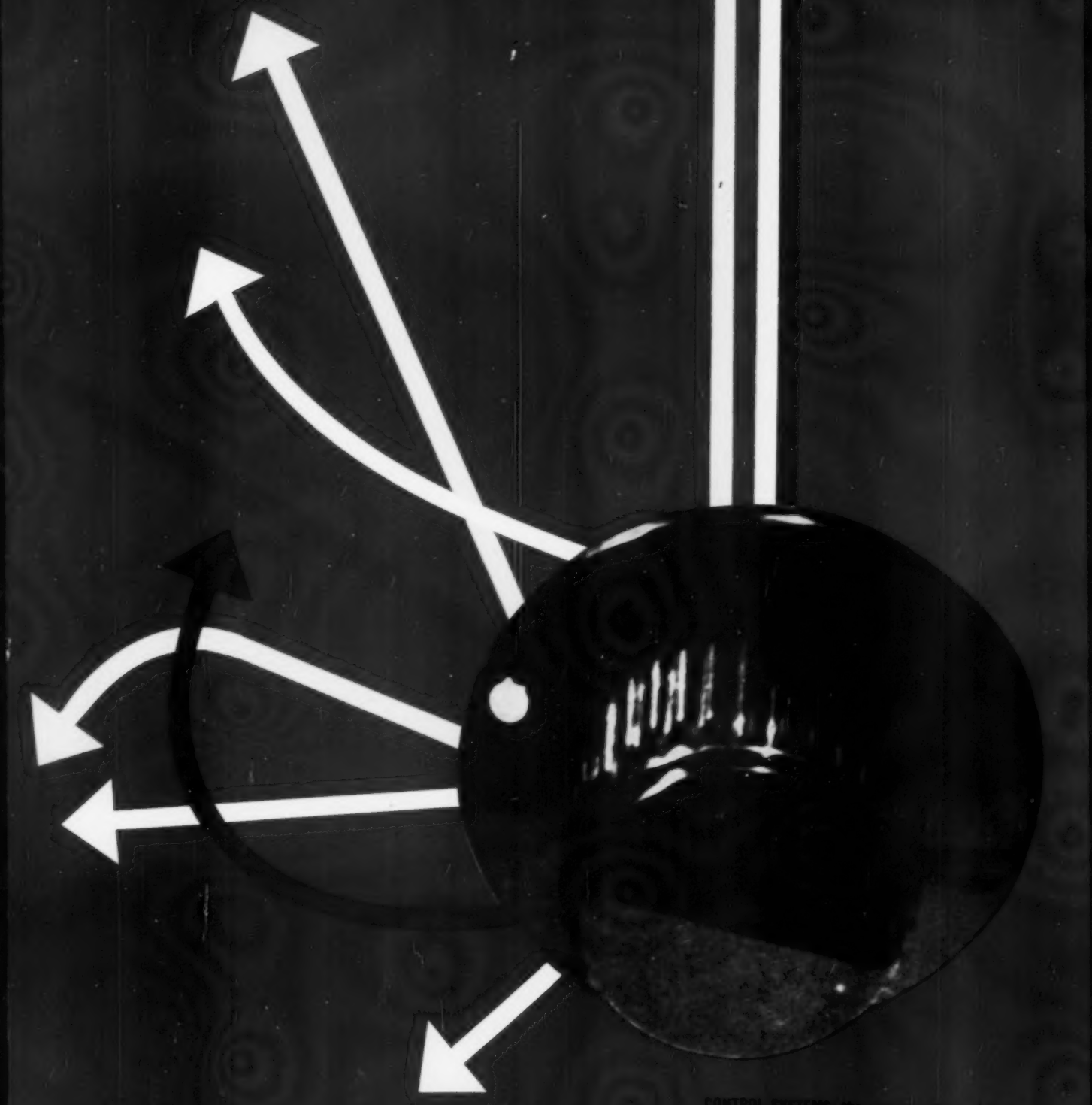
INDUSTRIAL DESIGN

9 *September 1959* *$1.50 per copy*



CONTROL SYSTEMS: the nerve centers of technology

GALLERY I: first in a series on personalities in design

A pretty tough case

An Eastman plastic helped Emerson solve a material selection problem

One of the toughest problems in designing a new product sometimes proves to be choosing the right material.

The Emerson all-transistor pocket radio shown above is a good illustration of how the familiar "process of elimination" often is used in evaluating materials to find one whose properties satisfy all the demands of a specific application.

Here, the need was for a tough housing that would have beauty and light weight, yet be rugged enough to endure hard knocks and outdoor exposure hazards. Important, too, since the radio would be spending a good bit of time in the user's hand, the case had to be made of a material that would be pleasant to the touch.

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an Eastman plastic

The Emerson Model 555 "All-American" transistor pocket radio is manufactured by Emerson Radio and Phonograph Corp., 14th and Coles Streets, Jersey City 2, New Jersey. Its case is molded of Tenite Butyrate by Worcester Moulded Plastics Co., 14 Hygeia Street, Worcester 8, Massachusetts.

SEPTEMBER, 1959 VOLUME 6 NUMBER 9

INDUSTRIAL DESIGN

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

CONTENTS

Coming

IN OCTOBER — Design as a Career, and the Museum of Modern Art's packaging show.

IN NOVEMBER — New computers, sporting goods innovations.

COVER: Our September cover is an interpretation of the character of controls, with forces moving in a single path abstractly re-directed to their separate, particular jobs. A less abstract interpretation of the role of controls begins on page 44.

FRONTISPIECE: Designer-photographer Elton Robinson took our introductory photograph: what appears to be an aerial view of a Quonset hut is actually the front end of a large truck trailer unit moving through New Haven, Connecticut.

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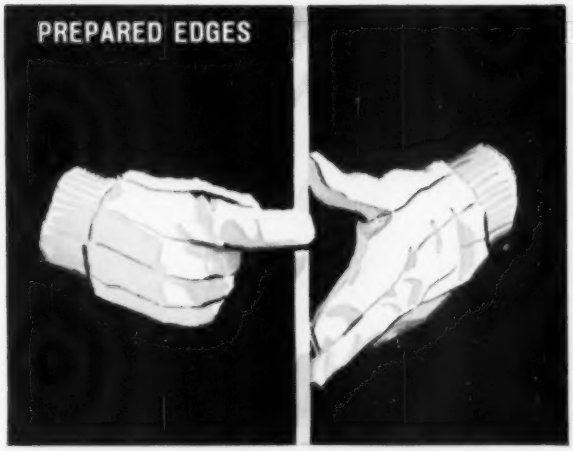

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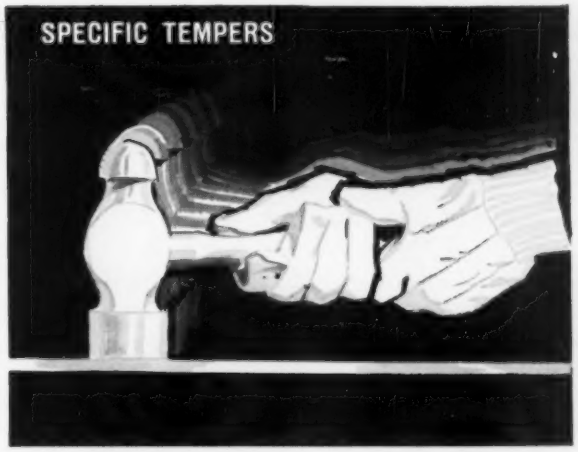

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in this issue...


Giurgola


Thompson


Weinig


Eskolin


Ratia


Scott


DiGianni

Romaldo Giurgola, who analyses the design of a group of Italian machines (page 76) is an Italian now living in this country: he is a partner in the young (formed in 1958) architectural firm of Mitchell & Giurgola, Philadelphia. Mr. Giurgola is a graduate of the University of Rome, acquired his master's degree in architecture from Columbia University, has taught at Cornell and University of Pennsylvania, and from 1952 to 1957 was art director of ID's sister publication **Interiors.**

Benjamin Thompson is president of Design Research, the very special specialty shop in Cambridge, Massachusetts (see ID, September 1957) which opened six years ago as a source of modern furniture and furnishings, and which this past summer housed the comprehensive show of Finnish design reviewed on page 98. Mr. Thompson is an architect, one of the eight partners in The Architects Collaborative.

Vuokko Eskolin, with Armi Ratia (below) installed the exhibition of Finnish design (page 98) at Design Research. Miss Eskolin originally studied glass and ceramic design, but switched to the field of fabric design where she soon became known as a gifted innovator and stylist. At present she designs for the Printex factory in Helsinki, producing special patterns for clothing, wall decorations, and—most recently—ryijy rugs.

Armi Ratia co-designer of the Finnish exhibition (page 98) is design director of Printex-Marimekko, the fabric house founded and operated by her and her husband, Viljo Ratia, in Helsinki. Mr. and Mrs. Ratia came to Helsinki from an area called Karelia, now occupied by Russia, and in 1950 began Printex with a group of hand-printed textiles. Marimekko, which grew out of Printex, makes dresses from the fabrics.

Irma Weinig, whose report on the Russian reception to the American exhibition in Moscow appears on page 66, was a temporary member of the George Nelson staff during the design of the exhibition and helped assemble the products selected for the show. Mrs. Weinig—a one-time associate editor of ID who retired to become a full-time housewife—is married to a metallurgist.

John DiGianni is senior art director of Frank Gianninoto & Associates, the industrial design firm responsible for the new Life and Belair cigarette packages (page 74). Mr. DiGianni is a native New Yorker, studied architecture and advertising design at Pratt Institute, and became a professional while still a student: between classes he was employed as head designer for an offset printing concern. Before joining the Gianninoto firm he was with Lester Beall for eight years.

Edmond Scott took on the design of the Vanguard cigarette package (page 74) as a last-minute assignment and completed it in a few days. Mr. Scott was born in New York, graduated from Pratt Institute, but has lived most of his life in Connecticut where he currently owns a 200-year old house on 40 acres of land. House and land accommodate Mr. and Mrs. Scott, three children, six horses, four cats, one dog, one pony, and a swimming pool. He has free-lanced for 14 years on jobs in advertising, magazine illustration, product, package and interior design.

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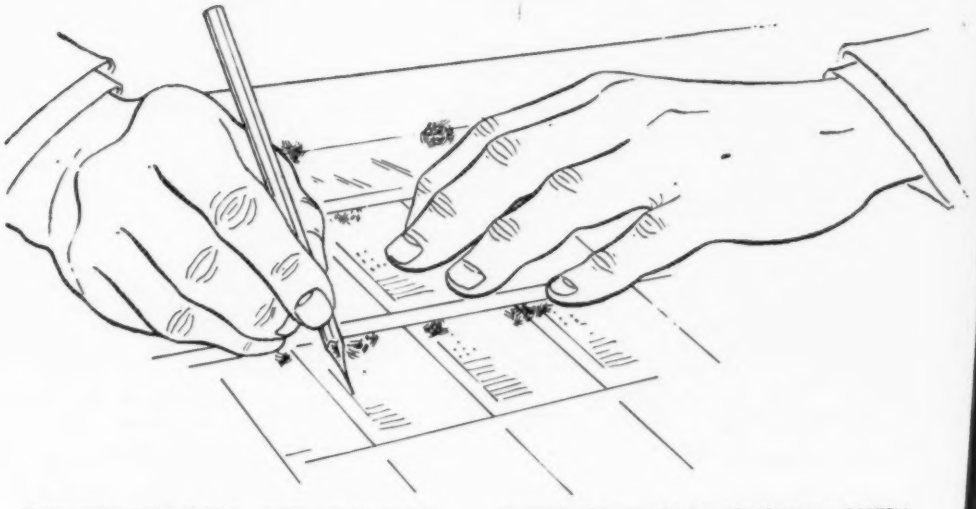

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BOOKS

Leather rice sack from the Mederdra district, illustration from Au Sahara

Designers from the desert

AU SAHARA. By Jean Gabus. Vol. II: "Arts et Symboles." 408 pages, illustrated. Neuchâtel: 1958. American distributor: George Wittenborn Inc., New York. $21.75.

Between 1942 and 1954, Jean Gabus, a Swiss ethnologist, made eight expeditions into the Sahara to record the arts of its inhabitants. His research, which began during one war and ended during another, will result in, eventually, three volumes: the first was called "The Men and Their Tools," and the third will describe "Jewelry and Techniques." This second volume is dedicated to the artisans and nomads of the desert, and its pages are filled with the symbols that they use to protect themselves against ill fortune and make their possessions beautiful.

These possessions, formed from clay, leather, or soft woods, are fragile, and since they belong to people without fixed households, are limited to the necessities of their existence: camel saddles, rice bags, sandals. The desert, which is relentlessly covering their oases and drying their wells, is the background for their art as it is for their lives, and even the representations of man are most often symbols of his footsteps or the traces of his fingers in the sand. Each figure has a meaning, but one that varies with its context, giving the artisan an individual freedom within the code. As fits the abstract geometry of this desert art, almost all of the more than 300 illustrations are line drawings, supplemented by magnificient color photographs and related by the French text to the culture they represent.—*U. McH.*

Lustig on design

THE COLLECTED WRITINGS OF ALVIN LUSTIG. Edited, published and distributed by Holland Melson, 1215 *Park Ave., New York.* 94 *pages.* $3.50.

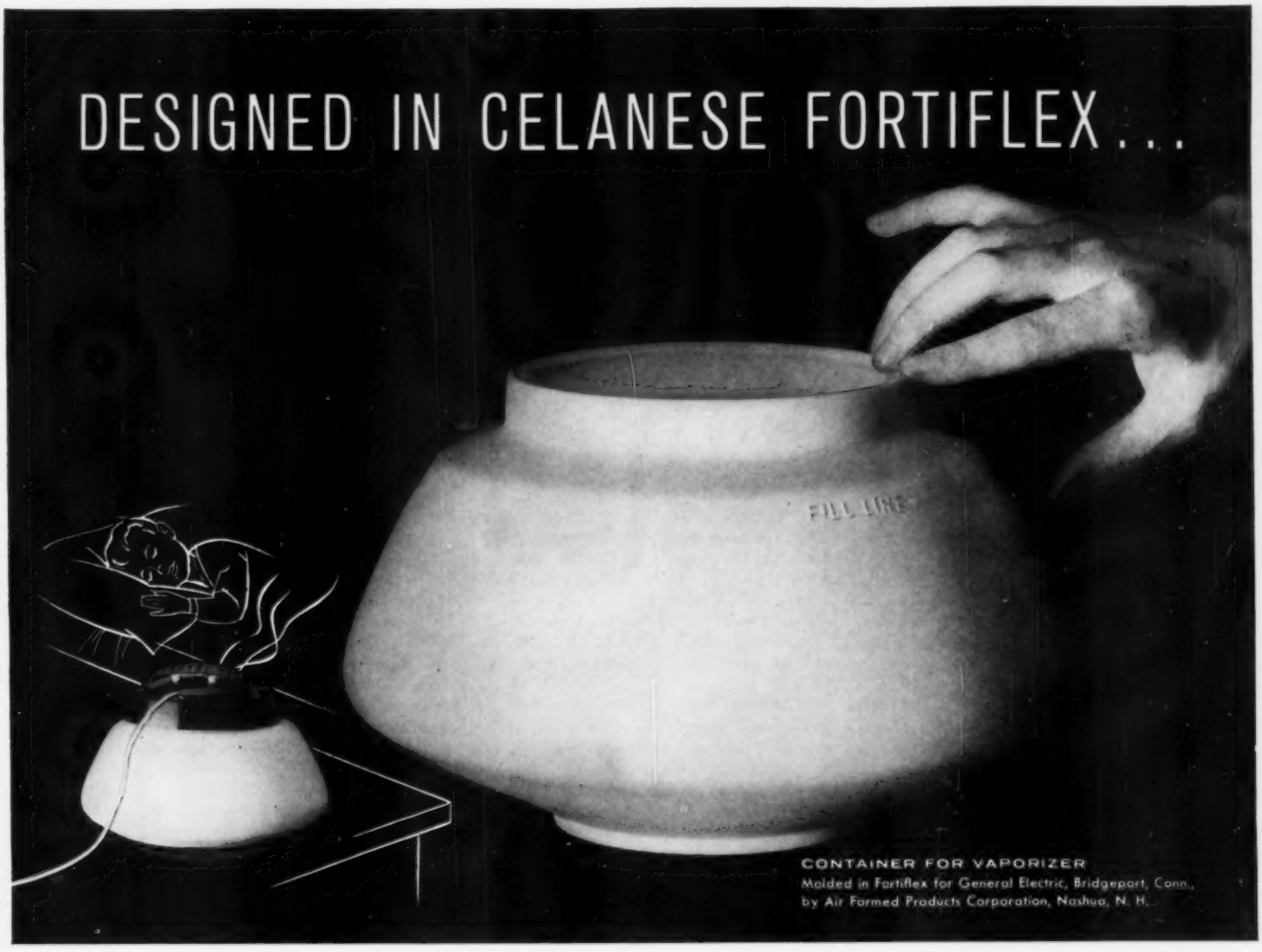
In the preface to *The Collected Writings of Alvin Lustig*, there is a one-sentence statement that does much to explain his very special life and work. "The words graphic designer, architect, or industrial designer stick in my throat, giving me the sense of limitation, of specialization within the specialty, of a relationship to society and form itself that is unsatisfactory."

What Lustig asks by implication he came close to accomplishing in a very short time. This is not to say that he quite earned the statement's implied title of "universalist" in the arts, but a review of his efforts shows the influence of this thought, and the range it allowed him.

There follows a selection of his thoughts on his work and those things that affected it. Considered as the total presentation of one man's philosophy, it is as short and tantalizingly inconclusive as his life. Considered as a personal view of one of the more important designers of our time, it is obviously required reading for anyone interested in design. For Lustig makes a case for the maintenance and feeding of what he called "the designer with a capital D." His tolerant but real distrust of what we might call "organizational design," or design by committee and market research, is most clearly described in one of the pieces, "What is a Designer?" Here also is his uncomplicated account of why the big D designer *is* different, how he goes about employing himself, and letting himself be employed. The deception in this piece lies in the fact that although his simple language appears to be addressed to those who both buy and practice design in the average situation, he seldom sold to the average buyer and rarely practiced in an average way.

Philip Johnson's introduction ends dramatically with, "There is no one to take his place . . ." Probably this is truer than Mr. Johnson realizes, for there were two elements that worked happily on Lustig's side: his indisputable talent and the fortunate timing of its appearance. Lustig lived through—and was one of the last great interpreters of—a fast dying but beautiful design revolution. One that has had its esthetic say and is at present mumbling. That there is no need to replace Mr. Lustig, that there are new problems to be solved, and new revolutions to understand cannot diminish his contribution. His work and writing show that he would have been the first to realize it, and the first to join in.—*J. S. W.*

DESIGNED IN CELANESE FORTIFLEX...



CONTAINER FOR VAPORIZER
Molded in Fortiflex for General Electric, Bridgeport, Conn., by Air Formed Products Corporation, Nashua, N. H.

Blow molded plastic puts steam in vaporizer design

Sometimes a material and a process make a natural team —as in the case of Fortiflex linear polyethylene and blow molding. Together, they make it possible to redesign products for better quality and greater economy.

In this blow molded bottle for the new G.E. Vaporizer, Celanese Fortiflex (a non-conductor) provides added insurance against shorting of the electrical element and contributes to safer operation. Fortiflex withstands boiling temperatures without softening. The blow molding method makes it possible to produce this difficult shape quickly and economically in large scale production. Mold costs are substantially reduced. With a capacity of nearly a gallon, the bottle weighs little more than 12 ounces and provides steam for 12 hours without refilling. Molded-in bottle colors are pink and blue.

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TYPICAL PHYSICAL AND CHEMICAL PROPERTIES OF FORTIFLEX

Properties of Fortiflex "A" Related to Melt Index

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Melt Index	D-1238-52T	—	0.2	0.7	2.5	5.0
Heat Distortion Temp. (66 psi)	D-648-45T	°F.	185	185	180	180
Brittleness Temp.	D-764-52T	°F.	—200	—180	—160	—100
Impact Strength, izod (⅛" x ½" injection-molded bars)	D-256-54T	ft. lb./in. notch	23	18	13	3
Tensile Strength, Max., 0.2 in./min.	D-638-52T	psi.	3700	3600	3500	3300
Elongation, First Tensile Yield Point	D-638-52T	%	25	25	25	25

Properties of Fortiflex "A" Not Affected by Melt Index

PHYSICAL PROPERTIES	ASTM METHOD	UNITS	VALUE
Density		g/cc.	0.96
Refractive Index	D-542-50	n_D^{25}	1.54
Hardness, Shore D	D-676-49T		65
Stiffness	D-747-50	psi.	150,000
Water Absorption (⅛" specimen, 24 hr. immersion @ room temp.)	D-570-54T	%, wgt. gain	<0.01
Flammability	D-635-44	in./min.	1.0
*Mold Shrinkage, length		in./in.	0.03 to 0.05
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LETTERS

Errata

The name of the Dexter Company, manufacturers of the washing machine on page 72 of the July issue, was wrongly given as Dethen. The design firm was the Mast Company of Iowa.

The name of Mr. Ernest Daeschler, designer with Becker and Becker Associates, was incorrectly spelled in the July issue. The correct spelling is as it appears here.

On page 37 of the August issue, high density polyethylene is listed at 43¢ a pound. At the time the story was written, it was 38¢ a pound, making it absolutely competitive with low density polyethylene and in striking distance of styrene.

Commentary on Plastics

Sirs:

Just a note to commend your publication on the splendid articles on plastics which appeared in your July and August issues.

We feel that Robert Rockwood has presented this somewhat complicated industry to your readers in a concise, simple, factual form. Certainly these articles will help designers to better understand the plastics industry.

Wm. T. Cruse
Executive Vice President
The Society of the Plastics Industry, Inc.

Sirs:

I want to express my feeling of pride in seeing one of the fellows in one of the companies I represent getting off such a splendid article on the field of plastics. It is a most creditable job in one of the finest journals being published today.

George A. F. Schulte
Schulte Plastic Sales and Equipment Co.

Sirs:

INDUSTRIAL DESIGN and Robert Rockwood are to be congratulated on a most complete compilation of practical design information in the current 3-part plastics series. The only regrettable fact is that the date is 1959 and not 1952 or even 1948. First in 1948, the Manufacturing Chemists Association, Inc., in its "How To Buy And Sell Plastics," and then in 1952, the Society of the Plastics Industry, Inc., in its "Story of an Industry," broke with tradition and published facts on what each existing plastic *would not* do as well as what it would do, on the proper methods of molding each material, on its forms and its uses. The time lag in bringing this type of necessary information to the designer must represent a very substantial dollar loss to the plastics industry which too often in "industry" promotion, having developed educational material, has failed to give it adequate and sustained distribution.

"Too little and too late" describes Mr. Rockwood's information on the role of the plastics processor, fabricator, molder, call him what you like. Designer's time and client's money can be saved by starting consultation with an established molder when the idea for a product and the possible use of plastics first arises. It is even possible to pinpoint molders with very heavy experience in certain type of products. An example is the Molded Fiber Glass Body Co., which has made a specialty of automobile and truck parts. Such a plastic molder has a staff of designers whose job it is to help translate the industrial designers' concept into a practical, economic product. The sooner they are consulted, the less "translating" is necessary.

Contrary to the impression left by Mr. Rockwood, there has been and continues to be considerable effort by the plastic industry to provide facts that need no "interpreting." In addition to the two booklets mentioned above, our agency alone has prepared such non-technical yet factual information for the Vinyl Fabrics Institute, Union Carbide Plastics Co., and the Reinforced Plastic Division of SPI. The last was aimed specifically at industrial designers. The only criticism we have had was not that the material was too difficult to understand but, rather, that it did not include as much technical data as the product designer requires.

I do not mean to imply that the job has been done or that there was no need for the articles in INDUSTRIAL DESIGN. On the contrary, the industry's information program is by no means adequate and Mr. Rockwood has made a valuable contribution to what should be a never-ending educational campaign.

Laura E. Morrison
Morrison-Gottlieb

America on the rocks

Sirs:

I found the article "Taking America Straight" in your August issue an extremely provocative and fitfully illuminating essay on parts of our civilization, but it inspired in me something of the same delicious intellectual discomfort that Mrs. Hansen finds in our artifacts.

In the first place, I am not sure that marvel is a completely American quality. The marvelous implies an audience which marvels, and fantasy is in the eye of the beholder. The matter-of-factness with which Americans accept the scientific wonders that fill our hardware stores suggests that they accept technical miracles placidly. The atmophere of our city landscape may be fantastic to visitors from flatter regions, but they make the distinction between a real city and an unreal city because they have their own image of what a city should look like . . . it should look like London or Istamboul or Athens. (And at least one famous American sometimes refers to London as an "unreal city.") Perhaps it would be nearer the truth to say that Americans have not the standard on which a European could build a fantasy because they have no daily reminders of what a city *used* to look like and therefore of what a real city *should* look like.

This absence of a standard of seemliness (to use Mr. Hansen's word) is perhaps at least partly responsible for the restlessness that has always been an American characteristic. With no image of what should be, the American city-builder or designer can never feel he has reached a final form.

Finally, it seems to me that Americans live *less* in an atmosphere of fantasy than do people less anchored down by their possessions. The old man sweeping the subway steps is absorbed in the baseball game he hears on his transistor radio, but twenty years ago he would have had to invent a baseball game, and it might have been one which the Yankees won. If necessity is the mother of invention, a pessimist might suggest that Americans are day by day growing less sensitive to the magical, the mysterious, and the fantastic regions in the human imagination.

George Gradgrind
New York

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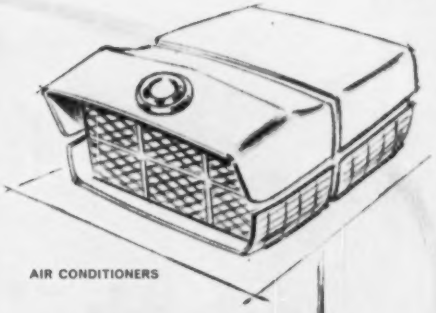

AIR CONDITIONERS

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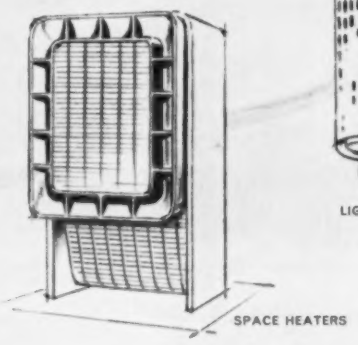

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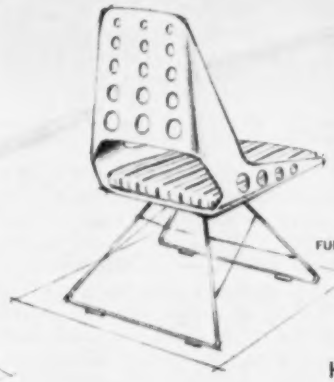

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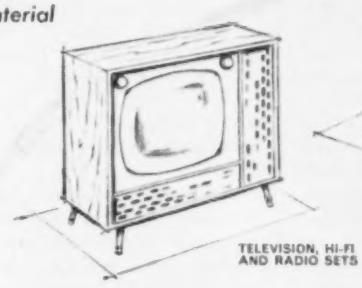

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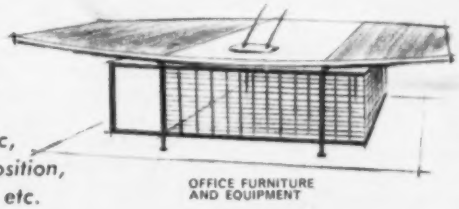

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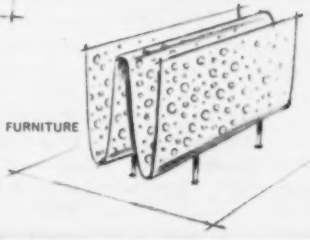

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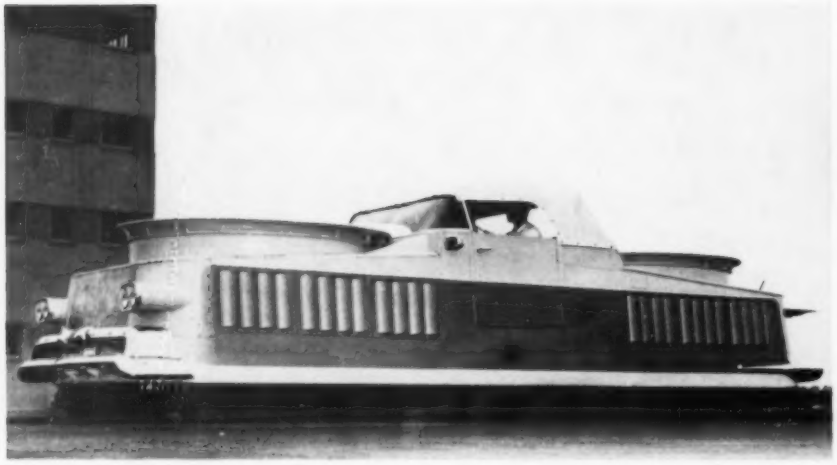
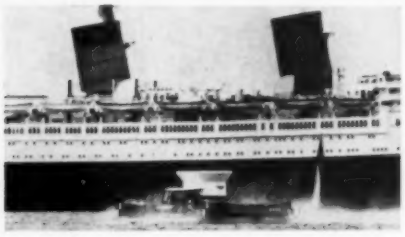
NEWS





The Curtis-Wright Air Car (left) and the Saunders-Roe Hovercraft (top and bottom, right) ride on air.

Air-borne ground-level travel

Two new and experimental forms of transportation which literally ride on air have recently been introduced, and one of them is scheduled for limited production.

The Curtis-Wright Air Car (top left) travels on a cushion of low pressure, low velocity air, and will be produced in Curtis-Wright's South Bend, Indiana plant in limited numbers. It weighs 1700 pounds, carries four passengers, and will travel up to 60 m.p.h. over unobstructed land, water or swamp six to twelve inches above the ground. According to Curtis-Wright, it can be operated by anyone who can drive an automobile.

Suspension of the Air Car is accomplished by maintaining about 1/10th of a pound pressure per square inch under the vehicle, a flexible deflection membrane helping to contain the pressure. The propulsion is by means of louvers on the side of the car through which additional air is released. The propelled air is also used for braking. Curtis-Wright has retained designer Duncan McRae, formerly with Studebaker-Packard, to work on styling for the new car.

The Hovercraft (photos at top right), conceived mainly as a sea craft, is the invention of British designer Christopher Cockerell, and is constructed by Saunders-Roe. It is supported on a cushion of air sucked in by a fan and blasted down through verticle nozzles. Like the Air Car, it also operates at heights just sufficient to clear waves or irregularities in the land surface. In appearance the blue and silver Hovercraft SRN1 is oval in shape (see photo above) and resembles an inflated life raft, the funnel-shaped structure being the fan, attached to which is the two-man enclosed cockpit. The machine is 30 feet long and 24 feet wide.

The future uses of the Hovercraft are seen as providing ferry service over water, and eventually, trans-oceanic service with loading on land; although it is said to be capable of efficient service over smooth land surfaces, such as snow, ice and the desert.

WESCON awards announced

Eighteen winners in the industrial design competition for radio and electronic equipment sponsored by the Western Electric Show and Convention were announced last month at the opening of the show in San Francisco. WESCON awards of excellence and merit, which reflect a growing interest in industrial design by electronics and radio engineers, were given to the designers of the winning products.

Awards of Excellence were made to the following designers and products: Frank T. Walsh for the FR-300 digital tape handler, Ampex; Sam Arson and Carlos Beeck for the XIR audio/electronic connector, Cannon Electric; Matt Jacobson for the ELIN precision power oscillator (DK-102) Electronics Internation Company; H. D. Wright and Jack Reitzell for the Digswitch (Series 7300), the Digistran Company; Thomas C. Lauhon for the DC current clip-on probe (Model 428 A-21A) Hewlett-Packard Company; Jim Powell Industrial Designers for Electropack, Santa Anita Engineering Company; James Lee, Channing Wallace for a closed circuit TV Camera (CM-30), Industrial Products Division, International Telephone and Telegraph.

Awards of Merit went to the following designers and design firms: Frank T. Walsh, Glen A. Smith, Richard Ketcham, Melvin Best Associates and James Hackney, Roger Wilder, James Patmore, R. E. Davis, John Wilson, John Gaska, Robert Robb, Noland Vogt, Zierhut and Associates, Wade C. Vaughn and Tor Petterson.

The jurors consisted of the following designers: Robert M. Emerson, F. Gordon Mackay, A. Peter Augusztiny, John Maguire, and Charles Cruze.

Harold W. Lindsay, chairman of the committee in charge of the selection of winners, said that visual clarity, ease and safety of operation, and appropriateness of appearance were factors in the choice of winning entries.

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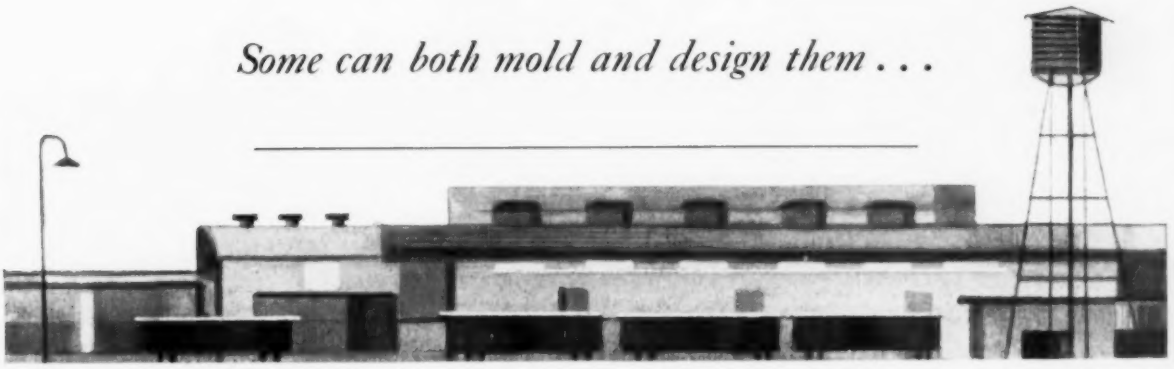

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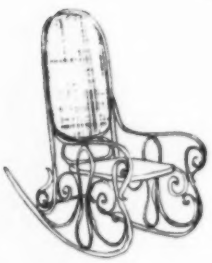

These drawings of chairs are from a set of 24 used in a test of seating choices.

Preferred chairs

Recent research has disclosed a correlation between chair preference and personality type, according to Irving Taylor, assistant professor of psychology, and Arnold Friedman, assistant professor of design, both of Pratt Institute in Brooklyn, New York. These examiners found a positive correlation between certain personality types and the chairs they chose out of a list shown them.

Respondents were asked to choose the chairs they liked least and most from pictures of 24 chairs. The most popular chairs among those shown were the top two, shown left. The bottom two were the least popular. A total of 66 people, 42 women and 24 men took part in the survey.

Personality types were tested with the aid of the well-known "Study of Values" test devised by Gordon Allport and Phillip Vernon. This test attempts to divide a person's sense of values into theoretical, economic, esthetic, social, political or religious classifications by means of a choice of desired alternatives.

The survey found that most respondents preferred modern designs to traditional ones, that social people showed a preference for straight-backed chairs, and that women held delicacy of line above comfort.

ASID annual meeting

The program for the ASID annual meeting is now complete. Built around the theme of "Planning by Design," the conference will be held at the Statler-Hilton Hotel and the schedule will be as follows:

November 12th. The Sales Impact of a Corporate Image Program; Lee S. Bickmore, National Biscuit Company. Discovering the Trend of Public Tastes and Interpreting it into Successful Products; Henry C. Bonfig, CBS.

A Re-evaluation of Product Planning in American Industry; Conrad Jones, of Booz, Allen & Hamilton. The Growing Significance of Human Factors Engineering; Renato Contini, New York University. The Product Outlook in Five Years; Dr. B. D. Thomas, Battelle Memorial Institute, and Walter Dorwin Teague, Walter Dorwin Teague Associates, New York.

November 13th. The Valuable Lesson in Designing an "Advanced" Line of Products; Carl L. Bixby, Jr., General Electric. The Pricing Implications of Better Product Features and Design; Dr. Alfred R. Oxenfeldt, Columbia University. The Threat of Foreign Competition to American Products; Mr. Harvey Whidden, Bulova Watch Company.

Developing Design Consciousness and Coordinating Its Use Throughout an Organization; R. Monahon, I.B.M. Expanding Sales Through a Creative Approach to Product Development; Bay Ested, U.S. Steel. The Importance of Design in Development of Industrial Equipment; Myron S. Curtis, Warner and Swasey Company.

After the talks there will be small group sessions and a social program. Activities will be planned for members' wives, and the conference will end with a Board of Directors meeting on November 15th.

Silvermine symposium

George Goshco, of George Goshco Associates, Chairman of the IDI Silvermine Symposium, has announced the speakers for the symposium, to be held October 10, at Silvermine, Connecticut.

The theme of the conference will be "Polydirectional Horizons" and the list of speakers is as follows:

Richard Bach, education advisor for the AID; Norman Cousins, Editor of the *Saturday Review;* General W. W. Watts, Executive Vice-president of the Radio Corporation of America; William B. Terhune, Associate Clinical Professor of Psychiatry at Yale University; John Peter, architectural editor of Look Magazine; William Capitman of the Center for Research for Marketing; James Plaut, design consultant and author of "Industrial Design in the United States"; and John Griswold, of Griswold, Heckel and Keiser, New York.

The day's program will begin at nine in the morning and admission will be $12 (students $5) including lunch. The address is the Silvermine Guild of Artists, Silvermine, Connecticut. Reservations will be accepted by Gerald Ewing at 933 Ridgefield Road, Wilton, Connecticut.

Bridge to Staten Island begun

Construction of the Verrazano-Narrows Bridge which, when finished in 1965, will link Brooklyn and Staten Island, was started last month. From anchorage to anchorage the bridge will be 6,690 feet long, supported by 690 foot steel towers at either end. Its suspended center span of 4,260 feet will exceed the center span of the Golden Gate Bridge in San Francisco, presently the longest in the world. At present the only direct means of transportation between Staten Island and Manhattan or Brooklyn is by ferry. The new bridge, shown in rendering, above, will link the parkways and expressways of Long Island, Westchester and New England with the arterial system of New Jersey and southern states.

Home building techniques taught

A ten day course in building techniques, planning principles and design will be taught this fall by the University of Illinois Small Homes Council—Building Research Council.

The course is scheduled for October 19-28 on the Urbana campus of the university. Lectures and discussion periods will be supplimented by field trips. Registrations are being accepted now, and enrollment is limited to 50 persons.

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Architectural League exhibition

The next exhibition of building arts held by the Architectural League of New York will take place at the Museum of Contemporary Crafts, 29 West 53rd Street, New York, from February 25 through May 15, 1960.

The theme of the exhibition will be progress in the interrelated arts of architecture and interior design. It will consist of both invited exhibits and open submissions. Work submitted must have been executed between January 1, 1955 and December 31, 1959, and submissions in the allied arts must have a relationship to architecture. Open submissions must be sent no later than January 4, 1960 to the 1960 Gold Medal Exhibition of the Building Arts, The Architectural League of New York, 115 East 40th Street, New York 16, N. Y.

Gold and Silver Medals and Honorable Mentions will be awarded to designers in architecture, murals, design and craftsmanship, sculpture, landscape architecture and engineering. Presentation of the awards will take place at the inaugural dinner of the League next April.

New device aids market research

A new testing device meant to present entire displays to the viewer has just been introduced by the Center for Research in Marketing, Inc. of Peekskill, N. Y.

The new machine permits very large objects or large mass displays of smaller objects or packages to be shown in mass display at subliminal exposures. The machine resembles a frozen food counter and, according to the Center for Research, has the advantage over similar devices of showing the viewer the object to be seen, rather than a mirror reflection of it, or a mere image. It can be constructed to any size, in order to hold display items and billboards.

The machine is called the Disappearing Screen Object Tachistoscope and will be used mostly in conjunction with another development of the Center, Audio Visual Conflict Analysis. That is, while the person being tested is perceiving the object in the tachistoscope, he is also hearing contrasting word pairs, one word being spoken into each ear.

