Inventor in Space

BY STAN FISCHLER



Alan Murray, the apostle of Space philosophy and the inventor of the Space shoe, the Space bicycle and Space suspenders, has just announced the Space Fresco, a product, like several of his other inventions, of his experiments with plaster of Paris. He predicts that it will revolutionize both the art of fresco painting and the wallpaper industry.

The classical method of fresco painting employs pigment mixed with water, or water and lime, and applied to wet lime plaster—a long, expensive process which produces a rich and brilliant color. Murray's Space Fresco is actually a thin layer of plaster impregnated with plastic, which can be applied to any wall in about as long as it takes to affix wallpaper.

Unlike either wallpaper or traditional fresco, however, the color is not limited to the surface but extends through the whole depth of the plaster layer. For this reason, and because the plaster is combined with plastic, Murray believes that he has invented a highly durable wall covering, one that will outlast Michaelangelo's.

Murray is purposely vague about his process, but he will describe the general method: The design is painted in watercolor or other water soluble pigment on a glass, paper, or plastic mat, and allowed to dry .Then the mat is covered with a layer of wet plaster of Paris which absorbs the color like a sponge. When the plaster has dried it is impregnated with plastic to give it the feel of stone.

The color and the plaster are united by a process of crystallization, which, in the traditional method, takes place during the painting process, or immediately after. In Murray's method the crystallization does not take place until the painter completes the design and places the wet plaster on the mat. "The moment of miracle," as Murray calls it, is thus controlled by the artist.

Murray happened upon his Space Fresco technique while he was experimenting with a method for making lighter medical casts. Feeling that ordinary casts used an excessive amount of plaster and were, consequently, too heavy, he worked with plaster of Paris until he could produce an accurate and extremely lightweight reinforced shell of the body. He found, further, that he could duplicate almost anything with plaster: fine lace, or, as in the case of the frescoes, color.

And Murray's interest in the plaster casts was, in turn, an outgrowth of his first and most famous invention: the Space shoe. Variously compared to ducks, little hams, and baseball mitts, the Space shoe is, nevertheless, the only thing that stands between thousands of footsore Americans and immobility. To its inventor, the Space shoe represents Truth, and with the compulsion of an Ancient Mariner, he spreads the news of the truth to anyone who will listen and to some who won't. To those who wear it, the Space shoe represents a level of comfort and pedal well-being beyond their wildest hopes.

For the prospective converts he cannot reach in person, Murray has written a book, *Shoes and Feet to Boot*, which propounds his Space philosophy in 139 pages of small type. The foot is a hydraulic device, he explains: "The foot is a watery, fluent mass. Insert this mass into an arbitrary shape of any order and you unavoidably distort its shape. Now apply hydraulic pressure to the bottom of the foot, and these pressures become, of course, powerful forces for the destruction of the foot, for they force the foot strongly upward against the false, arbitrary shapes."

Murray becomes angry when he thinks of the harm that untruthful shoemaking has done to the feet of mankind. But this is possible only because people are indifferent: "We don't listen to pain." Before the entrance to his office there is a bronze statue of winged Mercury. Murray asks visitors to describe the pedestal, and when they cannot (Mercury's foot is supported by a breath of air from the North Wind) he explains triumphantly that this is because people are so ashamed of what they have done to the human foot they refuse to look at it. They think it is ugly.

They look at it when it's wearing a Space shoe, however, for the shoe resembles no other foot covering in existence. Both exterior and interior attempt to reproduce, in almost exact detail, the wearer's foot. To do this, Murray first takes a plaster cast of the customer's foot. Then, to construct the shoe itself, a lining of monk's cloth is laid over the cast and impregnated with latex. Next comes a layer of leather, also impregnated with latex, and a platform laminated with fabric. Since all the junctions are laminated, stitching and nails are unnecessary. Finally, a sliver of metal is inserted into the heel to discharge static elec-

tricity. (Murray's first rubber shoes burned the foot, and he discovered that this was caused by an accumulation of static electricity generated by the moving body.)

The shoe takes a month to construct, and costs upwards of $75, but its greatest drawback is its appearance, which few but Murray find attractive. Murray says it is beautiful: "I say it's the most beautiful shoe in the world because it bases its esthetics on the truthful shape of the foot." Murray borrowed his ideas for the shoe, he says, from the ancient Greeks. "The Greek as an artist could sense the ideal intentions of the greater artist, Nature. He realized that Nature was not only a great compromiser but also the great perfectionist. The Space shoe is classic because it is based on the simple fact that feet are made potentially perfect." Why not a Greek sandal, then? Because we don't live in a Greek world today, and the flat sandal is obsolete in a world which is paved flat. But, he says, "The Space shoe puts the foot in its own world and provides that it can function within the immediate situation of life today."

Murray feels he has now solved the problem of making the Space shoe beautiful to the eyes of the laity. His solution is a "water shed line", a raised cord of leather running along the top of the shoe from the toe to the top. "Notice," he says, "I didn't make the line perfectly straight. It sways, sometimes to the right, sometimes to the left. I call it the 'water-shed line' because it starts at the big toe, which represents the top of the mountain and, as rain goes down a mountain sometimes one way, sometimes another, so my line waves along with the contour of the foot." As a further concession, he has added a couple of lines curving down the center of the shoe to make the foot seem narrower—"people hate the sight of big feet." He denies, however, that these non-functional elements represents a corruption of his principles: "The lines are like draping. They don't mutilate the Space concept in any way; therefore they are permissible."

Murray has even gone so far as to create the Space sandal to reconcile feminine whims with Space philosophy. In pastels and gold and silver, with a number of openings to give the foot a "daintier appearance," it is, Murray's organ, the *Space News*, announced proudly, "seen dining and dancing in the smartest places." The sandal is faithful to Space despite its fashion, however, since it maintains the covering over the big toe and heel, which keeps the foot from slipping.

Murray with several Space members

Each part of the shoe plays its part in what Murray considers the regeneration of the human foot. The laces, for example, are located on an angle at the side of the shoe instead of in the middle. This is because, as the foot is lifted, its top surface comes in contact with the instep of the shoe, and Murray feared that the laces might exert a distorting pressure on the foot. The U-shaped cut on the edge of the shoe at the heel is to prevent it from cutting into the Achilles' tendon, and to permit the shoe to be built high at both sides. Air holes along the bottom of the shoe provide "pump action"—forcing air out of the shoe as the foot lifts and steps. Finally, the laces are of the same leather as the shoe, adding to the unity of design.

The standard, classical Space shoe is the biggest seller, but Murray has invented a number of variants. One has a buckle instead of the leather laces. Another is the Convertible, which has a top section that can be removed for summer wear. There are the Calypso Cutout, the Athena Cutout, and the Castle Cutout, with perforations in various patterns. He has also created a Space golf shoe, Space tennis and basketball sneakers, a Space ski boot, and—very importantly—a Space ice skate.

It was through skating, in fact, that Murray came to Space. He had been a professional ice skater for twenty years, until, he says, badly designed skates had ruined his feet. (In Murray's view, skatemakers and shoemakers are equally guilty of criminal negligence, although, in softer moments, he concedes that they know not what they do.) He tried a number of corrective shoes, unsuccessfully, and spent a summer working in a shoe factory trying to create his own pair. But the true light came to him at the dentist one day, as he watched a plaster mold being made. False teeth work because

PHOTOGRAPHS OF SCHLUMBOHM AND MURRAY BY MAUDE DORR

they are molded; why not shoes?

Murray gave up skating entirely to devote himself to his quest. In his room in a boarding house on West 34th Street in New York he experimented with a number of ways of taking casts. (The conventional method at that point was a bandage cast, which he found unsatisfactory.) He worked with plastic, wax, and paraffin. At one point, when both his feet were encased in paraffin blocks, he knocked over the pot and started a fire that nearly put an end to Space philosophy.

The casting method he finally evolved employed plaster of Paris, and from his experiments with this Murray produced a molded steel slipper to which he attached a steel blade. The bare foot was inserted into the steel skate, and the result was, Murray insisted in public demonstrations in Madison Square Garden, the most comfortable skating he had ever experienced, although it gave sensitive spectators the shivers.

Murray pressed on in his search for the perfect shoe. At first he thought he could simply build a shoe around the molded steel plate, but he found that this impeded the action of the foot. None of the materials used in conventional shoemaking were suitable for molding, but rubber was. Murray began to experiment with it. He tried a series of rubber molds, like those used in constructing tires, but this was too slow a process. He then tried a combination of rubber and fabric, and, finally, found that latex had the qualities he wanted—"It actually photographed space."

No one shared his enthusiasm for space, however. Neither shoe manufacturers nor podiatrists were interested in his shoe. (Podiatrists continue to oppose him, perhaps because his shoe could make them obsolete. Murray makes absolutely no medical claims for his shoe, however.) One evening, in desperation, he went into a health food restaurant (*Pes Sanus in Corpore Sano*) and offered to trade the proprietor a pair of space shoes for some free meals. Soon the proprietor and his wife and children and 90-year-old grandmother were wearing Space shoes, and the health food clientele were ordering them. Murray expanded first into a shop in Greenwich Village and then to a factory in Bridgeport, where most of the shoes are now made.

His New York office is a building that was once Jay Gould's stable, and that Murray has converted into a combination townhouse, showroom, and ice skating rink. From this headquarters he operates three factories and a hundred outlets scattered throughout the country. At 66, Murray is a prophet who has at last found honor, but the years of struggling to make people look at their feet have left him a compulsive preacher, who fixes his audience with a glittering and hypnotic eye while he asks (rhetorically, of course), "Is it without meaning that there is a phonetically identical word for the sole of the foot and for the soul of man?"

Murray has turned his philosophy of space to other areas. With his wife, a former dancer, he has designed a collection of Space clothes for women. Like the shoes, they follow the contours of the body (a feature that, in this case, will probably not curb their popularity). Murray's Space splints, which led to the invention of the frescoes, are now being tested by three hospitals.

Two other inventions are still in the experimental stage: a Space roller skate and a Space bicycle. The roller skate has hundreds of rubber wrappings twisted around its axles. The strands are arranged in two sets, one pulling forward and one pulling backward. "This produces 1,000 pounds of pressure in the core," Murray explains. "The body hangs on the pressure created by the strands of rubber. They make the skate a sensitive device which takes up vibrations, eliminates noise, and gives the wearer a soft, velvety feeling." The space bicycle, whose wheels have two rims, is

Alan Murray and Space products

designed on much the same principle. Finally, there are Space suspenders, which Murray predicts will entirely replace ordinary belts and suspenders. He will not, however, reveal further details.

Murray's search for a better way, and his struggle with the defenders of the status quo, duplicates the story of most successful inventors. And Murray is a successful inventor. But he prefers to call himself "a good shoemaker." Cobbler, inventor, or designer, he has bet his professional life on the literal belief that form follows function wherever it must go, and that style, or mode," is irrelevant.

Contention in Connecticut

IDI argues the difference

Domey, Christ-Janer, Outhwaite, Parker

Papanek, Katavolos, Caplan, Christ-Janer

A COTTONY FOG lay over Westport, Connecticut, on the morning of October 15, but by afternoon it had burned off and a bright autumn sun sharpened the colors of sea and sky and foliage and the white clapboard clubhouse of the Longshore Country Club. Inside the clubhouse a similar process went on. An audience of designers changed from politely quiescent listeners to excited and sometimes angry participants in the seventh annual symposium of the Southern New England Chapter of the Industrial Designers Institute. The theme to which everyone was asked to address himself was "The Professional Challenge of the Sixties." Surprisingly, almost everyone did. Even more surprising, generalities got reduced to particulars and almost everyone talked to the point of these. The program was under the direction of Ralph Kruck and Joseph Parriott

The first speaker was psychologist Richard G. Domey, research associate in the Department of Industrial Hygiene at Harvard's School of Public Health. He was followed by anthropologist Leonard Outhwaite, credited with the creation of the GI Bill of Rights during his tenure as secretary to the President's Committee on Demobilization of Civilian and Military Personnel. The final speaker of the morning was Miami architect Alfred Browning Parker.

Dr. Domey, perhaps predictably, saw the designer's desire for professionalism as a dilemma. A lot of Dr. Domey's work involves human behavioral studies on vehicle design, and from his brush with industrial designers in this capacity he deduced that they are required on the one hand to deal with function ("admirable"), and on the other to provide "sexed up" sales appeal ("wrap-around windshields look great but create a terrible glare, and everyone knows this could kill someone . . ."). He concluded that designers are the captives of marketing — "'somebody up there' only *pretends* to love you"—and that while professionalism is conceivable, "you have a long row to hoe if you want professional recognition."

Mr. Outhwaite did not think the demands of commerce were the deterrent. Rather, it was just a lack of historical perspective, and time would take care of this, and could even be helped along a little—but there were dangers. "Today, splendid examples of design are all about us, but they are not accepted at their true value because they are not defined in terms of their worth and they are not part of an accepted tradition. It is tradition that gives the patient or client confidence . . . that calls forth the professional practitioner's best and most devoted performance; it is tradition, not law, that sanctifies the relation between doctor and patient, attorney and client. Law can only succeed, and can only establish sound practice where it has a solid foundation of tradition and standards and active experience to back it up."

For Mr. Parker the problem of professionalism for designers could not be divorced from the problem of professionalism for just about all of nuclear age society, and he saw it as a lack of concern for the conservation of values. Literally and figuratively, according to Mr. Parker, we are "throwing beer cans in the bays." One of the chief causes of this undervaluing of values is the "erosion of conformity." "For years we have been concerned with tests . . . to be used by great corporations in picking employees who would make a positive contribution to the group action without causing any trouble or difficulty. Today these very same corporations are screaming for men with ideas, men of individual action, men who are non-conformists in their approach to thinking problems through in a complete manner."

