INDUSTRIAL DESIGN

4 *April 1957 $1.50 per copy*

Newcomers in foams: what do they offer?

Housewares review

Canon camera: Japan designs for the world market

Martin Rosenzweig

Case for comfort control

A twist of the knob on the handsome plastic case, and the lady has dialed the precise amount of heat—and comfort—that will be maintained through the night by her new automatic blanket made by Fieldcrest. She probably hasn't given a second thought to the little control box she adjusted so easily.

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1932 – EASTMAN'S 25TH YEAR IN PLASTICS – 1957

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plastics by Eastman

Control box of Tenite Acetate plastic molded and decorated by Madan Plastics, Inc., Cranford, N. J., for Fieldcrest Mills, Inc., New York 13, N. Y.

APRIL, 1957 VOLUME 4 NUMBER 4

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 design, development and marketing.

CONTENTS

COVER: The juxtaposition of Japanese symbols for man (upper right), bird (lower right) and eye (left) with drawings of a new Japanese camera suggests the influence that Japan's calligraphic tradition has had on industrial design in that country. The symbols are taken from a panel created by Genichiro Inokuma for the Canon Camera Company's New York showroom. The drawings are part of the design development of the Canon V 35 mm camera, described in detail on pages 104-109.

FRONTISPIECE: The masonry grille that will screen the sun from the windows of the United States Embassy in New Delhi, designed by Edward Stone, now screens one portion of the Museum of Modern Art's "Buildings for Business and Government" exhibition, shown on pages 61-65. (Photograph by Hugh B. Johnston.)

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ADVERTISING OFFICES

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

Chicago Archer A. King & Company
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San Francisco 5, California

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

Memphis Weaver, Incorporated
1604 Raymore
Memphis, Tennessee

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

Member of the Audit Bureau of Circulations

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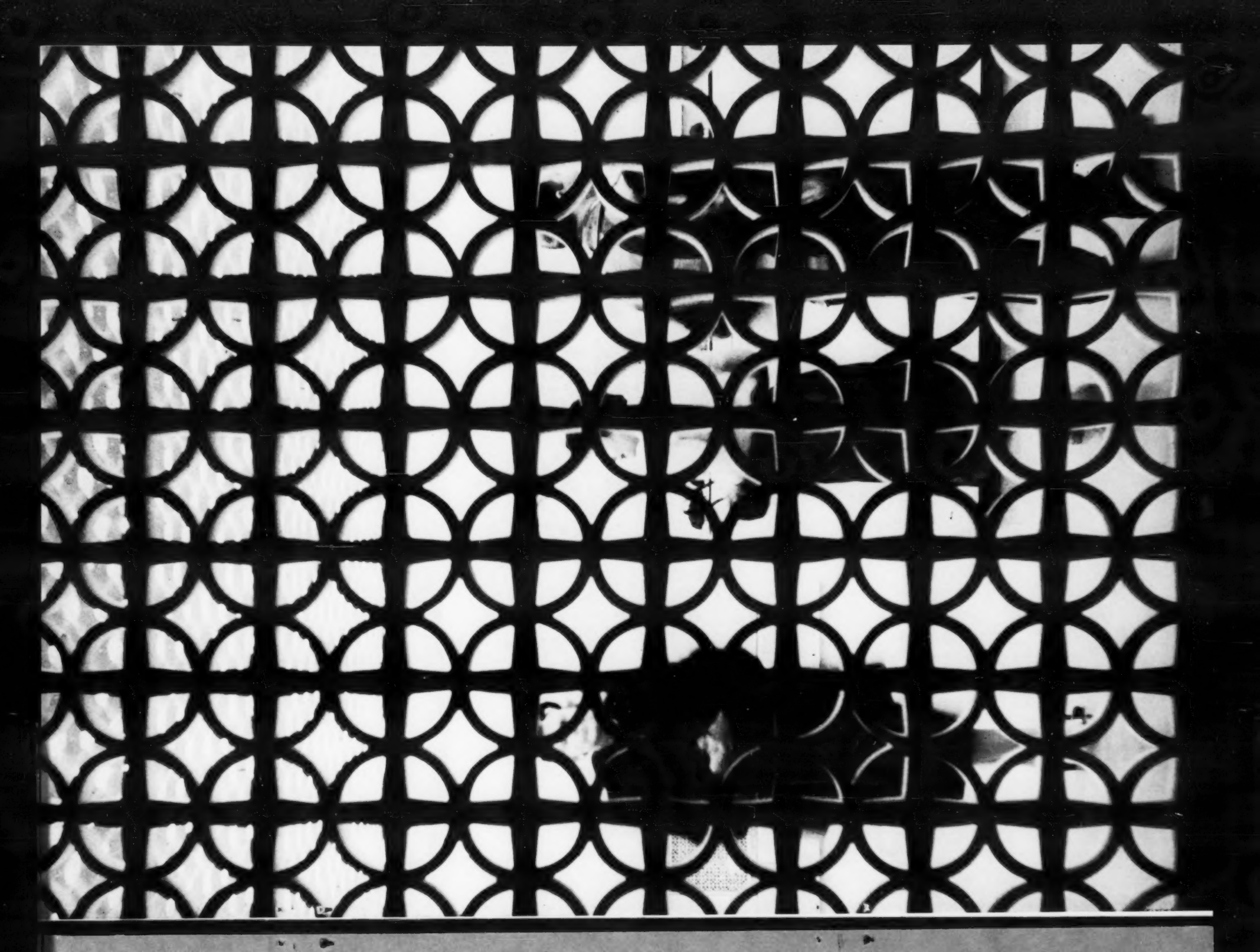

in this issue...

Teague

Goldsmith, Chapman

Adams, Jergenson, Nakamura, Coleman

Renaud, Muller-Munk, Karlen

McDermott, Smith, Scherr

Wirkkala

Dave Chapman and **William M. Goldsmith**, general manager of Dave Chapman Industrial Design, study some of the handcraft that they collected on their survey, under the ICA program (pp. 56-59). DCID, established 21 years ago in Chicago, is also involved in product and package design for Montgomery Ward, product development for Corning Glass, a line of lawn and garden implements for Scoville Mfg. Both Chapman and Goldsmith are members of ASID, Goldsmith being vice president.

Walter Dorwin Teague, founder and first president of ASID, is actively involved in design for the U. S. government on many fronts. In addition to the ICA programs (pp. 52-53), Teague Associates have designed a trade fair for Vienna, one for Zagreb opening this year. In this country they are involved in the multi-million dollar interior and equipment design program for the new U. S. Air Force Academy, where some 60,000 separate items will be needed. Interiors and equipment for the new military museum and academic buildings at West Point are also under the aegis of Teague Associates.

E. A. Adams, George Jergenson, John Coleman and **Frank Nakamura** of the Art Center School of Los Angeles toured Japan to advise on design of export items (pp. 54-55). Founder of the School, Adams has directed it for 25 years. Jergenson and Coleman, heads of industrial and product design respectively, were connected with GM's styling department. Nakamura is an art Center graduate.

Peter Muller-Munk, who has directed his own office in Pittsburgh since 1944, is flanked by two of his associates in the ICA program (pp. 48-51): **Robert J. Renaud** and **Paul Karlen.** Muller-Munk Associates is also consultant on the United States entry for the Brussels International Fair slated for 1958. Among other projects, they have designed Sylva-Lume, a lighting system for Sylvania, cameras and projectors for Bell & Howell, a kitchen for Westinghouse. Muller-Munk is a member and past president of ASID.

Samuel Scherr, middleman of Smith, Scherr & McDermott of Akron, Ohio, made the trip to Korea to lay the groundwork for the firm's participation in the ICA program (pp. 54-55). All three members date their friendship and mutual interest in design to days at Cleveland Institute of Art. In 1947, **F. Eugene Smith** and Scherr opened their own office; eight years later **Bernard McDermott** joined them. All are members of ASID. Work in progress includes children's wheeled toys for Blazon International, air conditioning equipment and furnaces for Perfection Industries, plastic housewares for Wooster Rubber Co.

Tapio Wirkkala brings to the design of a lamp (pp. 88-89) the craftsman's knowledge of materials, the artist's feeling for form. As designer for the Karhula-Littala Glassworks in Finland, he has experimented audaciously with the dimensions of crystal. He has just been commissioned to design new bank notes for the Finnish government.

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CLIPS AND QUOTES

Howard Engstrom, *National Security Agency, in his keynote address to the* **Eastern Joint Computer Conference,** *Dec.* 10, 1956:

"The enthusiasm with which electronic data handling and automation possibilities have been greeted is astonishing. I should not like to state categorically that the field has been much oversold, but I do think the over-optimism of engineers and scientists in the field is a definite fact. This optimism causes serious complications. There have been too many cases of long delays in the delivery of vital equipment. Many of these delays, I believe, could have been avoided had the project been less ambitious technically. Another aspect of the industry which I believe you should consider rather seriously is that of engineering manpower. The usual procedure following the award of one of the major (Department of Defense) contracts is for any industry to lure engineering personnel from its competitors. As a result there is an inflationary spiral of salaries for engineering and scientific personnel.

I believe you have lost a great deal of dignity in participating so actively in this mad scramble for personnel. It is certainly your responsibility to see that our industrial and defense program is on a sound basis. We have developed computing equipment of tremendous speed and capacity, and what perplexes the industry and the Department of Defense is the sluggishness of the human spirit in participating in their fundamental problems." ❞

Randall Jarrell, *poet and critic, in a lecture,* **The Taste of the Age,** *at the Library of Congress, Dec.* 17, 1956:

"A great many people are perfectly willing to sit on a porcupine, if you first exhibit it at the Museum of Modern Art, and say that it is a chair. In fact, there is nothing, nothing in the whole world, that somebody won't buy and sit in, if you tell him that it's a chair. The great art form of our age, the one that will take anything we put in it, is the chair.

You can put a spherical plastic gas tower on aluminum stilts, divide it into rooms, and quite a few people will be willing to crawl along saying, 'Is this the floor? Is this the wall?' and to make a down payment and call it a home." ❞

Alan Berni, *package designer, reviewing trends in his field:*

"Mass-production techniques have invaded the package design profession in a dangerous way. All beers today are light, mild and dry, and they feature blues, creams, and spotlighted ovals to prove it. All detergents are billed as soap-soft, but they scream with terse names and glaring colors to win the fight. Salad oil and motor oil are offered in exactly the same bottles. Insecticides and shaving cream are sprayed from precisely the same container.

Where is dramatic packaging form, distinctive for an industry, believable for a product, appropriate and functional for specific needs? It *can* be done. The liquor and cigarette industries have already shown the value of this thinking: distinctively styled decanters have captured new markets and powerful recognition. The flip-top box has been one of the few real package-merchandising developments in almost a decade." ❞

Design

Alec Davis, *in the British magazine,* **Design,** *Nov., 1956—a special issue contributed by Mr. Davis on House Style:*

"First among the advantages of a good house style (company-wide design) I would put the air of personality which it gives to its sponsors. A one-man business has a ready-made personality — the one man's; but as soon as it increases in size, something of this individual character is lost: and with the large organizations which are typical of commerce and industry today, it is a common complaint among customers—and employees too—that they are "up against" a vast impersonal machine. Big business needs to live down its reputation for soullessness, and if it cannot acquire a soul, it can at least acquire a house style.

Improvements in presentation design will often show up weaknesses in the design of the products made in a manufacturing business, of the merchandise sold in a retail store. This is especially true when the improvements involve either packages or premises, as these form the more or less immediate surroundings in which the product is expected to be seen at its best. A good house style can in this way stimulate a more critical approach to the design of manufactured goods; and though this may possibly be an embarrassment at first, it must be counted an advantage in the long run.

Briefly, then, a good house style encourages *esprit de corps* within the organization; it can make advertising more effective, and reduce the costs of producing publicity material; it stimulates constructive self-criticism; and it implies that its sponsors are living in the present century." ❞

Raymond Loewy, *at the* **Home Furnishings Show,** *Chicago Merchandise Mart, Jan.* 9, 1957:

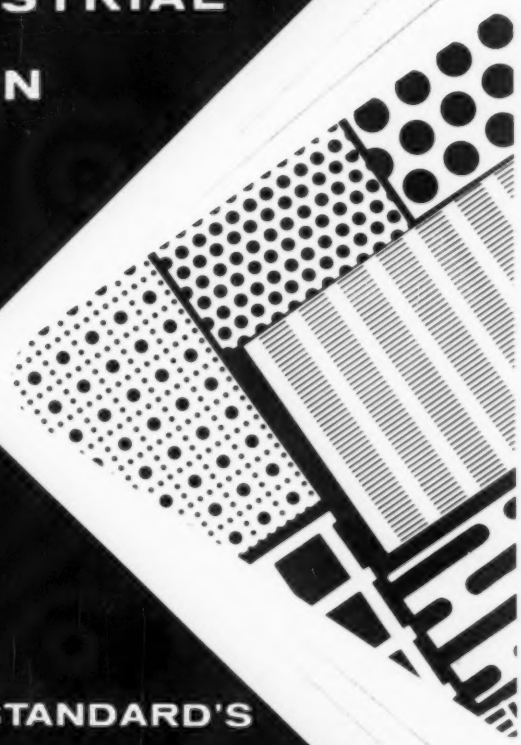
"The home furnishings market cries for two satisfactions based on human desires which our technological society can be adjusted to meet: one, the desire for ways to express individuality, and two, the desire for quality. Inside the home there is an opportunity to demonstrate individuality, especially since many aspects of living — public housing, TV programs, transportation — tend to make Mr. and Mrs. Brown conform, whether they like it or not. As an attempt to offset the monotony, industry should be urged to offer a wider diversity of goods.

Another difference in today's market which affects home furnishings has to do with a moral attitude towards goods. In the recent past a consumer's restraint seemed to be a hangover of Puritanical attitudes towards coming things. It wasn't "nice" to be too colorful, too different. The "changing market" shows that these are not considered reprehensible. It is no longer bad manners to be alive and to express this in a healthy appetite.

No doubt the freedom from restraints can lead to regrettable excesses. It is up to designers and interpreters of taste—buyers, merchants, salesmen—to channel this urge for self-expression. One way is to offer the widest number of correct choices in all goods classifications. There must be increased design flexibility to satisfy the greatest number of individual conceptions of what is good.

Above all, we must stop identifying quality with only one type of design or range of materials. Quality must not be offered as the exclusive property of a limited aesthetic represented by only three or four lines of furniture and accessories." ❞

2 VITAL FORCES IN INDUSTRIAL DESIGN



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NEWS

Mixing bowls, shortening measuring cup, spatulas, canister set (Federal Tool Co.)

Plastic housewares make news in third Koppers contest

The third annual Koppers Design Competition for plastic housewares presented awards in three out of four announced categories on April 2 in Pittsburgh. The prizes, in the form of four full-tuition scholarships in industrial design at colleges of the winners' choice, were given on the selection of a jury which included Jay Doblin, of the Illinois Institute of Technology, Dr. Jesse H. Day, Editor of the Society of the Plastics Industry Journal, and Dr. Mabel A. Rollins of Cornell University.

Best-of-Competition and first prize winner among home maintenance products of polyethylene or polystyrene was Loma Plastics' 20-gallon trash can of low-temperature polyethylene, designed by Paul C. Gunn. Honorable mention in this class went to Republic Molding Corp.'s rectangular pail, and Travel Aids Co.'s Car John (portable children's commode), designed by Robert H. Zoffer, was considered the most original in the category.

First prize in polystyrene products for use with food was won by Flambeau Plastics' mixing bowl set (above), designed by Jack Collins. Picnic knives made by Federal Tool Corp. won honorable mention, while Brown & Bigelow's olive and pickle fork, designed by John J. Olson, was voted as Most Original.

Among polyethylene products for use with food, Flambeau Plastics' 3-piece spatula set (above) designed by Jack Collins and Harold Hulterstrum won top prize, with honorable mention going to Plas-Tex Corp.'s ice bucket (R. J. Willis, designer), and most original designation going to Milmour Products' adjustable measuring cup (above) designed by Seymour F. Fohrman.

The judges decided that although there were several good items submitted in the decorative products category, there were none outstanding enough to warrant awards. But Koppers managed to reward high quality as well as usefulness. A full report of the competition, including both winners and non-winners of special interest in the plastic housewares field, can be found on p. 110-111 of this issue.

Quick data for airplanes in a hurry

The jet age has created a need for a new concept in aircraft instrumentation to keep pace—to make standard readings accurate enough for high-speed airplanes, and to interpret the data quickly enough to use while the same conditions exist. An Integrated Flight Instrument System which Kollsman Instrument Corporation, the developer, claims is the first of its kind, uses only five sensing units to take altitude, temperature and other readings, but combines them with an electronic computer to make each perform many functions.

The reported advantage of the KIFIS system is that it depends on conventional pressure instruments which can function independently, but which are also connected electrically to a computer and to each other. By means of this electrical connection, standard indications are made considerably more accurate and new information is secured. But in the event of electrical interruption, the pilots continue to receive pressure readings for speed, altitude and Mach number (which tells how fast the plane is moving in relation to the speed of sound at a given altitude, to warn the pilot against shock waves in approaching the sound barrier). The other two pressure instruments are an angle of attack sensor and an outside air temperature probe. By means of servo mechanisms the instruments are connected to each other and to the computer.

New information used in detecting and flying the jet streams, but not directly available before, includes minimum safe speed for approach and landing, most efficient cruising speed and true outside air temperature. True airspeed is also given directly, so that involved computations are no longer required.

The nusleus of the system is an altimeter which has a new high accuracy and is designed for easy readability: instead of the hard-to-read 3-pointer dial face, it is redesigned to register thousands-of-feet on a drum and hundreds-of-feet with a pointer.

Many airlines have already specified the Kollsman System for their jet passenger planes, and the Douglas DC-8, the Convair 880, the Boeing 707 and the British Comet will be using it. A full report on this and other developments in aircraft instrumentation will appear in a coming issue of INDUSTRIAL DESIGN.

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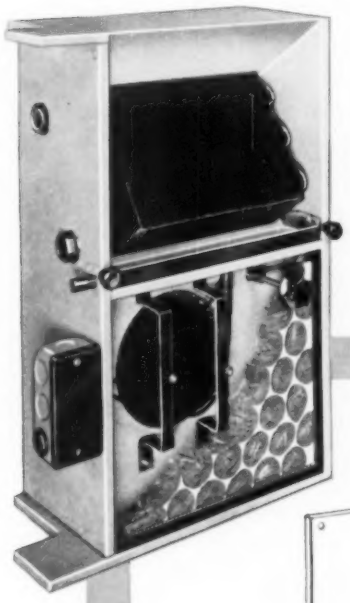

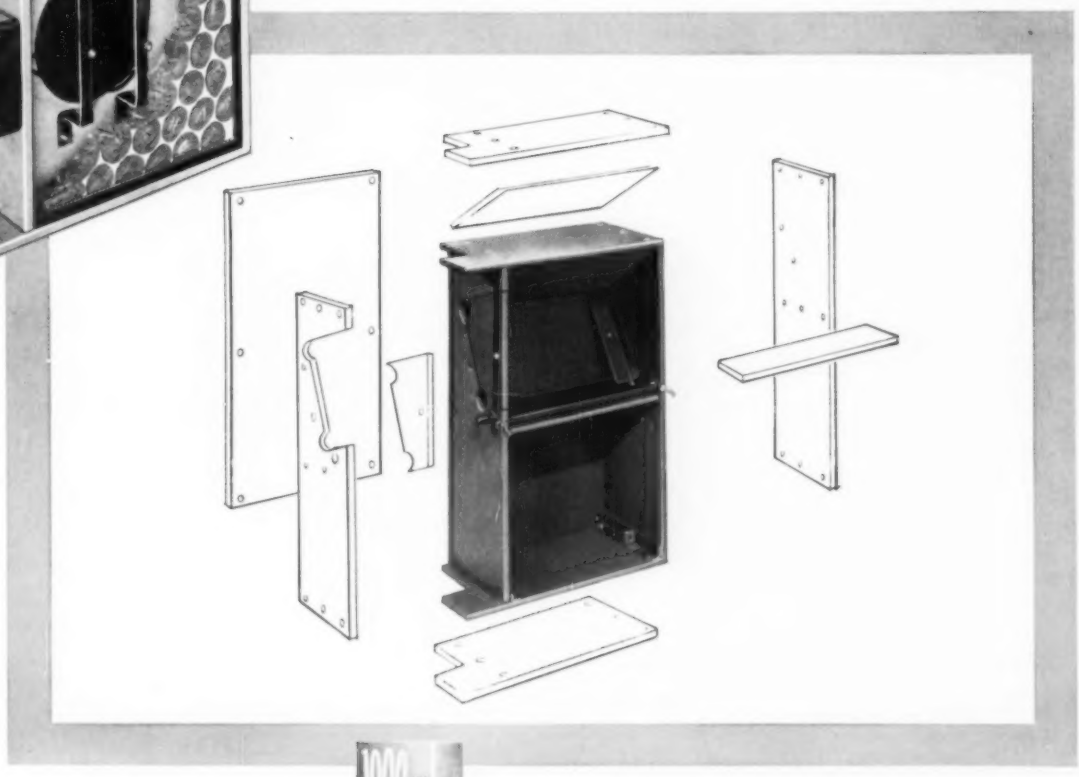

The EJAY Remote Heat and Cool Unit, manufactured by EJAY Baseboard Manufacturing Company, Winsted, Conn., shown above, is a typical example of Upson Fiberboard Engineering. Its toughness and resiliency give this cabinet rugged strength. Its superior finishing and sound deadening properties improve product quality and customer acceptance. Insulated and waterproofed, this Fiberboard cabinet actually solves condensate troubles usually found in metallic cabinets. Each part, shown above, was precision cut to its specified shape and delivered by us *ready for production*. Punched, beveled and die cut, to close tolerances, pieces are easily and quickly assembled, and joined with simple braces and screws. UPSON FIBERBOARD and our specialized engineering and cutting service could be *your* answer, too. Choice of lengths, widths, thicknesses and surface textures. *Send this coupon for our free idea booklet of uses and sample kit.*

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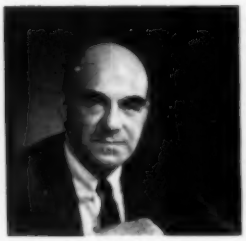


Joseph J. Thursh

Robert W. Schier

New design firm

Members of several leading design and merchandising offices have joined forces to create a new industrial design consulting firm in Chicago. Design Dynamics, Inc. will apply merchandising, marketing and other management specialties to design planning. Officers of the firm include President John L. Cox, former general manager of Raymond Loewy Inc., Chicago; Vice-President Wayne G. Williams, also a former Loewy associate; Vice-President of package and graphic design Bruce Beck, who brings with him the staff of his former independent office; Vice-President of merchandising and marketing Joseph J. Thursh, who has been a vice-president of Macy's and other department stores; and Manager of product and transportation design Robert W. Schier, a former associate of Sundberg-Ferar, Inc.

