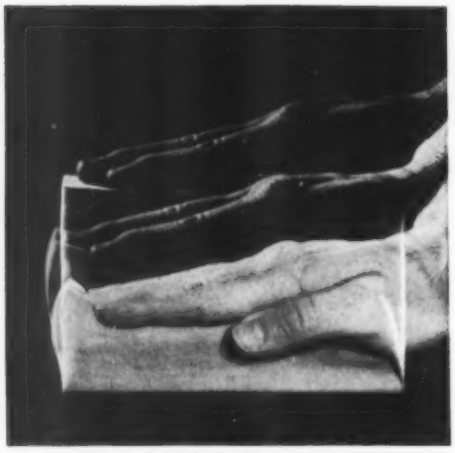
INDUSTRIAL DESIGN

April 1956 two dollars a copy

Shaping America's Products: Large-scale industry
Color problems — II
Appliance and housewares review



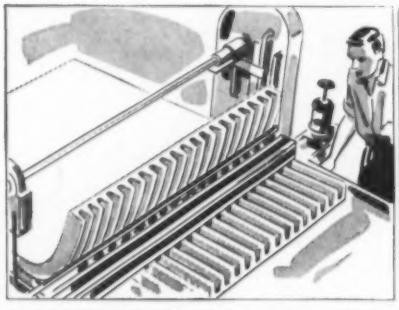
Takes 6 Million Flexes (50% compression) —with no breakdown—and you can order urethane foams in a range of resiliencies; in densities from 2 to 8 lbs. per cu. ft.

Cushioning . . . with Urethane Foams

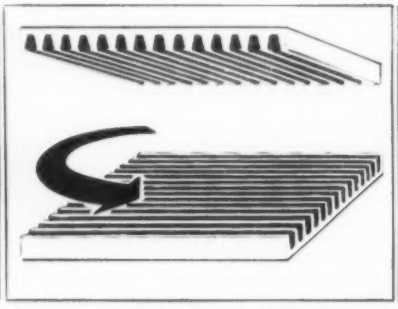
Flexible, shock-, sound-, heat-absorbing urethane foams —a totally new material for industry—are available now to make startling improvements in seating design and greatly simplify the manufacture. Colorful urethane foams:

- *Have open cells — they breathe!*
- *Can be band-sawed, stamped, cut with hot wire.*
- *Can be stapled or hog-ringed directly to wood or springs.*
- *Can be stitched or glued to fabric.*
- *Can be custom molded directly into arm rests, head rests, or shapes as large as automobile door and roof liners.*

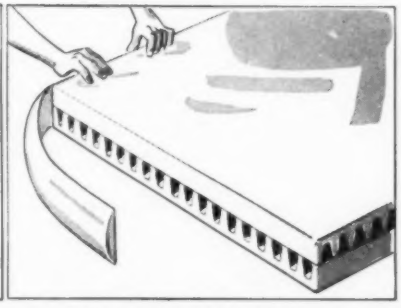
Upholstered furniture without springs!



1. Fed automatically through a shaped wire die, the electrically heated nichrome wire cuts foam section into scalloped halves . . .



2. Halves are then rotated a quarter-turn and rejoined with scallops criss-crossed to form air pockets for cored cushioning. Degree of softness is controlled by shape of scalloping, by specifying the desired compression-deflection of the foam.



3. Hot wire, profile-cut edging fastens permanently with self-curing urethane adhesive . . . bonds foam to wood, metal, leather, vinyl, or fabric.

Nichrome: Registered Trademark of Driver-Harris Co.

Monsanto does not make urethane foams—only the chemical raw materials that go into them. However, Monsanto would be happy to send you a list of companies who can supply you with samples, specific information on available properties and prices. Write: Organic Chemicals Division, MONSANTO CHEMICAL COMPANY, Dept. ID-1, St. Louis 1, Mo.

Where Creative Chemistry Works Wonders For You

MONSANTO

VOLUME 3, NUMBER 2

INDUSTRIAL DESIGN

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

CONTENTS FOR APRIL, 1956

Frontispiece:
The decorative pattern of nailheads on the door of a medieval church in Valencia, Spain, photographed by Rolf Strub, reflects some of the qualities of craftsmanship, and exploitation of natural structural elements, discussed in terms of modern industry by Don Wallance in "Shaping America's Products," beginning on page 38 of this issue.

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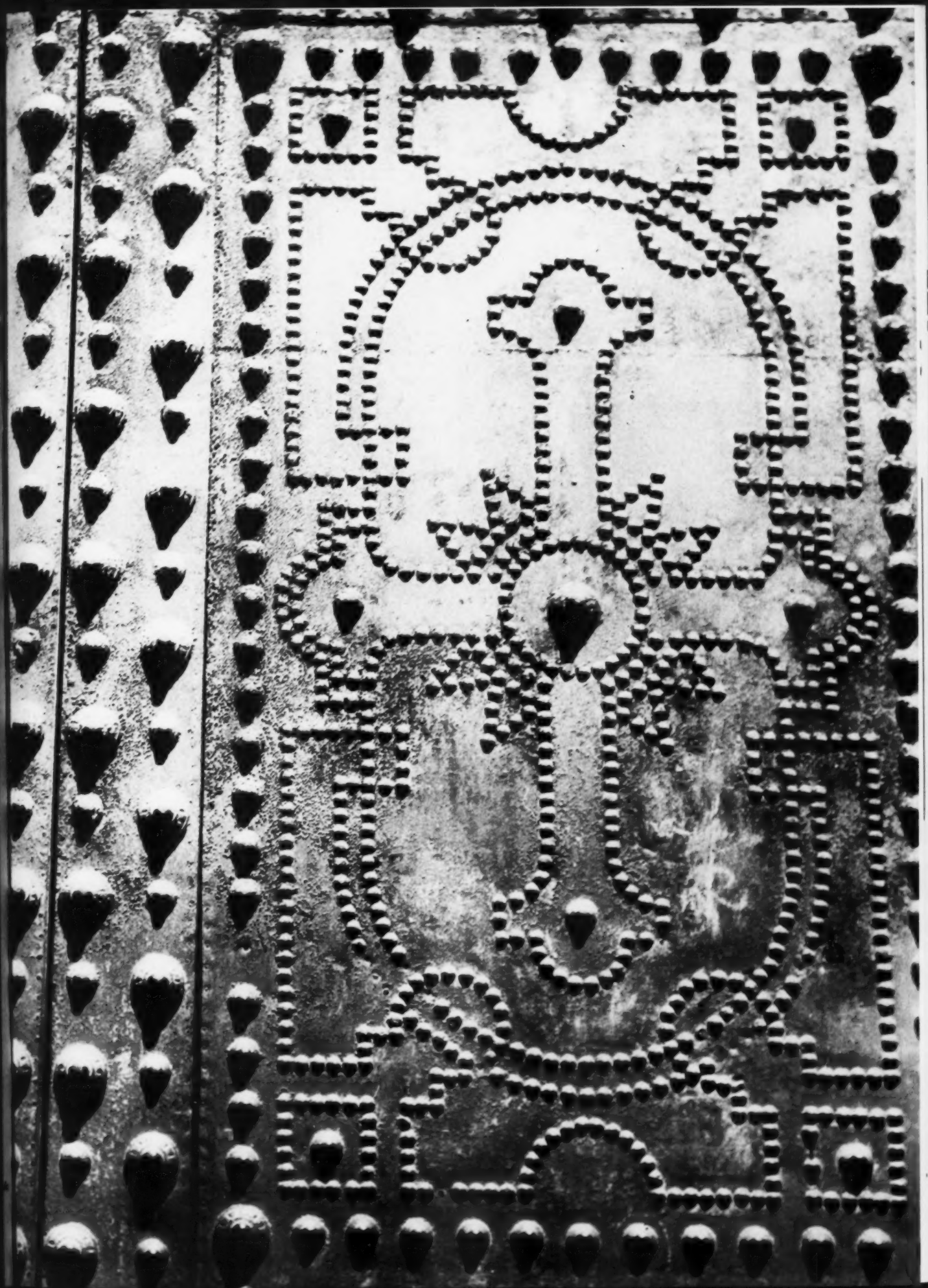


in this issue...

L. to r. Culver, Harper, Briddell, Jim Nelson, George Nelson, Mirando, Pfohl

Wallance

Rockwood

Muller Brockmann

Burtin

Figgins

Don Wallance, author of the book "Shaping America's Products," from which we present case study excerpts on pages 38-50, is also the author of furniture, housewares and tableware designs, which emanate from his workshop in Croton, New York. Trained at the Design Laboratory and Pratt Institute, among other institutions, he was formerly consultant to the U. S. Quartermaster, and developed aluminum and plywood furniture in collaboration with the Midwest Research Institute. At the moment he is consulting with the Puerto Rican furniture industry on product improvement and market expansion.

The seven animated planners at the left, and on page 55, make up the designer-client-fabricator team that collaborated on the new "Leisure" flatware of Chas. D. Briddell, Inc. Specifically labelled, they are (left to right around table): **Paul Culver,** who executed all the models for Briddell; **Irving Harper,** Vice-President of George Nelson Associates and chief designer on the Carvel Hall project; **Willis Briddell,** representing the client, one of three brothers who direct the cutlery firm established by their father; **Jim Nelson,** Advertising and Sales Promotion Manager of Briddell; designer **George Nelson,** President of the New York firm bearing his name; **Felix Mirando,** executive of the Imperial Knife Company of Hartford, manufacturers of the flatware; and **Louis Pfohl,** head of Plaxall, Inc., of Long Island City, inventor of the pressure forming process by which the Briddell compacts are manufactured.

Bob Rockwood, whose peregrinations as a plastics specialist are documented on pages 66-73, is a native of Schenectady, a graduate of the School of Architecture and Design, University of Michigan, and an ardent skier. After a tour with the Army, he became an applications engineer for GE's Textolite Division, then joined Plaskon in a job that led to his unusual career with Barrett. During preparation of his story, Rockwood's cross-country trail was diligently pursued by photographer **Roy Stevens.**

J. Müller-Brockmann has made a graphic designer's presentation of his own graphics on pages 82-89. With a studio in Zurich, he works not only in illustration and graphics, but on exhibitions and stage design; his work has been shown in cities throughout Europe. Mr. Müller-Brockmann will return to this country in June to address the International Design Conference at Aspen.

Will Burtin, who prepared the traveling exhibition of plastics for the Smithsonian Institution (pages 74-77), was formerly Art Director of *Fortune*, is currently Art Editor of *Scope*, a publication of the Upjohn Company. Mr. Burtin's New York office specializes in visual research and design, which has been widely published, exhibited and honored. He is Program Chairman for the 1956 International Design Conference at Aspen.

Richard Figgins, Associate of Sundberg-Ferar, and Design Director of S-F's eastern operations, headed the Sylvania project on pages 51-54 as he did the design of IBM electronic computors (ID, August 1955). He joined S-F in 1950, after associations with General Motors, Chrysler Corporation, and the Lustron Corporation. Mr. Figgins collaborated with **Richard Martinson** of Sylvania's engineering department on the projector project.

CORNING GLASS BULLETIN FOR PEOPLE WHO MAKE THINGS

CORNING GLASS WORKS, 54-4 Crystal Street, Corning, New York

Please send the material checked below:

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

Name_____

Title_____

Company_____

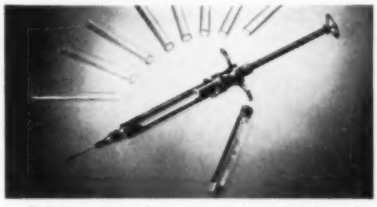
Address_____

City_____ Zone_____ State_____

How to make a point—painlessly

In the syringe behind the needle, which your dentist wields so deftly, is a neatly prepackaged dose of anesthetic. These containers are glass tubes stoppered at both ends.

We call these painkiller packages "cartridges," and fashion many of them of a PYREX brand glass. The specific glass used goes under the somewhat undramatic name of glass No. 7740.



While the title may be lacking in imaginative quality, the glass is not. Consider, for a start, the fact that the glass cartridges must be made to close inside-outside tolerances because (a) rubber stoppers must fit snugly inside and (b) the cartridge itself needs nestle neatly in the dentist's hypo or syringe.

These close fits demand fire polishing the ends (so they won't chip) without impairing dimensional tolerances—quite a delicate operation for mass production.

The glass tube must be capable of being sterilized without undue strain or breakage; it must be chemically inert so it neither adds to nor detracts from the quality of its contents. And the cartridges must be economical as, in the interests of sterility, they are used once and discarded.

So far, so good. This PYREX brand glass No. 7740 meets all the counts—and then some. It's a glass that's easily formed into intricate shapes, by varied methods, including inexpensive, one-piece molding.

For most general purpose use, No. 7740's reluctance to interfere with chemicals is without peer. Its unusual thermal expansion coefficient (33×10^{-7} between 0 and 300° C.) gives it a better than fighting chance with the temperatures encountered in a wide range of design problems.

And certainly of importance, the fact that countless customer-conceived projects have *proved* its profit worth.

We recommend for your reading a copy of Bulletin B-83, "Properties of Selected Commercial Glassware." Within the 14 pages of this unpretentious volume you'll find detailed, for a number of our glasses (No. 7740 included), data on mechanical properties, thermal stresses, heat transmission, and electrical and chemical characteristics. Free. Much easier with the coupon.

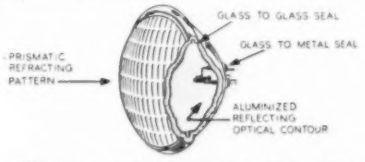
Stray rays . . . the care and handling thereof

Selective maneuvering of rays in the visible spectrum has traditionally been one of the roles that glass plays with considerable success.

Now comes another improvement in this field—one that adds comfort and safety to your motoring and, conceivably, some valuable facts to your files on glass utility. It's the new sealed-beam headlight which reduces the hazards of driving at night and in the fog.

The glass lens and reflector of the new headlight, sealed together hermetically, are designed to reduce stray rays, to concentrate more light—further ahead on the high beam and to the right of the road on the low beam.

Sounds like a simple achievement, but it took several years to accomplish and involved significant contributions of automotive, lighting, and Corning glass engineers working together on lens design, reflector design, and filament design. Corning now makes these prismatic lenses and the reflectors for several headlight manufacturers, one of whom even includes three aligning knobs on his lens, which contribute to easier and more positive focusing.



The new sealed-beam headlight illustrates how you can engineer glass to maneuver light into places where it does the most good. It also illustrates high perfection in hermetic sealing—glass-to-glass and glass-to-metal. The sealed-beam headlight is as airtight as a lamp bulb.

You can glean more about the nature and extent of engineered glass accomplishments, in *many* fields, from an attractive little primer called "Glass and You." We'll gladly send you a copy—free.

Or, Bulletin B-84: "Manufacture and Design of Commercial Glassware." Contents follow the title, offering suggestions for matching design to known advantages (as well as limitations) of various processes. The coupon will bring them to your drawing board or desk.

The big payoff?

Here's a quiz that may get you prizes galore in the form of money made (or saved). This is a matching game, aimed at showing you how one just-right Corning glass handles a difficult problem.

Write the number of the appropriate glass in the box following each description.

Protects light-sensitive substances from wayward and annoying angstroms. ☐

Conducts electricity and provides uniform heating surface. ☐

Protects against radiation effects as effectively as concrete; is nonbrowning; has density of 3.3. ☐

Can be used with intermittent temperatures to 1200° C.; has thermal coefficient of expansion of 8×10^{-7} per °C. ☐

Absorbs visible light from tungsten filament (2700° K.) but transmits infrared. ☐

1. VYCOR brand Glass No. 7910
2. Low Actinic Glass
3. Corning Code No. 8362 Glass
4. Corning E-C Glass
5. VYCOR brand Glass No. 7950

Correct answers: 2, 4, 3, 1, 5.

And that's just a start. There's also ribbon glass that outperforms mica; glass that's brick-wall thick or eggshell thin; glass that handles metal-eating acids without ill effects; glass that copes with almost any form of radiant energy—glass that improves performance of and often adds beauty to many, many, many products.

Jot down your most vexing problem and we'll let you know if one of our glasses can help you solve it.

CORNING GLASS WORKS, CORNING, N. Y.

Corning means research in Glass

LETTERS

Lustig memorial

Sirs:

It was extremely gratifying to me to note the attention which Alvin Lustig's exhibition at the Museum of Modern Art merited. Critics, designers, architects, and publishers share a knowledge and enthusiasm for Alvin's work, but the exhibition delighted a public which recognized particular book jackets and record album covers, and was the scene of lively caucuses among students.

Many requests were received by the Museum for the exhibition and it was with regret that we could not number it among our traveling shows. For this reason among many others I am delighted to tell you of Yale University's plans to establish an Alvin Lustig Fund, which will preserve his work in such a way that it can be made available to institutions for exhibition and study. It is also hoped that sufficient funds will be available to enable Yale University to grant scholarships for work in the field of graphic design. Contributions from James Laughlin, Thomas George, Philip Johnson, etc., have already been promised and a general announcement of the Fund will be made within a short time.

A year ago I asked Alvin if he agreed with me that the time was right for a most carefully selected exhibition of his graphic design at the Museum of Modern Art. Alvin's response, "It *is* about time," was most characteristic. We both recognized it as an artist's honest appraisal of his work and realization of his accomplishment.

Mildred Constantine
Associate Curator of Graphic Design
Museum of Modern Art
New York, New York

Boston bouquet

Sirs:

I can not say enough for your magazine and what you are doing, both in providing an articulate voice for the Design profession, and also in interpreting Design intelligently to manufacturers and businessmen.

Samuel Ayres, Jr.
Boston, Massachusetts

Suggestion

Sirs:

The organization of your "Index to INDUSTRIAL DESIGN 1955" is clear-cut—good detail and very handy.

Although FUNCTION is an almost all-pervasive subject in design today, its inclusion in your next index may appear reasonable and helpful to readers specially interested in its theoretics—similar to your inclusion of the sub-headings AUTOMATION and EDUCATION.

The communicable knowledge you are making available to student and professional designers is inspirational.

C. A. Winkelhake,
Design Research Consultant
University of Texas

The Lion defended

Sirs:

I read with interest Mr. Pile's review of Michael Farr's book, DESIGN IN BRITISH INDUSTRY. While agreeing with him that the illustrations in the book are not very representative of up-to-date British design, I think it is important that your readers should not be misled by some of Mr. Pile's comments.

Those of your readers who have had an opportunity of seeing some of the material which I showed at last year's Aspen Design Conference, and those who may read the bi-annual publication of the Society of Industrial Artists — DESIGNERS IN BRITAIN—will know that the best of British design is as good as any produced in other countries, but this may not be apparent to some of your *other* readers.

That the standards of design in Britain are far from dull and tasteless, I hope will be further supported by the 'Designs from Britain' Exhibition which is touring the USA at present after its successful showing at the Florida State University in Tallahassee, where it opened in January. (See pages 75-79. *Ed.*)

We certainly cannot be complacent and there is still much bad design in Britain, but it would be a great disservice if American designers and the American public were given the impression that design in England is lagging behind when, in fact, it has been progressing steadily since the "Festival of Britain" in 1951.

W. M. de Majo
London SW3, England

Vivaldi reviewed

Sirs:

In your December number you bestow praises on the designs of Alvin Lustig, whose work has been on exhibit at the Museum of Modern Art.

I was struck by the inappropriateness of a statement made on a specific item with which I do have some acquaintance — namely, the Haydn Society's Vivaldi record sleeve, of which you reproduced a cut. Your writer's comment was that this "through sharp-edged type and prismatic purples creates a visual vibration akin to his music."

None of the music on this record, or in fact any of the music of Vivaldi that I have heard (and I've heard a good deal), has any relation to Lustig's design. Why couldn't your writer see the obvious? Lustig was just fooling with letter shapes, that's all. Any other name with straight-line, angular letters can get the same treatment—and still have nothing to do with the nature of Vivaldi's music.

Before the war, record albums were always severe and plain; since then they have blossomed more and more, until even the mediocre ones are attractive (Lustig's effort is one such, I think) and many are most decorative and admirably suit the subject matter (which Lustig's neo-Bauhaus effort does not).

If you must praise a design, select one that is praiseworthy, and if you do praise it, let the reasons be the right reasons, and let them make sense.

Stanley Metalitz
College Park, Maryland

Errata

Sirs:

In your article, "Education of a Designer," (February, 1956), you have me listed from the University of Michigan. In correction, I am from the University of Bridgeport, and a full-time instructor under Professor Robert E. Redmann.

Douglas Merrilees, Industrial Design
University of Bridgeport
Bridgeport, Connecticut

With apologies to MR. MERRILEES, *we should also like to correct the following:* GORDON LIPPINCOTT *and* WALTER MAGULIES *(page 6, February ID) are members of the Package Designers Council, not the A.S.I.D. as reported. Danish designer* ACTON BJORN *was wrongly identified as* SIGVARD BERNADOTTE *on page 76 of the February issue. Count Bernadotte appears on page 77.—Ed.*

NEWS

Step-on garbage can in polystyrene and polyethylene was "Best in Competition."

Koppers design awards announced

Winning molders of plastic housewares select schools to receive scholarships.

Plastic molders from Brooklyn, Columbus and Chicago were the winning contestants in the second annual Plastic Housewares Design Competition, sponsored by the Koppers Company. Results were announced recently at a banquet in Pittsburgh's William Penn Hotel, in conjunction with a display of the 214 entries from 72 molders. Prizes were four one-year, full-tuition design scholarships in the names of the winning molders at a school of the molder's choice, and a two-year, full-tuition scholarship for the "Best in Competition."

Prize-winning polyethylene decanter.

First-prize winners in each category and their entries were: Federal Tool Corp. of Chicago, for a two-color, four-piece canister set made of impact polystyrene; C. B. Cotton & Co. of Brooklyn, for a two-color water or juice decanter in regular polyethylene; Bu-Gay Plastic Products, Inc. of Chicago, for a self-watering, two-part planter made of regular polystyrene; Columbus Plastic Products, Inc. of Columbus, for a two-color step-on garbage can with an outer container of impact polystyrene and a liner of regular white polyethylene. The Columbus garbage can was also named "Best in Competition."

Federal Tool announced that its scholarship would go to the Illinois Institute of Technology; The Cotton Company named the School of the Art Institute of Chicago; Bu-Gay also selected I.I.T.; Columbus assigned its two-year scholarship to the University of Cincinnati and the one-year to the Cleveland Institute of Art. Students receiving the scholarships will be selected by the schools.

Cadillac Plastic sponsors contest

$1,000 prize is offered for design application of plastic tube.

Cadillac Plastic and Chemical Company, Detroit producer of cast acrylic and styrene rods, tubes and massive sheets, has announced a contest for designs involving any application of cast or extruded rod in any thermoplastic material. First prize in the open contest (limited to designs that are or will be in production or in tooling by December 1, 1956) is $1,000; and second prizes of $150 are offered for designs in three areas: consumer products; industrial or technical products; architectural or decorative uses. The parallel contest for student or speculative designs (which may be presented through renderings and prototypes) offers a first prize of $250 and three second prizes of $75, in the same three areas, consumer, industrial, architectural.

Design teams as well as individuals are eligible and may submit their entries (with the approval of the employer or instructor) in the form of photographs or sketches. Judges are: Professor John Arnold, Massachusetts Institute of Technology; George Beck, General Electric Co.; William T. Cruse, Society of the Plastics Industry, Inc.; Hiram McCann, editor of *Modern Plastics;* Jane Fiske Mitarachi, editor of INDUSTRIAL DESIGN; Jean O. Reinecke, Reinecke & Associates. The deadline for entries is September 30, 1956; prizes will be presented at a special convocation in New York before February 1, 1957. Cadillac hopes to make the contest a continuing company project.

For details and entry forms, write to Ladd Orr, Contest Advisor, Cadillac Plastic and Chemical Co., 15111 Second, Detroit 3, or branches of the company in Chicago, St. Louis, Los Angeles and San Francisco.

S.P.I. sponsors House Contest

Stakes are $3,250 for new ideas using plastics in home built-ins.

Architects and designers are invited to submit designs for a house utilizing plastics ($1000 first prize, $500 second) and for special areas, porch, kitchen, etc. for which awards of $250 and $100 will be given. Approved by the A.I.A. and sponsored by the Society of the Plastics Industry, Inc., the deadline is May 20. Judges are Paul M. Rudolph and John N. Highland, Jr., architects, and Hiram McCann, editor of *Modern Plastics.* James T. Lendrum, Professional Advisor, SPI Plastics House Competition, Mumford House, University of Illinois, Urbana, Illinois will supply contest details.

Do you need **SIZE?**

Can you use special **SHAPES?**

Here is a homogeneous fiber board—each sheet individually molded. It is weatherproof, crackproof, insulating and sound-deadening. It works easier than wood—takes paint, stain, paper or any laminate glue can hold. Homasote, the oldest and strongest insulating-building board on the market, is now made in seven thicknesses and several densities.

8′ x 14′ sheets are available in the $^{15}/_{32}$″ and $^{25}/_{32}$″ thicknesses. Along with this size, you have great structural strength. In other thicknesses, the sizes are those most adaptable to their original uses.

For special shapes, Homasote is clean-cutting and easy-working. It has a long record of successful use by display and furniture makers. Arrangements can be made to have Homasote cut to your particular requirements.

Let us send you samples and specification literature on Homasote in all its forms. Kindly address your inquiry to Dept. D-20.

SEE OUR CATALOG IN SWEET'S

HOMASOTE COMPANY
Trenton 3, New Jersey

Two important expositions

The **Seventh National Exposition of the Plastics Industry**, sponsored by The Society of the Plastics Industry, Inc., will be one of the first industrial shows to open the New York Coliseum, June 11-15. Every aspect of the industry will be represented in over a thousand booths, and a conference is scheduled at the same period on plastics technology, offering practical information to designers and engineers.

The first **Design Engineering Show**, devoted exclusively to the needs of those engineers who design products for consumer and industrial use, will be held at Convention Hall, Philadelphia, May 14-17. It is an outgrowth of the Basic Materials Exposition, previously held in New York and Chicago. Exhibits will include parts, components, finishes and machinery having design-engineering applications.

Four days of discussion are also scheduled in Convention Hall. Executives from General Electric, Westinghouse, Bell Telephone, with Professor Chester Linsky from Pennsylvania State University and George V. Woodling, patent attorney from Cleveland, will discuss: Value Analysis in Product Design; How to Get and Train Design Engineers; Selecting Engineering Materials for Products; Problems in Miniaturization; Recognition and Reward for Invention; and Rights of the Employee's Inventions.

Lounge chair and ottoman *by Charles Eames, recently unveiled by the Herman Miller Company, is a swivel-and-tilt design consisting of independent molded plywood shells upholstered with cushions of unique construction. The fabric (or leather) cover of the cushion is zippered to a vulcanized fiber back; inside is a thin foam rubber envelope holding feathers and down. The whole assembly snaps to the plywood shells to make a thin but resilient seat. Prices from $580.*

Teague wins U.S.A.F. contract

$70,000,000 *Air Force Academy job to be done by industrial design firm*

The U. S. Air Force Academy in Denver has paid the profession of industrial design a tribute, by deciding that the interior arrangements, equipment and furnishings of all Academy buildings should be the responsibility of an industrial designer. A selection board surveyed the field, and reviewed presentations from some 30 design firms, with the objective of getting "The best obtainable environment, unity, efficiency, economy and pleasant appearance" for the Academy; it concluded that "the large industrial designer with broadest background is best qualified in breadths of experience . .. and in depth of established capacity." The contract was awarded to Walter Dorwin Teague Associates of New York (ID, February, 1955).

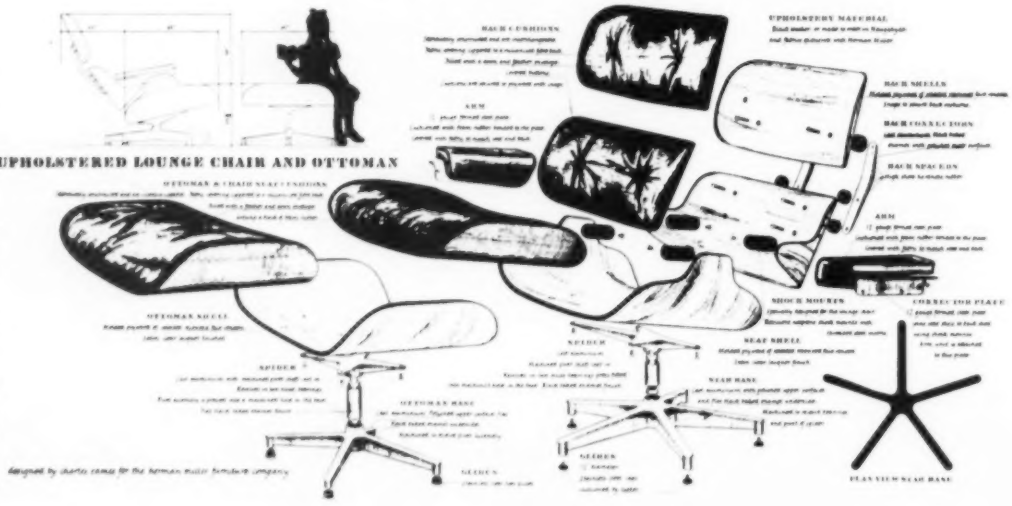
It is estimated that 60,000 kinds of equipment and fittings must be selected and specified, of which some 1500 will have to be specially designed. Installation and arrangement of all Academy equipment and furnishings, for which there is a $70,000,000 budget, will be the responsibility of the designers. Work has already begun, with task groups in Denver, New York, and men in Chicago for liaison with Skidmore, Owings & Merrill, architects.

Railroad begins renovations

Pennsylvania RR is using plastics and electronics in future plans

The Pennsy, experimenting with all plastics in dining car interiors, introduced their second car, a twin-unit, on March 20. Unbroken vinyl strips (some 27 feet long), micarta counters, Fiberglas drapes, and plastic tile floors, as well as textured plastic upholstery on dining chairs, have been installed. Colors—red, blue, and autumnal shades of green, brown and beige —were selected by the railroad's art director, Alfred C. Strasser. Even the aluminum "multi-vent" strip for car ventilation has been bonded in plastic for easier cleaning.

On February 15, it was announced that the railroad is also starting to construct a new ticket office in Pennsylvania station, equipped with electronic devices and closed circuit television to show available Pullman space. Designed by Lester C. Tichy, the new ticket and reservation center will be crowned by a luminous canopy, suspended by cables from the station pillars. Made of metal, glass and plastic, the canopy will supply lighting and air conditioning to the open, oval structure below. The new bureau is scheduled to be in service by the end of the year, the railroad having decided that this construction could be adapted to any major renovations, such as William Zeckendorf's idea of the Palace of Progress, which may occur in the future.



hi-lites on hi-fax

(TRADEMARK)

and other Hercules plastics

**Our Hi-fax plant is underway!
Construction has begun in Parlin, New Jersey
on the new plant which will produce Hi-fax,
a versatile new ethylene polymer made
by the Hercules process.
For more about this important new plastic,
and other new plastics developments
at Hercules, please turn the page.**

over

HERCULES POWDER COMPANY

facts about hi-fax

Hi-fax is the name of a new ethylene polymer to be made by the Hercules process. Hi-fax provides a completely new plastic with an unusual combination of properties unmatched by any material previously available.

Hi-fax is truly heat resistant! Can be immersed in boiling water without distortion. Insoluble in water or organic solvents below 100°C.

Hi-fax is rigid and strong! Hi-fax has four to five times the rigidity of regular polyethylene. It has double the strength.

Hi-fax has exceptional low-temperature toughness! Retains its impact strength at extremely low temperatures.

Hi-fax has superior resistance to chemicals, solvents and greases! The fluid permeability of Hi-fax is only ⅓ that of conventional polyethylene.

Hi-fax is richly colorful with an attractive lustrous finish!

Hi-fax is easy to fabricate! Can be molded by compression, extrusion and injection techniques and machined by conventional methods.

If you make or design toys, housewares, industrial moldings, sheet and film, pipe, bottles, or electrical insulation, Hi-fax offers a *better* plastic for the specific requirements you must meet. That's why we consider Hi-fax the plastic of tomorrow for tomorrow's superior products.

HI-LITE ON hercocel®

In design, production, and sales, versatile Hercocel continues its job of keeping new products on the move. Long-wearing and durable, economical and easy to mold, Hercocel—Hercules® cellulose acetate—is the perfect plastic for many products. The Dormeyer "Edge-Well" Sharpener, for example, is molded with Hercocel and is guaranteed by the manufacturer for one year against defects in material or workmanship. The Hercocel housing for the "Edge-Well" is molded by Plastic Precision Parts Co., 2535 West Madison St., Chicago, Ill. It is a product of the Dormeyer Corporation, Kingsbury and Huron Sts., Chicago 10, Ill.

Cellulose Products Department

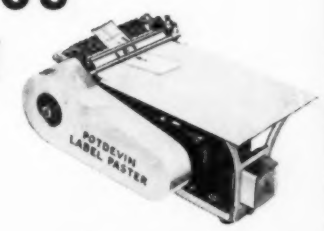
HERCULES POWDER COMPANY
INCORPORATED

942 King St., Wilmington 99, Del.

CP56-1

Today's precision machines for gluing and paper converting operations

SAVE YOU MONEY



...as do today's

PRESCRIPTION ADHESIVES

Precision means economy in modern production. The Potdevin machines pictured above are typical components of modern gluing and paper converting operations. The Label Paster is a time-saver in some 20,000 plants. On the stand is the Sheet Coating and Gluing machine, a money-saver in most mounting and laminating work. Quick changeover is the economy secret of the rugged Multiwall Paper Bag Tuber.

Quality control doesn't stop with machines. The complete operation demands the right materials all down the line—and the right adhesive is the least expensive link. Precision machines deserve *prescription* adhesives.

For 71 years Arabol has kept in step with the increasing demands of modern production methods. Arabol has supplied many thousands of specific adhesives formulas in serving the leaders in 100 industries. In *your* business—in your product or in its labeling, packaging, and case-sealing—you use adhesives. Near your business one of the fourteen Arabol plants and warehouses stands ready to serve your needs.

We invite the opportunity to submit samples for you to test in your own plant—under your particular working conditions—for your specific requirements, whatever their nature. That is the one kind of testing that assures you of satisfactory results. Your inquiry to Department 47 will bring a prompt response.

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71 YEARS OF PIONEERING IN THE MAKING OF ADHESIVES

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

EXECUTIVE OFFICES: 110 East 42nd Street, New York 17, N. Y. • CHICAGO • SAN FRANCISCO • LOS ANGELES • ST. LOUIS • ATLANTA PHILADELPHIA • BOSTON • PORTLAND, Ore. • ITASCA and McALLEN, Tex. • CINCINNATI • DENVER • TAMPA • LONDON, Eng.

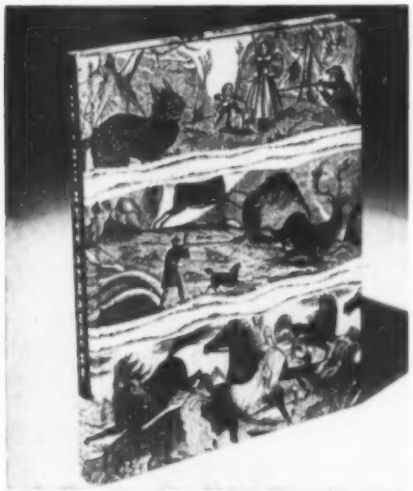
Left to right, jurors Martin, Beall, Bayer.

S.T.A. shows its graphic best

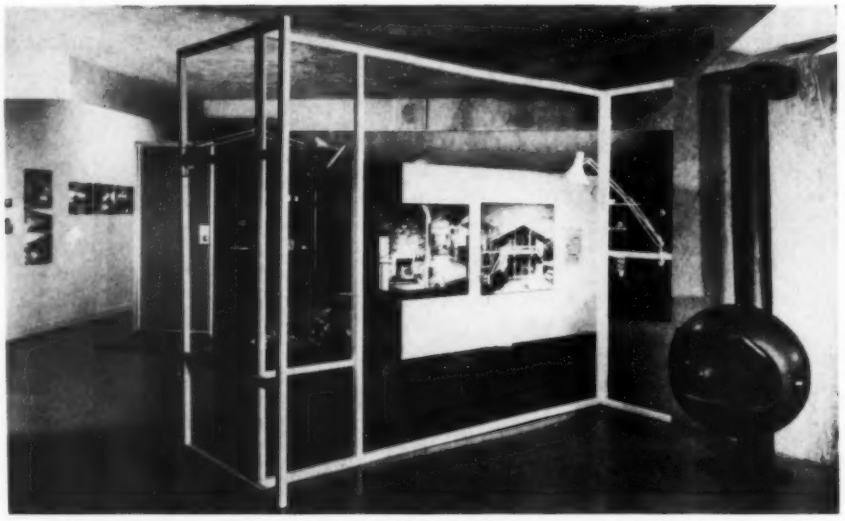
Chicago exhibition surveys the situation in graphic arts in the Midwest

For the 29th year, the Society of Typographic Arts is holding an exhibition of graphic designs from the Chicago area. Packages lead the pack this year, with 13 among 89 selections; ads, gift cards, direct mailing and posters are only sparsely represented. In narrowing down 23 categories involving design for printing to these few examples, Herbert Bayer, Lester Beall and Noel Martin are said to have been the strictest jury in years. They surveyed 900 entries for this popular show, for Chicago's output in graphic design ranks the area as one of the busiest in the country, with many designers actively organized in the large membership of the S. T. G. A.

Seven of the 13 packages in the show are the work of seven designers for the same firm—Sears Roebuck. After packaging, folders, Christmas cards and books were the second most populated categories, representing such regular exhibitors as Bruce Beck, Morton Goldsholl, Phoebe Moore, Franz Altschuler, Carl Regehr and Larry Muesing, and many others, whose work will be on view at the Art Institute of Chicago, March 31 to May 6.



Albert Schlag's design for Davy Crockett.



In this section of Akron exhibit is the Carl Koch prefabricated house. The prefabricated fireplace was designed by George Kosmak of San Francisco.

Akron holds design exhibition

"Off the Production Line" is a product glossary of today's market trends

From February 10 to March 27, Midwesterners could survey 125 contemporary products at the Akron Art Institute—according to the subtitle, "Designed for Industry and You." Ford's Continental, GM's Aerotrain, a Carl Koch prefabricated house, and a few other items not sized for a museum were shown in photographs, but otherwise the actual products were on display. With the exception of Frigidaire's Holiday Kitchen, all the products shown are currently available on the market. Borrowed from distributors and manufacturers, the works represent designers from all over the U. S. and such local firms as Smith, Scherr and McDermott from Akron, and Onnie Mankki and Greenlee-Hess from Cleveland—with the addition in some instances of research material (Dave Chapman's Brunswick-Balke-Collendar school furniture) and clay models (a tire from Firestone's design development department). A well-illustrated catalogue carried a foreword by Edgar Kaufmann: ". . . The modern designer's opportunity is to establish control over the processes in order to ennoble the product."

Luke Lietzke, Curator of Design at the Art Institute, organized the exhibition, which opened with an evening panel discussion, "What is Happening to America's Taste." Speakers were William Friedman, head of the Design Department at Indiana University; Arthur Bec-Var, president of the ASID and Manager of Appearance Design for G. E. in Louisville, Kentucky; Jay Doblin, Director of the Institute of Design at Illinois Institute of Technology; and Leo Molinaro, Executive Secretary, Adult Education Foundation of Akron.

A.S.I.D. cooperates with U.C.L.A.

A show of industrial designs represents the field at a Farwestern university

This month students (above) and faculty are looking at the work of American and British industrial designers in an exhibition loaned by the American Society of Industrial Designers and installed by design students at the University of California. Professor John Maguire arranged the showing as a means of bringing to the attention of the academic community the significance of its recently established curriculum in industrial design.

Among other current exhibits . . . Demonstrations of crafts in New England will be featured at the Boston Arts Festival, June 9 to June 24 in the Boston Public Garden. A new demountable pavilion is now being designed to house workshops for potters, block printers, jewelry makers and ceramicists. . . . The dates July 25 to September 2 have been announced for "Design in Detroit," sponsored by the Detroit Chapter of the Industrial Designers' Institute.

on deck in all weather

Housed entirely in weather-resistant Tenite Butyrate plastic, this new Bow Light is one boat accessory that won't rust or corrode and requires no periodic refinishing.

The streamlined case, in white or a choice of colors, and the translucent red and green lenses are formed of Butyrate by rapid injection molding. These tough parts stand up under exposure to sun, salt water, and temperature changes...also take the hard knocks of deck usage without becoming dented and deformed. The colors, an integral part of Tenite Butyrate, do not chip off or peel.

You will also find Tenite Butyrate used in many other outdoor products, such as garden tool handles, football helmets, fishnet floats, outdoor signs, housings for drive-in movie speakers. For more information about Tenite properties and uses, write EASTMAN CHEMICAL PRODUCTS, INC., subsidiary of Eastman Kodak Company, KINGSPORT, TENNESSEE.

Bow Light distributed by Dee Zee Enterprises, New Baltimore, Mich.; manufactured by Anchor Bay Plastics, Fair Haven, Mich.

• **Information on Tenite can be obtained from local representatives listed under "Plastics—Tenite" in the classified telephone directories of the following cities: Chicago, Cleveland, Dayton, Detroit, Houston, Leominster (Mass.), Los Angeles, New York City, Portland (Ore.), Rochester (N. Y.), St. Louis, San Francisco, Seattle and Toronto—elsewhere throughout the world, from Eastman Kodak Company affiliates and distributors.**

TENITE
BUTYRATE
an Eastman plastic

Loewy launches design program for United Airlines

Raymond Loewy is standing in a mock-up cabin of United Airlines' DC-6B Mainliner, which has recently gone into service with his new interior. Seated, from left, are: D. F. Magarrell, vice president, transportation services; Robert E. Johnson, vice president and assistant to the president, and W. A. Patterson, president. More DC-6 cabins, Loewy-redesigned ticket offices and DC-7's will follow.

"Well-Designed Autos" on view

Kalamazoo Art Center selects 23 cars for their excellence as works of art

With 23 photographic enlargements on view during March, the Kalamazoo Art Center went on record with its choices for "Well Designed Automobiles" from the past and present, from Europe and the U.S.A. The cars were chosen, according to the introduction by Curator Richard Gregg, "primarily for their excellences as works of art. Mechanical performance is an important fact, but stress was placed on their being good examples of 20th century industrial sculpture . . . An automobile is not a shop front or a new dress, however much it may be influenced by fashion, and these automobiles represent some of the most serious thought given in our time to the esthetics of automobile design."

Unlike the Museum of Modern Art of New York, which sponsored the first two shows dedicated to the art of the automobile, Kalamazoo did not confine itself to a handful of specific examples. In addition to those shown below, it picked the following eclectic groups, classifying them as Traditional ("box on wheels"), Contemporary Envelope ("all parts enclosed in a single metal shell") and Transitional: Paige-Daytona, 1922; Vauxhaul 30-98, 1926; Mercedes SS100; Dusenberg, 1932; Rolls Royce, 1932; Mercedes-Benz 540-K, 1935; Bugatti 57-C, 1935; Jaguar SS100, 1937; Lincoln Continental, 1940; MG; TC, 1949; Alvis Sports coupe (Graber body); Cisitalia coupe (Farina body), 1946; Siata coupe (Bertone body); Volkswagen coupe (Ghia body); Studebaker, 1953.

Conferences

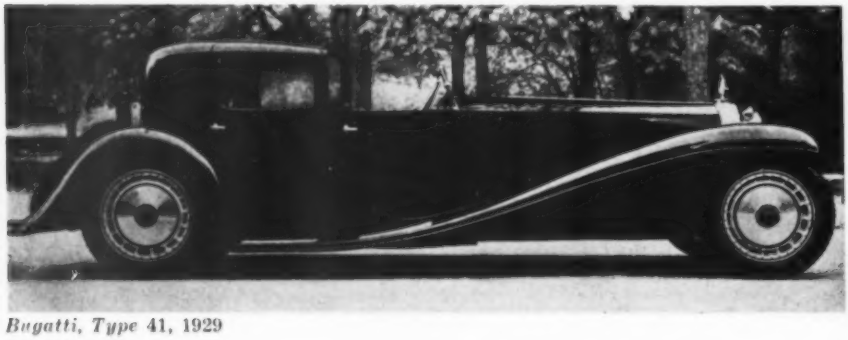
The American Ceramic Society, Inc. will hold its 58th annual meeting April 22-26 at the Hotel Statler in New York. The Design Division of the Society will discuss "The Education of the Designer"; Alfred Auerbach will moderate a panel on "The Changing Public Taste"; and the chairman of the program, F. J. Von Tury, will open the convention with a talk: "How Design Brings the Four E's—Editors, Educators, Executives and Engineers — Together." On the general theme, "How to Protect Your Investment—Financially and Technically," the **Midwest Plastics Conference** will take place from April 25-27 in French Lick, Indiana. Sponsored by the Society of the Plastics Industry and the Society of Plastics Engineers, one day's conference will be devoted to "Engineering's Contributions to Management."

The **Package Designers' Council** will hold a day's seminar on May 12th at the Silvermine Guild in Norwalk, Connecticut, discussing mass packaging, marketing research, and design.

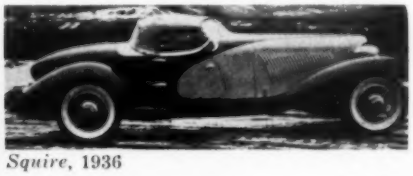
Seminars

A seminar in **"Creative Engineering and Product Design,"** conducted by John Arnold, will be held at Massachusetts Institute of Technology June 18-June 29. This is the famous summer seminar which stresses techniques for organized and "inspired" creative activity. Also emphasized will be problems in selecting, training and managing creative personnel.

"Plastics in Building" will be the subject of a two-week Special Summer Program to be given at Massachusetts Institute of Technology from July 2-13, presented by the Department of Architecture and the Course in Building Engineering and Construction of the Department of Civil and Sanitary Engineering. Guest lecturers will include Eliot Noyes, Dr. Lucius Gilman, plastics research specialist, and W. Burdette Wilkins, consultant in plastics.

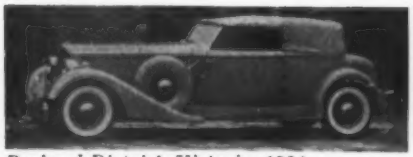


Bugatti, Type 41, 1929



Squire, 1936

L29 Cord Speedster, 1929



Packard-Dietrich Victoria, 1934

Bugatti 57SC, Electron Coupe, 1937

Fiat coupe (Boano body)

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STYRON 475 SHEET
can make money for you!

Plastics Sales Department, Dept. PL 490K
The Dow Chemical Company, Midland, Michigan

DOW

Please rush technical data on Styron 475 sheet and nearest source of supply:

Name and title_____

Firm name_____

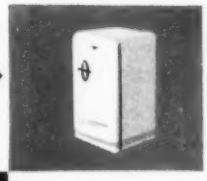
Types of product manufactured_____

Address_____

City_____ Zone____ State_____

HIGH FABRICATION COSTS A PROBLEM?

Many complicated refrigerator and appliance parts like freezer doors and crisper boxes are made with easily formed Styron® 475 sheet!



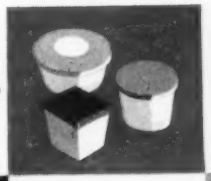
There's no limit to colorful, high-impact Styron sheet's applications in the novelty fields!

Many beautiful three-dimensional displays and signs are formed of low-cost Styron 475 sheet!

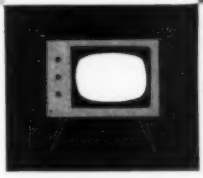
Dow has the answer in

STYRON 475 PLASTIC SHEET

The list of its advantages below shows why more and more packaging men have turned to dependable Styron 475 sheet!



Versatile Styron 475 sheet sets the pace for realistic detail, extra play value and longer play life in today's fastest-selling toys!



Styron 475 sheet is the choice of many radio and TV manufacturers for masks, back and tube enclosures and insulating shields!

YOUR PRODUCT GOES HERE

You can use these Styron 475 sheet advantages to cut your operating costs—

1. Economical
2. Will not corrode, rust or tarnish
3. Easily formed and fabricated (punched, die-cut, stamped, vacuum-formed)
4. Adaptable to most painting and printing methods
5. Excellent resistance to water and moistures
6. Will not support mildew, mold and fungi
7. Lightweight
8. Chemically compatible with a majority of packaging materials
9. Reusable or disposable
10. Wide range of opaque and semitranslucent colors
11. Nontoxic
12. Has good chemical resistance

Yes, imaginative engineering minds have made plastics a basic part of almost every industry you can name. Styron 475 sheet is a high impact polystyrene plastic formulation produced as a sheet in a variety of sizes, thicknesses and colors. Developed by Dow through advanced extrusion techniques, it is a vital factor in the swing to plastics as a profitable production material. Styron 475 sheet is available from leading manufacturers throughout the country. There are also leading fabricators nearby ready to form to your specifications. Return the coupon above today, and put Dow's experience and leadership in plastic sheet to work for *you*. Our pledge: *Prompt*, personal attention to your needs.

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DOW

Your Guide to the Best in Aluminum Value

Competitions

AIGA is planning two new shows for the fall of '56: one will be called "50 Packages of the Year," the second "50 Record Album Covers." Egbert Jacobson of the Container Corporation of America, who will act as chairman of these shows, said it was not yet determined whether they would be held in New York or Chicago. Reception and judging of entries is scheduled for the month of July. The call for entries and final dates will be mailed in May from the AIGA offices, 5 East 40th Street, New York 16. The sixth annual **IDI Design Award Program**, whose aim is to give professional recognition to industrial designers, is now under way, according to Walter C. Granville, chairman of the award committee. Medals will be presented to no more than three designers whose entries have been mass produced and nationally distributed. Entries must be postmarked no later than midnight, May 19, 1956 and addressed to the chairman, Sixth Annual IDI Design Award Program, 38 South Dearborn Street, Chicago 3.

The 1956 Boston Arts Festival from June 9 to June 24 will feature the third **New England Architectural Competition** exhibit, which will be displayed outdoors in specially designed pavilions in the Boston Public Garden. The Competition is open to any New England architect or architectural firm for work that has been put up in one of the New England States during the past five years. The jury will select a limited number of projects for display in the Garden, and will award a Grand Prize and several honorary awards. For further information, write to the Boston Arts Festival, 31 Newbury Street, Boston. **The American Association of Nurserymen** have announced the opening of their "Plant America" competition, which gives recognition to firms that have promoted landscaping and beautification of industrial premises through planting. The awards will be based upon 8"x10" glossy photographs of the building and ground. Submit entries to the association offices at 635 Southern Building, Washington 5, D. C. by September 1, 1956.

Awards

The $500 annual John Woodman Higgins Re-Design Award of the **Pressed Metal Institute** was presented to Francis B. Lord of Waltham, Massachusetts for redesigning a wave guide flange for TR radar tubes used for low-frequency scanning. By having the flange "coined," Mr. Lord may save his customers as much as $74,000 a year. The **Art Director's Club of Los Angeles** gave the Package Design Award of the 11th West Coast Exhibition of Advertising and Industrial Art, Los Angeles, to "The Candlelight," the Old Fitzgerald holiday decanter of the Stitzel-Weller Distilleries. The decanter was designed by Walter Landor & Associates, West Coast industrial designers. **The Museum of Modern Art** has selected nine artists to work on a commission for the Family Service Association of America. The commission involves creating posters that will encourage support of community agencies providing professional services to families in trouble.

The original posters, executed by Ben-Zion, Bernarda Bryson, Leo Lionni, Noel Martin, Wayne Miller, Constantino Nivola, Robert Andrew Parker, Henry Ries and George Tscherny, will be exhibited at the museum, at 11 West 53rd Street from April 18 through May 13.

People

Randall D. Faurot (right) has been appointed director of styling (a newly-created position) at Kelvinator. For the past eight years, he has been stylist for Studebaker.

Richard Neagle, head of Richard Neagle Associates in Philadelphia, has been retained as consultant by Monsanto Chemical Company's Plastics Division.

