

INDUSTRIAL DESIGN

1

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February STEEL

By fully exploiting technological resources, and partly the design versatility of this traditionally basic materials industry has sought to adapt itself to changing markets. In this article, the ninth in the series on the fabrication and use of basic materials we explore the latest developments, design properties, alloy research programs, new mill shapes, production techniques, various experiments with coated steels, and their applications as they affect design.

May MATERIALS AND TECHNIQUES FOR PACKAGE DESIGN

A review of the latest materials (papers, boards, foils) and components (closures, spouts, labels, hinges, coatings) and processes (forming, filling, sealing, labeling, etc.) for packages for both industrial and consumer use. This article includes a report on the AMA's 30th packaging materials conference.

July URETHANE FOAM

As urethane foam continues to gain wider use in both industrial and consumer products, industrial designers find increasing application manual directed specifically to them. Our article examines a number of its specific production applications, such as furniture cushioning, automotive and aircraft interior packaging, insulation, kitchen products, and building materials.

August FOILS AND FOIL SUBSTITUTES IN PACKAGING

Foils offer so many advantages in both structural and decorative applications and they can be so eye-catchingly "elegant", that even their contents are now sold in (and, some experts believe, by) foils. But, despite insured sales increases, the cost of foils is very high, and competing materials suppliers are not slow to respond. Metallized papers, as well as specialized inks, are also used as foil substitutes. Recent trends and foreseeable developments in this field will be discussed, including ways in which foils are effectively used foils and foil substitutes as a weapon in the competitive battle.

October PRODUCT GRAPHICS

Every product carries its own identification, and the way it is identified to the product varies greatly. Trim parts or name plates from metallized paper with adhesive backing, from anodized metal with embossed and/or etched markings applied by rivets, or as part of a product's stamping, or can be separate parts of a product-function (the Royal typewriter label, for example) also serves as a release mechanism for opening the machine. The methods for producing these trim parts also varies. This article treats the production of nameplates and escutcheons as a separate field.

November FINISHING METAL WITH METAL

This article -- comparable to those we have done in the past on coatings and laminates -- will treat nickel, chromium, and plain buffing, and various methods available for metal finishing.

December THE 8th ANNUAL DESIGN REVIEW

For the 8th time the editors of INDUSTRIAL DESIGN present a selection of the best designs in products manufactured by virtually all major manufacturers in the United States. This is a critical selection, based on product research. The 1960 issue had more than 300 products and analytical captions, plus a special section on the news. The 1961 Annual Design Review will be even more comprehensive.

For the benefit of advertisers who wish to attune their copy to editorial content we present several outstanding editorial features planned for 1961.

This editorial outline is of course subject to change. In such event we will acquaint advertisers sufficiently in advance.

ID

INDUSTRIAL DESIGN

Copyright, 1961, Whitney Publications, Inc.

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

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COMING

IN FEBRUARY—*The latest developments in an old material; Airplane passenger seat design*

IN MARCH—*Industrial design at General Electric's Light Military Electronics Department*

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DESIGN

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resent their selection tually every industry, based on exhaustive products, with descriptive the year's technological ore inclusive.

COVER: Art director Peter Bradford's abstraction is from a photograph of a recently perfected stamping die consisting of steel rules embedded in epoxy plastic, discussed in our story on short-run production (page 36).

FRONTISPIECE: Raschig rings, now made from Teflon tubing, are used by the chemical industry for "tower packing," where they function as accelerators, hastening a chemical reaction by providing more surface on which the reaction may take place.

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PUBLICATION OFFICES Whitney Publications, Inc.
18 East 50th St., New York 22, N. Y.
Charles E. Whitney, President and Treasurer
Jean McClellan Whitney, Vice-President
Alec E. Oakes, Vice-President
Paul R. Kane, Vice-President
Herbert T. Ettala, Secretary
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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 Robert L. Watkins Associates
583 Eight-O-Five Peachtree Bldg.
Atlanta 8, Georgia

Los Angeles The Maurice A. Kimball Co., Inc.
2550 Beverly Boulevard
Los Angeles 37, California

San Francisco The Maurice A. Kimball Co., Inc.
681 Market Street
San Francisco 3, California

Tyler, Texas Weaver, Incorporated
P. O. Box 3142
Tyler, Texas

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

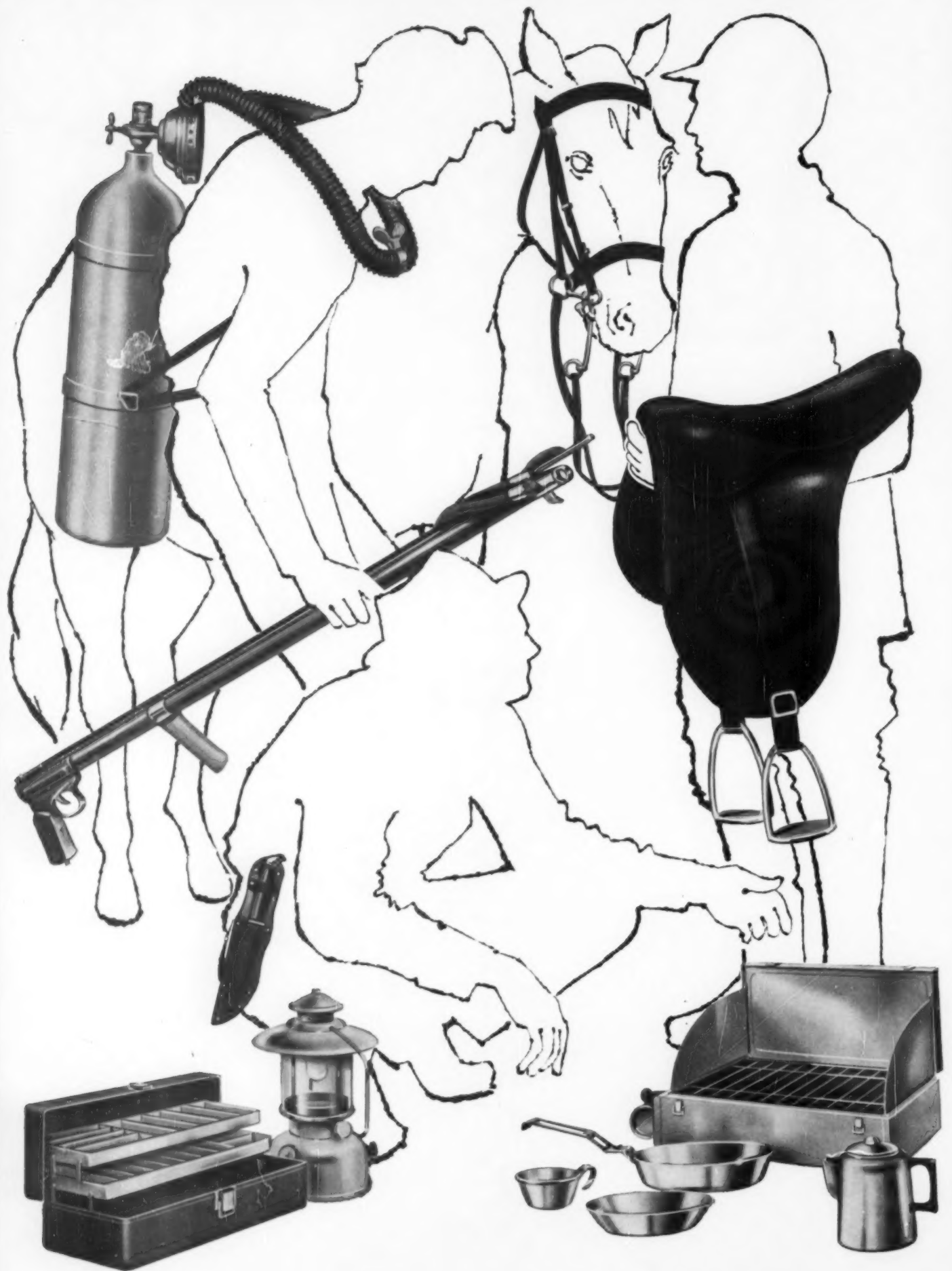


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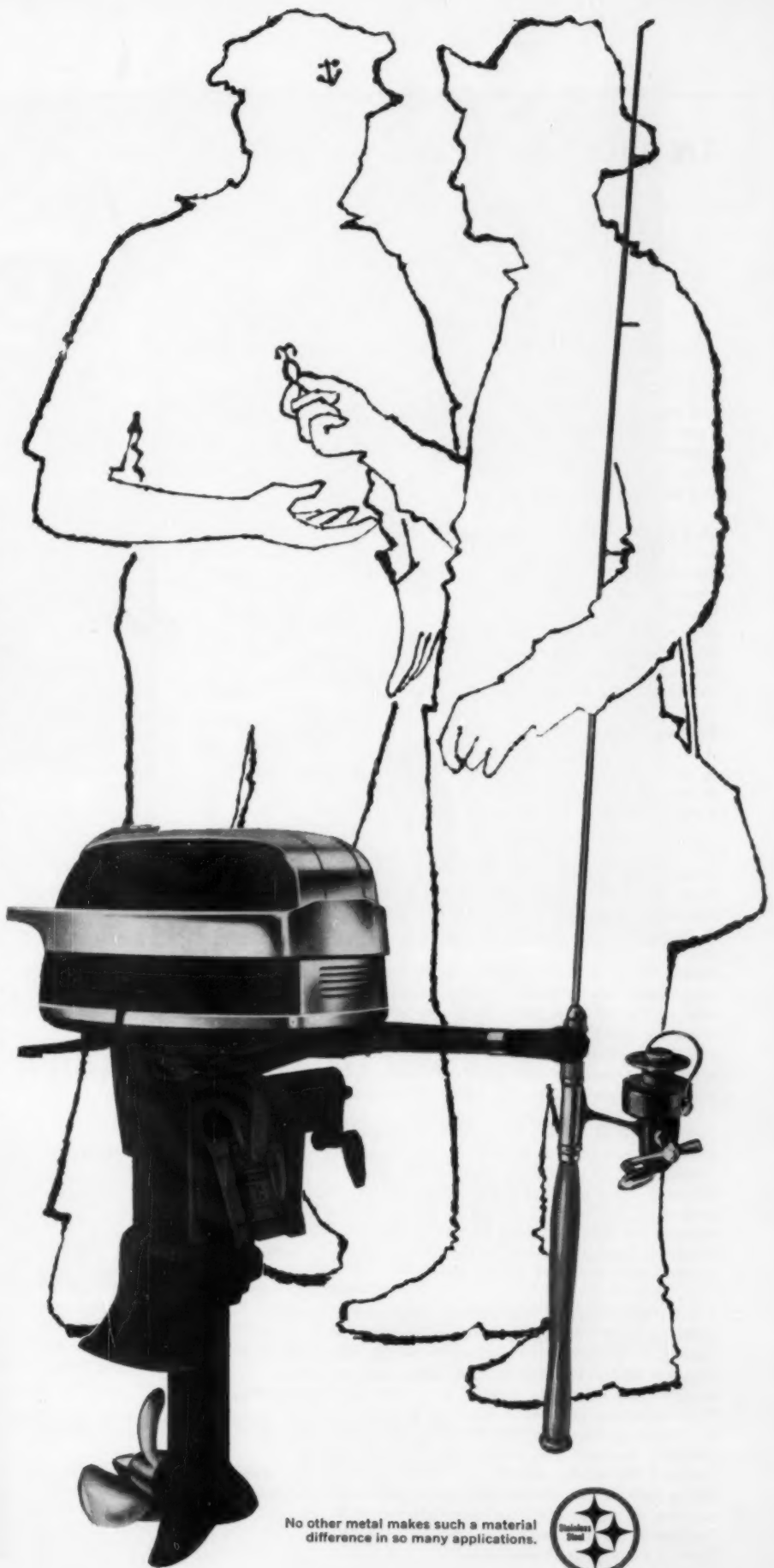
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No other metal can equal Stainless Steel's unique combination of properties: its excellent corrosion resistance, its superior strength, its attractive appearance. The people who make things out of Stainless Steel like it because it is not difficult to fabricate or to sell. Designers *should* like it, because Stainless Steel's unmatched versatility means freedom to explore and advance an idea—the heart of sound design.

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No other metal makes such a material
difference in so many applications.



IN THIS ISSUE

Albert H. Woods, who served as general coordinator of the atomic energy exhibition described on page 58, received his B.A. from Alabama Polytechnic Institute, studied delineation and painting at Los Angeles' Art Center School. He has been associated, either as staff member or consultant, with a number of prominent design firms, including George Nelson, Eliot Noyes, Becker & Becker, and Reinecke & Associates, and now designs independently on a project basis.

Carl Ramirez, the graphic designer for the AEC show, is a graduate engineer (Rutgers) who changed his mind. He picked up some formal art training via adult education courses, and a commercial artist friend supplied additional instruction—along with some piecework employment. His first real job was with George Nelson, for whom he still does projects; later he worked for Will Burtin. In 1958, he opened his own office, specializing in graphics, packaging and exhibits. He also teaches at Cooper Union.

Francis Thompson's latest production is the film for the AEC exhibition shown on page 62. His earliest production, as far as he can remember, was *20,000 Leagues Under the Sea*, drawn on strips of adding machine paper when he was eight. Later he studied painting at Carnegie Tech and in Paris, taught art briefly, then returned to film-making with *L'Evolution du Gratte-Ciel* for the Museum of Modern Art. Because his most famous film, the prize-winning *N. Y., N. Y.* took 10 years to finish, he has, he says, an unmerited reputation for slowness: actually he made fifteen other films in those 10 years.

Victor Lundy is a New York-born, Harvard-trained architect who made a name for himself by going off to the non-resort side of Florida, and there designing a succession of rather romantic buildings in advanced structural materials—neo-Gothic churches with curved laminated wood beams, a motel composed of cast concrete umbrellas. His air-supported structure for the AEC exhibit appears on page 58.

John McGiffert (right) and—**John Desmond** (left), shown here with designer **George Nelson**, are producer and director, respectively, of the CBS tv program "Camera 3," on which Nelson's "How to Kill People" (page 45) was originally presented. McGiffert is actually a writer, and in 1956-57 handled the writing chores for the program he now produces. Desmond got his directing experience as assistant director of the long-running tv serial "Mama."

John Gregory Dunne, who reviews Norman Bel Geddes's autobiography (page 12), first became interested in Bel Geddes when, as an associate editor of ID, he wrote ID's obituary on him in April of 1958. He is also interested in show business (his brother is a television producer), Nightingaliana (his sister works in a hospital), and the novels of John O'Hara. This breadth of intellectual curiosity is reflected in an adventurous life that has included the wrong eating clubs at Princeton, the right eating clubs in Manhattan, and—he claims—a tour of duty as a marine guard at the Latvian Embassy in Torrance, California. He is at present a contributing editor on *Time*, a weekly news-magazine.

Woods



Ramirez



Thompson



Lundy

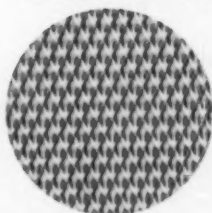
Desmond, Nelson, McGiffert



Dunne



If you made aluminum crust for apple pie which would be best to use?



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THE RIGHT ANSWER TO ALUMINUM BUYING PROBLEMS depends upon right materials utilization.

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MORAL: before final buying decisions are made, consult with a Fairmont field engineer. His mature and varied experience among aluminum fabricators makes him a whiz at application ideas that help you buy profitably. And he's backed by the aluminum source, according to a recent survey, that rates first for fulfilling promises and commitments.

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LETTERS

Copy and coincidence

Sirs:

I have been witness on two occasions to a designer's disappointment when an idea, which he thought was his exclusive province, was simultaneously developed by someone else. Certainly this problem has caused other designers anguish, and it occurs to me that an article by you might help create a more wholesome attitude about it.

Excluding piracy, there is no reason this sort of thing shouldn't happen. Here are a number of reasons I can think of. It could result from designers responding similarly to ideas or a climate outside their profession, or reaching the obvious solution to the same problem, or it could be just accidental.

But it happens—honestly and morally—and people get mad. An article in ID might clarify the situation.

Jack Deveau
New York

The conquest of Space

Sirs:

We found your article in the November issue on the Space Shoe very timely. Of particular interest was your reporter's comment that "its greatest drawback is its appearance." Our office is working on that problem for Tru-Mold



Tru-Mold model

Shoes, Inc., and this photograph shows the first production design.

In our design, the shoe completely encapsulates the foot, creating a controlled environment. The rib or raised cord is a functional element acting as a structural member to rigidize the envelope.

Harold Lewis Malt
Industrial Designer
Malt & Ness
Buffalo, New York

Mr. Murray replies: "This shoe is an offshoot of my primary concept: a controlled environment for the foot. Any arbitrary change of the front perimeter of the shoe removes the shoe from the realm of my chief concern, which is function. A single shoe is never of just one length, but of at least five lengths—one for each toe, with some additional allowances for subsidiary individual variations. I am commonly asked: 'Why don't you shape a shoe conventionally on the outside, leaving function to the inside where it can't be seen?' The answer is that this is impossible mechanically, because it would require the mutilation of the shoe walls. Beyond this, I state that I have little trouble with feet. They are logical devices and respond to logic. The sickness resides in the eye of man. The Space shoe will have completed its full cycle when men believe, as did the classic Greeks, that the foot is beautiful and that the shoe should declare its beauty."

Kind thoughts after Christmas

Sirs:

This is to let you know how much we at IDI appreciated the excellent job you did in covering the Southern New England Chapter's "Symposium" in Westport. Because of the format of the program, it was a difficult one to report, and you succeeded beautifully in catching the significant points. This record of the event is one that IDI members will be happy to have.

E. Betty Berry, Executive Secretary
Industrial Designers Institute
New York, New York

Sirs:

We at the United States Testing Company have read "Testing the Product," in the November issue of INDUSTRIAL DESIGN. It is rare to have our laboratories and services described so accurately. . . . Arthur Gregor's technical writing ability and careful researching represent the mark of a top craftsman.

H. M. Block
United States Testing
Hoboken, New Jersey

Sirs:

Your November editorial of *The Waste Makers* is a far more temperate and penetrating analysis than any of the advertising publications or any of the bigwigs in the ad business made of a perfectly obvious situation. I agree 99 and 44/100% with you.

James J. McMahon
New York, New York

What to do when the sun goes down

Sirs:

I am an art student at Valley College, Van Nuys, California, in the evening division, and employed full time as a mechanical design engineer, and am seriously interested in a career in the field of industrial design.

The particular problem I wish to point out is the astonishing fact that there are no evening classes in industrial design at any major school in the Los Angeles area! Since your excellent publication is the "spokesman" for this profession, I am writing to you to learn what can be done to rectify this situation.

I am studying art at present, and the concepts of industrial design are touched upon very little in the curriculum of this school. I have sought employment with several well-known designers in this area, but to no avail, due to my lack of formal training in this field. In talking with my fellow students, I find that many of them feel just as strongly as I do on this point.

I have written to the Dean of the Evening Division at Valley College asking his support in establishing a course in industrial design to supplement the present curriculum. During the recent elections, the voters of this state approved the passage of a bond issue for the expansion of college facilities, and I think the time particularly apt to press for this program.

Robert E. Hansen
Glendale, California

Late but welcome

Sirs:

I am late in sending you my congratulations on the October (New York) issue of INDUSTRIAL DESIGN. Perhaps I can make up for my delay by sheer enthusiasm.

The issue is admirable in every way. In a way I am qualified to pass judgment because I was in on the subject almost at the beginning. And although I wrote the *New Yorker's* profiles on Deskey, Dreyfuss, and the late Walter Dorwin Teague, your notes on them and their work told me many things I didn't know.

We are, at this school, acutely aware of the part industrial design plays in several forms of communication and constantly follow its movements. It is good to have ID to keep us posted.

Gilbert Seldes, Dean
Annenberg School of
Communications
University of Pennsylvania
Philadelphia

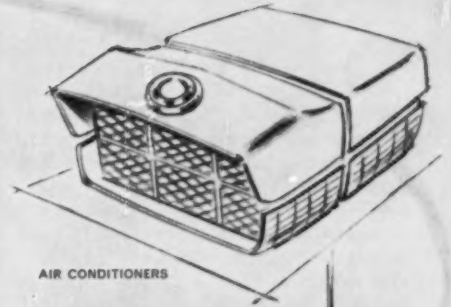
Idea!

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with **H&K** perforated metals



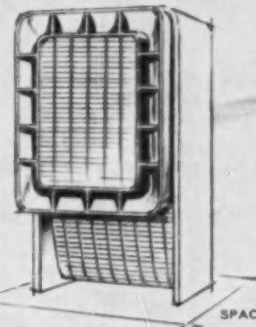
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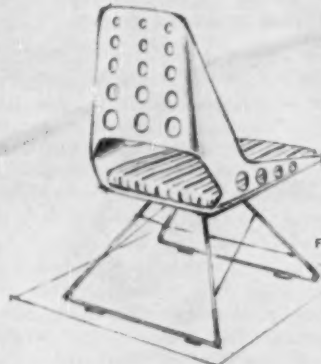
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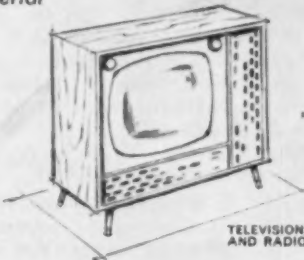
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SPACE HEATERS



FURNITURE

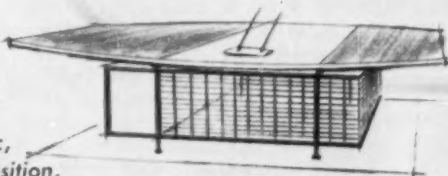


TELEVISION, HI-FI AND RADIO SETS

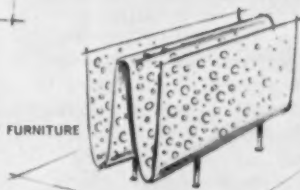
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REVIEW: BOOKS

Explosions from a Roman candle

Miracle in the Evening. By Norman Bel Geddes. Edited by William Kelley. 352 pp. Doubleday & Co., New York. \$4.95.

Reviewed by JOHN GREGORY DUNNE

"Walk upstage," Broadway producer Norman Bel Geddes ordered the young actor reading for a part in a new Geddes production; "walk downstage. Look fierce—not quite so fierce." At Geddes's command, stagehands stretched a rope across the stage and turned on a battery of floodlights. "Now keep looking fierce and pull the rope," Geddes commanded. As the young Thespian strained, Geddes deliberated. "Sorry, I'm afraid we can't use you," he said finally. "Why not?" demanded the sweating actor. Said Geddes imperiously: "Wrong bone structure."

No detail, however small, long escaped the attention of Norman Bel Geddes. Ever conscious that he was shaping a legend, he could not tolerate the stamp of another on his work. Geddes was a Roman candle of a man, exploding ideas endlessly, effortlessly, often infuriatingly, always brilliantly.

Art gave Geddes the means to indulge his passion to improve. From advertising poster design in the Midwest, he went to the West Coast, where he was soon absorbed in a creative little theatre movement. Geddes's view of the theatre often seemed unique; plays and even theatres were built around his sets instead of vice versa.

Gifted with almost total recall, Geddes does not write of his life as much as he recreates it, complete with dialogue and stage directions. Unfortunately, he labors under the delusion that genius is consistently interesting. In *Miracle in the Evening*, his only attempt at autobiography, conversations are remembered, kisses dwelt upon, and letters unearthed in almost numbing detail. Dozens of characters wander through the book, but all too often they are just name droppings—lists of people seemingly mentioned only to flatter Geddes' conceit that he had such talented friends. One such list (of people who played his horse racing game) stretches to 62 names and concludes with the airy statement "and others whose names escape me." Despite his massive talents, Geddes was not above unbecoming pettiness. He tells a sordid and extraneous tale out of school about Alexander Woollcott, and his first stand-off meeting with Frank Lloyd Wright, who was not bowled over by his genius, still rankled 40 years later.

Miracle in the Evening ends before



Norman Bel Geddes

Norman Bel Geddes embarked on his career as an industrial designer. But already honed was the talent and the ego that wanted to give the world a face lift. Only with great restraint does Bel Geddes the writer manage to contain his awe of Bel Geddes the phenomenon. Readers are bound by no such strictures of modesty.

Lettering and type trends

Letter Design in the Graphic Arts. By Mortimer Leach. Reinhold Publishing Corp., New York, 1960. 192 pages. Illustrated. \$12.00.

Reviewed by BEN ROSEN

Assembling a useful book on type and lettering is primarily a labor of love, and Mr. Leach's well organized study is such a work. It probes the relationship between type and lettering, and then explores applications of lettering in contemporary graphic art. The text, brightly and cogently handled, opens with a question and answer section on type trends and lettering requirements, development techniques for new type faces, and a discussion of photo-process lettering. A number of side issues are discussed by various authorities in the field, and the variety of opinion makes lively reading in this usually heavy subject.

A selection of one or two of the best cuts of the basic type faces followed by a rich collection of lettered variations shows clearly the creative potential of good lettering. A section on space advertising presents an inventive array of letter forms in current use, and the advertisements from which these selections have been made represent a discerning cross-section of American advertising art at a relatively high, yet representative, level.

Forty-eight pages on packaging demonstrate the subtle relation of type and lettering to the problems of package design. Although overloaded with case histories that read like ads for the in-

cluded design firms, the selections are, for the most part, excellent. Brush letters, calligraphy, interpretive and special effect styles, formal and informal scripts are also included in this substantial, serious study of the lettering of our time and its application in current graphic art.

Primer on restaurant design

Interiors Book of Restaurants. By William Wilson Atkin and Joan Adler. Whitney Library of Design, New York, 1960. 215 pages. Illustrated. \$15.00.

Reviewed by MARION E. LANDBERG,
Donald Deskey Associates

Primers on the physical characteristics of public restaurants have been, until now, practically non-existent. However, authors Atkin and Adler have created a truly readable book of informative text, layouts, plans and photographs—virtually an encyclopedia of up-to-date technical advice for both the designer and the restaurateur.

The book's unifying concept is that a restaurant is like a theatre: it affords the designer an opportunity to create a stage set of the decor, and the restaurateur a chance to play impresario. (The authors' own theatrical analogies enliven the text.)

The book, which falls in three sections, deals first with the restaurant owner and his problems—the choice of a location (urban or highway), the type of establishment (festive, luncheonette, cafeteria), the intended clientele and anticipated profits. (Two useful pages of legal advice on tenancy agreements and insurance are also included.)

What design means for the restaurant is discussed in the second section, which properly stresses that design should be inherent in, not grafted on, a project. The relationship of the designer to the owner is thoroughly explored; and the exterior's power of attraction—along with that of public areas such as dining rooms, bars, lobbies and washrooms—receive special attention. And the authors also go backstage to examine the kitchens and service areas.

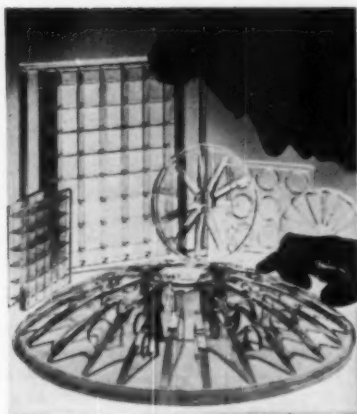
The book's final pictorial section is interesting but unbalanced (the best American designs are shown, but few foreign ones). Floor plans, charts, sketches, and pictures appear liberally throughout, but it would be helpful if a general concept of overall restaurant sizes were given to tie in with the dimensioned drawings for counters, stools and table settings. Since this text is a must for designers, we hope that the authors will give us their promised sequel, and that it will be so illustrated.

THIS IS GLASS

A BULLETIN OF PRACTICAL NEW IDEAS



FROM CORNING



99.999+% PURE FUSED SILICA

Astronomers are notoriously strict about materials. Well they might be, since a minor deviation in an optical material makes for catastrophic miscalculations when extrapolated through the infinity of space.

A new fused silica which we developed is eliciting quiet approval, the most anyone expects, from the meticulous astronomer. Drop to the molecular level and you will find only several parts of impurity per million of silica.

Such purity is naturally beneficial to the optical properties of the material. It has an extremely high degree of optical homogeneity. When you talk visible or ultraviolet light, it is the most transparent glass we have ever made. On the physical side, it has a coefficient of expansion of $5.6 \times 10^{-7}/^{\circ}\text{C}$. Its refractive index is $n_D - 1.4584$. Birefringence constant: $3.40 \text{ m } \mu\text{m/cm/kg/cm}^2$. Neither gamma nor X-rays darken it.

Among some of the various products that we have made or are presently working on are telescope mirrors up to 80 inches, ultrasonic delay lines; windows for wind tunnels, high temperature viewing and star guidance systems.

We can play a few tricks with this fused silica in designing. Witness the unique sandwich construction of the mirror blanks above. This simple design innovation cuts as much as 50% off the weight of the mirror blanks without sacrificing rigidity one whit.

The coupon is your invitation to get more information on this new Corning material.

WILL THE MACHINE GIVE WAY TO CHEMICALS?

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mechanical operation.

We made them by exposing photosensitive glass to a precisely drawn pattern and a series of chemical etchants.

This is more than a parlor trick.

It is a method of making parts precisely which would be impossible or far too costly to make mechanically. It is the FOTOFORM® process.

We make brush holders for digital computers which call for rectangular holes measuring $0.0075" \times 0.015"$.

We can take a square inch and riddle it with as many as 250,000 holes, each precisely like all its neighbors. Or, with a simple inexpensive change in art work, we could make just one of those 250,000 holes a triangle.

The material itself is nonporous and dimensionally stable glass, utterly free of flaws and voids and able to operate continuously at 500°C .

We can use the same process on FOTOCERAM,® one of our glass-ceramics which has a coefficient of expansion nudging zero.

If you would like to know more about chemical machining and the photosensitive glasses, please send the coupon.

FOR 10^{-6} mm Hg GREASELESSLY

With all due apologies to the people who make grease, it is usually a nuisance in



vacuum lines.

It's also a likely source of contamination.

So, we say, get rid of grease.

There are recesses in the sockets of this joint which match to perfection the configuration and dimensions of a Buna-N O-ring.

Even without grease, this seal will hold a vacuum down as far as 10^{-6} without leaking.

The assembly accepts a standard socket and clamp.

The glass is PYREX® brand No. 7740, so it will not serve as a source of contamination either. It's easily worked to fit into any setup, so it should be in demand for more than the usual bench-top vacuum line. There should be considerable demand among people everywhere who want a tight, greaseless joint.

The November 1959 issue of *The Review of Scientific Instruments* has something to say about this useful new tool. So do we. For our message, call your local lab supply dealer, or send us the coupon direct.



CORNING MEANS RESEARCH IN GLASS

CORNING GLASS WORKS, 5401 Crystal St., Corning, N. Y.

Please send information on:

Fused silica FOTOFORM O-ring vacuum joint

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Company.....

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

NEWS

Designers honor the client

John Morrell and Company has won this year's Package Designers Council Industry Award for its "outstanding package design program resulting from the use of professional design counsel." Making the award in Chicago on November 29, former PDC president Karl Fink said: "Simply defined, this award is for a fine client-designer relationship, resulting in noteworthy packaging design. Since PDC feels favorably disposed toward all professional designers, it may be assumed that this is an award to our country's best client." Fink presented the trophy, designed by PDC vice president Margery Markley, to Morrell's president, W. W. McCallum.

Robert Sidney Dickens Associates are responsible for Morrell's new design program. Describing it at the award dinner, Mr. Dickens (who is PDC's president) explained that the program began in 1956 with a 10,000-mile survey of Morrell's "visual personality" as it was being perceived in 78 cities. Later Dickens mounted all 600 competitive packages on a 60-foot strip in his studio. As a result of such studies, Dickens Associates urged that Morrell avoid the red and yellow color scheme which dominates the meat industry, and adopt instead a cool aqua. They decided that since Morrell's trademark, a heart, got high recognition in their tests, it would be wise to retain it—restyled for greater individuality.

For the benefit of New York members, PDC held a second Morrell program at the Gladstone Hotel on December 1. At this meeting Robert Zeidman announced future monthly meetings devoted to Research in Packaging; the Role of the Advertising Agency in Packaging; Managing the Packaging Function; the Chain Drug Store, an On-Location Workshop. Mr. Zeidman also announced the Silvermine Conference for Young Designers.

Ivory tower for Park Avenue

New million-dollar skyscrapers sprout along New York's Park Avenue as prolifically—and sometimes as identically—as mushrooms, but the latest one to be announced has some special points of dissimilarity from its neighbors. It will be designed by an industrial designer rather than an architect, and it will not have a metal-and-glass skin. Henry Dreyfuss has been commissioned to direct the total design of the Bankers Trust Company's projected 30-story, \$18 million office tower scheduled to rise on the west side of the avenue between 48th and 49th Streets by late summer 1962.



Dickens, McCallum, Fink; Morrell symbol traveling

For the Dreyfuss office the project is part of a continuing corporate image program for the bank, and in keeping with that image (bank officials characterize it as "alert, but stable"), the building has been designed to reflect both tradition and modernity. Its facade will be a masonry curtain wall composed of ivory-colored pre-cast concrete and quartz chip window frame panels whose 9 by 12 foot size evolves from the building's six foot module. The panels' 12-inch depth will form deep reveals around the floor-to-ceiling windows, thus acting as sun screens. None of the structural members will be visible on the exterior; the masonry grid will appear to support the building.

In silhouette, the building will have two elements—a 16-floor base and a 14-floor tower. It will sit on a raised three-foot terrace and the two bottom floors will be a colonnaded portico (the building's elevator pits must be placed at



Bankers Trust tower

ground level because the N. Y. Central railroad tracks run beneath it). A terrace-rimmed executive floor will top the base structure, and most of the other floors in the base structure will also be occupied by the bank, with upper floors

temporarily assigned to rental use. Eventually the bank expects to use the entire building and for this reason interior design plans, still in preliminary stages, call for the same flexible partitioning system throughout and a consistent window treatment.

Dreyfuss has retained Richard Kelly to provide special lighting for the exterior, and Richard Kiley to do the landscape architecture. Emery Roth & Sons will handle the architectural details for the structure; Shreve, Lamb & Harmon will do the detailing of the interiors.

"Italia '61"

Italy observes the 100th anniversary of its national unification this year, and a number of celebrations, all under the general heading of "Italia '61," are scheduled. Two events at the top of the list, so far, are the six-month International Labor Exposition in Turin (first capital of unified Italy) and a ten-week Festival of Italy in Philadelphia.

The Turin exposition (which will run from May 1st to October 31st) will be the largest such show anywhere in the world this year, and the only one in which the U. S. government will participate. For the design of the U. S. exhibit the plum has gone to Harley Earl Associates. Earl staffers Manuel Jarrin and Craig Paul will be working with Italian architect/designer Gio Ponti, primary exposition design consultant, in setting up a display on the subject of "Man and Communications," with contributions from such firms as AT&T, IBM, RCA, General Dynamics, General Electric, Upjohn, Westinghouse, and the Heath Corporation. Ponti was in this country in November to hold a series of conferences explaining the overall plans for the design of the exhibition.

The U. S. display, along with exhibits from 18 other countries, will be sheltered under one enormous concrete palace designed by celebrated Italian engineer-architect Pier Luigi Nervi.

Festival of Italy is scheduled for Philadelphia's Commercial Museum, January
(Continued on Page 18)

THE MEASURE OF MAN (AND WOMAN) (AND CHILD)

Human Factors in Design by Henry Dreyfuss

Imagine being able to find every important measurement of the human body on 16 handy charts. Thanks to Henry Dreyfuss this is now possible. These charts are included in the portfolio *The Measure of Man* along with 2 full sized 6 ft. x 2 ft. male and female figures, a concise reference text on the charts, and an explanatory text by Henry Dreyfuss.

The full sized figures are suitable for mounting. They are reverse printed white on a handsome gray-blue ground so they may be used decoratively. The dimensions are large enough in size, however, so they may be read from 15 feet or more away for those who wish to mount them on the drafting room wall for ready reference.

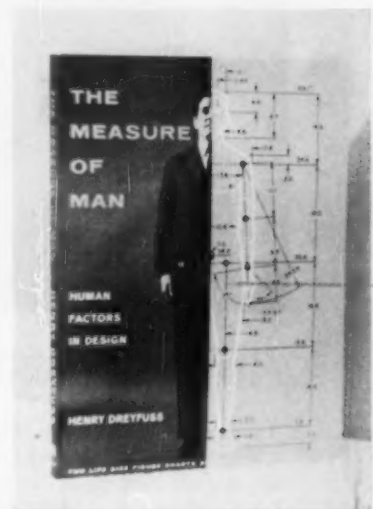
The charts were developed (over a period of years) by the Dreyfuss office from widely scattered sources; the bibliography not only lists the sources but includes sources from which additional data may be had. The check list which accompanies the diagrams includes supplementary information on the following important subjects:

Manual Controls	Anthropometric Conformity
Pedals	Safety
Visual Displays	Illumination
Auditory Signals	Environment
Sensory Signals	Maintenance

As an example of the kind of information contained in the check list, consider the heading *Safety*. Here are reminders about safeguards for moving parts, electrical equipment, corners and edges, dangerous chemical solutions, etc., location of emergency controls, color coding for stairway and platform edges, aisles, fire protection, traffic control, etc.

The cover of the booklet containing the explanation, check list, bibliography, etc. is a seventeenth chart giving thresholds of environmental comfort, discomfort, damage, etc. for light, noise, ultra-violet, atomic radiation, and other phenomena which affect the functioning of the human body or the comfort of the human being.

ONLY \$4.95



- INCLUDES 2 LIFESIZE CHARTS 24" X 76" SUITABLE FOR MOUNTING
- 16 DIAGRAMS GIVING ALL THE ESSENTIAL MEASUREMENTS OF THE HUMAN BODY
- BOOKLET WITH AN INTRODUCTION BY HENRY DREYFUSS, EXPLANATION OF THE CHARTS, A CHECKLIST, AND A BIBLIOGRAPHY

Whitney Library of Design, 18 E. 50th Street, New York 22, N. Y.

