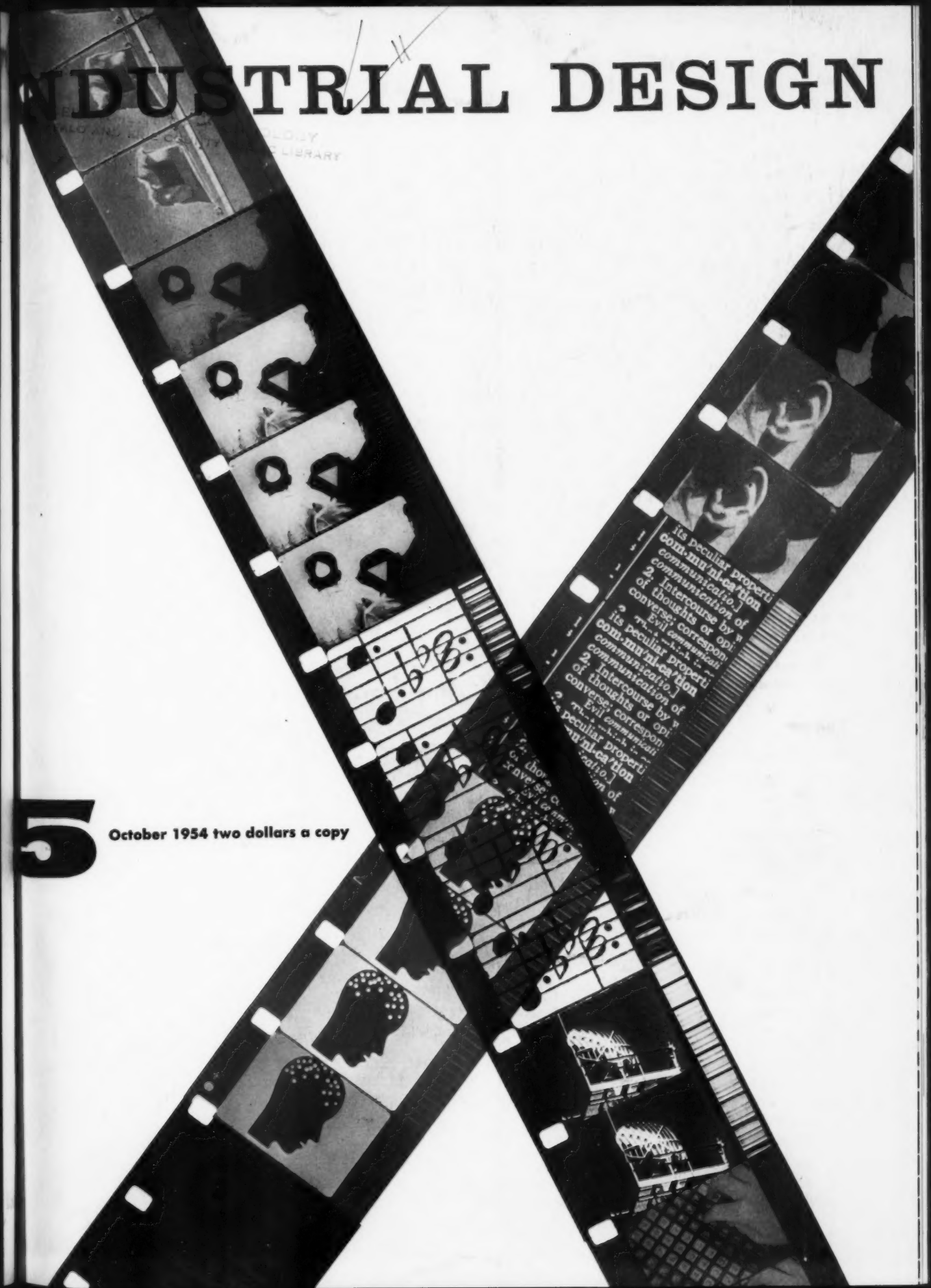
INDUSTRIAL DESIGN



5

October 1954 two dollars a copy

LARGE AREA MOLDING

with Celanese* Marco* Resins

can give you new design freedom

This one piece, reinforced plastic truck front gives the fleet owner all the distinction and other advantages of a special body job. But, because of the simplicity of its die construction and the low pressure bag method of molding, this truck front can be produced in long or short runs—economically.

The simplicity of large area molding opens up opportunities for nearly every industry. Already, there are hundreds of out-sized products: car bodies, tank trailers, furniture and pleasure boats now being produced better, stronger and often at lower cost through the use of reinforced Marco resins.

Marco resins produce molded structures with excellent resistance to hot and cold weather, corrosion, moisture, vibration, impact and stress. As with this truck front, color can be molded in. Patch repairs can be made by an amateur.

Marco resins can give you greater freedom of design, greater strength and construction simplicity. Write for the new Marco brochure. It is prepared for your benefit by the pioneer in polyesters.
Celanese Corporation of America, Marco Products Dept. 152-J Plastics Division, 290 Ferry Street, Newark 5, N. J.
Canadian affiliate, Canadian Chemical Company Ltd., Montreal and Toronto.

● Marco resin truck front manufactured by General Body Manufacturing Company, West Pennway & Summitt Sts., Kansas City, Missouri. It is part of assembled plastic body.

Celanese* PLASTICS

*Reg. U. S. Pat. Off.

VOLUME 1, NUMBER 5

5

INDUSTRIAL DESIGN

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

CONTENTS FOR OCTOBER, 1954:

Over the central staircase in Milan's Palazzo dell' Arte, a spectacular ceiling of Murano glass discs leads to the industrial design section of the Tenth Triennale. The yellow, orange and purple-brown patterns of the discs are played up as daylight filters through a white muslin ceiling above them. A detailed report of this major exposition appears on pages 24-43.

PUBLISHER	*Charles E. Whitney*
EDITORS	*Jane Fiske Mitarachi* *Deborah Allen*
ASSOCIATE EDITOR	*Marilyn Silverstone*
TECHNICAL EDITOR	*John Pile*
ART DIRECTOR	*Martin Rosenzweig*
BUSINESS MANAGER	*Alec E. Oakes*
ADVERTISING MANAGER	*Douglas B. McIntosh*
CIRCULATION MANAGER	*James F. Wells*
SALES PROMOTION	*Lawrence Terzian*
PRODUCTION	*Sven Martinsen*

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; Robert E. Connolly, Secretary.

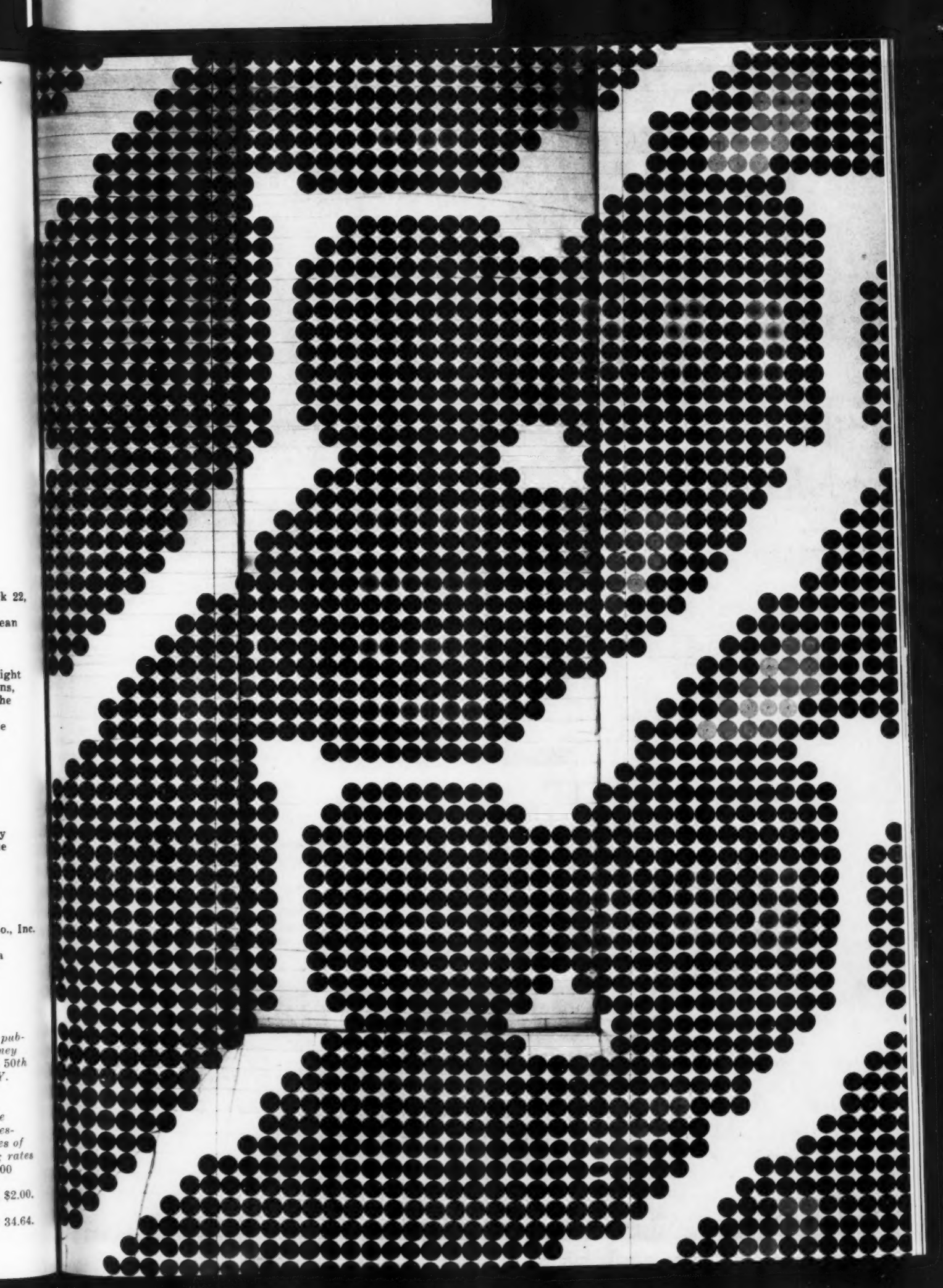
Copyright 1954 by Whitney Publications, Inc. All rights reserved. The trade mark "Industrial Design" is registered in the U. S. Patent Office.

ADVERTISING OFFICES

New York	18 East 50th Street New York 22 Telephone PLaza 1-2626
Chicago	Archer A. King & Company 410 North Michigan Avenue Chicago 11, Illinois
Atlanta	Blanchard-Nichols-Osborn 75 8th Street North East Atlanta 5, Georgia
Los Angeles	The Maurice A. Kimball Co., Inc. 2550 Beverly Boulevard Los Angeles 57, California

INDUSTRIAL DESIGN *is published bi-monthly by Whitney Publications, Inc., 18 East 50th Street, New York 22, N. Y. Subscription price* $9.00 *for one year (six issues),* $16.00 *for two years in the United States, U. S. Possessions, Canada and countries of the Pan-American Union; rates to all other countries,* $11.00 *for one year,* $20.00 *for two years. Price per copy,* $2.00.

Acceptance under Section 34.64. P. L. & R. authorized.



in this issue...

Lynes

Dunbar

Russell Lynes, whose brief against *The Tastemakers* is presented on pages 72-80, expands the attack in the book published this month, which also includes his unsettling codification, "Highbrow, Lowbrow, Middlebrow." Previous forays were directed against *Snobs* and *Guests*. A clergyman's son, former principal of a girl's school, he is now managing editor of *Harper's Magazine*.

Jack Dunbar, painter, photographer, draftsman, and erstwhile assembler of turret lathes, interrupted a year of painting in Europe to photograph and report the Triennale (page 23). Previously, he spent three years as assistant art director for *Harper's Bazaar*, free-lanced for Museum of Modern Art books and some architects, studied at Taliesen and Institute of Design.

Eames Nelson

Charles Eames and **George Nelson** overcame the three thousand miles between their offices (Los Angeles and New York respectively) and the educational precedent of centuries to produce Art X, a suggestion for mass-producing a condensed, high-impact art education (pages 44-51). Eames' feet occupy the space belonging to Alexander Girard, who worked on an exhibition to accompany the show. The three architects have a long standing association as designers of the Herman Miller line of furniture and fabrics.

Mankki

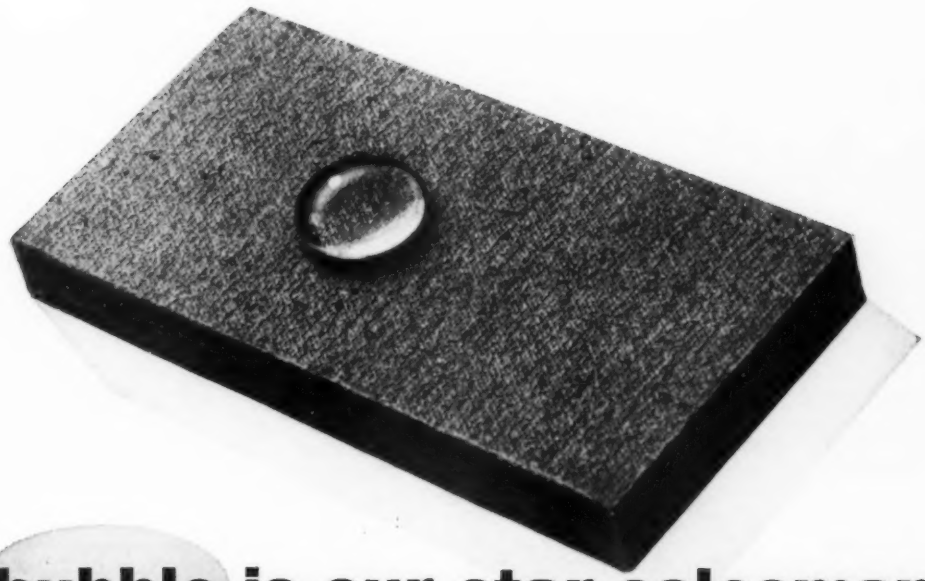
Onnie Mankki prepared for the industrial architecture problems presented by the Cleveland Transit shelters (page 114) by studying architecture at Carnegie Institute of Technology, Princeton, and Ecole des Beaux Arts. He was Vice-president of Designers for Industry in Cleveland before opening his own office in 1947, and is a member of the American Institute of Architects and the Society of Industrial Designers.

Peressutti

Enrico Peressutti can be seen at full length on page 52, representing the Italian architects Belgiojoso, Peressutti and Rogers (BBPR) at the opening of their showroom for Olivetti in New York. B, P, and R are already known here through professorships at M.I.T. and Princeton and the journal *Cassa Bella*, edited by Ernesto Rogers.

Dreyfuss

Henry Dreyfuss heads a transcontinental design office (Los Angeles and New York) that turns out small room thermostats (page 118) and heavy machinery with equal aplomb (his design for the new Mergenthaler system for setting type from film was described in August ID). Mr. Dreyfuss is an Associate in Industrial Design at the California Institute of Technology, a founder, past president, and Fellow of the SID.



This bubble is our star salesman

Homasote boards are weatherproof; they are highly moisture-resistant. When a prospective purchaser challenges these statements, the Homasote representative puts a sample of the board on his desk — and pours a small amount of drinking water onto it. This forms a bubble, as pictured above.

The bubble remains there throughout the conversation. Allowing only for an extremely dry room, the bubble is essentially unchanged when the prospect returns to his office the next day. A good many customers have found this an interesting fact.

We would like to send you a sample piece of Homasote and ask you to make this test for yourself. After which — you can also test it for strength, nail-holding, sound-deadening, or any other test that has a bearing on your immediate requirements.

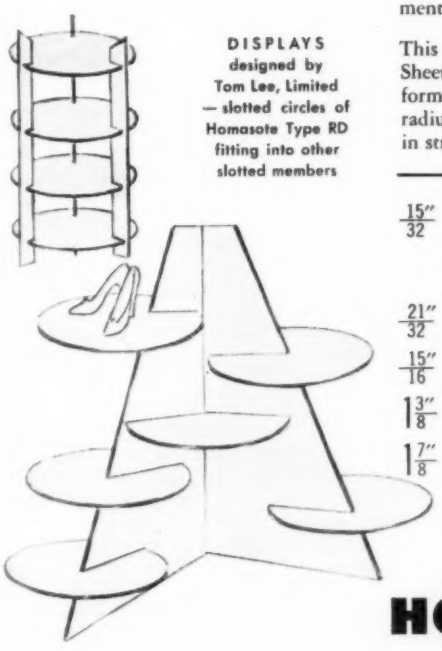
This material also has SIZE... its Big Sheets — up to 8' x 14' — abolish many former size limitations. Bent on an 18" radius, it holds its new form with no loss in strength.

This material has NO GRAIN... its fine, homogeneous surface takes any paint or stain, holds a coat of paper, leather or any other laminate glue can hold.

Homasote is available in a variety of forms and thicknesses — each having its own special qualities and properties. *All are weatherproof and crackproof — all may be used indoors or out.*

In one form or another, users have already found more than a hundred applications for Homasote Boards.

May we send you literature, samples and detailed specifications? Kindly specify which boards sound interesting and address your inquiry to Department 88.



DISPLAYS designed by Tom Lee, Limited — slotted circles of Homasote Type RD fitting into other slotted members

15/32" **HOMASOTE**—in Big Sheets up to 8' x 14'. Time-tested in all climates — from Alaska to Africa to Little America.

21/32" **HOMASOTE TYPE RD**— Strong, tough, weatherproof. All 4 thicknesses

15/16" in 2' x 8' size—with V-groove on 21/32" and 15/16"; tongue and groove on 1 3/8" and 1 7/8". *Not V-grooved*—21/32" also in

1 3/8" sizes up to 8' x 14'; 15/16" up to 4' x 14'.

1 7/8" Live load 200 lbs. per sq. ft.

5/8" **HOMASOTE TYPE U** — more resilient. In 4' x 4' size.

3/8" **STRIATED HOMASOTE PANELS** — offering endless variety of pattern, depending upon how cut and positioned. Panels are 8' in length; 16", 32" and 48" in width.

3/8" **WOOD-TEXTURED HOMASOTE PANELS**—molded from actual board, retaining everything but the splinters. (Dimensions same as for Striated Panels.)

SEE OUR CATALOG IN SWEET'S

HOMASOTE COMPANY

TRENTON 3, NEW JERSEY

LETTERS

Satisfied . . .

Sirs:
Some days ago I received number three of your magazine. I wish to express my satisfaction about this useful and perfectly made review. I congratulate you and wish you full success.
Max Bill
Hochschüle für Gestaltung
Ulm, Germany

Impressed . . .

Sirs:
As charter subscribers to INDUSTRIAL DESIGN, we have developed an almost unbelievable enthusiasm for your publication —for its scope, its content and its form. Really, a most impressive offering.
Robert V. O'Brien,
Executive Vice President
The Brady Company
Appleton, Wisconsin

Gratified . . .

Sirs:
I have noted with gratification the growth of your new publication. I have not only found the early issues crammed with information pertinent to my problems of attempting to develop new products for home furnishing use, but I have also enjoyed thoroughly your manner of presentation.

I wish to express my thanks especially for your article covering design patents and the protection of those general designs and also your very specific, informative and illuminating article on new plastics which "grow their own skin" by W. C. Renwick. I for one would appreciate more specific technical, business and engineering articles like these.
Norbert Nelson
Richards Morgenthau Co.
New York, N. Y.

And interested

Sirs:
I just finished reading my first copy of INDUSTRIAL DESIGN. Without a doubt this is one of the most interesting publications I have ever read. I am looking forward to the time when I will be able to purchase a subscription.
Robert Allison
General Electric Training Program
Schenectady, N. Y.

Five judgements

Sirs:
SOME snap judgements:
1. Reader Wang is right. For the most part your pages are jumpy and hard to read. A page is a page is a page is a good principle. And why the timidity about page numbers?
2. I'm getting tired of round tables with conferences attached. Especially conferences about design. All I got out of the Good Design thing was that somebody had to sell kitchen floors in order to sell a potful of clocks. As for Aspen — let me lift some remarks out of context: "Planning—Basis of Design." What in hell does that mean? It could just as easily have read "Design—Basis of Planning." "The public is the jury that decides by its purchases who is a good designer." Why advertise?
3. I couldn't help comparing the magnificent strength of the Fulton's engine with the superficialities of Bell & Howell. A far cry indeed from the "clean, direct and businesslike appearance which came as a natural expression of its function rather than from special esthetic considerations." There was a day when engineers were good designers. Nowadays engineers think they're designers, and designers—God knows what they think they are—engineers I guess; all that "research" and everything.
4. Another thing I have had enough of is the "accidental" approach to design. One square foot of Jackson Pollock and you've had it. Why the "designer, too, in his search for new relationships, may find a stimulus in this world of accidentals and strange juxtapositions" is more than I can handle. Here is a fantastically beautiful world of light and air, water, storm and wind, mountains, valleys, rocks, trees—and the designer is supposed to look at somebody's old glove. (We have a number this time: page 100) There is no virtue in the insignificant—not even in a good photograph of it.
5. There were two, only two, examples of product design in your August issue worth looking at twice. One was the engine. The other was the section of steam-traced piping. No nonsense here, just the rigorous discipline of solving a problem, without all the advertising-selling "esthetic." That's "Good Design."
Joseph Salerno, architect
New York, N. Y.

Credit due

Sirs:
May we request a credit note for our design of a family of handles and controls for the Shopsmith which is shown in a full page photo in the "Do it Yourself" article? Everybody and his grandmother gets credit in your publication and we feel we deserve it just as much as the big boys. Incidentally, Hans Goldschmidt, in charge of engineering and John Edgemond, chief engineer of Magna, are responsible for the basic design and engineering. We were industrial design consultants.
Channing Wallace Gilson, designer
Los Angeles, California

Sirs:
I am sure that through an oversight my name as consultant designer to the Clary Multiplier Corporation was omitted from the copy below the picture of their machine on page 127 in the August issue.
Newton S. Leichter, designer
Los Angeles, California

We answer the two corrections above with a plea. In both cases we asked the manufacturer for design credits; in both we got none. Designers can help by sending us material directly. They can also help us to impress manufacturers with the fact that design credits are an essential part of product information.—Ed.

Experimental furniture

Sirs:
On page 123 in your August issue you show three pieces of furniture which you credit to the Heywood Wakefield Furniture Company. We would like to correct this error.

The pieces you illustrate are part of an experimental group designed and engineered by Victor G. Canzani and myself of the Industrial Design Laboratory at Pratt Institute, under the direction of the late Alexander J. Kostellow. The furniture represents the results of a mutual research project with the Plastics Division of the Monsanto Chemical Company.

Heywood Wakefield Furniture Company was kind enough to allow space in their New York showroom during the Furniture Market to introduce this experimental line to buyers and manufacturers.
Luigi A. Contini
Pratt Institute
Brooklyn, N. Y.

CORNING GLASS BULLETIN

FOR PEOPLE WHO MAKE THINGS

3-WAY glass grounds electricity, conducts it, and fights off heat rays . . . Glass gun shoots oil . . . An introduction to solving some materials problems.

3-way glass

E-C glass is a PYREX brand glass panel (or tube) permanently bonded on one side with a thin (20-millionths inch) transparent coating that conducts electricity. (The E-C stands for Electrically Conducting.) Run a current through it and you get an efficient heating element. Ground it and it drains off charges of static electricity, as any metal would. (But you can *see through* the E-C glass). Let it stand by itself, with or without electrical or ground connections, and E-C glass reflects infrared heat rays.

E-C radiant glass panels drying lacquer on plastic sheets.

Since 1950 we've worked with a number of customers on applying E-C glass, quite successfully, as a heating element in space heaters, home appliances and industrial drying equipment. (It's especially useful where an uniformly distributed heat flow is wanted.)

One of the most recent applications is shielding certain elements of IBM's new electronic calculator from static that might disrupt the workings of this remarkable abacus.

And a well-known steel producer has erected a curtain of E-C glass between shear pulpit operators and the intense heat of the fiery steel bars moving through the shear. (About 60% of those sizzling infrared rays bounce off the E-C curtain.)

Not every day, but every now and then, some manufacturer, bent on new product development or old product improvement, shoots a question at us, "What about this E-C glass of yours?"

▼ We're always glad to tell people what we know that's pertinent to their problems. And we'll be glad to tell you, too, if you're interested. Just check the E-C square in the coupon below.

glass gun

Nobody would have believed five years ago that a gun made of glass could shoot anything, but today the oil industry is using glass guns to shoot holes in heavy steel oil well casings to release trapped oil pools miles deep in the ground, making run-out wells produce profitably again and even bringing some dry holes to life.

These guns are called glass jet perforators. They contain shaped explosive charges and a 4-inch charge will cut a neat hole through six inches of steel without leaving even a burr.

McCullough Tool Company of Houston, Texas, was far from happy with the containers for their shaped charges. After considerable experimenting with various metal containers, McCullough asked, could we design and manufacture a glass container that would stand the tremendous pressures involved, but completely disintegrate after the charge exploded? (Metal containers left debris in the well which often clogged valves and pumps.)

Up to thirty or forty glass jet perforators are mounted in series on a metal strip for lowering into oil well casing.

How we found the answer in PYREX heat-resisting glass perforators may interest you even if you don't own an oil well. It illustrates another instance where we were able to help a customer find a successful answer to a design and engineering materials problem.

▼ An article in the October-November 1953 Corning GLASSMAKER tells the story in detail. Just check the appropriate square on the coupon below and we'll be glad to send you a copy.

solving problems

If you've been wrestling with a materials problem that still refuses to lie down long enough for the count, we encourage you to thumb a few informative pages that describe briefly and succinctly some of the things other people are doing today with glass.

In a matter of only a few decades glass has changed from a simple, fragile material of limited utility into a versatile material whose uses are unnumbered. You'll glimpse something of the meaning of this conversion by remembering that glass can now be made as light as cork or heavier than iron, hard as steel or soft as cotton, thin as tissue or thick as a wall; that it can be fragile or strong, a conductor of electricity or an insulator, a selective transmitter or absorber of radiation in the infrared or the visible, the ultraviolet or the X-ray regions of the spectrum, *as required.*

There may be an idea or two for you in these 48 pages of informative but nontechnical reading about some of the things people are doing these days with glass.

▼ This parade of antithetical utilities roughly indicates the flexibility and versatility of modern glass. If any of them suggest a possible answer to that stubborn problem of yours and you'd like to modernize your information about glass, quite painlessly, the few pages we mentioned three paragraphs ago make up an illustrated booklet we'd like to send you. Just make your mark in the "Glass and You" square and mail the coupon to us.

If the items covered on this page don't seem to bear on any problem of yours, we may have the information you need at our fingertips. We'd like to hear from you.
▼

CORNING GLASS WORKS
CORNING, N. Y.

Corning means research in Glass

CORNING GLASS WORKS, 32-10 Crystal Street, Corning, N. Y.

Please send me more information about E-C glass ☐; a copy of the Oct.-Nov. '53 GLASSMAKER article ☐; "Glass and You" ☐.

NAME _____ TITLE _____

COMPANY _____

ADDRESS _____

CITY _____ ZONE _____ STATE _____

A multi-position clamp, designed to hold difficult angles of tubing for welding by Donald H. Lloyd, 16, of Orange, N. J., and a closed-circuit television unit built by Donald Trumbull, also 16, of Milford, Conn., were two of Ford's I.A.A. winners.

Ford rewards junior craftsmen

For the fifth year, winners in Ford's annual Industrial Arts Awards competition show the amazing virtuosity and ingenuity of design-minded high school students. Selected from more than 5,000 entries, thirty-two of the 700 top prize winners were shown and demonstrated recently at New York's Waldorf Astoria hotel; all will go on display at Chicago's Museum of Science and Industry. Special achievement and ingenuity awards go to outstanding entries in fourteen specific craftsmanship divisions (such as wrought metal, machine shop, plastics, electrical and pattern making), also judged according to the student's grade level. Among the outstanding awards this year was a radio-controlled car built by David Swindler, 18, of Warren, Ohio. Another, built by Baylor W. Spratt, 19, of Pittsburgh, was an experimental pulse-jet engine; Wilbur Barath, 17, of Cleveland, built an electrically-operated four cylinder engine of transparent plastic. Some of the winning ideas, like a carved mahogany four-poster, stress hand-craftsmanship; others, like the clamp pictured above, have real industrial application.

Alexander Jusserand Kostellow

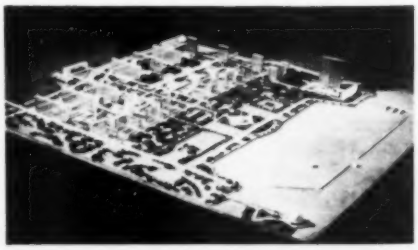
In the passing of Alexander Kostellow, on September 1, industrial design has lost one of its most imaginative spirits and education one of its leaders. Chairman of the Department of Design at Pratt Institute, he was engaged on a special project for General Motors in Detroit at the time of his death; his most recent and best-known work for them was Frigidaire's Kitchen of Tomorrow. Before joining Pratt, in 1938, he taught at Carnegie Institute of Technology; as director of A. J. Kostellow Associates, New York design consultants, he directed design and product development for major companies for over two decades.

Alexander Kostellow

Chicago Loop Unlimited

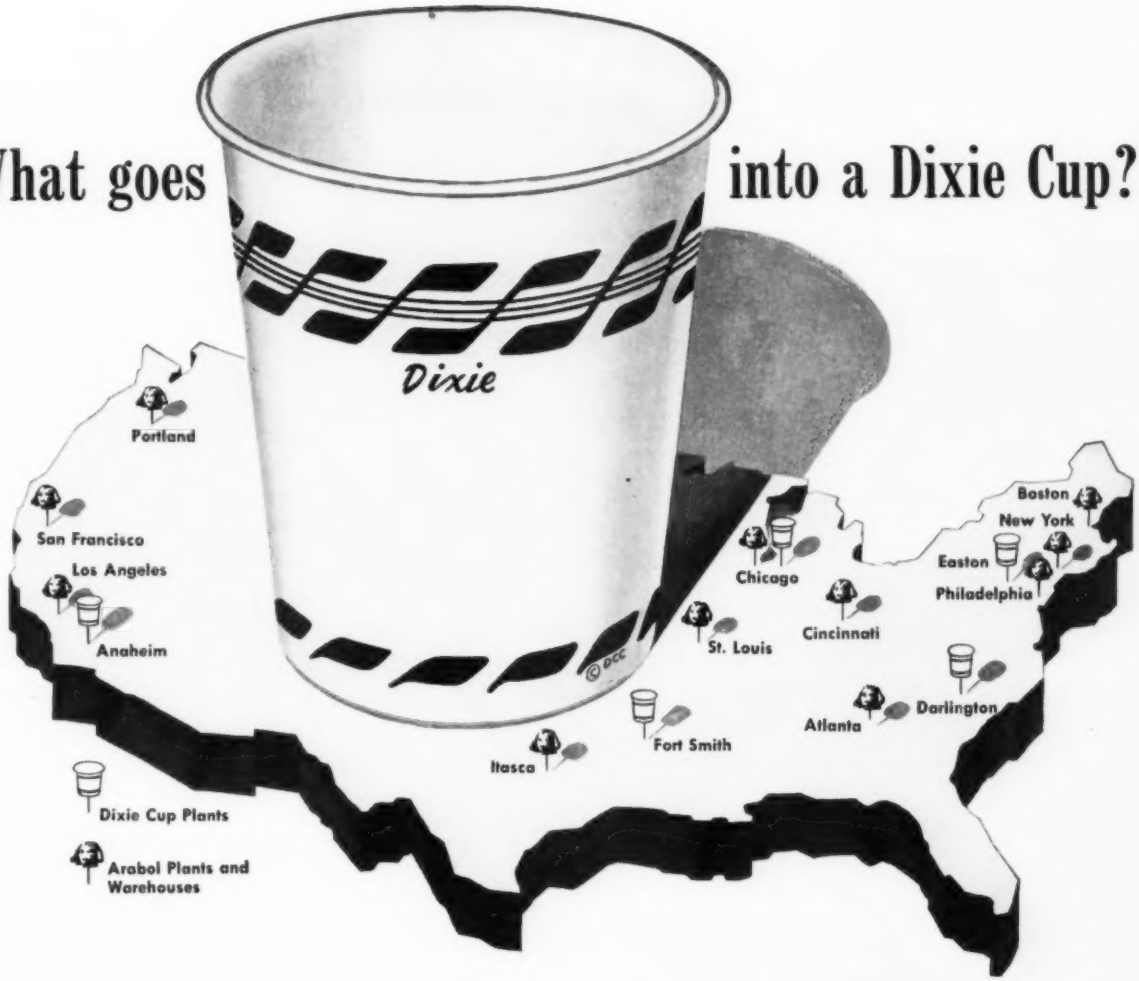
Plans to remodel Chicago's Loop area into a model civic and commercial center were sponsored by Carson Pirie Scott & Co. in their Centennial Competition. Chosen by a five-man jury headed by Dr. Henry T. Heald, chancellor of New York University and former president of I.I.T., the first-award plan was designed by four recent Pratt Institute graduates: Herbert Tessler, Leon Moed, Joseph D'Amelio and William Liskamm. William N. Breger, associate professor of architectural design at Pratt was the project's design critic. In a scheme for the ultimate organization and development of the district, for an expandable segregated traffic pattern (access and circulation now being among the severest Loop problems).

This plan represents a goal for the next hundred years; the second award plan, by the Philadelphia group headed by Wilhelm von Moltke of the Philadelphia City Planning Commission, and the third, by a Chicago team headed by John F. Kausal of Pace Associates, could be intermediate stages.



$20,000 pass from John T. Pirie, Jr., to the team of Liskamm, D'Amelio, Moed, Tessler and Breger (l. to r.) for their winning Chicago Loop plan (top).

What goes into a Dixie Cup?



Into a Dixie Cup goes a variety of hot and cold foods and drink... Cokes, soda and malteds in the flat bottom cold drink cup shown above for the younger set – in many other sizes and types, a wide selection of packaged foods for the home. In the relatively few years since the Dixie Cup Company created the first paper cup, the Dixie Cup has become a national institution.

Today, the Dixie Cup has an every-day role in Industry, too. Blanketing the United States, five Dixie Plants turn out the many different sizes and types of Dixie Cups used by Industry for serving food and drink. Dixie Cups assure clean, safe service at water coolers, in cafeterias and restaurants, in automatic drink vending machines, for pre-packaged foods, and for a variety of other important uses.

Into the making of a Dixie Cup go science and skill born of many years' experience; the finest modern machinery; raw materials to feed these machines – carefully selected paper, ink and adhesives.

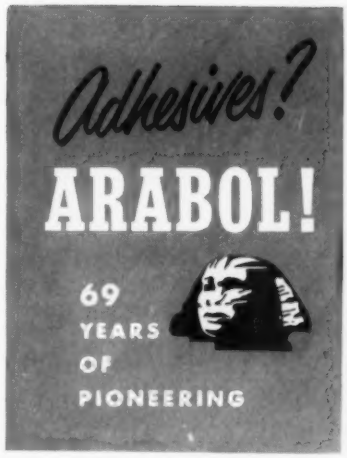
On the subject of adhesives, Dixie says, "Arabol Adhesives meet the exacting quality requirements which make Dixie Cups perfectly safe and economical for both Industrial and home use!"

The multi-billion dollar Paper Converting Industry is one of a hundred industries in which Arabol is privileged to serve the leaders. In 69 years of pioneering, more than 10,000 adhesives formulas have been developed in our five laboratories – each meeting a specific need for a special adhesive in some step of a customer's operation.

Somewhere in your business, you use adhesives for the making, labeling, packaging or shipping of your product. The cost of fine adhesives is low – so low, in fact, that you can easily afford adhesives made to your specifications for each of your requirements.

Somewhere *near* your business, one of seven Arabol plants and four warehouses stands ready to supply your regular adhesives needs – to furnish prompt and efficient help in meeting your new ones. And in the event of disaster or economic need in one area, you are served from another plant; you are assured of uniform quality and service.

We invite the opportunity to submit samples for you to test in your own plant – under your particular working conditions – for your specific requirements, whatever their nature. That is the one kind of testing that assures you of satisfactory results. Your inquiry to Department 15 will bring a prompt response.



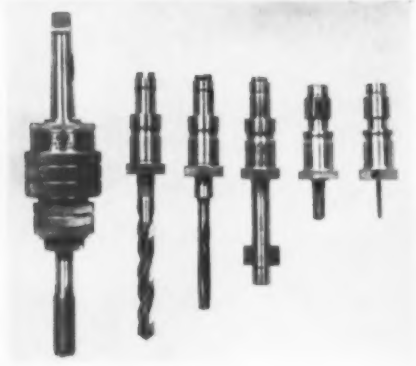
THE ARABOL MFG. CO.

... a nationwide organization serving major users of industrial adhesives

EXECUTIVE OFFICES: 110 E. 42nd ST., N. Y. 17, N. Y.
CHICAGO • SAN FRANCISCO • LOS ANGELES
ST. LOUIS • ATLANTA • PHILADELPHIA • BOSTON
PORTLAND, Ore. • ITASCA, Tex. • CINCINNATI
LONDON, Eng.

Scottish Industries Fair

In addition to its best-known export, Scotland is now manufacturing a remarkable number of industrial products, some under American aegis. The Scottish Industries Exhibition, held in September in Glasgow, showed such products of industries developed since the war as typewriters, calculators (American), prefabricated houses, giant gasoline and electric motors, airplane engines and plastics. More than a thousand new factories have gone up in Scotland since the war, as American, English, Canadian and European manufacturers have found a location convenient to European markets, and a labor force with traditional Scottish diligence.
The exhibition, sponsored by the Scottish Council for Development and Industry, was unusually attractive with yards of Scottish fabric defining the halls.



At the Scottish fair (top): "Jay-dee" universal attachment for radial drills.

Ancestor restored

One of America's industrial landmarks, the colonial ironworks at Saugus, Massachusetts, has been restored and opened as a museum by the iron and steel industry, working through the American Iron and Steel Institute. Dating back to 1646, the ironworks, large for its day, was perhaps our first real industrial plant.

Fairgrounds at Oslo: propellor is part of a shipbuilding exhibit.

Oslo exhibits

A twenty-three-foot ship model, a full-size railway car, and a demonstration of the seven steps required to make an aluminum coffee pot were among the star attractions at the recent large mechanical engineering exhibition at Oslo, Norway. Sponsored by the MVL—National Federation of Mechanical Workshops—the show played host to some 15,000 school children from Oslo and nearby cities as part of its educational and recruiting program. Most displays of the 180 exhibitors were arranged inside three large buildings; outside, amid benches and flying pennants, exhibits included an 11-ton ship propellor.

William B. Petzold

The death of William Petzold has been announced by General Electric. Mr. Petzold was supervisor of design for the company's Laminated and Insulating Products Department. A pioneer in plastics design, he designed the first all-plastic lipstick case, and more recently, patterns and colors for Textolite. With GE since 1928, he established the first industrial design group in molded plastics. He was a member of the Society of Industrial Designers.

Illuminated acoustical panels on display transform Fiberglas' New York showroom.

Unindustrial design

Just because she is so un-industrially designed, the whimsical lady below finds her way into the news. Designed by the young Danish ceramist Bjorn Wiinblad, who looks as perpetually surprised, delighted and wryly amused as she does, she holds a candle in each hand, is on view at Georg Jensen, New York, in a show of his work, and is here as a reminder of the Other approach.

Fiberglas Acoustarama

With Acoustarama, Owens-Corning Fiberglas demonstrated how its acoustical tile had changed from a strictly utilitarian material into a product with design, pattern, and color. In a display designed by Tom Lee in the Fiberglas headquarters in New York, illuminated panels were arranged along a dark corridor to give a close-up view of four decorative kinds of tile: Stria, a corduroy-like texture; Random Perforated, which looks like a bulletin board after two sizes of thumbtacks had got through with it; ordinary Textured; and Sonofaced, showing a web of fibers through its smooth plastic-filmed surface, designed in pastels by Teague Associates.


H
C
ORIGINATORS OF
SEE·DEEP
THE PIONEER
3-DIMENSION
PLASTIC
Cardinal
Division
HOOSIER CARDINAL
CORPORATION
EVANSVILLE 7, INDIANA

Two ways with glass: Steuben whiskey decanter (top) and Italian vases and bowl.

Glass directions

Two quite different directions in glass design were shown recently in New York store exhibitions. The traditional heavy, clear, rock-crystal look of Steuben pieces like the one above contrasts with the almost haphazard shapes of Ercole Barovier's bowls and vases. Reminiscent of antique Roman glass, they are luminously stippled by blown streaks of orange or spinach-green pigment. Deceptively heavy, they are on view at Bonniers.

Packaging Competition

The Package Designers Council announces its annual packaging competition. To be eligible for the 1954 competition, packages on the market since October 1953 must be in the hands of the P.D.C., 66 West 38th Street, New York, by November 22. The competition is open to product manufacturers, package designers, advertising agencies and materials suppliers; packages (up to six in each) may be submitted under 11 categories: coordinated packaging program; drug package or family of packages; cosmetics; toys; tobacco and liquor; notions or soft goods; hardware, household or sporting goods; food; gift; redesign; new products. The actual packages must be accompanied by an entry blank obtainable from the Council.

New Higgins award

A new competition, the John Woodman Higgins Award, will give an annual prize of $500 to the individual who has done the most outstanding and original redesign work in the field of metal stampings. The award will be based on: successful production of a metal stamping for a part previously made by another metalworking process; originality of design involved in the changeover; significant cost savings through redesign. First of the Higgins awards will be presented in May, 1955; recommendations for the award should be addressed before December 1, 1954, to the John Woodman Higgins Redesign Award, Pressed Metal Institute, 2860 East 130th Street, Cleveland 20, Ohio.

Goodyear's performing target

An all-metal winged target which can be towed at speeds over 500 miles per hour has been developed by Goodyear Aircraft Corporation in cooperation with Wright Air Development Center of the Air Research and Development Command. The 1400-pound target, which looks like a jet fighter, has a 25-foot wing span and can be towed as far as two miles behind a medium jet bomber tow-plane. Towed to one side, it can perform evasive maneuvers. When it lands, a parachute eases it to a stop.

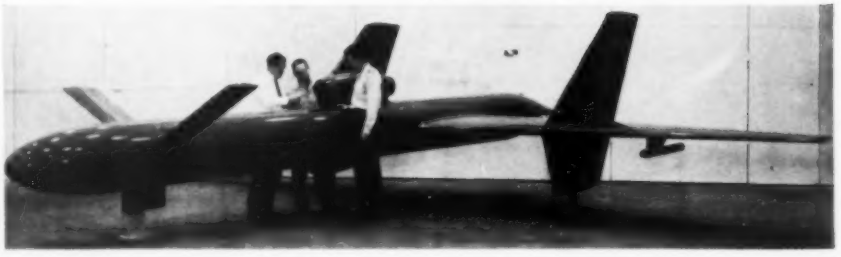
Boeing's big jet

Boeing's swept-wing 707, America's first jet transport (the British Comet had a head start but is presently grounded pending investigation of last spring's crashes), is now being tested and evaluated in Seattle. Costing over $15 million, the big jet prototype, powered by four Pratt & Whitney engines each rated at 10,000 pounds of thrust, will be used to demonstrate the potentialities of jet power for military and commerical transport, carrying 80 to 130 passengers at 550 miles per hour. The 100′ long interior of the commercial version has been designed by Walter Dorwin Teague Associates.

Lockheed's big turbo-jet

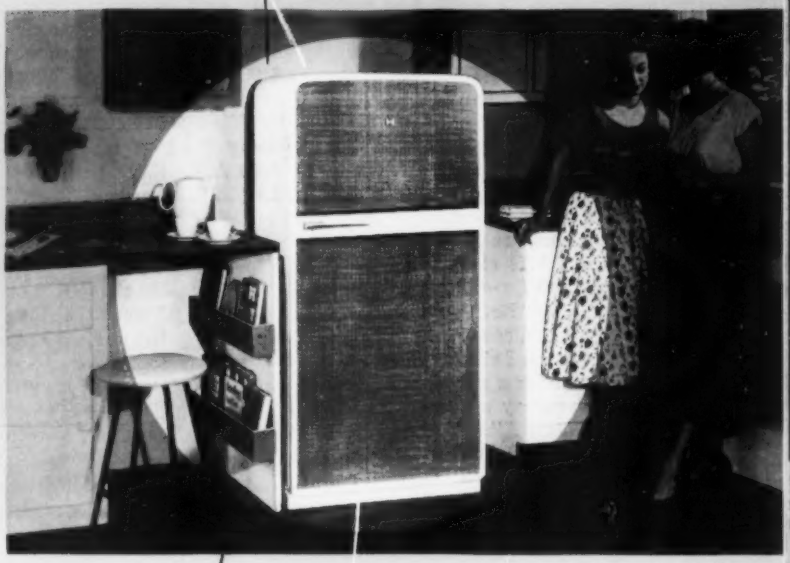
Bigger, higher and faster all the time: Lockheed is now testing its U.S. Air Force YC-130 turbo-prop transport, the first military transport designed for jet-and-propellors. The underslung fuselage with its high, upswept tail, is designed to facilitate loading; the wingspread is 132 feet. Four 3750-h.p. Allison turbo-prop engines are expected to fly the big plane higher and faster with 20 tons of cargo than any transport now flying, says Lockheed, although the Air Force has not yet released official figures. Two developmental models of the YC-130 are being built at Lockheed's Burbank plant, while production preparations begin at their Georgia division.

Shapes of wings to come, as the jet roster grows: Goodyear's sleek, fighter-shaped tow-target (below); Boeing's giant jet transport (right); and Lockheed's high-speeed turbo-prop transport (bottom).



VICRTEX V.E.F.* FABRICS

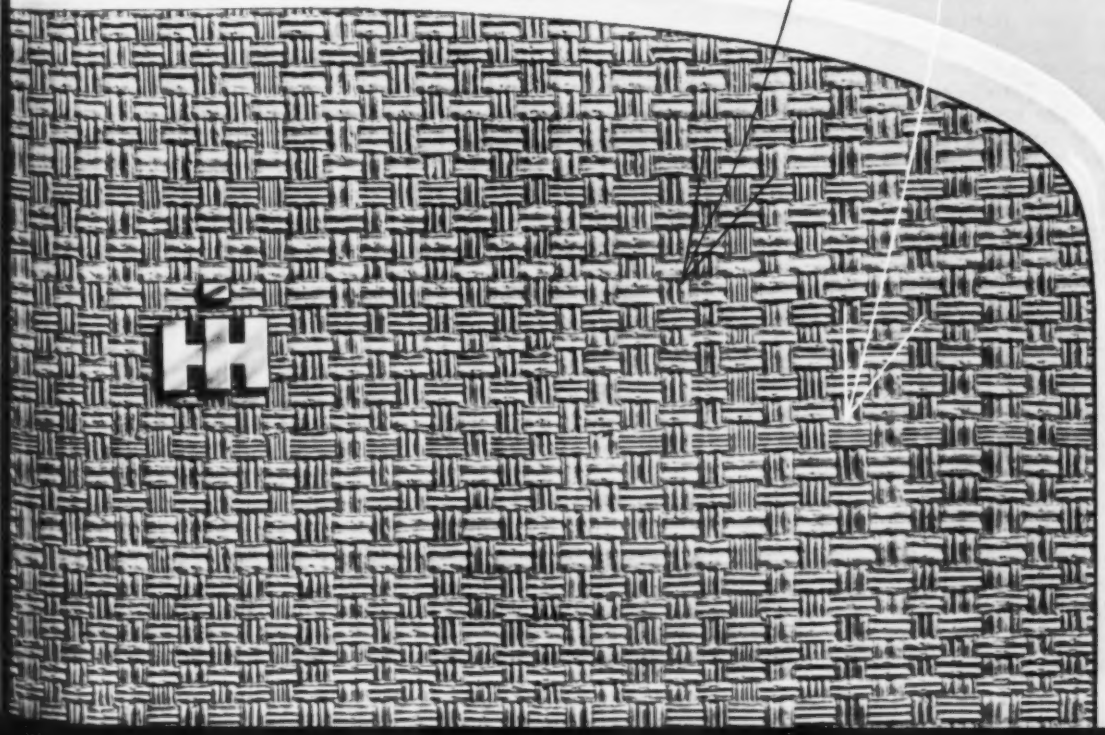
open a new door to beauty



Fabric refrigerator doors? Never! That is, never before Vicrtex! International Harvester Co. styles a new model with handsome Vicrtex "Woodweave" — one of 30 deeply sculptured textures in 36 fadeproof House and Garden colors. Product designers may well profit by this beautiful adventure in textural thinking.

Splashproof, mar-proof, flame-stain-soil resistant . . . care-free a swish of a damp cloth, and it's clean . . . practically indestructible Vicrtex fits smoothly into modern life and modern decor. To open new vistas of beauty, send for sample swatches and prices today.

L. E. CARPENTER & COMPANY INC. SALES OFFICE · Empire State Building, New York 1 • Longacre 4-0080 • MILLS: Wharton, New Jersey



* *vinyl electronically fused* needs no extra backing either as wall or furniture covering.

Krause

Quesada

Microwaves and nuclei

Research makes news for three major companies. A new $10,000,000 laboratory for advanced research has been announced by Elwood R. Quesada, vice-president and general manager of Lockheed's Missile Systems Division at Van Nuys, California. Nuclear research will receive heavy emphasis, according to Quesada. Heading the laboratory will be Dr. Ernst Krause, formerly associate director of Washington's Naval Research Laboratory. General Electric will establish a new electron tube development laboratory on Stanford University land at Palo Alto. H. R. Oldfield, Jr., has been appointed manager of the new laboratory, which will explore and develop microwave electron tubes for the broadcast, communications and radar fields. Dow Chemical has begun construction on an ultra-modern 40,000 square-foot laboratory to house its Biochemical Research Department at Midland, Mich.

New Forces for the IDI

Launching what it hopes will be a tradition, the Industrial Designers Institute Southern New England Chapter held its first annual design symposium on October 2, in Silvermine, Connecticut. The all-day program focused on activities which, as chairman Robert Redmann stated to the 250-member audience, "will affect design thinking whether you like it or not." After an opening discussion of the policies and plans of INDUSTRIAL DESIGN, by co-editor Jane Fiske Mitarachi, Professor John Arnold of M.I.T. defined the qualities of a "comprehensive designer," and the education which might produce him. Robert P. MacNeil, of Electric Boat Company, illustrated problems in the design of instrumentation for the "anatomical submarine," the *Nautilus*. Potentials of glass-reinforced plastic, and its design requirements, were outlined by Dr. Robert Nelb of Naugatuck Chemical, and the day concluded with designer Seymour Robins' displays and movies of the Ames perception experiments at Princeton—a vivid demonstration of how much habitual "prejudice" the eye brings to an object.