David C. Slipher has been retained by Frigidaire Division of General Motors as a consultant on research, design and marketing of appliance and air conditioning products for the home building industry.

Frank F. Elliott, president of Crane Co., has been appointed trustee of Illinois Institute of Technology.

Kenneth Van Dyke, on February 13, formally announced the opening of Van Dyck Associates' new offices in an old mill building on the Post Road in Westport. They are consultant product designers.

Eszther Haraszty, formerly head of the textile division of Knoll Associates, has joined Michael Saphier Associates, Inc. as director of Interior Design.

Edward Klein, chief industrial designer for the Chicago offices of Motorola, Inc. announces the opening of his own firm, Edward Klein Industrial Design, 605 Michigan Avenue, Chicago.

James M. Ritter, Assistant Sales Manager of the Farrell-Cheek Steel Company, Sandusky, Ohio, has been appointed a member of the National Steel Founders' Product Development Committee.

Arthur C. Treece has been appointed General Manager of the General Electric Plastics Department. Its headquarters are moving April 1 to Decatur, Illinois.

Joseph Carreiro, Director of the Industrial Design Department at the Philadelphia Museum School of Art, has taken over the duties of National Executive Secretary of the IDI, Henry Hagert, who is touring Europe for three months.

Jack Fairchild Fleming has joined the staff of Donald Deskey Associates as associate.

Donald Dailey (right) has been appointed design consultant at Capehart-Farnsworth Company, Fort Wayne, Indiana.

William M. Schmidt, Vice President and Director of Styling at the Studebaker-Packard Corporation announces that his firm, Design Consultants, is enlarging and opening another office in Grosse Pointe Woods, Michigan. M. F. Harty, Jr. is Chief Designer.

Herbert J. Zeller, Jr. has been named Director of Styling, Motorola Inc., thus giving design full departmental status in the company.

Eric de Kolb (right), formerly art and packaging director for Helena Rubinstein, Inc. and Gourielli, Inc., has opened his own packaging design firm at 20 East 53 Street in New York.

Raymond Loewy has signed a contract to design an entire new line of television receivers for Westinghouse Electric Corporation.

Russel Wright was given an award at the 1956 International Food Show — "as a salute to his 25th anniversary as the pioneer of modern design for the American home."

Jorgen G. Hansen and **Jens Thuesen** (above, left and right) have formed a corporation, Hansen and Thuesen, Inc. They will continue to specialize in interior and industrial design.

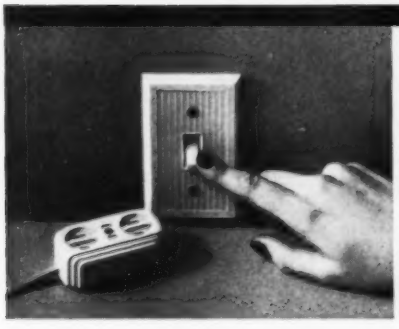
Raymond Stevens (right) succeeds Dr. Earl P. Stevenson (now board chairman) as president of Arthur D. Little, Inc., Cambridge, Mass.

Edith Witt, of Western Research Institute, San Francisco, has been appointed Market Research Consultant on packaging for Smith, Tepper and Sundberg, industrial designers in San Francisco.

Ralph Lowell, President of Boston's Museum of Fine Arts and **Nelson W. Aldrich**, President of the Institute of Contemporary Art, announced that the Institute will be housed in the Boston Museum temporarily beginning in June. Their joint project will be to explore the possibilities of adding industrial design courses to the Museum School curriculum.

Opportunity materials—Cyanamid Plastics and Resins

FIRST ALL-PLASTIC AEROSOL is marketing news! At last—a spray dispenser with the beauty of *quality* plastic: Cymel* Melamine Molding Compound! It offers new design possibilities in unlimited colors . . . feels warm and pleasant in the hand . . . resists breakage and corrosion. Here's a smart packaging opportunity for many marketers of aerosols!



THE MODERN, SAFE LOOK in wiring devices—ivory-colored BEETLE® urea plastic. Lighter and more cheerful than old-fashioned dark colors and safe, too! Look for the UL seal. BEETLE is rugged, hard, and resists heat and discoloration. If you make, sell or buy current-carrying devices, be sure they're adequate for safe wiring. Be sure they're BEETLE!

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NOR SNOW, NOR RAIN, NOR HEAT ...will spoil the gleaming beauty of a melamine resin baked finish. Gloss, weather resistance and mar resistance combine to make melamine finishes first choice for automobiles...for household appliances and industrial equipment, too. Look to Cyanamid—the leader in melamines—as your source of supply.

NEW MATERIAL FOR PRODUCT DESIGN...low-cost, easy-molding Pre-mix compounds of LAMINAC® Polyester Resin and fibrous glass. The LAMINAC pre-mix lightning arrester caps (right) used on telephone lines, for example, weigh 84% less than former ceramic counterparts (left) *and* provide much greater impact strength. Pre-mix polyester can cut costs, simplify production, reduce maintenance and replacement.

Come to Cyanamid for thermosetting plastics (melamines, ureas, polyesters)...resin adhesives...resins for surface coatings.

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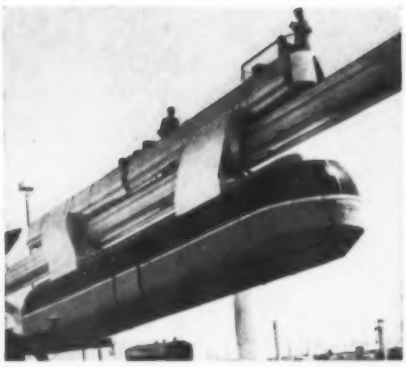


A monorail blazes the trail

970-foot test run in Houston is now in operation above the ground

Although it is not new under the sun (Wuppertal, Germany has had a "floating car" for 53 years), the monorail (above) is new in American public transportation. Houston, Texas is giving it a 970-foot test run in the city's Arrowhead Park, where representatives from other congested cities may also view the practicality of the design. The monorail costs $500,000 a mile on a full scale line, compared to four to six million dollars per mile for freeways and twelve to fourteen million dollars for subway construction.

The 54-foot coach above is made of fiber glass and solar glass; eight Goodyear Traction Hi-Miler tires carry the load and provide the traction and another series of 20 Goodyear rib trailer tires serve as guide tires, making the ride noiseless and vibrationless. The coach is powered by two 305 horsepower gasoline engines and moves along a single steel rail that is suspended 18 feet over the ground by a series of inverted J-shaped towers 30 feet high. The short rail length of the test run limits speed; on a long rail, it can travel at high speeds. The German "schwebebahn" has run up a remarkable safety record, having carried more than 900 million passengers without a fatal accident. The Houston version is said to be an an improvement on the German design, having interlocking and auxiliary wheels which make it impossible for the coach to overturn or to jump the track. It can also be adapted to surface travel or underground.

England will have Design Centre

Duke of Edinburgh opens national showroom of industrial designs

On April 26, the Duke of Edinburgh will officially open "The Design Centre for British Industries" at 28, Haymarket, SWI, in London. Organized by The Council of Industrial Design, this will be the world's first permanent national exhibition of well-designed manufactured articles, open to the public on weekdays. The main display, covering 8,000 square feet of floor space, will change constantly, including special exhibits of topical interest. Annual costs (estimated at 80,000 pounds) will be met jointly by the government and the manufacturers whose goods are represented.

Company news

International Business Machines announces a multimillion dollar expansion program on the West Coast: a 13-story office building and data processing center in Los Angeles; a six-story building nearing completion in San Francisco; new manufacturing and engineering facilities at San Jose; a new office building in Santa Monica, completed in January; data processing centers to open in Portland and Seattle.

Stromberg-Carlson, a division of General Dynamics, has opened a Nucleonics Research Section, led by Robert L. Deming.

Minneapolis-Honeywell Regulator Company has established a new subsidiary—Honeywell G.m.b.h.—in Vienna, in the former Russian zone.

Quotations in the news

Frank Carioti, marketing specialist, Dave Chapman Industrial Design, Chicago, to Electrical Women's Round Table at IIT: "For the home of tomorrow," he explained, "designers are adapting gracious living room visual standards to new appliances, cabinets and furnishings for kitchen-type activities. The living room will move into the kitchen—not vice versa."

Heaton Robertson II, Peter Schladermundt Associates, to the monthly meeting of Marketeers: "Successful package design is based on scientific methods—not sudden inspiration or blue-sky thinking."

Walter Landor, West Coast designer, to the Folding Paper Box Association Convention, San Francisco: "You as suppliers have an obligation to your clients to properly and honestly advise them when the need for a packaging change arises. The onus is on you. If you fail in this obligation, you and the client both lose. The client will surely lose sales, and you may eventually lose the account."

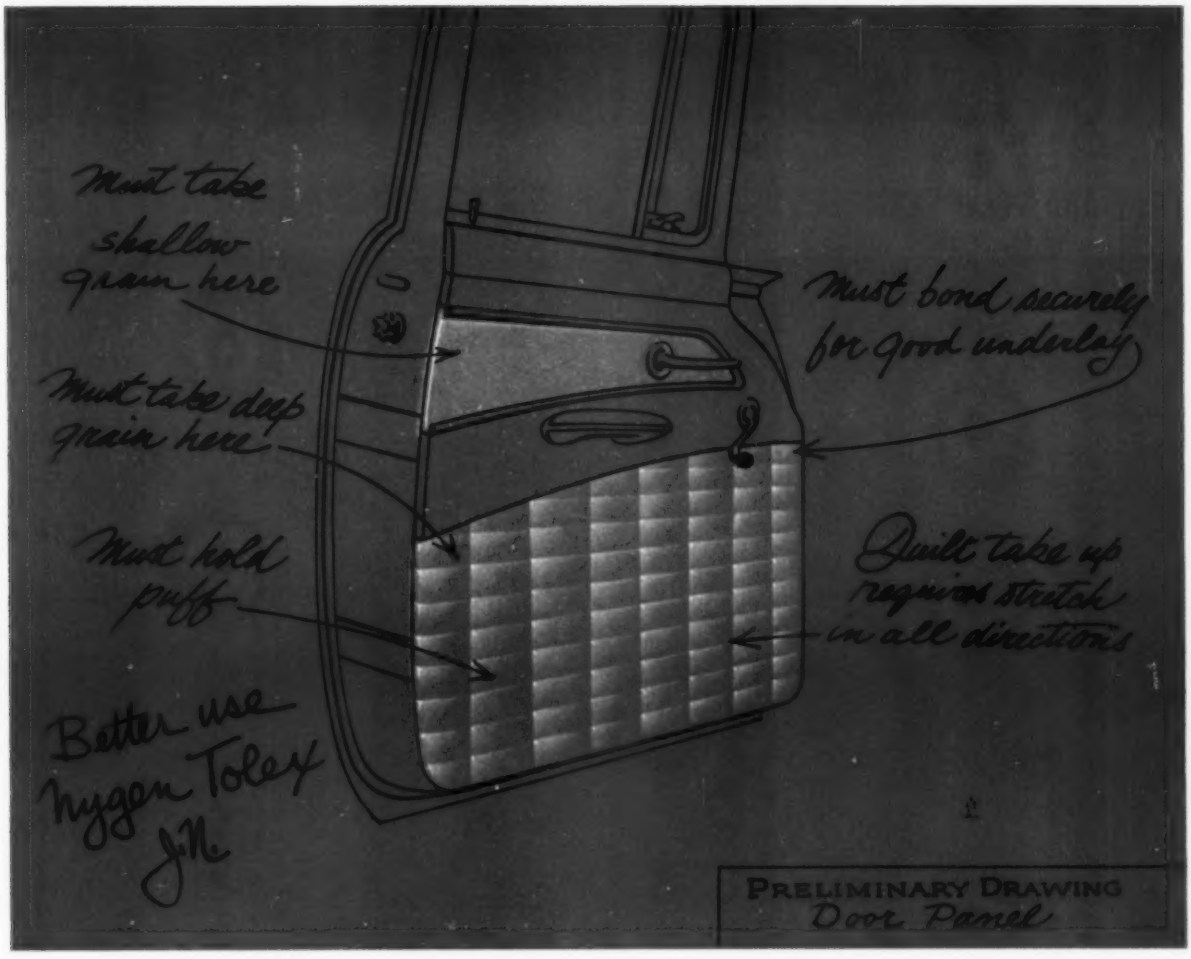
Gordon Lippincott, Lippincott and Margulies, at the Variety Store Merchandisers' Awards Dinner: "The variety store will be squeezed out of today's merchandising structure if it continues to ignore contemporary marketing techniques."

David Swan, Union Carbide and Carbon Corp., to the American Society of Tool Engineers: "For every billion dollars expended in industrial research, from 5 to 20

(*continued on page* 126)

General Electric strikes out for another TV market

Like the three bears in the fairy tale, TV is coming in graduated sizes. General Electric, manufacturer of the 32-pounder (right) and the 26-pounder (left), has just announced a new 13-pound "personal" receiver with a 9-inch picture tube. The baby set is complete in every detail, required special compact bulb design.



NYGEN* TOLEX . . . SOLVES ANOTHER DESIGN PROBLEM!

New NYGEN Tolex is the most "tailorable" supported vinyl plastic material on the market today. All fibers in the exclusive NYGEN backing are securely bonded yet able to move in every direction to form smoothly and snugly . . . without pleating, folding, or wrinkling. Nygen Tolex is available in a wide range of weights, colors and patterns for every design application—from automotive and furniture upholstery to luggage and small case goods.

*Reg. T. M.—The General Tire & Rubber Company as used with the famous NYGEN tubeless tire.

IN COLORFUL EMBOSSED PATTERNS . . .

Tangle Tweed Havana Niagara

"BALANCED STRETCH" IN EVERY DIRECTION!

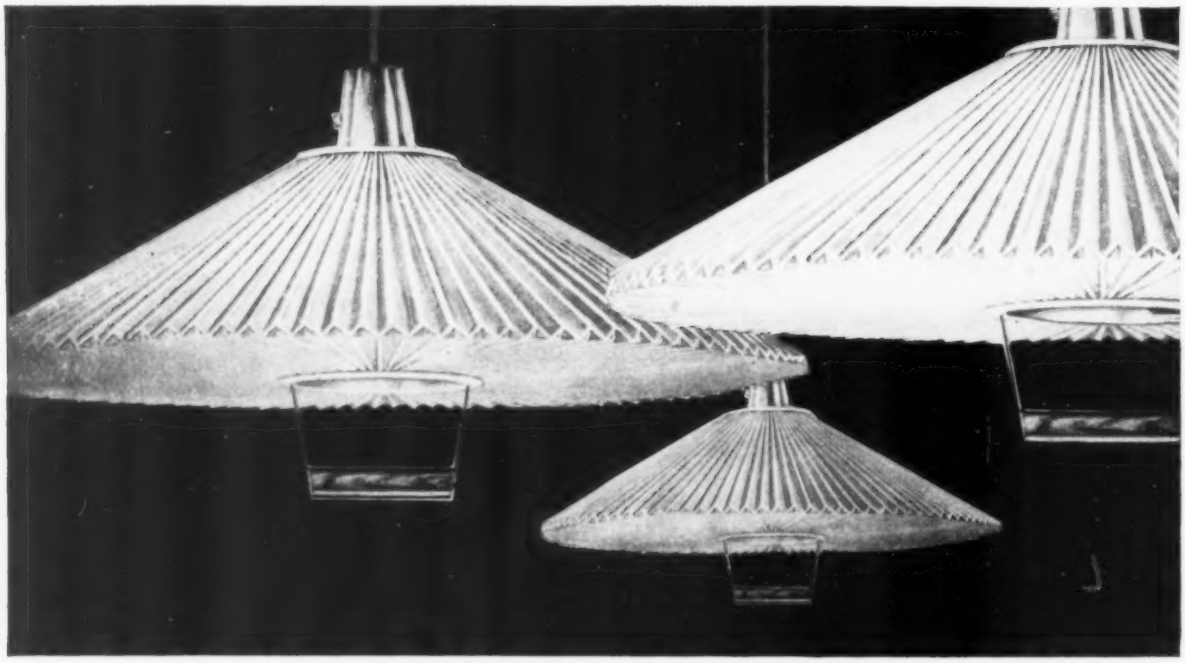
AND MANY MORE . . . SEND FOR COMPLETE DATA

THE GENERAL TIRE & RUBBER COMPANY
TEXTILEATHER DIVISION
TOLEDO 3, OHIO

GENERAL PLASTICS
The General Tire & Rubber Company

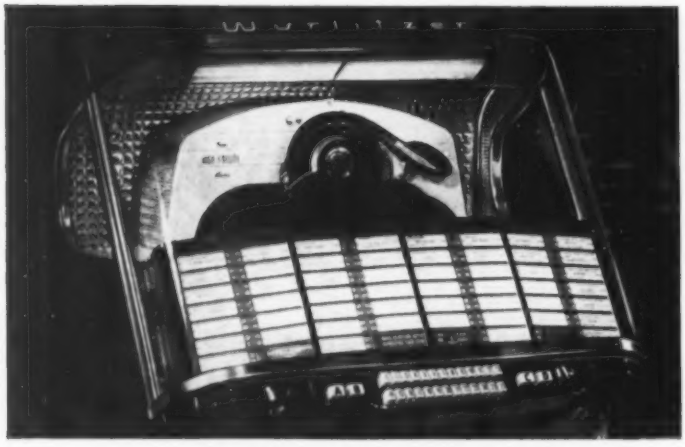
New design achievements

HERE ARE A FEW EXAMPLES OF THE WAY PRODUCT DESIGNERS ARE USING "MYLAR"



"We use a laminate of 'Mylar' and parchment paper to give strength and beauty to a new line of shades for our fast-selling adjustable ceiling lamps. From a decorative viewpoint, 'Mylar' provides a soft sheen that enhances warmth and beauty of both white and colored lights. From the functional viewpoint, 'Mylar' gives body and rigidity for long-lasting, practical use. Because heat-resistant 'Mylar' contains no plasticizer, our shades will not dry out or crack. Because 'Mylar' has a hard, smooth surface, cleaning is simplified . . . a flick of a cloth is all that's needed."

Lightolier, Inc., Jersey City, N. J.



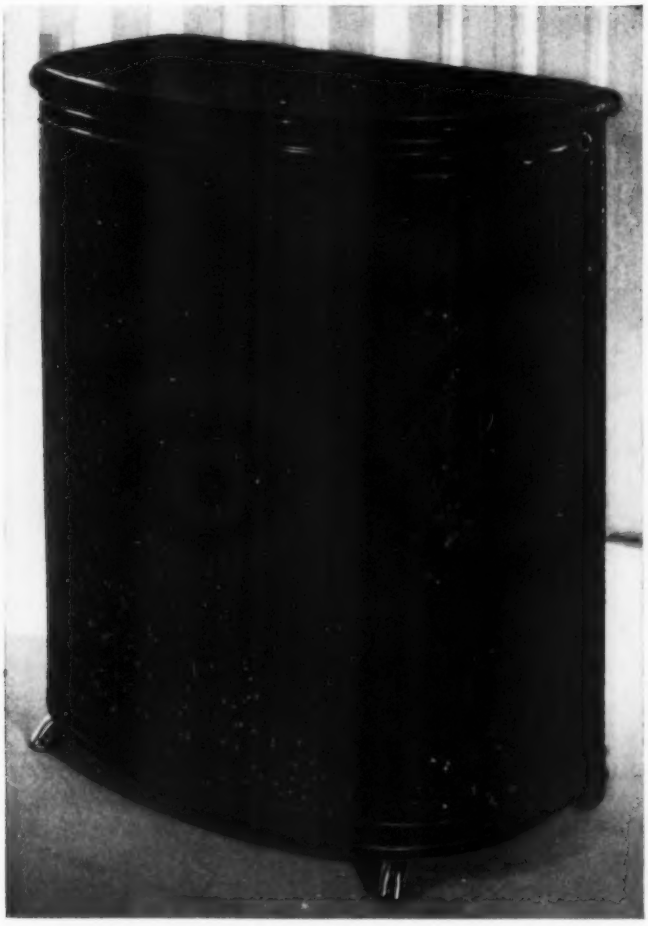
"Durability and lasting beauty were the primary reasons for using a laminate of Du Pont 'Mylar' as the surfacing material for our coin-operated juke box. 'Mylar' accentuates the gleaming colors and lights necessary to attract the attention of music fans. At the same time, 'Mylar' protects the sparkling appearance from scuffs and abrasion . . . it's easy to keep clean and eye-catching . . . all at reasonable cost."

The Rudolph Wurlitzer Co., North Tonawanda, N. Y.

"By using chrome trim to secure the top section of our water heater, we had three problems: high materials' costs, high inventory costs because of various sizes and damage in production, shipping or installing. Now, by using metallized pressure-sensitive tape made with 'Mylar', we've been able to reduce material and application costs by *80%*. At the same time, we get a high metallic luster fully protected by the 'Mylar' from corrosion, dust and dirt."

Sands Manufacturing Co., Cleveland, Ohio.

using Du Pont MYLAR®



To maintain its long-standing reputation for attractive yet rugged products, Pearl-Wick, Inc., N.Y., is now using a lamination of "Mylar" as the surfacing material for its new line of hampers. For decorative touches, a random scattering of glittering metallic yarns and squares is sandwiched between two layers of "Mylar". What's more, the finished surface has all the desirable qualities of "Mylar". It's tough, for extra scuff resistance . . . water and most commercial chemicals have no effect on the surface . . . it's easily wiped clean of dust, dirt and fingerprints. Net result—a fast-selling item for modern living. (**NOTE**—Laminates of this type pattern are available in both roll and sheet form.)

HERE'S HOW YOU CAN USE LAMINATES WITH "MYLAR"

Whether it's brightening up juke boxes or reinforcing lamp shades, Du Pont "Mylar"* polyester film means smart styling and long-lasting protective beauty for a wide variety of products. It can be used to create unusual decorative effects in a wide range of colors and designs. Metalized "Mylar" enhances and beautifies . . . preserves surfaces against heat, cold, moisture, dirt and solvents.

By combining strength with flexibility, laminations surfaced with "Mylar" are easier to install and shape around corners. Since no plasticizers are used in its manufacture, "Mylar" won't become brittle or crack with age.

What about the products you design? Are you looking for new ways to add value through improved appearance and functional performance . . . or, just as important, the possibilities of lowering over-all costs?

If so, it will pay you to investigate the possibilities of "Mylar". Send in the coupon below for our new booklets on decorative materials made with "Mylar" and names of manufacturers who supply them. Be sure to indicate the specific application you have in mind.

*"*Mylar*" *is Du Pont's registered trademark for its brand of polyester film.*

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MYLAR®
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Film Dept., Room I-4, Nemours Bldg., Wilmington 98, Del.

☐ Please send your booklet on pressure-sensitive tapes made with "Mylar" polyester film and names of manufacturers who supply them (MB-6).

☐ Please send your booklets with swatches outlining properties of and applications for decorative surfacing materials made with "Mylar" and names of manufacturers who supply them (MB-7, SF-4).

Application_____

Name_____ Title_____

Firm_____

Address_____

City_____ State_____

MIRRO-BRITE

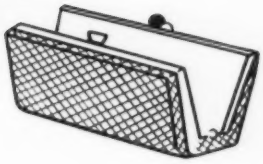
LAMINATED AND METALLIZED WITH

MYLAR*

is now available for unlimited industrial applications

READER:

There is something missing in this advertisement and it belongs in this spot. In the past we covered this area with an actual Mirro-Brite "Mylar" sample but Mr. Postmaster has decreed no more plastic materials in second class publications. But there is no reason why you can't write for the samples and we'll send you several.



Take a look at the attached sample. It represents a development you can't overlook . . . (half mil) .0005 gauge aluminized "Mylar" laminated to 14 gauge non-migratory vinyl and dimensionally embossed. Here is the newest entry in the materials supply field with a limitless potential for many usages.

"Mylar", the miracle polyester film with amazing tensile strength, embodies an unusual combination of physical, electrical, chemical and thermal properties. Combined with metallization, it offers designers and manufacturers unlimited opportunities for novel effects and functions.

MIRRO-BRITE "MYLAR" can be furnished in laminations to paper, plastics, leather, board, textiles and other materials. It can be embossed, die-cut, printed and processed in many ways. A wide variety of color finishes, embossing patterns and special effects available in continuous rolls in 40 and 54" widths or cut-to-size sheets. Send for additional information, prices and data now. Samples upon request.

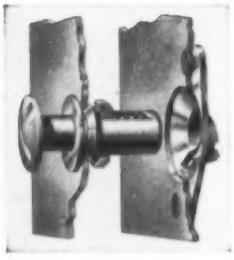
COATING PRODUCTS

DEPT. ID-4 101 WEST FOREST AVENUE ENGLEWOOD, N. J.

*"Mylar" is DuPont's registered trade mark for its brand of polyester film

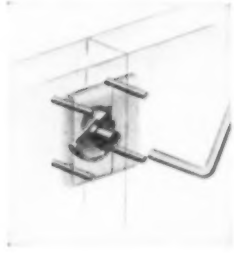
ALSO MIRRO-BRITE ACETATE, POLYSTYRENE, BUTYRATE AND ETHYLCELLULOSE

3 ways to save on assembly costs



QUICK-LOCK For fastening removable access doors and panels. Because of its ease of installation, QUICK-LOCK is ideal for assembling removable panels. A 90° turn locks it in place. Stud is self-ejecting when unlocked; visual inspection shows whether fastener is locked. Spring loading takes initial load; solid supports carry increased load. Available in a wide range of sizes.

SPRING-LOCK One-piece fastener for blind holes has load-carrying steel spring wire. Spring steel arms lock fastener securely, prevent loosening under vibration. SPRING-LOCK will work with varying panel thicknesses, locks with a twist of the wrist. Made in all-metal and plastic with steel insert. The molded design permits heads to be made in various shapes for refrigerator shelf supports, washer knobs, brackets. Available in a wide variety of shapes and sizes, and also in custom designs.



ROTO-LOCK Serrated, tapered cam is engaged by formed lug as fastener is locked. Cam action draws panels together tightly, insures locking even under conditions of misalignment. Opens easily for demounting. ROTO-LOCK carries heavy tension and shear loads; can be used for air and water-tight seals; recesses completely into panels. Solidly built without springs or delicate mechanical parts, unaffected by arctic temperatures or field service.

Simmons

QUICK-LOCK
SPRING-LOCK
ROTO-LOCK
LINK-LOCK
DUAL-LOCK

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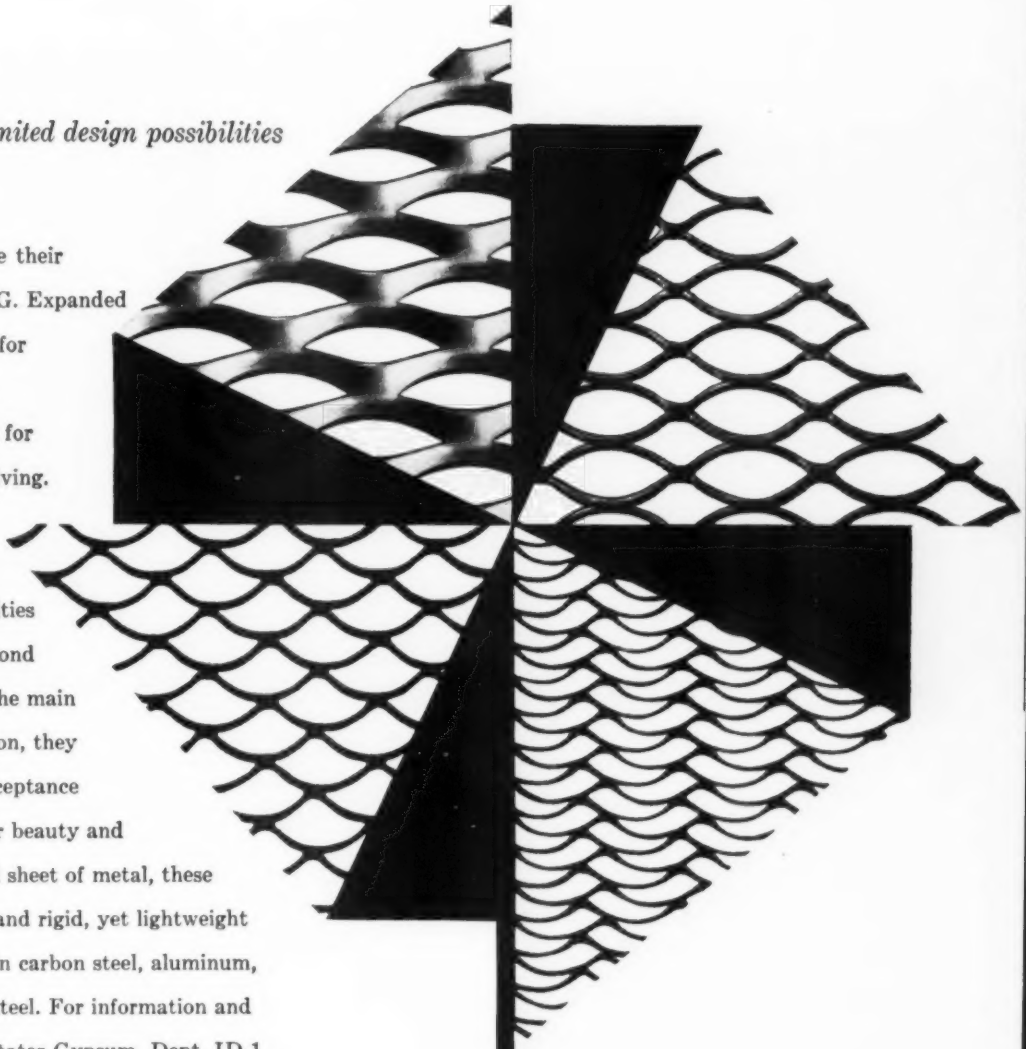
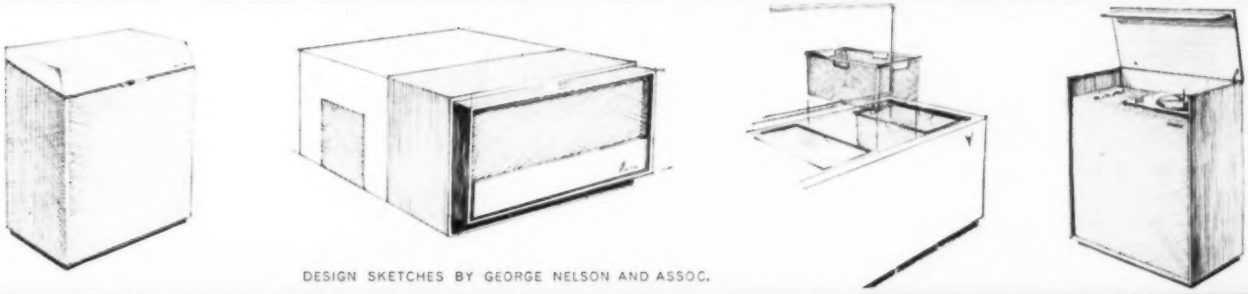
expand your horizons with new U.S.G. Expanded Metals

4 *new patterns for unlimited design possibilities*



Industrial designers can now give their talents full rein! Four new U. S. G. Expanded Metal meshes open new frontiers for everyone concerned with design, manufacture and sale of products for greater efficiency and for better living. These dramatic new meshes—*Rondo, Festoon, Wavelength* and *Armorweave*—offer design possibilities far beyond the conventional diamond mesh. Versatile enough to carry the main theme or to serve as ornamentation, they promise quick and widespread acceptance of products that fully utilize their beauty and warmth. Cold-drawn from a solid sheet of metal, these new expanded metals are strong and rigid, yet lightweight and easy to fabricate. Available in carbon steel, aluminum, and—in some meshes—stainless steel. For information and samples, write today to United States Gypsum, Dept. ID-1, 300 West Adams St., Chicago 6.



DESIGN SKETCHES BY GEORGE NELSON AND ASSOC.

UNITED STATES GYPSUM

Pioneering in Ideas for Industry

another definitive report on the influence of design on industry

design in the

As a sequel to its study of Design in Detroit (October, 1955), INDUSTRIAL DESIGN will examine the Mid-West, with Chicago as the focal point of the nation's largest area of diversified industry. This 60-page study will include behind-the-scenes stories of Chicago's many industries and design offices. It will stress new ways in which designers and design executives — working together as product development teams — expand markets through design.

Here are some of the points that will be covered:

How design serves these Mid-West industries:

Steel
Electronics
Plastics
Transportation Equipment
Packaging
Printing
Machinery
Building Materials
Appliances and Office Equipment

How design organizations work:

- . . . the changing relation between company designers and consultant designers
- . . . how designers serve the consumer product industries
- . . . how basic materials producers use or employ designers
- . . . how suppliers and fabricators contribute to the success of design.

New directions in design:

- . . . exploring Chicago-designed products, new developments in the designers' services, and influential personalities in Mid-West industry

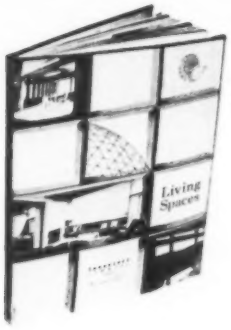
INDUSTRIAL DESIGN for October, 1956 will be essential reading for designers, product development executives, consultants, and management in every industry. Everyone on your staff concerned with product planning and design will want to read INDUSTRIAL DESIGN in October. The subscription card inside the back cover, mailed today, will start subscriptions at once and assure delivery of October copies.

Watch for it: October INDUSTRIAL DESIGN

Midwest

with the Chicago area as the nucleus

coming in the



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What HOUSE & HOME, the national building magazine, says of these basic design books —

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

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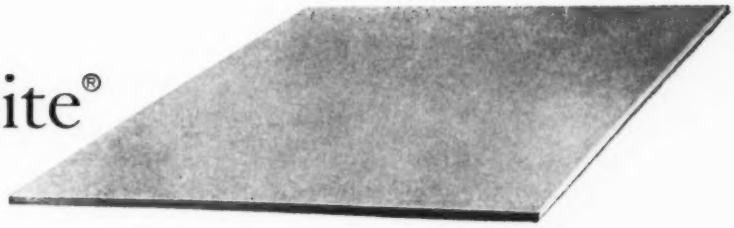

molds to any contour or detail, functional or decorative... can be quickly tooled by means of cast molds

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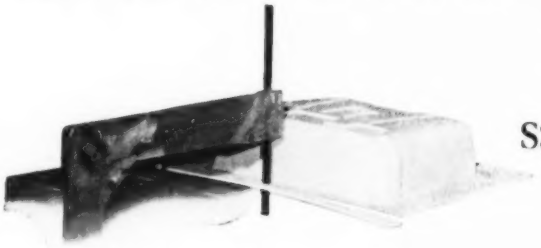

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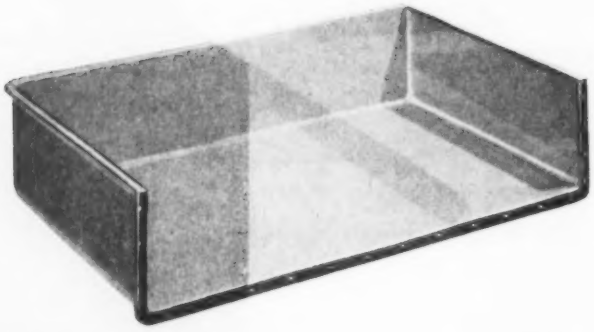
US RUBBER **United States Rubber**



Plastics drawers like these are being custom-molded in a variety of sizes and colors for such companies as Sears, Roebuck and RWAY Furniture by General Electric's Plastics Department. Drawers are seamless, jointless, non-warping and cleanable with water.

These drawers are molded of plastics

Now milady can have a new kind of drawer to keep her nice things nicer—a *plastics* drawer—that won't warp and stick, is comfortably light, and a dream to clean. Typifying many of the advantages of that wonderfully versatile medium, plastics, these drawers are moisture-resistant . . . have rounded corners for easy dusting . . . molded-in color for permanent beauty. They afford an excellent example of how alert manufacturers are realizing their objectives—through plastics.

Added facings match furniture or color schemes, combine the advantages of plastics with the beauty and warmth of wood.

Let G. E. help you fit plastics into your designs!

If you are contemplating a new product, or are seeking ways to improve a present one, why not design with *plastics* in mind? As one of the world's foremost custom-molders, General Electric has helped thousands of industrial designers realize the advantages that plastics offer. G.E.'s custom-molding service will be happy to help *you* in engineering and developing your products—through plastics!

Progress Is Our Most Important Product

GENERAL ELECTRIC

Write today, on your company letterhead, for a free copy of "The G-E Plastics Story," containing stimulating case histories that show how G-E customers profit when they design with plastics. Just write: **Plastics Department, General Electric Co., Section 6P2A1, Pittsfield, Mass.**

how to select an industrial designer

In our mail the other day, we unearthed an inquiry that actually made us want to stop everything to write a return reply. "We are designing a new product," the letter from an equipment manufacturer began. "Our engineers are doing the mechanical and electrical design, but feel the need of an industrial designer to help with its appearance. It is not a large-scale project. Could you give us a few tips on a procedure for selecting a consultant designer?"

Two points interested us: the positiveness of the writer's attitude, and the contradiction between the way he framed the question, and the way he framed his problem. This is what we replied:

"In some respects, we can give you no advice at all. You recognize that you have a problem that requires a designer, and that is about half the battle. And you realize that we can't name a designer for you, but can only suggest a method of approach. Your serious interest in making your own decision about the right designer forbodes good results. At best, all we can do is list some pointers about *what* to look for in any good designer or organization.

"1. *Look for a designer whose work you like.* At the start, you may want to survey the work of many people. (Published reviews, such as those in INDUSTRIAL DESIGN's Annual Design Review, will give you a quick summary of current work. Two professional societies, the American Society of Industrial Designers and the Industrial Designer's Institute, can provide lists of members with independent offices throughout the country—or in your region, if geographic selection seems necessary.) You will then narrow down your list to a number you can conveniently interview—maybe three, maybe a dozen. Whether you make personal visits to these offices, or invite the candidate to visit you, depends on time, money, and the scope of the project.

"Interviewing designers, like hiring a staff member, is a matter of judging ability in terms of the job to be done. Reviewing each man's past work in detail, you will be able to single out some whose work you particularly like, whose past performance suggests a sympathetic interest in your program. Don't hesitate to trust your own judgment.

"2. *Look for an approach—not a product or style.* Few designers will have examples of work in your field—nor is related experience the best proof of a designer's suitability for a given job. A designer is not a specialist with a proven bag of tricks, but a generalist: his stock in trade is the ability to grasp any new problem, and come up with an answer that is imaginative, appropriate and realistic.

"3. *Talk Freely.* After you have found out all you want to know about *his* background, attitudes, work and fees, give him the benefit of full information about your company, its products, objectives, problems. See how he reacts to your side of the story. Since you will want someone with the ability to collaborate with your organization (and this would be equally important if you had an internal design department), it is important to judge how he will get along with you, as well as vice versa.

"4. *Give him the biggest possible problem.* A competent designer can help you achieve a pleasing appearance for your product, but this may be more of a limitation than an invitation. Appearance is usually less successful when "applied" to a finished product, than when it grows as an expression of the concept and engineering. In a case like yours, with conditions still flexible, a designer will serve you better if he is asked to participate during the development stages. And you will judge each candidate better by testing his response to a broadly framed problem.

"In the long run, you may find that appearance design is not all you ask of your design consultant. For in addition to lines on paper and materials in the round, a good designer can offer another important talent: *design thinking.* This means the ability to relate the product to the market, to the user, and even to the structure and objectives of the entire company. This kind of creative evaluation—a sizing up of the product in its larger context—should, ideally, precede any detailed decisions about engineering and appearance. A designer might add ideas to your own program; he might suggest new functions or even an entirely new concept for present or future use. So if possible, don't limit a designer—before *or* after you select him. Give him a maximum field in which to exercise his abilities, and you give him the maximum opportunity to help you."—*j.f.m.*

Shaping America's Products:

Design and craftsmanship

The most significant contribution to the growth of democracy made by twentieth century America has not been in politics or government but in the widespread distribution of material goods. The Sears, Roebuck catalog might be called the Magna Carta of our civilization and — some cynics might add — its Bible, too.

The forms of everyday objects are a key to the standards of a democratic industrial culture. If the invention, production, distribution and acquisition of things are among the principal preoccupations of modern life, the industrial arts that give form to these things are a characteristic artistic expression.

How then do the myriads of products turned out by our factories and workshops get to be the way they are? What are the forces shaping their forms? The production of these things has been increasingly mechanized and automatized. But their creation still remains a function of the human mind, eye, and hand, despite mechanization and specialization. The pre-industrial master craftsman was a designer, maker, and seller of his handiwork. Integration of these functions was simple and direct. But changing patterns of production, distribution and business organization have broken up the hitherto united functions which must be integrated in new and often more complex ways.

This book is about the patterns of product creation which are taking shape today. It is also an inquiry into the nature of craftsmanship and how it finds its expression in our industrial society, based on a study of a diversified group of consumer products that are typical of the best in contemporary design and workmanship.

What is a good product? From a business standpoint a good product is one that can be readily made and sold at a profit. From the standpoint of the consumer and of the individuals who are creatively concerned with the intrinsic qualities of the object—whether designer, engineer, or business man—the satisfaction that the article provides in use is the ultimate measure of its worth. This ambivalence can be a source of conflict—and often is. But the case histories in this book provide ample proof that good forms and sound quality are not incompatible with sustained high level sales. In selecting examples for these case histories precedence was given to objects that had been on the market long enough so that an estimate of their intrinsic qualities on the basis of theoretical standards and personal judgment was reinforced by the test of time and continued consumer acceptance. Many of the products will therefore look quite familiar. Accustomed as we are to marketing and promotional pressures with their constant emphasis on the new, these objects are unique, not in that they are new, but in that they are old —at least by present-day standards.

in large scale industry

by Don Wallance

In 1950, designer Don Wallance was commissioned to make a survey of design and craftsmanship in today's products, under the sponsorship of the Walker Art Center and the American Craftsman's Educational Council. In the course of his study, the purpose of which was to analyze the patterns of product creation that bring forth well-designed and well-made consumer products, and to study the expression of craftsmanship in industrial society, Wallance travelled thousands of miles, visited over 50 factories and an equal number of smaller studios and workshops. Some 30 of his case studies of classic contemporary products have been compiled into a book, "Shaping America's Products," to be published by Reinhold Publishing Company in June. Because these studies have special interest for our readers, ID has arranged to present excerpts from the book. This is the first of three installments, including selections from the introduction and three case studies.

American conditions have been peculiarly favorable to the growth of large-scale industry. The size of the American population and its high standard of living have provided an ever-expanding market which has stimulated highly mechanized production methods and supported large capital investment. Our wealth of natural resources has provided an ample material basis for the development of mass production technology. But American industry continues to be surprisingly diverse in size and organization. Small-scale industry (employing less than 100 workers)* and intermediate size industry, (employing less than 500 workers)* together account for about half the gross national product. The term "small" is actually relative: a firm considered small in the auto industry could be a giant in the furniture industry. In this book the term "small scale industry" is used flexibly but, in general, applies to firms employing less than 500 workers.

No individual in large-scale industry creates a product. From the initial conception of the product to its use by the ultimate consumer, a complex of interrelated activities is brought into play—market appraisal or analysis; product analysis, design, and development; technical research; cost analysis; materials specification and procurement; tool and die making; organization of production facilities; training of workers; choice and preparation of distribution channels; planning of promotional activities. Each of these phases may in itself be a complex operation, and the planning of the whole process or any part of it can be a highly creative activity. Participants must be capable of subordinating their own individuality to the discipline of the team. Even in the research laboratory, whose contributions to industrial development are commonly associated with individual geniuses such as Edison and Bell, we find individual brilliance and initiative increasingly absorbed into the group. In tracing the origins of the forms of today's mass-produced products, we find numerous instances in which the contributions of various individuals are so interdependent that it is impossible to ascribe the form of the object to any one person. This does not mean that individual creativity and genius are less important today than they were in the past. They are being absorbed into working relationships that are increasingly collective.

The current tendency to focus on personalities in nearly all of the arts seems to contradict the foregoing observations. To some extent this may reflect a survival of the Renaissance outlook, which glorified the godlike individual hero and genius as the independent source of all great creative achievement. It may also reflect the survival of 19th century attitudes, when individual exploit was still a dominating factor in progress. The current practice of featuring designers' names can be attributed in part to the undoubted sales promotional value of associating an otherwise anonymous and impersonal product with a colorful personality. This is not to deny the creative contribution of many designers of great talent who have left their mark on hundreds of today's products. But it is a far cry from the Renaissance artist, responsible to a single patron, or today's independent artist or craftsman, responsible to a small following, to the designer for large-scale industry, who must subordinate his own personality to the exigencies of a complex industrial process and his personal taste to the requirements of a mass market.

The designer for large-scale industry often finds his own bent and convictions in conflict with the limitations imposed by the mass market and by the prejudices and inertia of salesmen, dealers and others who stand between him and the consumer. Strong individual views, unorthodox attitudes, or uncompromising standards cannot be tolerated in large-scale industry. Where immense investments and the employment of thousands are at stake, the designer necessarily accepts the fact that sales considerations take precedence over intrinsic values. But the designer is a human being and an artist. His inner convictions, pride in work and sensitivity to the opinions of others cannot be completely dismissed. He may try to reconcile the conflict between the realities of the market place and the standards of his own craft. Some designers fully accept their responsibility to assist the development of saleable products in an idiom which has mass acceptance, but they attempt to find forms within this idiom which are sound in themselves. A number feel that by staying close to the most advanced limits permitted by public acceptance levels they are discharging their responsibility to industry while slowly helping to raise the level of public taste.

* *As defined by the U. S. Census of Manufactures.*

Whether a calculated approach to product creation on a higher or lower level, however well motivated, can result in vital forms is another question. Can forms which have vitality and lasting quality be created without inner conviction? In the long run it may be that this conflict can be resolved only when designer, producer and consumer achieve a common outlook and response to visual form.

Craftsmanship

Product creation can be considered as a dual process involving, on the one hand, essentially abstract procedures—analysis, synthesis, planning, invention—and on the other, concrete execution—delineation, model fabrication, tool and die making and actual production. The one is concerned with *ends*, the other with *means*. For want of more precise terms, we may call the one *design* and the other *craftsmanship*.

"Design" in the sense that the term is used here always involves *both* the technical and esthetic aspects of an object. All design for human use, whether the conscious emphasis is technical or esthetic, is actually a combination of both. Even the engineer who determines the form of an object on the basis of what appear to be purely technical considerations is probably influenced by esthetic bias and visual memory. The esthetic elements of order, balance and rhythmic variation are found in the structure of all matter—in physical, biological and technological forms. As Herbert Read points out in the preface to a recent book of essays by scientists on form in nature:* "The increasing significance given to *form* or *pattern* in various branches of science has suggested the possibility of a certain parallelism, if not identity, in the structures of natural phenomena and of authentic works of art. . . . Esthetics is no longer an isolated science of beauty; science can no longer neglect aesthetic factors." During the last war the Naval Bureau of Special Devices, which was concerned with the development of highly complex technical equipment involving advanced scientific concepts, had on its staff a number of artists with no specialized scientific training. These artists worked on the development of fresh approaches to the solution of technical problems that baffled the purely technical mind. This does not mean that artists should supplant engineers, or vice versa. But esthetic design and technical design, as creative processes, are not as unrelated as they may seem.

Product creation in modern large-scale industry usually requires that artist and engineer be separate persons. A question arises at this point. If esthetic design and technical design are the functions of specialists, can art and technics be integrated in modern industry as they were in the work of the pre-industrial master-craftsman? This brings us to that aspect of product creation which is concerned with execution—*craftsmanship*. In its broadest sense the term describes the common human drive toward perfection in doing any task. The urge to do things well for the sake of doing them well has found its expression in one way or another with each succeeding generation. The term "craftsmanship" is commonly associated with skilled hand work. But we do not refer here to any particular method of doing things or to the nature of the tools used. What we mean by craftsmanship might be summarized as *will* and *skill*—the will to take pains and the skill and resourcefulness to take pains creatively and effectively.

Design is in its essence a conceptual process. But design is interwoven with craftsmanship throughout the creative process. This is just as true in the case of an object to be produced by the machine as it is in the creation of hand-made things. Before a design concept finds its ultimate expression in the concrete form of an actual object—even a machine-made object—models must be made, tools and dies designed and made, standards of quality established, and production procedures worked out. These are not merely routine steps in the mechanical translation of a design concept into the production of the end object itself; they are a creative aspect of the development of form, whether in the creation of a painting or of a chair, without which only sterile forms can emerge. Design, the conception of forms that fulfill given ends, also requires conception of the means necessary to achieve these ends, as well as the standards of excellence to be met.

Unity of design and craftsmanship, of form and technique, is perhaps most readily perceived in the work of primitive craftsmen. Franz Boas, in his introduction to *Primitive Art*, writes: "The manufactures of man the world over prove that the ideal forms are based essentially on standards developed by expert technicians."

Mechanization and craftsmanship

A simple, direct relationship between art and technics continues so long as the tools required to produce an entire object can be acquired and manipulated by a single individual who is both artist and technician. The pre-industrial craftsman produced excellent and beautiful things as a matter of course and without much conscious concern with "design." One of the earliest criticisms leveled against mechanized production was its debasement of craftsmanship and the shoddiness of its products. This bias against the machine is still widespread. But craftsmanship both as a motivational force and in its more concrete sense as skilled hand work is a commonplace aspect of mechanization from its earliest beginnings. The English millwrights and tool makers of the late 18th and early 19th centuries, who were the pioneers of mechanization in production and the forerunners of the modern

* *Aspects of Form*, edited by Lancelot L. Whyte, London, 1951.

engineer, were highly creative craftsmen on both a mechanical and a manual level.

Today, craftsmanship as an expression of personal skill in the manipulation of tools and materials is to be found primarily in the tool and die maker. Modern machine tools, and the dies, instruments, and other precision equipment essential to the production process, represent an exceedingly high degree of craftsmanship as well as technical knowledge. The relationship of craftsmanship to mechanization becomes less clear when we turn from the *means* of production to the end products themselves. The pressures to undersell one's competition, to widen profit margins by lowering quality or to create built-in obsolescence have often tended to lower the quality of mass-produced goods as compared to their hand-made equivalents. But there are counteracting forces as well. Perhaps the most important of these is technological progress. As the technical virtuosity and precision of the machine improves, quality becomes less dependent on manipulatory skill. A low-priced machine-made chair that is mass-produced from bits and pieces of wood glued together like its hand-made prototype is obviously inferior in durability and finish to its higher-priced hand-made equivalent. But a chair molded or stamped as a jointless stressed skin shell supported by a welded steel undercarriage will probably outlast both the hand-made chair and its machine-made imitation, and need be no poorer in the perfection of its form and surface finish.

Despite mechanization, human factors are still crucial to the attainment of quality in the modern factory. There are few industries so completely mechanized that achievement of quality can be removed completely from the province of the production worker, or worker attitudes and application. Industrial psychologists have found that work attitudes are poorer in operations of a semi-automatic nature than in those which are either fully automatic or fully non-automatic. Whatever the case, the fact remains that under prevailing work relationships in the factory, the production worker feels little interest, stake, or personal identification with the end product to which he contributes some minor detail.

In designing for mass production the designer must take into account not only the machines and processes available in the plant but the capabilities of the production workers themselves. Design details that require a degree of precision and pains beyond the capacity or habitual practice of the workers, and that are not controlled completely by the machine process, will fail to come off, however beautiful they may have appeared on the drawing board or in the hand-made model. Furthermore, if the workers on the production line come to feel that a product imposes unusual or unfair difficulties, it will create a morale problem for the plant and an animus toward product and designer.

Attainment of quality on the production line devolves mainly on the engineers who design the production tools and formulate technical specifications and methods of quality control, and on the skilled tool makers who actually make the tools, dies, jigs and fixtures which will give final shape, down to the subtlest contour, to thousands of identical objects. The tool and die maker, mold and pattern maker are the apex of craftsmanship as manipulative skill in the plant.