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Please rush a copy of the new portfolio *The Measure of Man*

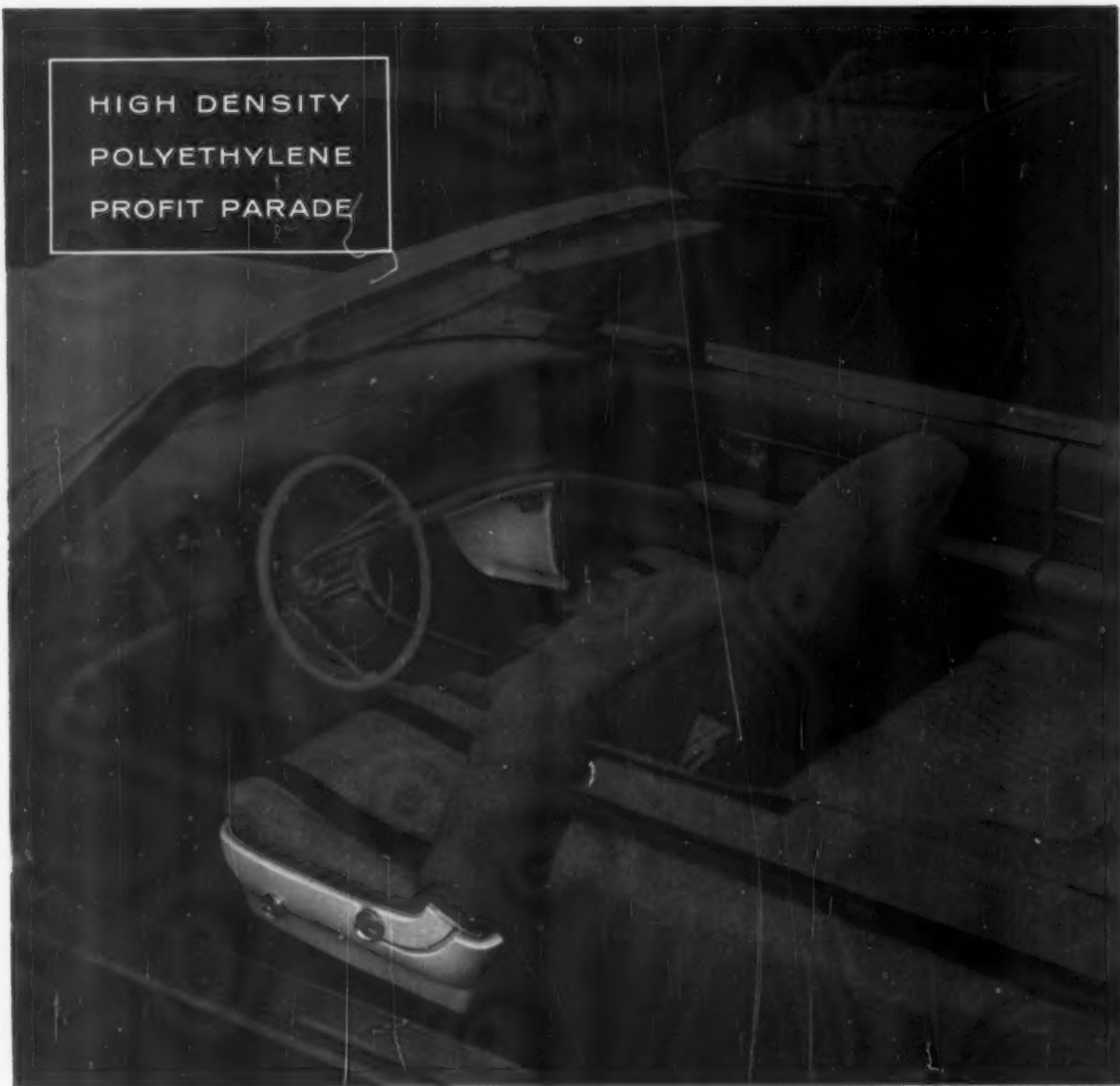
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HIGH DENSITY
POLYETHYLENE
PROFIT PARADE



Grace Plastic Adds to Lasting Value of Classic Car

The beautiful, classic Thunderbird is a king in Ford Motor Company's famous line. And as befits a king, all its parts and appointments are made with special care, for lasting beauty, value and service . . . while maintaining realistic economies.

Example: Grex High Density Polyethylene is a material used in three "show" parts of this '61 model—in the side cowl cover, the side seat shield, and the pivot cap on the seats. Besides having smooth beauty, these parts also must be scuffproof. And they must be perfectly color-matched with other parts of the interior.

Grex is an excellent material for components such as these, where beauty, duty and economy of fabrication must go

hand in hand. Grex can be formed by any conventional fabricating technique, in any color. It takes day-after-day punishment without chipping, cracking or breaking. It can undergo extremes of temperature without losing its strength or shape. And most important of all, it adds beauty and value to this car.

If you need the special advantages of high density polyethylene, don't overlook the experts. Grace has the production facilities, technical service and experience to help with demanding components problems. And we're easy to do business with.

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

W. R. GRACE & CO.
POLYMER CHEMICALS DIVISION



CLIFTON, NEW JERSEY



'61 Thunderbird sets a standard for value.

Color is critical. As every auto buyer knows, cars are made in almost every color of the spectrum. Ford, in its Thunderbird line alone, uses 6 colors. Grex already has been supplied in all of these approved colors.

Matching colors to the most critical standards requires ingenuity, patience and experience. For colors must not only pass stringent visual tests under the Macbeth light, but must stand the test of time as well.

Wearing qualities essential. There would be little virtue to parts made of Grex if they merely appealed to the eye. All the parts are in "wear" locations, and are subject to scuffing or continual flexing. The problem of scuffing is overcome with a handsome, textured, leather-like effect. Scuffs literally "bounce off." This textured pattern was engraved in the irregular surface molds by photo arc.

The side cowl cover presented a special problem. It is thin-gauge, yet has large surface area. High density polyethylene was selected as the material for this part because it resists abrasion, withstands flexing, and has native toughness, even in very thin, large-area sections.

Why not use some other material? High density polyethylene has special advantages in applications like these. It requires no additional surface finish, and gives close color match. It has a warmth and solidity lacking in other materials. It doesn't chip, crack, or peel. Perhaps most important, it maintains economies while actually improving the quality look of components.

What about you? The problems present in this application can be applied profitably in other products. Luggage, for instance. And housewares, appliance components, quality toys. If you'd like a profitable answer to a high density polyethylene question, just write us:

Technical Service Department
Polymer Chemicals Division
W. R. Grace & Co., Clifton, N. J.

COMING NEXT MONTH

Changing steel

Steel: The ninth installment in ID's series on the fabrication and application of basic materials examines the latest developments in this industry, including the changes the industry is undergoing to keep up with innovations introduced by some newer materials. One aspect of steel's new market approach is an increasing interest in and use of industrial design as a developmental tool. February's article will discuss new mill shapes, the properties available in recent steels, latest fabrication techniques, various experiments with coated steel, and recent noteworthy product applications.

Towards a rational airplane seat

Airplane passenger seats have grown more and more luxurious over the years, but as any long-distance traveler knows, they have not grown proportionately more comfortable. Today's seat is a burden to the airline, and is regarded by many as an inefficient support for the passenger's posterior, and a needlessly unattractive interior detail. Its departure may be hastened by a new plastic contour chair about to be produced by Teco, Inc., one of the handful of major airplane seat manufacturers. Next month, ID's article will review airplane seating over the past 30 years and will examine the design of the new Teco chair.

Low-cost shelter by Fuller

Working with a group of designers and students at Long Beach State College in California, R. Buckminster Fuller has just constructed a shelter 60' in diameter, made of bamboo and fishing twine. Intended for densely populated Asia, the shelter is discussed in ID's report on Fuller's five-day crash program.

Each issue of **INDUSTRIAL DESIGN** delivers to the *eyes* of designers and executives a definitive review of contemporary design ideas and techniques.

INDUSTRIAL DESIGN

is published monthly
Subscription rates: \$10.00 for one year
\$18.00 for two years
\$24.00 for three years

Whitney Publications, Inc.
18 East 50th Street, New York 22, N. Y.

NEWS *continued*

21st to March 26th. The show will feature an automobile salon, an exhibit devoted to Italian industrial design (with a special exhibit by Olivetti), a selection from the recent Triennale di Milano and displays of Italian textiles, fashions, and arts and crafts.

Loewy office changes name

A year and a half ago, Raymond Loewy Associates' managing partner William T. Snaith said he didn't mind running a firm that was called by somebody's else's name because "in the frame of this business I am well known, and unquestionably I'll get part of the credit for the growth of the organization." On January 3rd, in a gesture that gave Snaith much more than part of the credit, Raymond Loewy Associates (and Raymond Loewy Corporation) changed its name to Raymond Loewy and William Snaith, Inc. Snaith has been the prime force behind the expansion of RLA services away from purely product design and towards such RLC specialties as product development, store planning, and marketing counsel. Inclusion of his name on the marquee announces that this is what the Loewy-Snaith office wants to do more of in the future.

Along with the re-christening, RLWS announces a new administrative set-up. The organization is now broken down into 14 divisions, each headed by newly created operating vice-presidents. These divisions are: product design; product development; packaging; graphics; package engineering; transportation; retail planning of stores; supermarkets; commercial buildings; home and components design; exhibitions; urban programming; human engineering; and marketing. (This is not necessarily the order of importance.)

Company policy will be directed by an executive committee composed of partners Loewy and Snaith and six new senior vice-presidents: H. S. Barnhart, Justin Fabricius, David M. Freudenthal, Neal Hathaway, Leroy Larsen, and Elizabeth Reese. This committee has been operating experimentally since last June.

Designers resign

Members of the design board of the New York World's Fair, hired early last year to design a plan for the Fair, have quit because their proposals were rejected by the Fair corporation. They were: architects Gordon Bunshaft and Edward Durrell Stone, industrial designer Henry Dreyfuss, and consulting engineer Emil Praeger. Architect Wallace K. Harrison is staying on as a member of the Fair's Executive Committee.

The design board had submitted several



Dutch saucepans, British dairy gear, and Italian scissors in Canadian show

plans for the Fair, one of which was for a single enormous donut-shaped building to house all exhibits. The Fair corporation rejected these schemes (largely for reasons of economics) in favor of the ground plan used for the 1939 World's Fair. Bunshaft, who had resigned from the board several weeks before the other members, said that "we were trying to design a plan that would be an expression of our times. Mr. [Robert] Moses and the [Executive] Committee wanted a repeat of the old World's Fair plan of 1939. Why should architects hang around four years beating an old cat?" His reaction was reported last month by the *New York Times*. Dreyfuss was reported as having said, "This was an opportunity to do a very great thing. It's too bad we couldn't."

Last month the architectural world was bitter over the Fair corporation's flat rejection of an imaginative plan in favor of a good return on the investment. The angry editors of *Architectural Forum* wrote: "The great stage for the World's Fair is proceeding with no art either in the grand plan or in the correlation. It is steering without advice from architects. It is the first fair to depend entirely on what it can get cheaply out

of a shabby old ground plan that was already obsolete in 1939 when it was first put into operation."

In publicly announcing the disappearance of the design board from the councils of the Fair corporation, the Executive Committee stated that the board had "retired" because it had "completed its work."

Stainless steel exhibition

"Design in Stainless Steel" is an exhibition of products which won an international stainless steel design competition sponsored last year by the Canadian National Industrial Design Council in conjunction with a group of Canadian metal companies (Atlas Steels, International Nickel Company of Canada, and Union Carbide Canada). Originally shown at the National Design Centre in Ottawa in November, the exhibition is now circulating among Canadian galleries and other institutions.

Among the award-winning products

are the Italian scissors, Dutch saucepans and British dairy equipment shown here (above). Scissors were designed by A. Campi for E. Collini, Milan; saucepans by D. W. Simonis for N. V. Gero-fabriek, Zeist; and dairy equipment by Burnett and Rolfe for Firth Vickers Stainless Steels, Sheffield.

Mead expands design facilities

The Mead Corporation, Cincinnati, producer of paper and paperboard products, formally launched its New Products Division in Cincinnati, Ohio, in November. Division designers approach packaging from the structural as well as graphic standpoint and their service is geared specifically to customer packaging problems, beginning with manufacturing and continuing through sorting, assembling, packing, transporting, warehousing, advertising, and merchandising.

In still another move to expand their design services, Mead Packaging last month opened a design consulting service in New York under the managing direction of Herbert M. Meyers. Mr. Meyers was formerly director of Graphic Design for the Atlanta Division of Mead Packaging. (Continued on Page 22)

* *The stool, also designed for the lobby, can be used as a table or an extra seat.*

* *by Charles Eames*



**A COMFORT-
ABLE, BUT
NOT TOO
SLOUCHY,
ARM CHAIR
DESIGNED *
FIRST FOR
USE IN
THE TIME
MAGAZINE
LOBBY IS
AVAILABLE
FOR WHAT-
EVER USE
SEEMS AP-
PROPRIATE.**

**HERMAN
MILLER INC.**

**ZEELAND,
MICHIGAN**



PHOTO MATERIAL COURTESY OF WOODALL INDUSTRIES, INC.

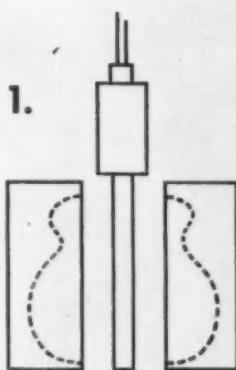
The auto industry warms up to blow-molded polyethylene

These complex shapes you see are sections of heater ducts for Chrysler Corporation cars, blow molded of BAKELITE Brand high-density polyethylene. Each part is made in *one piece*. These components must fit together easily and precisely, yet this method produces them economically. They are tough and light-weight, characteristic of the material from which they are made. They show the designer new sizes and shapes he can now work with in polyethylene.

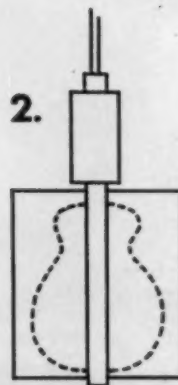
BLOW MOLDING PUTS BIG DESIGNS

Blow molding is economical

Economy is a major advantage of the blow molding process. All you need is the mold cavity; the core is air pressure itself. Essentially, the operation begins when an extruded tube of heated plastic is placed within the two halves of a mold. An air blast into the tube forces it out against the mold, which is then opened, allowing the blown piece to be removed. Since air pressures seldom exceed 80 psi, molds can be made from low-cost materials and tooling up is fast. The plastic is formed at relatively low temperatures. That means faster cooling. Refinements of the basic process allow cost-cutting automation. Even injection molding equipment can be adapted to the process for special requirements.



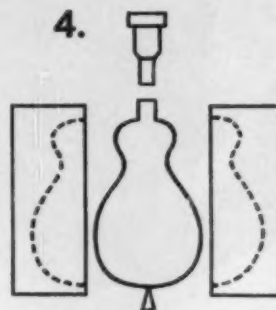
1. Tube of heated plastic is extruded into open mold



2. Mold closes over extruded tube



3. Air forces tube against mold sides



4. Mold opens to release product

**50% cost reduction was just
one of the benefits...**

This traffic blinker housing is two feet long. It, too, is made in *one piece* by blow molding high-density polyethylene. Any other technique would have required a two-piece assembly. Previously constructed from sheet metal stampings, it required not only assembly but a separate coating operation as well. Blow molding saves 50% of former production costs! Molds can be made quickly and inexpensively. The color is molded in. BAKELITE Brand high-density polyethylene also gives the product lightness, rigidity, and durability.



IN PLASTICS

Since participating in the development of the squeeze bottle, Union Carbide has been refining the techniques and materials for blow molding. Facilities for studying production-line blow molding at the Bound Brook, N. J., laboratories are unsurpassed. A battery of blow molding machines there reproduces every set of conditions encountered in the process. This equipment, in addition to providing basic knowledge about blow molding, helps in developing new BAKELITE Brand polyethylenes—high-, medium-, and low-density, and copolymers. You can select from the greatest variety available at one source, confident of getting the formulation best suited to your needs.

For information on application of these materials and processes to your products, write Dept. 1Q-73, Union Carbide Plastics Company, Division of Union Carbide Corp., 270 Park Ave., New York 17, N. Y. In Canada, Union Carbide Canada Limited, Toronto 12.



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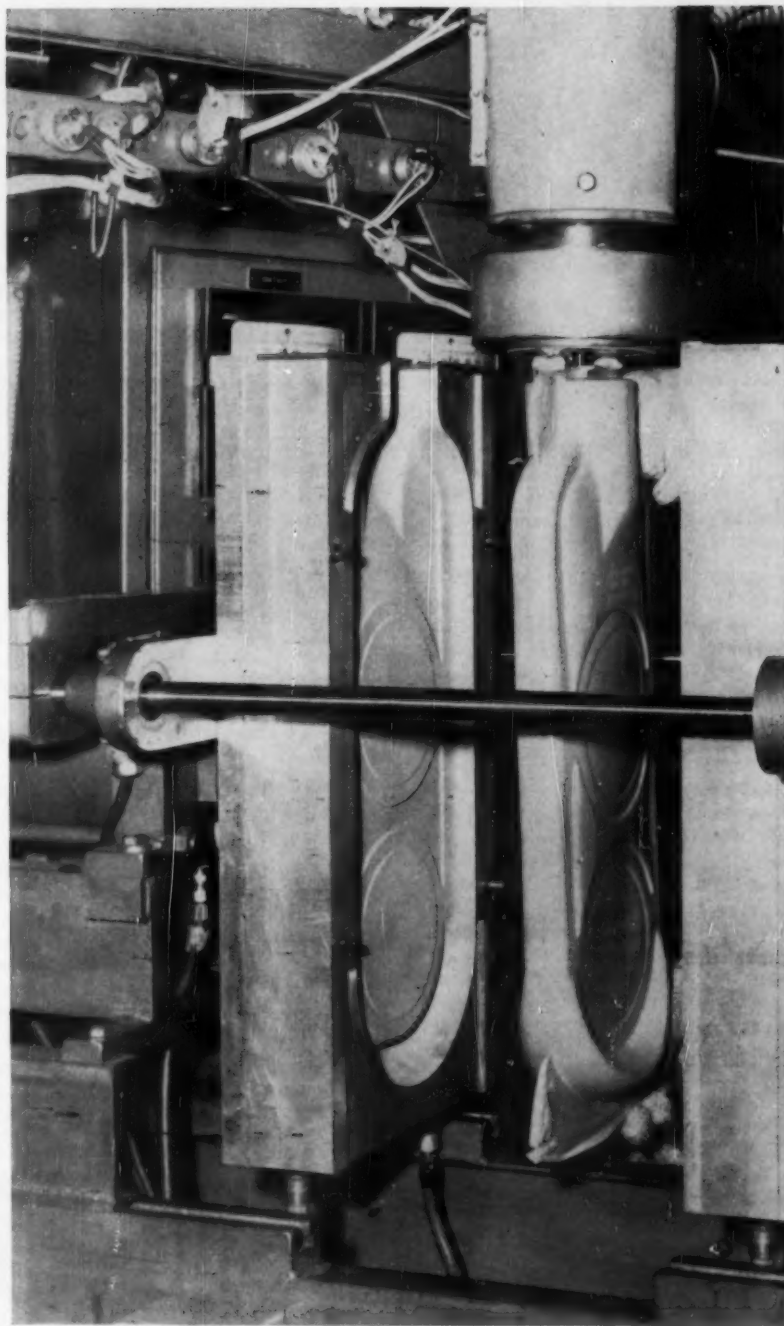
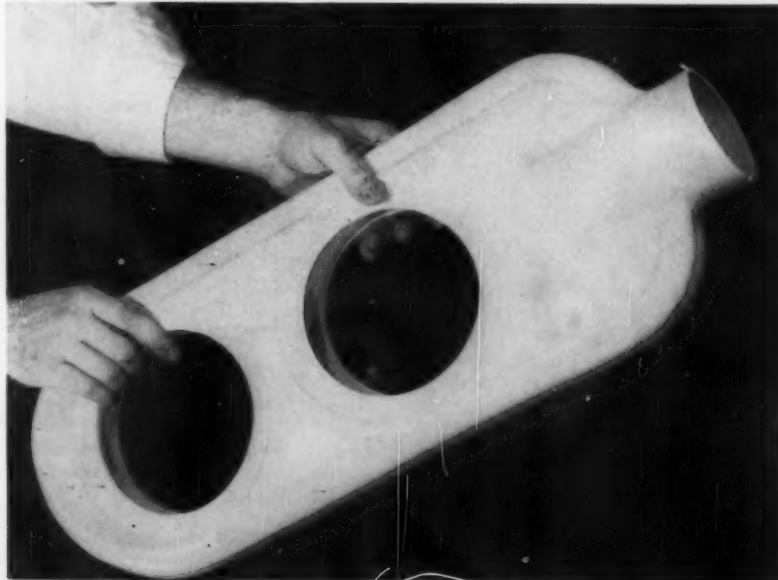


PHOTO MATERIAL COURTESY OF DE WITT PLASTICS



NEWS continued

People

ELECTED: Ray Cassidy (below), as chairman of the Southern New England Chapter of the Industrial Designers Institute. Gerald Ewing is vice chairman; Gary Barsumian, secretary; Yasha Heifetz, treasurer. (George Goshco, of George Goshco Associates, Valley Stream, Long Island, was appointed national IDI trustee.) . . . Carl Bjorncrantz and John Griswold as Fellows in the Industrial Designers Institute.

APPOINTED: Richard Osborne (below), formerly with Smith, Scherr & McDermott, as director of package design and graphics at F. Eugene Smith Associates, Bath, Ohio. . . . Charles B. F. Sharp (below), previously in charge of sales at Peter Schladermundt Associates, and Robert H. Weait (below), previously editor of "Pre-Pack-Age" and manager of market research and new display development at the Nevins Co., as vice presidents of Alan Berni and Associates, New York. . . . Christman Dawn (below), former design director with Lippincott & Margulies, as director of package planning and graphics at Merendino/Greene and Associates, Pasadena, California. . . . George S. Gardner (below), previously project supervisor on trade fairs in Vienna and Zagreb, and the Atoms for Peace Exhibition in Geneva, at Walter Dorwin Teague Associates, as director of design with Peter Quay Yang Associates, New York. . . . Robert D. Pfister, formerly with Greenlee-Hess, as executive

a member of the National Screening Committee on Fulbright Awards in the field of industrial arts of the Institute of International Education for the academic year 1961-1962. . . . Douglas F. Kelley is serving as managing director of the Compagnie de l'Esthétique Industrielle in Paris. . . . Harry W. Fritts as development manager, containers and packaging, Alcoa, to develop aluminum uses in packaging drums, foods, non-foods, tobacco, and military items.

Company News

RETAINED: Harley Earl Associates, Warren, Michigan, by Massey Ferguson, Ltd., the Durham Co., La-Z-Boy Chair Co., and Wood Shovel and Tool Co. . . . Henry P. Glass Associates, Chicago, by Murphy Miller, Inc. . . . Van Dyck Associates, Westport, Connecticut, by the Electromode Division of Commercial Controls, the Dexter Co., Devar Systems, Haydon Division of General Tim Corp., the Miller Co., Optics Mfg. Co., Sandia Corp., and the Vir Tis Co.

OFFICIALLY ANNOUNCED: The new firm of F. Eugene Smith Associates in Bath, Ohio (see ID, September 1960).

EXPANDING: Ken Schory Associates, Park Ridge, Illinois, to Schory-Steinbach Associates, with the partnership of Thomas M. Steinbach, the firm's managing director. . . . Charles M. Huck—Industrial Design, New York, with the opening of a second office at 77 Paterson Street, New Brunswick, New Jersey.

GOING PLACES: Forest Wilson Associates, Chicago, to 1515 North Harlem, Oak Park, Illinois. . . . The National Society of Interior Designers to Suite 700, 157

The Owens-Corning Fiberglas Corporation will award an annual "Reinforced Plastics Design Award" for the product chosen by a Society of the Plastics Industry jury as most outstanding. The award will be given at the Technical and Management Conference and Exhibition of the SPI next February 7th, 8th and 9th, and will be in the form of a crystal sculpture designed and made by Steuben Glass.

The Charles Eliot Norton lectures at Harvard this year are being delivered by three of the chief figures in contemporary architecture, all of whom are primarily engineers. Felix Candela lectured for a month prior to Christmas, R. Buckminster Fuller (below) will lecture during February and March, and Pier Luigi Nervi during April and May. The lectures are open to the public.

Graphics expert Herbert C. Rosenthal will give an evening course on "How to use graphics to communicate facts, figures and ideas more effectively," starting January 17th. The American Management Association is sponsoring the course, which is open to members and non-members alike, and which will be held on consecutive Tuesday and Thursday evenings for two weeks at AMA headquarters in the Hotel Astor, New York.

The design philosophy and engineering theories of R. Buckminster Fuller (below) are being sound-film recorded at Southern Illinois University, where Fuller is a research professor. Basis of the production will be twenty to thirty hours of film recordings now being made of Fuller's SIU classroom studies. This record will be edited and combined with animation and other material illustrating



designer at Van Dyck Associates, Westport, Connecticut. . . . Aaron Donner to the staff of Turoff Design Associates, New York. . . . Donald I. Kane to the industrial design department of Remington Rand Univac Military Department as a human factors engineer. . . . James W. Graham (above) to the industrial design staff of Farrington Packaging Corp., Needham Heights, Mass. . . . Howard O. Brown as head of the industrial design department at Cranbrook Academy of Art in Bloomfield, Michigan. . . . Trace Christenson, Jr., managing partner of Good Design Associates, South Bend, Indiana, as a regional state director in charge of Indiana on the membership committee of the Building Research Institute. . . . Ernest E. Kirwan, assistant professor of architecture at the Rhode Island School of Design, Providence, as

West 57th Street, New York. . . . Irv Koons Associates to 8 East 48th Street, New York.

RE-CHRISTENED: THM Partners, London, England, to Tandy, Halford & Mills, Ltd.

Events

The third annual National Society of Interior Designers Fabrics Fair will be held at the Hotel Pierre, New York, on January 24. The show will include an exhibition of fine decorative fabrics in a standing display and a fashion collection designed by Maria Sandi to illustrate the theme of "Design Periods of the Ages." NSID's 1961 Distinguished Editorial Award will be presented at the Fair to an outstanding journalist for distinguished reporting in the field of interior design.

lecture points. The final product, in segmented form, will be housed at SIU and will be available to nation-wide circulation. New York film producer/designer Francis Thompson (see page 58) is directing the film, which is being jointly produced by his firm and SIU's own film production unit and design department.

A retrospective exhibition of Movie Posters is on view at the Museum of Modern Art in New York until February 5th. Selected for historical interest and graphic excellence, the 45 examples range from an 1898 advertisement for Edison's Kinetoscope to Saul Bass's recent work, and they come from nine countries. With the aid of a grant from the CBS Foundation, the exhibition will travel to several U. S. cities during 1961-62. END



This is a "warhead". It's the front end of a carrier which darts through a pneumatic tube system at speeds up to 20 mph, and is subject to frequent shocks and impact. There's a story behind the choice of LEXAN® polycarbonate resin for this new design . . .

Formerly, destinations were set by contacts along the entire body of the carrier. Engineers of Airmatic Systems Corporation, Saddle Brook, New Jersey, reasoned that if all the control elements could be fitted into a small impact- and wear-resistant head, the rest of the carrier could be designed for easy maintenance and quick replacement. Many plastics had the required dielectric strength, but none

could measure up to LEXAN resin's combination of good electrical properties, excellent dimensional stability and extremely high impact strength. LEXAN resin actually withstands over 12 foot-pounds per inch of notch — an impact strength attained by no other plastic!

The new warhead is injection-molded of black LEXAN resin by Berkeley Engineering & Manufacturing Co., Berkeley Heights, N. J. Now when wear and tear take their toll, the transparent carrier body is easily replaced, since it has no control elements. Also, body length can be varied to suit customer needs, and carrier weight is reduced. Printed circuits and compactly arranged brushes and con-

trol plates are used. The new design is more attractive, more practical, less costly. And—LEXAN resin warheads have proved in field tests to last longer than the old control units.

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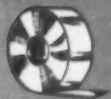
ON THE MANTLE



ON CARPETING



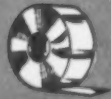
ON THE PATIO



These eye-catching products use functionally a basic Nickeloid Metal. The finish of Chromium, Nickel, Brass or Copper is electroplated to a base metal, usually Steel (but often Zinc, Brass or Copper).



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Walter Dorwin Teague 1883-1960

One of the most clearly irreplaceable figures in industrial design died last month. All death is shocking and, for reasons no one understands, the death of a seventy-six-year-old man is no less shocking than any other. But Walter Dorwin Teague's death was shocking in more than a personal way: beyond the keen loss sustained by those who knew him, there was the professional loss; something solid and reliable that had always been with us, suddenly wasn't. Everyone concerned with any aspect of designing for industry is aware of the tangible contribution of Walter Dorwin Teague and his associates, reflected in the sampling of achievements on pages 28 and 29. It is a mark of Walter Teague's peculiar role as a pioneer in American design that the impressive volume of his work is dwarfed by his statesmanship in the field he helped found. Yet his early work never lost its hold on the informed imagination, and only a few days before he died, *Esquire* magazine, in discussing the creation of the Marmon V-16, attributed much of its magnificence to "Walter Dorwin Teague, a man of great artistry who knew how to rise to the occasion." The phrase is felicitous: Teague was a man who rose to occasions, whether a week-end in the country or the establishment of a new profession.

Someone responded to the news by remarking, "This means that we're on our own now. There comes a time in the figurative life of a profession when you grow up, leave school, and go to work." It struck us at the time as a curious and badly overstated sentiment, but it turned out to be a fairly common one. Designers in their fifties, after discussing business matters with Mr. Teague, have confessed to feeling like a boy asking the old man if he could have the car for tonight.

It has become trite to call him "the dean of industrial designers," yet this is what he was, and—as the editor of *Interiors* pointed out ten years ago—he did not blush at the epithet. Henry Dreyfuss saw Teague as "an elder statesman with young ideas, whose standards and ethics were to form the basis of our profession." However one labeled Teague's position, there was no questioning its force, or the seriousness with which he took it. Teague was in this respect like the crusty Army sergeants who pride themselves on never ordering their men to do anything they are not prepared to do themselves. If he was paternalistic, the paternalism was buttressed at every point by a sense of the duties of his high, if unofficial, station. "Sure, Walter was a sort of father image to us," one of his friends recalls soberly. "But it is very important to remember also that he was willing to assume the parental responsibilities—including that of administering a spanking when he thought it necessary."

It is more than 25 years since Gilbert Seldes wrote: "Teague is not the most spectacular of the American industrial designers, but he is one of the most practical and he is easily the most articulate in communicating his principles." Teague never did become spectacular, and he never became any less practical ("He brought a lot of Pendleton, Indiana, with him when he came East," one of his partners observed several months ago), and he remained one of industrial design's most articulate spokesmen. His diction, both spoken and written, was always clean and precise; while in many respects Walter Dorwin Teague took on the aura of big business, he never let it affect his language adversely. In *Design This Day* he not only heartening-



ly analyzed industrial civilization and explained the role of industrial design in it; he convincingly expressed the designer's stature. Few other books on the subject, however well-intended, have been able to do that.

His literacy, like his passion for rectitude, was a legacy. When his circuit-minister father died, he left the family an impressive library and a pair of horse pistols. It is obvious to anyone who has ever had a ten-minute conversation with him that Teague had had access to the library. But the horse pistols, too, are significant—at least as a symbol. For Teague was a fighter. His clients, his fellow board members of the American Society of Industrial Designers, his partners, and his co-professionals everywhere will remember him as a man who knew what he believed, defended it, and did everything he could to implement it. Once Peter Muller-Munk commented on this vitality, and received from Teague the following reply:

"Maybe I am rough in a fight, but I am a Civil War buff and have learned a lot from my reading on this subject. I have found that there were two kinds of generals who never accomplished anything in this struggle. . . . Those two kinds of no-good generals were, first, those who were continually worrying about their own status and prerogatives; very sensitive to slights and terribly distressed if they thought some other officer had received greater preferences than they. The men who emerged as really great were men like Grant, Lee, Stonewall Jackson, Sherman and Sheridan, who were thick-skinned and were too busy getting on with the job to worry about their prerogatives.

"The second class of no-gooders were the men who would never enter a battle unless they felt absolutely sure of winning—which apparently they never did. The fellows who got places, such as those I have named above, took long calculated risks and then took into a fight everything they had.

"I much prefer sweetness and light, and I think I can dispense them as well as anybody when it's called for. But there are times when you need to get rough, and then I don't pull my punches. . . ."

Walter Dorwin Teague Associates is a large office, and Teague himself took deep satisfaction in this. From the very beginning he had the respect and admiration of management. Unlike many designers, he did not find size incompatible with his personal goals—in fact, it probably was essential to them—and he never pretended that his drafting room was an atelier, although he was convinced that he could offer clients a truly personal service which consisted of the infusion of his own personal values into their business. The Teague organization has not just size, but weight. Even its terminology sometimes approaches officialdom: branch departments are called "task forces," and the phrase "the Teague office" is spoken with the same institutionally authoritative air of, say, "Foreign Office" or "Bureau of Weights and Standards."

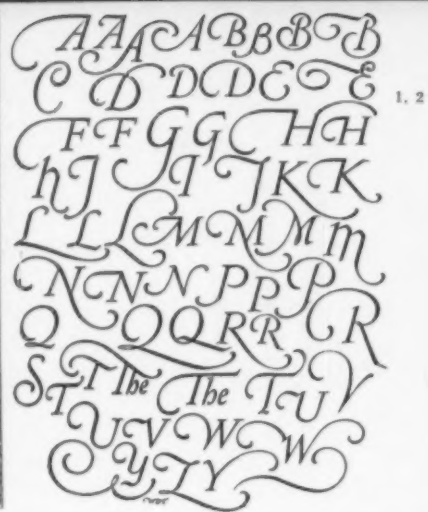
A good many years ago a group of young designers in the back room of a major office (not WDTA) were amusing themselves by composing satirical rhymed couplets based on the surnames of their professional elders—the men who had established industrial design. There were rhymes for Loewy and Deskey and Chapman and Arens, conceived in the spirit of fraternity boys imitating faculty members during the pan-hellenic stunt night. But one couplet was not a parody at all. It went like this:

Walter Dorwin Teague

Is big league.

And that — without question — is what he was. — R. C.

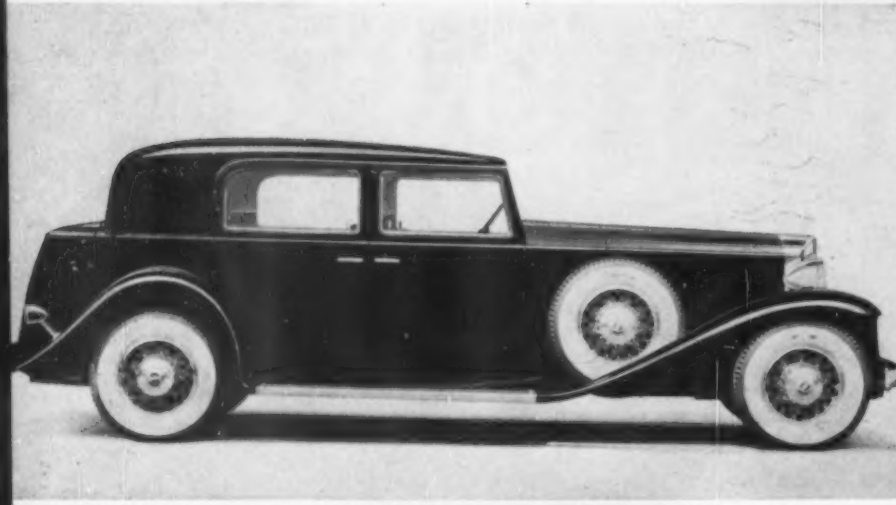
Walter Dorwin Teague was born on December 18, 1883 in Decatur, Indiana, and grew up in Pendleton, Indiana, where his father was a Methodist minister. Teague came to New York in 1903 to be an artist, studied four years at night at the Art Students League, and for a time worked in an advertising agency. In 1911 he opened his own small office, specializing in—and acquiring a reputation for—typographical designs for books and advertisements. The office began calling itself an industrial design firm in 1926, and in 1927 signed a contract with its first major client, Eastman Kodak. Other important early projects were the Marmon car (which Teague designed in collaboration with his son, Walter Dorwin Teague, Jr.) and a number of buildings for the 1939 New York World's Fair. Diversity continued to be one of the Teague office's trademarks, ranging from graphics for a brewery to quality control in the assembly of complex firing mechanisms, developed for the U. S. Navy's Bureau of Ordnance, and used on the Talos, Terrier, Tartar, and Polaris missiles. Teague had been president of the AIGA, and was the first president of the ASID.