S. I. D. conference program

Plans are now complete for the Society of Industrial Designers' gala tenth anniversary celebration and annual meeting which will take place October 28-31 at Williamsburg, Virginia. The theme of the meeting, announced by S.I.D. president Robert H. Hose, is "Industrial Design—the Customer's Voice in Management."

As looks now, the schedule for the four-day meeting shapes up something like this:

Thursday, the 28th

9:00 A.M. Registration

1:00 P.M. Lunch; speaker: Robert H. Hose, outgoing president.

8:00 P.M. Forum: a philosophical look into design and the design profession.

Friday, the 29th

9:00 A.M. S.I.D. business meeting

3.00 P.M. Forum: Open discussion on two design case histories, with exhibits: Arthur N. BecVar of General Electric on the GE refrigerator; Dave Chapman on the Brunswick - Balke - Collender school furniture.

8:00 P.M. Dinner; speaker: Albert Christ-Janer, art historian, educator, director of New York University's proposed Creative Art Center.

Saturday, the 30th

9:00 A.M. Forum: How large corporations deal with design, presented by "Design Directors in Industry"; Ted Clement, Eastman Kodak, moderator. Speaker: L. C. Kalff, general art director, Phillips N. V. Eindhoven, and president, Netherlands Design Corp. Speaker: Robert Gruer, president, Industrial Designers' Institute. Speaker: Fred K. Bollman, Foreign Operations Administration, on forthcoming U.S. tour of European designers.

1:00 P.M. Lunch, speaker: Charles E. Whitney, president, Whitney Publications.

8:15 P.M. Past Presidents' Dinner; speaker: Paul Hollister, formerly executive vice-president, Macy's; now merchandising consultant. Installation of new officers and address by new president.

Sunday, the 31st

10:15 A.M. Forum: S.I.D. panel on the business elements of design.

Unistrut Space Frame

A new construction system, based on an unusually strong framework which eliminates the need for all but the minimum supporting columns, is embodied in a two-storey building going up on the University of Michigan campus. In the Unistrut Space Frame system, a network of diagonal struts connect horizontal lattices at roof and ceiling levels, permitting an extraordinary stress load to be distributed in three directions. The building's entire framework is composed of standard four-foot steel struts and connecting plates, bolted together at the site; four-by-four panels, many of them plastic, form its skin. The building is readily demountable, and as interior walls carry no load, they can be shifted at will. Sponsored by the Unistrut Corporation of Wayne, Michigan, research for the project was conducted by the University's Engineering Research Institute and the College of Architecture and Design under the direction of Professor C. Theodore Larsen.

Michigan's two-storey Unistrut building: expandable, demountable, reusable.

GOOD DESIGN

10th Exhibition Opens January 4, 1955 at The Merchandise Mart

NOTE—ENTRIES ARE DUE NOVEMBER 8, 1954

The Museum of Modern Art, New York, and The Merchandise Mart, Chicago, invite you to submit your outstanding designs to the Selection Committee for Good Design Exhibition, opening during the January Market.

Anything made or to be made during 1954 is eligible

Furniture	Floor Coverings	Appliances
Housewares	Curtain Draperies	China
Upholstery Fabrics	Glass	Cutlery
Lamps	Table and Bed Linens	Radio and TV

The 1955 Selection Committee

Edgar Kaufmann Jr.,
Director, Good Design Exhibition, Permanent Chairman

Arthur N. BecVar
Manager, Products and Appearance Design, Major Appliance Division, General Electric Co.

Just Lunning
General Manager, George Jensen Inc. and Frederik Lunning Inc.

Photos of your products should reach Good Design Office, Museum of Modern Art, 11 W. 53rd Street, New York no later than November 8th.

Samples, if you'd rather submit these, should reach Good Design, Room 12-122, The Merchandise Mart, Chicago 54, Ill., no later than November 8th.

Information should accompany photos or samples giving retail price and date when product was first marketed.

Eligible items are those first marketed any time in 1954; progressive in design (no "period" design, please); available to the U. S. public through retailers or on order. Handmade and imported products are welcomed along with mass produced and American designs.

Arden House conference

Scheduled for October 20-22, too late for us to report in this issue, was the 26th Annual Design Conference sponsored by Boston's Institute of Contemporary Art at Arden House, near Harriman, New York. Centered around the topic, "How can designers serve industry more effectively?", the "open" conference was planned essentially for younger staff and free lance designers, and design directors, enabling them to exchange ideas informally and hear talks by leading design figures. Among those scheduled were J. Gordon Lippincott of Lippincott & Margulies, William V. Judson, design director of Elgin National Watch Co., Mel St. Clair, design director of the Plax Corporation, and William J. J. Gordon of Arthur D. Little.

Automation show

Automation was the theme of the First International Instrument Congress and Exposition held recently in Philadelphia. Some 325 automatic equipment manufacturers displayed more than 2000 types of automatic devices ranging from simple pressure gauges to complex analog and digital computers. The show, at Commercial Hall, was sponsored by the Instrument Society of America.

Model museum for Fort Worth

A new art museum and educational center, designed for the flexibility of an educational program rather than for a fixed permanent display, opened in Fort Worth, Texas, on October 8. Designed by Herbert Bayer and his assistant, Gordon Chadwick, in collaboration with the Fort Worth architects A. George King and Associates, the first floor is one large area. Lighting comes from continuous electrical ducts recessed in the ceiling, along which lights may be fixed at any point. Classrooms and workshops are upstairs; a special feature of the museum is a small elliptical "Performance Gallery," with a stage, sliding display walls and 50 seats.

New baby for I D I

Swelled by the ranks of General Motors' styling section, the Industrial Designers' Institute inaugurated a Detroit chapter on September 29th. On hand to launch the new chapter, expected to become IDI's biggest, and to welcome Chairman William Mitchell (of GM), were IDI leaders seated left to right in the picture below: John Vassos, John Griswold, Jens Risom, Henry Hagart and Peter Quay Yang.

IDI hears new Detroit Chairman Mitchell.

New plant

Athol Manufacturing Company announces a new plant for the production of Terson vinyl coated fabric at Durham, North Carolina.

Shell Molding and You

"Shell Molding and You," a twenty-minute sound slide film designed to acquaint foundrymen and buyers of foundry products with the latest benefits of this process has been made available by General Electric's Chemical Materials Department. The 35 mm color film gives step by step demonstrations of the shell molding operations at the experimental foundry which GE has installed at Pittsfield, Massachusetts, for the purpose of studying and developing new molding techniques. The film may be borrowed by writing to the General Electric Company, Chemical Materials Department, Pittsfield, Massachusetts.

I. I. T. shows and grows

In an all-out effort to expand its Institute of Design, Illinois Institute of Technology has simultaneously launched a fund-raising program and a First Annual Chicago Area Industrial Design Exhibit. Chairman of the campaign to raise $750,000 to finance the new building which will house all design departments (ID August) is William Stewart, president of Martin-Senour. $250,000 has already been received from Col. Henry Crown, an Institute trustee; construction is expected to begin in November.

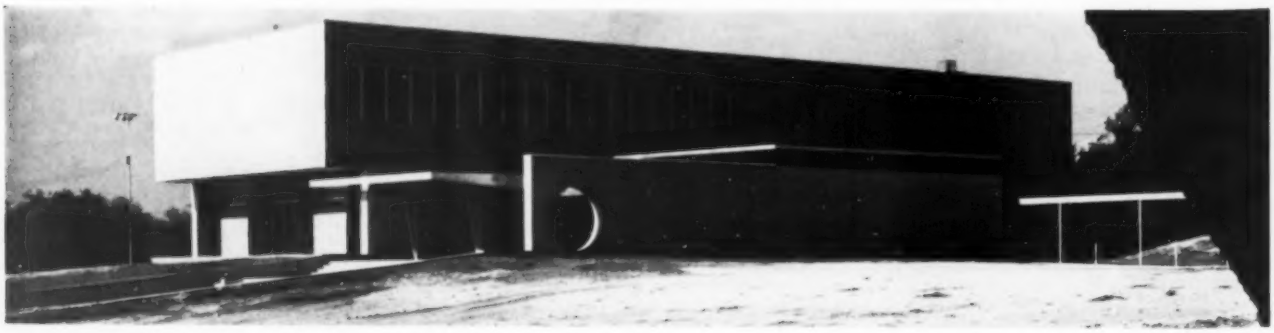
The purpose of the exhibition, a comprehensive show of Chicago designers' products, which will run to October 30 at 10 West 33rd Street, is both to stimulate public interest in good design and to point up Chicago's importance as a design center. Speaking at the opening, ID's publisher, Charles E. Whitney, underscored the growing need for well-trained designers in industry, urging that I.I.T. receive "the support not only of Chicagoans but of industrialists and designers throughout the nation."

Package designers elect

Frank Gianninoto, head of Frank Gianninoto & Associates, has been elected president of the Package Designers Council. Formerly executive vice-president, he is a fellow of the Industrial Designers' Institute. Newly elected also are Gerald Stahl, executive vice-president; Karl Fink, secretary, and George Reiner, Treasurer.

Landers buys Dazey

Landers, Frary & Clark, New Britain, Connecticut manufacturer of Universal household appliances, has purchased the net assets of the Dazey Corporation of St. Louis for $1,500,000. The purchase excludes the Dazey subsidiary Lloyd Scruggs Co. Dazey's non-electrical kitchen products, like the magnetic can opener, are expected to complement Landers' small electrical appliances.



Designed by Herbert Bayer, Fort Worth's Art Center is a model of flexibility, with mobile space, lighting, classrooms and even theater.

NEXT ISSUE

In the December issue **INDUSTRIAL DESIGN** *presents the first*

ANNUAL DESIGN REVIEW

An inclusive portfolio of the year's notable achievements by creative designers . . . reviewing products, packaging, material and accessory applications—from here and abroad.

Presented in handsome graphic format, with commentary on origin, development and marketing of many new and pioneering products, the Annual Design Review offers an indispensable reference for every practicing designer and management official. In addition to this noteworthy editorial service, INDUSTRIAL DESIGN advertising pages will contain informative product stories of numerous, leading manufacturers and producers.

Watch for this important reference issue.

Customer styling services
by Col. Alexis de Sakhnoffsky

Die casting, stamping, plating
and finishing facilities.

Automotive
Appliance
& Plumbing Hardware.

GRAND RAPIDS BRASS COMPANY
Division of Crampton Manufacturing Co.
101 Front Avenue, N. W. **Grand Rapids, Michigan**

3 Books You Need

DISPLAY

In launching this volume, INTERIORS has bound into a book some of the most ingenious and remarkable displays that have set new patterns in interior design thinking and techniques . . . in museums here and abroad . . . in shops from Minneapolis to Milan . . . in the Merchandise Mart in Chicago, the Triennale at Milan, the Festival of Britain . . . wherever creative designers have put prophetic ideas into three-dimensional designs planned to "show something." Edited by George Nelson, DISPLAY is a book that fairly crackles with fresh ideas. Its three main sections show the new systems, the outstanding displays and exhibitions created by more than 125 designers and architects of international note. It is a fertile source of new thinking . . a basic book for every library of interior design—including yours.

***Bound in full cloth**: 192 pages, 9 x 12 inches with 312 illustrations. Price* $12.50.

CHAIRS

In planning this series it seemed natural to devote one of the first books to the chair. The greatest names in architecture since the Renaissance have been connected with the designing of seating pieces. Le Corbusier, Mies van der Rohe and Marcel Breuer have been notably attracted to this important design problem. In CHAIRS, George Nelson traces the evolution of the chair and examines those produced today in bentwood, laminated wood, molded plastic, solid wood, metal and upholstery. New ideas and new applications of materials in furniture find their most important expression in the chair. The work of 137 designers is represented in this volume. CHAIRS is arresting reading, a valuable permanent inspiration and reference book and a handsome two color pictorial record of the chairs of today.

***Bound in full cloth**: 176 pages, 9 x 12 inches with 433 illustrations. Price* $10.00.

LIVING SPACES

is a book of contemporary interiors by 80 designers including Finn Juhl, Le Corbusier, Mies van der Rohe, Richard J. Neutra and Frank Lloyd Wright. In 232 photographs. LIVING SPACES shows outstanding contemporary designs selected by the editors of INTERIORS with unfailing taste and a keen perception of what is basic, rather than ephemeral. George Nelson's witty, informative, often provocative comment adds greatly to the value of the book—and to your reading pleasure. LIVING SPACES is the only complete collection of interiors reflecting the best designs, based on the new philosophy—freedom to use space, as Nelson puts it, "for living as one damn well pleases." This comprehensive volume will interest decorators, architects, manufacturers, retailers and all others interested in interior design.

***Bound in full cloth**: 148 pages, 9 x 12 inches illustrated with 232 photographs. Price* $7.50.

Special Discount Rates: *Any two books—deduct 5%*
Any three books—deduct 10%
Four or more books—deduct 15%

TO: WHITNEY PUBLICATIONS, INC. • 18 EAST 50TH STREET • NEW YO

Enclosed is remittance of ..... for ..... copies of books as checked in the boxes to the right. (For Canada and foreign countries, add 35c per copy for postage.) ID-10

☐ DISPLAY
☐ CHAIRS
☐ LIVING SPAC

NAME .....

ADDRESS .....

CITY..... P.O. ZONE.....STATE.....

A whole new era begins in fabrics with FABRIcushon*

PROCESS PATENTED

FABRIC-TO-FOAM WEDDED FOREVER

Suddenly, the products you create can acquire entirely new selling features! Your fabrics refuse to wrinkle! They can be surpassingly luxurious yet economical . . . outwear similar fabrics as much as 8 to 1! They can even be water-resistant—yet breathe!

You'll accomplish all this with FABRIcushon . . . fabric wedded forever to foam by the patented ANDAL® process.

Right now, FABRIcushoned products in several fields are being marketed with electrifying success. New design effects, new fashion flair, spice the decor of homes and offices, hotels and institutions, Pullmans and planes.

And you can use FABRIcushon as easily as ordinary fabric. Write us today for full details.

Russel Wright famous industrial designer of everything from radios to china, calls FABRIcushon "a revolutionary fabric development—transforms fabrics for new uses and greater versatility."

America's finest cars, now carpeted in FABRIcushon, are more than ever a superlative joy to ride in, a thrill to step into!

New shoes by I. Miller are now FABRIcushoned for this season's fashionable embossed look, and for true comfort throughout!

Not a wrinkle in sight! FABRIcushon slip covers are air-cell soft! They stay put, won't slip. And they hold their shape forever!

Bras by Peter Pan are FABRIcushoned for more alluring contours . . . glorious, easier-breathing comfort!

Non-slip fatigue mats by Wickford are FABRIcushoned to rest feet in wonderful pillow-comfort—make work time fly!

LOOK FOR THIS MARK . . .

FABRIcushon*
PROCESS PATENTED
fabric-to-foam wedded forever

*TRADE MARK, A. A., INC.

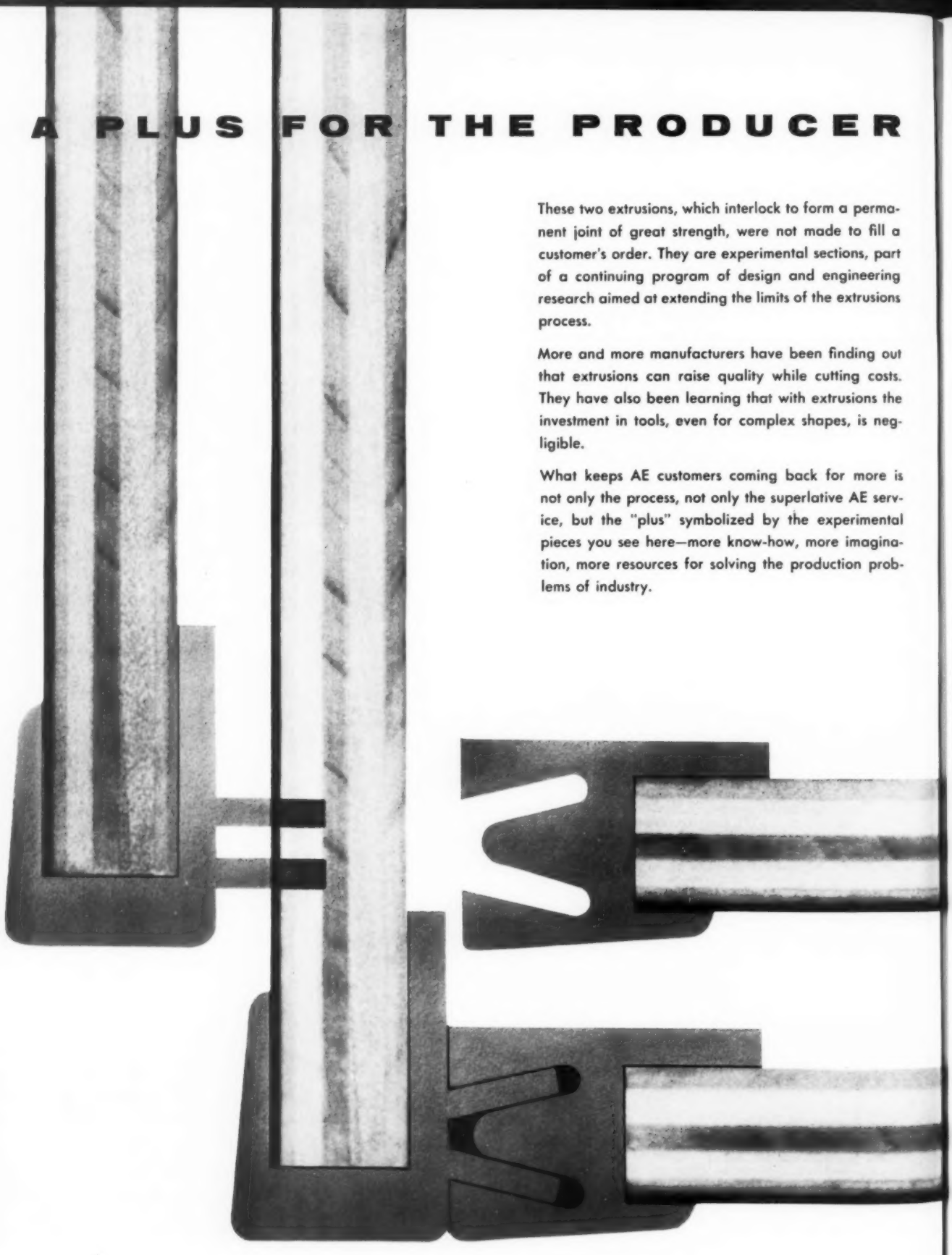
For further information write
ANDREWS-ALDERFER CO.
1055 Home Avenue, Akron, Ohio
Representatives in
Boston, New York, Chicago,
St. Louis, Los Angeles,
Toronto, London, Mexico City

A PLUS FOR THE PRODUCER

These two extrusions, which interlock to form a permanent joint of great strength, were not made to fill a customer's order. They are experimental sections, part of a continuing program of design and engineering research aimed at extending the limits of the extrusions process.

More and more manufacturers have been finding out that extrusions can raise quality while cutting costs. They have also been learning that with extrusions the investment in tools, even for complex shapes, is negligible.

What keeps AE customers coming back for more is not only the process, not only the superlative AE service, but the "plus" symbolized by the experimental pieces you see here—more know-how, more imagination, more resources for solving the production problems of industry.



AE ALUMINUM EXTRUSIONS, INC., CHARLOTTE, MICHIGAN

Wherein we discuss

STYLING

once and for all

Christian Dior had a chance to redesign Jane Russell along squarish lines recently, and we hear Jane Russell won out. It comes to mind because every now and then someone asks, Why don't you people talk about *styling?* We do talk about it, in a way, but we don't often say so because the word is an unfortunate one. It suggests something less than a real design job. And actually, many more designers seem to malign themselves with the term, and its implications, than really have to, if you examine what they do.

Let's start with definitions: Sometimes designers can work with a product from start to finish, from engineering up, so they have reasonable control over the final result. This is, quote, design. Sometimes they are called in late and asked to do a job on an old product, or an existing mechanism. This is, quote, styling. At some point, though, the definitions break down.

Suppose you start with a perfectly nice, well-proportioned chassis — Jane Russell's for instance. There's nothing wrong with Jane Russell the way she is, really, except that the effect is a little heady for day-to-day consumption. If you're Pygmalion you get carte blanche, but an ordinary designer can only add a few drapes and some baubles. What you add may be beautiful in itself, or maybe she would have looked better if you'd merely dropped a sheet over her. In any case, why should you get credit for the entire production? In our eyes this doesn't malign the value of designing from the outside, nor does it necessarily make it "styling." What Christian Dior does in the way of surface coating is pretty remarkable as design — and often as engineering too. It may show a cruel scorn for the structure underneath, but it doesn't ignore it. In fact, Dior has an almost sacrosanct regard for feminine beauty; it's his job to shed new light on it every season. His concept of Jane Russell's features may not be the popular one, but he's entitle to his opinion; Miss Russell may not conform to his image of her, but that's her hereditary right. Possibly the problem in dresses, as in all design, is getting the right chassis into the right kind of housing, and that's why there is more than one designer. Dior, Sophie and McCardell are all real designers, working with a superb regard for materials, construction *and* structure—in terms of what they wish to say about it. The Seventh Avenue merchant, who tacks bustles or high collars or low necklines on an ordinary housedress is the stylist in the business—a poor soul who doesn't dare express his real thoughts about the body underneath.—*The editors.*

XT

letter **by Jack Dunbar**

"Triennale" is a quick word for a major exposition of architecture, decorative and industrial arts which is held every three years in Milan; it might be defined as a World's Fair narrowed down to the design field. This year's exposition is held as usual in the immense Palazzo dell'Arte, built for the First Triennale in 1923. Some 17 countries are displaying current design and production in this important exhibition, which will continue until mid-November.

This Triennale is built around two themes: the unity of art and industry; and the collaboration between architects, sculptors and painters. Though the exhibits couldn't help but fall short of this idealistic summary, they serve another purpose by giving a picture of what is going on in the minds of designers throughout the world. One thing becomes clear: without losing their identity, designers everywhere are tackling similar problems, using many of the same materials, and frequently coming through with answers which begin to suggest an international vocabulary.

The exposition has three major parts: 1) displays of individual countries (covered in the following pages); 2) exhibits prepared by Italian designers; 3) experimental buildings in the public gardens. A series of rooms by Italian designers deal with such subjects as low-priced furnishings, Italian handicrafts, mass-produced furniture, everyday objects, building materials, and town planning. One of the most delightful rooms is a small garden room by Vico Magistretti, in which art and industry are

from the

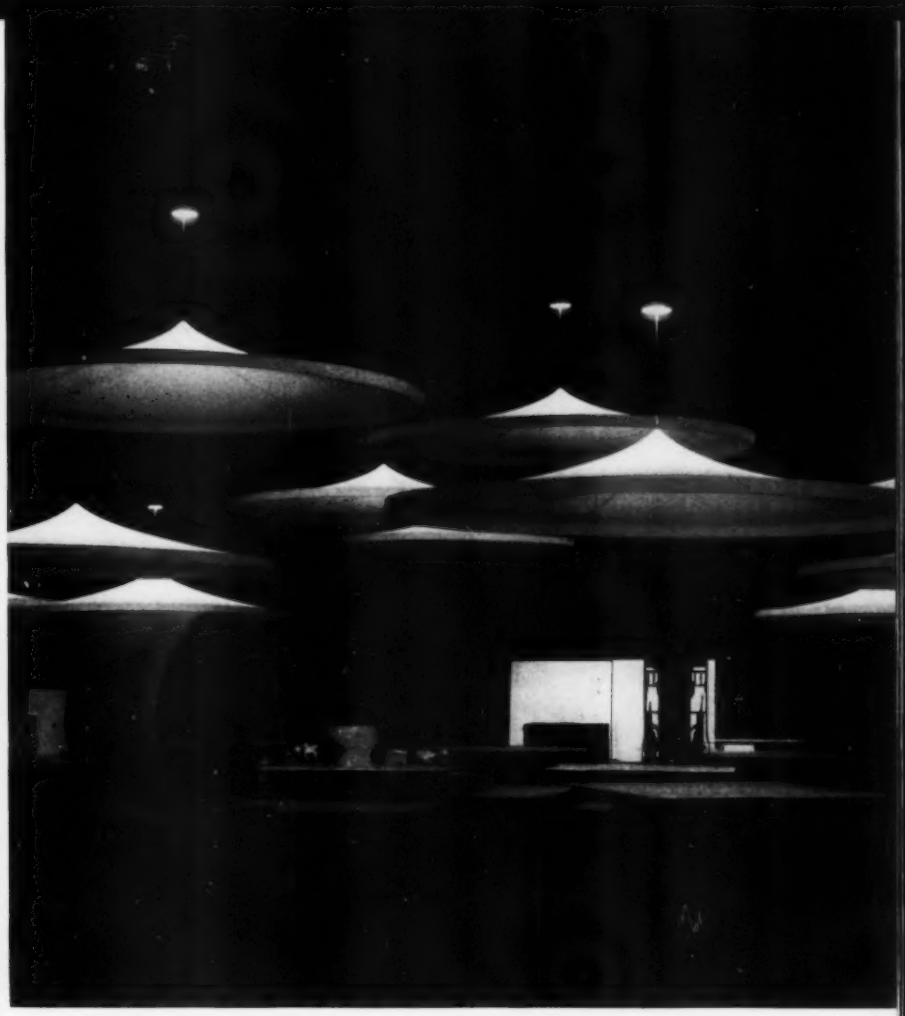
X TRIENNALE

Ceiling of curved plywood strips in entrance hall to Palazzo dell'Arte.

Ceiling of glass discs over central stairway.

neatly combined at low cost. A review of contemporary world furniture gives an impression that abandoned playfulness is an international idiom. Many furniture problems seem to have been solved definitively: casual and dining chairs, low tables, the home desk and child's cupboard. There are neglected ones, however— the lounge chair which invites lengthy reading, cabinets for "old marrieds," beds without a trick, and a dining table for a large family. In these areas there is still crying need for mass-produced furniture which anticipates a Golden Anniversary somewhere in the future of today's young buyers.

One of the major exhibits centers around 150 examples of industrial design from many countries, including a number from the United States, submitted by the Society of Industrial Designers. The installation, by seven Italian architects, is dramatic: over the vast central stairs leading up to the exhibit hangs a brilliant ceiling of orange and yellow glass discs; in the darkened room beyond, giant canvas shades illuminated from above throw a diffused light on the objects, arranged on low square platforms. The display techniques used throughout, in fact, are a subject in themselves. Lighting is a vital prop, most brilliantly used in the Scandinavian sections. Simple, unpolished materials have been imaginatively exploited—heavy concrete, unpainted wood, undyed muslin, plain steel struts. Floors and ceilings are treated as major display elements: struts, trellises and fabric strips play overhead, while changes of texture and level mark the transition from one space to another. Perhaps

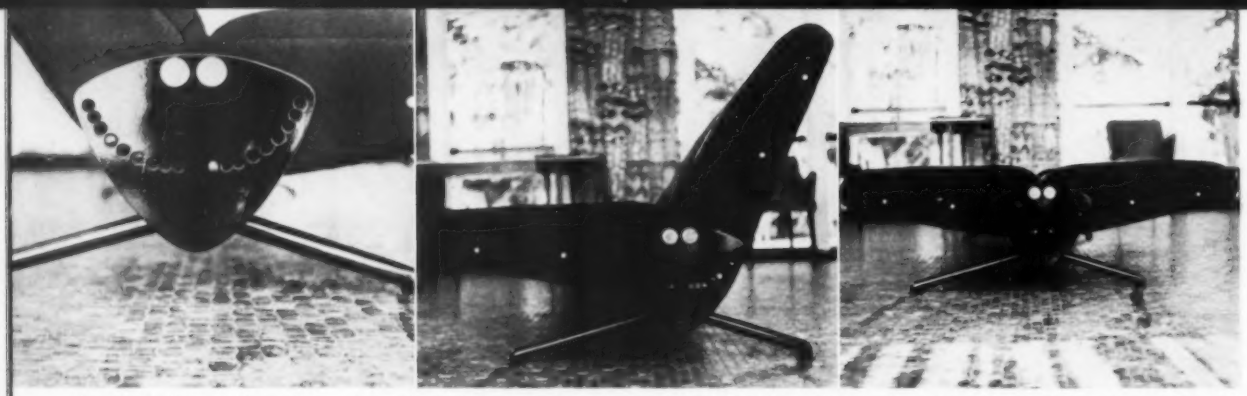


Giant canvas shades, lighted from above, to illuminate the industrial design exhibit.

the *grand coup* is the Hall of Honor, designed by Franco Albini—a forest of steel posts supporting wood cases which show work from earlier Triennales. Unless you happen to climb the stairs, you never discover that the posts actually support a small auditorium overhead, a charming room lined in red felt.

In some ways the Triennale is more than a review; it is a stimulus, such as the World's Fair used to be, for designers to try new ideas at nobody's risk; some are more interesting for what they attempt than for what they achieve. There are new ideas in materials—a chair seat of plastic impregnated molded felt, concrete blocks cast in patterned molds. There are practical ideas—a canvas shade for outdoor TV, a collapsible closet. The park is full of experiments, like the plastic house and the delightful bit of playground sculpture in the form of a maze.

Many visitors regret that the U.S.A. has no official, juried exhibit this year. (The SID's contribution was absorbed by the design section, and this did not constitute an American exhibit. A detailed report of this section will follow in December.) We have lost face by indicating that we are not enough impressed by our own design to match the quality of the other exhibits by one all our own. Thanks to private sponsorship, the U.S.A. has made one statement which helps compensate for this: the geodesic domes in the gardens, built only of paper and staples. The technical brilliance which conceived so simple a structure, and the industrial know-how which can produce it so fast and so cheaply, have impressed visitors as much as any other display.



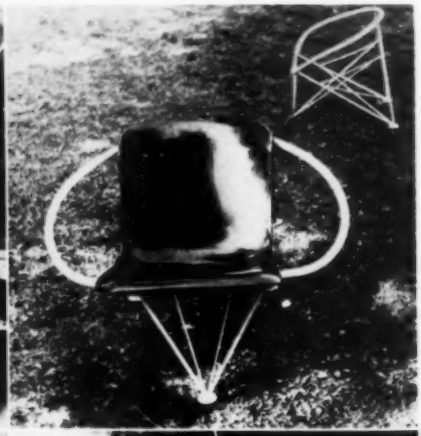
A sofa bed used throughout the Palazzo has an underside knob which adjusts the angle of two foam rubber wings. Borsani.

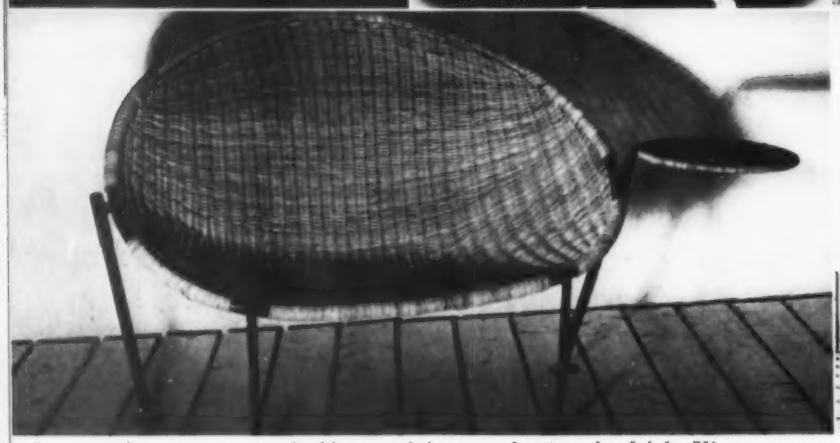
XT

ITALY

Project for molded plastic sofa, metal and wood frame. Alberti.

Metal feet of tripod garden chair are pointed to grip lawn. The molded wood seat, made in four colors, can be removed; curved arm is rubber-covered. Ravegnani.

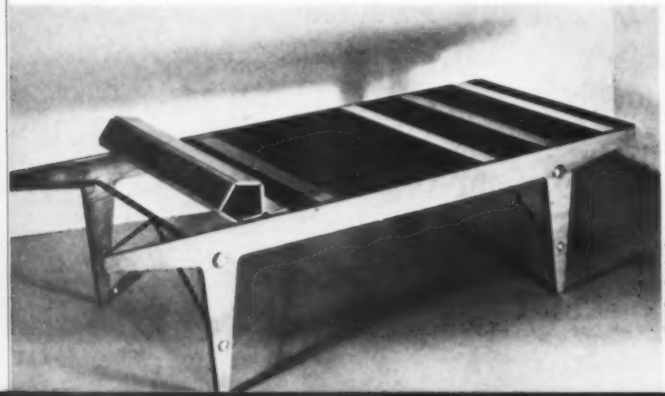




Large wicker scoop—not quite big enough for two—has tray for drinks. Vigano.

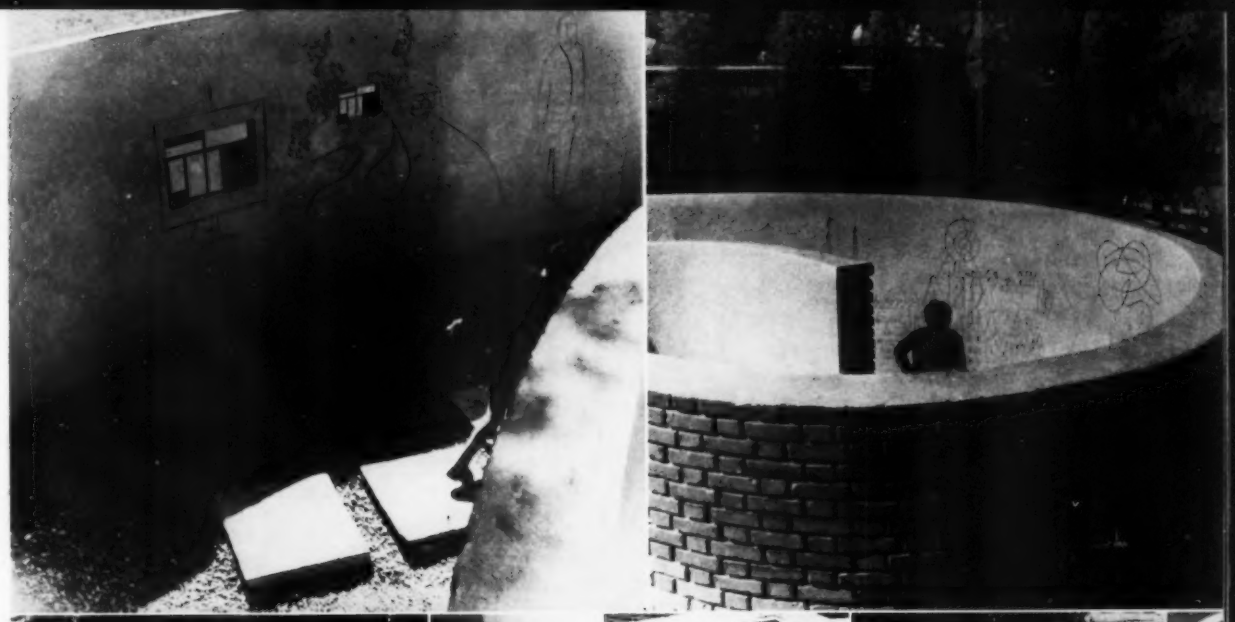
Garden chairs have integral shades.

Occasional piece has roll top with colored slats. Roselli.



Desk with open file drawers; Albricci, Bianchi, Paccagnini.

photos: Retailing Daily

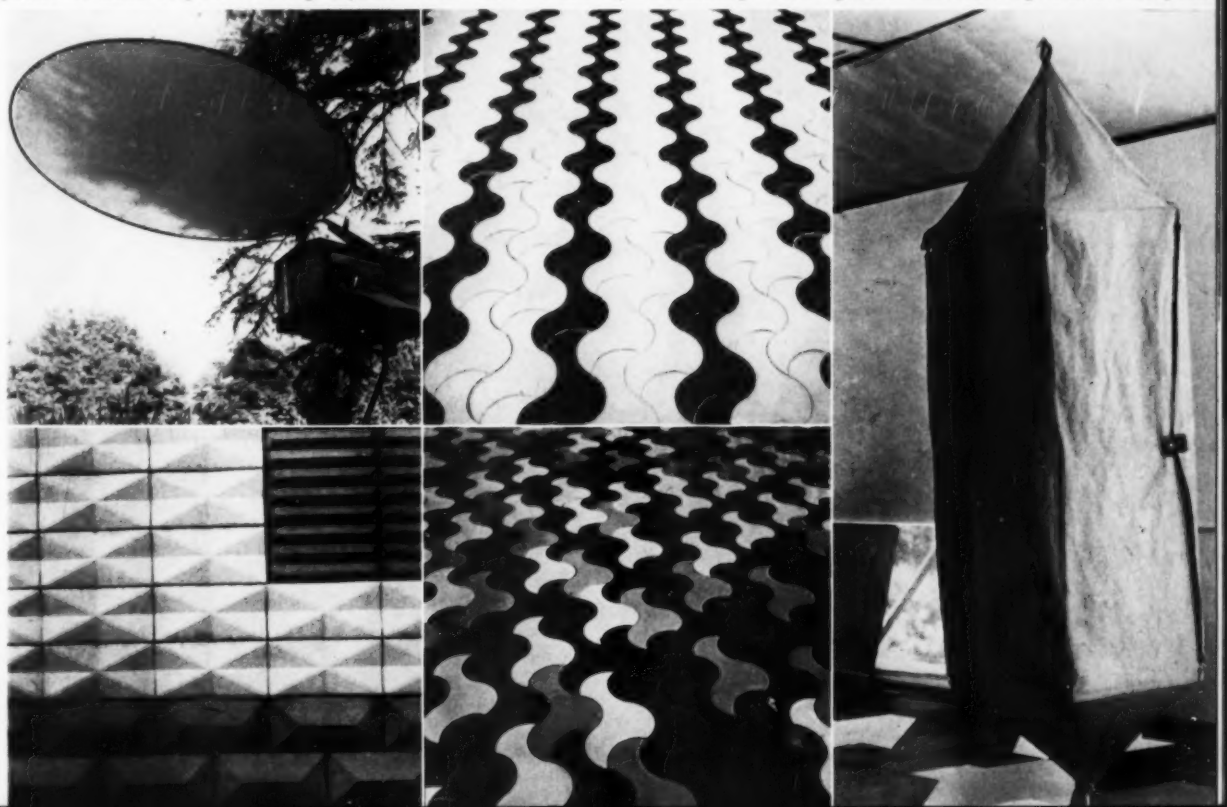


A maze for children, its white cement inside walls scratched with Saul Steinberg drawings, is a park attraction. The reward for the child who finds his way through the labyrinth is a Calder mobile above a lily pond. Belgiojoso, Peressutti, and Rogers

A canvas canopy shades a Zenith TV set for easier outdoor viewing (top). Cement blocks are colored and cast in patterned molds to give a variety of faces.

The floor of a garden room is laid of brightly colored ceramic tile. A variety of colored patterns can be created from the basic stock of undulating tiles.

A portable canvas closet designed for camping or country living hangs from floor to ceiling, folds up flat. Bright red yellow and blue. By Mario Ravegnani

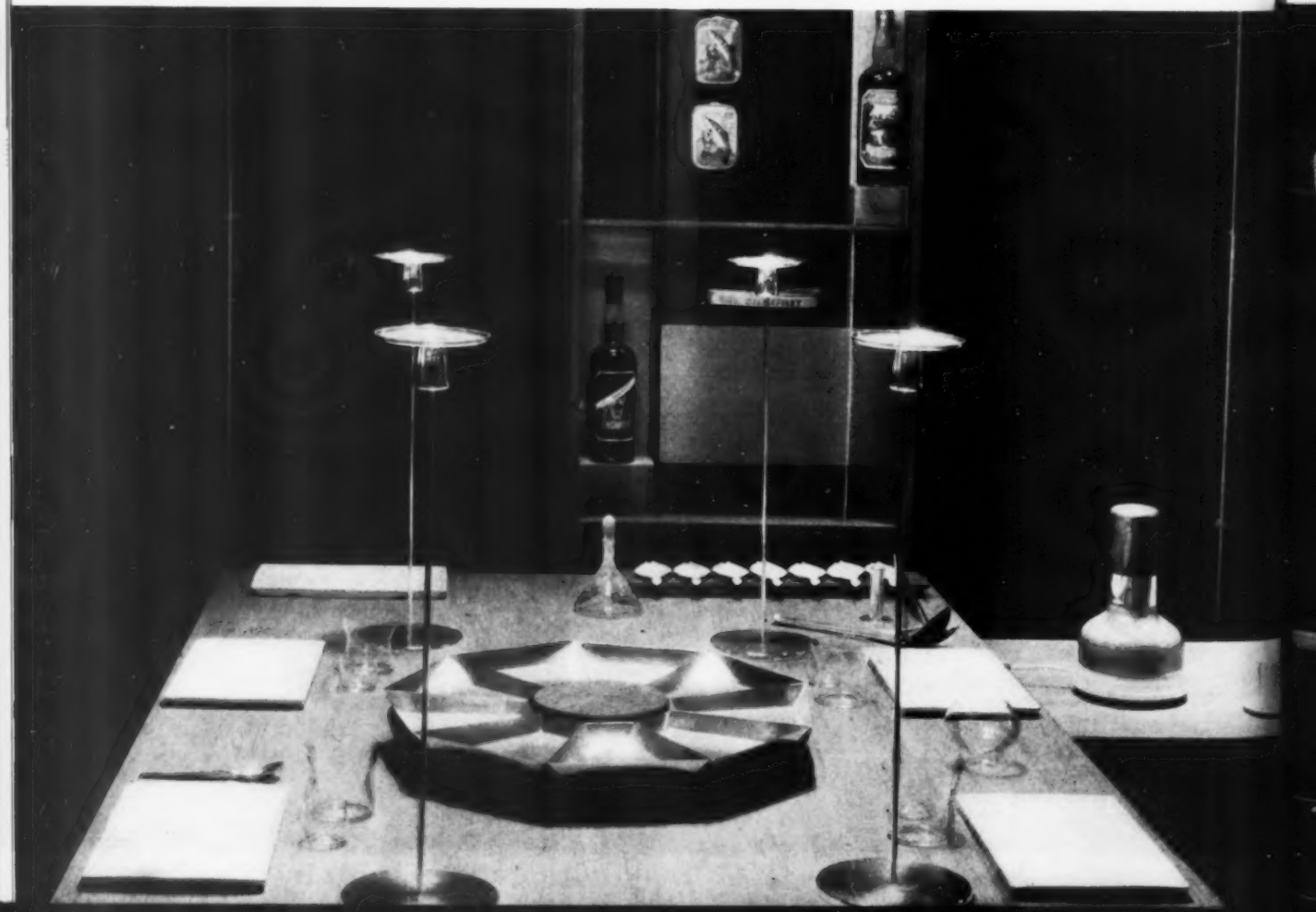


1	3
2	4 5

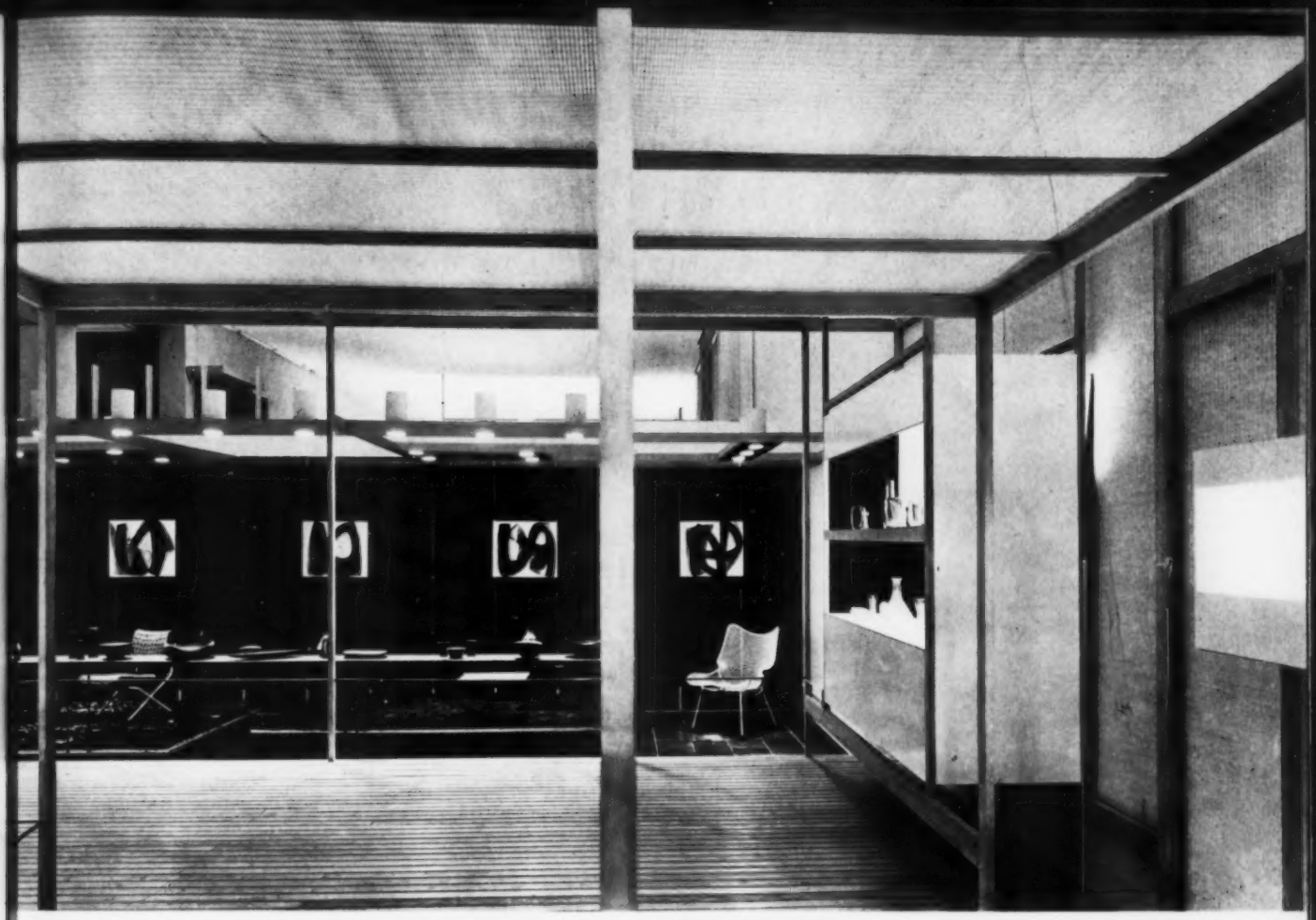
NORWAY

Making her debut at the Triennale, Norway presents her wares in a multi-level pavilion beautifully detailed in wood frame and slats. High-level lighting plays up a group of products—machine-made fabrics, jewelry, furniture and pottery—whose design and execution is generally excellent. The apparent ease with which the exhibit is assembled suggests that good contemporary design is a natural part of daily life.

1 Triple lamp, Birger Dahl
2/3 Installation by Arne Korsmo
4 Wire chair, Ragnar Myre
5 Molded plastic chair

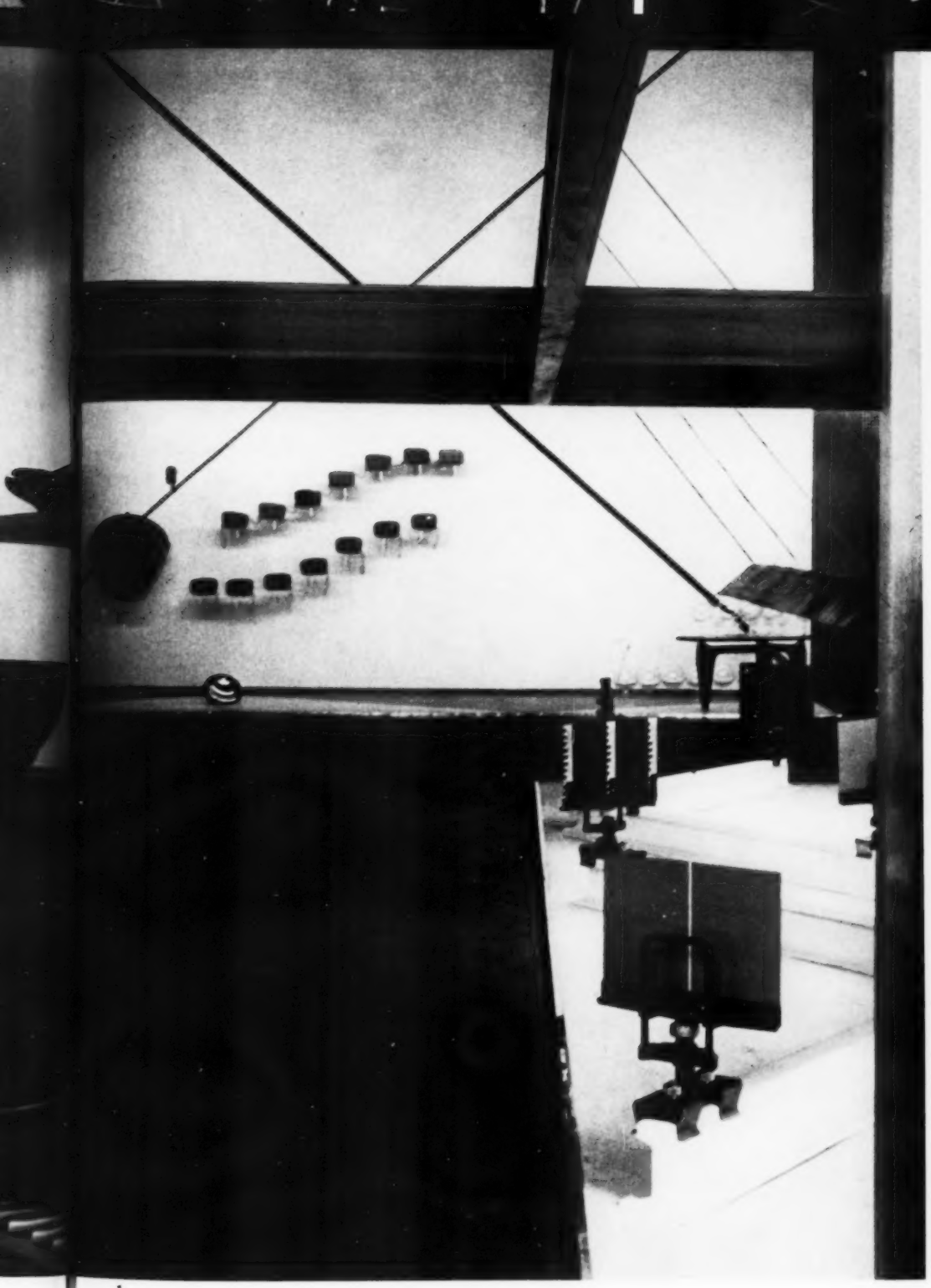


nale,
nulti-
d in
ight-
cts—
urni-
and
The
hibit
con-
rt of

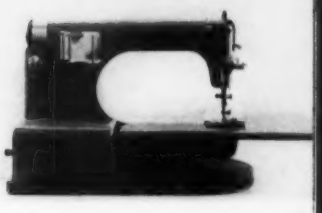


DENMARK

Finn Juhl made a sparkling exhibition of Danish silver, stainless steel and ceramics by concentrating on light. Over some of the display tables, batteries of spots play up the contrast of level and color contributed by simple square platforms. The ceiling treatment in one area is among the most interesting at the Triennale: panels of yellow and orange muslin stretched on white metal fixtures create openings through which bullet lights shine down.