Design Dynamics offers merchandising and marketing studies as a specific service, as well as relating them to design projects —which have already been launched for eight manufacturing firms. As President Cox explains the firm's orientation, "Design renders its most valuable service to industry and commerce when it becomes an essential tool of management. The design group must count among its leaders professionals in those areas who know and speak the language of business."

The new firm reports it was inaugurated completely equipped, staffed and financed, with offices in the LaSalle-Wacker building, 221 North LaSalle Street.

Canada's design awards

The National Industrial Design Council of Canada made its Design Awards for 1957 more of a national affair than ever before, as 46 of the 54 winners were Canadian-designed. The awards are granted to Canadian-manufactured products, wherever designed, and since the inception of the program six years ago the percentage of foreign-designed articles has steadily decreased.

Over 600 products were submitted this year, in a wide range of categories ranging from furniture to plumbing fixtures. Among the unusual items cited were a series of cooking utensils combining stainless steel and aluminum (Sunshine Waterloo Co.), plastic ski-grips produced in a one-piece mold (Allcock, Laight & Westwood Co., designed by J. D. Mossop and F. Johnson), and a combination gas range and household gas heater (Enterprise Foundry Co.).

The National Industrial Design Council is an independent body which draws its membership from manufacturers, retailers, consumers, designers, members of Canadian government agencies, and others interested in design and production. The headquarters for the NIDC is the Design Centre in Ottawa, where a photographic archives of all Canadian-manufactured articles of design merit is kept. It is from this collection, known as the Canadian Design Index, that the Design Awards winners are selected. The award winners will be displayed in Toronto this month.

Organization news

The Industrial Designers Institute at its national convention re-elected George A. Beck as president and Robert E. Redmann as executive vice-president for the coming year. New national officers are Leon Gordon Miller, treasurer, and John S. Griswold, secretary.

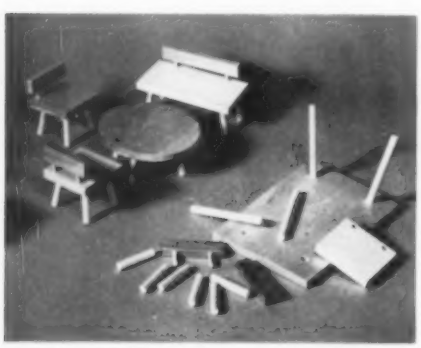
Officers of the IDI New York chapter for this year are Gerald Thurston, chairman, Jens Thuesen, vice-chairman, Peter Quay Yang, secretary, and George C. Graves, treasurer.

Robert Kolli, James Ward, and Gerald Luss have been accepted for active membership in the IDI New York chapter; F. William Militello, Rita Long, Elizabeth Fisher, William B. Evans and Maurice H. Mogulescu were received as Associate Members.

Officers of the IDI's Southern New England chapter for the coming year are Irving S. Allen, chairman, Maurice S. Libson, vice-chairman, Douglas Merrilees, secretary, and Edward Conroy, treasurer.

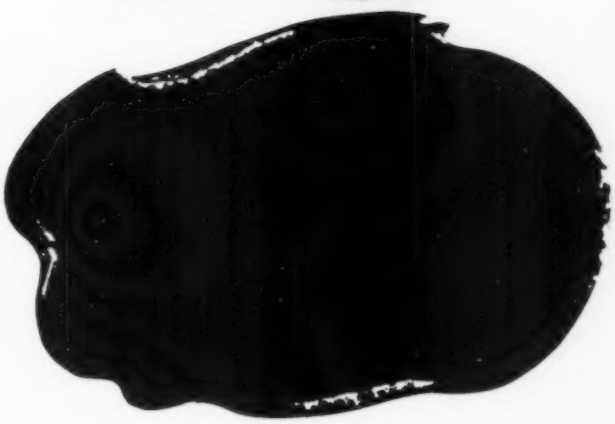
Newly elected members of the American Society of Industrial Designers are William H. Armstrong, Donald H. Behnk and Roger Mark Singer. Frank T. Walsh was accepted as an Associate Member.

Walter Dorwin Teague Associates were hosts to the New York chapter of ASID on March 21 for a tour of the firm's new offices at 415 Madison Ave., New York, and a visit to the full-scale mock-up of the Boeing 707 Stratoliner interior, which they designed.



Canadian design winners include (l. to r.) Maba Toys Ltd.'s doll furniture, AKA Works' arm chair (Sigrun Bulow-Hube and Reinhold Koller, designers), Roto Electric Co.'s fan heater, and A. Richard Ltd.'s hardware (Paul Poirier and Bernard Gregoire, designers).

IMAGINE WHAT YOU COULD DO



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"New concept" in gallery design

When a new art gallery opens in New York, ID thinks nothing of it, but when a gallery called "World House" opened recently, the editors thought twice. "World House" was a "new concept in the exhibition of fine art," according to the press release, and the New York Times called it "a complete departure from the conventional four-square places for pictures and sculpture." Ever alert for new concepts, particularly ones that shake the very four-square foundations of design, the editors travelled uptown to investigate the stairs that "float" and the walls that "flow" and, especially, the "integrated continuity."

"World House" was designed by architect Frederick Kiesler as an application of his cherished concept of the "endless house." Indeed, as one penetrates its furthest recess, there is one valid suggestion of endlessness. There the carpeting flows continuously up and over a wedge that juts from the wall—to make a bench, one that is neither of the floor nor of the wall. Through most of the gallery, acutely angled or obtusely rounded wall junctures create less continuity than distraction from the art, much of which was excellent. A plaster lip droops down from the ceiling to hold a painting at an angle; many of the paintings are streaked with light; a wall leans over the "floating" stairway, forcing two ascending abreast to jockey for footing. Only a rail saves the one on the outside from dropping into the water-filled moat below—a moat of black carrara, with a drain gleaming prominently not far from some long-forgotten piece of sculpture, completely four-square.

Briefly noted

The transcript of last Fall's Arden House conference on "Creativity as a Process" has been published by The Institute of Contemporary Art, 230, The Fenway, Boston 15, Mass.

A 16mm color motion picture, "Electronic Computers Improve Management Control," is available from the Educational Film Sales Department of the University of California, University Extension, Los Angeles 24, Cal.

The Print Council of America has been formed, with offices at 527 Madison Ave., New York 22, to promote the growth and appreciation of fine prints, new and old.

"The Role of Product Design in Today's Competitive Market" was the theme of the **University of Wisconsin** Extension Division's Industrial Product Design Institute, a conference held at Madison, Wisconsin, March 19-20. Speakers included J. M. Little, Jean O. Reinecke, Theodore H. Koeber, Joseph Palma, Jr., J. L. Nelson and Armand S. Zucker.

An open question period between design experts and press representatives tried to answer the question of the evening (March 25): "What Will Be Designed For You In 1967?" The symposium, sponsored by the Midwest Chapter of the **American Society of Industrial Designers**, was held in connection with the Modern Living Exposition in Chicago. Designers Franz Wagner of Raymond Loewy Associates, Russel Wright, Paul McCobb and Fred Keck, and Dr. William Bradley of the American Baking Association explored the future in appliances, housewares, furniture, architecture and food processing respectively.

The American Ceramic Society will hold its 59th annual meeting at the Statler-Hilton Hotel in Dallas, Texas, May 6-8. The Society's Design Division will discuss "Management Philosophy of Design."

Plastics group meets

The 12th Annual Exhibit and Conference of the Reinforced Plastics Division of the Society of the Plastics Industry was held in Chicago from February 5th through 7th, and the papers presented have been printed for distribution by the Society, 250 Park Ave., New York 17.

The extensive presentation of technical data included information on properties, processes and applications of a wide variety of reinforced plastic materials in products, buildings, tools and boats. An international panel described the industry's activities abroad, and several surveys of new developments in resins, reinforcements, fillers, core materials and pre-impregnated materials were presented.

With sincere regret we note that Victor G. Canzani, Associate Professor of Industrial Design at Pratt Institute, died in Hackensack, N. J. on February 28, 1957. Noted for his experimental work with plastics for the Monsanto Chemical Company, he recently completed designs for the interior of Monsanto's "House of the Future," and is shown below with one of his experimental auto designs.

Polyethylene film insulates house

On a —10 degrees F. winter night in Lafayette, Indiana, the goldfish bowl froze in the living room of an old farmhouse near the campus of the Purdue University Agricultural Experiment Station, although the oil burner was running. Prof. N. K. Ellis, Head of the Station's Horticulture Department, who has had good results in using polyethylene as glazing on greenhouses, suggested that the poorly insulated building might be made more habitable by wrapping it in sheets of polyethylene film, which is resistant to moisture and keeps its durability and flexibility at temperatures well below 0 degrees F.

At Dr. Ellis' suggestion, polyethylene film strips made by Bakelite, 16 feet wide and 100 feet long with .002 thickness, were wrapped around the house just below the eaves, and an 8-foot wide strip was then wrapped around the bottom, with the top strip made to overlap the bottom by several inches. Lath battens painted the same color as the house were nailed around the building at regular intervals to hold the film in place. Openings were cut around the doors and several windows for ventilation.

Purdue's Agricultural Engineering Dept. has turned the film-covering job into a research project and is keeping thermographic records of relative temperatures inside the house and out. It will require several seasons of testing to get a scientific evaluation, but in the meantime the University employee and his family who live in the farmhouse report that they were able to turn down the oil burner at night, even in wintry weather. It is, of course, cold comfort for those goldfish.

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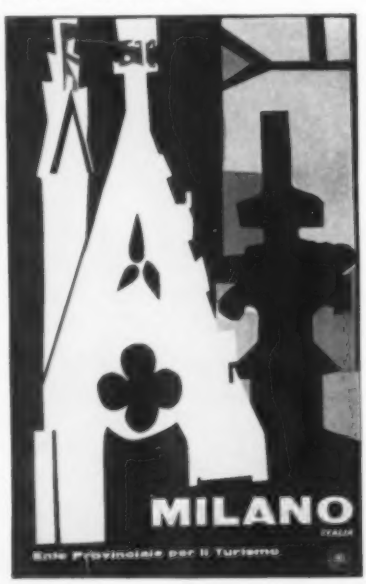
Retrospective look at the travel poster points up national and individual styles

Eschewing the conventional travel poster ("Photographic reproductions of scenic wonders and ancient buildings or reproductions of paintings, however beautiful these may be" as Mildred Constantine describes it), this current exhibition concerns only international posters which the museum selected as an individual statement, historical or contemporary. The techniques have changed radically over 60 years, from naturalistic illustration to a stronger use of photography (presaged by Herbert Matter's *Pontresine* 1937 design, with the powerful head of a skier wearing big goggles). And there are others which show, in a shortlived medium whose message may be meant to last only for a week or for a season, some remarkable survival qualities. During the '20s A. M. Cassandre designed stirring images of ships and railroads; through the geometric expression of the skyscraping height of a hull or the perspective of endless tracks, he was a master of the drama of a foreshortened view. His British contemporary, E. McKnight Kauffer, was also keen and original in the use of distilled abstractions. While Cassandre concentrates on the speed and awesomeness of the experience of travel, McKnight Kauffer uses planes and brief outlines to express the poetry of a place. In current designs, there are unique achievements from Italy and Denmark (shown here), not to forget England's remarkable Abram Games, represented by several on the theme of Israel and the Jerusalem fair (below).

Below: Marcello Nizzoli (Italy, 1956); right column: Pierre Gauhat (Switzerland, 1950), Fuss (German, 1928), Kurt Wirth (Switzerland, 1956), Abram Games (England, 1953); far right column: Vigno Vagnby (Denmark, 1953), Jean David (Israel, ¥954), Cassandre (1927).



DESIGNING WITH ALUMINUM

This is one of a series of information sheets which discuss the properties of aluminum and its alloys with relation to design. Extra or missing copies of the series will be supplied on request. Address: Advertising Department, Kaiser Aluminum & Chemical Sales, Inc., 1924 Broadway, Oakland 12, California.

NO. 4 CORROSION RESISTANCE

ALUMINUM ALLOYS RESIST ATTACK BY WIDE RANGE OF ENVIRONMENTS, MANY CHEMICAL COMPOUNDS

(THIS ADVERTISEMENT REPEATED IN RESPONSE TO THE HIGH INTEREST EXPRESSED BY ENGINEERS AND DESIGNERS.)

RESISTANCE to corrosion is a relative matter because it depends on the environment to which a metal is exposed. Aluminum and aluminum alloys have generally excellent corrosion resistance. They withstand corrosive attack by most types of environment, including many which adversely affect the performance of other commonly used metals.

Conditions which cause the corrosion of aluminum are the exception, not the rule. Normally, aluminum lasts indefinitely—bare and unprotected. This fortunate situation occasionally leads to over-enthusiastic use. The user may expect and demand a much higher level of performance from aluminum than he ever has or would from another metal, with resulting improper application or failure to follow good installation practice.

Reason for the good corrosion resistance of aluminum is that the practically transparent oxide coating that forms on surfaces exposed to air is tough, adherent and non-flaking. So, once formed, it is non-progressive and non-destructive, in contrast to oxidation which results in flaking that constantly exposes new metal to attack and so proceeds inevitably towards the total destruction of the metal.

Under most conditions the oxide coating of aluminum thickens within a relatively short time to a point where no further measurable oxidation occurs. It is also self-renewing. Whenever the oxide film is broken, it immediately reforms on exposure to air and again assumes its protective role.

It follows then that the conditions which promote the corrosion of aluminum usually involve the presence of a compound which dissolves or otherwise penetrates this coating, and the absence or exclusion of the oxygen required to rebuild it.

One of the useful properties connected with aluminum is that the electrolytic process known as anodizing thickens and strengthens the oxide coating artificially. Anodizing thus increases resistance to destructive atmospheres and also tends to reduce the possibility of galvanic corrosion. Anodizing is regular commercial practice in many applications and products of aluminum. A coincidental benefit resulting from this process is that brilliant color can be incorporated to obtain highly decorative effects, and frequently it is used for this purpose only. Building up the oxide coating also increases resistance to abrasion.

High purity aluminum is rated as having the best corrosion resistance to chemicals, but this is not always the case with other forms of attack. For instance, in marine atmospheres 52S is superior to high purity aluminum. Most aluminum alloys will generally outlast other metals except under special conditions.

ATMOSPHERIC CORROSION

In general service metals may be exposed to three types of atmosphere—normal (rural, uncontaminated), industrial (urban, contaminated) and marine (moist, salty).

Tests of several aluminum alloys sponsored by the American Society for Testing Materials (Table 1), using the percent change in tensile strength as a measure of corrosion resistance, showed that all the alloys exposed were practically unaffected by normal atmospheres. In industrial and marine atmospheres corrosion was so slight as to be of no significance in practice. This was true even for 24S-T3, copper-bearing heat-treatable alloy. The clad form of this alloy suffered no loss in tensile strength, indicating the effective protection given to the high-strength alloy core by the cladding of higher-purity aluminum.

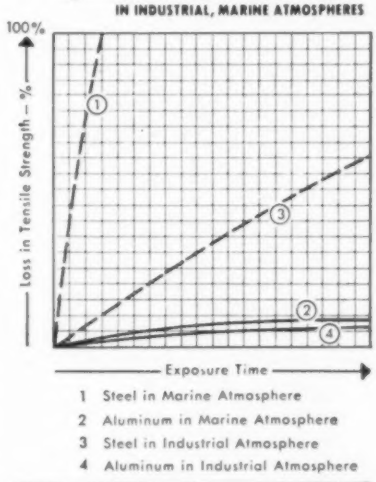
Table 1—EFFECT OF VARIOUS NATURAL ENVIRONMENTS ON ALUMINUM ALLOYS

(% Change in Tensile Strength Resulting from Ten Year Corrosion Tests Conducted by American Society for Testing Materials)

Alloy Type	MARINE			INDUSTRIAL		RURAL	
	La Jolla, California	Key West, Florida	Sandy Hook, New Jersey	New York, New York	Altoona, Pennsylvania	Phoenix, Arizona	State College, Pennsylvania
2S-H14	−5	−2	−3	−7	−5	−1	−4
3S-H14	−3	0	0	−4	−6	0	−1
24S-T3	−18	0	−3	−9	−6	−1	−4
Clad 24S-T3	+2	+1	+2	+2	0	+2	+1

NOTE: The gains in strength resulting in some cases arises from the fact that the tensile strength of heat-treatable alloys increases with natural aging.

Fig. 1—RELATIVE LOSS OF TENSILE STRENGTH IN INDUSTRIAL, MARINE ATMOSPHERES



Numerous other tests of aluminum alloys, both wrought and cast, have shown similar results, while steel simultaneously exposed has been virtually destroyed by industrial and marine atmospheres over a period of time. Typical relative loss in tensile strength of aluminum alloys and steel under exposure to marine and industrial atmospheres is illustrated in Figure 1. These test results are verified by the long actual service given by aluminum in buildings and equipment under severe conditions where other materials have required steady maintenance or replacement. A guide to the resistance of a number of aluminum alloys to atmospheric and sea water attack is given in Table 2.

Of importance as well is the fact that aluminum stands up well in contact with most other common building materials. Such attack as may occur is usually limited to superficial etching and minor pitting where dirt accumulates between faying surfaces. Although it has been considered good practice to protect the surface of aluminum where it is in contact with concrete or mortar, protection is really not necessary. Most if not all of any attack, even upon unprotected aluminum, takes place early during the setting period and is so minor as to be

PLEASE TURN TO NEXT PAGE ➡

of no consequence. Maximum penetration of the metal under such conditions probably would not be much over two mils. Where aluminum is in contact with masonry or wood which is continuously or repeatedly wet, it should be protected with a bitumen or similar coating on the contacting surface.

Table 2

RELATIVE CORROSION RESISTANCE OF ALUMINUM ALLOYS

Alloy	Non-Industrial Atmosphere	Industrial Atmosphere	Marine Atmosphere or Sea Water Service
1100	A	B	B
3003	A	B	B
3004	A	B	B
5005	A	A	A
5050	A	A	A
5052	A	A	A
5086	A	A	A
6061-T4 or T6	A	B	B
6063-T5	A	B	B
2024-T3	B	C	D
Alc. 2024-T3	A	A	B
7075-T6	B	C	D
Alc. 7075-T6	A	B	C
214, 218	A	A	A
43, 356-T6, 360	A	B	B
195-T4	B	C	D

A = Best relative resistance
B = Good relative resistance
C = Fair relative resistance
D = Not usually recommended without additional surface treatment

NOTE: This table is to be used as a general guide only, since in many applications an alloy with a D rating performs satisfactorily while in other applications an alloy with an A, B or C rating may require additional protection.

Table 3

PARTIAL GENERAL GUIDE TO RESISTANCE OF ALUMINUM TO VARIOUS COMPOUNDS

COMPOUND	GRADE
Acetic Acid, Dilute	B
Acetic Acid, Glacial	A
Alcohol, Methyl & Ethyl	B
Ammonia (dry)	A
Ammonium Hydroxide	C
Benzene	A
Boric Acid	A
Bromine	D
Carbonic Acid (dilute)	A
Chloride of Lime (calcium hypochlorite)	C
Chlorine (v.c. with water)	D
Creosote	B
Dichlorodifluoromethane (Freon F-12)	A
Dichloromonofluoromethane (Freon F-21)	B
Dichlorotetrafluoroethane (Freon F-114)	A
Ethylene Glycol	B
Fluorine	D
Freon 11	B
Freon 22	A
Freon 113	B
Gasoline (anhydrous)	A
Hydrochloric Acid	D
Hydrogen Peroxide (30% and higher)	A
Lacquers	A
Lime	B
Nitric Acid (above 80%)	A
Nitroglycerine	A
Olive Oil	A
Oxalic Acid	C
Oxygen	A
Perchlorethylene (dry)	A
Phosphoric Acid	D
Potassium Bicarbonate	A
Potassium Carbonate	C
Potassium Chromate	A
Resins	A
Sewage	A
Sodium Carbonate	C
Sodium Nitrate	A
Sodium Sulfate	B
Steam, Low Pressure	A
Sulfur Dioxide (dry)	A
Toluene	A
Trisodium Phosphate	C
Urea	A
Varnish Solvents	A
Water, Distilled	A
Water, Industrial	B
Water, Rain	C
Water, Sea	C
Water, Tap	C
Zinc Acetate (up to 10% conc.)	A
Zinc Chloride	D

NOTE: Resistance—A, excellent; B, good; C, fair; D, poor.

After prolonged exposure to normal air, aluminum surfaces weather, with some loss of the original polish and smoothness. This is seldom more than a superficial condition that can be remedied by simple cleaning.

AQUEOUS CORROSION

Most of the non-heat-treatable aluminum alloys and clad forms of the heat-treatable alloys offer a high order of resistance to corrosion by alternate immersion in sea and harbor waters, where unprotected steel deteriorates rapidly.

Magnesium-bearing alloys such as 50S and 52S are especially resistant to all forms of aqueous corrosion. 52S, strongest non-heat-treatable sheet and plate alloy in commercial use which is noted for its ruggedness, is used extensively in marine applications.

The copper and zinc-bearing heat-treatable alloys such as 14S, 24S and 75S are generally less resistant to aqueous attack, but their performance under salt water conditions is substantially improved by cladding. 61S has better resistance than the other heat-treatable alloys, and is therefore used widely in the bare condition.

CHEMICAL CORROSION

The chemical process industries are large users of aluminum because it resists attack by many chemical compounds. Aluminum in some instances offers the further advantage that the salts of aluminum are colorless, tasteless and non-toxic so that any corrosive products will not adversely affect manufactured products.

An example is the use of aluminum for the manufacture, storage and transportation of glacial acetic acid. There is no contamination, other impairment or coloring of the product by any products which might be introduced through superficial attack.

Aluminum provides excellent corrosion resistance to organic compounds and such chemicals as ammonia, hydrogen sulfide, hydrogen peroxide (30% and higher) and concentrated nitric acid. Solutions of strong alkalis, sulphuric acid, hydrochloric acid, carbonates and fluorides tend to attack aluminum because they can dissolve or penetrate the protective oxide coating. However, the extent of corrosion varies with concentration and temperature and may often be minimized or eliminated through the use of inhibitors. Table 3 provides a guide to the relative chemical resistance of aluminum to a few widely used compounds.