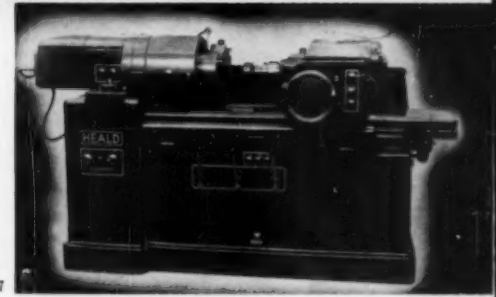
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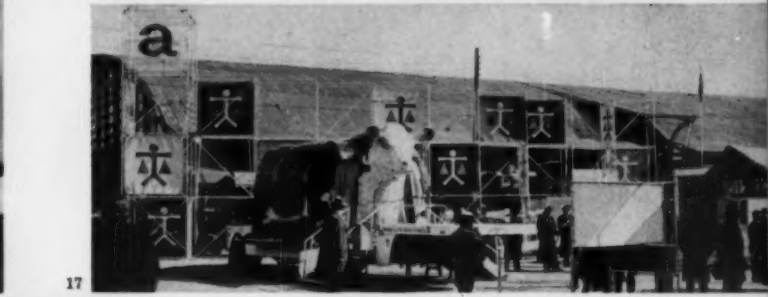
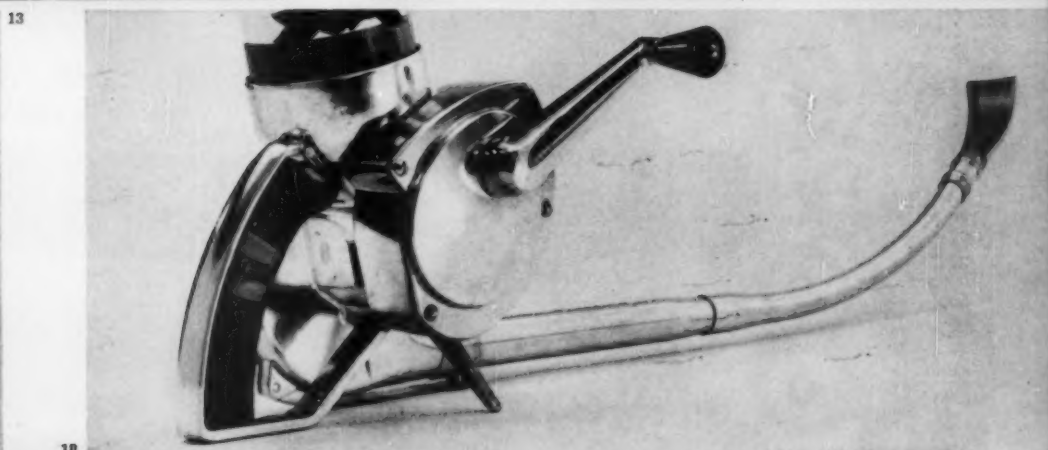
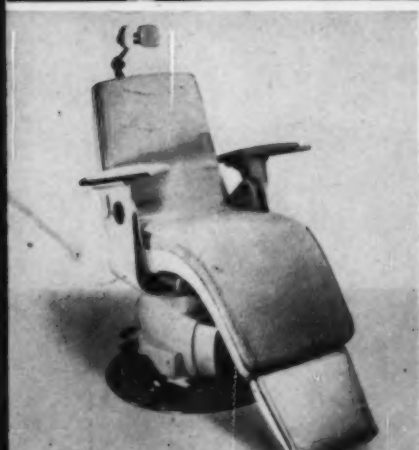
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Walter Dorwin Teague's first career as graphic artist produced designs for alphabets and the famous "Teague borders" (1, 2) in the 1920's. The 1930 Marmon (3) was one of his earliest three-dimensional projects, although his first (1926) industrial design client was Eastman Kodak, with whom he developed the all-plastic Baby Brownie (4). Introduced in 1933, it remained on the market unchanged until World War II, at one point sold for 85 cents. The Teague office still serves as consultant to Eastman Kodak. It is also still consultant to National Cash Register Company, which first retained Mr. Teague in 1935, and for which he designed the Model 100 (5) in 1939.

Among the earliest examples of Teague's exhibition and building design was the Ford building (6) at the 1939 New York World's Fair. For Heald, in 1940, he redesigned the enclosure for its boring machine (7); and for International Minerals & Chemical Corp., he redesigned the packaging for Ac'cent (8) between 1951-56. The Teague-designed Scripto pen (9) appeared in 1952, and was the first pen to offer a wide range of really bright colors. General Foods' bubble-topped display units (10) for traveling exhibits were designed, in 1957, to accommodate various themes.



The Teague office has been designing stores for the Boston firm of S. S. Pierce since 1949; the Peabody branch (11) was completed in 1958. Cadet's quarters (12) was one aspect of famous job for Air Force Academy, an academic city of 12,000 for whom the Teague office designed or selected 60,000 items ranging from furniture to toothbrushes. New kind of dental chair (13), developed in conjunction with Ritter Company and Dr. Sanford Golden, appeared on the market in 1959. For Boeing, one of its largest clients (1200 separate projects), the Teague office designed interiors for a VIP version of the 707 jet (14).

Schaefer beer label was Teague's first project in the packaging field and is also, in the redesigned label (15), one of the latest; the new design also appears on the brewery's trucks (16). Among numerous Teague-designed trade fairs was U. S. Department of Agriculture mobile exhibit (17) which toured Europe in 1959-60. Scott rose feeder (18) is one of recent projects for manufacturer of lawn care compounds and equipment. Polaroid 900 (19) is Teague's latest camera for another long-time (20 years) client.





Design for limited editions

Short-run production challenges the designer with tighter budgets and—as a result—fewer available tooling methods and a more limited selection of materials BY LESLIE D. GOTTLIEB

In an economy geared to mass production, one of the most formidable problems for the designer is how to keep costs down on products that are *not* mass produced. The challenge is one of low budgets—which means not only limited selection of tooling method, but also limited design capabilities within each method. Some methods cannot handle complexity of shape; others result in poor surface finish; and almost all low-cost tooling methods have lower dimensional tolerances, and cannot accommodate special features. But good product design is no less imperative with short runs than it is with mass runs, and the designer must therefore find ways to overcome these limitations. Some examples of how designers have solved short-run problems are presented on pages 33-35. A sampling of new tooling techniques that can facilitate design and lower production costs are described and illustrated on pages 37-41.

The process of determining whether or not a product warrants mass production or short-run production tooling is strictly one of economic analysis—including the cost of the tools, the size of the market, availability of facilities, and desired delivery time. The presumed sales figures that would justify expensive mass-production tooling can be 50 or 5,000 items. It is a relative figure depending on the normal production capacity of the manufacturer and the industry. Orders for 500 laboratory scales a year might be enough to justify mass-run techniques and expenses. But the same number of refrigerators would probably make it necessary for the refrigerator manufacturer to set up special short-run tooling facilities.

Short runs may be feasible not only for products with numerically limited sales, but also for models for design and engineering evaluation and market testing.

Design problem peculiar to market testing

Since products for market testing must be almost identical in appearance to the projected mass-produced product, designers are faced with an intriguing problem: how to design within the capabilities of a short-run, low-cost tooling method, and make the design suitable for the proposed expensive mass tooling method, which allows greater design freedom. Often, once the client sees the original form of the product, he forgets the circumstances under which it was created, and thinks it has to continue to look the way it does and cannot be changed.

Don Dailey Associates of Evansville, Indiana, faced this problem when they were asked to design a rototiller housing for inexpensive initial production. For reasons of economy, they designed the housing as a sand-casting, knowing that if the product proved popular, it would be die-cast in mass production. When the manufacturer, intent upon maintaining product continuity, decided to switch to die casting, he insisted that the mass-production tools duplicate the form and appearance of the sand-casting, instead of permitting Dailey to take advantage of the richer visual effects possible with the more expensive method.

On the other hand, Monte Levin of New York City found that he *was* able to persuade his client to utilize injection-molding techniques to improve the appearance of a fan housing, first designed in sheet metal, when the unit was put in mass production.

However, Melvin Best of Melvin Best-Fujioka Industrial Design, Pasadena, California, felt it unnecessary to convince Photo Research Corporation to change the design of a photo spot meter he did for them when they switched tooling from short-run sand-casting to die-casting. The initial design still satisfied Best, and he saw no reason why the product should not look the same in its mass-run form as in its short-run form.

The problem, then, is confined to those cases where the designer is unable to produce one design that satisfies him when manufactured both in short-run and mass-run form, and when the client is unwilling to change the design when changing tooling. In this type of situation, the designer has to educate the client to take advantage of the design extras possible with mass-production techniques.

Traditional short-run methods

The relative low cost of short-run methods provides the manufacturer with a built-in safety valve: he does not have to risk heavy investment in tooling to put a product on the market. Another advantage is speed of delivery. For example, a wood pattern used in

sand-casting can be made in a matter of days, but steel dies, which often must be machined, may take three months for delivery.

The designer generally uses the following methods for short-run production in metal: sand casting; investment casting; impact extrusion (a slightly higher cost process, but, in some cases, dies cost under \$200); spinning; flexible die forming (in which a rubber pad, or hydraulic fluid action under pressure, substitutes for one die member to reduce the cost of sheet-metal press-forming dies); and sheet-metal fabrication techniques such as welding, brazing, bonding, tangent bending, braking, etc., which do not require the construction of special tools and dies. Sectioned metal tubing can be converted into mechanical parts by bending, flanging, flaring, expanding, flattening, grooving, etc.

For short runs in plastic, designers generally call for mechanical forming (limited to bending and beading), vacuum forming of sheet stock, and hand lay-up of molded fiberglass—generally because some die casters or injection molders can construct tools and produce a limited number of parts at a lower cost than the equivalent short-run method. One of Laird Covey's clients, for instance, located a molder willing to do this on a short run of business machine buttons (see page 34).

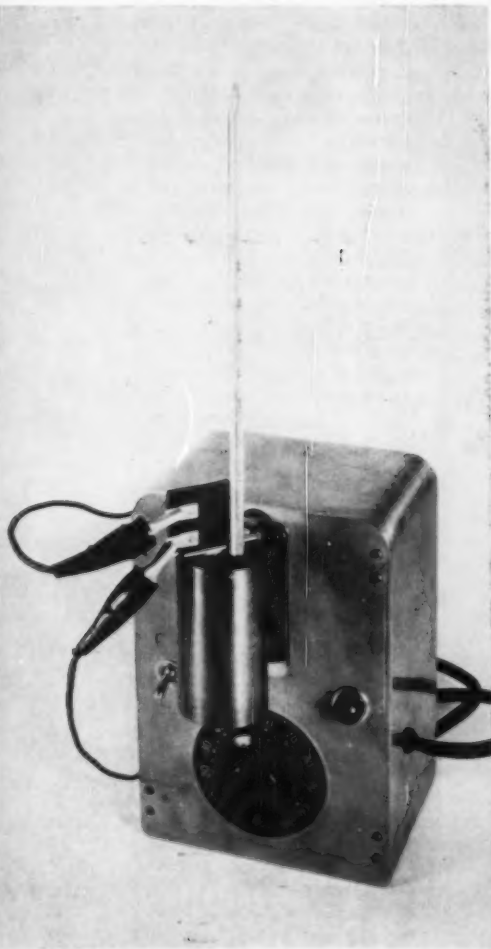
Money-saving design approaches

"The opportunity to recommend new tooling techniques is not frequent," says Dan Cardoza, product designer at Walter Dorwin Teague Associates. In most cases, he goes on, techniques are obvious; in others, the designer is told he must work within the manufacturer's facilities and use existing tooling or stock items. However, the designer does have ample opportunity to lower production costs by a variety of different approaches. He can, for example, design a basic mass-run unit with an assortment of mass- and short-run accessories when the manufacturer has a multi-product line of similar mass- and short-run items: a line of chairs could have a compression-molded seat, and both mass- and short-run bases. The manufacturer can use the former for what he believes will be the popular chairs in the line, and the latter for the more expensive and individual items.

When a small manufacturer wants to compete with expensively tooled products of larger manufacturers, the designer uses a low-cost technique or combines several low-cost techniques. Thus, Paul Wrablica Associates of New York City designed a hassock fan housing of sheet metal with a spinning for the top and welded heavy gage wire for the open areas, to compete with the expensive one-piece injection-molded enclosures already on the market.

Also of great value to designers are manufacturers of short-run stamping dies, such as Dayton-Rogers

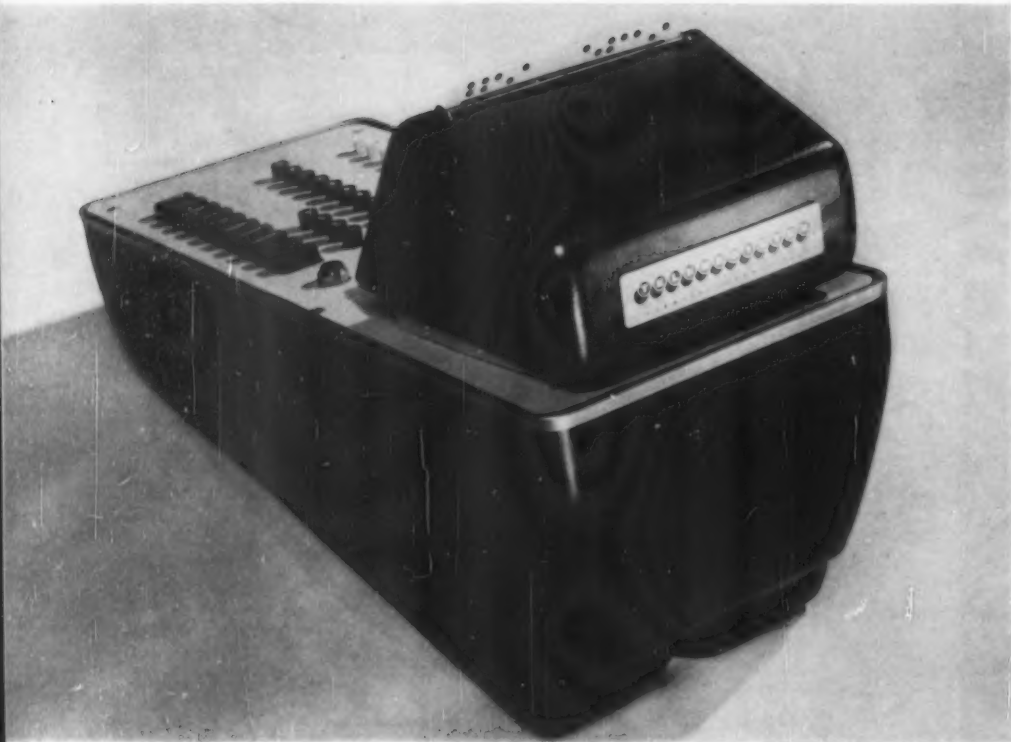
*A number of ways—some of them ingenious—
in which designers have been able to get
around the limitations of low-cost tooling*



Paul Wrablica Associates, asked to design a carrying case for a thermostat tester, redesigned the tester to eliminate the need for a separate case. Wrablica felt that the \$3,000 originally earmarked for trimming and drawing the stainless steel enclosure was much too high for the small production of approximately 100 units per year which Spenser Thermostat Division of Metals and Controls Corporation sells. The major cost-saving resulted from replacing the stainless steel box (far left) with a sand cast aluminum shell (pattern cost, \$60), and a much smaller stainless steel enclosure (left). Since it is very difficult to obtain flat surfaces in sand castings, Wrablica—turning the handicap into an advantage—curved the top and back of the shell to avoid unequal sagging, and included three runners on the bottom to serve as feet. The top curve also provides deeper gripping space beneath the handle. To avoid excess tooling expenses on the new enclosure, he sheared, bent, and punched it (for ventilation) with standard dies. Also, to protect the operator from possible injury, he transferred the control knob to the side of the enclosure, away from the heat unit. Wrablica's redesign resulted in a savings on tooling cost of several thousand dollars.

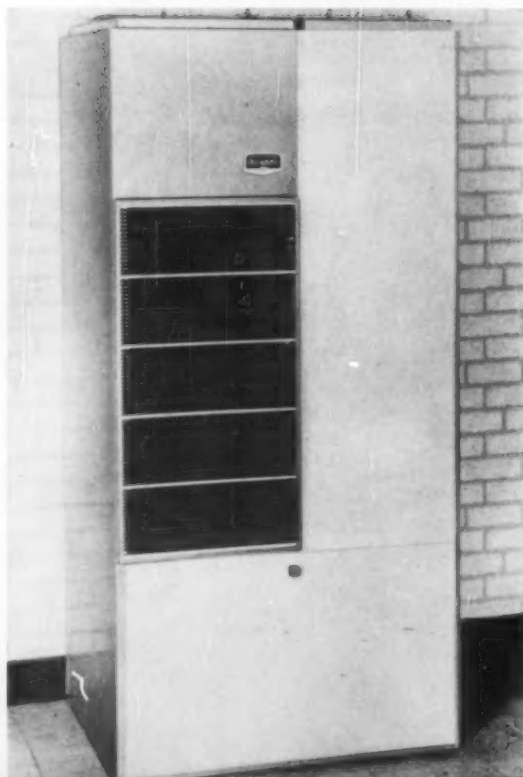
Henry Keck Associates combined a short-run tooling method with a mass-run method for a laboratory instruments case they designed for Statham Instruments, Inc. Keck needed a larger number of identical cases and only a few different insert trays to hold the different proportions and shapes of the various instruments. Therefore, he injection-molded the case from Cyclocac plastic and vacuum-formed the inserts with inexpensive wood patterns. He saved further expenses by photo-etching the stainless steel nameplate on the case and bending it on a brake rather than making tools for stamping.





When Laird Covey redesigned Teleregister Corporation's airline ticket reservations keyset, (left), he substituted two vacuum-formed housings for an aluminum sand casting which had required machining and painting and had a high casting rejection rate. He selected a co-polymer sheeting (Boltaron) for the housings because of its electrical insulation properties, durability, and the fact that it is pre-colored. For the top cover plate, he used a plastic laminate (Textolite), and milled out the key holes. Covey's first suggestion for the key tops was machining; however, they were finally molded because the company found a molder who would competitively injection-mold them. He also re-arranged the assembly of the unit because of the flexibility of the plastic housing. In the new unit, the chassis is hung from the main support plate, located beneath the cover plate, and supported by two internal frames running the length of the lower housing. In the previous sand cast unit (above), the chassis was dropped in from the top, and rested on the top edge of the aluminum sides of the housing. Covey's redesign cut the cost of the entire housing and assembly in half.

Don Dailey & Associates made use of existing tooling when they designed a market testing version of a combination furnace and air conditioner for Bryant Manufacturing Company. The unit (right) was directed towards homes where space was at a premium; consequently, Dailey was asked to refine the details of ventilation and color so that it would not have to be closeted. His solution was to use previously tooled louver dies in multiple applications to provide both the necessary ventilation openings and an overall decorative effect. He added three inexpensive brake-formed panels to complete the face instead of designing it as a single piece, which would have cost more. To give the unit a "home appliance" look, and to distinguish functions, he used white for the air conditioning and gray for the heating elements.





Monte Levin submitted designs for both mass-run and short-run tooling to Air Kem, Inc. because the company was uncertain of the size of the market for their deodorant-dispersing fan. Levin worked out an enclosure design in sheet metal (left) for the short run, and reduced expenses on it by utilizing a combination of existing tooling, stock items, and low-cost special tooling. He bent and welded the box from sheet steel, and used a special piercing die to form the open area, for air circulation, on the front cover. Welded wire covers the open space to guard against potential injury. Levin used existing tooling for the trademark button and its cut-out, and for other similar cut-outs on the control side (left panel) and rear of the box. The handle is a stock item, and the name plate is inexpensive adhesive-backed plastic tape. After selling nearly 4,000 of these units, Air Kem decided to switch to Levin's mass-run injection molded polystyrene enclosure (lower left)—with tooling costs of \$30,000 as compared to \$1,400 for the sheet metal unit.



Richard Hollerith, Jr.'s design for Monroe Calculating Machine Company's recent (February, 1960) Monrobot XI computer keyboard input unit (left) specified an aluminum sand casting made with a two-part pattern (cost \$250). Hollerith split the pattern because he anticipated that the company might want to widen the keyboard to add more input keys at a later date, and he wanted to save them the expense of making a new larger pattern. He cut and bent the cover panel from sheet steel, and used standard punching dies for the keyhole cut-outs. The keys are made in a temporary mold and then engraved. To disguise the surface roughness caused by the casting, he sprayed the unit charcoal grey vinyl.

Manufacturing Company, Minneapolis, Minnesota, who have specific experience with a wide variety of short-run problems, and who stock "libraries" of dies running into the thousands of units. When one of them can be utilized, the fabricator charges only a small set-up fee.

For multiple punching operations in sheet metal, there are also adjustable punches and dies, such as those manufactured by O'Neil-Irwin Manufacturing Company, Lake City, Minnesota. These units, trade-named Di-Acro, can be used to punch a number of holes of varying size and shape in one operation. They can cut material as thick as 16-gage steel and 1/4-inch aluminum to a tolerance of plus or minus .005 inch. The punch and die holders are arranged by means of a template into a variety of hole patterns. The arrangement can be changed as required, and the tooling is completely reusable. The Di-Acro tool sets save money on short runs because they do away with punching or drilling holes individually, and they obviate the need for making permanent dies.

Short-run tooling with plastics

Several recent developments in tooling make it possible to use forming methods that were once taboo for short runs. For the most part, the new developments hinge on the substitution of easier-to-work and cheaper epoxy plastic dies for metal dies. The aircraft and automobile industries spearheaded the use of plastics for dies in the late 1940's. Today, they are found in most fabricating industries. The metal-forming industry employs epoxies for stretch dies, draw dies, flexible forming dies, drop hammer dies, foundry tools, and hand hammer forms. The plastics-forming industry uses them for vacuum-forming patterns, foam-forming patterns, matched dies for low pressure molding and, most recently, for temporary dies for injection molding.

The advantages of epoxy tools, which are constructed either by casting or laminating, are manifold. They cut costs—in some cases, by a spectacular 80 per cent; they reduce lead time to a matter of days; they eliminate finishing, since the plastic accurately reproduces the finish of the model against which it is cast or laminated; they obviate matching and trimming of dies, because they are made from a single model, whereas metal dies are machined from separate metal blocks; they facilitate quick design changes, since they can be revised by recasting, resurfacing or chipping off (or adding more) plastic; they handle well because they are lightweight (one-fifth the weight of steel); and they store easily because they do not rust or corrode.

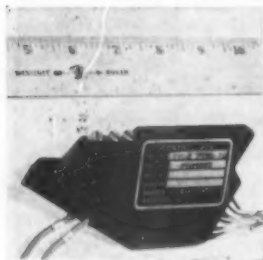
Very large tools sometimes call for a combination of casting and laminating. They may have a cast core to reduce costs, and a laminated surface for high shear strength on the corners. For other tooling applications, epoxies may be combined with other materials: metal cores to increase compressive strength; metal inserts

to pierce and shear (see page 39); foam cores to reduce weight and cost (see page 37); and various other fillers to boost resiliency and abrasion resistance.

The newest plastic tooling techniques include spraying a metal surface over a plastic backing to increase strength (Marblette Corp., Long Island City, N. Y.); spraying metal fibers to serve as a mechanical bond between epoxy and plaster (U. S. Gypsum Corp., Chicago, see page 38); pattern making with flexible silicone rubber molds (Dow Corning Corp., Midland, Michigan, see page 38); using transparent epoxies (that can be tinted any shade or color) for casting knobs, lenses and other transparent items which previously had to be machined or carved (Marblette Corp.); and modeling with special plastic formulations that replace mahogany (Ren Plastics, Inc., Lansing, Michigan).

Additional significant short-run methods

Besides plastic tooling, several other recent money-saving tooling developments have a special interest for designers. The Barber-Colman Company, Rockford, Illinois, has perfected a process for forming complex, odd-shaped enclosures in one piece; previously these could only be hand fabricated. The process, known as Polyforming, has already been used to form a temperature control box (see photograph, left), for the Titan missile system. Hand fabricating the box costs \$100 each in lots of five, and \$50 each in 1000-piece lots; Polyforming reduced the cost to \$45 each in lots of five, and \$9 each in 1000-piece lots. The company

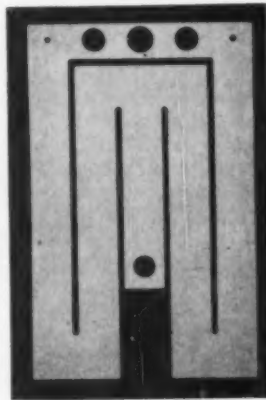


Polyformed box

is not revealing exactly how the process works, since patents have not yet been granted, but it does say that it involves a "metal dispersion" technique. Polyforming permits use of thin gages of metal not possible with any other method. However, the material used has a lower density than normal rolled sheets, and therefore its strength is less. Heat treatment, though, is said to double the strength. To date, stainless steel, aluminum and magnetic materials have been formed by the new process. The company believes that Polyforming will cut costs on any enclosure whose shape cannot be obtained by conventional tooling, and also on extremely complex shapes that are presently bent and welded.

The Dayton-Rogers Manufacturing Company, Minneapolis, Minnesota, produces extremely thin (up to .020 inch) metal shapes by photographic etching procedures. The company claims their process averages cost savings of 80 to 90 per cent over conventional tooling. All types of intricate shapes can be made to close tolerances, free of burns, and completely flat. The photograph shown

below shows a phosphor bronze spring used in precision switch equipment made with the process. Price per part in 1000-piece lots is 15 cents. The engineering charge is \$52 (a one-time charge—comparable to similar



Etched spring

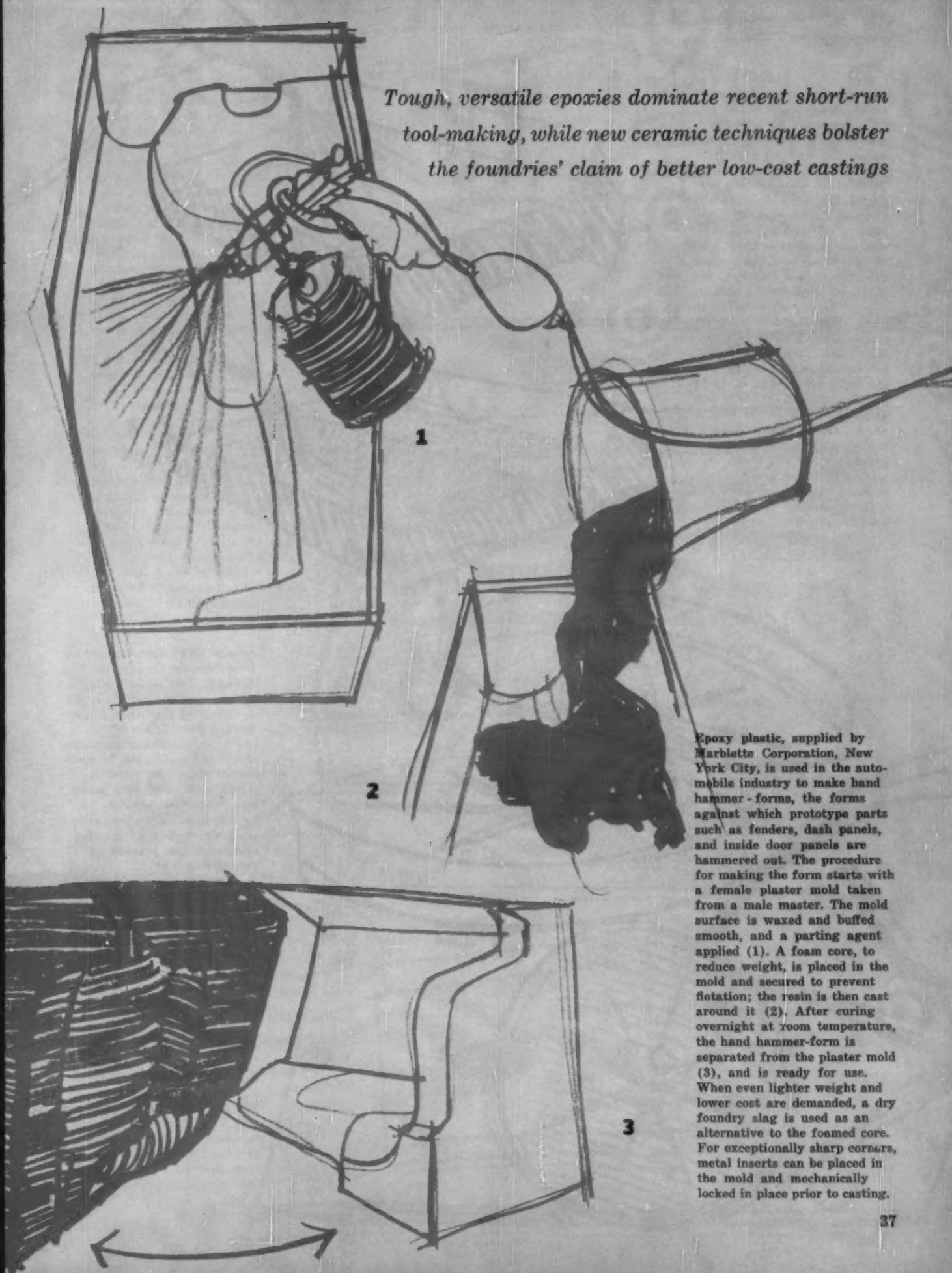
tooling set-up charges—that does not apply to repeat orders).

Templet Industries, Inc., Brooklyn, N. Y., has a process for making lighter, less bulky steel rule dies for piercing and blanking sheet metal. The cutting edges, made from hardened steel, are braced with specially hardened and moisture-resisting plywood. Templet claims its dies can be constructed for about 10 per cent of the cost of standard all-steel dies. The dies can be used with any stampable material, and have blanked gages of metal up to one inch thick. The company licenses the process to many major industrial firms, including RCA, Bendix, International Harvester, A. B. Dick, General Electric and Pratt & Whitney. Its performance may be illustrated by the following example: only 10 tool hours were required to produce a die to blank a one-half inch hot-rolled steel shape for an ACF Industries railroad car coupler part. Die material cost was comparably low, suggesting that designers might use these dies for experimental production.

Short-run tooling in the future

It is difficult to anticipate how short-run production techniques will be improved in the next 10 to 15 years. However, there is strong evidence that tape-controlled "robot" equipment will permit presently expensive machining operations to become short-run operations. While the cost of the equipment is still very high (running over \$150,000 for Kearney & Trecker's Milwaukee-Matic Model II combination production unit), its increased productivity and its ability to machine small numbers of parts with very little set-up time and without expensive labor costs, are already proving irresistible to manufacturers. Republic Aviation Company, which uses tape-controlled machine tools, regards them as the only practical means of reducing machining time, tooling costs and lead time for the great number of machined parts that they require. In their initial operations, they find that the cost of programming the tapes is 54 per cent less than the costs of fabricating models. Machining is reduced from 60 to 85 per cent, and tool storage and handling costs are reduced 85 per cent. When the savings these figures represent are added together, only the price tag of the tape-controlled machines can be called expensive.

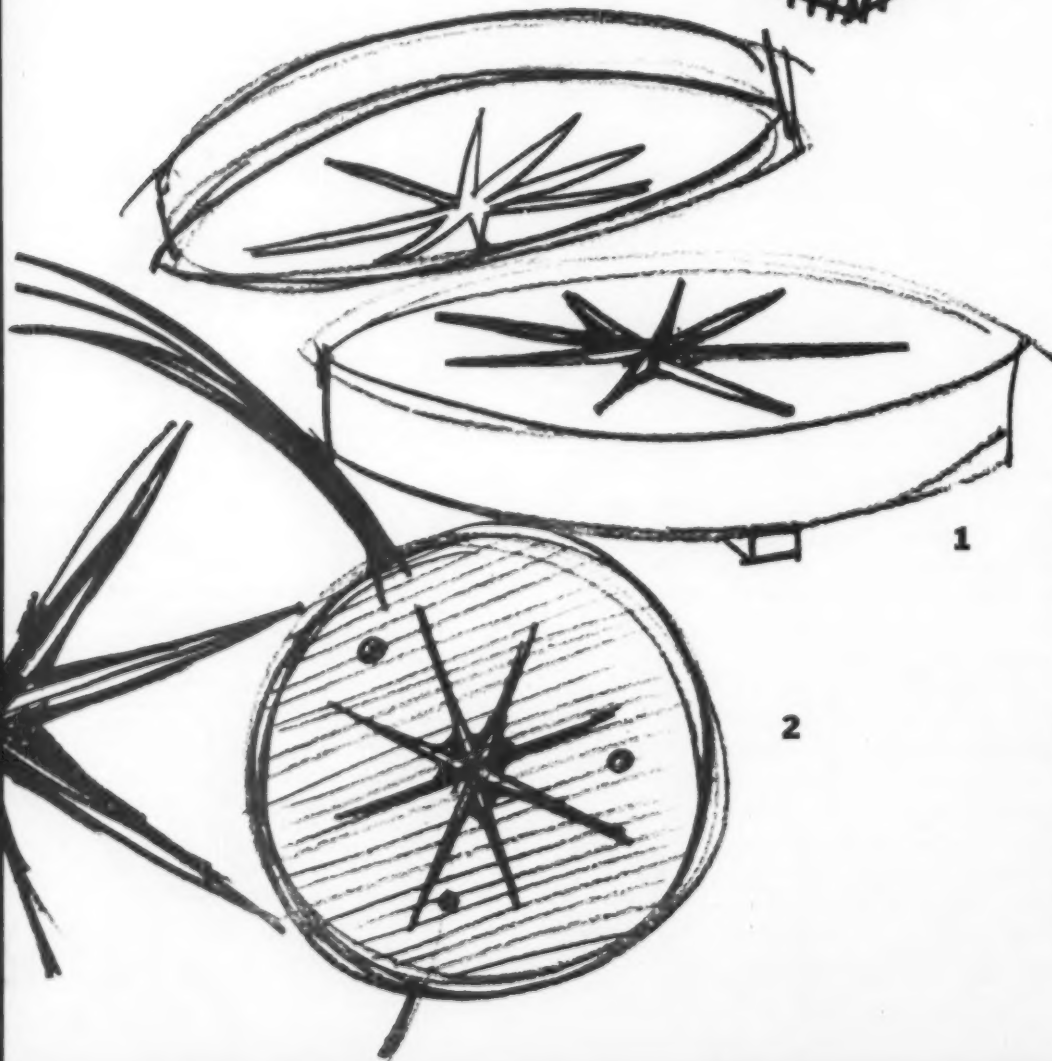
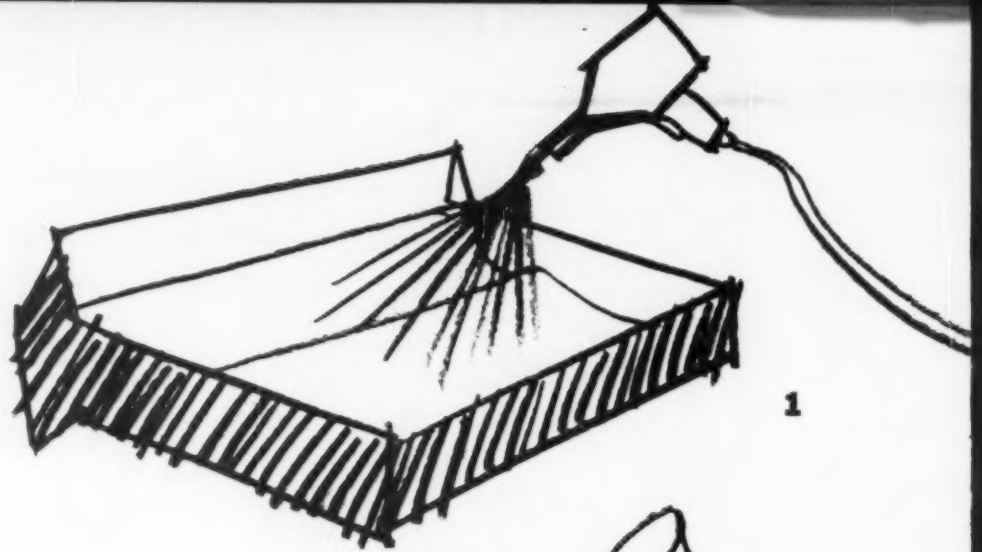
Tough, versatile epoxies dominate recent short-run tool-making, while new ceramic techniques bolster the foundries' claim of better low-cost castings



Epoxy plastic, supplied by Marlette Corporation, New York City, is used in the automobile industry to make hand hammer-forms, the forms against which prototype parts such as fenders, dash panels, and inside door panels are hammered out. The procedure for making the form starts with a female plaster mold taken from a male master. The mold surface is waxed and buffed smooth, and a parting agent applied (1). A foam core, to reduce weight, is placed in the mold and secured to prevent flotation; the resin is then cast around it (2). After curing overnight at room temperature, the hand hammer-form is separated from the plaster mold (3), and is ready for use. When even lighter weight and lower cost are demanded, a dry foundry slag is used as an alternative to the foamed core. For exceptionally sharp corners, metal inserts can be placed in the mold and mechanically locked in place prior to casting.

SHORT-RUN PRODUCTION

Epoxy and gypsum plaster are combined as an alternative to the more costly laminated or cast all-epoxy dies. Epoxy, used as the die surface, provides the hardness, and gypsum (cost about 5 to 6 cents per pound, and supplied by U. S. Gypsum Corporation, Chicago), used as the backing, reduces the cost—sometimes by as much as 60 to 70 per cent. The method has already been employed in short-run work for the production of vacuum-forming molds, compression molds for polyesters, foundry patterns, duplication and engraving models, and prototype models. The two materials are bonded by spraying thousands of 1/16 to 1/4 inch aluminum fibers on the wet epoxy (1); the gypsum is then poured or sprayed on the partially embedded fibers to achieve the bond (2). A wood or metal frame secured to the gypsum backing is used to provide extra structural strength for large patterns.

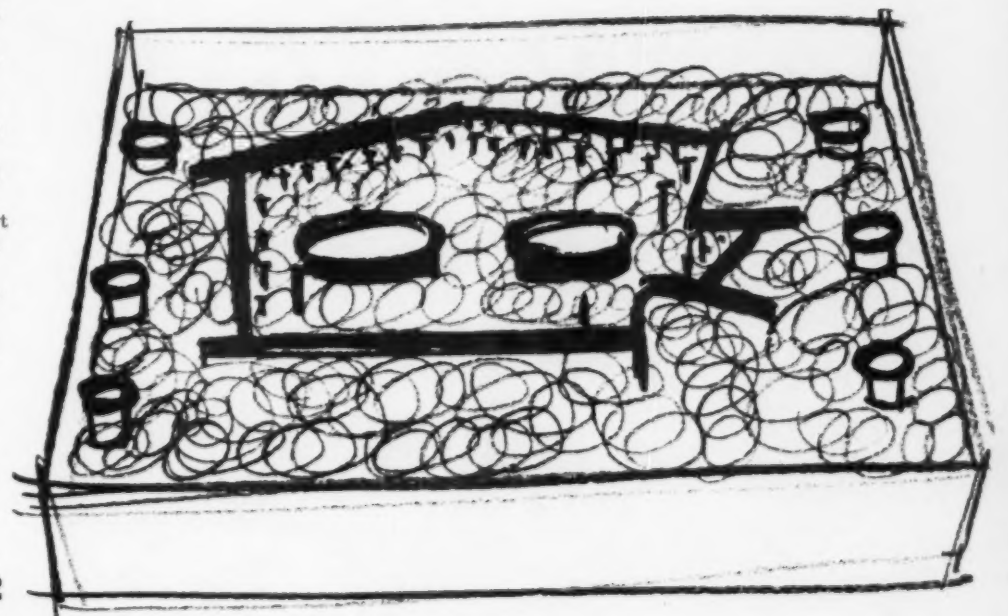


Silastic RTV, manufactured by Dow Corning Corporation, Midland, Mich., a fluid silicone rubber, can be used to cast a variety of plastics and low-melting metal alloys for exact reproduction of temporary molds and prototypes. In some formulations, the material, which costs about \$4 a pound, sets in only ten minutes, greatly speeding up the pattern-making process. It also eliminates the problem of reproducing complex shapes and tiny crevices. The fluid silicone cures at room temperature, vulcanizing into a rubbery mass which strips easily from metal, wood and most other materials. A typical pattern-making procedure is as follows: Silicone fluid is poured over a wood pattern to form a negative mold (1); a plastic reproduction is cast in the negative to yield a positive; from the positive, a pantograph engraving machine reproduces a positive embossing die (2). The same procedure is followed with a negative silicone mold to obtain a negative die. The two exactly matching dies are then used to produce the prototype design.