1



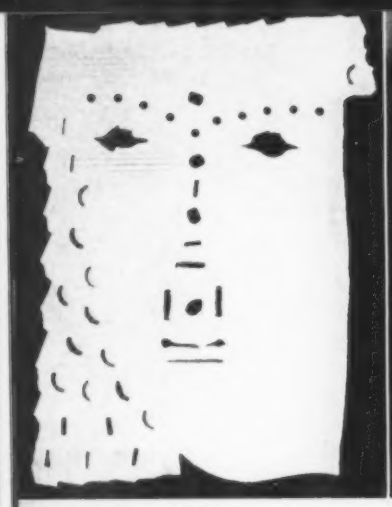
2
3
4
5
6

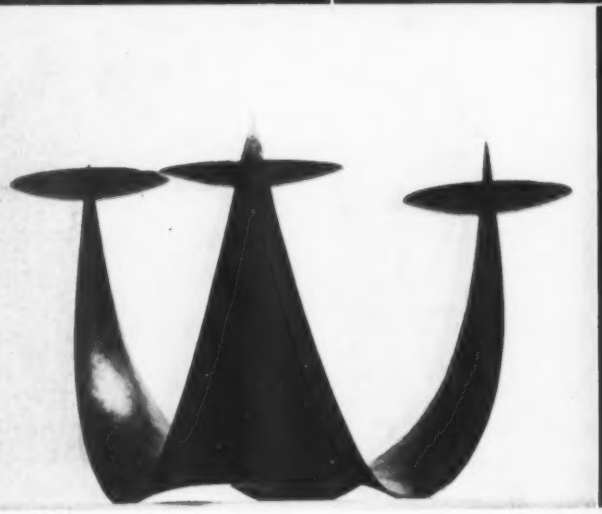
BELGIUM and HOLLAND

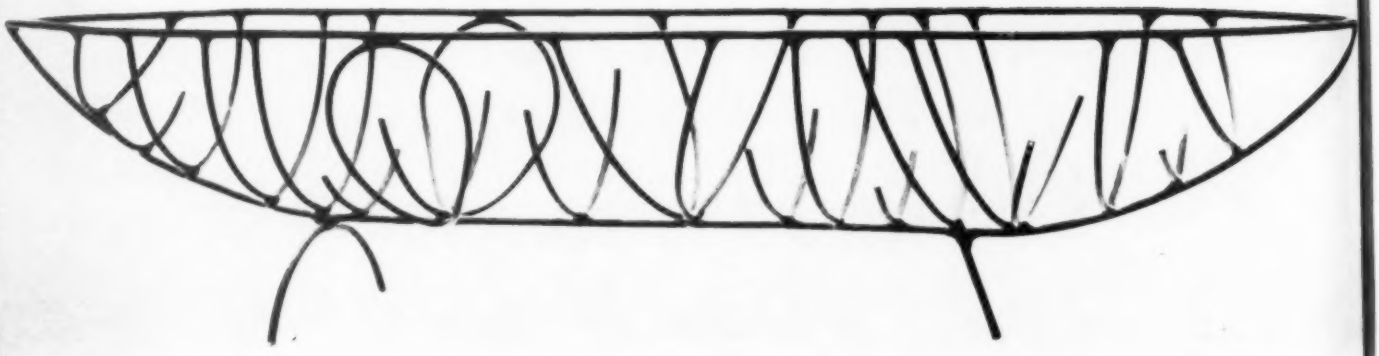
Andre de Poerick of Belgium has created a spacious display in a confined area by using giant plywood trusses suspended at a seven foot level, and parallel to platforms 2" from the floor. With a selection of precision instruments, rifles, prisms, bookbindings, lathes, vices and glassware beautifully distributed in the space, he has caught the spirit and purpose of the art-and-industry theme.

Holland, too, puts forth a display of machines — projectors, vacuum cleaners, sewing machines — which are less startling for innovation than for the quality which has been created by an understanding use of machine tools.

2 Hand drill, J. C. van Osnabrugge
3 Desk and chair, R. Parry
4 Balancing scales
5 Post office weighing machine, K. Kuiler
6 Fridor sewing machine, W. Flem







ISRAEL

Israel's debut at the Triennale—in fact her presence there at all—is a bold statement of the nation's determination to do the best with what is at hand. Copper and ceramics are predominant; there is also a photographic exhibit of progress in the design of new cities.

1 Copper mask, Baraham Habba; **2** Wicker-shaded lamp, milk-glass center, Nathan Shapiro; **3/5** Plates, Bezalel Schatz; **4** Copper Candelabra, A. Segal; **6** Terra Cotta jug, H. Grossman; **7** Fruit Basket, Louise Schatz.

1	2	3
4	5	6
	7	

SPAIN

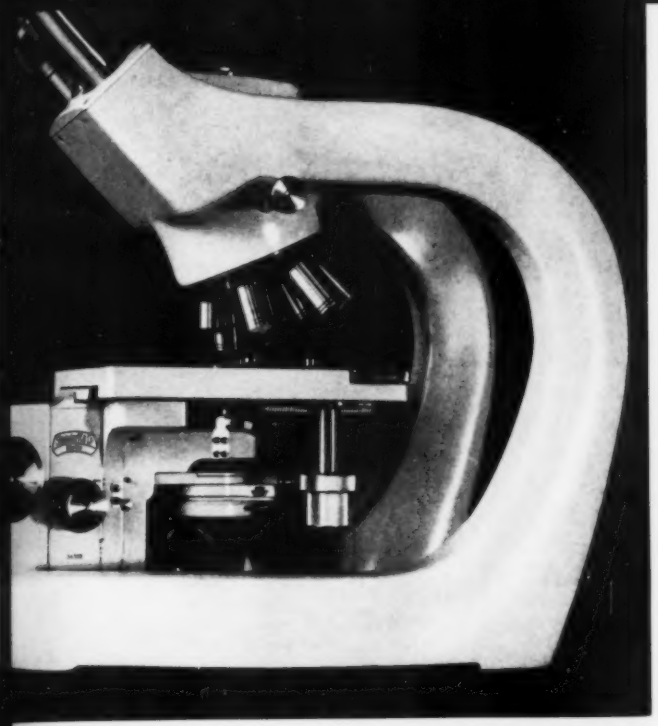
Spain created an exciting space with almost nothing. Several rugged iron sculptures, six fantastic Baroque jewels, and a few craft objects have somehow been arranged into elegant proof that imagination does not need to operate on a large budget. One of the jewels, a Dali-esque ruby heart spotlighted by an electric eye beam, is the prime show-stopper: it pulsates. Installation designed by Manuel Molezun, Ramon Molezun, and Amdea Ubeda.

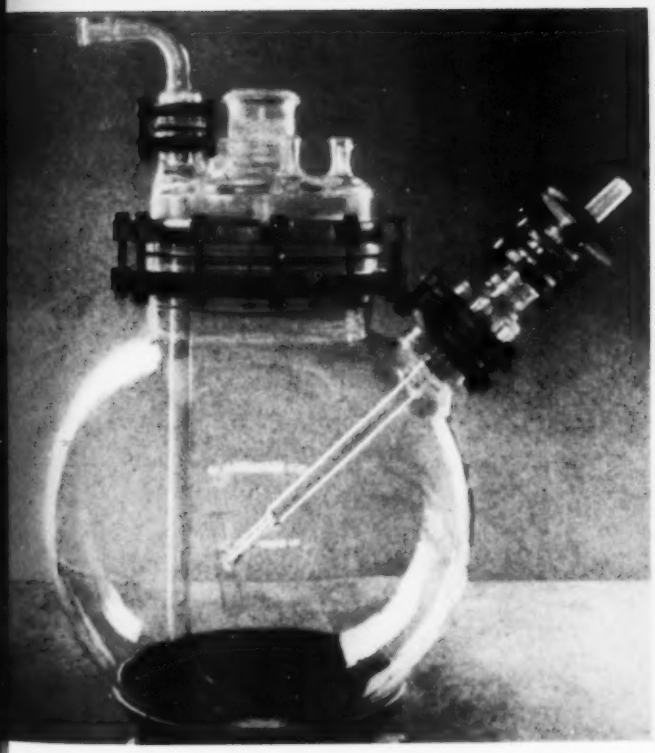
1

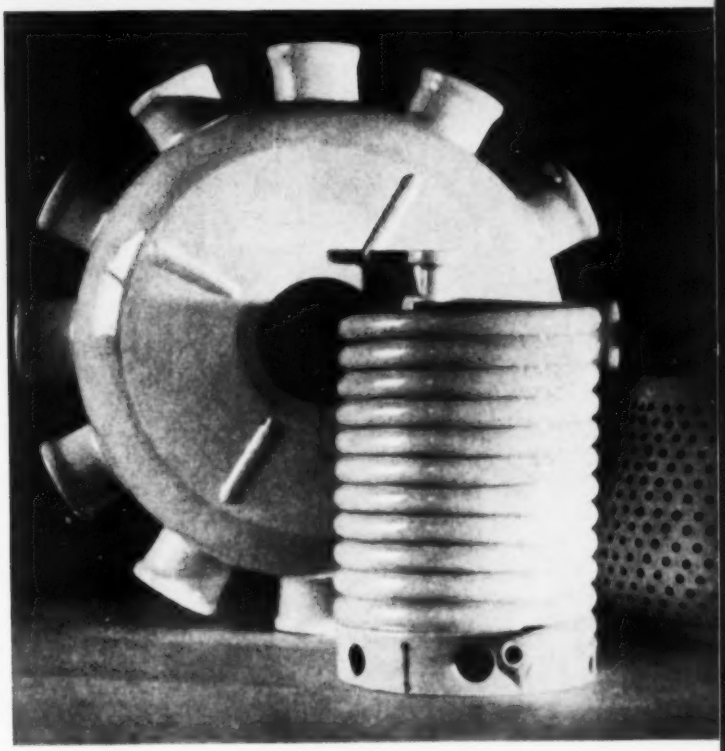
GERMANY

The foundation of West Germany's display is concrete, lightened by wood and wicker. All the display stands and tables, even display screens, are made of a rough gray-brown reinforced concrete, an interesting background for the very precise fruits of German industry. Plexiglas domes protect many small objects from stray and curious fingers. Very few home furnishings are shown—heavy industrial equipment is presented as a legitimate example of industrial design in Germany today.

2 Microscope, Steindorff & Co., Berlin
3 Contemporary tapestry on concrete display screen
4 Laboratory apparatus, Jenaer Glaswerk, Mainz
5 Industrial porcelain, Technisches Porzellan, Berlin







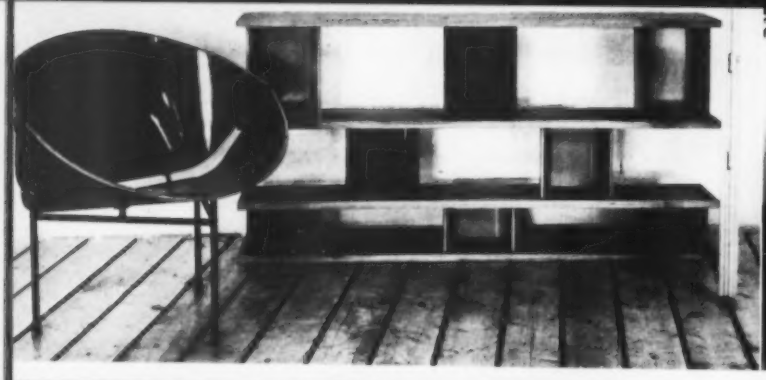
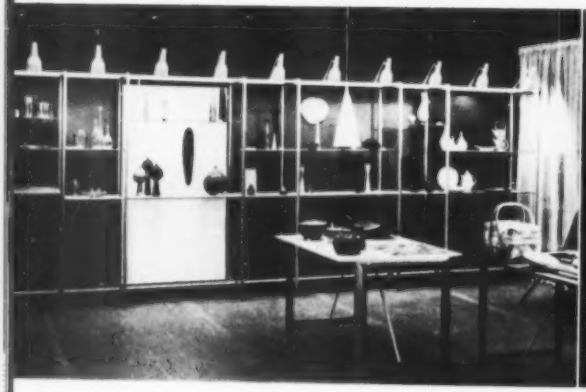
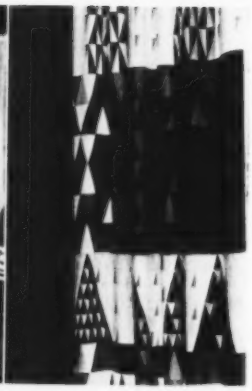


photo: Retailing Daily

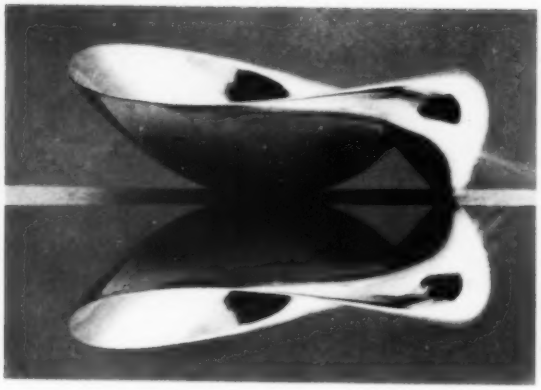
1 | 2

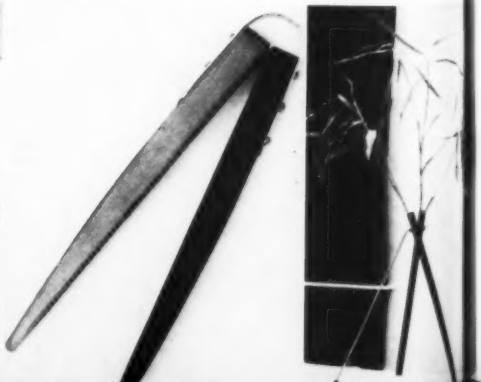
3 | 4 | 5





6 | 7





FRANCE

Among the more mature and imaginative examples of French design is Charlotte Perriand's economy bookcase, which refines the old bricks-and-boards idea with bright colored plastic blocks **(1).** The chair, not French, is Roberto Mango's plywood sunflower. Marcel Mortimer's chestnut table **(2)** extends to seat more people.

GREAT BRITAIN

Great Britain concentrates mainly on modern home furnishings in typical room settings, featuring the work of Robin Day and Ernest Race.
3/4 Examples of a group of metal garden furniture, Ernest Race. **5** Deck chair by Ernest Race, designed for a steamship company, has laminated wood frame, nylon slats, and foam rubber cushions.

SWEDEN

Sweden's exhibit was organized to show that good design has production behind it and is available to everyone. Among the many familiar items shown, woven and printed fabrics are particularly outstanding.
6 Installation by Sven Engstrom and Gunnar Mystrand. **7** Blue and purple fabric, Sven Markelius.

8 | 9 | 10 | 11

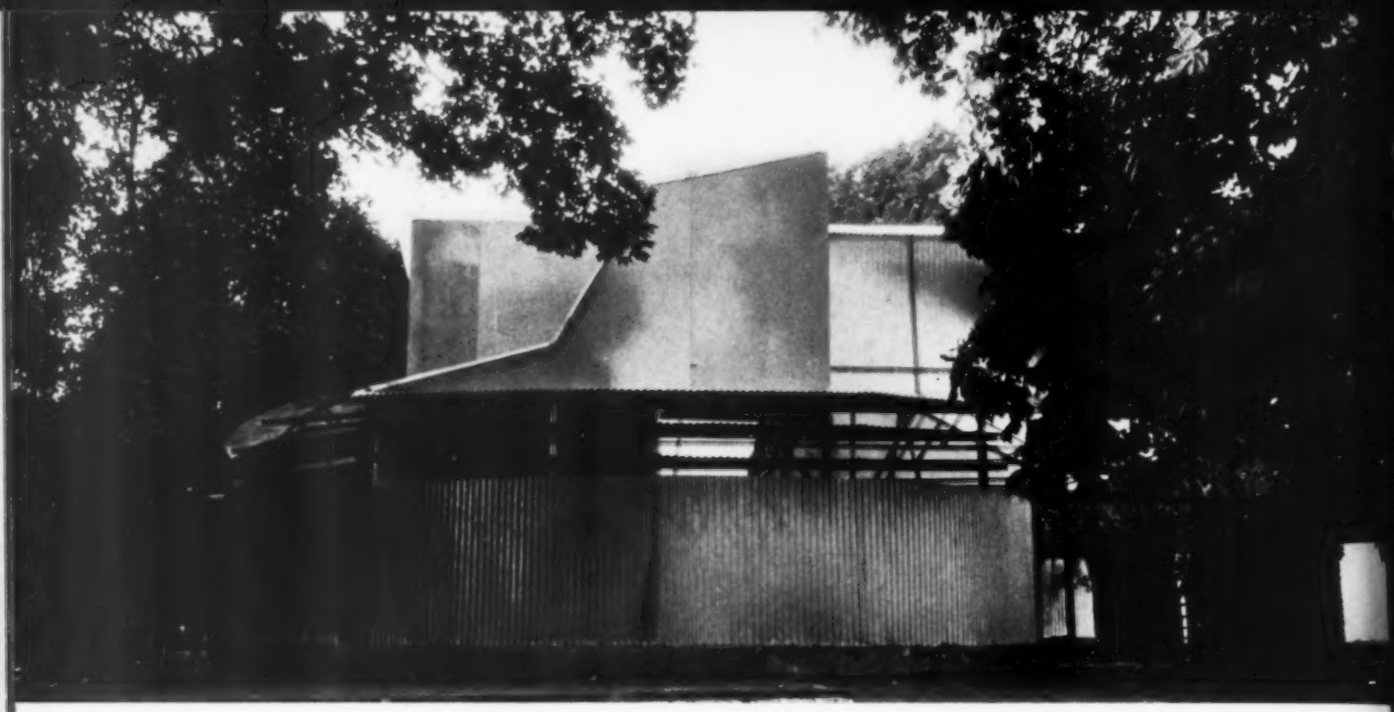
FINLAND

Finland concentrates almost exclusively on craft arts in the modern tradition. Wirkkala's latest romantic handling of wood, glass and silver are attracting unusual attention. **8/9** Silver bowls, Tappio Wirkkala. **10** Glass vases, Tappio Wirkkala. **11** Bent plywood stool with changeable seat, Alvar Aalto.

AUSTRIA

In a tiny space Austria concentrates on small objects, mainly for the home; they show a consistent clarity and severity of form. **12** Silver vessels, Carl Auboeck. **13** Large nutcracker lever, wood arms and metal spring, Carl Auboeck. **14** Three-legged flower holder.

12 | 13 | 14

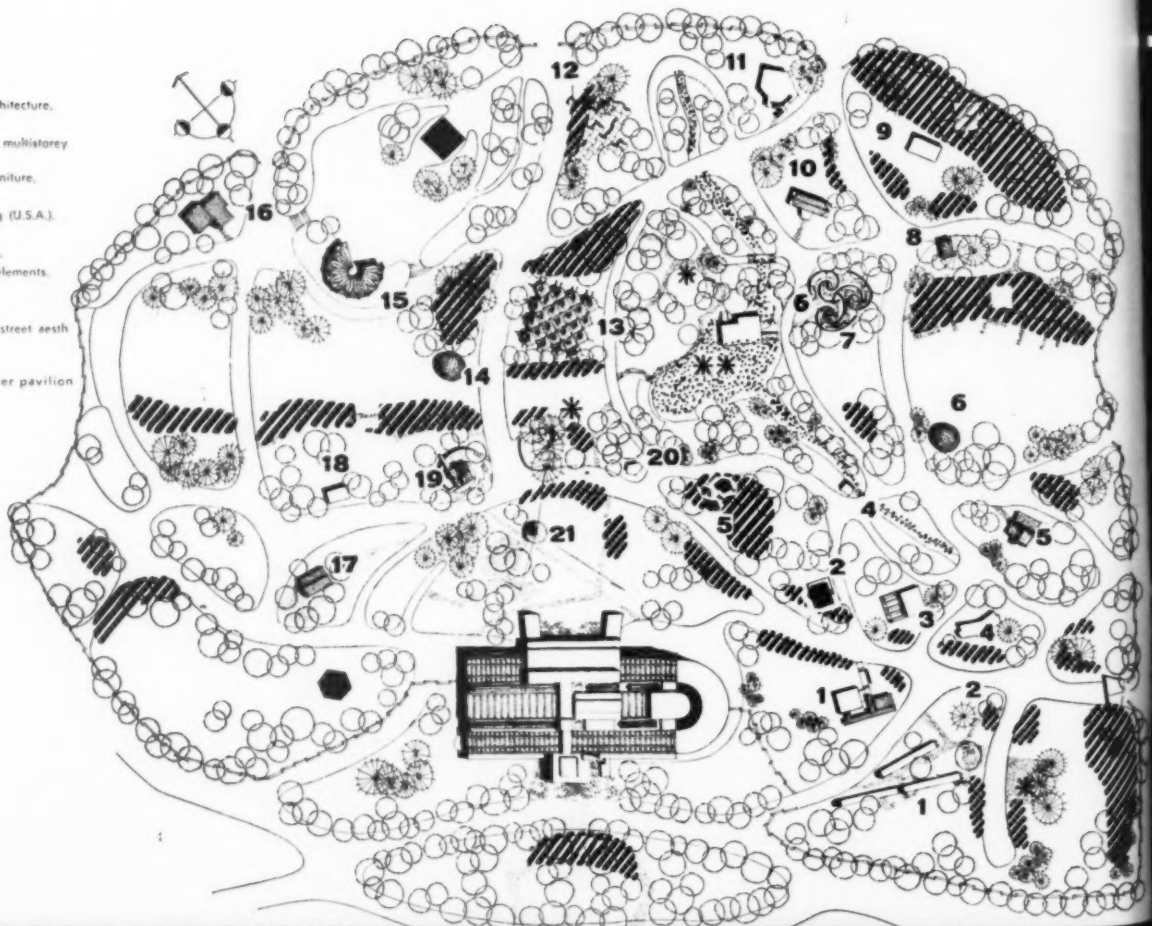


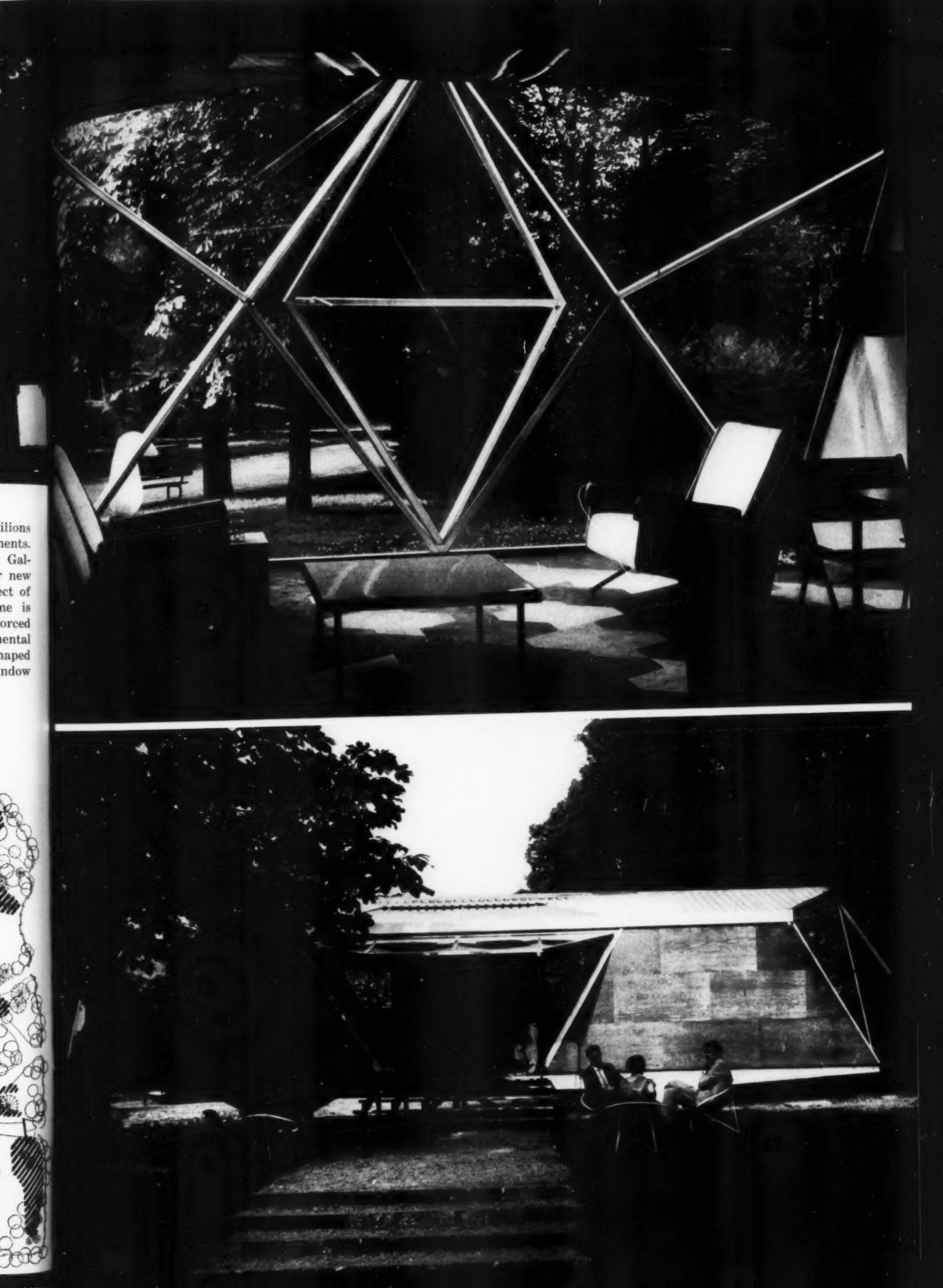
IL PARCO

The gardens around the palazzo are spotted with pavilions that show construction and architectural experiments. Among them is the "transparent house" above, by Galvagni and Chessa, which explores new materials for new possibilities: rapid assembly, lightness, and the effect of color and luminosity. Its demountable metal frame is wrapped with wall and roof panels of corrugated reinforced plastic, colored blue, orchid and white. An experimental house by Ravegnani and Vincente, right, has prism-shaped window walls at each end. The front door is a window which swings up into a canopy.

PARK

1. Pavilion of the Faculty of Architecture.
2. House of trusses.
3. Industrialized element of a multistorey building.
4. Pavilion of mass-produced furniture.
5. Standard singlefamily house.
6. Fuller geodesic dome dwelling (U.S.A.).
7. « Labyrinth for children ».
8. Pre-fabricated mountain house.
9. Farm house of industrialized elements.
10. Experimental house.
11. Milk bar.
12. Exhibition of advertising and street aesthetics.
13. Flower pavilion.
14. Fuller geodesic dome, flower pavilion (U.S.A.).
15. Living pavilion.





UNITED STATES

Although the U.S.A. made no official entry in the Triennale, an American exhibit made possible by private sponsorship is one of the high points. It is Buckminster Fuller's geodesic dome, constructed of paper and staples: flat impregnated sheets were printed and scored by Container Corporation of America, shipped to Milan, folded into three-dimensional triangles (by one of several methods devised by Fuller) and stapled into manageable sections with Bostitch fasteners for transport to the site. The completed dome is covered with a tight plastic cap, which allows light to filter through the triangular hollows. It sits on a simple wood platform and is furnished with a few benches and several cacti. This seems very much in the spirit of the display, and few people seem moved to ask if it can be lived in; the possibilities for its use are stated by its being in the park. There are actually two such domes, set apart by a lake, and the surprise of seeing twin 36' spheres rising from the gardens has captured everyone's imagination.

Applying

industrial methods

to education

could be

an education

for industry:

Art X =

George Nelson

Anyone who has ever meddled with activities outside his own specialty knows that the amateur approach contains two sets of possibilities: there is always the chance that its fresh view of a problem may open unsuspected avenues of thought; there is also the likelihood of its leading the enthusiast up blind alleys long since explored and abandoned by the professionals. The experience I am going to describe was initiated by amateurs in the field of education, and the ideas which developed from it may turn out to be valid—or they may not. I suspect that they are by no means unfamiliar to workers in the field. The reason for presenting the story to an audience concerned with problems of business and industry rather than education is in part the steadily growing evidence that the barriers between these two areas are not as solid as we have led ourselves to believe; also because I have come to believe that the industrial approach can play a vital role in helping education cope with the difficulties that currently beset it.

The experience that led to this conclusion began at the University of Georgia. Early in the summer of 1952 the phone rang and the caller identified himself as Lamar Dodd, head of the university's department of fine arts. His reason for calling was an invitation to fly down and give a lecture. I declined. It was June, there had been too much talking at schools the past winter, and it was sure to be uncomfortably hot in Athens.

As things turned out, it was. Two days later the persistent Mr. Dodd was again on the phone. It seemed that what they wanted wasn't really a lecture, but consultation with the faculty on some problems of educational policy. This was a ready-made opportunity to get out from under, and I quickly explained that nobody could possibly know less about educational policy. "I know," drawled the voice at the other end of the wire. "That's why we want you."

Foreground

Georgia's department of fine arts is a large one, and like similar departments at other universities its functions are widely varied. The majority of the student group consists of undergraduates taking art as a major, not as a rule with any intention of making it a career, but simply because they like it. Many of them are girls who believe it will help them as future homemakers, presumably by improving their taste in decoration. Each year a sizable group comes in from the department of home economics, no doubt for the same reason. A small percentage of the students, particularly those in textiles and ceramics, go on to establish careers in these fields. But essentially the department is one which turns out laymen interested in the arts rather than professionals.

As a necessary part of the discussions I was to have with the faculty, a tour through the various classes was arranged. Everything I saw was familiar: courses in theory, classes in drawing and painting, classes in design, craft workshops for weaving, screen painting, ceramics and so on. At this point several uneasy thoughts came to mind. Here was a place functioning exactly like any art school, but it was supposed to turn out non-professionals. All art schools, obviously, turn out one or the other, but what seemed a little odd was the lack of visible differences between the two kinds of instruction. To the outside observer, it seemed that there was possibly a confusion in both methods and objectives. Does it make sense for a girl whose main ambition is to become a homemaker to pretend for four years that she is aiming for a career in sculpture or painting? Perhaps it does, but isn't the real problem to foster understanding and creative capacity so that these qualities could be employed in any situation? And if this were the real problem, how would a school go about meeting it? Is intensive instruction in drawing and modeling the best way? Or is this method used simply because it has always been the art school method?

In the discussions which followed, these questions were put to the faculty rather tentatively. The response was quick and intelligent. A feeling gradually developed that it might be worth re-examining objectives and perhaps trying some experiments in educa-

the Georgia experiment

tional techniques—though at the time no one had any very clear idea of what the experiments might be. We decided to have another session in the fall and Lamar Dodd, who had guided the discussions with an extraordinary combination of firmness and sensitivity, suggested the formation of a small advisory committee. I asked him to invite Charles Eames.

Battleground

At the beginning of the fall meeting we again went through the routine of visiting the various classes. Now that we had asked the basic questions, it was perfectly clear that much time was being wasted through methods originally developed for other purposes. For example, one class was finishing a two-week exercise demonstrating that a given color is not a fixed quantity to the eye but appears to change according to the colors around it. In a physics class such a point would have been made in about five minutes with a simple apparatus, and just as effectively.

We cited this example in an effort to establish a principle by which teaching effectiveness could be evaluated. We suggested that if a school knew fairly precisely what it wanted to communicate, a yardstick could be used for checking its methods. The yardstick was a clock. In other words, given the intention of communicating something specific, the shortest time taken to do this—*without loss of comprehension or retention*—represented the best method.

At this point storm warnings began to go up. Were we proposing to apply time-motion studies in the painting studio? Maybe, we retorted, such schools as this had no business teaching painting. The discussion became an argument, then a free-for-all.

From the faculty's point of view, there were good reasons for opposing mass educational techniques at a college level. For many of them college is the last stronghold of individualized instruction, where the student-teacher relationship is the vital core of education. Others, we realized, were exasperated by proposals which would mean new burdens on the school budget and their own scarce time. There exists in the art professions, a strong feeling that their problems are unique and that methods sanctioned by tradition need not be questioned too closely. All of this was perfectly understandable, for in education, standards of performance are not under the same pressure as in industry, and the price of inefficiency is not exacted as swiftly or as ruthlessly.

That night Eames and I discussed the turmoil created by what we had believed were innocuous proposals. It was our feeling that the most important thing to communicate to undergraduates was an awareness of relationships. Education, like the thinking of the man in the street, was sealed off into too many compartments. If a girl wanted to know something about decorating her future home and what she got was a class in painting, this might make perfectly good sense, but perhaps it was up to the school to build a bridge between the two so that she might see how they were related. Whether this was accomplished by personal or impersonal methods seemed of little consequence.

Preparation

It occurred to us that if the faculty was confused and uncertain about what we wanted, it might be because we were too. The following day, in an atmosphere of interested cooperation, we proposed that we present a specific example of our thinking in the form of a sample lesson for an imaginary course (the course was promptly labelled "Art X"). We asked, too, that Alexander Girard be invited as the third member of the committee during preparation of the lesson.

It was a relief to have our part in this exploration now placed on a "put up or shut up" basis, but it was only after leaving Athens that we realized what we had let ourselves in for. The idea was to develop high-speed techniques for exposing the relationships between seemingly unrelated phenomena. This meant films, slides, sounds, music, narration—the familiar world of audio-visual aids—and it soon became clear that we were committed to a job which might easily demand the resources of a Hollywood production unit.

There was also the problem of how the three "producers" were going to work together: Girard lived in Michigan, I worked in New York, and Eames, in California.

Problems are made to be solved. We solved ours by outlining the lesson and dividing it into "packages" which could be produced separately. Girard agreed to make a facsimile exhibit which was supposed to accompany each of the canned lectures. Eames and I divided the one-hour lesson between us. Slides were to be made as needed and movies were to be made or, if possible, borrowed. The subject of the lesson was "Communication," and if anyone should ask why we started with so impossibly difficult a theme I can only answer that at the time we did everything the hard way. We wanted a subject permitting the exploration of relationships and "Communication" offered plenty of opportunities. And there was the easily comprehended starting idea, that art was a kind of communication.

Presentation

Five months later the "Art X" company met in Athens, burdened with as much equipment as a traveling medicine show. There was a 16-mm. projector handling both film and magnetic sound. There were several tape recorders. There were three slide projectors, three screens which filled the end of the auditorium, cans of film, boxes of slides, reels of magnetic tape. Girard's exhibit arrived in a series of mammoth packing cases and he also brought a collection of bottles of synthetic smells, to be introduced into the room via the air conditioning system at various points in the show. Seventy-two hours later when we had staggered through the first creaky performance, we found that it took eight people to run it.

What had happened during the months of work was that our ideas had outstripped technical resources. As an example, while running off some slide sequences, it occurred to us that two slides run at once could illustrate certain contrasts. We liked the simultaneous projection so much that we tried three slides and found ourselves with a kind of poor-man's Cinerama on our hands. But to carry out this simple notion required three projectors, three screens and a magnetic tape playback.

The reason for the complexity was lack of money. Technical means for wide-screen projection already existed, but they were out of reach. Our dream had been to produce a one-hour lecture which could be transported in a few small cans; ultimately we decided that it was more important on the first try to explore as many possibilities as we could and to worry later, if the need should arise, about making the results portable.

What was the show about? The illustrated chart gives an idea of the subjects touched upon, but any audio-visual presentation that is more than a series of stills strung together cannot be described except in its own terms. Take, for instance, the small section which relates to the idea of "abstraction":

A slide goes on the screen, showing a still life by Picasso. A narrator's voice identifies it, adds that it is a type of painting known as "abstract," which is correct in the dictionary sense of the word, since the painter abstracted from the data in front of him only what he wanted and arranged it as he saw fit. The next slide shows a section of London. The dry voice identifies this as an abstraction too, since of all possible data about this area, only the street pattern was selected. Then follow other maps of the same area, but each presents different data—routes of subways, location of garages, etc. The voice observes that each time the information is changed, the picture changes. The camera closes in on the maps until only a few bright color patches show; the communication is now useless to the geographer, but there is something new in the residue of colors and shapes. Then a shift to a distant view of Notre Dame, followed by a series which takes you closer and closer. The narrator cites the cathedral as an abstraction—the result of a filtering-out process which has gone on for centuries. The single slide sequence becomes a triple-slide projection. Simultaneous exterior views change to interior views. Organ music crashes in as the narration stops. The interior becomes a close-up of a stained glass window. Incense drifts into the auditorium. The entire space dissolves into sound, space and color.

What I have tried to describe is a fragment which may have taken four minutes in its entirety. But even in this flash presentation a very complex communication was completed. The students were shown a modern painting to which they reacted with feelings ranging from hostility to exaggerated reverence. They were then forced to make a swift adjustment to the unexpected idea that maps and cathedrals were also kinds of abstractions, and finally introduced to a sample of medieval architecture in a way which tried to communicate atmosphere rather than fact.

To describe all this with anything approaching adequacy might take a competent lecturer an hour, and still the emotional impact would be lacking. The degree to which learning can be accelerated through audio-visual methods is perhaps its best known characteristic: what may be even more significant is the extraordinary force with which it can be used to relate idea and concepts. Its significance lies in the extreme delicacy and complexity of relationships which go to make up the modern world. The success

of leadership, even in relatively small ventures, depends to an ever-increasing extent on comprehension of these relationships. Industry, in recent years, has shown an awareness of the problem by sending off more and more of its most talented young executives —not only to the business schools—but to the liberal arts departments of the universities. Superior performance as a specialist is no longer enough. And dependence on the traditional tools of communication is no longer enough either.

Money

The first thing one learns about audio-visual techniques is that they are expensive, and our own experience with the "Art X" show quickly taught us that a course prepared in this way could add up to a fantastic total. The cost of film-making in a commercial studio (16 mm. color with sound) rarely averages out at less than $1,500 per minute—and a lecture takes fifty minutes. Even assuming every possible economy, a full course on almost any subject, prepared for wide distribution, could easily cost $1,000,000.

At first blush it may seem idiotic even to consider this kind of thing for institutions so chronically short of funds as schools, but the industrial designer has a somewhat different viewpoint than the professional educator. The sum of $1,000,000, for instance, is not large if it is the new tooling for a refrigerator which is being considered; $50,000,000 is a modest sum if the product is to be a new line of cars. To an educataor such comparisons might seem meaningless, since the two kinds of investment are totally different. But for us it brought up a question: are they so different? With the question came a new picture of education as a "handicraft" process in a society geared to other methods. With the picture, a hypothesis: many of the difficulties facing education today are related to the persistence of outmoded methods.

If, by some miracle in reverse, two men could make one automobile by hand in a year, the industry would require a working force of 10 to 12 millions. There would be a labor shortage, as there is in teaching today, and cars would be very expensive.

Two or three centuries ago in the European universities there existed a numerical ratio between faculty and students which may have been on the order of one to fifteen, or perhaps one to five. This could be described as a production ratio: it took x faculty members to produce y graduates. Today's ratios are: University of Illinois, five to six students per faculty member; Iowa, nine; Harvard, three or four; Michigan, sixteen. Now it is possible that education is one activity immune to the effects of the Industrial Revolution, and that nothing will ever change its production ratios. But I wonder.

Let us consider something else. There are listed in the World Almanac some 1,000 colleges and universities. Let us assume that certain common denominator courses, such as physics, biology, art appreciation, etc., are taught in all of them. Let us also assume that in each institution an average of $1,500 is budgeted for the instructor's time and other costs. If this figure were accurate (it is probably low) you would have a recurring annual bill of $1,500,000 for instructing the nation's undergraduates in, say, elementary biology. This is hardly low-cost production, by industrial standards. Nor can it possibly be claimed that the present "handicraft" method results in production of a uniformly high level.

With what has already been said, the contrasting industrial approach to this problem needs no detailed explanation. The big investment would be made *once*, at the beginning. The most gifted teachers in the field would be retained, and they would be backed up with all needed technical facilities. The result: a series of "packages" available to students everywhere. The cost per student: a fraction of what it is today. I cannot say that this procedure would solve the financial problems of the schools, but it seems reasonable to hope that it might relieve them. And much more than money is involved.

Time

One of the most irksome problems confronting the educator is the competition for the student's time. On the one hand are the pressures for a more highly specialized education-training which covers more ground more intensively than ever. (Consider what a physicist has to learn today.) On the other is the insistence that everyone have a liberal dose of the liberal arts. Both pressures, moreover, will increase. The demands of business, science and industry will become more exacting, not less. Public awareness of the dangers of a society run by half-educated specialists is also greater.

It is hard to see how, with present teaching methods, the schools can hope to turn out the competent technician who is *also* a mature, educated individual. A clear distinction between the two objectives, however, might open the way to improved methods. When a school turns out a professional, his capacity to perform is of crucial importance. To date, the best way to learn to do something is to *do* it, preferably under expert guidance. This is time-consuming, and there are few short-cuts. The procedures involved in a general liberal education, however, are different. It is not necessary for the student to be able to write Latin poetry, remember the date of the battle of Thermopylae or the name of the barroom where Kit

Marlowe got into his final brawl. The objective is to help him form a coherent picture of human activity, a capacity to understand its great achievements, an ability to form independent judgements, and above all, to learn to relate isolated bits of information in terms of a large context.

To meet the second of these objectives, the approach tried in the sample lesson offers rich possibilities. It can communicate with great force and tremendous speed; it can establish relationships in minutes which would take a classroom lecturer hours. If the "briefings" such a method makes possible were substituted for many current elective courses, whole sections of time would be freed, and the specialist student could be powerfully exposed, during his undergraduate years, to many important areas of human activity.

We are aware of the widespread feeling that canned education destroys the value of the personal contacts that schools and colleges make possible. People used to be suspicious of food out of cans. One cannot deny the inspirational value of direct contact with a great teacher but how many great teachers are there? And why shouldn't a great teacher, in addition to inspiring one small group of students, be passed on to students in other schools?

Interestingly enough, the audio-visual methods, so rich in educative potential have been confined largely, to date, to the teaching of trade skills and to conveying isolated bits of information. And the best of the experiments in education—as distinguished from training—have appeared in television.

Results

If the result of work on the Art X lesson was to give us a new insight into some aspects of education, it does not follow that the result at the University of Georgia was the prompt allocation of a million dollars for the production of a course in art appreciation. What happened was far more constructive.

The Art X sample lesson was run through six times before the demands of students and faculty were satisfied. It produced both confusion and enlightenment, generated enthusiasm and hostility, and a rather depressed conviction that this kind of project was simply out of the grasp of a single school. Then one faculty member happened to remark, "Well, if we had about $25,000 for equipment. . ." and Eames and I both erupted in unrehearsed but perfect unanimity. We pointed out that nobody had given us $25,000, or fancy equipment, or a staff of technicians, and that we had offices to run while making Art X. It apparently made the point. The weekend following the showings, a number of faculty members descended upon one of the larger classrooms and began ripping out its insides with their own hands. That summer they ripped down the barriers between courses which had previously been rigidly separated. In the fall, new students walked in on a new kind of learning experience, one which gave them drawing, modeling, painting, carving and automatically projected lectures as a single integrated activity. Miraculously, two faculty members have managed to turn out over thirty of these presentations in one school year, and though there are immense obstacles to overcome, I doubt very much that it will stop.

It is early to draw conclusions but two things are quite clear: (1) given the determination, a school can produce its own audio-visual material with limited resources. The results are far from technically impeccable, but it doesn't matter; (2) creative use of the industrial approach does not eliminate the teacher —it upgrades him. It also gives an entirely new direction to the curriculum.

Prospects

The emergence of a valid new concept is like suddenly turning on a light in a dark room. One no longer feels one's way from one separate object to another: the room and its contents become visible as a unity. The Art X lesson was innocently undertaken as a device for the clarification of certain ideas about teaching: it ended up by illuminating some of the immense enrichment which could come about through application of the industrial method to education. Its costs, by advance calculation, were prohibitive—so it goes ahead anyway. It presents all the dangers which stem from centralized production and control—but in practice it takes form at the grass roots level as an activity in which any institution can participate. The speed of communication is so great that the conventional course can be compressed into a kind of briefing. This, in turn, suggests one kind of answer to the education needs of industry, and to the growing demand for general adult education. It relates automatically to the emergence of non-commercial television. It suggests the merging, in a future not too far off, of the many current experiments in communication into a new pattern of continuing education.

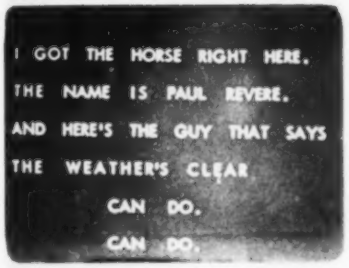
Art X said its piece in an industrial vernacular because industry has given us more and better ways to say things than we had before. The pictures which flickered across the multiple screens were made by machines, developed by machines and projected by machines. The voices, music and sounds were electronically recorded, amplified and played back. But it was people who said the words, wrote the music, and made the final statement. This is why there is no need to be afraid of our tools—even in education. The teacher may become less visible in the new classroom, but he will still be there.

A sample lesson: subject **"COMMUNICATION"**

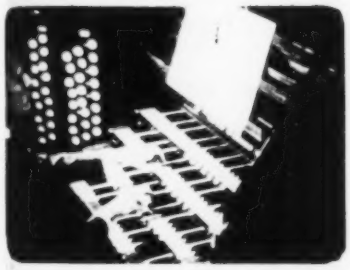
Excerpts from a visual lesson prepared by Charles Eames and George Nelson from original and borrowed films and slides, presented at the University of Georgia and U.C.L.A.

1 Introduction

Opening film (10 minutes) makes one point: the completion of a communication requires not only a message and a transmitter, but a receiver capable of tuning in.



Message: song from "Guys and Dolls,"



constructed in the form of a fugue.

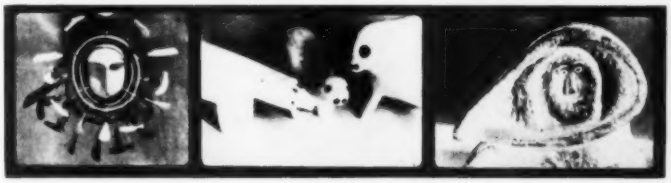
"Receivers" include student in American history (not used to thinking of Paul Revere as a horse).

bookie, who knows all about race horses, nothing about fugues,

specialist in oriental literature, who does not speak English.

Each can receive only a portion of the apparently simple message.

2 Visual Communication



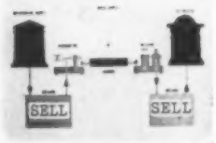
Film dissolves in triple color slide sequences, simultaneously projected. The sequences (about 50) cover an extreme variety of visual communications: painting, artifacts, sculpture, equipment, landscape design, structures, type faces, etc.

Here again the intention is to show that comprehension of a message varies with the capacity of receiver. Music background, no narration. Running time, about 10 minutes. Both sections by Nelson.

communicatio...
communication of
2. Intercourse by w
of thoughts or opi
converse; correspon
Evil communicati

3 Communications Process

picks up the opening idea of the transmitter-message receiver relationship and develops it.

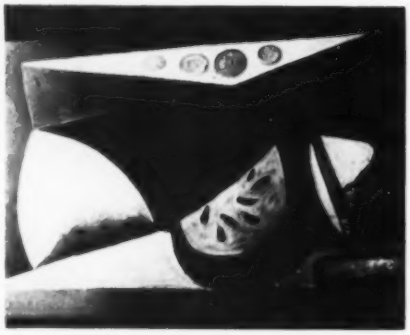


There is the example of a stockbroker's office, with transmissions of the simplest message: "Buy" or "Sell."

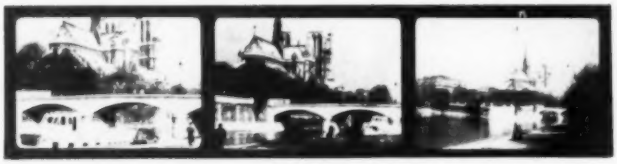
"Noise" is described as a factor in message distortion.

The process of communication is shown as it takes place between two people ("I Love you") between artist and audience, etc. Running time: 10 minutes. By Eames.

4 Abstraction

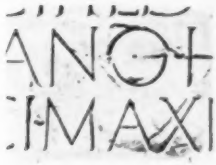


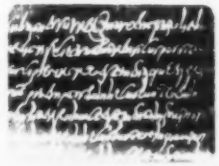
The point: The use of abstraction is necessary in communications, since it is rarely possible to send a *total* message. Examples: a Picasso still life, maps of a section of London ("change the information and you change the picture") and cathedrals in England and France.



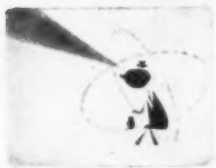
Presentation of abstraction in communication changes from single slides (above) to simultaneous triple projections shown below. Smell effects (incense) accompanied slides of cathedral interiors. Detailed description is given in text. Slides, 35 mm color. Running time, 8 minutes. By Nelson.

5 La Lettre





6 UPA



←

La Lettre

Excerpts from a French film on the evolution of lettering and calligraphy. 16 mm black and white. 4 minutes.