GALVANIC CORROSION

Direct contact with dissimilar metals in the presence of a liquid which might become an electrolyte should be avoided to prevent corrosion of the anodic metal. Metals such as zinc and magnesium are usually anodic to aluminum. It is not always true that aluminum is anodic to steel. For example, in some tap water conditions, particularly where higher temperatures are involved, steel may be attacked in preference to aluminum.

The danger of galvanic corrosion is frequently overrated. Its extent depends on the amount of current flow between dissimilar metals. In turn this depends on the electrical resistance of the space by which the metals are separated as well as the difference in potential.

In most cases galvanic corrosion can be entirely eliminated or reduced to negligible proportions by simple, practical methods. There can be no galvanic corrosion if moisture is excluded or if insulating material increases electrical resistance. The problem is minimized when the anodic area is large in comparison with the cathodic area such as a large area of aluminum and a small area of steel or copper. Innumerable composite steel and aluminum structures have given long life.

CORROSION PREVENTION

There are numerous ways of protecting aluminum where it is used under circumstances where conditions may be conducive to corrosion. They include painting, artificial thickening of the oxide film through anodizing, formation of other insoluble films, plating or cladding. Where used with aluminum, steel bolts and other fittings should be galvanized or plated with cadmium. Design should avoid corners and crevices where moisture can lodge.

The assistance of Kaiser Aluminum engineers with information on the corrosion resistance of aluminum or on specific corrosion problems or other phases of aluminum application may be obtained by calling any Kaiser Aluminum sales office in the principal cities or by writing Kaiser Aluminum & Chemical Sales, Inc., 1924 Broadway, Oakland, California.

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Events

The **Brooklyn Museum's** exhibition "Home Furnishings, Old and New" opened on March 20 and continues for one month with a novel museum display. Four rooms have been composed by Lazette and Victor Gruen, Edgar Kaufmann, George Nelson and Edward Wormley, using selections from the Museum collection combined with other furnishings of modern design.

"Twelve Scandinavian Designers," an exhibition at **Georg Jensen Inc.**, New York, from March 27 to April 13, features work in silver, crystal, ceramics, furniture and textiles by past winners of the Lunning Prize for Scandinavian design.

The **Midwest Designer-Craftsman Society** will hold an exhibition of 164 works submitted in competition at the Art Institute of Chicago, March 27-April 24.

The **American Society of Industrial Designers** held its third and final symposium of the season at the Museum of Modern Art in New York on April 11.

The Sixth Annual Meeting of the **Building Research Institute** in Chicago, April 15-17, will have ten major themes including "Household Appliances in 1962," "What's New in Environmental Controls," and "Making a Home of a Modern House."

A one-day design conference at **Georgia Institute of Technology** on April 19 will hear addresses by designers Walter Dorwin Teague, Rudolph Koepf, Raymond Spilman and Edward Ferrari.

This year's May 7-10 conference on "Creativity as a Process" at Arden House, Harriman, N. Y., will have a chance to put the ideas of William J. J. Gordon into practice by participating in problem-solving small-group creativity sessions. Sponsored by Boston's **Institute of Contemporary Art**, the conference will also hear Dr. Jerome S. Bruner, Professor of Psychology at Harvard. Registration may be made at the Institute, 230 The Fenway, Boston 15, Mass. A third creativity conference is planned for November 1-4 at Arden House.

The industrial and package design firm of **Lippincott and Margulies** will sponsor a conference in New York, May 22-23, on research and testing in the packaging industry, open to management by invitation.

Joseph Carreiro surveys Scandinavia

Ellen Manderfield accepts Syracuse honor

People

Palma-Knapp Associates have recently moved to 412 Thatcher Ave., River Forest, Illinois.

Walter Landor and Associates received the top award in the National Chip Bag Design Contest for their "Crispie" package.

Ralph E. Eckerstrom has been made Director of Design of the Container Corporation of America. Formerly art director and Associate Professor at the University of Illinois, he succeeds **Herbert Bayer**, who was appointed Chairman of the Design Department at CCA. **Walter Granville**, former Assistant Design Director, has resigned to establish independent practice as a color and design consultant.

British designer **John Forest Wilson** has joined the staff of Ken White Associates of Westwood, N. J.

Eron and Eron, industrial designers of Englewood, N. J., have contracted with the Thom McAn shoe chain of Melville Shoe Corporation to design stores, displays and other merchandising elements.

Package Products Company of Charlotte, North Carolina, appointed **Charles F. Anderson** packaging sales engineer for the northeastern states. Mr. Anderson was formerly associated with the Frank Gianninoto and Robert Sidney Dickens' package design firms.

Joseph Carreiro has toured the Scandinavian countries as design consultant to Asko, Finnish furniture company.

R. F. Spangler now is manager of product planning for the Westinghouse laundry equipment department.

Seymour Robins, Inc., a new design firm at 24 West 45th St., New York, will apply sensory perception studies to its consultation on package design.

C. F. Graser, manager of product planning at General Electric's portable appliance department, served as chairman of the American Management Association's seminar on "Improving the Coordinating Function of the Product Manager" in Chicago last month.

Richard Hollerith, Jr. has become a staff industrial designer for the Monroe Calculating Machine Company.

Ellen Manderfield, Syracuse industrial designer, was honored as one of the city's 10 Women of Achievement by the Syracuse Post-Standard.

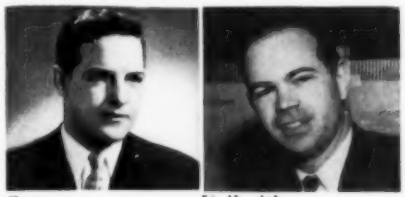
Dana Mox, Director of Design for Ken Schory Associates, Park Ridge, Illinois, has been made a partner of the firm.

The Los Angeles Chamber of Commerce Industrial Design Committee has elected its officers for 1957: **Melvin Best**, chairman, **Joe Portanova**, vice-chairman, and **Bob Mason**, treasurer.

Walter Dorwin Teague Associates have been retained by Proctor and Gamble to supplement the services of Donald Deskey Associates.

Judges for the Industrial Designers Institute 7th Annual Design Awards will be **Walter C. Granville** (chairman), **George Beck, Morton Goldsholl, Franklin Q. Hershey, Paul R. MacAlister, James Shipley** and **Gerald Thurston.** Deadline for entries is May 5, and should be made to Mr. Granville at 1226 N. Dearborn Pkwy., Chicago 10, Ill.

The entire staff of Harold Van Doren is to remain intact under a new partnership titled **Harper Landell Associates.**



Graser *Hollerith*

Jim Nash Associates have promoted **J. Roy Parcels** to vice-president.

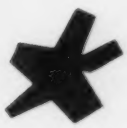
Ivan Matteo Lombardo, Italian statesman and President of the Eleventh Triennale, presented the La Rinascente's Golden Compass award for 1956 to the Museum of Modern Art in New York on March 21.

Chalmers L. Goyert has been appointed director of the Product Planning Office, Ford Motor Co.

Dale Graham and **John P. Engelhardt** have been promoted to new positions as product managers for RCA Whirlpool home laundry appliances at the Whirlpool-Seeger Corp., and **Neil Forbes** has been appointed product coordinator of the division.

A University of Detroit architectural engineering student, **John Hreno**, has designed a program title piece for a Detroit television station, using a sculptural Stabile for the symbol.

Madeleine and Jim Nash, Parcels, Dixon



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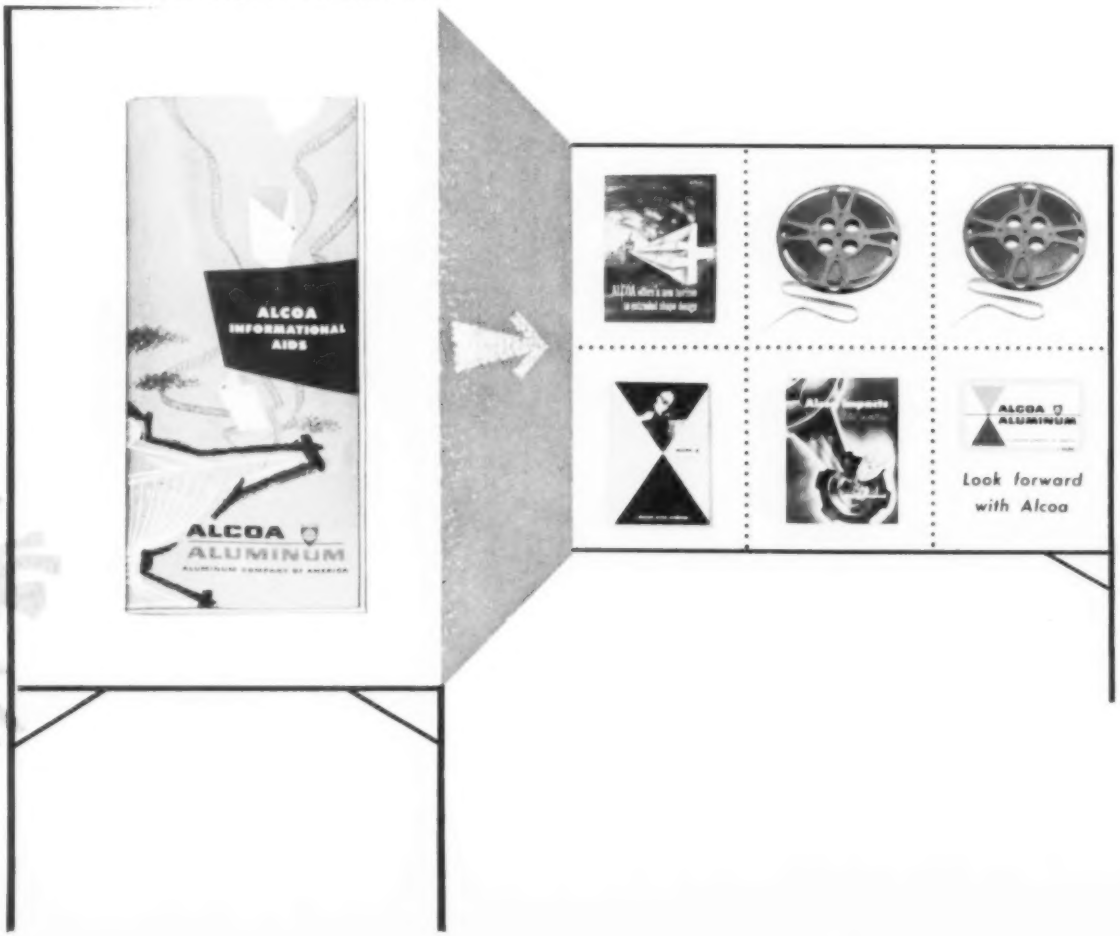

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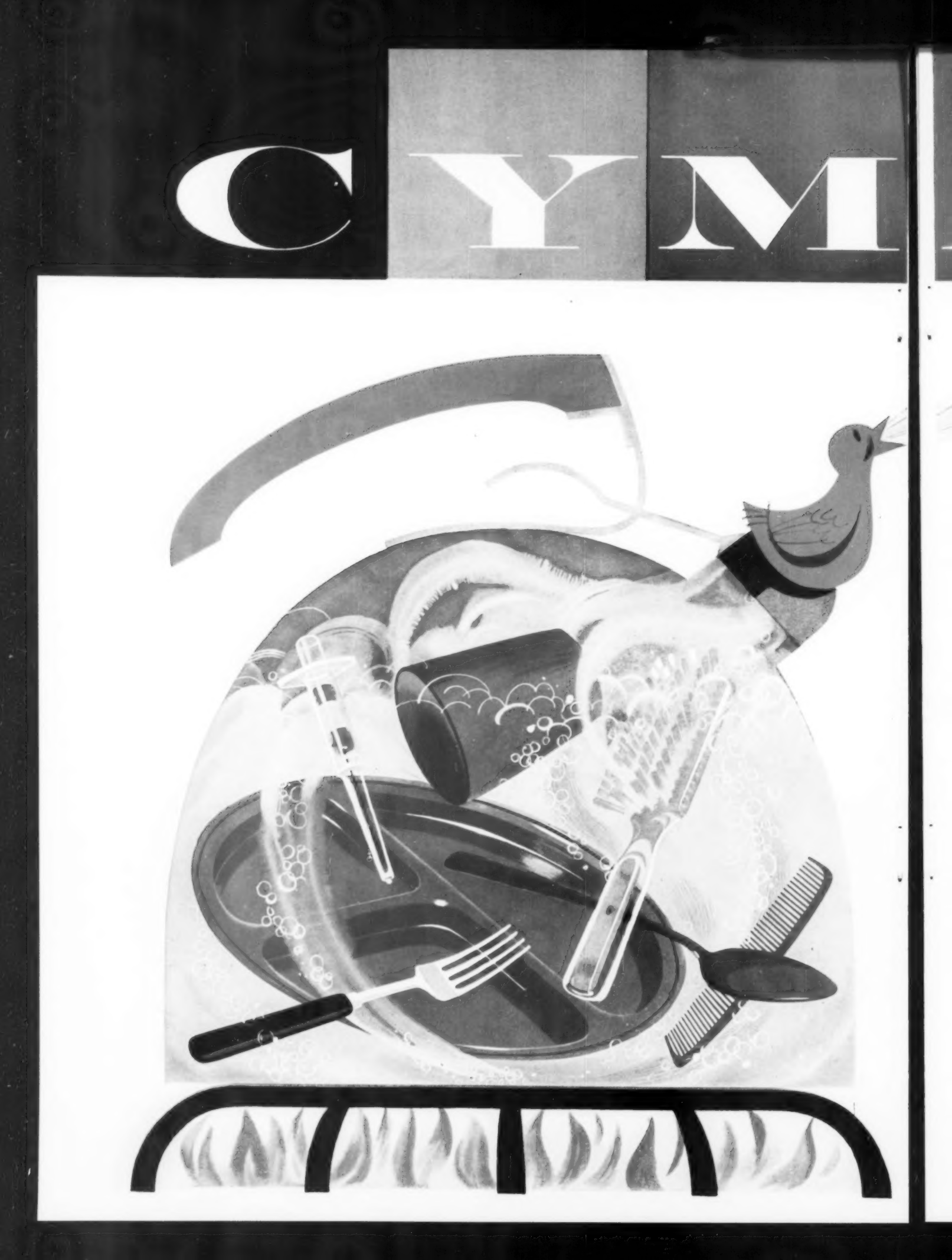
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Methyl – Styrene Molding Compounds

*Trademark

Announcing New Thermoplastic Molding Compounds...CYMAC

—based on Methylstyrene Monomer

NOW AVAILABLE—two compounds so heat resistant that products molded from them show no distortion after repeated, extended immersion in boiling water.

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Both of these new molding compounds provide the added value of remarkable heat resistance at costs no greater than competitive materials.

These new methylstyrene thermoplastics are made possible by revolutionary new processes developed by Cyanamid. They will help you upgrade existing molded products, and find new applications in consumer and industrial fields.

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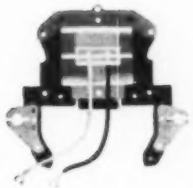

For electrical parts

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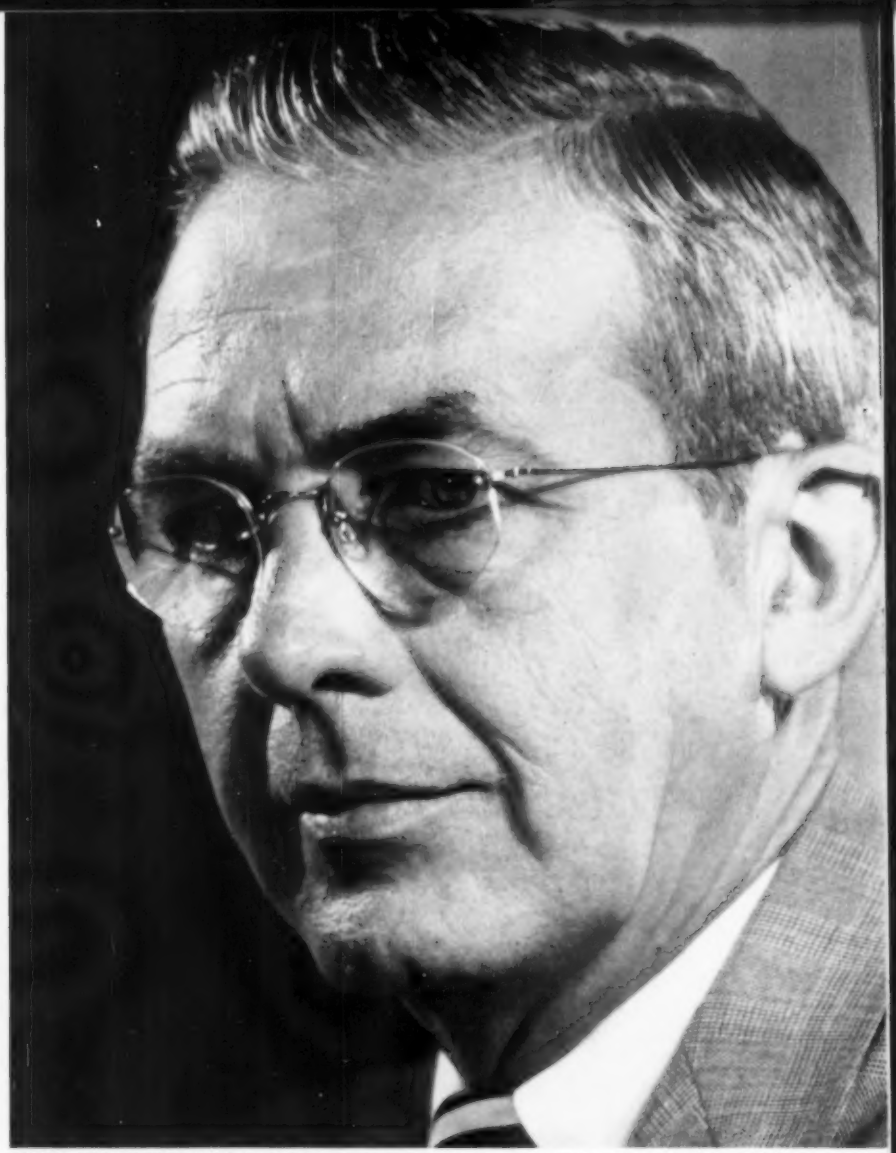
. . . and hundreds of other products

Colorful, easily molded Styron reproduces this handsome pitcher with complete fidelity to detail.

Sleek good looks and function without bulk mark these double-walled thermo-tumblers molded of Styron in decorator colors.



QUOTED FROM PAUL M. KOOHS, A.S.I.D., Head of Styling Design, National Cash Register Company**

Abreast of change: designers and Styron

"Keeping abreast of changes in materials . . . is the responsibility of the (industrial designer's) art."

To keep abreast of changes in materials, keep in touch with the company that paces the industry in new developments. Dow leads in introducing new polystyrene materials and now offers eleven different Styron® (Dow polystyrene) formulations.

"Keeping abreast of changes in methods . . . is the responsibility of (your) art."

Many changes in methods are pioneered by Dow. A recent example is the "plug-assist" technique for vacuum-forming sheet plastics. To keep abreast of such developments in methods, write us for technical literature.

"To the many challenges, (the industrial designer) must bring . . . good taste."

Hand in hand with good taste goes the knowledge that improves product performance. Our understanding of the relationship between designer, fabricator and supplier can help you express your good taste with products of top performance.

We invite you to contact us for help in meeting the challenge of today's dynamic plastics industry. Whether your problem concerns material, tooling or product application, our experience and facilities are as near as your phone or your mail box. THE DOW CHEMICAL COMPANY, Midland, Michigan—Plastics Sales Department PL1548M.

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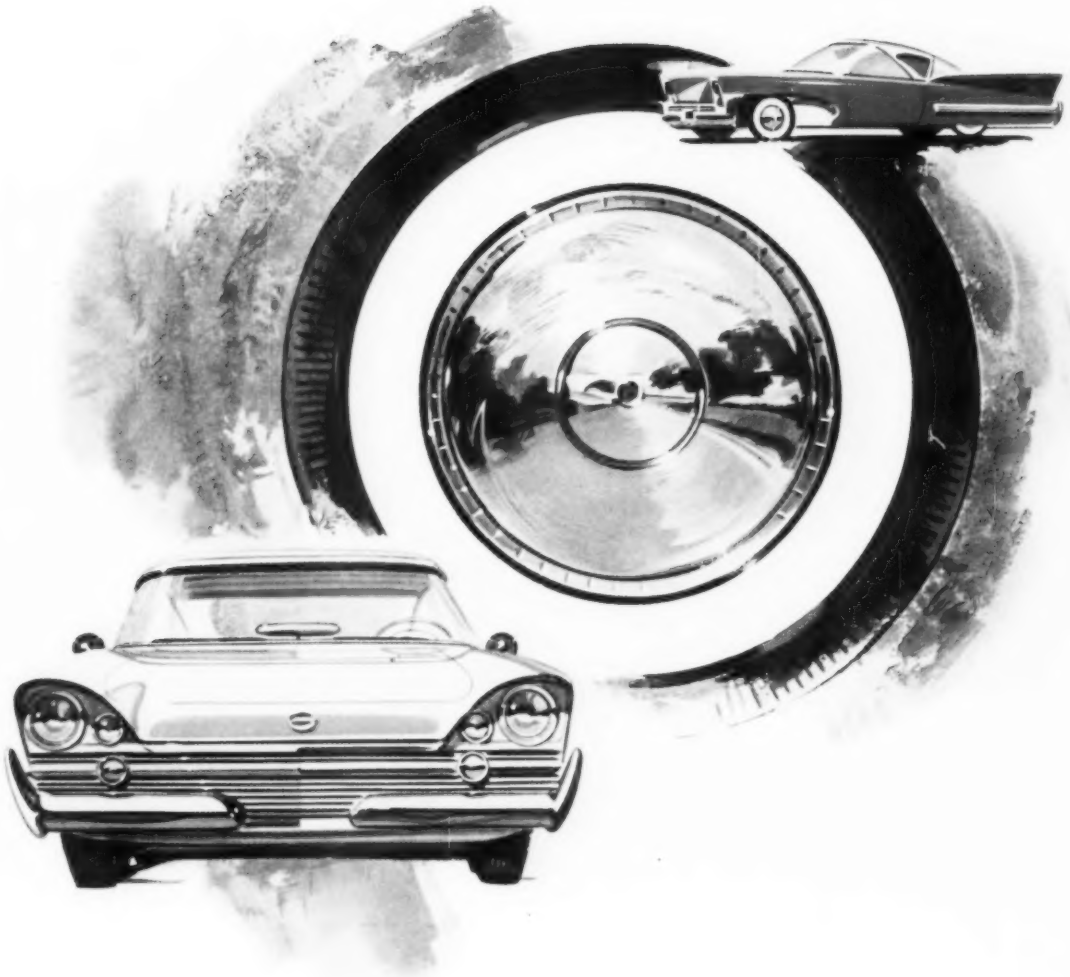
- STYRON 665 (Extrusion)
- STYRON 688 (Easy Flow)
- STYRON 689 (Easy Flow)

HIGH IMPACT
- STYRON 475
- STYRON 429 (Extrusion)
- STYRON 777 (Medium Impact)
- STYRON 440 (Heat Resistant)
- STYRON 480 (Extra High Impact)

HEAT RESISTANT
- STYRON 683
- STYRON 700

The Styron family is represented on the West Coast by sales offices in Los Angeles, San Francisco and Seattle, together with resident plastics technical service manufacturing plants and warehousing services.