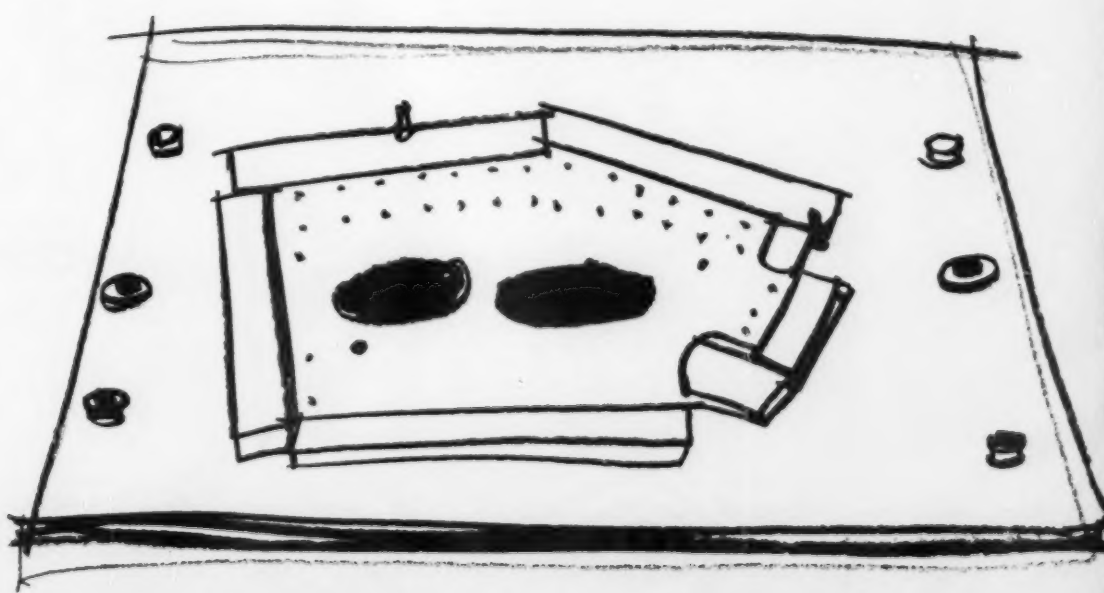
Steel rules embedded in epoxy are used by Republic Aviation, (see cover) Farmingdale, N. Y., as stamping dies for production of a variety of short-run metal parts of aluminum, titanium, and stainless steel. In the previous versions of these dies, the steel rules were set in laminated plywood, but this procedure created a costly maintenance problem because the slightest warpage changed the tolerances. Epoxy, which is not subject to this problem, is also better able to withstand the high impact of the steel rules against the metal sheet in the stamping operation. The epoxy steel rule dies cost no more than the conventional plywood ones, and they offer higher productivity because they last longer. Die construction is simple. The steel rules and piercing punches for the male die are arranged on the die plate and tacked in place with a special adhesive (1); epoxy is then poured around them for support (2). Sketch 3 shows completed male die. A similar process is repeated to obtain the female die, with rubber strippers substituted for the steel rules.



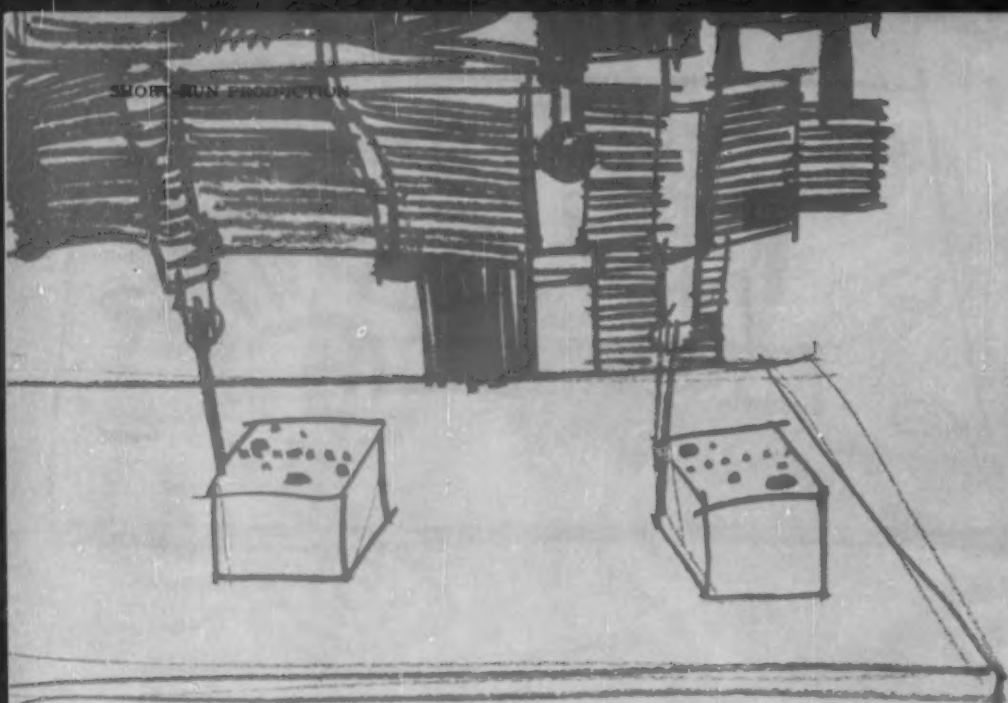
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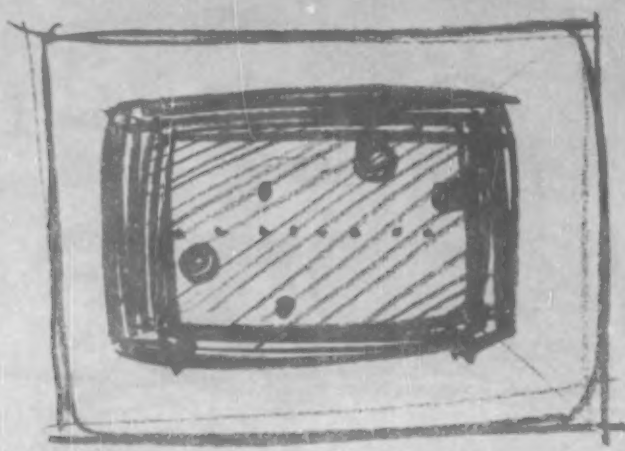
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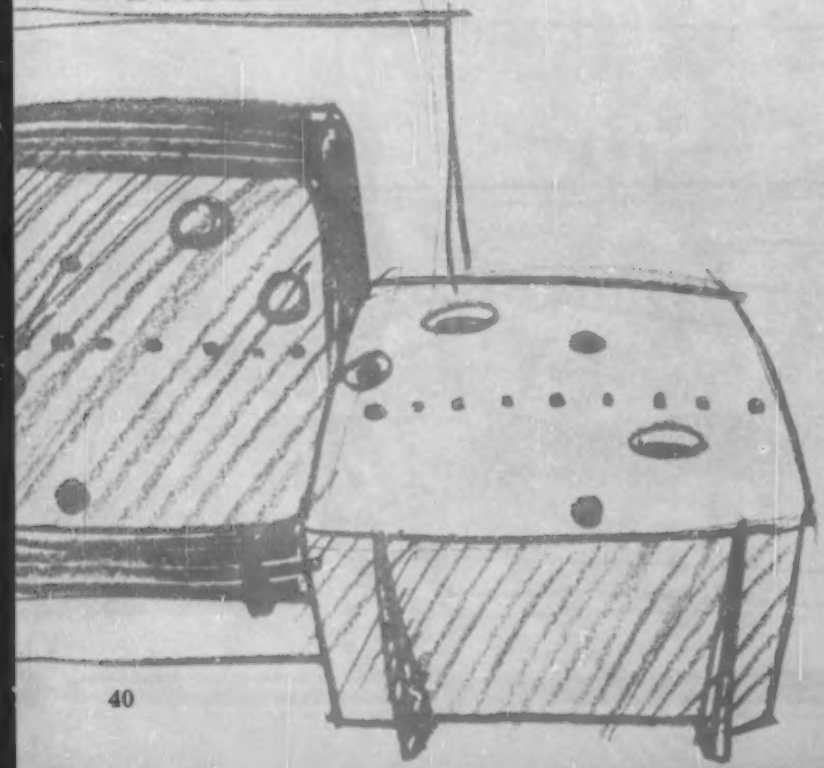
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1



2

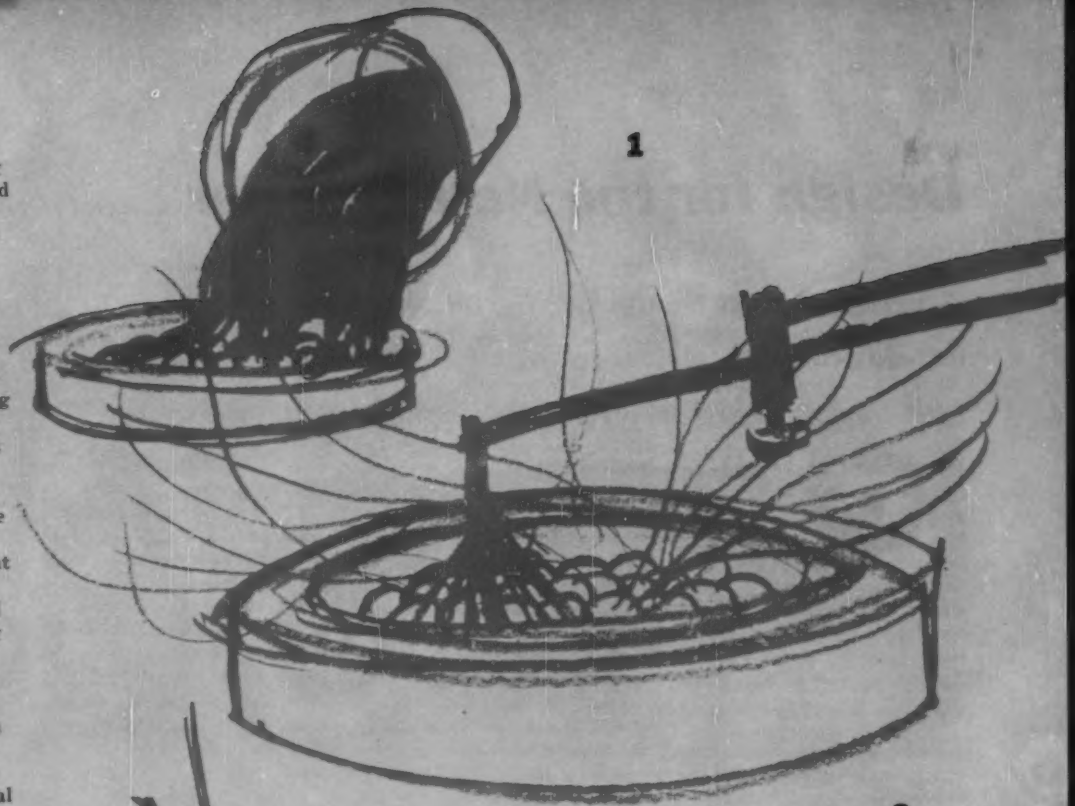


3

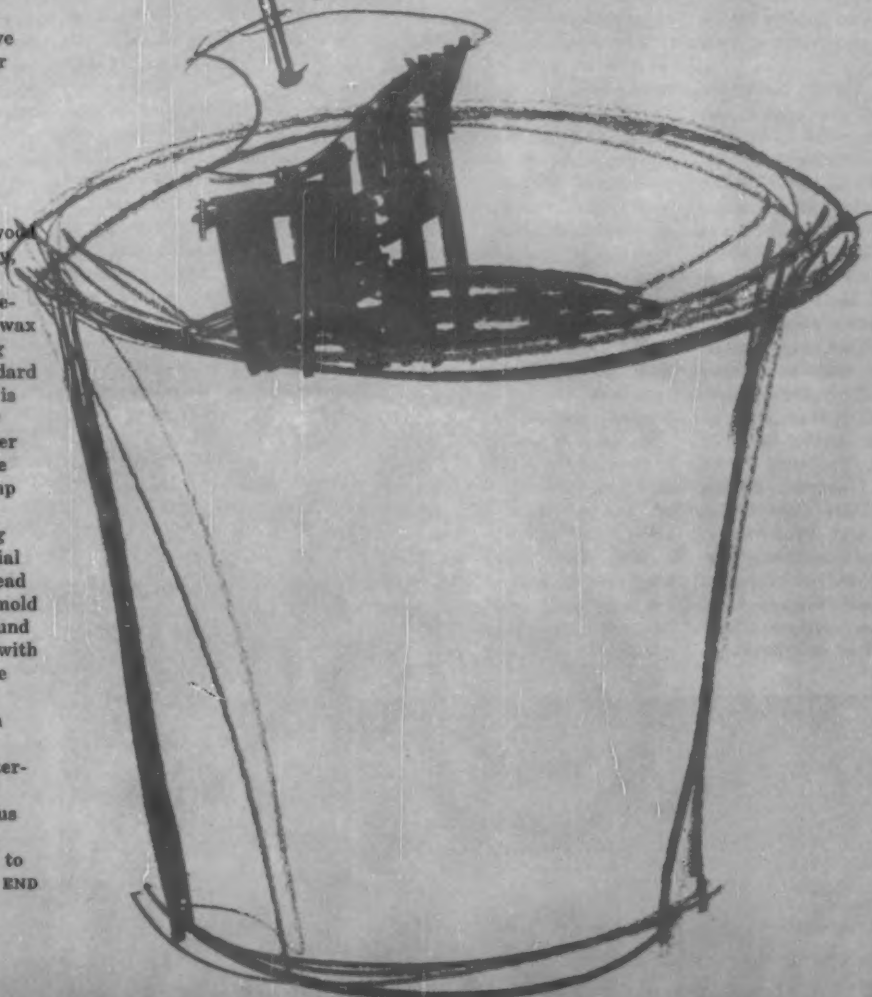
Plastic Tooling Aids Laboratory, Inc., Bridgeport, Conn., produces multiple models, and is the seven-year-old business of an ex industrial designer, Peter Cherry. As manager of appearance design at General Electric's Small Appliance Division, Cherry realized the pressing need for models of potential plastic products in the exact production material and with the accuracy and detail specified on the engineering drawings. Such models are used for evaluating design and engineering details. The models then available were carved and machined by hand from solid blocks of plastic, and although important for visual evaluation, they were sometimes misleading because they were not always producible from molds, the essential consideration in production. Cherry opened his own shop, purchased a used injection molding machine, and now constructs relatively inexpensive temporary aluminum dies. With these he molds up to 100 units in any thermoplastic and in any color. When only three or four models are required, and it doesn't pay to construct a die, he casts them from epoxy, a common procedure. Besides being used for design and engineering prototypes, his models can also be used for short runs for market testing, as they were for Bell Telephone's new Princess telephone. The drawings on this page illustrate his process of making temporary dies. A duplicating machine (1) makes the male die by copying the hand-carved plastic master. The female die (2) is made by die sinking a metal cavity from an epoxy female mold taken from the plastic master. The two die components (3) are then set up in an injection molding machine for limited production.

The Shaw ceramic-mold casting process, imported from England several years ago, and promoted in this country by Shaw Process Development Corp., Port Washington, N. Y., produces both large and small castings with extremely accurate detail, smooth structure, and high strength. Shaw castings also permit the designing of adjacent light and heavy sections, a problem with most other casting processes. In many applications, the process produces finished dies for little more than the cost of the raw block of tool steel for equivalent machined dies.

For Shaw casting, the patented ceramic is mixed with a jelling agent and poured over the pattern (1); in two to three minutes, a rubbery mold is formed which is stripped from the pattern and ignited (2). Burning cracks the mold into a microscopic three-dimensional network of fissures—the reason for the finer-grained, stronger casting. These fissures are small enough to prevent molten metal from entering them, but large enough to accommodate the expansion of the mold particles when heated by the molten metal, and still leave adequate openings to vent air and gas.



Ceramic-shell mold casting, a new technique used by Arwood Corporation, New York City, is a variation of investment casting that permits the designer to use inexpensive wax patterns for parts weighing up to 100 pounds. The standard type of investment casting is limited to castings weighing under two pounds. The larger casting size is made possible because the mold is built up as a shell around the wax pattern by repeated dipping in a special ceramic material (see sketch at right), instead of being formed as a solid mold by pouring the ceramic around the pattern. Castings made with the new technique also have other advantages: more intricate coring; finer grain structure; more consistent surface finish; and fewer internal air holes because the ceramic shell is more porous and permits air and gases, caught in the molten metal, to escape more readily. END



Design for the New Frontier By JUDITH RANSOM MILLER

A personal report from California concludes that we are building complex machines for simple needs and that there's only a step from milestone to millstone

IN NOVEMBER the Editors' Conference on Western Living, sponsored by the Pacific Coast Gas Association, was held in Los Angeles, and a couple of days later the 14th National Home Laundry Conference, sponsored by the American Home Laundry Manufacturers' Association met in San Francisco.

Both of these conferences demonstrated once more man's uneven use of available information and knowledge. Amazingly talented domestic equipment (stoves, refrigerators, freezers, washers, dryers, etc.) was displayed in homes whose planners had completely ignored the organization of work space according to the logical sequence of steps in the work process.

In about 1840 Katherine Beecher first assessed this problem; in 1912 Christine Fredericks re-assessed it; during the 1920's Lillian Gilbreth stated the case in scientific terms; and, finally, Siegfried Giedion (1952) re-presented these three ladies to industrialized America in *Mechanization Takes Command*. Home economists in college laboratories and research centers all over the country study the problem of the organization of the work process. Yet in the \$110,000 model house we were taken to visit (Milestone House, Friendly Hills, Whittier, California) the "fully programmed" oven and refrigerator are located at opposite ends of a long storage wall, neither of them adjacent to a working counter. Additionally,

the refrigerator door opens from the right only, although its position demands a door which could open from either side. (Philco produced a refrigerator with such a door in 1955. It has been discontinued, we are told, because people don't believe that the door won't fall off.)

Some of the visitors questioned the housewife's ability to read the instructions on the central panel of the oven, basing their assumption on the fact that there was not one book shelf (except in one bathroom—no books, though) and no more than five or six books in the "completely decorated" house—or in either of the other houses we visited.

The house was filled with wonderful colors, enduring man-made textures and surfaces, a "discreet" use of stone from a Southern California canyon, and materials and equipment performing special and valuable services: Insulation against noise, cold, heat, invasion of privacy, glare. Precise control of communications so that at any point in the house one could hear (or not hear) the telephone ring, the door chime, the music, other members of the household. Surface resistance to soil, abrasion, deterioration from exposure to sun and light. Mechanization or elimination of every major household chore. (If the sun was not shining, and it was not, then one could be radiantly warmed by artificial, overhead, gas-fired means.) In fact, every possible convenience was pro-

vided except that of a reasonable organization of space.

The best choice of family to purchase this house would be one that had lost everything but its money; in all of the 3,500 square feet there appeared to be little room for roots, and no room for a familiar mess. The personality of most families would, we believe, be an unpleasant overlay—not an inlay—on the house.

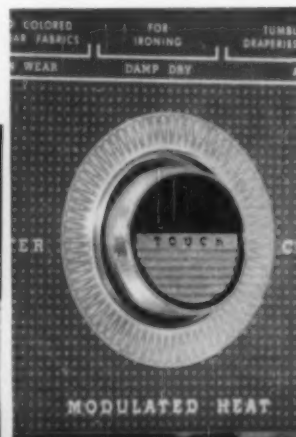
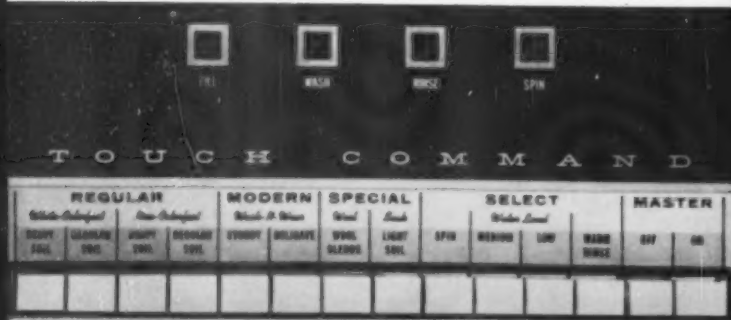
If this appears to make scapegoats of this house and its prospective owners, it does so first out of a kind of envy (few of us live in houses so "equipped") and second because they (the house and owner) represent the essence of an American difficulty. How is it still possible to sell "elegance," "exciting Roman American baths," "glamorous telephones," "Massive master bedroom suites," or the idea of "grandiose entertainment"? If they're so rich, why aren't they smart? It reminds one of a cigarette advertisement of several years ago in the *New Yorker* which showed a shapely lady playwright holding a small red cigarette box and receiving "fulsome praise" from a group of admirers who apparently did not share her status and therefore did not smoke her brand.

How is it that planners disregard the need for "foot saving" in 3,500 square feet of space? Here of all places

laundry equipment should be noiselessly and centrally located; corridors should abound with cupboards—traffic and storage being highly compatible. (We have heard that there is a house in South America designed by an architect from southern California that is so large that its owners use scooters inside to get from one Roman South American bath to another.)

The builder described the Milestone house to us as having been designed for a family composed of successful father—perhaps a lawyer—a mother and two children of college age who come home for weekends and vacations. By inference, these children are more devoted to their parents than most and will return to the parental shelter frequently with their own wives and children. Otherwise, the Milestone house is not a house but a Millstone. The weights and sizes of Millstones vary with the family's ability to carry the financial load; the larger stones present evidence more dramatic, but not more tragic.

The products displayed at the laundry conference demonstrated a striking aspect of modern technology. Characteristically industry attacks the housewife's problems on two fronts: (1) complete elimination of the task, and (2) the reduction of the time, skill and human energy needed to accomplish the task. A third front—the time, skill, and energy used in earning the money to buy the means to eliminate or reduce household drudgery—receives less attention. Occasionally, industrial solutions converge and amusing anomalies occur. An advertisement for the General Electric Spray, Steam and Dry



Iron in the latest ladies' magazines reads: "NEW — THREE WASH AND WEAR SETTINGS!" Translated by experts at the AHLMA Conference, the advertisement says, "This tool reduces even further the skill, time and human energy used in the maintenance of minimal-care (note the re-definition) fabrics and is designed to serve those having a degree of fastidiousness not met by wash-and-wear standards. Additionally, the appearance of garments whose cut or tailoring do not lend themselves to wash-and-wear care will be improved through the use of this tool."

While the home laundry industry is busily researching home laundry techniques, tools and supplies along with textile properties, another growing segment of industry is busily producing such throwaway goods as paper napkins, tablecloths, towels, diapers, camp clothes, etc. Still another produces transparent protective plastic materials for use as bibs, over tablecloths, etc. Besides these developments there are visually and socially acceptable enduring counter and table surfaces, and upholstery or drapery materials which do not require laundering.

The laundry is not the only place where equipment is appearing to fill a need that is vanishing. Bakery goods, packaged mixes, automats, restaurants, tv dinners, frozen cakes, pies, mashed potatoes, French fries, fish sticks, etc. tend to

deny categorically the services provided by the versatile household gear researched and produced annually by the stove manufacturers. By and large, the clientele purchasing such gear is not really skilled in the organization of the work process and is living in houses which ignore it completely.

We live in a time in which mechanical process and uniformity appear to take precedence over outcome and individuality. Giedion spoke pensively in *Mechanization Takes Command* of the marvel of the baking industry (he would be even more impressed today) in which production techniques are so faultlessly smooth and immaculate and from which comes a product so uniformly textured, browned, shaped and tasteless. Even domestically the process of laundering or cooking seems to get more attention than the outcome. Who bakes bread in the fully-programmed built-in marvel of the kitchen? Besides, you can have genuine home-made bread delivered to your door by mail. The net result of all this confusion is that, although Americans eat better and are cleaner than ever before, their judgment of quality and imagination as to use of goods and services have not kept pace

with products available. As a result, they use only a small fraction of the complex and costly equipment they have bought and paid for.

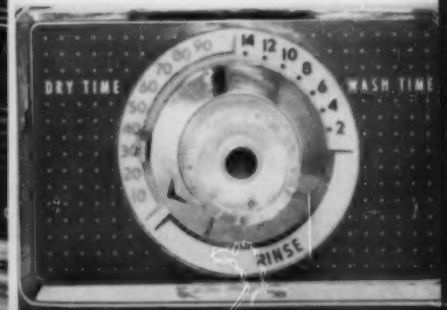
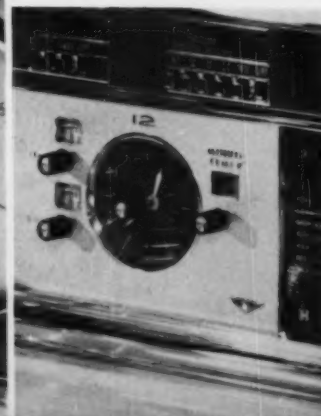
Industry, by its very nature, compounds the problem by offering the housewife (among others) a great many choices among goods and services that are not really very different. Provided that she makes the decision in time and puts the meat in the oven, the housewife can dial the hour she wishes to serve dinner, set the control for the number of pounds, the type of meat (if beef, she has a choice of "rare," "medium," or "well-done"). Whereupon, the oven will compute the roasting time, start and stop automatically. (*Magic Chef's Magic Control Center*.) Or she could consult Henry Dreyfuss' well-tabulated dashboard for a different clustering of the same data. (*Waste King Universal Built-ins*) Or she could rely on an electrically operated thermometer which, when the center of the meat has reached the appropriate temperature, will turn off the oven and, I hope, notify her of this fact. (*O'Keefe and Merritt, Automatic Oven Roastmeter*.) Or she could choose a rotisserie, or revert to manual controls, or heat a tv dinner, or go out to eat. She can have color or steel or built-in or free-standing or fold-away, or controls that are on the top or the side or are recessed.

Laundry equipment manufacturers offer "timed bleach injection and automatic rinse additive dispenser" plus "unified controls affecting both the washing and the drying cycles"

(*Maytag*), or "four compartments for dispensing automatically detergent, bleach, water conditioner, or fabric conditioner . . . (and) automatic clothes sprinkler" (*Norge*) or "modulated heat . . . tumble fluff for draperies and pillows" (*Whirlpool*) or "touch command" on a triple keyboard which permits a choice range from "heavy" to "light" soil, "medium or low water level," "sturdy" or "delicate" wash-n-wear, plus the opportunity to change one's mind in mid-wash and "reset" the machine, and indicators which show the operating position of the machine at any given time (*Hotpoint*). Then there is the machine which has a "plastisol-coated wire guard," "flotation rinse," "lint and sediment ejectors," "aerated waterfall inlet" and "bleach and rinse conditioning center" as well as "normal," "delicate," "no-spin," and "special cycles" (*Speed Queen, McGraw-Edison*). And, of course, there is the new "Spray, Steam and Dry Iron with three wash and wear settings!" (*General Electric*).

These machines can be seen as the climax of an historical process. In the beginning, man does things the hard way. Then he develops a complicated machine to make the job easier. Finally he simplifies the machine. The problems of the home appliance manufacturer accumulate with the increase in variety and number of services expected of his products. As a result, although there is a trend toward mechanical simplification, it is lost in the complexity of the new demand. Or, it takes fewer moving parts to do the old job, but more moving parts must be added to meet increased demands.

In spite of everyone's best



efforts the housewife apparently has laundry problems. Miss Esther Foley, Home Service Director for MacFadden Publications, presented the housewife's queries for the experts to mull over in a direct question and answer session. If the sampling of questions was in any way representative, then the housewife wants convenience, a clean wash, and white clothes *white*—not gray, or yellow, or streaked. (The need for a white wash is, of course, not primarily a need for cleanliness but rather a demand for status.)

The housewife's complaint, "I've tried everything . . . my clothes are still yellow! . . . or gray! . . . or streaked!" found the experts indefinite, contradictory, inconclusive. All felt that the housewife was careless, impulsive, "over-doing" (i.e. trying out too many products at one time) not using enough soap and/or hot water, or not following instructions. None pinpointed the problems as one possibly or even probably growing out of the character of the water supply. In many localities, for example, the presence of iron in the water, either in solution or suspension, causes a problem which may be aggravated by the use of chloride.

Almost nowhere does a laundry equipment or supply manufacturer emphasize the facts that water problems other than "hardness" are a factor to be reckoned with or that sequence of introduction of washing supplies into the washer is a factor in their efficient function. Explanation of such things call for "if's," "and's," "but's," and "maybe's"—that is, qualifications which reduce the convincingness of advertising copy. It is unlikely that the

Madison Avenue linguists will ever come out with copy that reads, "Our automatic washer will not get your clothes clean unless . . ." or "Our synthetic, all-purpose detergent works satisfactorily if you . . ."

Actually the home laundry equipment manufacturer does offer the housewife all she asks for, but he stresses the idea of convenience, which he teaches her to associate with a Dior evening dress, elbow-length gloves, a 23" waistline, and a sans souci personality. He is thus hoist by his own petard and must neglect certain instructional elements which take away from the illusion of convenience, elegance, and long-stemmed roses.

There were several significant reports made at the two conferences; reports which deserve reprinting and distribution to a larger audience than the one for which they were intended.

While we would not necessarily agree with all of Tyler MacDonald's goals for, or satisfactions concerning, the West Coast, I still believe his statistics ("Orientation to Western Living") deserve consideration:

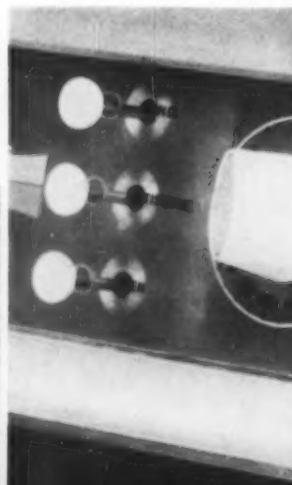
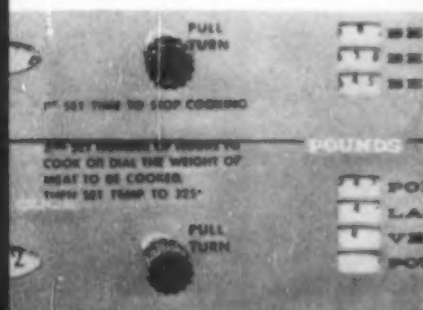
"The per capita income during the last decade went up 33 per cent in Arizona. California's went up 80 per cent per capita. Oregon's went up 54 per cent, and Washington's went up 49½ per cent. . . . You look at these states and you see these wonderful houses that any kid can afford, the new cars, tv sets, the air condition-

ing, those great gas kitchens, and you begin to see why we think that we have written our destiny in our minds and we think big in this area."

Walter Prill's introduction to the nearness of thermoelectric converters and fuel cells still comes as a shock ("Keeping Pace with Western Living"), even though designers have been hearing it for some time now. In his report, "Don't Blame the Washing Machine," P. J. Fynn came very close to a basic industrial design problem, that of the limitation imposed on the designer by technical advance: "Much of the advertising by fiber producers goes over the shoulders of the garment and household textile industries directly to the consumer, and it intimates or even promises washability and colorfastness performance based upon fiber characteristics which are difficult to carry through into the finished product. It does not follow, just as a matter of course, that using a thoroughly washable fiber will insure a satisfactorily launderable garment."

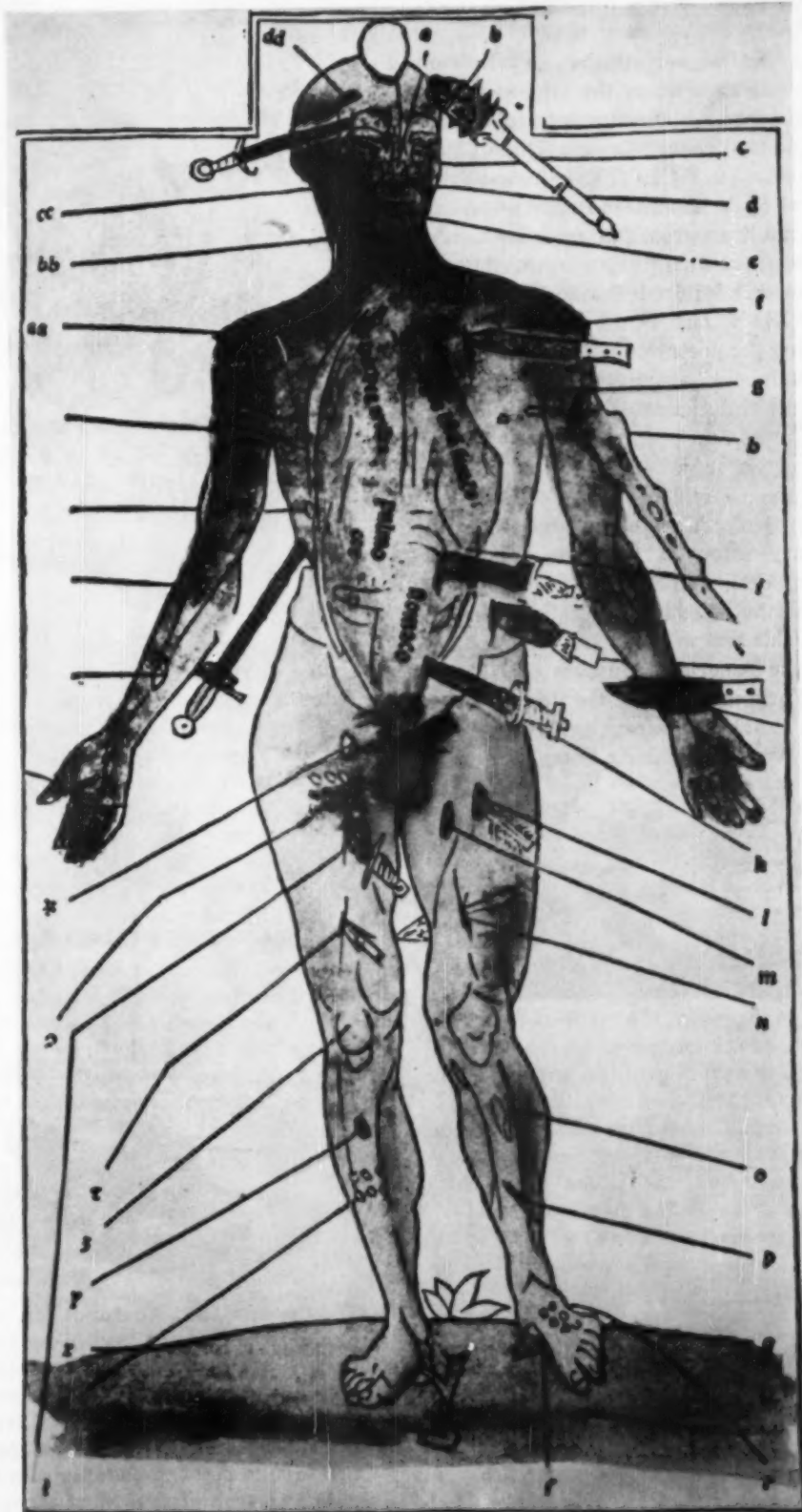
(Many years ago an economist told an assembly of designers, merchandisers and manufacturers that textiles such as nylon and Dacron would not come into their own until suitable threads for use on them were developed and machine tensions adjusted accordingly and until designers adjusted their design and engineering to the limitations of these textiles. This warning preceded the development of the so-called wash-and-wear fabrics, but so far no very great progress has been made.)

END



HOW TO KILL PEOPLE

A PROBLEM OF DESIGN



Society, according to designer George Nelson, has traditionally given its support to several areas of design including fashion, material comfort, religion, government, and killing. On the CBS television show "Camera Three" Nelson recently presented an interpretive design history of the last of these.

Normally, when a designer appears on television he is required to speculate about the kitchen-of-the-future, or to comment on planned obsolescence. But there is nothing normal about "Camera Three." Presented each Sunday by WCBS-TV in cooperation with the New York State Education Department, it is an unsponsored, adult program that is experimental in the archaic sense: it actually experiments. (Its offerings have included Mildred Dunnock in scenes from Faulkner's *As I Lay Dying*, mezzo-soprano Betty Allen singing the poetry of William Blake, and "The Stamp of Steinberg"—an arrangement of Saul Steinberg's drawings, accompanied by sympathetic sound effects.) For its first program on design, Nelson, abetted by producer John McGiffert, director John Desmond, and Clair Roskam, the writer assigned to the project, delivered a straightfaced, ironic commentary intended to make important points both about design and about the extent to which society has sanctioned human destruction.

The ancient shields and weapons are used through the courtesy of the American Museum of Natural History in New York, and some of the drawings are from *Weapons, A Practical History*, by Edwin Tunis, published by the World Publishing Company.



Nelson

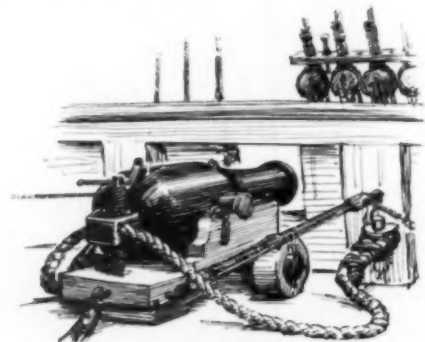
Design is the process through which things acquire meaningful form. A bird in flight has meaningful form — it looks as though it had been designed to fly.



A designer is a person who gives shape to man-made things. If he is a good designer, his products will not only work, but they will seem beautiful as well.



Designers create things for people.



This means that to function successfully, to produce works of art, designers must have society's approval of what they are doing. Design for killing is interesting because war occupies so much of our attention, and receives our unquestioning support. The great advantage for the designer in this area is that nobody cares what anything costs. This atti-

tude has been prevalent from the siege of Troy to the bombing of Hiroshima. And it's this kind of attitude towards money that has always attracted creative people. This is the reason, probably, that the design of beautiful and efficient weapons has progressed continuously, without serious interruption. What we're talking about is killing — but not murder, for murder is of no interest to the designer. Murder weapons are almost always improvised—a bathtub, a breadknife, a clothesline. What we are talking about is the kind of killing that is supported by society. There is a silly myth that generals win wars. What the facts show is that designers do. Let me illustrate this with a simple situation. A wants to kill B. His problem is how to do it. His best chance is to bring the whole thing off as a big surprise. If B knows what's on his mind he tends to react unfavorably.