→

7 Egypt

A 10-minute 16 mm film in color, taken from the magnificent footage shot by Ray Garner, generously made available for the lesson. Here a dead civilization is shown as a live transmitter. Its ruined architecture, sculpture, jewelry, hieroglyphics add up to a communication on a variety of levels. Again the success of the transmission depends on the ability of the receiver to decode the silent messages. Edited by Nelson.

←

UPA

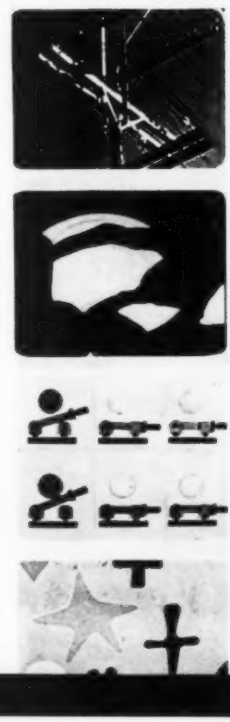
"The animated calligraphy of sound" — a 3-minute fragment taken from a 16 mm color film made by UPA for CBS. Edited by Eames.

→

Communications Method

An extension of the "Process" film, which penetrates still more deeply into the procedures used in communication. It shows, primarily, how the most complex of messages can be broken down into myriads of individual on-off, yes-no, stop-go decisions.

8 Communications Method



→

Communications method (continued)

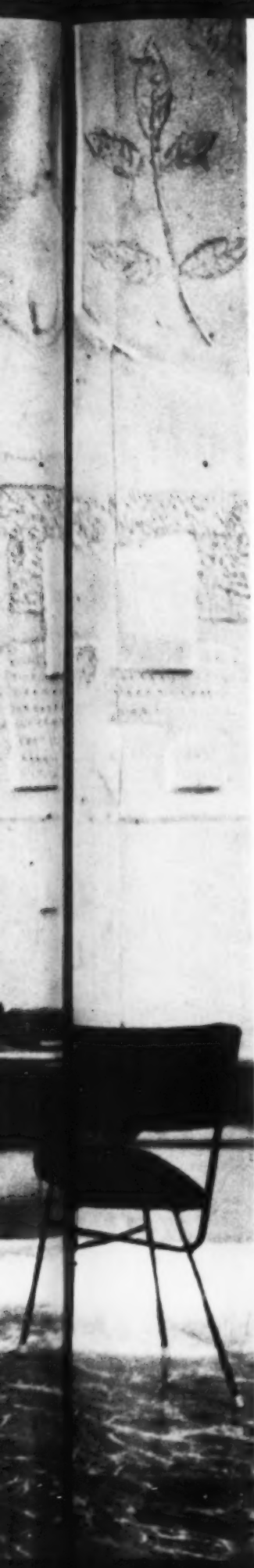
Example of ways messages may be broken individual decisions: halftone photograph of a face is made up of several hundred thousand black-or-white decisions.

An electronic computer presents as many possible decisions as the halftone.

"The simplest human act" — picking a flower — takes infinitely more stop-go decisions than the most complex computer or printing plate.

Mosaic and pointilliste paintings are examples of complex productions visibly based on great numbers of separate, decisive acts.

Note: Both the "Process" and "Method" films, by Eames, have been merged into a single 16 mm color films which runs about 20 minutes, entitled "A Communications Primer." The film is available for distribution.



architect enrico peressutti by hans namuth

Pardon me, mister, but maybe you can tell me,

What's going on here?

Are they selling something?

It's beautiful! If you like this much modern.

Where but in New York would you find a typewriter waiting at the curb. What a chance to write up my weekly activity report.

Is that floor real marble?

I've passed this place so many times now I don't mind it any more.

Look at that concrete wall. Picasso did it.

I hear it was all built in Italy and shipped over in pieces.

It's pretty, all right, but how practical is it?

It's gorgeous, absolutely gorgeous. Not a bit like a store.

When you think of it, the ceiling is blue and the floor is green!

You type all day, what are you typing now for?

I wonder if this place pays for itself.

It types like a dream.

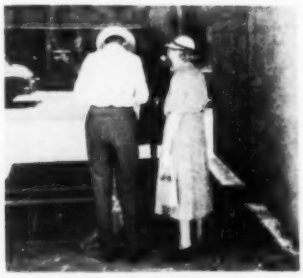
Unless I can figure some way to get this typewriter off its stand I may be forced to buy one of these things.

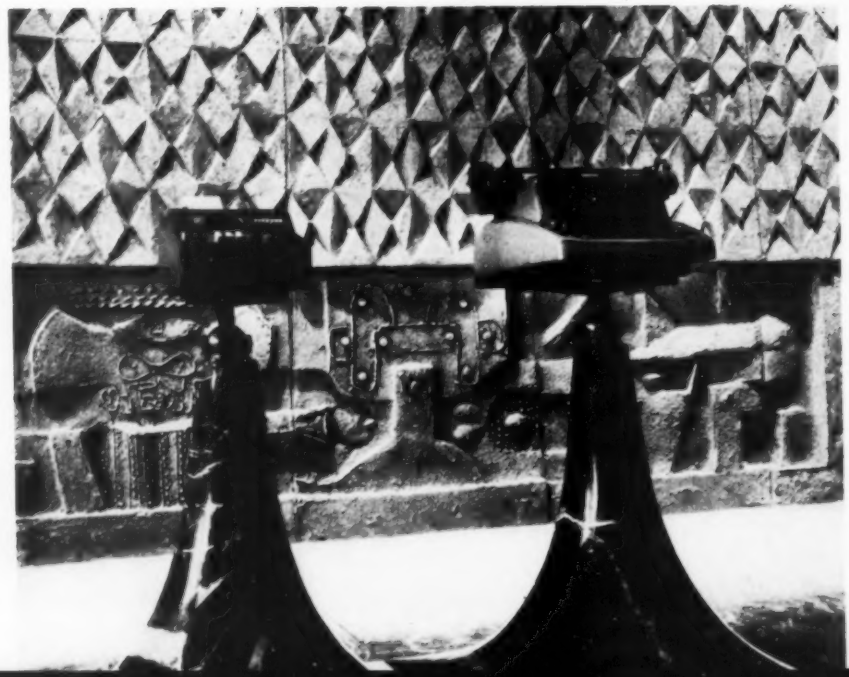
snapshots: mitarachi

upper case showmanship and lower case selling win a quick reputation for Italian business machines

Olivetti

interior photos: hans namuth





The showroom of the Olivetti Corporation, at 580 Fifth Avenue, New York, was designed by architects Belgiojoso, Peressutti and Rogers, of Milan. Wall relief, by Tino Nivola, is plaster cast in sand molds. Suspended lighting fixtures are Venetian blown glass in red, green, and blue, by Venini. Green marble floor slabs and pedestals, and 16' high walnut door were made in Italy and shipped here.

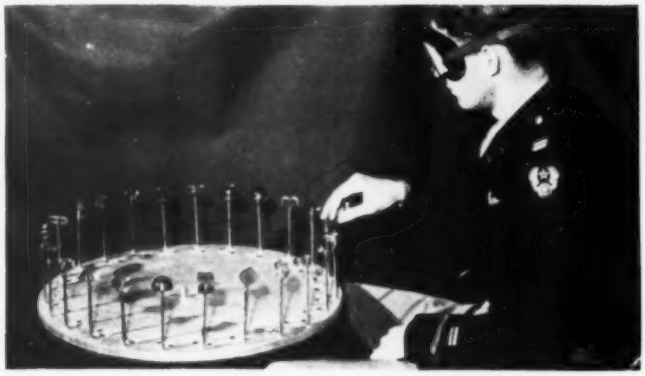
hans namuth

paul mitarachi

"The architects were planning to put some sculpture in front of the showroom window," explains Dino Olivetti, head of the Olivetti Corporation's American activities. "I said, our typewriter is sculpture, why not put *it* there, like a merchant's symbol of what we are selling?" Interestingly enough, Olivetti's showroom is one of the least voluble in town—and it is a crowd stopper. Like the typewriter out front, its magnetism seems to lie in saying the most with the least. It has no sales talk in the window, not even a price tag discreetly turned down. Its props are few but fabulous, and suggest some sort of theatrical fantasy put on for the by-passer's amusement: a wall of sand sculpture, a sea of rich green marble, multicolored Venetian lamps spotlighting marble pedestals which rise from the floor with wave-like rhythm, an Olivetti machine on every crest.

If you ask Mr. Olivetti why the showroom was designed to put pleasure before business, he makes it quite clear that the showroom *is* good business. Olivetti's machines are known throughout the rest of the world, and its 106 showrooms are trademarks as important as the quality of the products themselves. Preparing to invade an American market unfamiliar with its standards, Olivetti knew that its first big job was not to sell machines over the counter but to sell the company name. Characteristically, it decided that one bold gesture was worth a fistful of slogans. "This showroom is nothing unusual for us," Mr. Olivetti explains, "just a little bigger splash." By giving the best designers a free hand to create an outstanding display, Olivetti plainly implies that equal devotion is lavished on the design and manufacture of the machines themselves.

"It doesn't cost more to do things well," he concludes. "For the price of a few ads we can operate this permanent advertisement for a year. The basic design and construction cost? That's no extravagance. In fact it's a way of giving the customer better value because it helps sell more machines. You might even call it capital equipment."



Left: Testing a pilot's ability to distinguish between handles designed for tactual discrimination. Opposite: composite photo of F84 fighter-bomber, courtesy Republic Aviation Corporation.

Introducing a series of articles about designs in which "human engineering" is essential

Men and Machines

by Deborah Allen

The egg, which Raymond Loewy regards as the perfect form, was designed in kind consideration of the hen. This humane approach to design is as old as design itself, but it has only recently become a science —the science of human engineering.

Human engineering developed as a science during the last war, when a series of apparently unnecessary accidents made the military realize that a good deal of its equipment was badly designed. The typical problem was the airplane. A trained pilot, flying a sound plane, would misread his altimeter by 1000 feet and dive into the ground. Another, on a night flight, might turn off his battery and generator switches instead of his landing lights and think, of course, that he was having engine failure.

Since men had made the mistakes, it was natural to call on psychologists to find out what was wrong. The psychologists, with the humane instincts that befit their profession, decided the fault lay not with the men but with the machines, and they began to tackle the problem with scientific methods. After pinpointing the trouble areas, they set up careful tests to find out which instruments and controls were easiest to use and yielded the most accurate response from the pilot. Many of the things they have learned seem absurdly obvious: A scale marked in fives with subdivisions half way between is plainly going to be the devil to read (if you think the pointer is somewhere near 4 you can check it by mentally dividing the distance between 2.5 and 5 into 5 steps of .5 and adding 3 of them to 2.5). Nor does it take a psychologist to tell you that a pointer which covers up the number it is pointing to is badly designed. But the human engineers have also been building up a catalog of useful information. The designer may not know, for instance, that a circular scale with zero at eight o'clock is easier to read than one with zero at twelve o'clock, or that red lights on a dash panel interfere least with the dark-adapted eye. If the findings of the human engineer sometimes read like a catalogue of common sense, we should remember that every new science must lay its foundations in the obvious.

The designer works from insight and experience, and any extra source of insight and experience is valuable to him. Human engineers should be important partners for the designer in the future. They may even *be* designers — scientists, after all, are designing the universe. But one thing, to our mind, is certain. Human engineering will never be a *substitute* for design. The scientific method and creative imagination are two entirely different things.

The human engineer, who in a sense must work in the past, can study a product, find its failings, and suggest improvements, but any man who gives an object a definitive form is a designer, no matter whether he calls himself industrial designer, architect, engineer, or scientist. Human engineering in its usual sense might be described as one aspect of design, enlarged to the scale of a profession.

For example, recent studies indicate that capital letters are more easily read at a distance than small ones, but lower case letters are best for close reading. This is useful information, but it just so happens, as any designer knows in his bones, that our capital letters were designed by the Romans, who used them to glorify great columns and arches. Lower case letters were developed somewhat later for use in manuscripts and books. These two alphabets, which the human engineers can scrutinize and even criticize, were aptly designed before human engineering was born.

To return to the cockpit: If the military had asked a designer what was wrong with it, the designer could have answered in a minute. It wasn't just the instruments — the cockpit itself was badly designed. In fact,

it was hardly designed at all. The engineers had designed good planes, and they had equipped them with good instruments — apparatus that would detect motion and pressure and temperature, devices that would control flaps and generators and lights and fuel tanks. When they had fitted all this paraphernalia inside the plane they left off designing, and the man who had to fly it was left with the ragged ends of the equipment — indicators that counted in hundreds, thousands, tens, threes, and point fives, instruments that swept and circled and rose and fell and flashed and clicked and talked in code. The trouble was that nobody had come along and said, "What are we trying to accomplish and what is the best way of doing it? What is essential and what is wasted?" That would have been design. One of the most remarkable things about the human engineers, and one of the things that seems to prove their value, is the fact that they have arrived at that simple principle — good design is the appropriate answer to a clearly perceived problem.

Aside from the fact that human engineering is likely to develop as a useful science, we have a special reason for being interested in the subject: Human engineers have proved the validity of good design. In an era when nothing is good unless it works, the designer sometimes wonders where he fits in. The human engineer can tell him — the designer makes things that work. Human engineering may not be synonymous with design, but the human engineer knows a good design when he sees one. It is difficult — almost impossible — to define good design, but these scientists are developing some useful rules of thumb. Here are some examples

1. Good design is unified; that is, it transcends specific problems with a general solution. In experimental cockpits, for example, the attempt is now to make an over-all design symbolic of flight conditions rather than improve the old conglomeration of instruments.
2. It is apt: good design is not simply a matter of giving things a pleasing form; it provides a unique answer to a specific problem.
3. It is essential: one of the cockpit designer's first problems is to find out which information is essential to the pilot and which is irrelevant and therefore a liability.
4. It is expressive: a good design communicates the nature of an object — be it a toggle switch or a typewriter — and its importance for people.
5. Finally, it is humane — a good design has regard for people's emotions. Accurate instruments, for example, can bolster the pilot's confidence by *looking* accurate.

In this issue we present the first of a series of articles on designs in which human engineering was a major factor. Design is important in every object, but sometimes the design program almost precludes good design. The dash panel of the automobile, unlike the cockpit of most planes, was designed with care, but it is not, strictly speaking, a good design. The central theme is a humane one — people should enjoy driving cars; but this unreproachable aim, carried too far, leads to patent absurdities. The instruments are purposely made to look more intricate and important than they really are. It doesn't matter too much, though, because the driver gets most of his data from the view beyond his windshield — a graphic presentation of driving conditions that designers would like to emulate in planes. Our series will be devoted to products in which design is a critical factor, not for consumer acceptance, but for speed, economy, safety, and even life, because these products present an undisguised statement of the meaning of design. The professional label on the man who designed them is not our concern.

mia opera conflate. Et ciaſcuna di queſte, Nel ſuo femine diſcriminan-
iſe,& diſſentiente le polpoſe coxe,uertiuano poſcia quelle in antiquarie
ronde,cum fogliatura Achantinea,Obuiãtiſe luna cum laltra,ſe colliga
ano, Poſcia uerſo gli ſui Ilii, o uero fianchi,gli uolubili eſſe cum ſtri-

Above: Hypnerotomachia Poliphili, *Venice, Aldus Manutius*, 1499; *courtesy the Cooper Union Museum.*
Opposite: Arch of Constantine, Rome.

Dash panel of Chevrolet.

When the early models of man were produced, the problems of communications were relatively simple, and were mainly related to man's communication with himself. The modern version of man operates in an entirely different environment. Integrated dynamic team operations, such as a baseball game or a surgical operation, demand efficient communication with specific requirements as to accuracy and speed. When one of the partners in a conversation is not human, we experience many problems.

There are various views as to the goal of data reduction or computation machines. One might say that the end result has been achieved when the computation results lie in the storage system of a computer. According to another view the information must be carried a stage further to the point where the computer is free to unburden its soul, yielding masses of transcribed data. The operator, filled with amazement and consternation, then embarks on the laborious process of extracting the pertinent information. Still others say the end result has been achieved when that part of the data which is relevant has been extracted and is presented to the operator in convenient form. Data is, in fact, only a means to an end and not an end in itself; if it leads to no decision or action, it serves no real purpose. Man's knowledge of the theory of flight would be of no value if he did not have the resources to put it into practice in the building of airplanes. On the other hand, birds are not concerned with the theory of their flight because they have achieved the end result directly.

In the simple desk calculating machine, the information circuit comprises an intimate conversation between the operator and the calculator; the question is generated by the operator, proposed to the calculator, the answer is fed back to the operator, who evaluates it, generates a new question, and feeds it back to the calculator. High speed computers manipulate the information in electrical form, inaccessible to the operator. Often saturated with information, they are tongue-tied when they face their operators.

Ideally, one strives for a total system wherein the flow of information at any one stage is compatible with the cost of achieving that flow. The general limit at which information can be reliably fed to a computer is on the order of six characters per second. On one side of this constriction, the human operator can think very fast; on the other side, the computer can operate very rapidly. The limiting speed of the system is too often set by the human hand—ten fingers which are better suited to the tasks of swinging from trees or peeling the skins of bananas.

There are two main approaches towards solutions to the problems of efficient man-machine communication. Basically, the first is to reduce by a pre-digestive process the amount of information which is to be transmitted to the human operator. Ideally, one would like to pre-digest the information to the point of providing a yes-no answer, insofar as a choice of two is the minimum number of variables from which a significant choice can be made. A yes or no answer is meaningless unless it is placed in some environment of independent facts which are available to the operator and not to the machine.

The second approach to the problems of man-machine communication holds very fascinating and unexplored possibilities. It involves the establishment of more nearly direct communication between the high-speed thinking element of the human being and the high speed element of the machine, thereby avoiding low speed mechanical devices attached to both units. Human beings are, in fact, plugged into machines at the present time. The objective is merely to raise the level of activity at which the connection is made.

Bernard Benson

Men and Machines: **Benson-Lehner**

Boscar

Oscar

Electroplotter

Digital Converter

Benson Lehner

in the burgeoning field of electronics, brilliant progress is commonplace, yet the machines that result are often in many respects quite primitive. The beauty of the "thinking machines" is usually ruined by their inscrutable, elaborate exteriors and their demand for a ritual of obscure attentions. As the statement on the preceding page indicates, Bernard Benson, president of the Benson-Lehner Corporation of Los Angeles, believes that such devious machines are not properly efficient. He wants them to drop their jargon and speak on an intelligent human level, in human terms, at human speeds.

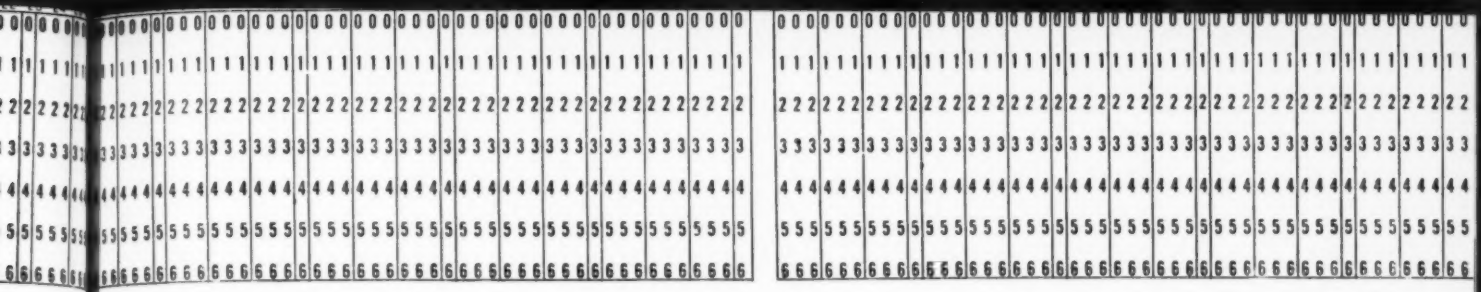
The most revolutionary designs are often a result of the broadest statement of objectives. Mr. Benson's objectives, which might serve as inspiration until the machines are autonomous, have already produced a remarkable series of products. These products are interesting to the designer because their engineering and their design are united to one goal.

The Benson-Lehner Corporation is specifically concerned with data reduction systems. In plainer language, they make machines for analyzing instrument records — oscillographs and films — and reducing them to a more useful form — simplified graphs, digits, or grist for a computor. Such systems might be used, for example, by the designer of guided missiles. The performance of various designs in wind tunnel tests could be recorded by oscillographs or on film, but they would be meaningless until they were analyzed and redrawn as easily understandable graphs or tabulated in numerical form.

In Benson-Lehner's unique system, the operator works directly with three machines — two for reading such graphic material and one for plotting it. In essence, the two readers help the operator note the relative position of any point on a record by measuring its x-y coordinates. The earliest devices of this sort consisted simply of crossed wires which the operator could align over the point to assist him in measuring its distance from the x and y axes. If he was reading whole film strips or pages of oscillographs, crossed wires and a rule were obviously not a great help. The Benson-Lehner machines were designed to speed up this process by allowing the operator to concentrate on the critical job of choosing the points to be measured, relegating the clerical job of measuring and logging their coordinates to the machine.

In the newst addition to the system, the BOSCAR (Ballistic Film Analyzer and Recorder), the operator's job is reduced to essentials: instead of following a mathematical route along the axes of the point, he uses a joy stick to spot it with a tiny beam of light. When he has found the point, he signals for readout and the machine automatically records its position according to whatever scale has been chosen. To pinpoint the record accurately the operator may have to shift the stick a half a thousandth of an inch (although the screen is nineteen inches wide, the stick has a maximum movement of only two inches.) Nevertheless, a novice can resolve a point in a second, for the skill required is a native one — the skill of coordinating eye and hand on one spot.

The second reading machine in the Benson-Lehner system, the OSCAR (Oscillograph Analyzer and Recorder) is not so direct in operation, but it makes up for this by its genius for mathematics. Key points on oscillograph traces placed on the OSCAR are located by means of the hairlines engraved on plastic overlays



(see page 67). Instead of crossing each other at right angles, both overlays move horizontally across the trace. One carries a vertical line for measuring the x displacement, the other generally carries a sloping line, representing the hypotenuse of a right triangle. When the two lines are positioned and the operator presses the readout button, the machine makes two measurements along x. The first is the simple x displacement; the second is the base of the right triangle that contains y, from which the machine deduces the height of y. In addition to the fact that parallel motions are easier to control than disparate ones, the system offers pretty mathematical advantages. Chief among them is the fact that callibrations are automatically applied to the readings when the sloping line is replaced with an overlay inscribed with the appropriate curve. For example, the machine can automatically filter the carrier wave out of an oscillograph. Instead of turning to a computer for the log of a value, the operator can expect the machine to derive it from a log curve. By setting the controls properly, the operator can also ask the machine to apply multiplication, division, addition and subtraction.

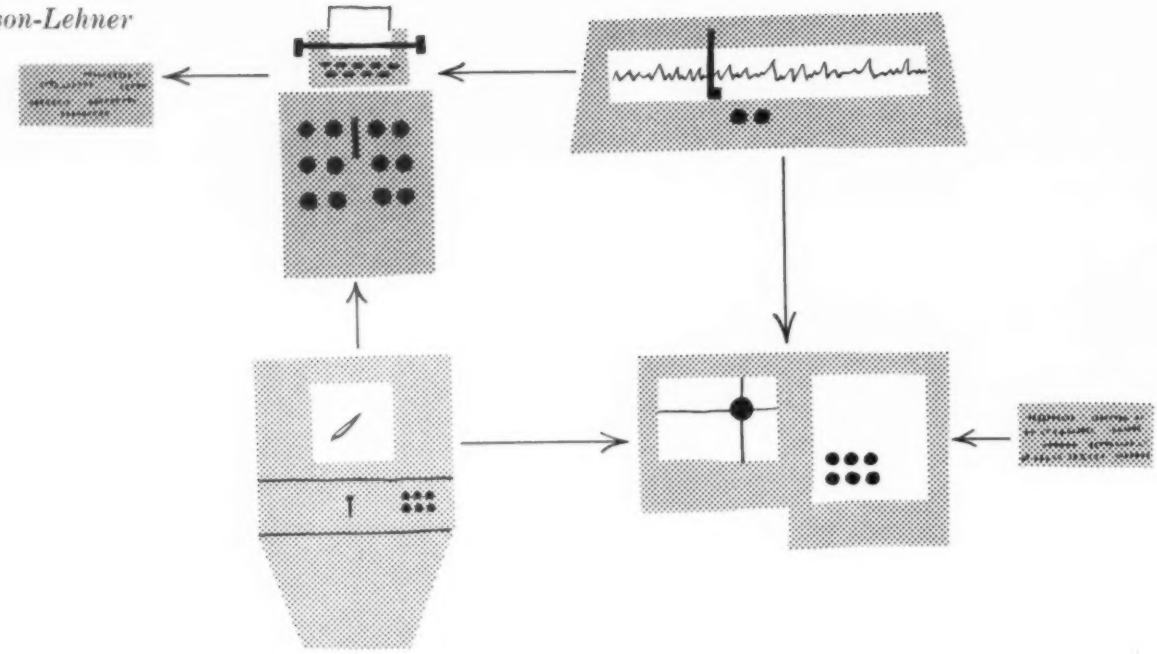
The data compiled by the OSCAR and the BOSCAR can be automatically transferred to punched card or punched tape or handed over to a computer, or it can be fed to the third element in the system, the Electroplotter, for replotting. The Electroplotter will also plot figures the operator feeds in from a keyboard.

It is hardly surprising that Benson-Lehner's machines are among the most beautiful in the field of electronic equipment: for their appearance is one aspect of a total design program. Other firms have asked who their designers are; the designers are the men who conceived the machines. Bernard S. Benson, who headed Great Britain's wartime guided missile program at the age of twenty-one, founded Benson-Lehner in 1950. Today, with 115 employees, the company boasts of intimate working conditions which encourage a personal interest in the quality of the product.

The prime consideration, from the initial concept to the final organization of the cabinets, is how to make the best use of both operator and machine and establish an intelligent rapport between them. The concept is both practical and humane: the machines must expedite work but the company is also aware that operators may spend more time with the machines than they do with their families.

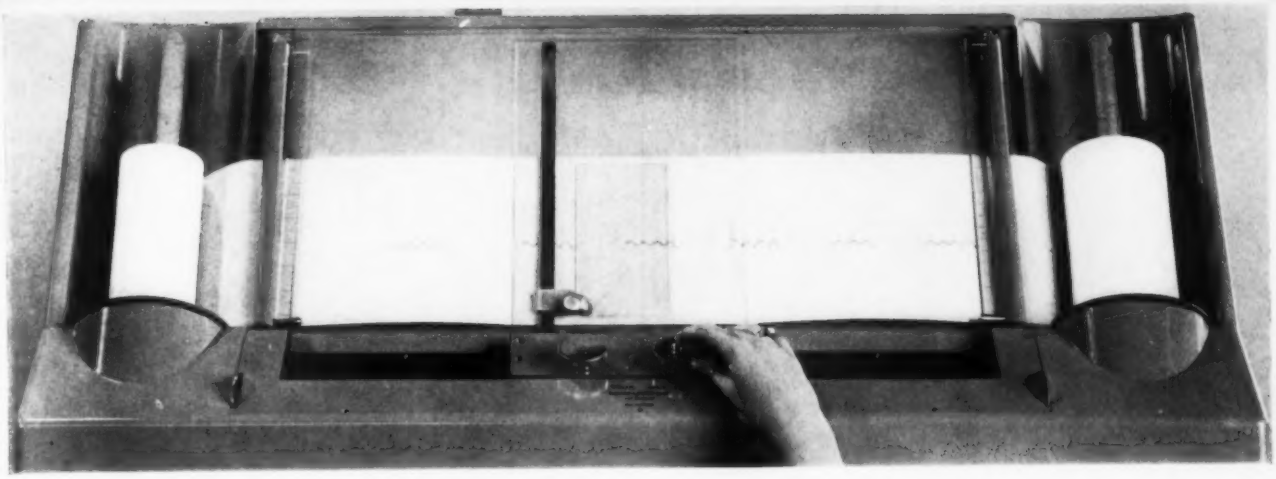
Most electronic equipment is economically housed in standard metal cabinets, but for models and prototypes wood is naturally less expensive. Benson-Lehner likes to shape each cabinet to the layout of the machine and the human requirements, and uses a maker of wind tunnels to tailor wood cabinets even for production models. The freedom this gives the designer accounts in part for the singularity of the designs. Wood also makes a quieter machine, and a less chilling one to work with. The design of the cabinets is founded on two functional requirements: first, the graphic material the operator must see is presented clearly and conveniently. Second, the necessary controls are arranged for the convenience of the operator's hands (or foot, in one case). The remainder is refinement — clean lines and balanced forms — worked out by designers who are evidently deeply involved in their work.

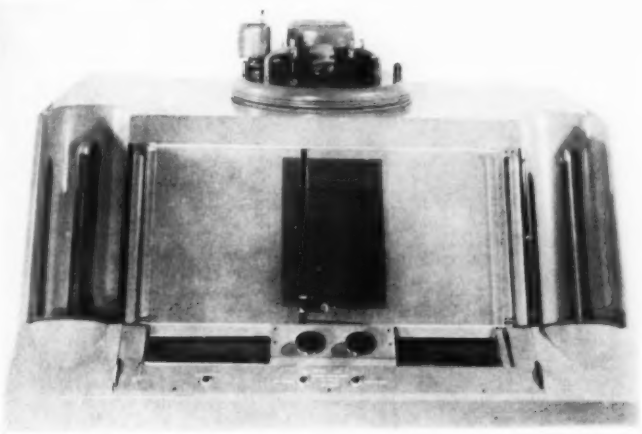
Benson-Lehner



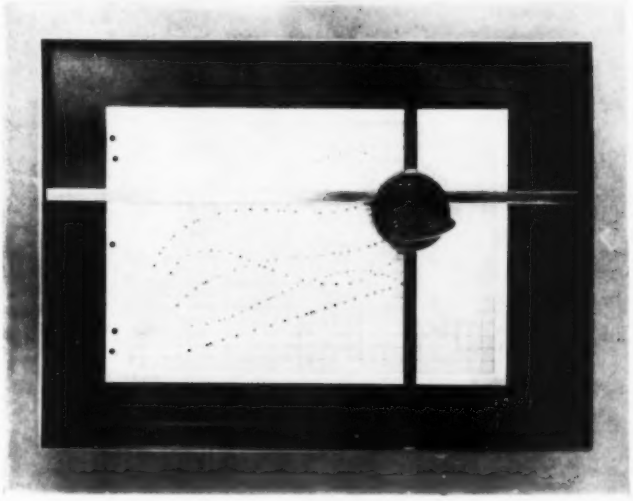
The four elements of the Benson-Lehner data-reduction system are shown above. At bottom left is the BOSCAR, which reads ballistic films; at top right is the OSCAR, which reads oscillographs. At bottom right is the Electroplotter, which plots graphs of the x-y values fed to it by the OSCAR, the BOSCAR, punched card or tape, or its own keyboard. The output of the BOSCAR and the OSCAR can also be fed to the digital converter at upper left, which converts electrical values into specific digits for translation to punched card or tape or typing out by the IBM typewriter.

Seated before the viewing screen of the BOSCAR, the operator rests her arm on a broad counter as she points at the spot she wishes to measure. Her pointer is a joy stick controlling a small light which is directed to the screen and the projected film image by a series of lenses. When she has picked out the spot with her right hand she signals for readout with her left hand or her foot. Her left hand covers four keys: readout, film advance, film reverse, and zero out, a key with which she can re-establish the position of zero on the film. To add key numbers to the record she moves her right hand to the corner keyboard.

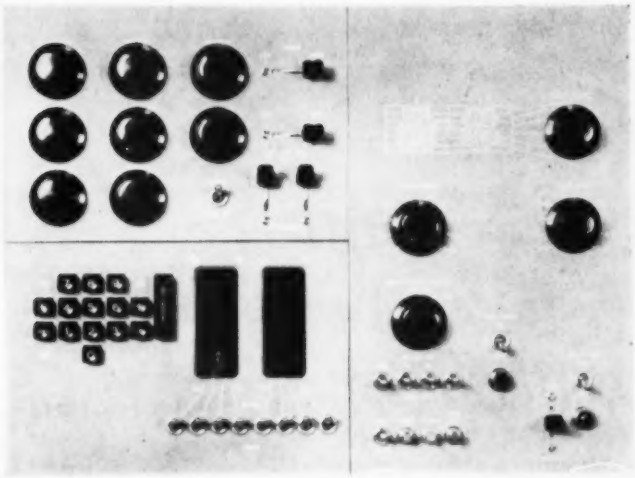




The OSCAR provides a back-lit plane against which the operator can read oscillographs in rolls or sheets. The two control knobs are used to align two plastic overlays on the point to be measured. The left-hand knob moves the entire control panel and the vertical line which measures x *displacement; the right-hand knob adjusts the smaller overlay engraved with a sloping line. When the two lines intersect a right triangle has been formed from which the machine deduces the height of* y*. Readout is in the right knob. In the OSCAR, as in the BOSCAR, analog values are established by two* 5000 *ohm potentiometers, whose resistance varies with the position of the controls. The OSCAR at right is equipped to project microfilm onto the screen.*

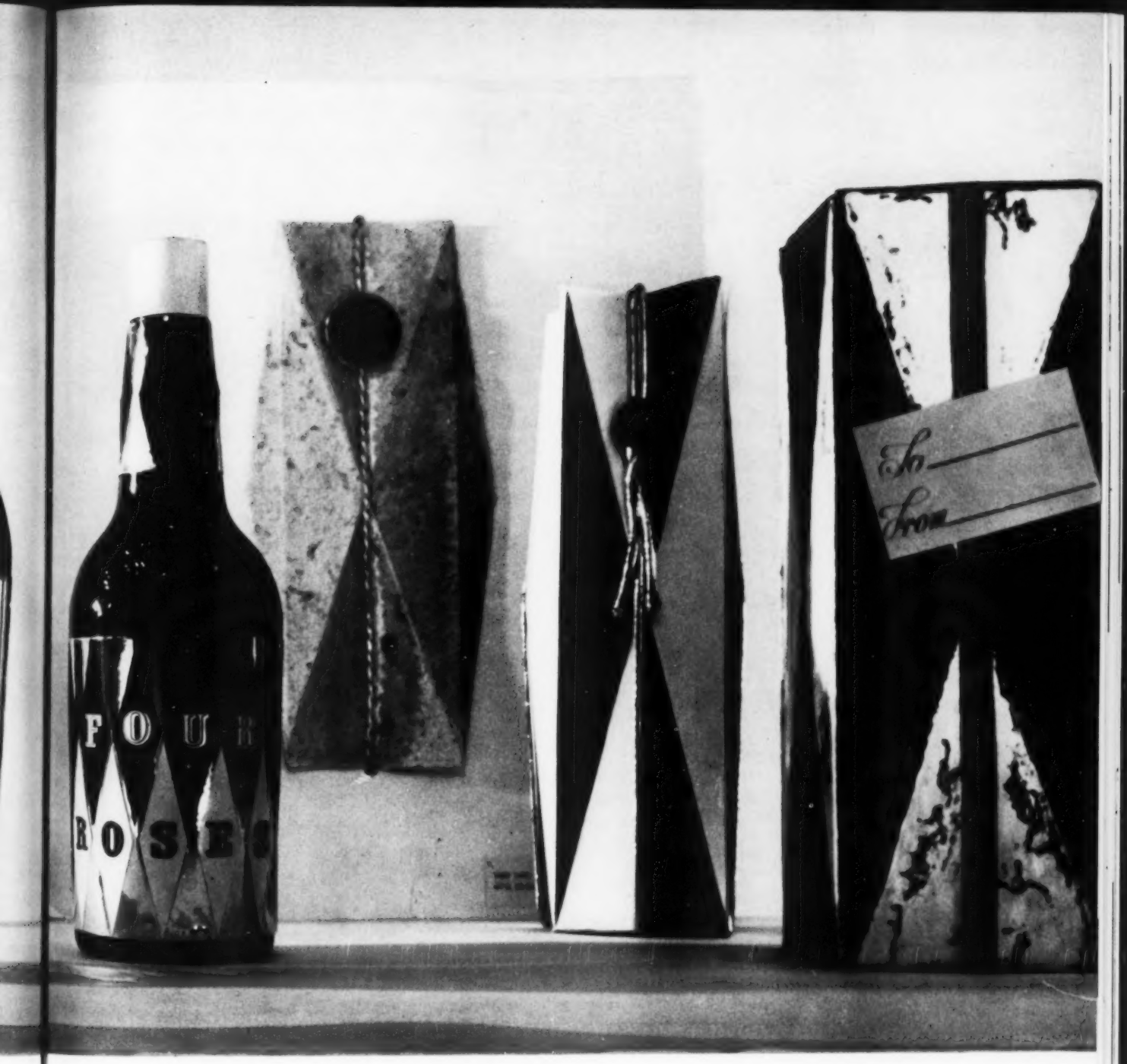


The wide frame of the Electroplotter gives the operator an armrest and a table for her work when she is feeding in numbers by hand. For touch operation, the serial keyboard was found to be easier to encompass than a parallel one. If y *is erratic and* x *rises in even steps, the operator turns a switch to advance* x *automatically as she adds in* y*s. Next to the keyboard is a lamp bank for verifying numbers as they are set up. If the graph takes a gradual curve* (1120, 1135, 1147 *for instance) the operator can use hold switches beneath the lamp bank to hold the digits that are repeated. A suction table holds the graph paper. The plotting head is carried on steel strips activated by servo-mechanisms.*



Christmas brings no cheer

to the distiller. Since the decanter idea began to take hold, so many have been marketed that selling Christmas spirits now depends largely on design. The decanter is everybody's problem. The customer expects a fancy wrapping, or better still a special bottle which will make his gift look more important. But, if the bottle costs the same, he may suspect that the liquor inside isn't so good. The retailer's problem is how to unload an assortment of leftover decanters when the holiday is over. The distiller has the biggest gamble: will the investment in a fancy glass container pay off? (The decanter not only costs more for design and manufacture but requires a special filling machine, hand corking and affixing of the neck label and stamps.) The designer faces Treasury Department rulings that no "inducement" to buy may be offered. Only a primary container may be provided, and that must have the "mandatory" identification marks ineradicably blown in. (If the decanter is "distinctive" enough, in cost or shape, the "not for sale or re-use" prohibition may be blown inconspicuously into



the bottom instead of around the neck on the premise that the odd-shaped decanters would be too hard for moonshiners to fill on an assembly line). On top of all this, there is the self-defeating character of the decanter itself: each year it must be new, better and more eye-catching, because no one is going to buy the same fancy decanter twice for the same people.

The array of bottles and boxes above, a case history of the new design for Four Roses by the firm of Von der Lancken, Lundquist and Sorensen, shows in a nutshell the industry's alternatives. First, a re-usable cocktail shaker. (Actually on the market this year are Beam's pin-ball shaped shaker and a Pyrex carafe, presumably for coffee, though with the distiller's name ineradicably stamped on the bottle actual re-use is a moot point.) Next, the server—"something extra" not necessitating any change in the bottle. (Jack Daniel's and Seagram chose this route, explaining to the Treasury that the servers would be sold only as an integral part of the bottle itself, and had "no value other than as a decorative device for the bottle." Because the customer pays extra, "inducement" is avoided.) A third alternative was a fancy carton or Christmas wrapping. Four Roses chose a fourth course: The familiar rose-lithographed carton was revamped, and the bottle was simply given a heavy ridged gold foil jacket and collar with a minimum of copy. Thus Four Roses achieves its cheer with nothing more than a special label.

Retail shelves carry a variety of spirits, masculine, feminine and neutral

Distinct this season among the decanters is the delicate, perfume-bottle look. Witness the dinosaur-edged flacon and its toile-de-Jouy box, imported from France. Raymond Loewy's svelte, waisted Old Forester with its gold screw cap effect may confuse boozers but appeal to lady givers. A blue-shaded white porcelain carafe conceals Danish Cherry Heering. The importers think it might make a lamp; Old Forester bottle is suggested for bath salts or table legs.

Some distillers leave the bottle alone, concentrate on the package. Arrow Liqueurs' brightly striped carton and bag designed by Carl Formberg have windows to make identifying label part [illegible]. Erwin, Wasey & Co., has a masculine, old moonshine appeal, while Harwood's ruggedly refined Mountie-red canister could easily contain biscuits. Old Thompson sports sprightly, brightly [illegible]

Distinguished among the decanters is MacNaughton's, whose maple leaf insignia would offend no one in post-use. I. W. Harper's dignified old bottle, designed by Ernest Dupree, has a pouring lip, and represents solid, whiskey-bottle tradition; Glenmore's two decanters emulate cut and hand-blown glass respectively with restrained and fairly ambiguous gold-stenciled identification. All four look reasonably masculine, retain whiskey-carrying identity.

One answer to the problem of left-over decanters is the server. For a slight extra charge, the regular bottle slips into a filigree metal basket. Jack Daniel's is silver plated, from England; Seagram's, an economical version by Dave Chapman.

The package becomes a display device: Old Hickory's decanter is wedged into a striped sentry box, open front and back, eschewing both old woodsiness and specific Christmas decoration; by Alfred B. Hailparn and Leon Merz, Jr. For virile drinkers, the wood-grain carton with rat-eat factory pattern is notched like a bakery carton to slide open for display; by Richard E. Paige. Park & Tilford juxtaposes four sections of a scene to encourage quantity buying.

	1850's-1860's	1870's-1890's	1910's-1920's	1940's-1950's
HIGHBROW	 A "Mantegna" crucifixion	 Whistler's "Arrangement in Gray and Black"	 Van Gogh's "L'Arlésienne"	 "The Crossroads of Life," an early Griffith film
MIDDLEBROW	 Durand's "Kindred Spirits"	 Gérome's "Pygmalion and Galatea"	 Whistler's "Portrait of the Artist's Mother"	 Van Gogh's "L'Arlésienne"
LOWBROW	 Currier & Ives' "Fourth of July"	 Becker's "Custer's Last Flight"	 D. W. Griffith in "Crossroads of Life"	 "Whistler's Mother"

Copyright 1954 by Russell Lynes. Illustrations from his book, The Tastemakers, published this month by Harper & Bros.

THE TASTEMAKERS

Show your good taste

Express your personality

Get a decorator

Be honest

Worry!

Copyright 1954 by Russell Lynes. Illustrations from his book, The Tastemakers, published this month by Harper & Bros.

By Russell Lynes

Several years ago a friend of mine in a moment of husbandly expansiveness deposited $7000 in his wife's bank account. "There," he said to her, "You've been wanting to do over the living room. There's the money. Now do just as you please with it. And don't get in a decorator. Do it your own way, so that it expresses your personality."

My friend, who is a very successful lawyer and a generous man, was puzzled and dismayed by the effect that the lavish gesture had on his wife. "You know?" he said to me a few weeks later. "It's a funny thing. I've got to go to the west coast on business and this time I'm going to take my wife with me. She's just got to get away. She can't make up her mind what to do. She doesn't know whether she wants French provincial or Early American or Modern or what. She wanders around from shop to shop trying to make up her mind. Now she's taken to crying about it. She's so upset about the whole business, I think she's got to get away from it for a while."

Surely the lawyer's wife, whom I have never met, seems to have been far from sophisticated in matters of taste, but the dilemma that confronted her on a large scale often confronts a great many of us on a small scale. We are constantly being called upon to make decisions that, in a sense, give our taste away. The fact is that most of us take it seriously, not only as an ornament of life but as one of its almost inescapable problems. Taste is our personal delight, our private dilemma, and our public facade.

In this we are more like the lawyer's wife than like another woman who faced the problem of decorating her new apartment. She was a New Yorker and she called in a decorator who asked her in what style she wanted the apartment "done." Did she want it Victorian? or perhaps Empire? or maybe madam would like something in the Modern manner? "I don't care what style it is," she said, "so long as when my friends see it they should drop dead."

One could say that the first woman is a middlebrow, full of conscientious ideas about taste, and that the second woman is a lowbrow, but it is not as easy as that. The fact is that we live in an era in which the tastemakers will not, if they can help it, let any of us alone. There are pressures on us from all sides that

Currier & Ives' "Fourth of July" Becker's "Custer's Last Flight" D. W. Griffith in "Crossroads of Life" "Whistler's Mother"

even the most reluctant among us can scarcely ignore. The making of taste in America is, in fact, a major industry. Is there any other place that you can think of where there are so many professionals telling so many nonprofessionals what their taste should be? Is there any country which has as many magazines as we have devoted to telling people how they should decorate their homes, clothe their bodies, and deport themselves in company? And so many newspaper columns full of hints about what is good taste and what is bad taste? In the last century and a quarter the purveying of taste in America has become big business, employing hundreds of thousands of people in editorial and advertising offices. If the taste industry were to go out of business, we could have a major depression, and there would be breadlines of taste makers as far as the eye could see.

That is not, however, a catastrophe we are likely to encounter, because the taste industry has gradually become essential to the operation of our American brand of capitalism. It is in the nature of our economic systems not merely to meet demand but to create it. One of the ways demand is created is by changing people's taste, or at least inviting them to change, and by making the pressures to give up what seemed good yesterday for what should seem inviting today so strong that they are almost impossible to resist. There is no better, nor more obvious, example of this than the automobile industry which as long ago as 1906 decided that taste could be changed on an annual calendar basis.

Lowest common denominator

But the pressure of business on our taste is a minor one compared with other pressures to which we are subjected. It is a commonplace among highbrows and other custodians of our sensibilities and culture that taste in America, taken as a whole, is far below that in most other countries. The commonest explanation of this is our system of mass production both of goods and education. Here, they say, we have no use for the artist and the craftsman; we are concerned only with making things by the millions that will satisfy the lowest common denominator of taste of millions of consumers and we give people no standards of taste. There may be a great deal the matter with taste in America, but the answer isn't as easy as that. Does mass production and mass education explain the dilemma of the lawyer's wife with her $7,000? I don't think it does, but perhaps if we can get to the basis of her dilemma we can discover not only some of the things that are the matter with American taste, but who is responsible for what is wrong.

As I see it, there are five things that are the matter with our taste and none of them, I think, are going to be solved by design or by designers or by people talking about design. But as a step toward discovering people's aspirations, I think that these five questions are pertinent. I have arrived at them by rubbing my nose in the taste of Americans for the last century and a quarter—that, is from the time when tasteful objects for the home first began to be mass-produced and everybody was supposed to have taste. It wasn't until mass production of carpets and furniture and wallpapers and the like began to pour out of factories at low prices in the 1840's and 50's that the tastemakers, as we know them today, went into operation and took to lecturing to the public from their paper pulpits about what taste ought to be.

The bear trap

This leads us directly to the first thing that is the matter with American taste. Too many people worry about it. There are thousands upon thousands of men and women trying to tell other men and women what their taste should be. Taste has become big business and the pressures on us to change our taste for better or for worse are never relieved. Some of these pressures are exerted from the highest aesthetic motives, some from moral motives; some are just simply commercial; but the fact is they are unrelenting in their insistence. The upper jaw of the bear-trap is the do-gooders of taste, the lower jaw is commerce, and the bait is a morsel known as *Good Taste.*

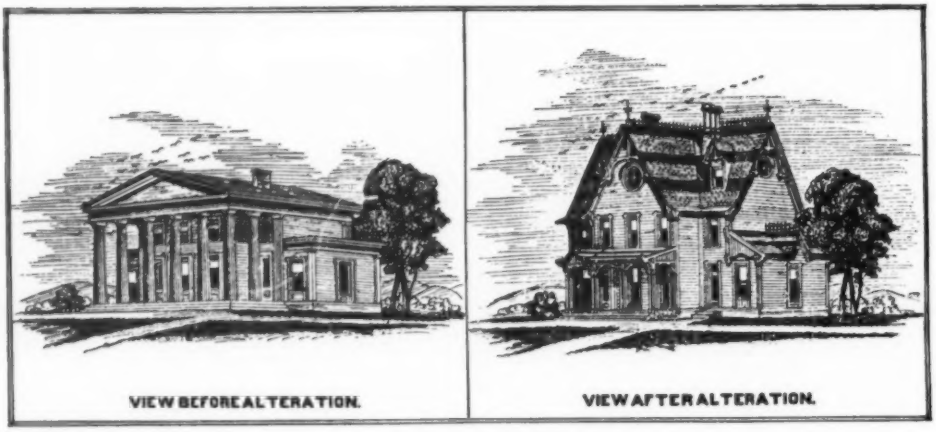
This brings us to our second trouble. We are constantly being told that there is a right thing about taste and a wrong thing, that there is good taste and bad taste, and that nearly anybody who tries hard enough and is diligent enough can have good taste. But nobody ever tells us what good taste is — for a very good reason. Nobody can define what it is, or at least nobody has. Tolstoy tried in his long essay "Art" and gave up. Recently in a book called *Good Taste Costs No More* Richard Gump, of Gump's in San Francisco said: "Any definition of good taste in absolute terms is, of course, an absurdity." This is a little like saying: "I don't know what it is that you should have that costs no more, but you can have it for the same price."

Yet most Americans are convinced that there is an ultimate right and wrong about taste, and if they were only clever enough or well enough educated they would be able to achieve the indefinable. So they not only worry too much about taste but they worry about what is good taste and what is bad taste, how to achieve one and avoid the other. Sometimes, as my friend's wife did, they worry themselves sick about it.

To these two worries, we add still a third. Many people worry about expressing their personalities through their taste. It has long been true that the

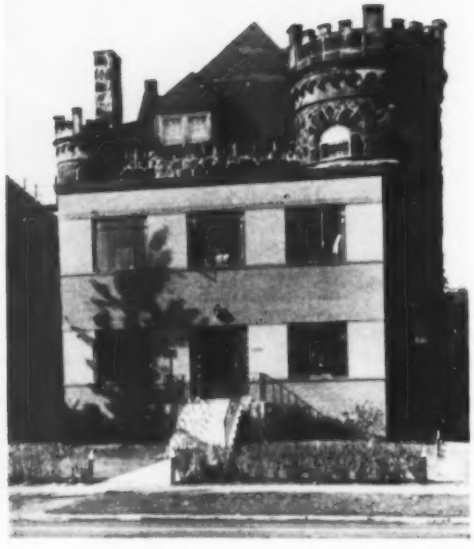
A Taste for Conformity

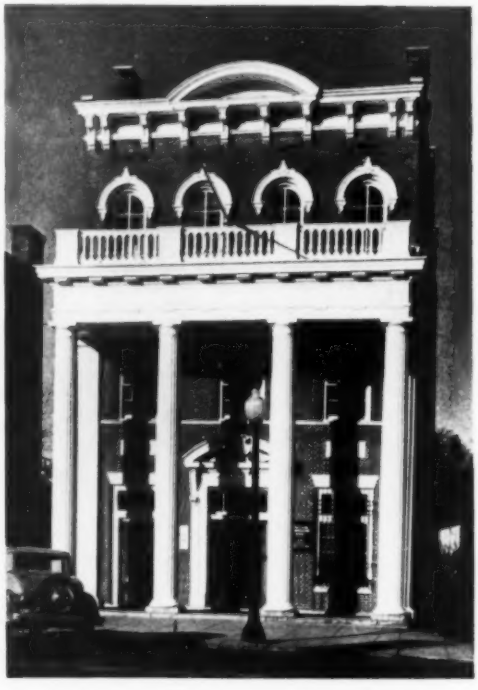
Some Americans like to live in houses just like their neighbors; some can't avoid it. It is nothing new. The "Italian villas," top, were painted in the 1860's. The concrete houses below were "poured" in 1917. The ranch houses at the right are brand new.