Belgian exhibit has U. S. goods

Although Le Signe d'Or Industrial has announced that the exhibition it is sponsoring with the International Council of Societies of Industrial Design and the Bon Marche, department store has been postponed, some choices of products it has already made are definitely planned for inclusion. The following American products are to be shown at the exhibition, now scheduled for March, 1960. The designer, product and manufacturer are listed below, in that order: Gordon Florian, Dicte Portable Recorder, Dictaphone Corporation; Harley Earl Inc., Oval Bowl China Lavatory, model B-3158-H, Briggs Manufacturing Company; L. Garth Huxtable, Plane-R-File #1220, Millers Falls Company; Raymond Loewy Associates, Recorder Pre-amp Tone Arm, Fairchild Recording Corporation; Raymond Spilman (in collaboration with Walter O. Stanton), Tone Arm, Pickering and Company; Robert Fujioka, Melvin Best Associates, Samsonite Luggage, Shwayder Brothers; Palma-Knapp Associates, Electric Can Opener, Cory Corporation; F. Eugene Smith of Smith, Scherr, McDermott, 400 Range, The Tappan Company. The exhibition has been postponed because the European entries had not been chosen in time for the previously planned date of September, 1959.

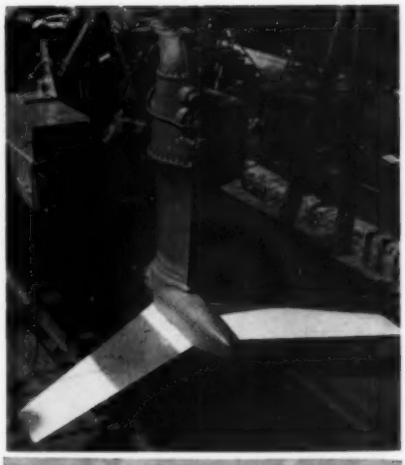
Designers interested in having their products considered for this forthcoming exhibit should submit photographs to the IDI National Office, 441 Madison Avenue, New York 22, N. Y., as soon as possible.

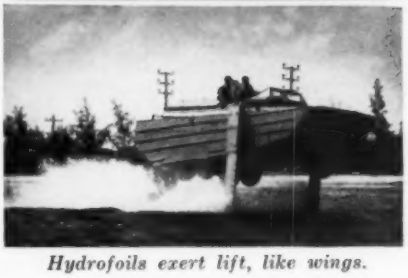
Display for deodorant

Point-of-sale by Stuart & Gunn

The recently formed design firm of Stuart & Gunn has just completed the counter display for Bristol-Myers' Ban deodorant (above), a red, white and black pyramid with an eccentric oval on top suggesting the "roll-on" action of the product's package design. The display comes already erected with the top triangle to be fitted in.

Whitney Stuart and William Gunn, partners in the new firm, have been retained to do packaging and graphics for Bristol-Myers as well as Brillo Manufacturing Company and the Nylonge Corporation, among others.





Hydrofoils exert lift, like wings.

Army Duck flies at 50 m.p.h.

The U. S. Army's Ordnance Corps demonstrated this month an amphibious cargo carrier, which resembles landing craft of World War II, at a test site near Miami. The craft can "fly" up to 50 mph above water by means of three hydrofoils.

The craft was developed by the Avco Corporation and is powered by a Lycoming turbine engine. The power shaft to the propeller extends down with one of the rear hydrofoils and, in full flight of the machine, the hydrofoils travel about 30 inches below the surface of the water.

When the "Flying Duck," as it is so far called, attains a speed of five mph the hydrofoil wings begin to exert a gentle life, and at 13 mph this is sufficient to lift the craft completely out of the water. At full speed the vehicle rides about four feet above water.

Plastics Fair at Duesseldorf

"Plastics 1959" will be held in Duesseldorf, Germany, October 17 to October 25. The show will exhibit products from 16 countries, and conventions and meetings concerning the industry will be held in Duesseldorf during the fair's run.

Requests for information about the fair may be obtained by writing to: NOWEA Nordwestdeutsche, Ausstellungs-Ges. mbH., Ehrenhof 4, Duesseldorf.

A provisional list of exhibitors will be forwarded free upon writing to the above address.

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The broad effect of CLAD-REX® on industrial design, engineering, and selection of materials

Reaction to the potential offered by vinyl-clad metals is contradictory. The potential advantage is so broad that it's hard to believe. But, when full realization does begin to develop, enthusiasm tends to go too far!

Therefore, your vinyl-clad metals data file should be assembled with care. Know exactly what you are considering, when to use it, and how.

Clad-Rex is a vinyl-metal laminate. Specifically, a calendered, semi-rigid poly-vinyl chloride film bonded to sheet metal. All alloys and tempers of aluminum and steel (including galvanized and aluminized) are commonly used. However, other metals can be used where their special properties are important to end product performance.

The sales appeal of Clad-Rex vinyl-metal laminate

The words *calendered* and *film* mean styling in Clad-Rex is unlimited, because film can be printed. Simulated wood-grains and leathers, as well as any color, combination of colors, texture or pattern can be used. Or you can design your own, if you prefer.

This unlimited choice ranges from sparkling burnishes including high metallics, to non-reflective matte finishes (or variations between) as well.

The abrasion resistance of Clad-Rex vinyl-metal laminates

The words *semi-rigid* and *poly-vinyl chloride film* mean Clad-Rex has unusual resistance to abrasion. Therefore, products made of Clad-Rex are more durable and suited to usage where abrasion resistance is required.

However—most important to manufacturing—Clad-Rex can be processed without the careful handling or rejects common to other pre-finished metals.

The corrosion resistance of Clad-Rex vinyl-metal laminates

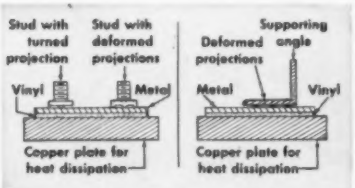
The words *poly-vinyl* and *chloride* become important again, because of the inherent properties of the Clad-Rex vinyl. It provides excellent resistance

to acids and alkalis, as well as other corrosive chemicals. It also has high dielectric properties.

The fabrication of Clad-Rex vinyl-metal laminates

Clad-Rex can be formed in almost as many ways as any *un*finished sheet metal—including deep drawing!

Resistance welding, generally, is limited to projection techniques. However, the equipment must be (1) tooled for series welding (both electrodes on same side of sheet), and (2) capable of very short weld times with extremely fast follow-up of forging pressure.



Epoxy resins are proving quite successful for assembly. Clamps can be eliminated by using resistance weld tacking or interlocking design.

The cost advantage of Clad-Rex vinyl-metal laminates

As a purchased material going into a user's plant, vinyl-metal laminates cost more than *un*finished or some other pre-finished metals. *But, most important, end products made of Clad-Rex generally cost less!* Here's why:

(1) Parts made of Clad-Rex require no further finishing. This is a savings in equipment, finishing material, factory floor space, labor, handling, etc.

(2) The abrasion resistance of Clad-Rex substantially reduces (and often eliminates) rejects. This includes both rejected products *and* the expensive handling, reworking activities, and labor required.

Movement of sub-assemblies, etc., through your plant actually becomes more direct—out of your dies into assembly!

A source of engineering and manufacturing service for you

Clad-Rex interest in helping you extends into your own plant. A Clad-Rex Fabricating Engineer is provided to show your production people how easy it is to process Clad-Rex.

Furthermore, Clad-Rex operates a fully staffed and equipped research laboratory. Its facilities are devoted to customer service as well as improving Clad-Rex itself.

Write and describe your product. See how Clad-Rex can work its broad effect on industrial design, engineering and selection of pre-finished metals in your product.

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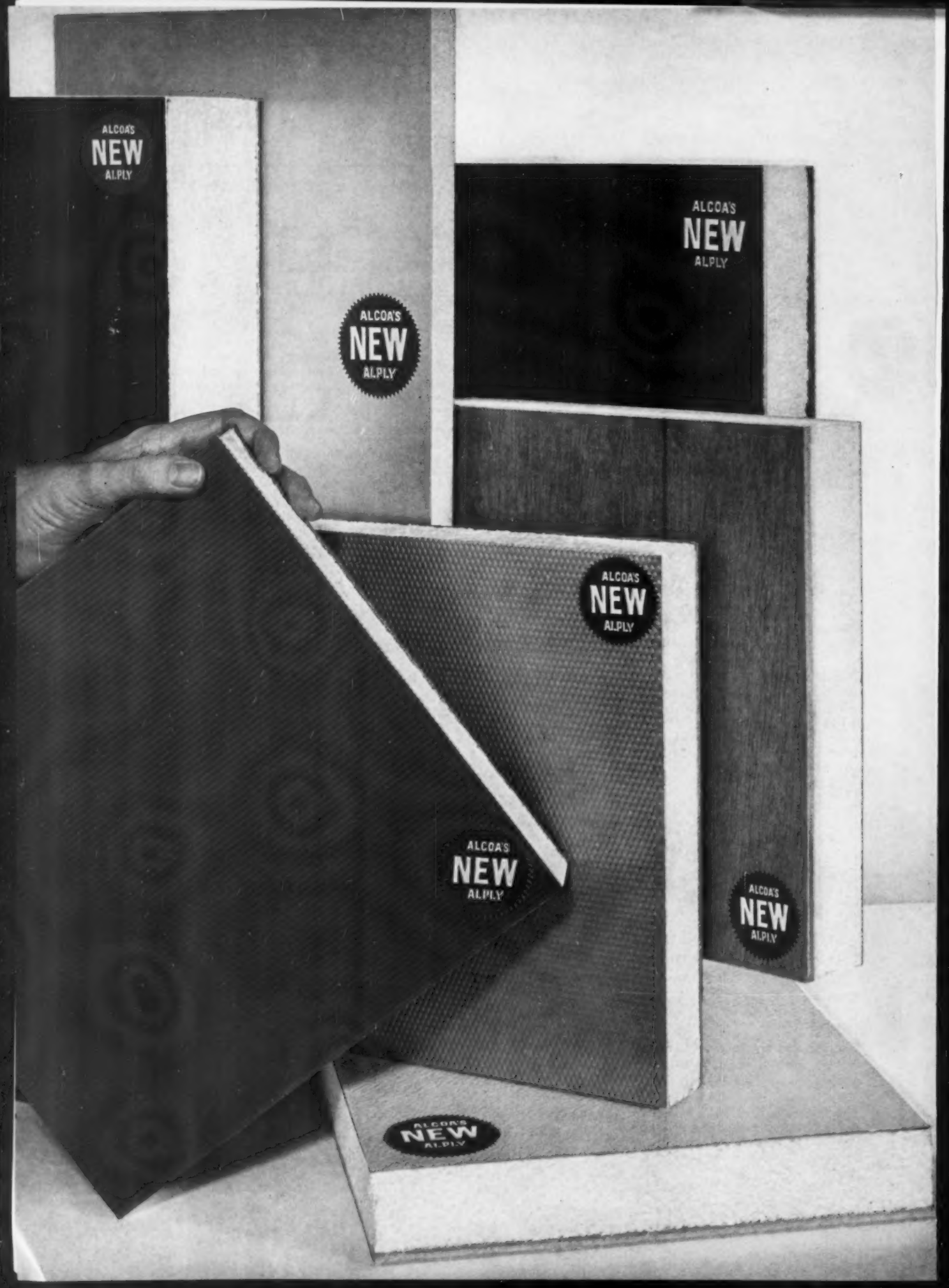
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Events

Wesley Larson, President of the Western New England Chapter, Society of Plastics Engineers, has announced that the first issue of a new magazine, the Western New England *Spectator* will appear this month.

The **Elmer A. Sperry Award** for achievement in transportation will be given to the designers of the British-built Comet Jet plane. The presentation will take place later this year at a joint meeting of the Institute of Aeronautical Science and the Royal Aeronautical Society.

The most complete display of British industry shown in this country will be part of a 17-day **British Exposition** of industry, technology, science and culture at the New York Coliseum next June 10 to 26. The designers for this exposition will be James Gardner and John Lansdell, who together created the British Exhibition at the Brussels World Fair last year.

At the August **Board of Directors Meeting of the ASID** in New York, Philip Dalsimer, of the National Council of Patent Law Associations, explained the present state of design protection. It was generally agreed that the proposed O'Mahoney-Wiley-Hart Bill was an improvement of present legislation for the protection of design, and that the ASID should go on record as favoring such legislation.

People

APPOINTED: **John Cuccio** as executive associate at Van Dyck Associates. . . . **Frederick H. Schmerling** as design director and **Jack Henegan** as director of client relations at Schnur-Appel, Design Consultants. . . . **Victor J. Papanek** as associate professor of industrial design at State Teachers College, Buffalo. . . . **Norbert Frosch** as manager of industrial styling at Columbus Coated Fabrics Corporation. . . . **Thomas M. Hibben** as staff architectural designer at Forest Wilson Associates. . . . **Martin Jackson** as executive art director at Lavenson Bureau of Advertising, Philadelphia. . . . **Randall D. Faurot** as director of styling at Studebaker-Packard Corporation. . . . **Sidney Lirtzman** to the executive staff of the Center for Research in Marketing. . . . **Eva Zeisel** as associate professor in industrial design and **Marc S. Harrison** as instructor at the Rhode Island School of Design. . . . **Robert J. Brown** as manager of marketing for General Electric's Heavy Military Electronics Department. . . . **Jack G. Anderson** as a vice president of marketing at Hoffman Electronics Corporation. . . . **Walter E. Stubbins** as chief development engineer at Methode Manufacturing Corporation. . . . **Bill Rowells** as director of package design for Helene Curtis-Lentheric. . . . **Gerald E. Ervin** as architectural instructor at California State Polytechnic College. . . . **Charles P. Davis** as acting head of the mechanical engineering department at California State Polytechnic College. . . . **Nicholas Vergette** as assistant professor of design at Southern Illinois University. . . . Granville Ackermann as chief designer of interiors and exhibitions at Becker and Becker Associates.

RETIRED: **Hubert Ropp** as dean of the school of the Chicago Art Institute.

HONORED: **Dick Hubers** and **David Weinrib** as gold medalists at the Second International Congress of Contemporary Ceramics at Ostend, Belgium. . . . **Colonel Maurice J. Fletcher** with the Holley Medal from the American Society of Mechanical Engineers for his design of artificial limbs. . . . **Robert G. Le Tourneau** with the 1959 National Defence Transportation Association's Award.

RETAINED: **Van Dyck Associates** by the Pfaudler-Permutit Company to execute a corporate identity program and by Sperry Products for product design. . . . **Good Design Associates** by the First Methodist Church of Michigan City to coordinate interior planning for a building expansion program. . . . **Sundberg-Ferar, Inc.** as consultants to the Regina Corporation. . . . **Leon Wirch Associates** by Child Guidance Toys for the design of educational playthings. . . . **Becker and Becker Associates** by the U. S. Navy for a study of the missile range at Point Muge, California.

NEW OFFICES: **Samuel D. Han** at 353 Broad Street, Leonia, New Jersey. . . . **Murray Feldman,** Designers Guild, 152 North Clark Drive, Los Angeles, California. . . . **Industrial Design Collaborative** at 755 Boylston Street, Boston, Massachusetts. . . . **Scope Associates,** at 66 E. Palisade Avenue, Englewood, New Jersey. . . . **Tarpey and Dillon** at 414 Main Street, Louisville, Kentucky. . . . and **Peter Thompson** joined **William Renwick's** firm as a full partner in the new firm of Renwick-Thomson at 1 East 54th Street, New York City.

Shop by Finn Juhl

A newly opened suburban branch for Georg Jensen, Inc., New York home furnishings store, has interiors by designer Finn Juhl. The Jensen store is one of three sharing a single building (above) in the Vernon Hills shopping area of New York's Westchester County; all three are related internally by extensive use of glass partitioning.

Cuccio

Schmerling

Ackermann

Rowells

Han

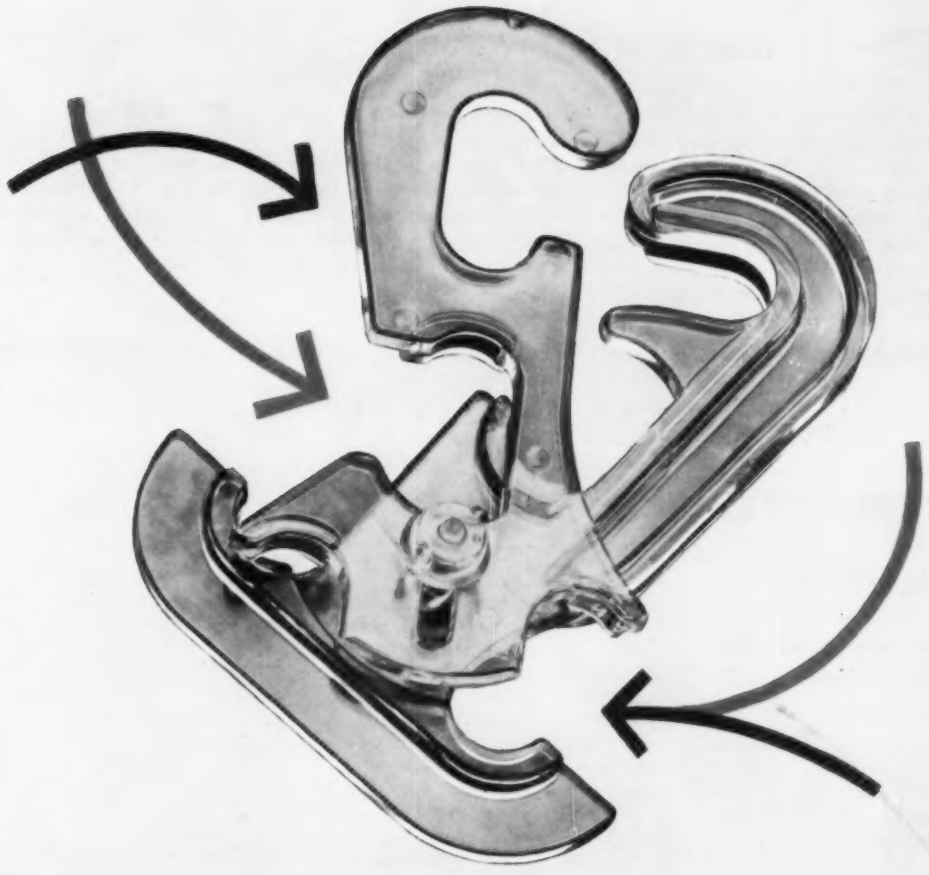
Hibben

Frosch

Henegan

Italian-built business plane

The Trecker 166, (above) manufactured by Piaggio in Genoa, on specifications from the Trecker Aircraft Corporation boasts a Lycoming pusher engine and interior design and exterior styling by Brooks Stevens Associates. Intended to appeal to the space-conscious businessman, the Trecker 166 stresses largeness of passenger space and quietness of the cabin, which is said to be accomplished by the pusher engine and the gull wings.



This molded plastic part hangs up a record 60% savings

Could be abstract art. Actually, it's a brand new molded plastic device for hanging both low and high voltage power cables—saves up to 60% of the cost of running power through heavily timbered areas. In designing this 15¾ oz. 4-part suspension clamp for injection molding, we worked with customer engineers—adapting their design to custom molding requirements. The selection of molding material—Methyl Methacrylate—assured the right electrical and physical properties, and the ability to withstand all types of weather. This is just *one* angle of every plastic molding job. Because we mold all types of materials and offer full range (small to large) compression, injection and transfer molding facilities, we're free to make unbiased recommendations . . . to provide the material and method of most value to you. For more information, call or write.

CHICAGO MOLDED
PRODUCTS CORPORATION
1027 North Kolmar Avenue, Chicago 51, Illinois

DOW | **7 NEW IDEAS IN 7 MINUTES**

It takes two things to make the cash register ring today: New ideas—products that people really want—and new materials to make those ideas work. Many of these are plastics materials such as the large, widely diverse line of Dow thermoplastics. These chemically engineered materials give the product designer more latitude and the production man fewer headaches. Sales managers like them, too, because they contribute beauty, durability and *quality* in no small measure. Six members of the Dow family of plastics are portrayed on these two pages in seven different product improvement roles. Reading time: One new idea per minute.

STREAMLINED TV SETS:

NEW EPOXY RESIN BREAKS THE BULK BARRIER

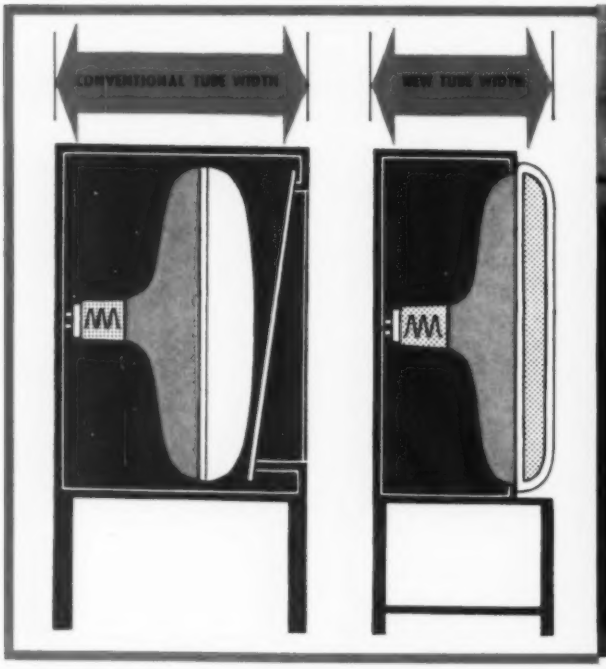
Brighter images, fewer reflections, larger picture areas also accrue from advance in TV tube design

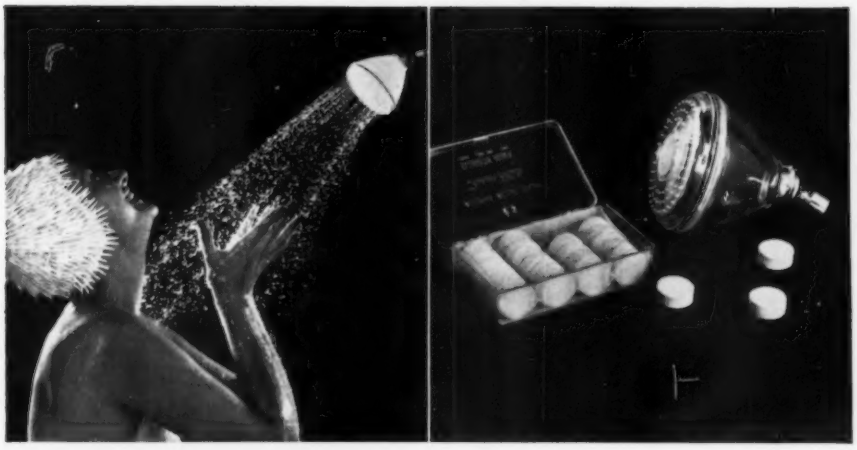
When the TV set manufacturers set out to streamline TV cabinets, the first and foremost problem they faced concerned the "picture tube". Conventional set design calls for a glass safety panel mounted in front of an oval-faced tube. If a contoured safety panel could be laminated directly to the tube, a saving of several inches in the depth of the cabinet would be possible and the tube face could be flatter and almost square due to the extra strength of lamination.

Tube manufacturers brought the problem to the attention of Dow's Coatings Research Staff. The requirements: A material that would firmly bond glass to glass, stand up under the heat generated by the tube and not interfere with the transmission of the picture in any way. And, of course, the material had to lend itself to lamination on a production line basis.

Dow resin chemists developed a new epoxy resin that met these requirements with properties to spare! After months of testing, this new material is now in widespread use.

Eliminating the separate panel has some other important advantages besides streamlining. The area between the tube and the panel always served as a dust catcher, resulting in fogging of the picture. Also, the separate panel often caused double reflections, or glare, in the viewer's eyes. The new integrated, square-faced tube means greater picture area without increasing the basic size of the set.





SALES POWER IN THE SHOWER

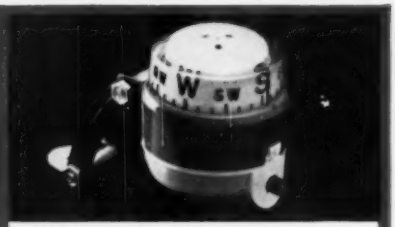
How would you like a shower fixture that softens, suds and scents the water? Just slip a soap pellet into this new type of shower head and you get a full three minutes of all three. A new product that has brought the sweet smell of sales success to its manufacturer, it's made of smooth, durable Styron® 683. Its crystal clarity harmonizes with any decor and lets you see if calcium deposits are building up inside. The excellent moldability of Styron 683 was put to good use in forming the minute spray holes.

HARDHEADED PERFORMANCE PAYS

Sandlot grid stars wear this football helmet made of super tough Ethocel®. This lightweight, high gloss material is called the aristocrat of the thermoplastics because it has the best resistance to impact, especially at low temperatures. Thus this molded helmet offers a maximum of safety to young line chargers. Ethocel also resists weathering and is easy to clean. Like most Dow plastics, it is available in a wide range of colors. Its exceptional molding characteristics make large one-piece moldings practical and economical.

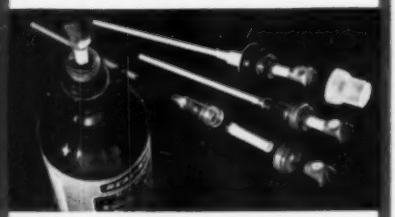
• • •

STYRON 480—Here's a trailer drainage system that will never corrode! Tough, durable Styron 480 can take the vibrations and bumps of normal trailer operation, has excellent chemical resistance.



TYRIL®—The housing of this car compass must be rugged, nonmagnetic and have good resistance to chemicals and distortion over a wide temperature range. These requirements make Tyril first choice.

PELASPAN®—New expand-in-place beads provide lightweight, durable insulation for this new cooler for sportsmen and picnickers. Pelaspan contributes maximum design flexibility, minimum production costs.



TYRIL—Tyril teams excellent dimensional stability and chemical resistance in this insecticide bottle top sprayer. Its superior moldability helps hold close tolerances on close-fitting parts.

THESE ARE JUST A FEW

of the countless ways Dow thermoplastics are helping to make new and improved product sales history. For more information about properties and applications of any Dow plastic, write to us today. THE DOW CHEMICAL COMPANY, Midland, Michigan, Plastics Sales Dept. 1513BR9.

Industrial Molding Materials

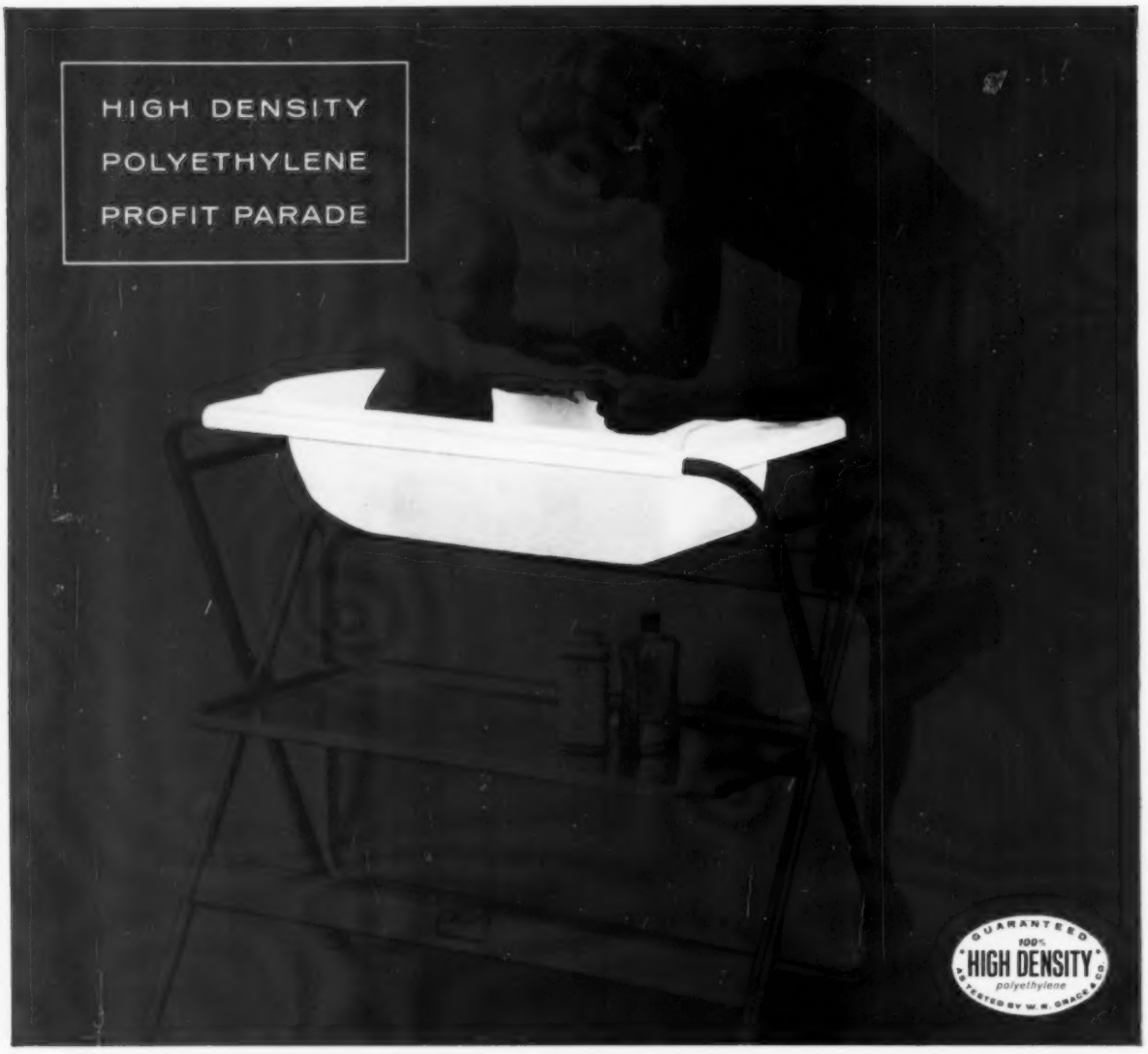
Packaging Materials • Building Products

Paint and Coating Materials

THE DOW CHEMICAL COMPANY

Midland, Michigan

DOW



Exclusive Selling Advantages Offered in Lifetime Tub

Products in many different fields are gaining an edge over competition by utilizing the benefits of Grex high density polyethylene. The "Lifetime Tub" by Baby Bathinette Corporation is an example that really holds water.

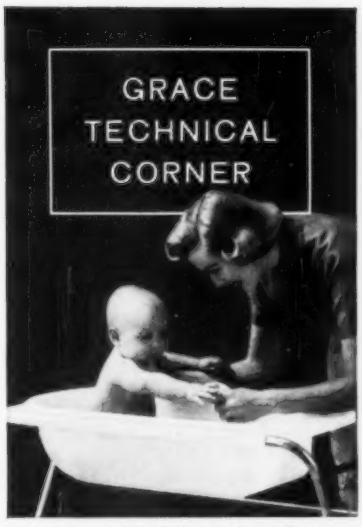
This well-known manufacturer chose Grex to make a tub that would outlast competitive models since this is a tough plastic that is virtually indestructible. They used its molding characteristics to obtain a soft, pleasant, easy-to-clean texture. They took advantage of its strength and rigidity to make the tub light in weight for greater ease of carrying.

This new Grace plastic offers a unique combination of properties to help you create unique selling advantages. It takes a beating without chipping, cracking or breaking. It can be molded in any color and decorated. It resists the elements and most corrosive chemicals. And it is the only thermoplastic that takes boiling or freezing without losing its shape or strength.

If you need an idea of how to gain an edge over competition by using high density polyethylene be sure to call in the experts. Grace has the production facilities, technical service and experience to help put your product in the Grex profit parade. We're easy to do business with.

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

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



Grex answers design and molding problems on extra-large piece.

Don't let size limit your thinking when designing or molding with Grex high density polyethylene. The "Lifetime Tub" shown here is 30½″ x 6½″ x 19″—one of the largest pieces so far injection molded with this Grace plastic. Some of the technical thinking that went into this job may give you an idea of how to get the most from Grex.

Cost a design factor. Production of a piece as large as this tub invariably presents a cost problem. Taking advantage of the way Grex performs in thin wall sections, the designers were able to keep the amount of resin per tub to a minimum and permit economical cycle times. Use of thin walls, however, called for a design that would not only take care of the weight of baby and water but also provide for satisfactory suspension of the tub in its metal frame. Reverse curves solved both problems and minimized use of ribs and fillets to avoid heavy sections, sinks and depressions.

Mold surface. Depending on mold surface, Grex takes any finish ranging from high gloss to matte. In this case, it provided a smooth, pleasant texture—essential to protect baby and make cleaning easy—through the use of a highly polished chrome-plated mold.

Molding technique. Production of the tub involved a 3-pound shot of Grex, a large mold cavity and thin wall sections. Under these conditions, multigating was chosen over normal gating. With four gates the cavity was filled faster and strain reduced.

What are your problems? If you have a job in mind for high density polyethylene count on Grace for help. Now's the time to call, wire or write:

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

Give wings to imagination:

CROSS

PERFORATED METALS T.M.

Anyone can punch holes in steel. But few can match the variety of Cross designs. Perhaps no one can match the clean, true perforations in Cross patterns. And we doubt that you will find perforated metal anywhere with the consistently high-quality materials used in Cross Perforated Metals.

When you need the functional beauty, strength and long-life characteristics that only perforated metal can provide, give wings to imagination . . . Call Cross, or write for our interesting Designer's Guide to Perforated Metals.

C+ Cross Perforated Metals, Carbondale, Pa.

NATIONAL NS STANDARD

NEW! FIRE-

PROPERTIES OF PLASKON FIRE-RESISTANT UREA UFR-28:

MOLDING PROPERTIES	ASTM TEST METHOD	FIRE-RESISTANT UREA
Bulk Factor	D392-38	2.4-3.0
Preformability		Good
Temperature, F		275-325
Pressure		2,000-8,000
Mold Shrinkage, in/in		0.006-0.014

PROPERTIES MOLDED	ASTM TEST METHOD	FIRE-RESISTANT UREA
Electrical		
Arc Resistance, sec.	D495-58T	110-130
Dielectric Strength, v/mil	D149-55T	
Short time, ⅛ inch		300-400
Step-by-step, ⅛ inch		200-300

PHYSICAL	ASTM TEST METHOD	FIRE-RESISTANT UREA
Specific Gravity	D792-50	1.47-1.52
Coefficient of Linear Thermal Expansion/deg C, max.	D696-44	2.7×10^{5}
Thermal Conductivity, g-cal/(sec) (cm^2) (deg C/cm)		7.8×10^{4}
Heat Resistance, F, max.		170
Deflection Temperature under Load (Heat distortion), 264 psi, F	D648-56	245
Water Absorption, per cent, 24 hr @ 25 C	D570-42	0.5-0.7

RESISTANT UREA

PHOTO COURTESY OF UNDERWRITERS' LABORATORIES INC.

A.S.T.M. Test D635-56T
RATING: NON-BURNING

MECHANICAL	ASTM TEST METHOD	FIRE-RESISTANT UREA
Impact Strength		
Izod ft-lb/in. of notch	D256-56	0.25-0.35
Flexural Strength, psi	D790-58T	10,000-16,000
Tensile Strength, psi	D638-58T	5,000-10,000
Rockwell Hardness	D785-51	M116-M120

Plaskon

Today, more and more emphasis is being placed on plastic material possessing high fire retardant characteristics. In response to this critical need, ALLIED CHEMICAL has developed a truly *FIRE-RESISTANT* Urea UFR-28. Where other white and pastel compounds may blister, crack, drip, sag, or readily contribute to flame spread—PLASKON Fire-Resistant Urea effectively meets stringent Underwriters' Laboratories requirements.

In products made of low fire retardant materials, the possibility of "hot spots" arising from overload, long use or any malfunction presents serious fire hazards. PLASKON Fire-Resistant Urea will combat such hazards. Fire-Resistant Urea continues to pass test after test requiring maximum safety. Whether it be a structural or non-structural component for today's products, look to ALLIED CHEMICAL for the thoroughly qualified fire-resistant thermoset compound—Fire-Resistant PLASKON Urea UFR-28 Molding Compound.

AND LOOK AT UFR-28's OTHER IMPORTANT PROPERTIES:

- High dielectric strength
- Non-static dust attraction
- Resistance to detergents
- Photometrically controlled color
- Self-supporting rigidity
- Ease of cleaning
- Hard surface, non-abrasion.

PLASKON Engineering know-how is at your service with technical assistance and experience acquired through years of problem solving. A phone call or letter is all it takes . . . do it TODAY!

PLASTICS AND COAL CHEMICALS DIVISION
40 Rector Street, New York 6, N. Y.
BASIC TO AMERICA'S PROGRESS

Allied Chemical

INDUSTRIAL

DESIGN

announces its

6TH

ANNUAL DESIGN REVIEW

appearing in December 1959

A major feature in each December issue of INDUSTRIAL DESIGN, The sixth Annual Design Review will be a portfolio of the year's major innovations in industrial design. It will also help forecast the effect of these advances and developments in the designs of the coming year.

What Will It Include?

This year's Annual Design Review will cover every facet of industrial design from the newest forms of basic materials and technological components to the most outstanding products and packaging for home, office, and industry. Listed below, in outline, are the categories it will cover. A comprehensive review of this scope, highlighting the ideas and accomplishments of an entire year, provides a valuable permanent reference for all designers and manufacturers.

1 Consumer Products

- Furniture
- Fabrics & rugs
- Lamps
- Decorative accessories
- Electric housewares
- Housewares
- Radio & tv
- Hifi
- Photography
- Garden (including outdoor cooking)
- Hand tools
- Personal (razors, hair dryers, etc.
- Toys & recreational equipment
- Educational materials and equipment
- Silver, flatware & china
- Packaging

2 Building Products

- Prefab structures
- Systems and materials (panels, grilles, etc.
- Components (skylights, doors, fireplaces, etc.)
- Finish materials (tile, wall covering, etc.)
- Hardware (locks, hinges, handrails, etc.)
- Heating and cooling equipment
- Plumbing (mostly bathroom fixtures)
- Lighting (built-ins, ceiling grids, etc.
- Appliances (ranges, freezers, home laundries)

3 Business, Professional & Industrial Products

- Design materials (electronic & industrial)
- Communications equipment
- Business machines
- Institutional furniture
- Transportation (planes, boats, helicopters, moving sidewalks, etc.)
- Rolling equipment (tractors, lift-forks, etc.)
- Professional hand tools
- Machines (lathes, riveters, pumps, etc.)
- Electronics (components as well as products)
- Laboratory equipment

INDUSTRIAL DESIGN

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

CHALLENGE TO INDUSTRIAL DESIGN: *Find a manufacturing material that fills the triple requirements of high style, light weight and great strength — and eliminates the cost of hand operations.*

COLOVIN vinyl laminated to aluminum meets both engineers' and designers' specifications for Boeing 707 Jetliner.

From thousands of competitive materials, Boeing Aircraft engineers and designers **both** selected Colovin vinyl plastic laminated to aluminum for the interior of the 707 passenger jet — the engineers for its great strength and light weight, the designers for its rich color and luxurious styling.

Working with Walter Dorwin Teague Associates, the Boeing team has created a variety of glamorous interior effects with Colovin in the 707's now in service for Pan American and American Airlines. Still in production are 707 fleets for Braniff, Sabena, Air India, Lufthansa, Cubana, South African Airways, Varig of Brazil and Irish Lines.

A 707 Galley — cabinet surfaces, door and sidewalls are all Colovin vinyl laminate.

The U. S. Air Force makes wide use of Colovin laminates in its version of the 707 designed as a long range staff transport.

In Pan Am's 707, window panels, dado and cove-light cover are formed of blue Colovin vinyl laminated to aluminum.

Of the many materials tested, Colovin vinyl was Boeing's first choice on the basis of its all-around versatility. As semi-rigid sheeting, it can be laminated to metal in thicknesses up to 20 mils. Colovin vinyl offers unlimited design possibilities in multi-color printing and deep-texture embossing.

"Cities of the World" pattern in gold and white Colovin laminate makes decorative window panel in executive office of MATS 707.

With the complex curved shapes inside the 707, it is important to Boeing engineers that Colovin laminate can be fabricated on standard equipment as precisely as metal alone. Costwise, it brings sizable savings in pro-

duction as no painting or finishing is required. The laminated sheets come decorated and, after forming, are ready to install.

Many manufacturers are gaining a competitive edge through the use of this remarkable material. Can your company? Get the whole story in "Colovin Meets Metal." Contains laminate samples, colors, textures, test specifications, industrial applications, and a list of laminators to whom we supply Colovin vinyl sheeting. Write for a copy.