Mr. Parker's fingering of the non-conformist was prophetic of at least one of the panelists that appeared in the afternoon: William Katavolos. Besides Katavolos, who is a teacher at Pratt Institute and Parsons Institute, the panelists were Victor Papanek, associate professor of industrial design at the State University of New York, and ID's editor, Ralph Caplan. The moderator, who did an admirable job of keeping the discussion on course, was architect Victor Christ-Janer. Speaking first, Caplan was sharply critical; he questioned the point of investigating the professional challenge of the '60s, when the major challenges of the '50s had not been met, and he accused all design organizations of regularly "victimizing" guest speakers. "You invite men like Dr. Domey here to tell you in good faith precisely what you have been told before, and what the ASID has been told by Sidney Harris, and the International Design Conference has been told by Dr. Parkinson. You get intelligently scolded once a year, and it's a kind of therapy; now

between being called a professional and behaving like one

IDI officials Franke, Vassos, Miller, Parriott *(see page 20)*

you don't *have* to do anything about it." Caplan thought industrial design could be a business or a profession, and that the real question was no longer how, but which. "Many of you in this audience," he said, "think you want to be professionals, but you don't. What you really want is to be *called* professionals, and to be businessmen. I think that the importance of what you are called is overrated, but I do wish that you would decide unapologetically what your values are. Then your meetings could be devoted either to professional problems or business problems, rather than to this annual search for your soul by innocent visitors who don't know how embarrassed many of you would be if they found it."

Papanek agreed and, as a designer, said at once where he stood: design *should* be a profession. "I am an angry man approaching middle age," said Papanek, "and I have a duty to myself and to the race. We are no longer survival types. We change our environment, and then our environment changes us. We are committed to values." He drew a clear distinction between designing "for all the people" and designing for humanity, and felt there was a great deal too much of the former at the expense of the latter. And he had in mind some specific examples: "Why aren't we designing aids for the handicapped? Teaching aids? Hospital equipment?"

It was Katavolos, however, who really jolted the audience by suggesting not that they weren't professionals, but that they weren't designers, and he did so with such passion and conviction—Christ-Janer called him an evangelist — that he inspired the same sort of immoderate response in the audience. (One designer denounced the whole proceedings: "I am in design to make money . . . to keep my wife and children in gin and sneakers.")

Katavolos's evangelism is for technology. "Architecture ceased being creative with Gothic, everything since then has been 'fluff.' In the world of organic chemistry, of DuPont and Dow, it is nonsense to go on forming things by pressing, stamping, casting, bolting, welding. . . . Science is inevitable. . . . Investigate the *science* of design. . . . The designer should be an engineer with esthetic sensibilities. . . . Instantaneousness is the thing, products formed organically. I want a new car every day, a new chair every time I sit down. I want an instantaneous house, formed from a stream of plastic shot in the air—the mass production of one-of-a-kind. . . . You cannot solve things on the level at which you are now operating. Blast off!"

Someone did: "I'll tell you what you'd have if you shot houses from hoses," said a member of the audience indignantly. "You'd have a mess!" Christ-Janer also disagreed: "If you repudiate structure, if structure becomes a matter of growing molds, how do you *evolve* form? How does man remain a form-giver?"

"Look at the Guggenheim," said Katavolos. "Wright meant it for plastics, but he knew he hadn't time to build it in the right material, so he gave it to us imperfectly rather than not at all—as a parting gesture."

"The Guggenheim was meant to be the ultimate expression of a material—concrete," interrupted Papanek. "It was never conceived, even at its earliest stage, for plastic."

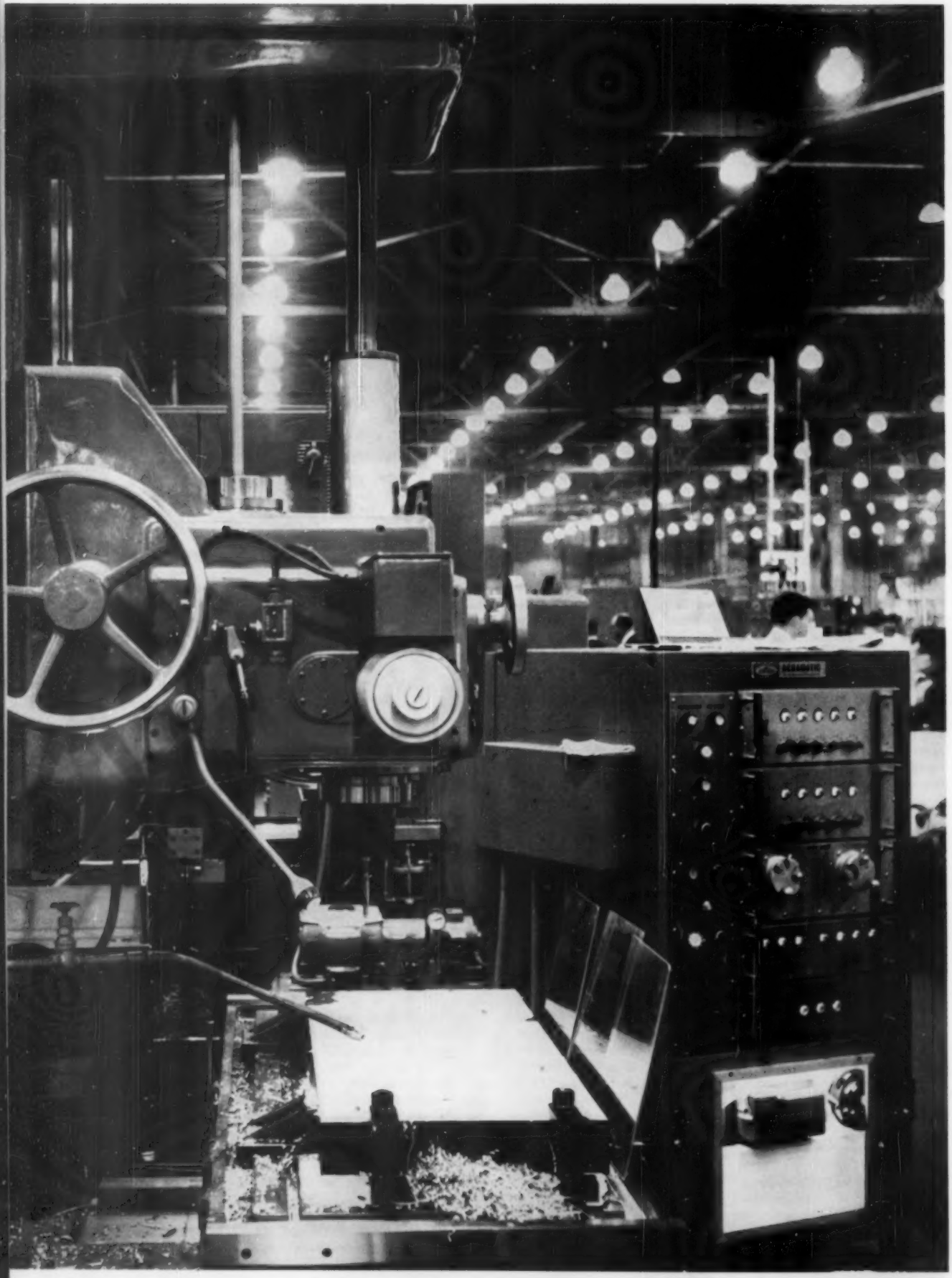
"I am so completely convinced that its pure validity is form," retorted Katavolos, "that, as a matter of fact, I have never even been to the Guggenheim."

Inadvertently Katavolos also triggered the central question of the day — what motivates professionalism? — by observing that the older designers present seemed to have most of the vigor, to be fired with the desire to accomplish something. He was delighted to see it, he said, but somehow it should be vice versa. Christ-Janer wondered why, and kept returning to the question: "What motivated the earlier generation of designers?"

They had better focus, said someone. They were concerned with improving the standard of living, of life, said someone else. And Katavolos once again upset everyone by suggesting that what they had was a sense of urgency, that it was war which had provided it, and that it was war that inevitably liberated technological ideas. "A threat to life always generates life," said Katavolos.

"A sense of urgency could become so great that it would cancel creativity," countered Christ-Janer.

In the end, no one resolved the question. But designer Tom Lamb, who had been repeatedly referred to as an example of a vigorous older designer, came close. Speaking from the floor, Lamb said, "You have to want to give before you get . . . to regard dollars as dividends. What you are is what you reflect; as big as you are, so big will you produce."—*B.D.*



Machine tools make massive debut

Chicago's combined Machine Tool and Production Engineering Shows feature numerically controlled machines which could open a big field for the industrial designer's talents

Chicago's giant Amphitheater, frequent scene of the nation's political conventions, hummed and steamed last month with another kind of action. From September 6 through 16 the energy came from $25 million worth of powerful machine tools representing the National Machine Tool Builder's quinquennial exposition. (The Production Engineering Show operated concurrently from the Navy Pier with a display of such auxiliary equipment as cutting tools, cutting oils, gages, and precision instruments). The Machine Tool Exposition included 132 exhibiting companies while another 132 appeared at the Navy Pier, and visitors had to trek better than 3½ miles of gray-draped aisles to cover both shows. In all, 11,000 products were on display, and more than 125,000 people came to look at them. Indeed, this largest single-industry exposition in the world even produced a Russian spy. Sergei Zhadanov, chief engineer at Russia's U. S. trade mission, Amtorg, got thrown out of town for visiting the shows to collect what the *Chicago Tribune* called "satchels of highly technical data."

For the designer, machine tools have often represented a happy refuge from styling because they usually look ruggedly honest if not "designed." But because designs change so seldom in this field (review expositions occur only every five years partly for the reason that there is little obsolescence), the industry has not used industrial design services as often as might be expected. An even more significant reason for the absence of the designer from this field is that radical innovations, and hence changes in basic machine design concepts, occur rarely: visitors at the Chicago show saw little evidence of much design progress since the previous one. Where design was obvious it was sometimes superficially applied — a jazzed-up nameplate here, a suspicious looking, rocket-fin extrusion there. Nevertheless, this exposition has excited designers — not so much with what it shows as with what it promises. For on display in Chicago for the first time in many years was a truly radical innovation, one that may eventually change the appearance of most machine tools, and ultimately the very manufacturing process itself—*numerical control*. This concept, which could bring designers into machine tool design as nothing has before, substitutes magnetic tapes or punched cards for human control. The exposition featured over 75 ma-

Micromatic Hone's staff-designed machine (above) can hone up to 600 ball bearing raceways an hour. Staff-designed Heald drilling machine (opposite) uses Cincinnati Milling Machine's Acramatic Control by staff designer Norman Doane in cooperation with staff engineers.

Numerically controlled

Although numerically controlled units were the top news at the Machine Tool Exposition, it is clear that many design problems remain to be solved on this type of equipment. One notices, for instance, that the numerical controls governing* LaPointe's *drilling and boring machine (at far right in photo) are designed by another company in another spirit and seemingly attached as an afterthought. Although in itself it has a "designed" look,* Monarch's *new engine lathe (below) does not appear to be integrated with the tape unit which controls it. The same problem comse up again in* R. K. Le Blond's *engine lathe (right). Control panels on* American's *sleek but rugged looking open-side traveling drill (bottom) are placed sensibly high for easy, unobstructed viewing. But the similarity of the buttons and dials used here to those on* Ex-Cell-O's *control panel and on many others at the show indicates that companies are restricted to standard parts, which makes design innovation on control panels difficult.

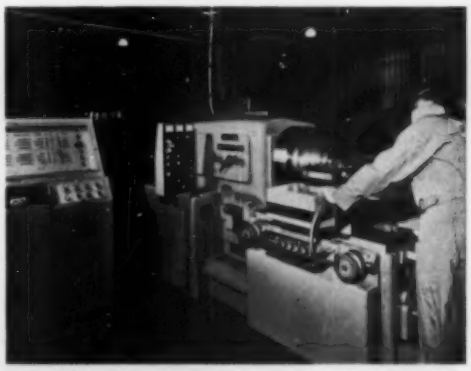
chines using numerical control, and it was clear that many more companies will want to experiment with similar automated systems.

This development makes a strong bid for the industrial designer on several counts. The most obvious of these is that manufacturers investing in an advanced system like numerical control will increasingly want their equipment to *look* advanced too. More important, the increased complexity of numerically controlled machines cries for a designer to simplify the operational complication one suspects, for instance, in LaPointe's drilling and boring machine, opposite. Another problem is that at present most control systems, like Acramatic's (shown on page 82) are produced by one company, the tools themselves by another. In a sense, the designer here faces a situation similar to designing for the motor boat industry, where one company produces hulls and another produces engines. An important part of his job will now be to integrate the machine tool with the separately manufactured machine which runs it. As the photos on this spread indicate, many machine tools need this kind of treatment, a marriage between control device and machine which is expressed in terms of form as well as actual operation.

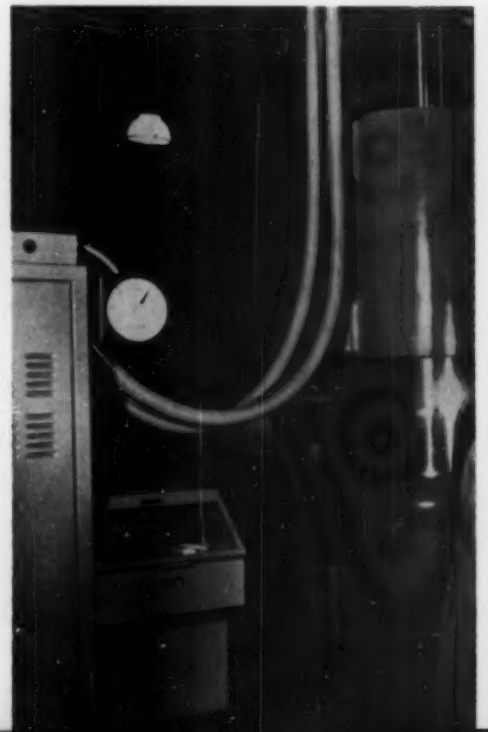
Devices to replace manpower are not new, but the Machine Tool Show featured control devices, akin to those used in guided missiles, which have greater accuracy (some correct tolerances up to one ten-millionth of an inch) than previous systems. Such controls can be set for long or short runs, re-set quickly for other work and returned, as often as needed, to the original job. Unlike conventional forms of automatic control, numerical control does not require cams, templates, or metered hydraulic systems. This means that the machine tool can be shifted quickly from one type of work to another without costly time loss.