A Taste for the New

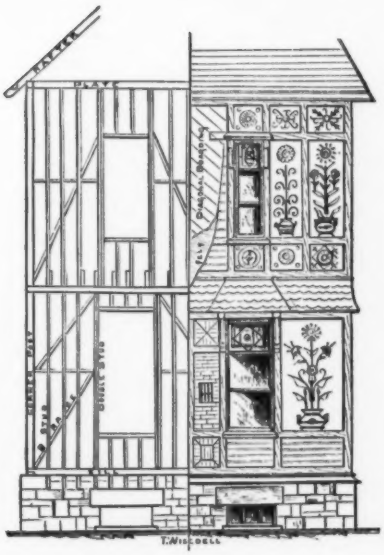
In 1878 *William M. Woollett in his book* Old Homes Made New *recommended the alterations above as the solution for making an "old" Greek Revival house into a "new" Queen Anne model. In Chicago, below left, a red stone castle home of the* 1890's *dons a "modern," somewhat International Style, front, and next to it a bank built in* 1869 *put on the columns which all banks were supposed to have when it was made new in* 1916. *This was a throwback to the days of the Greek Revival when gentlemen lived behind columns which were considered a symbol of solidity.*





A Taste for Honesty

The moral arguments for architectural styles persist but the looks change. Each of the buildings on this page is an example of the "honest" architecture of its day—the Gothic Revival house, below, right, was said to be more honest than Greek Revival. The Queen Anne house, right, displaced the Gothic for the same reason. Below is today's honest architecture—the entrance hall of Lever House, New York.



A Taste for Scientific Comfort and Convenience

When Locomobile boasted in 1899 *that "No better [horseless carriage] will be made. Time cannot improve it," the automobile manufacturers had not yet learned how to coax the public taste by changing models every year. But manufacturers of all sorts have long understood the American taste for scientific gadgets for comfort and convenience, as the Wilson chair of the* 1870's *and its modern counterpart, the BarcaLounger, attest.*

A Taste for Taste

It is a far cry from the Mississippi River steamer (City of Hickman) of a century ago to the brand new restaurant in the Metropolitan Museum in New York, but the gold and white floating palace and the black and gold and white palace of 1954 *bespeak the persistence of America's taste for "tastefulness."*

powerful and would-be powerful men and women of the world have displayed their power or their aspirations by surrounding themselves with the most elegant and expensive trappings that their money, or somebody else's, could buy. It has also long been true that emulation of the taste of the successful has played an important role in making men try to seem or even become what they are not. The emphasis on the idea that a woman's home should express her personality is something that American tastemakers have been talking about since the days of Andrew Jackson Downing in the 1840's when he was trying to make Americans take the Gothic revival to their hearts. In recent years it has had an added impetus from the popular interpretation of Freud's theories that to suppress one's personality is to deny a basic human need.

So the housewife is not only urged to express her personality but to do so with an eye on good taste. Since, if she is normal, she probably has no very clear idea of what her personality is and an even vaguer idea of what good taste is, she is up against a problem with two unknowns. Unable to resolve the equation for herself, she seeks help. She turns to the people who are supposed to know about such matters, the experts on taste. If it was just her personality that was worrying her, she might, if she could afford it, turn to a psychiatrist to tell her who she really is and what she is really like. But she doesn't. She turns to a decorator (or if she can't afford that, to a decorating magazine) who not only makes up a personality for her but then expresses it according to his private formula of good taste.

But our troubles with taste go further than merely worrying about it. There is a moral trouble as well, or perhaps I should say a trouble that is concerned with morality.

A moral tale

The story of American taste for the last century and a quarter is a moral tale, and in the succession of styles through which our country has passed there have been a series of moral slogans. Each style of architecture has displaced the one that came before it because it was more "honest." The Gothic Revival was claimed to be a more honest architecture for America than the temple-like houses of the Greek Revival. In the 1870's when a style known as Queen Anne came along to cover the landscape with houses that had wooden towers and second and third floor balconies and spindle work it was called more "sincere" than Gothic. The prophet of taste in those days was a man named Charles Eastlake and his book on household taste became a sort of bible to American housewives and architects. Sincerity was his great slogan, and a chair put together with dowels was sincere — one put together with nails or screws was not. On the other hand the balloon frame which depended on machine-made nails was sincere. This was followed by a style known as "adaptation"; it brought the French chateau to America to house the Vanderbilts and their likes and it was also known as "honest"— the honest accretion of all that was great in architecture of the past— and this so-called honest approach was used to create what was proudly called by the architects of the day the American Renaissance. In our own day, the International Style has been billed as the only honest architecture for the twentieth century. We call it functional honesty.

[ach aesthetic revolution has been supported by strong moral arguments. It is not merely the way things look to people that arouses them to such violent feelings about matters of taste. It goes deeper than just aesthetic appreciation; it touches very basic beliefs. If it were not so there would be no way to explain the intensity of people's feelings in the matter.

If we go back again to the middle of the last century from which came the kind of moralism about taste that is still with us, we encounter John Ruskin, the towering English prophet of reform in the arts. Taste, he thought, had come to a pretty pass. The new aristocracy of wealthy industrialists had replaced the old aristocracy and they had had little training in how to be patrons of the arts. The best they could do was to imitate the old patrons in display of grandeur. This display was coupled in Ruskin's mind with the inequities of the way in which the industrialists ran their factories; it had to do with dark satanic mills and child labor and sickness. Ruskin's ideas for reform now seem odd to us. He wanted to return to medieval craftsmanship and to what he considered the simplicities and dignities of the Gothic era. It was an aesthetic idea deeply immersed in a moral conviction. And in varying forms every aesthetic revolution that has swept Europe and America since has had a moral concept somehow attached to it. And so it is with the Modern movement in architecture and design — a sort of puritan revolt against an overstuffed era in which the stuffing protected the prosperous from the changing realities of the world around them.

One of the reasons, I believe, why the Modern movement has lasted longer than many assaults on the bastion of American taste is that it appeals to a morality that is deeply imbedded in our history. It seems to be harking back to American puritanism, a morality which stressed the virtues of modest, clean living and disdain for what we call vulgar display. Like the Modern movement, puritanism was in part a revolt against an overelaborated aesthetic. The puritan revolt was against the baroque of the Counter-Reformation; ours is a revolt against the baroque of the

Industrial Revolution. Furthermore, the Modern movement appeals to another ingrained moral belief which we are pleased to call the pragmatic American philosophy, in which the ultimate question is "Does it work?" Modern design, even when it doesn't work — and it often doesn't — looks as though it ought to.

We like to have good, respectable, and rather high flown reasons for changing our taste, even when we suspect, as we often do, that in a great many cases the people who have a new kind of taste to promote make up a morality after they have devised the commodity. For some puritan reason if the sugar pill of taste is dipped in a bitter coating of morality, it is easier for a large segment of the public to swallow.

This brings us to still another consideration of what is the matter with taste in America. It brings us to the uncomfortable question of pleasure.

A great many people enjoy having taste, but too few of them really enjoy the things they have taste about. Or, to put it another way, they are like a man who takes pleasure in his excellent taste in women but takes no pleasure at all in a woman. One of the things that is most the matter with American taste is that those who worry hardest about it are not worrying about enjoying the fruits of their taste; they are just worrying about taste itself.

Art for Taste's Sake

There was a time not so very long ago when we used to hear a great deal about Art for Art's Sake. We hear little about it now. Art, except by artists, is very little thought of for its own sake now. To most consumers it is Art for Taste's Sake. We very rarely find ourselves taking pleasure in other people's pleasure in the art they enjoy. Indeed, we are likely to begrudge them their pleasure unless we happen to share it. We are all too prone to think only about the kind of taste they exhibit, to measure them with a cold and steely eye, to decide whether we approve of their taste or not. We turn this same steely eye on ourselves.

When we stop being concerned with pleasure and understanding and start worrying about the quality of our own and other people's taste, what we have arrived at is not a state of grace, as many people seem to think, but a state of Taste for Taste's Sake.

Taste has little to do with art. Art is the painstaking and often pain-giving result of creation; taste is merely the consumer's ticket to the enjoyment of the arts. It is true, of course, that again and again artists have considered good taste, which is a form of complacency, to be their worst enemy. They have flung their paints in the face of good taste, determined to shock rather than to please, to horrify rather than to cater. The Armory Show of 1913 was just such a slap in the face, the last thorough-going slap that American taste has had and the last it is likely in these pussy-footing days to get for some time. Artists are nudging taste today; they are not kicking it around. They, too, I suspect, have been caught in the tastemakers' web and many of them have become tastemakers themselves . . . busy trying to improve taste rather than to create art.

Not infrequently one hears that the level of American taste is improving. It was a constant theme in the last century, and one is likely to hear it from designers and critics today. But rarely is it from the young that one hears this or from the old. It is from the middle-aged, and by it they usually mean that the taste that they considered advanced when they were young has been accepted by more and more people than they thought it ever would be. To the young it is already old fashioned, while to the old it is merely another phase of taste that is passing across the horizon. In place of the nineteenth century *what-not* we may have substituted the more functional idea of *what-for*, but I doubt that taste has improved.

I don't see any reason why we should want taste to improve. Taste as it is dispensed and manipulated in our own day, it seems to me, is all too often nothing more than a set of aesthetic mannerisms that one learns from books of cultural etiquette. It is, as I have said, Taste for Taste's Sake.

We are fortunate in America that we have so many different ways of satisfying so many different kinds of tastes. We produce hundreds of movies each year, some of them good by the most discriminating standards, some of them bad by the least discriminating, and the same may be said of paintings and of architecture and cookery and industrial design and probably of circus wagons. The point is that we have in America a tremendously diversified basis of morality, education and sensibility — three components of which taste is made — and the frictions among them generate the kind of heat that gives light. It is these conflicts of ideas and tastes that give the arts in our country vitality.

Unless I completely misunderstand the real reason for having taste, it is to increase one's faculties for enjoyment and understanding. The lesson that one can learn from looking at American taste from an historical point of view is simple. Americans are conscientious about taste; indeed they are over conscientious. It is their doubts about themselves and their enthusiasm for following the lead of those who set themselves up as mentors of taste that results in their running after one fad and then another. It is the tastemakers, not the artists, who have made them distrust themselves. If we worried *not* about taste but about pleasure and understanding in the arts, taste, I believe, would take better care of itself.

Department 817

SEARS, *Roebuck and Company, as even non-stockholders* are probably aware, is the largest store in the world. Its gross income last year was something over $3,000,000,000, which poured in from 700 retail outlets and a catalog business which still brings in a sizable slice of the sales. (50,000,000 catalogs were distributed in 1953, but getting on the mailing list is about as easy as getting admitted to the Century Club.) Though fewer people are aware of it, Sears is also, in a manner of speaking, a major manufacturer. Other firms' trade names may be on more billboards, but Sears' own brands are among the nation's top sellers in laundry equipment, lawn mowers, garden tools, refrigerators and freezers. In some lines Sears is No. 1. In manufacturing these items — in factories which it generally does not own — Sears is devoted to the cost advantage; it is axiomatic that Sears products should save the customer money. The firm is equally devoted to its reputation for quality; Sears' brands have a generally high rating for performance and reliability.

And Sears offers some products which can't be duplicated anywhere — innovations like the Tri-Trac and the "Little Gem" toaster and the Ken-Maid vacuum cleaner.

It is hardly surprising, when you view these facts, to find that research and development have been instrumental in making Sears the number one merchant. But why should Sears, known as the common denominator of American taste, also find it necessary to indulge in design? The reasons go back to the company's changing attitudes toward selling, and to the part played by its Merchandise Testing and Development Laboratory — Department 817. The way design and development are being coordinated in the laboratory today suggests that one day Sears may be as noted for good design as it is for solid workmanship.

Sears, Roebuck and Company was established, in 1886, with the idea of giving out-of-touch rural customers a complete store in a few hundred picture-packaged pages. In theory, American industry was Sears' oyster. It could sell any brand it pleased,

R. S. Burke, Manager Merchandise Testing and Development Laboratory

Laboratory and field tests for its own and competing products in Sears' Department 817.

and volume buying made it possible to sell at attractive prices. But the psychology of mail order raised its own problems. Since the customer could not inspect his purchases, the store had to do it for him; its reputation was built on the guarantee that only reliable values got into the catalog in the first place. In 1911, it set up a testing laboratory, where merchandise could be worn and stretched and overheated and generally given the same rigorous evaluation a million customers might apply.

Around 1925, as rural areas lost their isolation, then-vice-president Robert E. Wood started to open city retail outlets. This, a significant move in itself, led to two other actions: Sears began to offer its own brands, to insure the lower prices which would attract customers; and it introduced industrial design into its laboratory, as a method of making those brands better.

Its approach to refrigerator design in the '30's was typical of the policies on which the laboratory was built. The industry was offering its best values in 4-cubic-foot boxes, but Sears saw that a 6-foot box suited family needs better; by emphasizing production of the larger one, it priced it low and offered the best value. It saw, too, a chance to beat competition by offering a better looking appliance. Raymond Loewy was retained to redesign the Coldspot. Between 1935 and 1939 — with the double edge of price and design — Coldspots sold like hotcakes and made Sears one of the country's top purveyors of refrigerators.

Buyers, makers and designers

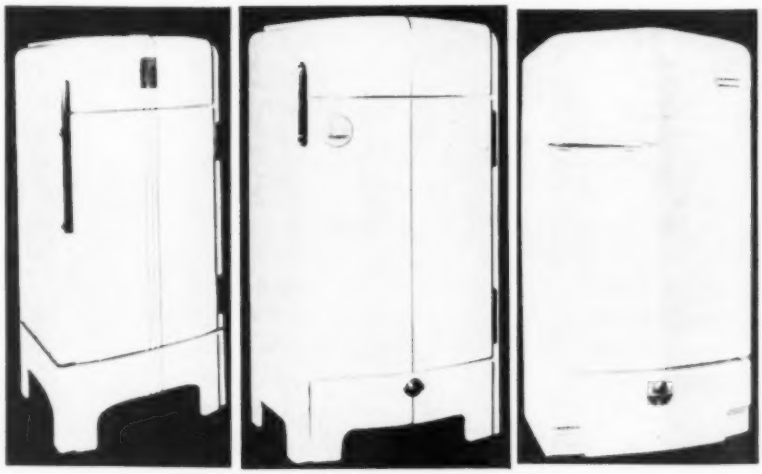
Almost total responsibility for the merchandise bought and sold by this vast enteprise rests on the buyer. He functions like any store buyer — to the tenth power. Each of Sears' 250 buyers rules his own domain, deciding what products will be carried (Sears of course carries some nationally advertised products) and what holes will be filled in with items commissioned from selected manufacturers.

In practice, this system makes the buyer an executive, who is in a position to shape design policy though he is not a designer or engineer. Since his ideas may need exploration and execution before the manufacturer can proceed, the buyer ordinarily starts any new project by taking his problems to Department 817.

The Testing and Development Laboratory occupies some 50,000 square feet of a vast red brick building in Chicago. It boasts equipment for grading and testing merchandise ranging from furnaces to bedroom slippers. There is an electronics laboratory, a testing kitchen full of professional housewives, an echoless chamber, and an indoor test rifle range. The labora-

Carl Bjorncrantz, head of Sears' industrial design, and staff designer Phil Egan.

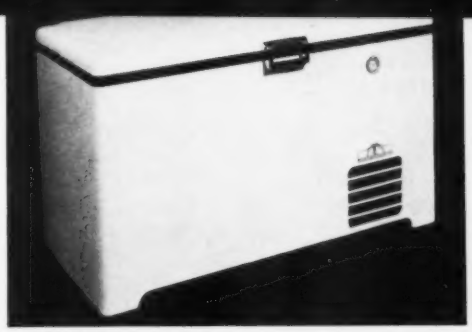
SEARS OWN *design is the big competitive feature of many products*

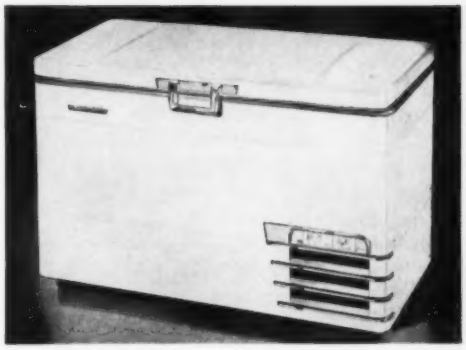


Industrial design *is not new at Sears — the store had one of the earliest "designer" refrigerators in the country. The Coldspot of* 1934 *is shown at the left. That year Raymond Loewy was asked to redesign it, and the model introduced in* 1935 *is shown in the center. It sold for* $135. *The next year Loewy dropped the skirt to the floor (right). Within five years Coldspot sales jumped from* 15,000 *units a year to* 275,000.

Allstate auto spotlight, *a Sears exclusive, was designed by department staff on the premise that such accessories are impulse items, and must incorporate a visual impact which is achieved by attention to proportion, line and detail.*

Tower portable typewriter *was redesigned in* **1953** *by staff designers. Standard model, left, became a deluxe model with a full-length tabulator. Along with mechanical improvements, an embossed metal nameplate replaced the die-cut one, the housing was given a crisper shape, the fine wrinkle finish changed from blue-green to gray. Lettering and layout of the paper table was improved, new finger-shaped keys added.*





Coldspot chest freezers *show design progression in eight years.* **1946** *freezer, top, offered innovations which jumped Sears into sales prominence: slanted temperature dial, counter-balanced door, adjustable storage racks and removable tray. In* **1950** *model, new capital equipment permitted rolling the body and recessed base in one piece; the appearance improvement was judged worth the slight extra cost. High density insulation permitted greater capacity in a smaller box.*

1953 *model had a new compressor unit which enabled designers to eliminate front air grill. Low controls were used so that connections would not have to pass through insulation, thus preventing possible leaks where frosting could occur.*

1954 *freezer, designed by Sundberg-Ferar, has a more prominent handle and control escutcheon, and features more convenience and flexibility by way of improved baskets and adjustable dividers.*

tory has a staff of 175, headed by Richard Burke. 12 of them belong to the industrial design section, directed by Carl Bjorncrantz.

The importance of the laboratory is best understood against the main fact of Sears' set-up: its sales volume will permit any product it wants, and support any manufacturing process — an entire new factory if necessary. Such a sanguine state allows for a pioneering state of mind, but it doesn't demand it; neither does the store's need to suit mass taste imply an aggressive interest in esthetics. But Sears has decided that even common denominators need design, and Sears can afford it. Burke even goes so far as to say that Sears should be a design leader in fields in which it is a leading distributor. "We should always be nudging the threshhold of design acceptance, experimenting, making budget allowances for experimental losses. This is a kind of insurance, and costs very little."

Meaning of the word

What does he mean by design? The three areas in which D/817 functions clarify the meaning of the word at Sears:

1) Product development: testing of its own and competing products, planning, specifying, developing sales features.

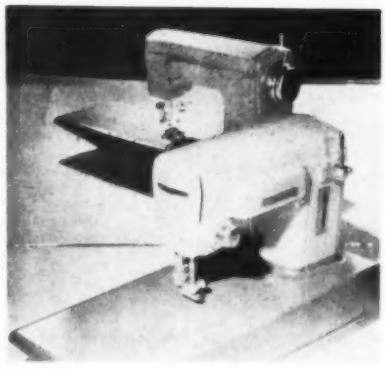
2) Product engineering: keeping costs down by solving manufacturing problems.

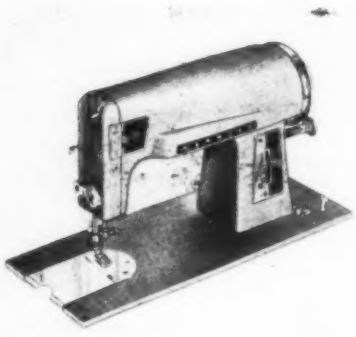
3) Product design: creating a suitable appearance for any product.

Definition-wise, areas 1 and 2 imply that the form of a product originates largely, if not wholly, from the working out of mechanical and functional problems, as might be the case with a tractor or hand tool. Area 3 defines design as an attention to the looks of an object. (This is called styling by some designers, in reference to the fact that design which lacks a functional basis is frequently changed for stylistic reasons; the degree to which the meaning is derogatory depends very much on how meaningful or superficial the change is.) At Sears, design in the development sense has, of course, been going on for years — the work of many anonymous and perhaps unaware hands. Sears' early nod to appearance for its own sake, Loewy's refrigerator, apparently prepared the ground for the new emphasis on design which is burgeoning at Sears today. The rationale of this interest has been summarized by Burke, who is neither a designer nor engineer, but a Sears merchant responsible for making the services of good designers and engineers useful to the merchants of the company.

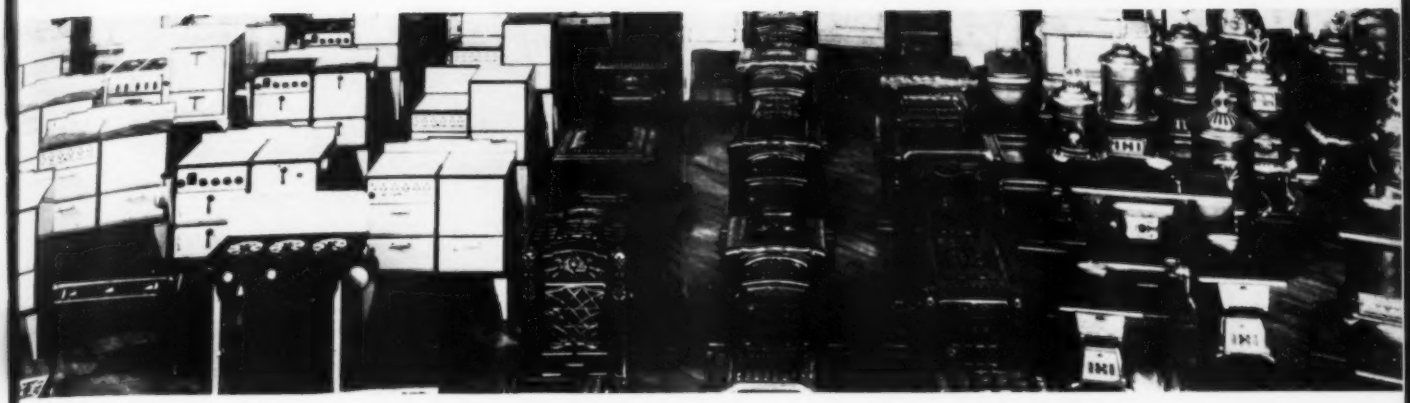
"All merchants are merchants of design," he says, "and should know more about it than about other aspects of the product. Unfortunately, few of them do, and they

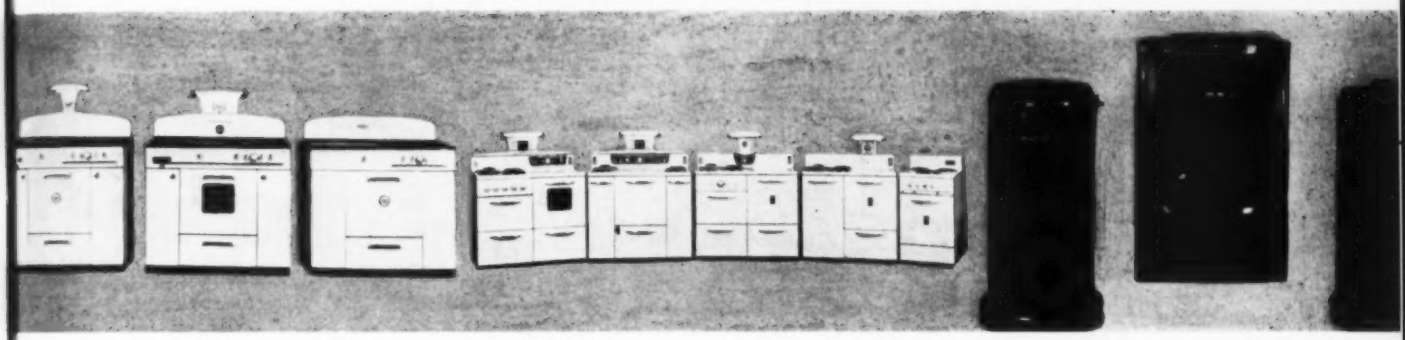
LOWER PRICES *are often achieved by coordination of engineering and design to solve tooling and production problems.*



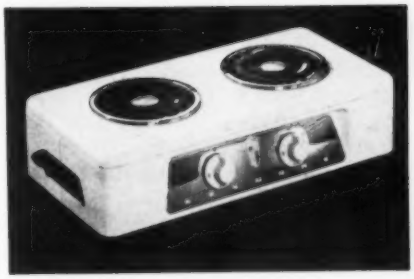


Kenmore sewing machine *was originally worked out by department designers as shown in clay studies at the left. In this case, tooling costs and lengthy tool delivery time required them to revert to a different model which required only minor additions to existing tools. Designers simplified surface contours, used control and adjustment plates decoratively, and combined nameplate and lamp housing.*





Stove company's files reflect the laboratory's effort to coordinate design and modern production methods. In 1936, *the firm's line consisted of many stoves manufactured by outdated processes. Within ten years, the foundry was eliminated, heavy cast iron replaced by pressed steel parts, and the line greatly simplified to lower unit production costs.*



Good — Better — Best. *Sears' policy of presenting a good vertical line which competes on price and quality evolved into the "good — better — best" categories about* 1933. *The theory is that when a customer sees display of differently priced items, she should be able to tell at a glance the reasons for price differences. The hotplates were designed to communicate this step-up by differences in overall size, heating coils, knobs, and nameplates. The same tool was used to emboss Better, and to deboss Best.*

Good *Kenmore hotplate,* 19" *x* 10", *has exposed coils set in glazed porcelain, simple nameplate, inexpensive phenolic knobs.*

Better *model has steel armor elements, white melamine knobs, decorative metal nameplate, embossed panel for easy reading.*

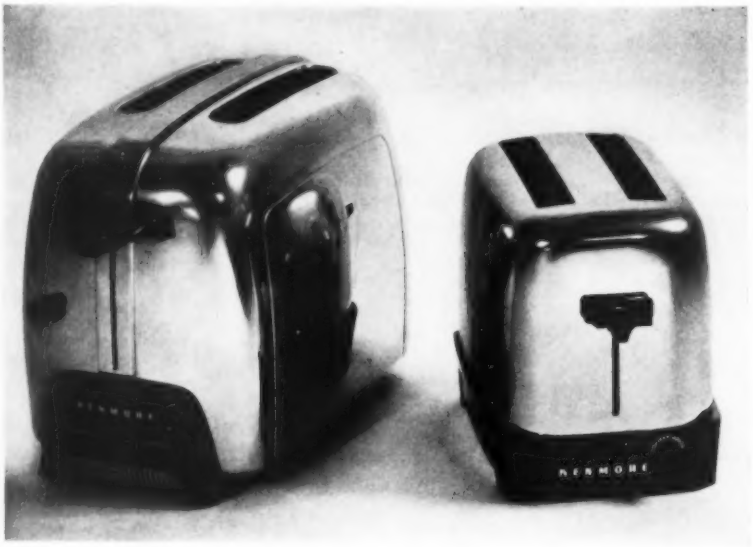
Best *boasts range-type rod burners with 6 heats, decorative panel debossed to recess knobs, and black carrying handles.*

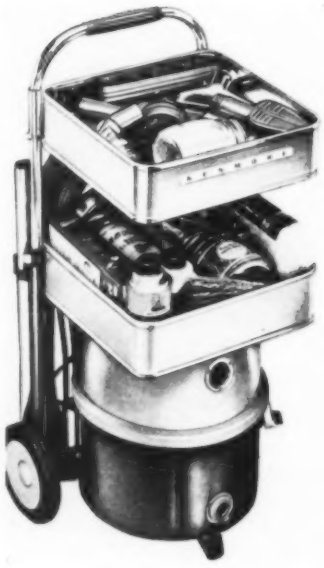
have a hard time communicating their demands to the designer." Essentially D/817 does that communicating; it acts as a consultant to all buyers, lining up their assignments and passing them on to designers, either inside or outside the department. In addition to the design staff, suppliers sometimes have their own designers, and frequently Sears assigns work to independent designers too.

The buyer's personal perception of his market must always give weight to three considerations: 1) holding down cost; 2) maintaining quality; 3) meeting the widest possible acceptance of appearance. Their relative importance is the buyer's decision, but ideally any solution takes all of them into account. As the intermediary, Burke tries to get a clear definition of the problem, and then set it up as broadly as possible. If the buyer feels cost is the major objective on a certain refrigerator, production engineers may analyze all possible ways to make the door and box, and put a price on each one; designers can then try to balance visual and practical factors. Some large merchants base their cost advantage mainly on lower distribution cost. Sears wants an even greater advantage, and achieves it not by cutting labor, manufacturing, freight or other specific costs but by smoother coordination of all elements between the conception and sale of the product: 1) Preplanning for year-round operation of the factory; 2) Selecting factories which can be loaded with a single kind of work; 3) Carrying a simple diversified assortment of goods in each area; 4) Design: a periodic evaluation of products to eliminate hidden burdens and features not worth their production cost.

It is in this last area, as a function of the cost advantage, that design at Sears is most significant today, and notable for the future. When the appearance of a product grows out of functional needs, the designer's hand may not be particularly evident; cost problems, too, may cut down chances for fancy treatment. But this doesn't mean that it is any less "designed" in the pure sense, nor does it make the design any less effective in commercial terms. As a store Sears has never had pretentions to high style; its sales talk is value — a delicate mixture of economy and quality — and design which illustrates that standard will always be better design for Sears' than tame versions of some flashier ideal. Sears' designers have already shown how successful product design can be in this province: the Tri-Trac and the small toaster, among others, are suitably direct, sturdy, and above all original. They could be the basis for a design vocabulary which is appropriate to mass production and distinguished in its own right.—*j.f.m.*

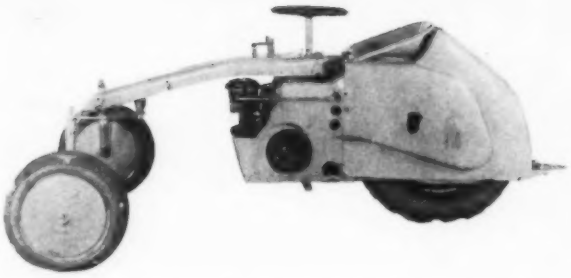
EXCLUSIVE *Sears offerings are developed in*

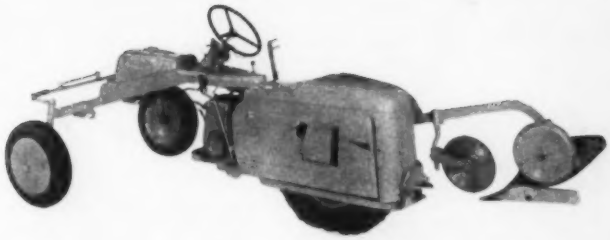




Kenmore toaster, *a new offering for 1955, is shown next to the deluxe model. Designers felt that a toaster could be smaller and lighter and equally efficient, and worked out clearance, temperature and cleaning problems with buyer and manufacturer. Measuring 5" x 7½" x 5¾" high, the toaster holds a normal piece of bread, costs less than deluxe.*

Ken-Maid Cleaner *was based on a buyer's idea that a vacuum cleaner would be handier if all accessories were within reach while it was in operation. The trays can be removed, and the whole unit telescopes so it fits into a small wood cabinet.*





Tri-Trac, *a unique new three-wheeled tractor designed especially for the "sundown" farmer, is the product of five years of development and field testing. Working with engineers after the basic mechanism had been evolved, designers found that giving the Tri-Trac a pleasing and practical form called for numerous trials and revisions. A preliminary model is shown at the left, the final model at the right. Partial housings had to be removable for cleaning; accessibility and clearance requirements, moving parts and implement attachments made a continuous shell impossible; designers concentrated on blending surfaces and structural parts to maintain its basically flexible look. Note that the seat is integrally molded with the rear housing, and cushioned with foam rubber.*

D/817 to fit the buyer's assessment of market needs

FAMOUS *Sears tools and equipment are also subject to design*

J. C. Higgins, *Model* 31, *illustrates one of the ways Sears holds its lead by applying design where it is not generally considered critical. Staff designers felt that the style of a custom gun should be made available at a price the average wage earner could afford. They gave the stock sleeker shape, to balance well with the receiver, barrel and trigger guard. A ventilated rib and compensator was designed both for appearance and easy aiming, and the breech block was given decorative engine turning. A recoil pad, pistol grip and initial plate — usually costly optionals — were added at very little additional cost because of Sears' large scale production.*

Craftsman bench saw, *another big Sears item, exemplifies the coordination of engineering development and appearance design. The base, formerly made of heavy cast iron, was changed to lighter, less expensive metal stampings. Designer Clarence Karstadt used die cast parts in styling the control knobs, guides and guards.*

Plastics used in tooling

Name	Type	Characteristics	Curing	Tooling Considerations
phenolics	thermosetting phenolformaldehyde	negligible dimensional change during transition from liquid to solid; ease of coating; low tensile strength; reliable accuracy of duplication	external heat (hot oven) or catalyst; former gives superior physical characteristics	no evidence of cracking or dimensional change in tools after many years; acid catalyst may corrode metals; male and female can be poured so accurately that no spotting is needed for metal thickness; new surfaces can be repoured
polyesters	thermosets, used with glass fibers to produce laminates	some shrinkage encountered during curing; great strength and toughness, especially in thinner sections	room temperature or oven cure	metal strips may be molded in for reinforcement; makes possible contour-molded stable reinforced plastic with little heat or pressure
epoxies	polymers of epichlorohydrin and bisphenol; may be used with glass fibers for laminates; may be cast if sections are thin.	new strength properties; versatility; accuracy; dimensional stability. Inherent adhesiveness to glass fibers is excellent, as well as to steel, cast iron, ceramic, glass and wood	room temperature cure, but short oven cure improves strength; time widely variable	withstands hard use; bonds easily to all materials; exothermic heat prevents very thick sections; dimensions of tools and fixtures may be large because of low shrinkage
ethyl-cellulose	thermoplastic melted and cast	resembles molded rubber or soft metal casting	hardens in cooling so no catalyst or heat cure is needed	can absorb high impact at low temperatures; resiliency; reclaimability

Types of dies constructed of plastic

	Properties Required	Advantages of Plastic	Other Considerations
draw dies	compressive, cohesive strength; good resistance to wear; accuracy of duplication	eliminates all hand barbering and fitting; cast or laminated epoxy reinforcement can be used at point of stress with metal reinforcement for areas with sharp radii	20-25% of time span for fabrication and 1/3 cost of metal dies; now used for auto hoods and fenders; refrigerator outer doors; range panels
stretch dies and hydroform presses	no impact strength needed; compressive and cohesive strength; accuracy of duplication	especially good for large dies (up to 140 sq. ft.); weighs less; glass-like surface eliminates galding or other die marks	used for: refrigerator components and large panels; aircraft industry is the largest user
drop hammer	requires dimensional accuracy; uses thermoplastic ethyl-cellulose; can be cast in simple molds to required shape for cold-forming sheet metal	plastic punch in metal cavity has elasticity and resiliency found in rubber; eliminates metal thickness clearance between punch and die; by eliminating hand barbering, major tool cost is avoided	because material compresses, it permits running of rather large range of metal gages without changes in tool
molds for reinforced plastic and post-forming dies	easy duplication from wood or plaster models; lightness	molds developed from master molds can be exceptionally large; a complicated mold can be made in minimum of time; practically all hand finishing operation eliminated	low tool cost makes it possible to take advantage of complex parts made with reinforced plastic on pilot and small-scale production; permits duplicate tooling to hasten production

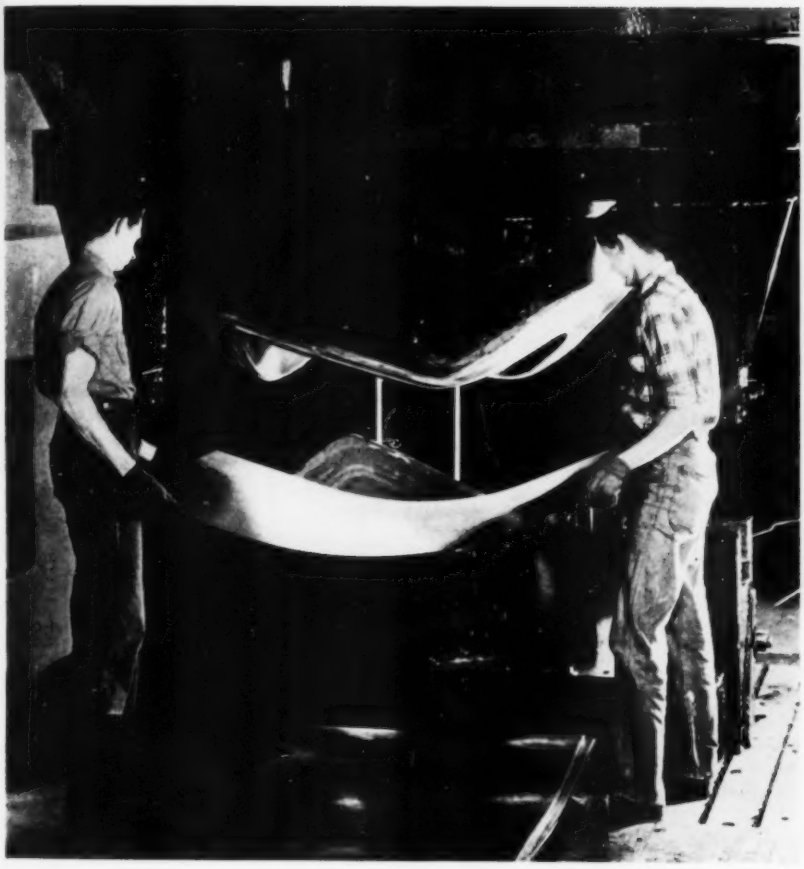


photo: Chrysler Corporation

ITEM:

Two leading automobile manufacturers report that 20% of all tools used to stamp out metal parts are now made of plastic.

ITEM:

An executive of a resin manufacturing firm, addressing steel plate fabricators, debunks many of the sweeping claims made for plastic tools in metal fabrication.

ITEM:

A major aircraft company reports that 100% of its stretch dies and 25% of its draw dies are made from plastic today.

ITEM:

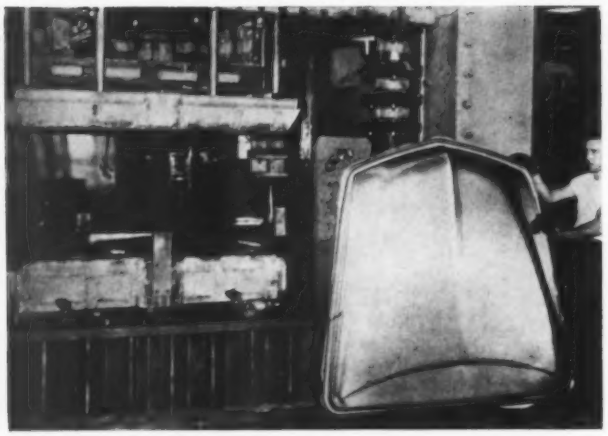
An industrial design firm states that the development of plastic tools will result in a greater volume of work for designers.

what they say about

PLASTIC TOOLING

Any number of conventions and trade meetings in the past few months heard talk about something new in the tool shop: plastics. Generalities and predictions, warnings and contradictions, all gave the impression that this news was strictly for the toolmakers and engineers. Not much was said about how the new developments might affect design.

Believing that a major development in the nation's tooling techniques cannot fail to touch the design of all kinds of products, ID questioned a group of manufacturers and users of tool plastics; on the following pages we record their views on how plastic tools and dies might affect the technical, economic and esthetic aspects of industrial design.



© Rezolin, Inc.

Auto hood produced on a plastic draw die

TECHNIQUES

The idea that plastic tooling might have some far-reaching effects on design was first suggested by statements on the importance of tooling to industry:

> **George C. Adams,** Rezolin, Inc.: Entirely too many people think that the automobile industry, appliance industry and others require tooling for millions of parts. This is not correct. Many times the production is only a few thousand parts, and over-tooling — made necessary by lack of better methods — has imposed severe economic burdens on industry.
>
> **Robert Voss,** Warren Plastics Engineering: As I see it, we will get many new products on the market because we can make cheaper tools to get them there. How many times have you seen a new product die because the sale was limited and you could not amortize your tooling costs?

It is not as if tool plastics have to be specially introduced to industry; many firms have used them for some time, for stand-by tooling, checking devices, jigs and fixtures, prototypes and model work. Because plastic can be molded or laid up directly from a wood or plaster model, a series of finished pre-production models—washing machines, for example—are measurably cheaper to make with temporary tooling than by hand methods. And this method takes the guess work out of the final metal tooling. The aircraft industry, working mainly with light metals, has used plastic for its major dies for years. But the question today goes beyond minor uses and light materials, and into heavy production work — particularly in the fabrication of steel from plastic dies. The automotive industry's recent work in manufacturing car bodies with plastic tools has everybody wondering:

How strong can plastic dies be, and what materials can be formed with them?

Drawing, stamping or forming sheet metal means stressing it beyond its yield point, so it is obvious that such materials as lead, magnesium and aluminum will be easier to form in the soft condition than metals like steel and tungsten, which have inherently higher yield points. One supplier has outlined the strength of plastic this way:

> **Lewis F. Bogart,** Marblette, Inc.: Plastic dies are generally restricted to use with 16 to 20 gage cold rolled steel (.062 to .035), or to .030 stainless steel. But plastic tools *have* been used to form .090 cold rolled steel.

Though heavy section steel may have been formed by plastic, it clearly puts a severe demand on the tool, which suggests that parts such as bumpers, requiring superior physical properties, would not be suited to plastic tooling for long runs. Skin panels, however, should certainly be considered. If heat treatment could be used — as it has been by the aircraft industry for increasing the tensile strength of an easily formed aluminum alloy — the problems of hard-to-form materials might be overcome. This leads to the next question:

How does the material formed relate to draw depth?

> **Lewis F. Bogart:** Depth of draw is restricted by the material being drawn, not by the tool itself. Each tool must be taken on its own merit, and measured against the demands made on it. In draw die applications, no two tools are the same. An inside automobile door panel can be made on plastic tools, but tool life will be short — probably less than 1000 panels. For gentle forming operations on 16 to 20 gage steel, tool life could be indefinite. In general, for a run of under 20,000 panels of 20 gage cold rolled steel, plastic can compete economically.
>
> **George Rice,** Ren-ite Plastics: Extreme draws can readily be made on properly constructed epoxy tools. Apparently the insulating characteristics of the epoxy causes heat retention in both the die and the sheet metal stock. This sometimes makes it possible to produce good panels from a cold plastic die when it could not be done with a cold steel draw die. Plastic-formed sheet metal panels actually come out too warm to touch — so the ability of the plastic to help sheet metal retain heat during drawing is considered beneficial.

What other limitations are there to the job which plastic dies can do?

Many manufacturers assume that plastic dies have severe limitations, especially in the forming of sharp radii, but there seems to be evidence that these drawbacks can be overcome:

> **Lewis F. Bogart:** Phenolic dies cannot pierce and shear metal, and they are weak in thin sections and sharp radii. But there are ways to overcome this. In most cases, steel inserts at the stress points help overcome the low shear strength that causes breakdowns on sharp radii. In one case, steel inserts enabled a die to run over 100,000 panels of .033" cold rolled steel. Gentle radii do last longer — a die with a radius larger than 3/32" and a moderate draw can yield several thousand panels between repairs.
>
> **B. L. Brown,** Chief Tool Engineer, Grumman Aircraft: As far as radii and standards of forming are concerned, we have not had to make any major design changes in our aluminum panels.

Vacuum bag mold. © Rezolin, Inc.

Which plastics are best for metal-forming dies?

To this question there are as many answers as there are users — or at least as there are plastics. Each particular problem seems to evolve a combination of plastics which is best for its purposes. The range of advantages and drawbacks of the major tool plastics is outlined on the chart. (Tool plastics, of course, possess special properties which are not found in many chemically similar plastics.) Users says the following:

Fisher Body Division, GM: We favor phenolics because there is no shrinkage in curing.

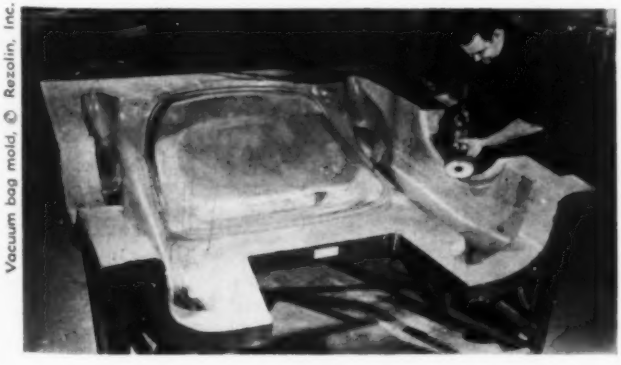
Chrysler Corp.: After early trials with phenolics, polyesters with Fiberglas seemed best for our plastic draw dies, except for the shrinkage problem, and we learned to control it by a system of pressure casting. All our automotive dies are made with glass cloth face, backed with two inches of chopped Fiberglas for the core. The glass content of the finished dies is about 50% by weight. (Fred Lijynen, Body Division)

Republic Aviation Corporation: Now that epoxies can be considered economical enough for tooling, we can take advantage of their versatility, strength and accuracy. (Benjamin Sokol)

What are the prospects of using plastic dies to manufacture plastic products?

Though the use of plastic dies for such low-production runs as plastic sports cars would seem inevitable, there are drawbacks. To make Fiberglas-plastic parts in reasonable quantity, a heat cure is most economical of time. Whereas metal heats quickly and evenly, plastic presents conductivity and expansion problems; the longer molding cycle may offset the economies of using plastic. But for some uses plastic is practical:

Chevrolet Motors: Experimental Corvette bodies were made on hand lay tools, molded of glass fibers and epoxy resins directly from a wood model. The first 300 production bodies were produced in phenolic vacuum bag molds (photo), on which glass cloth and resin were laid up, pressurized and cured by heat lamps for an hour. For regular production, matched metal molds were developed — with the aid of glass cloth lay-ups for the Keller models and spotting racks. By this method, a heated fiber preform is laid in the metal die, resin mixture poured in, and the die closed for about three minutes. (E. J. Premo)



Vacuum bag mold, © Rezolin, Inc.

The obvious future for plastic in manufacturing plastic products seem to lie in post-forming sheet plastic which is pre-cured, drawn into the mold, and cooled.

COST

There are four areas in which the cost of tooling can be measured: 1) Cost of material; 2) Cost of fabrication; 3) Time factors; 4) Life of the tool. No one of them can be judged an economy until it is weighed against the other three.

The per-pound cost of the plastics themselves varies widely, from about 35c a pound for polyesters to $1.00 or more for epoxies. But the difference between the most and the least expensive material — even for several large tools requiring several tons of plastic — will usually not be critical. On a cubic-foot basis, the cost of plastic and steel may not differ too widely. Furthermore, plastics are not reclaimable, while less costly metals like Kirksite can be re-used. On the whole, however, savings will be achieved in other areas. It may be too early to evaluate those areas definitively, since know-how is very important in using plastic tooling methods to best advantage.

What advantages do plastics have over metals in the fabrication of the tool or die?

Though there is generally no basic change in the design of dies made of plastic, it is inherently easier to make a tool by molding to a master model than by rough-casting or machining metal, with all the necessary finishing operations to get a perfect duplicate.

Benjamin Sokol, Republic Aviation: The most marked advantage in the preparation of a plastic die is that it can be molded or laid up directly from the master die models; this achieves great accuracy without hand barbering or fitting—one of the major time and expense factors in metal tooling.

Lewis F. Bogart, Marblette, Inc.: Because of this reliance on master molds, the actual fabrication of the die requires very little skilled labor.

E. J. Storfer, Rubber & Plastics Laboratory, Chrysler Corporation: Our decision about when to use plastics is very simple: whenever the number of pieces falls within the optimum production of plastic, it should and will be used. Though it will rarely do things not possible in conventional tooling, it will undoubtedly cut manhours in tooling.

What is the over-all cost picture when all of the factors are weighed?

Various users and suppliers report the following:

Ford Motor Company: The plastic die for making an air duct, with a plastic punch and lower die with a steel draw ring, was $4,500, compared to $9,000 for a conventional steel die. The plastic took six weeks to make, the steel three months. Unit production was about 40,000 parts in plastic (on a simple part) against a possible production of 1,500,000 parts from metal dies. But unit demand was low: it was a replacement part for an earlier model.

Warren Plastics and Engineering: Cost records maintained by one of the large users of plastic dies, show that from scratch the plastic ones cost 1/5 of the same dies in steel. This includes all building, set-up, try-out and maintenance of 18 dies which have, to date, run 5,000 pieces of a 15,000-piece run.

Marblette, Inc.: Economically, plastics will produce more parts per tool dollar than any other method. The relative cost of metal inserts to increase the life of plastic dies is an individual matter. The conditions are almost identical to those under which metal inserts are put into steel tools, and the only saving would be mounting the insert in position by casting plastic around it. This could be a considerable saving.

Ren-ite Plastics: A set of checking fixtures was recently made for an auto company. There were 12 fixtures designed in steel with plastic surfaces to be used as masters for making the balloon type welding fixtures for production. . . . The cost in steel was quoted at $68,000, with 22 weeks delivery. The fixtures were made completely in plastic in 7 weeks for $33,000. One fixture, 15′ x 5′, would have weighed over 2,200 pounds in steel, but with plastic and tubings it came to only 642 pounds.