(PICKING UP ROCK)

Here is a lethal weapon. It has the great virtue of being harder than the human skull. It is also inexpensive. But it has two serious disadvantages: If A holds it in his hand, it takes him uncomfortably close to B. If he throws it, he may miss.

(PICKS UP STONE CLUB)

When the designer comes into the picture there's a tremendous improvement in the product. It's more interesting to look at. A doesn't have to move quite as close. And the force of the blow is greatly increased. If A has this weapon, with B still relying on rocks, our bets, naturally, are on A. He has the better designer. Given this unequal situation, what can B do? He has to get a designer, too. His designer may come up with a defense product — such as a helmet or shield.) By the time the diagram (on page 45) was made for medieval students of medicine, all of this was old stuff — people had learned a long time before how to dispose of other people. One early genius shaped a piece of flint, stuck it in a sapling, and grew his own club. It was very efficient for puncturing, splitting, or crushing.



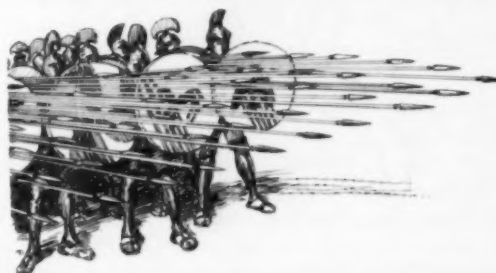
The Bronze Age added absolutely nothing to the knowledge of how to kill people — but it made a tremendous leap forward in technology and esthetic refinement.



During the Renaissance, we find that craftsmanship is better — the instruments are made of steel instead of bronze — the idea is the same, but expressed with a new elegance. This war hammer head finds a soft spot and moves in. The extraordinary thing here is not the beauty of the decoration — lovely as it is — but that the design in no way interferes with the efficiency of the weapon.



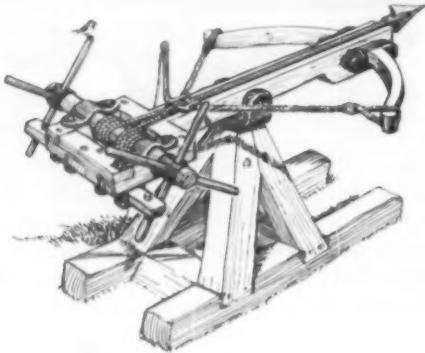
A permanent problem in weapons design is keeping a safe distance. The Greek phalanx, unbeatable in its time, was based on the familiar defense of the porcupine. The Romans, incidentally, made the phalanx obsolete by a very simple device: they walked around it.



The greatest of all inventions for separating the attacker from his victim was the bow and arrow. The noble redskin's graceful designs frequently out-aimed and out-shot the clumsy guns of the early settlers. The European bows, illustrated in this 15th century painting, were sophisticated instruments, with a killing range up to 300 yards. Using them on a target five feet away is painter's license.



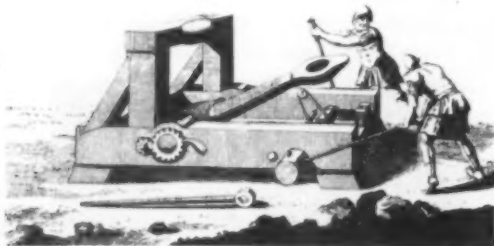
The European crossbow had some interesting ancestors, like the Roman ballista.



The Middle Ages, with a more modern viewpoint, preferred the greater mobility of the crossbow. The spring was released by a trigger. It shot its bolt with such force that in 1139 Pope Innocent II banned its use — except against infidels. The ban still left plenty of legal weapons for Christians interested in killing other Christians.



The catapult, a device for throwing heavy objects, had the advantage of using cheap ammunition, such as rocks. This example illustrates the extreme self-confidence of the Romans. No army expecting to retreat would ever saddle itself with such a cumbersome machine without putting wheels on it.



What makes war such a gamble is that designers for the defense never fall behind designers for the prosecution. The purpose of the hel-

met is obvious and it is invariably made of the toughest materials available. Shielding, of course, extended to more parts of the body than the head. The Etruscans, for instance, produced beautiful shields, highly decorated chest protectors, shin guards. But all their art works show a curious disregard for what we consider vital parts of the body.



The armor of the medieval knight was a triumph of defensive craftsmanship. The best suits were virtually impenetrable.



Medieval armor, incidentally, was not an invention. Its system of flexible plates was taken directly from nature.



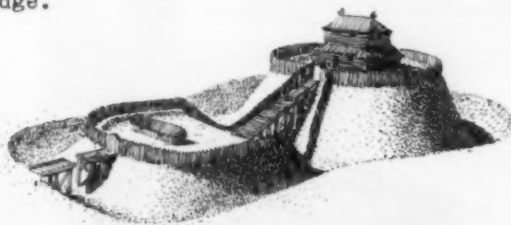
But, for all its extraordinary ingenuity, medieval armor had one frightening flaw: once pulled off his charger, the knight was as helpless as a turtle on its back. This is an anti-knight machine. Pushed against neck, arm, or leg, the inner prongs opened, trapping the victim, who was then yanked off his horse.



The western designer's answer to the basic weakness of heavy armor was chain mail, but the Orient had its own solutions. The battle dress of the Japanese warrior was a flexible



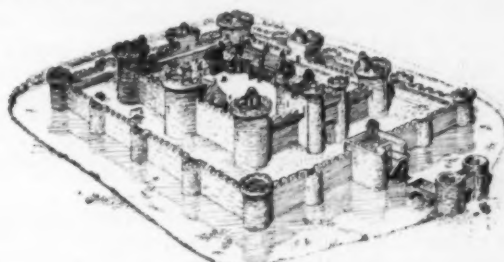
interlacing of leather, tiny metal plates and gaily colored silk threads. The helmet had possibilities for attack as well as defense. The most imposing of all shields is the castle. Its functional requirements created a new form of architecture. Even the earliest examples show the moat or ditch, and the drawbridge.



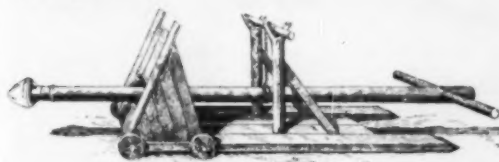
The wooden stockade, however, was presently replaced by walls of stone.



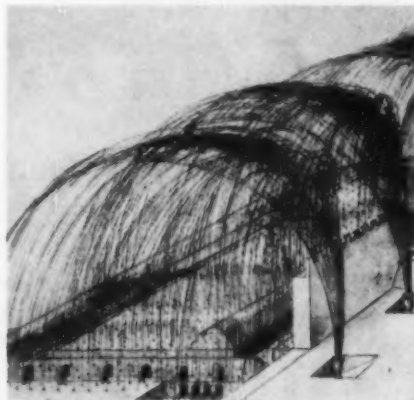
As centuries passed, the architecture increased in complexity. In their state of ruin, these establishments have a forbidding picturesqueness, but their design details made considerably more sense than the tailfins of today's automobiles.



The castle at its strongest was an effective defense against primitive machines like the battering ram.



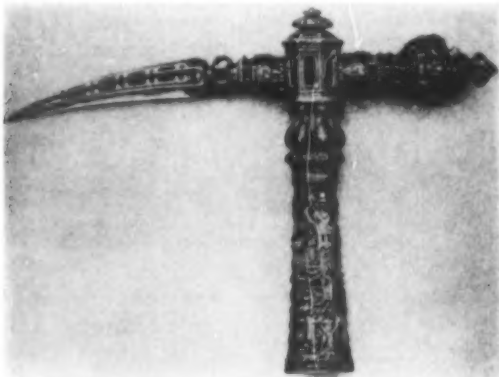
The designers of the medieval castle continued their efforts to make it impregnable. What they failed to realize was that the device that would destroy the castle was already in existence. Gunpowder was the revolutionary invention, the cannon was the instrument. The great Leonardo da Vinci, who turned many an honest penny inventing engines of annihilation, made this prophetic drawing showing the castle, its contents, and its occupants obliterated in a rain of fire.



Do you remember A and his great new weapon, the axe? The designer had another idea.

(DISPLAYS REVOLVER)

He reduced the size. He reduced the weight. The performance is incomparably better and at a much greater distance. Again we can see the close relationship between handsome form and superior functioning. The cylinder shows exactly what it is. The hammer, an interesting decorative accent, also explains its function without words. The shape is more sophisticated. There is even a smooth indentation in the handle to increase the user's comfort. There are also carry-overs of traditional elements: the trigger is not new, (we saw it on the cross bow), the gun sight is not new (we can find it on primitive blow pipes). A great step forward, but esthetically we paid a price. Never again will we have the glorious craftsmanship of the armorer. The exquisite detailing, the preoccupation with nature, the pride of ownership.

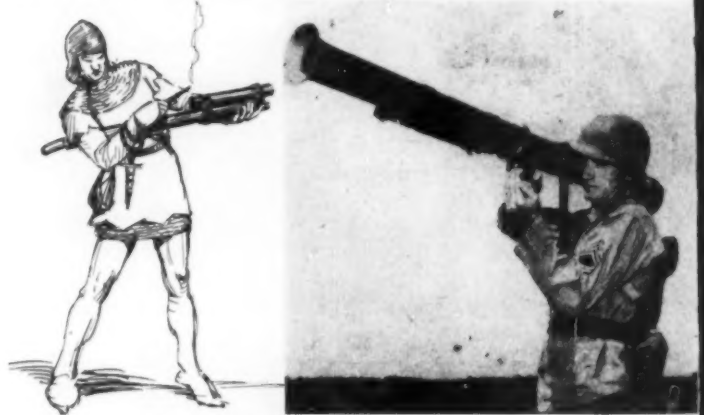


The elegance of form and intricate decoration.



Firearms introduced a new tempo into design for killing. Invention of the gun is generally credited to a German monk, Father Bernard Schwartz. Some claim that China was ahead of the West,

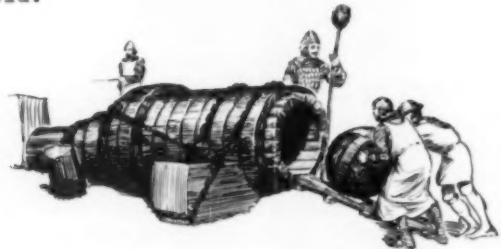
but for us it is both touching and appropriate to think of the Church in connection with this invention, for all during the Dark Ages, the Church was the guardian of culture and the cradle of science. Some of these early guns bear a surprising, though superficial, resemblance to their most modern descendants.



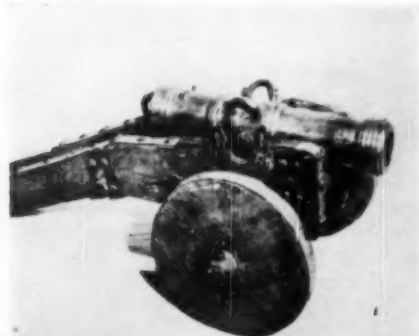
It took perhaps a hundred thousand years for the designer to come to the point where he could create this — an arrow shot out of a bottle.



From here in, progress was more and more rapid.



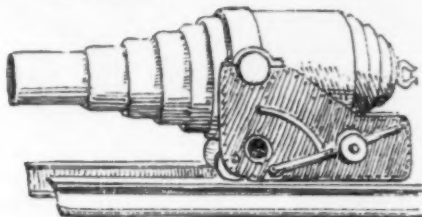
Barrels were cast in one piece, and the weapon became mobile.



Some unsung genius conceived the idea of hollowing out the cannon ball and filling it with explosives. There were some tricky problems, since it was desirable to have the cannon go off before the shell exploded.



By the 18th century, the cannon displayed a certain perfection of form. The ring shapes on the gun were not decoration, but a direct expression of the fact that the explosive force was the greatest in the powder chamber, least at the muzzle.

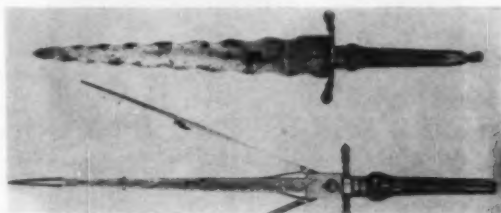


To perfect the gun took about five centuries, which is no time at all in terms of human history. Naturally during this period there were carry-overs from earlier design. We see this in the rich decoration . . . and in the combination of functions. If any of these pistols failed to go off—a not unlikely event



— the handle made a good club, recalling the mace of earlier times. One of the curious combination weapons was the plug bayonet. The story is that back in the

17th century, a group of French peasants ran out of powder while hunting bandits. They converted their guns into spears by ramming their knife handles into the gun muzzles. This was followed by the manufacture of daggers such as these, designed to fit gun muzzles. Since they were made in Bayonne, they were called bayonets.

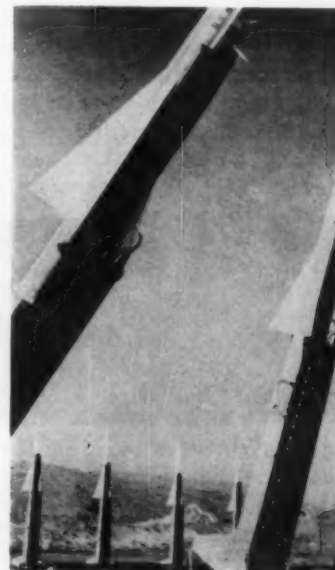


In the time of William the Third, the English soldiers were startled when the French charged with their bayonets, and then proceeded to fire without removing them. What had occurred was another brilliant design idea — to attach the knife to the outside of the barrel instead of the inside.

The bayonet has survived up to the present, but 150 years ago, it was clear that this was the winner: the pellet that punctured, the streamlined shell, the rocket, the missile.



Modern design has a sleek deadliness unmatched in all recorded history. The ancient shape of the arrow remains a familiar reminder of purpose, but the arrow now has an electronic brain.



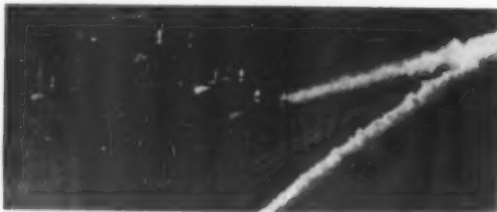
Machines with their own new kind of beauty can throw fire as well as projectiles at other machines.



It is hard to find the people any more. From whose plane are these bombs being dropped? And onto which city? Had the pilot or the bombardier ever visited the city? Had they ever seen the museums? Had they shopped in any of the shops?



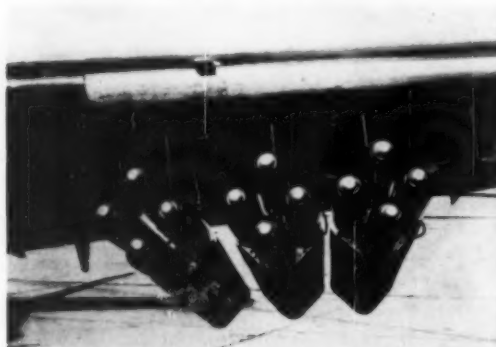
Did the Greeks or the Romans ever produce anything as beautiful as this? Young men fly multi-million dollar machines. They read instruments, and presently they press buttons. They don't bother to look out; there is nothing to see. Eventually, with luck, they return to base.



The city replies with its own terrible and impersonal beauty. Tracer fire covers a night sky like a drawing of Leonardo. There are no people to be seen in the city. There are no people to be seen in the planes.



Sometimes, the city sends up machines to meet the attacking machines, at a combined speed of two thousand miles per hour, too fast for people to take aim and fire. So machines inside the machines do the aiming and the firing.



Since the machines are faster than people, more precise, and less emotional, the designers have now made machines that fly without people.

We have a bomb, a brain, and an engine. The journey that took Marco Polo years is now over in minutes. It's quicker but not very interesting, and the design shows it. This impersonal array of unbelievable precision might be an oil refinery in Texas, a laboratory in Alaska — it happens to be a weapon, but it's hard to tell any longer.



The designers have designed the excitement out of killing.



We will never see the whites of their eyes again.



Or the likes of General Wolfe breathing his last at the siege of Quebec. The designers have put generals a thousand feet under the ground, where their companions are radar screens, and humming banks of computers. And for the common man, things are no better than they are for the generals. For healthy outdoor exercise and the satisfaction of a job well done, he has substituted another day at the office and the same pile of papers.



Ours is not the first period when designers thought they had produced the ultimate weapon. The marvelous missiles sleeping quietly in their cradles all over the world are indeed a triumph of design, but in many respects, they are still traditional, still reflecting the desire of the attacker to stay removed from his target. They are also very complicated — the best weapons have always been more expensive than people, but the cost of these is almost beyond comprehension. It may be that for further improvement of killing there are principles which still remain to be explored.

(PICKS UP MAGIC BONE AND POINTS IT)

Here, for instance, is a weapon with no moving parts, which does not have to be thrust or thrown, and yet it can kill a man. Pointed at the victim, to the accompaniment of suitable incantations, it is absolutely lethal. It was developed by the Australian aborigines and there are too many authenticated records to permit any doubt of its efficacy. The victim, learning what has happened, promptly heads into the bush and presently dies. I am pointing this at you, and if you feel no ill effects, it is partly because I don't know the right phrases, but mainly because ours is not an age of faith — except in the machine.

To pass on this faith, to give the young an appreciation of our best designs, we have evolved a way to teach them through exposure to toys. To see the latest modern weapons, adults too have to go to a toy store. There was a time when children could learn about things because people had them around — the captured spear or rifle, great-grandfather's suit of armor, the musket over the mantel. But how many of us have ever been near a missile? Or a launching platform? Or walked the deck of an aircraft carrier? Or seen the inner workings of a nuclear bomb? We have designed war and its instruments to the point where not only have we recreated the boredom, the tedium of peace, but we have also made the weapons incomprehensible. And the design shows this. Is it any wonder that in every medium of entertainment we have shifted from the respectable kind of killing to murder? How else can we reintroduce the personal element into the activity that has been man's favorite throughout history? If legalized killing should ever be brought to an end, the newest designs tell why: it has become too impersonal to be interesting, too complex to be comprehensible. But if peace ever does break out, we designers needn't worry. We'll find something else to do — though it may be not so profitable — and, personally, I hope it will have to do with people.

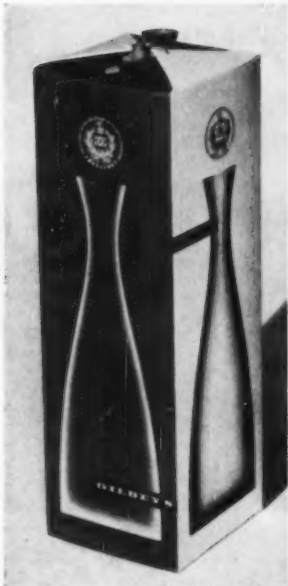
END

DE MAJO BRIGHTENS BRITISH COMESTIBLES

"You have to be a ruddy marvel as well as salesmen and psychologist to succeed as a designer," says William de Majo, who tries to combine all three in his own practice as a consultant to British industry. De Majo, whose past was a bit checkered—from graphic and business studies in Vienna and Switzerland, to his father's export business in Belgrade, to wartime service as an RAF officer—until he established his

London studio after the war, concentrates on graphics and packaging. But he also does exhibition design (e.g. the Farm and Factory stand at the Festival of Britain), and is currently working on a permanent museum on the founder of the Boy Scout movement for the Baden-Powell Memorial House in London. De Majo's work for three of his most faithful clients is sampled on the following pages.





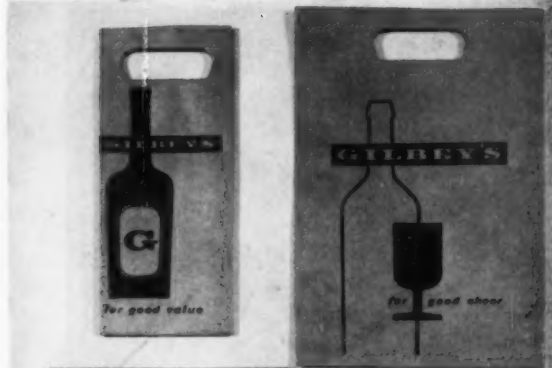
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W. & A. Gilbey Ltd.: Great Britain's internationally famous wine merchant and distiller has a growing reputation for having a distinctive house style. While designer Milner Gray is directly responsible for this and for Gilbey's bottles and labels, de Majo acts as consultant designer on everything else—including the packages in which the bottles are sold, showcards, displays, brochures, wine covers, ashtrays, waiter trays, and exhibition stands. Gilbey has won numerous packaging prizes for such de Majo designed items as the carrier pack (below), the Spey Royal Whisky gift pack (left) and the Centenary exhibition toy bottle package (below).

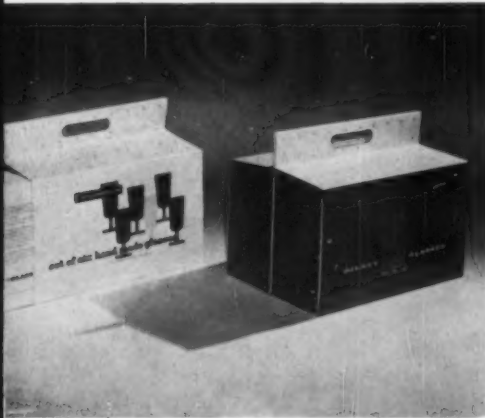
1. Centenary carafe gift package; 2. Spey Royal carton; 3. Carrying case for Gilbey glasses; 4. Kraft paper bag for miniature bottles; 5. Paper coaster and matches; 6. Package for Gilbey's toy bottles.



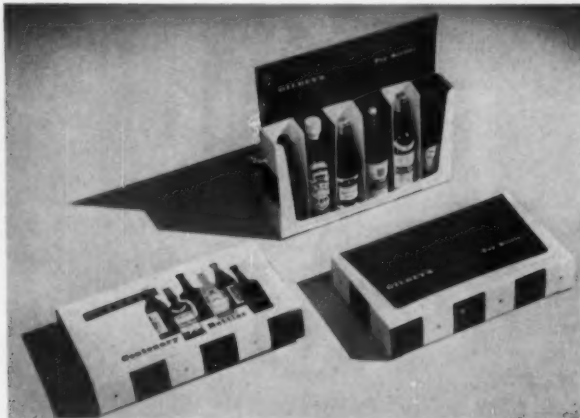
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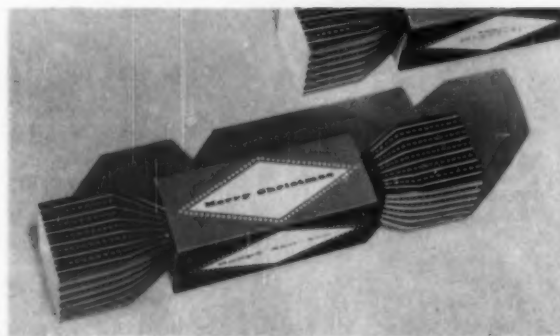
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John Millar & Sons Ltd., an Edinburgh firm which has been making candy and confectionery for over 100 years, hired William de Majo because they wanted their products "not only to taste good but look good." De Majo began in 1954 with a house style based on the Millar logotype and a pink and gray color scheme. Since then he has designed packages, delivery vans, stationery, bus posters, sweet tins, sample packs, and a television commercial (with Saul Bass).



2

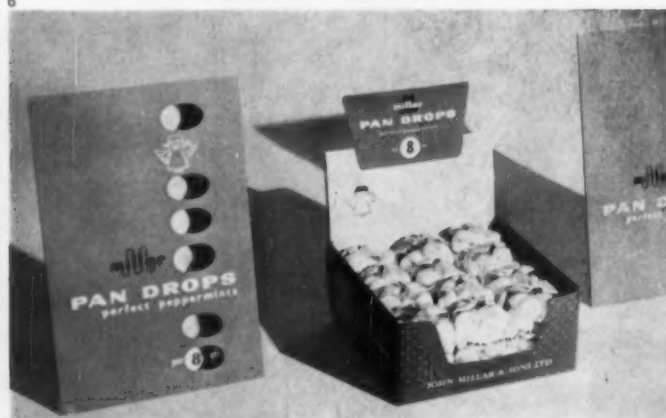


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1. Gift tin for Raglan mints; 2. Package for Pan Drops peppermints; 3. Posters for delivery vans; 4. Christmas promotion package; 5. Bon-Bon package; 6. Pan Drops point-of-sale display.



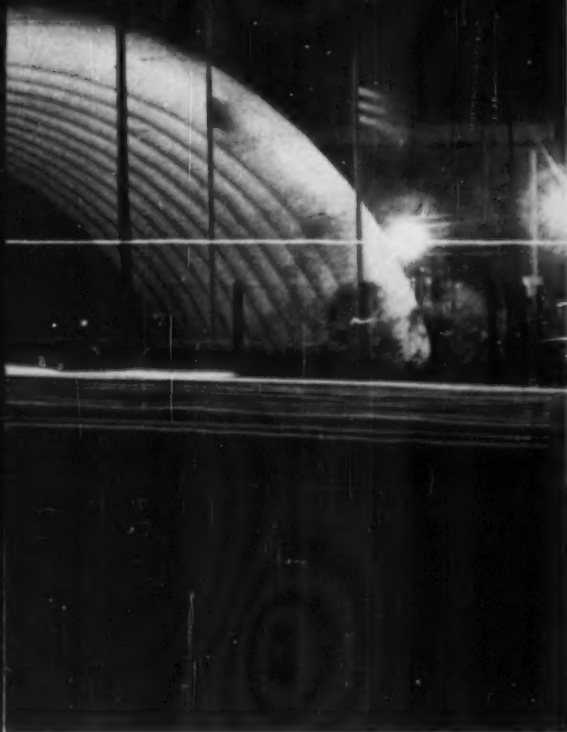
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Atoms for South America BY ALBERT H. WOODS



The coordinator of the AEC's new traveling exhibition describes the long-term planning that went into an effective display of complex material

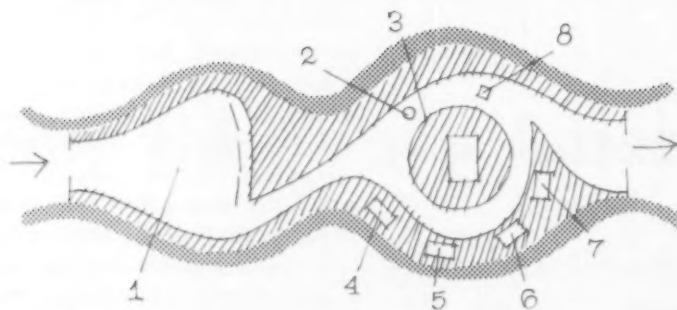
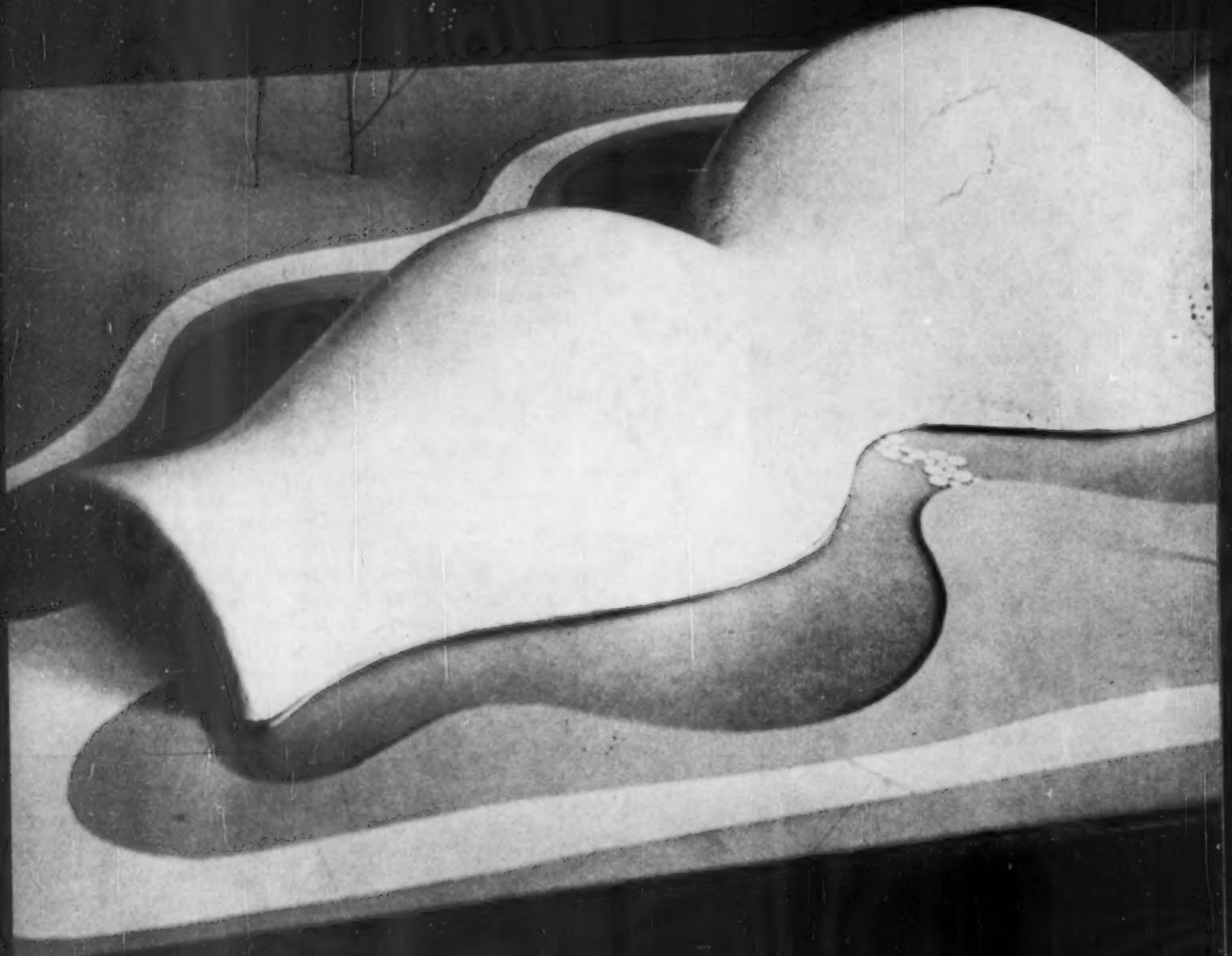
For the past several years the United States has been participating in exhibitions abroad, many of them of great importance—at least potentially—in furthering international understanding. They range from simple graphic displays to the transmittal of complex knowledge and philosophical attitudes to large audiences. They involve formidable problems in planning and design and must often draw not only upon the techniques of industrial design, but on those of research and writing, architecture, interior design, the graphic arts, and both live presentation and film.

Our success in this field has been sporadic. While individual practitioners in all these separate fields have turned in creditable performances, and we have had moments of brilliance (such as Charles Eames's film presentation for the recent Moscow exhibition), on the whole we have failed to achieve what all designers talk about — integrated presentations. Our solutions have rarely approached the impact of the Broadway musical, in which music, choreography, lighting, set design, and acting are fused into a spectacular whole.

There can of course be no single exhibition formula. Since each one has its particular audience and subject matter, and may have its beginning in any number of circumstances, each must be approached as a separate communication problem. Yet our solutions tend to be neither individually appropriate nor coherent. They grow in layers during the time between the original administrative decision and the final presentation abroad, and often the dissimilarity between the layers is irremediable. This is partly because the people who make many of these early decisions have little feeling for what they will mean in their final, physical, form. In the course of working on five of these presentations (in Stockholm, Milan, Rome, Brussels, and Moscow) I had become acutely aware of the need for a closer relationship between the early planning of these projects and the elements which make for an effective exhibition.

A little over a year ago, I had a chance to do something about it. In September, 1959, I was retained by the Atomic Energy Commission to plan and coordinate an exhibition for them in Latin America. The AEC intended this program as an important statement of the United States' progress in the peaceful uses of atomic energy, and hoped to display it in several different locations in South America. Apart from this outline of aims, there were no initial restrictions.

Although I had designed a previous atomic energy exhibit for the AEC, I now spent three months doing basic reading in the subject, as well as on the general background of Latin America. As an underdeveloped area, whose immediate need is to raise the standards of nutrition, literacy, and health, Latin America has as its most pressing task the large-scale development of both human and physical resources. Our audience there would consist, generally, of two groups: a small



A model of the exhibition structure shows the two-celled form with arched canopies at either end. Building can be erected by 12 local workmen in four days, is 300 feet long and covers 22,000 square feet. Plan at left maps route of audience through exhibit: (1) film, (2) irradiation pool, (3) reactor dome, (4-7) lecture demonstration areas, (8) demonstration illustrating the safe handling of radioactivity.

group of technically-oriented people (scientists, technicians, advanced students) and a much larger public audience with little or no preparation for learning about atomic energy. The technical group would be interested in very specific information pertinent to their work, and would be equipped to absorb detail. Our aim in regard to the public audience was to stimulate their interest in atomic energy and technology in general, and to impress them with the relationship of atomic developments to the social and economic well-being of their country. We were particularly interested in reaching students at the secondary level, who badly needed stimulation to increase their interest in scientific studies—which at the moment have relatively little prestige in South America.

By January, my research had boiled down to a sort of working script for the content of the exhibit, and a set of specific goals to present to the AEC. The goals, I felt, were as important for what they excluded as for what they contained. (Failure to set definite goals often leads to an unmanageable accumulation of subject matter, impossible to present effectively, especially to a mixed audience of scientists and laymen.)

The proposal I prepared treated the technical and general audience separately to avoid compromise. Previous atomic energy exhibitions had included some technical equipment and an information library. I proposed that a more than usually extensive working laboratory be supplied and a cooperative program of experiments be arranged between our scientists and those of Latin America. (This facility was to be insulated from the public to allow the program to function without disturbance.) The laboratory was to be supplemented by a technical information and film library, like those used successfully in past exhibitions.

To satisfy the needs of the student group, who possessed little background or interest in science, but who were ready for more specific and more advanced information than that provided for the non-academic public, I investigated programs carried on in this country to stimulate student interest in science. There was already in use a traveling lecture-demonstration program sponsored by the Oak Ridge Institute of Nuclear Studies; it seemed to fit our needs, and I recommended that a similar program be included in our technical section. This entire technical section was to function on a prearranged invitation basis, and would have a separate entrance and exit to allow it to function independent of the public section.

Now that the technical audience had been provided for, I could greatly simplify the subject matter in the public area and choose media for the most dramatic impact upon the general audience. The historical aspect of atomic energy was eliminated, along with explanations of atomic structure and chain reaction; and the vocabulary was simplified. I tried to concentrate on

conveying the important general aspects of atomic energy, and with this in mind wrote a script along the following lines:

- 1) Modern civilization and a better standard of living for everyone depends upon the use of tremendous amounts of energy.
- 2) Since fuel resources are being depleted, new sources must be found to meet our future needs.
- 3) A vast new source of power—called atomic energy—has been found within the basic structure of matter.
- 4) In addition to supplying electric power to light our cities and power our industries, atomic energy in the form of radioactivity contributes to our industrial processes and products, and is a research tool of great importance in gaining new knowledge about plants, animals, and the human body. The results are better agricultural products and improved methods of diagnosing and treating disease.
- 5) The benefits of atomic energy are the result of work by thousands of technicians and scientists in laboratories all over the world. Our progress toward a better life depends to a large extent upon our continuing efforts to gain new knowledge and to apply it to our problems.

This greatly simplified message had to be transmitted to a large number of completely unprepared people. Film was unquestionably the most effective mass medium at our disposal: the subject of atomic energy was impossible to convey by other means because of the bulk of its physical facilities. Also, film was a medium fairly easily converted from one language to another.

After they had seen the film, the audience could move on to the technical area, and watch the guest scientists at work behind a separating barrier, with the feeling of a "glimpse behind the scenes." There would also be a series of lecture-demonstrations on the peaceful uses of nuclear energy.

From the project's very beginning, the enclosure had been a problem. We intended to move the presentation from city to city in Latin America, but trailers and rented spaces (the two solutions that seemed the most possible within our limited budget), placed too many limitations on design. I began, therefore, to look into the available structural systems and portable buildings. These early investigations turned up, among other things, a portable air-supported missile maintenance enclosure, known as the Pentadome, which had been developed by the Army for the Redstone Base in Alabama. Officials there showed me movies of the installation and estimated the cost at \$1.50 a square foot. The dome covered 50,000 square feet, and loaded on trailer trucks along with its power generation equipment and its air supply system. An air lock had been developed to solve the problem of getting large objects into the structure, and revolving doors allowed personnel access.

We outlined our own requirements to air structure

suppliers, and asked for preliminary proposals. While these proposals did not satisfy all our requirements, they did indicate that an air structure might be designed to meet our needs and our budget.

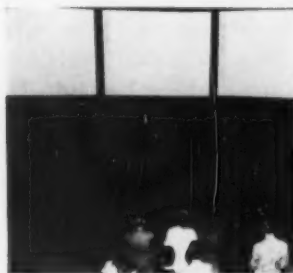
Our next need was for an architect, since not only the site development and building, but also the technical center itself were architectural problems. Furthermore, it seemed particularly important that the inside and outside of the building be designed as a whole to avoid the usual competition between building and exhibit.

This is of course not a new idea, and we designers always talk about it. But the present exhibition seemed a real opportunity to effect genuine design integration. I recommended that we not hire an exhibition design firm, but rather select an architect with whom I might cooperate on the interior content. The architect we chose was Victor A. Lundy of New York, whose work had shown his ability to incorporate diverse requirements into a simple solution with the immediate visual impact so important to an exhibition.

I turned over the results of my preliminary research into portable structures to Mr. Lundy, and the consensus was that an air-supported structure was the best answer to our program requirements. We met with the air structure companies that had submitted proposals earlier, and Birdair Structures of Buffalo, New York, supplier of the Army's Pentadome, was selected as fabricator.

Meanwhile I was interviewing prospective film producers. I had just returned from Moscow a few months before, where the Eames film for our exhibit had shown me the excitement inherent in this medium. I knew very little myself about the process, but the Museum of Modern Art in New York was extremely helpful in filling in background information and in giving me a list of film producers to call upon. My first investigations showed that the procedure often followed in film production was all too similar to that often used in approaching exhibition problems. Film content as expressed in written script is prepared by the client and/or the writer, and this script is more or less literally translated into the film medium. Again, material is organized in terms of the written work instead of the medium in which it is to be presented. This division of labor, seemingly a business necessity, is usually fatal to the film as a communicator. Moreover, films are usually based on a predetermined specification including method of presentation, e.g., 16mm color, thirty minutes in length. This, of course, eliminates experimentation.