The basic motivation source of design and craftsmanship in the factory is top management. These case studies show that wherever unusually well-done products emerge, management attitudes have permeated the organization with a craftsmanlike approach, and a pride in the intrinsic merits of the product which are often typical of the industry as a whole.

"Anonymous" design

During the early stages of the industrial era, business management, insofar as it was consciously concerned with "design" at all, commonly associated design with applied ornament, and the practice of design with craftsmanship. Design patents issued by the U. S. Patent Office still carry the designation "ornamental design." Beauty and utility were split conceptions — the former to be *applied* to the latter. Indeed, the term "applied art" itself appears to be the creation of the industrial era.

Despite this cleavage between art and techniques we can find many sectors of industry in which design has always been an integral part of the production process. In these cases design is sometimes the responsibility of a skilled worker, often a highly skilled mechanic who acquired his skill, along with an intuitive feeling for form, during the course of a lifetime of experience in his trade. Often design has come about without conscious awareness of esthetic considerations, the work of engineers, mold makers, or even businessmen who created the object as a routine aspect of their production activities without thinking of themselves as designers. "Anonymous" design is found in such objects as pottery, glassware, and kitchen utensils, whose basic forms and functions have not changed for a long period of time and whose forms are not subject to the frequent style changes imposed by a fashion market. The intuitive feeling for form represented by these objects is becoming increasingly rare. Furthermore, the accelerating pace at which new product types, many of them without precedent or tradition, have developed during the last 25 years, the increased emphasis on design as a factor in sales competition and the continuing trend toward specialization within industry itself, have created a need for the industrial designer as a new kind of specialist in the service of industry. These studies consider the designer in large-scale industry; anonymous design and small-scale industry will be discussed further in June.

Marine telephone, 1892

First American handset, 1878

an excerpt

The independent designer in large-scale industry: **Bell Telephone**

The telephone system sells service, not merchandise, and the Bell Telephone Laboratories defines its approach to product design as "design for service." A study of the telephone is therefore of special interest because it provides the rare example of a "consumer" product whose design is not subject to the usual market pressures. Fashion (eye appeal with a high rate of obsolescence) and price competition (which leads to low initial cost but not necessarily to low overall cost) have no direct bearing on the design of the telephone.

During the early years of the telephone, technical progress proceeded at a furious pace, spurred on by the international competition for priority in inventions and patents. By 1896, all of the important components of the modern subscriber's telephone had been invented, including the rotary dial and the combination handset. Nevertheless, a continuing research and development program at Bell Laboratories has led to improvements of two types: 1) improvements in performance, convenience, and appearance; and 2) improvements that reduce costs, especially operating costs. New models of the telephone involving major changes in form are introduced only after sufficient progress has been achieved in *both* categories to justify the costs and operating problems involved in major design changes. During the first half of the present century only five new models of the common desk telephone were introduced.

Until the late Twenties there was no separation between

technical and appearance-convenience design. The forms of telephones were developed by telephone engineers and technicians in direct response to technical and functional requirements. These early telephones are direct, unmannered and anonymous in character, and many have a pleasing and timeless appearance, despite their lack of refinement. A few, such as the specialized marine telephone of 1892 (left), show a remarkable feeling for form. However, the functional approach was not altogether uncontaminated. According to W. H. Martin, Bell vice-president in charge of apparatus development, Bell engineers tended more and more to favor forms that they felt would please the top brass. This was one of the factors that ultimately led Martin and other Bell executives to favor an independent design consultant.

The first handset, combining earpiece, handle and mouthpiece as a single unit, was patented in England in 1877, only one year after the invention of the telephone. In 1878, the first central telephone exchange was established in New York by the Gold & Stock Telegraph Company. To meet the needs of the operators, who had to carry their telephones to various points along the switchboard in order to complete calls, R. G. Brown, chief operator of the exchange, developed the handset shown at left.

A lighter and more convenient handset that was designed by M. Berthon, chief engineer of the Societe General des Telephones, received widespread acceptance in France, not only for operators' use but also for subscribers.

In the United States, however, the handset was not used on subscribers' telephones for 50 years after its appearance. The reasons for this time lag were primarily technical: in order to cope with America's longer transmission distances, it was necessary to develop more sensitive instruments. The relatively insensitive Edison transmitter was soon superseded by the more efficient granular carbon type, but the early granular carbon transmitters could be used only in a fixed position and were therefore unsuited for mounting in a handset. The first American subscribers' telephone, the box telephone of 1877 was followed by the first desk stand in 1879, a wall telephone in 1882, and a succession of desk stands all of which maintained the transmitter in a fixed position.

The 1927 Handset

The convenience and attractiveness of the handset were obvious. After years of study, a subscribers' handset was finally introduced in 1927. The design of the handle for the first handset was conditioned by stringent technical limitations. The form and material of the handle affect the transmission of mechanical vibration from receiver to transmitter, and hence the tendency to "howl." After a great many designs had been tested, a handle was chosen whose resonance was out of range of the receiver and transmitter. The phenolic plastic it was made in also tended to dampen vibration. Increasing attention was being given to what the Laboratories call the "psychophysical" aspects of design; as Martin puts it: "The performance of the telephone system is inextricably bound up with the performance of the users." Special efforts were made to lighten the 1927 handset, to shape the handle so that it would fit comfortably in the hand, and to space the ear and mouthpiece for optimum comfort as well as efficient sound transmission. In order to determine the dimensions and positional relationships of the assembled handset, about 4,000 head measurements were taken with a measuring gauge developed at the Laboratories especially for this purpose. Bell engineers were responsible for the outer form and appearance of the 1927 handset, as well as for its electromechanical and "psychophysical" design.

The 1937 combined handset

There is little direct pressure on the telephone system to improve the attractiveness of the telephone, since the consumer is obliged to accept whatever instrument the operating company provides. But Bell recognizes that the telephone is a visible element in the homes and offices of its customers. Provision of a telephone which is pleasing in appearance and use is considered a normal objective of "design for service." No doubt Bell management and technicians personally enjoy seeing the telephone in a form which beautifully expresses its function and technical excellence.

As technical research people, the directors of the Bell Laboratories felt unsure of themselves when confronted by aspects of telephone design that did not seem susceptible to "measurement." Furthermore, they felt that the long intervals between design changeovers call for the handling of appearance design by someone especially qualified to evaluate and anticipate long-range design trends. It was therefore decided to retain the services of a specialist in appearance design. In 1929, the Laboratories selected a number of "artists" and offered each an honorarium of $1,000 to present his ideas. Among those approached was Henry Dreyfuss, who had just opened an office for the practice of industrial design, a virtually new profession. Formerly a successful designer of stage sets, Dreyfuss had become interested in the design of everyday industrial products. Already he had developed a preference for working on objects which are not subject to frequent style changes, which call for classical simplicity and stability in design. The problem of designing a telephone therefore had special appeal, and the $1,000 was enticing at that time. Nevertheless, the young designer turned down the Bell offer on the ground that it did not provide for a serious study of the problem. A year later Bell returned with a revised proposal of sufficient scope to permit serious exploration. The results of Dreyfuss' first collaboration with the Bell Laboratories appear in the Combined Handset of 1937. He has been consultant to the Bell Laboratories ever since.

The No. 500 combined handset of 1950

At the end of World War II a survey of recent progress indicated that a completely new telephone set was justified. Development work on a new model was undertaken in 1946, with the following major objectives:

1) A more efficient receiver and transmitter to permit longer transmission distances or smaller gauge cable conductors without a sacrifice in volume;
2) A single circuit for all types of service — individual, party, measured service, etc.;
3) Improved voice fidelity;
4) Better visibility and greater convenience in dialing;
5) A lighter and more comfortable handset;
6) A louder and lower-pitched ringing signal, adequate in carrying power for persons with poor hearing, adjustable in volume to suit individual needs;
7) Integral mounting of the entire apparatus on a base plate, independent of the outer housing, for simplicity in assembly and servicing.

It was felt that all aspects of the form of the telephone should be freshly considered for the new model. Accordingly, Dreyfuss was called in to collaborate with the Bell engineers at a very early stage in the project. At the same

time, Bell's own staff designer, Robert H. Hose, went to work on the new telephone.

Hose had come to Bell Laboratories after getting an M.A. in Architecture at M.I.T.. After work on the new telephone began, Bell directors decided that there was unnecessary duplication between Hose's function and that of Dreyfuss. Hose left his post in the Bell organization and joined Dreyfuss, where he took over primary responsibility for the telephone project.

The important qualities to be achieved in the form of the telephone had already been quite well established in work on previous models. Such a commonly used object should be pleasant in appearance, but unobtrusive and anonymous. It must be convenient and comfortable to handle and use. Its material and shape should minimize the possibility of physical damage and permit easy cleaning.

The internal components of the new telephone were only partly developed when Dreyfuss started work on the housing and dial. Bell engineers furnished a wooden dummy of the chassis as a basis for determining dimensional limits for the housing, but revisions were made constantly as work progressed in electrical, mechanical, convenience, and appearance aspects of design. At the same time there was constant interaction between the Bell development engineers and the production engineers of the Western Electric Co., manufacturing unit of the Bell system. Every detail of the new design had to be evaluated from the standpoint of economical mass production, and all possible modifications had to be anticipated before the complex and costly job of tooling, production layout, and procurement of machines and conveyors was begun.

The integration of *performance*, *appearance*, and *production* aspects of design—each the responsibility of a different group of specialists—could be achieved only through teamwork of a very high order. Creative teamwork happens to be a special interest of W. H. Martin. This interest stems from his conviction that "the organization's capacity for creative achievement is greater than the sum of the capabilities of its individual members." Martin believes that creative teamwork depends on the cultivation of cooperative attitudes and an informal approach to teamwork rather than on rigidly channelized organizational procedures.

The approach to teamwork at Bell Laboratories, an organization of over 8,000 persons, has its counterpart in Dreyfuss' compact staff of 30. Virtually everyone in the Dreyfuss organization contributes to the ultimate design of a product, regardless of his specialized function within the organization. Over-all direction and major design decisions are the result of frequent consultations between Dreyfuss and the persons responsible for various projects.

Teamwork also characterized Dreyfuss' relations with the client's staff. From the outset Dreyfuss attempted to effect close collaborative effort: "Real success is not achieved when the completed product is *my* design or the client engineer's design. It must be our design—a truly joint achievement." When a Bell engineer working on the technical development of a component simultaneously arrives at an appropriate form, Dreyfuss is quick to recognize and utilize the contribution. According to Martin, Dreyfuss has had a stimulating influence that has tended to raise the level of design in many items of Bell communications equipment whose forms are determined solely by Bell engineers.

Design of the base

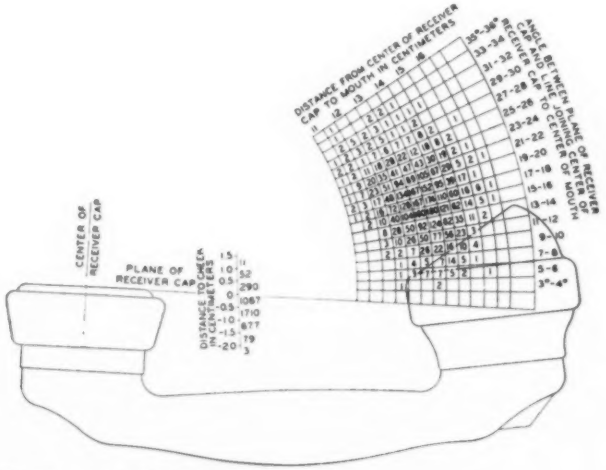
A great deal of attention was devoted to the means of resting the handset on the base, and to relating the shapes of handset and base. Bell engineers stressed the importance of the R.O.H. problem (receiver off the hook), which disrupts phone service and results in unnecessary service calls. In detailing the handset rest and base, great pains were taken to minimize the possibility of accidental R.O.H. The concept of a low silhouette for the base was conceived by Dreyfuss quite early in the project, though successive compromises had to be made because of the height requirements of the internal components.

The most promising exploratory sketches for the base were developed further in dimensional drawings, which were then used in preparing models by John Amore, a skilled model maker who had been trained as a sculptor and architect. Zinc templates were used in transferring the contours from drawing to model. As work progressed, modifications were made on the basis of frequent consultations between designers and model maker. Continual refinements of form, some of which would hardly be visible to the casual observer, were gained with successive clay and plaster models. Despite the stress on three-dimensional design, the designer did no work on the models himself. This kind of specialization is partly a matter of economics, since the trained model maker ordinarily can turn out a model in much less time than a designer.

In the design of the dial, special pains were taken to improve visibility and convenience, and to minimize dialing

Marine set, 1896

Desk sets, 1927, 1900, 1937



Measurement chart for 1927 *handset, also used for* 1950 *handset*

errors. Among the many possibilities developed by Bell engineers and explored in sketch form by the Dreyfuss staff were push-button dialing (ultimately rejected because two buttons might be depressed simultaneously) and dial holes with tapered edges so that fingers could slide off smoothly (rejected because fingers might slide off before the dial turn was completed). The final solution, placing the dial numbers outside the holes, was not new at all; it had been used for many years in toll booth telephones. Although this dial actually improved the visibility of numerals and reduced errors, tests showed that the actual time required for dialing a number was 11 seconds with the new dial, compared to 10 seconds for the old one. A study of this vexing situation revealed that the extra second was lost in shifting the eye from the number to the adjacent hole. The time loss was eliminated by placing a small white dot in the middle of the hole to give a clear focal point. Design of the numerals was undertaken by Quentin Fiori, consultant type designer.

Design of the handset

The principal considerations in designing the handset were light weight, comfort, elimination of any tendency to turn the hand, and relationship to the form of the base. The original handset of 1927 had an offset mouthpiece to provide direct transmission of sound from mouth to transmitter, but proximity of transmitter and mouth resulted in unsightly and unhygienic deposits on the face of the mouthpiece. The improved sensitivity of the 1937 transmitter permitted the offset mouthpiece to be eliminated, and this in turn made it possible to reduce the over-all length of the handset. The 1937 handset could not be shortened because it had to be interchangeable with the 1927, but this limitation did not apply to the 1950 telephone. The new handset was shortened accordingly, with a corresponding reduction in weight. The basic measurements of the 1950 handset were derived from the same data on facial measurements that had been used for the 1927 model. Presumably, the human physiognomy had not changed noticeably in two decades.

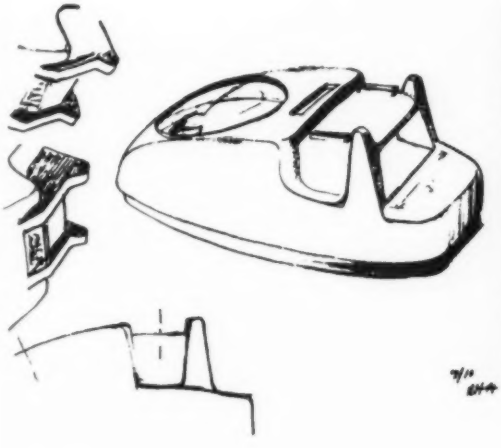
Improvement of the granular carbon transmitter had, by this time, virtually eliminated the problem of "howling." Since there was no longer any concern about the transmission of vibration through the handle, the designer had greater freedom in the form of the handle itself. Numerous wooden models were prepared under Dreyfuss' direction by several outside model shops. The square cross-section was finally chosen because it helped prevent turning in the hand, as well as for esthetic reasons; but it created some differences of opinion among Bell and A.T. & T. people: the rather sharp transition from the square handle to the round mouth and ear pieces were especially controversial. Dreyfuss defended these details on esthetic grounds and was ultimately backed up by Bell management.

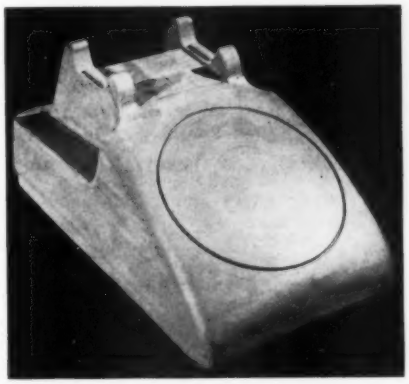
After all of the components had been agreed on, a complete model of the telephone was made of wood, weighted and finished to simulate the black cellulose acetate butyrate plastic of the production models; this model was scrutinized and further refined, and was followed by a new model machined from a solid block of plastic. This model was approved for production by Bell. Agreement on the final design was not so much a matter of formal approval from this or that top executive of A.T. & T., Bell, or Western Electric, as it was a meeting of minds of all the principals concerned with the development, manufacture and distribution of the telephone.

It is interesting to note Dreyfuss' emphasis on three-dimensional design throughout the project, shown below. Translated into time, 2,248½ man-hours went into the design development and drawing; 1,302½ man-hours to design in preliminary clay models (there is no record of the time spent on finished models prepared outside the Dreyfuss office); and only 4½ hours on presentation renderings. Unfortunately, there is no comparable record of the time spent on purely technical development by the Bell Laboratories, since research affecting the telephone often overlaps other aspects of communications technology.

Approval of the design by no means ended the designer's responsibilities. After detailed drawings of all components had been made by the Bell Laboratories, brass master models of the base and handset were prepared by the Western Electric Company's tool makers under the supervision of Robert Hose. Production molds were carefully checked by Dreyfuss and Hose, using precision templates prepared at Bell Laboratories. Edge radii were checked by "feel," or running a wet finger along the edges. The brass master models, after blackening of their surfaces, were then checked visually for highlights and regularity of contours.

The final outcome of this long, costly, and complex process of research and design hinged on the craftsmanship of the tool and die makers, whose hands and eyes faithfully translated the designer's intent into the precision steel dies that gave final shape to millions of identical telephones.





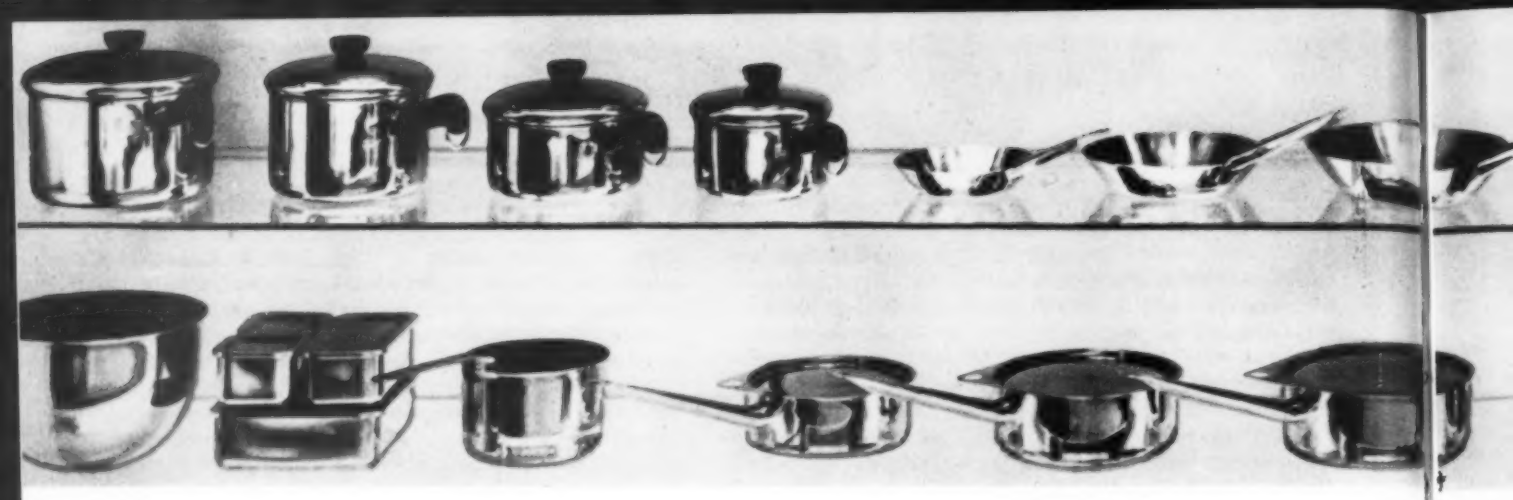
Early sketches and clay model

Media Chart: Bell Telephone

Henry Dreyfuss Organization

	Base & Dial	Handset
Rough sketches	57	19
Dimensional layouts	60	12
Presentation drawings	0	3
Master layouts, dial face	48	--
Preliminary clay models	42	0
Preliminary wood models	0	5
Refined plaster models	56	12
Models finger wheel detail	12	--
Models handset sections	--	6
Models mouth & ear caps	--	5
Finished wood model	?	--
Finished plastic model	?	--

Chart describing the various media and number of times each was used during creation of the new Bell Telephone.



The designer-craftsman in large-scale industry: **Revere Ware**

Revere Ware, the now familiar line of copper-bottomed stainless steel cooking utensils, represented a great technical advance when it was introduced in 1939; today its unchanged forms have stood the test of time and growing competition from other excellent lines. This success is founded on a remarkable combination of far-sighted management, tenacious technical research, and exhaustive design research by a creative designer-craftsman.

The origins of Revere Ware go back to 1892, when the Rome Manufacturing Company was launched at Rome, New York, to make copper household products of the highest quality and durability. About 1929, Rome was acquired by Revere Copper and Brass Company, and shortly thereafter the first attempt was made to develop a pot which would combine the thermal efficiency of copper with easier cleaning and maintenance. For centuries copper had been recognized as the most efficient material for transferring heat to food, but the problem of scouring and polishing it had never been solved. The Rome plant tried making copper pots with chromium-plated interiors instead of traditional tin, but these proved unsatisfactory, and J. M. Kennedy, an aide to the president of Revere, was sent to Rome to find out why. After exhaustive tests it was found that the chromium plating was affected by vegetable acids. A research and development department, set up for the specific task of analyzing all metals, alloys, and combinations of metals, chose stainless steel as the most satisfactory material in corrosion resistance and ease of cleaning, but found it was among the poorest of metals tested in heat conductivity. Kennedy and the research department were baffled.

In 1936 the answer occurred to Kennedy on a Christmas holiday: why not deposit a copper coating on the bottom of a stainless steel pan, thus uniting the conductivity of one with the durability of the other. After hundreds of experiments and tests the research department developed a practical, low-cost process for electrodepositing a heavy, hard copper coating on stainless steel. Meanwhile, the company's designer, Mr. W. Archibald Welden, was authorized to undertake an exhaustive design study for a completely new line of pots and pans exploiting the potentialities of the new process and combination of materials.

Largely self-educated and self-trained, Welden had been a skilled designer-craftsman in his own metal fabricating business, Kantack, Inc., doing architectural metalwork, lighting fixtures, and metal giftwares. He had designed a number of things for the Revere giftware line. As time went on Welden became disturbed by the waste involved in individually designing and producing metal objects and increasingly interested in the possibilities of mass production. When the depression wiped out his business, he conceived the idea of working at Revere's Rome plant, where production tools, materials, and technical people would be right at hand. He convinced Kennedy, who had become manager of the Rome Manufacturing Division, that he would be most effective as an independent designer working closely with the firm's staff. Given complete freedom of the plant, he applied himself to learning Revere's production methods and materials. He was especially interested in stainless steel and learned everything he could about handling this difficult metal in production.

The Revere Ware project, assigned to Welden a few years after he joined the company, was his first venture in the design of purely utilitarian objects. He took it as a challenging opportunity to design pots which were not only practical but beautiful enough to grace the dining table and low enough in price to reach a wide market. As a starting point, he visited department stores all over the country, talking to consumers and observing their attitudes. He decided there were three basic aspects to the problem of designing pots: 1) heating efficiency; 2) ease of carrying and handling, especially with liquid contents; and 3) ease of cleaning. The development of the material was the major factor, but not the only one in achieving heating efficiency. To find the best size and shape for the pan bottoms, Welden made an exhaustive study of the design and dimensions of coal, oil, and electric ranges. Close contact with the burner is particularly important in the case of electric ranges. Knowing it was impossible to stamp stainless steel pots with a

perfectly flat bottom, Welden tried to persuade the principal manufacturers of electric ranges to make the burner surface slightly concave so it would maintain full contact with the pan, but they were not interested.

Welden felt it would reduce spillage if the top diameter of the pot were as nearly as possible the same as the bottom diameter. In technical terms, he wanted the smallest "draft" compatible with ease of production. With top and bottom dimensions thus virtually fixed by functional considerations, the height of the pot depended largely on its capacity. But within these confining limits Welden made careful modifications to improve proportions, using dynamic symmetry as a check.

To make the pots easy to clean, Welden took special pains to provide large radii at corners and avoid crevices where dirt might accumulate. Instead of using a true geometric radius at the bottom of the pan, he developed a free curve which conforms to the shape of the finger as it wipes around the inside of the pot. The resulting curve is exceptionally ample, yet leaves a maximum flat area on the bottom of the pot for contact with the burner. It is a subtle addition to the form of the pots.

The tool and die department objected strongly to a nongeometric curve because it is more difficult to achieve in fabricating dies and adds to the difficulty of maintaining them, an important consideration in stainless steel, which deteriorates the dies rapidly. Welden stuck to his guns, however, and was upheld by management. Later on, when price competition became a factor, the company tried a true radius to cut costs, but after several thousand pots had been produced this way, complaints from customers forced the plant to revert to the original design.

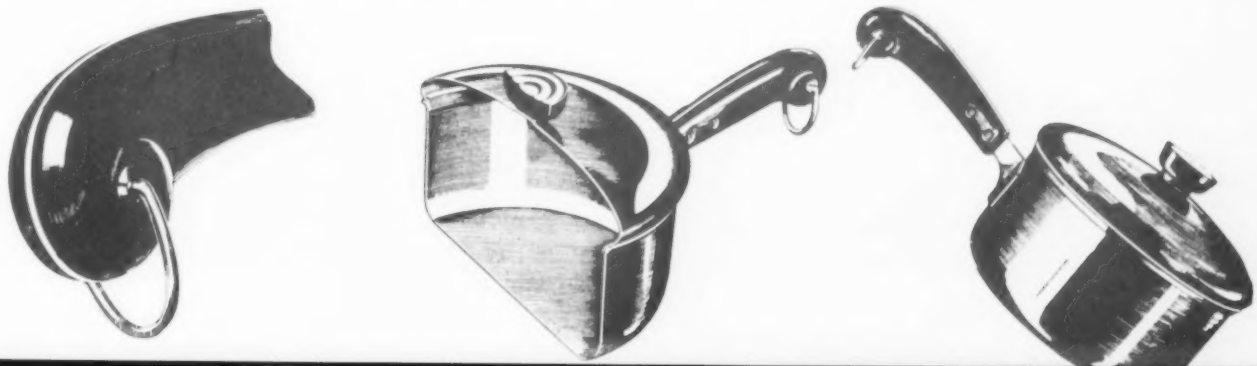
It is customary to bead the upper edge of a stamped metal pot for stiffness. The ordinary round bead provides excellent stiffening but forms a crevice for dirt. A flat foldover, on the other hand, which leaves no crevice, is deficient in stiffness and difficult to achieve in stainless. After much experimenting, Welden arrived at the present ogee bead, which combines the advantages of the round bead and folded edge

Welden had observed in the stores that women almost invariably tried the handle and "hefted" the pot. He decided the handle should not only be beautiful in form but pleasant to feel, that it must not turn in the hand and should be placed to provide optimum balance. The final design was inspired by the traditional handle of the silversmith's hammer, whose form has evolved over centuries. He placed the handle so that it points at the center of gravity when the pot is two-thirds full of liquid.

Production of the plastic handle was subcontracted to an independent molder. When the dies were finished and the first handles molded, Welden found that the inside curve of the heel was not the free curve he had specified but a regular arc. With the permission of Revere management, he reworked the expensive dies himself until he was satisfied with the form. Revere sales and management objected to some details of Welden's handle design as "cheap" looking, especially the method of joining it to the body. At first, Welden was overruled and the design was modified to suit these objections, but after limited production the simplicity and directness of the original design became apparent and it was restored.

When the basic dimensions of the pots had been settled, copper samples were spun under Welden's direction and plated to simulate stainless steel. As soon as he arrived at the final form, he personally made brass templates in triplicate for every detail, carefully computing the proper allowance for springback. These templates were used by the tool and die department in making the original dies and later in checking them during production. In addition, Welden checked and signed all tool drawings and checked the tools themselves prior to production.

Although Welden retained his independent status throughout the period of design and development and was not on the regular payroll, he cultivated the closest possible working and social relationships with technical, administrative, production, and office people. Only by so doing, he felt, could he effectively integrate his contribution with the resources and needs of the plant.



an excerpt

The design department in large-scale industry: **Corning Glass**

The more than 50,000 technical and consumer products made by the Corning Glass Works in some eighteen plants span the entire range of glass technology from its earliest beginnings to the present. At Steuben Glass, a wholly owned Corning subsidiary, glass is blown and formed by skilled craftsmen with the same "offhand" methods used for centuries. In another Corning plant the glass bulbs for incandescent lamps are formed without human intervention on completely automatic glass-blowing machines. In a third plant, modern heat-resistant Pyrex baking dishes and cooking ware are formed on automatic presses. Still other plants produce television tubes, light diffusion lenses, glass tubing, restaurant and laboratory glassware, and optical glass.

Most of the myriads of glass products in use today are the result of advances in glass technology which have taken place during the last half century. Pyrex baking ware, introduced about 1913, is one of many products made possible by the work of the Corning laboratory.

When the Corning design department was founded in 1948, its first job was the redesign of Pyrex ovenware and flameware. The forms of these objects were largely anonymous in origin, emerging in the course of manufacturing and re-

flecting traditional usage. During the early years of production, Corning management was not greatly concerned with their appearance: they were sold mainly on the basis of their technical qualities, functional characteristics, and low price. Patent protection was an important factor in holding off competition. As patents expired and competitive mass marketing became increasingly important, Corning management began to devote more attention to visual design. At first the company turned to consultant designers for help, but finally found that the range of its design requirements and the need for complete familiarity with glass production techniques justified a well-staffed and equipped design department within the company.

Corning's current design policy is largely the result of the deep interest in design of Arthur A. Houghton, Jr., a director of the company and great-grandson of the founder. The story of that policy begins with Houghton's first major assignment after he entered the business—reorganization of the ailing Steuben Division. Steuben Glass had been founded in 1903 by Frederick Carder, an English glass maker and artist who brought over a number of skilled glass blowers to product "art" glass. The company was acquired by Corning in 1918, but its operation proved unsuccessful. In 1933, after several attempts at reorganization, the directors of Corning contemplated liquidation of the firm. Young Houghton asked for authorization to make a study of Steuben's potentialities. Corning's research department had recently developed a new formula for crystal glass of exceptional purity and transparency. Houghton recognized the potentialities of the new material and also realized that one weakness of the Steuben Division was in the design of its products.

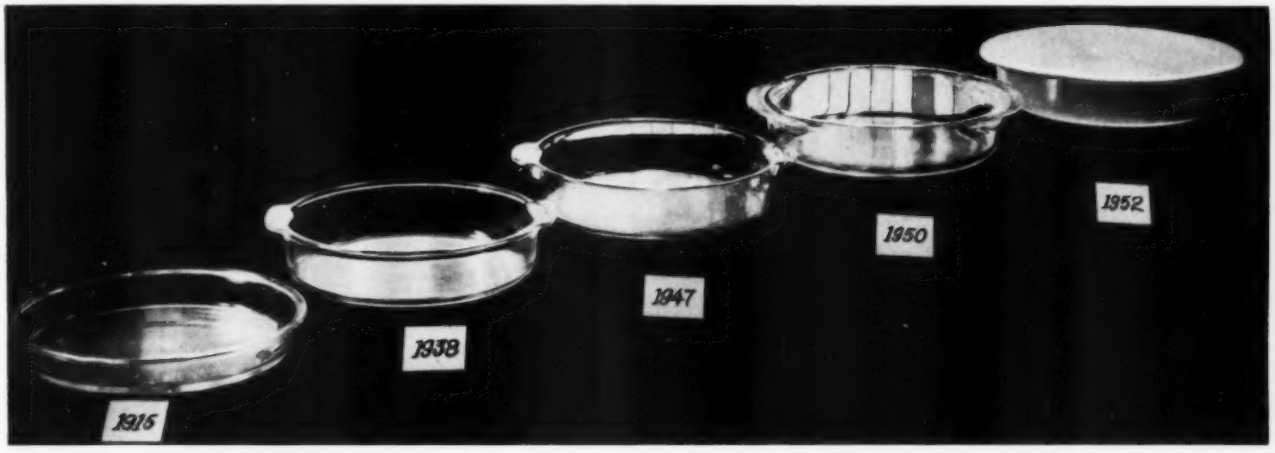
It had always been assumed that the master craftsman was best qualified to design the products of his skill. But Houghton recognized that this tendency had often led to demonstrations of technical virtuosity, seldom to works of art. Concluding that modern craftsmen were incapable of acquiring both the complex techniques of glass making and an understanding of design, Houghton turned to an architect friend, John M. Gates. Gates called in Sidney Waugh, the sculptor. During the first three years of the new Steuben operation, Gates and Waugh worked in close collaboration, studying their new medium, learning its properties, and analyzing the most successful achievements of historical glassmaking. In 1936 Gates organized the Steuben design department, and in 1937 it established its headquarters in the Steuben Building in New York, designed under his direction. With this design policy a proven success in restoring the Steuben Division to business health, Houghton turned his attention to creating a comparable set-up for Corning.

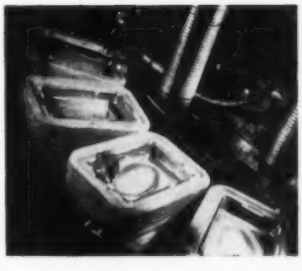
A design policy for Corning

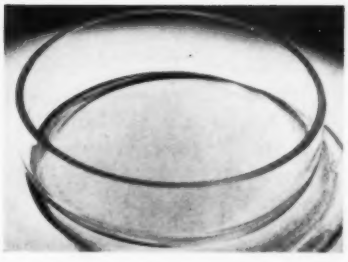
A piece of Steuben crystal is primarily a showpiece, and only secondly an object of utility. It is individually made in limited editions, precious and high priced, and sold by exclusive franchise in a few well-established stores in major cities. Pyrex ware, on the other hand, is mainly functional, mass-produced, low-priced, marketed through typical housewares channels, and available in more than 40,000 hardware, chain, department, drug and rural general stores.

Despite these differences, Houghton felt that the Steuben experience had pointed up a number of broad, underlying principles which could become the basis for the new Corning design department. The role of the department was formulated on the basis of two principles.

First: ". . . Good design must be integrated and extend throughout the company's every activity . . . our advertisements and booklets and stationery and packages—all of these auxiliaries must be designed as carefully as the product." Second: "Design policy must be regarded as a function of high-level management."







Above: 37 years of Corning pie plates demonstrate the evolution of form. Cut-off battery jar, (bottom row, center) used by a housewife for the oven, originated the idea of Pyrex ware. Far left: An automatic press forms today's Pyrex ware. The double boiler is shown as it looked before redesign by the Corning Design Department.

Ideally, Houghton felt, "the chief executive officer of the company should also act as Director of Design, with all important decisions on design being referred to him. However, such a plan is not practical in many instances, particularly in large organizations, and it was impractical in our case. Our plan, therefore, was to bring in a trained creative designer with broad and flexible interests and to make him an integral part of high-level management, to have him become one of the executive officers of the company, to give him not only responsibility but also authority, to see that as Director of Design his influence spread over the entire range of the company's activities."

In recruiting and training a staff for the new design department Houghton enlisted the cooperation of Boston's Institute of Contemporary Art. In a wide survey conducted by the Institute, twelve young designers, painters, sculptors, and architects were selected for an experimental training program which was conducted at Corning in the summer of 1948. After intensive training in glass technology, research, manufacturing, and marketing, and the opportunity to design glassware with the technical facilities of the plant right at hand, those considered qualified were invited to join the newly established Corning design department.

The Corning design department is housed with Steuben in New York City, some 300 miles from the main plant and executive offices of the company in Corning, New York. The only member of the department located at Corning is the director, John B. Ward, who coordinates design department activities with those of management, research, production, and sales. This arrangement, which involved considerable inconvenience and expense, is the result of management's conviction that the environment and cultural facilities of a large metropolis like New York provide an important stimulus for the designer.

The Corning design department under Ward's direction consists of four closely related groups, organized somewhat as follows: a product analysis section assembles all the relevant information and defines design objectives in terms of the company's needs and marketing requirements. The product design group designs the actual three-dimensional product. The "merchandising" designers are responsible for two-dimensional design—applied decoration, packaging, displays, etc. The architectural design group designs offices, showrooms, trade exhibits, and, to some extent, the plants themselves.

Creating "satisfaction" value

When the new Corning design department tackled its first assignment, Pyrex cooking ware had behind it thirty-five years of research, design, and development, beginning when the wife of a young research scientist obligingly used the bottom of a battery jar for a baking pan. Before the design department started work, the basic sizes, shapes and functional features of Pyrex kitchen ware were established by the home economics department. Other aspects of form were determined by the mold-making department, largely on the basis of efficiency in tooling and production. Corning engineers had developed the metal collar for clamping handles to skillets, saucepans, and percolators. The approach of the design department is best explained by Houghton's analysis. Houghton believes that a product offers two types of value—"utility value," and "satisfaction value." Utility value is provided by science and technology; satisfaction value by art and design. According to Houghton, most of today's products do not provide satisfaction value comparable to their utility value. "Each year millions of hours of man's labor and millions of tons of raw materials are used in making articles in which the element of satisfaction is deficient, and which are, therefore, scrapped while they are still useful. To discard them before their usefulness is exhausted is a luxury our civilization can no longer afford."

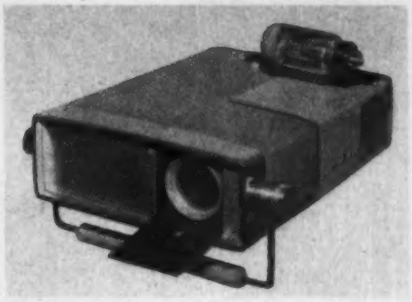
But apparently consumers do not always agree with designers as to what constitutes satisfaction value. According to Houghton, most consumers demand the element of "luxury" in their possessions. A small minority, including the designers themselves, demand pure "taste." How then to resolve these differences so as to satisfy the consumer, the designer, and the stockholders? Houghton feels that the solution lies in the area where the two qualities overlap, that it is possible to offer both luxury and taste in one object.

When the new design department began its work, the "utility value" of Pyrex kitchen ware, to use Houghton's phrase, was already well established. It was the job of the design department to improve the "satisfaction value" by modifying shape and color to enhance the beauty of the glass utensils and their convenience and comfort in use. An important objective was the development of handle shapes which would be more comfortable and attractive. They also wanted to improve the clarity of the glass and remove the green tint caused by iron. This problem was turned over to the technical research department. Once the basic design objectives had been formulated and the specific tasks assigned, the individual designers were allowed complete freedom in planning and executing their work within the over-all plan. As design director, Ward regards his own function as primarily administration and coordination. While periodically reviewing the overall progress of work in his department, he refrains from pushing his designers' pencils. This approach is quite different from that at Steuben, where John Gates participates as designer in fact as well as design director.

Relationship of Design on Sales

The sales department had formerly exercised a good deal of control over design through its home economics and market research activities, and at first it resented the autonomous position of the new design department; but as the usefulness of the department became apparent, the antagonism wore off. After preliminary sketches were shown to the sales department for concurrence in the general approach, the design department carried its work independently to completion. The new designs were finally presented with related packaging and point-of-sales displays as a completely integrated solution. In those few cases where there was disagreement, spot surveys of selected consumer panels were conducted by the sales department.

When plastic or glass models had been approved by sales, production engineering, and management, the design department prepared detailed drawings, dimensioned to the thousandth of an inch, from which the mold department could fabricate the molds. The mold makers, accustomed to working with geometric forms—straight lines, right angles, and simple radii related to stock cutting tools—often objected to contours arrived at by use of the French curve, to blended radii, and off-beat dimensions. As they have worked together, designers and mold makers have come to understand each others' point of view. Approximately two years were required for completion of the project, which involved about twenty products with their packaging, displays and catalogues. The substantial investment of time and money was justified by the large production involved and by the nature of the product, to sell year after year without change.



Flatter, more compact projectors are made possible by a

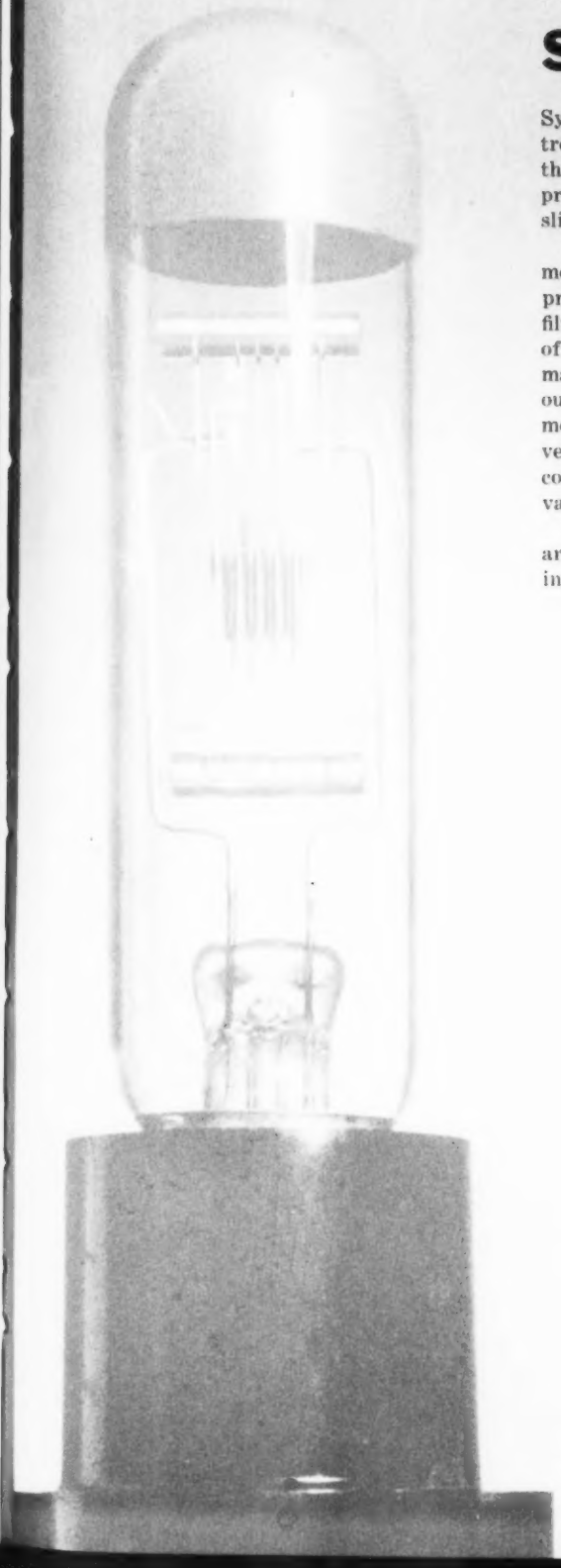
Smaller projection lamp

Sylvania Electric Products recently introduced a projection lamp, christened the "Tru-Focus," which opens up some provocative possibilities in movie and slide projector design.

Five basic elements determine the dimensions of a modern movie or slide projector: lamp, motor, fan, optics, and film-handling mechanism. In the course of Sylvania discussions with projector manufacturers, the lamp was singled out as chief bottleneck in designing a more compact product. "Tru-Focus," developed over the past two years by the company's photolamp engineers, is Sylvania's answer to the lamp problem.

The unique aspects of this new lamp are its compactness — it measures four inches overall as opposed to six-plus for conventional lamps in use today— and its ability, due to a new grid screen that directs air flow inside the lamp, to burn in any position without blackening the glass envelope. This makes horizontal arrangements practicable in projector design for the first time.

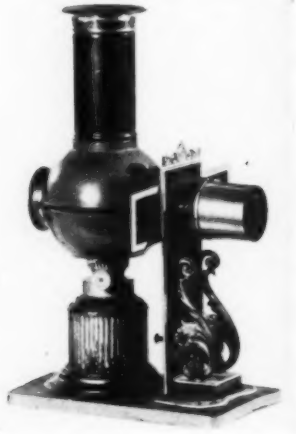
To prove to manufacturers that the new lamp will permit surprising design departures, Sylvania instructed Sundberg-Ferar, its consultant design office, to do sketches and wood mock-ups (one pictured above) of projectors that capitalize on the lamp's special features. Sundberg-Ferar's experimental suggestions, and some antique projectors that demonstrate how the light source has traditionally affected the shape, are presented on the following pages.



The larger lamp is of the type generally used in today's movie and slide projectors. The smaller one is Sylvania's new alternative.

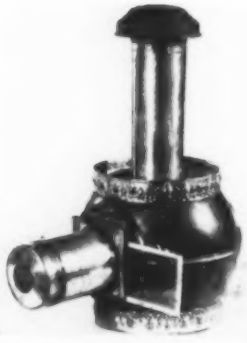
Early projectors, using various light sources, were lanterns with lenses tacked on

Projection lantern of late 18th century; light source—a single candle.

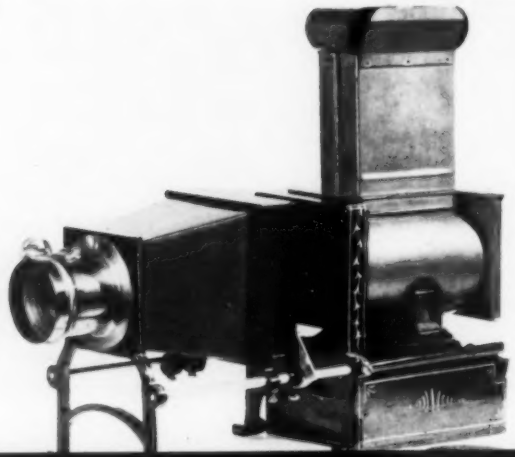


Lantern of about 1880; light source—kerosene.

Long focal-length lantern of about 1890 with three wicks; light source—kerosene.



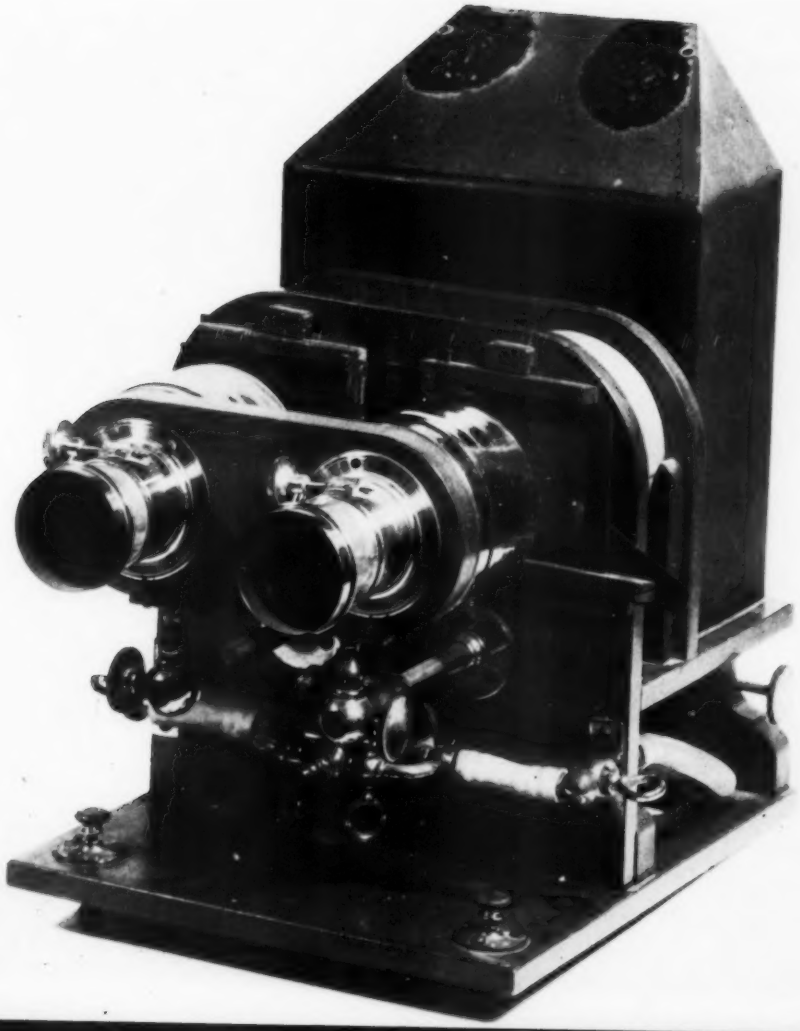
Red-painted, tin projector from the first quarter of the 19th century; light source — kerosene.



The "Kromskop" of 1892, *first color projector; used three black-and-white negatives and three color filters, red, green, and blue; light source —electric arc lamp inserted at back.*

Projector of about 1860; *light source—whale oil.*

Sheet metal opaque projection lantern of about 1890; *light source—kerosene.*



Projector of about 1890 *with two lenses for fading from one to the other or for superimposing; light source—acetylene gas.*

Smaller projection lamp

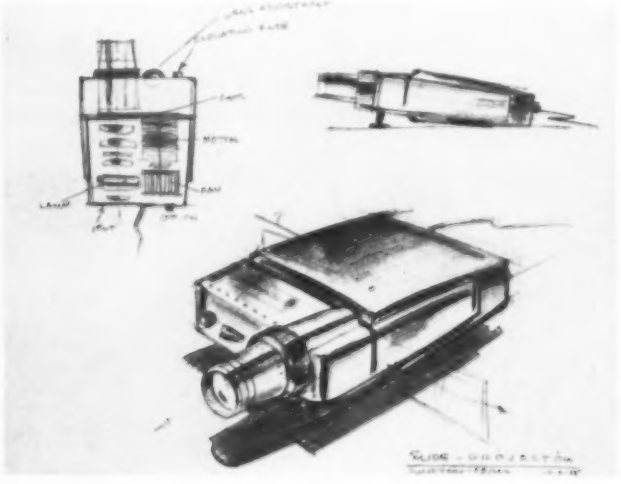
Exploratory designs stress flatness and compactness

Sylvania's recent announcement of a new projection lamp was noteworthy for more than the lamp itself, which is smaller and more versatile than the conventional sort. It also marked an imaginative use of a design service, for Sylvania underscored its presentation of the lamp to the press, public and projector manufacturers with a surprising group of Sundberg-Ferar sketches and models, slide and movie projector designs that explore the unique advantages of the lamp—its dimunitive size and its ability to burn horizontally. Properly enough, compactness and flatness are the qualities common to all of the Sundberg-Ferar projector ideas, which otherwise differ considerably in proportions, lens placement, and treatment of the slide-handling mechanism. The lamp is always used horizontally.

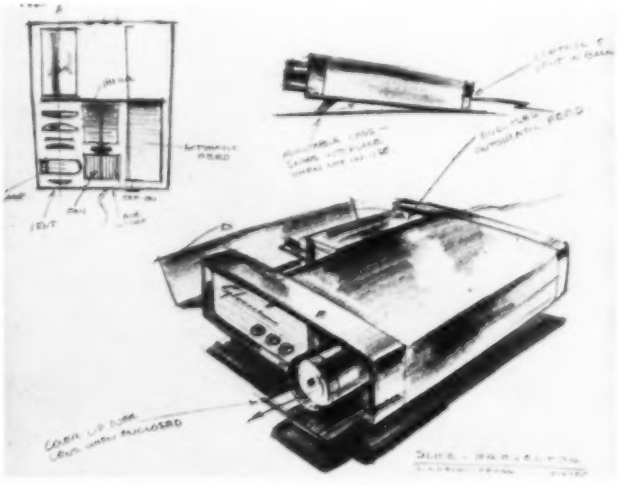
Sundberg - Ferar's New York staff, headed by Richard Figgins, conducted the design exploration. Some sixty sketches were made of different projector possibilities, from which Sylvania management chose six for further rendering. Finally, one slide projector and one movie projector were modelled in wood. They were intended strictly as eye openers for the industry—no mechanical detailing or further development of the Sundberg-Ferar designs is planned. Sylvania has provided the lamp and suggested some design possibilities; from here on it is up to the manufacturers.