For use in forming lighter metals, plastics should be compared to Kirksite instead of steel. Republic Aviation has supplied the following breakdown:

A typical compound curved stretch form (used to form wing or fuselage aluminum skins) with a face of 3′ x 6′ and a maximum depth of 9″ would compare as follows:

Material used	Metal	Plastic
	Kirksite	Epoxy resin reinforced with glass cloth and fillers
weight	4,000 lbs	200 lbs
material cost	$1,000	$200
labor hours	220 man hours	70 man hours
total elapsed time for tool fabrication	3 weeks	5 days
number of parts:	Approximately 10,000 skins may be formed on either the kirksite or plastic tool. The obvious advantages have turned us to plastic for 100% of our stretch forms.	

In preparing a drop hammer die, 2′ x 2′ x 2′:

Material used	Metal	Plastic
	Punch: lead Die: Kirksite	Punch and die: fiber glass cloth-reinforced epoxy plus cast (filled) epoxy.
weight	3,600 lbs	750 lbs
material cost	$800	$500
labor	150 man hours	150 man hours
total elapsed time for tool fabrication	2 weeks	2 weeks

While the plastic tool seems to have a slight edge over the metal one, it should be pointed out that:
1) Metal is reclaimable, the plastic is not.
2) If the plastic tool contains any air pockets or laminate defects within ¼″ of its surface, repairs will be required.
3) The plastic tool will not form sharp joggles as long or as well as the metal tool.

The answer to the plastic drop hammer die, we feel, lies in casting it directly against a pattern and then casting a flexible punch directly against the die with no allowance for part thickness. This would cut labor down to about 30 hours and eliminate face failures inherent in the laminate lay-up technique currently in vogue. But even when we have perfected this method, plastic dies will not produce configurations as well as metal equivalents.

© Chrysler Corporation

Surface finishing a cast phenolic die with sandpaper

In summary, plastics seem to offer the following technical & economic advantages as a material for making tools and dies:

1) Accuracy: High degree of accuracy is inherent in the technique of molding or laying up plastic dies. The Handbook of Plastics Engineering adds that construction of plastic tools is normally restricted, for economic reasons, to methods of duplication which do not require high pressure—casting, laminating, low-pressure molding.
2) Weight: Lightness of plastic in large quantities simplifies handling and shipping.
3) Lower fabrication cost: Tools are quickly made, require short lead time, no expensive machinery for grinding, cutting, polishing, boring or welding; they may often be made by semi-skilled or unskilled labor.
4) Adaptability: The surface contours of a plastic die can be modified if an experiment or style change is desired.
5) Repairs: Even if wearing occurs, repairs can be made quickly.

Certain inherent disadvantages must also be considered:

1) Necessity of a mold: Since plastic is not machine-duplicated like steel, tools must be made in a mold or against a model.
2) Inability to take handling: Plastic has a tendency to chip on corners and wear on edges, though metal inserts and fillers may overcome this.
3) Toxicity: Most tool plastics are cured by toxic catalysts, some having strong fumes, so they must be used with caution.
4) Hardness: Plastics are not hard enough for many applications, though fillers may be added to increase hardness.
5) Limited life, depending on the complexity of the part.

DESIGN

The effect tooling plastics might have on design was recently summarized by a firm of industrial designers:

Sundberg-Ferar: Plastic tooling seems certain to result in a greater volume of business for industrial designers. Because of the high cost of tooling for new models, many manufacturers can't afford to bring out new models as often as they'd like. Perhaps the worst compromise they make is the face-lifting model change, which gives a well-designed product a "new" appearance by adding a few superficial embellishments, which frequently spoil the original lines of the product. In the auto industry, in many cases, the good design of first models is corned-up in the second and third versions, as designers struggle to add bits of chrome to obscure the original lines.

© Chrysler Corporation

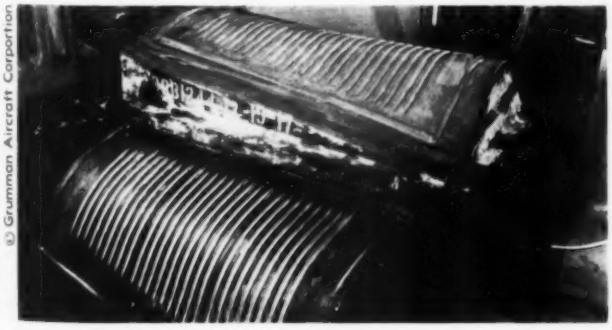
Less costly plastic dies will permit the manufacturer to make more frequent changes in product design. Although they dictate low production runs, the design of low-production products can now be less costly, and the products can be more frequently redesigned on a functional basis . . . a competitive advantage, in fact. Some of our clients have started to use plastic dies; we foresee that good use may be made of the technique for such low-production products as motor trucks, sports cars, business machines, farm equipment, appliances, electronic and testing equipment.

It seems possible, too, that the inherent advantages of the fabricating technique will bring to light new and easier ways of manufacturing things:

B. L. Brown, Grumman Aircraft: We have found that plastic tools have made it possible to utilize engineering designs which were not practical before. Take the example of one fuselage skin panel which had to be on the airplane in five weeks. Conventionally this panel would have consisted of a plain outer skin reinforced by an inside doubler skin, and held to contour by formers running stationwise across the panels. This construction involved many individual parts which could be worked on by many men simultaneously; the low-cost tools could be made quickly, making it possible to complete the panel on schedule.

A better design, however, would use only one single beaded reinforcing skin, saving weight, cost, and production time. But it was ruled out because a conventional Kirksite drop hammer die to produce the inside skin would alone take five or six weeks. But we found we could cut down the tooling time considerably by using a phenolic (Rezolin 930) in combination with a Kirksite base. From the plaster mock-up, we cast the female half of the die, and waxed the surface with a thickness representing the aluminum to be formed; we placed the waxed die against the sand-blasted Kirksite, and poured more plastic into a ½" cavity. This adhered to the Kirksite (forming the male portion of the die) but left a smooth outer surface where it parted from the cast, eliminating all grinding and polishing and reducing die completion time to two weeks.

© Grumman Aircraft Corporation



Fuselage skin panel formed by cast phenolic die on Kirksite base.

If some manufacturers seem less enthused about the idea than designers and engineers, it may be due to the current lack of experience with the techniques and possibilities of plastic tooling:

Rival Manufacturing Company: We are planning to try some of our shapes, which are now drawn on high carbon chrome dies, on plastic dies. This will be an experiment, to determine the quality of the work as well as the die life.

Skepticism sometimes reflects another consideration: if plastic tooling offers great economies, but demands in return a certain obedience to softness of form, will designers accept it? It seems possible that designers will exploit a technique to the extent that it helps them accomplish their own ends; and that they will either modify it, or abandon it, if other techniques make those ends easier to achieve.

Hotpoint: We realize that considerable time and money are saved with plastic dies, but there are factors that make us hesitate. It seems imperative that radii be large and sections not too sharp. This suits automobiles, because their design calls for large radii and smooth planes and curves. Our parts, on the other hand, have sharp, crisp radii and our draws are severe.

E. J. Storfer, Chrysler Company: The designer may at the moment benefit from the use of plastic in prototype work, die models and so on. Fiberglas lay-ups, cast models and the like offer new ways to reproduce design ideas almost directly from the drafting board.

Possibly plastic tooling will affect other aspects of industry's operation:

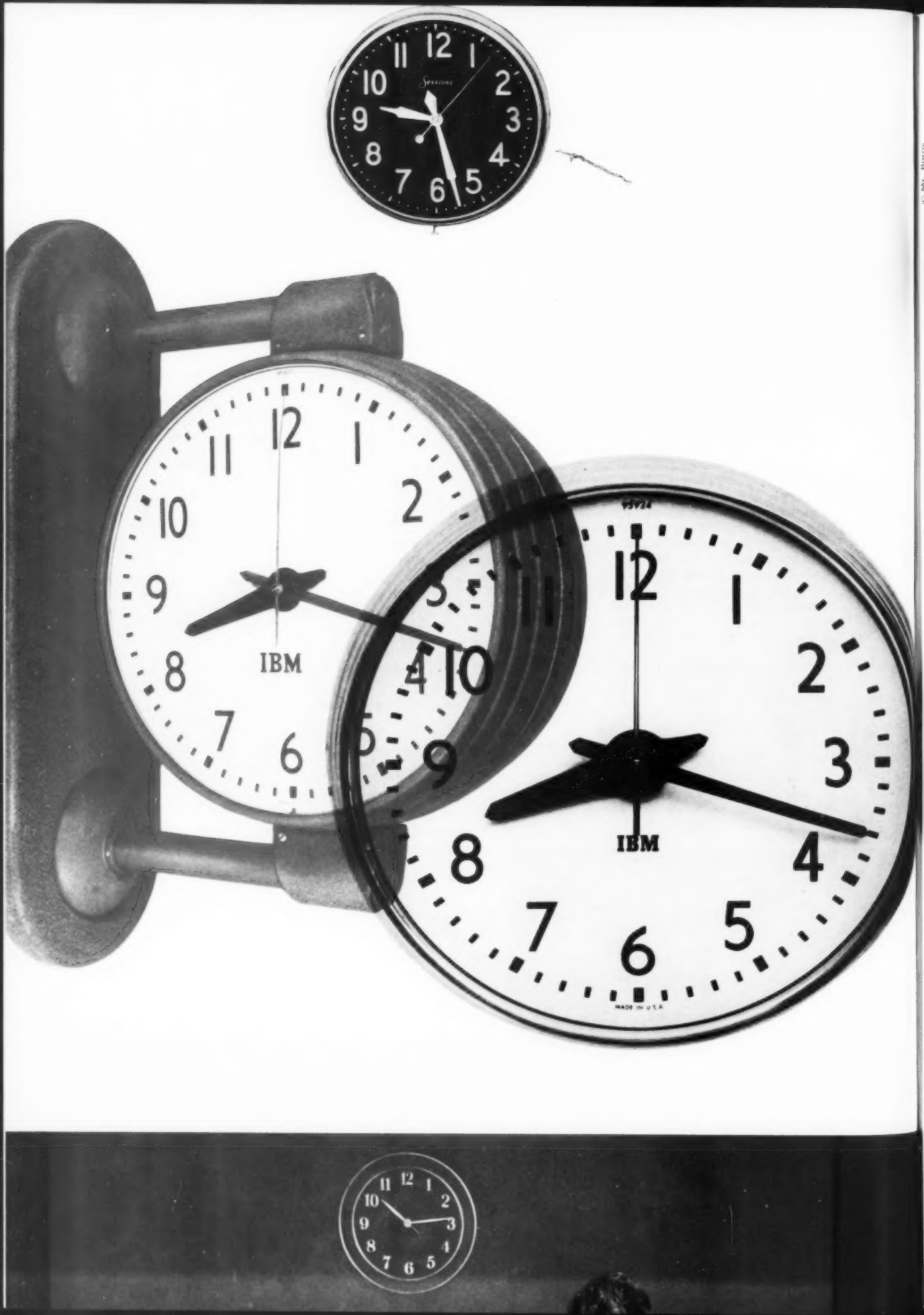
Thomas Walb, Shell Chemical Company: One major effect of plastic tooling could be decentralization; this would result from the ease with which dies can be duplicated and shipped directly to market areas for final production. Thus the shipping costs of finished products could be cut enormously, and probably labor costs too, depending on the regions involved.

The biggest stumbling block today is the lack of a good fast test for a durable die. Adequate data have been developed for metal dies and the time will no doubt come when plastic factors can be correlated with equal certainty.

American industry, with a large investment in other methods, is viewing plastic tooling with caution. As tooling plastics get better and as industry gets on familiar terms with them, prospects of faster amortization will probably spur the kind of experimentation which is impossible today. This may be in the form of very-low-run test models, or small quantity products for actual marketing; it may inundate us with changes taken too lightly, or with new heights in well-designed and inventive products.

Chrysler Corporation: Frequent changes in car styling will now be possible on low production models; the cost of sports cars may be reduced; it may mean, too, that the customer of the future will have a greater variety of car style to choose from in each line.

The effect, in short, will be what people make it. The auto industry, with a fortune tied up in yearly tooling, has reasons for wanting more economical and flexible tooling methods. Other industries may follow suit as necessity dictates. While there is nothing inherently good or bad about the technique itself, it can easily have an effect on the quantity and quality, and perhaps cost, of goods offered to the consumer — as the designer dictates.


IBM
IBM

© Mr. Barry

Louis Lyons Antiques

by Marilyn Silverstone

CLOCKS

A current review of shapes and faces

The elaborate mechanical devices that measure time would be useless if they did not present their measurements to the eye. Presumably, then, a good clock is not only accurate but as easy to read as design can make it.

There are many ways of marking off the twenty-four hours into which we divide the day. Until about 1670, the clock had only one hand. On the seventeenth-century Japanese clock above, a single winged pointer points unequivocally to the hours marked in graceful calligraphy around its dial. In the nineteenth-century French clock beside it, a globe of white glass revolves to carry a band of the hours past a single fixed pointer. But along with our increasing interest in speed and precision, we have developed a specific and unique pattern of recording time which allows us to read and differentiate 12 x 60 x 60 or 43,200 divisions at a glance. Our time-reading habits are so entrenched now that any basic change in this design would seem impractical.

The clock face established by convention is a circle divided into twelve equal segments, each of which is further divided into five small segments. These sixty divisions are usually marked around the circumference of the clock face, with the twelve large divisions marked by numerals. Two hands radiating from the center of the circle sweep around this dial at different speeds: a short one rotates once every twelve hours and indicates the hour; a longer one rotates once in an hour and indicates the minutes. Sometimes a third, usually needle sharp and often bright red, rotates once a minute and indicates the seconds. The time track that these hands travel must be interpreted differently for each of them. The numbers are read directly when indicated by the hour hand, but they symbolize another set of numbers for the minute and second hands.

Habit and standardization of the clock face have simplified these mental gymnastics. Once a child has learned to read a clock, his painstaking spelling out of the numbers usually gives way to a quick look at the position of the hands; the numerals are simply guideposts.

A curious difference between American and English time-reading suggests what varied interpretation this simple dial allows: the American reads a clock in terms of minutes (ten thirty; six forty-five) where the Englishman reads in the more leisurely terms of the hour (half past ten; quarter to seven). The French add a further complication: after noon, each indicated hour must be added to twelve so that midnight becomes *24 heures*. This may be a more logical way of relating a twenty-four hour day to a twelve-hour clock.

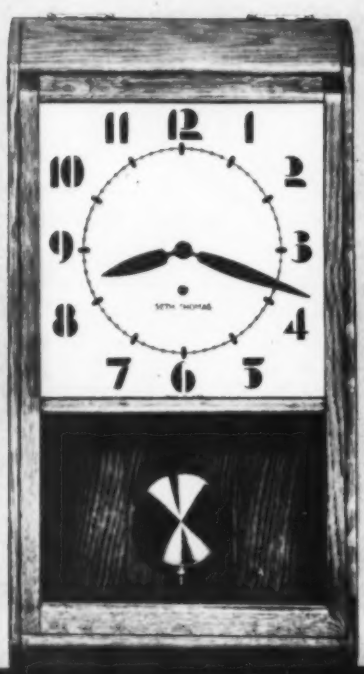
If a clock is to be taken as an instrument for reading time, legibility and a respect for the reader impose certain limitations; these limitations, however, can be turned into points of emphasis (see the eminently clear wall clocks on the previous page). Within them there is room for many variations, not only in the design and relationship of the clock elements, but in the concept of time which the clock reflects. In its simplest, most elegant form, like the Rensie Vega (1), the clock-as-an-instrument consists of a twelve-division hour track, marked by legibly rounded Arabic numerals and encircled by a sixty-division minute track. The two hands are clearly differentiated in length; finely pointed, the long minute hand reaches exactly to the minute track at the perimeter of the circle, while the shorter hour hand reaches only to the inner circle of the hour numerals.

Hands, track, relationships and scale are subjects for infinite variation. The Sentinel Wafer (2) combines a logically placed track with clearly differentiated hands. The red sweep-second hand (the only hand you see moving on a clock), with its large pivotal disc, seems overemphatic only because of the small scale of the dial. The Seth Thomas Observer (3), on the other hand, places its rudimentary minute track illogically with relation to the gracefully differentiated hands. Visually, though, this inner track serves to pull the extraordinarily legible stenciled numerals back into a circle, counteracting the square shape of the case. Another aspect of legibility is tackled in the Swiss Omega (4): a subordinate minute track is numbered by fives with small Arabic numerals, while the hours are marked with large Roman numerals. These last though appear only at the quarters, a bow to the premise that people often read time by the position of the hands.

The design of the number track can reveal a concept of time. The Roman band, used in the Chelsea Erickson (5), recalls the measured dignity of the sun dial. Westclox' Manor (6) expresses time in a speeding

1

2



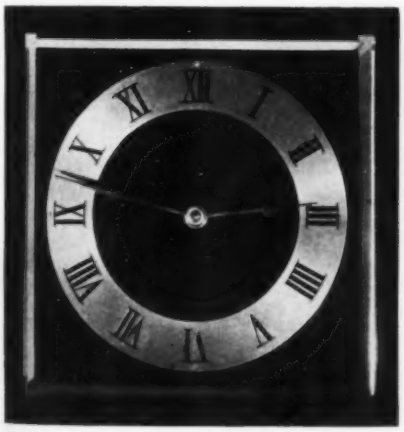
3

4

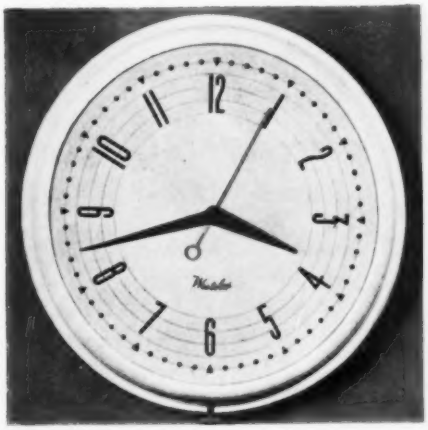
5

circle (perhaps the track of the racing, electrically powered hands). In its haste, however, the Westclox trips over its radiating numerals: suddenly 3 and 4 are lying head to toe. Time as a radiating circle is suggested differently in the Telechron Tele-jour (7). Isolated in their black discs, the hours seem to revolve around a nucleus; the idea of a continuous track is gone, leaving the hours as autonomous points in time, held together only by some sort of centrifugal force. In the Westclox Country Club (8), time has the orderly disorder of an exploding atom. Numerals, except for the identifying quarters (little more than arabesques), are gone; only the second hand bears any real relation to its track, which is now a spray from the core of the explosion.

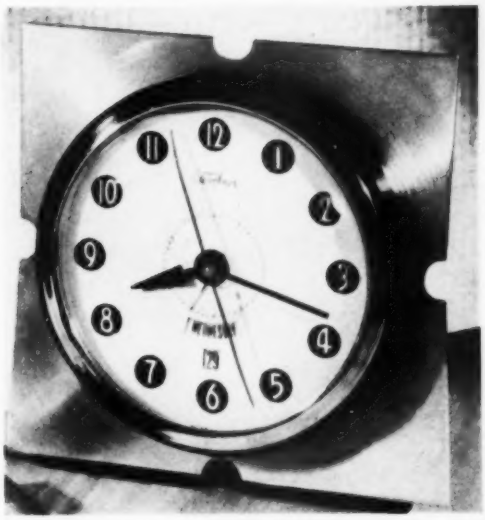
As the clock face disintegrates, and as the clock accounts for time less specifically, paradoxically we seem interested in smaller and smaller divisions of time. Our discovery that the essence of matter is energy seems paralleled by an interest in the essence of time.



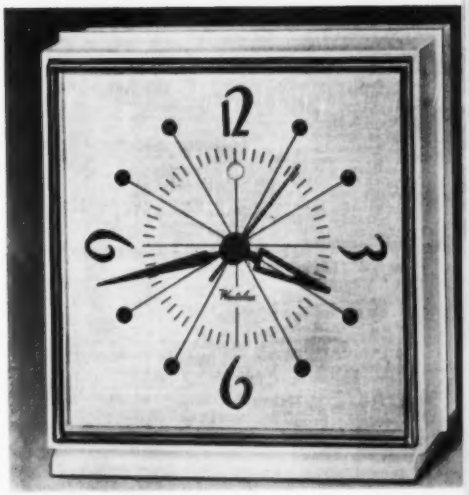
5



6



7



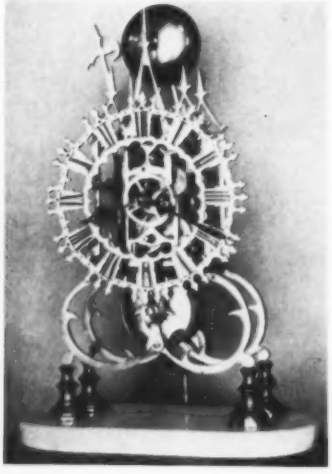
8

If we are not seriously interested in the clock as an instrument, if we conceive time in an abstract, or symbolic way, then a new direction is open to designers: the clock can become a decorative object whose function, though not obliterated, is secondary. This attitude is not new: in a seventeenth-century Italian night clock (9), the hours, illuminated from behind by a candle, rise and set like planets in the murky night sky of a Nativity. Four stationary points representing the quarter hours are pierced above the path of the hours, which pass them on a series of rotating discs. The mystique of the mechanism is another source of design: in the 19th-century skeleton clock (10), the wonderful wheels and gears are exposed, the supports and even the face are slightly Gothicized extensions of the mechanism, and legibility is subordinated to the *idea* of the mechanical clock. The wonder of the works is exploited today in LeCoultre's Atmos (11), whose perpetual atmosphere-powered movement is the heir to the mechanical wonder; in their baton clock (12), an exquisite jeweled movement is arranged on a vertical baton and suspended in transparent Lucite.

These days, when nearly everyone carries a watch to tell time by, the decoratively symbolic clock is more likely to derive from our concept of time in the abstract. The Howard Miller Ball Clock (13), by George Nelson, becomes a universe; no longer is there any vestige of the instrument, or even of a mechanism, but it remains a recognizable clock. This approach can easily lead to excess: while the luxuriously austere, simply balanced mahogany and brass wall clock (14) on the *Cristoforo Colombo* is completely legible, the same hours-as-planets concept leads to a busy explosion of many-colored glass in GE's Higgins (15).

As fancy grows, a new symbolism creeps into clocks: the positive-negative opposition of dark and light, day and night. The Howard Miller Diamond (16) plays with the idea somewhat to the detriment of legibility; a harlequin-faced Herschede clock (17) hints at phases of the moon or the revolution of the Earth.

9

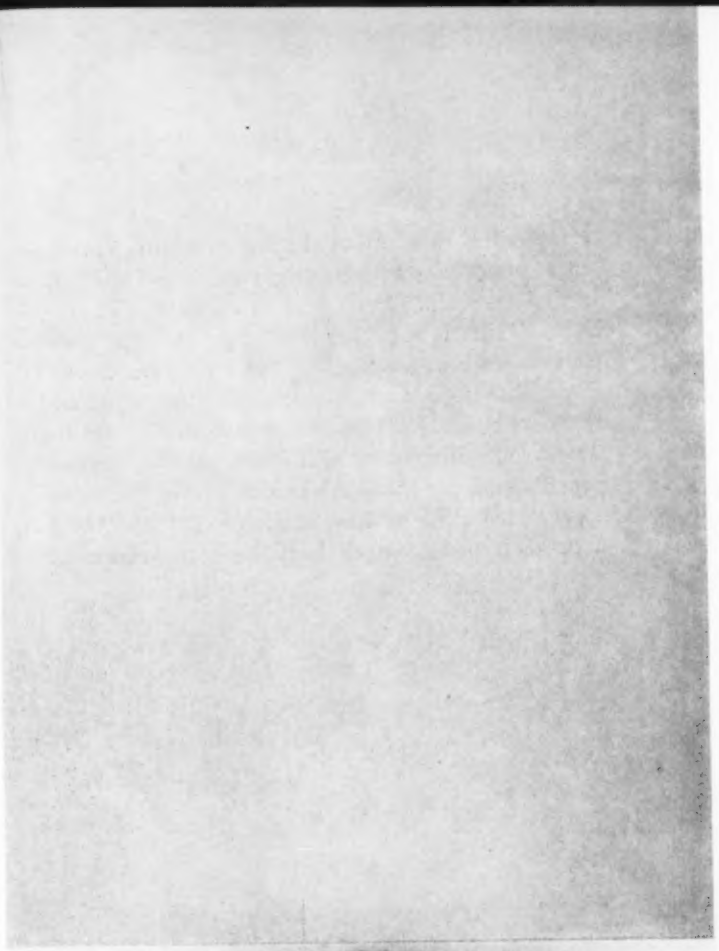


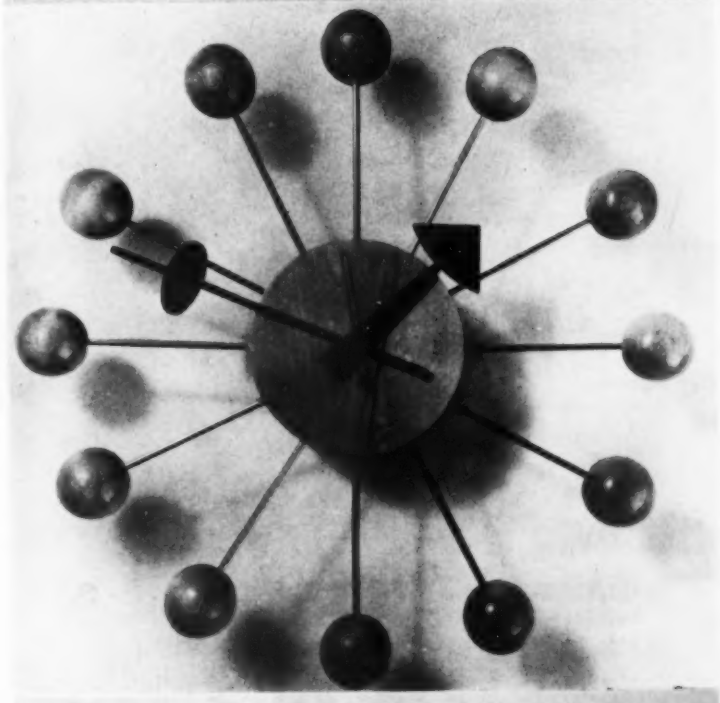
10

12

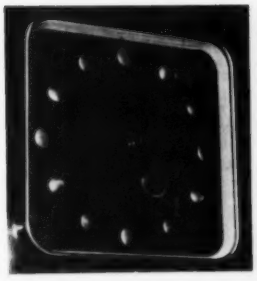
11

Clocks 9 and 10 from Mr. Barny
218 East 59th Street, New York

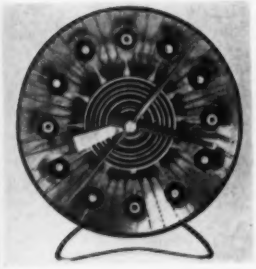




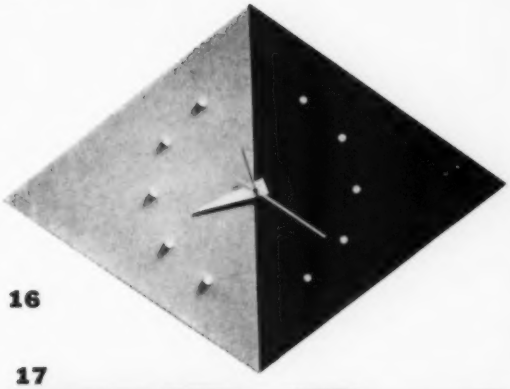
13



14

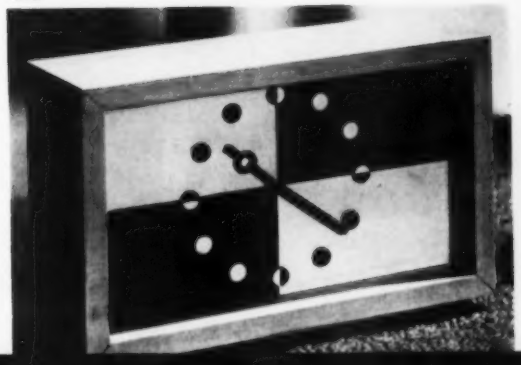


15



16

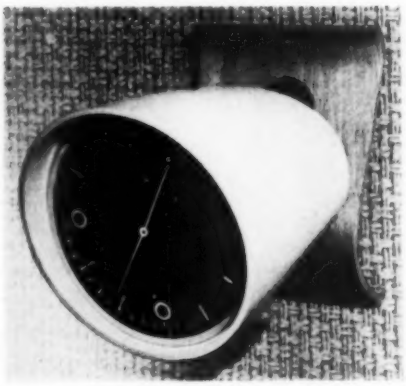
17



If a clock is viewed as a decorative accessory, a new design question arises: how to incorporate some semblance of "clockism" into an independent, free-standing object which will be considered part of the interior architecture. The globe clock (18) did this in the late 19th Century. Brass, alabaster and milk glass, it stood alone as an *objet d'art* in tune with its surroundings; yet its decorative value proceeds directly and simply from its nature as a clock. Today, in an effort to "modernize" the clock, current modes in architecture, furniture, industrial design and materials are often imposed from without, sometimes aptly, sometimes with no relevance to the integral nature of the clock. The Telechron Turnabout (19) looks like a lamp; it can be swiveled so that the plywood wall plaque becomes the base for a standing clock. The Herschede hooded brass clock (20) hangs aggresively on its black iron legs like an automobile headlight. Telechron's Innovation (21) is a mobile, suggesting practical use for the electric clock's cord. Microphonic, a projected clock by Paul McCobb (22) will perch on a brass tripod; colored hands and the rudimentary

18

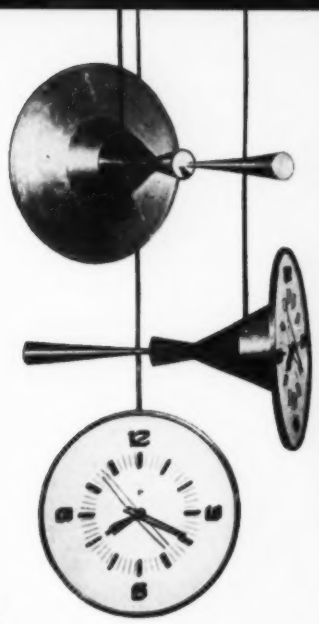
19



20

minute track (a brass rod halo) become airy decorative elements.

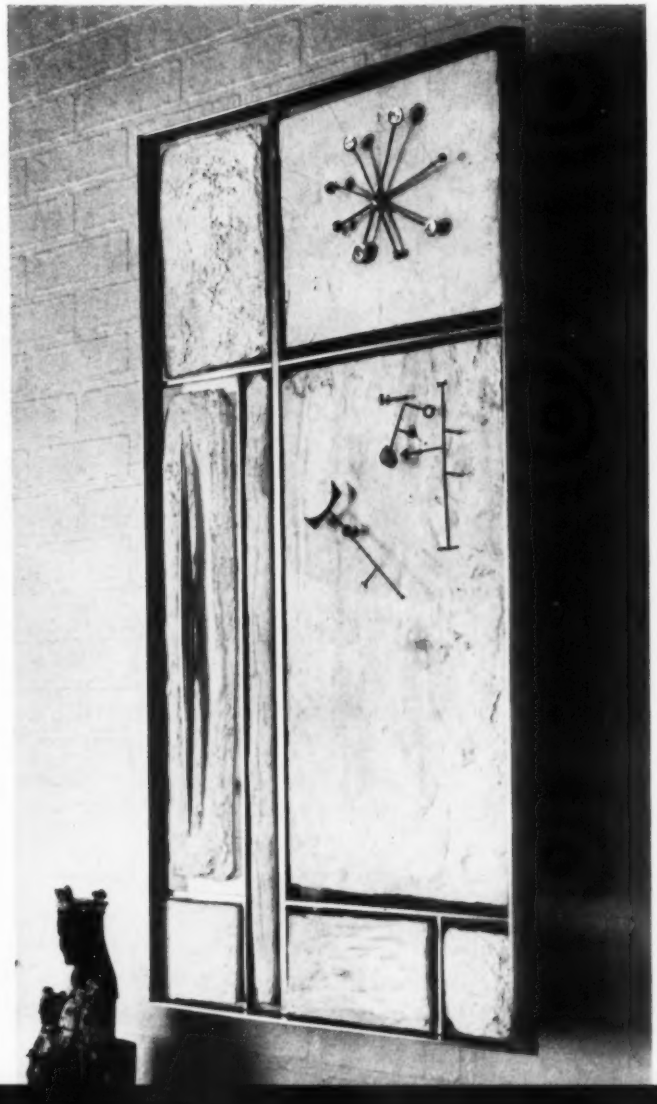
It may be that playfulness and fantasy will lead to a more relevant and significant design in the modern idiom. The clock designed for a lady novelist by Jay Doblin (23) turns the clock face elements into individual revolving symbols powered by three separate motors, and reassembles them into an elegant gold and white sculptural composition. The lady can read it just fine, and it hangs in the clock's traditional place of honor over her mantel.



21

22

23



After years of barking about big-screen tv, television makers are suddenly boasting of a new breed of compact, small-screen sets. Radio makers vie to cram the most radio into the least luggage leather, and record players are designed with increasing ingenuity for a life on the road. Compact and portable — they seem to add up to a trend. Why? People have been taking radios to baseball parks and phonographs to picnics for years, so it took more than demand to start the trend. In the case of television, it may be a sign of maturity: now that television is an institution it doesn't need to be monumental. Tv makers have to sell something while everyone's waiting for color, so they're reaching new markets with low cost and light weight. The new radios seem to foretell real miniaturization: while the

sound carries

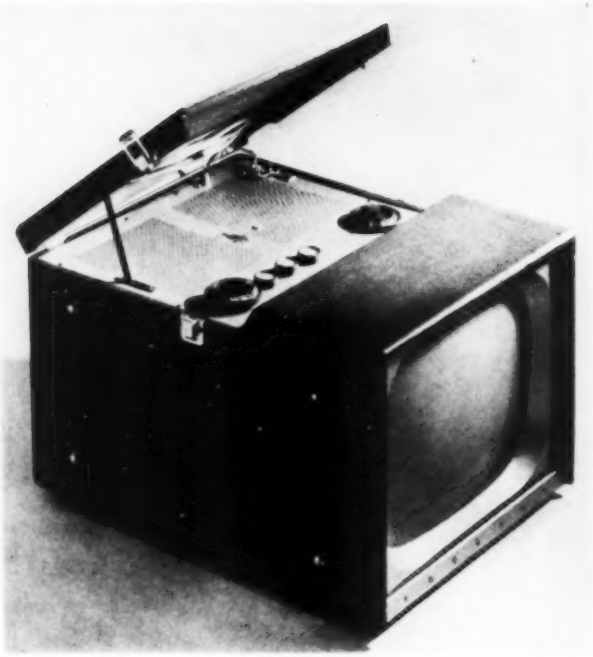
machines courtesy liberty music shops

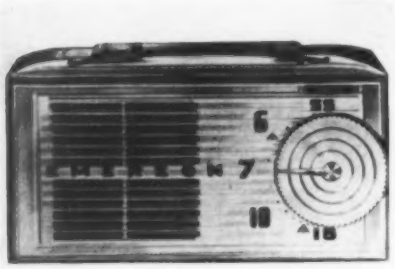
designers wait for printed circuits and transistors they are learning to pack fewer components in a tighter space. Meanwhile, the public has shown it likes the convenience and novelty of the little ones and doesn't regard size as the measure of quality. It's the other side of the coin, apparently from hi-fi and the architectural music system.

Lined up here for a quick trip, from left to right: Majestic's battery-run radio-phonograph, CBS-Bell and Howell tape recorder, Emerson's radio-in-a-purse, CBS radio-in-a-case, a portable Revere radio, Miniphon recorder, Emerson's portable tv, and Columbia's husband and wife team of traveling phonographs. Details appear on following pages.

Suitcase tv

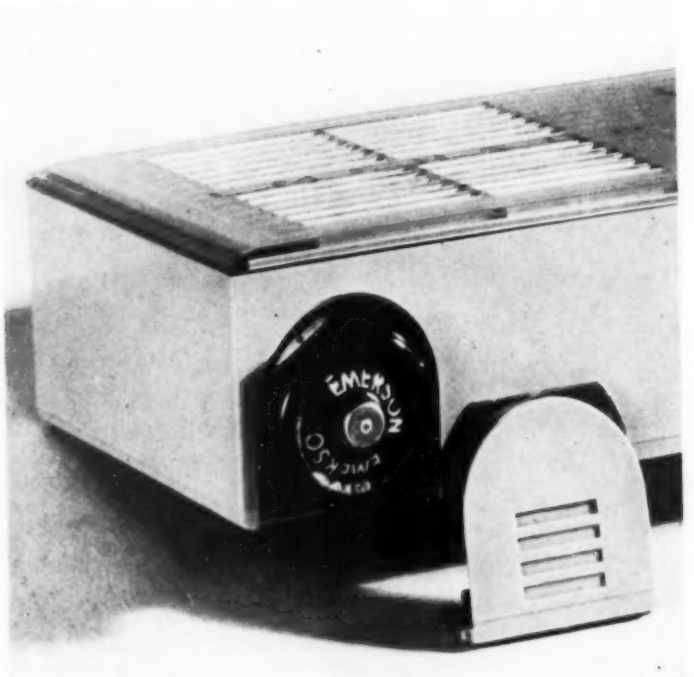
Emerson has capped the current spate of compact, vertical-chassis sets by providing a 14″ model with a carrying handle at one side, rubber feet on the other, a lid at the top to protect the controls. Not technically a portable (it has to plug in), and not a featherweight (40 lbs.), it nevertheless makes transport easier and emphasizes a new concept in tv with its trim fabric-covered case neatly detailed in gold. Black, $150; Brown, $160.



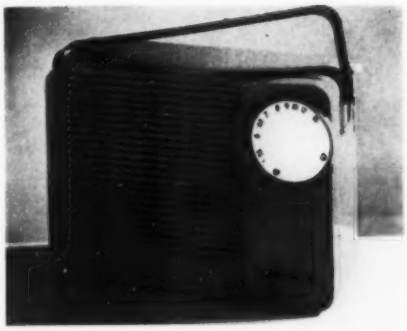


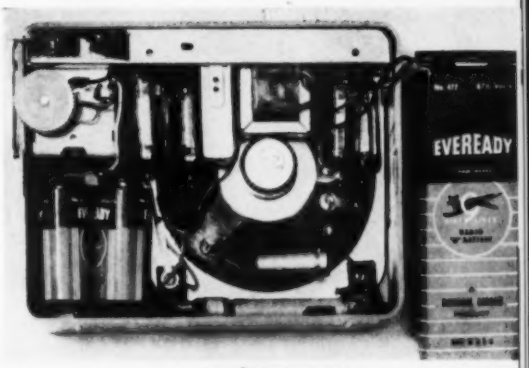
Pocket radio

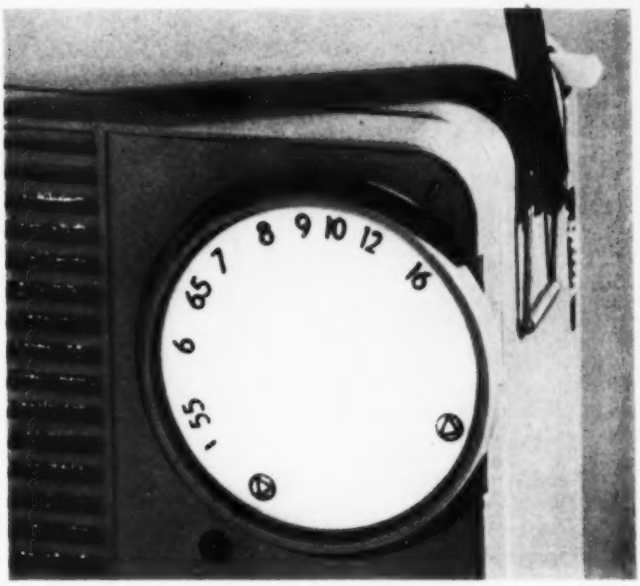
Emerson claims leadership in small radios; its first portable appeared in 1936 and it hopes to be first with a wrist model. This pioneering pocket radio appeared a year ago, uses 4 tubes, measures 6 x 3½″. Emerson designers managed to suggest technical craftsmanship rather than pinched proportions by designing it to look like an instrument, with elaborate metal case, camera-like dial. $40.



Small radio, big speaker

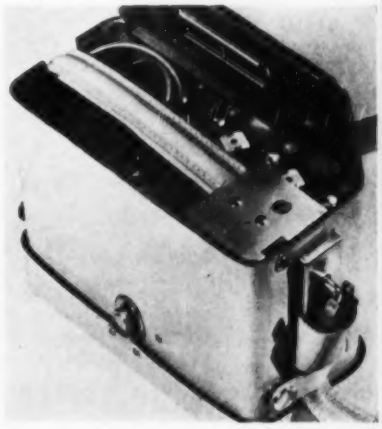






New CBS miniature, claimed to be the world's smallest portable with a four-inch speaker, has parts packed like noodles around this talking point. The well-proportioned case by Paul McCobb is the simplest combination of nicely detailed elements: speaker grill, tuning dial, snap-up metal handle, on-off switch. Symbols on dial indicate Civil Defense bands. The switch is designed as a flag to show when radio is on. The styrene case comes in four suave color combinations. About 4¾ x 6¼, 4 tubes, $29.95 with case.

Plug-in or portable

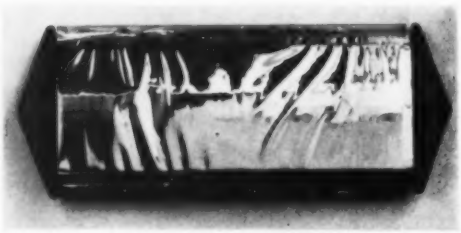


Revere portable can be plugged in or run on batteries. It is made in one with its leather case, which opens at one end to reveal the sculptured face of red-trimmed metal, at the other to give access to the batteries. The leather-sheathed cord plugs back into the case when the radio is operated on batteries to make a carrying strap. 6 tubes, 4¾ pounds, $44.50.

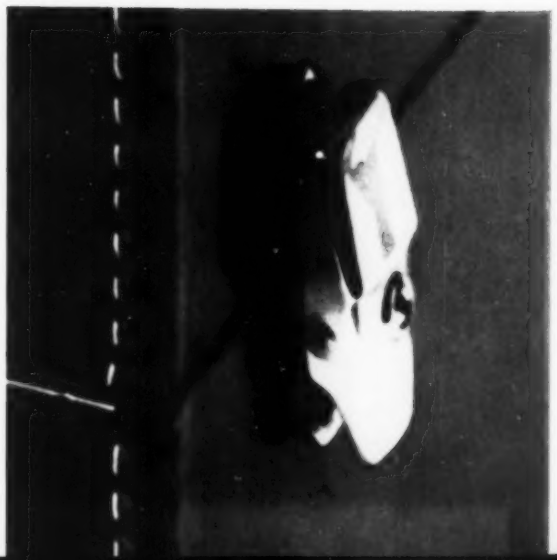
Battery-run combination

Majestic's Music Mate is called the first portable radio-phono with a battery-run phonograph. Like cigarette boxes made to look like books, it doesn't open where you'd expect, but has a small hatch in the top side. Aside from this trickery, it's neatly designed, with an oversize radio tuning dial that circles the 45 rpm rubber-rimmed turntable. Controls are in a plastic pushbutton keyboard. 14" x 10" x 5", it weighs 12 pounds in a covered wood case, has a crystal pick-up and sapphire needle. $84.50.

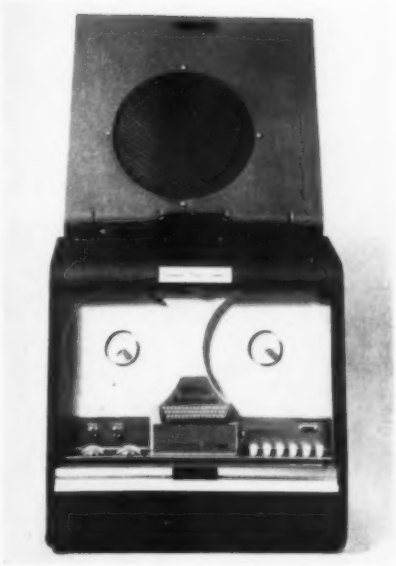
Hi fi in a suitcase

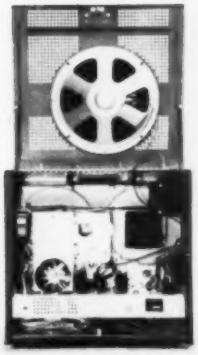


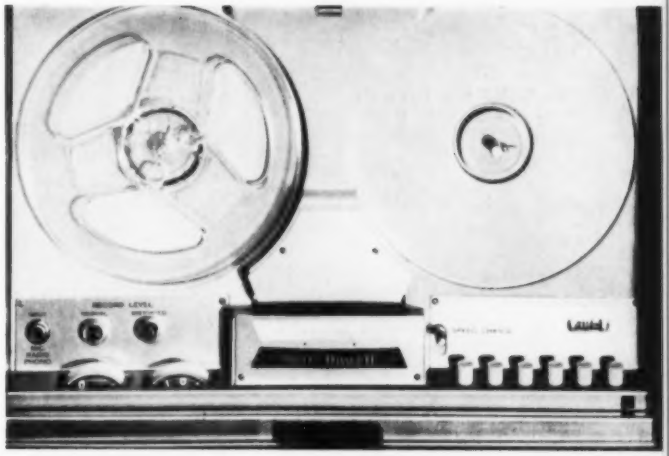
The high fidelity of the Palm Beach portable phonograph, Columbia explains, is based on its new kilosphere—a device the size of a candy bar encased in plastic foil which contains over a thousand minute loudspeaker outlets capable of relaying frequencies up to 20,000 cycles. Covered in Goodyear Neolyte, it has well-tailored luggage details like saddle stitching and metal fittings. 9½" x 15" x 17¾". $149.50.



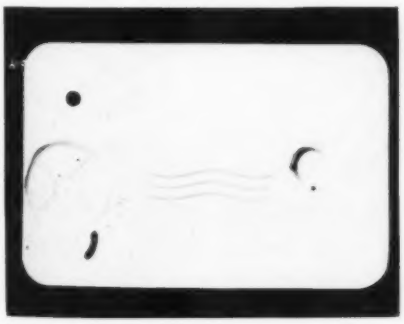
Upright tape recorder







Made by Bell & Howell's TDC Division, distributed by Columbia, this new portable reduces tape recording to pushbutton operation. 10" speaker is not hi fi because it lacks a baffle, but swung upright it's powerful enough for p.a. Gray crackle, tambour cover, $249.50.

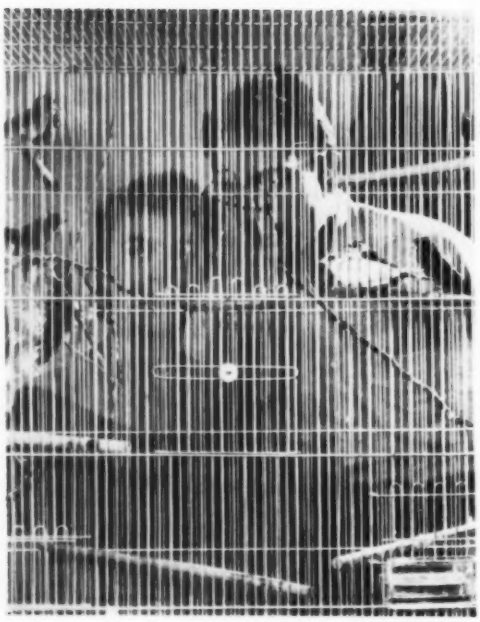


Pocket-sized wire recorder

Undisputably the world's smallest (6") recorder, the Minifon looks like the perfect toy, complete with all the paraphernalia an amateur spy could desire: a false wristwatch which is really a microphone, a stethoscope for earphones, and a tiny mike which can be pinned under a lapel. Its quality is, actually, as precise as its shiny inner workings would suggest. With its tiny battery-driven motor, it can wire record up to 2½ hours. A German import, $289 complete.

Product photos by Tom Yee

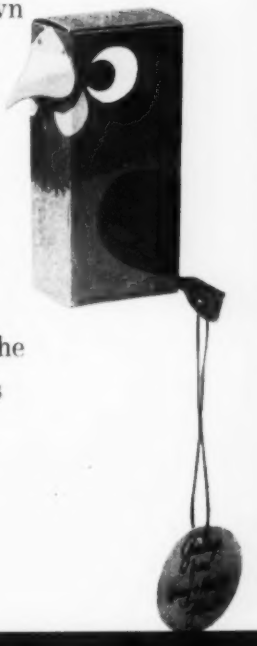
Sophisticatedly whimsical animals and figures are boxes designed by Harry and Marion Zelenko to appeal to children or to any manufacturer of a competitive product that needs a box. Living as they do surrounded by birds, it is natural that their first box should have been a parrot (opposite), their candy-bearing Christmas card.



Maurice Manson

Die-cut menagerie

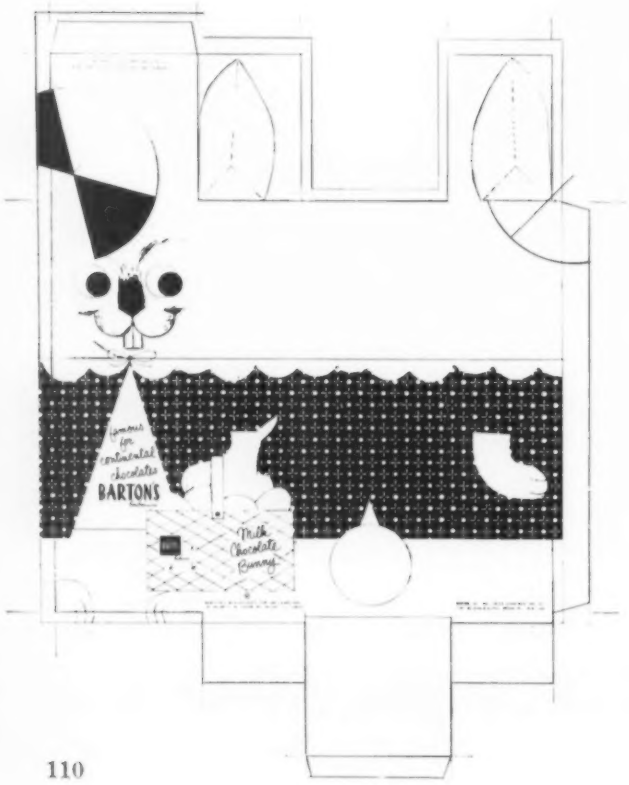
Harry and Marion Zelenko live and work in an airy white apartment with some thirty-five finches and eleven parrots; they used to have monkeys too. The parrots have names, some speak (whether or not they are spoken to) and three golden conures, known affectionately as "the monsters," roost in a tree in the studio corner of the five-room birdcage. It is not unusual to find a monster or two perched on Harry Zelenko's head, or looking over his shoulder, while he works. The Zelenkos decided about a year ago that packages could be designed not only as containers but as premium toys as well; small wonder that their boxes turned into birds and beasts. With their whimsical menagerie, they have made box design a kind of paper sculpture. In place of the usual rectangle with each side decorated separately, their boxes fold into three-dimensional bunnies, alligators, or what have you. The manufacturing process is the same; only the imagination which uses it is different, conceiving the box as an object with a continuous surface, and carrying out the idea with a knowledge of die-cutting and box-folding. Some products, like pharmaceutical samples, have no visual appeal of their own; the Zelenkos feel that their animals put any product into a package with personality.