I hoped to find a unique method of presentation: one that would arrest our audience's attention and that would be conceived as an integral part of the total presentation. Francis Thompson Films, Inc., of New York, gave the most promise of meeting these goals—a promise that was more than fulfilled. I turned over my



Francis Thompson's primary assignment from the AEC was to make a film that would seize the attention of a lay audience, excite their interest, and overwhelm them with the subject — "We wanted them carried out on stretchers," says Thompson cheerfully. When Al Woods came to Thompson with the job, neither of them had any idea of how to accomplish this; they knew only that it would involve a new configuration of screens. Thompson experimented with almost every arrangement imaginable; when finally he arrived at three screens, he was not the first one there. Cinerama and Cinemiracle use three screens, of course, and thirty years ago the French film director Abel Ganz made a film called *Napoléon*, using a smaller screen on either side of the main screen. Thompson, however, wanted to use three screens with much more freedom than before.

He found that his new freedom imposed its own discipline: there are certain rules for working with three screens (e.g.: each screen should contain approximately the same amount of sky area) and certain difficulties to be overcome. But figuratively as well as literally, he feels, the new medium gives the film maker a much wider scope. With three screens there is no need to wait, no need to remember between long shot and closeup. Or the director can combine live action and animation or photograph and diagram.

The top panel at right uses one panoramic image across the three screens; the second series shows two views of one crane (the left and right images are the same, reversed). The third panel shows traffic patterns in New York and Los Angeles; and, at bottom, a long shot of an oil well is repeated at either side of a closeup.



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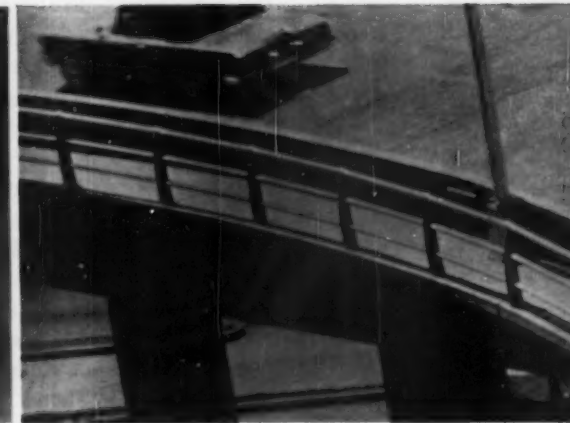
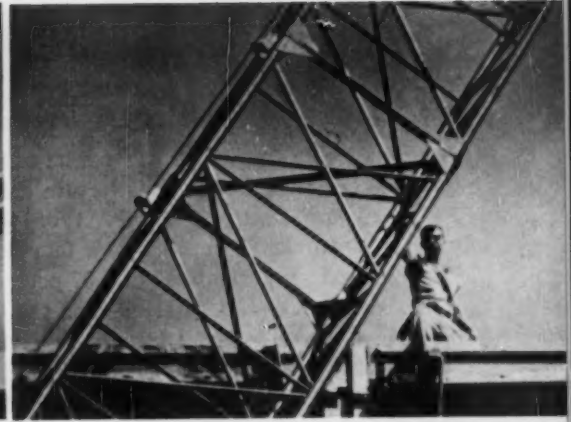
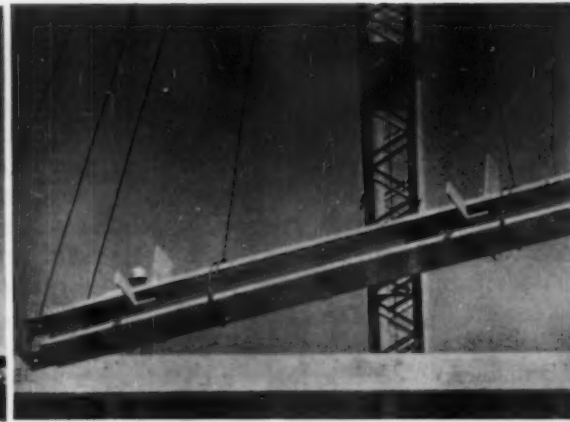
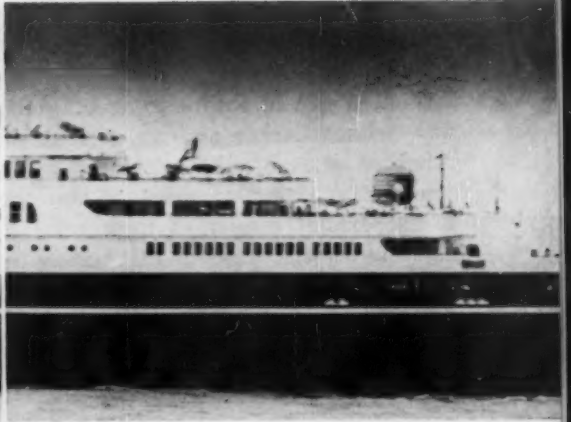
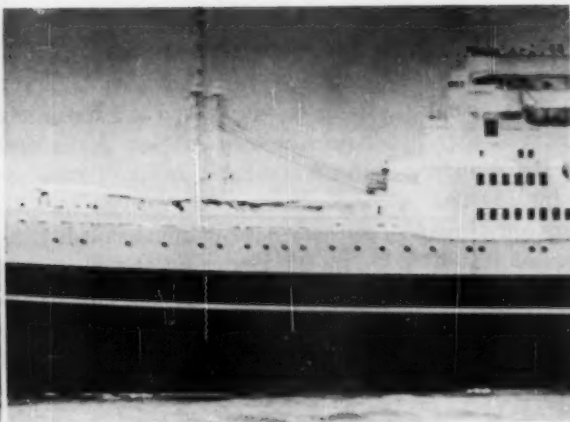
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exhibition content outline to him, together with visual and printed background material on atomic energy. After a series of discussions, in which Mr. Lundy joined, Mr. Thompson proposed that the introduction to the exhibit consist of three color films on three adjacent screens. Tests of this system revealed that it was a tremendously exciting medium, and extremely versatile. The three screens allowed simultaneous presentation of three different aspects of a subject, or they can give the effect of a single wide screen for impressive panoramic shots. It is a medium well-suited to our subject matter and one that transmits maximum information in a short time, an important point in moving crowds through the exhibition.

With the film system established, the architect now had all the interior requirements and established a bold two-celled form which expresses the content of the exhibition. The first cell contains the film presentation and the second cell provides a large space for the technical center and the public lecture demonstrations. The structure itself is composed of two skins of vinyl-coated nylon, separated by a four-foot air space. The inner skin is pressurized at 0.07 pounds per square inch above atmospheric pressure and the outer skin at 0.054 per square inch. This pressure, too slight to be perceptible to occupants of the building, is maintained by two blowers. Both of the two balloon shapes are slightly warped to avoid the acoustical reverberation that would have resulted from perfect domes. The structure is white on the outside to reflect the heat and black on the inside for complete light control. A system of portable serpentine walls separates the audience from the building's inner-skin. A dim glow of blue-violet light from behind these walls serves as the only general illumination.

Carl Ramirez, a New York designer, and I were responsible for the design of the lecture-demonstration area. We decided on a series of four lecture-demonstrations on the uses of nuclear energy in power production, industry, agriculture, and medicine. Since a basic principle of the exhibition is complete light control, everything but the subject matter itself is left in darkness. Theatrical lighting is used to direct the attention of the audience to each item as it is explained and each of the four lecture areas is flooded with a characteristic light color. Here, as in the rest of the exhibition, printed text is eliminated entirely; partly because of the difficulty in converting from Spanish to Portuguese, but primarily because it did not seem dramatic enough for our purposes.

The lecture-demonstration areas are placed under a long, curved overhang designed to provide good sound characteristics. The items presented are arranged as in a window display and the four areas are flooded with colored light to relate the objects to their respective themes. A large animated symbol—designed by Carl

Ramirez—is placed at the center of each area to represent each subject. A demonstrator with a microphone stands in front of each symbol and by means of a control panel focuses spot lights on each piece of equipment as it is presented.

In the center of the floor, a railing separates the general audience from the technical facilities, which consist of a gamma irradiation pool built and operated by Brookhaven Laboratory, a portable research and training reactor, designed and operated by Lockheed, and a reactor simulator furnished by Leeds and Northrup. The reactor and reactor-simulator are enclosed by an air-supported clear plastic hemisphere with insulation material adhered to its upper side to provide a quiet working area for the scientists.

As part of the technical facilities, a separate classroom is provided for the student lecture program. Oak Ridge planned four lecture demonstrations, each 45 minutes long, to which groups of secondary school students are brought by appointment. The lectures, which cover basic atomic structure, nuclear reactors, radioactivity, and the peaceful applications of atomic energy, are delivered by local teachers trained by Oak Ridge personnel.

The exhibition was first installed in Buenos Aires late in November (it is going on to Rio de Janeiro and then to Caracas and Lima), and on the basis of its reception there, I can attempt to evaluate its successes and failings. Our first major problem was the familiar one of time. Although I was acutely aware of the importance of giving the various contractors adequate time, I was completely unprepared for the time and effort needed to get work actually under way within the government's structure, and this became our greatest single handicap.

Another problem—equally familiar—was that of maintaining follow-through. There were a number of separate contract items involved in the exhibit, practically all of which had to be prefabricated in the U. S. in such a way as to allow for subsequent dismantling and repacking. These included the air structure, film projection equipment, exhibit items, and a number of smaller items. Not all the items actually shipped fit together correctly at the site. Had the exhibition been intended for one installation only, the problem of badly fitting parts would not have been so serious, but we had to think of subsequent installations, requiring demounting and remounting.

The chief design contractor was the architect, whose drawings and specifications covered the work to be done in most of the areas. The architectural firm we had selected—wholly on the basis of design ability—was small and there was no general contractor for coordination and completion of the actual work. A general contractor, of course, was provided for in Latin America for assembly and installation. Even here, because of

the prefabricated nature of the exhibition and the fact that it differed in many respects from normal building construction, we had to provide constant personal supervision in all phases of the work. The prefabrication of a 22,000-square-foot exhibition including its enclosure and its movement to separate locations in foreign countries presents a sizable problem in logistics.

But the success of the exhibition so far more than makes up for the difficulties. The first three weeks of the exhibit proved the tremendous initial impact created by the sensational nature of the exhibit coupled with the architect's bold and sensitive solution, which is unquestionably the most successful exhibition structure I have seen. And the completely dark interior, with no visual competition for the subject matter, is extremely effective. At one point it became necessary to mount a few temporary light fixtures in a location where they could be seen. They immediately seemed an intrusion, pointing up just how much objects of this kind can compete with the subject matter.

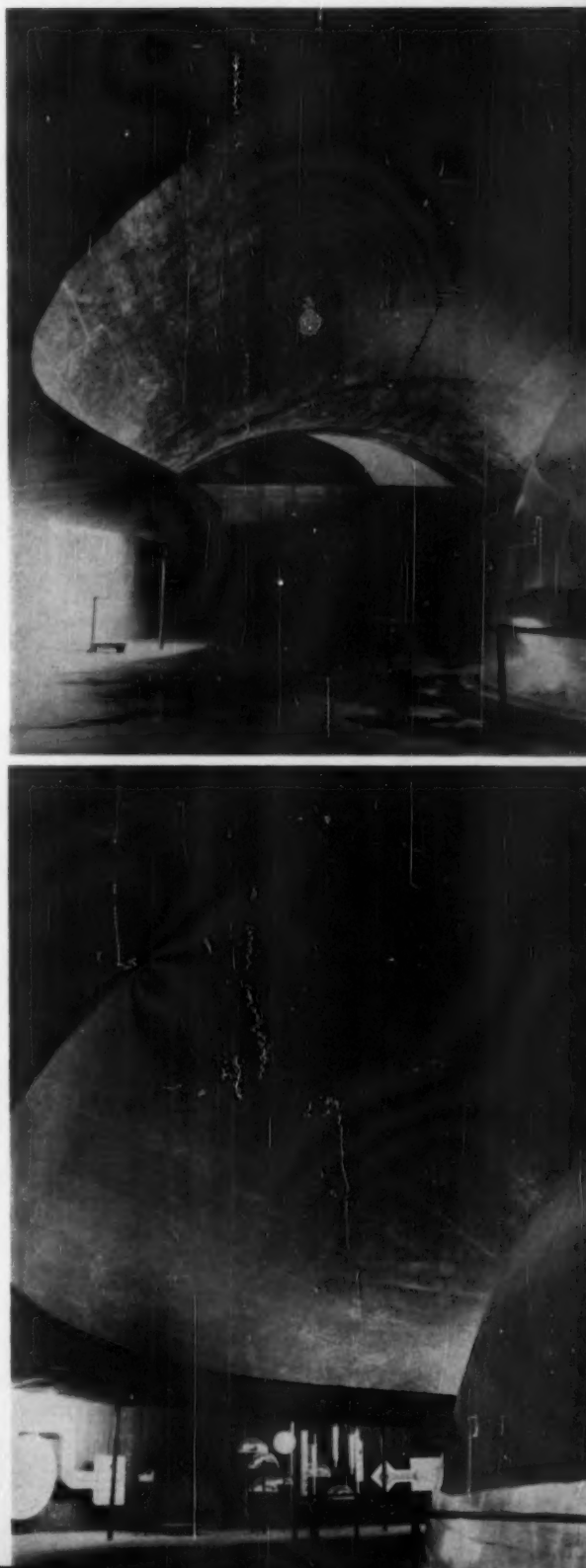
As a designer I found the interior space, which the architect had handled admirably, to be an exciting visual experience, and I can report the success of the lecture area with its use of colored light and verbal presentation. Francis Thompson's brilliant introductory film provides a successful bridge to the subject of atomic energy for the unprepared public audience. And more important than any of these single elements is the fact that they fuse into one strong impression.

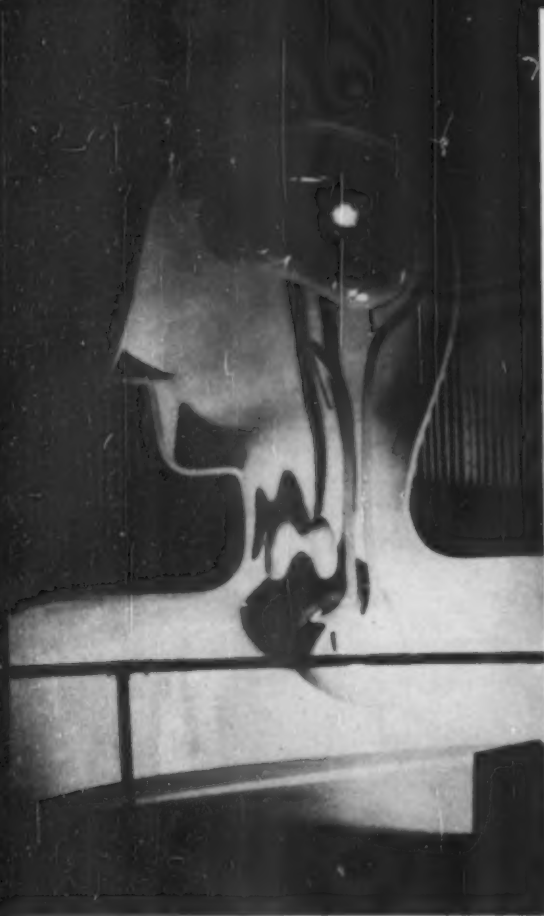
But, as planner of the exhibit as a whole, I received even greater satisfaction from the technical section of the exhibition. (And one key to the impact of the exhibition as a whole is the split between the technical and public areas, allowing each audience to be dealt with according to its needs.) While it is still too early to report on the success of the cooperation between scientists and technicians, the enthusiastic reception given the student lecture program was impossible to mistake.

There is still a great deal of work to be done to put the exhibition in perfect condition to move it to its other locations, and its future success depends on constant attention to the problems of installation and maintenance. Each new country will present a new problem to be solved.

When I originally undertook the project, I intended to feed back my previous experiences with other exhibitions into the early planning of this project in order to bring about a more unified solution. If we have taken a step in this direction, it is due largely to a progressive and creative client, willing to resist the familiar inertia that tends to stifle attempts to break new ground; and, even more important, it is due to a closer relationship between subject matter and planning; planning and design.

Walls and overhang pattern the interior with crossing curves.

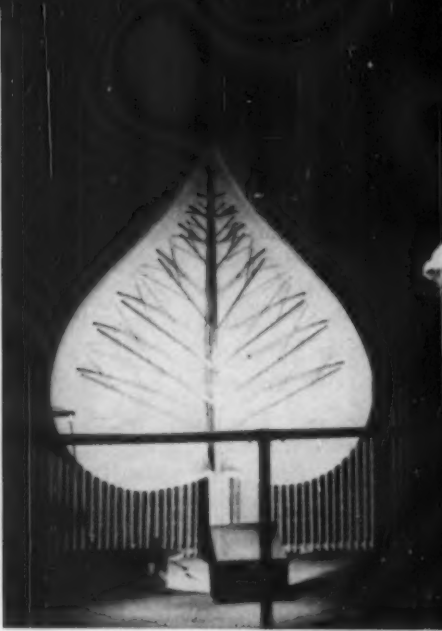




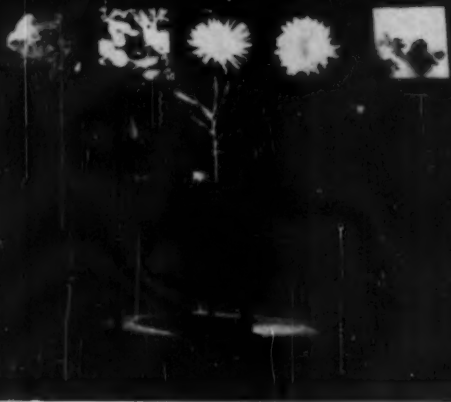
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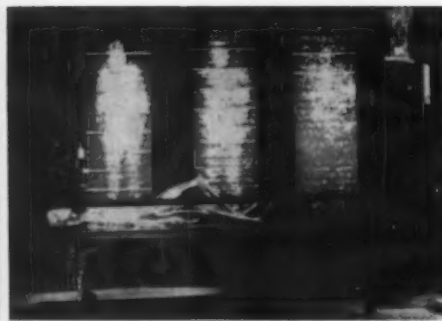
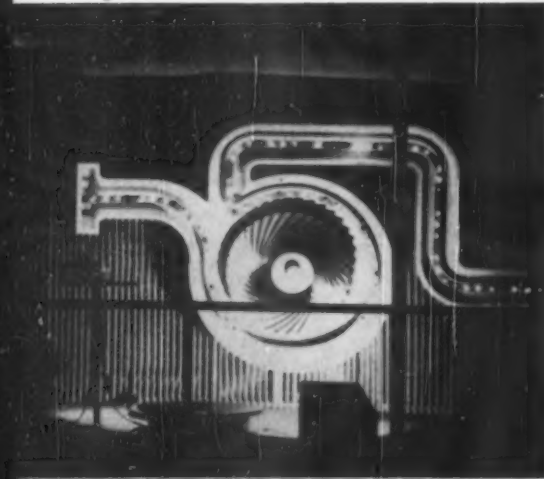
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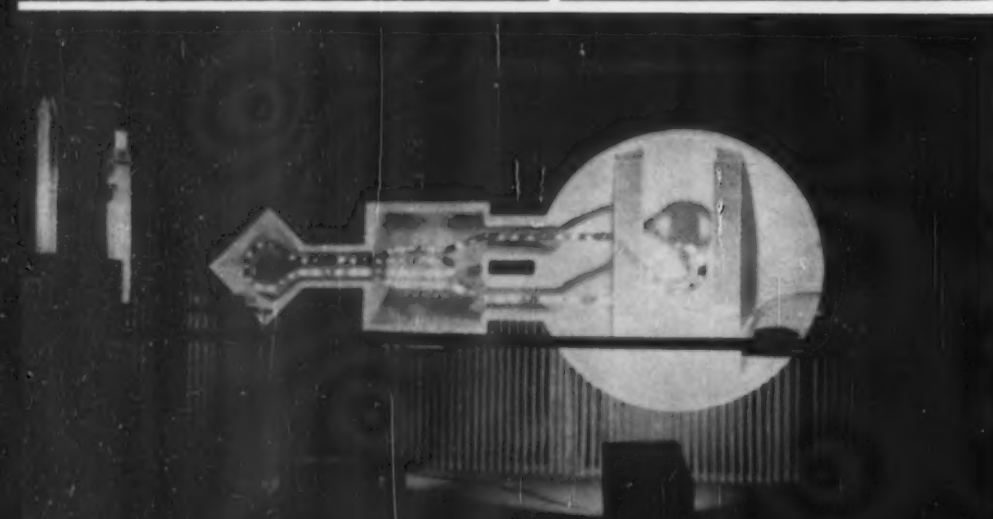
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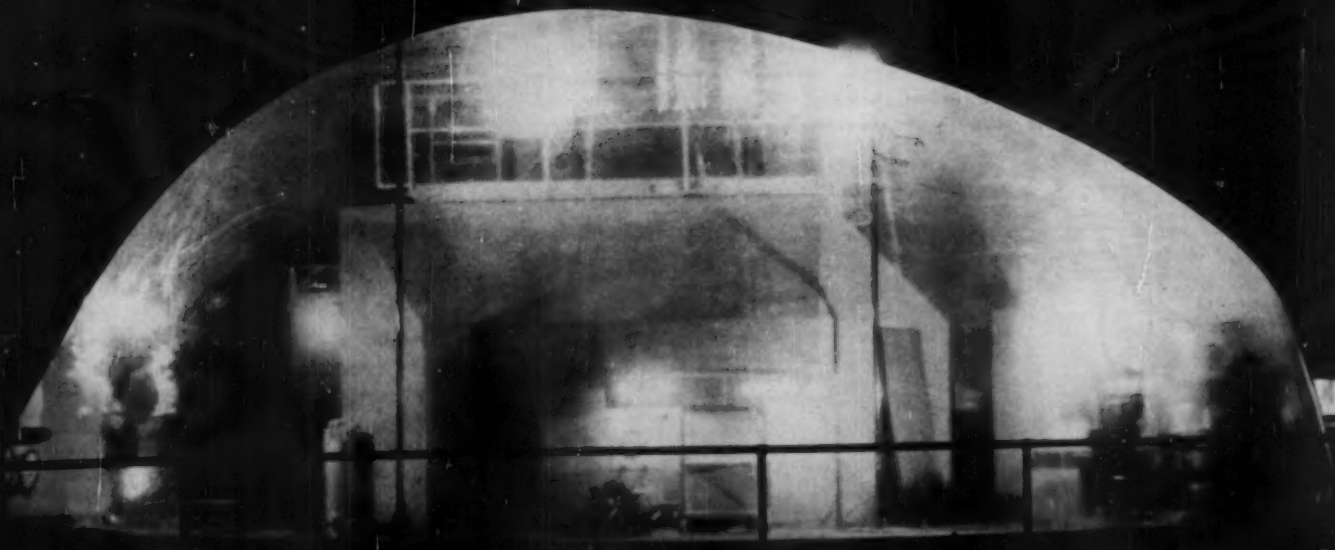
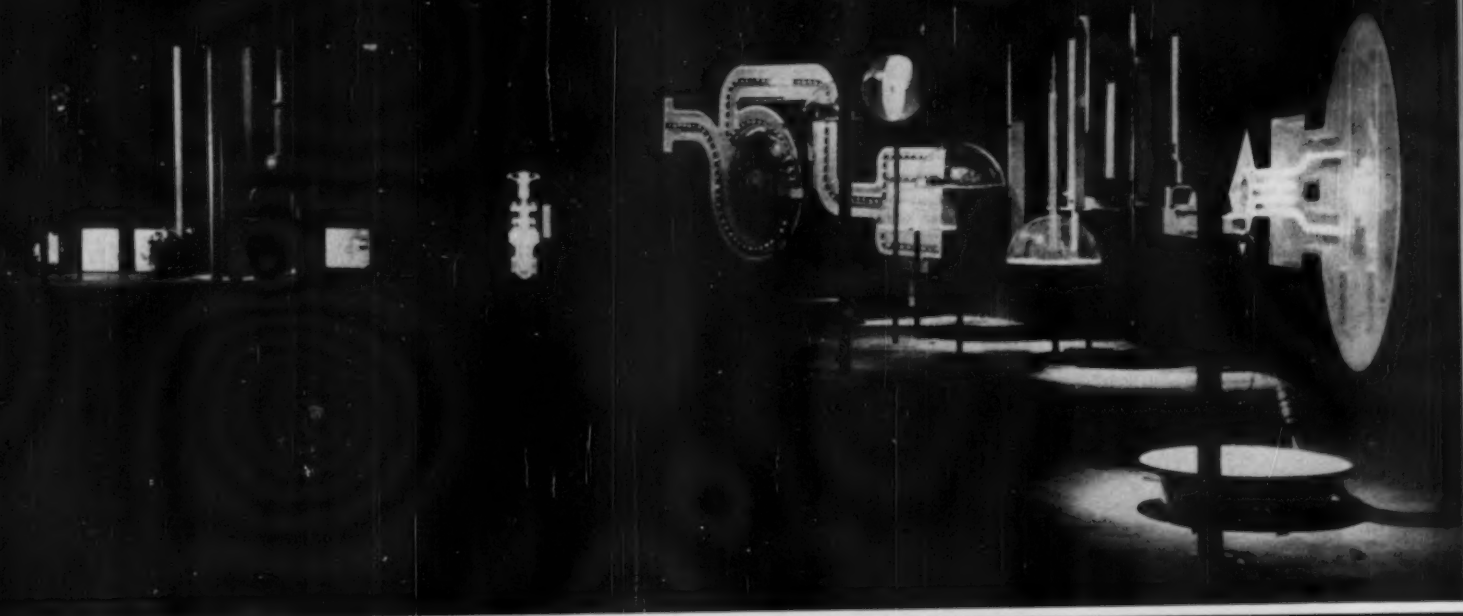
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Carl Ramirez designed the four animated symbols (1, 2, 3, 6) and served as consultant designer for the entire public demonstration area. Lectures are based on peaceful uses of atomic energy in four areas: medicine, industry, power, and agriculture. The medical area symbol (1) shows brain, heart, and thyroid gland, starred with twinkling lights indicating radioactivity. Below (5), a transparent body contains all the organs used in radiation experiments. The industry symbol (2) represents an industrial piping system, and the model below (6) symbolizes the production of power from the circular reactor vessel in the center through the square heat exchanger to the diamond-shaped generator. The symbol for agriculture (3) shows the way radioactivity can be used to trace plant processes.

In addition to the exhibits planned especially for them, the public can observe their own scientists experimenting with nuclear equipment. A mirror above the gamma irradiation facility (4) shows the glow of the radioactive source at the bottom of the 10-foot water tank. Opposite, below a view of much of the public demonstration area, the plastic bubble housing the nuclear reactor and the reactor simulator separates the working scientists from the public. Insulation covering the top of the bubble provides a comfortable working temperature inside. Advanced science students act as lecturers to explain operations inside the bubble.

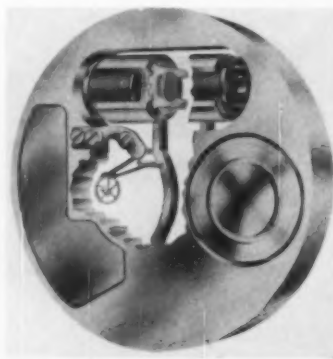
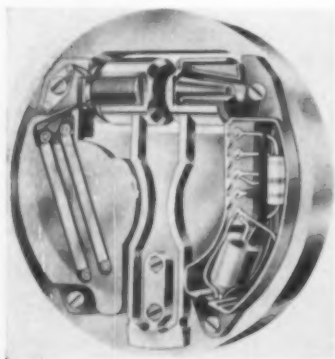


WHAT DOESN'T MAKE IT TICK?



Tiny tuning fork is heart of Accutron's electronic timekeeping system. Miniature electro-magnetic coils are wound on plastic forms before insertion in tuning fork cavities, and keep fork vibrating 360 times per second. Each of the coils has about 350 feet of wire, wound around 8,000 turns.

Diagram of Accutron's dial side (below, left) shows position of tuning fork in center with one coil cut away to expose one of the conical magnets that control vibrations. Transistor for electronic circuit is at lower right. Diagram of Accutron's back (below, right) shows tiny indexing components feeding from one tine of the fork to ratcheted index wheel, the circular recess for the power cell, and, on end of one magnetic coil, one of two regulators used to change frequency of tuning fork.



A timepiece with the tick taken out is Bulova Watch Company's Accutron, an electronically powered "micro-sonic timepiece," that works in a way similar to the timing mechanism in a space satellite. Since it operates on principles completely different from the usual wristwatch, Bulova prefers not to call it that, coining instead the word *Accutron*, from *accuracy* and *electronics*. What makes Accutron special is that it eliminates the traditionally essential mainspring, balance wheel, and winding mechanism and replaces them with a vibrating tuning fork, a micro-miniaturized indexing mechanism, and a transistorized electronic circuit. Bulova claims that the electronically powered tuning fork makes Accutron 10 times more accurate than conventional fine-performing watches; in fact, they guarantee it to be a hairsplitting 99.9977 per cent accurate. Because of its radical new system, Accutron hums (barely audibly) rather than ticks, its sweep second hand rotates smoothly rather than in jerky motions, and it has no visible winding and setting stem. Ordinarily, a self-winding watch has 29 moving parts, but Accutron has only 12 and needs no lubrication, thus minimizing maintenance. And since both tuning fork assembly and electronic circuit are designed as modules, they can be replaced as units if damaged.

Heart of the Accutron system is a one-inch long nickel alloy tuning fork (left and below). Electrical energy controlled by a transistorized electronic circuit drives the tuning fork with pulses of current and controls the vibration. Accutron's 1.3-volt mercury power cell costs about \$1.50 and lasts over a year; it can be inserted in the case as simply as a flint is replaced in a cigarette lighter. On one tine of the fork a finger-like spring, the "index finger," pushes on the ratchet teeth of the index wheel 360 times per second, once for each vibration of the fork (see diagram). These pushes force the index wheel to rotate, and the wheel in turn drives the wheel train which moves the hands across the dial. A similar jewel-tipped spring finger holds the wheel ready for the next push.

The man who invented Accutron is Swiss physicist Max Hetzel, who is now the chief physicist at Bulova's Jackson Heights, New York plant. Accutron costs \$175 to \$2500, depending on case.



Blowup shows Accutron tuning fork and electromagnetic coils at top. At left is tough plastic cover for electronic circuit and transistor; at right is plate covering recess for power cell.

Management states its case

When members of the ASID gathered together in Chicago they were not alone. Management was on hand to explore the role of design in planning.

IN CHICAGO'S Edgewater Beach Hotel, at the end of October, the American Society of Industrial Designers held its annual meeting in the form of a "conference for industry executives" calculated to stimulate management's interest in design by inviting management itself to talk about design.

First came "The Alcoa Program: A Lesson in Marketing Integration," presented by Frank L. Magee, president and chief executive officer; Arthur P. Hall, vice-president, advertising and public relations; Dr. Kent Van Horn, manager of research; and Samuel L. Fahnestock, manager of design. "Because we early recognized the vital role of design in a dynamic industrial environment, Alcoa has long endeavored to become identified with design excellence," said Mr. Magee. "We have thus made it a significant aspect of the corporate image we are attempting to project." Mr. Hall then elaborated on the projection techniques, particularly the company's efforts to "use the designer's language to speak to the designer." Dr. Van Horn discussed Alcoa's Technical Center, and its facilities for serving industrial designers, and Mr. Fahnestock explained how the design group works.

Next up to bat was George W. Romney, the President of American Motors, and the most authoritative opponent of the Annual Model Change. Mr. Romney said all The Right Things, and said them with a passionate conviction that won

the respect and applause of the entire audience. He fielded questions with the gruff earnest confidence of the kind of splendid businessman that they don't make any more. Yet for all the fierce sincerity of his attack on "capricious and superficial changes," even as Mr. Romney spoke his Indiana factory was assembling the "Classic" and the "American"—two 1961 cars that raise the question of why there is so much disparity between what Mr. Romney says and what his plant produces today.

Asking that question might in itself have been a kind of answer to Mr. Romney, but no one asked it. One kind of answer was supplied by James R. Toney, vice-president of product planning and development at RCA. Mr. Toney ticked off all the standard arguments, including sensible ones like technological developments and frivolous ones like the fact that salesmen need a gimmick they can call "new," and not forgetting the classic cliché of marketing feebleness: "Anyone who believes a manufacturer can force the consumer to buy something he doesn't want just hasn't spent time on a dealer's sales floor."

The third speaker on the subject of the annual model change was Dr. Reavis Cox, professor of marketing at the Wharton School of Finance. Dr. Cox summed up the stock arguments for and against "planned obsolescence" so accurately that, had he spoken first, it would have been un-

necessary for either Mr. Romney or Mr. Toney to speak at all. His talk was cogent and dryly witty, and his manner characterized by the sort of mellow realism that betokens the good professor. Cox pleaded for more and better information, chiefly for the purposes of defending industry in the halls of academe: "It would certainly help those like myself who are exposed continually to a blast of ill-informed criticism of business, but have very little valid information with which to combat it."

OLIVETTI

The second day of the conference was given over to "The Story of Olivetti," a story told by Paolo N. Rogers, director of foreign relations; Ricardo Musatti, advertising manager; and Edorardo de Robert, director of the Olivetti Corporation. Excerpts from the addresses of Mr. Rogers and Mr. Musatti follow.

MR. ROGERS

THE PRIMARY AIM of the Olivetti Company is to manufacture and sell various kinds of machinery and thus to provide employment for its workers and profit for its owners, and not, as someone might suspect, to provide employment for designers, artists, printers and architects—or executives.

You are probably interested in knowing how we go about building our corporate image. I have often wondered myself exactly what are the components of this image and what



process is followed to express it. There is no simple answer to this question. To start with, my personal experience is that the Olivetti Company is somewhat different from any other business concern with which I have previously been associated, in this respect: when working within the Olivetti Company one feels as if he belonged not so much to an organization as to an environment or an ambience in which people are the important factor. By nature and by inclination, perhaps by inspiration, but certainly not by definite instruction, we are not "organization men." In other words, large as our company is, it still manages to place the greatest value on the individual rather than on his function, on the ability of the individual to adjust to changing situations and even to radical shifts in duties, rather than on a preconceived program which so often makes for rigid organizational schemes. Of course, we recognize and respect organizational requirements, but we are not obsessed by them.

Our corporate image, like so many other images, is a composite. The main components are: our products, of whose quality we are fully confident; the emphasis we place on human elements; our high regard



Left to right: Cox; Nathaniel Becker; de Robert; Doblin; Dave Chapman; Toney; Van Horn; Richard Latham; Magee; Romney.

for the role of design and the graphic arts in all phases of our operation; and our unique position within a certain industrial and cultural environment. In each of these areas we strive to live intensely within the context of our time, and to express it as effectively as we can through our people, through our products, and through our presentation and marketing of them. Whenever possible we try to think, act, and live ahead of our time, but modern corporate life is such that today turns suddenly into yesterday—it is an achievement to keep up with the present.

We hope that as we translate our articles of corporate faith into the daily activities of our company's progress, they will result in a favorable attitude toward Olivetti—not so much as a corporate image, but as a corporate reality.

MR. MUSATTI

SINCE the Olivetti company first acquired international dimensions, and its graphic expressions and architecture were thus exposed to more and more people, two questions have been asked: what is this Olivetti style, and how did it come about?

We like to remind ourselves of a phrase written by the

founder of the Olivetti company, Camillo Olivetti, back in 1912: "A typewriter should not be a gewgaw for the drawing room, ornate and in questionable taste. It should have an appearance that is serious and elegant at the same time." It contains in a nutshell the guiding principle of the Olivetti design. However, for many years the limited production of a single model of typewriter did not create great problems of style in the advertising field.

It was around 1930, when the company embarked on a program of expansion, that the need for more intensive advertising came about. Adriano Olivetti, the son of the founder, took it upon himself to guide the advertising program and, on a broader plain, the visual manifestations of the company.

The modern movement was at that time struggling to assert itself in Europe, and was orienting the plastic arts toward a new unified form of expression. Adriano Olivetti understood that a high-precision mechanical instrument such as the typewriter had to be modern, simple and functional, and that mechanical writing had to assert itself over the age-old tradition of handwriting as a revolutionary need, as a development of a new rationalism in the material expression of the word. It was necessary to bring about a change in the taste and in the habits of the most active and educated part of the public—the part which was at that time directly interested in mechanical writing. One of the

slogans used in those years was, "It is time to change the ink-well into a flower vase."

Olivetti, to satisfy this need of asserting a new precision in the tools used for everyday life, turned to the most advanced expressions of contemporary art, which by its nature was linked with architecture, typography, and interior design. Yet the translation of this into concrete results could not be achieved through the artists who were then dominating the advertising field and Italian painting, and who were leaning towards illustration. Therefore Adriano Olivetti turned to a group of very young artists without previous advertising experience, and consequently freer in their creativity. He believed also that the best result could only be achieved by a spirit of total dedication to the specific problems of industry and by a progressive development of all the graphic and architectural manifestations of industry in the direction of a unified style. Throughout the following thirty years the company has maintained this major policy, and its implementation can be synthesized in a few points that have been and remain the essential foundation of all our activity.

It has been the constant position of the company to maintain a strong authority and autonomy of the advertising department. In fact, the advertising department reports directly to the president and is accountable only to him regard-

ing the men it selects, the media it chooses and in all matters of taste. Obviously the problem of selling is our problem, and cooperation with the sales department is a daily procedure, since we consider ourselves as an instrument of the sales policy. But in addition to this, we consider ourselves responsible for communicating to the public the total picture of the company, enhancing its prestige, explaining its social functions. The relationship between advertising costs and sales costs is determined in the formation of the budget of the entire activity of the company, and within these budget limitations we strive only to obtain the best overall results.