The Chicago exposition indicates that numerical control is most advanced in the metal-working industry. It also points toward more use of controlled machines in small plants. Since instructions can be changed simply and quickly, a small shop gains from a numerically controlled machine in terms of the briefer time it must remain idle, and also in the ease in switching from production of one type of item to another. One company, Moog Servocontrols, even advertises an "inexpensive" numerical control system. The $9,000 Moog system is actuated by a punched tape input, but it substitutes the less expensive pneumatic-hydraulic power for the usual electronic source.

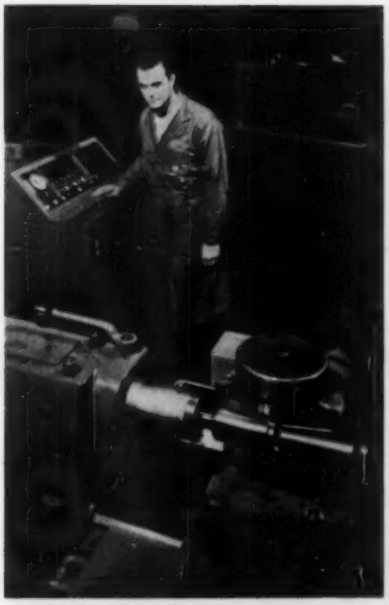
While a year ago numerically controlled machine tools had only one per cent of the market, some exhibitors are predicting that 50 per cent of all machine tool sales will be of this type by 1965. Packed with customers and busy salesmen right down to the last day, the show inspired optimism about the future of a market which has been seriously off for the past few years. The following pages offer a sampling of what visitors saw and case studies of two machines in which industrial design played a significant role.—*A.F.*



Monarch Machine Tool's engine lathe, staff design



LaPointe's drilling and boring machine, designed by staff engineer Abraham Polonsky



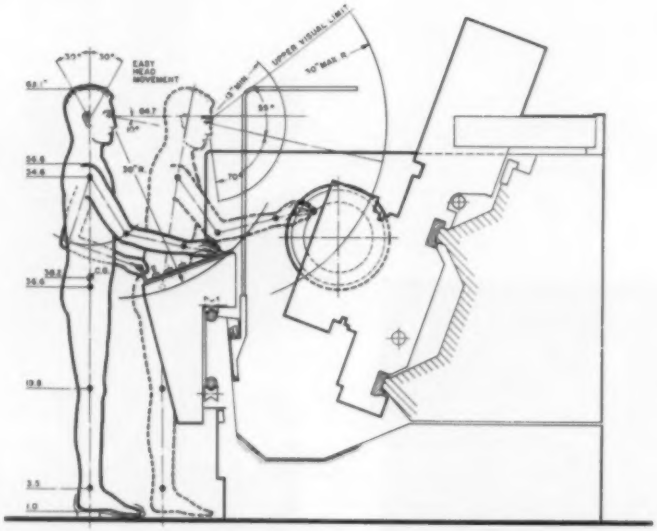
R. K. LeBlond's engine lathe

American Tool Works' openside traveling drill

Ex-Cell-O's contouring machine, designed by staff engineer Harold Seyferth

Case Study I: *Controls united to machine in Warner & Swasey's new turret lathe*

Warner & Swasey's *servofeed turret lathe, the SCA-25, on which* **Henry Dreyfuss** *collaborated, was one of the few machines at the show designed from the outset with the operator in mind. It was also one of the few numerically controlled units for which the manufacturer produced both the controls and the machine itself. In consequence, this machine, unlike most, actually looks and acts like a smoothly operating, integrated unit. Developing a series of such ergonomic charts as the one here, the Dreyfuss organization arranged controls to reduce operator fatigue, and shape- and color-coded them to further facilitate operation. The resulting design provides two control panels: one, at left, governing automatic control, and a mobile one at right, for manual control. Once commands have been set, the operator can close a door over the automatic control panel to prevent any accidental change in the program. One of the most unusual features of the SCA-25 is that its turret, bed, bedways and cross slide all incline 20 degrees from a vertical position (see chart), bringing the object being cut nearer the operator's reach and vision.*



Dreyfuss ergonomic study

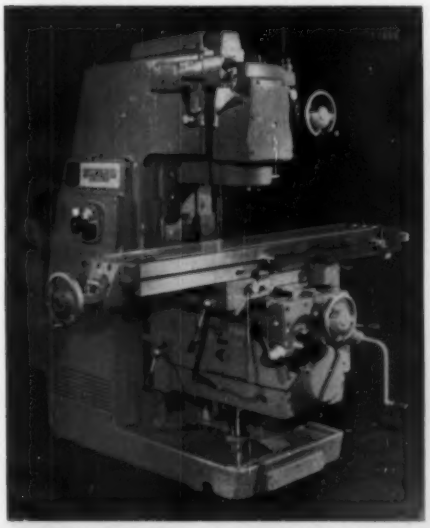
Warner & Swasey servofeed turret lathe (which appears in abstract form on this month's cover).

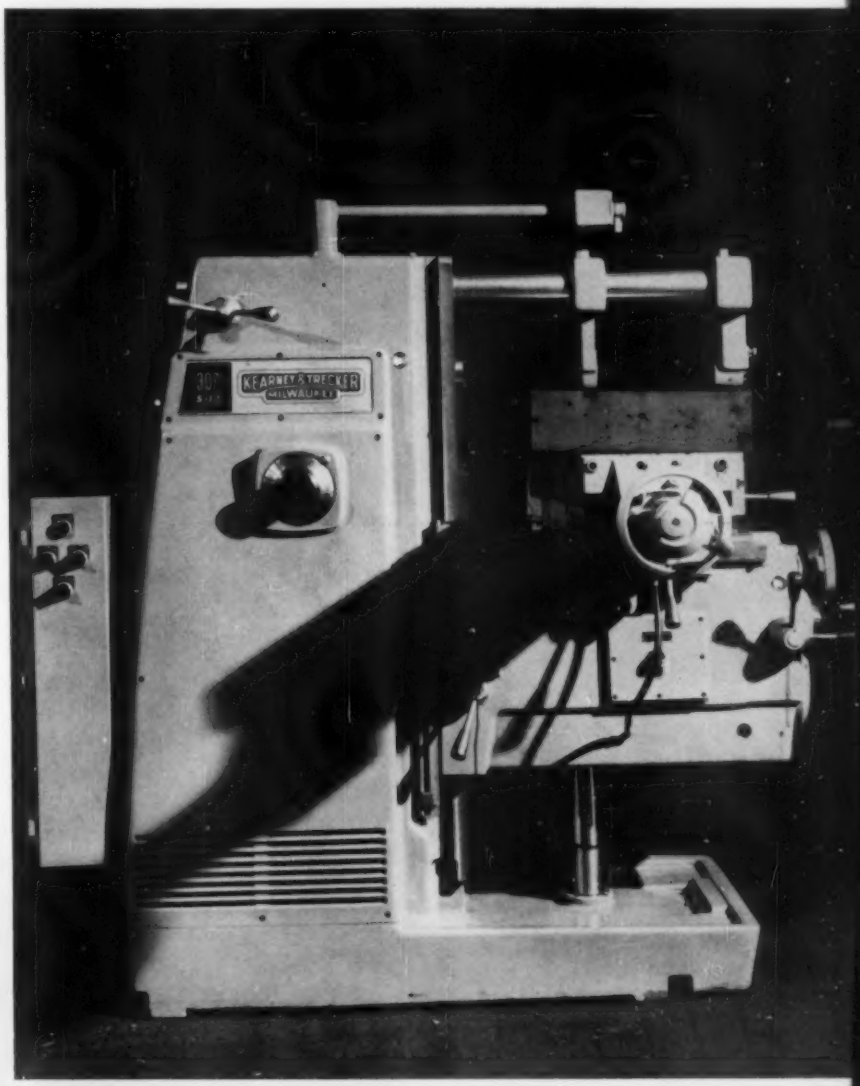
Case Study II: *Milling machines share parts to cut costs, heighten family identity*

When* Kearney & Trecker *invited* Peter Muller-Munk Associates *to consult on the design of a new series of milling machines, engineers were still planning internal mechanisms, and external contours had not yet been resolved. The designers approached the assignment with some definite goals; they wanted to emphasize a sense of orderliness, increase inherent strength without using applied ribs, develop a clean yet still recognizable corporate trademark, and a more symmetrical form, heightening recognition of the machine from either side. Early in the assignment they initiated human engineering studies which resulted in flattened hand wheels (below, far right) to fit the grip of the thumb and finger comfortably, and they added hilts to free-turning crank handles to eliminate the danger of pinched fingers. To make for easier grasping, they also specified large gripping flutes on all speed and feed dial knobs (below, right), and improved legibility by using black filled numbers against a brushed metal background.

Realizing that these machines would have to stand the test of five to ten years' time, PMMA consciously avoided "styling." Visually, the most important innovation was a strong looking, L-shaped column in place of the former soft C column. To economize on production, PMMA adapted handles, cranks, dials, and basic fittings from the vertical machine (below) to the horizontal one (right). Wherever possible they also developed similar surfaces, corner radii and continuity of contour to emphasize family resemblance among all machines.

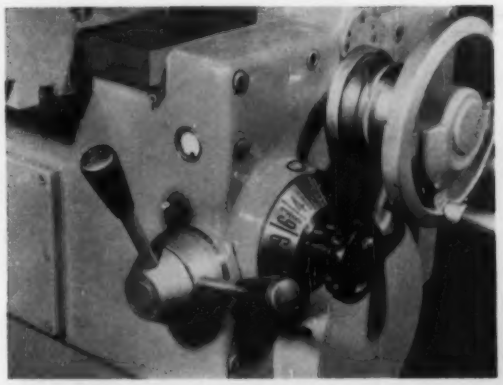
Kearney & Trecker's horizontal milling machine





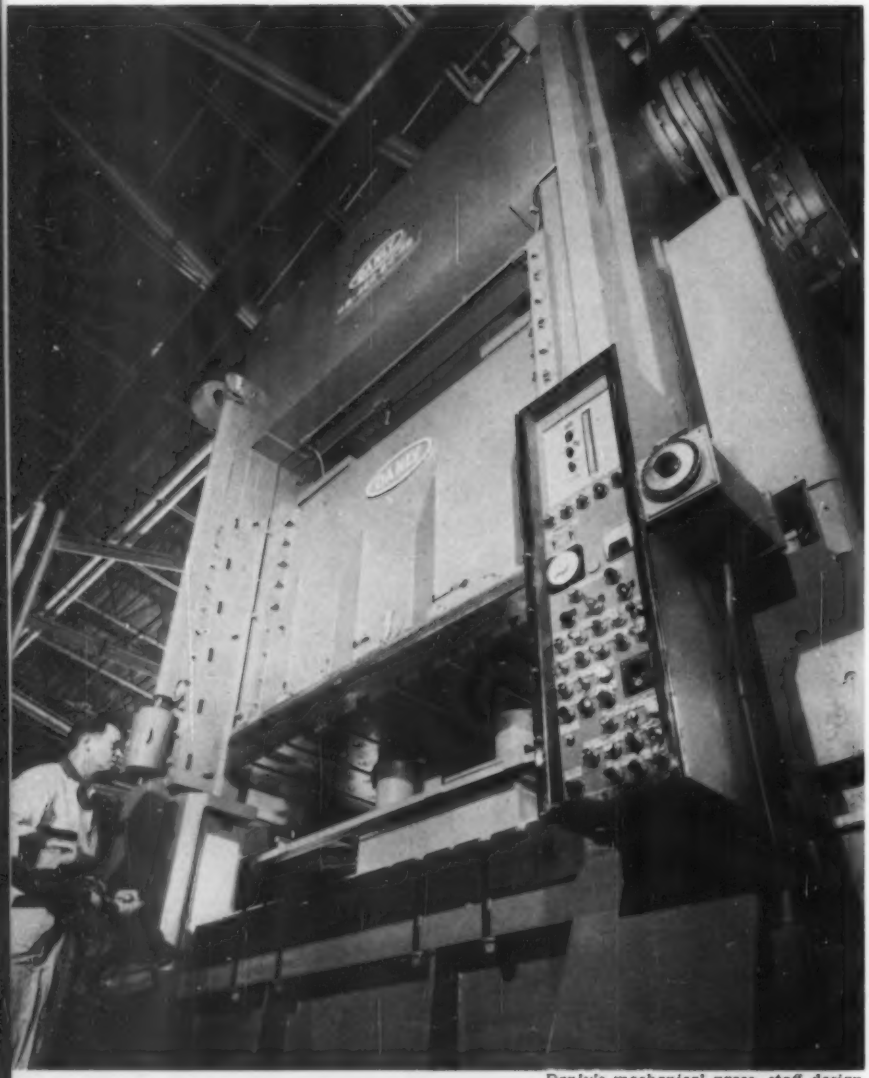
Kearney & Trecker's vertical milling machine

Control details



Electrically controlled machine tools are chiefly the work of staff designers

If numerical control stole the excitement at the show, some of the good looking designs were still to be found among electrically controlled machines. **Cincinnati Shaper's** *gigantic hydraulic press brake (opposite), the biggest machine at the show, is highly successful in terms of the sensible, well balanced organization of its huge masses. A similar sense of tight organization is apparent in* **Danly's** *towering mechanical press (left). This machine's automatic slide positioner, operated from next to its control panel (far right in photo), permits the operator to simply "dial" a desired "shutheight," rather than make the usual complex adjustments.* **Micromatic Hone** *set up one of the longest pieces of equipment at the show, a series of tracks for moving bearing inner race components through successive precision-honing operations. It turns out some 600 pieces per hour. Although controls on* **Thompson Grinder Company's** *electrically powered, high production grinder are set on an awkwardly devised shaft, they* **are** *placed in convenient relationship to operator.*



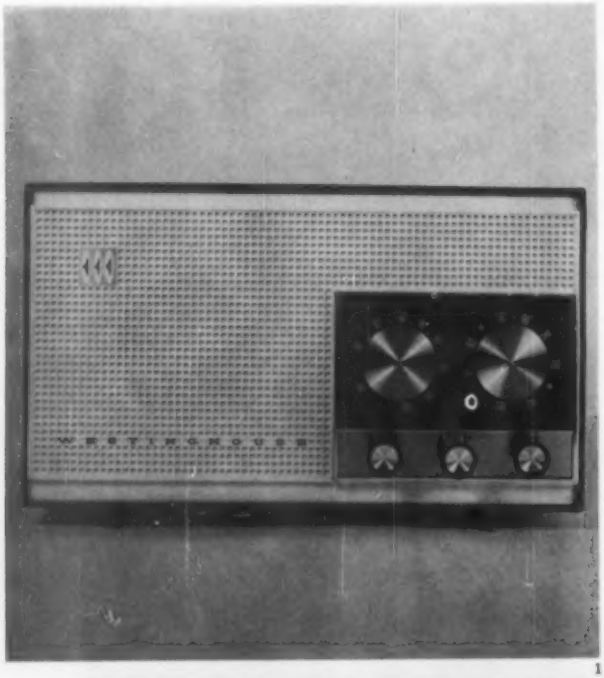
Danly's mechanical press, staff design.