COLOVIN®

first and finest in vinyl-metal laminates

COLUMBUS COATED FABRICS CORPORATION
COLUMBUS 16, OHIO

Inside "flying office" of Boeing MATS staff transport, Colovin laminate forms window panels, cove-light covers, curved overhead areas.

Colorful Colovin laminate interiors in the luxurious lounges of Boeing 707. Maintenance is at a minimum.

Coming in the October 1959 issue of

INDUSTRIAL DESIGN

Career Decisions

The problem of getting the right man in the right job is, according to management experts, one of the most pressing problems in industry today. This is certainly true of the design profession. But the problem of finding high level men has its roots in another problem: that of finding and placing men with potentially high, but unrealized, competence. For this reason ID will investigate, in the October issue, Design as a Career. What are the opportunities for the young designer: what does he want, what does he get; what does he offer, and what does industry—or the design office—expect of him?

Museum Packaging Show

On September 10th the Museum of Modern Art in New York opened an exhibition of packaging comprised of some 200 entries selected to show what a package is, and what constitutes a well-designed container. The show includes disposable and reusable packaging for merchandise, and "technological packaging"—the housing for machines. In October ID will review the exhibition critically with emphasis on its contents, its purpose, and the importance and pertinence of the ideas it seeks to communicate.

Typewriter Re-design

For almost 10 years the Smith-Corona portable typewriter has remained a best-seller with only minor changes and refinements in its interior and exterior design. But rapid advances in materials technology within the past few years — as well as a desire to tie the portable with the firm's new corporate identity program— have prompted the Smith-Corona company to re-design the machine. The special problems involved in the project will be examined.

WESCON Winners

The WESCON awards, presented by electronics firms to industrial designers for products used by producers of goods rather than consumers, expresses the growing design activity in the field of producer goods. ID will review the winners and the winning products in this year's competition.

Design Review

Trucks, tractors, cranes, and heavy-duty farm equipment introduced in recent months will be the subject of this month's report on special areas of design.

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

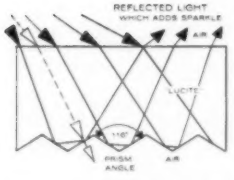
INDUSTRIAL DESIGN
is published monthly.
Subscription rates: $10.00 for one year
$18.00 for two years
$24.00 for three years.

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

New ideas . . . new designs with LUCITE®

ACRYLIC RESIN

MEDALLIONS of LUCITE add the selling touch to product designs. The underside of these components is molded into a decorative pattern and then metalized or painted. Beautiful three-dimensional and color effects are achieved at low cost. Parts have high structural strength. (Molded by Kent Plastics, Evansville, Indiana.)



When a light ray impinges on a LUCITE and air interface at an angle greater than 42°, the entire ray is reflected. By designing the bottom interface of a medallion to take advantage of this effect, maximum sparkle and brilliance can be obtained. The prism angle used is 116°. Well over 90% of incident light is reflected to the eye at optimum angles.

To brighten up a design—to interrupt an expanse of metal with a flash of color—use medallions or decorative panels of Du Pont LUCITE. It's the low-cost way to lend a touch of elegance to your products or call attention to your brand name.

Medallions and panels of LUCITE are beautiful and functional. For example, a large medallion for a tractor incorporates a prismatic pattern which acts as a night reflector. Control panels for a washer-dryer combination are corrosion-proof and retain their polished look despite splashes and heat. Fastening elements, such as pins for push-in fastening nuts, can be molded right into the strong plastic shells. LUCITE is a tough and impact-resistant resin.

We'll be glad to help you with the design of decorative components of LUCITE. For an interesting review of design opportunities write for our brochure "A New Look at the Product Design Qualifications of a Popular Plastic, LUCITE." Address: E. I. du Pont de Nemours & Co. (Inc.), Polychemicals Dept., Room L-219, Du Pont Bldg., Wilmington 98, Delaware.

In Canada: Du Pont of Canada Limited, P.O. Box 660, Montreal, Quebec

POLYCHEMICALS DEPARTMENT

LUCITE®
ACRYLIC RESIN

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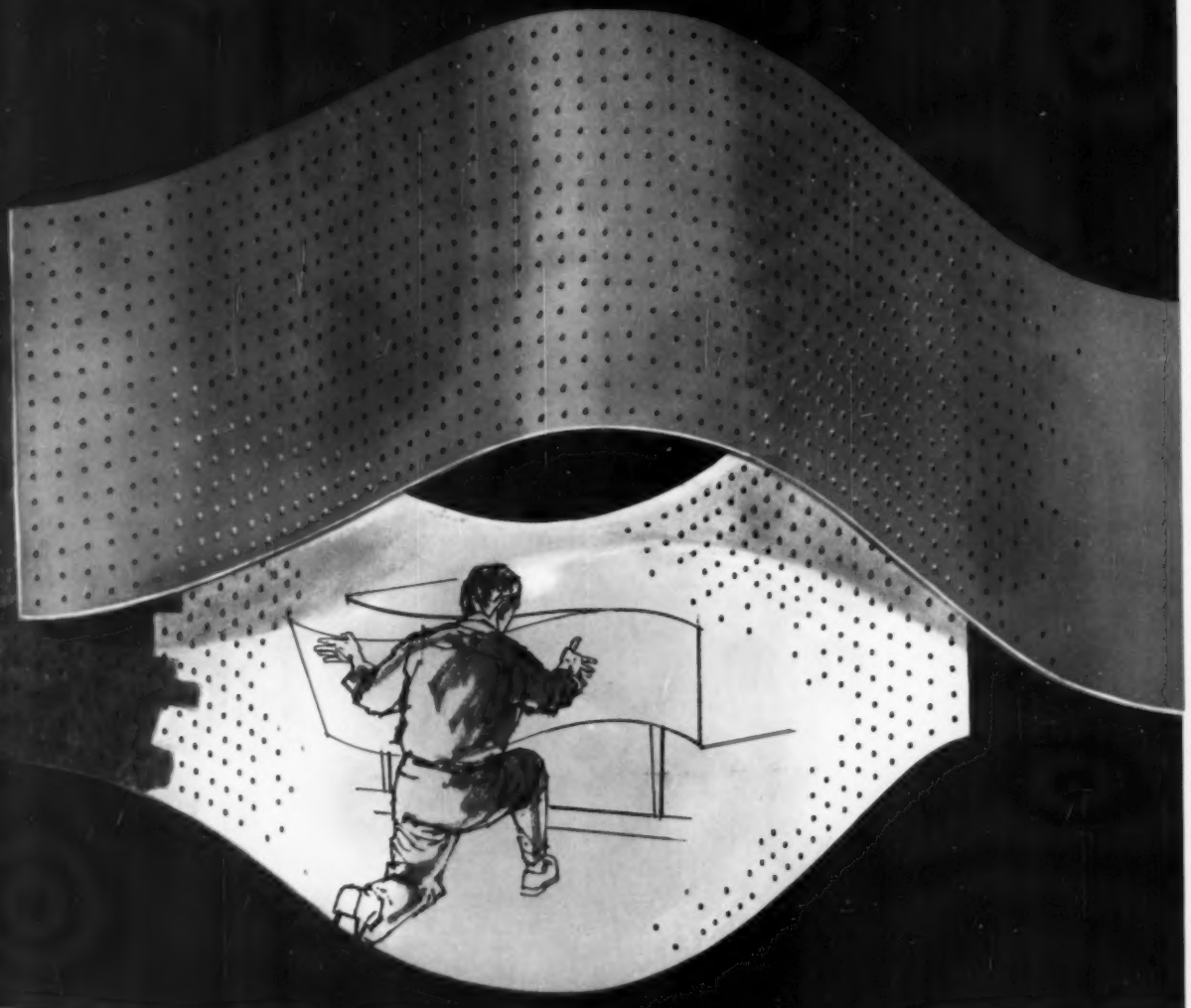
BETTER THINGS FOR BETTER LIVING . . . THROUGH CHEMISTRY

you can do just about anything with Masonite Hardboards...



Masonite Corporation
Dept. 2-2, Box 777, Chicago 90, Illinois
In Canada: Masonite Corporation, Gatineau, Quebec

☐ Please send latest design and production information on Masonite panel products.

☐ Please have your sales engineer call.

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Zone.....*County*.....

for example Consider the possibilities in these new, ultra-thin hardboard panels—perforated. (You may have seen them in auto or bus ceilings.) Only $\frac{1}{12}$" thick, they take curves beautifully, lend new interest to any broad surface.

in fact Masonite offers you a complete choice of thicknesses, densities, textures and patterns. Wonderful workability. Smooth finishing. Extreme resistance to impact, moisture and wear. Whatever your design or production need, Masonite has the hardboard to do the job.

MASONITE® CORPORATION

®Masonite Corporation manufacturer of quality panel products.

Books Received

ACOUSTICS, NOISE, AND BUILDINGS. By P. H. Parkin and H. R. Humphreys. 331 pages. Illus. Frederick A. Praeger Inc., New York. $15.00.

DECORATIVE ART 1958-1959. 48th issue. 148 pages. Illus. Studio Publications, Inc., New York. $8.95.
Current international trends in furniture and decoration, arranged according to categories.

INTERNATIONAL AUTOMOBILE PARADE. Vol II. 290 pages. Illus. Grosset and Dunlap, New York. $9.95.
Alphabetical catalog in six languages of all categories of new cars, giving full technical details, and, in many cases, appreciation of performance and design.

SCHOOLHOUSE. Ed. by Walter McQuade. 271 pages. Illus. Simon and Schuster, New York. $10.00.
This detailed analysis of requirements of American school design is both philosophical and technical. For architects and PTA groups. It is a remarkably handsome book.

BUSINESS ELECTRONICS REFERENCE GUIDE. Vol. 4. 604 pages. Controllership Foundation of America, Inc. $15.00.

HOW TO PLAN PRODUCTS THAT SELL. AMA management report no. 13. 148 pages. $3.75.

COLOR PLANNING FOR BUSINESS AND INDUSTRY. By Howard Ketcham. 275 pages. Illus. Harper Brothers, New York. $5.95.

QUALITY CONTROL IN ACTION. AMA management report no. 9. 116 pages. $3.00
A symposium of accounts from various firms of how they maintain quality control. Covers tools, techniques, and administration.

MATERIALS FOR NUCLEAR REACTORS. Edited by Bernard Kopelman. 157 pages. Illus. McGraw-Hill, New York. $12.00.
A complete textbook.

HOME BUILDERS MANUAL FOR LAND DEVELOPMENT. Second Edition. 264 pages. Illus. The National Association of Home Builders. $5.00.
Comprehensive analysis of technical and design problems in residential land development, addressed primarily to the speculative developer.

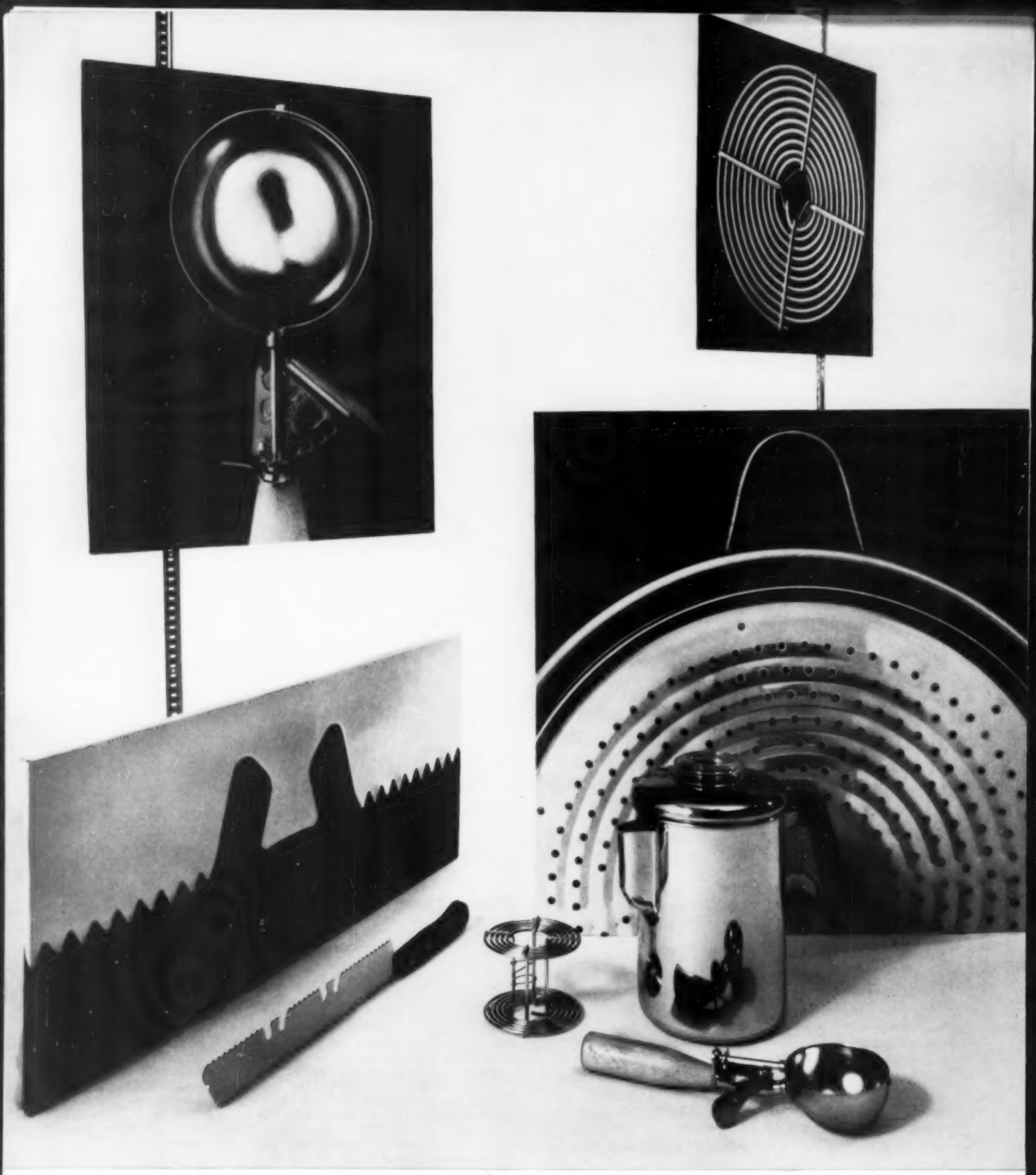
BUILDING WITH STRUCTURAL PLASTIC SANDWICH PANELS. Ed. by Professor Bernard P. Spring. 115 pages. Illus. Massachusetts Institute of Technology. $3.00.
Covers all aspects of the subject in detail. Contains annotated bibliography and lists of suppliers of plastics and plastics literature.

THE MUSEUM OF MODERN ART IN NEW YORK, by Arthur Drexler. Illus. Preface by Sir Herbert Read. 125 pages. Illus. LaRiascente, Milan.
A review and brief catalog of the exhibitions put on by the Museum 1932-57, with the purpose of improving and educating public taste.

WHY PEOPLE BUY, by Louis Cheskin. 319 pages. Liveright, New York, May 1959. $5.00.

MODELMAKING FOR INDUSTRIAL DESIGN. By Ralph R. Knoblaugh. 276 pages. Illus. McGraw-Hill, New York. $9.75.
Covers all modelmaking in all media. Special attention given to plaster models.

THE AMERICAN AUTOMOBILE MANUFACTURERS. By John B. Rae. 223 pages. Illus. Chilton Book Company, Philadelphia. $6.00
A detailed historical survey going up to the present day. Has carefully annotated sources.



A bold camera, an uninhibited approach, and even the most commonplace objects assume exciting, different identities. Stainless Steel offers the same uninhibited approach to product design. Easily fabricated, Stainless Steel can be sculptured to taste without sacrificing strength. In fact, Stainless Steel's superior strength eliminates the need to overdesign for durability. Parts can be thin and light, delicate and decorative, bright *and strong.*

No other decorative metal can match Stainless Steel for *permanent* beauty. Its luster is as deep as the steel is thick—it won't peel or chip. And it has remarkable resistance to denting and scratching. Small wonder that, today, there is no more effective selling phrase for a metal product than "Made of Stainless Steel."

USS TRADEMARK **United States Steel**

As others see us

To see ourselves as others see us has long been considered a laudable, if quixotic, ambition. Now American designers have a fair chance of realizing it. The magic mirror in this case is *Industrial Design in the United States,** the report of a 26-man European "mission" that visited this country in the fall of 1955 to study native design mores. It is not racy reading, but it is a fascinating, blunt description of design life in these United States by a group of specialists who have no stake either in praising the American designer or in burying him, but a truly enormous stake in finding out what he does. Considering how few design offices they visited, and how many important questions they seem not to have had time to ask, it is an astonishingly perceptive study.

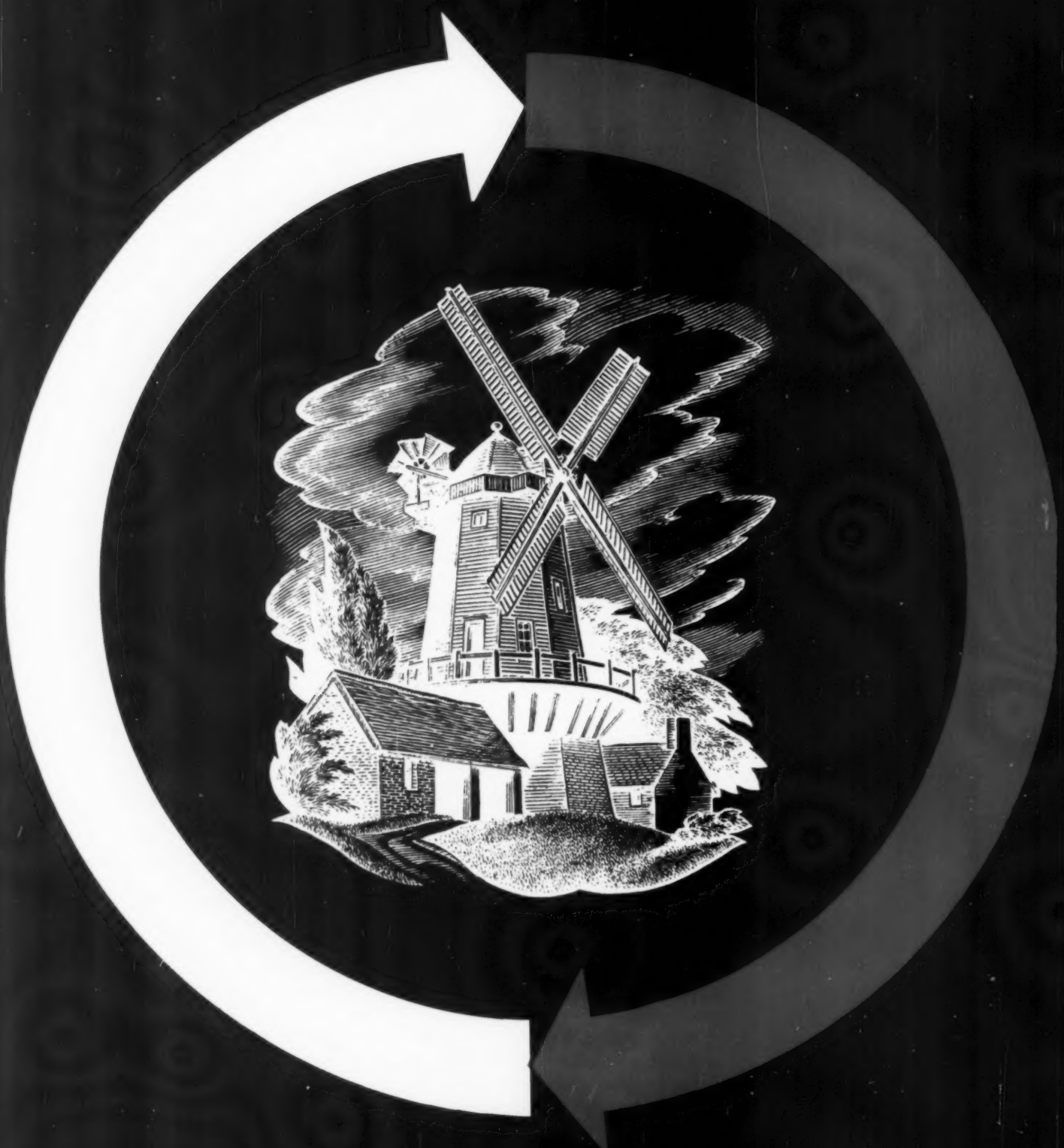
The subject itself was hardly an untapped mine. But the American magazines that have tried to explain the profession have usually been restricted by special journalistic interests or by deadlines that precluded any real perspective. Books by designers have tended to be exhortatory or anecdotal or academic. The European report is as prosaic and humorless and presumptuous as the title is: it tells the story of industrial design much as one might tell it to a child who is going to be examined in the subject later. Since no one has tried telling it to a child before—and since no one seems to have told it to *anyone* satisfactorily—perhaps this is the right approach. The tone of the report is the tone of Gulliver describing the Lilliputians—like someone's straight-faced observations of a race he had never before seen doing things he had never guessed were done. It is shocking in the way that the truth is always shocking when reduced to simplest terms, and it is no disparagement to say that the mission's findings have the freshness of naivete. For the authors actually began their study with the assumption that they were studying something else! The foreword explains that members of the team were chosen on the basis of a " 'misunderstanding' concerning the meaning of industrial design." But it goes on to state that this did not detract from the merit of the investigation, and indeed it appears to have been no handicap at all.

Apart from its value to European industry, the report can serve American designers in three ways:

- By presenting an objective, serious, and informed view, it can help the designer understand himself.
- By presenting a thorough but simply arranged body of information, it provides a pretty good packaged answer to the question: "Just what is it you industrial designers *do?*"—all the more convincing because, while sympathetic, it is not at all flattering.
- By discussing, sketchily but realistically, the extent to which our philosophy and techniques might be applied to European manufacturing and marketing goals, it can help the American designer understand what Europe needs, wants, and intends to get from design. This is particularly true in regard to the Common Market nations. What better way to get an insight into Europe's design aspirations than to read what her own experts recommend to her own industrialists?

The mission report is as far from poetry as anything can be, but in at least one respect it can be classed with the King James Bible: it is that rarest of all literary achievements, a useful and readable work created by a committee.—*R.S.C.*

* INDUSTRIAL DESIGN IN THE UNITED STATES. Published in France, 1959, by the Organization for European Economic Cooperation, and available from O.E.E.C. Mission Publications Office, Suite 1223, 1346 Connecticut Ave. N.W. Washington 6, D. C. 140 pp. Illustrated. $1.75.

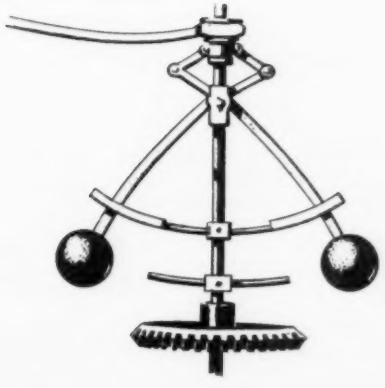


In homes, offices, and industry intricate relationships are constantly at work behind the switches, dials and consoles that keep rooms comfortable, plants rolling, and missiles hurtling through space. Automatic controls have their own loop of senses and nerves capable of

SELF-REGULATION

BEHIND THE PANEL

by ARTHUR GREGOR



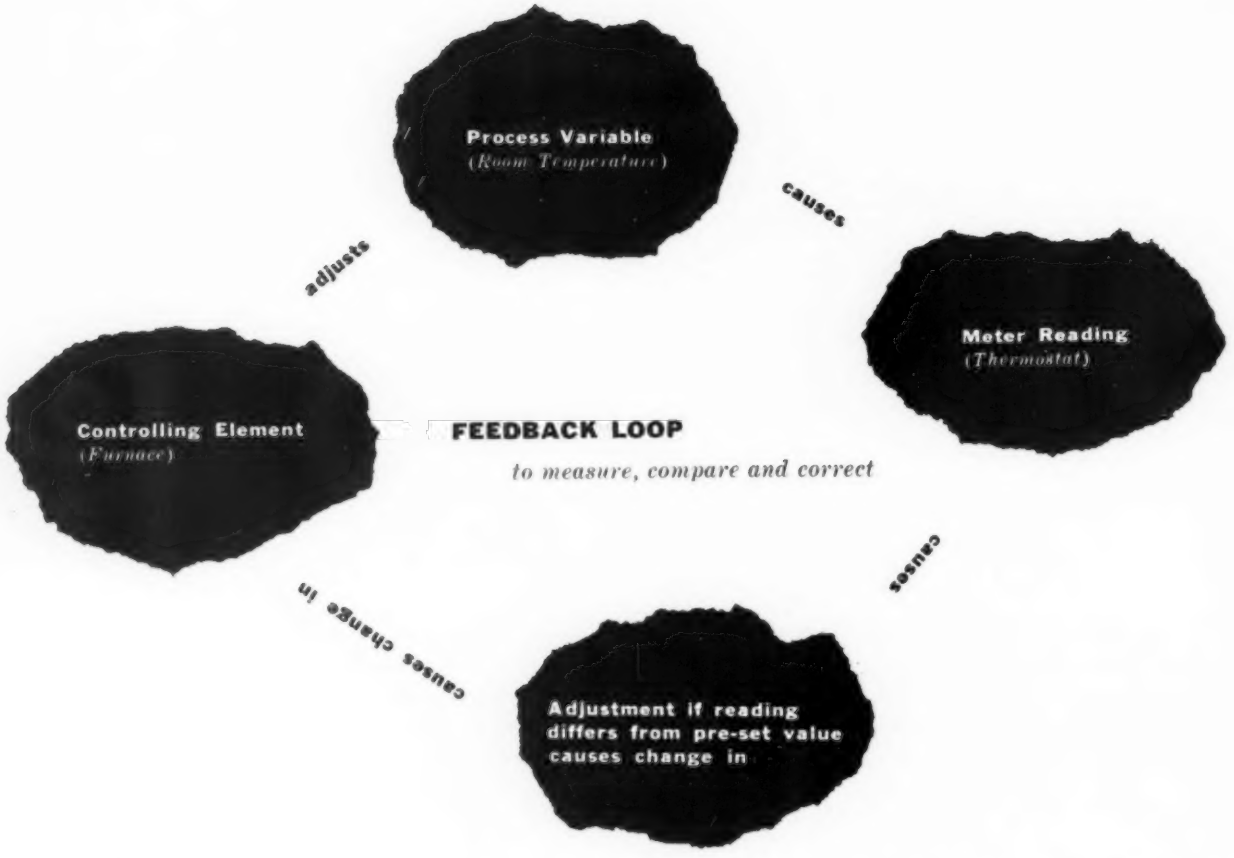
An early example of feedback control, the James Watts flyball governor.

Pictures: at left from "Windmills and Millwrighting," by Stanley Freese, Cambridge University Press; at right from "Let Erma Do It," by David O. Woodbury, Harcourt, Brace and Company.

In the eighteenth century a novel device made its appearance on top of windmills working throughout the Dutch lowlands. It was a replica of a regular windmill with sails made up of vane-shaped blades; it was mounted on a turning turret, and connected to the mill's revolving mechanism by a system of gears. The replica mill was mounted in such a way that its sails were always at a right angle to those of the large mill. This relationship was significant: it meant that the sails of the small mill would catch the wind once a shift in its direction caused the sails of the large mill to stop turning. The moving sails of the replica mill activated a mechanism which caused the turret to rotate and to revolve the windmill until the large sails were once again in the direction of the wind. The purpose of this device was to ensure continued operation of the mill by regulating its position, and the interaction of the replica mill and its exemplar set up a process activated by a change in the wind's direction, which was *continuous* and *self-regulating*. This was, of course, of prime importance to the mill owners of that time, but the significance of the device far exceeded the benefits of its immediate use: it was an early formulation of the basic principle behind *automatic control*.

Today, the same principle is at work in myriads of products and processes whose operation is affected by changes in temperature, motion, pressure, flow, light, moisture, etc. To the consumer, the self-regulation of appliances and home environments is, of course, not evident. The action is contained within the boundaries of the process itself, and he does not "see" just how the temperature in a room is kept at a pre-set level; how it is that a burner will turn itself off once it has cooked the "dish" on top of it; how the temperature environment of an entire building is kept under control from a single board in the basement; or how the cookies he buys were prepared, baked and packed without being touched by a hand.

Control of industrial processes and scientific experiments is also based upon the same principle which kept the windmills turning, and is employed almost exclusively in certain industries. Chemical plants and oil refineries whose elaborate piping, boilers and networks of vessels stretch over wide grounds, present a ghostlike picture, for although the plant is clearly active there are hardly any workers to be seen. And still, for all its wide use, the application of automatic control to industrial programs and to home, office, school, and place of entertainment is as yet in its infancy. Many physicists and engineers believe that the regulation of products and processes, of industry and home, will in future become as self-determined and self-performed as



The feedback loop (above) behind automatic controls is a self-contained cycle of cause and effect. The chart (below) gives a breakdown of the fundamental parts common to all automatic control systems.

AUTOMATIC CONTROL SYSTEM

PROCESS VARIABLE
(Temperature, pressure, moisture, motion, etc.)

AUTOMATIC CONTROLLER

MEASURING MEANS
(Thermometer, millivolmeter, pressure gage, pneumatic recorder, etc.)

CONTROLLING MEANS
(Switch, circuit-breaker, relay, etc.)

are the processes of nature, as automatic as is the control ability in man.

The first stage of man-made devices in a civilization is generally a transference of man's muscle power — as in the wheel, the plough, the man-operated machines; a later stage is that phase when the function of man's senses and nerves can be approximated by the more advanced apparatuses and machines. This sensing ability of man-made devices underlies the mode of living in this half of our century. But what *is* automatic control? What ability do materials and components possess that makes it possible for products to *sense* a change in the energy which drives them and which they control? How are they able to regulate themselves, to detect and check errors, to cause changes within the operating process? How can they regulate the input in order to obtain an output whose value has been pre-set and pre-determined? How, in short, have machines been made to function as though they had a system of nerves?

The designer, charged with the product expression of technological principles, is certainly concerned with the "mystery" behind the obvious, the laws by which the product and process output can be understood, the end-result of operation. The amount of work done by the designer in the field of control systems and their components is already considerable. He has, in many cases, pulled the system's "veins" together and incorporated them in a single control board handled by an operator; he has designed many of the components (valves, circuit breakers, switches, thermostats) as well as the necessary measuring and recording equipment. But how *is* instrumentation employed in the control of systems? What goes on behind the panels he designs? What do the components do, and just how does a meter-needle pick up the quantity of a process variable?

The principle of feedback

The action that results in a product's self-regulation is based upon a principle called *feedback*. It refers to the interrelatedness of elements within a system, and might be called a law of behavior which applies to all living organisms. Feedback is so basic a phenomenon that no single definition is possible. It can be stated in as many different ways as it is found to express itself in nature and in science. Perhaps the most general definition is the one given by Arnold Tustin (Automatic Control," Scientific American, 1955), namely: *interdependence*. A more complex definition is given at the beginning of Otto J. Smith's book "Feedback Control Systems" (McGraw-Hill, 1958): "A feedback system is one in which the action of an output member or controlled variable is measured, this measured value is compared with some desired value, and the error influences the forces tending to change the output or controlled variable." These two extreme definitions can perhaps be restated in, on the one hand, more specific, on the other hand, less complex terms: feedback is a cycle of cause and effect in which the output is linked to the input forming *a closed loop*. Or simpler still: feedback is a closed loop of cause and effect (see diagram on page 46). In the case of the windmill's operating cycle, a shift in wind direction causes the large mill to stop and the small mill to start; the action causes the large mill to rotate until it catches the wind again, its sails rotate, the small mill returns to its original state and the cycle is completed. This is feedback.

The fact that this law, observed in the logic of behavior, also holds true when applied to man-made devices was established by another early invention, James Watt's celebrated flyball governor of 1788 (see drawing on page 45). To control the flow of steam operating an engine so that a variation in power demand on the engine would not speed it up or slow it down, Watt attached a small vertical shaft to the engine shaft which turned it. On this attached shaft were pivoted two short metal arms with heavy metal balls mounted at their lower ends. Rotation of the shaft caused the balls to spin at a distance from the shaft dependent upon the speed of the engine. The arms of the governor were also connected with a rod that turned the steam-admitting valve on or off; when the engine went too fast, the balls flying outward would raise the valve-rod which would close off the steam somewhat and the engine would slow down. Thus the flyball governor automatically adjusted the steam requirements to keep the engine at constant speed.

The control that occurs within many popular products in use today is the result of a similar process. If the temperature in a refrigerator rises somewhat, a thermostat, performing the function of the replica windmill or the flyball governor, turns on the motor which produces the extra cold needed to keep the inside temperature at a given level; the falling temperature in turn causes the thermostatic switch to turn off the motor.

The relationships of the flyball governor to the engine and of the thermostat to the motor constitute a closed loop of cause and effect. By closing the process within a continuous cycle in which all parts were affected by the behavior of other parts and functioned in a co-ordinated sequence, Watt did, in fact, put into practice the principle of feedback, the core of automatic control.

Automatic control systems

The distinguishing features of an automatic control system lie in its ability to *sense, measure, compare* and *correct*. In semi-automatic processes whose starts and ends are not joined into a loop, this corrective action is taken care of by the human operator who performs the work of the feedback link handled in automatic systems by the feedback devices (the replica mill, the governor, the thermostatic switch, in the examples cited so far). But the feedback link is gener-

ally not made up of a single device; instruments and other controlling elements are needed to make up a system's nerve center. The extent of instrumentation depends upon the complexity of a system and varies from a single controller capable of measuring and controlling a single variable to complex controllers able to scan many variables and to govern a total plant performance (see page 58). But regardless of range and performance versatility, automatic control systems are made up of groups of parts, and these groups are common to all.

The chart on page 46 lists this breakdown. The element that needs to be controlled, the *process variable*, is always some form of energy (heat, pressure, motion, etc.); the fact that it has changed must be sensed to be measured and the error corrected. The measuring means (see page 52 for thermometer, pressure gage, meters, recorders etc.) and the controlling means (see page 53 for relays, switches, circuit breakers, etc.) constitute the *automatic controller* which watches the process variable continuously, detects any difference between a predetermined standard and its momentary status; the difference is recorded on a measuring device which relays it to the control unit which, in turn, makes the necessary adjustment.

This inter-relatedness of parts all functioning to control a given output is possible only as a result of a phenomenon readily discerned in its action but somewhat mysterious in its origin: the sensing ability of material essences by which they "perceive" a change in environment and respond to it.

Sensing ability: the mystery of control

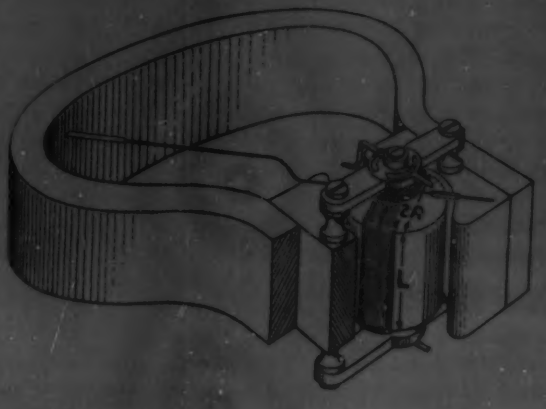
The detecting ability of materials—solid and fluid—is evidenced by their responses to changes in environments and atmosphere, but the basic principles governing their behavior remain largely unknown. It is a fact that fluids expand and vaporize under the influence of heat, that wires of two dissimilar metals connected at both ends create an electromotive force when one junction is at a different temperature from the other (the thermocouple, page 50), that coils of materials tend to uncoil under a change of temperature, etc. But just what it is that motivates a material to respond to a change in the condition of the environment surrounding it, is no better understood than the laws that determine man's response to similar changes around him. The fact is that a sensing ability is not only inherent in man but in materials, and that this ability causes them to perform actions which are useful as manipulating forces in products and processes.

Spencer's discovery of his thermostatic snap-switch (page 53) is a famous case in point. Spencer was not a scientist but a furnace tender in a lumber camp working on the night shift. He kept the fire going under a boiler that furnished steam for the saws. He discovered that the metal door of the furnace was, in fact, keeping watch for him. The door snapped sharply as the fire died and the furnace cooled off, and snapped again when it heated up. What was regulating Spencer's sleeping habit as he tended the furnace was a newly observed manifestation of the laws of thermal expansion: two pieces of dissimilar metal—such as steel and aluminum—welded together and formed into a slightly bent disk would expand at different rates when heated, setting up stresses which would turn the disk inside out; cooling it again would restore the disk to its original shape. The fact of this behavior became the action principle of the now widely applied automatic snap-switch. It is this device which handles the temperature control of many popular automatic appliances, electric irons, coffee makers, washing machines, frying pans, etc. And, in a more general way, it is this "inborn" ability of solids and fluids to *respond* and *react* to environment changes which is the "heartbeat" of the categories of automatic products and industrial control processes discussed here.

Control by instrumentation

The operating level (degree of heat, amount of pressure, speed, etc.) of automatically controlled products and systems depends, of course, upon the requirements of a given application. Although self-regulating systems are self-contained within their loop of operation, their total performance must be adjustable. It is essential that the process

This permanent-magnet moving-coil mechanism detects changes in electrical energy, and is a basic element in electrical instrumentation. The principle was developed by D'Arsonval and turned into a moving-coil instrument by Edward Weston in 1894. Courtesy of Weston Instruments Division of Daystrom.



can be observed at all times and its status indicated. A system must be able to "communicate", and it does this by means of instrumentation.

In his book *Process Instruments and Controls Handbook*, D. M. Considine defines instrumentation as: ". . . the art or science of applying measuring devices (or measuring-and-controlling devices) to an object or a combination of objects for the purpose of determining the identity and/or magnitude of certain varying physical and chemical quantities . . ." The instruments capable of this action vary depending on the type of process variable they are measuring (see page 52 for some measuring and recording instruments) but in all cases their operation principle is based upon the sensing and detecting ability of materials and electrical mechanism.

The drawing on page 48 shows the sensing mechanism on which much of the electrical instrumentation is based. The galvanometer resulted from Oersted's discovery in 1819 that a current passing through a wire set up a magnetic field around that wire, and that a magnetized needle, if held over it, would turn aside. The amount the needle would turn depended upon the strength of the current and, consequently, upon the strength of the magnetic field. This principle was incorporated by Edward Weston toward the end of the nineteenth century in his detecting-measuring mechanism consisting of a permanent magnet (see page 48) and a moving coil of wire which carried the current to be measured. This basic mechanism was the forerunner, and is still the core, of modern instrumentation. Although actuated by electrical energy, measuring instruments based on this principle can measure and record—by attaching some sort of inscriber to the moving needle—different types of process variables. Instruments have been developed to transform different types of energies into their electrical essence which can then be measured by electrical means.

Selected but basic aspects

These then are the "ingredients"—the process variables, the sensing, self-acting devices, the actuators, the measuring and recording instruments—which enable utilization of nature's principle of self-regulation and feedback. They are the basic tools of an industrial epoch whose wide-spread expression is still in the future but whose ability is beginning to be felt now in *automation*. The most prominent refinement, the computer, is now beginning to be used to integrate completely the operation of complex control systems handling diverse manufacturing processes and as intricate a program as national air control and defense. There are other types of controls, other important components, such as the electronic "valve" (the vacuum tube) and the many circuits and electronic detection, amplification, and transmitting equipment used in elaborate controls. The men in charge of installing control systems for home and/or industrial use face many problems and a new class of engineers, the automatic-systems engineer, is being trained by industry and the universities in the job of designing and installing automatic nerve centers in homes, offices and plants. There are other problems confronting the industrial designer involved in the realization of automatic systems, such as control panel layouts, the matter of proper reading scales, and the question of torque of switches, knobs and buttons, and many other vital considerations relating to human engineering. It is impossible to cover all of these in a single article, or even to touch on them in some detail. What can be done initially is to talk about the principle of self-regulation and how it is put to work in applications that affect the consumer directly.

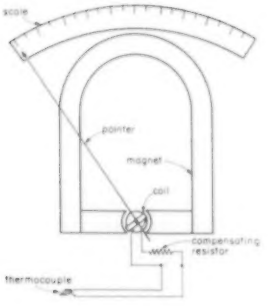
On the next ten pages some such products and systems are taken up.