Proposed projector serves as its own carrying case, the handle doubling as projection support.

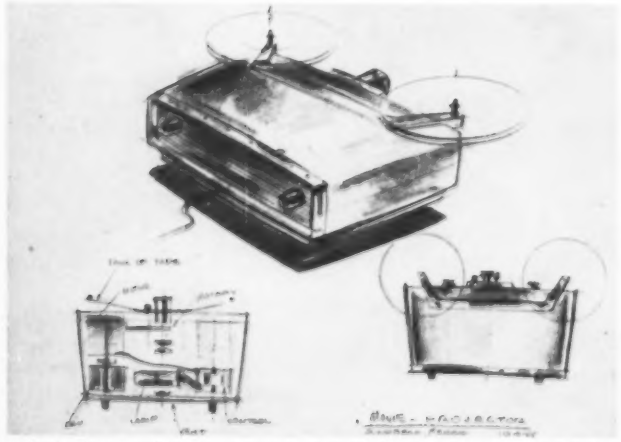
This slide projector sketch suggests a boldly canted lens turret and houses Sylvania's new lamp horizontally.



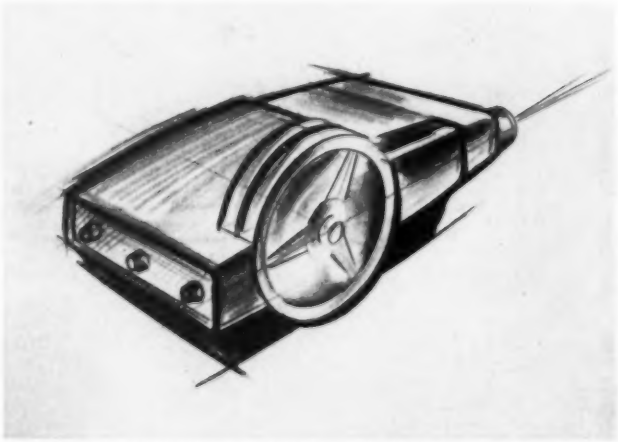
Here an automatic-feed mechanism has been incorporated under a flip-out side panel.



This helicopter-like movie projector design is intriguing in its horizontal placement of the reels.



A pair of mated reels on a single axle is the summit of Sundberg-Ferar's flight of fancy. No details were included with this one.

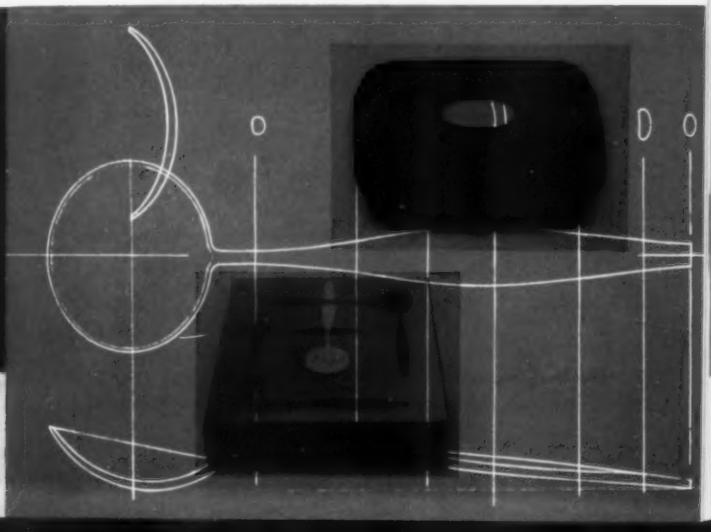


Design for merchandising

the story of a collaboration

The theme of this story is planned diversification. Chas. D. Briddell, Inc., not unlike many manufacturers today, wanted to cut itself a larger slice of the American market, and decided that new products could do it. What makes the story worth repeating is the correlated planning behind it. The expansion did not come about by a blind stab at the market, but from a logical plan that involved design from concept to sales. That plan grew out of a collaboration among the gentlemen pictured below — client, designers, supplier, fabricator, merchandiser — a collaboration that produced not only new products for Briddell but techniques to make the products possible.

The seven principals in Briddell's "Leisure" program consider one of the new designs. Complete team line-up is on page 6.



PROBLEM

As far as any of the principals can remember, the Briddell program was virtually frictionless from start to finish. The client recognized his problem, formulated his objectives with the help of a designer, pursued them systematically by relying on the judgement of specialists. This doesn't make the story any less real. In fact, it points out that if a new market is worth going after, it's worth designing the path to it every step of the way.

In 1954 Charles and Willis Briddell, president and vice-president respectively of Chas. D. Briddell, Inc., visited designer George Nelson with a question. The firm, established in commercial cutlery since 1895, had brought out steak knives in the late '30's, and had built a brisk consumer business with its "Carvel Hall" line. The steak-hungry postwar market had given Briddell nothing to complain about, but in one sense the market had been too good: it had attracted lots of competitors, and several unabashed imitators. Rather than lower quality, the Briddells were looking for more positive ways to combat cut-throat competition. Their question: how could they put a few eggs into a second basket before it was too late?

The Briddells themselves did not lack ideas. They discussed them with Nelson, and a few were taken on by the designer as experimental projects (one result was the electric knife sharpener introduced last year); others were discarded (a fiber glass boat, a collapsible coffeemaker, an electric ice cream scoop). A few months later George Nelson and his design director, Irving Harper, met with Willis Briddell and his Advertising-Promotion Director, Jim Nelson. This client-designer planning group (which it turned out to be) agreed unanimously that stainless steel flatware was a logical market to move into, for several reasons: 1) the firm's name and distributorship were established in gift, jewelry and department stores; 2) stainless flatware related to production and promotion methods Briddell already knew; 3) there was a gap in the market between inexpensive domestic stainless and high-priced domestic and imported flatware—a quality, price and *design* gap. Thus diversification, as the team began to formulate it, meant approaching the market at a new level, by creating a product with new qualities.

PLAN

Before a line was put on paper, the group laid out its merchandising plans. Flatware, traditionally, is marketed in two ways: as elaborately boxed sets, like silver, or as unpackaged open stock, which usually makes stainless a headache for the dealer. Jim Nelson saw the advantage of gift-boxing a line of stainless: a good package could assist the dealer, make an effective display, and provide a permanent storage piece for the purchaser.

As for the flatware itself, the group agreed that the objective was high quality and sophisticated form in the medium-price range; they began to think in terms of a 6-piece setting under $10, with correlated steak knives, carving and serving pieces. At this point, they made their only specific design decision of the planning phase: if economically possible, the new Carvel Hall "Leisure" line should have a high polish, equivalent to silver, rather than the currently popular brushed satin finish.

Willis Briddell and Jim Nelson then handed over this set of objectives to Nelson and Associates, with the instructions that all decisions about the design should be left to the designers who had helped to formulate the goals.

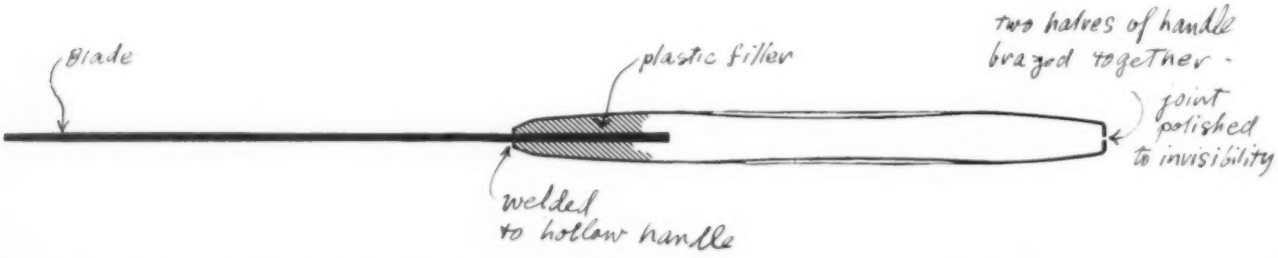
DESIGN

Irving Harper approached the design of "Leisure" more with an intuitive sense of balance and comfort than with any scientific plan. He came up with two proposals: one, essentially a straight profile with a sharply squared end, and a second which emphasized a curved line and a change of sectional contours. Drawings of both lines were dispatched to Paul Culver, Briddell's skilled model maker, and within a week the client-designer group was asked to make a choice. They selected the curved contour, with handles that are concave for comfortable handling. The individual characteristics of the line are shown overleaf, the soup spoon at the right.

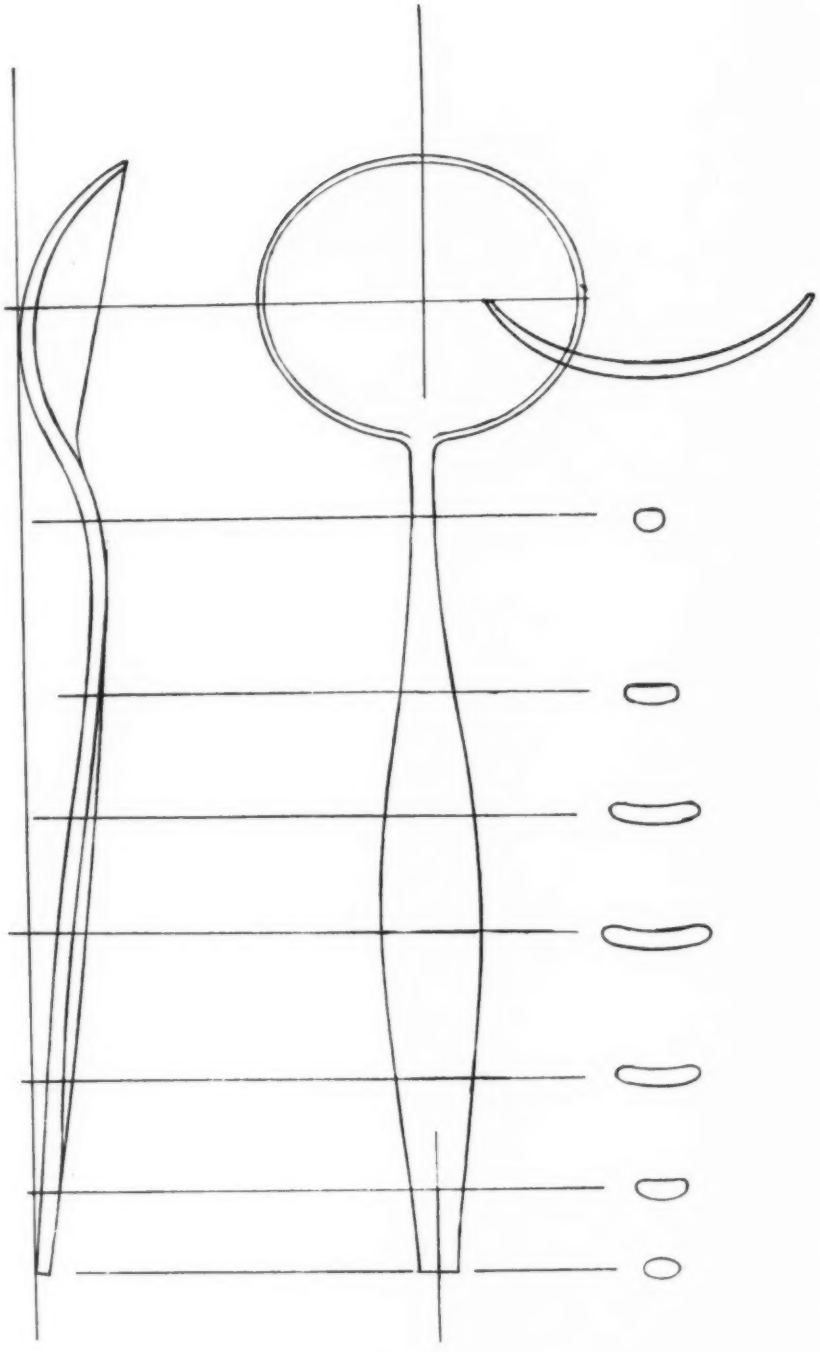
PROCESS

To make a high quality polished stainless flatware is one thing, but to do it economically required some production acumen. Because a mirror finish reflects every last flaw in the material, it is more common on five-and-dime flatware than on quality ware; achieving a polish that removes all visible imperfections, in a material eight times harder than silver, is often a costly matter of hand work on the formed piece.

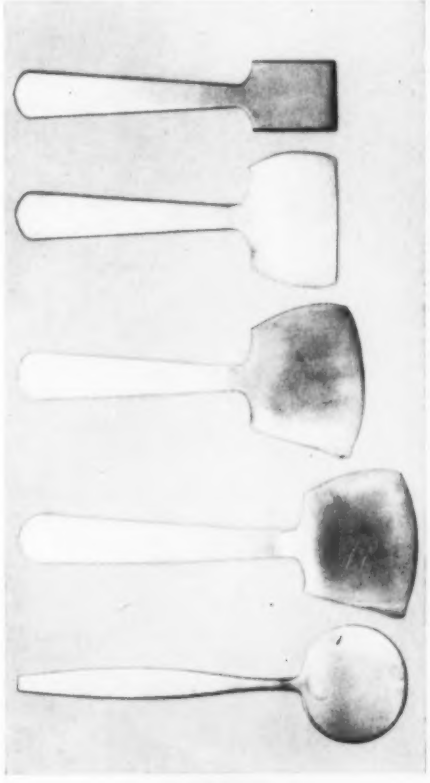
Willis Briddell took the matter up with Imperial Knife Company, whom he knew had perfected methods of polishing and grinding steel mechanically, and learned that the same methods could produce a mirror polish on stainless. Imperial's secret was a technique based on experience: 1) extreme care in choice of stock; 2) automatic grinding, glazing and polishing of the strip before blanking — so-called "bottom polishing" to get the all-important depth of finish; 3) careful blanking, rolling, and striking, combined with other polishing operations and a light hand buffing of the formed piece to perfect the mirror shine. Imperial also suggested the use of a stock with high nickel content (10%-14%). Its warmth and softness of color proved especially suitable to the design and polish of "Leisure." When the product was finally cost-estimated, it was possible to retail it for $9.75 per setting.

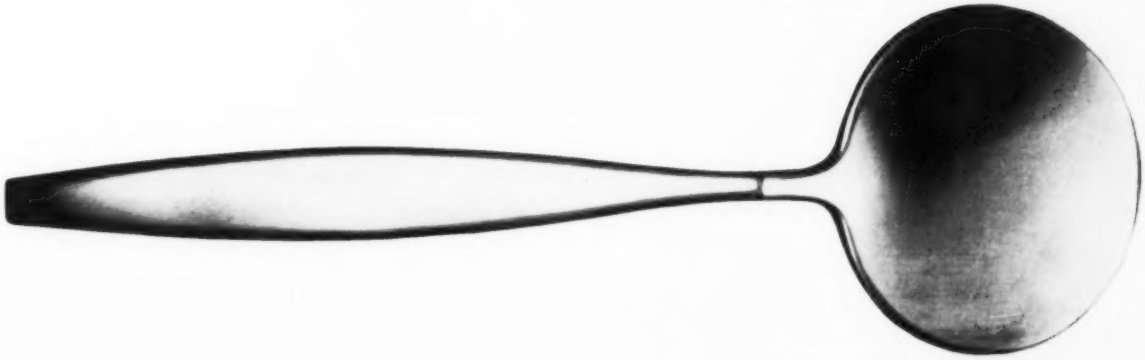


Dinner knife utilizes 2-piece welded construction so that high-carbon steel could be used for the blade, forming steel for the hollow knife.

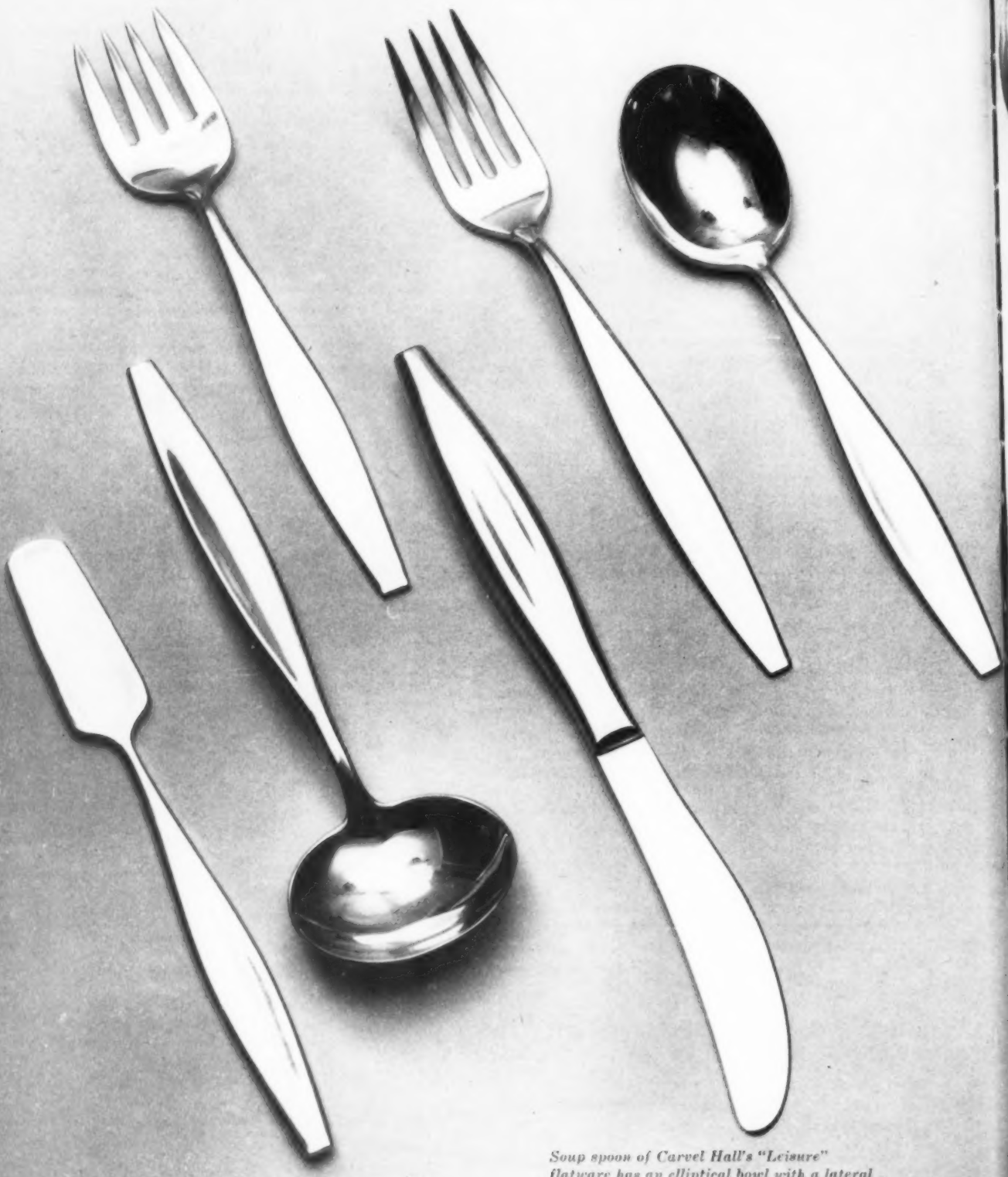


Five (out of ten) steps in making Leisure soup spoon are shown below, reading top to bottom:
1) *Pre-polished stainless blank.*
2) *Second cross by roller widens bowl section.*
3) *First grading of bowl thins top edge*
4) *First grading of handle elongates it.*
5) *Trimming. After flat polish is given, the piece undergoes eleven more forming and buffing operations.*
Left: Changes of sectional contour are demonstrated in designer's drawing.





Trimmed, polished blank, ready to be struck.

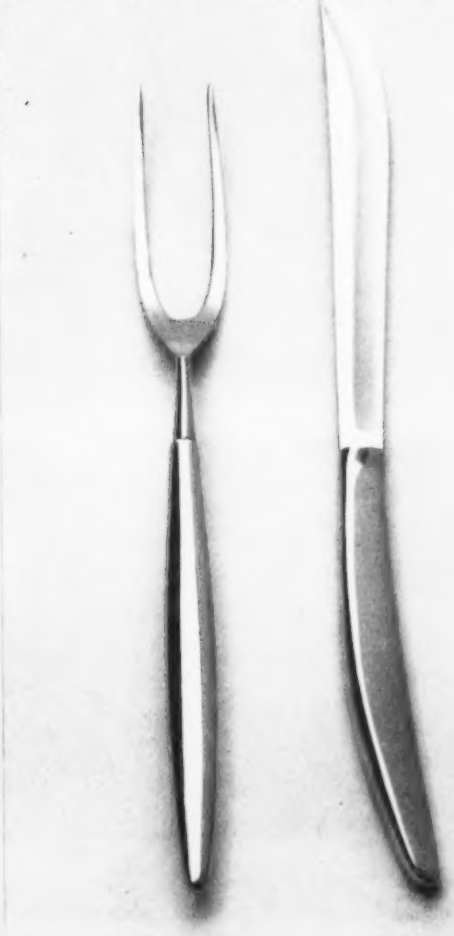


Soup spoon of Carvel Hall's "Leisure" flatware has an elliptical bowl with a lateral axis instead of the usual longitudinal axis, to give personality to the whole setting, and to provide an easier shape for sipping. Butter spreader has a palette-like blade, for convenient spreading, and the dinner knife blade is short and arched, for easy cutting.

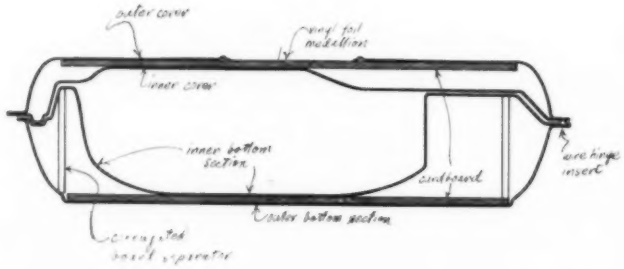
Special pieces include two serving spoons, a serving spatula, and a beverage spoon.

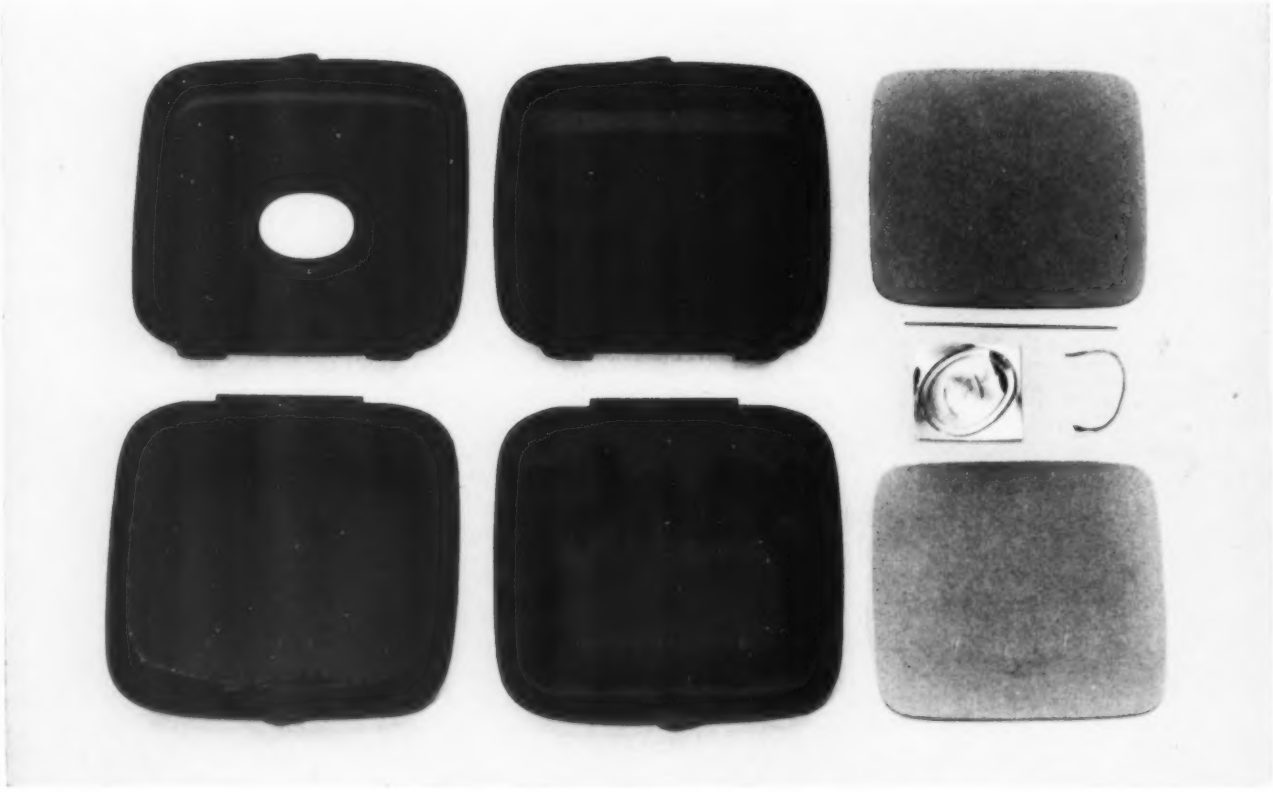
Companion steak knife set has a chrome-plated cast-zinc handle pressure-fitted to stainless blades.

Carving pieces, like steak knives, were designed to correlate with, but not imitate, flatware pieces.



Fabricator-designer collaboration produced a packaging innovation





PACKAGE

The display case presented another set of cost problems. Harper, dissatisfied with the hard, noisy surface of conventional knife boxes, wanted to achieve the luxuriousness of a lined, fitted instrument case in some lighter and less costly material. His first thought was molded polyethelene, which had been used for tool fittings, but he realized that there would be rigidity, tolerance, and cost problems in a large molding, and turned his attention to polished aluminum.

Then one day, while conferring with Lou Pfohl of Plaxall, Inc., in Long Island City, he happened to notice an Amtico tile folder with molded pockets for samples. It was the first and only result of a new Plaxall process for pressure-molding vinyl sheets and joining them electronically in a light sandwich construction. Pfohl agreed that the technique would make a hinged, contoured package with precisely shaped pockets and sections of uniform thickness. Harper quickly roughed out a design idea for a 40-piece package, and he and Pfohl worked together refining the contours and details to exploit the forming method and the sandwich construction.

The fabricating technique is outlined in the elements above: two black Geon vinyl sheets (20 or 30 gauge) are formed in a 2-part mold, one for the pocketed interior, top and bottom, the other for the exterior. After forming, the pieces are trimmed and a narrow central bridge in each piece cut to form a flange. A paperboard separator and two stiffeners are cemented between the two base and two lid pieces,

which are then electronically welded around their edges and joined by a steel pin inserted through the interlocking flanges. The result is a rigid yet light box with an integral hinge and button-socket closure. A medallion of gold-metalized butyrate sheet has been separately formed and applied through an oval cut out of the lid. Gold roll leaf stamping is used to imprint the trademark inside the lid, and a matching gold cord holds the lid erect for display. The interior has a satiny matte finish, while the lid is given a grained texture during molding. The total cost of the box, roughly $1.75, is considerably less than a routed wood chest, and Briddell considers the price quite painless when the box sells a full set of flatware for $74.95, as it has been doing very effectively since the line was introduced before Christmas.

PROGRAM

The basic display case was adapted to four different merchandising units: one to hold 6 or 8 steak knives (by an interchangeable pocket section); another for a carving set; a third for a 20-piece (4-place) set; and one for either 30 or 48 pieces (by removing two place settings). The latter has now been made more versatile with an alternate pocket that fits either butter spreaders, dessert spoons, or extra tea spoons.

Briddell did not halt its march on the new market with product and display box. A hardboard packing box was prepared for each packaged unit, buoyantly printed with individual silhouette patterns in white, vermillion, and shades of gray. The designers also worked up an inexpensive flexible pouch of vinyl and polyethelene, to hold 8 teaspoons and 4 dessert forks for card and dessert parties, as a separate gift item.

Shortly after the "Leisure" line was complete (from flatware to boxes it took nine months), the client asked the designers to restudy all of its existing packages and graphic work. Harper and George Nelson's graphic department produced a series of new schemes, individual enough to be distinguished from the "Leisure" line, but coordinated in style and color. Some of these are shown at the right: kitchen knife boxes in red, white and black; a box for the knife sharpener—the first Carvel Hall product designed by the Nelson office; boxes for "Constellation" carving pieces and knives. They carried the program into folders, tags, and an advertisement.

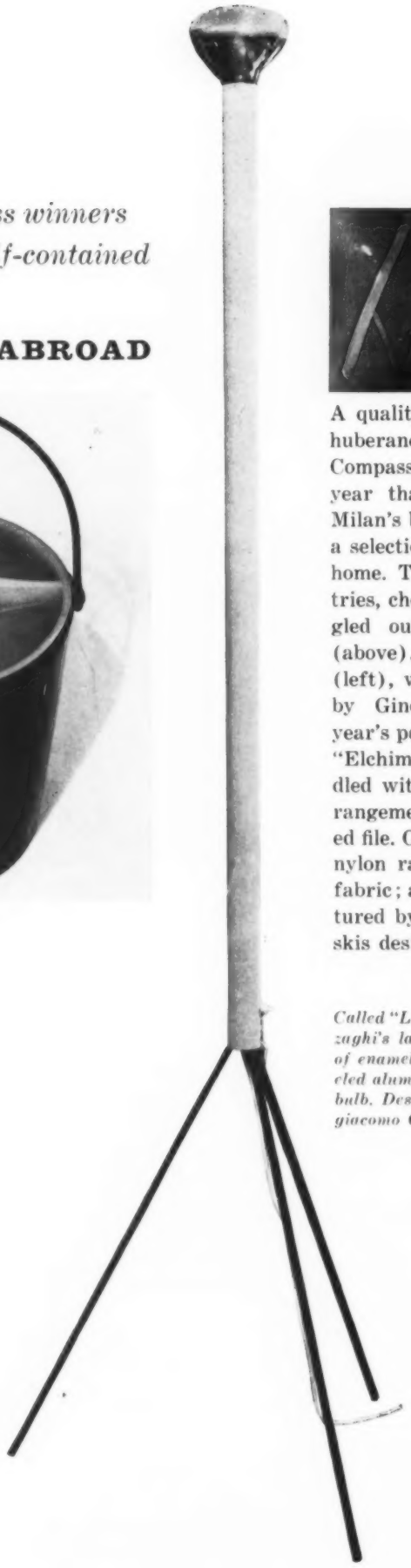
An unusual extension of the designer's service occurred in connection with the redesign of the Carvel Hall trademark. In every step of the product and graphic design program, the client wanted to express the company's tradition for quality cutlery. George Nelson coined the word "Steelsmiths" to lend to Briddell products the same suggestion of dignity and craftsmanship usually associated with the output of silversmiths. The label became part of the new trademark. When Willis Briddell requested a counter sign, the designers had the trademark tooled in metal, with a black enamel top finish (right). It now sits on dealers' counters amid polished stainless flatware in black and gold display cases—a small but effective symbol of the consistent quality the company achieved by its design for merchandising.


Constellation
Constellation

Current Golden Compass winners are svelte, shiny and self-contained

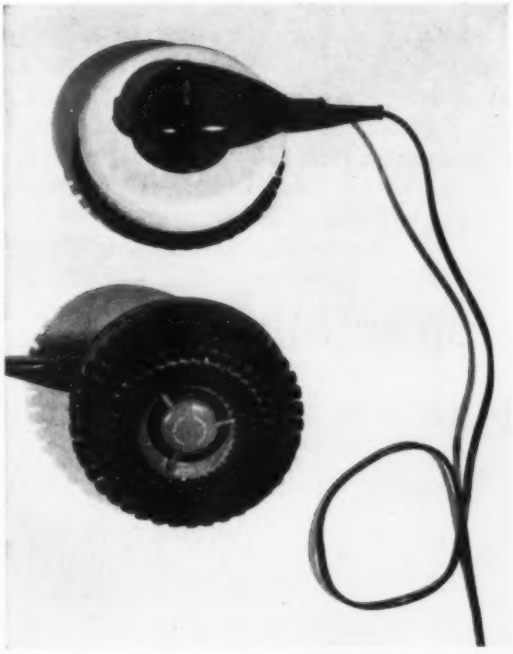
DESIGNS FROM ABROAD

Polyethelene bucket, manufactured by Kartell, has a lid divided into two parts for use as a tray, a handle covered in black nylon. Designer: Gino Columbini.



A quality of restraint rather than exhuberance marks the Italian Golden Compass winners of 1955—the second year that La Rinascente, Rome and Milan's big department store, has made a selection of "il buon disegno" for the home. The jury looked over 1,300 entries, chose 130 for exhibition, and singled out 12 for the special award (above). Kartell's polyethelene bucket (left), with its knowledgeable shaping by Gino Columbini, illustrates this year's policy of svelte containment. The "Elchim" Electric Brush has been handled with similar care, even to the arrangement of bristles in a neatly slanted file. Other winners were: a two-piece nylon raincoat; a hand-printed "JSA" fabric; a round plywood table manufactured by Arform; and a pair of water skis designed by Enrico Freyrie.

Called "Luminator," Gilardi & Barzaghi's lamp has a tripod support of enameled steel, a 45 mm. enameled aluminum tube and a 150-watt bulb. Designers: Achille and Piergiacomo Castiglioni.



Electric brush, made by Fratelli Chiminello of Milan in colored plastic, incorporates a motor-driven suction fan. Its designer, Giuseppe de Goetzen, won a Golden Compass last year for a similar design.

All-purpose lamp 1055, *produced by Societa Arteluce, Milan, comes in an assembly kit. Designer: Gino Sarfatti.*

Ice Bucket 510, *made by Attualita Artistiche Artigiane, Milan, is anodized aluminum, blue with a black lid and legs. Designer: Bruno Munari.*

"Verex" thermos flask, produced by Dewas, Milan, is chrome-plated brass. Designer: Egon Pfeiffer.

Glassware from Murano made by Nason and Moretti is of two layers, different colors. Designer: Umberto Nason.

"Luisa" chair seat and back are plywood covered with foam rubber and woolen fabric. Made by Carlo Poggia, Pavia. Designer: Franco Albini.

Life of a traveling plastics specialist

photographs by Roy Stevens

Doing the rounds in Chicago . . .

Visiting designers hither and yon while wearing the Barrett colors, Bob Rockwood has been doing more than producing goodwill for one supplier of basic plastic resins; he has been assisting his company and its competitors alike by stirring up, with suggestions and sketches, slides and samples, an interest in more appropriate and pleasing applications of the products the whole industry offers. Various aspects of his unique job are described on the next seven pages.

Bob Rockwood, a young New Yorker who carries a satchel of samples and reports to a Director of Sales, has nothing to sell. Though in his working routine he has all the earmarks of a traveling salesman, he is actually a traveling designer and his services are free. Not even for the asking—chances are he'll appear anyway.

Barrett Division of Allied Chemical and Dye, a supplier of basic plastic resins, incorporated Rockwood into its organization two years ago and called him Design Consultant. Out of Schenectady, the Army, and the University of Michigan (College of Architecture and Design, 1951), he spent two years as an applications engineer with G.E.'s Textolite Division in Coshocton, Ohio, and then, in June 1953, went to Plaskon in Toledo, when Plaskon was a division of Libby-Owens-Ford Glass Company. Plaskon was purchased by Barrett in October 1953, while Rockwood was getting an on-the-job education in plastics at Plaskon's Toledo laboratories. The following January he shifted his headquarters to New York and went into action as a one-man design service.

Since then Rockwood has been an itinerant with a designer's training and a special knowledge of plastics, visiting design offices East Coast and West, describing the limitations and potentialities of the various plastics, trying to get his colleagues to specify the *right* plastic for the right use before a design is frozen.

In Toledo for a briefing, Rockwood confers with two of Barrett's research executives: David E. Cordier (center), Director of the Glendale-Plaskon Laboratories; and Dr. Harold A. Hoppens, Superintendent of Technical Services.

From apartment to car with his major accessories—slide projector, slides, screen and samples.

Offering some pointers and explanations during a typical design-office visit, with a molded urea toilet seat serving as Exhibit A.

Launching a luncheon meeting with George Beck, General Electric design executive and President of the I.D.I.

The Barrett-Rockwood service is a far-sighted approach to market development

Barrett's sponsorship of a design-trained specialist to help designers represents another approach, and a unique one, to the development of markets for basic materials. If Rockwood can improve the level of design involving the basic resins, thus enhancing their reputation, then Barrett's investment in design assistance will yield tangible dividends in sales. Clearly, his job is not to promote polyester (a company product) at the expense of polystyrene (not a company product) but to enhance the prestige of plastics in general by encouraging proper applications at the drawing-board stage of a product's development, by giving sound technical advice in the detailing of these relatively new and ever-changing materials. Rockwood's usefulness to designers hinges on his objectivity—"If it seems that wood or aluminum is best for the job, I won't hesitate to say so."

His field of concentration, naturally, is the Barrett field—molding compounds and industrial resins, particularly urea, melamine, alkyd, nylon and the polyesters. He will collaborate as closely as desired in the development of a design involving any of these materials. Or if a designer wants to test melamine for a possible switch of materials in a client's product, Rockwood can be there to act as liaison with the Barrett Technical Services Laboratory.

At Barrett headquarters in lower New York, Rockwood reports to Carleton Ellis, Jr., Director of Sales, Plastics and Resins Department.

Enplaning for Chicago . . .

An innovation in laundry equipment starts with a visit to a Chicago design office

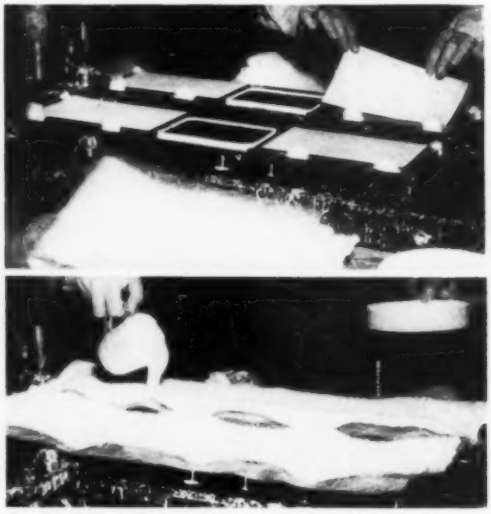
Bob Rockwood has been in circulation now for more than two years, dropping in invited or impromptu at design offices in every major industrial center, giving lectures and informal illustrated talks, attending expositions, conferences and even an M.I.T. seminar. Because of the uniqueness of his consultant service, calls for his help on specific design jobs were slow to come in at first, and few products on which he could be given a design assist have reached the market thus far. His first major assist was the Bendix washer, model WFG, designed in Chicago last year by Mel Boldt & Associates. The story (told in pictures on the next page) illustrates how Rockwood makes his contribution—timely suggestions and off-hand sketches at the critical conceptual phase of design development. Without the Barrett-Rockwood service, there would have been fewer sketches, less discussion, and, very likely, no polyester panel.

In Chicago, Rockwood arrives at the Boldt office and is greeted by Chester Wojtowicz, designer in charge of the Bendix washer project.

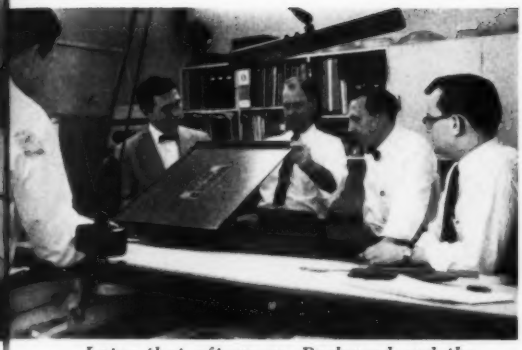
Wojtowicz and colleague Thurber Morrison show Rockwood the washer under development. Its shape had been defined, but a top panel was needed. It had to be light, durable, and resist discoloration. And, preferably, washing instructions would be integral with the material. Rockwood thought polyester a possibility.

Two days later, he returns with a pair of commercial bread trays molded by Fabricon Products, Detroit, to demonstrate polyester's rigidity, lightness, and ability to accept printed matter during molding.

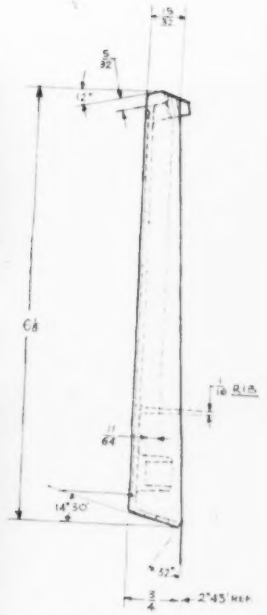
Weeks later, Kohlmann and Oles return to Boldt's office with a prototype panel molded by GATX in fiber-glass reinforced polyester. With Wojtowicz, they check it for accuracy and, after approval, give GATX the go-ahead for production molding.



At GATX's Chicago plant, the Bendix Washer panel is molded. Upper photo: after the printed washing instructions have been set into the mold, a fiber-glass reinforcing mat is laid down. Lower photo: with the glass mat in place, polyester resin is poured and the press closed. Heat and pressure are then applied, curing the assembly and forming a solid unit.



Later that afternoon, Rockwood and the Boldt designers show the polyester bread trays to two Bendix representatives from Cincinnati: Spencer Kohlmann (with tray), Chief Engineer; and J. F. Oles, Project Engineer.



To show how ribs and reinforcements could be molded in polyester, Rockwood sketches a panel cross-section for the Bendix engineers, who are impressed with the possibility and decide to try it out. Rockwood's participation in the panel development ended at this point. Right: panel cross-section from the drawings that Bendix submitted shortly afterwards to the General American Transportation Company (GATX) for molding.

The molded part is removed from the mold. It is later trimmed, holes are drilled, and the finished washer panels are shipped to Bendix.

With its unique polyester top panel as the pièce de resistance, *the Bendix washer attracts attention in a New York store.*

Rockwood spends time behind the scenes preparing lectures about plastics and desig

One of the unorthodox aspects of Rockwood's job is the quantity of time spent in preparation—trips to Toledo for consultation with Barrett's molding and materials experts, photography at home or in fish markets, speech writing. The latter two functions are particularly useful in offices where no specific problems invite his advice on the aptness or ineptness of a possible plastic application. Rockwood, by previous arrangement or on a moment's notice, can summon his resources and give any group of designers a general orientation on plastics in the Barrett group. "Our World of Color," a talk delivered recently to Henry Dreyfuss' New York staff and pictured on the opposite page, is a typical instance: Rockwood used slides and samples to demonstrate various color applications of Barrett resins, and diagrams to explain their particular flow characteristics and how to allow for them when detailing wall thicknesses, mounting bosses, etc.

It is, in fact, impossible to determine exactly where Rockwood's greatest contribution lies—he, and especially the designers he visits, are just beginning to sense the possibilities of his service. He will be useful to designers to the degree that he is relied upon to give candid opinions and direct support, for his aid is in the interests of the plastics industry, the design profession, and the consumer at large.

He catches his lunch on a sideways run . . .

To help illustrate a future talk, Rockwood photographs a molded urea TV cabinet . . .

. . . and an old Toledo scale housing, which was the first widespread application for urea.

. . . and goes home to compose his slides and thoughts into a talk.

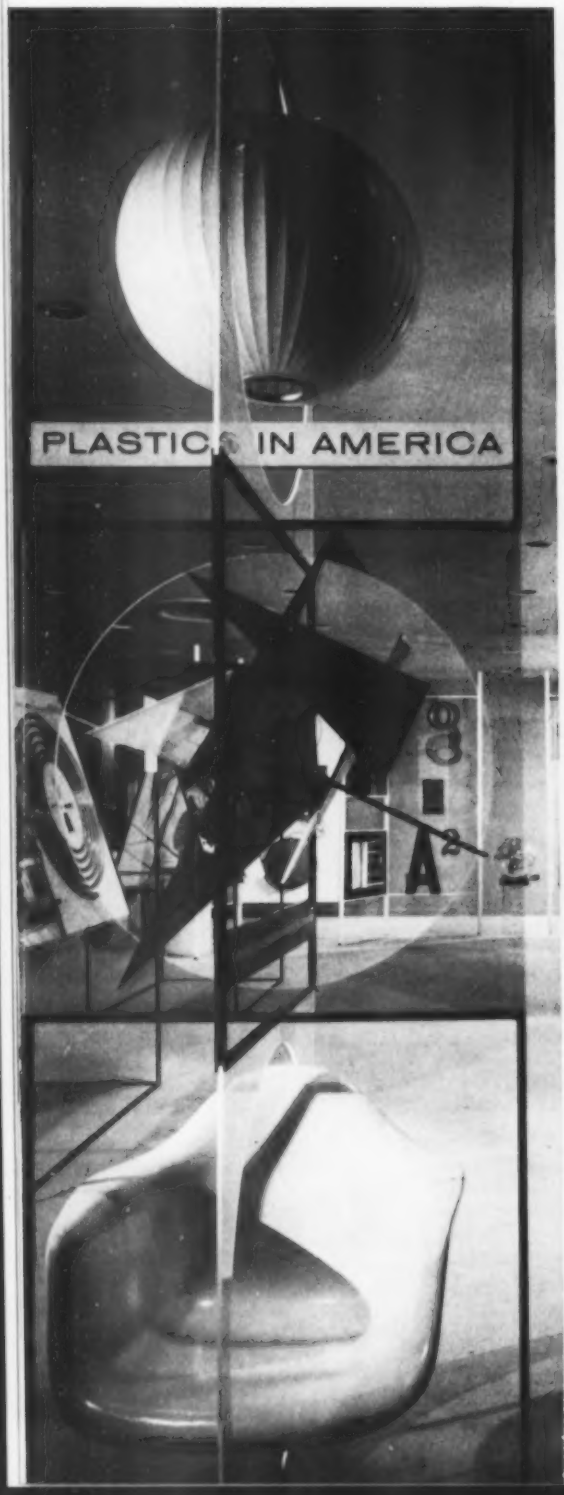
The outcome of all the activity shown on the opposite page is a talk, this time to Henry Dreyfuss' New York staff. Here he shows a slide . . .

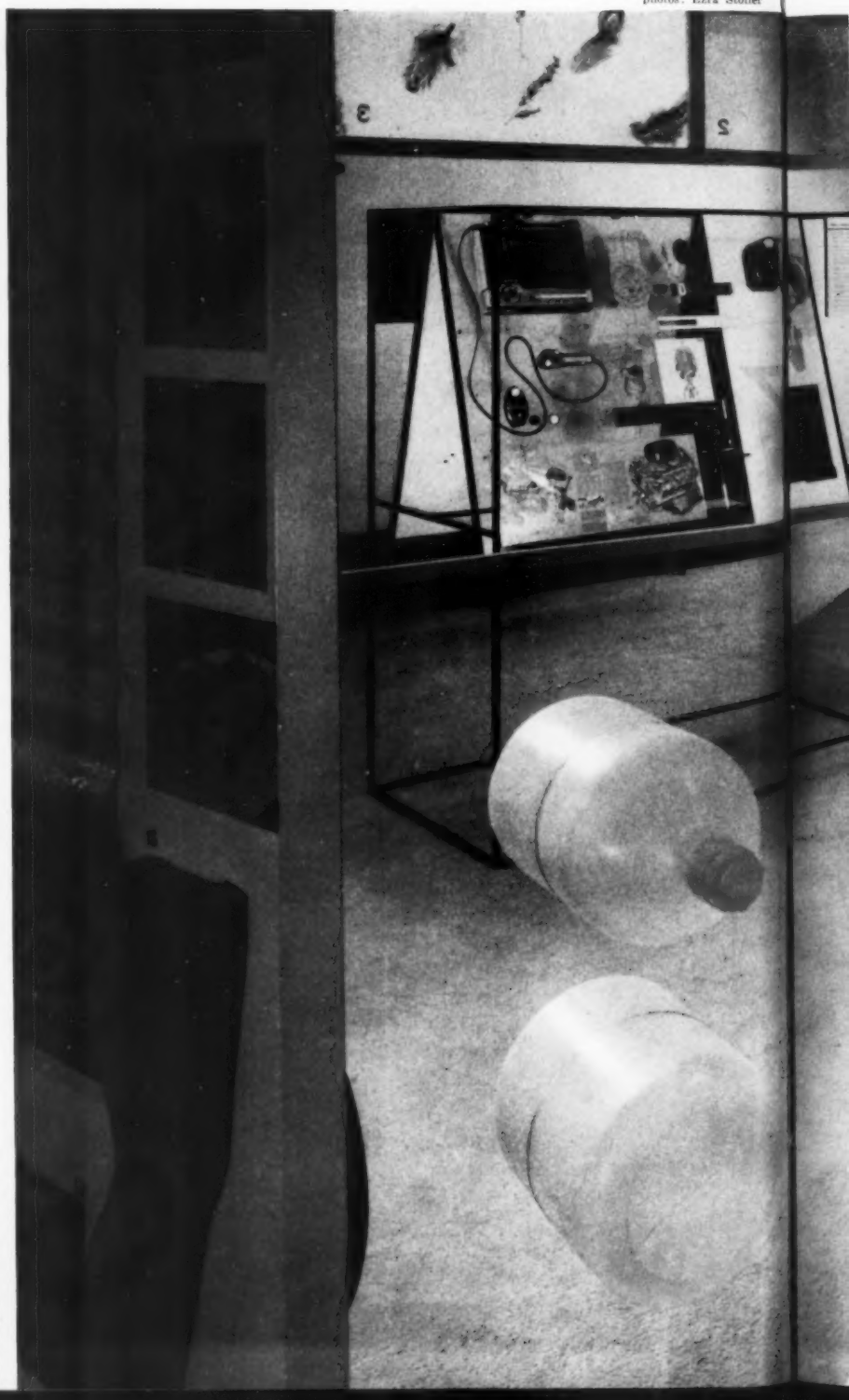
. . . and here he shows a sample . . .

. . . and here he starts out all over again.

Plastics exhibition

photos: Ezra Stoller



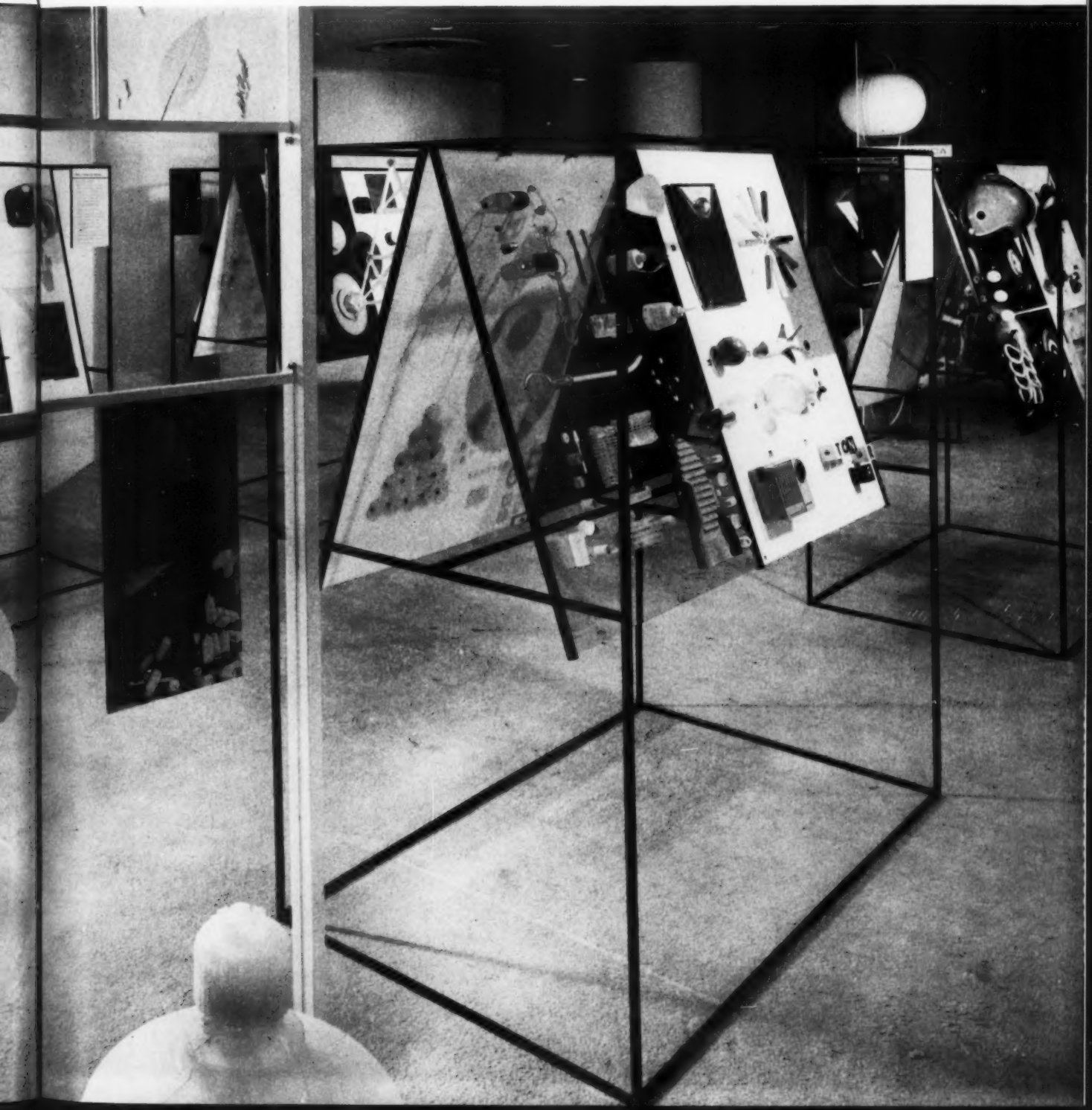


To foreign observers, a portable display carries a buoyant account of U. S. plastics

Europeans and South Americans will be viewing 400 examples of American plastics (called inclusively "le nylon") in an exhibition sponsored by the Smithsonian Institution and designed by Will Burtin, travelling under the auspices of the U. S. Information Agency.