Thompson's grinder, by staff engineer J. C. Wilson and consultant Lee Herndon.

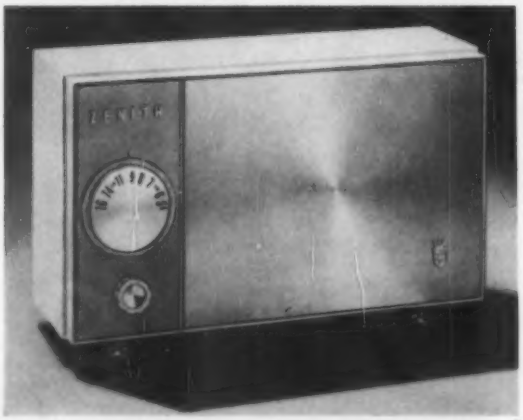
Cincinnati Shaper's press brake, (opposite) by staff director Merrill W. Haelton.

Micromatic Hone's honing machine, staff design.

DESIGN REVIEW: The **Home entertainment** industry seems unconvinced though any market researcher worth his tachistoscope can marshal facts to prove it, that the average consumer's taste is rising. The average radio is a pastiche of mannerisms; designers of tv sets rarely know when to leave well enough (a simple box) alone; and while hi-fi units are a good deal neater, they are not (given the money that is spent on and for them) what they might be. Here is a representative collection, slightly biased in favor of better-than-average examples, of what is currently on the market.



1



2

1. *This* **Westinghouse AM-FM** *radio avoids the salesmanship styling of most table models by relying on refreshing design simplicity. All-purpose polystyrene cabinet and crystal; butyrate dials with aluminum inserts; lithography. Staff design: Seymour Silverman. Bronislaw Zapolski, consultant.* **$59.95.**

2. *Big chunk of perforated aluminum for speaker grille gives* **Zenith Executive** *table radio a rather rough industrial look. Polystyrene cabinet, aluminum feet. Mel Boldt Associates, designers.* **$29.95.**

3. **Olympic** *table model takes dial motif from automobile dashboards (which in turn were taken from airplane cockpits). Staff design: Sidney Rhodes.* **$49.95.**

4. *Peter Quay Yang's transistor* **Columbia AM-FM-SW** *portable rejects plastics for leather-covered wood cabinet, uses stainless steel grille instead of aluminum.* **$99.95.**

5. **RCA's** *table radios this year seems to have been put together by several people in a hurry. This clock-radio uses Cycolac cabinet, stamped aluminum dials, and injection-molded acrylic crystal. Staff design: Bernard A. Grae, manager.* **$67.50.**

6. **Admiral** *transistor radio designed by Lawrence H. Wilson Associates uses oval speaker to get bigger speaker with little change in radio dimensions. But oval accentuation trim seems tacked on as an afterthought in comparison with similar motif worked into design of Westinghouse "Danish" radio shown on opposite page.* **$34.95.**

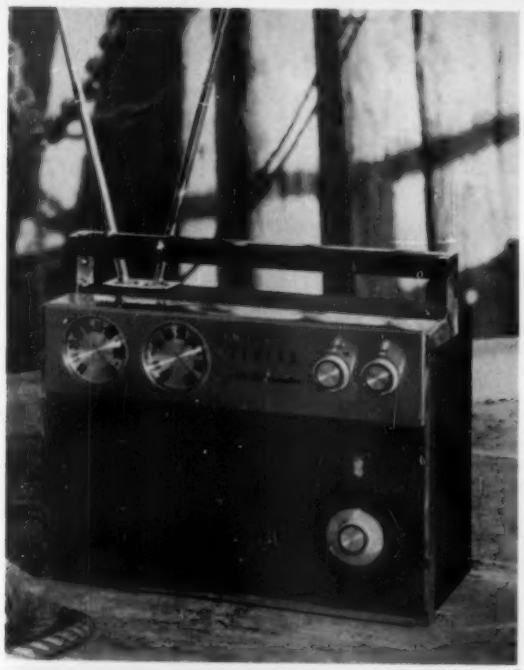
3

4

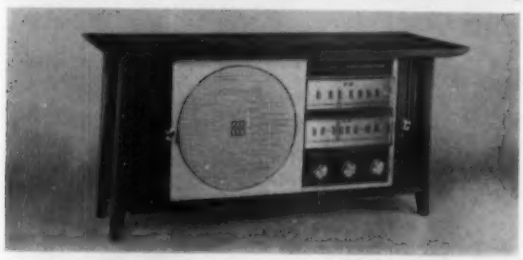
5

6

1



2



3

1. **Philco** *transistor portable achieves a decorative effect with lines and materials (brown-black leather, chrome gold diecast zinc grille) rather than by using attached decorative parts. Staff design: H. V. Gosweiler, Jr.* $59.95.

2. *Zenith's new* **Royal 2000 AM-FM** *portable transistor is a straight-forward, workmanlike piece of design. At a price of* $189.95, *it can afford to be. Vinyl covered aluminum back, metallized acrylic knobs, clear acrylic dial scale. Mel Boldt Associates, designers.*

3. *An adaptation of the "Danish modern" console to table-model dimensions, this* **Westinghouse** *radio encloses an all-purpose polystyrene face with a walnut and walnut-veneer cabinet. Staff design: Seymour Silverman. Bronislaw Zapolski, consultant.* $129.95.

4. *Just because a palm-of-the-hand transistor radio has to be small doesn't mean it can't be brassy. Smallest of the American lot, and a nominee for the brassiest, is* **G.E.'s** *six-transistor, introduced this fall. The case is chrome-plated zinc (with a partial leatherette finish coated with epoxy lacquer); the grille is anodized aluminum; the ring and ring-mounting are in chrome steel; the dial is die-cast zinc with a chrome steel bezel; and the dial face is vacuum-plated bright aluminum. Staff design: William Donnelly.* $39.95.

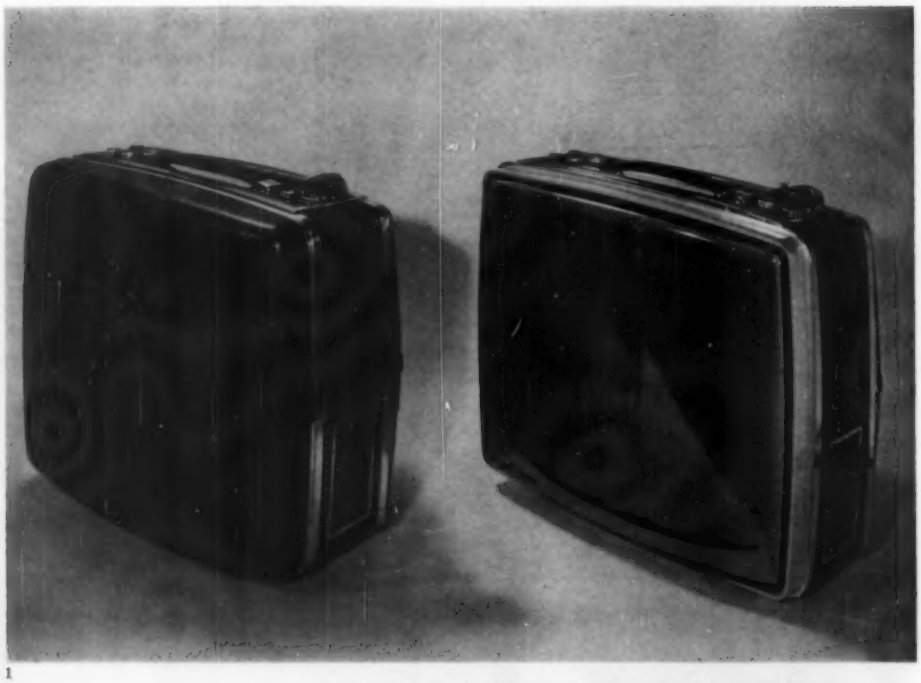
5. **Emerson** *spoils what might have been an unusually simple design with a misplaced knob and an out-worn trademark plate. Forticel cabinet; methyl methacrylate dial crystal; brass-plated steel handle. Staff design: Andrew S. Tanuma. William Macowski and John Mezey, consultants.* $44.00.

6. **Sylvania** *transistor, in common with most of the pocket-size transistors on the market, has a plastic cabinet and a metal grille. Designed by Monte Levin.* $49.95.

4

5

6



1

2

3

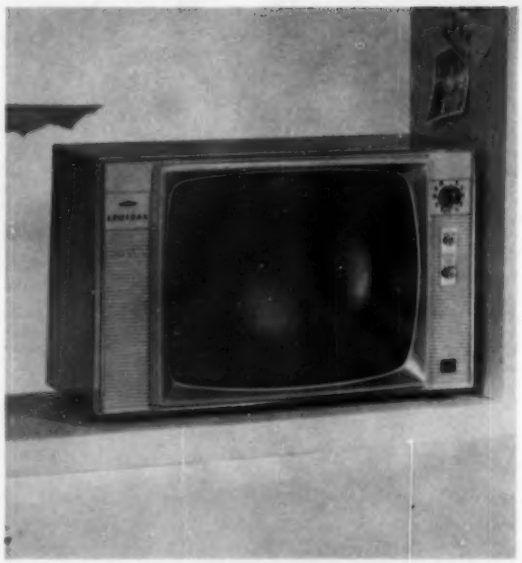
1. *Simplicity of* **Motorola** *Astronaut, new 19" transistor portable tv, is a refreshing departure from the fussiness (sometimes called "elegance") that marks most tv jacketing design (including Motorola's other sets). Shell is made of fiberglass reinforced polyester bonded to vacuum-drawn, grained vinyl sheet by a process perfected by staff designers Rudy Krolupp and Ed Stastny. With battery,* $363.

2. **Philco** *table model* (3702) *has formed steel cabinet; die-cast grille; injection-molded butyrate window. Staff design: H. V. Gosweiler, Jr.* $119.95.

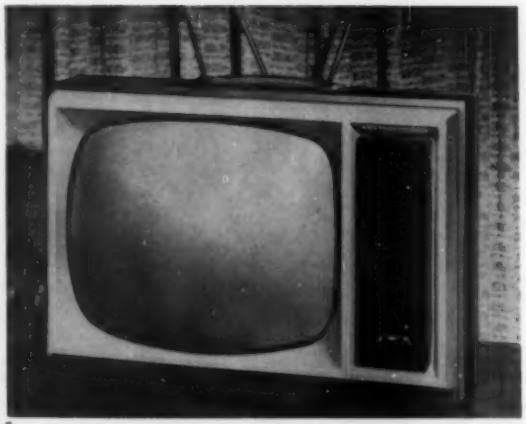
3. *Cabinet of* **RCA** *table model* (191B25) *is cold rolled steel, roller-grained to simulate wood veneers. Front and back are vacuum-formed polystyrene; grille and escutcheon are of anodized aluminum. Staff design: Tucker Madawick, manager.* $225.

4. **Admiral** *19" tv has formed metal case and die-cast escutcheon in table models (shown), white molded Cycolac on formed steel frame in portables. Lawrence H. Wilson Associates, designers.* $199.95.

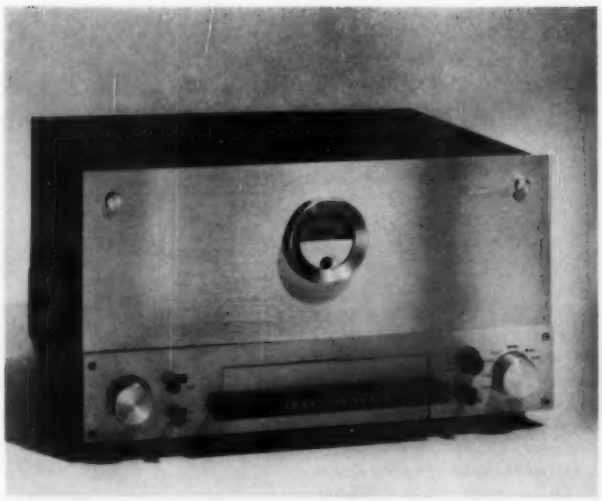
5. **Muntz** *portable Holiday tv designed by Dodge Design has gold anodized aluminum extrusion cabinet, vacuum-formed Styron front and back, stamped metal grille.* $149.95.