The diagrams on pages 50 and 51 explain how self-regulation is possible for these process variables: temperature, pressure, radiation, humidity, flow, motion. This is followed by a description of components that function as actuators. Examples of products and processes used to control *home environments* and to influence the extent of *creature comfort* are given on pages 54 and 55. The article concludes with examples that illustrate the use of the feedback loop to facilitate *message transfer* in offices and hotels, and to handle a total manufacturing process and chemical plant performance. (Data-processing is an elaborate chapter in itself and is not gone into here at all.)

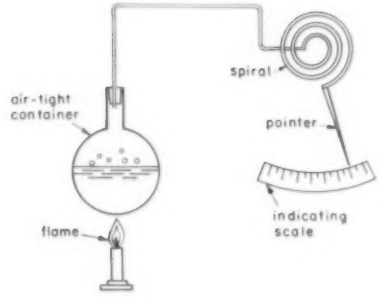
Refineries and chemical processing plants are handled exclusively by automatic control systems. Tanks, vessels, steam-pipes—active although no workers are seen — create strange impression as in this Standard Oil Co. refinery.

THE SENSING ACTION *responsible for the self-balancing of automatic systems originates not in the components per se but in the varying responses of materials to changing conditions of energy and atmosphere. These changes may be detected in a number of ways. Here are some of them, and the process variables with which they are used.*

Temperature



The THERMOCOUPLE is the sensing element applied extensively in systems in which temperature is a control variable. It is an expression of the principle of thermoelectricity: when two dissimilar metals are welded together at one end and this junction is heated, the free ends acquire a voltage proportional to the temperature difference between the welded and free ends. In practice, the free ends are connected to a millivoltmeter whose galvanometer mechanism picks up the emf created and indicates the amount on a scale calibrated in terms of temperature. The choice of dissimilar metals for the thermocouple depends largely on the temperature change in which they are to operate. Copper-Constantan is good for ranges between —300 and +600°F; Iron-Constantan is suitable for use up to 1600°F; Chromel-Alumel is satisfactory up to 2100°F; and other metal combinations are available. An important part of thermocouple assembly is the compensating resistor which keeps the open-end temperature at a constant temperature level.



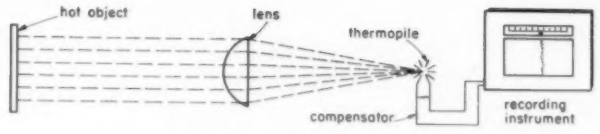
THERMOMETERS are adapted for industrial use, and with the aid of a spiral element and an indicating scale are used to record temperatures. The vapor filled thermal system shown here—other types employed industrially are: gas filled, mercury filled—operates on the principle that fluids expand when heated. If the fluid is contained, an internal pressure proportional to the temperature of the flask builds up in the system. The pressure causes a spiral to uncoil which moves the indicating pointer along the scale. The flask is often replaced by a metal bulb.

Pressure

PRESSURE GAGES are operated by a spiral-type measuring element which detects changes in one of the most important of process variables. The spiral is a thin-walled tube flattened on opposite sides to produce an elliptical cross section. When pressure is applied to the open end of the tube formed into a spiral, the tube tends to uncoil. The free end of the spiral is generally connected to the pen or pointer of a measuring instrument on which the pressure is recorded. The spiral is good for instruments measuring pressures from 10 to 4000 psi. Below this range, brass or stainless steel bellows are used. Enclosed in a shell connected to the pressure source, the bellows is compressed by the pressure and the extent of this vertical motion is indicated by a pen or pointer movement on a linear scale. This type of pressure-sensing element is very sensitive and can detect the least amount of change.

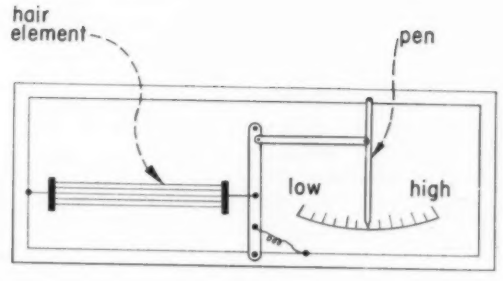
All illustrations except gyroscope from "Fundamentals of Instrumentation," courtesy of Minneapolis-Honeywell Regulator Company.

Radiation



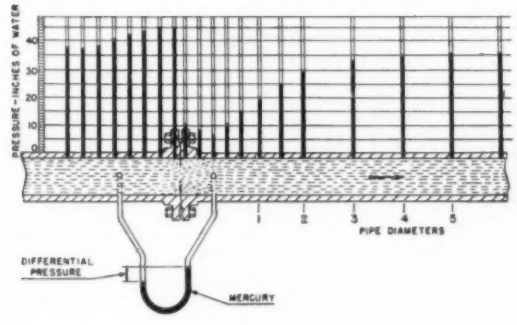
THERMOPILE is the core of a sensing element which determines the temperature of an object by measuring its heat radiation. The thermopile is a group of very small thermocouples connected in series; the junctions absorb all of the radiant energy of a measured object which is focused on the thermopile by a lens. The thermopile generates an emf proportional to the amount of energy falling upon it, which in turn is proportional to the temperature of the measured object. The emf is recorded on an indicating instrument which records and controls temperatures in the same way as the thermocouple meter. This method of temperature determination is particularly useful in applications in which objects need to be controlled in an environment of excessive heat, such as forgings, ingots, steel strip and plate, etc.

Humidity



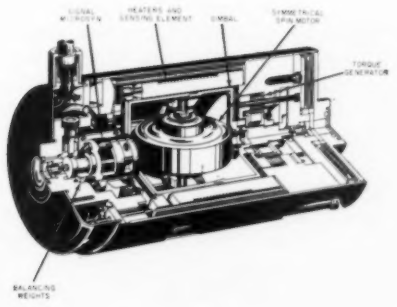
Strands of HUMAN HAIR are the basic element in an industrial method to determine the amount of moisture in the air. The strands are fastened together at one end and are connected at the other end to an instrument pen or pointed. An increase in humidity causes the hair to expand, which in turn, causes the instrument pen or pointer to move upscale. The reverse takes place in a decrease of humidity: the hair contracts and the pointer is moved downscale from the preset reference level. This sensing system is used in checking the operation of air-conditioning equipment in textile mills, food processing plants and other places where relative humidity is a factor influencing production. Measurements are made in per cent relative humidity, which is defined as the actual weight of water vapor in one cubic foot of a given sample, divided by the weight of water vapor the same volume would hold if saturated at the same temperature.

Flow



A RESTRICTION—usually an orifice plate, a Venturi tube or a flow nozzle—is the primary element in a number of arrangements employed to measure flow. This type of measurement tells how much fluid is used in a continuous process, or how a fluid is distributed. It is also used to regulate the quantity of a material added at certain process stages or to maintain the ratio of one fluid to another. The most frequently employed type of flow meter is the differential pressure meter. It consists of a restriction installed in a flow line to create an artificial pressure drop which bears a relationship to the rate of flow. The selection of the type of restriction used depends upon the type of application. The thin orifice plate is the most frequently used.

Motion



The GYROSCOPE is the key element in sensing a deviation in a line of motion; without it automatic flight control and guided missile systems would not be possible. It is this device which gives an air-pilot the strictest line of reference and sets the instruments in motion which inform the pilot the instant his craft shifts from its pre-determined flight direction. A gyroscope depends for its operation on a rapidly spinning wheel that reacts against any effort to change the direction in which its spin axis points. It is generally incorporated in accelerometers which the gyro keeps pointing in their pre-fixed direction. Gyros are the most complex of the basic elements around which automatic systems are built, and because of their importance in inertial guidance and space vehicles, explanations of the operation principles of the highly developed gyros are classified information.

THE AUTOMATIC CONTROLLER *is the operating mechanism of an automatic system. This always includes a measuring means and a control means. The control arrangement is often included in the measuring and recording instrument, other control and "muscle" elements—relays, circuit breakers, valves, etc.—are interspersed throughout the process loop. Some typical measuring instruments and basic control elements are shown here.*

Measuring a single variable

The MILLIVOLTMETER, one of the simplest measuring instruments, can be adapted to a wide variety of uses. The instrument itself consists of a d'Arsonval galvanometer which picks up and records changes in emf. The scale can be calibrated to read temperature, current, or voltage, and the meter is nearly always used for temperature measurements sensed by thermocouples. It can only indicate the condition of a single process variable but with adjustment it can operate as a control unit as well. Mechanisms can be incorporated which enable the instrument to make or break a circuit, effect a current change in a circuit, and adjust temperature levels at fixed time intervals. In each case the control action takes place when the pointer indicates a reading less or greater than the pre-set value.

Multiple station recorders

A MULTIPOINT RECORDING POTENTIOMETER is capable of measuring and recording different types of variables at a number of stations within the loop of a controlled process. The recently developed instrument at left (by Daystrom-Weston Industrial Division, Daystrom, Inc.) can be adapted to measure and record the process status at twenty-four different points. The instrument can handle any input from thermocouples or transducers, which means that it can be used to read and keep a record of voltages, frequencies, temperatures, pressures, etc. Adjustments can be made to incorporate alarm switches, internal illumination, and other devices helpful in actuating changes. The new multipoint recorder is an example of a trend in instrumentation which stresses greater flexibility and handling capacity.

High accuracy readings

The CIRCULAR CHART RECORDER-CONTROLLER is an instrument popular in the process industries for applications where high accuracy of scale reading is important. The large scale of the instrument makes readings possible at long distances. The charts on which readings are recorded in detail are easily removed and daily records can be kept. The speed at which data is recorded can be adapted to a desired cycle and the instrument also includes pneumatic or electric controls. The Daystrom-Weston instrument at left can include a four-position pneumatic transfer switch that functions as a loop control. Whether the control mechanism is connected to electric or pneumatic controls, it is directly coupled to the slidewire shaft which means little time lag between indication and control action.

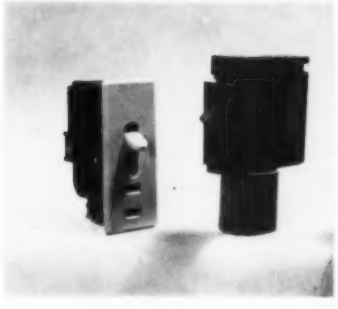
Snap-action temperature control

The DISC-TYPE THERMOSTAT is a simple bi-metal element used for temperature control in most commercial appliances. The unit at left is an example of the disc-exposed Klixon switch (by Metals & Controls Corporation) which includes the Spencer Disc. The composition of the curved disc is such that it will turn inside out under certain temperature changes. This snap-action is used to actuate a switch which can be connected to turn an appliance off or on, or used to regulate the quantity of energy flowing through a circuit. It was first discovered in the action of a metal furnace door. The snap-acting thermostats are now used to control operations of combination washer-dryers, heaters, refrigerators, etc. It is also employed industrially in such applications as motors, to protect them from overheating.

Switching action for heat control

The TUBE-TYPE THERMOSTAT is another popular heat control element. Nearly all automatic cooking appliances—fry pans, sauce pans, griddles, baking ovens, etc.—use this device for temperature control. The tube-type thermostat depends for its operation on the behavior of different types of metals exposed to temperature changes. The tube consists of a high expansion tube and a low expansion rod. The two elements are welded and sealed at one end; at the other end the rod is welded to a movable actuating arm which operates as a result of the difference in the expansion rate of the two elements. The tube can be inserted in a control plug (the Metals & Controls Corporation product at left) which acts as an off-on switch and has a dial on which the desired temperature can be pre-set.

Break and re-set switch



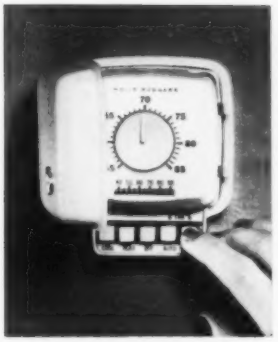
The CIRCUIT BREAKER is a familiar device in power circuits which it cuts when the rated current value is exceeded and thereby protects circuits and equipment from burning out, etc. The switch shown here (by Federal Pacific Electric Company, designed by Raymond Loewy Associates) is an adaptation of this principle of power control to low voltage applications. The small circuit breaker is used in place of fuses in appliances and other small pieces of electrical machinery, like power drills, electric stoves, radios, tv sets, etc. Use of these breakers makes fuse replacements obsolete. The breakers are equipped with an externally operated switch. When a circuit is broken, the switch handle drops. Pushing the handle puts the circuit back in operation. The breakers are available with a variety of face-plate finishes.

Flow control

The VALVE ACTUATOR is a control component very much in evidence in temperature systems that control entire buildings, in the process industries, and in many other applications in which flow is a process variable. The major function of the valve actuator is to control the flow of hot or cold water and/or steam. It can be used as a one-way or three-way valve which means it is capable of simultaneous control of various types of flow. The valve itself is operated pneumatically. Enclosed within the device is a diaphragm which responds to pressure applied to it and it will open or close a valve depending upon the amount of pressure it receives. This valve (designed by Henry Dreyfuss for Minneapolis-Honeywell Regulator Company) is available in different sizes for systems of varying specifications.

Control devices look after home environments, adjust room lighting, and cut down food wastes

The closed-loop principle of operation in which feedback takes place is at work in many products used in homes, offices, and hotels, to protect inhabitants from environmental changes and discomfort. The best known product in the family of simple self-regulating devices is, of course, the thermostat (at right), and it is pretty common knowledge how this device functions. Nevertheless, an account of its operating cycle illustrates in simple terms the actions that go on "behind" self-regulation. The thermostat's metal spiral — the element that senses any deviation from a pre-set temperature level — expands or contracts and thereby activates a tiny mercury switch connected to controls on the furnace. These react to "commands" from the switch when the temperature in the room has gone beyond a fixed level. The furnace controls shut off the heat supplied to the room until the temperature has fallen to its desired level, which causes the mercury switch to change its position and the furnace controls to turn the heat on again until the temperature level is exceeded and the process of self-regulation is repeated.

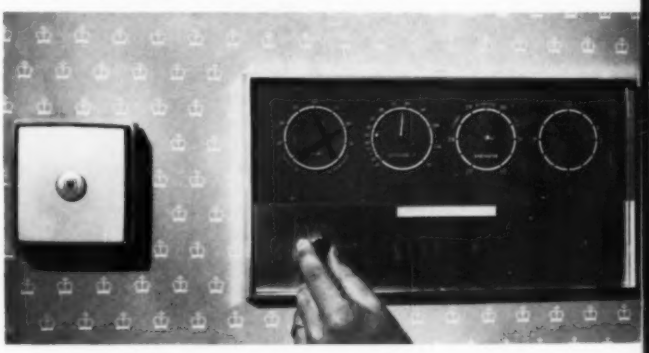


Simplest and most popular of temperature controls, the room thermostat, is now being extended to include air-conditioning control. The desired temperature is pre-set; any deviation is sensed by thermostat, which then puts the control cycle in motion. This round thermostat (Minneapolis-Honeywell, designed by Henry Dreyfuss) controls heat only; push-button unit (White-Rogers Company) looks after air-conditioning as well as heat.

More complex controls

Temperature control products capable of a more elaborate performance are more complex versions of this basic cycle of cause and effect. The thermostat (extreme right) regulates the cooling of a room as well as its heat, while the weather stations (below) permit homeowners centralized control of temperature conditions monitored according to outdoor weather; outdoor temperatures from minus 40 to plus 130°F are indicated on the panel and automatic change-over from heating to air-conditioning is possible; temperature increases and set-backs can be fixed by the electric clock included in the panel. The weather station also keeps a constant check on the operation of either the air-conditioner or the heater. Warnings are flashed by signal lights if the filter is clogged, the oil burner fails to ignite, etc.

New Weather Station gives homeowner complete control over home temperature environment. Station indicates indoor temperature and humidity, outdoor temperature, and other variables. (Minneapolis-Honeywell, designed by Henry Dreyfuss.)



Cafeteria aid and light control

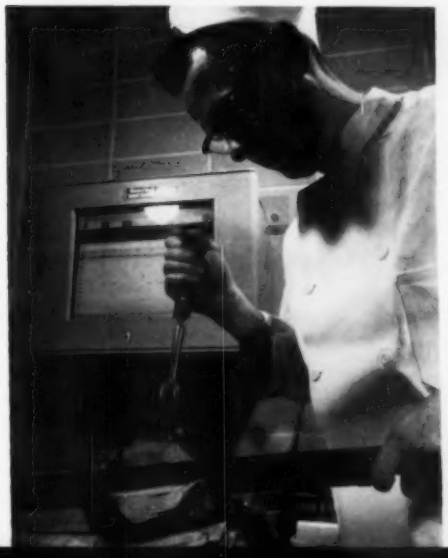
The ability of two joined dissimilar metals to sense a change in temperature is put to use in a cooking control system developed by Minneapolis-Honeywell (one of the largest companies in the field of temperature controls) for the cafeteria at the University of Wisconsin's Memorial Union. In the picture below (extreme right) a roast beef is cooked to exactly desired quality by pre-setting the corresponding temperature on a millivoltmeter mounted on a control panel near the oven, and by inserting into the meat a thermocouple device (the temperature probe) connected to the meter. When the pre-set temperature level is reached and the measurement and comparison readings coincide, an alarm is sounded and the roast is removed from the oven. The amount of meat saved as a result of reduction in shrinkage can be considerable.

Light is another variable that can be controlled by a system

Automatic light control system includes a thermostat-like device which is set for amount of light desired. Control system measures amount of daylight entering room and dims or brightens artificial lights. (The Superior Electric Company.)

This Climate Center, like the control station at left, monitors outdoor weather, indoor conditions, has an electric timer for automatic temperature adjustments, etc. (Carrier Corporation, designed by Raymond Loewy & Associates.)

Sensing head at center of top burner keeps flame height and temperature at pre-fixed levels. (Robertshaw-Fulton Controls Co.)



Instrumentation is employed to control meat temperature in cafeterias, hospitals, etc. Cooking control cuts down waste due to overcooking. (Minneapolis-Honeywell.)

The ability of systems to regulate themselves allows central supervision in offices and hotels

of inter-related devices. In the schoolroom (preceding page) a meter mounted on the wall is set like a thermostat at a specific light level. A photo-electric scanner in the ceiling measures the amount of daylight entering the room, which is recorded on the wall meter; depending on the reading, the system's nerve center then dims or brightens the room's artificial illumination and the total light is thereby kept at the pre-set level.

Centralized control of large buildings

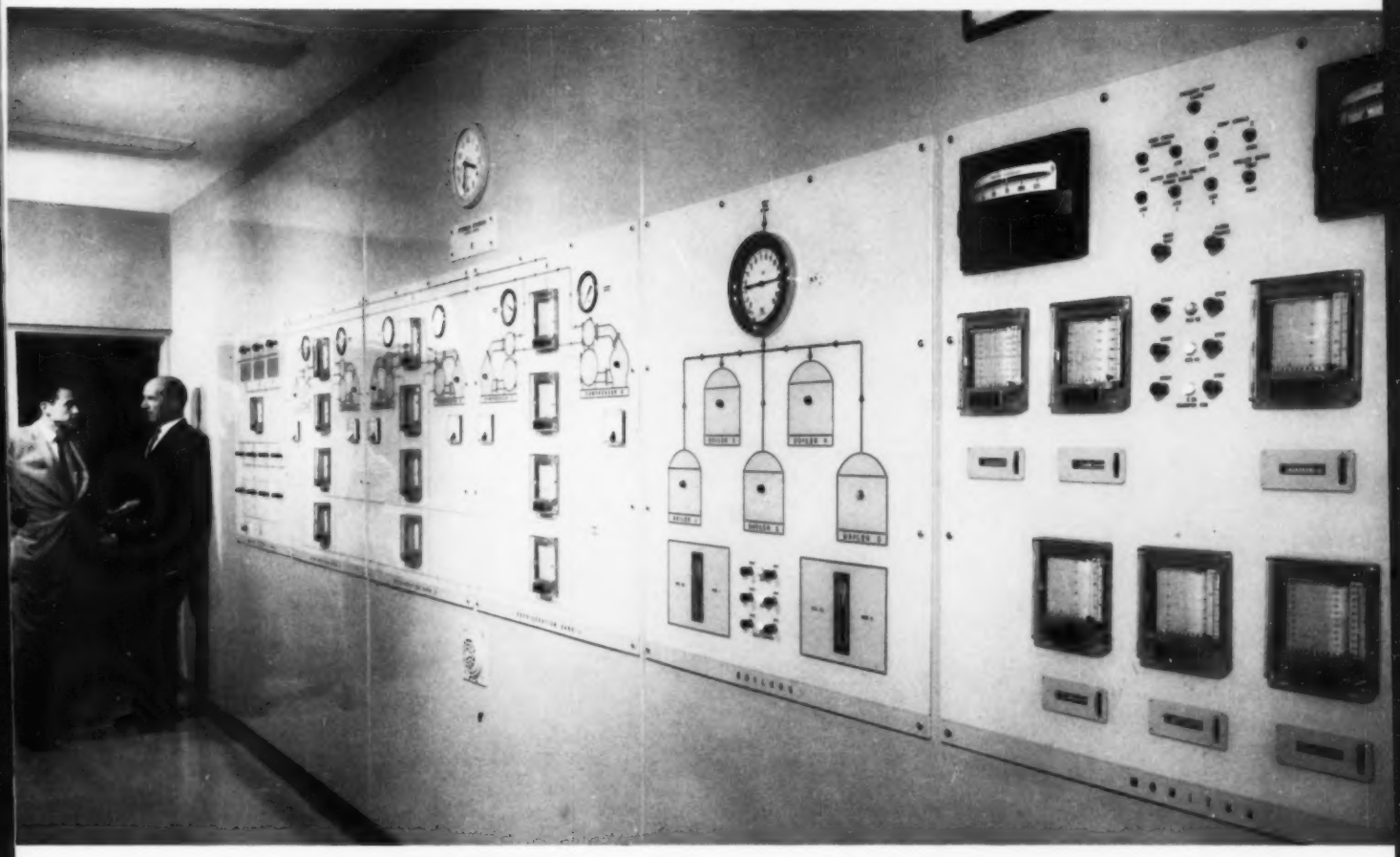
The environment control of rooms and floors of whole buildings are also being incorporated into elaborate systems all tied together at a single nerve center. One operator can, with little effort, keep a self-regulating process going. Boiler rooms, central air-conditioning installations, exhaust pressures, etc., do, of course, need supervision, and these are all looked after by a single person at one station. The large picture (top, next page) shows a section of a control board from which the entire environment control in twenty areas of a 42-story building can be checked and adjusted. The board shows flow charts for water systems, area indications for fans and circulating pumps, boiler locations, etc. all designed to keep the climate in hundreds of rooms at a desired level at all times. Pushbuttons and indicating lights enable constant adjustment of environments whose values are determined by, and adjusted to, the outside temperature and humidity, also measured on the panel.

The establishment of such a center is generally the result of coordinated effort by architect and engineer. Knob locations, scales, color-schemes, height of meters and other human engineering factors as well as the total layout and design of the supervisory center is often handled in consultation with an industrial design team. In the case of Minneapolis-Honeywell, Henry Dreyfuss designers who work with ten different divisions of the company, make periodic trips to Honeywell's Panel Board plant in Minneapolis for design consultation on work in progress.

So far the single control station for room environments is used mostly in newly constructed office buildings and hotels. The new Chase Manhattan Building (a 60-story tower now under construction in downtown Manhattan) will use twenty miles of electric wiring and 52 miles of pneumatic tubing to relay information from about 3000 thermostats to the supervisory panels, which will be linked with valves and sensing devices at thousands of key points. For control of such complex situations as this, a central control station is obviously desirable as well as economical. And it is a safe assumption that large apartment buildings will in future follow the example of office buildings and will also control room climates from a single board. The panels that are the background of the operator's station are, of course, part of the total building design. The station design — panels and console — will be the result of a strongly coordinated effort among engineers, architects and industrial designers.

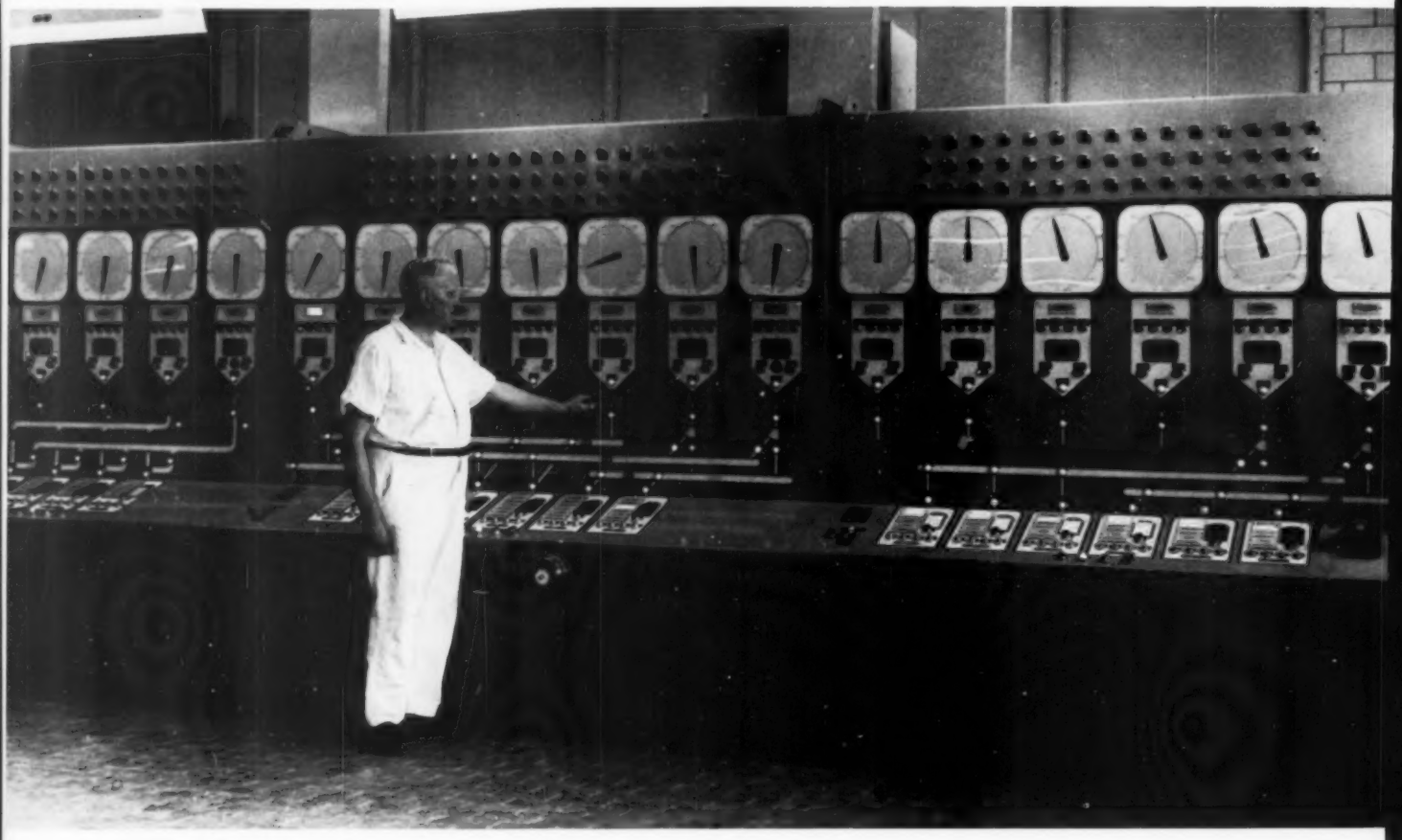
Pneumatic tube transmission is being adapted to automatic operation by combining it with modern control devices. All inter-office communication at Standard-Vacuum Oil Co. in White Plains (N. Y.) is taken care of by automatic tube carriers (right). Movement is recorded by lights on control panel. (System by Airmatic Systems Corp.).

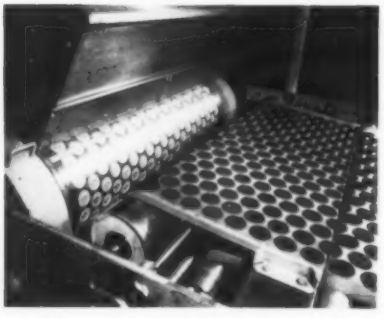
Comfort in a 42-story building, The Southland Center in Dallas, is taken care of by self-regulating systems which all originate in and return to central supervisory DataCenter (by Minneapolis-Honeywell). Center also supplies steam and chilled water to adjacent Sheraton-Dallas Hotel. Amount supplied is checked (at left) on chart of recorder which keeps permanent record of supply.



Automatic control devices are used in message transfer system at the Sheraton-Dallas Hotel in Dallas. A green light inside the room informs guests of messages received at the front desk. Switches on 12-foot long panel control transmission of incoming messages (Minneapolis-Honeywell Regulator Company).

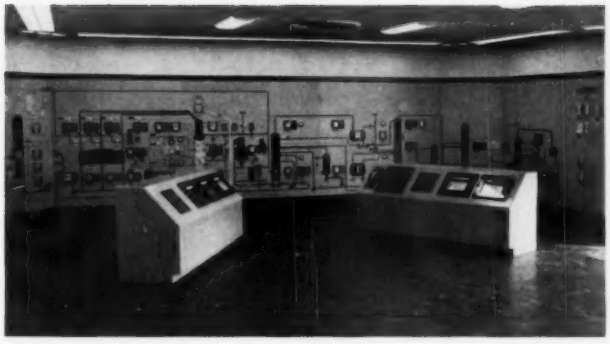
Large-scale processes, atomic reactor control, missile guidance depend on self-regulating loop.



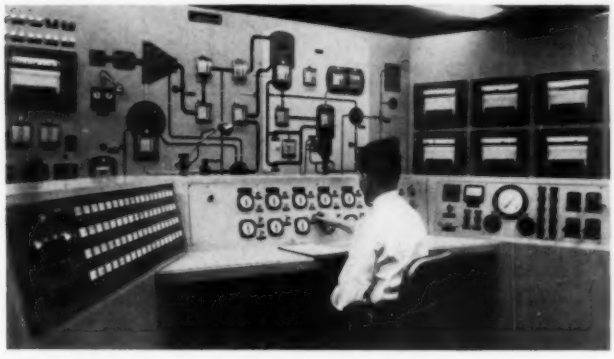


At Nabisco's new plant in Fair Lawn, N. J. all mixing operations are directed from this master console pre-set to deliver the required ingredients for numerous recipes. Nearly half a million cookies an hour are shaped by machine (left) before moving belt takes them into oven.

The ingredients of a manufacturing control process (the quantitative and qualitative values) can be pre-set by a variety of control types. This new Batchplug system (by The Howe Scale Company) provides pre-set control as well as quick changing of ingredient formulas.



Refineries everywhere are controlled from central systems such as the installation at the Pointe au Tremble, Montreal, refinery of Canadian Petrofina Ltd. Data is read on multipoint recorders in the foreground. Process flow is indicated on panel in the back. System is controlled electronically, transducers are employed to convert force into dc signal. (Manning, Maxwell & Moore, Inc.)



Atomic reactor operation is supervised by instrumentation system which indicates and records every step of the reactor process. The system shown here was designed for reactor at Fort Belvoir, Va. (Minneapolis-Honeywell's Brown Instrument Division.)

Missiles, inertial guidance systems, space platforms could not be planned were it not for gyroscopes and other sensing elements. This reference unit, or "inertial stable table" helps guide the USAF's supersonic B-58 Hustler. (Reference unit by Sperry Gyroscope Company.)

Complicated as they are, central controls for weather and light in homes and office buildings seem simple when compared with the network of sensing, measuring, and recording devices which check and regulate the complex processes of manufacturing plants, chemical refineries, atomic operations, and missile guidance systems. In industry the variables can include any or all of such conditions as temperature, viscosity, flow, or pressure. Hundreds of controllers, valves, meters and recorders transmit the operational status of machines, assembly lines, and miles of pipe and wire to a central master control which in effect supervises an entire complex of buildings and equipment as though they were a single machine. In the recently opened biscuit and cracker bakery of National Biscuit Company at Fair Lawn, New Jersey, the mixing operations are handled from a single control panel (opposite page) where the process is set up and supervised. Since each output type (cracker or cookie) has its own baking formula, the system's actuator and control elements are used in such a way that the console is able to direct delivery of each ingredient to any one of the plant's 16 mixing machines. The other steps in the baking process (blending the dough, cutting it into shapes, baking and packing) are also handled by industrial controls.

A change in variable is always picked up by the appropriate sensing element, but is not always recorded in the units of energy at which it is received. Speedier and more accurate recording of a variable — in oil refineries and chemical industries distances of up to about thirty miles are possible between the process and the control room — has often been achieved by transforming a variable into electrical or electronic measuring units by means of transducers. Electronic process control has the obvious advantage of being more readily tied in with a computer in applications in which total supervision by this most accurate and speediest of "process integrators" is economical. (Many control systems in the chemical process industries are so equipped but these are not taken up here, as the use of computers in processing is a vast topic in itself). But whether or not this most advanced method is used, whether a system transmits the status of its variables by electronic or pneumatic means, nearly all petroleum refineries and most large-scale chemical processing operations in this country are handled by self-regulated systems. The crude chemical feeds in at one end of a plant, flows through a complex of pipes and chambers, and pours out a variety of finished products at the other end. The exact process of energy distribution and refinement could not be achieved without a plant's own sensing and nerve system. Human ingenuity has made it workable, but the operation by humans of a comparably vast network of controls would not be possible. Automatic control systems are capable of carrying out the subtleties of man's mind beyond the potential of his own physical power. Therein surely lies the significance of the "soulless" plant and the objects in space that seemingly operate by themselves: man has found ways to turn his imaginative powers to a type of work which he is not capable of doing himself.

GALLERY 1

William T. Snaith

The man who runs Raymond Loewy Associates has stretched the meaning of "industrial design" to make it as varied as his own personal interests.

by Gregory Dunne

Propped on a table in the office of Raymond Loewy Associates' managing partner, William Theodore Snaith, is an oblong card bearing a legend from one of Martin Luther's Table Talks: "Even if I knew that tomorrow the world would come to an end, I would still plant my apple tree today." Snaith, a tanned articulate, and vigorously confident man a step into his fifties, has such an orchard of interests that in the melancholy event of Luther's supposition coming to pass, he would be hard put to select only one for final cultivation. Hung on his walls are a half dozen abstract seascapes signed simply "Snaith," a score of photographs of his famed 48-foot yawl *Figaro III*, and sketches of packages and products, department store interiors and cultural centers, delivery trucks and steamships. All embody the many-faceted man who directs the vast complex of Raymond Loewy Associates, to laymen, the best known design office in the U.S., and to professionals, the most respected, if most exasperating, rival. Yet managing partner Snaith is not satisfied with the vicarious rewards of fame and grudging respect; it is his professional ambition to double RLA's estimated billing of more than $3 million—already the largest in the field—by expanding its smoothly functioning divisions into even more diverse areas of professional service.

It is easy to confuse Snaith with the organization he runs, and Snaith himself is not averse to this juxtaposition of personality and organization. This confusion, moreover, is not wholly inaccurate. His is the first case of a minority partner's managing a design firm that does not include him in the firm name. Yet he does not choose to be governed by the legend of Raymond Loewy with its chapters on lipsticks and locomotives. He is an architect, interior designer, and marketing strategist, and in the areas of his special competence he has created an impression as indelible as Loewy's in product styling. "Industrial design," Snaith says," is only a handle so that our clients can call us something." He prefers the more nebulous term "service organization," and has evolved a total design service that enables RLA to guide an idea from conception to consumption. Snaith's concept of design has startled his more conservative rivals who insist that a major obligation of a design office is concentration on design itself for maximum efficiency. "It's sad in a way," says one, "that one of the most likeable and efficient men in the world becomes the head of the country's largest design office without being a product designer. He'll never be able to pull it off." Such comment, ironic in view of RLA's continued robust health, is not uncommon, because as in any enterprise it is the fashion to knock the man on top and even to disparage his success by asking whether it will work. But

Portrait photo: Mei Lou Foo

with characteristic confidence, Snaith has refused to relate the direction of RLA to other design offices. "We've always led the way," he says, "we've never followed." The implication that RLA is still in the vanguard is only too clear.

The non-hobbyist

Snaith is fond of saying that the designer is "the twentieth century's Renaissance man, the only professional who had indicated either the willingness or ability to tackle a modern problem in a modern way." The Renaissance allusion is one that is particularly suited to him. RLA's variety of services is perhaps a professional manifestation of the personality of its complex managing partner. Snaith is a painter, yachtsman, librettist, set and costume designer, writer, and avowed egghead. "He's an intellectual name dropper," one acquaintance has said. "Talking with him is like reading a primer on philosophy." His conversation is replete with references to Kierkegaard, Aquinas, and Buber, but he often deprecates his own scholarliness by adding as an afterthought, "That's my quote for the week." He does point out, however, that he possesses "none of the educational status symbols—bachelor's, master's, or doctor's," and this perhaps underlines his sense of philosophical accomplishment. Clients who have been subject to his torrent of ideas tend to agree with the one who said, "Like all talented men, he is impossible to work with. But that's a small price to pay for getting the best man in the field." Snaith dismisses criticism of his intellectual discourses to clients by saying: "If they talk about country clubs, I listen. When I talk, they listen."

As a painter, Snaith has shown four times in New York, and in 1949 and 1950 was selected for the annual show at the Whitney Museum of American Art. Critics have respectfully reviewed his work with such terms as "irridescent poetic study" and "distinguished by imaginative use of color and texture." Every Saturday and Sunday during the fall and winter months he is at work in his studio. His output is staggering; "The one immodest statement that I can make," he says, "is that I have a great deal of discipline." He is not an inspirational painter, but forces himself on the canvas until something comes out. "The trouble with a picture," he declares, "is that you can only have small victories. You begin with a big concept, but then it starts to devolve into technical minutiae." On one point, Snaith is vigorously outspoken. He wants to be judged as a painter, not as a designer who paints, and would rather be rejected as the former than accepted as the latter.

The sea is a dominant theme in one period of Snaith's paintings, reflecting his intense interest in all things nautical. Since 1945, he has owned four racing yawls, the first named *Cleody-Skipper* after his two oldest sons, the last three *Figaro* "because I couldn't see naming a boat *Cleody-Skipper-Jocko*" (his youngest son). He has sailed in four Bermuda races, and in 1956 finished first in his class, second overall, and won the Sir Thomas Lipton Trophy. In 1957, he won the plaudits of the Duke Edinburgh for his showing at the Cowes Regatta. During the course of his first Bermuda race in 1952, Snaith and his crew filmed the five-day sail,

Credit: Ann Rosener-Pix

Snaith, Loewy, and Barnhart plan new bus.

Poster for show and "Sage of Route 66."

Snaith's house overlooks 79 bucolic acres

FIGARO III under full sail at Cowes.

and with the help of a United Coast Guard band, a professional scripter and an actor, scored, wrote, and narrated a fifty-minute feature, "Figaro and the Sea," that has since been shown in yachting circles all over the country.

Snaith does not regard his extra-professional pursuit of the arts and sailing as hobbies. "I don't do things as hobbies. I have certain esthetic drives to which I devote my time not as avocations but because they mean a great deal to me. For example, I am now writing on the philosophy of art because by doing so, I can clarify my own esthetic position." He is also writing the libretto of an opera based on Aeschylus's *Oresteia* with his brother-in-law, composer John Colman. But Snaith denies that he must compartmentalize his seemingly conflicting business and artistic interests. "Everything is part of the whole," he says. "I've found that I don't have to work on schedule, that I can put something down and return to it without feeling frustrated. In an age of specialization," he adds, "I'm no specialist."

Onward and upward

Snaith was born 51 years ago in Brooklyn wnere he skirted convention through much of his youth. "I wasn't the model young man that I demand of my sons," he remembers, "but my delinquencies hurt not society but me." He played hooky, quit school, and finally because he was "an athlete looking for muscle work" began to haul paper for a lithographer. His work got him interested in lithographic art, and he returned to school at night to acquire enough credits to enter New York University. At night school he was exposed to architecture for the first time, gave up his $75-a-week job with the lithographer, and went to work as an office boy for an architect. By this time, Snaith had entered NYU, which had a special program permitting students who were not high school graduates to study there while the university helped them secure a high school diploma. One of his teachers was an architect named Lloyd Morgan whom Snaith says he owes more to as a directive force than any other man in his life. Morgan sent him to Paris with a letter of introduction to another architect who was trying to win a Grand Prix de Rome. Snaith apprenticed in Paris for four months and returned to this country badly bitten by the French architectural tradition. Morgan again took him under his wing; under his guidance, Snaith won a Whitney Warren Scholarship and returned to France to study at the Ecole des Beaux Arts at Fontainebleau.