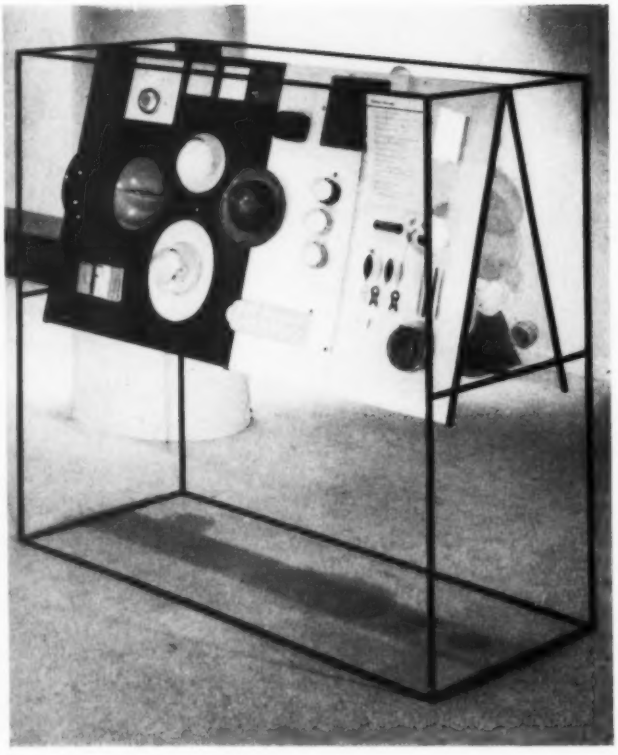
In an effort to focus the breadth and scope of an industry already gigantic and still growing, Burtin worked with the Society of Plastics Industry for a year selecting 400 products used in business and advertising, sport and travel, medicine, recreation, automobiles and the home. "We tried to find objects which were well designed and the best-adapted to their purposes," Burtin said, "but we have also included some because they show what is happening in the industry."

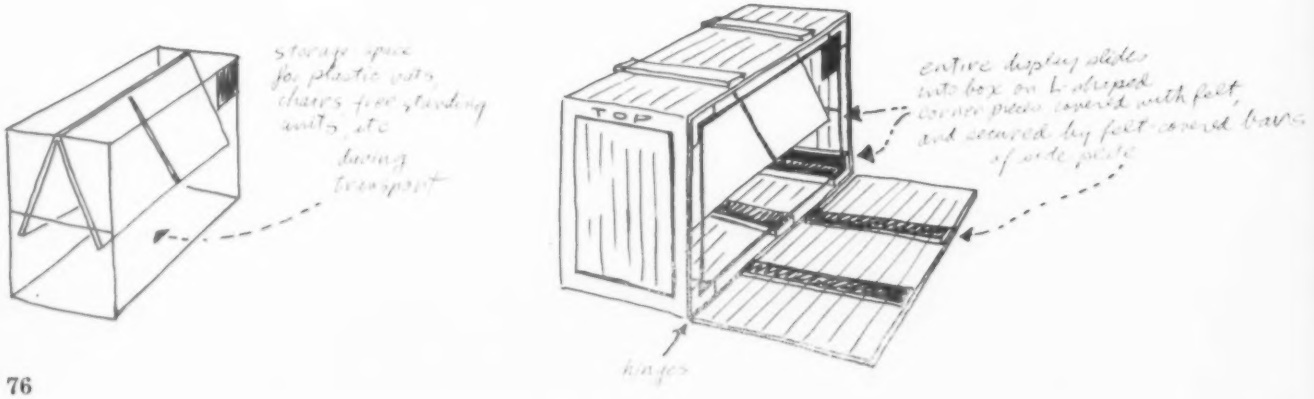
One free-standing unit (opposite page, far left) decoratively introduces the relationship between designers and synthetics: Nelson's white bubble lamp and Eames' white molded chair— with Burtin's plexiglas construction in many colors, the trademark of the exhibition.



Since it is not a collection of crown jewels or rare antiques, but of products that are virtually unbreakable and easily replaceable, the exhibit fulfills its educational purpose by inviting the viewer to inspect and touch. Made up of transparent and opaque plastic panels in aluminum frames, each unit can be viewed from both sides; and the samples are compactly organized and identified in a setting of gem-like colors. The installation represents manufacturers from coast to coast as well as some independent designers, and one sculptor, Leo Amino. There are such remarkable applications as skeletal parts for medical demonstrations, safety diaper pins, artificial fruit and swimming pools. Even more evident is the extent of plastics' encroachment upon daily life: buttons and buckles, ice cube trays, fabrics, fly screening, necklaces, floor tiles, containers, toothbrushes.

Experimental uses of plastics illustrate the changing American market: how in some areas—women's handbags, for instance—the limited success of plastics indicates that people are still finding greater satisfaction in other materials, while in other areas such as fabrics, display products and mechanical toys, plastics are having a heyday. As containers, plastics are the answer to special needs, particularly for chemicals, providing tough, unbreakable acid bottles that can be easily handled and that do not, like glass, deteriorate. Two fields in which plastics have just begun to be felt are advertising (see the giant plexiglas letters, molded and die stamped for outdoor use) and printing. An offset printing plate made of pyroxylin, a cellulose derivative, by Fairchild Camera and Instrument Corporation will enable foreign observers to assess one of the most recent developments in America's vast chemical revolution.



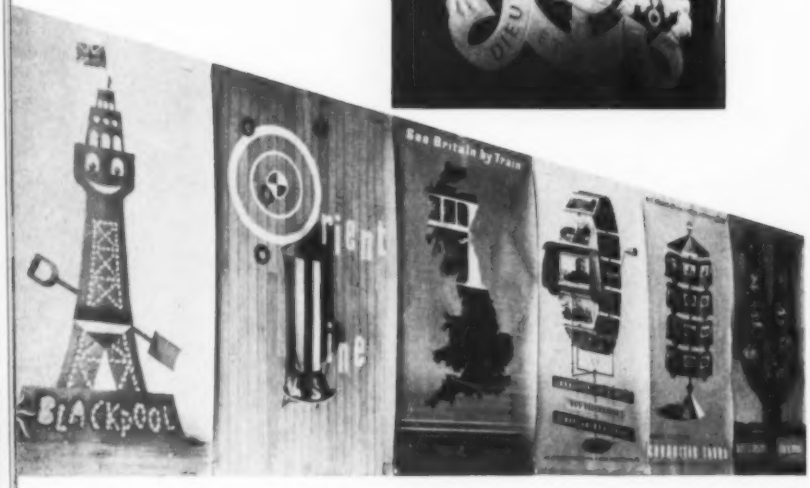


Designs from Britain

A cross-section of work by seven designers will tour the country

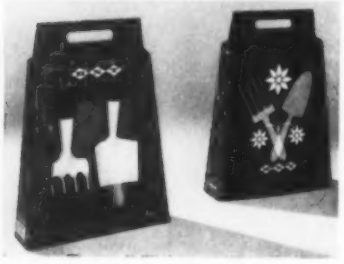
Just as plastics on the previous page announce American industry abroad, the glass screen (below), designed for the entrance to the Royal Box in the Royal Festival Hall, heralds an exhibition of the selected work of seven British designers, held through January at the Florida State University Art Gallery in Tallahassee. It was organized by W. M. de Majo (one of whose accounts is Gilbey's gin), who is represented by a cross section of strong designs, mostly graphic, from a presentation pack for ball pens to swizzel sticks for Pierre Smirnoff, Ltd. Abram Games (exhibitor in 1953 at the Museum of Modern Art in "Four European Poster Designers") has a display of travel posters and ads, Ernest Race, a folding chair and a special design for a spastic child. There are chairs also by Robin Day; fabrics by Lucienne Day (winner of the Gran Primo in the Tenth Triennale); photographs of buildings and interiors by Misha Black (jointly responsible, with Sir Hugh Casson, for the furnishing of the new Time and Life Building in London); the heraldic screen by Milner Gray, known as an illustrator in such recalcitrant media as silver, pottery and glass. Finally, there are designs by Hans Schleger, active in graphics and films.

At the opening Mr. de Majo commented upon the immense advantages American facilities for designers, chiefly through a secure home market, have over Britain, so dependent upon exports. "One way in which we have reacted, in a country where tradition goes for so much, is to raise and establish our status as professionals." How the works themselves fulfill one of de Majo's criteria that "things are made to last," (see letters, page 8) the public will be invited to judge for itself as the exhibition travels to Chicago, Minneapolis, and possibly, the West Coast.

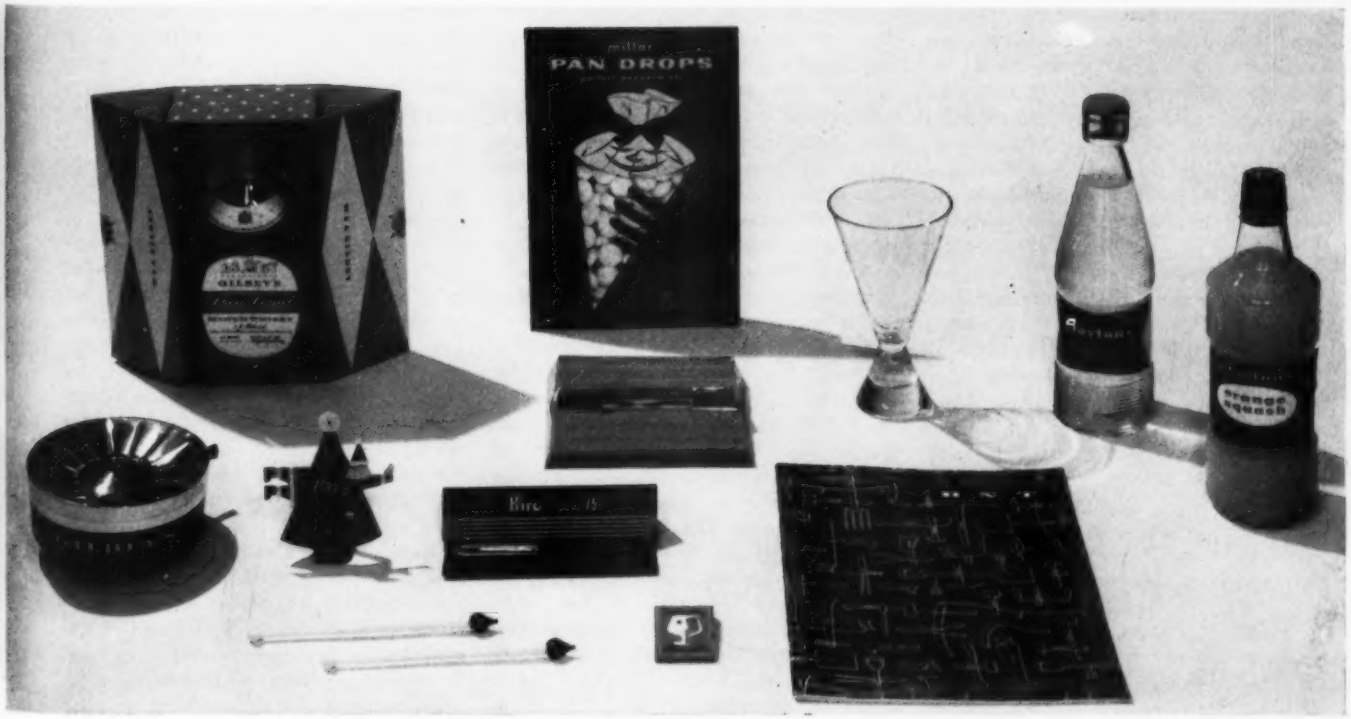


Touring posters by Abram Games. Also shown were his cover designs, postage stamps and ad for the Container Corp.

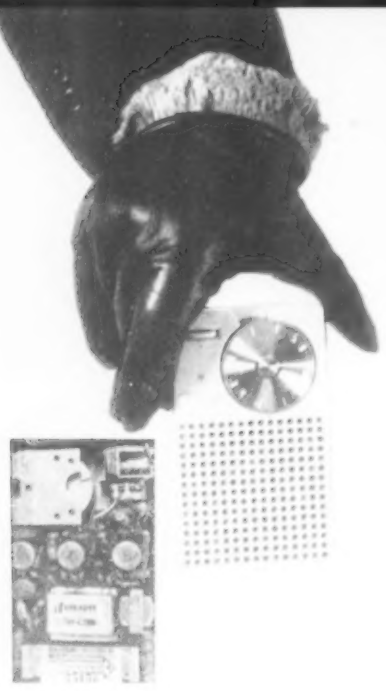
Package design with carrier was designed by W. M. de Majo for Brades Nash Tyzack Fork and Trowel (below).



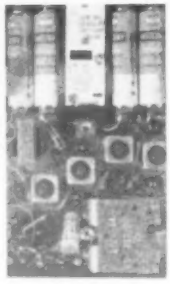
Produced to order for the National Spastics Society in Britain is this chair by Ernest Race for a spastic child. It can be tilted forward for mobility.



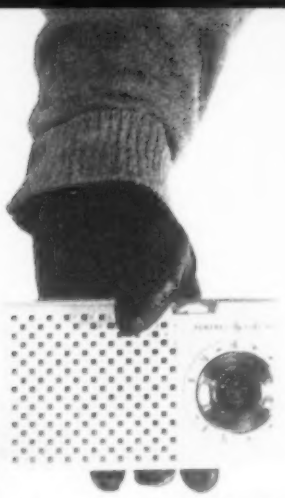
General view (top) shows Robin Day's Hillestack and armchair; Ernest Race's folding chair; Lucienne Day's fabrics. Photographs along the wall are work by Milner Gray and Misha Black. Group (above) is by W. M. de Majo and associates, Veronica de Majo and L. Bramberg.



Regency



Zenith



General Electric

the case of the Transistorized Radios

Just before Christmas 1954, the first transistorized radio, measuring 3″x5″x-1½″ and costing $49.95, hit the market; shortly after Christmas 1955, six companies were plugging "personalized" radios of similar dimensions. Four more have since entered the race, and the lists are not yet complete. The public has apparently shown that it likes the novelty of compact and portable little sets—even at premium prices—and for the moment doesn't regard size as a measure of quality.

But as manufacturers cram the most radio in the smallest space, there is more barking about quality too: about "all-transistor" and "shatterproof" sets, improvements that presumably explain why prices continue to rise. The industry's struggle to pare down size and weight while building up value provides a first-hand example of the problems of miniaturization: what it costs, what it's worth, what compromises it demands.

Why tinier?

The most publicized factor in the miniaturization of radios is, of course, the transistor, the wonder child of modern electronics. A thumbnail-sized germanium or silicon element of negligible weight, the transistor amplifies radio waves in less than one-quarter the space of an equivalent vacuum tube. When four or more tubes are replaced by transistors, this means an important economy of space. Some firms prefer hybrid sets, using both transistors and small tubes, because of the latter's better sensitivity in a particular circuit design.

There is a further space-saving advantage in their coolness. While vacuum tubes heat up like little stoves, transistors don't; components in a transistorized radio are packed more closely without danger of overheating, and without special ventilating provisions.

A third contribution to compactness is the transistor's low power appetite: it can be operated at power levels of a fraction of a milliwatt, which is vitally important in battery-run radios. Several of the sets above can run on one small penlight or flashlight battery for 100 to 150 hours, while a vacuum-tube set would consume several more costly batteries during the same time.

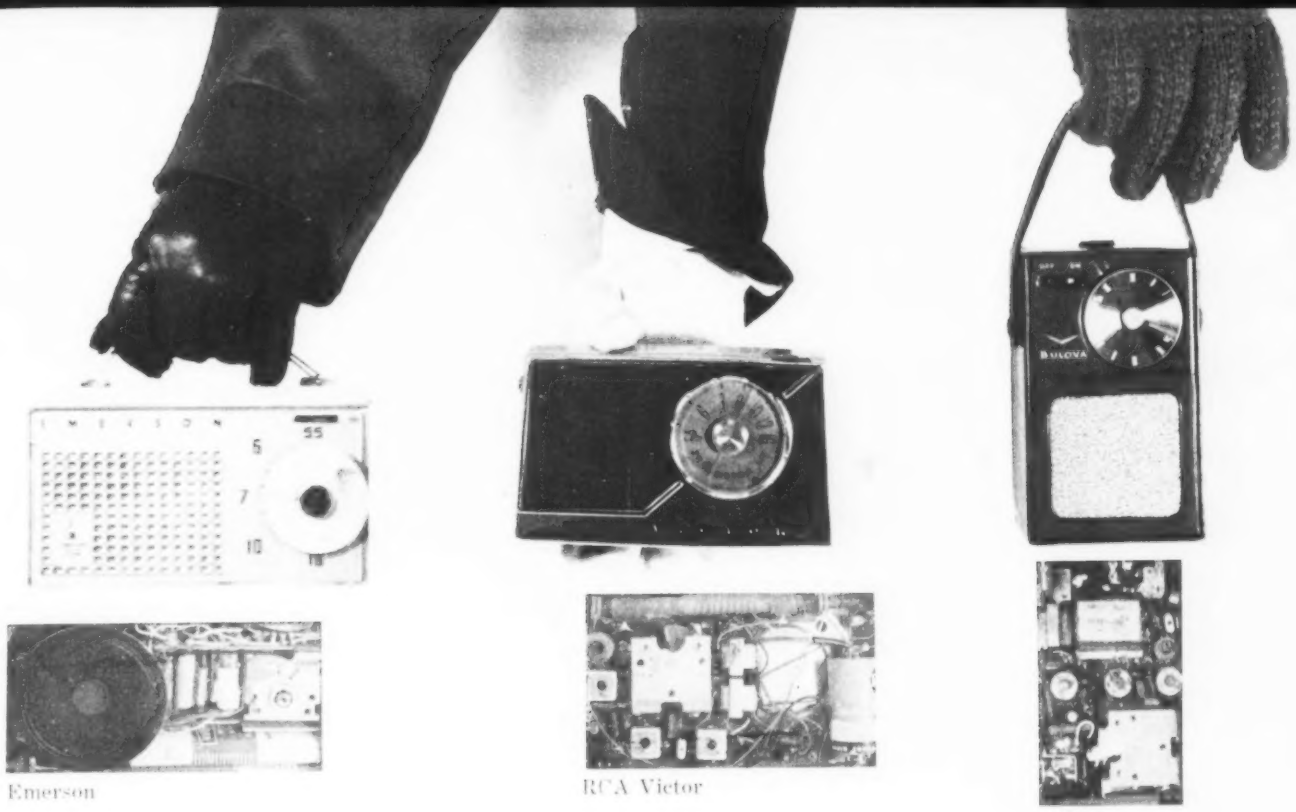
The transistor's fourth effect is on circuitry. Because the components associated with transistors differ from those of a conventional set, and are also much smaller, miniature radio circuits have had to be wholely or partially redesigned. Most manufacturers have gone to printed circuits, which, at this scale of miniaturization, are almost imperative—not only for neatness and compactness, but for simpler fabrication and servicing.

Transistors have helped shrink the radio into a handy gadget to be whipped from the pocket or purse at kickoff time, to be held to the ear during the agonizing hours of election returns. But one of the ironies of miniaturization is that the smallest package often carries the biggest price tag. Radios so far have been no exception.

Why costlier?

While regular battery-run portable and convertible radios are selling for $20 to $40, their younger transistorized brothers have been running from $44 to $75. Very recently, Emerson introduced a model at $29.95, no doubt heralding an industry-wide attempt to cut prices. But prices can drop only as economies are effected. Here miniaturization offers few immediate consolations.

Costs are tied directly to a) the price of transistors, b) the cost of other miniature components, c) the fact that it often takes more transistors to do the same job. A radio with 4 to 7 transistors, priced at $1.00 to $4.50 depending on type, has a strike against it; it will probably not be eased until more reliable methods of fabricating these delicate components can be found. (Transistor rejects have been known to run as high as 9 out of 10.) Yet no one doubts that prices will gradually come down, as a result of manufacturing experience, component development,



Emerson

RCA Victor

Bulova

Tinier but not always tonier, they demonstrate some hazards of miniaturization

and to some extent improvement in assembly technique. Three years ago Zenith sold a 3-transistor hearing aid for $125; today it sells a 4-transistor model for $50.

Increased production based on higher demand would, undoubtedly, help a great deal to bring down the cost of miniature components. But here the circle may close on little radios. As soon as the novelty wears off, the demand for tiny radios will be tempered by value received. The consumer will start to weigh compactness against performance, and will decide whether or not size *is* a measure of quality.

What about performance?

Obviously, transistor radios are convenient: with batteries they weigh between 12 ounces (Regency, Bulova, Emerson) and 19 ounces (Zenith), and offer from 30 to 150 hours of sound at a cost that is generally less than 1¢ per hour. They are reliable—since there is no reason transistors should wear out as tubes do. Their frequency range, area of reception, and sensitivity are comparable to tube sets of equal size (bypassing differences among miniatures.)

In other words, the sacrifices of fidelity and volume may be traced to overall size and weight reduction more than to any inherent limitation in transistors —which are, after all, only one factor in the miniature radio. Sensitivity is limited by the size of the receiver; volume and fidelity are limited not so much by the limited power output of the transistors, but by the size of the speaker, speaker resistor, and by the absence of a baffle. All of the pocket radios have speakers of $2\frac{3}{4}$" diameter or less—a size which does not yet provide excellent reproduction regardless of power output. (The earphone attachments actually offer better reproduction than the speakers.) As soon as power transistors come along, better miniature speakers will have to follow.

Features and futures

In the design of the housing, the problem is to make a little radio look like a precision instrument with quality as high as its price. The manufacturers of the first transistorized radio, Regency, suggested an idiom when it decided on a vertical case that would hold the loopstick antenna in an efficient horizontal position inside the pocket or out; the designers (Painter, Teague and Petertil) squeezed everything into a tiny, simple, molded case with integral holes. Despite functional changes, this idiom was followed by the first competitors, but recent comers like Zenith and RCA (above), as well as Motorola and Magnavox, have switched to a flamboyant style more suggestive of larger radios than fine instruments.

Though no one has yet devised an electric cord that plugs in like earphones, Zenith made a feature of a handle that becomes a table stand. A new Motorola model, like a larger portable, incorporates the antenna into the handle-stand so that the radio may be housed in a steel case. All other cases are largely non-metallic, to avoid interference with the inside antenna. Motorola feels the unbreakable case is a sales boon, and certainly the industry and public alike are conscious of breakage problems with pocket radios. Zenith features an unbreakable nylon case; RCA offers a 5-year guarantee on its Impac plastic case.

The miniatures' future is less clear than miniaturization itself. Novel and handy, they are not yet substitutes for table radios in quality. (Transistors may eventually make possible a table-size set that operates free of house current, the advantage being in permitting a freely located radio in a all-enclosed cabinet.) Some firms, like Raytheon with its larger 2-speaker transistor portable, will pursue quality as well as compactness, while others go for a radio the size of a watch. If the real goal of miniaturization is more (performance) with less (bulk, cost), it will take more than transistors to make the tiny radios tonier.

J. Muller-Brockmann

Dialogs on graphic design—IV

As an illustrator and as a designer of exhibitions, posters and other graphic work of spectacular precision and clarity, J. Müller-Brockmann has established a reputation in Switzerland which has extended beyond the borders of his native country. Continuing ID's series of discussions on graphic design, which has included thus far Lester Beall, Paul Rand, and Lou Dorfsman, we asked Mr. Müller-Brockmann to prepare a layout made up of a selection of recent work done in his studio in Zurich, where he is assisted by Nelly Rudin. It is presented on the next eight pages, accompanied by his own comments about his profession: "A great deal is asked of the designer today. Because of the hectic age we live in, new and varied problems are forced upon us every day, all demanding appropriate solutions. It seems to me that to solve them well requires a certain approach:

1) Clear thinking. It is necessary to recognize the essential points of the problem.

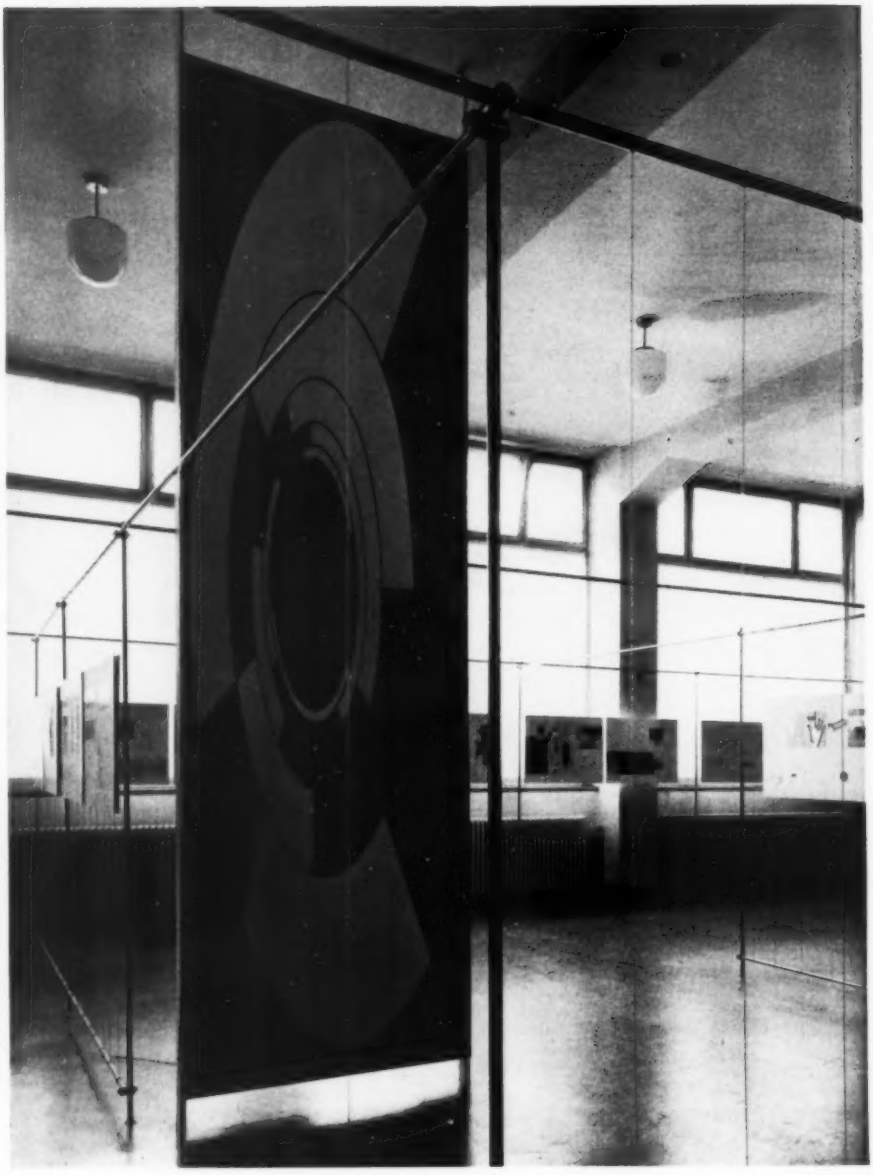
2) Mental mobility. This means the ability to go deeply into the various problems of a design, in terms of each situation.

3) Knowledge and control of the technical means which the problem involves. In graphic design the technical means are typefaces, photographs, drawings and color. The graphic designer must have a comprehensive knowledge of the value of typefaces, their different characters and their typographical rules. Since the principal task of type is to reproduce thoughts in the clearest and quickest way possible, the typeface has to be legible and well-organized with regard to the space between the single letters and words. Word and letter proportions, as well as their position in space, must be carefully considered. The same criteria hold for the relationships of photographs to the page design; if the whole is to make sense, script and pictures must be a perfect composition and the selected typefaces clear in their structure, like good architecture. Never should there be confusion in a layout. A great many newspapers, magazines and advertisements are guilty of using typography poorly:

1) Too many sizes and styles of typeface, producing a disorderly and confused effect. (Two or three, in the right proportion, will often be quite sufficient, and the meaning of the text gains strength and force because the type is direct and clear.)

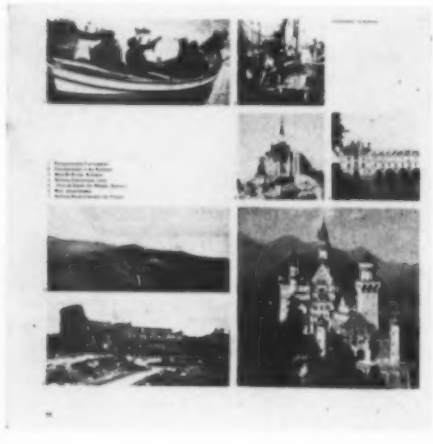
2) Awkward spacing of words in any typeface, ruining the clarity of running print.

3) Too-frequent repetition of a word, weak-



Above: symbol and installation of an advertising art exhibition.

Below: pages from a catalogue for the 50th year of the Automobil-Club of Switzerland.



ening its effect and detracting from the credibility of the statement.
With a thorough knowledge of typography and a sensitivity toward its use as a design medium, the designer must also be aware of the expressive qualities of photography. A photograph has the value of documentation; it shows the real facts. The technique of photomontage, of combining one photograph with another, makes it possible to convey inner connections so that an association of ideas becomes instantaneously visible. Whether the resulting effect is subtle or startling, witty or surprising, the application of photography in this manner is highly fitting in our technical age. We tend to think that there is something incorruptible about a photograph; it carries conviction. Where photography reaches its limits, the task of the designer begins—creating symbols to represent ideas, designing graphs, numbers and statistics. In the final analysis, the most striking impact comes from the utmost simplicity of form. This does not mean, necessarily, forms that are primitive and raw—simplicity in the negative sense—but rather the simplicity that is the result of the highest concentration upon essentials."

1 Poster for a concert using blue and white.
2 Poster for a concert in black and gray.
3 Another concert poster. Background is red; text and symbol are black.
Overleaf: Two more posters. Left, forms are tan, light blue and gray. Right, background is gray; forms violet, green, blue and pink.

1

2

3

musica viva

wladimir vogel

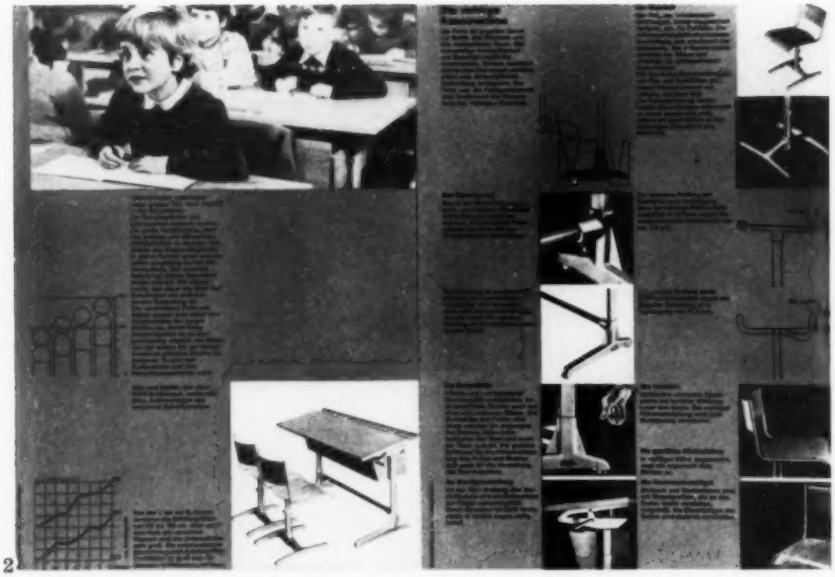
leitung
solisten

wagadus untergang durch die eitelkeit
spielmannsgeschichten der sahel
zürcherische erstaufführung
werner heim
ilse wallenstein, katharina marti, derrik olsen
st. galler kammerchor, zürcher motettenchor, kammersprechchor zürich
instrumental-ensemble
quatuor de saxophones marcel mule

7. volkskonzert der tonhallegesellschaft zürich
donnerstag, 17. november 1955
20.15 uhr grosser tonhallesaal
vorverkauf
tonhalle, jecklin, hug, kuoni, genossenschaftsbuchhandlung
karten fr. 1.– 2.– 3.–


erich schmid violine
carl seemann klavier
wolfgang schneiderhan violine
enrico mainardi cello

1

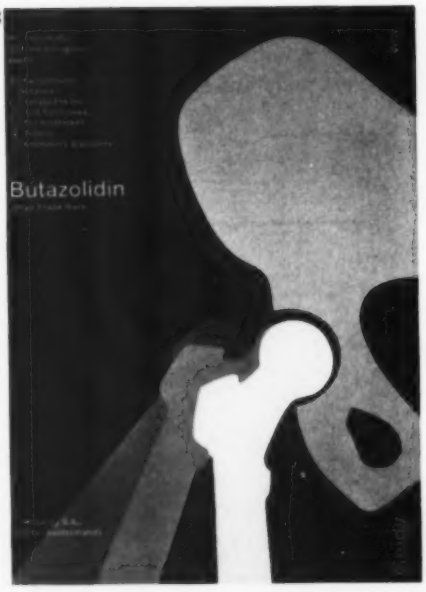


2

"We designers in this age of mass reproduction have a great responsibility. Day after day our products are being distributed in innumerable copies, influencing the taste of millions of people. Whether this influence is good or bad depends upon two things—our intention and our ability.

First of all, let us be honest craftsmen! The work can be good only when the design has been formed out of an inner conviction and a substantial idea, when the script clearly and simply reproduces the thought and the color has meaning. If there is to be clarity in the composition, the type styles, photographs and graphic designs must not only retain their characteristic qualities but enhance each other mutually, and negative forms must activate the positive forms and vice versa.

Since "modern" is the fashion, everyone wants to be modern, and thus we are subjected to a plethora of clichés in graphic design, an exuberance of so-called abstract forms, wildly distorted effects in typography, and glaring colors. To use only the earmarks of the contemporary idiom and to fail to understand its meaning is to design spuriously; the results are pseudo-modern. There are those who say that the best way to reach the public is through splash. A designer who accepts this idea is only trying to excuse his own inadequacy, for it is absolutely wrong that bad graphic design and advertising art is more successful than good because of the so-called bad and vulgar taste of the public. Big successful firms like Olivetti and Rinascente in Italy, Geigy and Lithographie und Cartonnage AG in Switz-



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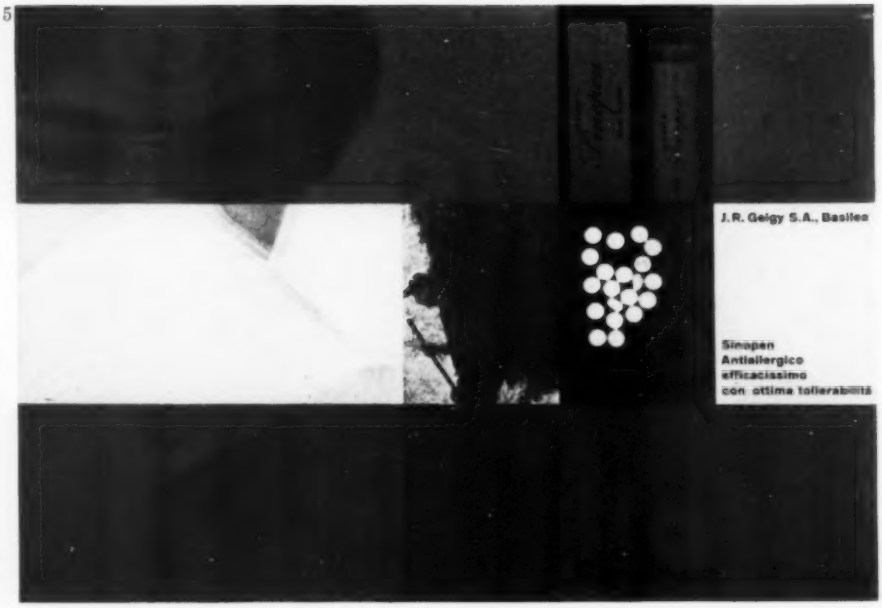


5

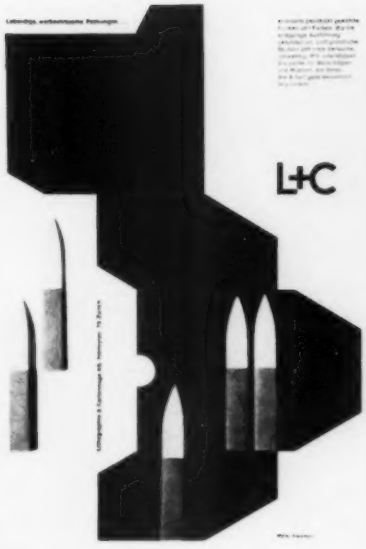
1/2 These are pages from an advertising folder done for the manufacturer of school desks. Background of the layout is green. Text and photographs are black.

3 Folder for an antirheumatic drug, Butazolidin, a photogram in orange and black.

4 A folder for Synpen (a Geigy product, a cold remedy) in violet and black.

5 Folder for Sinopen, a drug to relieve hay fever, done for Geigy. Technique is photomontage; colors are green and black. J. R. Geigy S. A. of Basle commissioned a series of these pharmaceutical leaflets.

erland, St. Raphael Quinquina in France, Upjohn in the United States and others prove exactly and unequivocally the opposite. It has been my experience for many years that the esthetic form in itself, the style of my work, has never been the reason for its refusal; it fails only when it is not good, logical or suited to the purpose for which it was intended. I am certain that the designer's first principle is to find a convincing form through serious thinking and searching. If his thinking is carried out purposefully and well, then his design will also be satisfying, formally and esthetically. As a designer, if I am asked what my favorite work or specialty is, whether exhibition, advertising, posters, layout, indoor or outdoor display (as on the wall of the Bally shoe store on the last page of this article), I am quite unable to single one out. Although they can be ever so different from each other, all problems have this in common: there is only one way to go about solving them. That is by concentrating only on the essentials and by crystallizing the right form and color according to the purpose of the problem. This is the creative element in each job and the greatest satisfaction for a practicing designer. And because the challenge exists in all fields of design, it is impossible to value one work or one problem more than another or any special field. My 'weltanschauung' enables me — in fact, requires me — to be always critical of my own work and that of others, for I feel that all graphic design, however diverse it may be in style, origin and purpose, should have this central conviction as its trademark.—*J. Müller-Brockmann*



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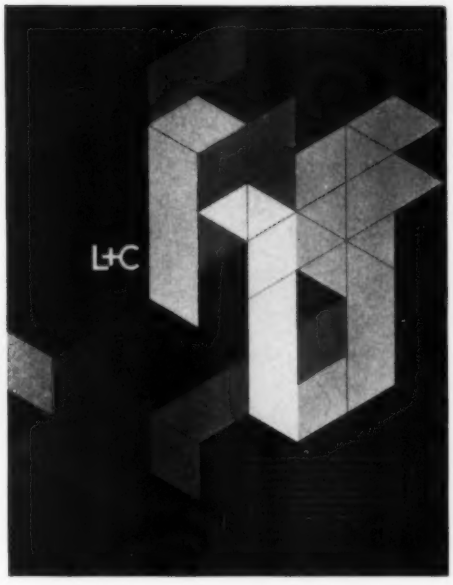
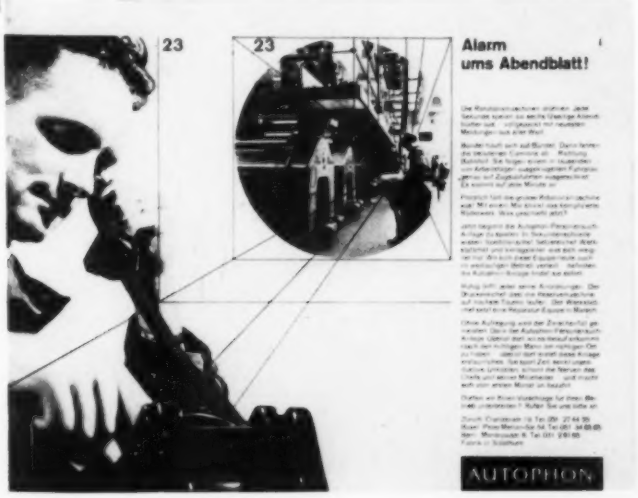


2

1/2 Advertisements for Lithographie und Cartonnage AG, Zurich, a packaging company, in black and white. The symbols are derived from the form of an unfolded carton.
3/4/5 These are three advertisements for a Swiss telephone company, Autophon. The designs in black and white were intended for newspaper or magazine reproduction. The message is conveyed through photomontage.
Overleaf: Left, poster for the Automobil-Club of Switzerland is a warning about safe driving: the friendly handsign is a protection against accidents. The cars and street are red; the border is tan, the hand, gray.
Right, wall design for Bally shoes. The footprints are in sprightly colors: a large yellow one, orange, blue, green, black and white. "Bally" carries out the same bright orange.

3

4



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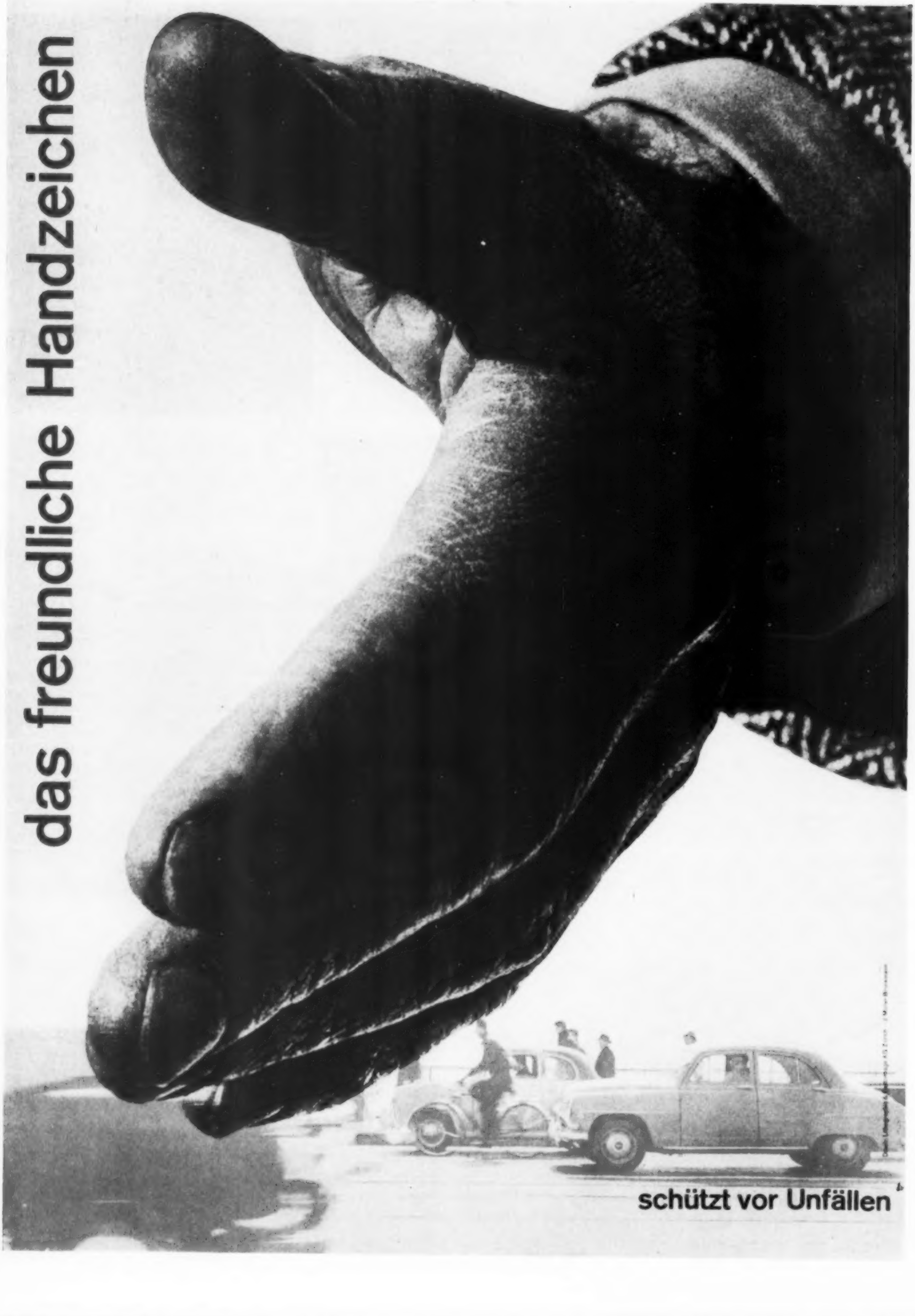
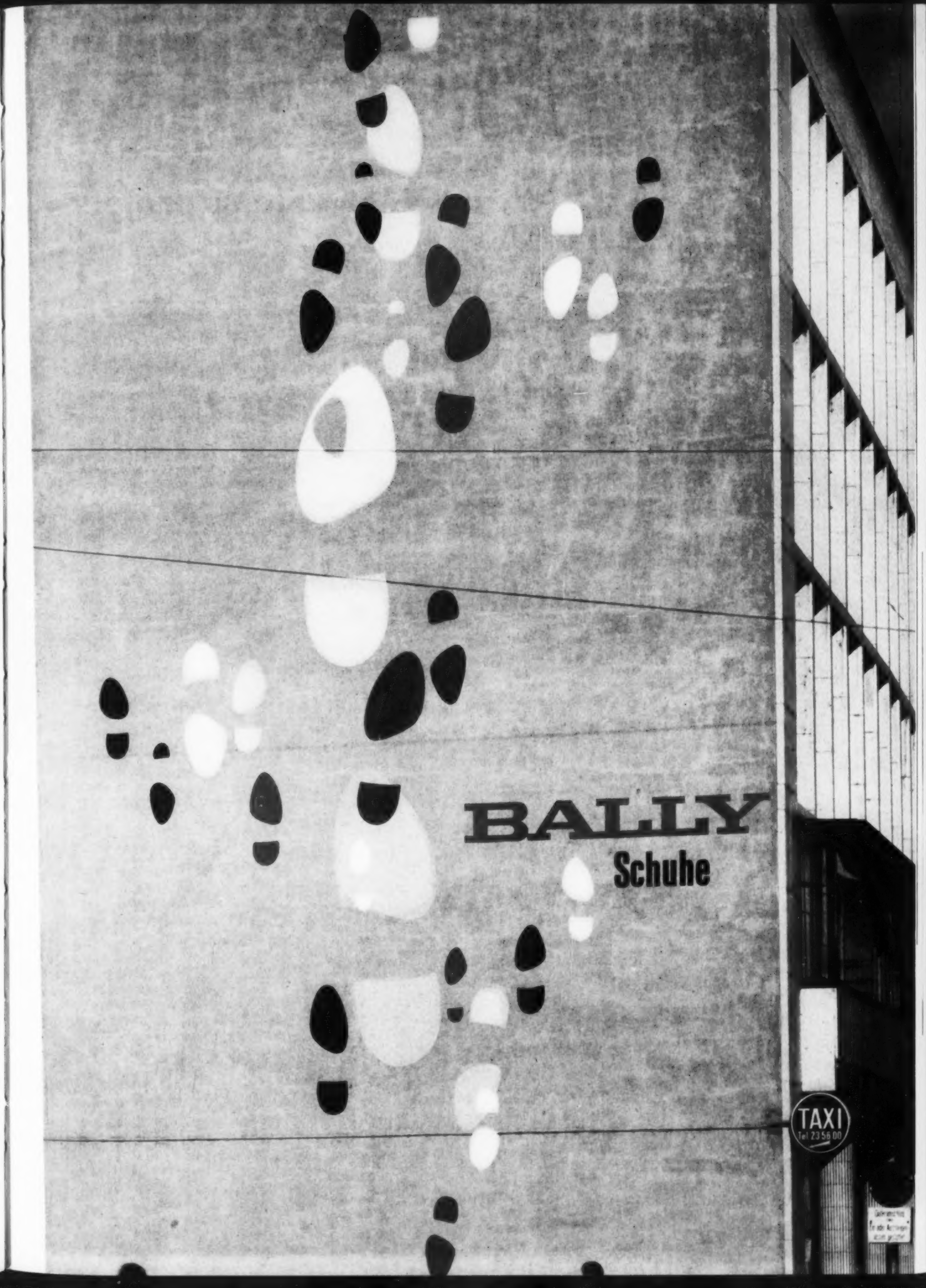

das freundliche Handzeichen
schützt vor Unfällen

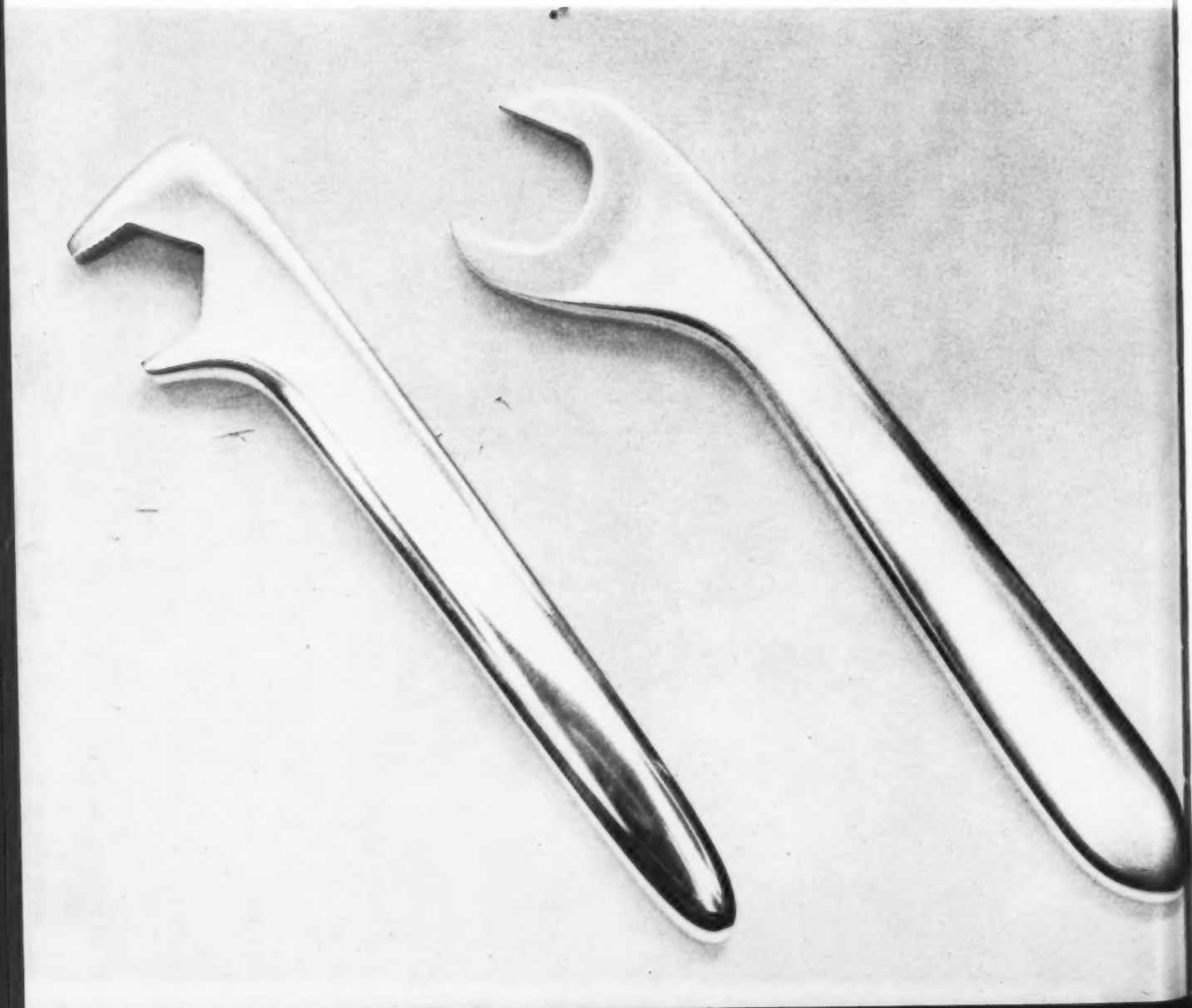

BALLY
Schuhe
TAXI
Tel 23 56 00

Student projects

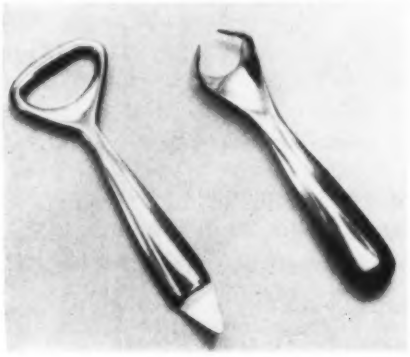
Pratt students have approached hand tools as a problem in form

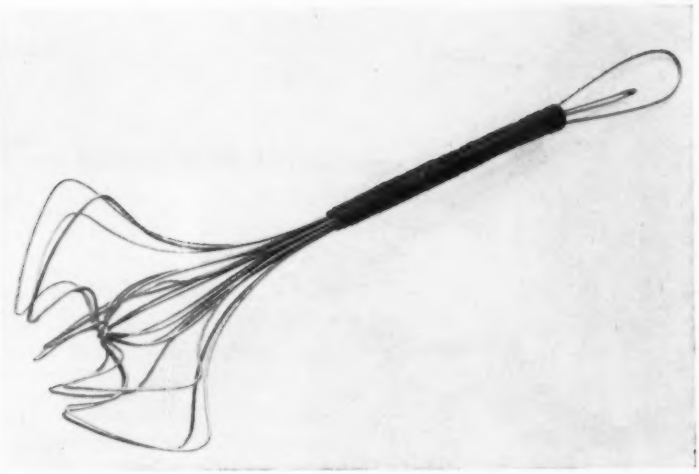
school: Pratt Institute
instructor: Ivan Rigby
participants: 40 third-year design students
problem: Hand tools

Constance Raitzky's wrenches have the shiny limpidity of tear drops.