YOU CAN DEPEND ON DOW



bright idea

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Molded into more than 100 parts, this super-durable, all-weather rubber helps provide a steadier, softer, more silent ride under even the most strenuous conditions of stress, weather change, and abrasive action. The dependability of all these parts contributes to the outstanding performance of the modern car.

Readily available in non-staining grades, Enjay Butyl rubber can be compounded into white and light-colored parts that combine beauty with top-notch performance. Low in cost, it out-performs and out-lasts all other rubbers formerly used, and may well be able to *cut costs* and *improve performance* in *your* product. For further information, and for expert technical assistance, contact the Enjay Company.

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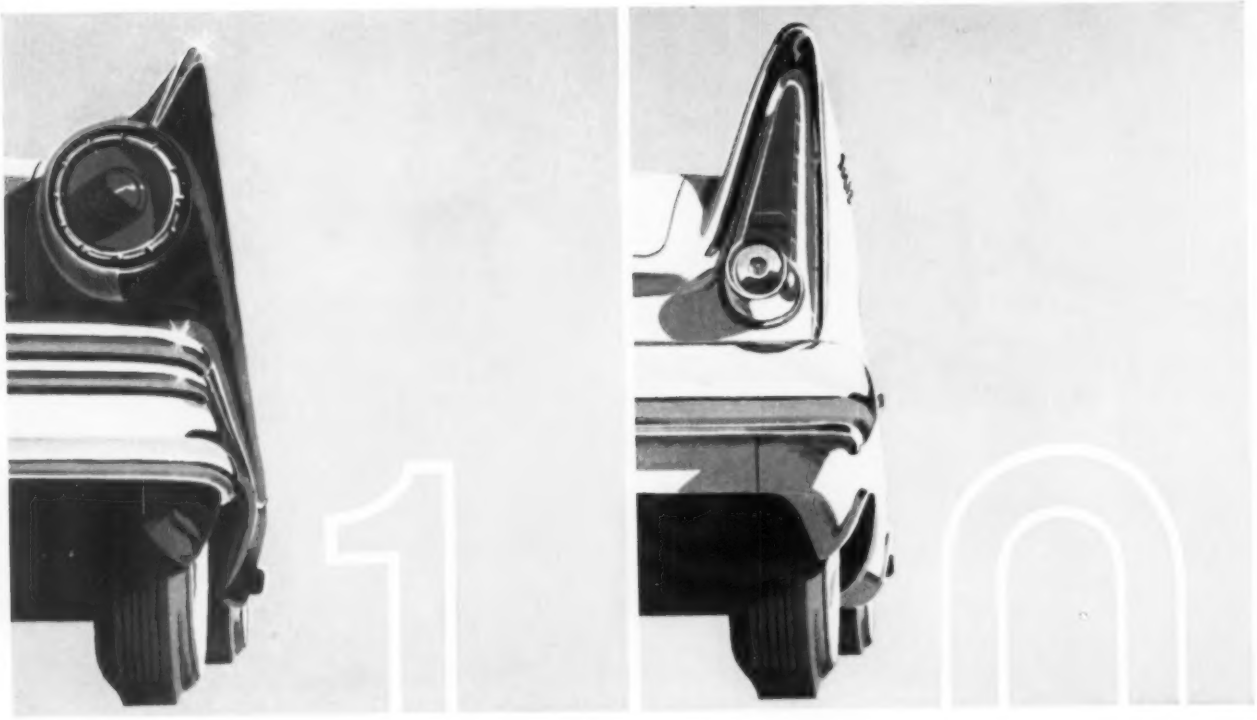
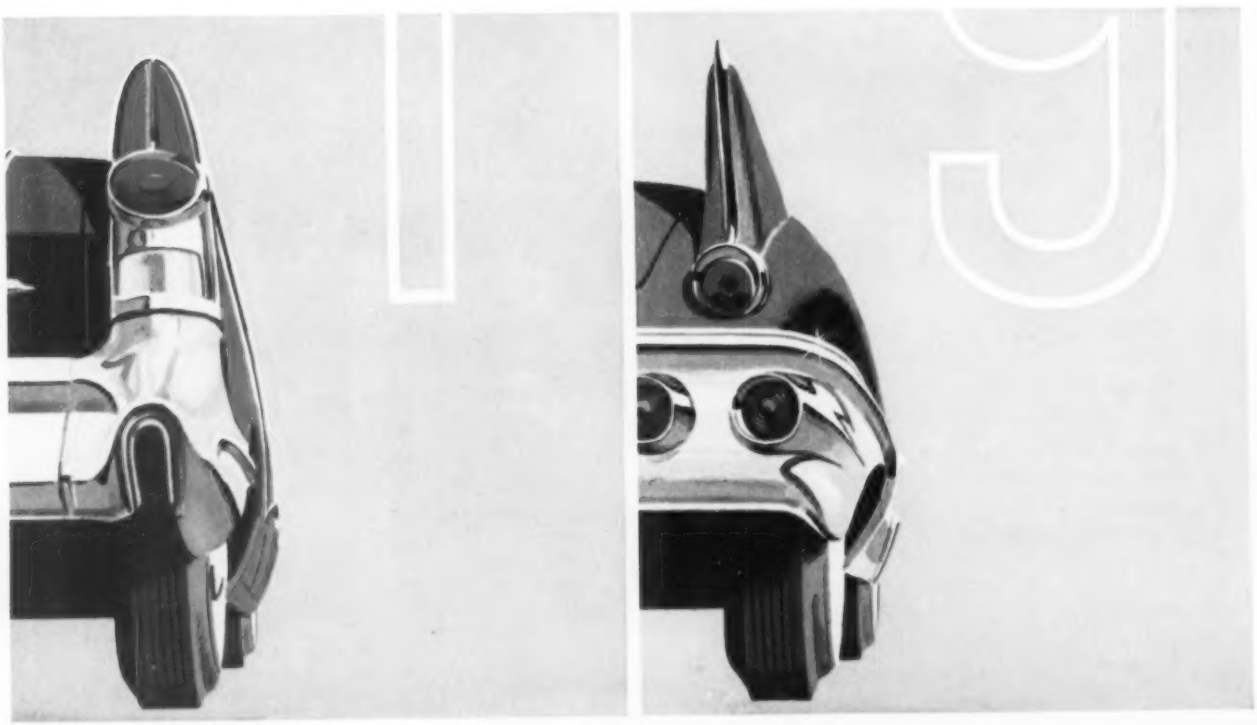


What do they have in common?



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Detroit Representative: *R. C. Oglesby, Nor-Way Building, 20211 Greenfield Road, BRoadway 3-0674.*

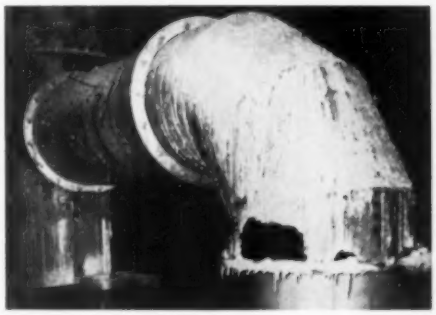
* **acrylic plastic molding powder for tail lights, parking lights, instrument panels, nameplates, ornamentals, dials.**

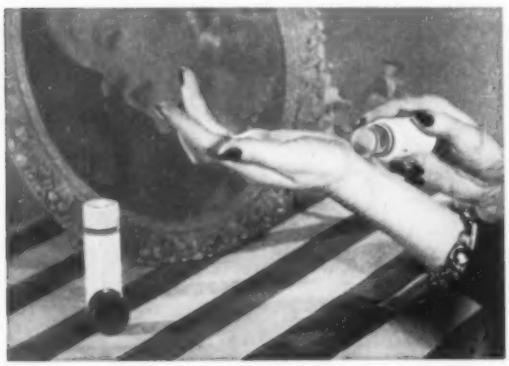
CYANAMID

PLASTICS NEWSFRONT

THREE YEARS IN CORROSIVE SERVICE WITHOUT MAINTENANCE

That's the record established by reinforced LAMINAC® polyester resin in venting service on alum digesters at Cyanamid's Warners plant. The carbon steel breech (left) in an alum evaporator required frequent maintenance, failed after less than three year's service. Glass-reinforced LAMINAC stacks (right) in even more severe alum digester service, have needed no maintenance in more than three years. The LAMINAC units cost less in the long run, and were easier to erect and assemble, using either telescope joints wrapped and polyester-welded on the site, or flange-type joints.



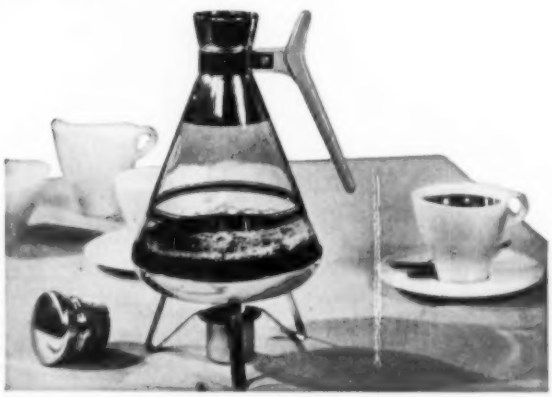


ATTRACTIVE, AIRTIGHT CASE FOR STICK COLOGNE

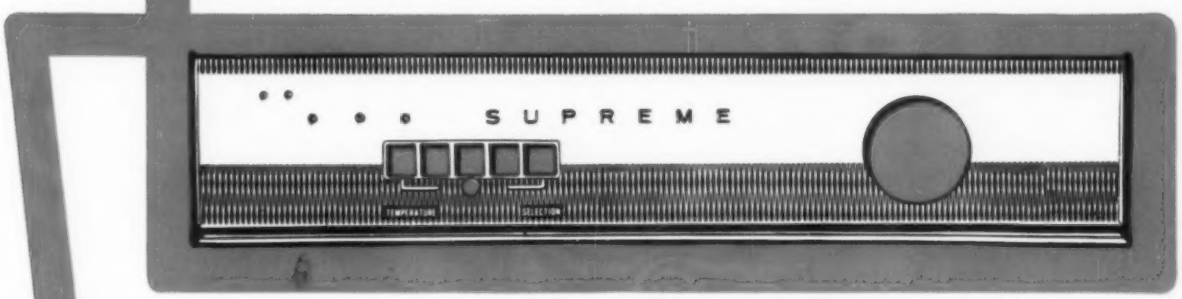
Six new scents of Avon Stick Cologne are packaged in smartly styled, practical cases molded of BEETLE® urea molding compound. Cases have a white base with contrasting closures in a different color for each scent. Airtight, the BEETLE case stops evaporation of the cologne. Yet the closure opens easily, and with a twist of the wrist the stick pops up for use. The case resists alcohol, essential oils and chemicals as well as staining from perspiration and grime, which wipe off easily.

FUNCTIONAL HANDLES GRACE CARAFES

Any dining or buffet table would be graced by this attractive carafe with its stylish, beige-colored handle molded of CYMEL* melamine molding compound. Elegance and function are combined in the handle, balanced for easy, comfortable pouring. Harmonizing with the carafe's gold decoration, the molded-in color won't chip or wear off. In keeping with its function, CYMEL is exceptionally strong, resistant to heat and flame, and stays cool even when the carafe, made by Club Aluminum Products Company, is full of hot coffee. *Trademark



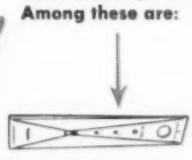
HOW RCA Whirlpool TURNED AN IDEA INTO A PRODUCTION REALITY



RCA Whirlpool selected a combination of our processes to produce this beautiful eye-catching escutcheon plate of golden anodized aluminum. The sharply etched design (done by ETCHRITE) is highlighted with white enamel. Deep dimensional embossing (EMBOS) accentuates the word "Supreme". It is our privilege to have worked with RCA Whirlpool designers and engineers on this and other metal trim parts.

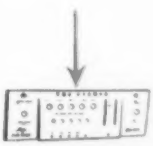
Many other major manufacturers are turning to our varied processes and facilities to secure sales-enhancing decorative metal trim and parts.

Among these are:

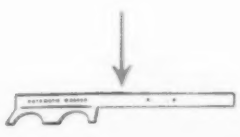


Hotpoint TV escutcheon by
Embos

G. E. initials and insignia by
Kolfor



Fisher Panel by
Etchrite



Bendix Washer Panel by
Rolbos

Write to:

ELECTRO-CHEMICAL ENGRAVING CO., INC.
1102 Brook Avenue, New York 56, N. Y.

ETCHED PRODUCTS CORPORATION
39-01 Queens Boulevard, Long Island City 4, N. Y.

Rolbos — roller embossing (including "stop-roll"). **Embos** — mechanical embossing. **Etchrite** — sharp etching. **Kolfor** — cold forged coined letters with integral lug. **Lithographing * Stamping * Anodizing * Plating * Enameling** Working in All Metals.

"WE DESIGN AND BUILD OUR OWN TOOLS AND DIES."

Designing with BAKELITE Plastics

- ***New material for vacuum-forming***
- ***Electric shaver's comb framed in plastic***
- ***Coating improves appearance, saves in production***

When you're working on a new design idea, find out if there's a plastic ready and waiting to help do a better job. A BAKELITE plastic can often extend the range of your ideas—help get a jump on competition—because there's something new in plastics just about every day.

In plastics, Bakelite Company is your leading source of information, as well as of materials. For 46 years it has been a leader in the field, offering the widest variety and number of plastics and resins. You can choose from BAKELITE Brand Phenolics, Vinyls, Styrenes, Polyesters, Polyethylenes, Epoxies, Silicones, and Impact Styrenes. In addition, Bakelite Company offers the aid of its extensive laboratory facilities and technical resources in applying modern plastics to your problems.

1 New Polyethylene Developed for Vacuum-Forming

New BAKELITE Brand Polyethylene DFD-4030 permits the application of polyethylene to the economical process of vacuum or thermo-forming—a development of major importance.

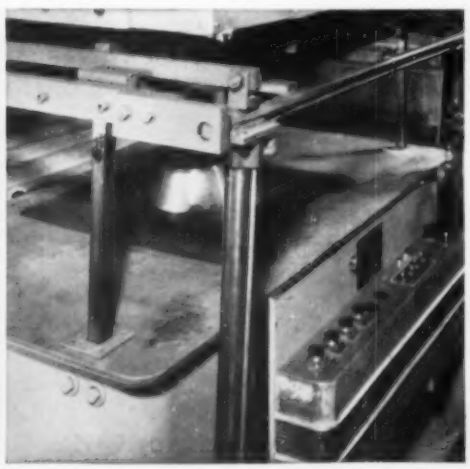
The first of its kind, DFD-4030 has been specifically compounded for sheet extrusion and vacuum-forming. This material provides ease of fabrication, bright color possibilities, light weight, and chemical resistance, together with the economy of vacuum-forming. Products made from it possess an attractive appearance, characterized by high gloss, complete freedom from skinning, and improved stress cracking resistance due to a high molecular weight. Colorants are completely dispersed, with no streaking.

Designers can apply the advantages of production economy, deep draws, and eye-appeal to a wide variety of products, including housewares and packaging items. Some typical properties of the new compound are shown in the adjoining table. You can get more information by writing to Dept. WP-80 for KABELITEMS No. 7.

Specific Gravity (D792-50 Method A)	0.92
Melt Index (D1238-52T)	1.7-2.4
Tensile Strength (D412-51T) psi	1800
Per Cent Elongation (D412-51T)	550
Brittle Temperature (D746-55T), 80% non-failure, deg. C.	−80
Stiffness Modulus (Torsion) at 23 deg. C. (D1043-51)	22,000
Durometer Hardness (D676-49T)	40 at 75 deg. F. 28 at 140 deg. F.
Coloring Properties	Unlimited

High gloss is evident on this polyethylene sheet being placed in clamping frame just prior to vacuum-forming.

Heater drawn forward over polyethylene sheet with bowl mold in position. Low mold cost is an important advantage of the vacuum-forming process.

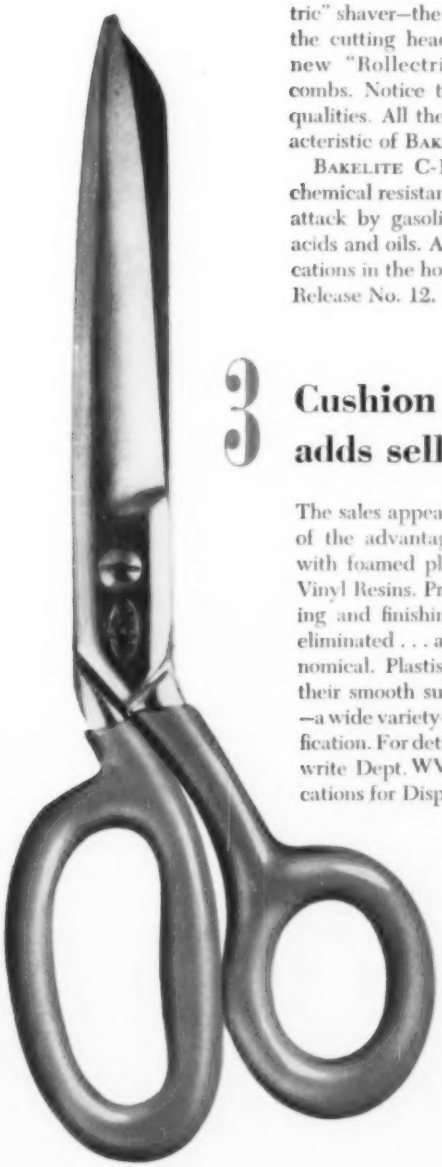


Heated polyethylene sheet drapes over mold before vacuum is applied. DFD-4030 is readily deep-drawn to large-size sections.

2 C-11 Plastic crowns the newest "Remington"

Take a look at the upper section of the new Remington "Rollectric" shaver—the part that houses the cutting head and holds the new "Rollectric" steel roller combs. Notice the even color and fine finish. Strength without bulk is another of its qualities. All these features—strength, finish, color, and good molding details—are characteristic of BAKELITE C-11 Plastic.

BAKELITE C-11, an acrylonitrile-styrene copolymer, is also notable for its superior chemical resistance. In this application, it is unaffected by perspiration. It also withstands attack by gasoline, turpentine, detergents, ink, coffee, carbon tetrachloride, and food acids and oils. As a result, BAKELITE C-11 Plastic is being used for more and more applications in the housewares and packaging fields. Write Dept. WT-80 for Molding Technical Release No. 12.



3 Cushion coating on handles saves finishing, adds selling point

The sales appeal of color and comfort are just part of the advantages resulting from handles coated with foamed plastisols based on BAKELITE Brand Vinyl Resins. Production benefits too. Hand polishing and finishing of rough castings can often be eliminated . . . applying the coating is fast and economical. Plastisols resist moisture and acids, and their smooth surface is virtually dirt-proof. Colors —a wide variety—stay true, permit easy visual identification. For detailed information on these materials, write Dept. WV-80 and ask for "Industrial Applications for Dispersions of Vinyl Resins."

Cross section shows relative thickness of resilient coating that provides a smooth, comfortable grip for scissors handles and conforms to uneven under-surface.

There's more to design with in

PHENOLICS
STYRENES
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BAKELITE BRAND PLASTICS

BAKELITE COMPANY, *A Division of Union Carbide and Carbon Corporation* UCC 30 East 42nd Street, New York 17, N.Y.

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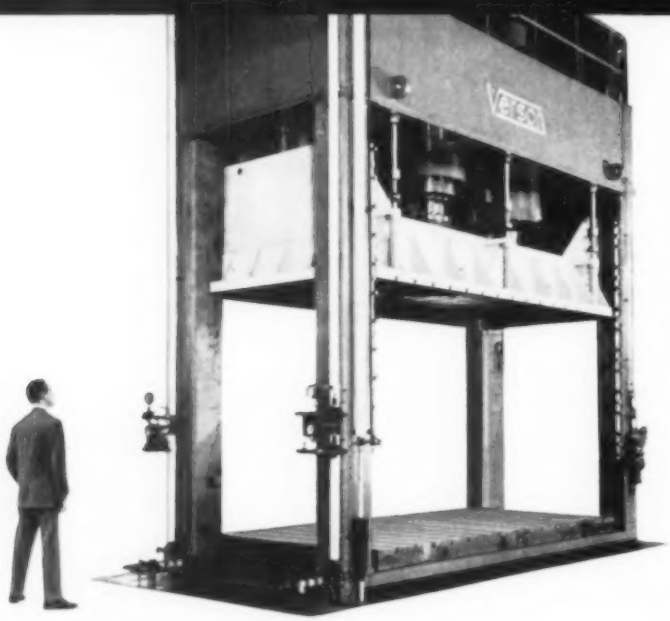
The term BAKELITE and the Trefoil Symbol are registered trade-marks of UCC.

THIS GIANT PRESS CAN DO IT!



Built to cut fabrication costs by molding big jobs in one operation, this 1,000-ton press is ready to handle *your* problem jobs—right now.

Boat hulls, door frames, wall panels, hatch covers, desks, bookcases, automobile fiberglass body sections or any part up to 8′ x 15′—in fact, just about any reinforced plastic product can be handled with ease by this unique press, the largest of its kind in the world.

If you are interested in obtaining the service of this press for your product, we'll be very glad to furnish you with detailed production information, complete time and tonnage schedules. Write or call.