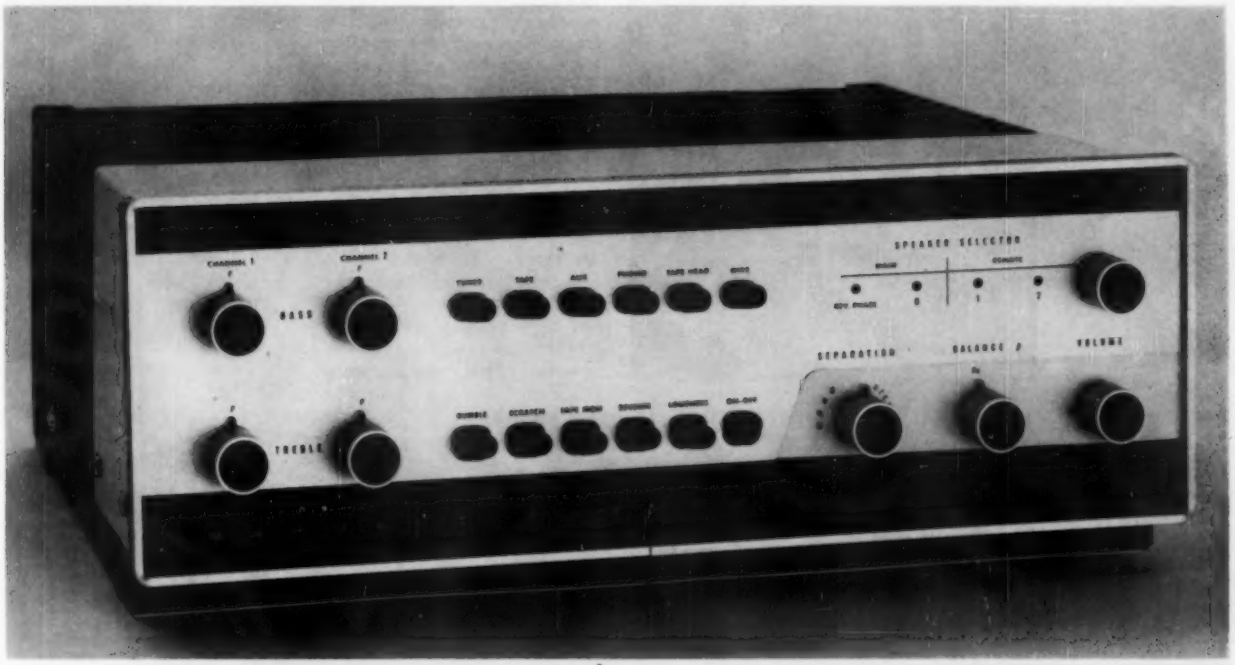
4



5

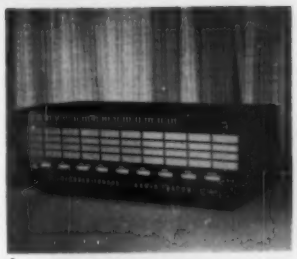


1. *In a field of products that usually display as many controls and adjustments as possible, this* **Marantz** *amplifier takes the unusual alternative of hiding seven controls behind a removable door (bearing nameplate). Staff design: S.B. Marantz, S.S. Smith.* $285.
2. *Cultivated complexity of hi-fi units often results in mystifying control panels.* **Sargent-Rayment** *50-watt stereo preamp/power amplifier avoids this pitfall with a panel composition that explains itself. Aluminum and steel faceplate and cage; knobs of gold anodized aluminum with black Tenite inserts; pushbuttons of black bakelite. Arnold Wolf, designer.* $263.70.



2

3. *What looks like a much simpler front panel on this* **Stromberg-Carlson** *36-watt stereo amplifier, is in fact a formidable assemblage of outer and inner dials and unnecessarily repetitious legends. Joseph Federico, designer.* $159.95.
4. *For use between power amplifier and preamp, this* **Blonder-Tongue** *"Audio Baton" designed by Roger Mark Singer is a highly refined tone-control system allowing nine adjustments from base to treble. Audio range is denoted by visual spectrum printed on front panel, claimed to be the first instance of continuous-tone lithography on metal.* $120.



4

1

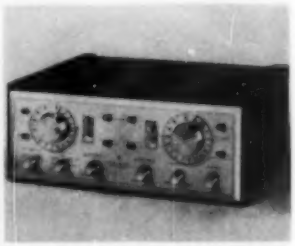
1. *One of the most elaborate hi-fi components on the market,* **Bogen-Presto** *Home Music Center, combines AM-FM tuner, power amplifier, preamp, and controls for direct and remote programming (both are possible simultaneously). Visual indicator panel on left side of center strip will light up to tell you whether the program you asked for is the one you got. Monte Levin, designer.* $329.50.

2. **Bell** *tuner-amplifier combo simplifies things by placing essential controls on gold-anodized aluminum extrusion panel trim. Cage is walnut-finished vinyl-clad steel. I. W. Simons, designer.* $329.95.

3. *Often thought of as the Rolls-Royce of high fidelity,* **Fisher** *appropriately uses brass front panel for this cadmium-plated, lacquer-coated tuner-amplifier chassis. Staff design: F. L. Mergner, chief engineer.* $429.50.

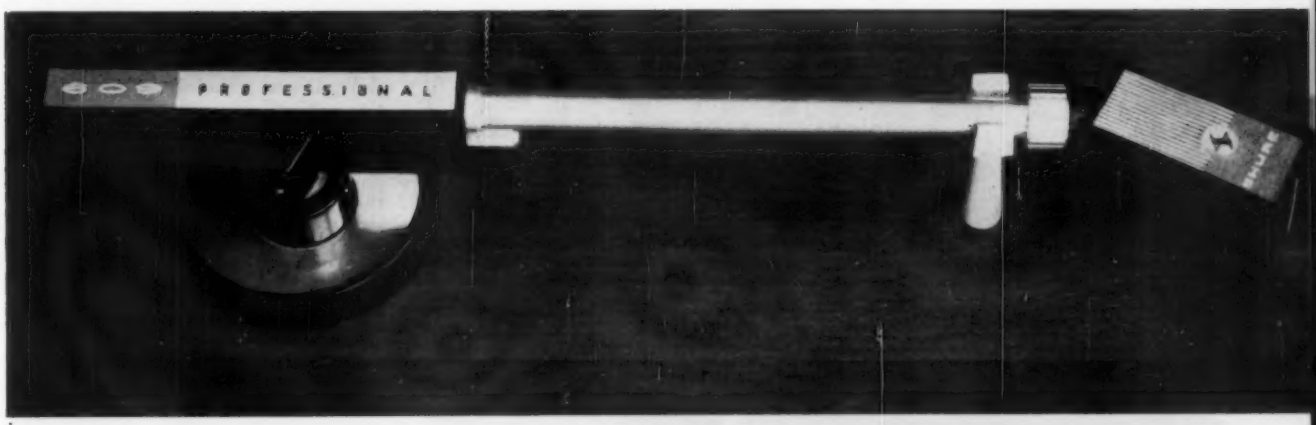
4. **H. H. Scott** *stereo tuner-amplifier is on an aluminum chassis, with a gold anodized brushed-aluminum front panel. Staff design: Victor H. Pomper.* $389.95.

2



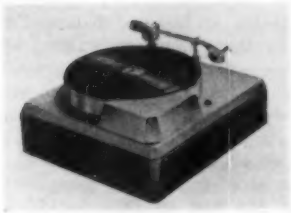
4

3



1

2



1. **Shure Brothers** *professional stereo tone arm designed by Palma-Knapp Inc. makes use of black-painted, die-cast zinc and anodized aluminum tubing. Head is made of injection-molded Cycolac, whose strength-to-weight ratio helps minimize size of counter-balance. Available in two sizes at* $29.95 *and* $31.95.

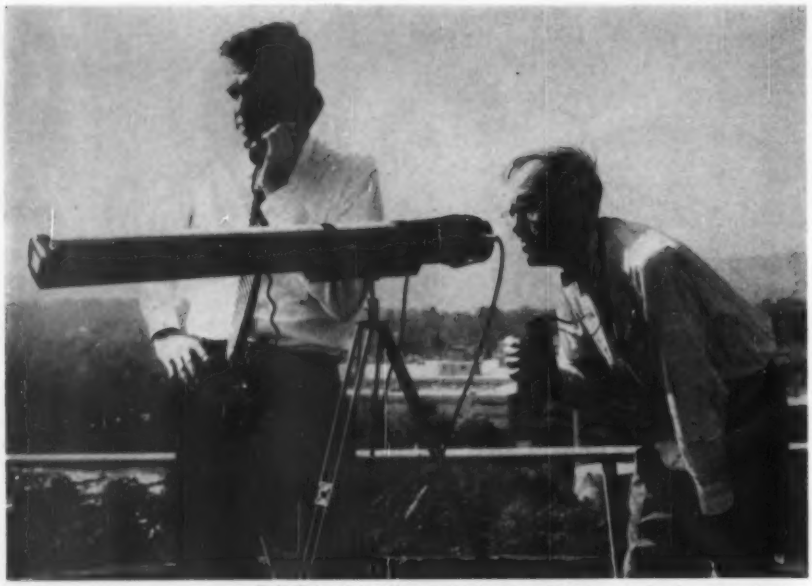
2. **Audio-Empire** *monaural/stereo turntable, tone-arm and base. Base-plate, turntable platter, and motor cover are aluminum castings. Satin chrome or satin gold finish. Staff design: Herb Horowitz.* $142.50.

3. This **Motorola** *console changer is an example of one way in which manufacturers are trying to win women over to the almost wholly masculine hi-fi business. It features a polished gold finish on die-cast metal parts, a beige turntable, and a satin gold base. Staff design: Joseph Horzick. Not sold separately.*

4. **Bogen-Presto** *turntable and tone-arm machined aluminum castings and tubings on a steel chassis, designed by Monte Levin.* $59.95.

3

4



Bell Scientists align optical maser for communication experiments

Communication by light waves

A very special kind of light — never before available — that can be controlled in the same manner as radio waves are controlled was recently demonstrated by Bell Telephone Laboratories. Light waves are ordinarily emitted in random order in all directions without definite relationship between one wave and another, whereas radio waves have a constant, point-to-point relation and can be beamed in a single direction. It is this constant, regular wave relationship, or what is called coherence, that permits radio waves to be controlled, directed and modulated for communication purposes. The new light also has an orderly, directed wave pattern, and therefore it is believed that it, too, can be used for communication.

Only a few years ago, such use of light was hardly considered; recently, however, a number of laboratories have been trying to develop devices that would produce this new "coherent" light (last July, a Hughes Aircraft Company physicist announced an experimental model: see ID, August 1960, page 12). Using light for communication is very desirable because the present radio bands are extremely crowded (this is why New York, for example, can have only 13 television channels), and the light bands could carry substantially more information—10,000 times as much data could be sent via a light wave as is presently possible by radio.

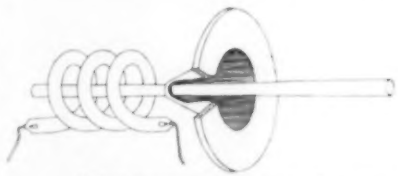
The new light comes from a device called an optical maser (masers have already been used to generate and amplify radio waves: see ID, June 1960, page 108), which is a synthetic ruby rod, 1½ inches long and 1/5 inch in diameter. The two ends are covered with a layer of silver which acts as a mirror, but which is thin enough to be slightly translucent to an intense light. The rod is held in the center of a spiral flash lamp.

When power is applied to the lamp, it excites certain atoms in the ruby by raising their energy levels. These atoms are then stimulated to release their additional energy in a coherent wave rather than in their ordinary way—a random, spontaneous fluorescence. This is accomplished as follows: The normally fluorescent light from these overly excited atoms bounces back and forth between the reflecting ends of the rod. However, those light waves that don't travel directly along the axis of the rod are not reflected and leave the medium. With each trip, the light that is reflected picks up the excess energy of the excited atoms and becomes amplified (more intense) until it is strong enough to burst through the silvered ends. Each burst is less than a millionth of a second long, and the bursts last for about a thousandth of a second. The bursts can be made to carry a coded pattern of impulses, and therefore can serve as the means for signal transmission from such communication media as telephone or television.

The new light differs from ordinary ruby fluorescent light in several important ways: it has a regular, "coherent" pattern; it is emitted in a cone angle of only 1/10 of a degree, since only those waves which traveled parallel to the rod's axis were amplified; and it is 60 times closer to being monochromatic (of a single frequency). This means that the band of frequencies that cluster around the single central frequency are more sharply peaked and better for communication.

The optical maser has been used in preliminary experiments by Bell to transmit pulses of light a distance of 23 miles. In these first applications of the light beam for communication, messages were sent in a code based on repeated flashes. The pulses were a deep red color visible to the naked eye, and registered on photomultiplier tubes. The circle illuminated by narrow beam was only about 200 feet in diameter. If a searchlight could send a beam that distance, it would be thousands of feet in diameter and extremely faint. Experiments have also been conducted in which the pulses of light were transmitted along a quarter-mile of pipe, two inches in diameter. Such transmissions might be useful when light-interrupting dust, fog or rain were in the atmosphere.

The Bell scientists believe that the optical maser might have various significant applications besides those in communication. Because the light is so



Spiral lamp surrounds ruby in maser

very intense (one million times brighter than an equivalent beam width of sunlight), it might be used to counteract the pressure of sunlight and push a satellite back into orbit. Its high concentration of energy within a small area might be used to influence the reaction of a single isotope at the expense of another. It might also refine spectroscopy by a large factor and enable long distance measurements to be made with extreme accuracy. It could be used for increased high speed switching in computers. However, it could not be used as the often-suggested "death ray." If this were tried, then, as in medieval times, the knights would go to battle in shining, light-deflecting armor. *Source: Bell Telephone Laboratories. Holmdel, N. J.*

Industrial control system

A European system for the planning and control of production processes has recently been introduced in this country. The system, called Productograph, automatically gathers and summarizes information about the status of a production process, and transmits it to a central control console where a single man, the supervisor, can analyze it and plan the most efficient manufacturing schedule. If a machine has stopped for any of a variety of reasons (breakdown, lack of materials, tool changes, personnel delay, no job), he can determine the best method to restore production. The system can also be used to compute incentive payments for the machine operators. Productograph was developed in Germany, and is presently in use in over 200 European manufacturing plants.

The data-collecting is handled by 14 different kinds of electromechanical inputs (including flow meters, microphones, photoelectric cells, voltage relays, and pressure sensitive devices) which continually monitor the operation of the machines on the assembly lines. Various devices on the control console receive, record, and display the data. These devices include: the lamp field, which by means of a checkerboard system of lights, instantly shows the operating status of every machine, i.e., which are running, which are down, and why; the graphic recorder, which produces a daily chart of the activity of each production machine; the linear counter, a mechanical Gant chart or bar graph, which visually displays the complete, minute-by-minute progress of the production line; the totalizers, which record the total number of parts produced and the total time of each category of machine down time; a telephone system between the machine operator and the production supervisor; and a tape recorder which records conversations. In short, the Productograph automatically records, counts, and adds —individually and overall—the machine operating time, quantities produced, and down time. The American firms are already using the system. *Manufacturer: Farrington Instruments Corporation, subsidiary of Farrington Manufacturing Company, Needham Heights, Mass.*

Productograph gathers and summarizes data from 40 assembly line machines

High-speed electronic printing

A new development in electronic tubes makes it possible to translate electronic signals into printed words and pictures at the extremely high speeds of 20,000 characters per second, or more than 10,000 lines of computer output per minute. Thus, if the new tubes, called electrostatic printer tubes, were used to print photographs transmitted over telephone and telegraph lines, they could deliver up to three 8½ by 11 inch sheets per second. Such photographs, transmitted over news service machines presently in use, require seven minutes for delivery. The pictures printed in this new manner have a clarity equalling that found in magazine illustration.