Joseph Wetherell and Marjorie Ford have fashioned smoothly similar bottle openers.





Leon Wirch has modeled a whipper as though it were a piece of wire sculpture.

A tack hammer by David Stiles, poised as a mushroom, shows some restraint.

Tools as old as the Stone Age and gadgets as new as the Age of Plastic qualify for this exercise. "Improvements" were to be made not strictly on the basis of utility (working models were optional and some of the examples, such as pipes and strainers, were of the utmost functional simplicity anyway) nor in terms of materials tests or handle balance (models were made in wood, aluminum or brass, stainless steel being to unmalleable). Appearance was the important factor in the problem. Over the course of ten weeks the students shaped, tapered and polished — whatever the tool, they were to make it "beautiful." Pratt instructors found the results fairly satisfying. "Many of them, though common plumber's tools," said Department Chairman Robert Kolli, "would not be out of place in the crisp, modern kitchen." On this spread ID has selected a few characteristic examples; there were at least a half a dozen others with equally svelte silhouettes.

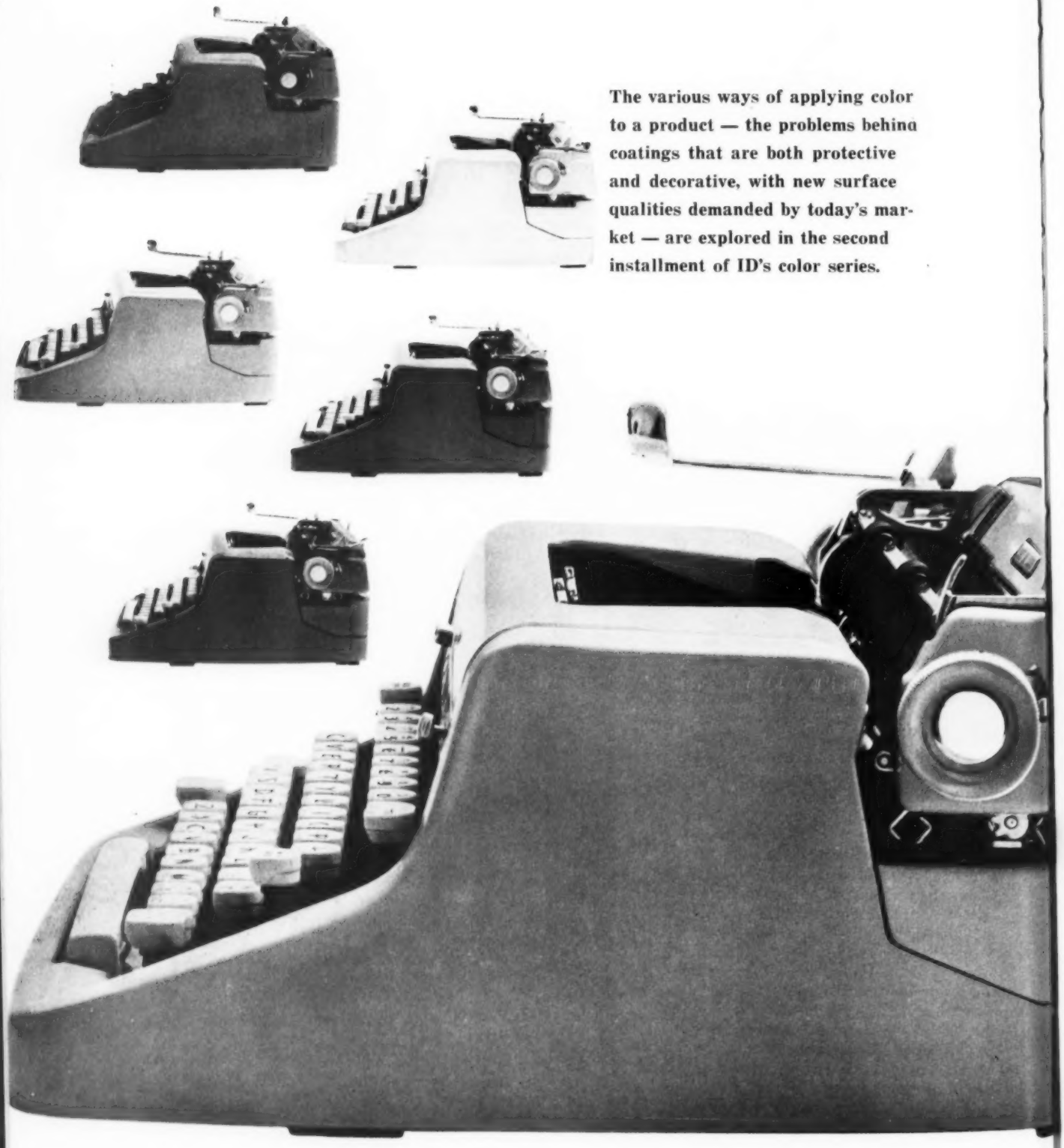
This kind of pure form problem brings home the fact that the more difficult challenge lies not in implements which offer some room for invention, and thus originality of form, but in the traditional hand tools—wrenches, choppers, hammers, etc.—whose time-tested forms are often appealing to begin with. When a tool needs no basic functional improvement, the design problem boils down to a matter of refinement; it tests the student's judgement and maturity: how to handle the surface without overworking it, or forcing it to conform to any arbitrary criterion of beauty (a tendency displayed in some of the Pratt examples); how to respect the rugged character inherent in the action of the tool.

John Leskowich's chopper has deliberately blunted blade corners.

Color Problems — II: Organic Coatings

by Douglas G. Meldrum

The various ways of applying color to a product — the problems behind coatings that are both protective and decorative, with new surface qualities demanded by today's market — are explored in the second installment of ID's color series.



Royal Typewriter's new portable line

The toothpaste tube and the typewriter on these pages both have surface coatings; both are *applied* to metal, both are applied to give color and protection, but the methods of application and the requirements for each coating are very different. It is these differences of requirements of surface coatings or finishes—the various methods of applying a color to a product and the limitations involved—that are of primary concern in this installment of "Color Problems."

Almost all surface coatings fall into two major categories: organic and inorganic. The organic finishes include paint, varnish, lacquer, shellac, all of which have bases or vehicles which contain carbon molecules. Inorganics, such as vitreous finishes, porcelain enamel, and glazes, are composed of inorganic oxides, minerals, fluorides, and salts.

Since coatings fall into these two groups, we shall treat them separately. This article will discuss organic finishes, while inorganics will be investigated in the third in the series.

To define coatings further in terms of today's problems, they must promote a product as well as protect it. Decorative coatings can serve both purposes by adding an attractive surface quality and color to a wood, metal, or plastic as well as giving to the material underneath a surface such properties as water, acid or alkali resistance, high or low gloss. The finish on a metal toy car, for example, not only appeals to a youngster because of its bright color, but protects the child by preventing rust—and protects the toy from the child if possible.

Choosing a specific finishing material for a specific product today is a complex task. With the new interrelationship of colors and coatings, and with the new demand for better performance and better appearance, both in the color and the *quality* of finish, designers and fabricators are faced with a two-fold problem: giving a product the best possible finish for surface protection and making this finish in the color and texture that is (or will be) the most irresistible to potential customers.

Endurance tests

There are several factors that determine the kind of finish and the process for putting it on a product: the material of the product, its design, the way it is assembled or formed, how it will be used, and the hazards to which it will be subjected. Of all the problems of applying color, getting the color per se is often the least problematic. The trouble is frequently a matter of what happens to color subsequently. Let us take the toothpaste tube as a test case. The first consideration is that a toothpase tube look clean and sanitary (like the Procter and Gamble tube here, designed by Donald Deskey). It must be brightly colorful—and stay that way during its entire life of abuse. Getting good color on a metal tube by lithography is just the beginning of the task; durability is the essential element. At least twice a day—and more frequently for those who follow the advice of the ads—every American man, woman, and child puts the finish on a toothpaste tube through an exceptional endurance test. It is subjected to pinching, squeezing, rolling, and punching and its colorful coating does not chip, peel or crack—an outstanding example of the punishment today's finishes will withstand. Furthermore, it must not stain or disintegrate under the influence of caustics, detergents, soaps, acids, and the other liquids found in every bathroom. It must be non-toxic, and constant contact with water and steam must leave its cheerful color unaffected.

Decorative protection

It cannot be said that all finishes are both decorative and protective. Red lead, the most widely used coating to inhibit rust on metal, is invariably covered with another coating to give a lasting and attractive appearance. Many varnishes have excellent electrical properties and are used as insulation on wire with no regard for their appearance, and the bottoms of ships are coated with certain types of paints to discourage barnacles. A decorative finish, however, that does not stand up in its environment cannot be considered satisfactory, no matter how beautiful it might have been when it left the assembly line. Thus there is an element of protection—if only self-protection—in every decorative and colored finish.

The typewriter on the opposite page is a good example of how a finish can become both functional and decorative—after a lot of research and expense. The traditional "wrinkle" finish has been used on office equipment for very good reasons: it hides defects and mars, cuts down glare, and is durable. However, there were negative reasons for the popularity of the wrinkle finish: it was impossible to obtain a really durable *smooth* colored finish that did not have an objectionable gloss.

Rapid and recent advancement in the field of high polymer resins brought about new *dull* finishes that are also very tough and durable. One result of these developments was the introduction by Royal of a new line of portable and standard typewriters in five colors with a smooth, non-glare finish. As with the toothpaste tube, the decorative qualities of the finish were only the beginning—in fact the desire for pastel shades

created more problems than ever. A black or gray typewriter with a wrinkle finish does not show stains or mars as readily as a pink machine with a smooth finish. However, a smooth finish is easier to clean than a textured one as long as the stains do not pit, eat away or permanently discolor the coating material. What, then, did Royal have to consider in going into color? A stenographer spends about seven hours a day at her typewriter. The finish on her machine must be able to withstand ink, mimeograph fluid, type cleaner fluid, hectograph ink, and perspiration. In addition, the all-American habit of eating at the desk brings in a whole new group of destructive elements to bear on that typewriter: mayonnaise, coffee, animal grease, lemon juice, tea (which is used as one of the most severe stain tests), and anything else found in a kitchen. And of course there are less obvious things that cannot be ignored, like nail polish and remover (which, after all, is designed to remove enamel whether it is on finger nails or on typewriters). The list of things that will affect a finish is almost endless and, depending on the product, a few, many, or all of them must be considered before the kind of coating material is chosen for every piece of equipment, every product, or every household appliance in existence.

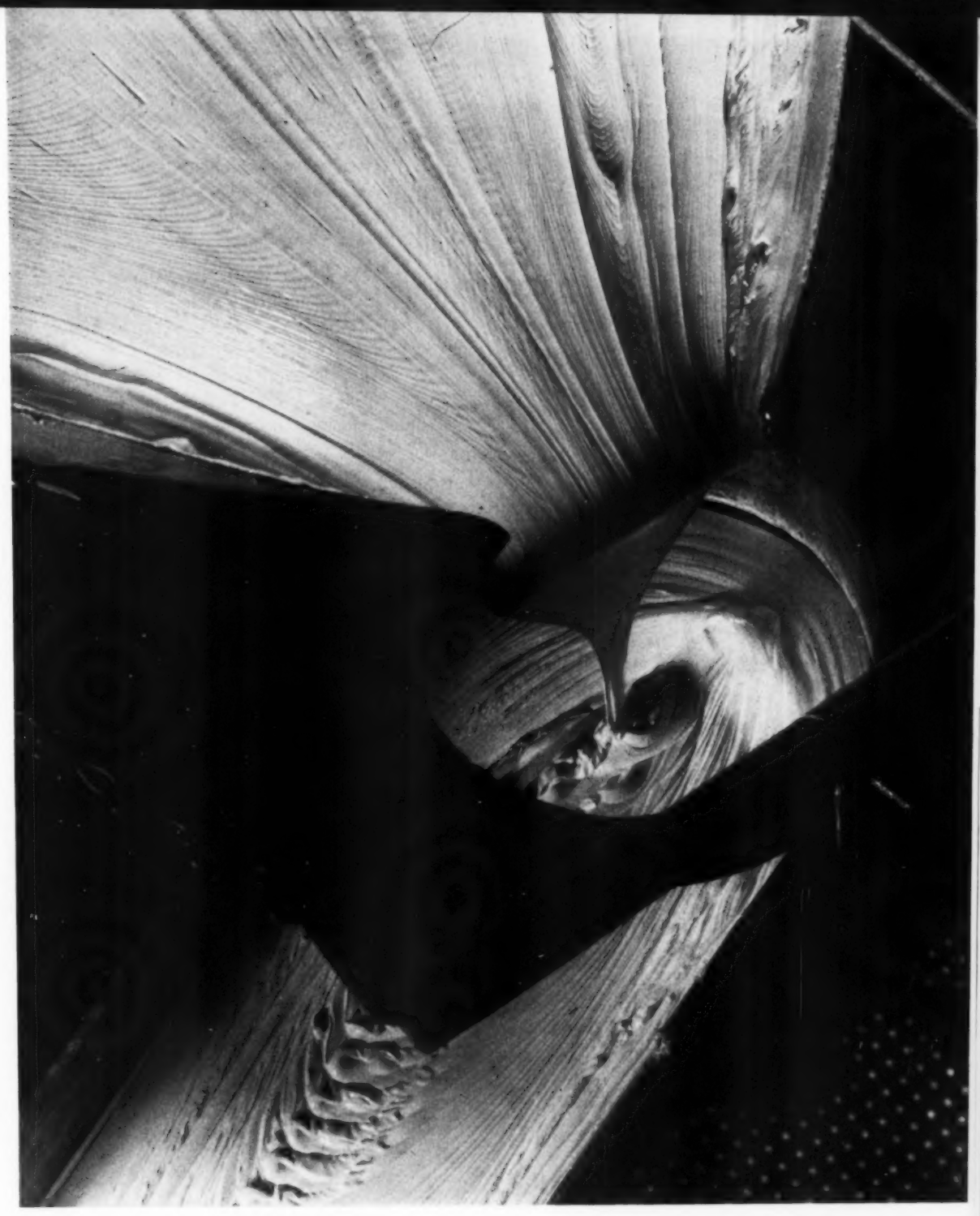
Choosing a pigment

The ideal finish, whether it is paint on a wall, enamel on a refrigerator, or the red on a fire engine, would be "as hard as glass, as flexible as rubber, and as cheap as water." The addition of "available in every color in the spectrum" would make such a hypothetical finish absolutely perfect. But no single finish can have all these attributes. Any finish is a matter of compromise, a matter of making a choice among the sum of qualities desired for any product. If the choice is color —including black or white—complications in the finishing process and extra cost may be the upshot.

Cost, of course, will vary with the color and the method of obtaining it. Adding a pigment to a coating material does two things: it gives the material hiding power and adds a decorative effect. But the addition of pigments cannot be haphazard and the selection of the proper pigments for a specific surface coating is directly related to the final use of the product. To go back to playthings, a toy manufacturer would certainly not use inorganic chrome yellow pigments to decorate something that would be in the hands and probably the mouth of a child, because they are toxic. The problem of toxicity could be avoided by using an organic benzidine yellow pigment. The toy manufacturer would get an added bonus because benzidine yellows give about ten times the tinting strength of chrome yellows. But, just to be sure he is not getting something for nothing, benzidine yellows cost about 10 times more per pound than chrome yellows (Color Problems I, ID February, '56). This brings up an important cost consideration. The price of a coating material cannot be judged by the cost of pigment alone; as it has been pointed out, some pigments will "go a lot further" than others. Consequently, there is always the possibility that if a high price must be paid to avoid or obtain a certain characteristic, it may be neutralized by the fact that less pigment is needed to do the job. There is no set amount of pigment that must be added to a gallon of paint to give it good hiding power; eight *ounces* of iron blue pigment per gallon of paint will give good hiding power while three *pounds* of cadmium maroon are needed for every gallon. Fortunately for maroon fanciers, they do not have equal price per pound—cadmium maroon is considerably less expensive.

Both organic (carbon) and inorganic (non-carbon) pigments can be used as colorants for paint. (These definitions should not be confused with the two general categories of coating materials, which apply to their basic ingredients, not the small amounts of pigments added to give them color.) Rarely, however, are organic and inorganic pigments blended together in the same vehicle because there is a constant danger that their chemical interreaction will affect the light fastness and the stability of the coating material when it is packaged. Brilliancy and clarity are usually reduced in proportion to the number of pigments that are blended together. Thus, the fewer pigments used or the closer they are in hue and chemical characteristic, the less the loss of brilliancy in the final color. However, there are many exceptions to the rule because brilliancy is only one of the many properties that must be considered. Generally speaking, inorganic pigments have good color permanency, but, when used in combination with organics, they lose this quality. More specifically, naphthol yellows have good baking characteristics and are frequently used to make imitation gold and bronze finishes on bottle caps and packages. Cadmium yellows have superior alkali resistance, zinc yellows are used as rust inhibitors, iron yellows do not have very good tinting strength and tend to redden when baked at too high temperatures, and so forth. It can only be indicated that the choice of the proper colorant for a finishing material is a highly intricate and scientific undertaking and one that demands the experience and knowledge of a specialist.

Pigments are only one of many considerations in the development of the proper colored finishes for a specific purpose. On the following pages we shall discuss some of the other ingredients that make up a finish, how they are assembled, and how they are finally put on a product.



Paint-making — an art and a science

There are hundreds of different types of surface coatings and they are made from combinations of raw materials of which there are thousands of possibilities. The process — mixing, grinding, thinning, blending, and shading ingredients to make a paint, varnish, lacquer, or shellac that can be applied in a certain manner, produce a film with definite properties, in a specific color — is an operation in which close control of hundreds of elements is essential. Paint, the most extensively applied surface coating, is, for all practical purposes, varnish with pigment. Since we are concerned with colored finishes here, we shall concentrate on its manufacture.

Paint-making begins in the laboratory. Chemists and paint technicians analyze the kind of coating they want or have been asked to produce. They must consider all factors from the economic feasibility of manufacturing a certain material — whether it will be

Ball mills at the Sherwin-Williams plant in Chicago. Raw material and pigments are ground and dispersed by the action of steel or porcelain balls tumbling in the steel drum.

Brightly colored thick paste is made in roller mills that mix raw materials and pigments—a key step in paint-making.

A Sherwin-Williams paint technician takes a sample of paint from a large tank for color matching in the laboratory. Slight additions of color concentrates are made if necessary to meet standards.

applied to something that will be used inside or out, in a kitchen or a garage, in New England or Arizona, on metal, wood, or plaster, as well as whether it will be red, white, or blue — before the first ounce of oil or resin is put into a kettle to start the manufacturing cycle.

A new formula is actually created for every new coating application. Requirements of durability, application, and cost are weighed and adjusted until the best possible combination of all is found in the desired color. A small batch of paint is made and tested. It is applied by the same methods and under the same conditions to the same surface that the product manufacturer will use. It is baked in the same types of ovens, it is given tests for light fastness, heat resistance, abrasion, viscosity, humidity, acid, alkali, and durability. The color is matched to samples and standards by colorists using their experienced eyes and photoelectric instruments. Finally, if it passes every test, production plans are made.

The actual paint manufacturing process starts by carefully measuring amounts of pigments, oils, and resins. These ingredients are mixed together to form a thick paste. The paste is run through grinding mills which completely and evenly disperse the pigment and make the paste smooth. Roller mills are commonly used for this operation: they consist of three, four, or five steel rollers which, rotating at different speeds, grind the paste between them. (picture: left, center.) An alternative to the roller mill is the ball mill, which is a large drum containing porcelain or steel balls. (picture: left, top.) The action of the balls tumbling and

grinding against each other disperses the ingredients to form a paste. The length of time that the ingredients are ground depends on the kind of coating material that is wanted. Extreme fineness of grind is not necessarily a desirable feature. Industrial primers, for instance, are not ground as finely as enamels for refrigerators and automobiles because primers would need adhesion and filling properties. If an enamel is to be glossy, however, complete dispersion is essential.

After dispersion, the paste flows into a tank where thinners and oils are added. Samples of the paint are taken from the mixing tank to the laboratory where careful color checks are made. Blending, (picture: left, bottom) a highly specialized procedure, is done at this stage: minute amounts of color concentrates are added to large batches of paint until the color matches a sample or standard. The paint is then ready for packaging and application.

The case of the can

One of the most familiar objects in the world, the tin can, presents very unfamiliar and involved finishing problems. A can has two finishes; one on the inside and one on the outside. This alone creates difficulties. In addition, thousands of different things, from food to tennis balls, are packaged in cans and each one is a potential source of more finishing problems.

The cans at the bottom of this page, made by American Can Company, are decorative and eye-catching. But what are some of the other requirements? Ideally, can manufacturers would like to find a single finishing material that would be suitable for all applications. This, however, is not possible because cost, color, and durability requirements vary—depending on what is in the can and what facilities the product packager uses. Also, as some cans require much greater resistance to certain elements than others, it would not be economically practical to give all can finishes the same characteristics.

Outside finishes for tin cans today are almost all one or another type of alkyd material. Alkyd-type enamels are well-suited for this application because they are versatile, give good color retention, gloss, and are tough and flexible enough to withstand high-speed forming and stamping; the latter is an essential characteristic because cans have their finish put on before they are formed. On the inside of tin cans, vinyl and oleoresinous finishes are used. Vinyls are particularly good where taste is a factor. Oleoresinous materials have a tendency to discolor which, although it does not affect the contents of the can, is obviously not desirable.

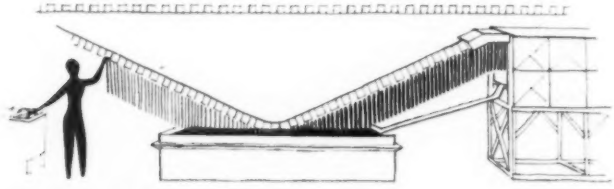
The broad application of alkyd finishes to cans is a result of the wide research that has been done to develop a great diversity in this material. Resistance to heat, for instance, is necessary for the ham can shown below because some meats are processed in the can for as long as three hours at over 250°F. A coffee can, on the other hand, does not necessarily need heat resistance, but creates a problem because an unusually brilliant gloss is desirable, and the strip opener, so familiar to everyone, requires unusual flexibility.

Examples are legion, each one involving such individual problems as grease resistance, detergent resistance — every colorful can on the grocery store shelves represents some sort of challenge and makes the tin can one of the largest fields of product finishing.

Applying color to a product

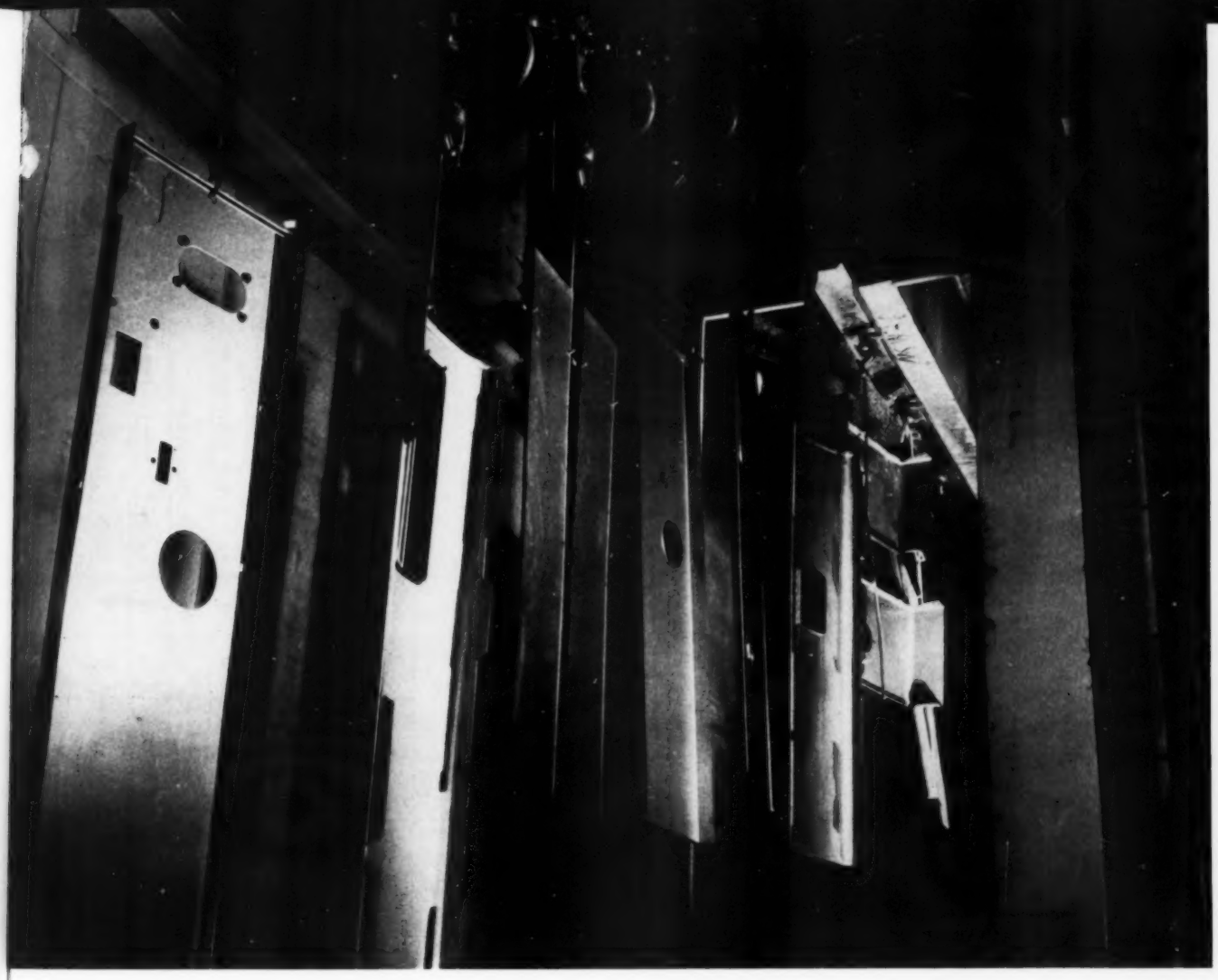
The colored surface coatings for the applications on these pages were chosen because they had desired characteristics, such as abrasion resistance, light fastness, or solvent resistance. Similarly, methods of application were selected to give the best results most economically under production-line conditions.

In addition to the four basic methods of applying coatings illustrated by the cases here (spraying, dipping, flow-coating, and electrostatic spraying), there are other ways of putting a finish on a surface. *Brushing* is the oldest method but has, to a very great extent, been replaced by *roller coating*. Even in the home, the roller has become increasingly popular. *Spraying* includes hand, automatic, and electrostatic. Approximately 90% of all final finishing materials used by industry are applied by spray. Hand spraying (left) was given a real boost in 1922 by the automotive industry when the first automobiles with a sprayed lacquer finish were turned out. Hand spraying is still widely used because it is flexible and portable, but mass-finishing installations have turned to automatic methods. *Electrostatic spraying* is based on the principle that like charges repel and unlike charges attract. The object to be sprayed is surrounded by an electrostatic field into which an atomized cloud of coating material is sprayed. The coating material becomes ionized and, having an opposite polarity to the object to be coated, is attracted to it, depositing an even film.



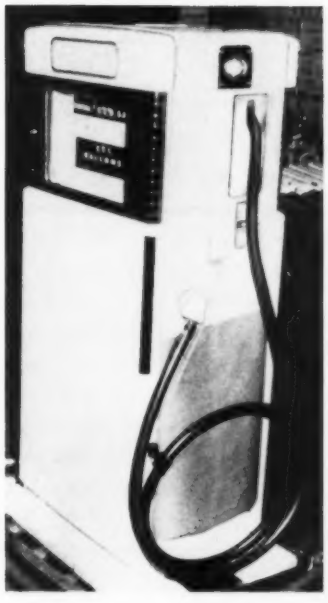
Rugged red for a mower

The Toro Manufacturing Company of Minneapolis, Minn., wanted to increase the production of its mowers and give them a superior bright red finish that would have high abrasion resistance and not stain or disintegrate under the influence of gasoline and oil. The emphasis was on two things: the best type of finishing material to give good wear under the abuse that a mower must endure, and the best way of applying it to live up to production schedules. The required properties were analyzed by the Glidden Company and the coating material chosen: an alkyd enamel, in this case, to give the necessary durability. For best application, Glidden technicians proposed that the process be changed from air-drying to infra-red baking to speed up production. Another change in the finishing process was to incorporate two methods of paint application: spraying and dipping. By spraying the motor housing and dipping the handles, time was saved, better results realized, and more units finished per gallon of paint



Custom-colored gasoline pumps

For an exceptionally weather-resistant and decorative finish on gasoline pumps (finished to order in any color), The Wayne Pump Company of Salisbury, Md., in cooperation with the Sherwin-Williams Company, developed a finishing system that also includes two methods of application. A neutral base coat of epoxy resin, selected for its outstanding chemical resistance, is flow-coated on the parts and baked at 400° F for 30 minutes. The alkyd top coat on Wayne pumps is applied by electrostatic spraying to take advantage of the uniform film thickness obtainable by this method. This coat is baked for 30 minutes before the parts are moved for assembly. Where under- and top-coats are involved, or if a decorative trim is to be added to a product, baking problems become more complicated. Depending on the coating materials, baking temperatures and duration, care must be taken that the cumulative effect of several baking cycles will not affect any one of the coats adversely. This problem is particularly severe for decorative strips. For instance, if a gasoline pump is white with a red trim, the white coat is generally applied and baked and the trim put on afterwards; thus the white will go through two baking cycles. The coating material for the white base must be able to withstand the second baking without turning yellow or becoming brittle.



KEY
Ratings
4+ outstanding
4 excellent
3 good
2 fair
1 poor
A.D. air dry
Cost range
M medium
H high

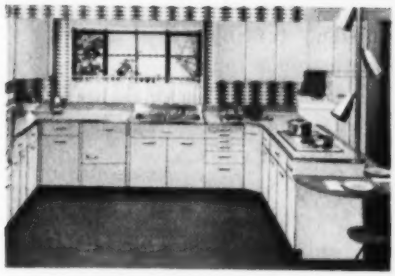
CONVENTIONAL TYPE OF VEHICLE	MANUFACTURING CHARACTERISTICS: CURE RATE RANGE	MINIMUM TEMPERATURE FOR CURING	THERMOPLASTIC	THERMOSETTING	APPEARANCE CHARACTERISTICS: GLOSS RETENTION - elevated temperatures	COLOR RETENTION - elevated temperatures	COLOR RETENTION - on aging	PERFORMANCE CHARACTERISTICS: EXTERIOR DURABILITY	FILM HARDNESS	FILM ADHESION	FILM FLEXIBILITY	FABRICATION AFTER COATING	ABRASION RESISTANCE	ALKALI RESISTANCE	DETERGENT RESISTANCE	SOLVENT RESISTANCE - aliphatic	SOLVENT RESISTANCE - aromatic	SOLVENT RESISTANCE - ketone or oxygenated type	HUMIDITY RESISTANCE	SALT SPRAY RESISTANCE	GREASE RESISTANCE	GENERAL CHEMICAL RESISTANCE - acids, etc.	COST: COMPARATIVE MARKET ON RESIN	
ALKYD oxidizing type	3	A.D.	No	Yes	2	2	3	4	3	3	3	3	2	1	1	3	2	1	3	3	2	2	M	
ALKYD non-oxidizing type	1	300°	No	Yes	3	4	3	4	3	3	3	3	2	1	1	3	2	1	3	3	2	2	M	
MELAMINE and oxidizing alkyd	4	250°	No	Yes	3	3	3	4	4	3	3	3	3	3	2	3	3	2	4	4	4	3	M or H	
MELAMINE and non-oxidizing alkyd	3	300°	No	Yes	4	4	4	4	4	2	2	2	3	3	2	3	3	2	4	4	4	3	M	
UREA and oxidizing alkyd	3	250°	No	Yes	2	3	3	3	4	4	4	3	3	2	1	3	3	2	4	3	3	2	M or H	
UREA and non-oxidizing alkyd	3	300°	No	Yes	3	3	3	3	4	4	3	2	3	2	1	3	3	2	4	3	3	2	M	
STRAIGHT EPOXY amine modified	1	375°	No	Yes	4	2	3	2	4	4	3	3	4	4+	4	4	4	4	4+	2	4	4	H	
EPOXY phenolic modified	1	375°	No	Yes	4	1	2	2	4	4	3	2	4	4+	4+	4	4	4	4+	2	4	4	H	
ESTERIFIED EPOXY amine modified	3	300°	No	Yes	3	2	3	2	4	4	3	3	3	4	3	3	3	3	4+	2	3	3	M or H	
CATALYZED EPOXY	2	A.D.	No	Yes	4	1	2	2	4	4	4	1	3	4+	4	4	4	4	2	2	4+	4	H	
VINYL	4	A.D. or 280°	Yes	No	1	1	3	4	4	4	4+	4+	4	4+	3	2	1	1	4	4	4	4	M or H	
MODIFIED VINYL	4	A.D. or 280°	Yes	No	2	2	3	4	4	4	4+	4+	3	3	3	2	1	1	4	4	3	3	M or H	
SILICONE	1	400°	Yes	Yes	4+	4+	4	4	4	3	3	2	3	2	1	3	3	3	3	3	4	3	H	
MODIFIED SILICONE	1	400°	Yes	Yes	4+	4+	4	4	4	4	4	4	3	2	1	3	3	3	3	3	4	3	H	

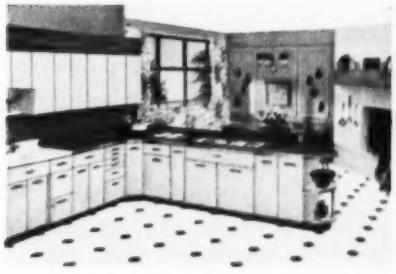
Coatings and their characteristics

From this chart it is possible to see some of the comparative properties of basically different surface coatings. Each of the twenty-three characteristics listed must be weighed against each other to determine the coating with the best combination of properties at the right price. The areas in yellow emphasize strong characteristics for each type. Alkyd-type finishes, for example, have good exterior durability, but do not resist alkali well. The choice of a finishing material, then, is a matter of comparison—or compromise—of these qualities.

Color consciousness in the kitchen

The Berger Manufacturing Company, a Division of Republic Steel, recently introduced a line of colored steel kitchen cabinets—to keep pace with the almost overwhelming trend to color everything in the kitchen, including the sink. These kitchen cabinets demonstrate several color obstacles. First, the colors selected had to either blend or contrast with other colored kitchen appliances. The Sherwin-Williams Company surveyed their sales of Kem-Glo, their most widely used household enamel, and picked out the most popular colors. About twenty of these colors were analyzed by Berger experts, who decided that three colors harmonized with all of them—pink, yellow, and turquoise.





The particular shades, shown here, were not chosen because they matched any of the original 20, but because they offered versatility: pink to blend with other pastels and accent strong colors found in today's wallpapers, fabrics, and accessories; yellow to blend with reds and browns and to contrast with grays and blues; and turquoise for a vibrant background for white.

Next came the problem of color and paint formulation. A modified alkyd enamel was chosen to give durability and surface gloss that would stand up under constant washing and resist all household stains. In addition, light reflection had to be carefully considered. Since coating materials give varying light reflection under different sources, Berger wanted surfaces that would reflect any light—fluorescent, incandescent, or natural—and not look dull next to the porcelain enamelled finish of other appliances. To do this, they could use only those pigments with the same spectro-response as pigments used in inorganic finishes—which restricted their choice further.

Since the cabinet doors might be sprayed with paint from one batch, and outside surfaces with another batch, any color difference in batches would be very conspicuous. Color standardization was, of course, very carefully watched, although with today's industrial methods and machinery, it was not an outstanding problem. The use of up-to-date instruments and close quality control by the paint manufacturer, as well as proper application methods by the fabricator, makes unmatched batches of paint highly improbable, if not impossible.

Available colored coatings: their applications and appearance

The finish is one of the more apparent aspects of a product's quality and appearance — and color, particularly today, is one of the primary finishing considerations. When difficulties arise in applying color, they may be traced to one of several areas: it can be the basic formulation of the coating material; it can be the way the finish is applied or dried; or it can be the surface to which it is being applied.

The close and definite relationship between paints and plastics over the past quarter century has done more than complicate the vocabulary of the paint industry — it has opened new avenues for research and development in surface coatings and, looking ahead, has given the paint industry a broader future than ever before in its long history. The result of this chemical approach to finishing materials is that today finishes fall into three major categories: synthetic finishes, coatings made with cellulose vehicles, and oleoresinous materials. Without trying to define all the characteristics, advantages, and disadvantages of every type of finish available today, we can indicate the range of application of these major groups to show how they fit into the present industrial picture.

The synthetics are by far the most widely used today and have broad application for virtually every type of product. The **alkyd-type enamels** were introduced around 1930 and established a reputation by replacing porcelain enamel for the outside of refrigerators. Today, alkyd-type enamels can be used in a full range of colors and, through constant effort by the coating materials manufacturers to increase the versatility of their products, a single kind of finish can be used for literally hundreds of finishing jobs.

Phenolic resins are used extensively for liners in tanks, drums and chemical vats because of their good solvent and acid resistance. **Vinyls**, which have seen very recent development and show great promise for the future, are used for adhesives, sizers, surface coatings for paper and textiles, rubber substitutes for waterproofing. Some of the newer **silicone** materials have outstanding stability at high temperatures and good electrical properties that until recently were associated only with vitreous finishes such as porcelain enamel.

Nitrocellulose-type finishing materials have been replaced by the newer synthetics to a great extent. The automotive industry used nitrocellulose lacquers until alkyd enamels were developed. Today, General Motors is the only corporation still using them.

Oleoresinous finishes, because of their poor exterior durability, are also being used less and less. Discoloration on drying is a problem with these materials, but they are still used quite widely for special effects, such as the wrinkle finish. If color is the most important characteristic and an oleoresinous material is being used, surface hardness may have to be sacrificed somewhat so that baking temperatures may be kept low enough (180° for light colors, 300° for dark ones) to avoid discoloration, fading, and, in the case of white, yellowing.

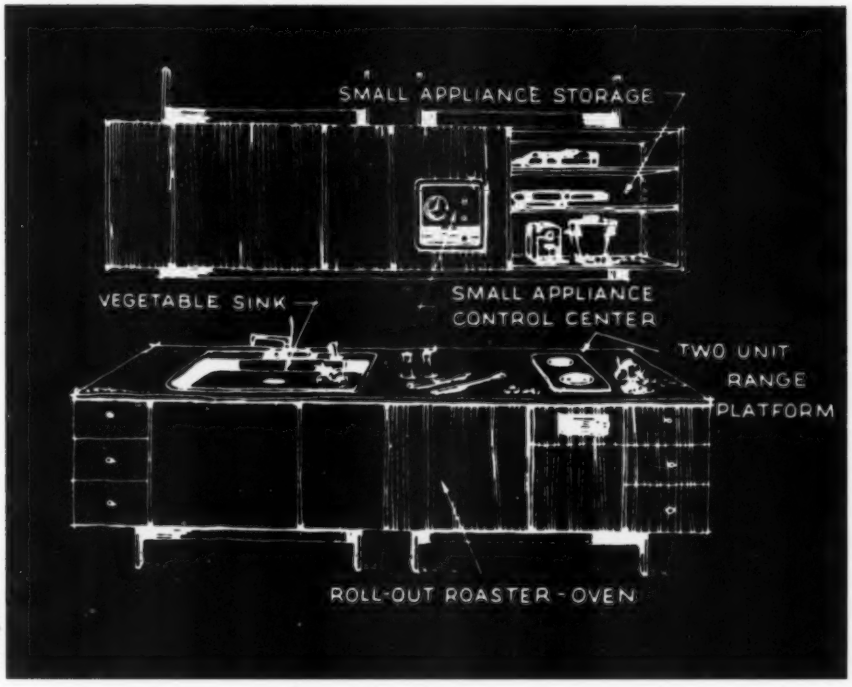
Special effects

In addition to color, products can be given appeal through the application of a finish that is textured or patterned. Many special finishing effects have been developed through the years, the most widely used being the "wrinkle" finish, popular for business machines, binoculars, sewing machines, furnaces, instruments, and many other products. It can be produced in all colors with the possible exception of some very light pastel shades, which are usually avoided because the baking of wrinkle finishes causes yellowing. Wrinkle finishes are possible only in oleoresinous and alkyd-type vehicles. They are always baked, and the wrinkling can be varied from very coarse to very fine.

"Hammered" finishes give the appearance of hammered metal. They are metallic coatings and require aluminum; like wrinkle finishes, they are invariably made with alkyd and oleoresinous vehicles. A hammered finish will obscure metal imperfections as well as add a durable decorative effect and is used extensively on furnaces, electric heaters, vacuum cleaners, and tools.

Other special effects give opalescence, iridescence, rough surfaces, or simulate other kinds of material. The Glidden Company and John Armitage Company both have produced a finish that resembles leather. These two finishes, known as Glidhide and Armorhide, are accomplished by irregular or uneven film setting. The result is a finish that both looks and feels textural. Applications include automobile dashboards, where the strength of metal is needed but the glare-proof texture is pleasing and practical.

There are still limitations on some coatings as far as color and durability are concerned. In many cases, high gloss and durability are obtained by baking at temperatures that are detrimental to colors, especially light shades. If color is the primary concern, durability must be sacrificed somewhat, and vice versa. This article has touched on a few of the complexities and problems in *one* area of colored finishes. Inorganic finishes, our subject for June, have other problems — heat in particular.



Westinghouse

1956 Appliance and Housewares Review

On the next 14 *pages we present our yearly summary of news and views on equipment for the kitchen.*

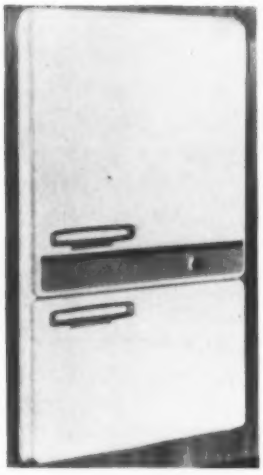
After all of the major appliances had made their bow this year, something interesting appeared: there were fewer individual lines of refrigerators ranges and washers, and more complete *kitchens.* Pressed by the demand for built-ins, manufacturers have begun to acknowledge one reason that built-ins are popular: they give unity to a kitchen. Though the time has not come to abandon free-standing appliances, the industry is fast finding ways to offer unified design without building anything in. There are two directions in '56:

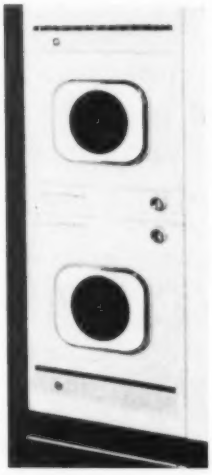
Coordination of individual appliances in a company's line is done with design. It started with color, a handy tool for unifying kitchens; more than ever this year, ranges, refrigerators and washers have also been styled to go together as "suites" of appliances. This sets each firm's products apart, and is good sales strategy when it helps the customer see the long-range design advantage of sticking to a single line. On the debit side, this tendency (not unlike auto styling) encourages designers to over-design for the sake of distinct identity. The result in many cases is more "grouping" than true integration.

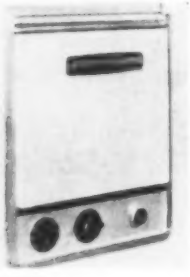
Modularization: One firm, striking out for the market that buys a kitchen in one fell swoop, has followed GE into the unit kitchen, designed as a piece. Another tackles the market with appliances to be installed as a piece. In housewares, too, the idea of coordination in the kitchen is having its effect, as our review on pages 110-117 will show.

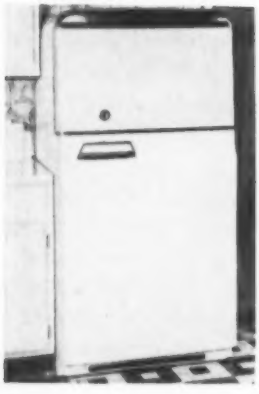
Coordination is best exemplified this year by Westinghouse's new line of built-ins, introduced at the winter markets in a series of "Confection Kitchens" that dramatized the virtues of unified design treatment. Because of a repetition of proportions and details, all the pieces of equipment obviously belong together. Even more significant, the standard refrigerator had gained something of the family look too, not from imitation but from a similarity of detail.

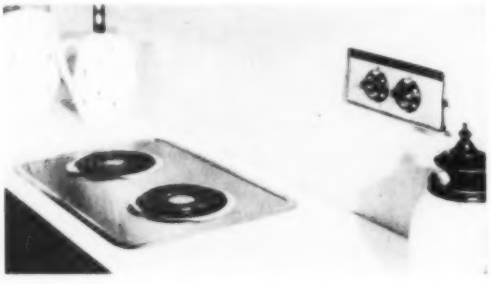
The Cinnamon kitchen, designed by Melanie Kahane to introduce Westinghouse's new built-ins, is a deluxe display that includes two of almost every appliance for the large family that likes to entertain: two refrigerator-freezer combinations (8½ and 3 cu. ft. each) that may be installed vertically or side by side; two built-in 17" ovens with companion surface units; two sinks, a dishwasher, and a portable appliance center (see page 42); custom cabinets are walnut.







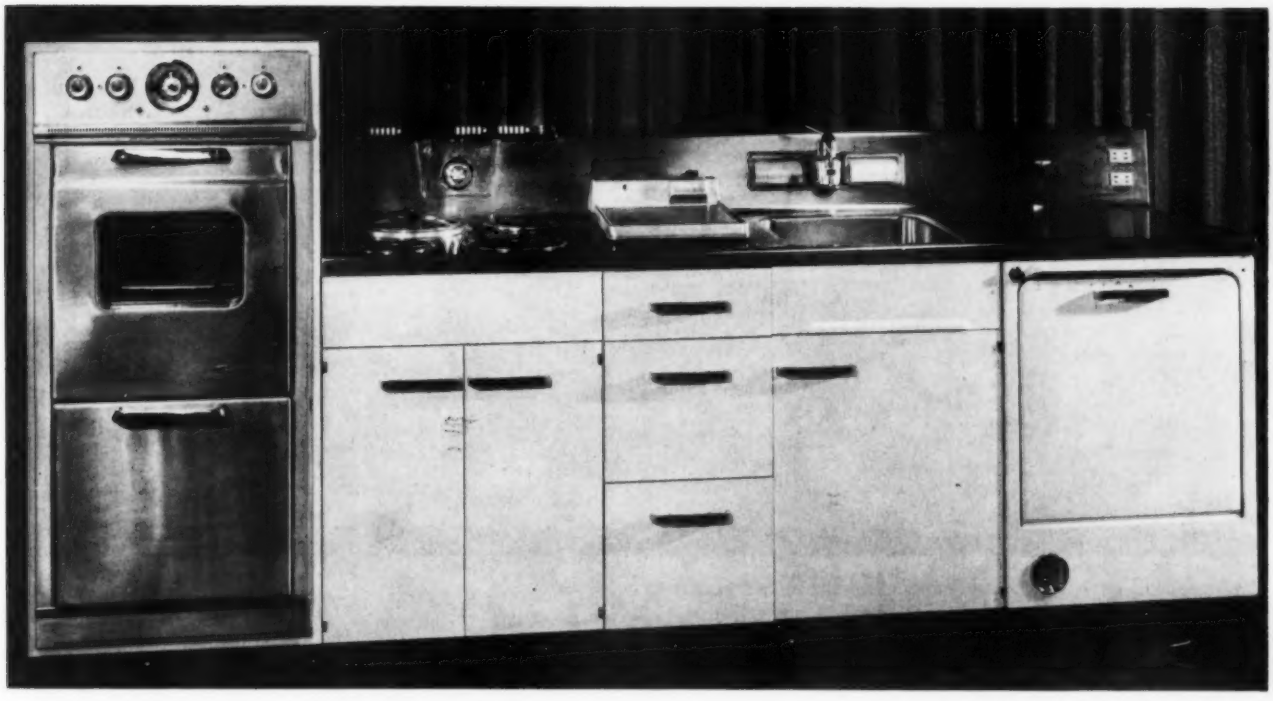


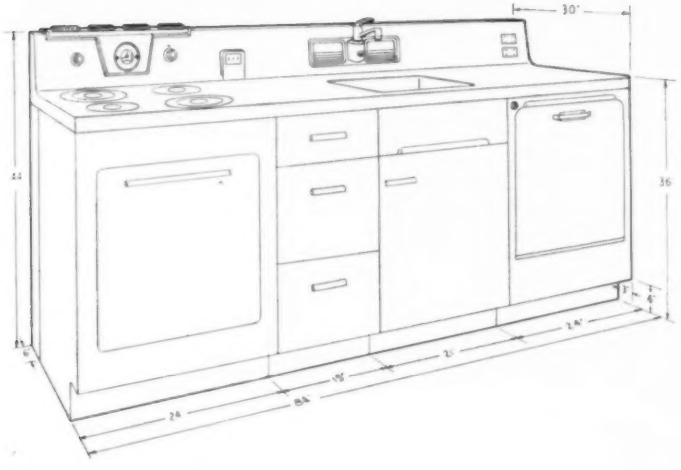


Detailing of Westinghouse built-ins turns the line into a "suite." A discreet symbol and a thin banded logotype, replacing a prominent and unrelated medallion, become the design theme of each piece; the band effect is repeated in the handle, and in the proportions of decorative panels. Westinghouse designers have tied the line together by using flush surfaces and rectilinear forms with a controlled softness at the corners.