This basic attitude enables us to maintain throughout the world the same formal expression. Almost all of our printed matter, printed advertisements and displays, and all of our showrooms are designed and to a considerable extent produced in our headquarters. Olivetti has never availed itself of the creative facilities provided by advertising agencies. Outside of Italy these organizations assist us in the preparatory work of printed matter, in the copy and in the administrative aspect of our program, but they have not only accepted but supported our effort to establish unity of style throughout the world. We do not believe that the public in each country requires substantially different advertising. Our machines, which are the same in all countries and perform the same

tasks, are accepted with enthusiasm in over 100 markets. We do not see any reason these markets should not also accept the same graphics or architecture. Just as our machines are designed and built by several technical men, who ultimately achieve the same standard of quality and efficiency, similarly in our advertising department we have applied the same principle; and rather than choose an artist for each country or group of countries, we have assigned specialized tasks to men according to the different products they are presenting.

Giovanni Pintori, the first and foremost artist creator of our company, has the responsibility of a department that prepares literature and layouts for the entire world. Our displays for the various shows and decorative materials are produced by a group headed by Egidio Bonfante and Franco Bassi, who have also designed some of the showrooms of our foreign companies. A third group headed by Walter Ballmer follows the activity of the Synthesis Division of the company, which produces card files, file cabinets and office furniture, as well as the Teleprinter Division and Machine Tool Division. These three main groups, who are independent of each other, report directly to the advertising manager. They work full time to produce an always increasing amount of work. But we also avail ourselves of the work of outside artists for special projects. This broader approach acts as a stimulus for our entire organization and offsets the dan-

gers of routine. We shall mention first of all the contribution made by Leo Lionni, whose work I am sure all of you know well, to the Olivetti Corporation of America. Similarly, some of you have seen the posters designed by Xanti Schawinsky, Paul Rand, Herbert Bayer, Savignac and Henrion. More recently Max Huber, Bruno Caruso and the brilliant designer of objets d'art and art books, Bruno Munari, have worked for us.

Our research continues as we keep ourselves open for suggestions and to this end we maintain within the advertising department an "advertising research office." The same guiding principles are applied to special undertakings which come about from time to time. The contribution from persons outside of our organization is always coordinated with the work of our own staff members. We have often been accused of "wanting to do everything ourselves" and in reality, through a gradual development of our staff, we are in a position to meet almost any demand. But this is not due to a dogmatic faith in the qualities of our collaborators but only to our belief that so important a responsibility as presenting the face of our Company to the international public can best be met by those who share its daily problems, ambitions and developments.

So far I have only presented to you the work performed by the advertising department, as these problems are most fa-



Rogers

miliar to me and also because I thought this aspect would be of interest to those among you who are directly involved in advertising. However, in speaking of Olivetti design, we should also bring into focus the importance that architecture and industrial design have had in the recent development of the company. The problem of enlarging the facilities has recurred frequently since the Olivetti company began. For many years Adriano Olivetti was deeply concerned with the problems of town and country planning and regional planning, which were then almost unknown in Italy. A long time ago, he began working with a group of very young architects in Milan to study an improvement of the region in which Ivrea is located. This group of young architects included Belgoioso, Peressutti & Rogers, the same men who many years later designed Olivetti's Fifth Avenue showroom, which you all know. This cooperative venture brought about the study that has since been published and distributed in book form and which is today considered the first scientific attempt at regional planning ever made in our country.

But if the problems of modern city planning were urgent in industry, even more urgent were the immediate problems of enlarging the manufactur-

ing facilities and developing housing projects for the workers. A few functional architects were then practising in Milan, and from them Adriano Olivetti chose two young men, Figini and Pollini. The big glass facade of the factory at Ivrea, which has since become a well-known symbol of Olivetti, the kindergarten, and the first housing project came from their drawing boards. These same architects have since developed a new plant for the production of calculating machines and a group of buildings in which social services are housed. New architects with different backgrounds were called for other assignments. Some of these assignments were the big dining hall by Ignazio Gardella, the factories in Sao Paulo and Buenos Aires designed by Zanuso, housing developments in Ivrea and the Milan office building in which the designer Marcello Nizzoli also cooperated with the architects Bernasconi and Fiocchi.

It may seem superfluous to mention the work of Marcello Nizzoli, who designed the very famous lines of all the Olivetti typewriters and calculating machines as well as other products of Italian industry. But it must be said that Adriano Olivetti is the one who first called this brilliant painter to make his experiments in design and later to work in the field of architecture, because he was convinced of his sensitivity which was a prerequisite for the understanding and solution of applied-design problems.

Only recently E. Sottsass, Jr., an architect and decorator, was assigned the task of designing the body of our electronic computer, Elea, and with this first project he won the highest Italian award in the field of design, the Golden Compass.

The history of Olivetti architecture is essential to an understanding of how our public image has evolved, and this history is primarily the history of the selection of a group of men. We already said that Adriano Olivetti was among the first in Italy to support new forms of art, and to assert the cultural and revolutionary force of rationalism. Yet when the problem arose of selecting architects for the new factories which came about in the fifties, Adriano Olivetti did not engage in the controversy then raging between the rationalist and organic schools of architecture, but once again focused on the individual. He relied on personal values. He relied on young men or on those who had never compromised their positions. For the new factory in Pozzuoli he called Luigi Cosenza, one of the few modern architects in southern Italy. He was chosen to build an ultra-modern factory, because Adriano Olivetti knew that he deeply loved and — perhaps more important — respected the marvelous landscape of the Neapolitan region. As many of you know, the region of Naples has frequently been defaced by badly conceived buildings. But at Pozzuoli the Olivetti factory, with its elegantly functional structures embedded between mountain and sea, stands in

harmony with its natural environment. I can give you a first-hand account of Eduardo Vittoria, the architect who built the Research Center at Ivrea, the machine tool factory, the transistor factory near Milan and several other buildings. In 1950 I was personal assistant to Adriano Olivetti, and received a telephone call from him urgently asking me to get in touch with this very young and totally unknown man and ask him to go to Ivrea to prepare a project for the Research Center. I was ill at the time, and asked Vittoria to come to my home. He was as surprised as I had been by the offer, but accepted with enthusiasm. He was assigned a private office outside of the main building, and a few months later he was submitting technical drawings to the engineers, who looked with skepticism at this young man, but approved his plans.

All this is to illustrate the non-conformist approach that has brought about the team of architects, designers and graphic artists who have helped to establish "the Olivetti style." For over 20 years the selection of these men was performed directly by Adriano Olivetti, and for those of us who have lived and worked alongside him or near him, his death has been a personal as well as a professional loss. But we shall not forget his teachings. He taught us to select the best man, the free man, independent both culturally and morally, to encourage his best work while aiming at goals beyond simple



Musatti

material interest, in full confidence that the modern world has assigned to industry a most important mission.

In the field of architecture and of graphic and visual arts, the responsibility of modern industry is large. The taste of the mass public is not something to be respected in abstract, since this taste does not exist and the public unconsciously follows the lead of an elite which is culturally more advanced. An industry, through its production and sales capacity, has at its disposal an immense force. This force is able not only to create an appreciation of the products that it manufactures but to spread to ever-larger groups the knowledge of the cultural values which are an essential component of every truly creative activity.

What did the ASID's 16th annual meeting actually achieve? Any fair answer must take into account the fact that annual meetings are seldom intended or expected to achieve anything beyond an exchange of ideas, information, and hearty fellowship. In recent years, however, the ASID has taken the view that one of the most important aims is to bring industry and design closer together. Unquestionably this is a vital professional aim, but whether it is a valid programming principle for a design society meeting is open to question. Certainly trying it has been worthwhile, but it has also caused a lot of problems. Not the least of them comes from the extreme difficulty of trying to reach two groups with one message, without watering the message down to uselessness. For example, many designers in attendance complained that the Alcoa lesson was one they had already learned; impressive as the program was, it was hardly news to the design field, mostly because Alcoa had made its point so effectively in the past. Yet the Alcoa team did exactly what it was asked to do: explain how the company used industrial design. The fear of inbreeding has made it the accepted practice for designers' meetings to be addressed exclusively by non-designers. Our feeling is that we might do well to go back to the almost reactionary scheme of holding professional meetings at which thinking members read professional, technical, and perhaps even learned papers.



ASID members get taken for a ride in Chicago

In the elegant Arts Club, ASID members installed new officers (ID, November, page 20) and paid special tribute to Henry Dreyfuss, appropriately by telephoning him in Pasadena. Mr. Dreyfuss was honored "for distinguished service to the profession of industrial design," and later presented in person

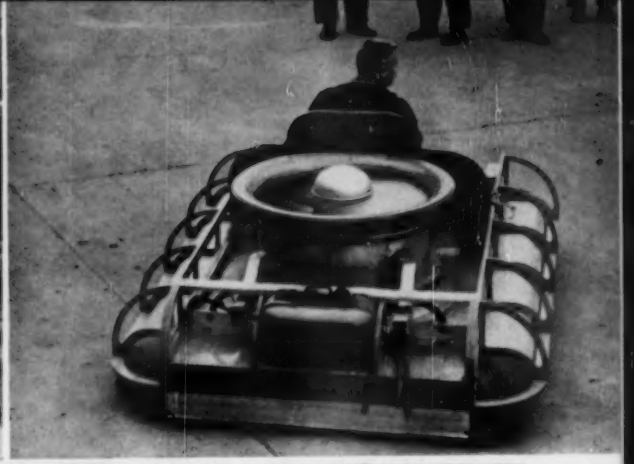
with an engraved trophy that did not lend itself to telecommunication.

The last day of the Chicago conference was regarded by many as the best, perhaps because it consisted of two plain elements: work and fun. The work took the form of a group of shirtsleeve seminars at IIT's

Institute of Design. The fun was a two-hour minimal transportation rally and demonstration by students of the Institute of Design, under the direction of Jay Doblin.

The vehicles included an air-supported platform built at IIT (directly above), a battery-powered scooter, and a plethora

of go-carts, runabouts, propeller-driven wagons, magic carpets and the like which could be, and were, ridden by members and guests. Far and away the most spectacular vehicle on display was a handsomely styled tank (top right, facing page) that runs on nothing but air, water, and promises.



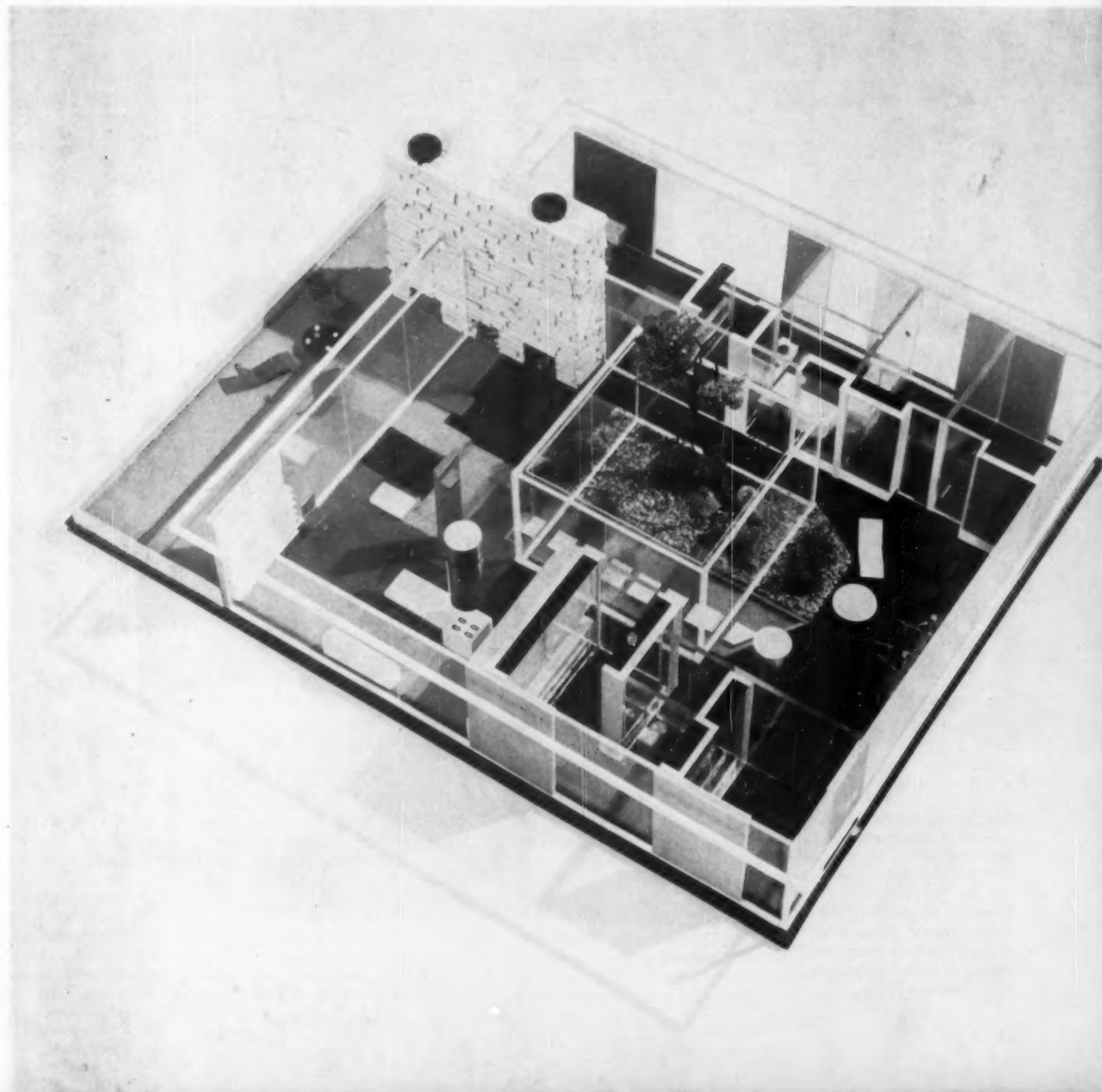
The tank contains water under a head of compressed air. It is mounted by an intrepid operator dressed like Flash Gordon out of *The Pickwick Papers*; when an accomplice releases a valve, the air forces a stream of water out the rear, and the vehicle is jet-propelled into the next county.—R.C.

DESIGN REVIEW

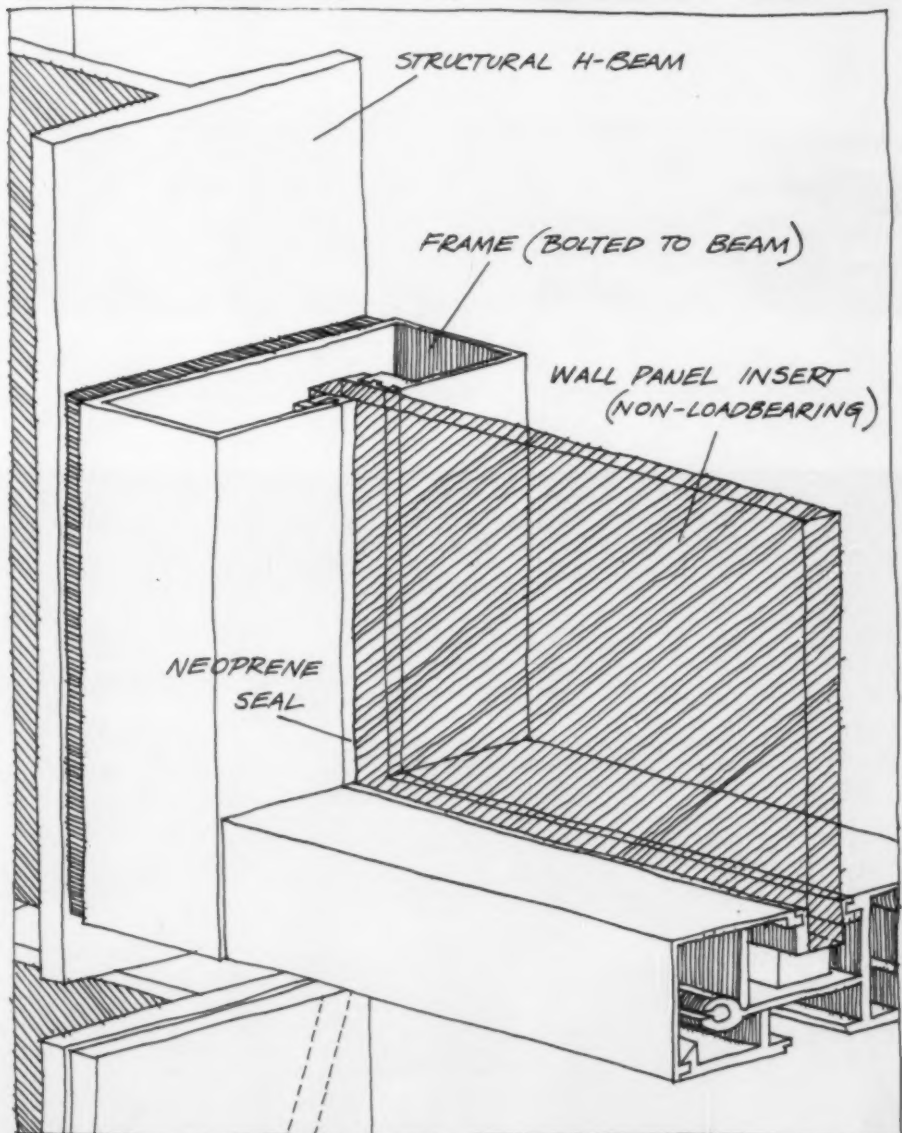
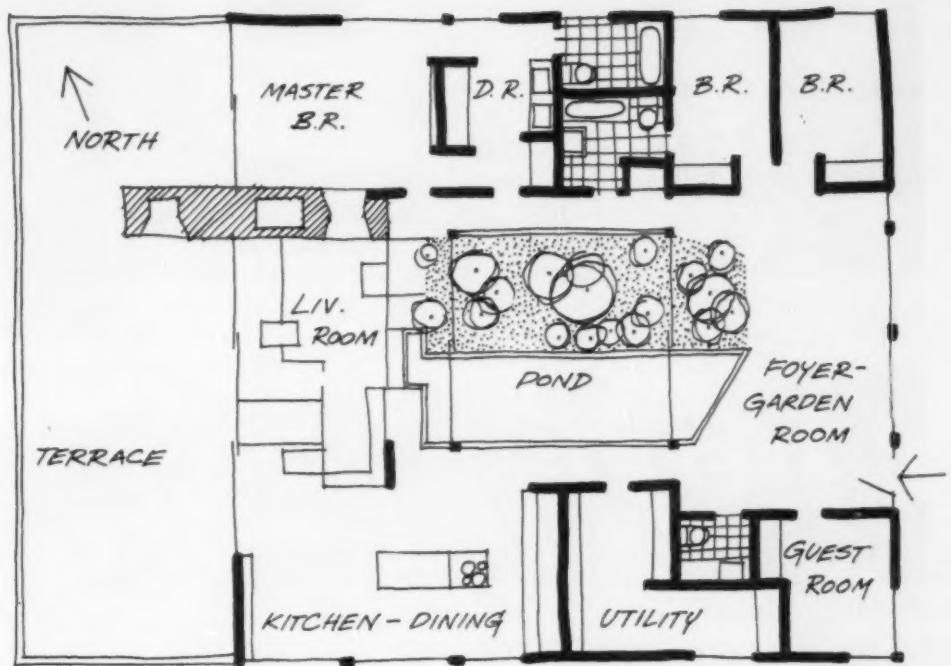
HOUSES IN PARTS

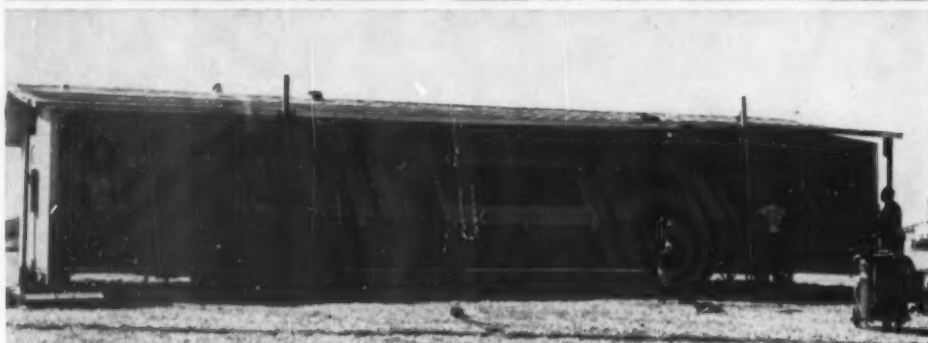
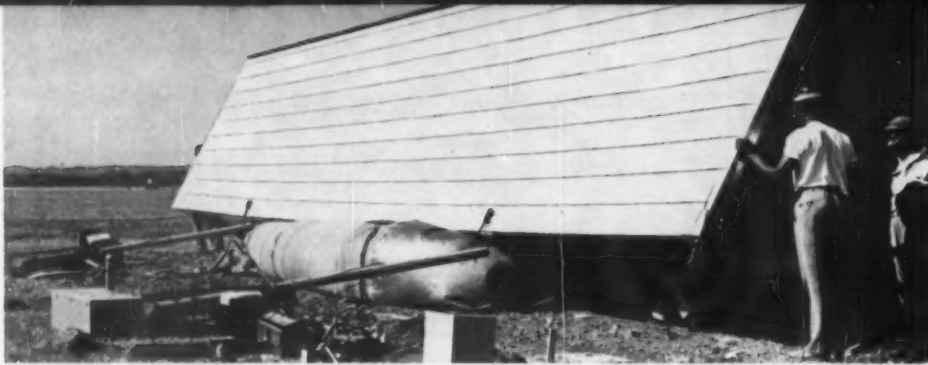
The situation in prefabricated housing is still deplorable. With a few exceptions, most prefab designs (using antediluvian materials and methods) run from Colonial Re-Hash to Nondescript Ranch to something they call "contemporary-

type design" because that's what you call a big box with corner windows. Jaap Penraat's modular house, shown here, promises to be a remarkable departure, if it ever gets built. Factory-built prefabs are reviewed overleaf.

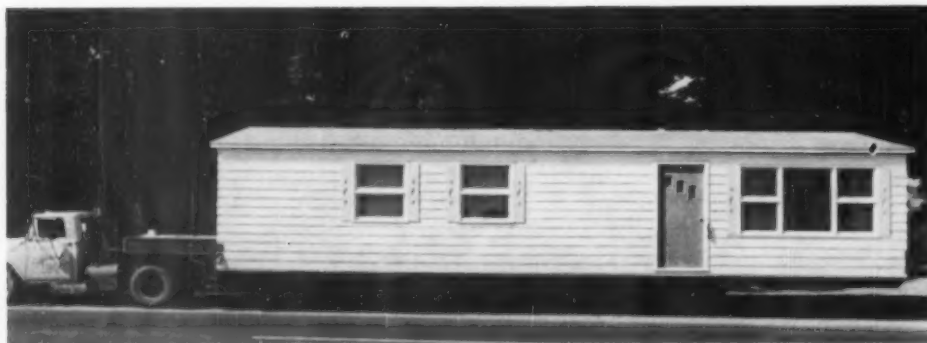


Industrial designer Jaap Penraat designed this modular house for Sterling Forest Corporation, which is developing a scientific research work-and-residence community on its 30 square miles of forested land near Tuxedo, New York. (Union Carbide has built a lab there already, and New York University has just leased a huge tract for its new research center.) Although the corporation does not build houses, its design board does control the quality of what is built by prospective residents. The real estate office is currently displaying the model of the Penraat house shown here, in hopes that someone will build it. It offers astonishing possibilities: for an estimated \$20-\$25,000 the resident can have nine large rooms (easily rearranged for changing family needs), an inner patio-pond, an 18' x 54' terrace, and a living room that requires no furniture because the concrete slab foundation in that area is "contoured" to provide foam-cushioned places for sitting and surfaces for resting martinis. Structural H-beam posts are at 18' intervals around the perimeter of the house, and at the four corners of the 18' x 18' inner patio. The walls of the house consist of 4.5' non-structural panels inserted between the posts with a frame-and-extrusion system (right). The interior walls are similarly installed, and are equally non-load-bearing. Insert panels could be of any material, but this model recommends as much glass as possible to take advantage of the forest. The design calls for standard architectural components.





Transa Structures: After some 12 years of military service (as dormitories, dining halls, etc.), this Transa Structures prefab is now being marketed for civilian housing in the \$12,500 range. Built on an assembly line at Fullerton, California, the seven-room house is folded (three walls up and two roof sections down), using a special system of piano-type hinges) for transportation anywhere by truck. No building operations are required at the site, where the house is deposited on a wood-pad or permanent foundation and unfolded in 36 man-hours. The roof sections are lifted by inflating a balloon, as shown at left. Completely pre-built, the packaged house includes finished and furnished interiors, plumbing, forced-air heating, perimeter foundation elements, porches and carport. Folded up for transportation, the house measures 45' x 10' x 9'6". Unpacked, the width expands to 24'.



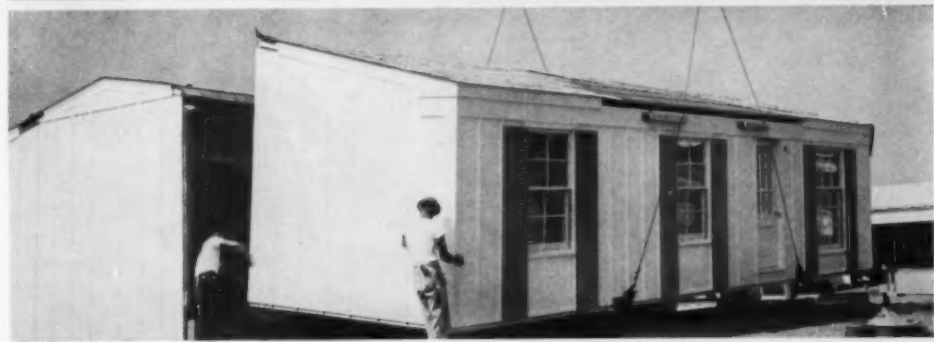
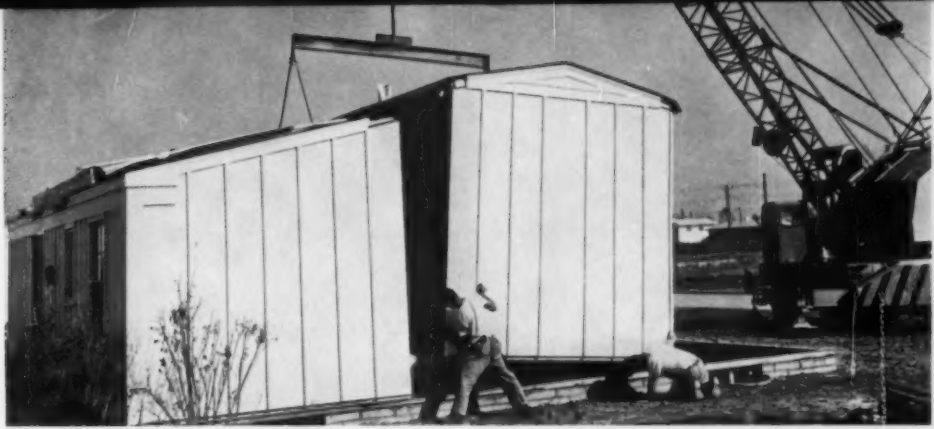
Midwest Homes says that this two-section factory-finished house (including conventional electrical, heating, and plumbing systems) can be erected on a basement or crawl-space foundation in 16 man-hours. Transported by rail, the sections are joined at the site by floor and roof bolts. Joints are covered with battens (ceiling), tile (floors), and pre-finished jamb castings (walls). Interiors are finished in a choice of either drywall or 4' x 8' wood panel sheets of oak, birch, mahogany, limba, or walnut. Wood or aluminum bevel siding. Ply-wood floors covered with tile.

The Midwest units come in several models offering two and three bedrooms, one or one-and-a-half baths. The model shown at left contains a little more than 1,000 square feet of living space, sells for \$13,500 on a \$2,000 lot.

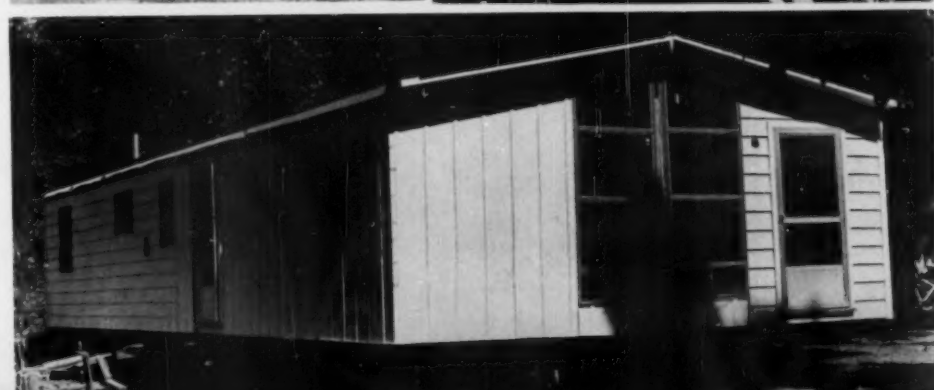
Scholz "20th Century" homes come in three sections to the builder-prepared site. Standard materials are used (flexboard-and-batten exterior walls, spackled foil-back drywall interiors, vinyl tile on plywood floors, polyester and Formica kitchen cabinetry, etc.). Heating is by forced air through floor ducts supplied in kit form for on-site installation. Sections are pre-wired with a conventional system; pre-installed plumbing system requires only 10 on-site drainage and water service connections.

Available options include a second bath, deluxe exterior color selection, a fourth bedroom, nylon carpeting, one- and two-car garages, and drop-in kitchen appliances.

The 1,200 square foot house shown here (second and third sections being installed, right) sells for \$15,000; the price includes a \$2,000 lot and a 10 per cent profit for the local builder.



Guerdon Industries' factory-made house is trucked to the site in two separate 48' x 9'10" sections (they are shown being set up at right). Ready for occupancy two days after arrival at the site, the 950-square-foot house provides three bedrooms, bath, built-in kitchen, and a 19' x 18' living room. Guerdon can build and finish the house in six factories, estimates that the average cost, including lot, will be \$12,000. Built-in kitchen includes eye-level oven, other major appliances. Roof overhang is designed as a carport, can optionally be converted for use as enclosed porch. Aluminum exterior siding is available in green, yellow, tan, red, pink, and white. Interiors feature natural wood beams in the living-room ceiling, wall-wide louver-door wardrobes in two of the bedrooms.



High-performance plastic

Two new plastic trade names, Lexan and Merlon, are finding their way into specifications for a broad range of parts and products, some of which have never before been made of plastic. The two are proprietary names for polycarbonate thermoplastic resin produced respectively by General Electric and Mobay Chemical Company. The new plastic promises designers a material with a combination of high performance properties not previously available in thermoplastics. It has been available in small quantities in this



Pneumatic tube carrier, left; fuse holder with Lexan cover, right

country since 1957; however, last year both companies began full commercial production.

Its most noteworthy property is an impact resistance (greater than Delrin's) high enough to put it in a class with glass fiber-reinforced thermosetting plastics. An in-use illustration of this property is the polycarbonate head of a direct contact pneumatic tube carrier (above) which travels at 20 miles per hour.

Polycarbonate's excellent dimensional stability and high heat distortion point (290 degrees F.) have permitted it to replace bronze for pump impellers in a line of self-priming convertible jet pumps. The plastic is reported to take abrasive wear better than bronze, and not to soften or change shape in water or dilute acids. Its smooth surface also means higher operating efficiency because of reduced friction in the liquid passageways.

The new resin also has better load-bearing properties than either nylon or Delrin, one of the lowest water absorption rates of all plastics, good electrical properties, and high resistance to chemicals, staining and aging. In addition, it is one of two self-extinguishing thermoplastics (the other is nylon). The resin is transparent (both nylon and Delrin are translucent to opaque) and colorable. It can be metalized, welded and cemented to itself and other materials. When even

better mechanical and thermal properties are needed, the resin can be reinforced with glass fiber; Fiberfil, Inc., Warsaw, Indiana, produces such a product under the tradename Carbafl G-50.

Also responsible for its wide appeal is ease of fabrication: the material can be processed by any of the conventional thermoplastic methods, including injection molding, extrusion, vacuum molding, blow molding, and cold working techniques such as hammer forging, stamping, drawing and die bending.

Because of its unique grouping of properties, polycarbonate is being used



in hundreds of applications. The electrical industry has initially been the major user. In this field, it has been utilized for insulators, switchboard connectors, coil forms, relay bases and meter cases. Safety helmets have been made from it for the construction industry; here it reduces manufacturing costs, because it can be molded, whereas, previously, the thermosetting plastics used had to be laminated. The material has also been employed for battery connectors, air diffusers, drafting film for original drawings and reproductions, business machine card guides, and as a transparent gage on GE's new Peek-a-Brew coffee maker.

Polycarbonate's price is still high compared to other plastics; however, at currently \$1.30 to \$1.75 a pound, it is 40 per cent cheaper than it was six months ago. As production increases, it is expected that the price will drop even more. GE estimates that within five years the market should reach 30 to 50 million pounds annually. *Manufacturer: General Electric Company, Chemical Materials Department, Pittsfield, Mass., and Mobay Chemical Company, Pittsburgh, Pa.*

Optical reader for computers

Both typed and printed business information can now be read directly into a computer memory for high-speed data processing. This advance in computer

technology was made possible by the new IBM 1418 optical character reader, which is capable of reading data printed in widely used type styles on paper or card documents, at a rate of 480 characters per second, and up to 400 documents per minute. Thus, a variety of forms of business information can now be understood by a data processing machine without going through the intermediate step of punched cards or tape.

As the documents are fed into the optical reader, they are separated, aligned and fed onto a revolving drum. A lamp floods the document with light, and the reflected light is passed through a lens system for analysis and recognition. The light image of a character is converted into electrical impulses which are compared and matched with internal logic patterns. Once recognized, they are transferred to a magnetic core memory storage of a computer for processing. *Manufacturer: International Business Machine Corp., White Plains, N. Y.*

Electronic fire warden

A new electronic tube, smaller in size than a golf ball, is capable of detecting fire by sensing its ultraviolet radiation. Called the U-V detector, it is insensitive to direct sunlight, normal light bulb illumination, and cosmic and nuclear radiation. The tube can also sense if flames have gone out, a capacity that would be useful in boiler fire boxes, furnaces and other combustion chambers.

As a fire detector, the tube is said to react sooner and cause less damage than the two most widely used conventional systems. Sprinkler systems are not activated until the fire is well under way, and in many cases water damage is often greater than fire damage. With thermostatic control systems, temperature must also reach a certain degree before an alarm is sounded, and by then the fire already has a good start.



Fire warning tube

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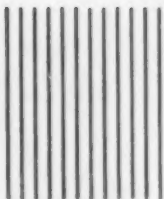
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The operation of the tube is simple. Ultraviolet radiation from flames causes the negative electrode of the tube to emit electrons. Because the electrodes have a high voltage, the emission of the first electrons ionizes the gas between them and begins a flow of current. The tube can then send this signal to a visual or audio alarm at a central, manned location, or directly to a fire station. In the case of flame-out detection, the reaction is the opposite; the tube, mounted in a small opening of a fire box, ceases to provide an output current which also sets off an alarm or operates controls.

The U-V detector may also be used as a communications device to pick up invisible ultraviolet ray signals. It can also detect gas and smoke, and the density of liquids or air. *Manufacturer: Thomas A. Edison Industries, McGraw Edison Company, West Orange, N. J.*

Highway surveillance system

The latest method of determining the condition of highway surfaces for maintenance purposes is to photograph them at night under high-powered lights from a slowly moving truck. The photographic record—which is objective, detailed, and suitable for research—is said to cost only a fraction of what conventional road inventories cost; these are typically made by walking or driving the area and noting or sketching defects. The film can record such facts as cracks of all types, scale, spalling, faulting, raveling, rutting, settlement, and bleeding.

Called Sur/Fax, the unit consists of a stabilized, vibration-free, continuous strip camera, a battery of shielded, high-powered lights beamed at a constant angle to obtain the right degree of light and shadow, and a truck. The camera records highway surfaces as wide as 36



Highway photographic unit

jects the film onto an 18- by 24-inch viewing screen. As pavement sections which require continued study come into view, a touch of a push-button stops the film and makes a positive print. The print, which is delivered in 30 seconds, may be annotated and used as an actual work sheet by maintenance crews. In addition, the data can be transferred to IBM punch cards for statistical study and analysis of highway conditions over large areas. *Manufacturer: Aero Service Corporation, Philadelphia, Pa.*

Silverware protection

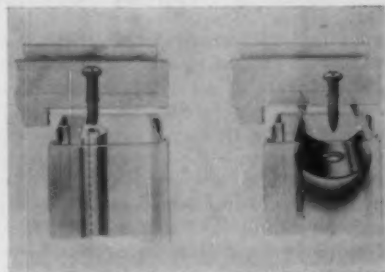
A new finish for silver flatware, based on a silicone formulation, is said to prevent tarnish and eliminate the need for polishing—a silver tea service treated four years ago is said to be still as sparkling as the day the silicone finish was first applied. Although the coating is less than one ten-thousandth of an inch thick, it may be washed in hot water repeatedly;

ware. However, a packaged supply in an aerosol dispenser will soon be available on the market. *Manufacturer: Silicones Division, Union Carbide Corporation, New York, N. Y.*

Window frame fastener

Fastening side and end aluminum window frames together will now be simpler and cheaper with the use of a recently designed spring fastener. The new fastener fits into the rectangular channel on the inside of the frame, and replaces an extruded, integral strip of half-round aluminum which previously extended the frame's entire length. The strip served as a fastening base for a self-threading screw that held the side to the end frame. However, only three-quarters of an inch of its entire length was used; the rest was superfluous.