But once he got back to Paris, Snaith made a great discovery. "French architectural training had nothing to offer me. It was a great big bust, like finding out that the Holy Grail was dross." Limping by in great poverty, he had begun to paint, and in the student tradition wandered around the countryside with a knapsack on his back sketching landscapes. The depression, however, defeated his efforts to stay in Europe, and finally, broke, he came back to the U. S. steerage after first going through the delousing station at Cherbourg. "It was," he states with distaste, "the most degrading experience in my life."

Back home, Snaith worked around as a journeyman architectural draftsman until a friend got him a job with Elsie de Wolfe (Lady Mendl) as a designer of commercial interiors. Lady Mendl's name was a magic wand that unlocked the gilded doors of business and the theatre. As a youth, Snaith had designed sets and costumes for the Provincetown Playhouse in Greenwich Village, where such problems as making nine sets for $25 had severely taxed his ingenuity. He was thus surprised and gratified when Gilbert Miller asked him to do the sets for his production of *Ode to Liberty* starring Ina Claire. The show failed, but New York *Times* critic Brooks Atkinson paid special note to the lavish bounty of roses that the set designer had placed on his stage. "Ina couldn't remember her lines," Snaith explains today, "and there was no place to put a prompter. So I bought a huge table, put it in center stage, covered it with a silver lamé table cloth, and stuck the prompter underneath. But the damned table looked so bare that I went out and bought dozens of roses and placed them all over it."

During this period, Snaith also did the sets and costumes for Hanya Holm's ballet *Eumenides*, and worked with composer Harold Rome and producer Harold Hecht on camp shows for the Borscht Circuit. In 1936, he was offered a job with Raymond Loewy. The original agreement was for Snaith to work three days a week with Loewy, and spend four on his own painting. But when the demands of the job became excessive, he pledged himself completely to the Loewy office.

While visiting a friend at Yale in the late thirties, Snaith met Elizabeth Colman, a slight, retiring, Vienna-trained ballet dancer, who was at the time working as secretary to a professor. He married her in 1938. They live with their three sons on a 79-acre farm in Wilton, Connecticut that has been acidly described as "status-seeking Grant Wood." Snaith has added two wings to the old farm house and filled its rooms with his paintings and mementos of the sea—figureheads, trophies, and photographs. A few steps from the main house is the studio where he spends the bulk of his free time. The isolation, the combining of the old and the new, the informality, and the studio leave the impression that the owner of this new/old farm is convinced that he has met the world on his terms and is holding his own.

The organization man

There is still considerable debate, however, about the terms that Snaith has attached to design. A department head has defined the present position of Raymond Loewy Associates by saying that "our business has shifted from a prime orientation in esthetics to a prime orientation in marketing." For some time designers have said that since many competitive goods were the same in quality, appearance and package design actually sell them. RLA takes this hypothesis one step further, contending that manufacturers are now so much aware of styling that goods not only *are* alike, they *look* alike. With the area of intuitional design so sharply restricted, Snaith believes that it behooves the design office to place as much emphasis on the marketing questions of why, how, and where a product is sold as on the actual styling problem.

According to Snaith, design is at the core of the whole problem of American marketing because all the factors involved in the ultimate sale of a product grow from a consideration of the product itself. For example, store planning is not industrial design, but since every item of consumer goods is sold through a store, it *becomes* a design problem, bringing the designer into the distribution complex. The Loewy attitude toward design argues that after the tools of modern management have been forged and used, somebody creative still has to decide what color, what shape, what size, what direction. At RLA, the marketing department is the starting point of the whole design process as well as being an autonomous division that handles individual assignments. Currently Snaith is overseeing a study for the Super Market Institute to suggest the best ways to house, display, and sell perishable foods and non-foods for maximum profitability. For this job the Loewy office is receiving a six-figure fee comparable to any received for a full product design project. But it also anticipates additional dividends in contracts to design individual markets as well as the products sold therein on the basis of its comprehensive knowledge of the supermarket outlet. This anticipation is based on the fact that Super Market Institute studies are directly comparable to some wartime studies Snaith did for the Associated Merchandising Corporation—and these resulted in jobs that were the basis for Loewy's store design department. The results of a marketing survey that is sold to an area of business, therefore, can be channeled to the various creative departments for specific design projects.

Snaith describes RLA as "a large organization serving large organizations." He foresees industry consolidating its external services into one agency, which makes it incumbent on the design office to offer a total, integrated service. Because of the structure of the major corporations in this country, there is less room for personality in a consultant office than in the past, and a pressing need for business organization. "Nobody will ever displace genius," he states. "But business today is run by professional managers responsible to stockholders. Therefore the service organization must be set up to meet the problems of the industrial organization." He feels that the horizontal expansion of RLA's services relates to the increasingly widening scope that he predicts for the whole design profession. The recommendations supplied by the total marketing service to the four design departments—product, packaging and graphics, transportation, and retail planning — far from reducing their functions, strengthens them by placing them in the most favorable situation to operate efficiently. As Raymond Loewy says, "There is no mechanical process through which the successful solution to a design problem can be arrived at automatically. Unavoidably, the most precise set of marketing recommendations is bound to reach the stage where interpretation at the human level is required. This is the moment at which the designer's flair and intuition are invaluable assets."

Former Loewy designers, however, are amused at Snaith's insistence on depersonalization. "Bill can talk organization until he's blue in the face," one says, "but he's every bit the prima donna that Loewy is. He used to come storming through the office cracking a bull whip and shouting 'What we need around here is someone like Lem Ayres' " [the late theatrical designer famed for his lavish thinking]. Another says that "actually he's the most emotional and intuitive designer around. Every time he makes a mistake, he can cover it up with blinding footwork and make the client think that the world is out of step, not him."

Prejudice and pride

There are still more profound reservations about Snaith's modus operandi. Several designers have wondered whether such emphasis on marketing will soon cause the tail to be wagging the dog—or even whether the tail and the dog will exchange places. They say that it takes a great deal of design activity to equal the billing of a single major survey, (which is billed separately by Raymond Loewy Corporation, RLA's wholly owned subsidiary that incorporates all the peripheral services apart from design). Futhermore, many marketing studies for an area of business (rather than for a specific client) become public domain, and offices competing for design projects have access to the results in making their presentations. Rivals forecast that this competition will bite into RLA's design activity and make the office top-heavy in marketing to the detriment of design. Also, while they acknowledge that total service broadens and enriches the Loewy office, they add somewhat primly that "gross billings are not the sole criterion of professional competence." Will Snaith, they ask, take on clients who cannot afford, or who are unwilling to contract for, total service?

Such interest in the Loewy organization is not unusual. "RLA is like an ex-wife," one ex-Loewy-ite mused recently. "You don't love her any more, but you always want to know what she is doing." Unfortunately, ex-spouses are apt to be hyper-critical and this is true of many of those who have left Loewy, who complain that the total service concept—if it is workable—will lead to dilettantism and an overall dilution of design efficiency. Snaith is stung by this criticism. "Anyone who doesn't offer as many services as we do," he replies, "is flying on one wing." Three years ago, speaking before the annual meeting of the ASID at Lake Placid, he said that industrial design is a profession with so large a scope "that it gives a specialist's attention to all areas of a problem and not to a particular corner where [it] might become overly impressed with a particular point of view or esthetic." He also denies that total service limits RLA to large clients. "It enlivens an office like ours to take on individual product or package problems because it offers the opportunity to become more adventurous than one can be with the big boys." He adds, however, the qualification that "if a client can afford to pay for design, he should be able to pay for research." Snaith also defends his practice of designing from his own market research with the argument that a manufacturer's internal research and design department is dominated by the opinion of management. "That kind of design is incestuous. No client owns our opinion, which enables us to say with perfect equanimity, 'Gentlemen, you are not wearing any clothes'."

If Snaith is to beef RLA up to the $7 million level, he must be able to attract additional first-rate, high-priced

talent into the office. There are two other active partners at RLA—the founder, who spends much of his time at his Paris office, and A. Baker Barnhart who, in addition to management planning, administers the packaging, products, graphics, and transportation divisions. Two other former partners, Carl Otto and John Breen have left the organization (in 1949 and 1958, respectively). In the 14 years since the partnership was formed, Snaith admits that no one else has seriously been considered as a partnership prospect. This has been—and continues to be—a bone of contention among the large Loewy alumni association. Many have said that as long as the door is closed at the partnership level, RLA will not be able to find enough top flight personnel to make its planned expansion a success. One ex-member of the club scolds, "If you are going to be in the design business, you can't be General Motors at the same time." Another, looking on from his own successful office, declares that "Bill has all the ideas, all the intuition—you can almost hear his mind click, but he's the only one over there who can put his plans into action. Loewy has never had any long-term planning about people. They use the technique of tumult. So people get fed up and quit." Product designers especially have seen RLA as a dead end street. It is their feeling that design has been lost in the shuffle of total service and that the gradual withdrawal of Loewy himself has left the office without a product design spokesman. Snaith's interests, they say, do not gravitate toward product work though he claims to be as knowing as anyone about the total aspects of a product problem. Recently, however, he offered a former staffer a job as the head of the product department. After turning it down, the designer reported: "That's how they think over there. People are replaceable. All the lost souls are off on a sabbatical, but they'll be back in time."

Rebuttal

Snaith disputes the claim that RLA is cutting its own throat with a shortsighted personnel policy. "Everyone remembers those who have left," he says. "There's no news in staying." He states that RLA is still a personally run business with the founder and most of the sub-founders still active. Losing personnel is merely a plague of the profession. But he adds, "We are the greatest training ground in the business. We have also been great pickers. But a partnership, if it were offered, just won't satisfy some people. They have to go off on their own. Some people think that everyone who leaves here is a big success. But there have been just as many dreary failures as there have been successes." He is backed up by one former employee who says, "No one has ever collapsed RLA by quitting, and no one ever will. They'll always find top talent, even though they might be coming and going through a revolving door." But if Snaith is to succeed in building RLA to three times its present size, he must not only find good people, but give them an incentive to stay. He is well aware of this. "If we are going to maintain the skill and knowledge of our people, we have to grow. You can't freeze a man; you have to reward him. And you can only reward him if you keep on growing." In this regard, the establishment of Raymond Loewy Corporation enables the

partners to grant titular recognition to selected employees with the award of vice-presidencies.

Inherent in the criticism of the Loewy office, however, is great respect for Snaith's ability as a designer, planner, and total service coordinator. "Bill makes the whole thing tick," says one admirer. "You can beef about what RLA is doing, but objections become academic because he's making it work." Another says that Snaith runs RLA "like a nutty artist, but he's the only truly creative guy I've met in this profession." Although within the Loewy office, the official word is depersonalization, several ranking employees admit privately that Snaith is the only man in the firm able to strike the delicate balance between all the services. Since this balance must be kept if RLA is to expand in the manner indicated, the program depends on Snaith.

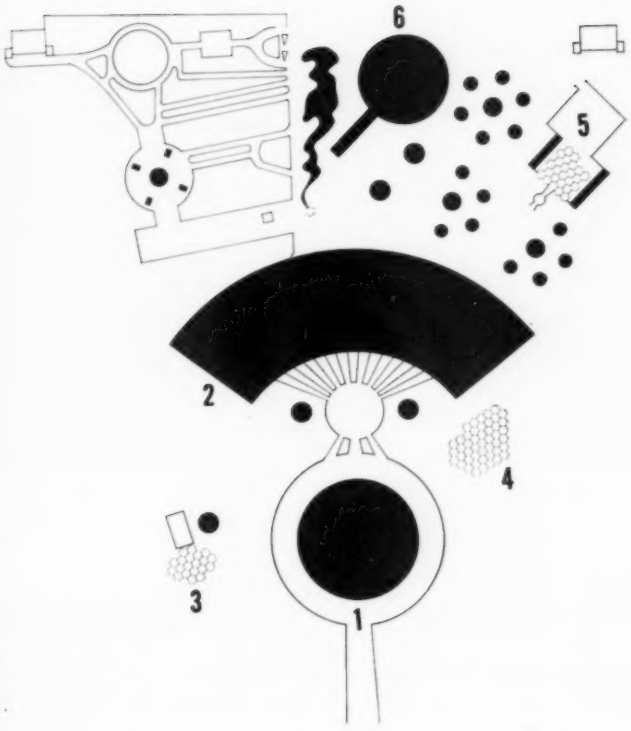
It is incongruous that so much dependence is placed on a man wrestling with so many varied outside interests. There is, of course, a basic ego drive for Snaith to draw out of the shadow of Raymond Loewy and to gather on his own merits the substantial fruits of success. "I don't care what the firm name is," Snaith says acknowledging the continued potency of Loewy's name as a lure for clients. "In the frame of this business I am well known, and unquestionably I'll get part of the credit for the growth of the organization. Whether or not my name is on the marquee makes no difference, because there are too many other places where I do want my name —at the bottom of a picture, for instance." Does Snaith think that the pressing responsibility of managing RLA will thwart his intellectual and esthetic ambitions? He does not. He recalls going to the Brussels Fair in the summer of 1958, "feeling 50 and depressed," and wondering if he could do all that he wanted to do with his life. At the German pavilion, he saw Martin Luther's confident challenge to the future. "I knew then," says Bill Snaith, "that I could still plant my trees and pick the apples that I wanted to pick."

Left: Exhibition entrance, visible for half a mile down the central mall of Sokolniki Park, was dominated by gold-anodized dome. Right: Shell-supporting truss of dome was left uncovered as strong decorative element. Photos and text about prominent Americans hung on dome walls. Above: Plastic umbrellas protected the fashion show, the Family of Man photographic exhibit and architecture display. Below: the glass pavilion at night.

All photos, unless otherwise credited, Hollister Nelson

AMERICAN EXHIBIT COMBINES SOFT SELL WITH HARD FACTS

by Irma Weinig



1. *Dome*
2. *Glass Pavilion*
3. *Fashion Show*
4. *Family of Man*
5. *Architecture*
6. *Circarama*

By night or day, the American National Exhibition in Moscow was a spot of brilliant color, sparkling lights and great fun in an enormous, drab city. While the Russians put their emphasis on *science and technology*—two key phrases in the cultural exchange agreement which provided the basis for the two exhibits—we preferred to dwell on how Americans live . . . in private houses, with cars, with an abundant choice of consumer products, with a press, free of government control, that produces a great variety of newspapers, magazines and books, with uncontrolled art that results in many ways of painting.

The picture of America was unfolded much like a drama with the geodesic dome as Act I, the glass pavilion as Act II. The dome has been characterized by George Nelson, whose staff designed the exhibition, as an information box. It was designed to answer immediately the questions which Soviets brought with them (and they were many), and to begin the process of pursuading them that this was an honest portrayal.

The media of communication were three: the IBM RAMAC; a film using seven simultaneous images; and graphic exhibits on education, labor, basic research, plastics, agriculture, public health, and space exploration. The film functioned as a visual reiteration of the facts and figures programmed into the RAMAC. Made by Charles and Rae Eames, with special music by Elmer Bernstein, the movie traced a working and a leisure day in all parts of America. Mindful of Pravda's earlier challenging of the validity of the worker's home on display, and the general Soviet belief that consumer products in America are only for the rich, Eames showed housing developments, cars and superhighways, the common use of appliances.

The graphic exhibits devoted to labor, education and public health explained how labor unions function to protect workers, how our educational facilities have grown to meet needs of a growing population, and how our public health program works. These were crucial facts for Russians who might be persuaded that capitalism leads to more and better goods, but who always countered with the facts that they were guaranteed a free education and free medical care.

Act II, the glass pavilion, displayed the fruits of Americans' labors — toys, sports equipment, major appliances, hi fi equipment, tv sets, clothing and textiles, cameras — not war weapons, sputniks, or heavy machinery. The products were chosen to demonstrate quality, finish and ingenuity, the range in size for different needs and the abundance which gives the consumer such a wide choice. Here were also displayed books, newspapers, and art, the variety of which also attested to abundance under free enterprise. To Russians who parroted Pravda's cry "Where are the machines and techniques for which the U. S. is famous?" the answer was "It is taken for granted that those machines and techniques are behind these products." The entire exhibit was directed to the average Russian, not the educated or technically trained, and aimed to put him squarely within the American scene.

Vast interior of dome was free of usual display items; graphic displays at periphery of dome left center free for peripatetic viewing.

A three-sided job: designing, coordinating, constructing

The exhibit presented not only a problem of communication through design, but of logistics and, in its last stages, of actual construction in a nation whose language and customs were alien and where it was impossible to buy such basic items as screws and nails in quantity.

Because of the severely limited budget and insufficient time, (ID, April) some stringent time and money savers were called for. We on the project staff designated the products to be displayed, but the manufacturers were approached by the procurement staff of the Office of International Trade Fairs, which asked not only that the goods be contributed but that the manufacturers cover the shipping charges both to Moscow and back. The only possibility of recouping part of this investment was the chance that the product would be sold in Moscow after the exhibit closed. The response to this government begging was overwhelming, and many large appliance manufacturers and automobile makers invested thousands of dollars. For the fashions and fabrics exhibit, an industry committee under Leonard Hankin of Bergdorf Goodman raised the money for the display in the glass pavilion and the fashion show outdoors.

To save time, all items were shipped directly to Moscow, and the designers did not see the actual products until they were on the spot. Since the manufacturers were contributing, they often preferred to send their newest and most impressive products rather than adhere to the requested list. Sometimes we were consulted about the changes, but the chain of information was long, and often we were not aware that changes had been made.

Ideally, of course, the objects ordered should have been seen by the designers, designed into the structure, then shipped as a complete module. The Soviets used this method for their New York exhibit and were able to send the whole exhibit on one ship and cut down their installation time to a minimum. We counted on two months of night-and-day work in Moscow for installation.

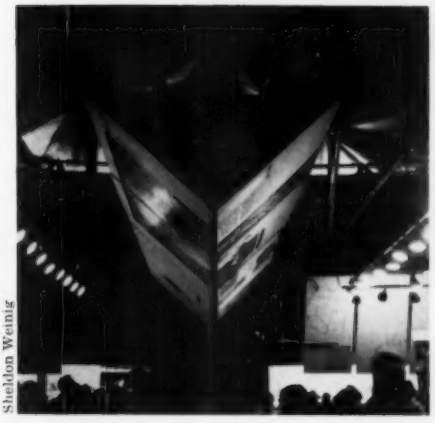
Graphics supply coordination

The design of some exhibits was in other hands: Blake & Neski designed the architecture show, Tom Lee, Ltd., the fashion and fabrics display. For industry exhibits, such as industrial and domestic sewing (Singer), color tv studio (RCA), travel (American Express), supermarket (Grand Union), the Nelson office provided text, and graphics, but left to the manufacturers the actual working out of alloted space.

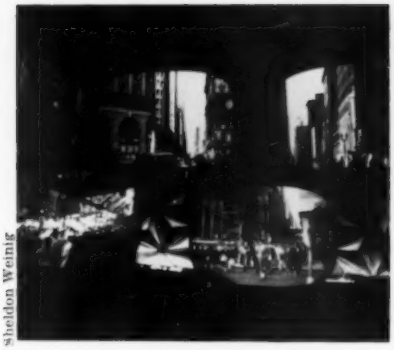
Text for signs in both the dome and glass pavilion was translated and set in type here, then sent to Germany for photostating or silk-screening. There were no photostating facilities in Moscow, and we relied on a neoprint set for making corrections and making new short signs. No text that ran into snags in this process could be corrected in Moscow.

A Finnish contractor was signed to construct the display panels, provide lumber, and other construction materials. He also provided a crew of Finnish carpenters, which were

THE INFORMATION BOX



Sheldon Weinig



Sheldon Weinig

Eames' movie was 12-minute presentation of color and black-and-white slides projected simultaneously on 7 screens. Pace of film (2000 slides in all) and music changes constantly to convey excitement and variety in America.

Struts projecting from dome wall supported graphic panels. Highest were slanted for better visibility. Y-shaped section marked division between different subjects.

Russians studied 4000 possible questions to put to the RAMAC. Operator fed question to machine. Answer appeared on one of two typewriters and was also flashed on a tv screen for all to see.

A BOUNTIFUL BAZAAR

Apartment for high-income family, as frankly stated in explanatory text along with figures on rent and upkeep, could be viewed at ground level and from second floor walkway. Russians fingered drapery and even made their way through to get closer to hi fi set.

Sheldon Welnig

sorely needed, for the Russians were unskilled workmen.

When the last of the design staff arrived in Moscow on June 23, the floors of both buildings were getting their finishing coat of cement, the plot plan had just been altered, the site was a mass of mud, and the consensus was that we were six weeks behind schedule. All our time-saving had been upset by the delays in construction.

The Nelson staff, 12 in number, designed many of the exhibits on the spot, and did the actual installation—hanging objects, texts and panels with the sometime help of the guides, and some U.S. Marines stationed at the Embassy. Charles and Rae Eames pitched in. This was practically a hand-made operation, with designers concerned with getting screwdrivers, bolts that fitted nuts, drills with the right voltage. "We needed", Nelson says, "thirty window dressers."

Help from individual exhibitors

What saved the day were the companies who sent their own men and tools to put up their exhibits. As soon as the floor was completed, RCA began work on the tv studio, asking no help of anyone. The Whirlpool Miracle Kitchen arrived in one van complete with aluminum ladders, (which we all soon borrowed), screw drivers of all sizes, etc. In the last weeks, many exhibits had to go up at the same time; it would have been an impossible job without this help. For future exhibits where time is short, it might be expedient to put more exhibit sections into the hands of individual manufacturers or industry committees.

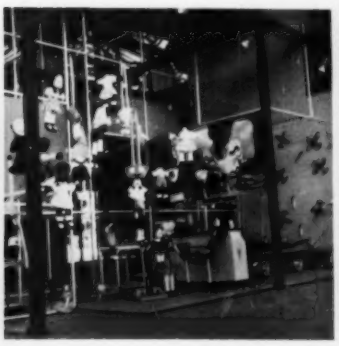
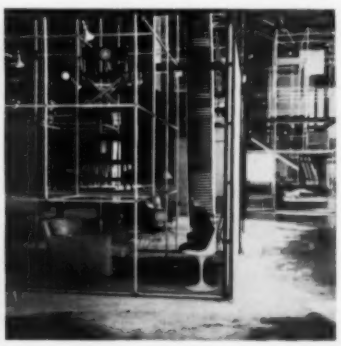
The exigencies of time and money made it difficult to maintain an even quality of design. In their zeal to show off their products, some manufacturers crowded their exhibit spaces. Other presentations were obviously designed independently and did not blend with the overall design and color scheme of the glass pavilion. To ride herd over the vast network of industrial contributors, outside designers, suppliers in Finland and Germany—and keep in touch with Washington, the Welton Becket office in California and the builder from Milan, Italy— was no easy matter. The Nelson office functioned as both coordinator and designer, either one of which was a full-time job.

But unevenness of design did not seem to bother the Russians. To them the exhibition was a carnival: the brightest, most colorful spot in Moscow. Usually deadly serious and law-abiding, living in a world of clearly marked "don'ts" and "don't touch's", they were free to follow their own bent at the exhibit. There were a thousand things to see, and no directions on what to do first. They dashed about, walking across grassy areas (in the city they not only would never do such a thing, but would make sure no one else did either), and—as might have been expected—touched whatever was not behind glass walls, plumping mattresses, sitting in chairs, hefting irons, opening refrigerators.

From outside, interior is colorful maze of structure, plexiglass panels, products and bright lights.

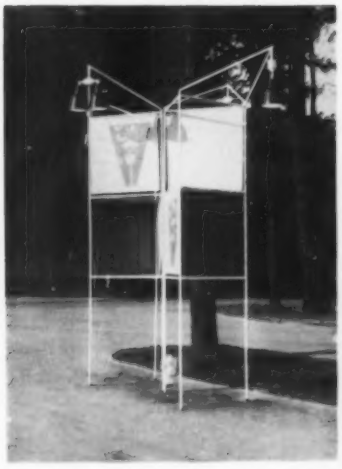
Open exhibition structure with objects gaily set out at hand's reach was invitation to Russians to touch. From left to right: kitchen utensils of numerous materials; refrigerators which must be opened to be appreciated; hanging stuffed dolls; stack of chairs stresses mass production and reveals wide color choice available.



Sheldon Weinig

Robert Lautman



Sign kiosks, modular units that could be expanded as needed, carried directions and text for outside exhibits.

Peter Blake

With photographs all taken from same one-point perspective, architecture exhibit gave Russians impression of being in the picture, surrounded by modern buildings. Stereo viewers (right) gave 3-D view.

THE SIDE SHOWS

General Motors

Russians were avid fans of American cars.

Colorful canvas tents, designed by the Nelson staff, are constructed on umbrella principle—central A-frame supports ribs which open like umbrella when raised to proper height. They covered displays of paperbacks and magazines (tacked on board) and beauty salon, among others.

Robert Lautman

Family of Man, only exhibit with international point of view, followed spiral path under plastic parasols.

American newspapers have pointed out that the exhibit had no unifying theme, and that a statement like "these are the products of competition to serve the needs and whims of consumers of goods and ideas" would have been appropriate. Max Frankel in the *New York Times* also asked for some explanation of private enterprise and the distribution network which makes these products available to the consumer. It is true that there was no discussion of our distribution system, but there was a statement on credit buying, reinforced by a mortgage plan for the model house, and a payment plan for buying a car, which is of more immediate interest to the Russian as a potential consumer. There were also discussions of competition and government regulation of competition which were unfortunately not ready on opening day, although they were hung later. But too great a stress on free enterprise and capitalism is an unprofitable business, as Mr. Nixon learned when he glibly introduced color tv to Mr. Khrushchev as one of the wonders of American industry. "We know about these things", said Khrushchev, "after all we are not still killing flies with our noses here."

"Where are the great painters?"

The Russians got their real taste of the fruits of freedom of expression in the art and sculpture exhibits. Reactions ranged from amusement to bewilderment, yet everyone with a camera was assiduously photographing every piece of sculpture. The Soviet citizen, brought up on a diet of Socialist realism, is unprepared for a work of art that is not photographic, that has no uplifting purpose, and that does not reflect government approval. Since there was no written explanation, they would corner any American around and begin questioning "Where are your great American painters?" In America there are many styles of painting and no one official school, we said, so there is no general agreement on what is best and who is greatest. This had to be repeated many times. One man asked if these pictures hung in the National Gallery, and was relieved to hear they did not. We hastened to explain that the National, despite its name, was not government-sponsored, but a private gallery based on the collections donated by wealthy capitalists.

The theme of the exhibit, not expressly stated but proclaimed by its very design, its free exit and entrance, its gaiety and variety, was the freedom of Americans to express their individuality, and to choose from an abundance of art styles, books, newspapers and consumer products.

If it was not the show of actual machines and technical processes which the Russians expected and wanted, it was perhaps something better, for it went beyond the machine to suggest the kind of life that an advanced technological society provides for its citizens. Someday Russia too may be less awed by the machine, more delighted by its product.

FASHIONS FOR SIX NEW BRANDS

This summer when the federal government first lifted its requirement that each cigarette package carry its famous old DeWitt Clinton tax stamp, tobacco companies — who still had the problem of sealing the packs—quickly had to invent their own stamps. New closures will likely be announced as soon as the machinery is developed.

All of the cigarette brands seen above are new this season, all have filters, all but one are mentholated, and all, of course, boast new package designs. Reason for the sudden appearance of six new brands is not hard to find. Though cigarette sales are running five per cent ahead of 1958, the U.S. cigarette industry is still worried that growing consumer concern over ill effects of smoking will create a drop in sales. Because they carry a vague connotation of medication and good health, the industry is counting on its new menthol brands to head off any sales loss.

Robert Louis Stevenson's famous admonition to "play the sedulous ape" has been picked up by designers of some of the new packages. In February of this year, INDUSTRIAL DESIGN described a growing trend toward similarity in cigarette package design, especially noticeable in the use of a red and white color scheme, identical front and back panels, strong geometric forms, and heraldic devices. Since then there has been at least one big change: "menthol blue" is blotting out cigarette red. Actually, the color on the menthol brands runs from sky blue to turquoise, but some shade of blue-green has been almost universally accepted as the means for designating a menthol brand.

Alpine, (by Philip Morris, makers of Parliament and Marlboro), was first on the market at the end of July. It "gives you in one cigarette what you previously had to smoke two cigarettes to get—" high filtration, menthol and high porosity paper. Like Marlboro, it uses a two-color format based on an inverted V shape. It is the first of two new packages using photographs, in this case a white Alpine mountain. Philip Morris retained Walter Landor and Associates of San Francisco as design consultants and to do final renderings for the new brand. The designers say that it was conceived "deliberately in an opposite direction from the current vogue in the cigarette field for semi-abstract

symbolism and often contrived-looking 'designiness'."

Brown and Williamson, whose Viceroy slumped 20 per cent in the first quarter of this year, will try to recapture some of their loss with Life, a non-mentholated product claiming "the world's finest filter." Its white and gold package, reminiscent of last year's striking Old Gold Straight package, features a new Brown and Williamson trade mark of gold tobacco leaves with the motto: Magna Vita Est. In an off-center position on the face of the package is a casual looking custom stamp device describing the featured filter. Brown and Williamson's second new brand, mentholated and filter tipped Belair, will aim especially at young smokers. A photo of blue sky and white clouds covers one half of the package while a stylized gold bird flys across the other half. Both packages were designed by Frank Gianninoto and Associates.

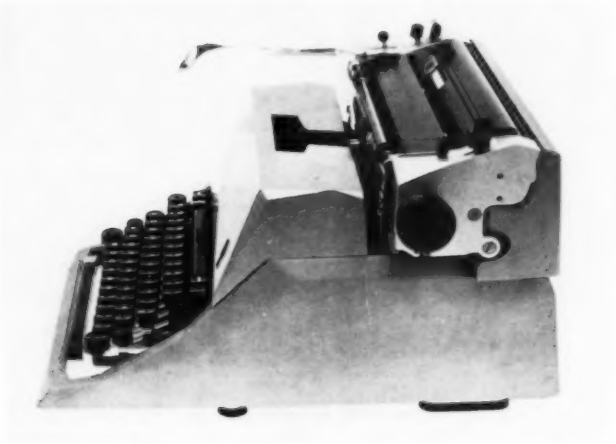
The American Tobacco Company's first mentholated cigarette, Riviera, has been packaged by Lippincott and Margulies, who also designed the company's Tareyton brand. Myron J. Helfgott, head of L and M's Package Research Institute says that designers tried to concentrate on the in-hand and personal aspects of the package because for the user it "is a statement of his taste and a reflection of all he wants the world to know of him."

Freshest design among the new packages is Spring, done by Jay Doblin, Leedia Vitale and Ray Grove for P. Lorillard, who also make Kent, Newport and Old Gold. Spring's full-page ads are designed to resemble news pages, but they make a surprisingly confused contrast with the simplicity and clarity of the package itself.

If most of these cigarettes and their packages are noticeably similar, Vanguard is not. In fact, since it's not made of tobacco but of "Fibrila, a blended formula of scientifically processed natural fibers," the tobacco industry would probably like to say that it isn't even a cigarette. And though it looks and feels like a cigarette, Vanguard warns users not to expect a tobacco smell. The new company's president, Gerald M. Schaflander, has selected H. W. Warden to handle advertising, and Edmond Scott designed the white, gold, and red package. Although law does not permit the word *cigarette* on the package, such characteristic cigarette pack motifs as a gold crown and a V have been used to give Vanguard a cigarette look. Mr. Scott says that gold foil, unusual in cigarette packaging, will suggest quality and attract attention to the new product.

A cigarette which plays on consumer health fears to promote smoking, Vanguard will sell the idea that now one can "smoke without fear." Its advertising backs up this slogan with the claim that Vanguard contains "no tobacco tars, no nicotine, and more important, no arsenic" (which, until now, most smokers didn't know was in regular cigarettes). But, as irked tobacco men have pointed out, this statement does not mean that Vanguards are free from other possibly dangerous tars. Because it is not actually made of tobacco, Vanguard's manufacturers, Bantob (contraction of ban and tobacco) Products, will offer retailers an especially attractive product. By selling Vanguard at regular prices, merchants will also collect the profit which normally goes for the heavy federal, state, and local tobacco taxes (increasing profit from about three to seven cents a pack).

Vanguard has already run into stiff opposition from the tobacco industry, and this may be just the beginning of its problems; Representative Watts of Kentucky has introduced a bill into Congress to tax cigarette substitutes just as though they were cigarettes. If this is successful, where it will put Vanguard, or, indeed, where Vanguard and the year's other new brands will place the cigarette industry will not be known until some of the smoke clears.—*A. F.*



ITALIAN MACHINES REPRESENT OPPOSING PHILOSOPHIES

by Romaldo Giurgola

According to Herbert Read, the intense preoccupation with tradition that one finds in design, and in architecture as well, reflects an attempt to reach back to the organic structure of an earlier society, with its emphasis on deep human dignity. Certainly any attempt to define "good design" or even "good product" must take some such consideration into account.

The "good product" is one whose maker has, by taking a definite interest in its nature, established a worthy constructive process. The "good product" represents a dignified human relationship; it stands for tradition as opposed to an eclectic whimsy; tradition as opposed to "design" that reveals—behind whatever facade of abstract "spirituality"—the alienation of a society that has itself been reduced to the role of a thing to be used.

The products shown here come from two companies with long-established traditions: the patriarchal Olivetti; and the Filotecnica Salmoiraghi, one of the oldest European manufacturers of precision instruments. Olivetti has just introduced the 82 Diaspron, a typewriter designed by Marcello Nizzoli, along new planes which seek to combine "formal elegance and mechanical perfection." Filotecnica Salmoiraghi is marketing four new sewing machines.

In our opinion the products represent the dilemma which the contemporary design world faces: there is on the one hand, as exemplified by the Olivetti, the possibility of perpetuating a "modern academy;" and on the other hand, as in

The Olivetti 82 Diaspron, designed by Marcello Nizzoli, is a redesign of the Lexicon 80, using sharply faceted planes for clarity.

the case of the Salmoiraghi products, the chance to work in one aspect of the contemporary tradition, to achieve design that is "in the time" because it reveals a really new organic form. This makes of the modern revolution more a fact of human consciousness, of human and civic acknowledgment, of moral and social content, than a mere story of forms.

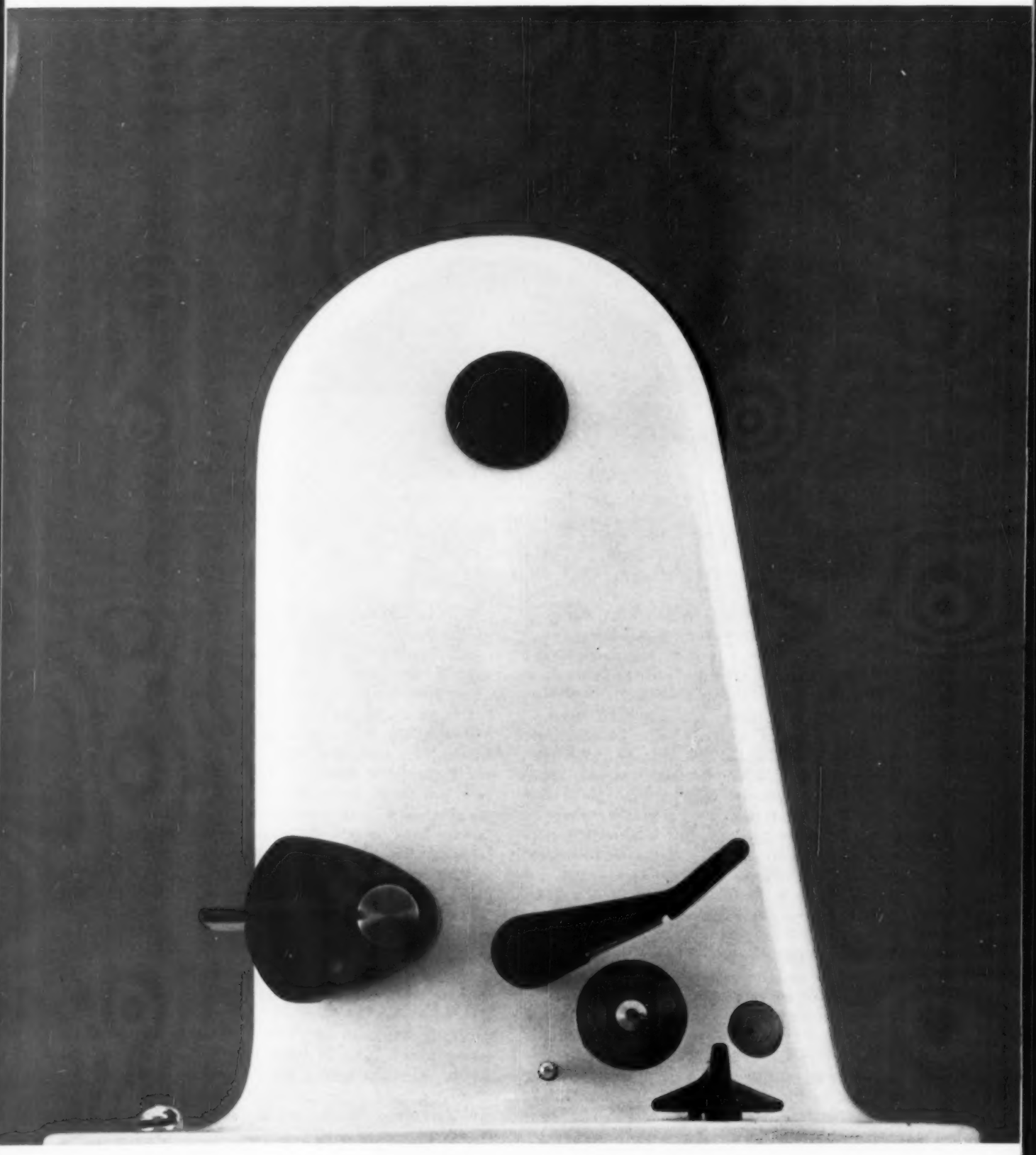
The Olivetti 82 Diaspron has the following technical characteristics: better acoustical qualities than the earlier Lexicon, a series of scales and margin indexes that make sheet-alignment easier, a system of pressure rolls to permit holding small-sized paper, and a horizontal board on top of the main roller, which eliminates rewinding and provides a surface for corrections and erasures. Two plastic holders on the lower part of the main roller hold the paper to the very bottom; the sheet is held in the roller by a scaled bar which is raised by a side lever, eliminating the operation of hand lifting.

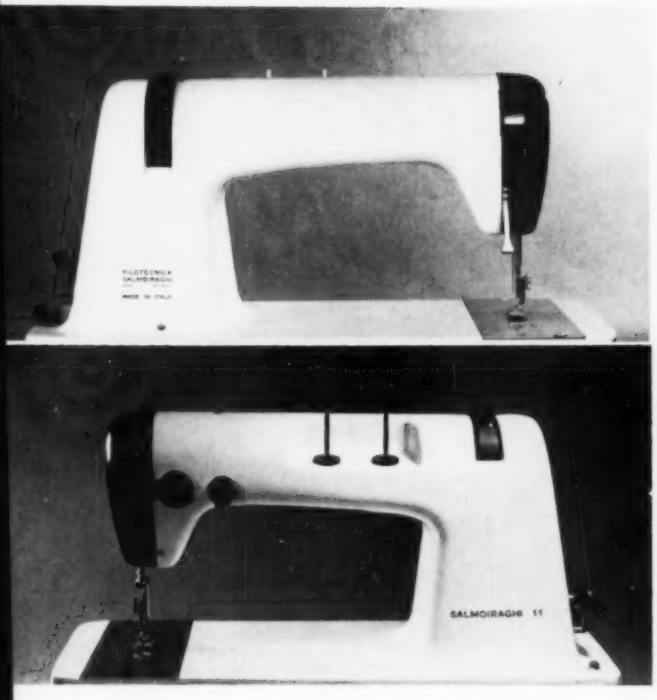
None of the above features are particularly startling. The keys themselves are much more interesting: they are oval, to let the fingers hit the right spot for typing ease, and they are colored to eliminate light reflection disturbances. For purposes of ribbon economy, the color selector has four positions instead of the usual three; like the Lexicon 80, the typewriter may be purchased with an automatic columnator or decimal tabulator. The keys of the tabulator seem to stand in much better relation to the rest of the keyboard, from the standpoint of composition, than in the previous version. The manufacturer claims improvements in alignment fidelity, type clarity, accuracy of columnation, and increased speed. The structure does not appear to be substantially different from that of the Lexicon, but our attention is rather attracted by the novelty of the armoring shapes.