The new washer and dryer may be installed side by side or vertically in 25" of floor space (which suggests that we could one day have a continuous two-machine wash-dry cycle with a trap door that releases clothes from the top washer into the dryer below). All Westinghouse equipment is available in confection colors: lemon yellow, mint aqua, frosting pink, nougat gray; the oven also comes in chrome and copper. The regular "stoop saver" refrigerator (13.2 cu. ft.) offers 50 color combinations with panels of heavy gauge vinyl in 10 colors ("Choose and Change panels") that are applied to the top section to contrast with five basic colors.

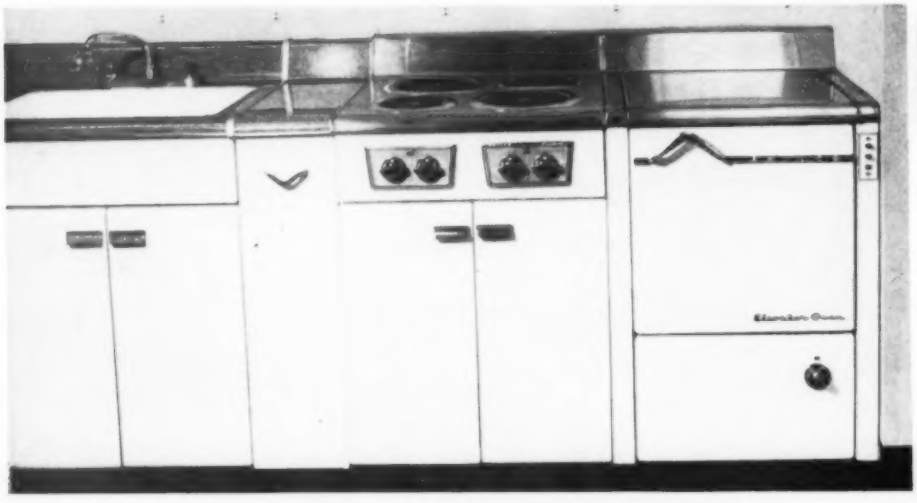
Modularization is Hotpoint's name for its 1956 one-piece kitchen —a term that primarily describes the manufacturing convenience of unitizing existing appliances and offering the customer a limited number of equipment options. Hotpoint puts its kitchen under a 7′ stainless top, with the option of a range or a freestanding double oven with broiler. The flush surfaces, sharp radii and complete simplicity of Hotpoint's basic equipment make it well suited to this kind of unification; compatibility is the first ground-rule of coordination.

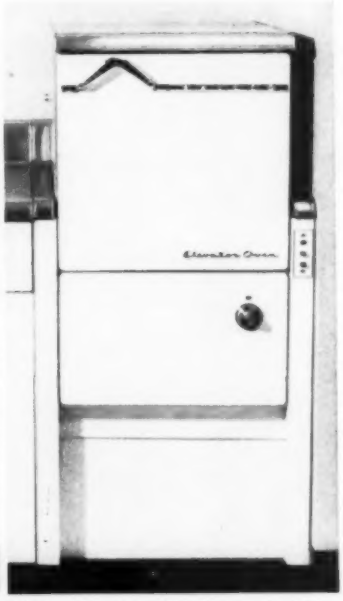


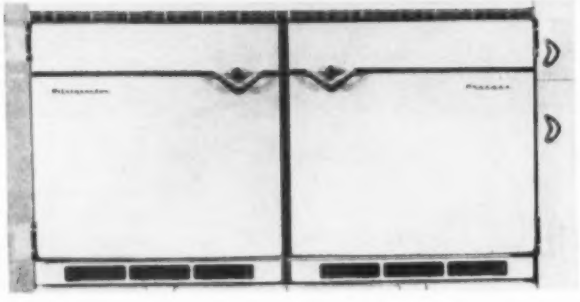


Hotpoint's modular kitchen with the addition of the free-standing twin oven occupies 9′ of wall space. Built-in appliances include dishwasher, food waste disposal, plug-in griddle, four-unit pushbutton cooking surface and oven; the latter may be replaced with a cabinet if the optional oven is desired. The basic unit occupies only 7 running feet — more compact than GE's unit (under an 8′6″ or 9′6″ top) because it does not include a washer-dryer or an 1′ counter extension. Approximate retail price is $1200, pre-plumbed and wired, in choice of five colors. Department of Visual Design, Hotpoint.

Custom Sectional appliances is the label Philco has given to its 1956 kitchen concept—an apt name for pieces that become a "built-in" kitchen by the simple expedient of being lined up side by side. Like many other manufacturers this year, Philco has given its sectional appliances a family resemblance by similarity of detailing, proportion, and decorative treatment.







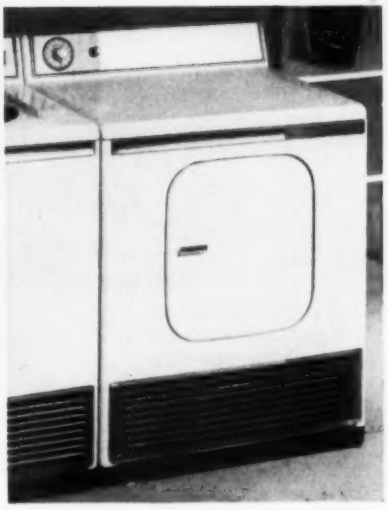
Philco has introduced an elevator oven that may be raised up to 15" over the counter. During cooking, the oven is lowered and the 36" high top becomes a work counter. Stainless steel is used on the oven top and range. Custom sectional refrigerator (8.2 cu. ft.) and freezer (6.8 cu. ft.) may be mounted on cabinets at waist height, or stacked up, with doors fitted for right or left hand opening. Harold Van Doren, consultant designer.

The unit kitchen carries with it the possibility that a kitchen may perform a new interior function: it may free itself from the walls and become a space divider—as an addition to GE's unit indicates.

GE, first with a one-piece kitchen, has added a sectional over-counter shelf that runs the length of the unit, raising the height of the back to 54". Oriented toward a living or dining room (and backed with a panel cover) this height could give the cook both privacy and a view. An extra oven may be appended on a sectional drawer base. Appearance design staff, GE Major Appliance Division.

Coordinated design may have started with built-ins, but it is rapidly taking over standard lines. Frigidaire, which pioneered new directions for the built-in of tomorrow (ID, February '56) also has the most complete "suite" of conventional equipment this year, tied together by bold decorative patterns, a distinctly high-style detailing. Assembled in the "Kitchen of Today," above, the 1956 pieces do not fade into the background like genuine built-ins, but they gain a conspicuous kind of unity from this bold statement of style.

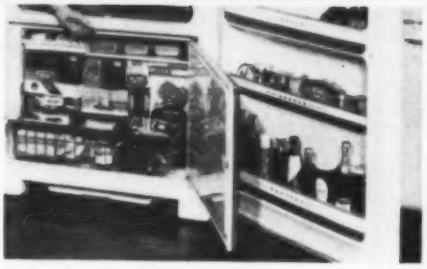
Frigidaire appliances gain coordination from persistent linear design. A decorative diamond or cross-hatch pattern is repeated on the panels of range, washer, dryer, and refrigerator. The controls themselves are restrained and linear in style, with radio-like horizontal indicators for surface units, oblong light windows for ovens (below, left), and rectilinear forms in place of the conventional tapered shapes for all instrument panels. The washer and dryer dials have a decorative star-like spray of fine lines. Frigidaire appliances are available in pink, gray, yellow, green, with the decorator panels in seven colors. Frigidaire design staff and General Motors Styling Section.



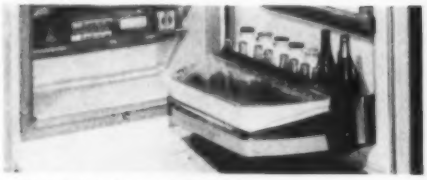
Refrigerators this year are brighter, roomier—on the inside. The innovation may be a fancier storage system, like Hotpoint's swing-out crisper, or an unexpected bid for art in Servel's indoor three-color scheme.

← **Servel's** two-zone refrigerator features a separate door for the 2 cu. ft. freezer, and to brighten the interior, a "Mondrian" pattern of three pastel colors against grey. The 10.8 cu. ft. model is sold at $619.95.

↓ On **GE's** new model, magnetic latches made it easier for designers to place handles at convenient height. The refrigerator is also equipped with a foot pedal. The 12 cu. ft. model sells for $399.95.

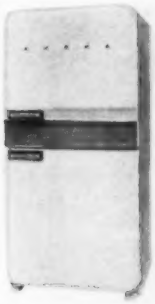


↑ **Kelvinator's** freezer with its own inner door is stowed below. The 12.2 cu. ft. refrigerator retails at $499.95.



↑ **Hotpoint** has solved the crisper problem by attaching it to the refrigerator door so that it swings out automatically. It can also be had in the conventional version, on rollers. $489.95.

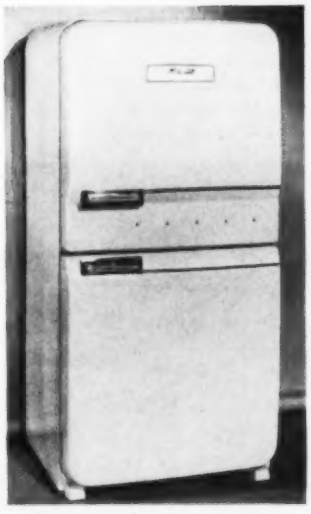
← **Frigidaire's** diamond motif that characterizes the 1956 line is repeated several times inside and outside this model. The frozen food compartment rolls out, features its own door and an ice server. At $509.95.



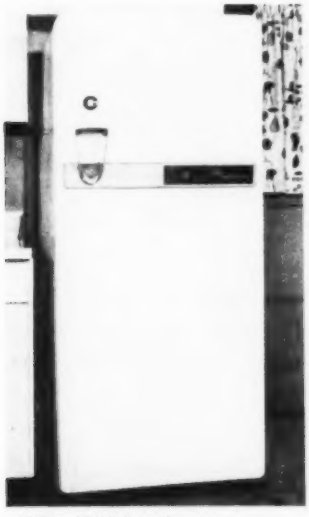
→ **Amana** divides space equally between refrigerator and freezer. The full size freezer alone holds 297 lbs. of food, utilizing the space of the extra heavy door. $699.95. J. O. Reinecke, consultant designer.

↓ **Revco's** Bilt-in refrigerator and freezer in vertical position occupy only 2' x 3' of floor space, but provide 14.7 cu. ft. of storage. Showing completely redesigned interiors, the clean boxy line may be had in 25 colors. Refrigerator at $354.95, freezer at $329.95.

↑ **Sub-zero's** line of business-like refrigerator freezer built-ins are available in colors, stainless or coppertone, come with flat or contour doors with their own frames. From $455 to $908.



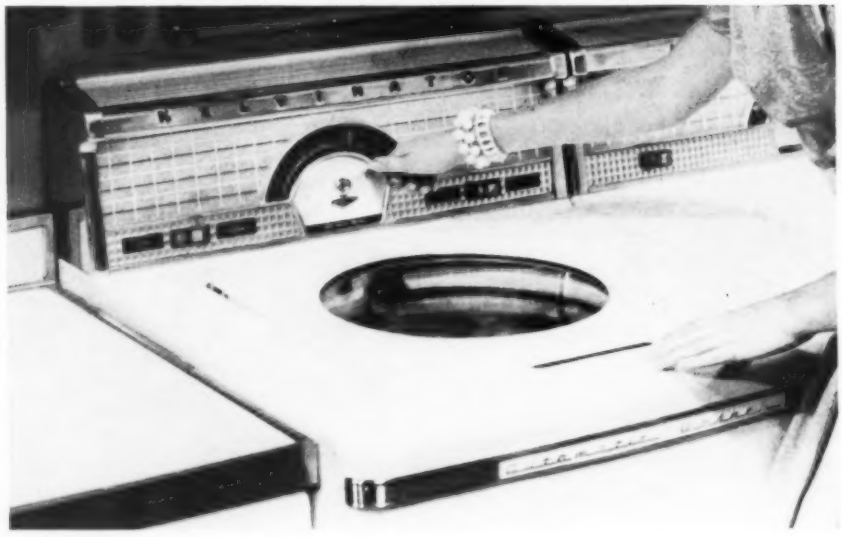
↑ **Maytag** makes its debut in the refrigerator field with the "Double Decker," a combination refrigerator freezer which allows equal space for each. The freezing unit is below. $599.95 for the 14 cu. ft. model.



↑ **RCA Whirlpool** uses a tangent-bent frame to give the flat-surfaced facade of this vertical freezer a lean, sharp effect. The 14.7 cu. ft. model retails at approximately $500.

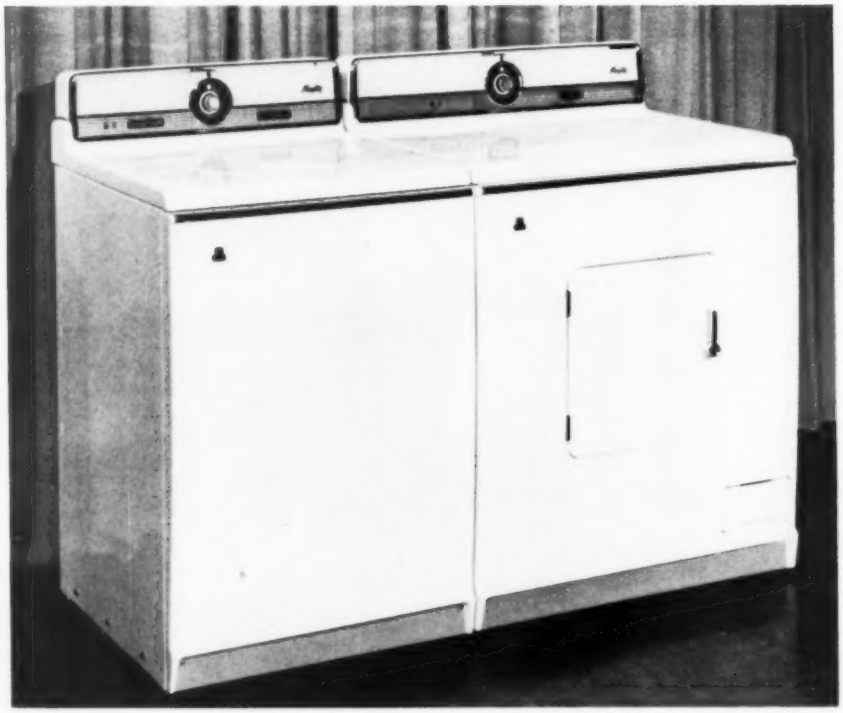
↑ **Kelvinator,** by building condenser tubing into the walls, makes additional storage space available in its 18 cu. ft. upright freezer. Three shelves are individually refrigerated to provide faster contact freezing. Retails at $579.95.

Washers, dryers and ranges, if changed at all, have often been designed to resemble ranges. Backsplashes are being built up, lighted, and trimmed, which heralds, perhaps, the joining of laundry and kitchen. Since there are a limited number of controls to display against this backdrop, the central dial becomes increasingly prominent, which in turn produces an interesting functional improvement: the second dial with only a few special settings is often replaced by individual buttons that are easier to handle. Ranges, meanwhile, continue to demand attention with more symmetrical controls, more refined and sparkling decoration. This brief review covers a few of the new features.



↑ **Kelvinator's** control panel follows the trend toward fancy backsplashes. The do-all dial has a linear indicator moving along an arc-like path; it can be moved to alter the cycle.

↑ **Bendix Duomatic** maintains a conservative approach toward controls by concealing two dials under a cover at the front. Another Bendix washer with concealed controls is on p. 71.

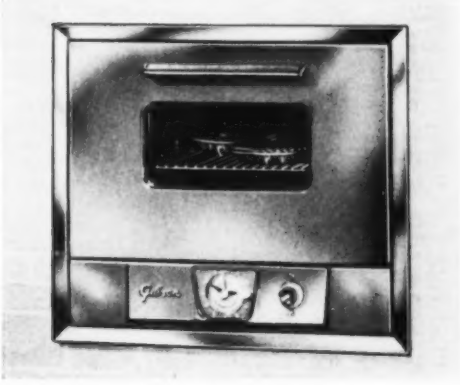


→ **Maytag** introduces a new design on its enlarged backlighted washer and dryer panels featuring one large (and very clear) dial. The second dial has been replaced by two groups of pushbuttons.

↑ **Hotpoint's** prototype electronic oven can cook bacon in 15 seconds by high frequency waves emitting from an electron tube. Finished in satin brushed chrome, it resembles a large built-in oven and will retail at about $1000 when production begins.

← **Hotpoint** advances the idea that small electric appliances belong under the countertop. A large french fryer with two baskets is built into a satin chrome base cabinet than can be placed between other appliances. Sells for $249.95.

↑ **Kelvinator** has entered the built-in field with an oven sporting a porcelain enamel door panel in eight pastel shades; the trim is brushed chrome. $199.95. Colors match Kelvinator's "Foodarama," which can also be built in this year.



↑ **Gibson's** new 30" built-in oven, in Coppertan porcelain finish and stainless steel trim, has especially crisp proportions and straightforwardness that has been lost in many other ovens. With automatic timer, Minute minder and interior light. At $199.95.

← **Norge** introduces a vertical grill compartment in the Futura automatic range to broil meat as it should be done—on both sides at once to prevent overcooking and loss of juice. Thermostically controlled "meal sentry" maintains chosen heat on one surface burner. At $429.95.

Housewares Show: *Fewer new products, but lots of news*

The most interesting turn of events at the midwinter housewares show, from a design standpoint, was power—and new ways to cope with it. The electric mixer, which has been accumulating attachments at a rapid rate, has finally been transformed into the all-purpose home power unit—since every gadget within reach is going to be mechanized anyway, a unit that will power them conveniently seems perfectly sensible. Shetland offers a rectangular motor with several attachment points, while NuTone has engineered a single power drive that is a permanent part of the work surface. Another twist on the power trend is the appliance center—a collection of extensions, outlets and circuit breakers to accommodate the army of appliances competing for the kitchen plug.

Westinghouse Automatic Appliance Center is a foot-square box with 3 extension cords, two outlets, an automatic timer for one circuit, and circuit breaker, wired for 220 volts. Shown above in a custom-built appliance cabinet, the Center alone will retail at about $100.

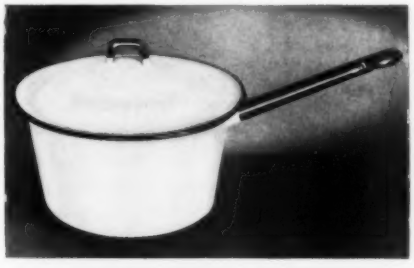
Shetland Company's Foodsmith is to the kitchen what the Shopsmith is to the cellar. It combines seven electric units in one: knife sharpener, can opener, blender mixer, meat grinder, salad maker, slicer. The latter four use the same power drive. White enamel, black phenolic and chrome trim. $49.95 and $59.95.

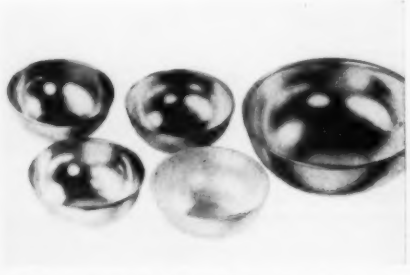
Nutone, Inc., offers the "In-Built" Power Maid. A motor-driven mixing bowl and beater, juicer, 6-speed blender, and knife sharpener all work from a single power drive, and one control recessed in a stainless steel plate. Motor hangs 6¾" beneath counter. Combination about $70. Waltman Associates, designers.

The other news, of course, was color, spelled t-u-r-q-u-o-i-s-e. Most manufacturers who made no other changes managed to get into the color race with at least one pink or aquamarine product. Since we cannot reproduce the atmosphere of Navy Pier in its rainbow splendor, we have selected a few examples of the various ways and places color made an appearance in porcelain cookware, decorative metals, plastics, and even wood.

Westinghouse has found a way to apply its four confection colors not only to appliances but to a matching toaster by finishing it in porcelain enamel. End pieces are molded phenolic. $22.95.

Federal Enameling, like virtually every cookware manufacturer, went in for shades of pink and turquoise this year, in addition to its regular red and white line. A few firms offer a full color line.

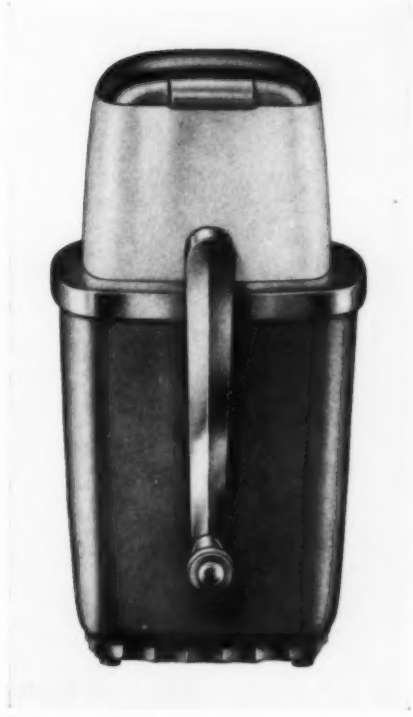




Aluminum Goods Manufacturing has brought out a Mirro snack set of five aluminum bowls, Alumilite-finished in coppertone, red, gold, and silver, $4.95. Metallic finishes, anodized or plated, were prominent throughout the housewares show.

DuPont developed a new absorbent, quick-drying, lint-free cellulose sponge yarn, and introduced it in green to make it look as clean and cheerful as it is to use.

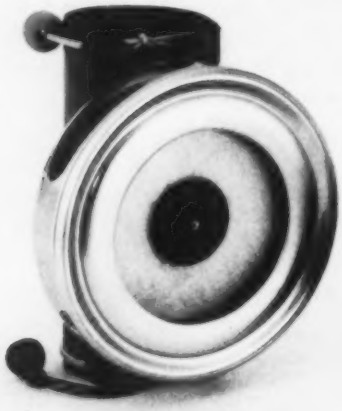
Boonton Moldings brings a new quality to melamine dinnerware with its "Candescent" line. A translucent formulation speckled with a coarser resin gives a textured see-through effect when held against light. $16.95 for 16 piece set, in charcoal, oyster, pink, turquoise.

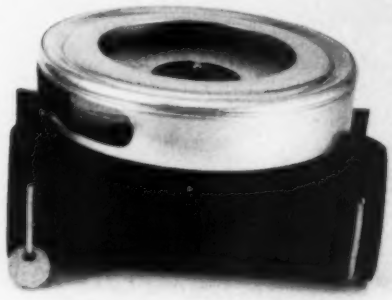


Swingaway's ice crusher, like its new automatic can open, sports a popular '56 color combination: copper and pink (or copper with white or black enamel.) Frank Roth, consultant designer.

Newcomers: Here are a few of the new starters at the housewares show—a few innovations among refinements of design and function.

↑ **Silex** offers the traveler a portable food warmer that can be plugged into the dashboard cigarette lighter. It operates on AC/DC, and also comes with continental voltage. Heats instantly to the boiling point and will hold eight cups. Standard home-auto Boilmaster costs $14.95.

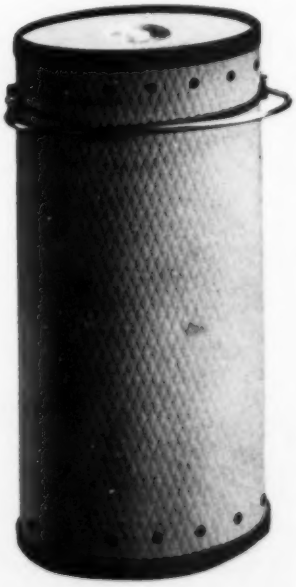




↑ **Chemex Corp.'s** revolutionary fan replaces blades with 5 plasticized paper discs that throw out filtered air tangentially, 320 cu. ft./min. With Royalite stand, the 8½" model sells for $29.50. Invented by Dr. Peter Schlumbohm.

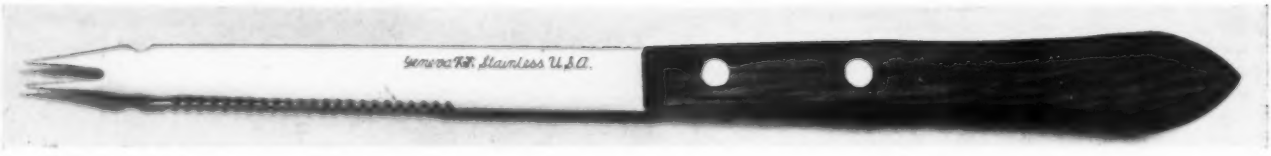
↑ **Emson's** aluminum insulated glasses with polyethylene lip guard have double-walled construction; silver-finished inside, retains heat or cold, eliminates condensation. In copper or assorted colors. 4 for $3.98.

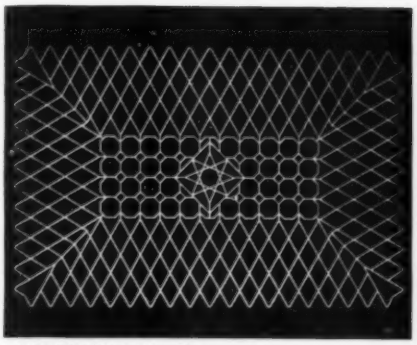
↑ **Ekco Products'** conical stainless steel scoop for potatoes, etc. is another commercial item making its way into the home. With detachable Bakelite handle. It retails at $2.19.



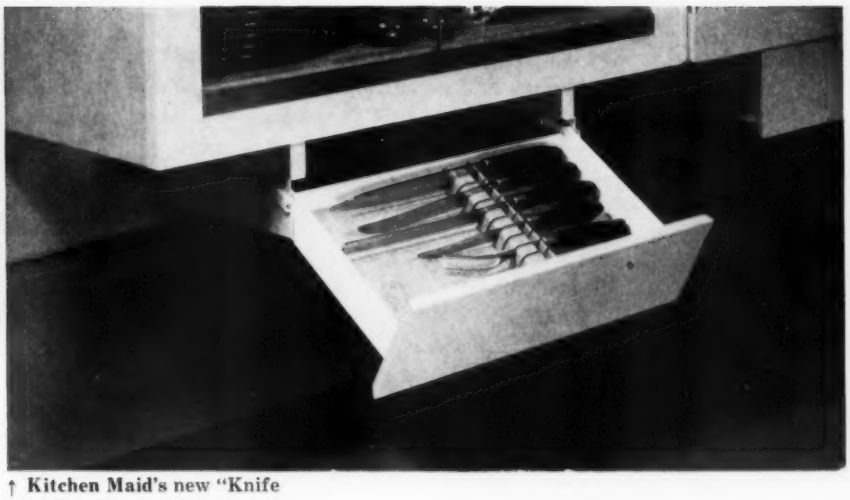
↑ **National Vulcanized Fibre Co.** introduces Vulcot, the strongest material per unit weight known, to the consumer market in a line of hampers and wastebaskets. Designed by Donald Deskey. $8.49.

↓ **Ekco Products** provides a Geneva spear for dislodging well-entrenched olives, pickles and cherries. A practical lemon and orange slicer, it also doubles as a cheese knife. 49 cents.





↑ **BW Molded Plastics** creates a lacy place mat out of sturdy polyethylene. In assorted colors at $.49 each.



↑ **Kitchen Maid's** new "Knife Nook" is lined with cork and will hold a complete cutlery set. Installed out of harm's way under a storage cabinet, it rolls out and down on a metal track. At $20.00.

↑ **Robeson's** "Kitchen-Aider" set helps protect knives and fingers. High carbon stainless steel knives and case are regularly priced at $15.00.

↑ **Westinghouse** shows a new canister vacuum cleaner on wheels in two shades of turquoise. 'Carousel Vac" features a floor-and-rug cleaning tool, complete portability, adjustable suction dial. The 7-piece set sells for $69.95.

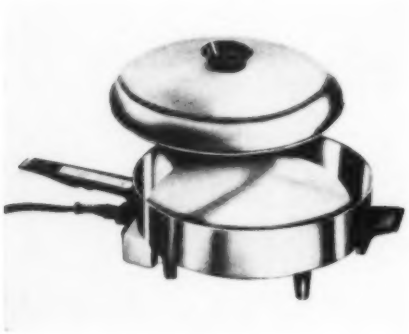
↑ **Silex'** electric "Freeze-O-Tray" whips and freezes ice cream in less than an hour inside the ice-box. Door closes over cord. $18.95.

Cooking

Electric table cookers continue to flood the market, each with its own set of culinary and practical virtues and some that claim to do everything but boil water. The market for ordinary pans and skillets does not seem to be dampened by this outcropping of portable equipment: new designs and new combinations of materials are intended to give better stove-top cooking in more practical utensils.

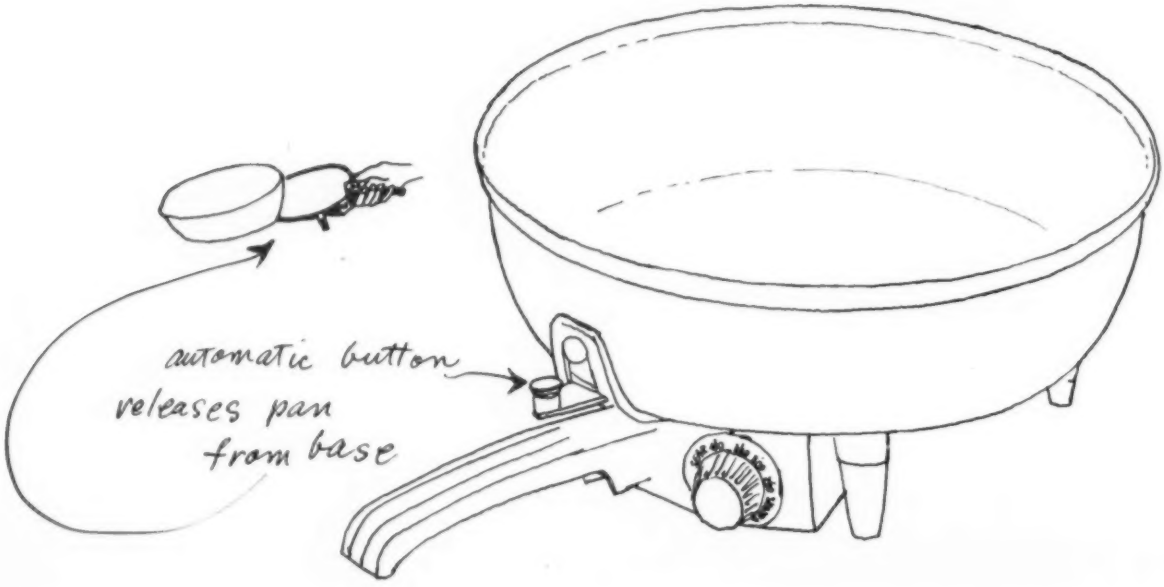
↑ **Du-Wal** claims its Fryall aluminum pan can do everything: fry, grill, bake, roast, stew etc., etc. Available with gold or copper covers, it also features a pilot light which indicates when set temperature has been reached. At $19.95.

↓ **West Bend** shows a new square skillet design with a continuous pouring lip. It retails at $19.95.



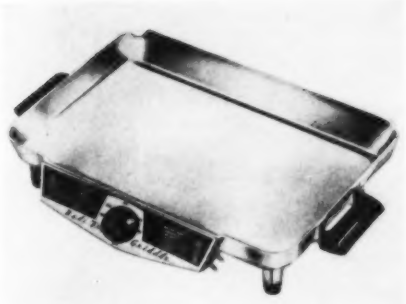
↑ **Emco's** automatic skillet is designed with straight sides; the water-sealed heating unit tolerates partial submersion. In heavy-cast aluminum with extra high dome cover that is also available in copper. $29.95.

↓ **Naxon** solves the cleaning problem by detaching the light aluminum pan from the heating base, which has special simmer and sear zones. Comes also in gold finish. $16.95.



↓ **Wagner** has brought out the first square non-electric skillet in magnalite (a magnesium alloy.) It matches other utensils in the line. $11.95.

↓ **Wearever** proves that tradition is the newest thing in an outdoor coffee boiler that looks like the serviceable utensil it is. It will percolate up to 16 cups of coffee on an open fire. At $7.95.



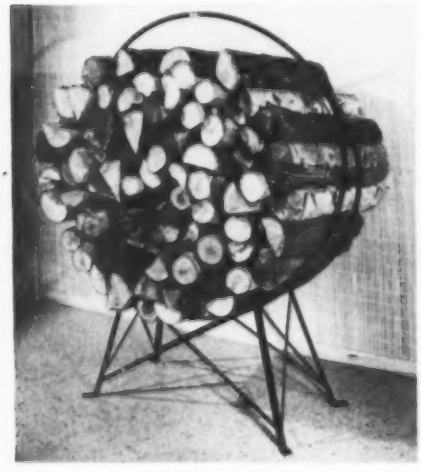
↑ **Knapp-Monarch's** frying griddle is rectangular and extra-large (12" x 16"), features an embedded element. At $19.95.

↑ **Bolsey's** 35mm. Jubilee incorporates some automatic features designed for the uninitiated to use flash and color in one easy lesson. To set shutter and diaphragm, an adjustable scale around the lens describes light and subject conditions for both black and white and color films (corresponding to f stops which are also given). At an adjacent finger tip position is a focusing wheel with two knobs. When the camera is fitted with a flash gun and bulb, an automatic computer, set in one of four channels, couples the focusing mechanism to a diaphragm and locks it according to the key letter, saving complicated figuring.

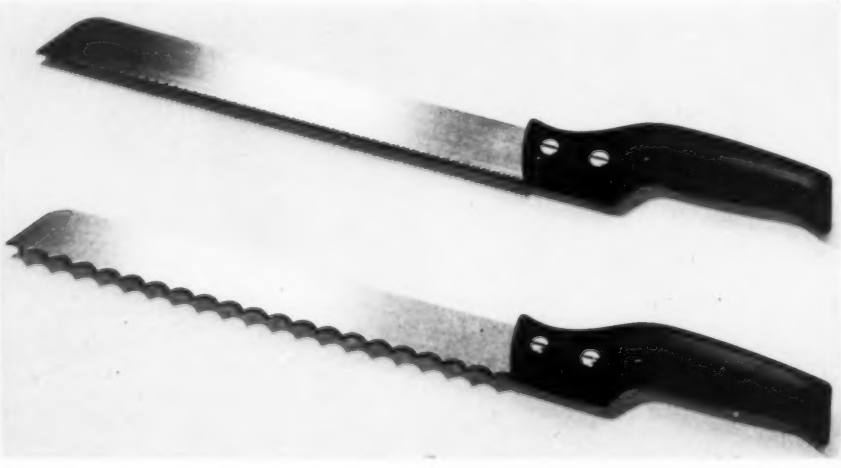
Sophisticated camera users may reject the automatic devices and still make good use of the 2.8 lens, reliable synchronization and compact aluminum housing. Camera, case and flash gun. $79.50.

↓ **Facit's NTK**, a Swedish calculating machine now distributed here, offers portability and compactness. Hand operated, it is useful for field work, or where electrical outlets are at a premium. All ten keys are in the span of one hand. $199.50 with simulated leather carrying case.

↓ **Stavert Co.** of Boston has come up with a decorative solution to the wood storage problem: a round cast-iron log holder which stores up to ⅛ of a cord of wood. At Hammacher Schlemmer, $14.96.

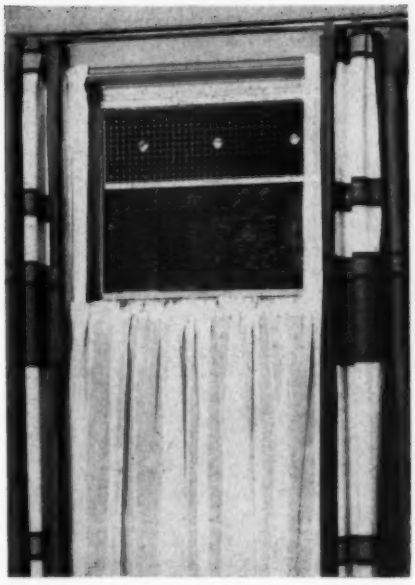


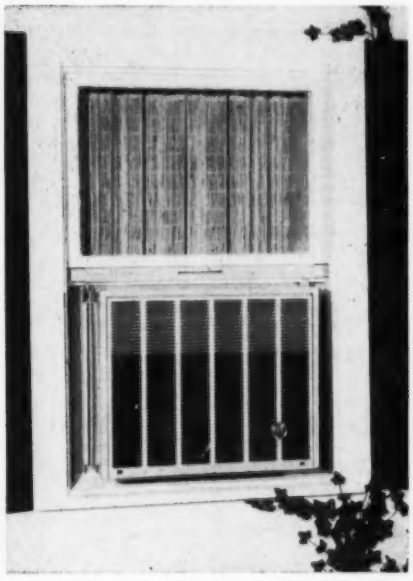
↓ **Millers Falls Co.'s** stainless steel Frost Twins — a saw for cutting bone, and a frozen food knife — have elevated handles that allow clearance for the fingers when cutting flush to the board. Designed with phenolic handles by L. Garth Huxtable. Pair $6.95.

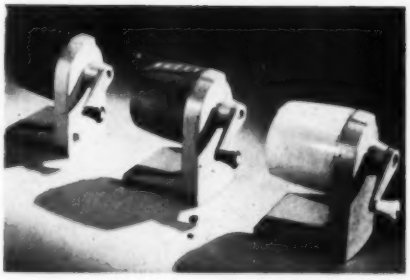


↑ **Markel's** neat twenty-inch "Direct-Aire" fan is one of a series of nine new models. It features simple eye-level controls for the two-way adjustable aluminum louvre, 3-speed reverse, and automatic thermostat temperature control. It moves cooled air to over 20 feet away. $79.95.

↓ **GE** has minimized the bulk of their 1956 air conditioner, the Thinline, by special redesign of the fan. Pared down to 16½" in depth, Thinline installs almost flush with the average window, extending only slightly on one side. This represents a reduction of 49 per cent in depth, 36 per cent in overall size, and 15 to 20 pounds in weight over previous models. The adaptable new unit can be placed in either the upper or lower sash and in some cases will allow the window to be opened or closed. From $299.







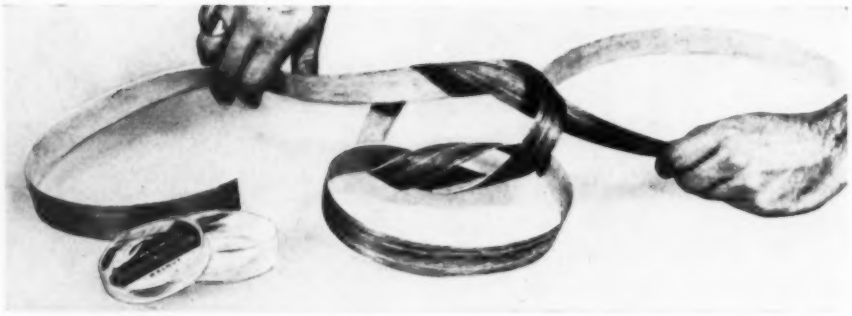
↑ **Dazey Corp.** are promoting the idea that a pencil sharpener in the home should look like an appliance, not an office leftover. Their new design for the kitchen, by Palma-Knapp, has a red, yellow, or black molded cup; the bracket and frame is a one-piece die-cast part, in enameled grey. Retails at $3.95.

↓ **Waring Ice Jet,** the first consumer electric ice-crusher attachment, by Dynamics Corp., works on the Blendor power base. Designed by King-Casey in die-cast aluminum case with polyethylene spout. $16.95.

↓ **Dynamics Corp. of America's** lightweight aluminum and plastic Waring hand Mixor features an open-angled handle, and a beater ejector. Designed in beige, brown and red by King-Casey, Inc. $19.95.

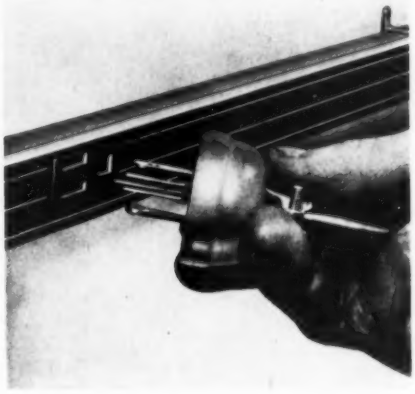
↑ **Evans-Zeier** has molded a trim Tenite polyethylene funnel for adding softener to water. It will not dent, rust or corrode, and the wide bowl prevents spilling and waste. Produced for manufacturers of water softeners.

↓ **U. S. Plywood's** inch-wide tape of wood veneer makes it easy to cover exposed plywood edges. Weldwood Flexible Wood-Trim comes in mahogany, oak, walnut, birch and Korina, can be applied with any high quality wood glue. 79c per package.



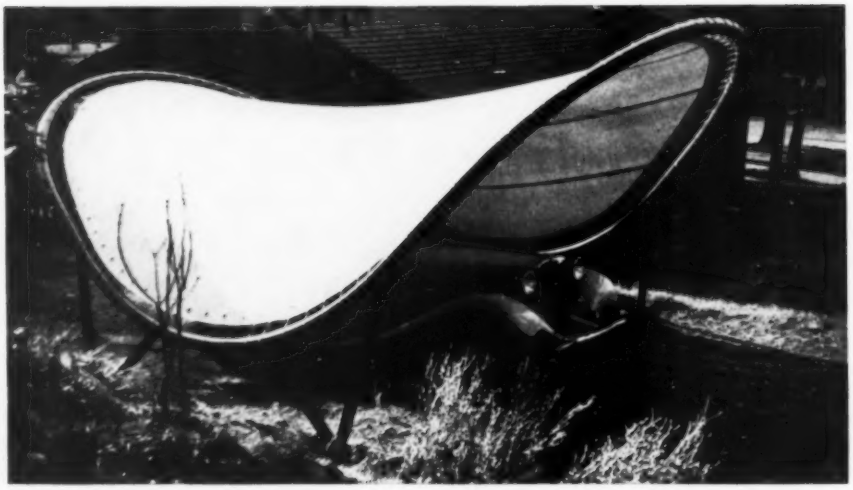
↑ **Kalamazoo Sled Company** gives a new shape to an old sport. Useful in deterring youngsters who like to coast on the best family tray, this lightweight "Flying Disc" is molded from G-E polyester resins and fiberglass.

↓ **National Electric Products Corp.** offers a new line of Plug-In Strip, a package idea that provides additional wiring, as well as extra electrical outlets, for carrying heavy loads like industrial air conditioning. The Strip comes in six-foot lengths, with receptacles every 6″ or 18″.



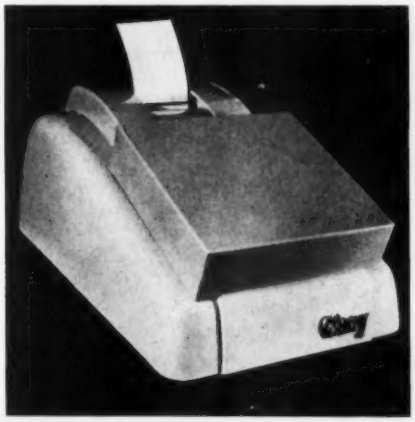
↑ **Poppet Corporation's** polyethylene "fountain-pen" dispenses 5,000 dots of rubber cement without refilling. Operating on a spring-loaded retractable point, it is designed as an improvement over paper-clips, staples and paste-brush applicators. $1.00. Refills 10c.

→ **Ted Bower** of Seattle has designed a simple shelter of reinforced vinyl stretched over a double-curved steel or aluminum pipe frame. It can serve as a carport, boat shelter or hangar. Elastic enough to support a 3-foot snow load, it will not flap in strong wind when sheet is pulled taut.

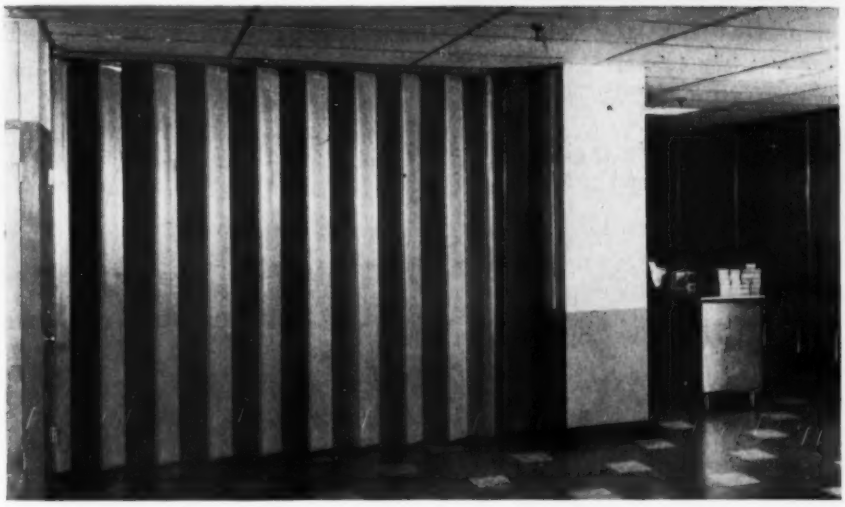


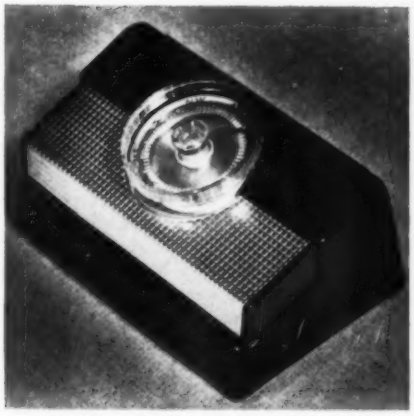
↑ **Ringlet Clothes Pins** have come up with a simplified answer to a washday problem—how to manoeuvre the laundry while holding on to a bunch of clothespins. Their ring-shaped clothespins are moisture and dirt proof, made of Monsanto's hi-impact Lustrex styrene plastic. In six colors. **Doz. 20c.**

↓ **Clary Corporation's** new data printer operates by remote control. Functioning like a regular office adding machine, it adds and substracts electronically-fed information from associated computers (I. B. M. key punches, addressograph punches or typewriters) with which it is hooked up. **From $425.**



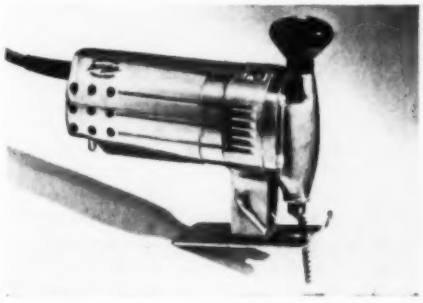
↓ **Bemis Bro. Bag Company's** folding curtain make it possible to partition office or cafeteria space into smaller areas. The heavily-coated burlap is sound-proof and fire-resistant. Forming 7" panel folds, the curtain is supported by steel top plates, and operates on noiseless nylon wheels. Custom-made for each application.

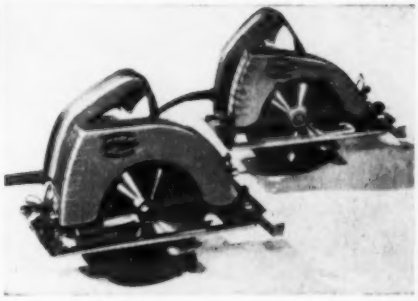




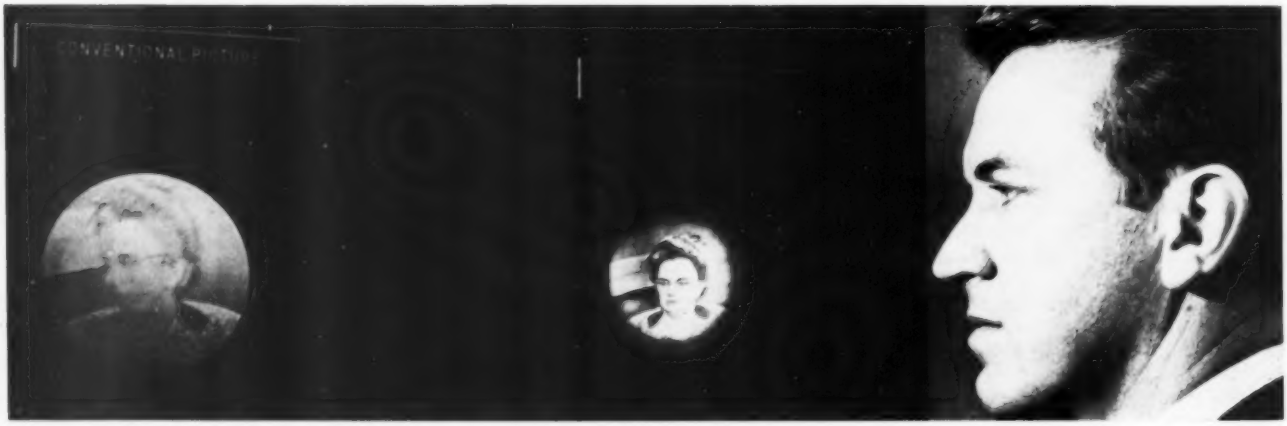
↑ **Thompson Products'** automatic antenna rotator enables the TV fan to turn his antenna towards the strongest transmitting station without climbing on the roof. Light in the compass dial goes on until the rotator reaches position. The superotor control cabinet is dark brown phenolic, with methacrylate dial. Designed by Onnie Mankki. $54.95.

↓ **Millers Falls Co.,** Greenfield, Mass. shows three new light-weight portable saws designed by L. Garth Huxtable. Housed in die-cast aluminum, the circular saws come in 6" and 7" models, retail at $48.70 and $76.10. The jig-saw sells for $44.95.





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



Tonotron tube (above) "freezes" TV picture for as long as three minutes. Regular tube on the left looks blurred. Air traffic is controlled by TV (below) at Alameda Naval Air Station. Small, compact television camera (bottom) weighs 5 pounds.

Trends in television are for technical purposes as well as entertainment

A rash of TV advancements are making flying safer, teaching easier

Although some advancements in television are bringing George Gobel into millions more living rooms every Saturday night, many new developments in the use of television are for purposes other than entertainment. Hughes Aircraft recently unveiled a tube that will "freeze" a television picture. The Tonotron, as it is named, has important potential applications for airborne radar. A pilot who is using radar for navigation or to detect storms in his vicinity can freeze the picture on his scope and, by controlling the time it takes to fade, can study it more carefully, rather than giving it the usual fleeting glance when the picture is in constant motion. A picture can be held motionless, with high brilliancy, for up to two or three minutes and can be erased by the flip of a switch. The new tube, developed with weather radar in mind, is five inches in diameter. It has sufficient brilliance for "reading" in bright sunlight.
Manufacturer: Hughes Aircraft Company, Culver City, California.