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Facilities unmatched anywhere: injection, compression, extruding and vacuum forming, reinforced plastics, painting and assembling

AL CHROMIUM-MANGANESE *LOW-NICKEL* STAINLESS GRADES

Here is a direct answer to the recurring problem of nickel shortage. For many users of chromium-nickel austenitic stainless steels, the new AISI 200-series of chromium-manganese low-nickel austenitic grades can be a source of immediate relief—and an avenue to the reduction and possible avoidance of nickel shortage problems in the future.

In many cases, you can switch directly from the older Type 301 and 302 grades to the new AL Stainless Type 201 and 202 steels, using the same fabricating processes and securing about the same results. There's nothing new to learn, and no loss in performance in practically all applications. In certain respects, these steels have better properties than the older materials and may be used to actual advantage in some cases.

We also produce low carbon grades of these chrome-manganese steels, arbitrarily designated Types 204 and 204L (similar to the older grades 304 and 304L) . . . as well as a lower-chromium, higher-manganese grade designated Type CM, which contains only 1% nickel. Allegheny Ludlum has pioneered in the development and application of these low-nickel stainless steels. We know what the new grades will do . . . let us help you put them to use. ***Allegheny Ludlum Steel Corporation, Oliver Bldg., Pittsburgh 22, Pa.***

WRITE FOR THE ASSISTANCE YOU NEED

1. "TECHNICAL STUDIES #3"

. . . essential information on the composition, properties, fabricating methods and applications of AL chromium-manganese, low-nickel stainless steels. *Write for your copy.*

2. TEST SAMPLES

. . . We'll be glad to supply engineering assistance, and actual samples of these 200-Series steels for testing under your processes and conditions.

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For Stainless Steel in ALL Forms—call

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CORNING GLASS BULLETIN

FOR PEOPLE WHO MAKE THINGS

Library of Congress Catalog No. 56-12659

To those learned in the lore of libraries, this simple phrase tells a great deal. It signifies that a book has been received and categorized by the people in Washington.

The volume so designated is "*This is Glass*," a new and completely up-to-date survey of the special glasses and glass products developed by Corning research.

We suspect no usual kind of book club will offer this book as a bonus to its members. But, you can get a copy, free, just by asking us for it.

Here's what the cover looks like.

Why should you want such a book? Because within its 64 pages (sized 8½" x 11" for easy filing) you'll find words, pictures, and tables dealing with glass as a basic material of design and construction.

Sample—pages 12 and 13 tell about the following special types of glasses: Colored, Electrically-Conducting, Multiform, Fiber, Opal, Radiation-Absorbing, Cellular, Radiation-Sensitive, and Optical.

The table on pages 18-19 is devoted to data for 8 *much-in-demand* glasses. It tells of Viscosity Reference Points (working, softening, annealing, and strain); Specific Gravity; Expansion Coefficient; Young's Modulus; Electrical Properties (volume resistivity, dielectric properties); and Refractive Index.

For example, from this table you learn that PYREX brand glass No. 7740, a borosilicate glass, has an expansion coefficient of 32.5 x 10^{-7} per ° C., between 0 and 300° C.

This ability to cope with thermal change, along with immunity to most acids and alkalies, makes 7740 the top choice for diverse applications such as drainlines for waste acids; pipes for corrosive fluids; flasks for coffee (no adding to or taking *from* the taste); heat exchangers; sight glass windows; precision laboratory ware; dental sterilizer trays, humidity chambers—in fact, quite an eye-opening list.

Specifics of this nature are somewhat out of place here, except, we hope as a means of tempting you to expose yourself to the practical and profitable ways in which glass can be used.

"*This is Glass*" is a fine starting point. And it's the type of book that any number of people you know will find both fascinating and useful. Use the coupon.

Heart(h) warming

You're looking at a product that's both warming like a hearth, and heart-warming.

It's Arvin's latest entry in the small, portable put-it-where-you-want electric heater field.

We agree—small electric heaters are not exactly new. But this electric heater uses *glass* as the heating element. That's right, glass—specifically glass by Corning.

These PYREX® radiant heating panels are quite fantastic when you consider that glass normally serves as an excellent *insulator*. But such panels are covered with a permanently bonded, transparent, slightly blue, extremely thin metal oxide coating. It's the coating that carries the dielectric current and puts forth an astoundingly uniform heat.

Permanent and portable heaters are one use to which this glass has been put so far. In other applications it's proven an excellent electrostatic shield.

And turned around with the coating facing a high-heat source it acts as a reflector, bouncing away the unwanted infrared.

As we said—electrically conducting glass can be like a hearth; also heart-warming because here's a material that might just be the answer to some tricky design or engineering problem facing you.

Heavy glass for weighty problems

What can you do with glass that has a density of 6.22, lets you see through, but still is the equal of the same-thickness iron in stopping gamma radiation?

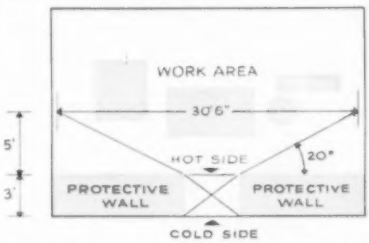
You'll be in good company if you use blocks of this optical-quality glass (along with some other special Corning varieties) to build windows for "hot labs."

These *ponderous peepholes* (that's what LIFE dubbed them) are often constructed with three unusual glasses.

Code 8362 is a nonbrowning lead glass with a density of 3.27 and is practically water-white. 8363 is straw-colored, a really heavy glass, density 6.22. And 8365, weighing in at 2.67 gm./cm.^{3}, is water-white.

In combination (especially as ready-to-install assemblies with oil "baths" between the glass layers) these windows provide protection, plus extremely good visibility.

Glass quality, plus high indices of refraction make for effectively large viewing fields, even with smaller area window on the "cold" side.



Here's a schematic of the field of view provided by a 3-foot thick, standard oil-filled assembly of Corning glass, Code 8362. A number of special glasses by Corning permit visual control plus protection from gamma radiation.

All the facts, including suggestions for radiation shielding window design, are packed into a 12-page Bulletin, PE-51. This recent addition to our literature file is titled "*Corning Radiation Shielding Windows*." One or more copies free with the coupon.

P.S. Glasses for ponderous peepholes are one of many types Corning has developed for special research and industrial problems. If you have a real knotty situation, we may already have a glass answer. Inquire in as much detail as you deem fitting.

Corning means research in Glass

CORNING GLASS WORKS, 54-4 Crystal Street, Corning, N. Y.

Please send me the following material: "This is Glass" ☐; Bulletin B-83, "Properties of Selected Commercial Glasses" ☐; PE-51, "Corning Radiation Shielding Windows" ☐.

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critical horseplay

To get an opinion, write an opinion. Dispute the necessity if you will, but we know now that it's true.

This department is always on the lookout for good virile opinions to spark our daily mail. We've printed a good many opinions of our own, always weighing both sides of the question, but recently we ventured one into print that had nothing but conviction to back it up, and it worked like a magnet. We referred to the appearance of one small TV set (January ID) as "the most interesting" of the current group. Straightaway a reader penned a view that may be shared by many others: "It is not," he opined, "the business of the magazine to act as critic."

Now critics are not unaccustomed to criticism. In the stormy history of literature and art criticism, they've received even more than they've given, which makes them not only less blessed but possibly more broad-minded. Yet amid all the brickbats hurled at critics by men like Francis Bacon ("They're like brushers of noblemen's clothes") and Charles Kingsley ("Critics lie, like saumon fry, to make their meal of you"), none bothered to challenge the critic's *right* to pen his painful opinion.

It seems possible that artists have accepted opinions not merely as inevitable, but as essential to a subjective endeavor. Whistler knew a man was always free to take issue with another man's opinion: he sued Ruskin for libel for equating his art to "throwing a paintpot in the public's face." Oscar Wilde insisted that "an age without criticism is an age in which art is immobile, hieratic, confined, or one that possesses no art at all." Samuel Clemens, in a more sportive mood, observed that "it is difference of opinion that makes horse races."

In today's commercial horse races, criticism has on occasion proved itself commercially useful. More than one out-of-town critic has helped save a loose-limbed play from a Broadway fiasco. But if the tradition of criticism survives in journalism, it is not just because a few sharpened pencils lash conscientiously at what is presented to public view. *The New York Times*, surely the nation's most respected newspaper, today presents its news reports as a series of by-lined articles. Why? To make clear that the man who objectively writes facts cannot write *the* facts, that the man who reads views may learn something from those with whom he least agrees. For the editorial effort itself is a critical one: not even the *Journal of Nuclear Physics* can be edited by automatons.

And where's the consolation to the designer? Every practicing designer knows that his work is never a yes-or-no proposition, that design does not spring ready-made from sales charts. His hardest job is to be his own audience and most severe critic—preferably at an out-of-town opening.

It is here that a magazine edited for him—continually studying his work and his problems—can be of some service. By expressing considered opinions and evaluating our motives for having them, the editors of INDUSTRIAL DESIGN hope to offer not only the news that each reader needs, but one set of views to help him form *his* opinions and examine *his* motives for doing what he does.

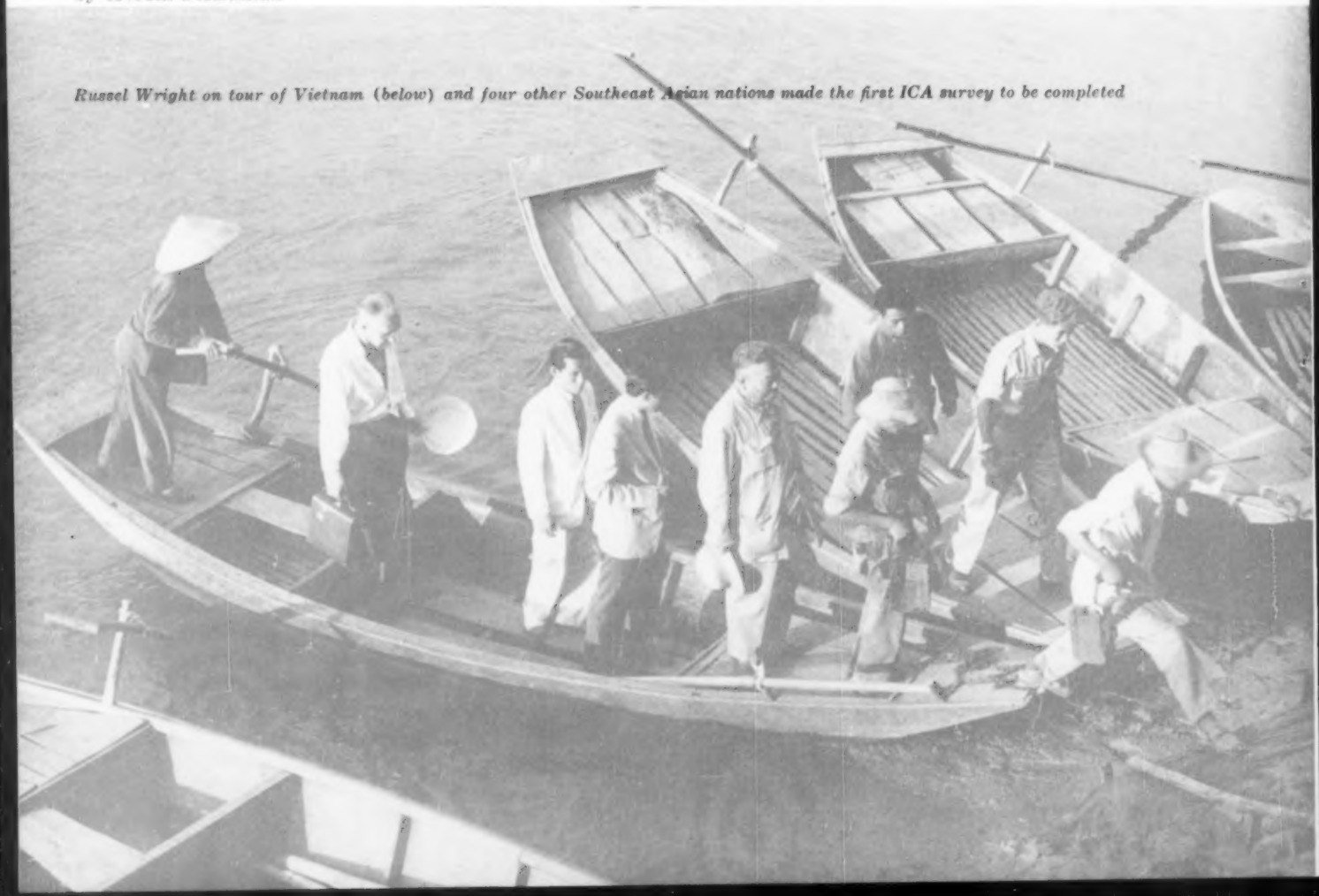
If written opinions stimulate thinking, then to our view everyone's ahead. After all, it's not guesswork but practiced judgment that keeps you at the horse races. No doubt all horses are equal (to paraphrase several people) but some horses are still more equal than others.—*j. f. m.*

Design as a political force Part 2

In the February issue, ID described the work of a group of designers selected to help the U. S. Office of International Trade Fairs to tell America's story to people overseas in short-term exhibitions. In this installment, we examine another instance in which designers have been given the job of communicator and diplomat — an even more extensive and penetrating program which casts seven design organizations in the role of national planner for 20 countries throughout the world.

by Avrom Fleishman

Russel Wright on tour of Vietnam (below) and four other Southeast Asian nations made the first ICA survey to be completed



When a designer turns up these days in an oriental or Caribbean marketplace, camera and notebook in hand, there is a good chance that he is more than a souvenir-seeking tourist. He may be an important member of a foreign economic aid program that began nine years ago with the Marshall Plan to reconstruct war-torn Europe, and that today seeks to help nations around the globe with the struggles of their peacetime economies. The Mutual Security Program will spend a large part of its $3,776,570,000 budget this year on military equipment, but almost 1/10 of it is a significantly large sum set aside for the economic development of underprivileged nations that the U. S. A. hopes to keep on its side of the political fence by encouraging a stable and prosperous future for them.

The key word here is development: the new program implies that vast construction projects like dams and factories can be introduced only when the ability to use them is developed. The Marshall Plan could quickly rebuild Europe's economy because the know-how to run it was already there, but underdeveloped countries require a more basic approach. Foreign aid is now approached as a cooperative effort between the U. S. A. and nations that feel they could benefit from our knowledge of markets and production. This shift in emphasis has introduced a new principle into the administration of foreign aid: the government is seeking ways not only to build up these nations but also to help them help themselves by working in their economies on their own terms.

A cooperation agency is formed

The independent government agency set up in Washington to handle this aspect of the foreign aid program is the International Cooperation Administration, and it is through ICA that design enters the picture. ICA directs a large share of America's technical assistance program to semi- or non-industrialized nations. The means ICA selects are various: generally they involve working with small industries and craftsmen to raise the quality of their products, direct them toward the ready markets for their work at home and abroad, and advise them on production, credit and

SURVEYING: Muller-Munk designer Robert Renaud scans Jaffa, Israel for products with export potential

MEETING: Teague and craftsman in Lebanon

TEACHING: Art Center School in Japan

marketing. The broad objective is to raise the standard of living of the man-on-the-street in Pakistan or Jamaica, to give him a better chance of living a productive life free of the allure of communist ideology.

In several of the early ICA projects, which have been underway since 1955, it was found that technical assistance was not proving comprehensive enough to bring about lasting changes in underdeveloped economies. Administrators often found that new techniques were discarded as soon as they were learned; better techniques led to better goods but not inevitably to a better sales picture. What was lacking apparently was not the market but a way of orienting production towards the market, which would result in an *incentive* to change in order to earn direct cash returns.

Realizing that a more comprehensive kind of assistance was needed to help these nations relate to modern patterns of international trade, ICA turned in 1955 to a group of experienced industrial design organizations. Why and how they used them tells a good deal about the nature of the ICA approach, and represents a new set of challenges for designers.

Enter the designer

How the recent ICA design program works was outlined in INDUSTRIAL DESIGN'S story on Russel Wright's survey of five Southeast Asian nations (August, 1956). Wright's approach to improving their trade centered on putting local producing units in contact with U. S. manufacturers and buyers. He arranged a large exhibition at the New York Coliseum for store buyers, showing current Southeast Asian craft products that might suggest other uses of existing techniques.

ICA has just renewed Wright's contract and the Taiwan (Formosa) government has set up the Handicraft Promotion Center he recommended, with such consultants as Jack Lenor Larsen, well-known fabric designer, and a staff of 12.

Wright's survey started at about the same time as those of four other design organizations: Walter Dorwin Teague Associates (Greece, Jordan and Lebanon), Dave Chapman Industrial Design (Pakistan, Afghanistan, Mexico, Surinam, El Salvador, Jamaica and Costa Rica), Smith, Scherr & McDermott (Korea), and Peter Muller-Munk Associates (Israel, Turkey, and India). The ICA also invited the Institute of Contemporary Art of Boston to make a study of Israel, and later last year the government of Japan independently invited a faculty group from the Art Center School in Los Angeles to make a study there which, although not officially connected with the others, is included here because of the parallel problems that it uncovered. In each case the answers they came up with were different, but the fundamental reasons for their visits were the same.

To any practicing industrial designer in the United States, the reason for asking a trained designer to work on the problems of a man turning clay pots in Korea or weaving woolen rugs in Greece may not seem obscure: an industrial designer is, after all, trained in making the client's problem his own, and his knowledge as a generalist rather than a specialist should equip him to find a valid answer to any problem if given an opportunity to analyze its ingredients. For the ICA, however, the move was anything but an obvious one; it required an understanding of the fact that a designer—no specialist in foreign affairs—could contribute something important by relating his knowledge of manufacturing and marketing to the problems of craft-oriented people he knew little or nothing about.

Working in foreign cultures

ICA was clearly aware that its work concerned not only the productive capacity of the nations involved, but their values, psychology, traditions, and attitudes toward the aid they were to receive. As the United States has found in the decade since the war, giving aid does not necessarily produce results—or gratitude. Missions sent to accomplish specific technical projects have sometimes failed, despite the best of intentions, by not understanding the attitudes they encountered.

One example may serve to suggest many others:

INFLUENCING: Smith, Scherr & McDermott jeep in Korea

EVALUATING: Handicrafts in Chapman office

an ECA technical aid team in Greece, trying to improve quality control to open up an export market for local wine, had little success in convincing the vintners to adopt modern refrigeration methods. From time immemorial, Greek wine-growers have used resin to retard spoilage; it produces the sharp antiseptic taste that is not "good wine" by American standards. The Greeks, of course, prefer it–and it also happens to be perfectly suited to their heavy cuisine in a hot climate. But one member of the same mission, observing that acres of unproductive submerged land could be turned to good account for rice-growing, had no trouble persuading and teaching the Greeks to become rice-farmers. Here no change of traditions was involved–but rather a wholly new learning process. As anthropologist Margaret Mead points out, it is usually more effective to introduce entirely new elements–and even to change a culture as a whole–than it is to make piecemeal modifications.

The designer in a craft economy

Many such cases, apparently paradoxical and certainly mystifying, come up when an alien technique or idea is introduced into established cultures. The problem was the same for the Office of International Trade Fairs in communicating American ideas and ways of life through exhibits of our products–many of which local visitors had never seen before and could not relate to their own lives (ID, February 1957). ICA, moreover, was not merely propagandizing but was seeking deep changes in the economies of underdeveloped countries. It had to consider not only their attitudes but also their stage of industrialization.

Most of these nations suffer from the decentralization inherent in non-industrial economies. In many, the largest share of work is done in cottage industries (farm families supplementing their income through home handicrafts). This situation creates enormous difficulties in coordinating government aid programs or even finding out what production resources exist. The craftsmen are often so far from their markets—geographically and culturally–that they have little knowledge of what it wants, and no facilities for quality control or quantity production to meet orders.

In these complex circumstances, design assumes a very different meaning from the one it has in industrial nations, where materials, production, distribution and markets are sufficiently developed to allow some freedom at the drawing-board. In their new roles, the ICA designers had to study and plan for these basic economic conditions first. Actual designing entered only after the designer found himself playing the roles of an economist, marketing specialist, technical instructor and large-scale coordinator.

In every nation he entered, the designer had to clarify his purpose there, not only to the craftsmen but to himself. Is it, after all, to these countries' advantage to learn new techniques? Though the need to end their grinding poverty is pressing, should it be done if an entire way of life may be threatened by stronger forces? Does it help Pakistanis to develop if they learn how to make products that please American tastes? Many crafts workers have already expressed their fear that with the coming of new methods and perhaps factory-organization for mass-production they will lose control over the entire creation of their products. How, if changes are to come, can they be introduced to the people's best advantage?

Before these questions could be answered, the designers had to find ways of introducing themselves *as designers*. It wasn't easy, because "design" in our sense of the term has little or no meaning to the individual potter, weaver or silversmith who designs and produces his product almost as one operation. The transition the designers had to make from an industrial to a craft economy was, at first contact, a job of reassuring the craftsmen and explaining what constructive help they could expect. In outlining this aid, the designers had to "sell" their ability to function as the manufacturer's right arm at every stage of product development, from materials and product-planning to production and marketing.

The Muller-Munk office in Israel plans new products on a national scale

One way to improve trade in foreign lands through design—perhaps the most natural one for an American—is to set up a design office on the spot. This is what Peter Muller-Munk Associates did in Israel, but to see what lies behind the obvious—why such an approach was particularly appropriate in Israel—the country's total economy has to be considered. The Muller-Munk office thought in just these terms, and its answers to national problems, in Turkey and India as well as Israel, suggest something of the essence of industrial design as a method of total planning.

Compared to the other nations studied by ICA, Israel is well on its way toward becoming an industrialized economy. It has a substantial number of small manufacturing plants. Besides Western-style manufacturing, it has a wide range of handicrafts made by the Arab and Jewish natives and recent immigrants from the Middle East. But for all its efforts in planning, training and development, Israel continues to have an extremely bad balance of trade (imports exceeded exports by $239 million in 1955, out of a total foreign trade of $414 million). In this situation, Muller-Munk Associates had more than underprivileged craft workers to think about. Thinking on the national scale, they planned to meet consumer needs at home to cut down on imports, and increase export potentials with new or more salable products. By earning foreign currency, Israel can buy materials and apparatus not available within the country, to build up her industrial capacity.

But Israel will never be an industrial giant, because it lacks the natural resources of fuel, water power and raw materials. Its future, given its skilled workers and technical adaptability, lies in the area of specialized manufacturing, and with these Muller-Munk Associates believe it might become the "Switzerland of the Middle East." Their solution to the "design" problem is to plan new products to supply the special needs of the country and its neighbors, like room heaters appropriate to the climate and glass containers for citrus exports. With the existing industrial capacities of the country, Israel can use a professional design office in its midst to give it direction in marketing, product evaluation and new product planning. Its handicrafts industries might also benefit from design consultation to gear them toward the western market.