A major design goal seems to have been the definite identification of the main removable parts of the body. In the Lexicon 80 a great effort had been made to include the top visually in the total form; in fact, the joint between the two parts was merely one hairline. In the 82 Diaspron, however, the metal cover is cast according to a variety of angular surfaces, and the result is a sharp definition of edges and parts of the machine. No doubt this is one way to achieve a formal expression; the question is whether there is not a formal language more sympathetic to the use of bent metal for better rigidity. The sharply defined edges are suggestive of wood construction, where they appear in order to allow for splitting of fibers.

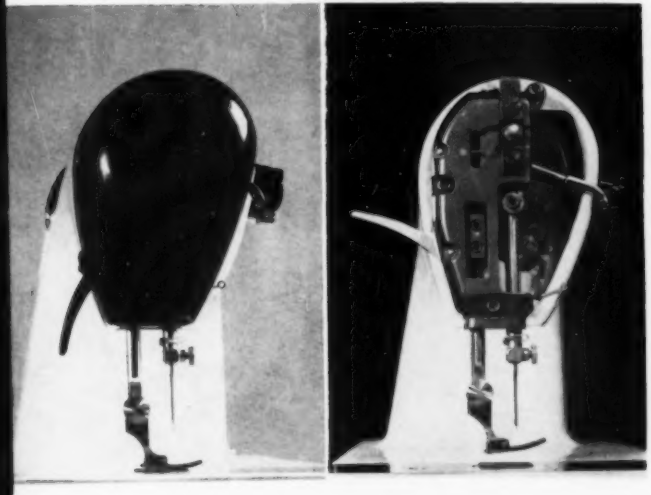
Of course the expression may have been dictated by the need for more room inside. But we are rather inclined to believe that it is the result of stylistic considerations which go way back into the open field of the evolution of contemporary Italian taste. It remains to be seen whether the angular shape has merit that the curved shape hasn't. From a purely esthetic view—and an admittedly precarious one—this predilection for the line, for the dynamic of sharply changing planes opposed to the compactness of curvilinear

The identity of mechanical parts, descriptive elements, and enclosing surfaces reveals a process rooted in order





The Salmoiraghi 11, shown on this spread in a variety of poses, is the least expensive of the new line (it will retail in Italy for about $112) and has been designed for what the manufacturers consider average domestic use. The machine is equipped with a rotating stitch device that has a safety catch to eliminate snarling in the seam, and uses from one to three needles at a time for vari-colored stitches and for relief. Except for the head, which is removable, the whole machine is cast in one piece.



shapes, results in a surface novelty which cannot enlarge the field of design controversy.

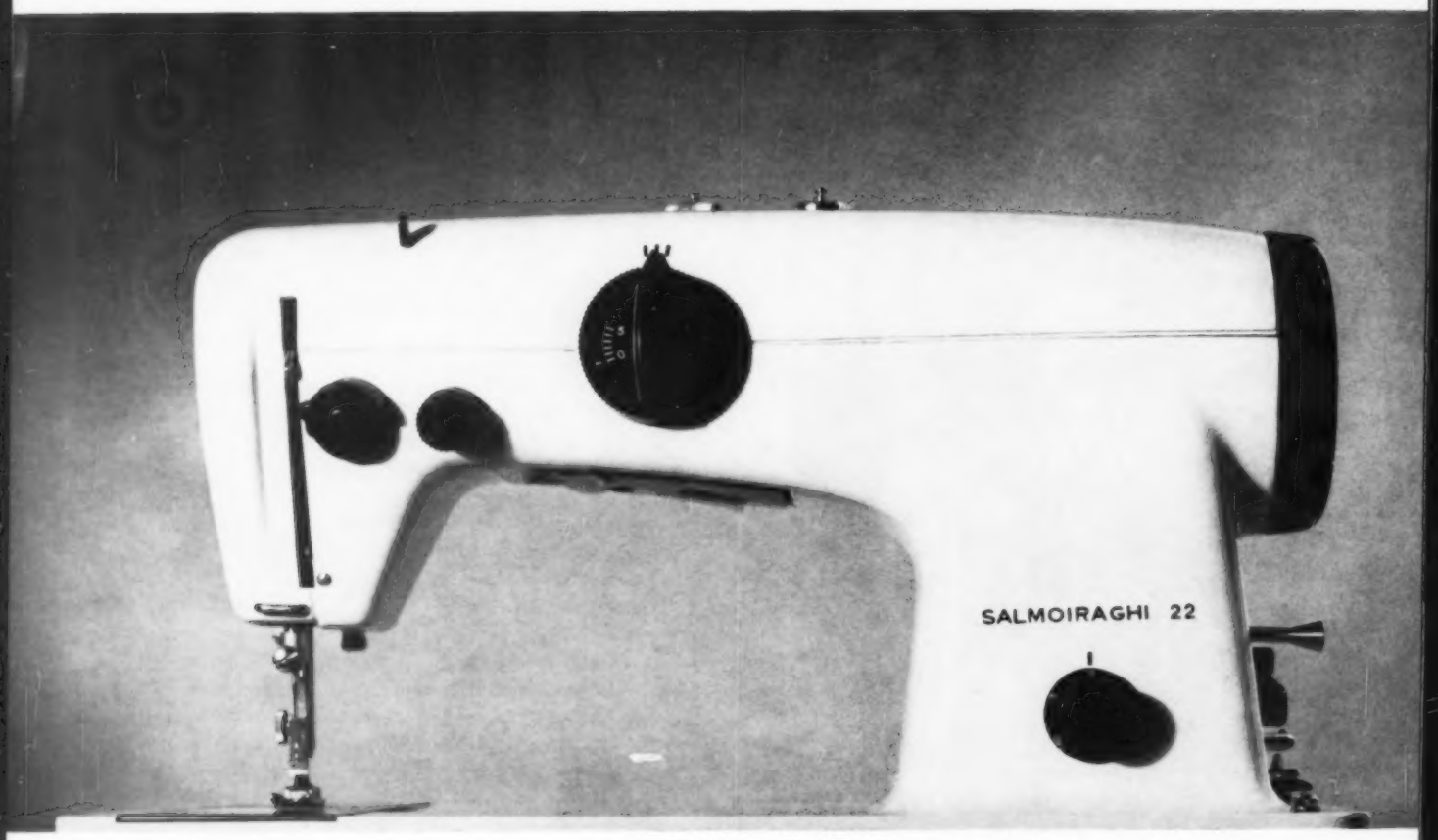
The Filotecnica Salmoiraghi sewing machines were designed by architects Angelo Mangiarotti and Bruno Morassuti, the principals in a firm well known for excellence in architecture and furniture design. Their recently built chapel on the outskirts of Milan is a small masterpiece of architectural coherence, truly one of the most beautiful structures built in recent years. The sewing machines are immediately appealing for the clarity of their form, the precision of their details, the proportion of their parts. Each lever, knob, and switch reveals its importance by its form, position, and composition.

The Salmoiraghi designs follow traditional structural form. The unusual 44 portable is rationally packaged for compactness, and traditionally retains the parallelpiped form. The Salmoiraghi 11 is cast in one piece, except for the removable head; the slight torsion of the head is a true expression of the mechanical operation. The larger machine is armored in two parts: the supporting structure and the protective cover. Such functional elements as the large rotor, the head, and the controlling knobs are rightly emphasized, without the distraction of extraneous decoration. The portable particularly is neatly packaged; and it also opens vertically for inspection. It is a remarkable small precision instrument, on which extended-time operation is possible.

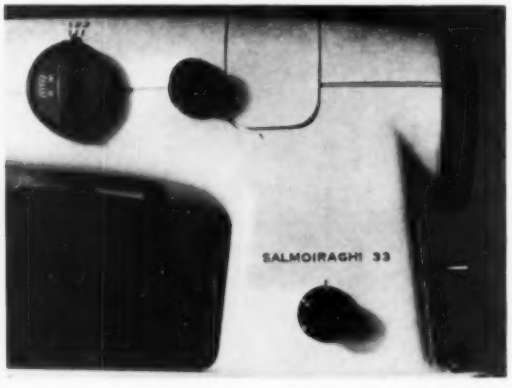
For the past few years we have been reviewing several types of sewing machines, many of them the result of new mechanical analysis, many with interesting detailing. But perhaps none has so effectively reached essentials, or so spontaneously achieved an aristocratic form (the same kind of aristocracy achieved by the early Singer) as these. They convey a sense of order because the design process was so obviously rooted in order: the identity of the mechanical parts, the identity of the descriptive elements and the enclosing surfaces. Since these parts are all functions of each other, the final form requires nothing arbitrary for "thrill"; it is not dispersive, but complete and makes the object seem perfectly born — which is, after all, the requirement of a work of art.

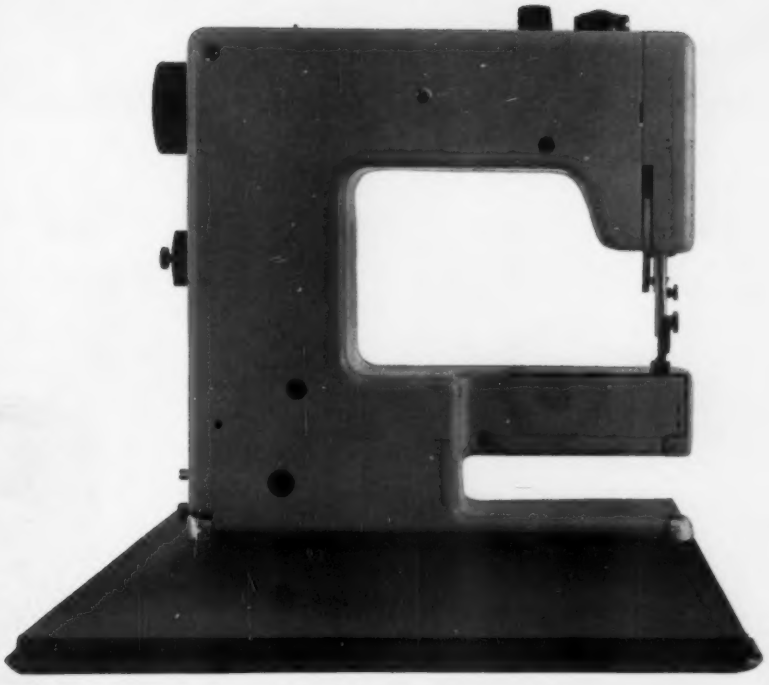
We conclude that this is working within a tradition — the tradition of the "good product" — in which the designer deals with the reality of his time rather than with a fictitious moment. This may be the prideful concern of some contemporary Italian craftsmen, a concern that can carry them through experiments in eclecticism, revivalistic attitudes, etc. And of course such experiments are good if disciplined by mature taste, awareness of environment and technology, rather than the passive acceptance of those comfortable slip covers that are the vague abstractions of the modern academy.

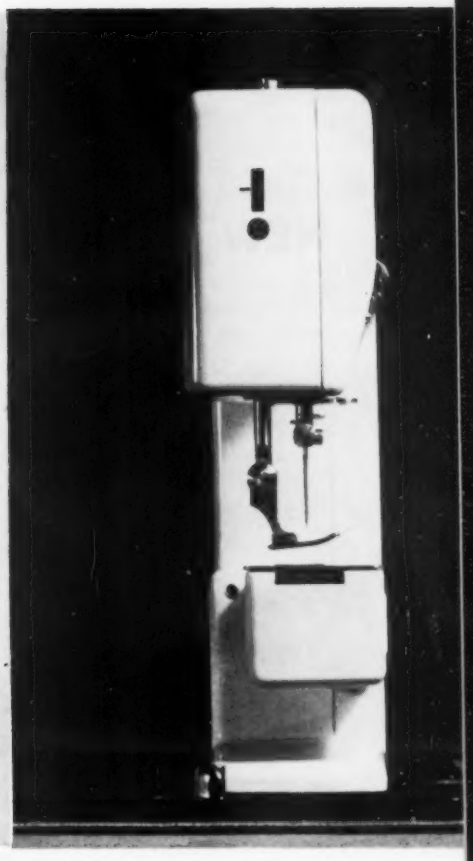
For the designer of the "forma dell' utile" a sense of tradition means the attentive study of a product's natural evolution — its introduction into the competitive world, its life. The product's vitality is, in the end, more a matter of good birth than of artificial rejuvenation.

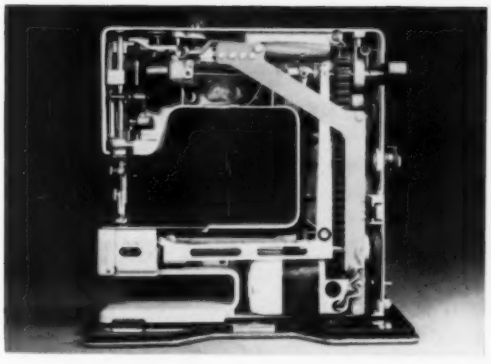


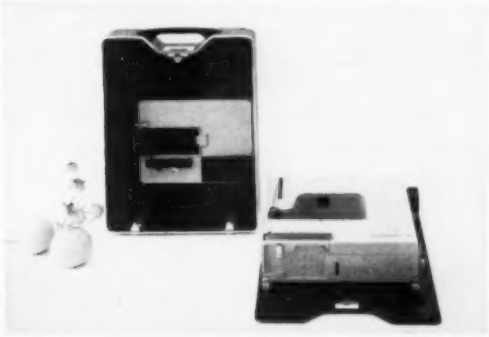
Number 22 (above) is conceived as one block, with stainless steel used liberally. Provided with a large workspace, it is designed for extremely ambitious home use, makes button holes, hems, cords, braids and trimming; it embroiders and can mend flexible mesh materials. The 33 (below) is a professional model equipped with accessories that make possible an enormous variety of embroidery stitches.











The ingeniously packaged portable model 44 is shaped to look even smaller than it is, and includes a number of features surprising in view of its size. It can embroider, for example, and can apply trimming in curved shapes. There is space under the stitching level for tubular garments. An attachable working plane fits into the top of the case, and the machine can be lifted from the case into working position in one quick motion. Since the machine is designed to be moved, the consumer does not buy it to harmonize with a specific interior, so it comes only in blue-black. (The three other models all come in white, turquoise, or lilac.)
Price in Italy: $118.

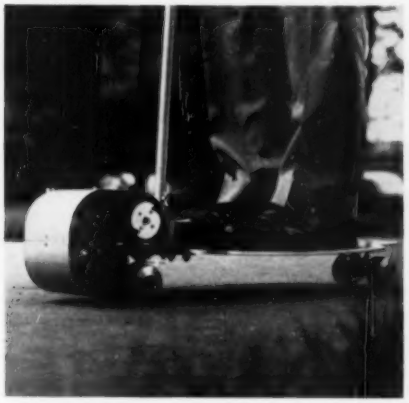
NEW TWIST TO ALCOA'S DESIGN SCHOOL PROGRAM

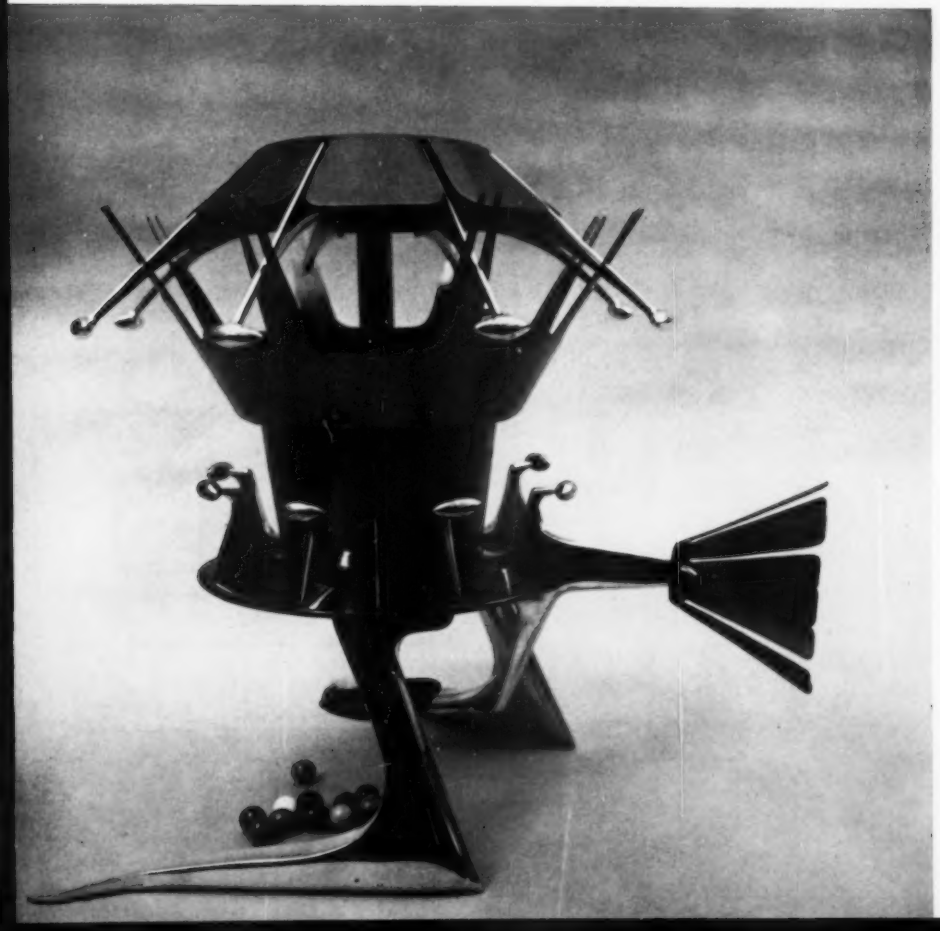
For building better mousetraps in aluminum, resourceful students at five schools earn a unique design prize

A wacky gumball machine, a postman's dream of a minimum transportation vehicle, a practical dispenser for shell-less eggs, a new twist in prefabricated housing, and an ingenious adjustable dome have all been designated winners in the Aluminum Company of America's new student awards program. If the projects are unusual, so is the prize. Besides the familiar winner's plaque, each student is being given "a full-page job-wanted display advertisement in INDUSTRIAL DESIGN, complete with endorsement." As Alcoa's chief industrial designer Samuel Fahnestock explains, the advertisement, describing the student's project and his educational background, will give him recognition within his new profession. (The first ad will appear in October.) The awards are the latest element in Alcoa's pioneering, year-old design school program, which also provides technical libraries, maintenance of a traveling lectureship on aluminum, and a free supply of aluminum for faculty-approved student projects at five participating design schools (IIT, Syracuse University, University of Illinois, Pratt Institute, Philadelphia Museum College of Art). Another new element will be added to the program this fall: each of the five original schools, now joined by the University of Bridgeport, will receive grants of $1000 each "in recognition of leadership in providing their students with technical preparation in basic materials."

For the current merit award program Alcoa laid no ground rules, placed no restrictions on the projects, other than the stipulation that each design "use aluminum to a significant degree as a structural material." The result of this policy is that the projects and the bases for judging them have varied widely. For instance, Samuel Lebowitz's dispenser (page 85) grew out of a packaging problem, while several other projects concern transportation. Some, like Louis Richard's Skeeter (right), were developed into fully working prototypes, while others necessarily remained at the model stage with ultimate possibilities merely sketched in. And though they are alike in material only, all reflect the working imaginations of promising new designers.

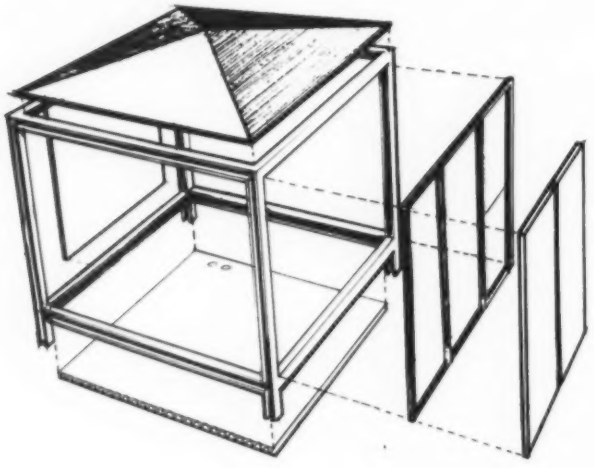
Minimum transportation was the problem posed to students at Illinois Institute of Technology in connection with Alcoa's contest. Winning solution was Louis Richard's Skeeter (left), a remarkably simple machine which incorporates "a maximum number of the advantages of the automobile." Skeeter consists of an 18-inch aluminum platform, wide enough for both feet, and mounted through gaskets on axles which have roller skate wheels. It is powered by a small model airplane engine, and will run nearly 20 minutes on three ounces of gas. Skeeter's two controls, both located on the handle, are a thumb throttle (regulating speeds up to 12 mph on the present model), and an ignition contact button. To stop, the Skeeterist simply decelerates to a slow walk and steps off. When handle is collapsed, Skeeter fits into a canvas bag under 2½ feet long, weighs only 14 pounds.

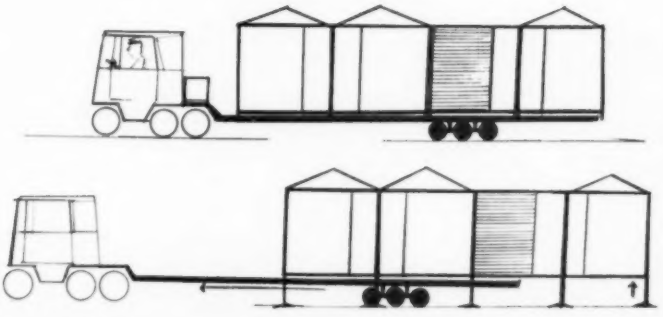




Entertainment for a penny. Rules for the Alcoa awards contest at Syracuse University required that students invent a machine which would 1) deliver a gumball, 2) operate for a penny, 3) provide entertainment. Arthur Goodbread's zany machine—which really works—was judged the most complete solution to the problem. The operator simply inserts his penny in the slot at the middle of the umbrella top. When he pulls the handle, the top pops up and the turkey feather pinwheel begins to spin. When he releases it, the handle, pulled by a spring, returns to its original position; and while the pinwheel continues to spin, the top lowers. When the top settles to its lowest position, a gumball drops through the chute at the bottom. Thus the candy counter crowd gets a few moments of free entertainment along with its one-cent gumball.

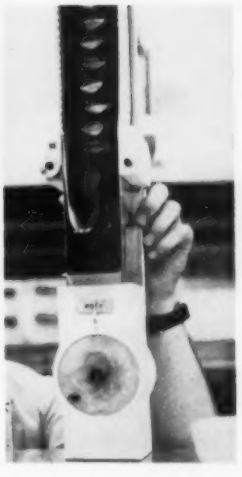
A new use for aluminum was the only requisite for student projects entering the Alcoa contest at the University of Illinois. After an investigation of mobile homes indicated that over 75 per cent of them are moved only once (from factory to site), William E. Stumpf outlined plans for an aluminum-walled, mobile home which eliminates the seldom-used carriage assembly of most mobile units and gives far greater flexibility than most now on the market. Stumpf's design is based on a ten-foot square, eight-foot high modular package (similar in concept to George Nelson's industrialized house, ID, January, 1958) which can be combined in any direction. Adjoining units as well as the aluminum-stamped roof element are joined together with a rubber-lined gasket. Each unit rests on stilt-like jacks which adjust for variations in the ground under the units. As Stumpf envisions his project, the exterior walls might take such varied finishes as natural metal, enamel, anodized color, formica, fabric, mosaic tile. Flooring would be a corrugated foam sandwich panel; side walls, also a foam sandwich, would accommodate interior heating element. He suggests that it could do duty as a military shelter or as a mobile motel, migrating from North to South as the seasons change.

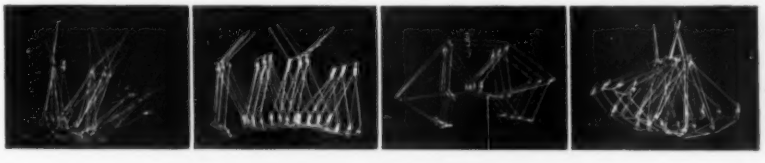




Flat-bed truck trailers deliver the units to their location, thus eliminating costly site work. After their jacks have been dropped to the ground, the truck drives out from under the units. The manufacturer also economizes by delivering complete assemblies rather than the wall and floor panels of the typical pre-fabricated house.

An original package is what students participating in the Alcoa program at Pratt aimed for. Samuel Lebowitz's egg-dispensing machine won because it was "unusual, represented new thinking, and was based upon feasible technology." His design, for mass feeding operations such as those found in restaurants and on military bases, takes advantage of the experimental plastic pouches developed by the Agricultural Department at Cornell University to eliminate egg shells, and further eliminates the bulky carton, and the storage refrigerator. In Lebowitz's improvement over nature's package, the eggs are contained in a continuous strip of heat-sealed aluminum foil pouches and dispensed automatically into the mixing bowl. The interior organic laminate serves as a heat-seal medium to join a second foil strip which completes the package. Sprockets are punched in the edges of the package, the package is pleated, and a sprocket-punched film leader is attached to the ends of the packaging at both top and bottom. The package is placed inside the dispenser sleeve, the leader fits over the outside and is drawn upward by a rack so that the egg pockets are pulled apart as they reach the base of the dispenser, automatically releasing their contents down a curved chute into the waiting bowl.





Something new and needed: A movable dome structure with adjustable elements was Herbick Van Reisgen's answer to this demand, which students at the Philadelphia Museum College of Art tackled in response to the awards program. Van Reisgen's dome is constructed of tubular aluminum members, connected at each end to a universal joint composed, in turn, of four flexible tubing members clasped by a fascia-like center section. After the dome has been erected, the structure can be expanded or contracted by motorized control at all four sides of the base. As Van Reisgen envisions his project, it could be almost completely assembled and connected on the ground (in the first stage looking something like a couple of gone-wrong grasshoppers, right). He believes that erection could be accomplished in almost a single operation, after which the unit would be adjusted to the desired dimensions. The structure would then either be covered or left to define an open air area. Van Reisgen thinks that his transportable structure could serve well as a warehouse, exhibit area, fairground building, or band shell.

P3 *Plastics for the Designer, Part III*

Although the designer makes the preliminary material choice for a product, the final decision of which plastic to use requires the special knowledge of the plastics expert who can be found on the staff of almost every plastics raw material supplier.

THE PLASTICS SPECIALIST: where to find him, how to use him

by Robert Rockwood

At intervals throughout the two preceding installments of this guide to plastics for designers (July, August) I have alluded to the "plastics specialist," the man to whom you will eventually go for a final check-out on your choice of plastic for a product. This last installment is devoted to him: who he is, where to find him, what sort of advice he can be counted upon to provide. If this tends to make him sound elusive, it is not without reason, for although he exists in considerable numbers he does not exist primarily to serve designers. He is a technician whose services are intended for other technicians, and although he is willing enough to talk to designers, his thinking is not designer-oriented. This is why, in the two previous installments, I have attempted to introduce you to all the kinds of plastics, kinds of forming processes, and kinds of questions you should ask yourself about the use and appearance of your product.

There are two main sources for this technical advice: one is the supplier of the basic raw material, the other is the fabricator. Although the latter's advice is invaluable for such things as tooling and production costs, his experience with materials and molding problems is likely to be limited to those encountered in his particular operation. The material supplier, however, has a much wider range of experience. His technical service men (different companies give them different names) work with *many* fabricators and convertors—customers of the supplier—developing techniques and trouble-shooting in the customers' plants. Consequently they are familiar with many different kinds of jobs and applications for their materials, and so are in a better position to suggest the best method for handling a particular plastic in the creation of a specific end product. In addition, because of their close relationship with various fabricator-customers, they can recommend fabricators whose processes and prior experience make them logical candidates for your particular job.

To help you locate these technical service men I have compiled a directory of plastic suppliers (see page 88). Rather than listing them by name, however, I have listed them under the generic classifications for the various kinds of plastics since it is on this basis that you will have determined which two or three plastics seem best suited to your product. In other words, if you are interested in polyester resin, you will find all the firms who supply this plastic listed under this heading. When a firm supplies more than one plastic, its name is repeated under all those which it supplies. I have also included each firm's trade name for its product because it seems to me that this is a great area of confusion: among the more familiar plastics, trade names are often taken for generic names. And to compound the confusion, some suppliers give each of their plastics a distinctive name, while others group similar plastics under a common trade name, distinguishing between them by an appended generic name.

But this, unfortunately, is only the beginning of your search for technical assistance. Even among the larger suppliers there is often no special procedure for handling designer inquiries. Furthermore the technical service man, or department, goes by various labels. Sometimes it is Product Development, sometimes Sales Engineering; sometimes the service is only available through the main office, at other times regional or local offices include technical personnel—or even salesmen with chemical or engineering training—who are capable of handling routine technical questions. In the larger companies each particular plastic has its own staff of technical experts, and almost all companies are willing to send their technical service men into the field—providing, of course, that the job is large enough, or unusual enough, to warrant this service.

Fortunately, more and more companies are realizing the value of working with the industrial designer in the development of his product; they are beginning to see that,

although it may not provide immediate gains, it is an important avenue to long-range market development. I think I hardly need say that this is mutually beneficial. For the designer, it offers the possibility of expert assistance in the creation of a product that looks good, behaves well, and is economical to produce. For the supplier, it offers the chance of wise supervision in the use of his product: he can see to it that his materials are used in proper applications, and can therefore protect his good name.

Several companies already have formal programs of this nature. DuPont, one of the largest suppliers, works with designers in two ways: its Polychemicals Division has thirty-eight engineers, spotted in nine locations throughout the country, whose full-time job is advising designers and design engineers on particular problems and/or answering requests for specific information. DuPont also has, in addition to the engineers, a travelling plastic consultant whose job it is to assist designers on their home ground, advising them on the use of DuPont plastics in new products and in effect acting as intermediary between the firm's technical specialists and the designer. Rohm & Haas, another large supplier, has a similar set-up. Its design consultation service consists of a staff of industrial designers and engineers working in a design laboratory in the research department of the Plastics Division, a travelling design coordinator attached to the sales development operation, and a design specialist assigned to the Detroit office. The combined function of this staff is to explore new uses for the Rohm & Haas materials, and to assist designers and manufacturers in the development of specific products. R & H makes a scrupulous distinction between free design service, which it does not provide, and free advice on basic technological problems, which is the essence of its service. Assistance may be requested through any regional sales office, and comments on designs are available through correspondence or, in special cases, through field calls. In addition, its travelling design coordinator makes periodic calls on major manufacturers and industrial design firms in the Northeast and Midwest, presenting new design applications. In every case, R & H attempts to follow through from design to engineering to production so that the end-product will represent the best properties of its materials.

The approach of still a third major supplier, Hercules Powder Company, probably comes closest to being typical of the service offered by most plastic suppliers. Hercules has no design service per se, but it does like to work with designers after their products have begun to take shape, preferably as early in this stage as possible. In discussing this procedure Hercules says that when its material is being considered for a job "it needs to be 'interpreted' by us so that the designer can make certain decisions. Does our plastic merit top consideration? How can it be put to best use, based on our previous experience with the type of application involved? Such counsel, or interpretation, can be obtained merely by writing or calling our plastics representative in the designer's area. All of these representatives are trained engineers, and have a very carefully planned internal program designed to keep them abreast of all new developments concerning our products. However, we have found it best, if the representative deems the application at all feasible, to ask the designer to submit a sketch of his product, in whatever stage it happens to be, to our Technical Service Laboratories for evaluation (see Refrigerator Drawer Case Study, ID August, page 46). Generally speaking, the earlier we get our hands on a job, the bigger our contribution can be to developing a really well-engineered product. We have found that if a design reaches the point at which the outside shape is frozen, everyone involved has become so wedded to the original idea that recommendations for changes are apt to meet with considerable opposition. Some of the biggest complaints about the failure of plastics to function in new uses have resulted from nothing more than a lack of liaison between designer and plastic engineer at a certain stage in new development."

Although communicating with these technical service people is, first of all, a matter of knowing what you are after, there are one or two other points I would like to mention. First, don't imagine that even the simplest of design terms will be familiar to technicians (a molder once questioned what was meant by "warm" when asked for a warmer red in a plastic compound). The reverse is also true, and to help you with *technical* terminology, I have included a glossary of plastic terms further along in this article. Second—and this is apropos of the Hercules statement above—don't keep vital information about your product a deep, dark secret. Most designers have been on the receiving end of this kind of cryptic exchange often enough to know how difficult it is to serve a client who refuses to divulge facts that the designer needs. The same is true of technicians. If you do not take them into your confidence, there is a limit to what they can do for you. Few if any design secrets get peddled about by material suppliers. They are accustomed to dealing with confidential information.

There is one other source of technical information for questions arising in the early stages of product development: the Society of the Plastics Industry, Inc., 250 Park Ave., New York, N.Y. This is a non-profit organization formed by manufacturers of plastic raw materials and plastic products to serve and promote their industry. They establish standards of production and performance, promote the proper use of plastics, and act as a clearing house for information about the industry. Many times they can supply or verify technical facts directly. When they do not have the answers they can steer the inquirer to the individual or company who does.

No matter what source you choose, however, remember that you are the judge of the pertinence of the information to your particular product. Materials suppliers and fabricators can give you the facts, but only you and your client can evaluate their relative importance to the product at hand.

A DESIGNER'S DIRECTORY OF PLASTICS RAW MATERIALS

Company Name & Address	*Services to Designers*	*Trade Name*	*Form in which supplied*
ABS Plastics			
Charles Crowl Company 11667 McBean Drive El Monte, California	No formal program. Direct inquiries to main office.	Crowl	Sheets
United States Rubber Company Naugatuck Chemical Division Naugatuck, Connecticut	No formal program. Direct inquiries to Product Development Dept. at Naugatuck.	Kralastic	Pellets
United States Rubber Company US Royalite Division 2638 N. Pulaski Road Chicago 39, Ill.	No formal program. Direct inquiries by phone to local offices, or write main office.	Royalite	Powder and sheets
Borg-Warner Corporation Marbon Chemical Division 7165 Chicago Avenue Gary, Indiana	No formal program. Direct inquiries to same division of company at P. O. Box 68, Washington, West Virginia.	Cycolac	Powder
Acetals			
E. I. du Pont de Nemours 11th & Market Streets Wilmington 98, Delaware	(see Polyethylene)	Delrin	Pellets
Acrylics			
Rohm & Haas Company Washington Square Philadelphia 5, Pa.	Design Consultation Service staffed by designers assists with all phases of product development.	Plexiglas Implex Paraplex	Rigid sheet, mld. cpd. High-impact compound. Liquid resin.
E. I. du Pont de Nemours 11th & Market Streets Wilmington 98, Delaware	(see Polyethylene)	Lucite	Pellets & liquid
Catalin Corp. of America 1 Park Avenue New York 16, N. Y.	No formal program	Catalin (copolymer)	Powder
The Dow Chemical Company Midland, Michigan	No formal program. Direct inquiries to main office.	Zerlon (copolymer)	Powder
Chicago Molded Prods. Corp. Campco Division 2717 Normany Ave. Chicago 35, Ill.	(see Cellulosics)	Campcolite	Sheet
Acrylonitrile			
The Dow Chemical Company Midland, Michigan	(see Acrylics)	Tyril	Molding compound
Catalin Corp. of America 1 Park Avenue New York 16, N. Y.	No formal program	Catalin	Powder
Foster Grant Company, Inc. Leominster, Massachusetts	(see Nylon)	Fostacryl	Molding powder

Company Name & Address	*Services to Designers*	*Trade Name*	*Form in which supplied*
Alkyds			
Allied Chemical Corporation Plastics & Coal Chemicals Div. 40 Rector Street New York 6, N. Y.	No formal program. Direct inquiries to main office.	Plaskon	Molding compound
Allylics			
Food Machinery &. Chemical Corp. Chemicals & Plastics Division 161 E. 42nd Street New York 17, N. Y.	No formal program; but assistance program is planned. Direct inquiries to main office.	Dapon Dapon M	Resins, powders
Mesa Plastics Company 2270 Nebraska Avenue Los Angeles 25, California	No formal program. Direct inquiries to main office.	Diall	Molding compound
Hooker Chemical Corporation Durez Plastics Division North Tonawanda, N. Y.	(see Phenolics)	Durez	Molding compound
Aminos			
American Cyanamid Company Plastics & Resin Division 30 Rockefeller Plaza New York 20, N. Y.	No formal program. Direct inquiries to manager of Market Development, New York office or managers of regional or branch offices.	Cymel (melamine) Beetle (urea)	Molding compound
Melamine Plastics Corporation 512-528 West 4th Street Winona, Minnesota	No formal program. Direct inquiries to general manager, main office.	Permelite (melamine)	Molding compound reinforced with cotton fabric. Bulk or custom preforms.
Allied Chemical Corporation Plastics & Coal Chemicals Div. 40 Rector Street New York 6, N. Y.	No formal program. Direct inquiries to main office	Plaskon melamine Plaskon urea	Molding compound Molding compound
Alcylite Plastics & Chemicals 23874 Plastics Road Newhall, California	(no information available)	(melamine and urea; no trade name)	Molding compound
Cellulosics			
The Dow Chemical Company Midland, Michigan	(see Acrylics)	Ethocel (ethyl cellulose)	Molding compounds
Celanese Corp. of America 290 Ferry Street Newark 5, New Jersey	Design inquiries are handled by Coordinator of End-Use Specialists, 744 Broad Street, Newark, N. J.	Forticel (cell. proprionate) Lumarith (cell. acetate)	Powder Film, sheet, molding powder
Eastman Chemical Products, Inc. Kingsport, Tennessee	No formal program. Direct inquiries to main office or sales offices.	Tenite (cell. acetate, cell. acetate butyrate, cell. propionate)	Pellets
Monsanto Chemical Company Plastics Division Springfield, Massachusetts	No formal program. Direct inquiries to Market Development Dept. at this address.	Vuepak (cellulose acetate)	Sheets
Joseph Davis Plastics Company 430 Schuyler Avenue Kearney, New Jersey	(no information available)	Joda (cellulose acetate, cellulose acetate butyrate, Cell. nitrate, ethyl cell.)	Molding compound, film, rigid sheets
Nixon Nitration Works Nixon, New Jersey	No formal program	Nixon C/A, C/N, C/AB	Sheets
Rowland Products, Inc. Fairview Place Kensington, Connecticut	Direct inquiries to industrial applications dept., main office.	(cellulose acetate, cellulose acetate butyrate, cellulose nitrate; no trade names)	Film, rods, tubes, rigid sheets (cellulose nitrate, film and rigid sheet only)
Alcylite Plastics & Chemicals 23874 Plastics Road Newhall, California	(no information available)	(cellulose acetate; no trade names)	(no information)

Company Name & Address	*Services to Designers*	*Trade Name*	*Form in which supplied*
Chlorinated Polyether			
Hercules Powder Company Wilmington 99, Delaware	No formal program	Penton	Resin, molding powder
Chicago Molded Products Corp. Campco Division 2717 Normandy Ave., Chicago	No formal program. Direct inquiries to advertising dept., main office.	Campco (cellulose acetate, cellulose acetate butyrate)	Sheet & film
Epoxies			
Ciba Products Corp. Fairlawn, New Jersey	No formal program	Araldite	Hard resins and solutions
Fiberite Corporation 510-524 West 4th Street Winona, Minnesota	No formal program. Direct inquiries to general manager, main office.	Fiberite	Molding compound, bulk form, and custom-made preforms.
Marblette Corporation 37-31 Thirtieth Street Long Island City 1, N. Y.	No formal program. Direct inquiries to main office.	Maraset Maraglas	Liquid resin Epoxy resin
Reichhold Chemicals, Inc. 525 North Broadway White Plains, N. Y.	No formal program. Direct inquiries to main office.	Epotuf	Liquid
Shell Chemical Company Plastics & Resin Division 50 West 50th Street New York 20, N. Y.	No formal program. Direct inquiries to division sales offices in New York, Chicago, Cleveland, and Downey, California.	Epon	Liquid and solid resins, solutions
Union Carbide Plastics Co. 420 Lexington Avenue New York 17, N. Y.	No formal program	Bakelite	Resins, molding compounds
Rezolin, Inc. 1651 18th Street Santa Monica, California	No formal program. Direct inquiries to main office.	Epolite	Liquid resin
Ren Plastics, Inc. 5422 South Cedar Street Lansing 9, Michigan	No formal program. Direct inquiries to Market Service Department at main office.	Ren	Liquid, paste
Fluorocarbons			
E. I. du Pont de Nemours 11th & Market Streets Wilmington 98, Delaware	(see Polyethylene)	Teflon	Molding powder
Allied Chemical Corporation General Chemical Division 40 Rector Street New York 6, N. Y.	No formal program. Direct inquiries to Product Development Dept., main office.	(no trade name)	Molding powder, sheets
Minnesota Mining & Mfg. Co. 900 Bush Avenue St. Paul 6, Minnesota	No formal program. Direct inquiries to Advertising Supervisor, Chemical Division.	Kel F	Molding powder
Nylon			
E. I. du Pont de Nemours 11th & Market Street Wilmington 98, Delaware	(see Polyethylene)	Zytel	Pellets
Allied Chemical Corporation Plastics & Coal Chemicals Div. 40 Rector Street New York 6, N. Y.	Program includes consultation, prototype design, machining, testing, and cost estimating. Direct inquiries to regional sales for main office.	Plaskon	Molding powder
Catalin Corp. of America 1 Park Avenue New York 16, N. Y.	No formal program	Catalin	Molding powder