The new tubes (above) resemble flattened cathode ray picture tubes with tiny wires (0.001 inches thick, and spaced 250 to the inch), inserted brush-like through their faces. When the tube is printing, the varying current of the cathode ray beam inside passes through the wire matrix and deposits electrostatic charges on paper passing against the tube.

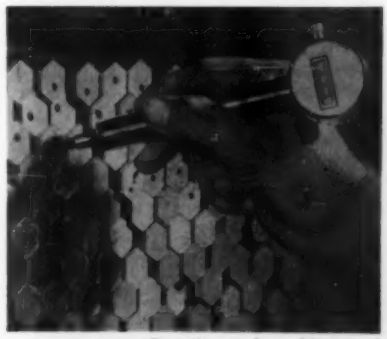
The tubes can also be used for label and short copy printing. In this application, they could be installed in addressing machines to print subscriber address labels from information stored on tapes in data processing machines. This would make possible the printing of two million different labels in an eight-hour day, which is about 18 times the speed of conventional processing.

The electrostatic tubes might also be useful in industries with many branch operations. For instance, bank statements, waybills, handwritten records, or photographs of persons receiving merchandise or cashing checks could be transmitted immediately between offices. *Manufacturer: Raytheon Company, Waltham, Mass.*

Tube prints three pictures a second

Inventory counter

A recently marketed device promises to eliminate the frustration and wasted time that often result from losing count during inventories and similar counting operations. When the device, known as the Mark Counter, touches an object to be counted, it leaves an ink mark and automatically advances by one a numerical dial counter (see illustration above). Thus, each item counted is identified; and the accuracy of the count can be visually verified. The problems of double counting and forgetting the count during interruptions are also eliminated.



Counting and marking stock

The Mark Counter costs $28.50 and comes supplied with five different colored pens. This facilitates inventory control because a different color pen can be used with each count and a visual inspection will quickly indicate all items that have not moved during the time between counts. The pens are readily changed, and when empty, are replaceable. *Manufacturer: Van D. Mark, St. Clair, Michigan.*

Progress in instrumentation

The latest developments in measuring devices, computers, transmission and communicating instruments, control regulation instruments, and information display equipment were on display at the Instrument Society of America's conference and exhibit at New York's

Metal detector

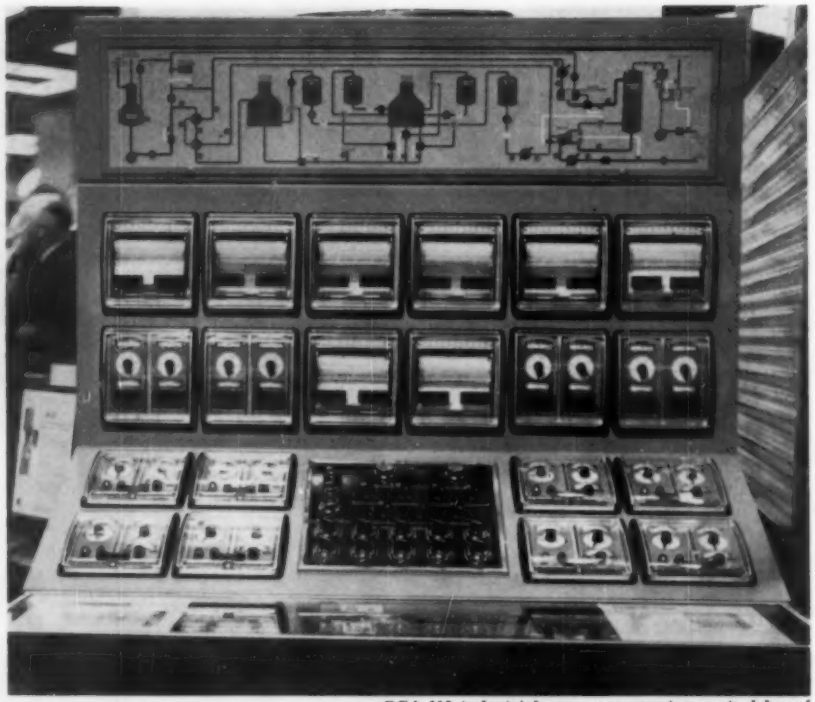
Coliseum this past September. In addition, the Army, Navy, and Air Force had more than 20 exhibits of space instrumentation and other technological developments.

Many of the products on display lacked good design, although there were several notable exceptions to this, including products of Beckmann Instruments, Minneapolis-Honeywell, and Consolidated Electrodynamics. But plenty of them, well-designed or not, were remarkable for their engineering advances. More than 300 companies exhibited.

RCA displayed its 110 solid state digital computer system for industrial process control—especially in the power, petrochemical, and metal industries. The high-speed system, available in a wide variety of options in both core and memory sizes, has a random access memory, and an automatic priority program-interrupt which allows specific computations to be performed on demand. This latter feature also permits continuous automatic verification of computer performance when higher priority tasks are not required. Bendix also showed an automatic process control system for large blending operations in refineries and chemical plants.

Technicon Controls, Inc., featured its new AutoAnalyzer, an automated chemical analysis system that can run up to 60 tests per hour on wet chemicals to detect trace materials. It can be used to monitor the rate of growth of a fermentation process, or to determine the efficacy of drugs by their appearance and disappearance in the blood stream.

A detector of small ferrous or nonferrous metal particles (with a smallest dimension of 0.063 inch) in non-metallic material was exhibited by Electro-Mechanical Research, Inc. An electronic detector of gas pressure changes as low as one ten-thousandths of a millimeter was shown by Trans-Sonics, Inc. The



RCA 110 industrial process computer control board

device, known as a micromanometer is sensitive enough to detect the wave of a hand across the room.

The Army's Diamond Ordnance Fuze Laboratories' exhibit was one of the most significant. They showed a family of amplification and control devices which use gas or liquids instead of electric

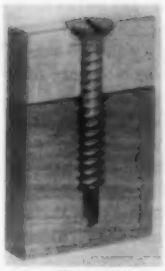
Pneumatic switching device

current to operate a variety of equipment. The system, which has no moving parts, consists of a block of metal or heavy plastic with passageways running through it. This block constitutes the basic element of the system, just as the vacuum tube and transistor are basic to electronic systems. The passageways are so constructed that streams of air or liquid from one can divert streams from another by simply permitting one stream to intersect another stream at an angle. This causes the stream being hit to divert and flow to a slightly different position. By diverting streams in this way, the blocks can perform the same complicated functions of complex electronic circuit. Army inventors have already developed units which can perform amplification, feedback, digital and analog computation, routine mathematic functions, and memory, and they believe that this system of pure pneumatics, using gas or liquids as the energy force, may have wide industrial applications.

The Armed Services also displayed a satellite-tracking device, the Transit navigation satellite, a working model of a "human disorientation device" that provides controlled angular accelerations in two planes of rotation simultaneously, and a model of a million-pound thrust stand and its instrumentation used in Polaris testing.

Wood fastening system

A self-tapping wire screw-thread insert for use in wood, particle board, and other fibrous materials has been developed which provides up to two and one-half times the holding power of standard fasteners. The fastener system is a tightly-wound coil of wire that is inserted into the hole drilled to accommodate a screw. Its increased holding power is attributed to the fact that its pitch is half that of standard machine screws, allowing it to leave relatively thick sections of wood between the threads. This eliminates the breaking up of fibers between the threads, which is a significant cause of weakness in standard fasteners.



Thread insert

The manufacturer believes that the greater holding power of the new insert fastener will cut down the number of screws needed in wood-assembly processes such as furniture manufacture.

For installation into a previously drilled hole, the wire insert is wound onto an inserting mandrel and screwed in with clockwise rotation and forward pressure. When the insert taps itself to the proper depth, one-half to one turn below the work surface, the mandrel is reversed and unscrewed from the installed insert. The installation mandrel is designed with a standard ¼-inch hexagon shank that may be used with most power tool chucks having an hexagonal receptable. *Manufacturer: Heli-Coil Corporation, Danbury, Conn.*

Propeller redesign

An airplane propeller has been developed which can be automatically adjusted to the most efficient operating lift for any flight condition, thus significantly improving the overall performance of the plane. The new design will eliminate the historic compromise between the need for a high lift propeller for take-off and climb, and a low lift propeller for efficient cruising.

A propeller blade is essentially a rotating wing in which lift is produced in a forward rather than a vertical direction. As in a wing, the lift is determined in large part by the camber (curvature) of the surface. The new propeller, known as a variable camber type (at right), uses six or eight blades mounted in sets of two on a common hub, with the rear blade at a slightly different vertical angle than the front blade. When moving against the air in flight, each pair of front and rear blades is in effect one surface. Therefore changing the camber of each set of blades, by altering the angles between them, increases or decreases the lift.

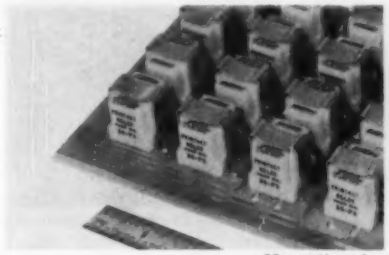
The new propeller promises increases of up to 30 per cent in the range of high-speed transports, and gains of as much as 50 knots in the speed of low-level attack planes. In addition, heavily-loaded, long-range aircraft would be able to use shortened runways. In the case of helicopters, the new propeller could mean a 40 per cent increase in payload or a 30 per cent increase in range.

Use of the propeller is said not to require radical structural departures from existing propeller support equipment. According to the manufacturer, requirements for the hub, retention, and pitch-change mechanisms of the propeller are far less exacting than those for the dual rotation propellers in use on many large foreign turboprop aircraft.

The variable camber propeller has already had extensive wind tunnel tests, and a full scale prototype is scheduled for delivery in nine months. *Manufacturer: Hamilton Standard Div., United Aircraft Corp., Windsor Locks, Conn.*

New relay

A smaller, lighter weight, more sensitive, and more reliable electrical relay has been developed which uses a permanent ceramic magnet in place of the conventional spring to hold the relay armature open. The new relay (below), known as Printact, is particularly adapted to printed circuitry because it may be mounted directly on the printed circuit board. It does not require fixed contacts; the contacts are part of the armature assembly and are designed to mate with conductors on the printed board.



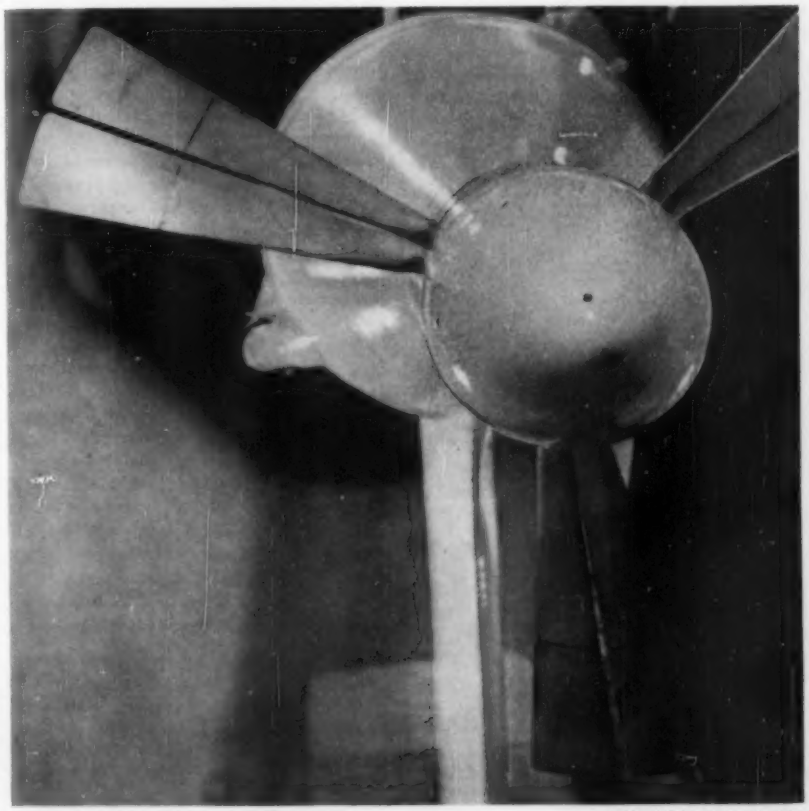
Magnetic relay

In the Printact relay the only moving part is a balanced armature assembly which opens or shuts the contacts by magnetic forces; this eliminates many of the problems that plague equipment which uses conventional relays. Spring-type relays, for instance, are difficult to maintain in proper spring tension after repeated operations, foreign matter may get between the contacts, they may corrode, and they require a high degree of skilled hand labor in the manufacturing process. The Printact relay can be manufactured completely automatically since the fine adjustments of the spring are no longer necessary.