TV air traffic system

Another new television development with aviation implications is the installation at Alameda Naval Air Station, in California, of a remotely-controlled closed circuit system for airport traffic control. Keeping track of airplanes which are landing and taking off has become an increasingly severe problem, particularly at military installations where longer runways are needed to permit high-speed jets to land. At Alameda, when the runways were lengthened, proper surveillance of aircraft was no longer possible. To raise the height of the existing tower was economically impractical. (The cost was estimated at $500,000.) Closed circuit television seemed to be the answer, and Kay Lab of San Diego, California, was awarded a contract for a system costing $47,780.

The systems consists of a television camera with a 3-lens turret. It is in a special housing that is thermostatically-controlled for all-weather operation. Complete control of the system is from the tower and the camera can be panned through 350 degrees and tilted 45 degrees up or down. The speed of pan or tilt can be varied by the operator so an aircraft may be followed in flight or along the runway. An automatic iris located behind the camera lens gives continuous automatic control of the incident light by repositioning itself to take care of increased or decreased illumination from the sun.
Manufacturer: Kay Lab, 5725 Kearny Villa Road, San Diego 12, California.

TV in the classroom

Teaching through television was given a recent boost when the Army's Signal School at Fort Monmouth, New Jersey,

used a portable television camera weighing five pounds to teach three groups in different rooms at the same time. The equipment, provided by General Precision Laboratory of Pleasantville, New York, can be controlled entirely by the instructor and, through a system of microphones, students can ask and answer questions regardless of their location.

Manufacturer: General Precision Laboratory, Inc., Pleasantville, New York.

TV for remote areas

The high cost of conventional television equipment has prohibited its use in many small communities. The introduction of new low power television broadcasting "packages" by Philco's Government and Industrial Division promises to bring these deprived communities into the TV picture. The "package" includes complete transmission facilities; television transmitter monitoring equipment, high gain antenna and transmission line, local program originating facilities for the transmission of slides, films and local live shows, and outside plant items such as studio transmitter building and tower. Because most low-power television stations want to pick up network programs from large cities that are nearby, microwave relay equipment is also offered.

The new equipment can be operated by one man; it has an intermediate amplifier of 20 watts and a final amplifier providing 150 watt peak visual power and 75 watt aural power output to the transmission line.

Manufacturer: Philco Corporation, Government and Industrial Division, 4700 Wissahickon Avenue, Philadelphia 44, Pennsylvania.

New structural panels are strong

Paper and plastic are combined to give colorful panels with many applications

A strong, lightweight structural panel made of a kraft paper honeycomb sandwiched between a plastic laminate is being produced by Continental Can Company. The paper honeycomb is impregnated with phenolic resin and faced with Conolite, Continental's plastic surfacing material.

Conolite surfaces are available in a variety of colors and patterns, including wood grain, marble, and dots. It is resistant to alcohol, scratching, chipping and marring, and withstands boiling water, acids, greases, and temperatures to 350°F.

The development of a method of producing the structural panels in continuous lengths makes seam-free installations possible. It is expected that the new structural panels will find application in kitchen tables, sink tops, wall partitions for bathrooms and kitchens, coffee tables, wall paneling, office partitions, and desk tops. Airplane interiors are another possibility where the combination of lightness and strength is important. Continental supplies the panels made to customer specification or furnishes the honeycomb and Conolite separately.

Manufacturer: Continental Can Company, Honeycomb Division, 100 East 42nd Street, New York 17, N. Y.

Epoxy adhesive sticks tight

New adhesive gives great strength to bonds for many materials

An adhesive that will form high-strength bonds of aluminum, steel, zinc, copper, brass, iron, glass, wood, rubber, and plastic surfaces to themselves or to each other is being produced by H. B. Fuller Co. Known as Resiweld, the new adhesive resists solvents, grease, water, and chemicals and, it is claimed, forms a stronger bond than welding, brazing, soldering, riveting, or bolting. Resiweld does not shrink, making it suitable for gap filling and the mating of two uneven surfaces.

Resiweld is a two component system consisting of an epoxy resin and a resin-type catalyst. The adhesive begins to set as soon as the two ingredients are mixed and takes about five days to obtain full structural strength at room temperature. Curing, however, can be greatly speeded up by baking; one hour at 220°F. is sufficient for proper curing. The strength of the bond is indicated by a test done with aluminum. Aluminum (.064" 24S-T3) bonded to itself had a tensile shear strength of 4010 psi at room temperature.

Manufacturer: H. B. Fuller Company, 181 West Kellogg Blvd., St. Paul 2, Minn.

Plastic coating protects safety belts

Cotton and nylon fabric safety belts coated with organosol last longer

Safety belts, which are receiving more and more attention particularly for automobiles, can be given longer life, stain and fade resistance, if they are coated with a new organisol formulation advanced by Goodyear. The plastic coating material was developed for coating cotton and nylon fabric safety belts to protect them against ravelling and fraying. It can be applied by a simple dipping operation or the basic organosol resin can be modified for use with different types of coating equipment.

Manufacturer: Goodyear Tire and Rubber Company, Chemical Division, Akron 16, Ohio.

Tape for laminating and splicing

One of the latest uses found for Mylar is this tough, transparent binding agent

A new transparent, double-faced Mylar tape suitable for various laminating and splicing operations is available from the Permacel Tape Corp.

Designated Permacel 94, the new tape combines thinness (3.3 mils) with exceptional toughness (20 lbs./in.) and is especially suitable for laminating transparent sheets, dissimilar metals or like metals, where paper or cloth backings would not be desirable. It is recommended for laminating when resistance to aging, low moisture vapor permeability, resistance to solvents, and compactness in the end product are desired. As a splicing agent, the tape is useful where overall thinness is important and where, because of Mylar's chemically inert nature, the tape should not be affected during processing.

Permacel 94 is backed by a one-mil Mylar film and uses a rubber-base, pressure-sensitive adhesive, cured in two hours at 250°F., in one hour at 300°F. It is interlined with a two-mil Mylar film.

Manufacturer: Permacel Tape Corp., New Brunswick, New Jersey.

Costs cut with Tenite meter housings

Utilities companies are cutting down on their meter cover replacement costs by substituting Tenite butyrate for glass. The clear plastic, made by Eastman Chemical Products, Inc., is weather resistant, has high impact strength, resists glazing effects, and permits easy reading of the dials. Simple to install, the new covers weigh 11 ounces. They are molded by Popular Plastic Products Corporation and distributed through Graybar Electric Co., Inc.

Manufacturer: Popular Plastic Products Corp., 10th Avenue and 3rd Street, East Northport, Long Island, New York.

New short-run color process

Eastman develops camera and system to standardize 35mm. reproduction

Eastman Kodak's Research Laboratories have announced a new short-run color process that cuts printing costs substantially and has been standardized for reproduction from ordinary 35mm. transparencies. Designed specifically for 1,000-5,000 copy runs, the new process was brought about by a series of modifications in conventional offset lithography equipment. Commercial printers usually require a day and a half to prepare fully color-corrected negatives for high-speed lithographic printing; the final plates can be prepared by the new Eastman process in less than two hours.

The first step in the short-run color process is to prepare a black-and-white contact of the original transparency as a mask, which is then mounted with the transparency in front of a strong light source. The mask reduces the contrast of the transparency, and the relative brightness of the various colors, to a range that can be readily reproduced with printing inks. Only three color-separation negatives are made (there is no black plate), exactly as in the conventional lithographic process, except that they are all made on one strip of film. Eastman has developed a completely automatic camera for the process. The operator need only press a button to make all three of the color-separation negatives. The emphasis throughout is on standardization.

Source: Eastman Kodak, Rochester, N. Y.

Two new plastic compounds from GE

A black phenolic molding compound and a laminate have electrical applications

General Electric has recently announced the availability of two new plastic compounds. One is a black phenolic molding compound and the other a new cold fabricating laminate. The new phenolic molding compound, designated G-E 12906, is reported to have higher impact properties than previously available compounds. In addition, it is suitable for automatic molding processes, due to its excellent granulation and fast-curing properties. In both cold and preheat applications, the black compound produces molded parts with a finish that is superior to conventional materials. It has been tested and demonstrated to be suitable in the molding of switch parts, electrical sockets, and other electrical control parts.

The new General Electric plastic laminate has properties that make it particularly suitable for automatic production of electronic equipment using printed circuits. Known as G-E Textolite 11570, the new material is a high insulation-resistance phenolic, paper-base laminate which permits precision punching of printed circuits. The cold fabricating quality of Textolite eliminates dimensional changes in the material which result from heat and punching stresses. Its translucency permits visual checks for the accuracy of circuit registration.

Manufacturer: General Electric Company, Chemical and Metallurgical Division, Pittsfield, Mass.

Tester to check radios, TV at home

Inexpensive tube tester simplifies electrical tests for the consumer

A low-priced, do-it-yourself tube tester makes possible quick electrical tests for radio and television that can be done in the home. The Telecar tube tester retails for $2.95 and can be used to check appliances, fuses, light or flash bulbs, wires, motors, resistors, line voltage, and other electrical equipment. No technical knowledge is needed for its operation; tubes are merely plugged into a socket and their condition is indicated by a neon light.

Manufacturer: Telecar Company, 25 Willett Street, New York 2, N. Y.

Versatile clamps are easy to use

"Insta Clamps" can be used without wedges and give good holding

Simplicity was the key to the development of a new type of clamp that saves time, is easy to use, and does a secure job of holding a work piece. "Insta Clamps," introduced by Bausch Products in Detroit, eliminate the need for shims or wedges to give proper purchase. They are heavy duty steel forgings with concave washers that distribute pressure evenly and locate the pressure tangent automatically. Narrow grooves, ledges, or corners are sufficient to lock a work piece of any shape into position. The price is $7.50 a pair.

Manufacturer: Bausch Products, 18411 West McNichols, Detroit 19, Michigan.

Plastic pipe has many uses

Identification program established for plastic pipe by Sanitation Foundation

Plastic pipe that can be formed, sawed, threaded, machined, hot gas welded, and solvent-cemented is being made of unplasticized polyvinyl chloride by the Carpenter Steel Company. The pipe is offered in two types of PVC: a normal impact grade with high chemical resistance, and a high impact grade with less chemical resistance but much greater strength. Simple and inexpensive to install, plastic pipe is half as heavy as aluminum and one-sixth as heavy as steel. It is non-toxic, odorless, tasteless, non-porous, non-contaminating, non-flammable, and abrasion resistant. Sizes range from ½-inch to 4-inch diameters in 10 and 20 foot lengths with plain ends. Possible applications for plastic pipe range from the brewing and distilling to the pharmaceutical and paper industries.

Plastic pipe in general received attention when, on February 1, 1956, the Society of the Plastics Industry, Inc., and the National Sanitation Foundation jointly put into effect a program to identify plastic pipe approved for use in systems trans-

porting drinking water. Concern on the part of health officers and the public about the possible effects of untried new materials in contact with drinking water prompted the plastics industry to start a research program of toxicity and taste studies more than three years ago. As a result of this program, all plastic pipe users can identify pipe that is free from toxicity or taste effect by the National Sanitation Foundation Seal of Approval. Twenty-two samples of plastic pipe were used in the study to determine their suitability for underground use in conducting drinking water. The samples included plastics most commonly used for conducting cold water, and some new formulations. They were broadly classified as Polyethylene, Polyvinyl chloride (including Saran), Rubber-Modified Polystyrene, and Cellulose Acetate Butyrate. The identification program requires that new materials be automatically tested by the National Sanitation Foundation, if the pipe is to be identified with the seal of approval.
Manufacturer: The Carpenter Steel Co., Alloy Tube Division, Union, New Jersey.

Sound lag gives better hearing

New headset delays sound to one ear for "live" sound effects

Strange as it may seem, people hear better if sound reaches one ear a little before the other. This fact was revealed recently by a U.S. Army research project conducted at the University of Cincinnati. It was found that a time delay of a few milliseconds in reception in one ear contributed to better understanding of speech. Adopting this principle, Telex, Inc., a manufacturer of headsets and hearing aids, introduced a new headset, known as "Duodyne," which has a five millisecond time delay in transmitting sound to one ear. The resulting reception gives the effect of actual presence at the source of the sound, whether it is voice or music.

The new headset weighs two ounces and has a Tenite housing. It has two dynamic drivers, one feeding each ear, one emphasizing high tones and the other low tones. It is an under-the-chin style headset with a frequency response of from 100 to 8,000 cps, and an impedance of 15 ohms. The tone arms are made of anodized aluminum, and the plastic ear plugs are removable for easy cleaning.

Manufacturer: Telex Inc., Telex Park, St. Paul 1, Minnesota.

Rust preventative can be sprayed

Application of new compound made easier through aerosol packaging

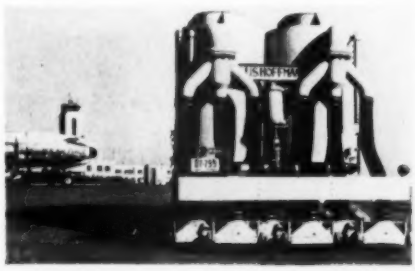
A new rust inhibiting compound, packaged in an aerosol spray container, is being produced by Eastern Aerosol Products. Rust Check can be used to prevent rust on tools, molds, dies, instruments, metal parts, and machinery. The spray provides a clear, waxy, dry film .0005" thick which, in most cases, need not be removed when the tool or part is removed from storage and readied for use. The film is worked off in use, and in some cases, such as on power saws, serves as a lubricant. By packaging Rust Check in an aerosol bomb, application is simplified, and it is claimed that the film has advantages over oil or grease because it does not absorb dust and dirt.

Manufacturer: Eastern Aerosol Products, Newfoundland, New Jersey.

Clean sweep for runways

Huge vacuum does a giant cleaning job to protect jet aircraft

Foreign material such as nuts, bolts, screws, stones, pieces of wood, glass, or any other small object lying on a runway are great and constant dangers to jet airplanes. Any object, no matter how small, can do a great deal of damage if it is sucked into a jet's airscoop. The Defense Department estimates that several million dollars are spent annually for maintenance and repair for damage caused in this manner. Precautions have been taken previously by placing a wire screen inside the airscoop, but as the mesh must be large enough to permit air intake, it also admits little objects in where they can do devastating damage to the turbine. The only really sure answer was to keep runways entirely free from all foreign matter. To provide the solution, the U.S. Hoffman Machinery Corporation developed a vacuum cleaner—the largest in the world.



Rather appropriately called the "Jarc" (short for Jet Aircraft Runway Cleaner), this 30,000 pound, 30 foot long monster cleans in one sweep the equivalent of 1,200 home-type cleaners. Six ground-level nozzles cover an eight-foot width at the rear of the vehicle and get their suction power from two heavy-duty exhausters. Air is sucked in at a rate of 350 miles an hour and will pick up anything from paper to steel, a great improvement over previous methods that used conventional moving brushes or large magnets.

The vacuum cleaning equipment is mounted on a specially-designed White Motors truck body incorporating a particularly strong axle and an extra transmission so the truck can be run continuously at three miles an hour. Only one man is needed to operate the machine and is able to clean an area of 2 million square feet in eight hours.

Manufacturer: U.S. Hoffman Machinery Corp., 105 Fourth Avenue, New York 3, N. Y.

New silicone finish for glass cloth

Dow Corning's T-31 an effective finish for structural laminates

A water dilutable silicone finish for glass cloth that shows promise of being a practical, universal finish has been developed by the Dow Corning Corporation. Identified as Dow Corning T-31, it is effective with epoxy, phenolic, polyester, and silicone resins, enabling laminators to meet a wide range of specifications with a single type of finished glass cloth.

T-31 is stable as supplied or in solution and does not separate or settle after standing. It is applied as a water solution on conventional finishing equipment. It can be applied continuously by passing the glass cloth through a dip tank, and then through a drying oven. Although no curing is necessary, it is recommended that the treated cloth be heated at temperatures in the range of 250-300°F. for a few minutes.
Manufacturer: Dow Corning Corporation, Midland, Michigan.

(continued from page 24)

billions have to be invested as capital to take advantage of the results of research. This combination of research and capital investment has, perhaps, been one of the largest single factors contributing to the general growth of prosperity in our country. Research is expanding at a rate where it seems that the most likely limitation will be lack of available trained manpower."

John M. Reinhart, chief stylist, Continental Division, Ford Motor Co., to the Los Angeles Art Directors' Club: "Current automotive styling may have reached the point of diminishing returns. . . . The massive, boxy, bechromed similarity of the present day American automobile gives every indication that it might be time for styling ideas to produce a fresher type of automotive design."

Dr. W. R. G. Baker, general manager of GE's Electronics Division, to the national convention of the Institute of Radio Engineers: "We know that the experimentation involved in the earth satellite program will bring new advancements in the electronic art." He predicted "new developments in research on electronic components—with an ever-increasing trend to miniaturization to meet the requirements associated with propulsion to outer space."

Gerald Stahl, Executive Vice President of Package Designers' Council, to a PDC packaging seminar, Springfield Museum of Art: "Future historians may well establish that we are now entering the 'supermarket age'—the era when mass distribution rather than mass production will become the driving force in our economy. Our times may become known as the age of the sales and marketing specialists whose knowledge of expanding markets through self-service and impulse buying enabled more people to buy more goods than ever before."

Peter Sammarco, advanced design engineer of the McCormick Works of International Harvester Co., Chicago, to the Drafting Organization Institute: "Detail drafting consumes 30 to 40 per cent of engineering time, with the remainder of the work-time used for the more important jobs of design and administration which result in new products . . . Every experienced draftsman has at one time or another taken a short cut in making a drawing, whether it has been tracing part of a similar drawing or omitting what is considered necessary cross-hatching. The short cuts were taken to gain time, and the methods used were acceptable . . . Why not study these short cut methods? Why not collect and organize them? Why not expand them and form them into a workable system which will intelligently utilize a draftsman's time and reduce costs?"

Tentative list of Aspen speakers announced

While plans for the Aspen conference are still being formulated, general topics and a partial list of speakers have been established for the International Design Conference in Colorado, taking place from June 23 to July 1. Presenting the general theme, "Management and Design" will be: Misha Black, Design Research Unit, London; Gordon Lippincott, Lippincott and Margulies, New York; Arthur Hald, Lidingö, Sweden; Hisaakira Kano, President of the Housing Corporation of Japan; Jacques Vienot, Institute Esthetique Industrielle, Paris. On "The Design Profession" will be heard: F. H. K. Henrion, London; J. Müller-Brockmann, Zurich, Switzerland; Paul Rudolph, Cambridge, Massachusetts; Garrett Eckbo, Eckbo, Roystan & Williams, Los Angeles; Alberto Rosselli, Editor of *Stile Industria*, Milan; Sori Yanagi, Japan Committee on International Design, Tokyo; and speaking on "Design Education": Mortimer Adler; Gregor Paulsson, University of Upsala, Sweden; and Max Frisch, Männendorf, Switzerland. Others will soon be announced.

Manufacturers' Literature Supplement

A bibliography of currently available technical brochures dealing with materials, methods, components, and machines

MATERIALS: 1—Metals

Alcoa Impact Fact Book. Aluminum Company of America, 724 Alcoa Building, Pittsburgh 19, Pa. 16 pp. Covers significant facts necessary to design products with impact extrusions.

Alloy and Stainless Steels Catalog. ESCO, 2141 N.W. 25th Ave., Portland, Ore. 102 pp., ill. New edition of Electric Steel Foundry's Catalog 175-A, expanded to include more data on corrosion-, heat-, impact-, and abrasion-resistant alloy steels.

Aluminum Railings. Blumcraft, 460 Melwood St., Pittsburgh, Pa. 44 pp. Detailed presentation of many ornamental aluminum components available for metal fabricators.

Beryllium Extrusions. The Beryllium Corp., Reading, Pa. 20 pp. Lists and describes the characteristics of the company's line of extruded products.

Brass and Aluminum Nuts. Fischer Special Manufacturing Co., 436 Morgan St., Cincinnati, Ohio. 16 pp. Catalog of complete line of turned brass and aluminum nuts and description of company's technical assistance department, available for consultation on all types of fastening problems.

Chemical Finishing of Metals. J. W. Rex Co., 834 W. 3rd St., Lansdale, Pa. 12 pp. Ways to cut manufacturing costs through substitution of low-cost, treated base metals and replacement of expensive plating operations.

Composite Metals. Metals & Controls Corp., General Plate Division, Attleboro, Mass. 12 pp., ill. A booklet pertaining to the unusual, difficult and precise combinations of malleable metals developed by this firm.

Continuous-Cast Bearing Bronze. Continuous-Cast Products Dept., American Smelting & Refining Co., Barber Station, Perth Amboy, N. J. 6 pp., ill. Advantages of using Asarcon 773 Continuous-Cast bearing bronze, and a description of the Asarco process for casting bronze alloys.

Designation Chart for Cast Stainless Steels. Empire Steel Castings, Inc., Box 139, Reading, Pa. A new chart designating specifications, analysis, physical properties and uses of a number of corrosion resistant and heat resistant stainless steels.

Pre-Finished Metals. American Nickeloid Company, Peru, Illinois. 23 pp., ill. Nickeloid metals and the advantages of using them in the manufacture of consumer products. A chart gives properties and sizes and lists advantages of different uses. Mar-Not, a coating that affords protection during fabrication, is also described.

Refinished Metals for Modern Design. Apollo Metal Works, 6652 South Oak Park Avenue, Chicago 38, Ill. 7 pp., ill. Folder describes advantages, fabrication and typical uses of pre-finished metals for product designers. Also charts, general data on pre-plated and pre-enameled metals.

Research at Alcoa. Aluminum Company of America, 724 Alcoa Building, Pittsburgh 19, Pa. 28 pp., ill. Information about Alcoa research and a complete bibliography of technical papers published by the Aluminum Research Laboratories.

Reynolds Metals' Facilities. Reynolds Metals Co., 2500 South Third Street, Louisville 1, Ky. 4 pp. Brochure outlining Reynolds' expanded facilities for producing wire, cable and bus conductor to meet increasing demand for aluminum in the electrical industry.

Roll Surface Finishes. Rodney Hunt Machine Company, Orange, Mass. Finding the right roll finish for the right job is discussed as an assistance in the design and selection of rolls for specific plant applications.

Stainless Steel in Product Design. Committee of Stainless Steel Producers, American Iron and Steel Institute, 350 5th Avenue, New York 1, N. Y. 40 pp. Illustrated booklet for industrial designers about where and how to use stainless.

Zinc Industry. American Zinc Institute, Inc., 60 E. 42nd St., New York 17, N. Y. 13 pp., with tables. "A Review of the Zinc Industry in 1955," summarizing the important aspects of both production and consumption.

2—Plastics

Bakelite Plastics—Vinyl Rigid Sheets. Bakelite Company, a Division of Union Carbide and Carbon Corp., 300 Madison Avenue, New York 17, N. Y. 40 pp. ill. A reference handbook describing the forms, properties, fabrication techniques and application of Bakelite vinyl plastic rigid sheets.

Cast Optics. Cast Optics Corp., Riverside Conn. 12 pp., ill. A catalog of the optically clear rigid plastic sheets manufactured by this firm.

Fiber Glass Reinforced Materials. Plumb Chemical Corp., Philadelphia 37, Pa. Technical data folder describing fiber core molding compounds: fiber glass reinforced materials of high impact strength.

GE Chemical Products. Dept. CDG-101D, Chemical Division, General Electric Company, 1 Plastics Avenue, Pittsfield, Mass. 27 pp., ill. Describes GE molded plastics, silicone products, compounds and resins, laminated products, and electrical insulating materials.

Laminated Plastics and Vulcanized Fibers. Taylor Fibre Company, Norristown, Pa. Comparative engineering data on laminated plastic sheets and vulcanized fibers.

Plastispray. Liquid Plastics Corp., 50-02 23rd Street, Long Island City, N. Y. 4 pp., ill. Describes uses of sprayed-on vinyl plastic sheeting.

Standard Plastic Parts. Harry Davies Molding Company, 1428 North Wells Street, Chicago 10, Ill. 32 pp., ill. Shows actual-size molded phenolic plastic parts available without tooling costs.

The Luria-Cournand Story. Luria Cournand, Inc., Havre de Grace, Md. 20 pp., four-color, ill. Shows Luria-Cournand products, new techniques, bonding materials, new architectural materials from plastics.

3—Others

Chemical Porcelain. U. S. Stoneware Co., Brimfield Road, Akron 9, Ohio. 8 pp., ill. No. CP-50. A description of this firm's line of chemical porcelain pipe, fittings, valves, expansion joints, packing, etc.

Concrete. Inorganic Sales Dept., Dow Chemical Co., Midland, Michigan. 10 pp., ill., charts. A concise and detailed account of benefits derived from the addition of calcium chloride to concrete mix.

Engineered Ceramics. Frenchtown Porcelain Co., 101 Muirhead Ave., Trenton 9, New Jersey. 8 pp., ill. Describes facilities and products of the company.

Glass Fiber Roving. Libby-Owens-Ford Glass Fibers Co., 1810 Madison Ave., Toledo 1, Ohio. Describes the company's Garan, Vitron, and chrome roving for rod stock, molding compounds, preforming, mat, woven roving and other uses.

Industrial Chemicals. The Pacific Lumber Co., 100 Bush St., San Francisco, Calif., 5 pp., charts. Information about Palco's "Palcotan" and "Palconate," reactive chemicals derived from redwood bark, effective as dispersing agents or replacements for tannins.

3M Adhesives, Coatings & Sealers. Adhesives and Coatings Division, Minnesota Mining & Manufacturing Co., 423 Piquette Ave., Detroit 2, Michigan. An up-to-date listing of 3M Adhesives, Coatings and Sealers according to government specification requirements, with a short description of the end use of each specification.

Molybdenum Chemical Bulletins. Climax Molybdenum Company, 500 Fifth Avenue, New York 36. Four-page description of all available company literature.

Nylon Molding Powder. National Polymer Products, Inc., 125 North Fourth Street, Reading, Pa. Bulletin explains how field for molded nylon applications is expanded due to wear and frictional properties of nylon molding powder.

Quartz Crystals. General Electric Company, Electronics Park, Syracuse, N. Y. 6 pp., ill. Explanation of an entirely new approach to the method of specifying GE custom-made crystals.

Synthetic Rubber Products. Acadia Synthetic Rubber Products Div., Western Felt Works, 4021-4135 Ogden Ave., Chicago 23, Ill. 20 pp., ill. Specifications for various synthetic rubbers, and listing of molded, extruded, and die cut parts produced, with their uses. Sheet and roll goods, lathe cut seals, and silicone rubber are also included. The company issues a special catalogue on synthetic rubber packings.

Vulcanized fiber. National Vulcanized Fiber Company, 1055 Beech Street, Wilmington 99, Del. 20 pp., ill. Summary of how vulcanized fiber is made, its outstanding properties, methods of fabrication and forming, shapes and grades available, and representative lists of applications in selected industries.

METHODS

Basements. The Small Homes Council, University of Illinois, Urbana, Ill. 8 pp., ill., 10 cents. Describes design of basements and offers recommendations for basement construction.

Castings. Atlantic Casting & Engineering Corp., 810 Bloomfield Ave., Clifton, N. J. 12 pp., ill. An explanation of the Atlantalloy casting process, precision casting design facts, and specifications on this firm's alloys.

Cutting Production Costs with Electronic Controls. Photoswitch, Inc., 77 Broadway, Cambridge, Mass. 74 pp., ill. Compilation of 46 case studies of industrial control problems and how they were solved through the use of electronics.

Electric Resistance Welding. Sciaky, 4915 W. 67th Street, Chicago 38, Ill. 12 pp., ill. Describes industrial applications, manufacture, service and principles of operation of electric resistance welding machines.

"How To Test Corrugated Boxes." Hinde & Dauch, Sandusky, Ohio. 24 pp. Check-list for judging the protective qualities and general efficiency of specific corrugated boxes. Testing terminology is fully defined.

Injection Molding of Tenite Polyethylene. Eastman Chemical Products, Inc., 260 Madison Avenue, New York 16, N. Y. 16 pp. Basic information about the molding of Tenite Polyethylene, along with a guide for correcting molding difficulties.

Investment Casting. Arwood Precision Casting Corporation, 56 Washington Street, Brooklyn 1, N. Y. 4 pp., 2 color. Describes nine different applications of investment casting process in nine industries.

Metalworking Catalog. Carboloy Department, General Electric Company, Detroit 32, Mich. 66 pp., ill. Describes most effective cutting speeds for carbide tools, machine tool hp. requirements, carbide grade selection and the Carboloy machinability computer. Also prices, specifications.

Platecoils. Tranter Manufacturing, Inc., Lansing, Michigan. 20 pp. Brochure No. 154. An explanation of the advantages of using Platecoils in process heating and cooling applications instead of pipe coils.

Pop-Rivet Fastening. United Shoe Machinery Corp., West Medway, Mass. 6 pp., ill. Describes the method and tools involved in this company's pop-rivet system of blind fastening.

Production and Plant Ideas. Keller Tool Division, Gardner-Denver Company, Grand Haven, Mich. New bi-monthly publication about production matters for tool designers and plant engineers.

Roll Shaft Breakage. Rodney Hunt Machine Co., Dept. IR, Orange, Mass. Second of a series concerned with basic roll engineering data, this leaflet covers the bending moment of shafts.

Stop Rust. American Hot Dip Galvanizing Assoc., Inc., 1st National Bank Bldg., Pittsburgh 22, Pa. 11 pp., ill. Describes hot dip galvanizing for industry and consumers; describes the process and proves products cannot rust.

Test Bars. Federated Metals Division, American Smelting and Refining Co., 120 Broadway, New York City. 18 pp., ill. A discussion of current test bar theory and practice, aimed at the copper and aluminum alloy casting field.

Unistrut. Unistrut Products Co., 1013 Washington Blvd., Chicago 7, Ill. 83 pp., ill. Catalogs No. 800 & 700 describe flexible all-purpose metal framing system.

Vacuum Forming. Nordic Plastics Co., 383 Douglass St., Brooklyn 17, N. Y. 4 pp. Vacuum forming explained with examples of items produced by this process and technical detailing of the materials used.

Welding. Westinghouse Electric Corp., Pittsburgh 30, Pa. 7 pp. The performance and applications of a new consumable electrode inert gas welding process, West-ing-arc, are given in booklet B-6525.

Windows. The Small Homes Council, University of Illinois, Urbana, Ill. 8 pp., ill., 10 cents. The first in a series of three publications on windows, this circular sets forth principles for window selection and placement.

MACHINES

Drilling & Tapping Machines. Hamilton Tool Co., Hamilton, Ohio. 4 pp., ill. Pamphlet describing the Hamilton Super Sensitive Small Hole Precision Tapping Machine.

Geargrind Machines. The Gear Grinding Machine Co., 3901 Christopher, Detroit 11, Mich. 8 pp., ill. Catalog provides complete information on entire line of machines as well as types and specifications of gears, splines, & special-contoured parts that can be ground on them.

Grinding and Lapping Machines. Norton Company, Worcester 6, Mass. 32 pp., ill. A general catalog.

Grinding Wheels. Norton Company, Worcester, Mass. 22 pp., ill. Details on how to select wheels for precision grinding of tool and structural steels.

Hydraulic Metalworking Presses. Baldwin-Lima-Hamilton Corp., Philadelphia 42, Pa. 12 pp., ill. Describes company's line of metalworking presses for extrusion, metal forming, forging, bending, flanging, crimping, etc.

Industrial Rolls. Rodney Hunt Machine Co., Dept. IR, Orange, Mass. The third report in a series prepared by the Industrial Roll Division of Rodney Hunt, to assist in the design and selection of rolls for specific plant applications.

Instrument Generator. Dalmotor Co., 1380 Clay St., Santa Clara, Calif. Form GPM-44A describes a nine-ounce, permanent-magnet, continuous-duty generator recommended for use as a precision voltage source.

Kiln Furnaces. Eclipse Fuel Engineering Co., Rockford, Illinois. A technical article describing special kiln furnaces for uniform heating of abrasives.

Machine Tool Fixtures. Swartz Tool Products Co., 13330 Foley Ave., Detroit, Michigan. 8 pp., ill. Swartz offers a booklet describing the services they offer to builders of machine tools, and outlining their facilities for the designing and building of precision work-holding fixtures.

Manufacturing Facilities for the Fabrication of High-Pressure Piping. Foster Wheeler Corporation, 165 Broadway, New York 6, N. Y. 18 pp., 2-color, ill. Describes Foster Wheeler's facilities in four plants for manufacturing custom-designed equipment to customer specifications.

Michigan Gear Speeders. Michigan Tool Co., 7171 E. McNichols Rd., Detroit 12, Mich. 4 pp., ill. Bulletin MS-10. Describes models 1126, 1126-A, 1127-B and 1129 and gives specifications.

Miniature Rigid Controls. Arens Controls, Inc., 2017 Greenleaf St., Evanston, Illinois. 2-page leaflet about Arens Miniature Rigid Push-Pull Controls, which are small and fine enough for use in test equipment and production equipment.

Portelvator. Hamilton Tool Co., Hamilton, Ohio. 4 pp. Pamphlet about the Hamilton portable elevating table.

Precision Drill Catalog. Precision Twist Drill & Machine Co., Crystal Lake, Ill. New catalog of straight shank twist drills and drill blanks as small as .006 diameter.

Precision Roller Bearings. McGill Manufacturing Company, Valparaiso, Ind. 58 pp., ill. Complete data on sizes, capacities and mounting details.

Shaft-Mounted Speed Reducers. Cone-Drive Gears Division, Michigan Tool Co., 7171 E. McNichols Road, Detroit 12, Mich. Describes the double-enveloping worm gear design in shaft-mounted speed reducers.

Turbine Booklet. Westinghouse Electric Corporation, P.O. Box 2099, Pittsburgh 30, Pa. 20 pp., with specification and selection data. Re-issue of popular Westinghouse booklet covering the complete line of Type E turbines; gives design and constructional characteristics and application of these units.

Vacuum Furnaces. F. J. Stokes Machine Co., 5500 Tabor Road, Philadelphia, Pa. 12 pp., ill. A discussion of the new field of vacuum metallurgy, with data about the effects of processing metals and alloys in a vacuum.

Woodworking Machines. De Walt, Inc., Lancaster, Pa. 20 pp., ill. A new booklet describes the De Walt "Power Shop" equipment. The line consists of four models of radial arm type multi-purpose machines, suitable for home, farm, school or woodworking shop.

COMPONENTS

Ball-Bearing Screws. Saginaw Steering Gear Division, General Motors Corporation, Saginaw, Mich. 15 pp., ill. Discusses basic types, operating principles, construction details, applications considerations, selection factors.

Burr-Master. Modern Industrial Engineering Co., 14230 Birwood Ave., Detroit 4, Mich. 4 pp., ill. Features how the universal Burr-Master can solve your gear burring and chamfering problems.

Heat Exchanger Tubes. Aluminum Company of America, 728 Alcoa Bldg., Pittsburgh, Pa. 24 pp., ill., charts. The latest in the Aluminum Company of America's technical booklet series presents the complete story on aluminum heat exchanger tubes.

Industrial Propellers. Columbian Bronze Corp., Freeport, New York. Propellers for mixing, pumping, aerating and agitating are offered by the Columbian Bronze Corp. A leaflet about their new line is available.

Leach Relay Catalog. Leach Relay Co., Division of Leach Corp., 5915 Avalon Blvd., Los Angeles 3, Calif. 44 pp., ill. Describes standard stock relays, and suggests modifications which can be made to accommodate special requirements.

Metal "O" Rings. Advanced Products Co., P.O. Box 75, North Haven, Conn. Catalog of "O" rings for positive static sealing under higher temperature and pressure conditions.

Multiple V-Belts. Goodyear Tire & Rubber Co., Dept. 722, Akron 16, Ohio. Detailed brochure containing engineering and design data on multiple v-belts. Comprehensive explanation of v-belts.

New Industrial Sockets. McGill Manufacturing Co., Valparaiso, Indiana. Bulletin S-54. Description of two new phenolic sockets and a new push-button brass socket recently added to McGill line.

Plug Valve Actuators. Ledeen Manufacturing Co., 1600 So. San Pedro St., Los Angeles, Calif. 8 pp., ill., charts. Ledeen's new bulletin, No. 3020, describes tandem and floating bar type actuators, typical applications and various mountings.

Relays. Guardian Electric Mfg. Co., 1621 W. Walnut St., Chicago 12, Ill. 72 pp., ill. Physical and electrical characteristics of basic type relays produced, along with operating data and dimensional drawings, are included.

Roller Bearings. McGill Manufacturing Co., Inc., Valparaiso, Indiana. 4 pp., ill. A bulletin on the new Sealed Guiderol Bearing, which adds single or double seals for dirt and lubrication protection.

Screw Thread Insert. Heli-Coil Corporation, Danbury, Conn. 4 pp., ill. Describes PIP push insert.

Socket Cap Screws. The Bristol Company, Socket Screw Division, Waterbury 20, Connecticut. Bulletin DM737 gives complete information on socket cap screws and installation.

Socket Screws. Safety Socket Screw Co., Chicago 31, Illinois. 38 pp., ill., charts. Catalog of Blue Devil socket screws, giving information about their manufacture, etc.

Solenoid. West Coast Electrical Mfg. Corp., AC Division, 216 W. 116th Place, Los Angeles, Calif. Easy to read solenoid design information, engineering drawings, solenoid performance charts, work and temperature curves necessary to assist the engineer in selecting the right solenoid for his application.

Thru-Broached Screw. The Bristol Company, Socket Screw Division, Waterbury 20, Conn. Bulletin No. 736, ill. Contains tables of dimensions and torque values.

Valves. Eclipse Fuel Engineering Co., Rockford, Illinois. 4 pp., ill. Discusses design and performance characteristics of the line of "DO" (diaphragm operated) solenoid valves. Eclipse also offers a bulletin on Valves for Combustion Control; another on their line of Air/Gas Proportional Mixers.

Valves. Marotta Valve Corp., Boonton, N. J. 52 pp., ill., charts. The entire line of Marotta valves, with illustrations, application information, and specifications, on each valve, is presented in four sections: magnetic valves, check valves, regulating valves and special valves.

Vibration Mountings. T. R. Finn & Co., Industrial Division, 200 Central Ave., Hawthorne, N. J. 4 pp. Catalog of rubber-in-shear vibration mountings used to isolate vibration, noise and shock caused by light and medium-weight machinery.

Voltage Regulator Practice. Westinghouse Electric Corp., P.O. Box 2099, Pittsburgh 30, Pa. 20 pp., charts. Booklet No. B-6053. Discussion of fundamental application factors of step and induction voltage regulators.

MISCELLANEOUS

Air Conditioning. Air Conditioning Division, Philco Corp., Tioga and C Streets, Philadelphia 34, Pa. 16 pp., ill. A brochure of facts about air conditioning an entire building with individual packaged units, compared to central systems.

Air Conditioning Cooling Tower. Halstead & Mitchell, Bessemer Bldg., Pittsburgh, Pa. 16 pp., ill., charts. New material on air conditioning cooling tower applications, selection and installation. The catalog describes operating characteristics of 20 standard Halstead & Mitchell Commercial Cooling Towers.

Allied International Inc. Allied International Inc., 230 Park Ave., New York 17, N. Y. 8 pp, ill. Brochure explaining facilities of Allied Engineering Division for producing electronic and electro-mechanical devices.

Benjamin Industrial Signal Guide Book. Benjamin Electric Mfg. Co., Des Plaines, Ill. 40 pp., ill. General information on sound signals, signal equipment, and technical data on signals.

Building Products. Majestic Company, Inc., Huntington, Indiana. 12 pp., ill. A catalog of building products available from the Majestic Co.; gratings, fireplace parts, window wells, coal chutes, etc.

Computer Components. Librascope, Inc., 808 Western Avenue, Glendale, Cal. Illustrated brochure outlines specifications of mechanical and electrical components most frequently used in analog and digital computers.

Data Sheet Numerical Index. American Society of Tool Engineers, National Standards Committee, 10700 Puritan Avenue, Detroit 38, Mich. A systematic classification of products of interest to the tool engineer.

Dock Fenders. Goodyear Tire & Rubber Co., Inc., Dept. 722, Akron 16, Ohio. 12 pp., ill., charts. The wide range of uses for rubber dock fenders is featured in this booklet, which also includes data on load and deflection and energy absorption.

Electronic Themostats. Honeywell Company, Minneapolis, Minn. 15 pp., ill. Describes advantages of electronic air conditioning.

Electronics and Business Management. Visual Education Department, American Management Association, 1515 Broadway, New York 36, N. Y. Four 35-mm filmstrips with accompanying LP records. Series is non-technical training film on electronic data processing. Price: $110 per set, less in quantity.

Heating and Air Conditioning. The Trane Company, La Crosse, Wisconsin. New literature on three Trane product lines. Bulletin DS-352 describes Cold Generators; DS-361 is about the new Trane Reciprocating Compressors; and Bulletin DS-362 describes improved self-contained air conditioning units.

"High-Voltage Electron-Beam Processing." High Voltage Engineering Corporation, 7 University Road, Cambridge 38, Mass. 32 pp., ill. Bulletin E is a survey of radiation machines and their application in chemical processing, sterilization and industrial research.

Industrial Directory of Mexico. Publicaciones Rolland, Vallarta #21, Mexico 4, D.F., Mexico. Price for three volumes: $21.50. Volume I lists 50,000 recognized companies and provides data about each. Volume II and III sort Mexico's products into 32,000 categories and list 180,000 suppliers according to category.

Industrial Laboratory Coolers. Conrad, Inc., Holland, Michigan. Data sheets on environmental chambers and liquid chillers, indicating various combinations of environment available with Conrad equipment.

Insulated Wire and Cables. Electrical Wire and Cable Dept., United States Rubber Co., 1230 Avenue of the Americas, New York 20, N. Y. 140 pp., ill. A new book containing engineering references and descriptions of insulated wire and cables made for the electric utility industry.

Inventions and Patent Applications. CGS Laboratories, Inc., 391 Ludlow Street, Stamford, Conn. Booklet about the nature of an invention and the steps necessary in processing a patent application.

Mechanical and Electrical Equipment for Buildings, by Gay, Fawcett & McGuinness. 564 pp., ill. John Wiley & Sons, Inc., New York. $8.50. Another basic text up-dated.

New Flush Push Button Latch Bulletin. Hartwell Company, 9035 Venice Blvd., Los Angeles 34, Calif. Illustrated bulletin giving full details of a new push-button flush latch development. Hartwell's 1955 catalog of flush latches (48 pp.) is also available.

Photoelectric Systems. Worner Electronic Devices, Box 129, Rankin, Ill. 19 pp., ill. Describes in lay terms the uses of electronic equipment in industry.

Precision Stamping Directory. American Silver Company, 36-07 Prince Street, Flushing 54, N. Y. Lists over 200 companies specializing in precision stamping and gives information about the production capabilities of each.

Remington Rand Institute. Publicity Department, Remington Rand, 315 Fourth Avenue, New York 10, N. Y. "Invitation to Learning." 8 pp., ill. Outlines seminars for executives and department heads about general management problems, or punch-card and electronic methods.

Side Indicator Meters. International Instruments Inc., New Haven 15, Conn. 2 pp., ill. An engineering data sheet, which gives complete performance information on a new series of large Side Indicator Panel Meters, developed primarily for electronic control panels.

Successful Automation. Photoswitch Division, Electronics Corporation of America, Cambridge, Mass. 18 pp., ill. Describes advantages of automatic photoelectric controls for sorting, starting, timing, inspecting, temperature control, smoke detection, etc.

Survey of Reactor Technology. Alco Products, Inc., Schenectady 5, N. Y. Paper on recent developments in the nuclear reactor field by Kenneth Kasschau, Manager of Alco's Engineering-Atomic Energy department.

"The First Tool Engineer." American Society of Tool Engineers, 10700 Puritan Avenue, Detroit 38, Mich. 16 pp., ill. Quotes references from the Old Testament to support contention that Tubalcain, grandson of Methuselah, was the father of tool engineering. By Robert B. Douglas.

Truck Bodies. Boyertown Auto Body Works, Boyertown, Pa. 14 pp., ill. Fully describes efficiency features of these truck bodies.

Water Heaters. Wolverine Tube, Division of Calumet & Hecla, Inc., Guardian Towers, Guardian Building, Detroit 26, Mich. Deals with economics of using an integrally finned tube in the manufacture of tankless water heater coils.

Index to Advertisers In This Issue

Classified

10c A WORD PER INSERTION, $3.00 MINIMUM, PAYABLE

Positions Wanted

INDUSTRIAL DESIGNER—*Executive Experience, administrative and creative abilities, experienced in developing and carrying products through all phases of design. Desires responsible position with medium to large manufacturer of furniture or cabinet type products. Box ID-73,* INDUSTRIAL DESIGN, *18 East 50th Street, New York 22.*

GRAPHIC DESIGNER—*Considered one of best in Chicago area. Work shown nationally and internationally. B.F.A., M.S. in Visual Design. Have taught university. Interested in design, art directing, museum, education, or any other position or association requiring the highest level of taste, imagination and craftsmanship. U. S. or abroad. Box 706, Chicago 90, Illinois.*

INDUSTRIAL DESIGNER—*Presently employed in the appliance field desires greater diversification. Wide range of experience in the fabrication of metal and plastic products. Engineering and styling background. Desires position with progressive organization. Box ID-74,* INDUSTRIAL DESIGN, *18 East 50th Street, New York 22.*

INDUSTRIAL DESIGNER—*Versatile, with creative ability in unusual field of product design. Thorough knowledge of industrial materials and processes. Successful experience in styling, engineering and production. Desires position with expanding, diversified manufacturer. Box ID-78,* INDUSTRIAL DESIGN, *18 East 50th Street, New York 22.*

GRADUATE INDUSTRIAL DESIGNER, *five years experience, desires change in position to a progressive organization sincerely interested in new ideas. Married and have family. Geographical location not too important. Box ID-79,* INDUSTRIAL DESIGN, *18 East 50th Street, New York 22.*

INDUSTRIAL DESIGNER—*Presently employed as project supervisor in Industrial Design 5 years experience in various phases. Plus formal training. Willing to relocate for challenging position. Box ID-80,* INDUSTRIAL DESIGN, *18 East 50th Street, New York 22.*

Help Wanted

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

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

PRODUCT STYLING SALES EXECUTIVE—*One of the largest industrial design organizations in New York has an opening for a sales executive to contact nationally known manufacturers regarding product styling. He should have the following background and characteristics: Substantial experience in marketing, advertising, and merchandising. Knowledge of materials and manufacturing techniques and ability to use this experience effectively. Creative, imaginative and inventive, yet practical. Able to verbalize ideas rapidly whether oral or written. Ability to understand motives of others and to size up complicated human relations situations. Enjoy contact work and find persuading others rewarding. Able to work with sustained concentration and to pay proper attention to both details and the overall aspects of the job. An effective organizer and administrator able to grow into a position of top level responsibility and decision making. Our staff knows of this ad. Replies will be held in strict confidence. Box ID-75,* INDUSTRIAL DESIGN, *18 East 50th Street, New York 22.*

DESIGNER, TOYS—*Brooklyn Manufacturer of Toys and Games has Opening For Imaginative, Cost Conscious Designer with Experience in Metal, Plastic and Wood Fabrication. Send Details Including Age and Salary Requirements to Box ID-76,* INDUSTRIAL DESIGN, *18 East 50th Street, New York 22.*

Advertisements

IN ADVANCE. BOX ADDRESS COUNTS FIVE WORDS.

AIRCRAFT INTERIOR DESIGNER—*If you're interested in the challenge of a fascinating new field, we may have a position for you—available immediately—we are looking for designers whose ideas and talents can create passenger accommodations that match the swept-back beauty and efficiency of our new jet airliners. If you are an Industrial or Interior Designer, or Architect with experience or training in transportation design, this may be an outstanding opportunity for a permanent career in the utilization of materials, preparation of color and lighting studies, design of interior equipment or many other design phases that will go into the ultimate creation of maximum jet passenger convenience and comfort. All company benefits, of course, including sick leave, retirement plan, paid annual vacation, employee scholarships and graduate study programs, etc. Send resume today to John C. Sanders, Staff Engineer, Personnel Dept. in Boeing Airplane Company, Seattle 14, Washington.*

WANTED INDUSTRIAL DESIGNERS—*For large appliance manufacturing company. Should be capable of making professional renderings and sketches. Will be working on diversified products. Good opportunity for man with creative ability. All replies confidential. Send complete resume. Box ID-72,* INDUSTRIAL DESIGN, *18 East 50th Street, New York 22.*

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For Your Calendar

Through April 29. An Introduction to Glass. Newark Museum, Newark, New Jersey.

April 18-May 13. Posters for the Family Service Association. Museum of Modern Art, New York.

April 21-25. The Decorators' Big Show. San Francisco Civic Auditorium.

April 23-25. 25th Anniversary Conference of the American Institute of Decorators. Palace Hotel, San Francisco.

April 23-25. Annual Convention of American Ceramic Society, Hotel Statler, New York. Design Division program planned.

April 23-May 4. 1956 British Industries Fair, Second Section. Olympia Hall, London, and Castle Bromwich, Birmingham.

April 26-7. Society of the Plastics Industry. Midwest Section Conference. French Lick-Sheraton Hotel, French Lick, Indiana.

April 28-May 6. International Automobile Show. New York Coliseum, New York.

April 30-May 1. American Management Association. Special Marketing Conference. The Drake, Chicago.

May 7-12. American Welding Society's Spring Meeting. Hotel Statler, Buffalo.

May 12-20. International Home Building Exposition. New York Coliseum, New York.

May 14-17. First Design Engineering Show. "Tomorrow's Products are Tomorrow's Markets," Convention Hall, Philadelphia.

May 14-17. American Society of Mechanical Engineers, Machine Design Division. Design Engineerng Conference, Convention Hall, Philadelphia.

June 11-15. Seventh National Plastics Exposition, Society of the Plastics Industry, New York Coliseum, New York.

June 11-15. Society of the Plastics Industry Conference and Annual Meeting. Commodore Hotel, New York.

June 18-20. American Society of Heating and Air Conditioning Engineers. Residential Air Conditioning Symposium. The Shoreham, Washington, D. C.

June 23-July 1. International Design Conference, Aspen, Colorado.

June 25-29. International Housewares Show. New York Coliseum, New York.

June 26. Society of the Plastics Industry. Plastics Structures Division Conference. Hotel Roosevelt, New York.

August 25-September 9. National Homefurnishings Show. New York Coliseum, New York.

September 17-21. Instrument Society of America. 11th Annual International Instrument-Automation Conference and Exhibit. New York Coliseum, New York.

September 25-28. Iron and Steel Exposition. Public Auditorium. Cleveland, Ohio.

August 29-November 4. American Fabrics Exhibit. Museum of Modern Art, New York.

October 1-5. National Hardware Show. New York Coliseum, New York.

October 15-19. National Business Show. New York Coliseum, New York.

October 23-25. Society of Industrial Packaging and Materials Handling Engineers. Exposition, competition, and educational short course. St. Louis, Missouri.

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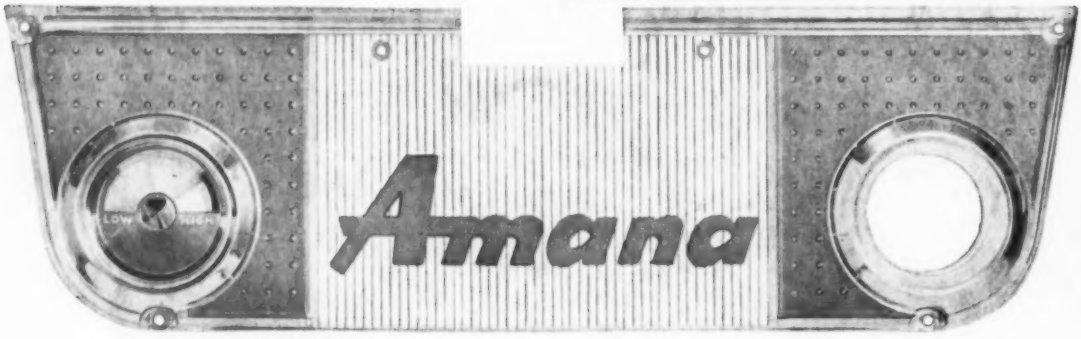

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