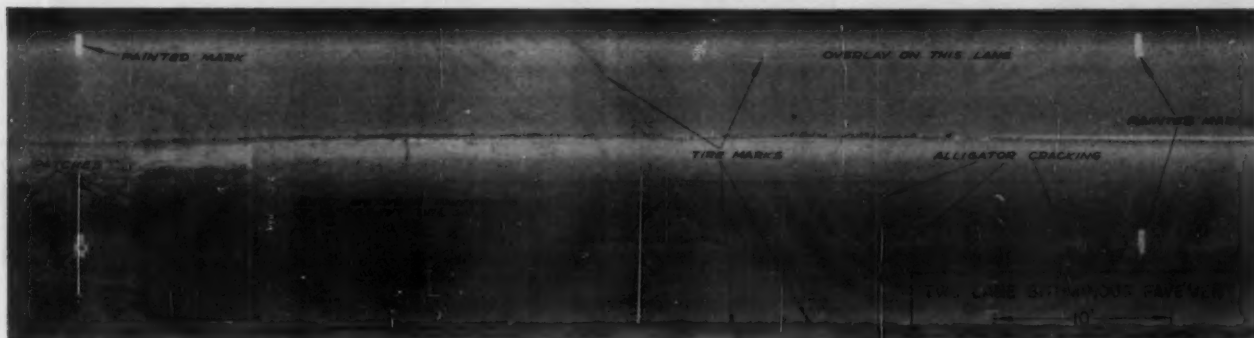
The new spring fastener is rectangular, and has a concave surface with a screw hole in its center. When it is placed in the inside channel of the frame, its square ends bite into the sides of the



Old (left) and new fasteners

channel and grip them firmly. A self-tapping screw passing through the other window frame into the fastener connects the two frames together.

The redesign simplified the extrusion



Highway defects appear on strip photo

feet in a single traverse, on 35mm film, at a scale of 1 inch equals 36 feet. The strip film positives may be projected as large as 10- by 10-feet for staff conferences, or for presentation of highway maintenance problems to public officials and civic groups.

For detailed analysis, a specially modified Minnesota Mining and Manufacturing Company Reader-Printer is used. It pro-

it resists stains from boiling coffee, melted cheese, mustard, vinegar, and other foodstuffs which often penetrate ordinary lacquer and resin coatings. As a result of the new development, silicone-treated silverware need not be kept in special protective bags. Instead, it may be left out in the open and still retain its luster. The finish is initially being applied only at the factory to new flat-

ware, and eliminated the close tolerance formerly required with the half-round strip. Substitution of the self-tapping screw for the self-threading screw resulted in further cost savings. The new fastener, called Channeloc, is made from aluminum, as are the window frames, and there is no electrolytic action between them. *Manufacturer: Geo. K. Garrett Company, Philadelphia 20, Pa.*

TECHNICS *continued*

Portable punch riveter

A portable punch riveter (below), described as the world's first, has just been put on the market. The 50-pound machine is said to be ideal for automatic



Portable punch riveter

punching and riveting operations that cannot be handled by stationary riveters. It is capable of punching through one-eighth-inch thick metal, and will punch a hole, place a rivet, and secure it in less than two seconds. Unlike the stationary models, which are controlled by foot pedals, the new riveter is controlled by a finger trigger and a hand grip. It is furnished with a cable for overhead suspension, or it can be installed on a work bench. The machine stores approximately 500 flush or round head rivets in a pneumatically-driven rotating drum that automatically drops them into place. *Manufacturer: Electronics Division, ACF Industries, Inc., Riverdale, Maryland.*

Woodgrained plastic trim

A New York firm has announced a new line of plastic trim mouldings available in woodgrains and in marble, speckled, or glitter patterns to match the finish of any high-pressure laminate, such as Formica, Weldwood, Micarta, Panelyte, etc. The new Silvertrim mouldings are said to be hand-formable, and capable of being bent around sharp corners without mitering. *Manufacturer: Glass Laboratories, Inc., Brooklyn, N. Y.*

New office copying machine

Significant reductions in the cost of reproducing business papers are possible, according to the manufacturer, with a new desk-top office copying machine. The machine is said to reproduce half tones, solids, and colored material to yield high quality copies that cost only 3½ cents each. In addition, each copy may be used as an offset master to reproduce up to 200 copies for as little as 1/5 cent apiece.

The machine, called the Electro-Stat, uses electro-photographic techniques first developed by RCA. This process automatically performs four steps: 1) In the first step, a uniform negative electrostatic charge is placed over the entire surface of a special Electro-Stat coated paper. 2) The charged sheet is exposed to a light image of the original and, where light strikes the surface, the charge is reduced in an amount corresponding to the intensity of the image. This results in an invisible electrostatic image of the original. 3) This image is made visible by dusting the surface with a positively charged black powder (replenished with every 1,000 sheets). The powder is attracted to the charged areas and forms an accurate reproduction of the original. 4) The black powder is permanently fused to the surface of the coated paper by the application of infrared heat.



Electro-Stat copying machine

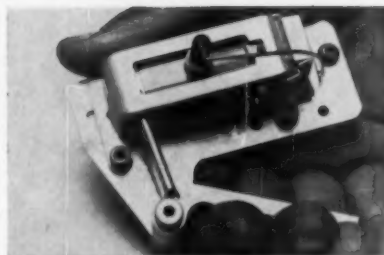
Copies produced by this process are said to be permanent and unaffected by aging, or exposure to light, heat or moisture. A low contrast paper is available for copying photographs.

The unit, designed by Charles E. Jones and Associates of Chicago, is enameled steel, finished in light brown and beige. It occupies 18 by 22 inches of desk space. *Manufacturer: American Photocopy Equipment Company, Evanston, Ill.*

New ignition system

The ignition system in small gasoline engines may be simplified by a new electrical device known as a Spark Pump. Smaller than a man's fist, the device contains two ceramic parts that are able to repeatedly convert a single, short motion into a 20,000-volt charge. The Spark Pump will perform the job that presently requires a magneto, points, coil and condenser. It can be used in such compact power units as power lawn mowers, out-board motors, and portable generators.

The basis for the new power source is a phenomenon known as *piezoelectricity*. Some natural crystals, such as quartz, will emit a tiny electric current when twisted or bent along a certain axis by pressure. Cut into paper-thin slices, these crystals have long been used as



Ignition spark pump

the pick-up elements for translating phonograph needle vibrations into electrical impulses that can be amplified and played through a loudspeaker. The Spark Pump utilizes artificial ceramic materials that are similar to the crystals but are able to produce a higher electrical potential.

Each time pressure is applied to the Spark Pump, it produces a spark. And it is capable of producing a constant high-voltage spark at all engine speeds. This means that many engines can be started with a single turn of the starting cord, without the need for complex starting mechanisms. A complete ignition system for a small motor would consist of the new device, a switch, and a spark plug. According to the manufacturer, the pump is able to fire a heavy spark even through a plug with burned or fouled electrodes. *Manufacturer: Cleveland Graphite Bronze Division, Clevite Corporation, Cleveland, Ohio.*

Pipe fastening

A new fastening device is capable of holding together at right angles two pipes or tubes of different diameters. Called a Right-Angle Tube Clamp, the fastener

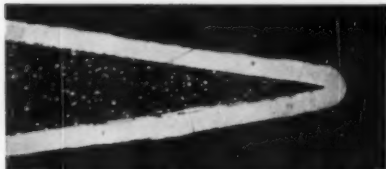


Right-angle pipe fastener

requires only one manual adjustment to tighten on both pipes at once. In the model illustrated—used in light, temporary or permanent pipe structures, and in television receiver antennas—a threaded bolt is passed through one pipe and drawn up. Other models employ a different type of engagement, eliminating the holes, when pipes are used to carry fluids. *Manufacturer: Hunter Spring Company, Lansdale, Pa.*

Ultra-thin nickel film coating

The photomicrograph below, magnified 1500 times, shows a thin coating of Kanigen, a nickel-phosphorous alloy, on a razor blade. The coating, applied chemically, is so thin, and blunts the edge so little, that the blade can still be used for shaving. Thin films of nickel such as this are being used on sub-miniature gyroscope parts for Polaris missiles, where they provide wear resistance and



Nickel coating on razor blade

prevent corrosion without altering the parts' dimensions more than 20 to 30 millionths of an inch. Industrially, Kanigen has been coated on the inside of railroad tank cars to protect chemicals from contamination during transit. *Manufacturer: General American Transportation Company, Chicago, Ill.*

Flexible magnetic tape

Flexible vinyl tape and fine magnetized particles have been combined to produce a magnetic material that can conform to any shape or surface. The particles are uniformly distributed on the tape so that it may be cut in any manner without destroying its magnetic qualities. Only one surface of the tape is magnetized; the other surface may be processed in various ways: hot-stamped, embossed, laminated, printed or silk-screened. The material, known as Magnyl, is available in standard bulk rolls, dark brown in color, in widths from 5/16 to 2 inches, and in thickness from 1/16 to 1/4 inches. The manufacturer has suggested a number of possible applications for Magnyl: seals for refrigerator and freezer doors; weather stripping for steel casement windows; holding objects against steel

surfaces in reservation and assignment boards, games, and educational maps. *Manufacturer: Applied Magnetics Corporation, Leeds, Mass.*

Largest springs

The two hot-coiled compression springs shown below, plus a third smaller spring, fit one inside the other and form a single unit which is used to stabilize ICBM's on their launching pads against the possible shocks of atomic explosions. They are said to be the largest springs ever made on a production basis. The outer coil spring is approximately 49 inches high, 22 inches outside diameter, and is made of 3-inch spring steel bars. The three springs together weigh over 1400 pounds. After coiling, heat treating and tempering, the springs are shot-peened, which increases their fatigue life from 500 to 1000 per cent over unpeened springs. Each coil is wound in the op-



Compression springs

posite direction to the one it is set inside, to prevent clashing or interference. *Manufacturer: Union Spring and Manufacturing Co., New Kensington, Pa.*

Mobile robot

The latest pair of mechanical arms can boast of such sophisticated developments as soft inflated pads on its hands for light touch, microphones on its wrists to permit the operator to hear tasks being performed, two television cameras



Mobile manipulators

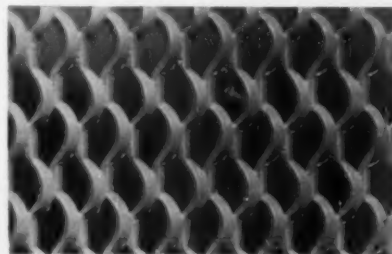
mounted on separate arms, and electrically actuated "muscles" instead of the conventional hydraulic ones. Each arm has ten different movements, and the whole apparatus is housed in a mobile desk-sized cabinet mounted on three partially-hidden wheels. The speed of the vehicle and the speed of the arm movements are regulated by foot pedals on the control console; the hand functions are controlled by toggle switches. The unit, known as Mobot Mark II, will also accept tape-programmed instructions to eliminate the need for constant supervision. The arm can move 180 degrees in any direction at each of three joints; it is six feet long, and can lift 25 pounds from any position. The hand can be telescoped 3 1/2 inches. *Manufacturer: Hughes Aircraft Company, Culver City, Cal.*

Custom acoustical ceilings

Kaiser Fir-Tex acoustical or insulating wood-fibered ceiling tiles are available with almost any desired trademark, message, or design imprinted on them. Such custom-imprinted tiles open a new range of design possibilities in commercial facilities such as supermarkets, ticket offices, banks, department stores, etc. *Manufacturer: Kaiser Gypsum Company, Oakland 12, Cal.*

Porcelain-enameled grilles

Porcelain-enameled aluminum grilles are now being offered for applications such as louvers, room dividers, and similar architectural and decorating devices. The material consists of expanded aluminum with a vitreous enamel coating fired at 980 degrees F. A choice of aperture designs is available in sheet sizes of 4



Porcelain-enameled aluminum grille

by 8 feet, in a wide range of colors from bright reds to dark blues, plus black and white. Grille aperture sizes vary from 1/4 inch to 1 1/2 inch. *Manufacturer: Erie Enameling Company, Erie, Pa.*

High temperature material

A new construction material for the tanks and vats in which chemical processes occur is said to combine structural strength, and resistance to impact damage, with a high degree of resistance to corrosive compounds that reach heats up to 1400 degrees F. Most metal containers would be destroyed in a few

TECHNICS *continued*

minutes by this combination of heat and chemical action. The material is called Nucerite, and is a ceramic-on-metal combination in which the ceramic, in a crystalline structure form, is physically and chemically bonded to a structural metal — usually steel or a heat-resistant alloy such as Inconel or Hastelloy.

It is thought that Nucerite will be useful as a material for containers in several recently developed processes for which available construction materials are not suitable. But it is also thought that the material may help to speed up existing processes since these processes may now be conducted at higher temperatures, thereby speeding up the chemical reaction. In many instances, the speed of chemical reaction doubles with every 18 degrees F. rise in process temperature. The ceramic structure of Nucerite is characterized by a large number of very small crystals, and it is this structure that imparts the unique physical and chemical properties. *Manufacturer: Pfandler Division, Pfandler-Permutit, Inc., Rochester, N. Y.*

Custom-design vinyl floors

A new floor color selection kit that makes possible custom-designed color effects in vinyl floor coverings is offered free-of-charge to architects and designers. The kit takes advantage of a new production process which permits the manufacturer to produce as little as 2,000 square feet of custom-colored vinyl tile at no increase in cost. Conventionally, a minimum order of 20,000 square feet is required. All necessary materials are supplied to enable designers to produce an endless variety of patterns in the manufacturer's 3-D vinyl terrazzo tile. Included are sample bottles containing aggregate or color chips in 35 colors, and sheets of matrix or background material in 14 colors. Since any number of colored aggregates can be combined in any desired combinations with any one of the background colors, the number of different



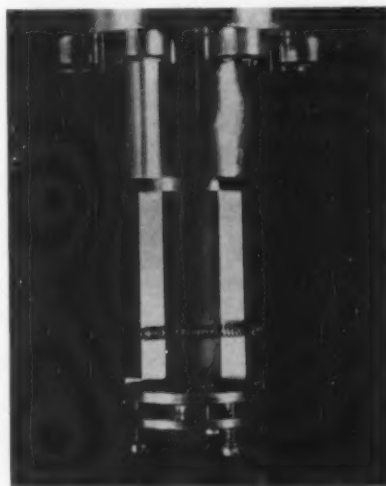
Vinyl floor color kit

color effects is infinite. To help the designer visualize his pattern, the kit also includes a quantity of tile samples with the exact proportion of various aggregates, used to achieve the pattern, printed on the reverse side. Nine-by-nine inch tile samples of the designer's color selection are provided free by the company. *Manufacturer: National Floor Products Company, Florence, Ala.*

Light wave communication

A new approach to optical masers (see ID, November, 1960, page 96) has made possible the continuous generation of coherent light waves for communication and other industrial applications. Previously, optical masers have been limited to outputs of short pulses of 1/1000th of a second in duration. This new generation of light masers, among many other applications, might permit the building of an "optical lane" navigation system to guide a plane or space ship to its destination.

The device generates coherent light in both the visible and invisible light por-

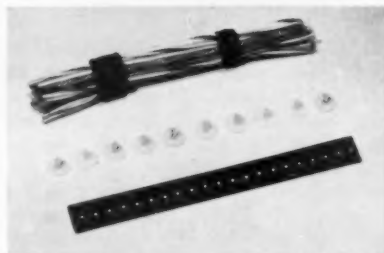


New optical maser

tions of the electromagnetic spectrum, and operates on about 1/500th of the amount of power required by the previously announced ruby optical maser. The key to the new invisible light maser is use of "trivalent" uranium atoms, so-called because three electrons are removed from the uranium atom's outer shell; "divalent" samarium atoms (two electrons removed from the outer shell of the samarium atom) are used for the visible light maser. *Manufacturer: IBM, New York.*

Wire and cable strapping

A system of strapping, called Insuloid Strapping, has been developed to secure or group all types of unsupported wire and cable of any diameter or form, without wasteful overlap. The system consists of two components: a PVC plastic



Strapping system

belt with evenly spaced mounting holes; and a stud-like insert. In use, the strap is wrapped around a group of wires and the insert is snapped through coinciding holes. The strapping is available in 75 foot coils in both 5/16 and 1/2 inch widths. *Manufacturer: Eiectrovert, Inc., New York, N. Y.*

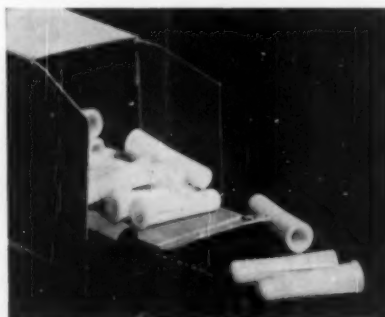
Metal finishing

Color-coating of all types of metals is now said to be possible with a single chemical surface treatment called the Hinac Process. The coatings are said to be color-fast, corrosion- and weather-resistant, and considerably more economical than color anodizing or painting. They can be used to prevent white rusting of aluminum or zinc, rusting of steel in storage, protecting stainless steel from salt spray, and for many other corrosion resistant requirements.

Hinac coatings are applied in water solution by roller coating, dipping or spraying at room temperature. The only pre-treatment required is thorough cleaning and rinsing. *Manufacturer: Pennsalt Chemicals Co., Philadelphia, Pa.*

Plastic screw anchor

Screw anchors, molded from Tenite butyrate, supplied by Eastman Chemical Products Company, N. Y., are said to provide superior holding power in masonry, wood, plastic, sheetrock, and other surfaces. The new anchor has a long-slotted inner end that compresses for easy insertion into a drilled hole, anti-turning ribs, and a narrow flange at the



Screw anchors

outer end to facilitate flush mounting. It accommodates both wood and sheet metal screws. *Manufacturer: Diamond Expansion Bolt Company, Garwood, N. J.*

FREE LITERATURE *available from manufacturers, on materials, components, processes, machines*

Materials—Metals

Titanium tubing. Superior Tube Company, Norristown, Pa. 3 pp. Ill. Data Memorandum 27 describes properties and applications of titanium and titanium alloy tubing; such tubing is used for hydraulic and pneumatic lines, low-stress structural components for aircraft, industrial heat exchangers, and products where extremely corrosive media are encountered.

Steel pipe. Youngstown Sheet and Tube Company, Box 900, Youngstown, Ohio. 8 pp. Ill. Brochure presents data on the qualities and physical characteristics of Yoloy steel pipe, a copper-nickel, high strength, low-alloy steel particularly suited for corrosion-resistant applications. The pipe has been used for salt brine transmission, bridge railing, lighting standards, and steam and water lines.

Creep-resistant titanium alloy. Titanium Metals Corporation of America, 233 Broadway, New York 7, N. Y. 12 pp. Ill. Manual outlines the properties of a new titanium alloy which raises by 25 per cent the metal's temperature ceiling for use in jet engines. Also included are procedures for forging and heat treating.

Alloy steel castings. Alloy Steel and Metals Company, Box 58323, Vernon Station, Los Angeles 58, Calif. 4 pp. Bulletin 300 presents design advantages and engineering properties of T-1 alloy steel castings. This steel may be specified for its great strength, toughness and weldability; castings made from the material are said to have excellent surface finish, and can be cast in thinner sections than practical with other commercial low-alloy steels.

Nickel alloy bonded steel pipe. Nickel-Over-Steel Division, M. L. Sheldon & Company, 350 Lexington Avenue, New York, N. Y. 8 pp. Ill. Brochure describes properties and applications of Niphos nickel alloy bonded steel pipe which is used to counter corrosion and iron contamination. The coating is said to have a ductility permitting 360-degree coiling and severe fabricating with no peeling or flaking, a capacity to withstand temperatures to 1000 degrees F., pressures equal to those specified for the base steel, and a much lower cost than stainless steel.

Materials—Plastics

General-purpose plastic resins. B. F. Goodrich Chemical Company, 3135 Euclid Avenue, Cleveland 15, Ohio. 20 pp. Ill. Brochure describes company's line of plastics: Geon high-temperature vinyls, Abson ABS resins, Estane polyurethane, and Polyblend 503-H, a thermoplastic colloidal mixture of Geon vinyl resin and Hycar nitrile rubber.

Protective coatings. Koppers Company, Tar Products Division, Pittsburgh 19, Pa. 8 pp. Ill. Bulletin T-97-61 describes properties of Bitumastic cold-applied protective coatings, which are applied cold by brush, spray and roller; they are said to be impermeable to water, and are particularly suited for corrosion protection.

Diallyl phthalate molding resins. Food Machinery and Chemical Company, Dapon Department, 161 East 42 St., New York 17, N. Y. 26 pp. Booklet describes properties, uses, and molding requirements of compounds based on Dapon diallyl phthalate resins. The resins are said to have good dimensional

stability, insulation resistance, and retention of electrical properties in extremely severe environments. Included in the booklet are tables giving performance data, and effects of various fillers on molded properties.

Methods

Electron beam welding. Air Reduction Company, 150 East 42 St., New York 17, N. Y. 8 pp. Ill. Reprint provides background on electron beam welding process and discusses the equipment required.

Designing with die-stamped circuits. Dytronics, Inc., Rochester, Mich. 12 pp. Ill. Bulletin D-1 describes properties and fabricating techniques of die-stamped printed circuits. The circuits are made by die-cutting the conductor pattern from copper foil coated on one side with a thermo-responsive adhesive and simultaneously bonding it, with heat and pressure, to the base material. The base may be vulcanized fiber, thermo-setting or thermoplastic molded material, compressed paper and wood products.

Fluidized-bed heat-treating. General Electric Company, Schenectady 5, N. Y. 4 pp. Ill. Bulletin GED-4306 describes the fluidized-bed process and equipment which permits up to 85 per cent reduction in heat-treating time and quenching rates in the production of steel, copper, aluminum and magnesium.

Components and Machines

Paint finishing systems. J. O. Ross Engineering, division of Midland-Ross Corporation, 730 Third Avenue, New York 17, N. Y. 12 pp. Ill. Bulletin describes Ross's paint finishing systems and component units for assembly line product finishing; also included is a section on laboratory facilities.

Industrial gas turbines. General Electric Company, Schenectady 5, N. Y. 16 pp. Ill. Bulletin 5685 describes performance data and application information of GE's models 720 and 722 gas turbines. Current applications include power for emergency generator sets, hydrofoil boats, gas line pumping stations, oil well fracturing units and amphibious military vehicles.

High-speed telephone sending and receiving. Digitronics Corporation, Albertson, N. Y. 4 pp. Ill. Folder describes Dial-over system which, when used with the Bell Data-Phone 200, permits use of regular telephone lines for sending and receiving data at high speed, to and from any number of remote locations.

Industrial wire cloth and screen. Cleveland Wire Cloth and Manufacturing Company, 3573 East 78 St., Cleveland 5, Ohio. Bulletin 160 gives detail descriptions of industrial wire cloth and screen products; also provided is information on weaving and fabricating facilities, and specific data needed for ordering.

High-vacuum equipment. Hughes Aircraft Company, Vacuum Tube Products Division, 2020 Short St., Oceanside, Calif. 4 pp. Ill. Folder describes line of high vacuum equipment including gage tubes, controls and ion pumps. Vacuum measuring apparatus is used in such processes as metal reduction, thin film deposition, crystal growing, cryogenics and hermetic sealing.

FREE LITERATURE *continued*

Multiple connectors. AMP, Inc., Harrisburg, Pa. 6 pp. Ill. Folder describes electrical and mechanical characteristics of line of pin-and-socket multiple connectors. A description of the compression-crimp technique for connecting the contact to the end of the wire, without solder, is also given.

Iron body bronze-mounted valves. American Valve Manufacturing Company, 22 Bayview Avenue, Manhasset, N. Y. 16 pp. Ill. Catalog 60 presents specifications and applications of line of iron body, bronze-mounted valves and accessories.

Air filtering equipment. Gelman Instrument Company, 106 N. Main St., Chelsea, Mich. 44 pp. Ill. Catalog describes equipment for dust surveys, air pollution analysis, radiation protection and sub-micron filtration. Techniques of measuring and filtering are also discussed.

Storage water heaters. Niagara Weldments, Inc., 55 Portage Road, Niagara Falls, N. Y. 8 pp. Ill. Bulletin 61 introduces a new line of storage water heaters: specifications cover 55 sizes in both vertical and horizontal models, and 114 sizes of removable U-tube heating elements.

Laboratory instruments. Arthur S. LaPine and Company, 6001 S. Knox Avenue, Chicago 29, Ill. 16 pp. Ill. Catalog describes characteristics and applications of a variety of laboratory apparatus: spectrophotometers, pH meters, electrobalances, recorders and related equipment.

Fasteners. Standard Pressed Steel Company, Box 883, Jenkintown, Pa. 6 pp. Ill. Guide to the selection and application of structural bolting for high-strength and elevated temperature applications. Included is a checklist of key factors in fastener design, materials processing, and fabrication.

Portable belt conveyors. Rapids-Standard Company, 342 Rapi-stan Bldg., Grand Rapids, Mich. 6 pp. Ill. Folder 300 covers applications and features of portable belt conveyors.

Electrical switches. Licon Division, Illinois Tool Works, 6606 W. Dakin, Chicago 34, Ill. 32 pp. Ill. Catalog describes features of precision snap-action switches and includes technical discussion of switches and switch terminology.

Oil filtration. Screen Products, Inc., Caldwell, N. J. 36 pp. Ill. Catalog describes all-metal filter assemblies for precision filtration of lube oils, hydraulic fluids, coolants, corrosive liquids, and other fluids.

Suction lift pump. Ingersoll-Rand Company, 11 Broadway, New York 4, N. Y. 4 pp. Ill. Booklet describes features and applications of Motorpump, a pump that combines a vane-type priming pump with a conventional high-efficiency centrifugal pump. It is used to handle a variety of liquids, and is specifically designed for work involving suction lifts or vapor handling problems.

Wall panels. Panel Structures, Inc., 45 Greenwood Avenue, East Orange, N. J. 8 pp. Ill. Catalog describes characteristics and applications of Sanpan translucent wall panels, window walls, and curtain wall systems.

Numerical control. Diehl Manufacturing Company, Div. of Singer Manufacturing Company, Somerville, N. J. 8 pp. Ill. Brochure describes a newly developed numerical control system that makes possible production accuracies of plus or minus .0002 inches on a 40 inch work table. Included is a

description of the operational sequences of the system from the preparation of input data to the completion of the entire work program.

Electrodes. National Cylinder Gas Division, Chemetron Corporation, 840 N. Michigan Avenue, Chicago 11, Ill. 20 pp. Ill. Booklet presents complete information on arc welding electrodes, including specifications, chemical requirements, and methods of estimating electrode consumption.

Solid-state power supplies. Power Sources, Inc., Burlington, Mass. 8 pp. Ill. Brochure presents company's complete line of solid-state power supplies and power conversion units.

Miscellaneous

Graphite and carbon felts. National Carbon Company, 270 Park Avenue, New York 17, N. Y. 2 pp. Bulletin 104 gives engineering information on eight grades of plain and reinforced graphite and carbon felts. These materials are used for insulation, gas filtration and gasketing.

Glass-metal components. Fredericks Company, Philmont and Anne Sts., Bethayres, Pa. 10 pp. Ill. Bulletin FC-5 describes line of precision glass and glass-metal components, sapphire-to-glass seals, infrared sensing components and other electrochemical glass products.

Mineral wool felts. Eagle-Picher Company, American Bldg., Cincinnati 1, Ohio. 4 pp. Ill. Folder describes features and applications of mineral wool felts which are primarily used for insulation.

High-speed equipment. Monitor Systems, Inc., Dept. 8, Fort Washington, Pa. 12 pp. Ill. Brochure describes facilities for engineering and production of ultra-reliable systems for high-speed process monitoring, production testing and automatic checkout.

Glass-steel. Pfaudler Company, 1124 West Avenue, Rochester, N. Y. 20 pp. Ill. Bulletin 985 describes manufacture, properties and applications of Glasteel, a construction material with high structural strength and great resistance to corrosive attack at high temperatures.

Adhesives. Raybestos-Manhattan, Inc., Bridgeport, Conn. 20 pp. Ill. Bulletin 701 contains discussion of selection of adhesives, bonding techniques, testing methods and a glossary of adhesive terms. Also included is a table of the most common causes of bond failure and specific remedies.

Fluid processes. Pfaudler Company, 1121 West Avenue, Rochester, N. Y. 16 pp. Ill. Bulletin 992 explains Fluidics: the science of fluid processes, and presents line of products for handling liquids and gases.

Shaft-mounted rotating transmission. Airborne Accessories Corporation, 1414 Chestnut Ave., Hillside 5, N. J. 8 pp. Ill. Bulletin IR-60 discusses a new rotating transmission which is said to provide up to six times more torque capacity than any other comparable unit. Applications include hoists, elevators, conveyors, machine tools, agitators, crushers, paper machinery, etc. The units are available in capacities from fractional to 60 horsepower.

Cargo container cranes. Materials Handling Dept., Dravo Corporation, Pittsburgh 25, Pa. 2 pp. Ill. Data sheet 248 describes two new types of land-based cargo container cranes designed to load or unload any standard 8 foot shipping container between 8 and 30 feet long. Both types are traveling structures of man-trolley design and are capable of lifting up to 30 tons. Similar cranes can also be designed for operation on ships.

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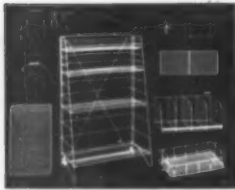
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PHOTOGRAPHER, New York area specializing in exceptionally good, clean work at budget-wise prices for industrial design requirements. Fidelity, clearness, painstaking attention to your directions. Box ID-349, INDUSTRIAL DESIGN, 18 East 50th Street, New York 22, New York or LExington 2-9133.






APEX

for new ideas in coated fabrics and simulated leathers to keep pace with new product designs

OPEN INVITATION, WITHOUT OBLIGATION:

Bring your case covering problems to us — drop them in our laps. We promise you a pleasant surprise when you examine the solutions we have to offer. No obligation, of course, for our creative recommendations.

One phone call brings you a background of 35 years of creative service.

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Apex Coated Fabrics, Inc., 12-16 East 22nd St., New York 10, N. Y.

NEW! x-acto[®] PENKnife

The world famous X-acto knife in a brand new "carry-about" case!

- **Famous X-acto Knife Features!** All the features of the famous interchangeable Blade X-acto Knife. Takes 3 styles of surgically sharp blades—specially designed for precise cutting and slitting operations.
- **So Safe!** Crystal clear "See-Thru" Plastic Cap reveals the blade. No mistaking it for anything but a knife when carried with other capped instruments.
- **Always Convenient!** Just clip it to your pocket and carry it with you everywhere.

For immediate improvement in efficiency, accuracy and safety switch to X-acto!

(Here's an idea! The X-acto PenKnife can be imprinted. It makes an excellent business gift. Complete details, with quantity prices, sent upon request.)

Open and ready for action! When not in use, replace the cap (like a pen) and clip it to your pocket... always handy.



Sample Offer

HANDICRAFT TOOLS, Inc.
Div. of X-ACTO, INC.
48-59 Van Dam Street
Long Island City 1, N. Y.

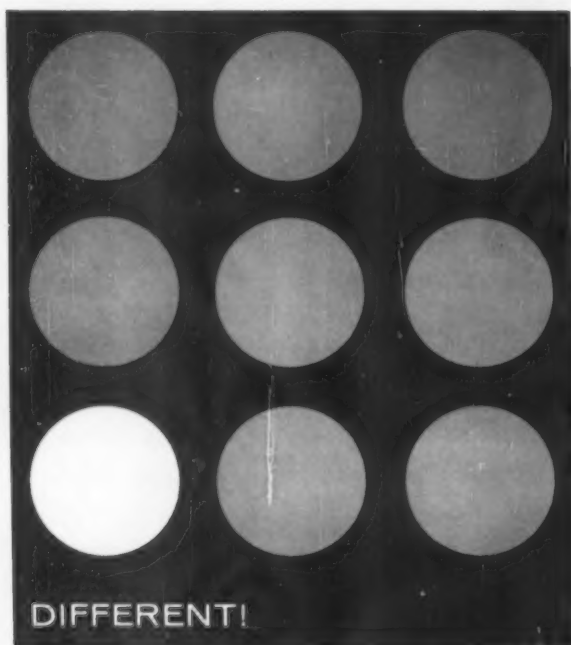
Enclosed is \$5.00. Please send me a PenKnife with the number _____ (specify #10, #11 or #16 blade) blade and free illustrated catalog of X-acto precision knives, blades, and tools.

Name _____
Company _____
Address _____
City _____ Zone _____ State _____

No. 10 for small, fine general cutting.

No. 11 for fine angle cutting, deep cuts, narrow slots.

No. 16 for small holes, notches, slits — in thin material.



Nine identical circles, yet, your eye is attracted to the white one. That's because the white circle is different—in appearance only!

We call this visual appeal the principle of attraction through surface variation. It's the sometimes dramatic, sometimes subtle, difference that makes one product attract more attention than the next. Applied to your new or restyled products, it may be the difference that makes a sales success.

On a wide range of products, many manufacturers have found that unusually beautiful surface effects can be achieved with

Nacromer®

SYNTHETIC PEARL ESSENCE

AND

MURANO®

LUSTROUS SYNTHETIC PEARL IN BEAUTIFUL COLORS

With Murano, for example, you can obtain a multiple color play which verges on the iridescent. You'll find that both of these materials will complement your designs with surface effects impossible to achieve with conventional dyes or pigments. They can be incorporated into plastics or used as coatings on wood, metal, plastic and other materials.

Tell us the material you work with and we will gladly send you literature and samples.

THE MEARL CORPORATION

world's leading producers of pearl essence

41 EAST 42nd STREET NEW YORK 17, NEW YORK

CALENDAR

Through January 29. An exhibition of pottery by Clyde Burt. The Art Institute of Chicago, Chicago.

Through February 5. Traveling exhibit of contemporary Japanese design, assembled by Walker Art Center. Museum of Contemporary Crafts, New York.

Through February 5. Retrospective exhibition of movie posters, with examples representing nine countries and ranging from 1898 to 1960. Museum of Modern Art, New York.

Through February 12. Exhibit of recent acquisitions including a section on architecture and design. Museum of Modern Art, New York.

January 6-20. Toy market. Merchandise Mart, Chicago.

January 11-February 19. "Art Treasures of Thailand." Historical exhibition at Metropolitan Museum of Art, New York.

January 14-22. National motor boat show. New York Coliseum.

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

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

January 17-18. Bearing symposium sponsored by the American Society of Lubrication Engineers on the design and lubrication of bearings. Penn-Sheraton Hotel, Pittsburgh.

January 17-February 2. A four-session evening course in "How to Use Graphics to Communicate Facts, Figures and Ideas More Effectively," sponsored by the American Management Association and taught by Herbert C. Rosenthal, President of Graphics Institute, Inc. Hotel Astor, New York.

January 21-March 26. "Festival of Italy," sponsored by the Italian Government and the Philadelphia Board of Trade and Conventions. Commercial Museum, Philadelphia.

January 23-26. 1961 Plant Maintenance and Engineering Show, centered on the theme, "The Maintenance Operation Meets the Needs of Increased Production." International Amphitheatre, Chicago.

January 23-February 2. A ten-day engineering and management short course, sponsored by University Extension, University of California; Los Angeles campus.

January 25-27. New mathematical methods for industrial engineers. A three-day seminar held by the University of Wisconsin Extension Division Engineering Institutes. University of Wisconsin, Madison.

February 5-7. China, glass and gift market. Merchandise Mart, Chicago.

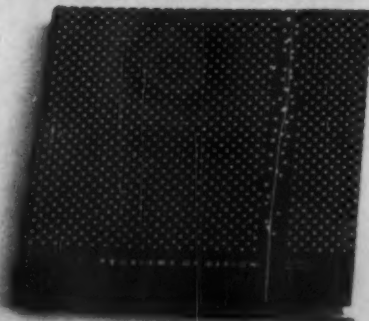
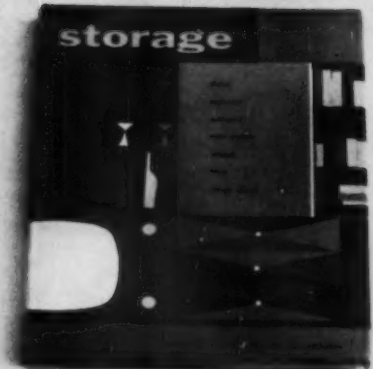
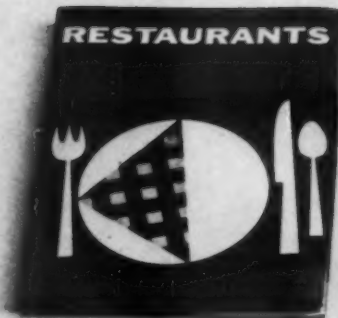
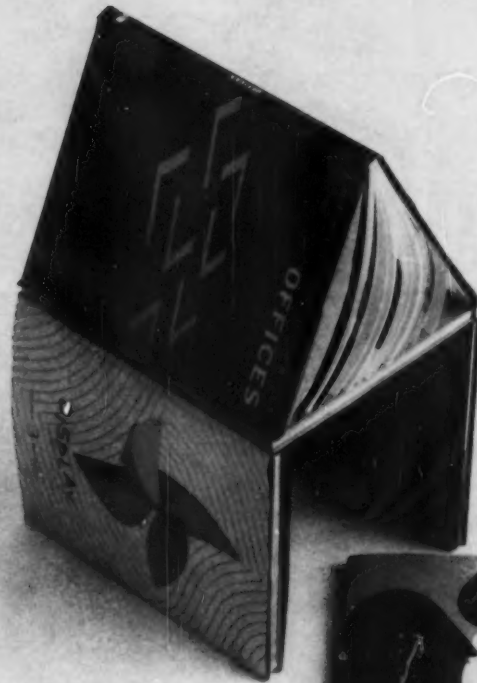
March 5-9. Sixth annual gas turbine conference and products show, sponsored by the American Society of Mechanical Engineers and the U. S. Department of Defense. Shoreham Hotel and the Pentagon, Washington, D. C.

Proof of the Pudding...

Interiors Book of RESTAURANTS, latest addition to Interiors Library of Design Books, once again demonstrates the power of INTERIORS editorial coverage of its field. Only INTERIORS provides the kind of editorial material that finds its way into these hard cover, long lasting volumes that go into the libraries of designers everywhere. Only INTERIORS has the wide acceptance among all professional design groups who want to own its design publications. In the past few years readers have bought thousands of copies of these books (at prices ranging up to \$15 a volume) based on the award winning features by INTERIORS editors as they first appeared in INTERIORS. The majority of these buyers are from INTERIORS own subscription lists.



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Handsome and Hardworking
Plexiglas... Implex



for Jet Spray Cooler . . . PLEXIGLAS® acrylic plastic is used for sparkling transparent bowls and lids on cold drink dispensers. Bowls and lids are one-piece moldings—crystal clear, breakage-resistant and free from taste or odor. Seven-inch-deep bowls measure 17" by 14".

for Smith-Corona . . . IMPLEX®, the tough, rigid, high-impact acrylic, gives outstanding strength and stain-resistance to vital components of new Galaxie portable typewriters. In addition, the smooth surfaces and lustrous colors of the IMPLEX parts contribute to the typewriter's handsome appearance.

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