To do all this, the Muller-Munk organization has set up an office in Haifa (Israel's second largest city) staffed with two Americans and four Israelis, and supported with counterpart funds by the American and Israeli governments. The aim is to have the office

ISRAEL's *mixed economy is mixed in many ways: handicrafts like copperware (1) and light manufacturing, private and collective ownership of industries, European and Middle Eastern cultural influences (2) exist side by side. To introduce the idea of industrial design to this complex country, Muller-Munk Associates held a three-day conference for Israeli manufacturers in Tel Aviv last June (3; Peter Muller-Munk, right) before setting up its Haifa office (4) to design products for them. None of the projects have been completed so far (the American designers have been temporarily removed due to the current political crisis in the Middle East), but the Israeli designers (5) are carrying on with projects to meet the country's needs and open up new markets abroad: chinaware to replace imports from West Germany, room heaters for the local climate (generally too warm for central heating), glass containers for a major export —citrus preserves.*

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self-sustaining after two years in both finances and personnel. The office will charge Israeli manufacturers a fee for its services and will be run entirely by the Israeli designers, who will pick up from Americans the professional skills needed to take complete charge.

It is interesting to compare the Muller-Munk method with the design assistance program suggested for Israel by Boston's Institute of Contemporary Art, working under contract with ICA and the Technion (Israel's college of industrial art). The Institute proposed a Design Center, much like the British model, which would operate in a coordinating capacity only. It would design products only as a phase of design instruction given at the Technion and its home-office workshop. A major part of its activities would be a Standards Evaluation Program to examine all products made in Israel, to "raise the level of sensitivity to any present weaknesses in design and to the areas of possible improvement." This method of working raises a question that applies elsewhere, too: should design standards come from within or from without? Evaluating existing products can have great value in the design training program, but anyone who does it will have to be conscious of the special situation of the country and the kinds of products it needs to develop. Otherwise the critic runs the danger of bringing in standards from America or imposing a universal criterion of good design.

These dangers are present for an American-sponsored local design office, too, but Muller-Munk Associates have tried to avert them by choosing to play a functional rather than an advisory role. Working on actual cases brought to it by business clients, staffed with Israeli and American counterpart designers, and slated to be independent after two years, the office could become a working part of the Israeli economy. American participation is not permanent but is self-liquidating, and gives the Israelis the necessary equipment and skills to carry on independently. Even now there are ways in which the Israeli designers can contribute to the direction of the office. As Muller-Munk Associates explain it, "We plan to train our Israeli co-workers in those methods and skills with which we have had more experience than they, but we, in turn, depend on them to interpret their country's needs in a language which fits their tradition."

What this implies about design in this context is that it is not an end in itself, not a set of standards for beauty or style that can be imposed on a product or communicated to a people.

The American designers are working to supply the means to the end, to give the client advice in marketing and product planning—and the skills needed to

TURKEY *will soon be the scene of a Muller-Munk design office aiming to adapt local handicrafts like ceramics* (1), *lace, meerschaum and copperware for the world market. Craft skills are at a high level in specialized shops* (2), *but most crafts are practiced in cottage industries by entire farm families* (3). *Designers Paul Karlen and Robert J. Renaud will tackle major Turkish problems: co-ordination of scattered production centers, quality-control and pricing (to combat poor trade reputation of Turkish goods), and better understanding of Western markets.*

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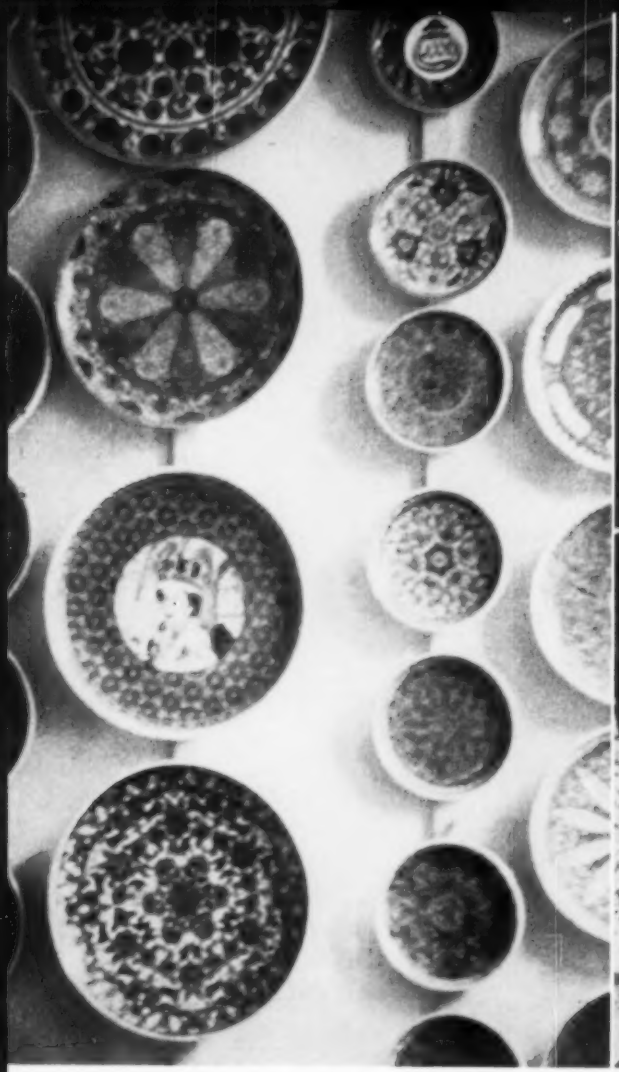
Planning in Muller-Munk Associates' Pittsburgh office: (l. to r.) Raymond A. Smith, Robert J. Renaud, Peter Muller-Munk, Paul Karlen.

1 | 2

INDIA *is the largest nation with the most diversified economy studied by ICA; its manufacturing types range from primitive bow-string power-drills* (1) *to large pottery industries* (2). *Muller-Munk Associates have recommended a long-range, large-scale technical assistance program which would begin by stationing four American designers at government industrial training centers at New Delhi, Bombay, Calcutta and Madras. They would train Indian instructors who will work in the field with the village craftsmen, teaching them new skills and design directions.*



People–and the way they work–were the first concern of the design surveys

detail and coordinate the plans—in order to execute the client's real goals. In Israel these goals are national, economic and cultural, but they are not much different from the designer's formulation of business goals in America.

Muller-Munk Associates' work in Israel is no universal panacea, however. When they surveyed the predominantly handicraft economies of Turkey and India, they had to search for different solutions, to design and market a different kind of product. Their projects have not yet gotten underway—the Muller-Munk staff for Turkey will soon depart for Ankara to set up a crafts consultation center, and ICA has invited bids on the contract for a similar mission to India. When they do get started, they are likely to encounter many of the same problems that are spelled out in the design reports on neighboring countries of Asia and the Middle East.

Teague's plan for marketing

The difficulties of communicating with remote cultures became a real problem for the ICA designers who surveyed nations whose resources are largely handicrafts. Under the ICA's principles of foreign aid, they had to be concerned with the individual workers who are the ultimate targets of the design assistance program, and at the same time plan design aid of a kind that would fit in with the craftsmen's traditional way of life. Designer Walter Dorwin Teague, surveying three such nations — Greece, Lebanon and Jordan — interpreted this goal as a matter of marketing rather than design. Teague felt strongly that to organize the craftsmen in shops for higher productivity, or to redesign their products for export to conform to Western tastes, would be to destroy their patterns of life and work and perhaps to edit out of their products the individual values of unique cultures.

The largest gap in the economic systems of the three nations, Teague found, was the lack of an organized system of outlets to market the goods they produce, and it was on this weakness that he built his program for increasing sales. His proposal pivoted on the establishment of offices in each of these nations to collect the best native products, and to maintain quality standards for export, principally to the U. S. Here, trade promotion centers would be established by the U. S. and foreign governments, serving as showrooms to the trade and distributors to retail outlets. As little change as possible would be made in the products, although natives of the craftsmen's countries would give styling advice on fashion items. They would design garments with local fabrics for export, as the Greek "Queen's Fund" promotion center now does for internal markets.

GREECE *has a long tradition of craft skills, as Walter Dorwin Teague found among metal workers on Athenian "Street of Hephaestus"* (1). *Products like woolen rug from Arachova* (2) *have good potential market in America, Teague thinks, but designs need to be simplified for American tastes—without destroying unique cultural values that are their selling point.*

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Craft nation's problem:

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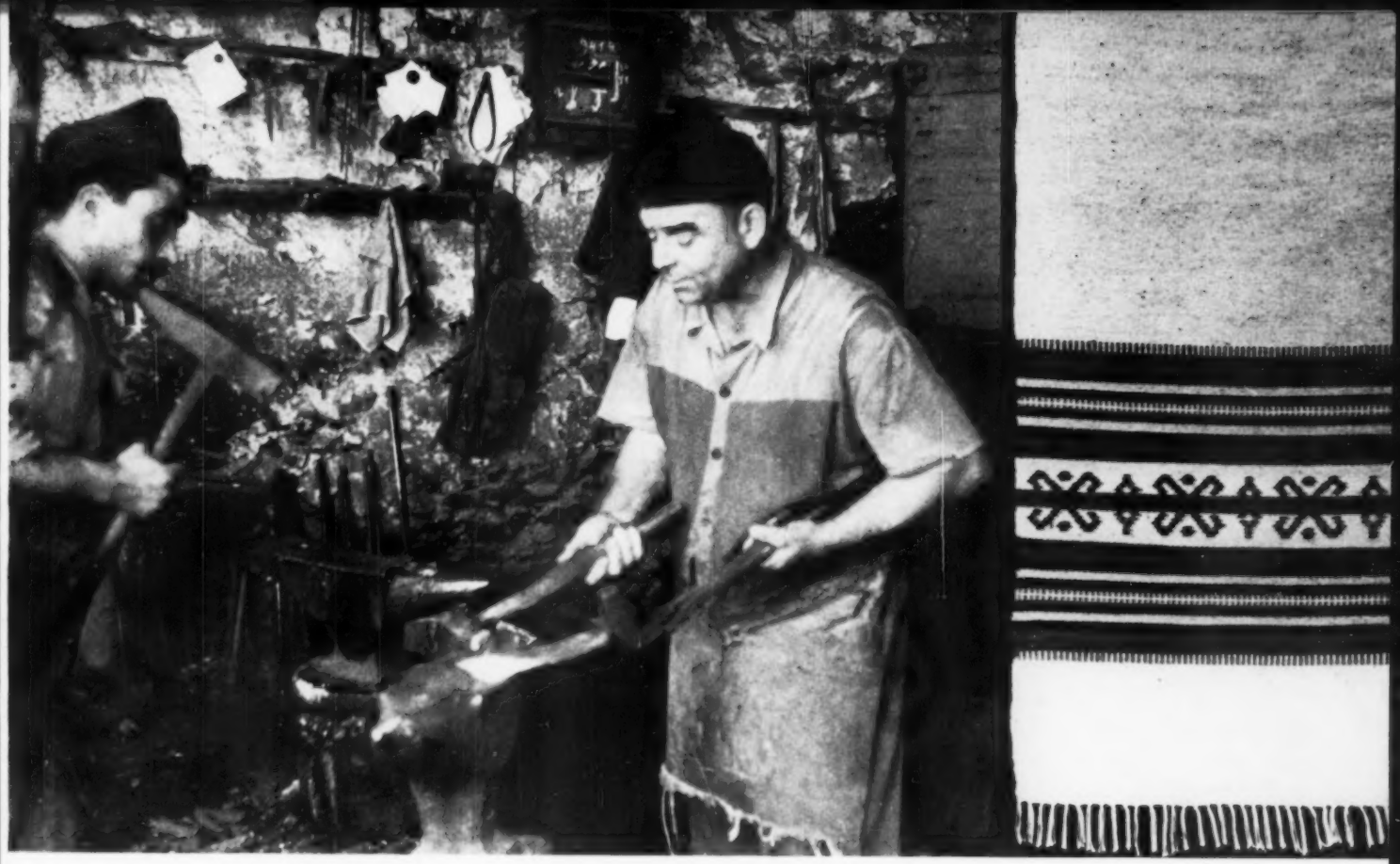
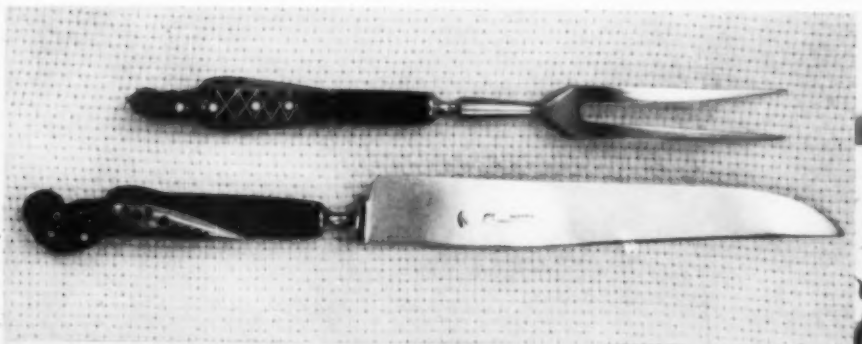
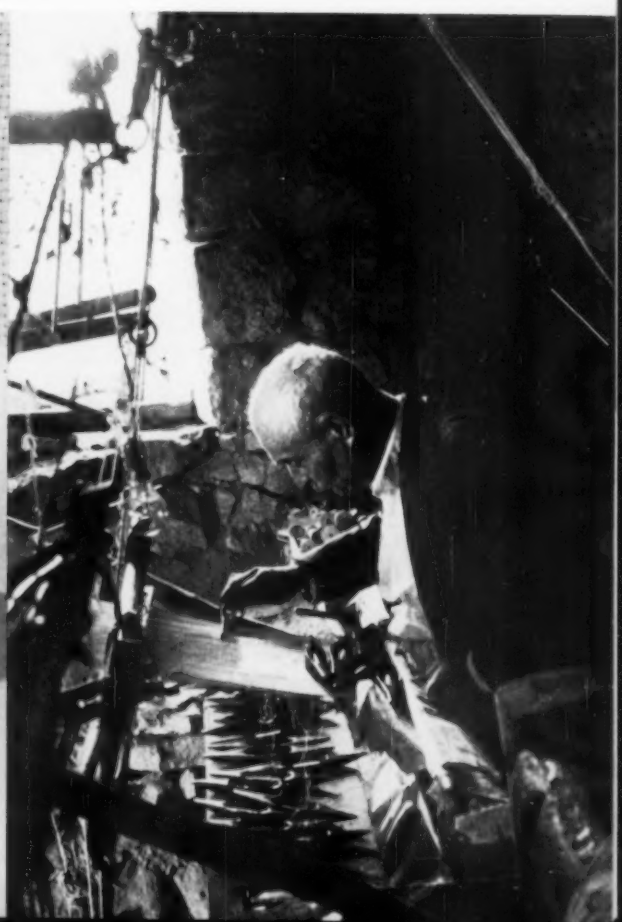
MIDDLE EAST *nations: Lebanon and Jordan have high-precision craftsmen like those at Jezzine, Lebanon, who make stainless steel carving sets with horn handles inlaid with dyed bone chips* (1), *and master weaver of Zouk, Lebanon* (3). *Products like exceedingly comfortable goat-skin sandals* (2) *could bring new inspiration to American craftsmen, Teague feels, but need an organized marketing system to distribute them abroad.*



how to keep their products genuine, yet suit them to foreign markets





Teague has elaborated in detail the way such a plan would work, and it shows another of the special roles that industrial design can assume — not only marketing but business management skills have been employed to meet the special needs of the client. Interest in the plan has already been shown abroad, and the Greek Productivity Center has set up a working committee to implement it. Meanwhile, Teague will exhibit his collection of Greek crafts at the time of the U. S. World Trade Fair at the New York Coliseum this month (April 14-27), to sound out the American store buyers on the potentialities of the products in the giftware and fashion fields. Similar presentations of crafts from Lebanon and Jordan are also planned.

Japan and Korea present a contrast

Realizing the need for design counsel in helping to improve their export of industrial goods, the Japanese government's department of commerce invited faculty members of the Art Center School, Los Angeles, to visit Japan last fall. The group chose two methods of surveying and advising Japanese industry. Mr. E. A. Adams, the school's director, together with George Jergenson, John Coleman and Frank Nakamura, interpreter, travelled to 86 factories throughout the country for conferences with management, evaluating their products and merchandising methods. Instructor Jergenson also conducted a course for 69 designers who came from industry to the Industrial Arts Institute in Tokyo. As a result of their broad contact with Japanese industry, the group made a diagnosis of Japan's problem: though the nation has considerable manufacturing skill, and its designers have a rich esthetic heritage and sensitivity to form, no bridge has been built between them. Manufacturers have relied on their ability to imitate, and undersell, the industrial products of other nations, but have not developed an industrial esthetic that could give Japanese products individual identity and national prestige. The Art Center group, seeing this absence of national product character as one of the cornerstones of Japan's difficulties in competing abroad, laid heavy emphasis on industry's need to develop a design approach out of its national art tradition. In their courses, the educators taught the Japanese designers basic visualization techniques but not styles of design; and in their evaluations they tried to point the way to a Japanese design expression that can compete on the world market on its own merits.

The Korean survey by the firm of Smith, Scherr and McDermott was restricted to crafts products, but it uncovered a situation similar to Japan's — the tendency to accept Western influences in the design of products,

JAPAN, *a highly industrialized country that produces many items like sewing machines* (1) *to compete with Western models, requested design advice from Art Center School. Director E. A. Adams met with Japanese manufacturers to discuss such merchandising problems as improving trademark design for better company identity in products* (2), *and George Jergenson counseled staff designers on appearance design in cars* (3), *taught modelmaking techniques for better three-dimensional visualization* (4).

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The Far East:

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KOREA's *handicrafts have fallen from traditionally high level, due to loss of skills and equipment: ICA surveyor Samuel Scherr (left) found farmers using bicycle wheels and fruit-juice cans in home weaving industries* (1). *Korean producers often try to style goods for Western markets without understanding its needs and tastes: e.g. glass-beaded toilet-seat cover* (2). *Smith, Scherr & McDermott recommended that basic technical training be administered along with design orientation.*

design instruction for quality exports and a higher level of skill

without fully understanding them. Korea, however, lacks Japan's highly developed technical skill, even in its handicrafts, and its immediate problem is to improve basic production methods before it tackles the problem of refining its design sense.

Before Korean crafts can attract Western buyers, the designers concluded, they will have to regain the traditionally high level of quality for which Korean Celadon and brassware were once world-famous. The craftsmen who carried these ancient skills were transported to Japan during the 39 years of Japanese rule of Korea; other cultural values have been lost in the general demoralization of the country by political upheavals. Most Korean crafts today have acquired a new meaning: they are usually basic household implements and living equipment — clothing, furniture, cooking utensils and farm equipment — produced in cottage industries to satisfy the needs of the local community.

Smith, Scherr and McDermott recommended a program of technical training for craftsmen, to improve the quality of their products for the local market. After their level of skill is raised, the team suggested, they could be directed toward producing better giftware and accessory items for export.

Design for two areas across the globe

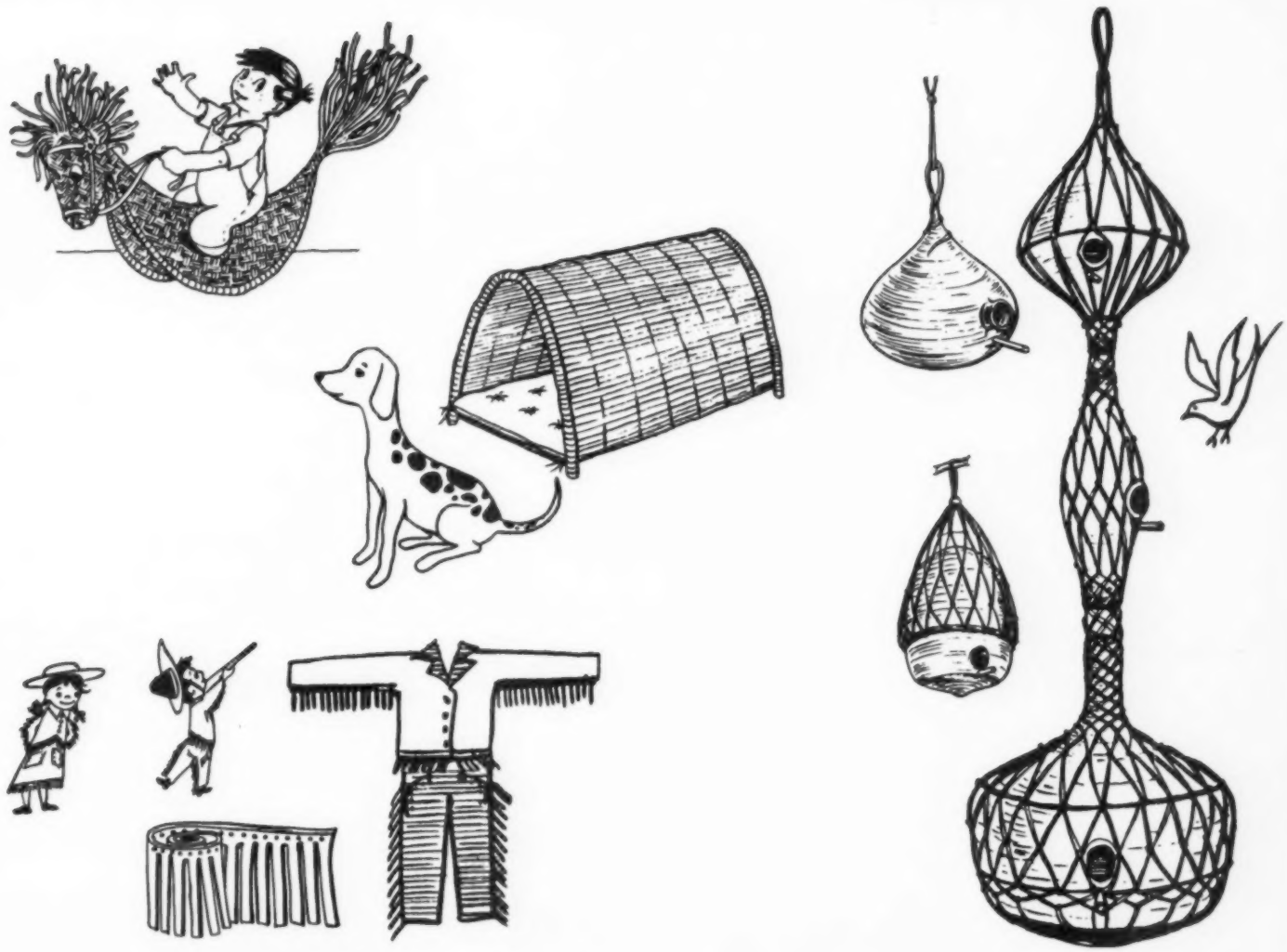
Design Research, Incorporated, of Chicago, an affiliate of Dave Chapman Industrial Design, made surveys of crafts in two widely different areas — the Latin American countries of Mexico, El Salvador, Costa Rica, Surinam and Jamaica, and the Asian nations of Pakistan and Afghanistan. Despite the wide differences between these regions, Design Research discovered some remarkable similarities in their economic problems. Both areas, they found, are oppressed by the same attitude that other design teams discovered in Japan and Korea: the feeling that only by producing low-price goods with their cheap labor can they compete on Western markets. But cheap labor was not proving to be a real advantage, for the productivity of the craftsmen in the areas they surveyed was low. That the craftsmen seemed to need technical training to improve their products was just one of the obstacles to better sales that turned up in the design surveys.