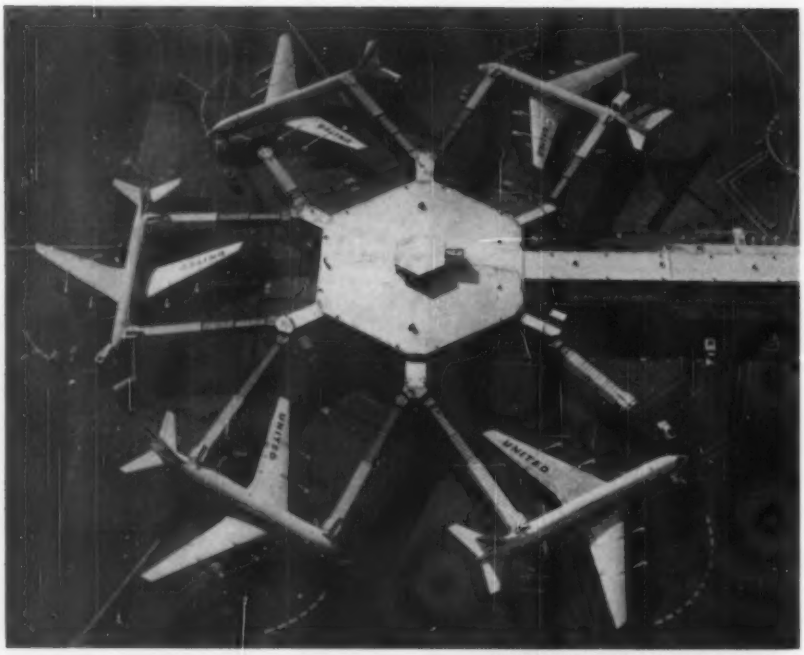
One of the first uses of the relay is in a doctors' register for hospitals, a device on which a doctor indicates that he is checking in or out of a hospital. At the same time, the register automatically informs him if there are any messages. Use of the Printact relays reduced the equipment volume of the register from 1165 to 345 cubic feet. *Manufacturer: Executone, Inc., N.Y.*

Short-run fabric lamination

The development of a fabric laminating technique now makes possible the use of fabrics as the design motif for decorative plastic laminates in short-run furniture and panelboard production. The technique thus provides an almost infinite range of specialty designs; previously,



Adjustable lift propeller



United Airlines San Francisco terminal

the choice of designs was limited to special printed papers. The laminate can be used in conjunction with wood, decorative paper, or other fabrics to produce many inlaid and other effects. It can also be matched with drapes and rugs to give a unified interior. The fabrics can be saturated at the furniture manufacturer's own plant.

Fabric about to be laminated

The protective plastic surface which shields the fabric—so far linen, denim, silk, and cotton have been used—is based on Dapon diallyl phthalate resin. This material is already used to laminate plastic surfaces on wood veneers. The fabrics can be saturated with the resin by spraying, brushing, or dipping. A typical Daponite fabric laminate would consist of a core stock (particle board, hardboard, or plywood), white decorative paper to highlight designs and colors, saturated fabric, and Daponite overlay paper. The design of the fabric can be blended directly with that of the wood by eliminating the white decorative paper. *Manufacturer: Food Machinery and Chemical Corp., New York, N. Y.*

New way to come and go

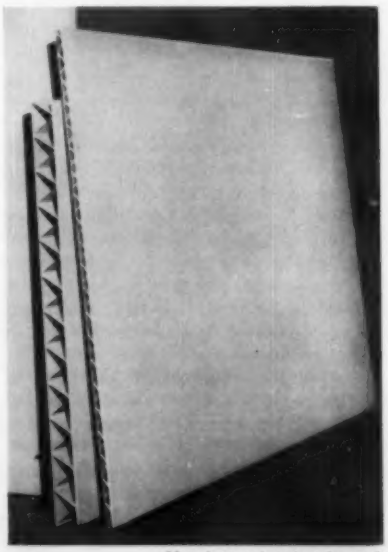
The photograph above, of the United Airlines San Francisco terminal, illustrates one of the newest methods of boarding and leaving an airplane. Looking like a huge pinwheel from the air, the hexagonal-shaped building connects with planes by means of telescoping "Jetways" which extend and contract from the perimeter of the building. The Jetways, constructed of lightweight structural steel, can be moved from stowed position to the terminal side of an airliner in one minute. They are operated by one man, and can be extended to 107 feet, and raised on the same floor level from approximately seven to 13 feet. Two airplane tires on their outside ends provide support and maneuverability. In addition to the above installation, Jetways are installed in Idlewild Airport in New York, and similar installations are planned for Chicago, Los Angeles, and Seattle. *Source: United Airlines, New York, N. Y.*

Well-behaved outdoor paints

A new binder for outdoor, latex water-base paints has been developed which provides toughness, chemical resistance, weatherability, and flexibility. Paints formulated with the material, known as Geon 450X3—a copolymer of vinyl chloride and acrylic—have remained fresh and uncracked through years of tests in northern Ohio, Arizona, Florida, and California. The Geon 450X3 paints retain the advantages of water-base paints over oil-base paints: they are smooth spreading, quick drying, non-toxic, non-flammable, water soluble, and comparatively odorless. Films formed by the paints are able to keep out rain and snow, yet they allow moisture from building interiors to escape; this eliminates blistering which is caused when interior moisture cannot escape. Color retention and adhesion to old chalky paint surfaces is said to be very good. *Manufacturer: B. F. Goodrich Chemical Co., Cleveland, Ohio.*

Aluminum sandwich panels

A new aluminum structural panel has been developed that is claimed to be stronger than any other aluminum load-bearing panel now available. Known as Reynocore, the panel (below) is a sandwich of two flat sheets of aluminum bonded by Reynoweld adhesive to a core of corrugated or delta-formed aluminum sheet. The manufacturer expects that the panels will be used to speed and simplify the construction of various types of commercial, institutional, and farm and home buildings. When used for walls or roof decks, the outer sheet of the panel serves as a durable exterior facing, and the inside sheet provides a finished interior surface. The interior surface can be perforated for acoustical purposes. Once in place, sheathing, masonry, painting, or finishing are not required. The first application of Reynocore will be for the roof of Coliseum 21, the major structure of the Century 21 Exposition in Seattle. The panels are available in a wide range of baked-enamel colors, and in any embossed design. They are manufactured in a variety of sizes from one-half to three inches thickness. *Manufacturer: Reynolds Metals Company, Richmond, Virginia.*



Aluminum structural panels

Manufacturers' Literature Supplement

Materials—Metals

Lead Surfaced Shielding Metals. Knapp Mills, Inc., 23-15 Borden Ave., Long Island City, N. Y. 24 pp. Ill. Booklet describes lead surfaced metals which are used in chemical process equipment to resist general corrosive conditions and radioactive corrosion. Known as Insmetals, the base metals include aluminum and its alloys, copper and its alloys, carbon steel, lead, stainless steel and nickel alloys, and stainless clad steel.

Alloy for Use in Electronics Industry. Allegheny Ludlum Steel Corporation, Oliver Building, Pittsburgh 22, Pa. 16 pp. Charts. Technical bulletin describes Moly Permalloy, a nickel, iron, molybdenum alloy, which is especially suited for transformers and relays.

Gaging of Metal Coatings. Twin City Testing Corporation, 533 S. Niagara St., Tonawanda, N. Y. Brochure gives data on various non-destructive tests that are used to measure the thicknesses of organic and non-magnetic metal coatings on iron and steel. Advantages and limitations of each test are discussed in light of thickness measuring instruments now available.

Iron Alloys. Centrifugally Cast Products Division, Shenango Furnace Company, Dover, Ohio. 8 pp. Ill. Bulletin 158 presents the engineering properties of Meehanite Metal, Ni-Resist Iron, Ni-Resist Ductile Iron, and Ductile Iron. The bulletin also describes various components produced with these metals by the centrifugal cast method.

Tool Steel Catalog. Darwin & Milner, Inc., 2222 Lakeside Ave., Cleveland 14, Ohio. 144 pp. Catalog describes company's tool steel line. It provides composition, properties and applications of 24 varieties of tool steels.

Corrosion Computer. H. M. Harper Company, Morton Grove, Ill. Corrosion computer card (8 by 4 inches) works like a slide rule and tells how each of eight types of metal withstands the corrosive effects of 141 chemical agents. The metals are: brass and naval bronze; silicon bronze; monel metal; stainless types 410, 416 and 430; stainless types 302, 303, 304 and 305; stainless type 316; copper; aluminum.

Materials—Plastics

Polyethylene. Phillips Chemical Company, Bartlesville, Okla. Technical information bulletin provides the latest data on Marlex family of polyethylenes. Properties and applications are given for each resin.

Kralastic MH. U. S. Rubber Company, Naugatuck Chemical Division, Naugatuck, Conn. 18 pp. Ill. Brochure describes properties and applications of Kralastic MH ABS plastic. This is a high-impact thermoplastic which has good flow properties and makes possible the molding of very large and intricate shapes.

Resin Guide. U. S. Rubber Company, Naugatuck Chemical Division, Naugatuck, Conn. 12 pp. Ill. Brochure describes Vibrin polyester resins, Kralastic ABS compounds and Marvinol polyvinyl chloride resins. For each plastic, a description of properties, special features and recommended applications is given.

Methods

Torque Manual. P. A. Sturtevant Company, Addison, Ill. 32 pp. Ill. Manual describes the torque wrench and gives illustrated data on its applications, assembly, use for testing, special torque wrenches, information on how to use adapters, attachments and extensions, proper care, repair and a description of the torque law. A torque wrench is a tool that measures the resistance to turning, which is torque.

Flame Hardening. Air Reduction Sales Company, 150 East 42nd St., New York 17, N. Y. 12 pp. Ill. Brochure discusses the various problems of oxyacetylene flame hardening, and describes all available equipment used for this purpose.

Bar Mill. Republic Steel Corporation, Advertising Division, 1441 Republic Bldg., Cleveland 1, Ohio. 4 pp. Ill. Folder describes Republic's new 11-inch bar mill, located in Chicago. Production techniques and new equipment are fully described.

Oxygen Cutting of Bevels. Air Reduction Sales Company, 150 East 42nd St., New York 17, N. Y. 8 pp. Ill. Article discusses bevel cutting under three main headings: the practical techniques for obtaining good quality bevel results; the relationship of preheat, cutting oxygen and speed in bevel cutting; and a comparison of fuel gases in bevel cutting.

Components and Machines

Transistorized DC Power Supplies. General Electric Company, Schenectady 5, N. Y. 8 pp. Ill. Bulletin GED-4184 discusses new standard line of precision-regulated, transistorized dc power supplies for a variety of applications in the utility, industrial, military and electronics area.

Testing Instruments. B & K Instruments, Inc., 3044 West 106th St., Cleveland 11, Ohio. 26 pp. Ill. Catalog lists complete line of integrated instruments for automatic measurement of sound, vibration and strain. Instruments include oscillators, voltmeters, filters, microphones, amplifiers, accelerometers, etc.

Time Control Systems. Time Control Systems Division, Designers for Industry, Inc., 4241 Fulton Parkway, Cleveland 9, Ohio. Folders contain technical material on frequency standards, programmers, and time control systems. These standards provide precise reference for vehicle guidance and control.

Automatic Lubrication. Bijur Lubricating Company, Rochelle Park, N. J. 4 pp. Ill. Bulletin describes the three basic elements of automatic lubrication: lubricators; distribution systems; and metering units, which regulate the amount of oil flow at each bearing.

Heat Transfer Equipment. Young Radiator Company, Racine, Wis. 32 pp. Ill. Catalog describes line of radiators, heat exchangers, air coolers, industrial and oil field equipment, and heating and air conditioning products. A description of facilities and services is also provided.

Precision Boring and Milling Machines. DeVlieg Machine Company, Fair St., Royal Oak, Mich. 12 pp. Ill. Bulletin describes the line of Spiramatic Jigmil machines, and the advantages of Diatrol direct dial dimension system, and Tapac numerical tape control system. Diatrol is a system of accurate point to point dimensioning and positioning.

Servomechanisms. Mechatrol Division, Servomechanisms, Inc., 1200 Prospect Ave., Westbury, N. Y. 68 pp. Ill. Catalog describes servomechanisms which are used to control, amplify, compute, measure, transmit and simulate signals in a variety of electronic components. Control in this type of system is achieved by a continuous comparison between the actual value of the quantity being controlled and the desired value. The difference in these values, or error, is amplified, and applied as a correction to bring the controlled quantity into correspondence with the desired value.

Turret Lathe. Sheldon Machine Company, 4258 N. Knox Ave., Chicago 41, Ill. 4 pp. Ill. Folder describes the new Sheldon 3R turret lathe and illustrates its new features. The lathe can be used for turning, chucking and single point threading in addition to standard turret operations.

Vibration Equipment. MB Electronics, 781 Whalley Ave., New Haven 8, Conn. 16 pp. Ill. Brochure describes line of products that excite, measure and control vibration. The principles of vibration testing are also discussed.

Pumps. Marlow Pumps, Division of Bell & Gossett Company, Box 200, Midland Park, N. J. 40 pp. Engineering manual presents a wealth of information relevant to the use of pumps. Various terms are defined, such as viscosity, electrolysis, head terms, etc. A number of charts and conversion units are also included.

Power Tools. Wilton Tool Manufacturing Company, 9529 Irving Park Rd., Schiller Park, Ill. 16 pp. Ill. Catalog 724 presents information on line of power tools. Included is information on air-hydraulic clamping tools.

Miscellaneous

Commercial Glass. Corning Glass Works, Corning, N. Y. 16 pp. Charts. Booklet presents property and application information on 32 commercial glasses.

Fiberglass Armature Banding Tape. Coast Manufacturing and Supply Company, Box 71, Livermore, Calif. 20 pp. Ill. Booklet describes a new non-woven, cross-reinforced fiberglass armature banding tape. The tape, known as Vec-O-Tex, has high hoop and tensile strength, and is said not to split during application, eliminating the need for edge restraint.

Ferrous Forgings. American Brake Shoe Company, 530 Fifth Ave., New York 36, N. Y. 28 pp. Ill. Booklet describes facilities and products of the AmForge Division, which produces drop, upset and press forgings.

Industrial Glass. Kopp Glass, Inc., Swissvale, Pa. 20 pp. Ill. Brochure describes a number of applications for industrial glass such as street and highway traffic control lights, aviation, railroad and marine signaling, street and interior lighting, industrial globes, indicator lenses, filters, etc. Special sections discuss how new glass compositions are developed for industrial applications, custom-production techniques and specialized finishing operations.

Fluorescent Compounds. American Instrument Company, 8030 Georgia Ave., Silver Spring, Md. 19 pp. Ill. Brochure lists several hundred components that exhibit fluorescent characteristics as a guide to identifying solutions through their fluorescent properties.

Discoverer Satellite Recovery Program. General Electric Company, Missile and Space Vehicle Department, 3198 Chestnut St., Philadelphia 4, Pa. 8 pp. Ill. Brochure presents a summary of the Air Force satellite recovery vehicle program covering Discoverers I through XIV.

ID

INDUSTRIAL DESIGN

ID will help you, as no other publication can, to make your company's products the favored contenders in the marketplace.