Company Name & Address	*Services to Designers*	*Trade Name*	*Form in which supplied*
Chicago Molded Products Corp. Campco Division 2717 Normandy Avenue Chicago 35, Ill.	(see Cellulosics)	Campco	Film, sheets
Foster Grant Company, Inc. Leominster Massachusetts	No formal program. Direct inquiries to Manager, Market Development & Research, main office.	Fosta	Molding powder
Polymer Corp. of Pennsylvania Reading, Pennsylvania	(no information available)	Polypenco Nylatron	Sheet, rod, strip Molding powder
Spencer Chemical Company Dwight Building Kansas City 5, Missouri	No formal program. Direct inquiries to Plastics Division, main office, or district offices.	Spencer	Molding powder
Belding Corticelli Industries 1407 Broadway New York 18, N. Y.	No formal program	BCI	Molding powder, also glass-reinforced
Fiberfil, Inc. Fox Farm Road Warsaw, Indiana	No formal program	Nylafil	Glass-reinforced molding compound

Phenolic

Fiberite Corporation 510-524 West 4th Street Winona, Minnesota	No formal program. Direct inquiries to General Manager at main office.	Fiberite	Molding compound, bulk form, custom preforms.
Hooker Chemical Corporation Durez Plastics Division North Tonawanda, N. Y.	No formal program. Direct inquiries to Technical Service Dept. at main office, or to branch offices.	Durez	Molding compound
General Electric Company Chemical Materials Dept. 1 Plastics Avenue Pittsfield, Massachusetts	No formal program. Direct inquiries to main office.	G-E	Molding compound
Marblette Corporation 37-31 Thirtieth Street Long Island City 1, N. Y.	(see Epoxies)	Marblette	Liquids, castings
Raybestos-Manhattan, Inc. Reinforced Plastics Dept. Manheim, Pennsylvania	No formal program. Direct inquiries to Sales Dept., main office.	Pyrotex (asbestos-reinforced) Novabestos	Prepreg felts and mats, molding compounds Treated asbestos paper
Reichhold Chemicals, Inc. 525 North Broadway White Plains, N. Y.	No formal program. Direct inquiries to main office.	Plyophen	Powders, liquids
Union Carbide Plastics Co. 420 Lexington Avenue New York 17, N. Y.	No formal program. Direct inquiries to nearest sales office.	Bakelite	Resins, molding compound
Rezolin, Inc. 1651 18th Street Santa Monica, California	No formal program	Rezolin Corfoam	Liquid Resin for foam
Allied Chemical Corporation Plastics & Coal Chemicals Div. 40 Rector Street New York 6, N. Y.	No formal program. Direct inquiries to main office.	Plaskon	Liquid resin
Alcylite Plastics & Chemicals 23874 Plastics Road Newhall, California	(no information available)	(no trade name)	Molding compound
Keyes Fibre Company Waterville, Maine	(no information available)	Kys-ite	Glass-reinforced molding compound

Company Name & Address	*Services to Designers*	*Trade Name*	*Form in which supplied*
Plastics Engineering Company 1607 Geele Avenue Sheboygan Wisconsin	(no information available)	Plenco	Molding compound
Watertown Manufacturing Co. 127 Echo Lake Road Watertown, Connecticut	(no information available)	Neillite	Molding compound
Polycarbonate Resins			
General Electric Company Chemical Materials Dept. 1 Plastics Avenue Pittsfield, Massachusetts	No formal program. Direct inquiries to main office.	Lexan	Powder and pellets
Polyester Resins			
American Cyanamid Company Plastics & Resins Division 30 Rockefeller Plaza, N. Y.	No formal program. Direct inquiries to Market Development Dept., N.Y. office, or branch offices.	Laminac	Liquid resin
Atlas Powder Company Wilmington 99 Delaware	No formal program. Direct inquiries to manager of Plastics Industry Group, Chemical Div., main office.	Atlac 382 Thermoflow	Solid and liquid Reinforced compound
Glidden Company 900 Union Commerce Bldg. Cleveland 14, Ohio	No formal program. Direct inquiries to main office.	Glidpol Gel-Kote Glid-tile	Liquid Pigment resin for gel coat Resin
Hooker Chemical Corp. Durez Plastics Division North Tonawanda, N. Y.	(see Phenolic)	Durez Hetron (fire-retardant)	Resin Liquid resin
Plumb Chemical Corp. 4837 James Street Philadelphia 37, Pa.	No formal program. Direct inquiries to main office.	Fibercore	Molding compound
Reichhold Chemicals, Inc. 525 North Broadway White Plains, N. Y.	No formal program. Direct inquiries to main office.	Polylite	Liquid
Rohm & Haas Company Washington Square Philadelphia 5, Pa.	(see Acrylics)	Paraplex (polyester, acrylic polyester)	Liquid resin
United States Rubber Company Naugatuck Chemical Division Naugatuck, Connecticut	(see ABS Plastics)	Vibrin	Liquid
Allied Chemical Corp. Plastics & Coal Chemicals Div. 40 Rector Street New York, N. Y.	No formal program. Direct inquiries to main office.	Plaskon	Liquid resin
Celanese Corp. of America 290 Ferry Street Newark 5, N. J.	(see Cellulosics)	Marco MR resins Marcothix	Liquid resin
Pittsburgh Plate Glass Co. 1 Gateway Center Pittsburgh 22, Pa.	No formal program. Direct inquiries to main office.	Selectron	Liquid resin
Alcylite Plastics & Chemicals 23874 Plastics Road Newhall, California	(no information available)	(no trade name)	Pre-mix molding compound
Sherwin Williams Company PC & C Division 260 Madison Avenue New York 16, N. Y.	(no information available)	Dypol	Liquid resin

Company Name & Address	*Services to Designers*	*Trade Name*	*Form in which supplied*
General Electric Company 1 Plastics Avenue Pittsfield, Massachusetts	(see Phenolic)	G-E	Liquid resin
General Tire & Rubber Co. Chemical Division 1708 Englewood Avenue Akron 9, Ohio	(no information available)	Glykon	Liquid resin
Minnesota Mining & Mfg. Co. 900 Bush Avenue St. Paul 6, Minnesota	No formal program. Direct inquiries to Reinforced Plastics Division, Bldg. 64-1.	Scotchply Scotchpak	Molding compound Film
Polyethylene			
The Dow Chemical Co. Midland, Michigan	(see Acrylics)	(no trade name)	Molding powders; low, medium and high-densities
W. R. Grace & Co. Polymer Chemicals Division 225 Allwood Road Clifton, New Jersey	No formal program. Retain Walter Dorwin Teague Assoc. for potential designs; Interior Design Dept. for design and design improvements.	Grex	Pellets, high-density
Hercules Powder Company Wilmington 99, Delaware	No formal program	Hi-fax	Resin & molding compound
Union Carbide Plastics Co. 420 Lexington Ave. New York 17, New York	No formal program	Bakelite	Resin & molding compound
E. I. du Pont de Nemours 11th and Market Street Wilmington 98, Delaware	Direct inquiries to Plastics Consultant, Polychemicals Dept.	Alathon	Molding pellets; high, medium and low densities
Celanese Corp.of America 290 Ferry Street Newark 5, New Jersey	(see Cellulosics)	Fortiflex	High-density molding granules, flakes
Am. Molding Powder & Chemical 703 Bedford Ave. Brooklyn 6, N. Y.	No formal program. Direct inqulries to technical sales representative, main office.	Ampacet	Resin and compound
Allied Chemical Corporation Semet-Solvay Petrochemical Div. 40 Rector Street New York 6, N. Y.	No formal program. Direct inquiries to main office.	A-C	Granules
Eastman Chemical Products, Inc. Kingsport Tennessee	No formal program. Direct inquiries to main office.	Tenite	Pellets
Catalin Corp. of America 1 Park Avenue New York 16, N. Y.	No formal program	Catalin	Molding powders
Koppers Co., Inc. Plastics Division Pittsburgh 10 Pennsylvania	For Dylan, Super Dylan, direct inquiries to Plastics Applications Sales Dept., 950 Koppers Bldg., Pittsburgh. For Durethane film, 7001 West 60th Street, Chicago.	Dylan Super Dylan Durethane	Conventional and intermediate-density mold. powder High-density mold. powder Film
Monsanto Chemical Company Plastics Division Springfield, Massachusetts	No formal program	(no trade name)	Low and intermediate-density molding powers
Philips Chemical Co. Bartlesville, Oklahoma	No formal program. Direct inquiries to regional sales offices.	Marlex	High-density molding powders
Joseph Davis Plastics Co. 430 Schuyler Ave. Kearney, N. J.	(see Cellulosics)	(no trade name)	Film, molding compound, sheets

Company Name & Address	*Services to Designers*	*Trade Name*	*Form in which supplied*
Chicago Molded Products Corp. Campco Division 2717 Normandy Ave. Chicago 35	(see Cellulosics)	Campco	Sheets
U. S. Industrial Chemicals Co. Div. of Natl. Distillers & Chemical Corp. 99 Park Ave. New York 16, N. Y.		Petrothene	Molding powders and film
Spencer Chemical Co. 600 Dwight Bldg. Kansas City 5, Missouri	(see Nylon)	Poly-Eth	Molding powder
Fiberfil, Inc. Fox Farm Road Warsaw, Indiana	No formal program	Fiberfil	Glass-reinforced molding compound
Polypropylene			
Hercules Powder Company Wilmington 99, Delaware	No formal program.	Profax	Resin and molding powder
Eastman Chem. Products, Inc. Kingsport Tennessee	No formal program. Direct inquiries to main office.	Tenite	Molding powder
Catalin Corp. of America 1 Park Avenue New York 16, N. Y.	No formal program	Catalin	Molding powder
Novamont Corporation 2 Broadway New York, N. Y.	No formal program	Nioplen	Molding powder
Spencer Chemical Company Dwight Building Kansas City 5, Missouri	(see Nylon)	Poly-Pro	Molding powder
Chicago Molded Products Corp. Campco Division 2717 Normandy Avenue Chicago 35, Ill.	(see Cellulosics)	Campco	Sheet
Styrene			
The Dow Chemical Co. Midland, Michigan	(see Acrylics)	Pelaspan Trycite Styron	Expandable beads Film Resin, mold, powder, sheets
Union Carbide Plastics Co. 420 Lexington Ave. New York 17, N. Y.	No formal program	Bakelite	Resin, molding compounds
American Molding Powder & Chemical Corp. 703 Bedford Ave. Brooklyn 6, N. Y.	(see Polyethylene)	Ampacet	Resin and compound
Catalin Corp. of America 1 Park Avenue New York 46, N. Y.	No formal program	Catalin	Molding powders
Koppers Company, Inc. Plastics Division Pittsburgh 19, Pa.	No formal program. (see Dylan and Super Dylan)	Dylene Dylite	Molding powder Expandable polystyrene in beads
Monsanto Chemical Co. Plastics Div. Springfield, Mass.	No formal program	Lustrex	Molding powder

Company Name & Address	*Services to Designers*	*Trade Name*	*Form in which supplied*
Joseph Davis Plastics Co. 430 Schuyler Ave. Kearney, N. J.	(see Cellulosics)		Film, molding compound, rigid sheets, polymers and copolymers
Nixon Nitration Works Nixon, N. J.	No formal program	Nixon	Rigid sheets, copolymers
Chicago Molded Products Corp. Campco Division 2717 Normandy Ave. Chicago 35, Ill.	(see Cellulosics)	Campco	Sheets, copolymers
Foster Grant Company, Inc. Leominster, Mass.	(see Nylon)	Fostarene Styrafil	Molding compounds Impact molding compound
Fiberfil, Inc. Fox Farm Rds. Warsaw, Indiana	No formal program	Fosta Tuf-lex	Glass-reinforced molding compound

Urethane

Marblette Corporation 37-31 30th Street Long Island City 1, N. Y.	No formal program. Direct inquiries to main office.	Maraset	Polyurethane foam-in-place resin
United States Rubber Company Naugatuck Chemical Division Naugatuck, Connecticut	(see ABS Plastics)	Vibrithane	Polyester liquid or slab
Witco Chemical Co., Inc. 122 East 42nd Street New York 17 New York	No formal program. Direct inquiries to the Manager, Polyester Sales, Witco Chemical Co., Inc., 75 East Wacker Drive, Chicago 1, Illinois.	Witco Fomrez	Polyester flexible and rigid urethane foam
Allied Chemical Corp. Plastics & Coal Chemicals Div. 40 Rector Street New York 6, N. Y.	No formal program. Direct inquiries to the main office.	Plaskon	Polyester resin
Allied Chemical Corp. National Aniline Div. 40 Rector Street, N. Y.	No formal program. Direct inquiries to the Public Relations Dept. at main office.	Nacconate	Isocyanate accelerators for polyester catalysts
Pittsburgh Plate Glass Co. One Gateway Center Pittsburgh 22, Pa.	No formal program. Direct inquiries to main office.	Selectrofoam	Polyester resins and prepolymers
Rohm & Haas Co. Washington Square Philadelphia 5, Pa.	(see Acrylics)	Paraplex	Polyester resin
E. I. du Pont de Nemours Elastomer Chemical Dept. Wilmington 99, Delaware		Hylene	Organic isocyanate
B. B. Chemical Co. 784 Memorial Drive Cambridge 39 Massachusetts	(no information available)		Prepolymer resin
Isocyanate Prods., Inc. Box 1681 Wilmington, Delaware		Isofoam	Prepolymer resin
Nopco Chemical Company Plastics Division 175 Schuyler Avenue North Arlington, N. J.	No formal program	Nopco Lockfoam	Prefoamed slabs and sheets

Company Name & Address	*Services to Designers*	*Trade Name*	*Form in which supplied*
Mobay Chemical Company 1815 Washington Rd. Pittsburgh, Pa.	No formal program	Multron Mondurs	Polyester resin Polyester and Isocyanate resin
Alcylite Plastics & Chemical 23874 Plastics Rd. Newhall, California	(no information available)	(no trade name)	Resins
Vinyl			
Charles Crowl Company 11667 McBean Drive El Monte, California	No formal program. Direct inquiries to main office.	Crowl PVC	Rigid and flexible sheets
The Dow Chemical Company Midland, Michigan	No formal program	Dow PVC Saran	Resin, molding powder and film
B. F. Goodrich Chemical Co. 3135 Euclid Avenue Cleveland 15, Ohio	No formal program. Direct inquiries to main office.	Geon	Resins, molding compounds
Goodyear Tire & Rubber Co. Chemical Division 1485 E. Archwood Avenue Akron 16, Ohio	No formal program. Direct inquiries to main office.	Pliovic	Resin powder
Reichhold Chemicals, Inc. 525 North Broadway White Plains, N. Y.	No formal program. Direct inquiries to main office.	Peroxidol (plasticizers)	Liquids
Union Carbide Plastics Co. 420 Lexington Avenue New York 17, N. Y.	No formal program. Direct inquiries to nearest sales office.	Krene	Flexible film, cast film sheeting
United States Rubber Company Naugatuck Chemical Division Naugatuck, Connecticut	(see ABS Plastics)	Marvinol	Resin
American Molding Powder & Chemical Corporation 703 Bedford Avenue Brooklyn, N. Y.	(see Polyethylene)	Ampacet	Resins and compounds
Escambia Chemical Corporation 261 Madison Avenue New York 16, N. Y.	No formal program	Escambia PVC	Resin and pearls
W. R. Grace & Company Dewey & Almy Chemical Div. Cambridge 40, Massachusetts	No formal program	(no trade name)	Special latex resins for incorporation with rubber
Monsanto Chemical Company Market Development Dept. Plastics Division Springfield, Massachusetts	No formal program	Opalon (vinyl chloride) Ultron	Molding powders Film and sheets
Joseph Davis Plastics Co. 430 Schuyler Avenue Kearney, N. J.	(see Cellulosics)	(no trade name) Polyvinyl chloride & polyvinyl choride acetate	Film, molding compound, rigid sheets
Nixon Nitration Works Nixon, New Jersey	(see Cellulosics)	Nixon V/L	Rigid sheets
Rowland Products, Inc. Fairview Place Kensington, Connecticut	(see Cellulosics)	Polyvinyl chloride (no trade name)	Rods and tubes
Polyplastex United Inc. 870 Springfield Road Union, N. J.	Direct inquiries to district offices or Design Dept., 441 Madison Ave., New York 22, N. Y.	Panlam, Panflex	Rigid and flexible decorative sheets

GLOSSARY OF COMMON TERMS

Blow Molding A method of producing hollow objects (e.g. bottles) by injecting a blob of hot melted material into a hollow mold, then inflating the blob against the cool mold surface, where it freezes into shape.

Boss Raised section on a plastic part designed to add strength, to facilitate alignment during assembly, to provide for fastenings, etc.

Compression Molding A technique of thermoset molding in which the molding compound (generally preheated) is placed in the open mold cavity, mold is closed, and heat and pressure (in the form of a downward moving ram) are applied until the material has cured.

Creep Deformation, with time, of a plastic material under load. At room temperature, it is also called "cold flow."

Cure To change the physical properties of a material by chemical reaction, which may be condensation, polymerization, or vulcanization; usually accomplished by the action of heat and catalysts, alone or in combination, with or without pressure.

Density Weight per unit volume of a substance, expressed in grams per cubic centimeter, pounds per cubic inch, etc.

Dielectric Strength The electric voltage gradient at which an insulating material is broken down or "arced through," in volts per mil of thickness.

Dimensional Stability Ability of a plastic part to retain the precise shape in which it was molded or cast.

Draft Degree of taper of a side wall, or angle of clearance designed to facilitate removal of parts from a mold.

Drape Forming Method of forming thermoplastic sheet in which the sheet is clamped into a movable frame, heated, and draped over high points of a male mold. Vacuum is then pulled to complete the forming process.

Elastomer A material which at room temperature stretches under low stress to at least twice its length and snaps back to the original length upon release of stress.

Extrusion A forming method in which plastic material is compacted and forced through an orifice in more or less continuous fashion.

Fillet The rounding of an internal angle between two surfaces of a plastic molding.

Film An optional term for sheeting having a nominal thickness not greater than 0.010 inch.

Flash Extra plastic attached to a molding along the parting line; it must be removed before the part can be considered finished.

Flow Mark A mark made by the freezing-in of a visible flow pattern.

Gate In injection and transfer molding, the orifice through which the melted plastic enters the cavity. Sometimes the gate has the same cross-section as the runner leading to it; often, it is severely restricted.

Hopper Conical feed reservoir into which molding powder is loaded and from which it falls into a molding machine or extruder, sometimes through a metering device.

Injection Molding A molding procedure in which a heat-softened plastic material is forced from a cylinder into a relatively cool mold cavity formed in the desired shape of the article.

Insert An integral part of a plastics molding consisting of metal or other material which may be molded into position or pressed into the molded part after the molding process is completed.

Notch Sensitivity The extent to which a material's sensitivity to fracture is increased by the presence of a surface deviation such as a notch, a sudden change in section, a crack, or a scratch. Low notch sensitivity is usually associated with ductile materials, high notch sensitivity with brittle materials.

Permeability 1) The passage or diffusion of a gas, vapor, liquid, or solid through a barrier (such as a plastic bottle) without chemically affecting it, i.e., the plastic. 2) The rate of such passage.

Polymer A high-molecular-weight organic compound, natural or synthetic, whose structure can be represented by a repeated small unit, the *mer;* e.g., polyethylene, rubber, cellulose. Synthetic polymers are formed by addition or condensation polymerization of monomers. If two or more monomers are involved, a copolymer is obtained. Some polymers are elastomers, some plastics.

Preform (n.)—A compressed tablet or biscuit of plastic composition used for efficiency in handling and accuracy in weighing materials. (v.)—To make plastic molding powder into pellets or tablets.

Prepreg A term generally used in reinforced plastics to mean the reinforcing material containing or combined with the full complement of resin before molding.

Runner In an injection or transfer mold, the channel, usually circular, that connects the sprue with the gate to the cavity.

Sink Mark A shallow depression or dimple on the surface of an injection molded part due to an insufficient charge of melted plastic or to local internal shrinkage which causes the surface of the molded piece to collapse.

Slush Molding Method for casting thermoplastics in which the resin in liquid form is poured into a hot mold where a viscose skin forms. The excess slush is drained off, the mold is cooled and the molding stripped out.

Specific Gravity The density (mass per unit volume) of any material divided by that of water at a standard temperature, usually 4°C. Since water's density is nearly 1.00 g./cc., density in g./cc. and specific gravity are numerically nearly equal.

Spin Welding A process of fusing two objects together by forcing them together while one of the pair is spinning, until frictional heat melts the interface. Spinning is then stopped and pressure held until they are frozen together.

Sprue Feed opening provided in the injection or transfer mold; also the slug formed at this hole. "Spur" is a shop term for the sprue slug.

Thermoplastic (a.)—Capable of being repeatedly softened by heat and hardened by cooling. (n.)—A material that repeatedly softens when heated, hardens when cooled.

Thermoset A material that will undergo or has undergone a chemical reaction by the action of heat, catalysts, ultraviolet light, etc., leading to a relatively infusible state.

Transfer Molding A method of molding thermosetting materials, in which the plastic is first softened by heat and pressure in a transfer chamber, then forced at high pressure through suitable sprues, runners, and gates into closed mold for final curing.

Vacuum Forming Method of sheet forming in which the plastic sheet is clamped in a stationary frame, heated, and drawn down by a vacuum into a mold. In a loose sense, it is sometimes used to refer to all sheet forming techniques, including drape forming, involving the use of vacuum and stationary molds.

Editor's note: Most of these definitions are drawn from the encyclopedia of plastics terms compiled by MODERN PLASTICS, *with whose permission they are reprinted here.*

DESIGNS FROM ABROAD

Design Research gives Americans long-needed review of Finnish design

1

Above and below: Pietinen

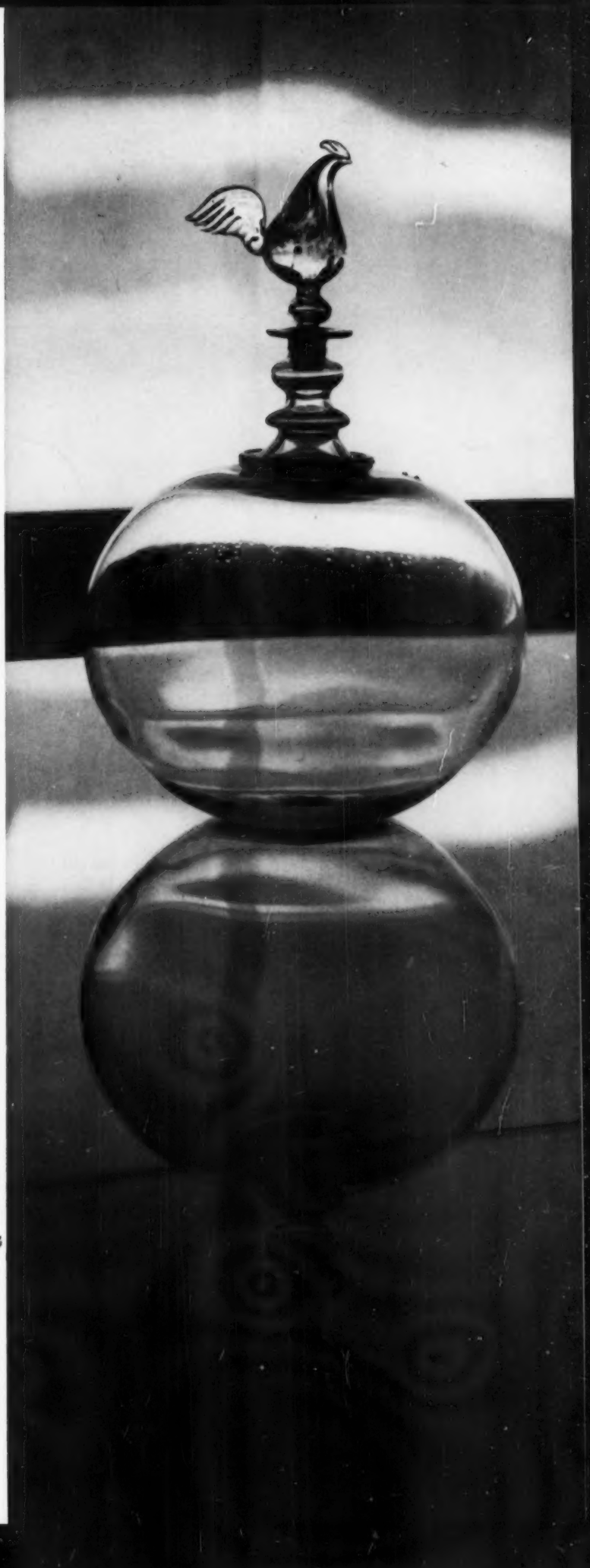
2

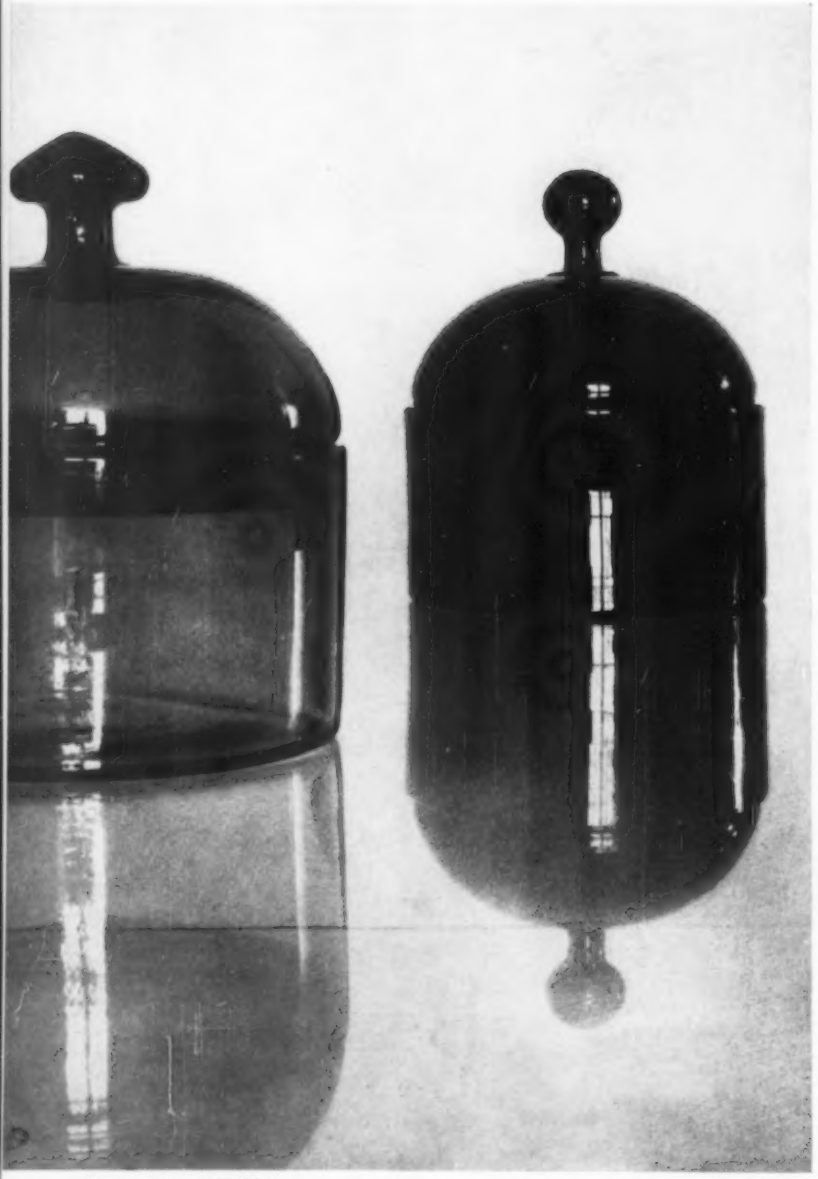
3 Studio Wendt

As the first major exhibition of Finnish design to be seen in this country in recent years, the show which opened at Cambridge's Design Research, Inc. this summer has received an enthusiastic welcome. A cross-section of objects for the Finnish home, it includes Finland's industrial design as well as her arts and crafts, and ranges from mass-produced chairs to textiles, ceramics, rugs, furniture, sculpture, toys and women's fashions.

Finland's high standards were evident at the eleventh Triennale in Milan (ID, July, 1957) where six of the 28 first prizes, including the Grand Prix, went to Finnish products. These high standards, which were established long before the last Triennale, are impressively maintained in the present exhibition. But Finland has embarked in several new directions since the Triennale. Although her designers continue to emphasize the natural qualities of the materials with which they work, some of them are developing increasingly elaborate forms. Kaj Franck, for instance, who has long been familiar for his elegantly simple, natural lines, has moved to quite baroque forms in his onion-shaped decanters (ID, October, 1958) in the current show. And even the blown-glass vase (right) is a more formally elaborate object than one would have expected from him a few years ago. Surprisingly embellished

1. *Bowls in earth brown chamotte by Kyllikki Salmenhaara.*
2. *Glass bowls. Timo Sarpaneva.*
3. *Tobacco jug of Britannia metal by Bertel Yardberg.*
4. *Blown-glass vase with bird stopper by Kaj Franck.*





Above and top right: Pietinen

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forms appear again in Nanny Still's salad servers (not shown). Her forms spring directly from Miss Still's imagination, unencumbered by too much concern for the servers' suitability for serving salad. Yet a strong concern for the practical emerges in some of Printex's handsome rugs (not shown) at the exhibition, indicating how ingenuity can lead to important economies. Designers at Printex, the fabric house, eliminate waste by using mill ends to make woven cotton rugs. When the rugs are re-dyed the original silk-screen colors are vibrantly transformed and unusual new patterns created. If one is accustomed to thinking of wood as *the* material for Finnish chairs, then the amount of metal in the chairs at the show will come as a surprise. Use of metal, along with the styling of such chairs as Morck-Schultz's (left), gives some of them a peculiarly American flavor.

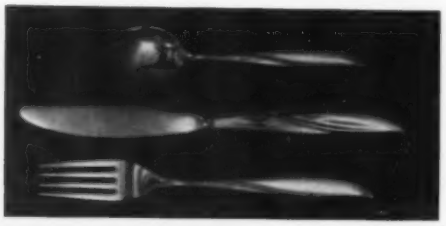
The idea for an exhibition of Finnish design was initiated by Robert Eskridge, a Cambridge architect who became interested in Finnish design after studying architecture on a Fulbright fellowship there last year, and developed by Design Research president Benjamin Thompson. Armi Ratia, co-director of Marimekko and Printex, and designer Vuokko Eskolin installed the show at Design Research, where many of the items will continue to be stocked.

5. *Jugs of clear glass and opaque ceramic by Vuokko Eskolin.*
6. *Rocking chair with molded plywood shell by Marita Morck-Schultz.*
7. *Leather-armed teak chair covered in dark wool fabrics, Antti Nurmesniemi.*
8. *Candlestick 1½ feet high of roughly textured ceramic by Oiva Toikka.*

8 Louis Reens

DESIGN REVIEW

Silver and stainless steel flatware is increasingly homogeneous in design; the distinction between tradition-laden silver and avant-garde stainless is no longer so sharp. Radicalism is found more often at the business end of a table piece than in its handle, and the piece is more often required to perform a double or even a triple (3) function. Disdaining the refinement of the majority, an occasional pattern (8) bluntly asserts its tool-like nature.



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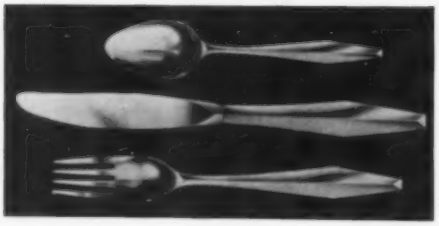


2

3

1 **Gorham Firelight,** the latest of Gorham's sterling silver patterns, is nearly duplicated by company's newest pattern of stainless.

2 **Reed & Barton** Diamond pattern in sterling, designed by Gio Ponti, has faceted surface, slightly pyramidal in section.

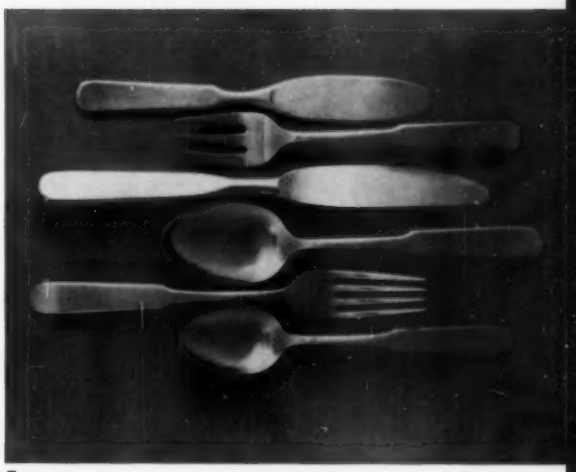
4

3 **Gense** "spoforkni," designed by Pierre Forssell in stainless steel with black nylon handle, is intended to perform functions of conventional three pieces.

4 **Lunt Raindrop,** in sterling, has slightly domed handle, turned up at tip. Staff design by Nord Bowlen.

5 **Lauffer Heritage**, in stainless steel, designed by Don Wallance and made in Germany, incorporates elements of a traditional silver pattern.

6 **Dansk Tjorn**, designed by Jens Quistgard, adds silverware to the Dansk line of contemporary Danish tableware. Serving fork and spoon are shown here.



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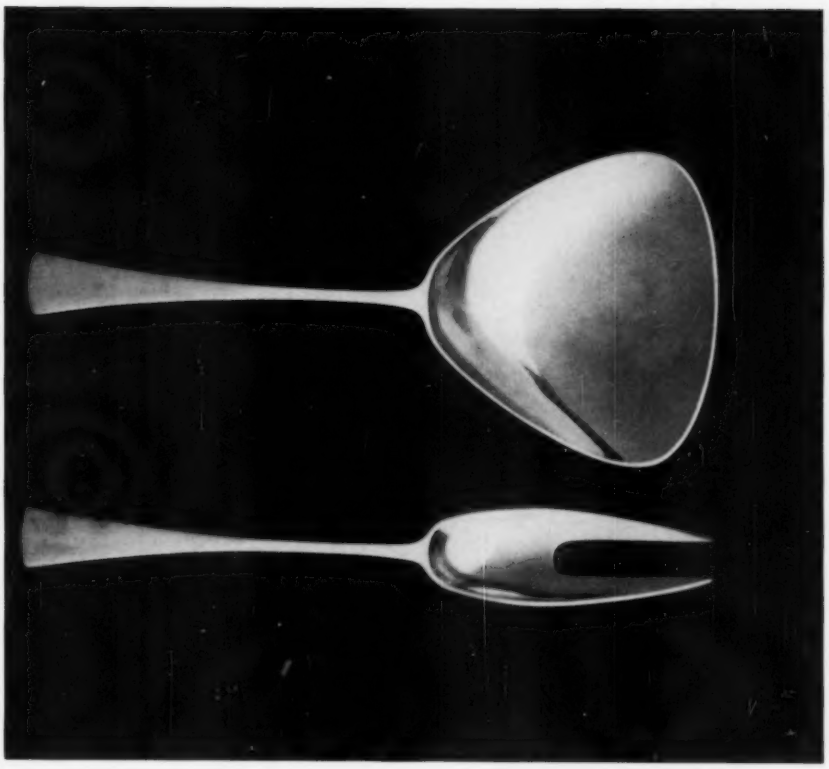

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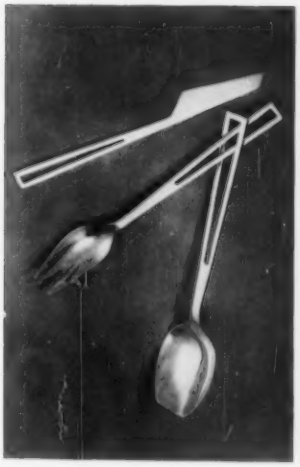

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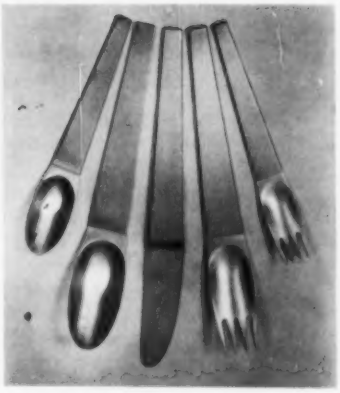

7 **Celsa Avanti**, Swiss-made in Mexico, joins cut-out handle to spoon with squared edge, fork with short tines and semi-spoon bowl.

8 **Amboss Vienna Maestro**, stainless steel designed by Oswald Haerdtl and imported by A. J. Van Dugteren & Sons, New York, has satin-finished handles, brightly-polished blades, tines, and bowls.

Dinnerware of plastic is assuming a different character as it shakes off its picnic associations and becomes an element in gracious living. Lenox China's expansion into the field, with its new line of substantially-priced plasticware, is one sign that even the most traditional china manufacturers are recognizing the claims of the new material. In china, shapes range from the sobriety at left below to the extreme fancifulness of the forms at the far right of this spread.

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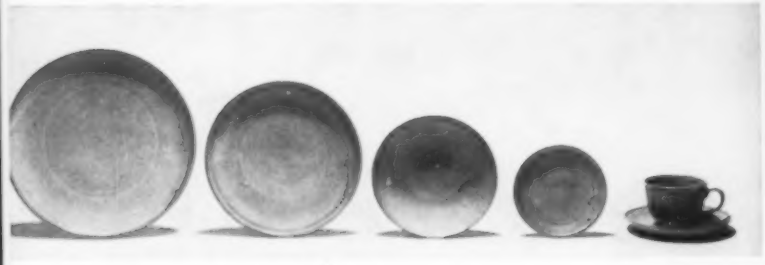


3

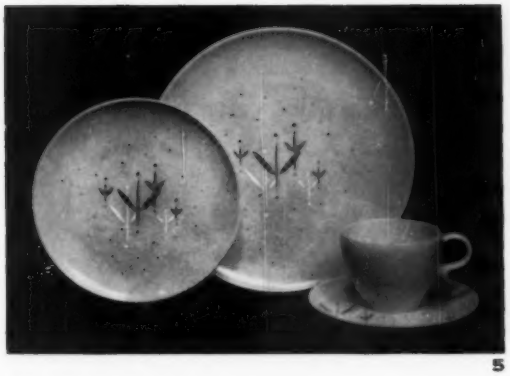
4

1 **Marshall Studios** Monoband stoneware, designed by Jane and Gordon Martz, is fired like porcelain but uses coarser clays. Hand decorated with majolica band.

2 **Marshall Studios** Impression, designed by Jane and Gordon Martz, has impressed edge design. Like Monoband, pattern may be ordered in any of nine glaze colors.

3 **Idealware** tumblers, designed by Russel Wright and molded in Celanese Corporation's Fortiflex, can be boiled or kept in the refrigerator. Available in five colors.

4 **Schmid International** ironware, designed by La Gardo Tackett, includes teapot with willow handle and molded self-strainer unit.



5

5 Lenox Plastics Golden Harvest is part of Branchell de luxe dinnerware line, molded of melamine.

6

6 Iroquois Medallion, vitrified chinaware designed by Ben Seibel, is one pattern in company's Inheritance line. Several pieces are accompanied by black lacquerwood pedestals.

7 Jackson Internationale Contempri line, designed by Paul McCobb, is made of oven-proof china. Tall compote has two inserts: one for flowers, the other for candles.