The designers noticed a sense of snobbery among the more Westernized middle-class population toward goods produced in the cottage-industries of their own country. There seemed to be some justification for this lack of national pride: the products of most of these countries lack distinctive national identity, the Chapman surveyors judged. Even where crafts have been developed in small manufacturing shops for export, the design investigation revealed that they were often copies of

CARIBBEAN *nations of El Salvador, Costa Rica, Surinam and Jamaica, as well as Mexico, can open new export business with the United States, Design Research survey concluded. Designers submitted sketches (right) to ICA, suggesting redesigned handicrafts to meet current U.S. recreation habits and tastes. Toy with bamboo frame and woven plant-fibre tail and mane, lattice-work kennel, ceramic and woven plant-fibre bird houses, and playsuits trimmed with scarred leather employ local materials and skills in new but not radically different applications.*

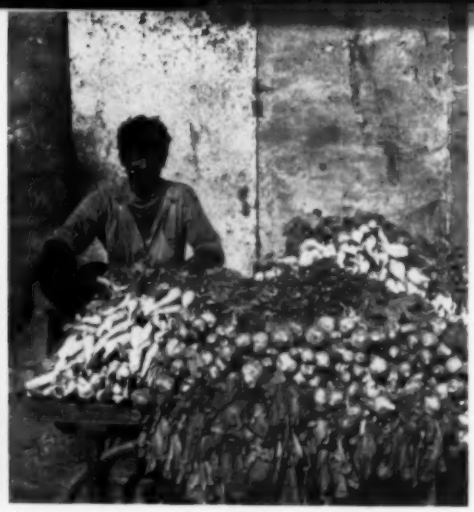
Chapman group redesigns crafts

PAKISTAN's *major marketing problem is expressed in store sign (right) on Karachi street: designers found prevalent belief among Pakistanis that underselling Western competition is their only road to success. Design Research encouraged Pakistani producers to develop quality handicrafts (following pages) for both local and export markets.*



to recapture home markets, raise sales abroad

1



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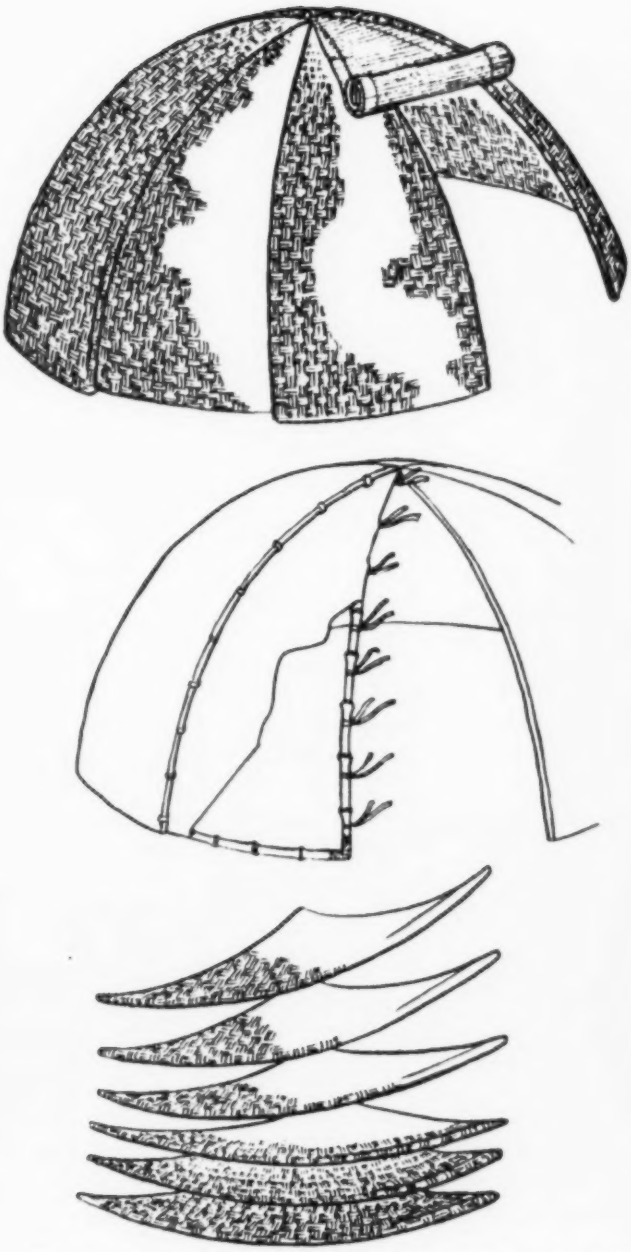
7

Pakistan's marketing is largely unorganized (1, 2); craftsmen (3, 6) need better local outlets for their work.

Products like vases and shoes (4, 5) show high level of workmanship, but workers have low productivity. Design Research recommended more technical training, on the model of ICA school (7) that trains native instructors to work with village craftsmen.

Design Research's formula for Pakistan economic development:



Sample redesign suggestion is demountable latticework shelter that can be stacked in transit; for recreation use as hunting blind, fishing shelter, children's backyard playhouse, picnic tent.

Pakistan craftsmen readily adapt to new design ideas; Design Research's Roy Ginstrom introduced a Margo Hoff rug design at Pak Carpet Co., had quick production and sales response.

planned marketing, technical training, and design of more salable products

neighboring countries' products — Persian rugs made in Pakistan, for example. The craftsmen, Design Research concluded, had to be encouraged to draw on their own cultural resources and incorporate them in products designed for contemporary needs.

The Chapman office's recommendation for a method of working out these aims is to station members of its staff in each of the seven countries to work with the craftsmen in the field. They would advise on both design and marketing techniques to capture specific markets that their Chicago office discovers, and would develop a prototype product line for trial runs before quantity production is urged. This work would be coordinated through producers' associations, which would be formed for each nation by the U. S. and local governments to develop a total program for revamping their manufacturing.

The designers-in-residence would try to direct the craftsmen in specific products that are particularly suited to their skills and have a ready market in America. Such items as toys and outdoor furniture would be suitable for adaptation to the habits and tastes of American life; other items in jewelry, fabrics, basketry and ceramics would be redesigned to give them the individuality which the Chapman designers feel they lack. A third class of products would be sold as art-objects to exploit their exotic appeal — decorative combs from Surinam might be sold in the U. S. at many times their present price by introducing new merchandising techniques. The designers would also advise on new products that could be made with existing materials and skills — like jute bags in Pakistan — in order to diversify these nations' production and open new markets to them.

The project would not be limited to designs for export, however; Design Research feels that the internal markets of most of the countries in their study could be greatly expanded by winning the wealthier urban buyers back from imported Western consumer goods. They hope to show these countries that they can produce quality goods to satisfy their own needs. This would give them the psychological uplift of appreciating their own traditions and talents, and reclaim a natural home market.

Craftsmanship and markets—two views

The Chapman office's approach is similar in many ways to that of Walter Dorwin Teague Associates, yet their differences of emphasis point up some of the questions for which ICA will have to find answers — and perhaps there are no single and final ones.

Both the Chapman and Teague surveys felt it necessary to evaluate the cultural interest of the craft products they examined, as one of their important selling points. Teague collected many items he thinks show a high level of individuality and skill, and which can sell on the American market with a minimum of redesign because they *are* Greek or Middle Eastern — which creates their special charm. Chapman's office feels that many of the items made in their survey areas lack this national distinctiveness (basketry and hats throughout Central America, for example), and are similar to crafts that can be found around the world. But both agreed that the cultural values of their project-nations are important and are the basis of successful sales programs both inside and outside these countries: the more distinct the national character, the better the sales potential is likely to be.

How much emphasis is to be given to internal or external markets is another open question, very much dependent on the local standard of living. Teague discovered that the local markets of Greece, Lebanon, and Jordan (where the average annual *per capita* income varies from $250 to $68) cannot absorb all the goods that the craftsmen can make. He looks to the foreign markets to open up a large source of supplementary income for the craftsmen. Design Research, too, stresses the American market in its redesign plans, but encourages Pakistan and the Latin American nations to look to their own city-populations as a market in which they can successfully compete with imported goods. Each nation that ICA works in will suggest a different relation between the trade alternatives, but it is already clear that the American designer will have to understand not only the American market but also the entire world trade situation if he is to direct the craftsmen to all the openings that offer themselves.

Besides these many talents, the designer engaged in government work in underdeveloped countries will have to acquire a set of personality traits which no design school can teach him. As Peter Muller-Munk describes the requirements that emerged in his office's Israel project, they include an understanding of the broad objectives of foreign aid programs, political sophistication and tact, patience with what are by our standards inefficiencies, an ability to refrain from promising more than one can do, a capacity to absorb remote cultural values, and a quick recovery from "giftware excitement" if one is to function as a national planner for the economies of entire countries.

There is likely to be much more national planning of this nature; countries like India and Puerto Rico are currently engaging American industrial designers as Japan did, to help their countries make contact with world markets. The designers who contract with these nations may be called upon to assume roles and responsibilities beyond any that have yet emerged.

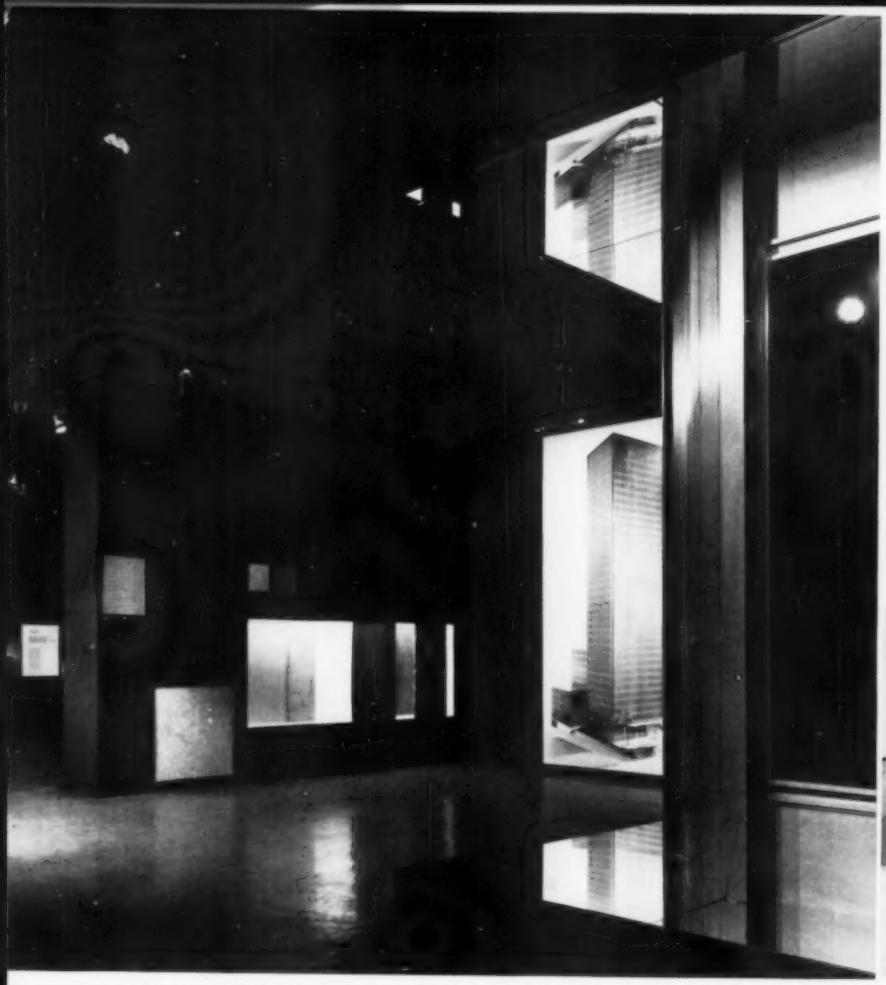
The point of good building

The current exhibition of "Buildings for Business and Government" at New York's Museum of Modern Art dramatizes a new pattern in public architecture. Four examples on the following pages represent a corporate client's increasing investment in esthetic and social values, two others, the government's — a major gain in design distinction, public relations and habitability.

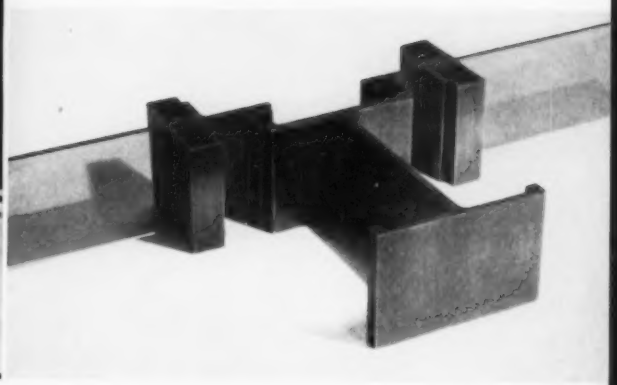
Thoroughly practiced in creating an architectural experience within its own walls, the Museum of Modern Art had as a problem in this exhibit to present six major examples of contemporary building, including the vast and multiple complexes of the United States Air Force Academy by Skidmore, Owings and Merrill, and the General Motors Technical Center by Eero Saarinen & Associates. Although only two—the GM Technical Center and the St. Louis Air Terminal—are in use, the installations seek to make all the buildings as actual as possible. A giant photo mural of the Air Force Academy's mountain site stands behind the model; a glazed red-orange brick wall and an entire window frame present life-sized pieces of the Tech Center; to the right of the entrance, shielding a whole room, stands a terrazzo grille from the New Delhi Embassy; and, trickiest of all, a full-scale model of a bronze mullion and glass section in Mies van der Rohe's Seagram building is set into many mirrors, giving the effect of its many-storied tower, shown on the previous page.

With the aim of demonstrating how business and government have grown from clients of architects to patrons of outstanding architecture, the exhibition space itself, designed by Arthur Drexler, emphasizes the qualities which make these different examples outstanding: excellent materials (samples of which may be touched); skillful detailing; but above all, a wise and generous awareness of architecturally defined space, exceeding merely utilitarian considerations. The Chase Manhattan Bank with its plaza on a Wall Street site exemplifies this point in a congested urban situation, and a similar rational approach lies behind the disposition of usable space in the microcosmic cities of the GM Technical Center and the Air Force Academy (below).

MMA exhibit animates the quality of buildings that are and others that are to be



Rollie McKenna



A monument before it is completed, the first building in New York by Ludwig Mies van der Rohe, Joseph E. Seagram & Sons headquarters is remarkable for the fine materials expressing the classic tower design: bronze, travertine and marble, and its sheathing with tinted glass. As structurally exact and simple as the verb "to be" (right), is the mullion of the window in the bronze spandrels.

Not without receiving a few brickbats from Congressmen, the Air Force Academy design by Skidmore, Owings and Merrill escaped with its glass walls and contemporary character. Occupying about 400 acres, seven major buildings will be erected on paved platforms, in a unified scheme to provide cadet living quarters centrally, and administration, social, dining and academic in other halls.

Ezra Stoller

For the Chase Manhattan Bank, Skidmore, Owings and Merrill have designed a 60-story tower with a plaza extending half a block and five basement levels below.

Ezra Stoller

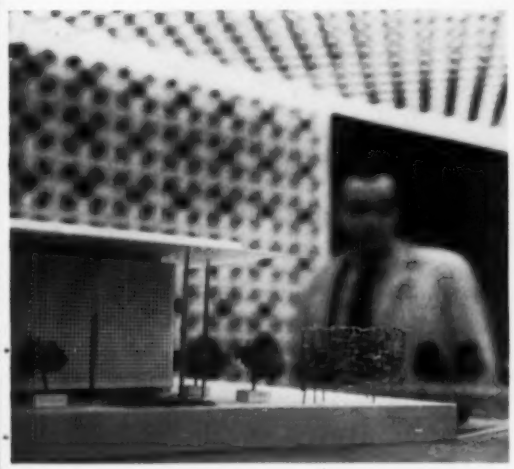
Inside and outside, the General Motors Technical Center carries out a modular plan in clean gleaming materials. A basic five-foot module applies alike to structure, partitions, light, heat, ventilation.

Three additional barrel vault units will be added to the St. Louis Air Terminal. The vaults, springing from the floor, arch up to 32 feet in height, are made of concrete 4" thick, sheathed in copper.

Ezra Stoller

Installation photos for this story unless otherwise noted are by Hugh B. Johnston

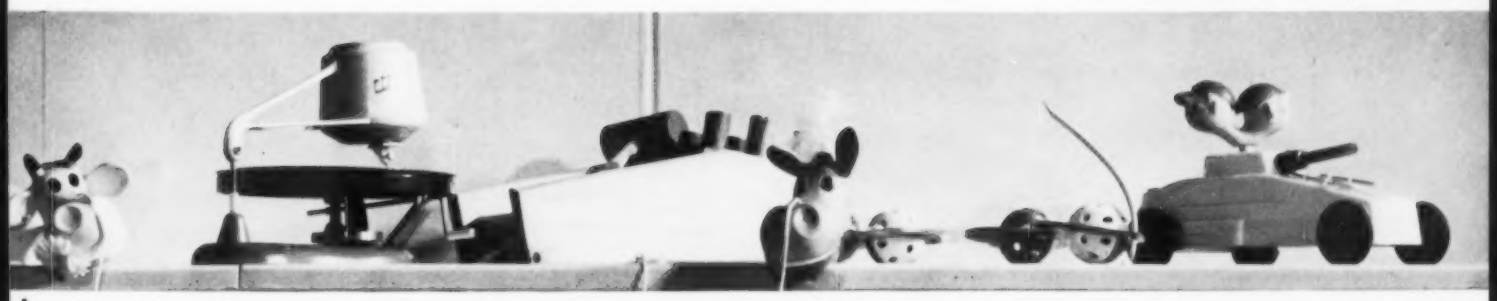
Some details are presented pictorially, others three-dimensionally in the MMA exhibit. On the opposite page are photographs keying salient points in three of the buildings: (1) looking down through a model, the open plaza of the Chase Manhattan Bank; (2) the suspended steel stairway in the GM Technical Center, one among many of its specially designed details which, according to Arthur Drexler, "suggest product design and manufacture as much as building"; (3) the flowing contour of the St. Louis Air Terminal, with its three pairs of intersecting barrel vaults. The Terminal is Minoru Yamasaki's graceful solution to a special design problem: a building easily visible from the air, to be finished at intervals. The most expansive display of materials surrounds the rectangular model of the United States Embassy for New Delhi, designed by Edward Stone. These exotic textures (right) represent practical sun protection: over the interior garden, a suspended mesh ceiling of aluminum anodized gold; and, to surround



the two glass-walled main floors, a continuous grille of terrazzo (a mixture of marble chips, cement and concrete) reinforced by steel rods. The building, made of charcoal-veined white Indian marble (makrana), will have 50 gold-plated steel columns supporting its projecting parasol roof on all four sides. With this double concrete roof creating an insulating air space, and with its interior and exterior water gardens, the building will be a luxurious conception —not however, a transplanted one, but suitable to the environment in which it is to represent the United States.—*s.b.*


Therm ex
motor

by Suzanne Burrey



How one manufacturer scouts, researches and coordinates—once he is convinced of a design's potential

John Burton Tigrett's business has no barriers

Originality in design is an unpredictable quality, and John Burton Tigrett, in search of it, is an elusive man. Seeking out ideas and putting them into producible form, he follows no orthodox path as a manufacturer, and even beyond the list of his diverse products there is more diversity than meets the eye. Since 1950 he has behind him, to name a few: the only round playpen on the market, a colorful clothes hanger, a motor that is fueled by a three-watt bulb, and shelves full of toys. "We don't copy anybody," Tigrett said in his headquarters in Jackson, Tennessee. "And we don't let anybody copy us." On this basis, he has about 40 products in his factory and countless in his head. Tigrett Industries grosses, he figures, between two and three million dollars a year; and he not only scouts tirelessly himself for new ideas as far as the rumor leads him, but the world beats a path to *his* door, about 80 miles from Memphis.

A big man, with dark sandy hair and freckles, Tigrett is as serene on the surface as his record is canny. Whether making new furniture for babies or such novelty products as the Drinking Duck and the paper Zoomerang variations, he is concerned mainly with the challenge of discovering new ideas, and he seems to have arranged his life to make risk-taking as pleasant as possible. As a personality, there are paradoxes about Tigrett: his obliviousness to appointments, for example, and his ability to get quickly to the market with a new find; and the fact that Charles Eames designed his office, but that his new home will not be too different from the others on a shady Jackson street. But as an entrepreneur he is wholly consistent: an invention that he buys and adapts to his facilities is always a fresh statement bearing the imprint of his enthusiasm.

It was an old habit of buying up patents that got Tigrett into manufacturing in the first place, and since he was in his twenties and made his first purchase—a hair straightener—Tigrett's interests have always leaned toward innovations. The hair straightener patent, which cost him $250, was a youthful folly, and yet it is the same adventurous approach mellowed by some other mistakes which spurs him to keep entering into new fields and also to set up research and development facilities in his own headquarters. "We really believe that just about anything we can think about, we can do." But first, he adds, there must be a good idea to work with, and for this you have either to know where to go or be lucky enough to have it come to you. Some of his best sources have been designers such as Charles Eames and Kay Bojesen; some ideas have come in the mail, some from people he meets. Tigrett once picked up a talking clock across the Iron Curtain; "A good idea is *really* hard to find," he says, "and then you must have the resources to develop it."