Each monthly issue will bring you an exclusive, pictorial review of the significant new design achievements in the various product fields; and it will keep you reliably informed on all new processing techniques, forming methods, new plastic compounds, alloys, bonding agents, finishes, etc., as soon as they become available for the designer's use.

Isn't this the time to enter your subscription — now, while you are thinking of product leadership?

POSTAGE WILL BE PAID BY INDUSTRIAL DESIGN

FIRST CLASS PERMIT NO. 38539 NEW YORK, N. Y.

BUSINESS REPLY MAIL
NO POSTAGE STAMP NECESSARY IF MAILED IN THE UNITED STATES

INDUSTRIAL DESIGN
18 EAST 50TH STREET
NEW YORK 22, NEW YORK

Interiors

More than 25,000 specialists in the interiors field rely on this publication to keep abreast of progress in every phase of their work, and a subscription to INTERIORS will do the same for you.

To enjoy the many rewarding benefits of a personal subscription, you need only fill out and return the attached card, so we will have it in time to send you a copy of the next issue as soon as it comes off press.

It will be a pleasure to add your name to our list of the most distinguished design professionals in the interiors field.

BUSINESS REPLY MAIL

Interiors

STATEMENT REQUIRED BY THE ACT OF AUGUST 24, 1912 AS AMENDED BY THE ACTS OF MARCH 3, 1933, AND JULY 2, 1946 AND JUNE 11, 1960 (74 STAT. 208) SHOWING THE OWNERSHIP, MANAGEMENT, AND CIRCULATION OF —

INDUSTRIAL DESIGN, published Monthly at New York, N. Y., for October 1, 1960.

1. The names and addresses of the publisher, editor, managing editor, and business managers are:
Publisher, Charles E. Whitney, 18 East 50th Street, New York 22, N. Y.; Editor in Chief, Ralph Caplan, 18 East 50th Street, New York 22, N. Y.; Managing Editor, Betsy Darrach, 18 East 50th Street, New York 22, N. Y.; Business Manager, Alec E. Oakes, 18 East 50th Street, New York 22, N. Y.

2. The owner is: Whitney Publications, Inc., 18 East 50th St., New York 22, N. Y. Following is a list of stockholders owning one per cent or more of the total amount of stock:
Charles E. Whitney, 18 East 50th Street, New York 22, N. Y.
George Mc C. Whitney, Sneden's Landing, Palisades, New York.
Mrs. Evelyn Thomson, 177 Light Street, Woodstock, Ontario, Can.
Mrs. Margaret De Brule, 18 East 50th Street, New York 22, N. Y.

3. The known bondholders, mortgagees, and other security holders owning or holding 1 per cent or more of total amount of bonds, mortgages, or other securities are: None:

4. Paragraphs 2 and 3 include, in cases where the stockholder or security holder appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting; also the statements in the two paragraphs show the affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner.

5. The average number of copies of each issue of this publication sold or distributed, through the mails or otherwise, to paid subscribers during the 12 months preceding the date shown above was: 10,319.

CHARLES E. WHITNEY,
Publisher

Sworn to and subscribed before me this 23rd day of September, 1960.

ANNE HARMSE
(My commission expires March 30, 1961)

Classified Advertisements

15c A WORD PER INSERTION, $5.00 MINIMUM PAYABLE IN ADVANCE. BOX ADDRESS COUNTS FIVE WORDS.

POSITION WANTED

N. Y. C. INDUSTRIAL DESIGNER—*Free Lance, Part Time. Product design and styling. Capable of creative, exciting, dynamic design. Experienced through the top world-renowned industrial design organization. PLaza 3-6352 or Box ID-327,* INDUSTRIAL DESIGN, *18 East 50th Street, New York 22, New York.*

INDUSTRIAL EXHIBITION DESIGNER — *Twelve years' experience in Trade Show Exhibits, Point of Purchase, Sign and Silkscreen Display including supervision details of construction, client liaison. Complete resume on request. Will relocate. Box ID-332,* INDUSTRIAL DESIGN, *18 East 50th Street, New York 22, New York.*

MECHANICAL ENGINEER *turned Industrial Designer nine years ago; experienced over broad range of industrial and consumer products offers creative sensitivity synchronized with ability to translate esthetic concepts into producible items. Free lance, part time but will consider full time offer of merit. Box ID-334,* INDUSTRIAL DESIGN, *18 East 50th Street, New York 22, New York.*

HELP WANTED

CAREER BUILDERS — RUTH FORREST — *Since 1947 a Personnel Agency specializing in Architectural, Interior, and Industrial Designers; all Home Furnishings and related personnel. Trainees to top executives. 35 West 53rd Street, New York 19, PLaza 7-6385.*

HELEN HUTCHINS PERSONNEL AGENCY—*Specialist Professional, Sales, Administrative Personnel for Industrial, Architectural, Interior Designers; Home Furnishings Manufacturers; Distributors, Stores, Publications, etc. Helen Hutchins' long association with a leading industrial design organization insures intelligent screening. 767 Lexington Avenue, New York. TE 8-3070. 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. 38 Park Avenue, N. Y. MU 3-2523.*

WE HAVE OPENINGS FOR COMPREHENSIVE DESIGNERS *with two years' minimum experience in industry. Must have knowledge of engineering and production techniques. Expected to transmit designs in model and drawing forms. Office near city in quiet rural area; ideal for those who enjoy outdoor activities. Stevens-Chase Design Associates, Split Rock Road, Camillus, New York.*

WE HAVE OPENINGS FOR COMPREHENSIVE DESIGNERS *specializing in two-dimensional design, with a background and interest in graphics. Stevens-Chase, Design Associates, Split Rock Road, Camillus, New York.*

PACKAGE DESIGNER — *Man required by design department of medium-sized folding carton manufacturer located in Michigan. Graphic design training in packaging necessary. However, previous experience not required. This is an excellent opportunity for a young man with creative talents. Plant is located in a progressive community providing excellent educational and recreational facilities. Salary open. All replies held in strict confidence. Please send resume of background and training to Box ID-330,* INDUSTRIAL DESIGN, *18 East 50th Street, New York 22, New York.*

TOY CREATORS WANTED — *Prominent New York toy manufacturer seeks creative designers for newly established toy development and styling department. Unusual opportunity to become established with a progressive, growing company that encourages creative thinking in plastics, metals, wood, cardboards; and all associated manufacturing processes. Immediate employment with compensation based on experience and ability. Write full particulars to: Box ID-331,* INDUSTRIAL DESIGN, *18 East 50th Street, New York 22, New York.*

DESIGNER — *Graduate M. E. who must be able to show examples evidencing capacity for inventive ability. Assignments will involve development of mechanical devices, in work on packages and appliances. Unusual benefit program, including profit sharing with vigorous, growing company. Send complete resume to: W. H. O'Shaughnessy, Johnson's Wax, Racine, Wisconsin.*

PARTNER OR ASSOCIATE: *Established one-man design office in metropolitan NY/NJ wishes to expand. Seeks experienced, qualified candidate to share in all aspects of private practice. Box ID-333,* INDUSTRIAL DESIGN, *18 East 50th Street, New York 22, New York.*

Index to Advertisers

MISCELLANEOUS

FRESH IDEAS IN TOYS. *Leading toy manufacturer, with national distribution and network TV show, seeks unique toy ideas. Interested in pure toy only, whose end is to amuse and fascinate child. Not interested in craft-type items whose end goal is completion. Royalty and per-item arrangements. Write for submission forms. Box ID-329,* INDUSTRIAL DESIGN, *18 East 50th Street, New York 22, New York.*

PRODUCTS WANTED: *Well-established research and development company desires to contact designers and inventors having original marketable ideas or concepts pointed toward the toy or hobby fields. Royalty or outright purchase. Prefer items two dollars retail and higher. Can be in any accepted medium. All inquiries will be treated confidentially and answered promptly. Box ID-328,* INDUSTRIAL DESIGN, *18 East 50th Street, New York 22, New York.*

For Your Calendar

Through November 20. "Japan: Design Today." An exhibition of contemporary Japanese design. Walker Art Center, Minneapolis, Minnesota.

Through December 4. "Visionary Architecture." An exhibition or architecture that was considered unbuildable at the time it was conceived. Museum of Modern Art, New York.

Through December 4. "Design for Silver." A show of the best entries in an international design competition for sterling silver flatware. Museum of Contemporary Crafts, New York.

Through January 8. "Viking to Modern." An historical survey of the arts and crafts of Denmark. Metropolitan Museum of Art, New York.

Through January 9. A comprehensive showing of Egyptian Sculpture of the Late Period, 700 B.C. to A.D. 100. Brooklyn Museum, New York.

November 6-27. "Landscape, Past and Present." A selection of landscape paintings from the 16th through the 20th centuries. Long Beach Museum of Art, California.

November 13-December 25. "The Precisionist View in American Art." An exhibition of some American artists whose work is in the precisionist mode. Walker Art Center, Minneapolis, Minnesota.

November 14-18. American Society of Tool and Manufacturing Engineers western engineering conference and exhibit. Memorial Sports Arena, Los Angeles.

November 15-16. Industrial engineers seminar on work measurement techniques and problems sponsored by the University of Wisconsin Engineering Institutes and the American Institute of Industrial Engineers. University of Wisconsin, Madison, Wisconsin.

November 15-17. 1960 fall conference of the Building Research Institute on the progress in preassembly of building components. Shoreham Hotel, Washington, D. C.

November 18. "Blow Molding Comes of Age." A regional technical conference of the Society of Plastics Engineers. Essex House, Newark, New Jersey.

December 5-8. National conference on the application of electrical insulation. Conrad Hilton Hotel, Chicago, Illinois.

December 12-15. Industrial Building Exposition and Congress sponsored by a board of 28 architects, builders, engineers and industrial executives. It will feature a conference on construction of new industrial buildings and modernization of old ones. New York Coliseum.

January 6-14. International home furnishings market. The Merchandise Mart, Chicago, Illinois.

January 8-12. National Retail Merchants Association's annual convention in its 50th anniversary year. Hotel Statler, New York.

January 9-11. Seventh national symposium on reliability and quality control. Bellevue-Stratford Hotel, Philadelphia.

January 16-19. The Instrument Society of America's winter instrument-automation conference and exhibit. Sheraton-Jefferson Hotel, Kiel Auditorium, St. Louis, Missouri.

January 16-20. National Housewares Exhibit, sponsored by the National Housewares Manufacturers Association. McCormick Place, Chicago, Illinois.

January 17-18. Bearing symposium sponsored by the American Society of Lubrication Engineers. Penn Sheraton Hotel, Pittsburgh, Pennsylvania.

January 23-26. 1961 National Plant Maintenance and Engineering Show. The International Amphitheatre, Chicago, Illinois.

January 23-February 2. The 1961 engineering and management course sponsored by University Extension and held at the Los Angeles Campus, University of California.

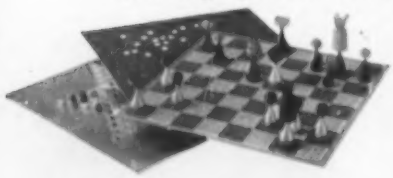
INDUSTRIAL DESIGN

in its **7th ANNUAL DESIGN REVIEW,** *encompasses the most significant design of the year. ADR collects the products and packages that represent the most important events and the most interesting thinking in the world of design for the preceding twelve months. Published in December, ADR this year will include:*

radio
air conditioning decorative
accessories institutional furniture
garden and recreational equipment machinest
and hand tools transportation roolling equipments
personal accessories packaging prefabrication materi-
als laboratory and institutional and home equipment fabrics
photography equipment data processing equipment electronic and
radio equipment fabrication tools housewares decorative accessory
tablewares business machines tv prefabrication materials hand tools
business equipment institutional and business furniture construction and
excavating equipment hardware components transportation equipment laborer
aids decorative accessories transportation and rooling equipment furnitures
prefabrication materials data processing equipment packaging laboratory equip-
ment plumbing materials building finish materials lamp and heating equipmention
house wares building materials laboratory equipment construction equipment radio
equipment toys school furniture garden and recreational equipment building equip-
ment transportation equipment air conditioning hifi equipment television and air
conditioning equipment hifi prefabrication materials tv data processing equipment
laboratory equipment hardware components packaging business machines housewares air
conditioning heating equipment lamps and heating equipment photography equipment toy
design photography equipment plumbing materials lamps and heating equipment person-
al articles rugs fabrics finish materials business and institutional furniture hot
air equipment data processing equipment transportation rolling equipment decoratives
prefabrication materials decorative accessories heating equipment prefabrication on
the job equipment personal articles data processing equipment plumbing equipment a
plenty personal accessories and aids institutional and home furniture business and
consumer equipment hifi equipment television broadcasting equipment radio plumbin
equipment packaging hardware components trnasportation rolling equipment cooking
elements institutional furniture electronic equipment prefabrication materials
television and hifi equipment rolling equipment housewares tablewares heating
equipment garden and recreational equipment decorative accessories business
furniture laboratory equipment packaging tablewares photography equipment
recreational equipment toys things for the children hardware components
hifi equipment transportation rolling equipment heating materials and
lamps personal accessories and aids tablewares rugs prefabricate
materials home institutional business furniture and equipments
garden and recreational equipment photography equipment hand
tools personal accessories data processing equipment in
business prefabrication tools furniture fabricse
housewares photography equipment lamps radio
equipment transportation rolling equip-
ment rugs plumbing material
hifi equipment

INDUSTRIAL DESIGN 18 *E. 50th Street, New York 22, N. Y.*

FORECAST: *There's a world of aluminum in the wonderful world of tomorrow* . . . where you will furnish your home for elegant fun with aluminum . . . aluminum that takes so many colors and shapes it turns a table and chairs into an endlessly versatile game center . . . aluminum that can be enameled, brushed, anodized, cast, forged, stamped or extruded in as many moods as there are moves on a chessboard. Aluminum Company of America, Pittsburgh.



CAST ALUMINUM GAME TABLE AND CHAIRS DESIGNED FOR THE ALCOA COLLECTION BY GENE TEPPER. PHOTOGRAPHED BY ALBERT GOMMI.

ALCOA ALUMINUM

ALUMINUM COMPANY OF AMERICA