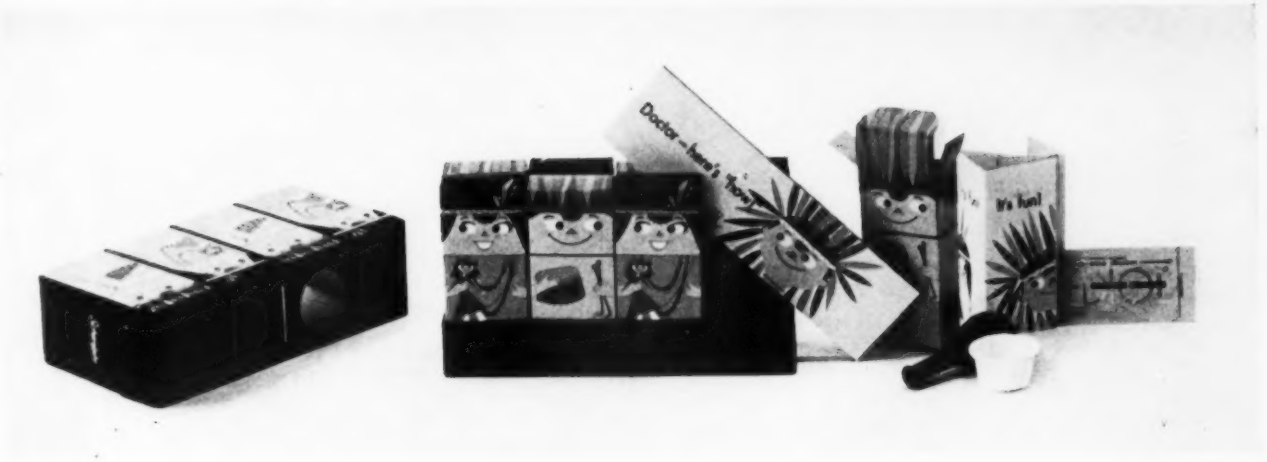
The Zelenkos come into box-making via advertising and promotion. Harry is art director at a medical advertising firm; Marion does free-lance graphic design and experimental photography. Their first package together was a promotion piece for tonic samples: the problem was to evolve a box that was inexpensive but different. The Zelenkos designed a box and humorous nursery-rhyme folder coordinated through color and a repeat fleur-de-lys pattern which covered the box and appeared again on the folder. From this project came their interest in packages, and the little parrot on the previous page. Enthusiastic about their own ideas, the Zelenkos got together several sample animals and went out to find a client.

Barton's was the first. Every candy store puts out a standard chocolate bunny at Easter, and competition among bunnies is tremendous. The Zelenkos sold Barton's on the bunny-shaped box whose bright, clean colors and light, humorous art work were designed to appeal to an adult with a gift for a child in mind. The box was cut and scored in such a way that the ordinary side-flap became a 3-D ear which could fold flat for shipping.

The next client's problem was more complicated: a package to contain a taste sample and cup for a child's emulsion, instructions for doctor and mother, and a toy balloon for the hapless child who is to be asked to swallow the tonic. The package had to be compact and easy for the salesman to carry around in quantity. In making the little Indians, eight to a set-up box (which is given to the doctor as a free sample), the Zelenkos appealed directly to the child, who is, after all, the ultimate consumer. "You can't always say it *tastes* good," says Marion, "so you've got to make it *look* good." The total cost was 20% below the budget; the original run of 250,000 was doubled within a week.



Mechanical drawing, left, shows how Barton's bunny is simply a die-cut shape; drooping ear accommodates wider rabbit.

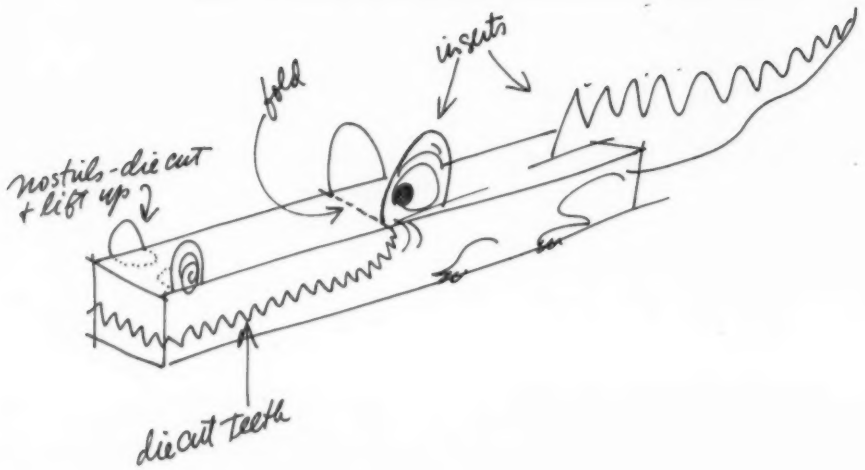


Ediol set-up box holds eight Indian sample boxes, instructions for doctor and mother, all gaily coordinated.

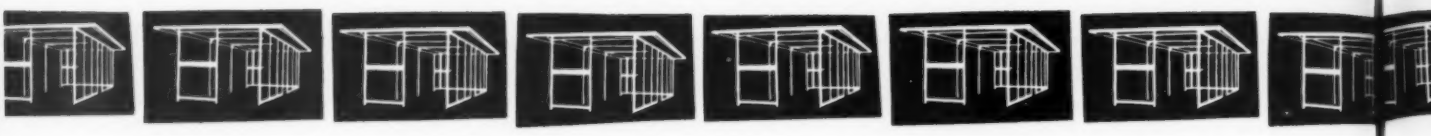
Drugstore display box points up the sinus-sufferer's dismay with real corks in the nostrils. It folds flat.

Among the Zelenkos' projects for other animal boxes are the three bears, designed to hold different amounts of candy and sell separately or as a family. Slits cut at appropriate places hold lollipops, which are stuck in by the dealer at point of sale to entice children.

The alligator's mouth opens and closes by a scoring at the top of the jaw. The teeth and nostrils are die cut, eyes and tail are inserts (or tail may be cut with box and printed on both sides.) Zelenkos think it would be good for toothbrush or toothpaste merchandising.



Zelenkos and parrots by Tom Yee



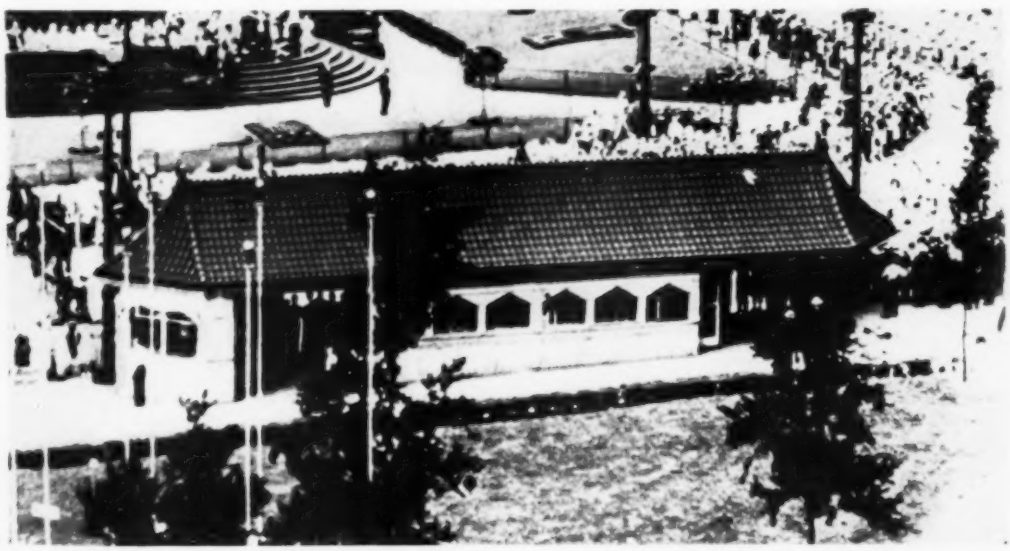
Cleveland's new transit shelters: **prefabs for pagodas**

Bus shelters and subway entrances have always been a prominent part of the city scene, the most conspicuous of those discordant structures of service and convenience that the British *Architectural Review* has so aptly named "street furniture." In the past, their design has been more notable for novelty or genteel romanticism than for utility. The decorative patterns of the kiosk have been fittingly immortalized by Saul Steinberg; Art Nouveau lives on in Guimard's cast iron fantasies for the Paris Métro; New York's Third Avenue El stations bear fading testimony to the Victorian taste for the Swiss chalet.

The new transit shelters for the city of Cleveland, by architect-industrial designer Onnie Mankki, are as direct a contrast to these sentimental relics as modern technology can make them. Neat, contempor-

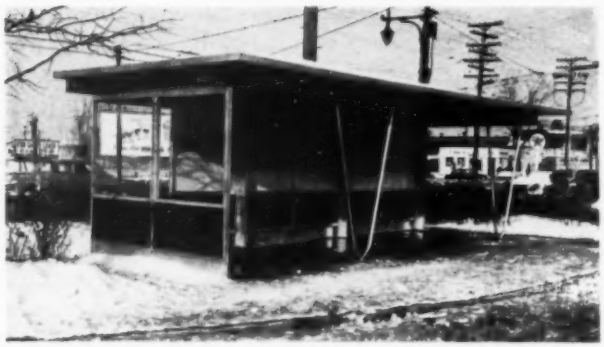
ary pavilions of aluminum and glass, they meet a rigid set of requirements specified by the client, the Cleveland Transit Company. The shelters had to be standardized and demountable for easy erection and moving, they were to provide maximum visibility, safety, protection against the elements and proof against vandalism, all at minimum cost.

The project went through two stages over a three year period. The design of the first model was based on the use of porcelain enamel steel sandwich panels of great strength and durability, set in an extruded aluminum frame. A second model substituted all-glass panels for porcelain, for a simpler, more startling design. Far from being impractical, a completely transparent structure offered certain definite advantages. It made it possible to see oncoming traffic without stepping outside, and helped eliminate the danger of assault in a public enclosure. Esthetically, it resulted in an inconspicuous simplicity of design that would add a minimum of conflict to a variety of unpredictable architectural backgrounds. When the job was interrupted by the aluminum shortages produced by the Korean war, Mankki considered the idea of bolting heavy plate glass sheets together directly, without the metal supports. The effect would have been spectacular, but the cost was prohibitive. With the easing of shortages, the second model was accepted as the final solution: a demountable, prefabricated structure based on a four foot module, using tempered plate glass panels with aluminum frame and roof to replace the Victorian pagodas of Cleveland's gilded age.



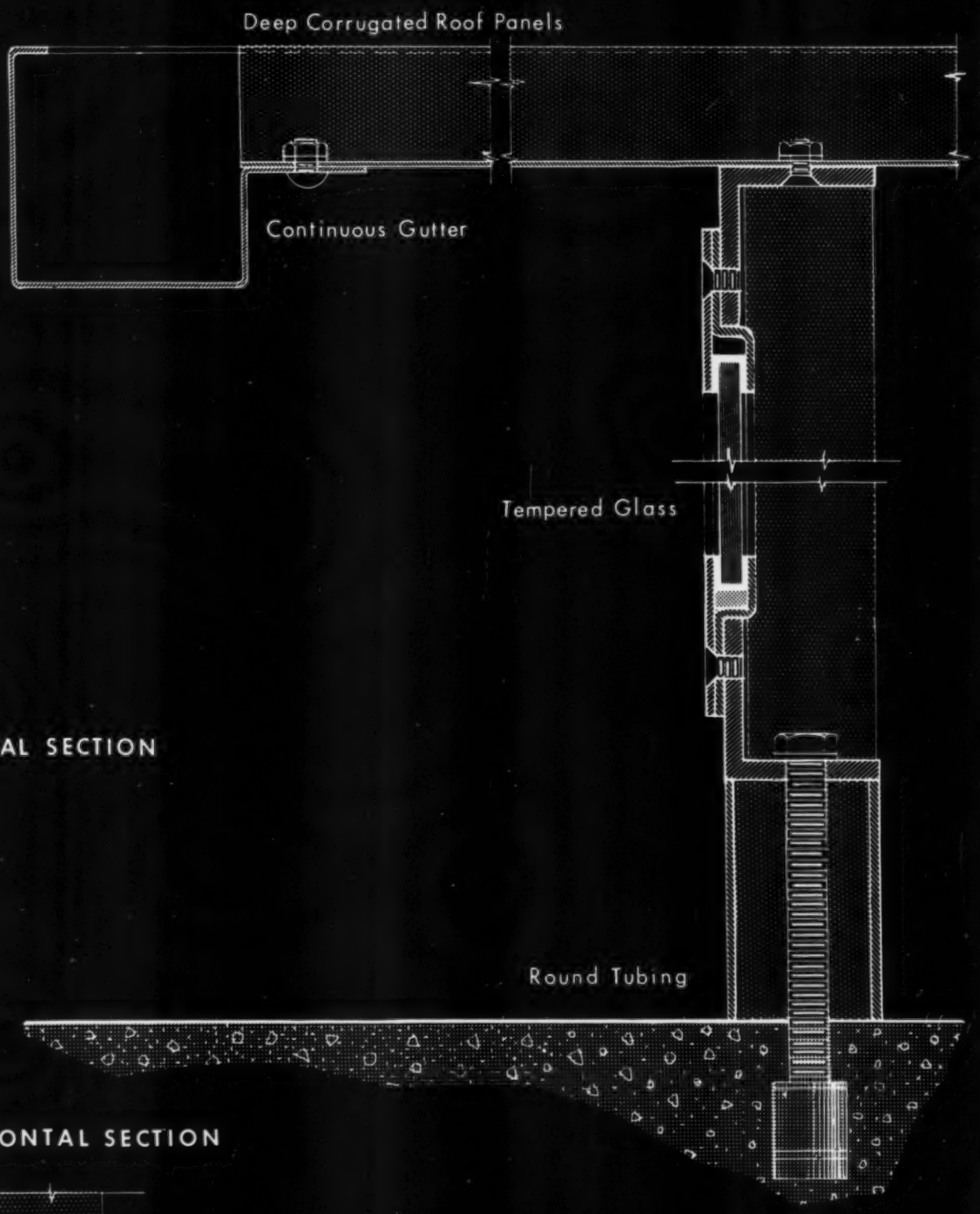
Victorian Gothic pagodas in Cleveland's Public Square are being replaced by aluminum and glass shelters.

Transit Shelters



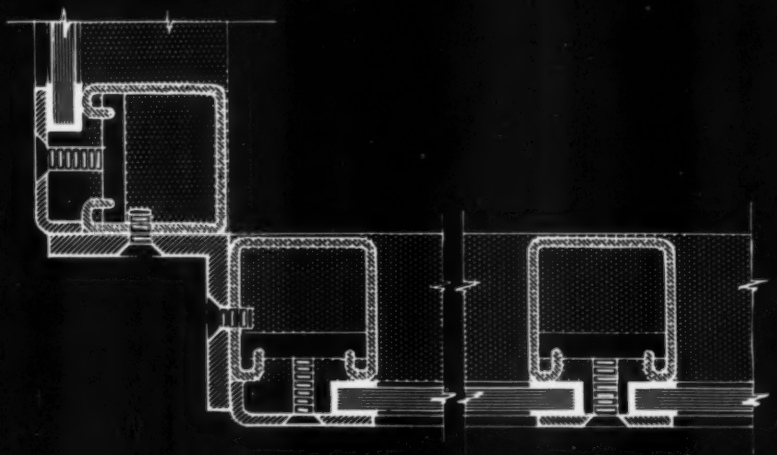
Steps in the design of Cleveland's new transit shelters: 1. A preliminary model by the Ferro-Enamel Corporation, based on the use of metal framed porcelain steel panels and a concrete floor slab. 2. Mankki's first design, which added a touch of World's Fair styling to the same basic system. 3. His final design, a simple and straightforward solution using ¼" tempered glass panels set in neoprene channels in a framework of aluminum members and Unistrut columns. Interlocking corrugated aluminum sections form the roof.

Metal tubes, variable in length to allow for differences in grade, raise the structure about 3" above the sidewalk, which serves as a floor and eliminates need for concrete slab. Expansion bolts through the tubes secure shelter to the ground.



VERTICAL SECTION

HORIZONTAL SECTION




50
60
70
80
90
H

Honeywell's round thermostat

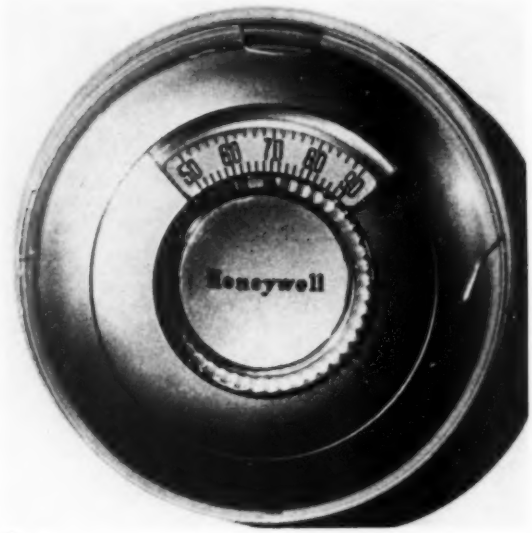
Henry Dreyfuss first suggested that Minneapolis Honeywell make a round thermostat soon after he became consultant designer to the company, in 1937. It is odd that he should have done so. Thermostats are usually rectangular for the simple reason that they usually enclose rectangular elements, but after fifteen years Minneapolis Honeywell has finally come out with a thermostat whose round shape is the logical expression of circular elements.

The conventional thermostat has three main parts. The temperature detecting element, a bi-metallic strip, contracts to one side to close a circuit whenever the temperature drops below a certain point. A straight clinical type of thermometer set in the cover tells the actual room temperature, and a circular control at the top of the box allows selection of the temperature which the thermostat is supposed to maintain. There are several reasons why this device should be as handsome as design can make it. It has to be seen, yet it should not intrude. It has to advertise the company, yet it should not disturb the domestic atmosphere with a loud commercial voice. There is also a technical problem: If the owner feels the thermostat strikes a sour note he may be inclined to hide it behind a door or in a closet, where it will operate on an a-typical temperature. Dreyfuss claimed that a round was the least obtrusive and therefore the best shape for the thermostat made for the home.

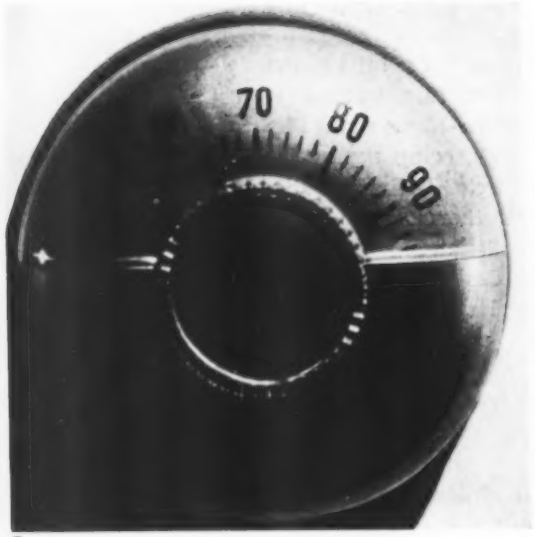
Henry Dreyfuss worked with Carl Kronmiller, a Minneapolis-Honeywell Design Engineer, and the M-H engineering department to fit the thermostat into a circle. Their first attempt, tested in 1942, had the glass thermometer curved across the outside and the usual flat bi-metallic detector on the inside. In a later design, a coiled bi-metallic temperature detecting element was introduced. At length this coiled element was perfected, and work on the circular form began to pay off. In the final version the clinical type of thermometer was also replaced by an inexpensive coil. Since both indicators now moved in an arc, it was possible to combine the two on one circular scale. A control knob of transparent plastic serves as a cover and a frame for the scale, which became the central motif of the design.

The prominence of the temperature scale on the new thermostat makes this simple control device as aptly ornamental as a clock. It might have been logical to make the scale cover the whole face of the thermostat, but Minneapolis Honeywell wanted to offer its customers a thermostat that could be "painted out." The result is an outer ring of plastic that can be snapped off for painting. In a sense, this ring is the most obtrusive element in the design simply because it is the least essential.

1



2



3

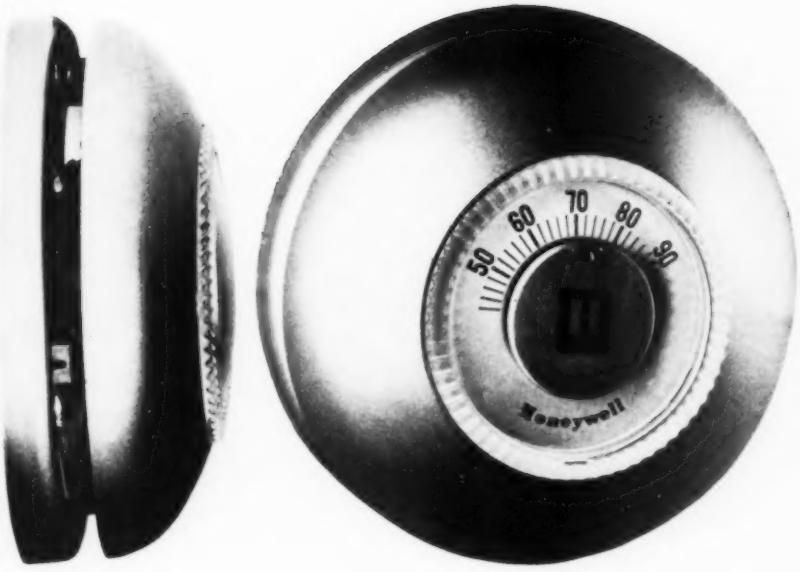
4

1 *Early version of the round thermostat, tested in several homes in* 1942, *correlated a curved thermometer with a large tuning dial on the outside. Temperature detector on inside was the usual bi-metallic strip.*

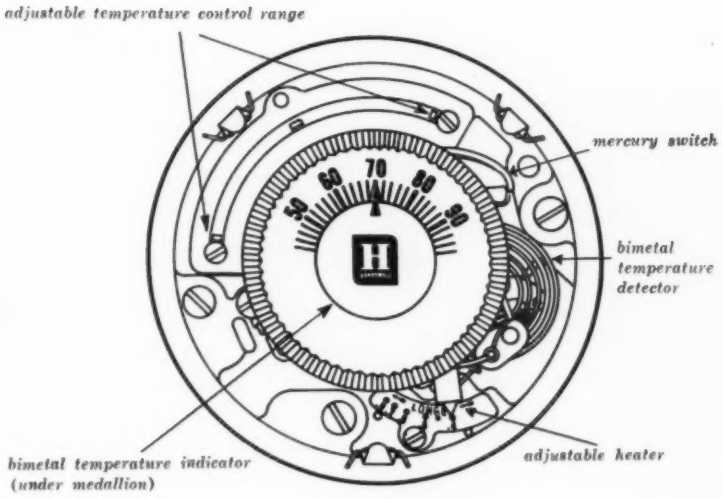
2 *In* 1946 *model, the scale was emphasized. Temperature was detected by a bi-metallic coil rather than strip, but the room thermometer was still glass.*

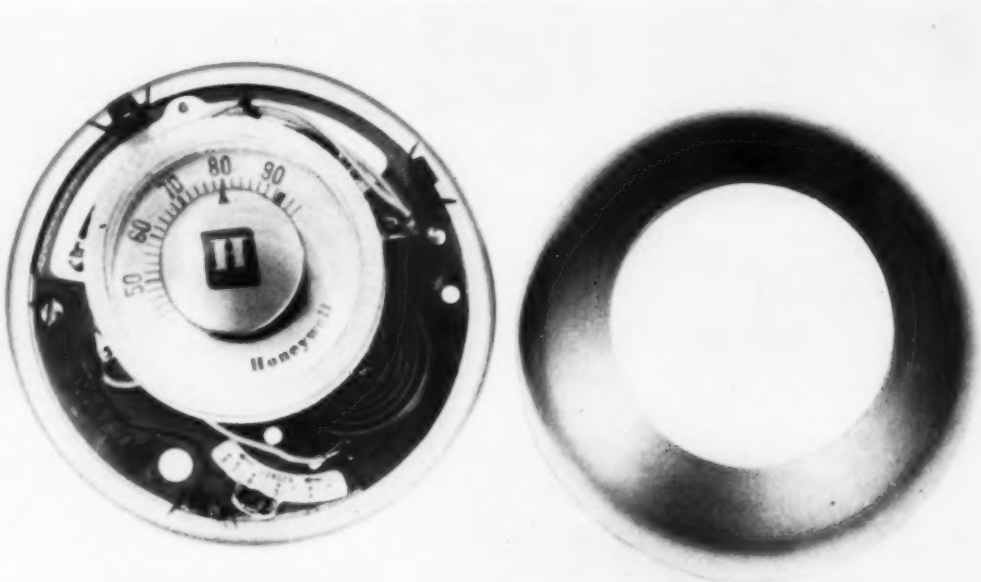
3 *Engineering improvements — a coiled temperature detector, coiled bi-metallic thermometer, mercury switch, and adjustable heat range — went into early* 1948 *model. With curved thermometer eliminated, the scale became the dominant motif of a simple wall thermometer.*

4 *Near final version,* 1948, *has scale printed against a circle, but reduces it to fit inside the control knob, leaving an oversized plastic frame that can be snapped off and painted to suit. The only change in the final version, opposite, which appeared in* 1953, *is the monogram.*



Several functional improvements were incorporated in the new thermostat. In the old model, circuit was closed when bi-metallic heat detector met open contact points, which sometimes gathered enough dust to throw thermostat off. On the new model, the bi-metallic coil activates a closed mercury switch. Automatic stops combat "jigglers," who try to speed up heating cycle by turning the temperature way up or way down. Another new adjustment makes it possible to speed up the cycle within the thermostat.



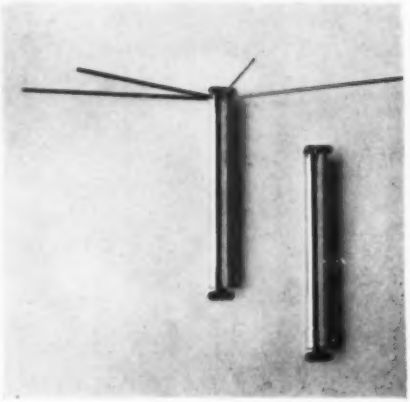


DESIGN REVIEW *Kitchen wares—nice materials, improved gadgetry*

↑**West Bend Aluminum Company's** new automatic hot water server is economically composed of body unit from 5-cup percolator (aluminum) and new horizontal handle (brown phenolic) for sit-down pouring. Base light indicates correct temperature. Recommended for instant coffee, hot toddies. Painter, Teague and Petertil, designers.

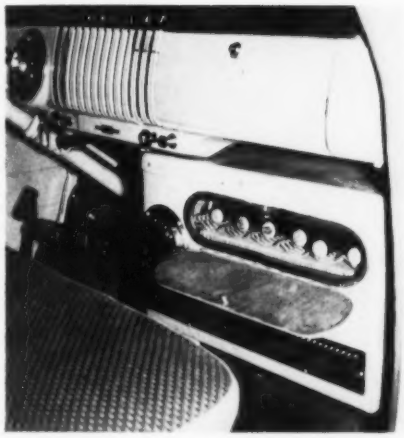
↑**Tricolator** electric beverage brewer is polished aluminum, has Bakelite handle sprung on metal struts. Designed by Cushing and Nebille. $9.95.

↑**Norris-Thermador** is reintroducing 12 Norrisware stainless steel utensils with copper bottoms. Vapor seal, which uses condensed vapor to lock cover, permits nutritious steaming. Retractable hangers, interchangeable covers.



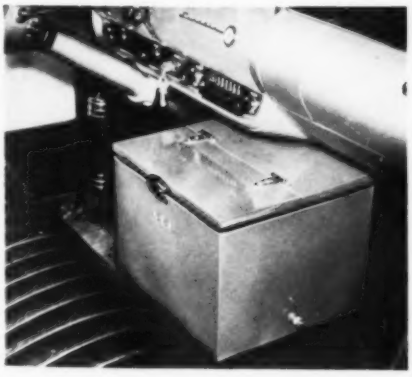
↑**Stratfield Company** of Bridgeport, Connecticut, makes a neat drying rack for kitchen or bath consisting of four eleven-inch arms that draw out of a polished aluminum tube one by one. Attached with four screws. $1.98.

↑**American Kitchens Division** of Avco is angling for custom cabinet market by offering steel cabinets with wood doors and "coppertone" sink and cabinet fronts. New fronts are interchangeable with standard white enamel, cost 10-15% more.



↑**A.R.A.** Manufacturing Company offers truck drivers refrigerated air in summer, heat in winter, and cold space for twelve cans in the Triple Treat, claimed to be world's first year-round air conditioner for trucks. 22½x10x14" with ½" insulation, 3-speed blower; installation 4-6 hours.

↓**A.R.A.'s** car refrigerator, called Refrigerette, depends on existing air conditioning system and is most effective on long trips.



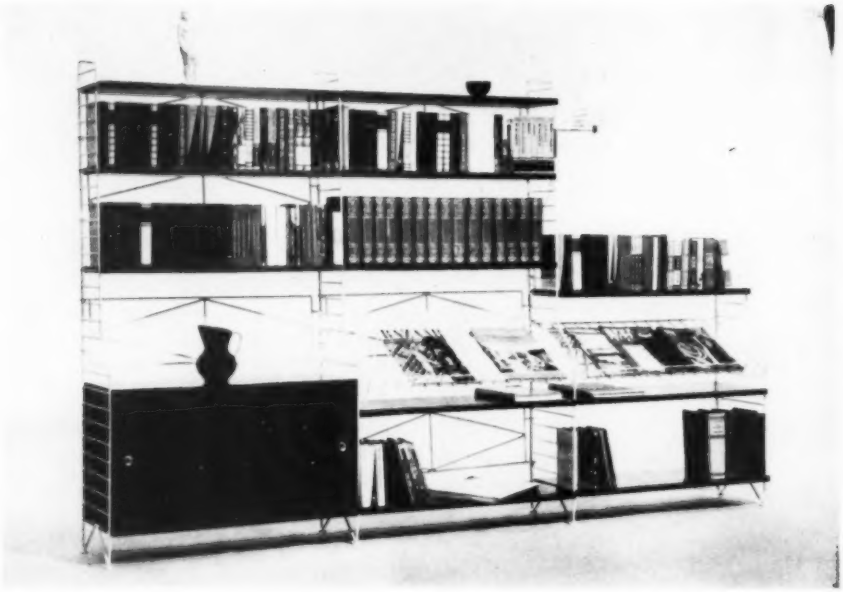
→**Dormeyer** promises lifetime service with the "first" mixer with shiny chrome finish, stainless steel bowls. Food grinder, a standard attachment, fastens directly to power drive. Portable mixing head; beaters released by trigger. $52.75.

↓**Hoover** "Stainless," a new steam or dry iron, is called first combining aluminum sole plate with heating element cast in and stainless-clad ironing surface. Large dial incorporates detent to click into steam position. Designed by Russell Swann with the Hoover Engineering Department.

↑**Revere Copper & Brass** offers a trick handle to help identify contents of four stainless canisters recently added to its line of stainless utensils. Lucite handles store samples of food inside. $3.75 to $6.75.

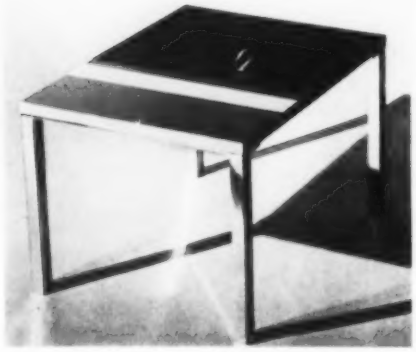
↑**Westinghouse** DC-7, a canister cleaner with throw-away bag, swivels on its base to prevent cord kinking and serves as a reel for cord when it is twirled. Ribbed vinyl hose snaps into tank; tubes extend like telescope to desired length. $99.95.

↑**Lewyt's** radically new vacuum has big rubber wheels inspired by a boy's box-scooter, square shape for compact storage, step-sitting. Other boasts: five-step filter, Fiberglas silencers, scented chlorophyll deodorizer, power dial for extra suction, pistol grip, "speed sak."



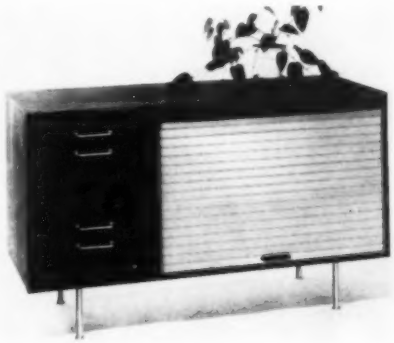
↑**B. G. Mesberg National Sales** adds a new bar unit to its Connoisseur's Collection by Paul McCobb. The rectangular brass legs continue up as integral part of the design. Mixing well under lid is Micarta-lined. 36″ x 17½″ x 34″. $329.50.

↑**Swedish Modern** imports a freestanding version of its versatile modular storage unit. Metal frame sections, in black, white or color, can be assembled with shelves or a variety of cabinet fittings.



↑**Habitat Associates** spices its classically simple end table with 4 tone bands in a Formica top, in a choice of three color combinations. Legs are polished chrome. $93.00.

↑**Troy Sunshade Company** adds interest to its wrought iron room divider with a variety of shelving materials: expanded metal, walnut-finish Formica, and clear glass are intermixed. Feet are gold-anodized aluminum. 55″x49″x15″, $90.



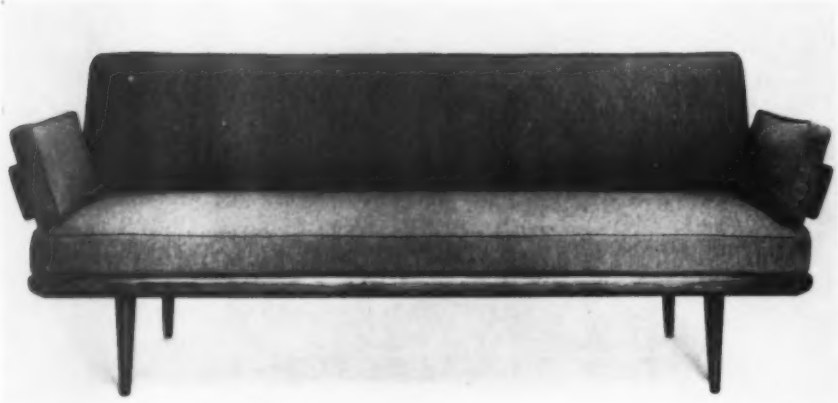
→**Jens Risom Design, Inc.** introduces Group R, a series of modular cabinets based on 36″ and 54″ basic birch or walnut units, which may be combined horizontally on wooden bases, mounted on brass legs, or stacked. Tambour front is warm grey extruded Tenite strips. R-12 on metal legs, walnut, $336.00.

→**Glenn of California's** new hostess cart, designed by Greta Grossman, holds liquor bottles in place for traveling with a stainless steel bracket on a tilting panel. Upper and lower levels and pullout shelf are white Formica. Hooded brass casters, from Italy. $155.00.

↓**The Mengel Company's** extensive Wall-to-Wall group features the Extender, a Finnish walnut slab topped with marble-grained Formica which matches the group's other pieces; it may be used between two chests, or with one or two pairs of Extender legs, as a versatile addition to the storage pieces. Other units include chairs, tables, bookcase headboard and room divider, all designed by Raymond Loewy.

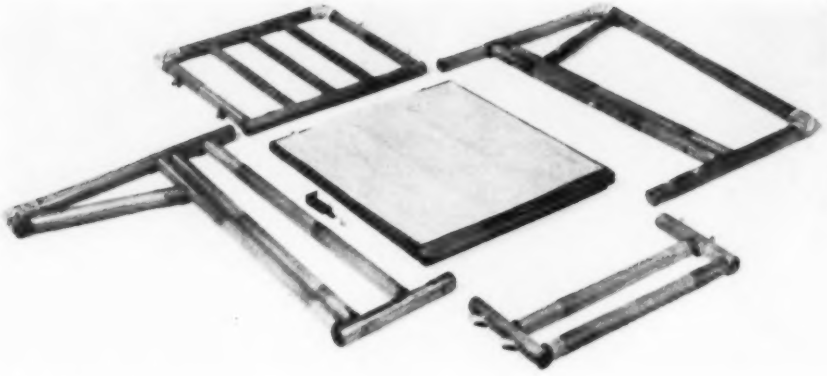
↑**Extensol Corporation** offers an idea for a double-duty sideboard console: the two center legs pull forward and, with the help of five 12″ fillers, form a dining table 40″ x 76″. Designed by Lubberts & Mulder. $275.00.

→**Dwight** of Grand Rapids is the first furniture manufacturer to use magnesium, a Dowmetal, finished in gold or pewter, for a light durable frame on its Drama line of casegoods. The bins are molded Masonite. Dresser, about $175.00.



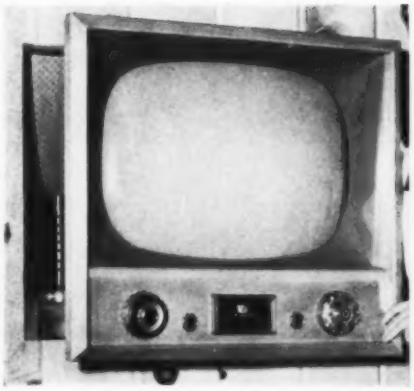
↓**Limpus Exclusives** offers a convertible sofa which becomes a bed when a third set of legs snaps down. The retaining spring at the center is a Danish "Flexo." Robert Limpus, design and mechanical patents. $260.00 in denim.

↑**John Stuart, Inc.,** uses Bankok teak for its sofa with removable arms. The brace detail is repeated on the exposed back support. Foam rubber upholstery has coil spring cores. Designed by Peter Hvidt and Molgaard-Nielsen. Approx. $305.00 in muslin.



↑**Willow and Reed** developed its K.D. rattan chair for easy export; it comes in a small carton requiring 60% less space, makes handling easier for the dealer. Its few basic parts can be assembled interchangeably into sofa, arm or armless chair. $89.00.

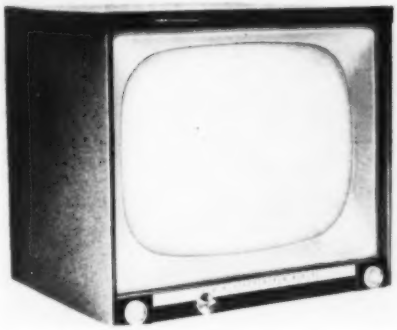
↑**Habitat Associates** has found the way to stability on a milking stool: a horizontal foot on the third leg of their Poplar stool. One half of the seat is sprayed in color; legs are sprayed light gray. 17½" high. $29.00.



↑**Hoffman Radio Corporation** is introducing a line of built-in TV sets for the do-it-yourself market; the chassis includes all parts except speaker, which is mounted on baffle with frame and grille cloth, ready for installation. A roller-and-truck installation of chassis is optional. $229.95.

↓**Hoffman Radio** suggests that outdoor viewing may be enjoyed with a sunshade attached to its 21″ table model, which comes in an informal tongue-and-groove case, mounted on a wrought iron TV cart. Styled by Joseph Portanova.

↑**Espey Manufacturing Company** introduces a low-cost high fidelity audio combination called the Overture: an acoustically baffled cabinet with a five-tube amplifier and three speakers. It may be used with any standard record player or tuner. 22″ x 13″ x 11″. $59.00.



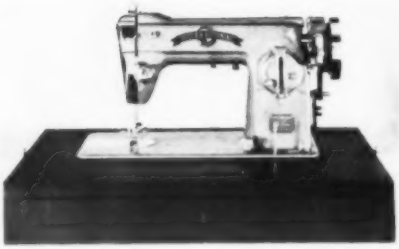
↑**CBS-Columbia's** new Century Line is offered as an economical alternative to heavier wood sets. Square cabinets designed by Paul McCobb have tight skins of coffee-colored Dura-Clad; new tuning dial sweeps fast or turns slowly; dials are bright red and yellow. $135.00.

↑**Tentenna,** made by Dynamic Electronics, is claimed to be the first truly electronic indoor TV antenna. It is equipped with 10 tuned self-adjusting circuits for VHF-UHF and color TV, and AM-FM radio. Transparent polystyrene case displays the mechanism at work; it can be suction-mounted to set or wall. In five colors, $4.95.

↑**Teleholder,** by American Homecraft, Chicago, snaps onto the phone without tools and automatically braces receiver against either shoulder. Adjustable foam-rubber covered shoulder piece fits all shoulder widths and slopes. $1.98.

←**Majestic Radio's** Mini-Boy pocket radio adopts the lines and general arrangement of a pocket camera. 6¼″ wide, x 3½″ x 1½″, it weighs only 22 ounces, and features a slide rule tuner with stations visible along the top. $29.95.

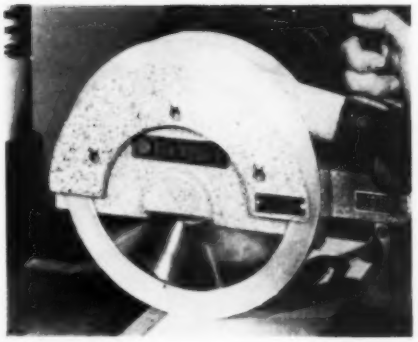
↑**Chrysler** dealer Bill Shadoff sponsored the Shadoff Special with modified Chrysler Fire-Power V-8 engine at Bonneville, Utah, where it "smashed national Class C speed and endurance records" with a new mile record of 248.26 mph. 6000 rpm, 14-1 compression ratio, 39 inches high, and 56 inches wide.



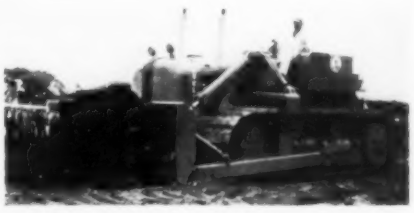
↑**International Sewing Machine,** a Japanese machine assembled here by Rodney Sewing Machine Corp., is now covered with a radio case, a cover in which a 4-tube radio has been installed. $279.50.

↓**Aerojet-General Corporation** offers the MiniSub, a 1 or 2 man craft driven by pedals or a 1 h.p. battery-driven motor. Molded of reinforced Fiberglas, with Styrofoam flotation blocks, it floods and dives to 150 feet, carrying 500 pounds, maneuvers well, attains 7.25 mph with motor. 13' long. At Abercrombie & Fitch. $4,850 up.

↓**Burroughs'** new ten-key adding machine was smoothly housed by George Walker in die-cast aluminum electrostactically finished with a mat amber-gray paint (Acme). Keys are gray, bars and trim brown. Prices from $300.



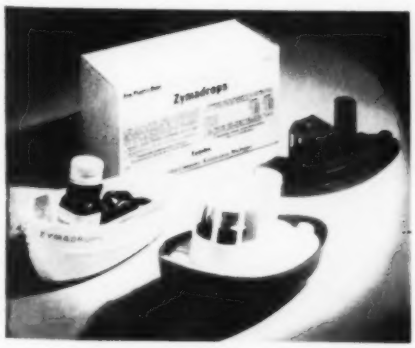
↑**DeWalt's** newest radial arm for the small workshop develops 1½ h.p. and cuts to 3 inches. Multicolor finish has replaced old dark green. The new saw guard (above), offered as optional equipment, consists of two rings suspended above the blades without springs.



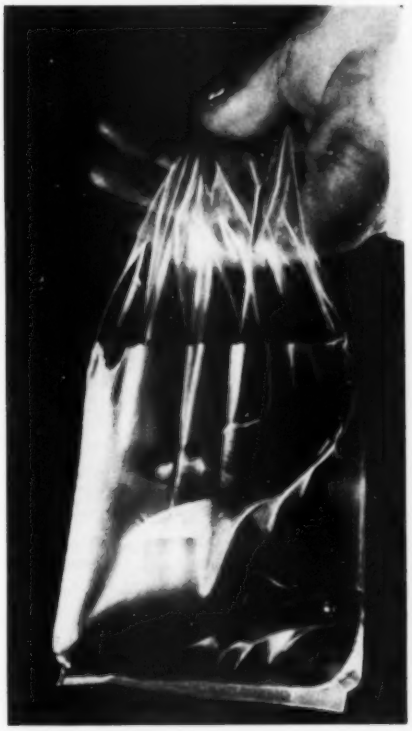
↑**Euclid Division** of General Motors initiates a new line of heavy equipment with a crawler tractor that uses two diesel engines to develop 380 h.p., said to be twice that of any other tractor in production. Flexibility and traction are increased by the machine's split construction: power is transmitted through two separate drive and track assemblies, which oscillate freely on a transverse shaft. 8 feet high, 26 tons.

↑**Comark Plastic Division** (Cohn-Hall-Marx) and Monsanto are joint authors of an all-purpose no-tool surface of vinyl film with adhesive backing. 18" wide film is backed with paper printed with measuring grid and directions, which peels off to expose adhesive. Adhesion improves with time; can be lifted and reset, cleaned with soap and water. Light gauge makes joints invisible. Except for steely endpaper marble, patterns are standard. 59c a yard.

↑**E-Z Glazing Supply Company** decided that mirror hangers were having a hard time getting mirror clips and screws that fit, so it packaged its EZ plastic clips with four proper screws. Box, 29c.



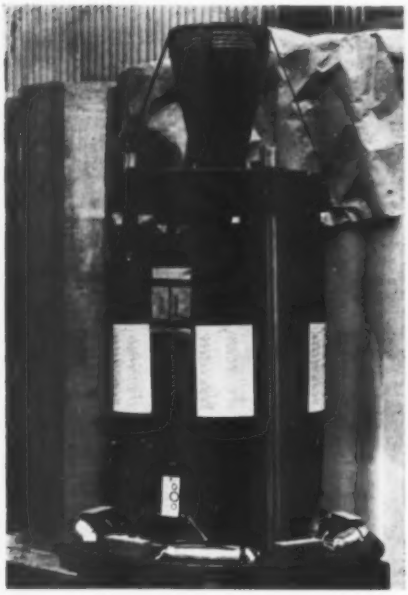
↑**Upjohn** hides samples of Zymadrops, an all-purpose vitamin largely for children, under snap-off superstructure of red and white styrene tub-tug designed by Painter Teague and Pettertil. 2,000,000 have not satisfied demand so far.

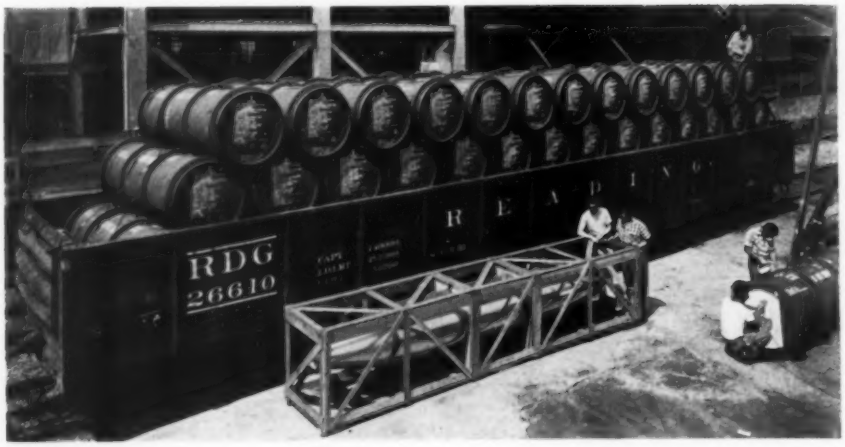


↑**Bemis Bros.** sells polyethylene bags to aquatic nurseries, which pack them with the customers choice of fish and a helping of water, turn over the top and close it with a rubber band.

↓**Philip Morris** heralds two new styles of Marlboro now in limited distribution with two new packages. The long-size cork-tip comes in the flip-top package below; the king-size ivory tip comes in the new PM snap-open package. Both packages in red, white and blue by Frank Gianninoto and Associates.

↓**Pro-phy-lac-tic** packs a fleet of three toothbrushes in a fleet of ships—aircraft carrier, transport, and submarine—vacuum formed of Celanese acetate sheeting. Sold separately or $1.00 per fleet.





↑**Royal Jet, Inc.,** Alhambra, California, developed an improved system for packaging its jet wing tanks for shipment. Formerly shipped assembled in the crate shown above, tanks are now shipped ready for assembly, 6 to a steel tank can; 252 can be carried in a car which held only 18 crates. Wing tanks are loaded by a tight packing and nesting technique; the small parts assembly, left, fits into nest of larger sections before being inserted into can. Assembly on arrival takes 90 minutes.

↑**Plas-Tex Corporation,** Los Angeles, has wrapped its Lustrex molded mugs and plates in a new "tote bag" of cotton mesh for trips and picnics. Sack may also be used as beach or book bag. Set of 4, $2.98.

↑**Cleveland Dowel Pin Co.** puts its wood dowels in a compact retailing kit. Six cartons fit into wire rack, displaying 296 dowels in 1 foot of floor space; sold-out sizes may be re-ordered individually.

↑**Molson's Brewery's** new Crown and Anchor beer, just introduced in Canada, needed an especially recognizable trademark label, since law forbids reproduction of whole bottles in advertising. Lippincott & Margulies, designers.