7

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9

8 Wedgwood Stardust is company's newest pattern; blue and sepia on white bone china. Designed by Peter Wall.

9 Lenox China Sculpture represents first new shape developed by company in more than twenty years. Various decorative trims are available.

Accessories for the dinner table are usually permitted more liberty than the basic cup and dish can afford, and the designs on this spread take advantage of that freedom in shape and in material. (The salt and pepper shakers at the left below are no longer even objects designed to fit the hand.) Plastic and metal has become a combination at least as popular as metal and wood, sometimes for purposes of utility, as in the knives, and sometimes chiefly for whimsy, as in the Oneida serving dishes.

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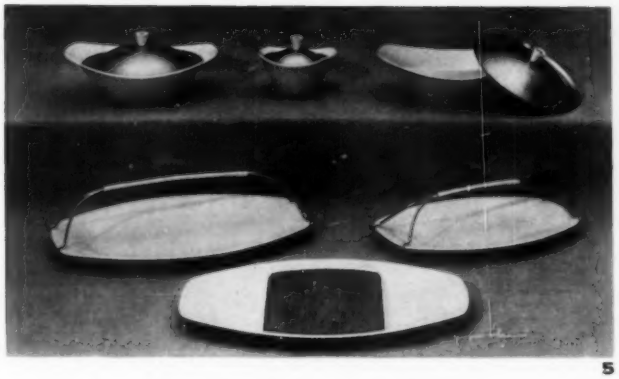
1 **Gense** shaker set, designed by Pierre Forssell, is of stainless steel, with hard plastic bases. Salt and pepper are poured from tips of cones.

2 **George S. Thompson** Partners, pepper grinder and salt shaker, designed by Henry Keck Associates, are wood with stainless steel tops.

3 **A C Fabricators Inc.** grill-and-serve platter is of heavy hand-cast aluminum highly polished on the outside, satin-finished inside. Base is walnut. Designed by Rose S. Gavin.

4 **Gense** tea strainer, designed by Pierre Forssell and made in Sweden, is stainless steel in trefoil design.



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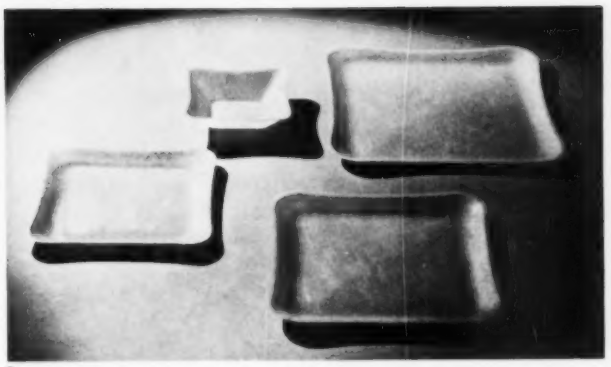


6

5 **Oneida** serving pieces in white or turquoise melamine are accompanied by covers of brass. Serving trays have removable handles.

6 **Quaker Industries** serving plates, designed by Edward Klein, are formed of fiberglass: white with gold fibers.

7 **J. P. Gits Bar-Big-Q,** heavy-duty section-plate and cup set, is molded of Dylene polystyrene supplied by Koppers. Rim is rolled to eliminate chipping.

7

8 9

8 **Georg Jensen** Gloria pattern is stainless steel holloware imported from Denmark. Basket bowl has lacquer handle.

9 **Ontario Knife Company** Viking line, designed by Michael Lax, employs grey nylon resin (supplied by Du Pont) for handles of steak knives, carving set, and kitchen knives.

The four stages in making a sandwich core from "Multiwave."

Sandwich core for casting tools

An aluminum sandwich core material called "Multiwave" is finding widespread use as a material for production-tooling. Originally designed as a core for high-strength, light-weight aircraft structures, the material has been adapted to the construction of such production tools as welding jigs, holding fixtures, and large molds for the forming of plastics and light metal parts.

The two most apparent advantages of "Multiwave" are its light weight and its dimensional stability. The tools are made up of sandwich panels, with skins of reinforced plastic on both sides of the hollow core. Even when the sections are more than twelve feet long they can be lifted by one or two men.

In addition to their lightness, tools made of this material seem to be weather resistant too. They can be stored out of doors for months and, when returned to use, have no detectable change in size or shape.

The unique feature of this material is its formability. A core section of "Multiwave" may be laid in place almost as quickly as a layer of glass cloth, and can be draped over many complex molds and shapes. Because of its high strength in the sandwich state, it can replace dozens of lamination layers, reducing cost and construction time.

In a typical application a plastic tool is coated with a release agent and two or three layers of impregnated glass are laid over the form. This is followed by specially cut sections of Multiwave core material. The unit is then cured, possibly at room temperature, but preferably in an oven, and finally the outside of the sandwich is formed by additional glass-laminate layers and stiffening ribs of sandwich core.

In the photographs left the process may be seen: First a layer of "Multiwave" honeycomb is draped over a base layer of pre-impregnated glass cloth. The tool is being formed to shape of the mold on the stand. Second, the top layer of glass cloth is added. The cloth already contains resin. When the unit is cured, the two layers of glass will form a sandwich with the honeycomb in the center. Third, stiffening ribs are added. Finally, the cured tool is lifted off the mold. Its light weight allows one man to lift it off.

Manufacturer: Narmco Resins & Coating Co., Costa Mesa, California.

Liquid steel adhesive

Steel in a tube to be used much like any metal adhesive is now on the market. The product, which dries to a dark brown color (but which, according to its manufacturers, can be burnished to a metal color) will permanently adhere to all metals, and will bond securely to concrete, fiberglass, wood, and many types of laminated woods. After it has dried it can be cut, filed, sanded, or machined. Liquid Steel is packaged on a card which contains directions for its use, and comes in a 6½ ounce tube. It can be used for filling holes and imperfections in metal castings or for building up worn patterns. The desired color may then be painted on, or the dried steel polished over.

Manufacturer: Woodhill Chemical Company, 1390 E. 34th St., Cleveland 14, Ohio.

Interference-free lighting panels

A glass lighting panel that eliminates radio interference radiated from fluorescent lamps has been developed for laboratories, hospitals and other places where sensitive instruments are used. The manufacturer says that the product has been introduced for use in research laboratories where delicate electronic equipment is affected by the high-frequency radiation from lamps.

The brightness panel consists of a lamp coated on one side with a thin, trans-

parent, electrically conductive film. The coating intercepts the radiated interference, which is grounded by a ¼-inch wide silver strip fired onto the film around the periphery of the glass. Thus, sensitive radio or electronic equipment which would pick up the radiated interference can operate normally.

The lighting panel is made of heat-resistant borosilicate glass and resists heat shock and corrosion. Its face will not statically attract dust and it can be cleaned with a damp cloth. The electrically conductive coating will not abrade. The panels themselves are thin and lightweight; single 24" by 48" panels meets Underwriters' Laboratories requirements permitting up to 1100 inches of exposed area. Manufacturer: Corning Glass Works, Corning, N. Y.

Ceramic coated mufflers

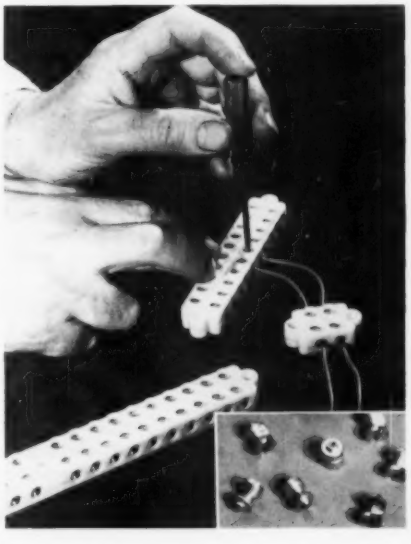
Passenger car mufflers with a 100,000 mile warranty, using processes developed in research for jet engines, have been developed by the Bettinger Corporation. The new mufflers are ceramic-coated to insure longer life. A .003 to .004-inch thick coating of the ceramic is fused to the surface steel of the muffler at very high temperatures. The coating is impervious to shock, corrosion, and temperatures of 1500°F. Preliminary tests indicate that the new mufflers will not be especially costly.

Among the factors contributing to shortened muffler life are start-and-stop driving, higher compression engines, higher octane fuels, dual mufflers and the labyrinth designs needed to cram effective cooling and noise supression into smaller units necessary to fit on low-slung cars. Start-and-stop driving contributes most to the corrosion of mufflers. The rapid changes in temperature cause decay of the muffler materials. In the photograph, similar conventional and ceramic coated mufflers are shown after the equivalent of 25,000 miles of operation. The ceramic muffler, after deposits are removed, shows no apparent corrosive effects from the fumes and acid condensate. Manufacturer: The Bettinger Corporation, Milford, Mass.

Die-cast cams in circuits

A new system of connections avoids the use of traditional soldering connections, or those with clips, lugs, plugs or screw fasteners. In a recent innovation a die-cast-cam was used to establish electrical connections on a terminal board. When the device was to be put into mass-production however, the apparently simple V-groove cam which was the main element of the device, was found to present a problem. Conventional metalworking techniques were found not to produce the cams at a reasonable cost. Both the use of the cam in a circuit board and the method of producing the cam are new.

The solution was found by die-casting the small metal cams. The tiny cylinders, shown in the right hand corner in the picture below, are less than 11/32nds of an inch in overall height, and ¼ inch in diameter, have a screw slot at one end, and a groove in the center.



As the cam is turned on its pivot, this groove forms a triangular opening with the metal cell wall, which is almost tangent to the cam. This V-groove is the developed surface of the cam; it varies in width, depth and angle of V along its length.

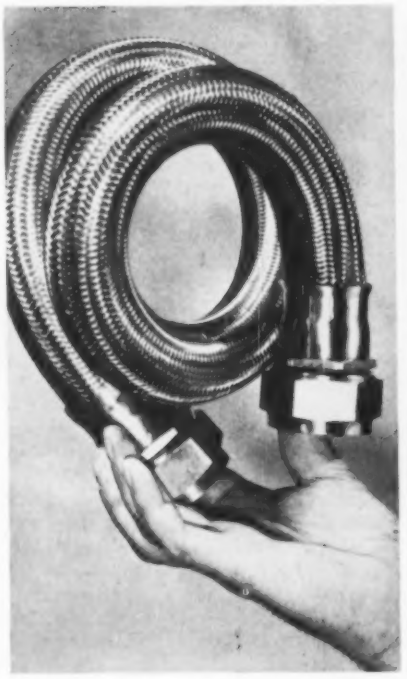
One or more bare wire ends can be inserted between the cam body and the metal cell wall, and as the cam is turned toward the wire, the advancing cam surface meets the wire surface and wedges all the wires against the cell wall.

If tension develops in the wires, the cam is further rotated in the same direction to lock the wires more securely into place. However, the connection can be broken simply by turning the cam and pulling the wires out. Manufacturer: Gries Reproducer Corporation, New Rochelle, N. Y.

Automatic pipe cutter

A new automatic pipe cutter is being used to prepare stainless steel for chemical uses, because the oxy-acetylene process will contaminate the metal. The pipe cutter is operated from a control board attached to it; one dial is set to the inside diameter of the pipe being cut, and one to the diameter of the outside of the mating pipe. A third dial is turned to the angle of intersection of the two pipes, and the fourth controls the distance of offset, when one pipe meets a larger one off center, thus requiring a deeper cut on one side than the other. The entire job of calculating depth of cut is thus done automatically, simplifying the job.

Until this new machine was adopted a six-step process was used. It consisted of making a layout, marking the pipe, sawing, and then burning. Finally the cut had to be bevelled to a proper fit. The new machine can do the whole job in one operation, thus saving labor and waste. Manufacturer: General Electric Company, Schenectady 5, N. Y.



New hose with unique flexibility

Exceptional bending power and strength are the characteristics of Springfield 400, a Teflon hose for use mainly in the petroleum, chemical and steel industries. Unlike most Teflon hose, Springfield 400 does not have an extruded innercore. Instead, unsintered Teflon tape and Teflon-impregnated fiberglass tape are wrapped and fed into a die which forms the laminated structure into helical convolutions. The innercore thus produced has considerable resistance to corrosion as well as exceptional flexibility. Springfield 400 has a bent radius of about three times its inside diameter and will operate at temperatures up to 400°F. It is presently available in inside diameters up to 2 inches, although the manufacturers suggest that 4 and 6-inch hose may be produced soon with the same characteristics.

In the manufacturing process several steps are followed: First the Teflon tape and Teflon-coated fiber are wrapped around a mandrel. Then the shaped innercore is cured in an oven designed to accept 25-foot lengths, and heat them slightly above the melting temperature as they pass through. The Teflon is thus fused together and becomes flexible. The oven is a specially designed one in which the heat cannot vary more than several degrees, or else the hose would become brittle. After removal from the oven, the hose is braided with stainless steel covering to strengthen it. Specially made bobbins braid the steel as the hose passes along, and finally ends are fitted over the edges of the steel covering. These ends must be inspected carefully to see that they entirely cover the braiding. The hose is constructed so that if a break occurs, it will occur in the middle of the length, because a break in the end would be more difficult to detect and harder to replace. Manufacturer: Titeflex, Inc., Hendee Street, Springfield, Mass.

"Signal-splitting" triode

A twin-triode receiving tube with four plates instead of the normal two offers designers a component which may save cost and space, according to the manufacturer, General Electric.

The tube is now in mass production and is registered by GE as the 12FQ8. The extra plate in each section of the tube offers an additional output from that stage which makes it possible to take two well-isolated outputs from one stage. For example, as used in the Wurlitzer Organ for built-in percussion, the tube can create such special effects as Hawaiian guitar, marimba, Scotch bagpipes, bells, chimes, glockenspiel, celeste, and harp plus vibration, or echo, effects.

The tones are taken out of frequency generator stages on two separate plate pins. One goes through the standard amplification process. The second output feeds the tone to a "delayor," which, when added to the original tone, can create a percussion effect. Although two tubes could be used for this purpose, the twin-double plate triode can do the job alone thus saving assembly time. Manufacturer: General Electric Company, Schenectady 5, N. Y.

Reproducing stone-work

Molds made from vinyl plastisol are now being used to form duplications of hand-carved stonework in mass-production quantities and at low cost. Concrete, colored or natural, can be used in these molds to produce any number of inexpensive reproductions for use on buildings. The process first involves creating a pattern of the stone work to be copied. A sand mold can then be made from the pattern, and an aluminum master mold cast with stainless steel tubing for later heating and cooling.

The plastisol, supplied by Precast Building Sections, Inc., of Hyde Park, N. Y., is based on Geon 121 resin, a Goodrich product. It is poured into a preheated aluminum and allowed to jell. After the vinyl has cooled, it is stripped from the mold and a durable mold results. Concrete can be poured into molds made in this way for mass-production purposes. A freeing agent will enable the molds to be removed easily and without damage to them.

In the case of large pieces of stonework, where the weight of the concrete is apt to be a problem, a vinyl mold can be backed with casting plaster to increase rigidity. This will increase the strength of the mold to hold the weight of the concrete.

The cost of such molds is considerably less than the wood molds conventionally used. Other advantages are that vinyl molds are flexible and can be peeled off the undercuts, the surface can be made to reproduce a variety of finishes on the concrete, and as many fixtures can be cast as is necessary from the same mold. Source: B. F. Goodrich Chemical Company, 3135 Euclid Ave., Cleveland, Ohio.

Locking cable ties

A device for locking bundles of wire cables together is being marketed under the name, "lok-straps." The cable ties, which support bundles and can anchor them in any position, consist of minature quick-release locks which hold the cables tightly but will open with a few ounces of finger pressure. They can be loosened and tightened to permit alignment of cables. The ties are made of nylon and have good insulating characteristics, high tensile strength, and a service temperature range from —65° F. to 300° F. Manufacturer: Panduit Corp., Midlothian, Ill.

Latex for paper coatings

A new latex that has greater adhesive strength and less foam has been developed for pigmented paper coatings. Known as Dylex Latex KCD-154, this new product is available in small quantities, although still, according to the manufacturers, in the development stage.

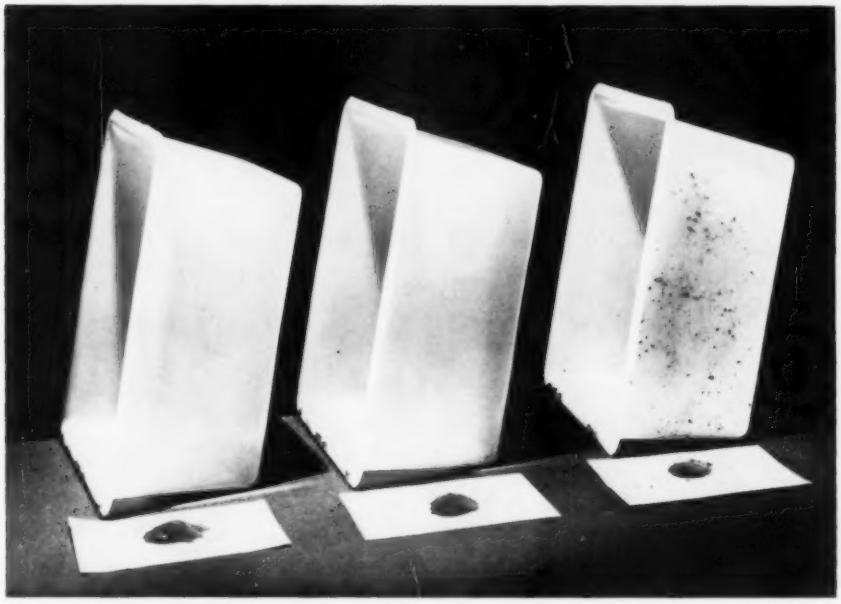
Improvements over conventional styrene-butadiene latices have been obtained by carefully adjusting the emulsifier content and by fortifying the polymer during polymerization.

The new latex is reported to have as much as 50% increased strength, which results in better pigment binding and increased pick resistence of the coated sheet.

Also, foaming tendencies are reported to be reduced and the foam initially dissipates more rapidly than with conventional latex. Manufacturer: Plastics Division: Koppers Co., Pittsburgh 19, Pa.

Locator light

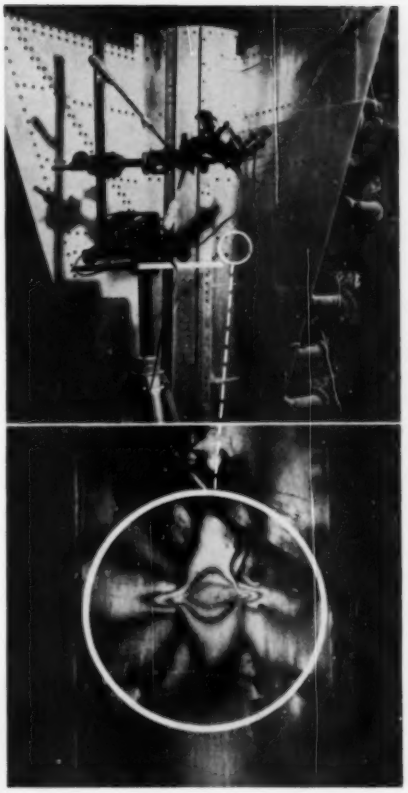
An ingenious light for drill presses, terminal setters, punches, riviting machines and similar equipment can be fixed on machine tools to spot the work area with a beam of light. Called Localite, it is 3½" long and comes with a transformer, prism, bulb, and bracket, which can be mounted on the machine. The Localite may be a particular help in operations such as drilling in insufficient light or badly directed light to reduce strain on the operator. Manufacturer: Black & Webster, Inc., Watertown, Mass.



New compound reduces static attraction of dust particles

Two new polyethylene compounds have been developed which, for the first time, eliminate dust attraction by injection-molded articles. Previous polyethylenes generally used for housewares retained a static electric charge which attracted oppositely charged dust particles, thus making cleaning a frequent necessity. The new materials are designated Bakelite Polyethylene DNDA-0401 and DPD-7366. They possess all other properties of polyethylene housewares compounds, but without any charge of electricity. According to the manufacturers, housewares made with the new compounds have good low-temperature resistance.

In the picture above, left to right, are two injection molded trays molded from the new material, and a third of conventional polyethylene. All were rubbed with a cloth and placed before a pile of cigarette ash. The photograph, taken a minute later, shows the effectiveness of the new materials. Manufacturer: Union Carbide Plastics Company, 420 Lexington Avenue, New York City.



Plastic aids in stress analysis

PhotoStress is a new quantitative stress-analysis tool which converts strain into colors. The material is used to calculate strain and stress on metals.

PhotoStress is a transparent, birefringent (doubly-refractive) plastic which can be applied to an actual part to be stress-analysed as either flat sheet, formed sheet, or liquid. The plastic sets without refractive qualities in itself. When the part to which the material is bonded is subjected to strain, the plastic follows the deformation of the part. When it is deformed, Photo-Stress becomes birefringent —that is, shows two sets of fringes under polarized light. Black fringes give the directions of principal strains, while color fringes give the magnitude of strains in the part being stress-analysed. The plastic, thus, behaves like an infinite number of tiny gages distributed over the part. The fringes may be "read" or photographed to give an indication of the stresses to which the part is subjected.

In the photograph above, fins of a missile are covered entirely with PhotoStress plastic. The instruments are in place for strain measurement. An enlarged view of a stress area at the base of the right fin is shown by a fringe pattern in the plastic covering. Manufacturer: The Budd Company, 2450 Hunting Park Ave., Philadelphia 32, Pa.

Non-combustible box

Non-combustible boxes for material handling have been designed by Beacon Boxes. These fiber boxes are rigid, low in cost, light-weight, and non-tarnishing, according to their maker.

The boxes have been tested in numerous places and found to be non-flammable. In one test, made by the manufacturers, the box survived a fire made with burning magnesium chips for 15 minutes. In the picture above, the blow torch has been playing on the box for five minutes at about 1660° F. resulting only in a shredded spot in the path of the flame. The box is suggested for use where it may be exposed to welding sparks, etc. Manufacturer: Beacon Boxes, Massillon, Ohio.

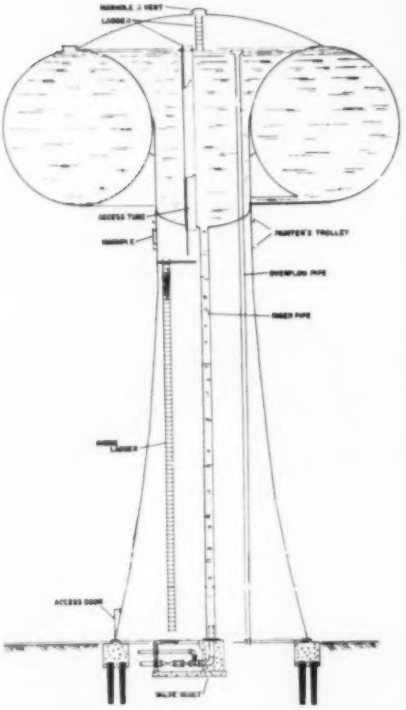
Adhesive for train tracks

A new metal bonding agent called Bondarc, which provides smooth butt joints between metal parts, is currently being used for bonding rail into continuous units. Most rails are joined by joint-bars on each side of the rail and bolted together with two or three bolts at each rail end. These joint bars do not get full contact with the tops and bottoms of the rail contours, because they cannot be matched to very close tolerances except at a prohibitive cost. Play in the connections develops as the trains pass over. The result is that passing trains batter the rail edges leaving an uneven wearing surface. This is the cause of the "clickety-clack" one hears.

The new adhesive is meant primarily for use with tracks. It binds them together, freezing them immobile, thus providing a smooth joint between rails. Bondarc is thermosetting and is mixed on the spot. Manufacturer: Armstrong Cork Company, Lancaster, Pa.

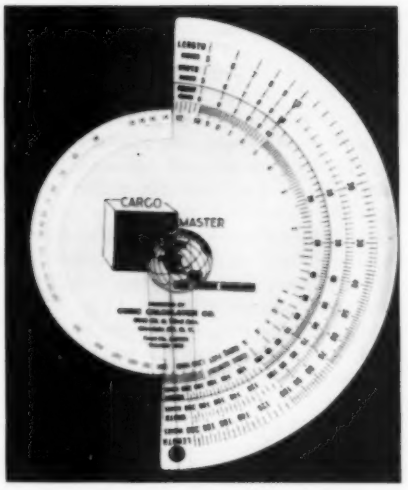
New water tower

A new design in large-capacity elevated water storage tanks for city or industrial use has been introduced by Graver Tank & Mfg. Company. The water tower, which is called an Aquatore, is supported by a



single steel column and can have a capacity of from 300,000 gallons to over 3 million gallons. The appearance of the tower is distinctive; it looks like a mushroom with corrugated sides. According to its manufacturers, the Aquatore will have lower costs of operation, due to the elimination of struts, tie rods, and balcony floors. A more constant water pressure will be maintained and no pump house will be needed.

The product's name comes from aqua—water, and torus, an engineering term for doughnut, which company officials said it resembles. Dimensions for a typical Aquatore with a capacity of 1,500,000 gallons would include a tank 94 feet in diameter, and 34 feet in height. The column diameter would be 46 feet at the ground narrowing to 23 feet at the tank. A normal height might be 100 feet. Manufacturer: Graver Tank and Manufacturing Company, East Chicago, Indiana.



The cubic calculator

A fast way of calculating the cubic contents of shipping containers is made possible by a new device introduced by the Cubic Calculator Company. The device, which is of plastic, is 7½ inches in diameter and less than ⅛ of an inch thick. It consists of three concentric disks calibrated from 5 to 200 inches. By moving a calculator arrow to the specified length, width and height, the cubic capacity in feet can be read. The foot total is useful in estimating shipping costs. According to the manufacturer, the device will cut costs by speeding time needed for such calculations. Manufacturer: Cubic Calculator Company, Glendale, N. Y.

New way to scale meters

A method of scaling and calibrating meter dials from commercially available dial blanks has been developed by Arthur Ruge Associates. The method utilizes the engineering firm's model SM-1 Scale Marking Machine, a hand operated instrument which, with the aid of lettering and a draftsman's set, can scale blanks for 2" to 7" meters. The manufacturer claims that this time-and-labor saving device will enable inexperienced personnel to produce neat and accurate scales. Manufacturer: Arthur Ruge Associates, Hudson, New Hampshire.

Manufacturers' Literature Supplement

A bibliography of currently available technical brochures

dealing with materials, methods, components and machines

Materials — Metals and Plastics

1. **Cold Extruded Metal Parts.** Burgess-Norton Manufacturing Company. Bulletin treats process of producing parts, their physical characteristics, mechanical properties, economies, and applications. 4 pp.

2. **Control Valves.** DeZurik Corporation. Bulletin 150 describes manufacturer's complete line of control valves, lists valve bodies and actuators. Illustrated with diagrams. 18 pp.

3. **Fastener Sample Board.** Richo Plastic Company. Sample board mounts binding, fillister, round, flat and washer head screws, with washers, insulators, hex nuts and screws.

4. **Hollow Metal Doors.** Ceco Steel Products Corporation. Brochure gives data on doors, frames and hardware, and shows how they can all be selected from one source. Includes illustrations of lock-sets, bolts and bumpers. 32 pp.

5. **Titanium Fact File.** Mallory-Sharon Metals Corporation. Booklet contains sections on titanium's high temperature performance, corrosion resistance, erosion resistance, welding, testing, with lists of alloys and mill shapes available. 24 pp.

6. **Metal Clamps.** Sterling Instrument Corporation. Catalog 50 lists all miniature clamps of the manufacturer. Diagrams and data. 48 pp.

7. **Titanium Fasteners.** Standard Pressed Steel Company. Catalog of titanium fasteners and review of manufacturer's special facilities for handling the metal. 12 pp.

8. **Sintered Metal Parts.** Burgess-Norton Company. Bulletin describes process of making sintered metal parts, their applications and characteristics. 4 pp.

9. **Plastic Materials.** National Vulcanized Fiber Company. Booklet on choosing between vulcanized fiber, nylon, or phenolite. 15 pp.

10. **Polyglycol.** Dow Chemical Company. Lists 40 polyglycols, description, manufacture and use. 24 pp.

11. **Dacron Polyester Fiber.** Du Pont Corporation. Describes performance of V-belts made of new fiber. Folder, 5 pp.

12. **Liquid Polyvinyl Plastics.** Bee Chemical Company. Liquid Polyvinyl plastics are described in booklet. 16 pp.

Methods

13. **Dust Control.** Torit Manufacturing Company. Information sheets on dust control machinery.

14. **Oil and Gas Machinery.** Steel Founder's Society of America. Product Design Study No. 93, deals with installations for drilling, etc., booklet.

15. **Docker Facts.** Automatic Transportation Company. Booklet on facts about handling materials in congested areas. 8 pp.

16. **Graphic Level Recorder.** General Radio Company. Technical booklet on the instrument. 10 pp.

17. **Vibration and Shock Controls.** Voss Engineering Company. Manual on vibration problems. Limited number.

Products and Components

18. **Sealed Relay Catalog.** General Electric Company. Bulletin GEA-6628. Booklet contains information on hermetically sealed miniature and sub-miniature relays for military and general purpose application. 24 pp.

19. **Nameplate Designing.** H. G. Dietz Products Company. Booklet. A manual of instructions covering the lettering, composition and procedure, and materials for designing nameplates. With illustrations. 20 pp.

20. **Conveyor Wheels.** Grey Hub Trolley Wheel Company. Data sheets on design and construction of sealed ball and roller bearing conveyor wheels, hoist trolleys and rollers.

21. **Centrifugal Pumps.** Marine Products Company. Bulletin 1004. Bronze and iron centrifugal pumps with capacities up to 320 GPM and pressures up to 40 psi are described. 6 pp.

22. **Plastic Mouldings.** Glass Laboratories. Booklet describes fittings available for Silvatrim, which simulates brass, chrome, copper or gold, with foil inserts. 4 pp.

23. **Clamp Locks.** Simmons Fastener Corporation. Clamp Lock data sheet for Simmons products.

24. **Infrared Heating.** Edwin Wiegand Company. Catalog describes Chromalox electric heat, and infrared heating advantages. 8 pp.

25. **Bellofram Seals.** Bellofram Corporation. Bulletin No. BF-200-3 describes design manual of Bellofram seal and its applications in regulating valves, fluid barriers, etc.

26. **Tap Selection.** Besley-Welles Corporation. Booklet describes selection of taps, information on size of fit, gauge data and availability from stock. Illustrations and tables. 30 pp.

27. **Photoelectric Control Catalogue.** General Electric Company. Bulletin GEA 6822. Booklet describes GE's full line of controls for virtually all industrial counting, sorting, detecting, or limiting. Included are descriptions and pricing data on relays, timers, and other electronic devices. 16 pp.

28. **Recording Tape Reliability.** Du Pont Corporation. Booklet summarizes test results on magnetic tapes, their materials, components, quantities. Charts and illustrations. 10 pp.

29. **Electric Doors.** Barber-Coleman Company. Ref. No. 42159. Booklet presents catalog of line of residential, commercial and industrial doors, and electric door controls. Specifications and instructions for some installation problems given. 16 pp.

30. **Self-Locking Fasteners.** Elastic Stop Nut Corporation. Catalogue No. 5711 describes latest designs in miniatured self-locking fasteners. Charts offer visual comparisons of sizes and shapes. Drawings of miniature hex, clinch, and floating anchor nuts. 32 pp.

Miscellaneous

31. **Low Temperature.** Hofman Laboratories. Booklet deals with developments in low-temperature chemistry, solid-state physics, superconductivity, metallurgical research, etc., and is illustrated. Technical data on liquid helium, hydrogen, and nitrogen. 44 pp.

32. **Deep Groove Bearings.** Hoover Ball and Bearing Company. Bulletin 110. Describes types and sizes of Hoover ball bearings, with application data. 12 pp.

33. **Concrete Floors.** The Master Builders Company. Bulletin MP-4d. Bulletin discusses longer life for concrete floors and is illustrated with photos and diagrams of the design of industrial floors. 24 pp.

34. **Flexographic inks.** Claremont Corporation. Bulletin 609 describes qualities of high gloss, one-solvent reducible inks. 2 pp.

35. **Flight Research.** Flight Research Inc. Issue of *Flight Recorder*, dealing with uses of photography and other equipment in radar. Data sheets and illustrations.

36. **Cellular Glass.** Pittsburgh Corning Corporation. Describes physical properties and available sizes of Foamglass cellular glass. Applications, such as roofing are also discussed. Accessories and technical data are shown. 20 pp.

37. **Slide Film Library.** National Retail Merchants Association. A list of 22 titles of films available for showing successful sales promotions in retail shops. Catalog available upon request.

38. **Stand for Animation.** Animation Equipment Corporation. Folder containing specifications and data on the Oxbery Unistand, designed for animation, film strip, title, commercial photography and photo engraving work. Illustrated with drawings and photos. 4 pp.

39. **Photocopy Machine.** F. G. Ludwig, Inc. Booklet listing ways in which a photocopy machine can be used and its applications to business, industry and institutions.

40. **Radiation Sources.** Nuclear Systems Division, The Budd Company. Brochure details available radiation sources for radiation research, radiography and teletherapy. Also mentioned are training courses for new customers, and radioisotopes. 12 pp.

41. **Printing Demand Meters.** General Electric Company. Booklet GEA-6892 describes GE's line of redesigned printing meters for precision recording of loads. Discusses application, design and cost of meters. Also includes construction and electrical specifications. 8 pp.

42. **Divider-Type Shelf Filing.** Sperry-Rand Corporation. Folder LBV 725 Rev. 3, illustrates how divider-type shelf filing saves space and reduces the cost of filing by cutting costs of drawers.

43. **Drill Point Grinder.** Morse Twist Drill and Machine Company. Illustrated folder contains specifications and prices for a new machine which is reportedly capable of grinding any type of drill point at higher speeds and to closer tolerances.

44. **Ceramic Filter Element.** Commercial Filters Corporation. Brochure describes properties and performances of new porous ceramic filter, made from specially formulated glass, and suitable for micro-filtration of corrosive and high-temperature liquids and gases. Filter tubes available in three sizes, and also as discs, sheets, and cylinders of other sizes. 4 pp.

45. **Customer Service for Packaging.** Customer Service Packaging Laboratory, Air Reduction Company. Brochure describes complete laboratory facilities offered by ARC to solve problems arising from the development of compressed gas propellants used in "aerosol" packaging. Offers testing of food and non-food products for suitability to this type of packaging, and field advisory service for establishment of new plants for packaging processes. 6 pp.

46. **Gases for Food Products.** Ohio Chemical & Surgical Equipment Company. Booklet describes in detail how the principal air-reduction gases (nitrogen, nitrous oxide, carbon dioxide, argon, hydrogen) can serve in packaging to blanket a food product, propel the product from a pressurized package, quick-freeze or refrigerate the product, and accomplish desired chemical changes. Gives physical properties of these gases, factors in choosing them, and list of supply sources in the U.S. 24 pp.

47. **Comparison of Magnetic and Area Flowmeters.** Fischer & Porter Company. Case History Bulletin 90-130-27 compares performance of magnetic and variable-area flowmeters in metering fine newsprint machines in the continuous automatic stock proportioning system of a typical Canadian paper mill. 6 pp.

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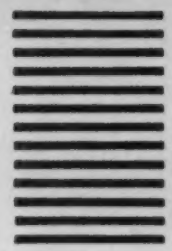

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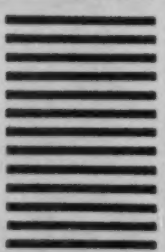

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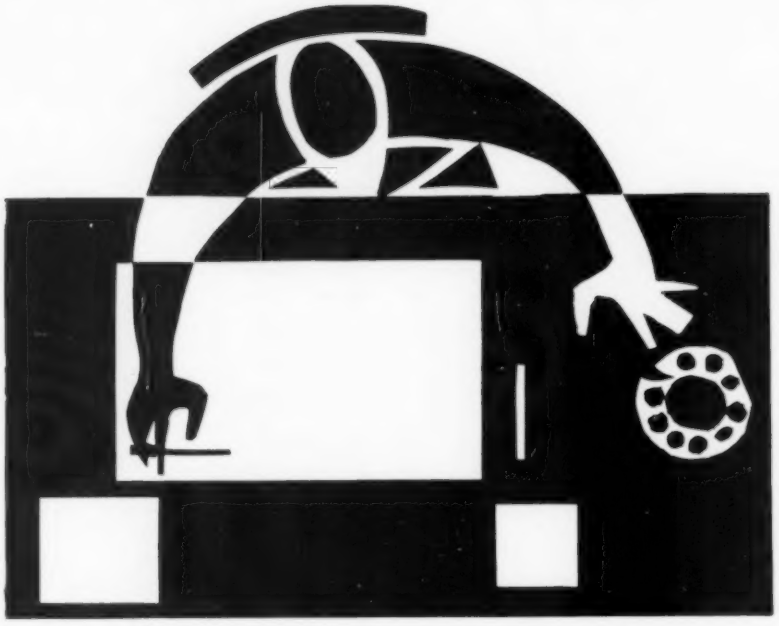

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list of designers

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PROMINENT MANUFACTURER OF INSTITUTIONAL OFFICE FURNITURE *is establishing a national sales organization to sell to architects and interior planning firms. Write fully stating territory covered and all pertinent information. Box ID-250,* INDUSTRIAL DESIGN, *18 East 50th Street, New York 22, New York.*

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Miscellaneous

MODEL MAKER—FREE LANCE: *Product models, furniture models, architectural models, wood, metal plastic. Box ID-259,* INDUSTRIAL DESIGN, *18 East 50th Street, New York 22, New York.*

For Your Calendar

September 21-October 25. Exhibition of Norwegian Folk Art. Brooklyn Museum, New York City.

Through October 25. Exhibition of Newsprint Advertising Graphics by Arnold Varga. Carnegie Institute, Pittsburgh.

Through the winter. Structures by Buckminster Fuller. Exhibition of actual structures. Museum of Modern Art, New York.

Through November 8. International Packaging Exhibition, Museum of Modern Art, New York.

September 21-22. Annual international conference of the Standards Engineers Society. Hotel Somerset, Boston.

September 21-25. Instrument Society of America: 14th Annual Convention and Exhibit. International Amphitheater and Palmer House Hotel, Chicago.

September 21-25. Congress of the International Council for Building Research Studies and Documentation. Rotterdam, Holland.

September 28-October 1. American Welding Society national fall meeting. Sheraton-Cadillac Hotel, Detroit.

October 5-6. Conference on Packaging Specifications. Purdue University, Lafayette, Indiana.

October 5-9. Eleventh annual convention and professional equipment exhibit of the Audio Engineering Society. Hotel New Yorker, New York.

October 6-10. New York High Fidelity Music Show. New York Trade Show Building, New York.

October 7. Vinyl Plastics: Regional technical conference of the Society of Plastic Engineers. Cleveland Engineering Society Building. Cleveland, Ohio.

October 7-9. National symposium on vacuum technology, sponsored by the American Vacuum Society. Sheraton Hotel, Philadelphia.

October 10. 1959 IDI Symposium: "Polydirectional Horizons." Silvermine Guild of Artists. Silvermine, Connecticut.

October 13-14. "Plastics Engineering: state of the art today." Technical conference of the Society of Plastics Engineers. Ambassador Hotel, Los Angeles.

October 17-31. National Business Show. New York Coliseum, New York.

October 20-24. Twenty-fourth Annual Paint Industries Show. Convention Hall, Atlantic City.

October 26-30. National conference of the Society of Photographic Scientists and Engineers. Edgewater Beach Hotel, Chicago.

November 8-10. First Toy and Housewares Production Show. New York Trade Show Building. New York.

November 10-12. Tri-Annual products of industry exhibit. Milwaukee Association of Purchasing Agents. Milwaukee Auditorium, Milwaukee.

November 15-20. Conference in developments in packaging. University of California center at Lake Arrowhead.

November 16. Western Appliance Technical Conference. Biltmore Hotel, Los Angeles.

November 16-20. Fifth Norelco Electron Microscope School. Hotel Victoria, New York City.

November 19. "Plastics in Packaging," Technical conference of the Society of Plastics Engineers. San Francisco, California. Place to be announced.

November 17-19. Building Research Institute Fall Conference. Shoreham Hotel, Washington D.C.

December 1-3. 1959 Eastern Joint Computer Conference. Statler Hilton Hotel, Boston.

December 11-February 14. First World Agricultural Fair. New Delhi, India.

March 28-30, 1960. Advertising Essentials and National Sales Show. Hotel Biltmore, New York City.

May 23-26, 1960. Annual Design Engineering Show. New York Coliseum, New York City.

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