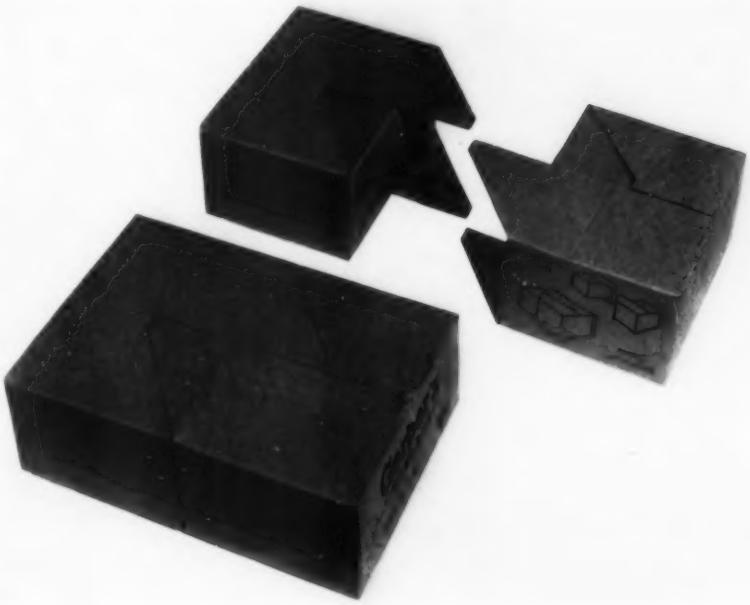
→**Campbell's** soups are being marketed in frozen forms. Lippincott & Margulies have designed the container horizontally, to be readable in store freezer bins and to remind the housewife that it is no ordinary can.

↑**Bradley Container Corporation** uses Bakelite polyethylene to make squeezable tubes to dispense food, drugs and liquids in small controlled drops. Walls of varying thickness and spring-back can be produced by patented extrusion process. From 4cc. to 32-ounce capacity, tubes are printable.

↑**Crystal Research Laboratories** offers a brake fluid dispenser featuring two measuring scales. One printed scale indicates the amount inside the polyethylene bottle in a normal position; another shows the amount being dispensed with the bottle inverted.

→**Standard-Toch Chemicals, Inc.** is leasing its automatic paint carousel to solve dealers' inventory and merchandising headaches. Code numbers from color chips are set on the six dials; electronic controls mix the exact shade in desired quantity and quality from 12 tint pastes and 3 base paints. Developed and designed by Raymond Spilman.

↓**Hinde and Dauche** simplifies the case-breaking problem with an Interlock Box—actually a multiple pack consisting of two or more individual boxes joined by interlocking arms and glued. When cut apart each package is a sealed section.



↑**Munray Products'** Peel-Kote, an invisible package which is sprayed on and peeled off, protects high polished or plated materials or industrial parts, as well as equipment, cutlery, gifts, furniture. A refinement of military spray-on plastics, it has high degree of elasticity, abrasion resistance, and can be furnished in four colors.

General Electric's concept of a future television receiver using flat "POW" screen.

Flat screen television

The gigantic size of the television tube which is needed to produce a picture of reasonable size creates a well-known problem for the designer of television equipment. Since this tube contains mainly empty space, it seems reasonable to expect a more compact and manageable mechanism to appear. Various projection systems have been proposed but all, so far, have proved impractical. General Electric now announces that the problem might be solved within the next decade by a technique that is now being developed for military use.

In the plotting of aircraft locations in military filter centers, planes are located manually, with pins or crayon marks, by plotters who get their data from radar screens. Equipment now under development will be able to convert this radar data electronically into a visual display on a large luminescing screen. This plotting board screen will be a "space matrix" of closely spaced perpendicular wire grids. Currents applied to the appropriate wires will produce glowing points at the wires' intersections. In principle, there is nothing to prevent the use of this technique to build up a mosaic of light points that could make up a television picture. If it were done, the television screen would become a flat plane with electronic equipment arranged around its perimeter, or even completely remote from it. The picture itself could be hung on a wall if desired, hence the designation "POW" (for "picture on the wall") which General Electric has attached to the idea. The unit illustrated is a conjectured design for a television set using this principle—only a dummy to hint at what may be expected in this direction in the future.

Source:
General Electric Electronics Laboratory, Electronics Park, Syracuse, N. Y.

Gelled paints

Paints made with a new thixotropic alkyd vehicle called "Burnok" will have the consistency of jelly, yet will brush as easily and smoothly as conventional paint. Any oil base paint, flat or glossy, can be made up with the new ingredient, and will not settle nor require stirring at any time. Although the paint is too thick to pour (so cannot be spilled from the can) it flows under the friction of the brush and will cover as well as conventional paint. It can be brushed, rolled or sprayed, but the non-running, non-dripping characteristics of the paint are most important in brush painting.

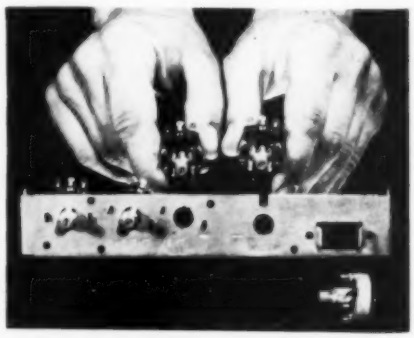
Paints using the new alkyd will be primarily aimed at the "do-it-yourself" painter to whom the neatness of application will be a boon. The manufacturer predicts that Burnok products will eventually replace all conventional paint vehicles.

Manufacturer: T. F. Washburn Co., Chicago, Illinois

Snap-in controls

The cost of assembling electronic equipment (including television sets) can be reduced by the use of potentiometer controls with a new type of mounting. Centralab "Snap-Tite" model 2 controls are installed in a chassis by pushing them through the mounting hole with one hand so that spring clips grip the chassis and hold the control firmly. In assembly line production, the controls can be installed with both hands, two at a time. The new controls will fit standard mounting holes punched for the conventional bushing, or twist-tab mounted controls. They are made in standard resistances and tapers.

Manufacturer:
Centralab Division, Globe-Union Inc., 900 East Keefe Ave., Milwaukee 1, Wisconsin.



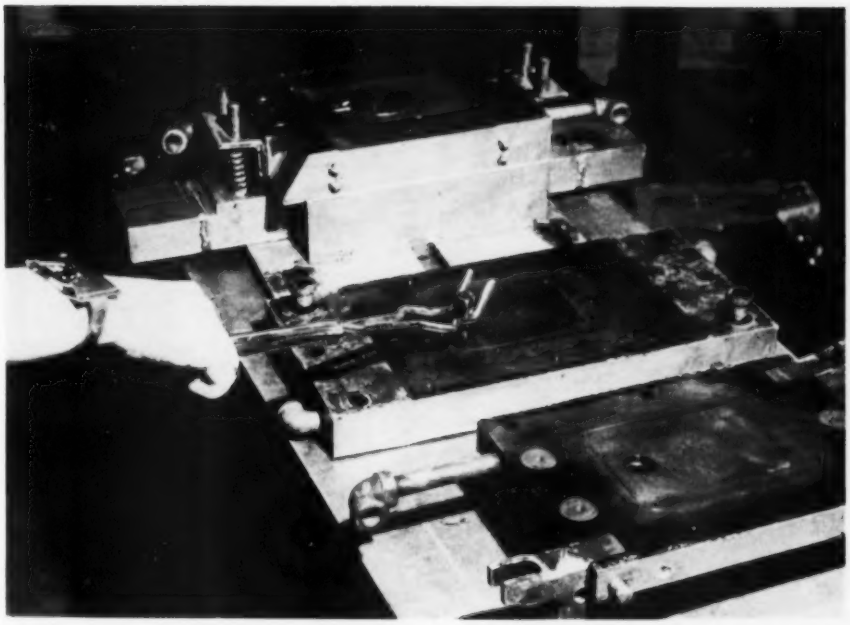
"Snap-Tite" controls are mounted in chassis by pushing through punched hole.

Atomic application

Radioactive materials are aiding General Electric research in the development of plastic molding compounds. Molds are eroded by plastic compounds at a rate so slow that it is very difficult to measure, yet this tendency to erode the mold is a characteristic of the plastic that must be investigated and checked as new molding compounds are developed. By the new technique it is possible to detect erosion which leaves one part of metal in twenty million parts of plastic. The data gained from this method has already helped improve molding compounds considerably.

In detail, the technique requires the preparation of a special sprue bushing which is irradiated in an atomic pile. The bushing is then inserted in a standard transfer mold. The mold is heated and the material under test is forced through the bushing under heat and pressure. The slug formed in the mold is then removed and, by measuring the radioactivity imparted to it, it is possible to calculate the amount of metal eroded from the bushing. Variation in the amount of metal eroded, of course, reflects the erosive powers of the molding material.

Manufacturer:
General Electric Chemical Materials Department, Pittsfield, Massachusetts.



Placing an irradiated bushing in a transfer mold in new mold erosion testing technique.

Nuclear laundry testing

Another peaceable application of atomic techniques is similar to that described above. In both cases, radioactive material is used to measure minute quantities, helping to locate materials present in amounts so small that conventional weighing or measuring would be next to impossible. The Bendix Home Appliance division is using radioactivity to test its own and competing automatic washers. A certain amount of radicactive soil is placed in the washer on a standard swatch. After a washing cycle, a geiger counter instrument measurement of radioactivity gives an accurate comparative measure of the washing machine's effectiveness in removing soil. Similar techniques would certainly be suitable wherever it is necessary to measure very small residues after an operation that removes the bulk of a material.

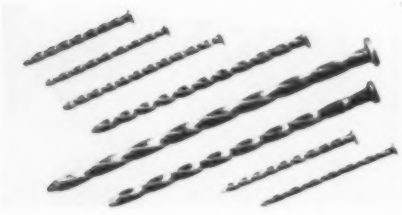
Manufacturer: Nuclear Instrument and Chemical Corp., Chicago, Illinois

Automatic laundries being tested by Bendix.

Dow Corning 400 gum, a basic ingredient for synthetic rubbers.

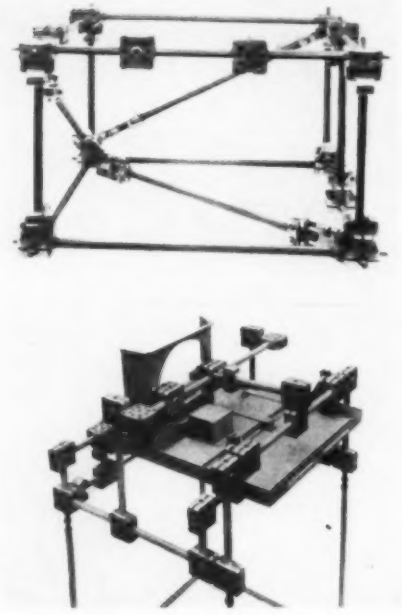
Silastic gum

Dow Corning 400 gum, a polymer, can be compounded with a wide variety of fillers and vulcanizing agents to produce a variety of silicone rubbers. The gum itself is clear, uniform and non-toxic. Heating a blend of the gum with organic vulcanizing agents converts the mixture into a resilient mass; the selection of inorganic fillers and additives determines the physical properties of the finished material. This gum is one of the basic polymers used in Dow Corning's silastic rubbers, available separately for the first time. Full technical information on the formulation of various materials based on the gum is available from the manufacturer.
Manufacturer: Dow Corning Corp., Midland, Michigan



Threaded nail

The trade name "Ardox" refers to a threaded nail now in production in Canada. An ordinary nail is obviously a rather crude holding device depending for its grip on friction along its smooth sides. Various kinds of ribbed and twisted nails have been developed, but their cost has always been high enough to discourage their general use. The Ardox nail is manufactured by a new process which makes the threaded shanks by the same kind of continuous mass production that is used for common nails, and at comparable cost. There is every reason to believe that the straight, common nail will be replaced by the threaded nail since its action, more like that of a screw, gives greater holding power, reduces the tendency of wood to split, and requires less driving force.
Manufacturer: Steel Company of Canada, Ltd., Hamilton, Ontario



Large jigs and fixtures made up from Wharton "Unitube" system.

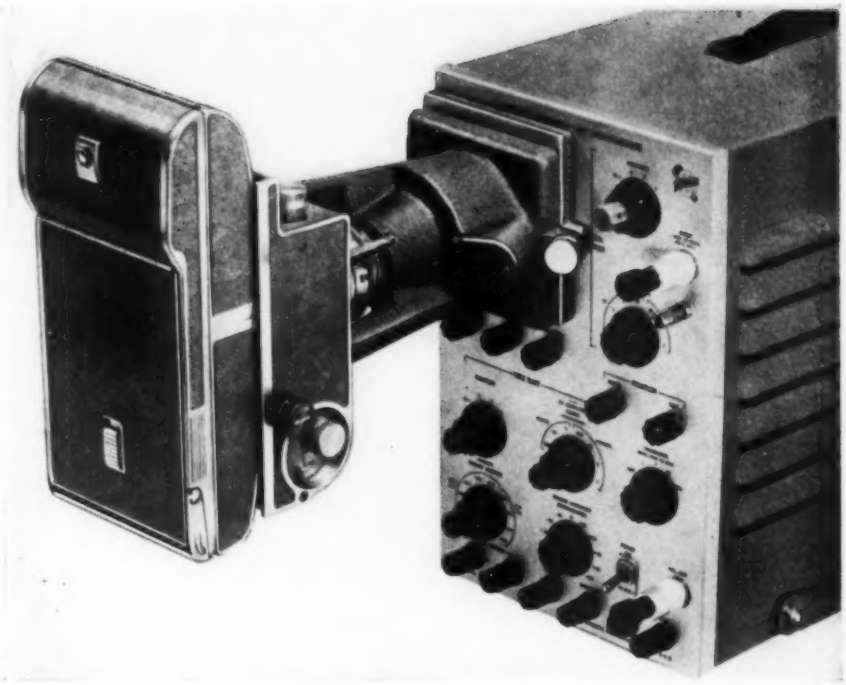
Jig system extended

The Wharton system of jigs and fixtures, described in this department in the last issue, now includes a range of larger components extending its application to large assembly jigs, welding and pipe-bending fixtures, supporting structures and similar assemblies. The new group of components is known as the "Unitube System" and consists of a basic kit of 323 parts plus 500 feet of octagonal tubing. The system, in general, enables you to build up any kind of structural assembly in Tinkertoy fashion. The joint elements are split "sandwiches" held together with socket head screws so that structures may be set up using frictional grips only. Provision is made for pinning the parts together with special taper pins for more permanent assembly. The octagonal shape of the tubing eliminates any possibility of rotational slippage. The joint elements can anchor from two to six tubes. Diagonal struts are also provided and can be attached to the typical joint assembly with pins to permit any required amount of bracing. There are also a number of special-purpose joint units permitting the assembly of circular structures and permitting the hinging of parts so that any part of a fixture can be constructed to move freely. As with the basic jig system, the advantages of the "Unitube" system are the versatility and reusability of all its parts, and the time saving that it offers in the construction of complex fixtures. Tools that require 40 to 60 hours to construct with conventional welding techniques can often be duplicated in 2 to 4 hours with "Unitube." The manufacturer states that the first cost of the system is usually recoverable in work saving after the first 35 to 50 fixtures have been built.
Manufacturer:
Wharton and Wilcocks of America, Inc., 17 Battery Place, New York 4, N. Y.

Silicone adhesive

Dow Corning A-4000 is a silicone suitable for bonding silicone rubber to itself, to aluminum, magnesium, stainless steel, or butyl or saran rubber. After blending with 2.5% of catalyst, a film of the adhesive is brushed on to the materials to be bonded and allowed to dry until tacky. The parts are joined and allowed to cure without heat. In 24 hours good strength is developed and maximum strength builds up in three to seven days. Strength of bond is generally better with extruded than with molded rubber parts. A peel strength of 15 psi can be obtained between aluminum and extruded Silastic, 9 psi with molded silicone rubber. The bond in both cases has heat and creep resistance at temperatures up to 100° C.
Manufacturer:
Dow Corning Corp., Midland, Michigan

Silicone adhesive holds rubber to aluminum with excellent peel resistance.



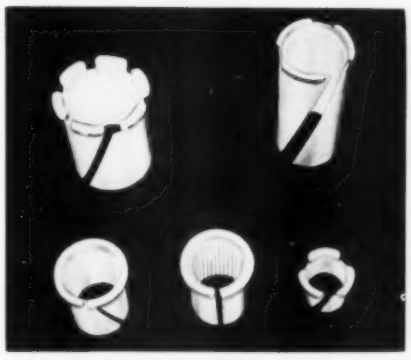
Oscilloscope camera to produce instantaneous prints by Polaroid Land system.

Oscilloscope camera

The Polaroid camera fast-print principle is the basis for a new Recordoscope unit for documenting the traces on the screen of a cathode ray oscilloscope. The camera can be fitted to any 3" or 5" scope and gives a full size picture of the 3" screen, or a half size image of the 5" screen, delivering a print in 60 seconds. The shutter may be operated manually or by cable release or by a remote electrical control switch. The camera is equipped with a special f 2.3-67.5 mm lens in a shutter having speeds from 1 to 1/100 seconds, "time" and "bulb."
Manufacturer:
Aremac Associates, 329 Washington St., Pasadena 3, California

Nylon bearings

Flange type Nylon bearings are in quantity production under the name "Nyliner." The low friction characteristics of nylon, which can eliminate lubrication needs and reduce bearing wear, have made Nylon a popular bearing material. In these bearings there is a compensation gap which permits the material to expand and contract under the effects of heat and moisture changes without appreciable change in the bore diameter. The Nyliner bearings are flanged to permit the bearing to carry end thrust if necessary, and to provide a simple means of bearing retention. For most purposes an interrupted or clover-leaf flange is recommended to discourage distortion of the bearing which might result from the gradual release of internal stress in the flange. Continuous flanges are also available. Either type of flanged bearing can be provided with an anti-rotation lug under the flange to engage a notch or slot. In addition to standard sizes, Nyliner bearings can be made up to special design with very moderate tool costs.
Manufacturer:
Thomson Industries, Inc., Manhasset, N. Y.



High-heat aluminum painting

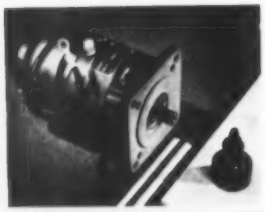
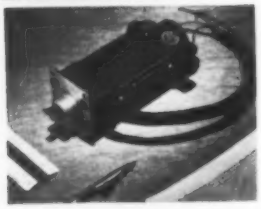
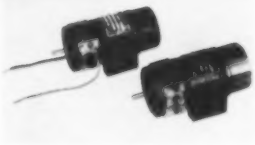
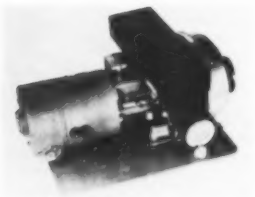
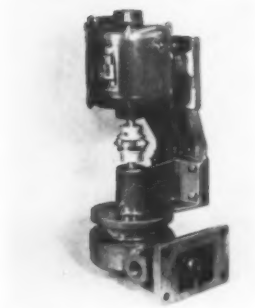
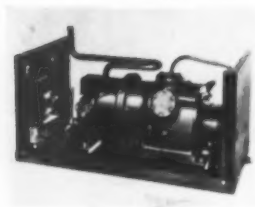
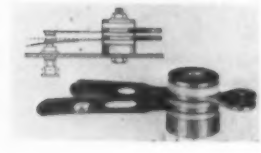
After extensive preliminary testing, Reynolds Metals Company has found a method of aluminum painting that is satisfactory for exhaust stacks where temperatures rise as high as 1100° F. A gray prime coat was applied to the stacks being tested, and they were put in use immediately after the application; after 24 hours, the engines using the stacks were shut down and the final coat of paint, a silicone resin combined with aluminum pigment, applied. The stacks were then immediately returned to use. In two years the stacks have required no maintenance and the condition of the paint remains excellent. Sandblasting prior to the prime coat is the most satisfactory method of cleaning. Some spilling of the paint may occur when only wirebrushing is used. For this particular use, a 90-day paint life would be considered normal, so that the life of more than two years is particularly noteworthy.
Manufacturer:
Reynolds Metals Co., 2500 S. Third Street, Louisville, Kentucky

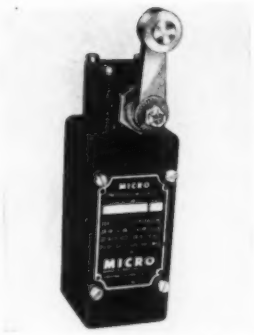
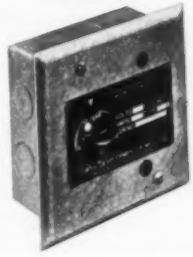
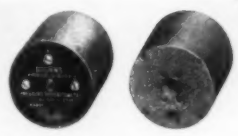
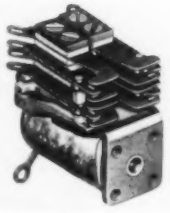
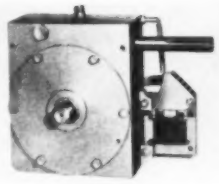
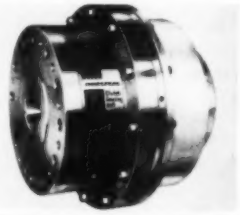
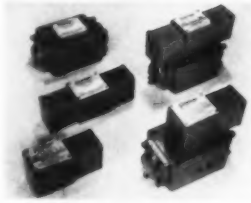
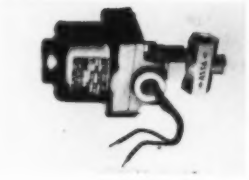
Diesel exhaust stacks painted with heat-resistant aluminum paint.

Tube connector

A new method for attaching parallel tubes is simple, strong and leaves no exposed fastener parts. A special headed stud is welded to one of the tubes to be joined. The other tube must have a punched hole through which the stud is passed. A special spring clip is then passed into the second tube from the end until it reaches and catches the stud. Spring tension holds the tubes together tightly and permanently. A single joint of this kind can act as a pivot; two or more joints connect the tubes so that no movement can take place. The tubing may be any shape; in fact the method can also be used to connect flat plates to tubes, or to connect flat plates together. The connector is intended for dinette furniture and similar products.
Manufacturer:
Nelson Stud Welding Division, Gregory Industries, Inc., Lorain, Ohio

Technics: a quick guide to specialized products and components

	Name	Purpose	Manufacturer
	Dalmotor SC-5	High torque drive motor with ±6% speed regulation.	Dalmotor Co., 1380 Clay Street, Santa Clara, Cal.
	Dalmotor SR-43	Compact intermittent duty actuator motor with clutch brake.	Dalmotor Co., 1380 Clay Street, Santa Clara, Cal.
	Instrument motor	PM motors or tachometer generators for 6-27 volt instrument service.	Instrument Motors, P.O. Box 5, Acosta Street, Stamford, Conn.
	Genie-Mite	Compact 6-7.5 volt gasoline powered portable electric power source.	Allied International Inc., 230 Park Ave., New York 17, N. Y.
	Centrifugal pumps FB-VBA and F-VBA	Continuous or intermittent pumping, particularly in machine tool accessories.	Pioneer Pump Div., Detroit Harvester Co., 14300 Tireman Ave., Detroit 28, Mich.
	Condensing unit SCYC	Condensing unit for small air conditioning or industrial cooling applications.	Worthington Corp., Harrison, N. J.
	Sub-miniature three-position toggle switch	For switching service where extreme compactness is necessary with load up to 4 amps.	Micro Switch, Freeport, Ill. (Div. of Minneapolis-Honeywell)
	Stemco Tip-Off switch	Safety switch to cut off heaters and other small appliances on overturning.	Stevens Mfg. Co., Inc., Mansfield, Ohio.

	Name	Purpose	Manufacturer
	Limit switch 51MLi	Limit switch for heavy-duty industrial applications.	Micro Switch, Freeport, Ill. (Division of Minneapolis-Honeywell)
	Speed control for shaded pole motors	Three speed control for fans, heaters and air conditioners up to 3 amps.	Curtis Development & Mfg. Co., 3266 N. 33rd St., Milwaukee 16, Wisc.
	Model 408 R absolute pressure potentiometer	Pressure measurement in aircraft instrument applications.	Bourns Laboratories, 6135 Magnolia Ave., Riverside, Cal.
	TQ miniature relay	Telephone type DC relay for limited space installations.	Advance Electric & Relay Co., 2435 N. Naomi St., Burbank, Cal.
	Solenoid controlled clutch	Machine stopping and starting in as little as ¼ revolution.	Anderson Bros. Mfg. Co., 1907 Kishwaukee St., Rockford, Ill.
	Clutch-coupling unit	Over-running clutch for dual drive and alternate power applications.	Formsprag Co., 23601 Hoover Road, Van Dyke, Mich.
	Directional control valves	Directional control of fluid in hydraulic systems at pressures up to 2000 psi.	Parker Appliance Co., 17325 Euclid Ave., Cleveland, Ohio.
	Asco solenoid valves 8268 and 8269	Solenoid operated valves for corrosive gases and liquids.	Automatic Switch Co., 391 Lakeside Ave., Orange, N. J.

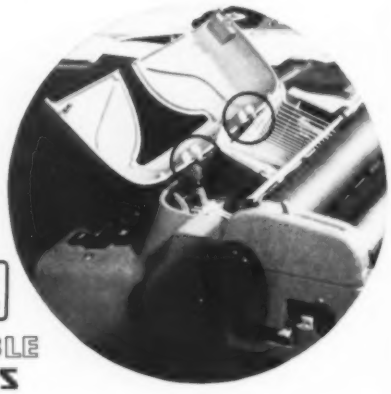
ANOTHER
Dream design

BROUGHT TO REALITY BY THE AID OF
"THE HINGE THAT HIDES ITSELF"

the SOSS Invisible Hinge

THE PROBLEM: To hinge the top of a typewriter and still maintain the smooth, streamlined, modern styling that the public finds so appealing.

THE SOLUTION: The IBM designers solved this problem quickly and easily by using the SOSS INVISIBLE HINGE—"the hinge that hides itself."



SOSS
INVISIBLE
HINGES

THE SOSS HINGE is the only hinge that remains completely hidden from view when doors and lids are closed. You'll find it extremely useful for modernizing and streamlining any type product requiring hinges. You'll find, too, that the SOSS HINGE will speak well of your good taste and wise counsel.

We invite you to consult with our engineers on any of your hinging problems.

For complete information and FREE Blue Print Catalogue, write to:

SOSS Manufacturing Company
21725 Hoover Road, Detroit 13, Michigan

Technics (*Continued*)

Rate-grown transistors

The progress of the transistor in supplanting the vacuum tube has been delayed by its extremely high cost. The fine parts of the transistor, and particularly its germanium element, are expensive because there has been no practical method for quantity production. General Electric is now making transistors by a process which begins to approach quantity production: a solid bar of germanium is lowered into a crucible of molten germanium; as it is pulled out the molten germanium adheres to the bar, forming a cylindrical ingot containing about 4 oz. of germanium. The ingot is then split into strips, and finally "diced" into tiny bars, each ingot producing about 2000 transistor elements. Attaching the leads to the element must still be done by hand, but automatic machinery is being developed to do this too. The process is expected to lower the cost of the transistor to $2 to $4 per unit.
Source: General Electric Co.,
Electronics Division, Electronics Park, Syracuse, N. Y.

Flexible molds

Small parts can easily and cheaply be cast with simple equipment, and a vinyl base plastisol mold, by a process developed by the Houghton Laboratories, Inc. of Olean, N. Y. The finished castings are Bakelite C-8 epoxy resins, light in weight, with considerable sheer strength, shock resistance and good dimensional stability.

The part to be reproduced is placed in a container and the plastisol is poured around it to form an envelope about ¼" thick. This is cured at 350° F. for 15 to 20 minutes; the part is then snapped out of the flexible mold, leaving a cavity. The casting resin mixed with the appropriate catalyst is poured into the cavity and allowed to set for several hours while air bubbles work out. After a short baking at low temperature, it is ready to be popped out of the mold. A single mold will produce an average of five parts. Tolerances can be kept within ±.005". A gallon of plastisol sufficient to make at least 100 molds costs about $10, or about two cents for each part. Parts with undercuts can easily be made in the simple molds since flexibility makes removal easy. The process is particularly suited to the making of prototype and experimental parts and models. The C-8 epoxy resin is also suitable for use in potting electrical assemblies.
Source: Houghton Laboratories, Inc., Olean, N. Y.

Aluminum coating

It is now possible to enamel-finish aluminum awnings. A recently developed technique opens the way to roller-paint aluminum strips in a continuous process with a strip speed of over 60 feet per minute. The strip passes through an alkali-emulsion cleaning with "Ridoline-Ridosol," a clean water rinse, an "Alodine" protective conversion coating, a clean water rinse, a final "Alodine" rinse and finally, drying and painting. The strip is roll-formed after painting without damage, and the finish will stand up under the worst weather conditions.
Source: American Chemical Paint Co., Ambler, Pa.

Flexible ceramic coatings

A new family of flexible ceramic coatings has been developed by the Armour Research Foundation. Called "solution ceramics," the coatings are liquids which form a brick-like surface on metals, ceramics and other materials. One of the chief innovations is that these ceramics, which can be applied in spray form, are not brittle, so that they permit sheet metal to be stamped after coating. They may be

applied to almost any clean surface, and require only a few hundred degrees Fahrenheit for baking. Thickness of the coatings may be controlled accurately, from .01 inch down to a few millionths of an inch. Highly resistant to chemical attack, solution ceramics have excellent adhesive qualities, but are not scratch-resistant and are not a replacement for other baked enamels in this respect. Numerous uses are foreseen: high temperature coating for electrical wires, foundry coatings, and decorative surfacing for ceramics, tile and glass. The process will be made available to industrial firms through license agreements.
Source: Armour Research Foundation, Illinois Institute of Technology, Technology Center, Chicago 16, Illinois.

Casting plaster

A new casting plaster for nonferrous metals is expected to solve a great many formerly insoluble problems. The new plaster, "Hydroperm," produces a mold that combines the smoothness of plaster with the permeability of sand. It is achieved by whipping the plaster to form interconnecting air cells about 1/100" in diameter through which steam and air escape when the casting metal is poured. The surface of the mold, however, is as smooth as that of a conventional plaster mold. The mixing and whipping of the plaster must be carefully controlled to insure sufficient cells of the proper size. The manufacturer is anxious to cooperate in development work using the new plaster and will provide samples, and demonstrate techniques and equipment for its use.
Source: United States Gypsum Company, Chicago 6, Ill.

High strength plastic

The strength characteristics of Fiberglas reinforced plastics are now available in a material designed for high volume injection molding equipment. Fiberfil Styrene-G has from five to nine times the impact resistance of the same plastic without Fiberglas reinforcing, and a tensile strength comparable to that of steel of equal weight. Extraordinary dimensional stability, thermal shock resistance and rigidity are also among its advantages. In most cases the new material can be molded in existing standard molds, as a replacement for weaker plastics now in use. Where new molds are being made, the manufacturer suggests that the Fiberfil technical department be consulted about designing molds which take maximum advantage of the new material.
Manufacturer: Fiberfil Corp., Warsaw, Indiana

Dowel joint data

Research done in England has given us new data on the effectiveness of doweled joints in wood construction. The most important findings, contradicting traditional views about wood jointing, have to do with tight wedging and length of dowels. Wedging, it was found, had no effect on the strength of joints as long as the glue was evenly and completely spread in the joint. Although the length of dowels did affect the strength of the joint, the increase in strength was by no means proportional to the length of the dowel, beyond a certain point it had very little effect on strength. The effects of moisture content of the wood on the strength of joints, turned out to be important only with animal glues, and not with modern synthetic resin adhesives.
Source: Furniture Development Council, 11 Adelphi Terrace, London W.C.2, England.

whether art or architecture...

Century's #365
recessed adjustable downlight
with 55-degree spread lens
plus Century's calculations
as to position, number
and spacing of units
equals ENGINEERED *lighting*
of all plane surfaces.

Century Lighting, Inc.
521 West 43rd Street
New York 36, N. Y.

626 North Robertson Blvd.
Los Angeles 46, Calif.

ELECTROFORMING!

Opens New Fields

FOR

Design in Plastics

- **TEXTURES**
- **DEEP SECTIONS**
- **MICROSCOPIC DETAILS**

New electroforming techniques permit the use of this process for making of parts of plastic molds. This brings increased scope to the designer of plastic products. Molds for plastics can now be made *directly* from masters or models, picking up every microscopic detail. Every detail of texture is reproduced in the plastic mold. Greater accuracy can be achieved in irregular shapes.

Send for bulletin which gives many other advantages of electroforming.

ELECTROMOLD Corp.

142 ENTERPRISE AVE. TRENTON, N. J.

Electroformed Moulds for Plastics

Manufacturers' Literature

Aluminum. Reynolds Metals Co., 2500 So. Third Street, Louisville, Ky. 220 pp., ill., charts. The 1954 edition of The Aluminum Data Book has been issued by Reynolds. It offers complete and detailed information on the properties and characteristics of aluminum, easily located with the thumb-indexed system.

Color Trends. Monsanto Chemical Co., Plastics Division, Springfield 2, Mass. 8 pp. Monsanto's Color Consultant, Faber Birren, has prepared a Research Study on American color trends in home decoration.

Control Centers. The Clark Controller Co., 1146 East 152nd Street, Cleveland, Ohio. 28 pp., ill., charts. Interchangeable compartments for the housing of electrical motor control systems with information about installations.

Dispersions. Acheson Colloids Co., Port Huron, Michigan. 10 pp., ill. A discussion of the products and processes aided by dispersions, with a centerfold table of 40 basic dispersions and their carriers.

Extruded shapes. Allegheny Ludlum Steel Corp., 2020 Oliver Building, Pittsburgh, Pa. 4 pp., ill. A description of new hot extruded shapes in stainless, tool steels, high temperature alloys, and other steels.

Flock. Cellusuede Products, Inc., Rockford, Illinois. Two booklets (10 pp. and 12 pp.), and a sample color card provide full information about the cotton, rayon hair and acetate flocks manufactured by Cellusuede products.

Furnaces. Eclipse Fuel Engineering Co., Rockford Illinois. 4 pp. A catalog about Eclipse gas-fired oven furnaces. Details of construction are illustrated.

Fusible Alloys. Cerro De Pasco Corp., 40 Wall Street, New York, N. Y. 60 pp., ill., charts. A loose-leaf folder on the industrial applications of Cerro's low temperature melting alloys.

Garages and Carports. Small Homes Council, University of Illinois, Urbana, Ill. 4 pp., ill., 10 cents. A folder of recommendations for garage planning and construction.

Hardness tester. Barber-Colman Company, Rockford, Illinois. 2 pp. A catalog sheet on the Barcol Impressor, a portable hardness tester for soft metals and plastics.

Hermetic Terminals. Fusite Corp., 6000 Fernview Ave., Cincinnati, Ohio. 19 pp., ill. A catalog of the glass-to-steel Fusite terminals that can be soldered or welded into a container to provide a one-piece seal, insulation and current-carrying electrodes.

Hydraulic Components. Wisconsin Hydraulics, Inc., 3165 North 30th Street, Milwaukee, Wis. This firm's motors, gear-type pumps, valves, cylinders and valve and pump combinations are presented, together with operating pressures and dimensions, in convenient chart form.

Injection Molding. F. J. Stokes Machine Co., Philadelphia, Pa. 4 pp., ill. This bulletin gives details of construction and operation, and various production economies accomplished by the new Stokes injection molding machine.

Laboratory Furniture. Metalab Equipment Corp., Hicksville, L. I., N. Y. Metalab's line of sectional laboratory furniture, equipment and accessories is described in a new 180 page catalog; or briefly, in a 12 page pamphlet. They also offer a laboratory planning kit.

Magnetic Electrodes. Electronic Processes Corp., 1124 San Antonio Road, Los Altos, Calif. 2 pp., ill. Information about the Ectromag magnetic electrode, designed for packaging-machine applications and to permit high-frequency welding of large-area plastic sheets.

Manufacturers' Literature *(Continued)*

Metal Coatings. Office of Technical Services, Commerce Dept., Washington 25, D. C. A comprehensive nine-volume guide to techniques of depositing metal coatings on non-metallic materials has been published by the Business and Defense Services Administration. Booklets range from 14 to 138 pages. Volumes on copper, nickel, lead sulphide, gold and other types of metal films are $1.00. The publication on silver films costs $2.00.

Metallized plastic sheetings. Gomar Manufacturing Co., 79 Paris Street, Newark 5, N. J. 3 pp. A technical bulletin on the uses and applications of metallized thermoplastic sheetings, including all phases of the vacuum forming process.

Neoprene. Rubber Chemicals Division, E. I. du Pont de Nemours & Co., Inc., Wilmington, Delaware. Neoprene Notebook No. 60 discusses liquid Neoprene coatings, Neoprene belts, and the performance histories of specific Neoprene products.

Plastic. Dow Chemical Company, Midland, Michigan. Dow offers a technical data bulletin on their recently developed Styron 647, a light-weight stable polystyrene plastic for the lighting field.

Rivets and Riveting Tools. Hi-Shear Rivet Tool Co., 8924 Bellanca Ave., Los Angeles, Calif. 24 pp., ill. Charts show recommended rivet guns and squeezers; full information about each tool set follows.

Plastics. Cadillac Plastic Co., 15111 Second Ave., Detroit, Michigan. 33 pp., ill., charts. A catalog of Cadillac plastics, with prices and sheet sizes. Plastic rods and tubing are also offered.

Sound Control Product. Owens-Corning Fiberglas Corp., Toledo 1, Ohio. Booklet AC6.A1. 31 pp., ill., charts. Complete data on Owens-Corning's entire acoustical line provides a one-volume reference on all Fiberglas Sound Control Products and installation system.

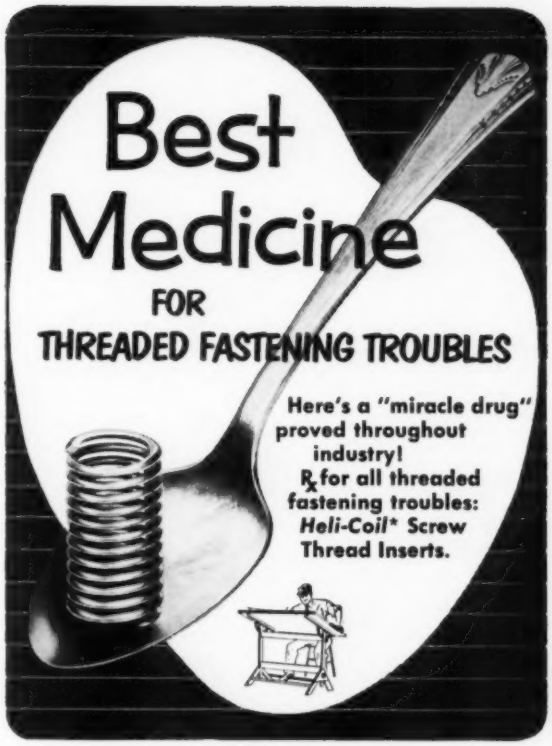
Steelmaking. American Iron and Steel Institute, 350 Fifth Avenue, New York, N. Y. 20 pp., ill. 25 cents. An easy-to-understand description of the iron and steelmaking process, explained in a series of illustrated flow charts on each of the industry's important operations. Reprinted from Steelways magazine.

Books in Brief

Metals Engineering-Design. Edited by Oscar J. Horger. 400 pages, 7" x 10", 560 illustrations. Published by McGraw-Hill Book Co., Inc., New York, N. Y. $10.00
This handbook, sponsored by the Metals Engineering Handbook Board of the American Society of Mechanical Engineers, provides engineering information on hundreds of metals and alloys, interpreted for the designer.

Plastics Engineering Handbook of the Society of the Plastics Industry, Inc. 850 pages, illustrated, with diagrams, charts and tables.
Reinhold Publishing Corp., New York, N. Y. 1954. $15.00
This new edition of the original SPI Handbook published in 1947, nearly twice the size of its predecessor, is a complete compilation of knowledge on the design and manufacture of plastics products.

Techniques of Plant Maintenance & Engineering—1954. Fifty-five diagrams, charts and tables. 291 pages. 8½" x 11". Clapp & Poliak, Inc., New York, N. Y. $7.50
This annual volume contains the proceedings of the Plant Maintenance & Engineering Conference, including papers read by 24 authors. Separate sections are devoted to chemical plants, breweries, food processing and packaging plants, paper mills, petroleum refineries, steel mills, textile mills, etc.



These 18-8 stainless steel or phosphor bronze ***Heli-Coil*** Inserts give you a minimum of 25% greater loading strength... your threads will *never* seize, corrode, or gall...you save space, material and money because you can use fewer, smaller, shorter fastenings and lighter, cheaper materials... and smaller bosses and flanges.

It will pay you to investigate the many advantages ***Heli-Coil*** Screw Thread Inserts offer. Write today for full information, free samples and, if you wish, the assistance of a ***Heli-Coil*** Thread Engineer.

***Heli-Coil* Inserts conform to official Military Standards MS-122076 (ASG) through MS-124850 (ASG) and others.**

*Reg. U.S. Pat. Off.

HELI-COIL CORPORATION
270 SHELTER ROCK LANE, DANBURY, CONN.

☐ Send samples and Bulletin 689—Military Standard Sheets.
☐ Please have a *Heli-Coil* Thread Engineer call.
☐ Send samples and catalog.

NAME _____ TITLE _____
COMPANY _____
ADDRESS _____
CITY _____ ZONE ____ STATE ____

Index to Advertisers In This Issue

Classified Advertisements

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

Positions Wanted

INDUSTRIAL DESIGNER *desires position with medium size firm with opportunity to apply sound design ability and experience to all phases from products through packaging, printed matter and displays. Result—highly integrated visual merchandising. Box ID-19,* INDUSTRIAL DESIGN, *18 E. 50th St., N. Y. 22.*

INDUSTRIAL DESIGNER *with versatile background, thoroughly experienced in development of commercial and household products, desires position with manufacturer or studio located in Chicago area. Box ID-17,* INDUSTRIAL DESIGN, *18 E. 50th St., N. Y. 22.*

PRODUCT DESIGNER—*Three years successful product, furniture design experience. Degree in Industrial Design. Age. 29, married, children. Desires position with manufacturer in Chicago area. Box ID-16,* INDUSTRIAL DESIGN, *18 E. 50th St., N. Y. 22.*

INDUSTRIAL DESIGNER *offers comprehensive personalized service, highly suited to challenging assignments calling for unique and creative design. Excellent experience in production and materials. University trained. Box ID-20,* INDUSTRIAL DESIGN, *18 E. 50th St., N. Y. 22.*

INDUSTRIAL DESIGNER—*9 years experience in all phases of product, design, development, engineering and model making. Excellent knowledge of die casting, metal working and plastics. Technical and executive ability to lead product from initial conception to production. Desires challenging position with manufacturer or design organization. Box ID-24,* INDUSTRIAL DESIGN, *18 E. 50th St., N. Y. 22.*

INDUSTRIAL DESIGNER—*Junior—9 years manufacturing experience as engineering draftsman—primary concern for experience in diversified design field. Pratt Institute evening student—presently industrial design. Box ID-21,* INDUSTRIAL DESIGN, *18 E. 50th St., N. Y. 22.*

INDUSTRIAL DESIGNER—*Responsible for all design and development phases of twenty succesful products currently in mass production plus several mass produced merchandising displays, also complete packaging line. Degree, Industrial Design, engineering background. Seeking challenging, permanent position with medium to large industry or established design office. Varied material experience, especially metal stamping, drawing. Age 29. Box ID-22,* INDUSTRIAL DESIGN, *18 E. 50th St., N. Y. 22.*

Help Wanted

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

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

Miscellaneous

INDUSTRIAL DESIGNER *with B.A. degree and 18 years of versatile experience in all creative fields of product designing interested in free lance designing on royalty or retainer fee. Box ID-15,* INDUSTRIAL DESIGN, *18 E. 50th St., N. Y. 22.*

PRODUCT STYLING—*An industrial dsign organization of long experience has opening for a new account. Complete design and product development coverage. Scope of work includes appliances, automobiles, decorative hardware, furniture, commercial interiors and offices, industrial equipment, testing devices, etc. Box ID-18,* INDUSTRIAL DESIGN, *18 E. 50th St., N. Y. 22.*

HUMAN ENGINEER—*Available on free-lance or retainer basis. Masters degree. Top Experience as human engineering advisor to leading design and consulting firms fitting consumer, industrial and military equipment and facilities to human user requirements. Box ID-23,* INDUSTRIAL DESIGN, *18 E. 50th St., N. Y. 22.*

DAYSTROM FURNITURE

is Granodized

WITH "GRANODINE"®

FOR EXTRA PROTECTION

Long noted for beauty in styling, Daystrom Furniture also boasts that its black and golden bronze Coloramic can take it. Here's why: sturdy metal parts are Granodized before painting.

Granodizing is a protective phosphate treatment that bonds Daystrom's exclusive Coloramic finish to steel. Beautiful Daystrom Furniture is truly built for a lifetime of rugged use.

CHEMICALS ACP PROCESSES

"GRANODINE"® anchors the finish.

Pioneering Research and Development Since 1914

AMERICAN CHEMICAL PAINT COMPANY

AMBLER, PENNA.

DETROIT, MICH. NILES, CALIF. WINDSOR, ONT.

NUMBER THREE IN A SERIES: CONTEMPORARY THINKING ON DESIGN

A distinguished Design Executive interprets the expanding role of design in industry . . . how form, technique, and appearance have emerged as major factors in volume manufacturing and marketing.

"Through industrial design, the purpose and role of industry is communicated to society. Its well-being will depend in large measure on how well industry and design fulfill their obligations and on the professional and personal code of ethics with which they conduct their affairs."

Peter Muller-Munk, S.I.D.
Peter Muller-Munk Associates
Pittsburgh, Pa.

INDUSTRIAL DESIGN *bi-monthly review of form and technique in designing for industry, is read regularly by design executives of the stature of Mr. Peter Muller-Munk. For* INDUSTRIAL DESIGN *provides an authoritative, continuing report on product design applications, materials and accessories.*

WHITNEY PUBLICATIONS, INC. 18 EAST 50 STREET NEW YORK 22, N. Y.

For Your Calendar

Through November 15. Tenth Triennale, Milan, Italy.

Through December 31. 100 selections from Good Design 1950-1954, and a survey of Good Design popular sellers prepared by *Retailing Daily*, Merchandise Mart, Chicago.

October 21-23. American Society for Quality Control, New England Conference. Ten Eyck Hotel, Albany, N. Y.

October 27-28. Plastics in Building Conference. Sponsored by the Society of the Plastics Industry, the Manufacturing Chemists' Association and the Building Research Advisory Board. National Academy of Sciences Auditorium, Washington, D. C. A conference on the growing use of plastics in building construction, building standards and codes regarding the use of plastics, and what this development means to the building industry.

October 27-29. American Society of Body Engineers' Annual Technical Convention. Rackham Memorial Building, Detroit, Michigan. New designs for automobiles.

October 28-31. Society of Industrial Designers' Annual Meeting, Williamsburg, Virginia. SID's 10th Anniversary Conference theme will be "Industrial Design—The Consumer's Voice in Management." (Schedule on page 16).

November 1-3. National Motel Show, Morrison Hotel, Chicago.

November 1-5. National Metal Exposition of the American Society for Metals. International Amphitheatre, Chicago.

November 15. Textile Clinic (for exchanging technical information on wear-resistant parts for textile machinery). Greenville, South Carolina. Jointly sponsored by Poe Hardware & Supply Co., and Carboloy Dept. of General Electric Company.

November 15-17. Advertising Essentials Show. Hotel Biltmore, New York, N. Y. Sponsored by the Advertising Trades Institute, Inc.

January 3-14. International Home Furnishings Market. Merchandise Mart, Chicago.

January 3-14. Winter Market. Waters and Exhibitors Buildings, Grand Rapids.

January 5 (throughout the year). Good Design 1955. Merchandise Mart, Chicago.

January 7-11. National Retail Industry Show. Madison Square Garden, N. Y.

January 16-21. New York Lamp Show. Hotel New Yorker.

January 17-21. Winter Market. Los Angeles Furniture Mart.

January 23-26. Washington Gift Show. Hotel Willard.

January 24-27. Plant Maintenance & Engineering Show. International Amphitheatre, Chicago.

January 24-28. Winter Market. Western Merchandise Mart. San Francisco.

January 31-February 11. Chicago Gift Show. LaSalle Hotel and Palmer House.

February 2-March 20. 100 Museum Selections from Good Design 1950-54, and forecasts of home furnishings design trends prepared by seven leading design schools. Museum of Modern Art, New York.

February 14-19. Philadelphia Home Show. Philadelphia Commercial Museum.

February 21-25. New York Gift Show. Hotels New Yorker and Statler.

Adaptable

Beauty of fabric is unquestionably an important factor to the designer. When that beauty is coupled with durability, the value of that fabric increases immeasurably. Now add the vital advantages of a flexible material and a wide range of styles . . . and you have a fabric you should know about. Do you know the products of Athol Mfg. Co., trademarked Terson and Terek? If not, why not let us acquaint you with them, at no obligation to you? Just to begin with . . . whether you design furniture or jewel cases, autos or baby carriages, footwear or catalogue covers, you will find in Terson and Terek a wealth of ideas for your consideration. A note on your letterhead will bring you further details and free samples. Write us *today!*

TERSON* VINYL RESIN COATED FABRIC

TEREK* LEATHER CLOTH

* Reg. U. S. Pat. Off.

ATHOL MANUFACTURING CO.

Producers of Terek and Terson Products • NEW YORK • ATHOL, MASS. • CHICAGO, ILL.

Represented on the Pacific Coast by A. B. Boyd Co. • SEATTLE • PORTLAND • LOS ANGELES • SAN FRANCISCO • SAN DIEGO

Luggage by Koch of California

Won't dent or stain, guaranteed unbreakable

. . . no wonder Koch's Fiberglas* Reinforced Plastic luggage is going places!
Drop it . . . it won't break. Stand on it . . . it won't dent or warp. Spill ink on it . . . it won't stain.
It's the only luggage actually *guaranteed* by the manufacturer against breakage on any airline, railroad or steamship anywhere in the world. Its beautiful finish cannot absorb dirt or moisture. And its trim, ultra-modern look gives added sales-appeal. What's *your* line? Luggage? Lift trucks? Laundry machines? Whatever your product, you might make it better, safer or at lower cost by molding it of Fiberglas Reinforced Plastics. Look into these fast-growing materials now. Please write: Owens-Corning Fiberglas Corporation, Plastics Reinforcement Division, 598 Madison Ave., New York 22, N. Y.

OWENS-CORNING
FIBERGLAS

*T. M. Reg. O-C-F Corp.