Because he is both imaginative and amiable, people have approached him with schemes which would hardly have seemed worthwhile to a conventional manufacturer. Since he is more interested in the challenge of producing than the money, Tigrett does not give up easily. Once convinced, he will take on himself a large share of the responsibility for discovering the best design context for a mechanical patent that he has licensed, and he deals with inventors and designers on a royalty basis. His twenty current licensees include hobbyists, professionals, a Washington State

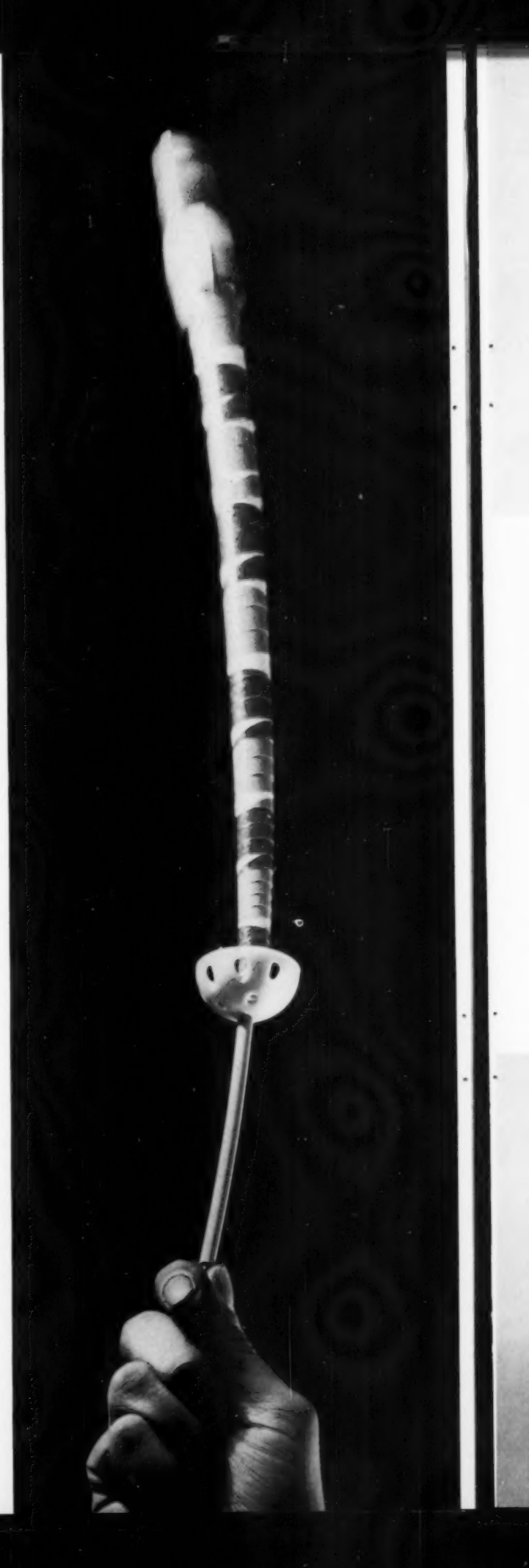
Photo: Hugh B. Johnston

Senator, as well as engineers. His new Design Development Laboratory in Jackson has a room full of crude models and sketches sent to him by people throughout the world who hope to duplicate successes like the Zoomerang.

The Zoomerang is a good place to start Tigrett's story because it founded his business; it has the ideal qualities of providing the delight of movement at a very low cost and is utterly simple to manufacture. Still thriving in a variety of forms, after seven years, it illustrates how Tigrett carries a basic concept beyond the first solution. He and his company continually use their own imaginations to discover more and more applications for one mechanical patent; in principle, although they have gradually taken on more complicated manufacturing problems, they are always seeking a master key like the Zoomerang's happy combination of accident and design.

Tigrett's strategy in the late 1940's, when he first began looking around for a patent he might manufacture himself, was to find something as simple as possible to produce. He was motivated not so much by a desire to build an empire of eccentric products as by a compulsion to move his family out of Chicago, where he was vice-president of a bus company, back home to Tennessee where he and his wife and three sons have numerous kinfolk and life is more pleasantly paced: duck hunting in the Obion Marsh; fishing in the little lakes around Jackson; and a return to the roots of old friends and tradition, to form a closer tie between business and daily life.

But John Burton had been too much of an independent globe trotter to settle down unquestioningly on a Jackson verandah. There was good reason why transportation had been his special field—his uncle, Isaac B. Tigrett, had been president of the Gulf, Mobile and Ohio Railroad. And although he had tried a variety of other businesses as well—bonds, oil, hotels—John Burton had had no experience in manufacturing. Proceeding with only a few thousand dollars capital, he dropped hints and questions in airplanes and hotels. One day, in New York, a room clerk rang him up to say that a young man wanted to see him. "He has a paper on a stick." His name was Roger Hamilton; he and the two children with him did not look very prosperous. Hamilton demonstrated how the paper, coiled up on the stick, would, at a flick of the wrist, hurl itself out into the air, then coil back again. He had gotten the idea from a short spool of movie film which, springing up and down, had amused the baby. Tigrett said, "I'll buy the patent. How much do you want for it?" Hamilton said he had no idea what it was worth. Tigrett explained that he could choose between a flat



Tom Yee

Tom Yee

ZOOMERANG *toys number many more, but the sampling above is representative: Santa Pops, Pops, Lolli Pops and Mrs. Santa Pops all have paper Zoomerang necks so that their heads spring up and down. Zoomerang guns come in Western, Jet Zoom and Zoomeray forms. There is even a Zoomerbow. Extending from two to five feet, all, being paper, are harmless.*

Theme and variations: one principle into many products

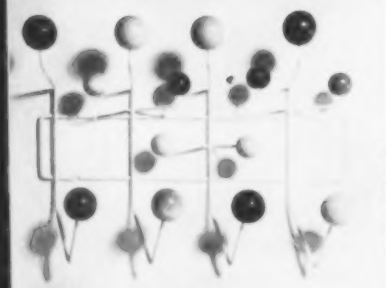
Hugh B. Johnston

POLYETHYLENE PRACTICE GOLF BALL *is made up of two halves (one of which appears on Giant Zoomerang, left). Some of the toys which use the ball as an element are (below) Happy the Horse, a pull toy, and play balls with bells inside. The ball also appears in several cradle toys.*

Tom Yee

Herbert Matter

Single source contributes a consistent line



Hugh B. Johnston

CHARLES EAMES *has designed many Tigrett products, including the colorful Hang-it-all; The Little Toy (a version of The Toy in squares of tekwood); The Coloring Toy, with forms that can be crayoned and punched out; and The Giant House of Cards, a building toy.*

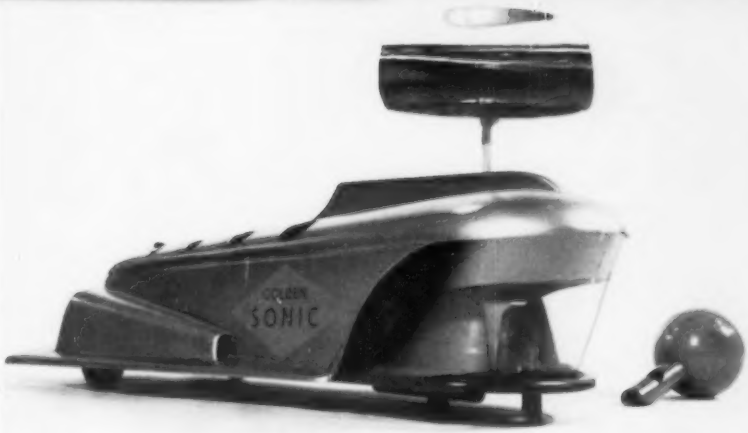
sum or royalties, and he recommended the latter. Hamilton is still collecting. "We have never," said Tigrett, "had a dissatisfied licensee."

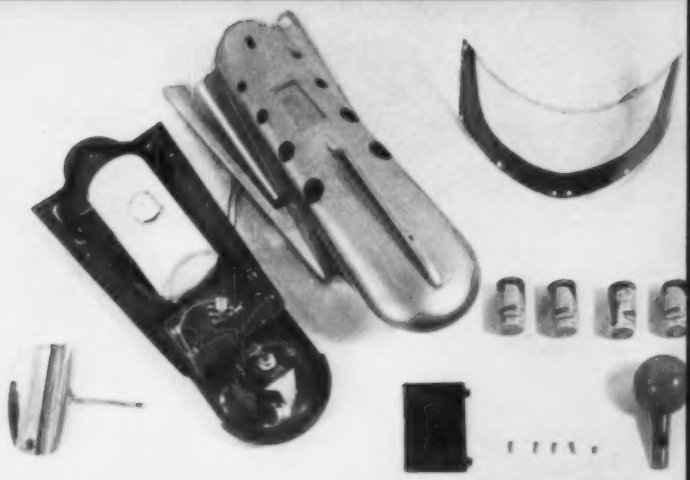
Working for the bus company by day, Tigrett rented a warehouse room and, at night, packed the Zoomerangs which Frances Tigrett cut and rolled during the day. Once he had cracked the resistance of a State Street chain store, the simple, novel toy caught on like a persistent jingle all over the country. By 1953, 15 million had been sold and Tigrett was back home in Tennessee, having established not only his own contented family, and the Hamiltons, but a family of Zoomerang-derived toys as well. There was Tipping Willie, now extinct, a duck with a Zoomerang in his hat; and there are the Pops family, including Lolli, Santa and Mrs. Santa, all of whom, with Zoomerangs for necks, have the happy release of blowing their tops; and all shapes and sizes of Zoomerang guns.

In its current form the Zoomerang has at the base of the paper coil another versatile Tigrett patent—a perforated hemisphere of polyethylene, and this is but one of its many uses. The two halves sealed together make a lightweight ball which the Wilson Company distributes for practice golf swings—since it is full of holes, it cannot be driven far. With bells in it, the ball appeals to dogs and cats and babies; with a ring, it makes a good teether; with sticks, the Kiwi building toy. And it also provides wheels for pull toys—for Happy the Horse and Bossy the Cow. Thus did one basic patent stimulate a diversity of products, and Tigrett Industries branched out from toys to sporting goods.

If Tigrett's "business without barriers" cannot be pinned down to any simple field of operation, neither can one generalize about how designs are developed—except that Tigrett himself is always in some way involved. As to any rule of thumb, he says only, "Each one must have a patentable mechanical principle, and each one must be original in design." There is a certain family resemblance in the bright red, yellow and blue that mark the vinyl and polyethylene of Tigrett toys and infant goods, and among the toys, traits of safety combined with the ingredients to entertain, as the Imaginator does purely and simply.

Tigrett has the knack of sensing a design's potential. Once a man sent the Chicago office a pile of cardboard squares, three feet by three feet, and a box full of brass clips. A child could build a good-sized house with it. Unfortunately, Tigrett told the designer, the size of the package was quite unmanageable. Tigrett encouraged him to give the handling problem more thought, and Charles Eames did, send-





Albert A. Stobe

GOLDEN SONIC *operates on sound waves that are made by blowing into the whistle-shaped object on the right. Parts are simple, including a reflecting piece overhead and four batteries. Appropriate to its eerie performance, it looks like no other vehicle.*

Many sources lie behind a diversity of products

HI-FI JUNIOR *was designed by Maggia-Rosa. Tigrett enlisted aid of a research director in a national broadcasting firm to develop a governor for speed control.*

IMAGINATOR, *made up of simple shapes of polyethylene linked together, was conceived by Nat Washington, State Senator of the state of Washington.*

Tom Yee

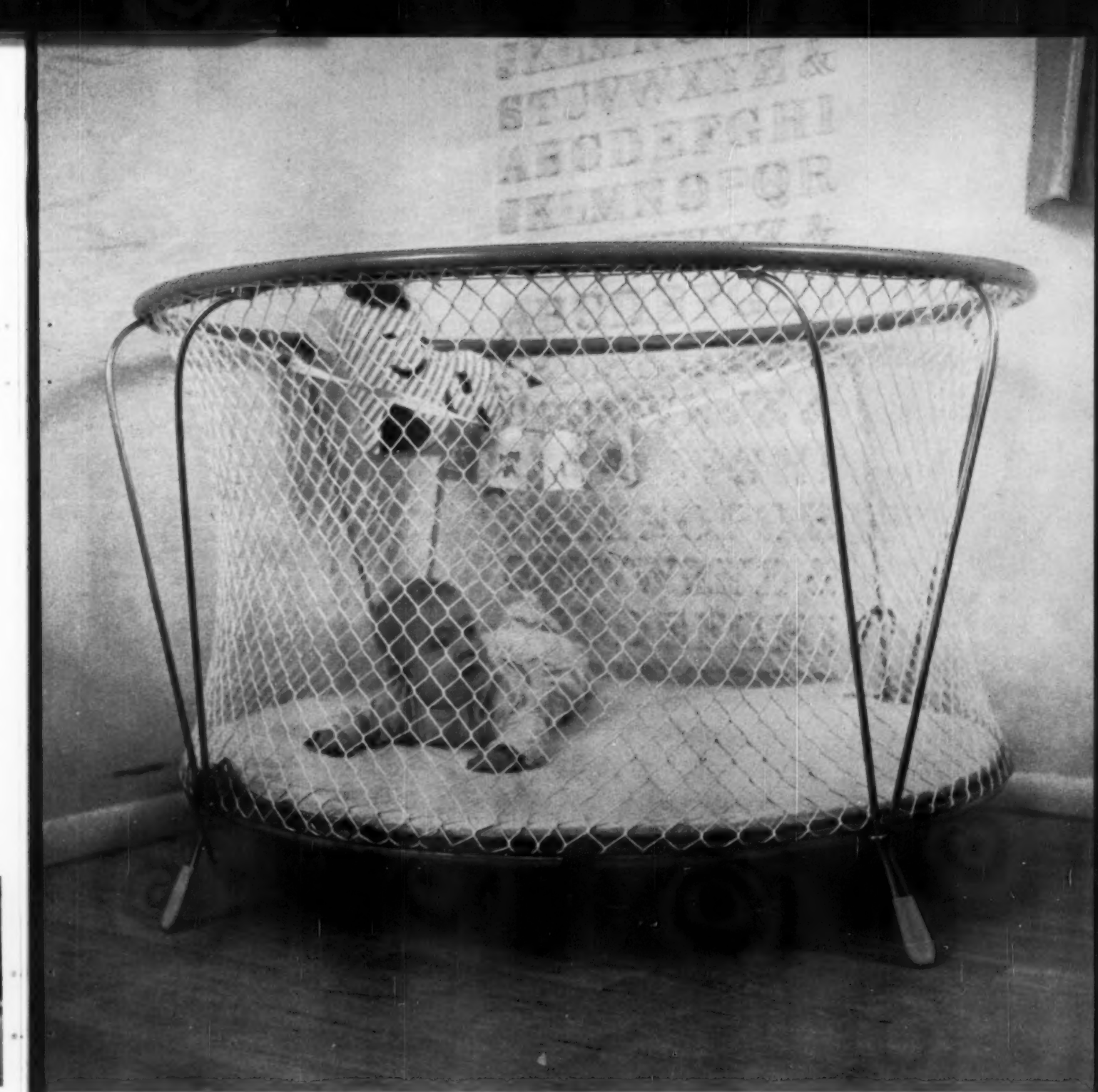
Hugh B. Johnston

ing to Chicago some weeks later sheets of brightly varied paper instead of cardboard, and a tube instead of a box, having worked out a complex piece of construction easy to store and to play with: The Toy. On the train, later, returning to California, he had another idea. He cut slits in a deck of cards and found that they criss-crossed into towers, squares and rectangles, that here, too, was a way to build. He sent the original playing card pieces to Tigrett, and between them they decided on the patterns to be printed on the backs, so that the House of Cards emerged, not as a jigsaw puzzle to be literally fitted together, but as a kind of wonderland, which in the toy's giant form, a child can almost walk into. The Eames' Coloring Toy opens up unlimited play in another way—in the forms that can be colored, punched out, and fitted together to make figures and other shapes, offering more design potential to the child than a mere coloring book. But whereas these toys are exceptional in quality and concept, his Hang-it-all is unique; with brightly colored balls on a steel-wire frame, it appeals to everyone as a decorative as well as useful element. Eames, incidentally, designed Tigrett's home office in Jackson, with black and white tiles; and his same colored panel desks and Fiberglas chairs are in the Chicago office, to which Tigrett's president, Harry Sundheim, like a highly perceptive magpie, has made flamboyant additions—kites, dolls, skulls and paper fishes.

Rarely does a product come to Tigrett in a form ready to produce, and there are always several going through development at the same time. Once every month or so, Tigrett gets together with Sundheim, who is the marketing specialist, Aroldo Maggia-Rosa, who animates all the faces and figures and advises on color (he designed toys for Pirelli in Italy), and Fritz Wigal, chemist and technical consultant, who has six engineering and chemical assistants in his department. They may start with a mechanical patent that Tigrett has licensed from Switzerland and discuss what they might make of it, after which Maggia-Rosa will take the best suggestions and make sketches and models for further consideration. Or they may begin with a rough model. They did this in the case of the Golden Sonic, which came in as a crude looking little vehicle that could be remotely controlled by making noises into a horn—an early application (it may be the first) of electronics in the toy industry. They spent a year making the Golden Sonic presentable. Sometimes they sit down to consider a patent they have had around for years, such as the thermal motor. This small tube (see page 66) will create a nodding movement merely on slight heat or water fuel. It animated the endlessly drinking duck that was a national craze a few years ago. Tigrett put it in a gymnastic monkey later; the monkey did not sell well, but he feels that the thermal motor's potential is still great, especially in display. On the strength of a three-watt light bulb, the little tube can keep a bottle dancing for hours, and he is eager to discover other uses for it.

Fritz Wigal's well-equipped laboratory has often solved technical problems; it was he who developed a method of sealing together the two halves of the polyethylene golf ball, a patent which Tigrett recently protected by taking action against a Japanese copy. Delicate problems can arise with toys—for instance, the Yogi Bird that walks up the wall by means of suction cup feet. Wigal spent months working on formulas for the right rubber composition, for the cups had to stick only *slightly*, then release their grip. Eventually he found his material, and also the best action by sanding off the bottoms of the cups to a fine point. The cups, sticking in turn for a brief second, rotate on a wheel-like mechanism and move the bird weirdly up and down vertical surfaces. "You've got to work out your engineering so that you keep your assembly simple," said Tigrett, "particularly in the South, where you don't have much mechanically skilled labor." Tigrett's factory, an extensive cinder-block construction on the site of an old lumber company, employs 500 people during the summer's peak of production, mostly young women whose fingers are nimble, because many of the toys, such as the Pops faces, must be painted by hand. Tigrett is content with the combina-

Above, Tigrett, left, confers with Aroldo Maggia-Rosa, whom he brought to Jackson from Italy; right, a portion of Wigal's laboratory.



Hank Parker

Case history: the development of the Play-A-Round

1943—Sears makes about a hundred models of circular playpen, using steel frame, rubber hose. Since the design is not mechanically successful, Sears abandons the plan.

1951—Harry Sundheim, formerly infant's buyer at Sears, joins Tigrett, proposes round playpen idea, sends old model down to Jackson. Tigrett inspects market for square playpens, decides round one might work better, (and might even be better for the child) if a good method of collapsing it could be found. He sends model to independent design office, Designers, Inc., to develop.

1952—Designers, Inc., a year and a half later, fail to find a good collapsing method but introduce the nylon net: more conducive to free exercise and safe falls than wood, it feels soft and smooth and is untearable.

1953—Tigrett sends revised model to Eames to work on, still seeking to find a method to collapse it. Nine months later Eames returns it, unchanged.

1954—Tigrett and Sundheim review the problem, work particularly on the bottom, bending aluminum legs in different shapes, try decorative touches (hanging lions and tigers on it), try snapping canvas bottom over metal ring.

January, 1955—Still unable to collapse the pen successfully, Tigrett, Sundheim and Wigal again review the situation, and find it discouraging. At this point Tigrett conceives the idea of pulling the bottom **up**, and folding the legs across the back. This meant changing from canvas to hard bottom. They choose Masonite, snapping it to the ring of the frame by means of straps. Wigal develops a special non-toxic vinyl for the rim, having both hardness and resiliency.

May, 1955—Sears, already sold on the idea, is happy with the product and gives Sundheim an order. At this point Tigrett begins extensive tests of the playpen in Jackson. He discovers that the pen, on ordinary aluminum legs, is subject to tipping. Although Tigrett has already bought aluminum rods and is on the verge of producing Sear's order, he changes the design back to steel legs, bending them outward for utmost stability.

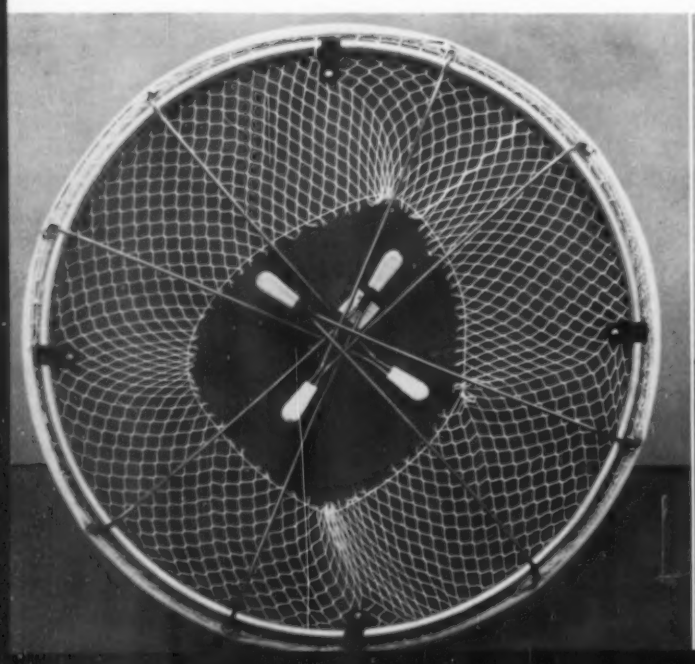
June, 1955—Marshall Field buyer refuses to order, claiming the design is too unorthodox. Sundheim persuades him to put a sample on the baby goods floor. Customer interest, immediately expressed, causes Field to reconsider and place an order. Success of the playpen follows this same pattern; still increasing, it is largely due to the favorable reaction of purchasers and their word-of-mouth advertising. Tigrett sells 10,000 by the end of 1955. He now makes 250 per day.

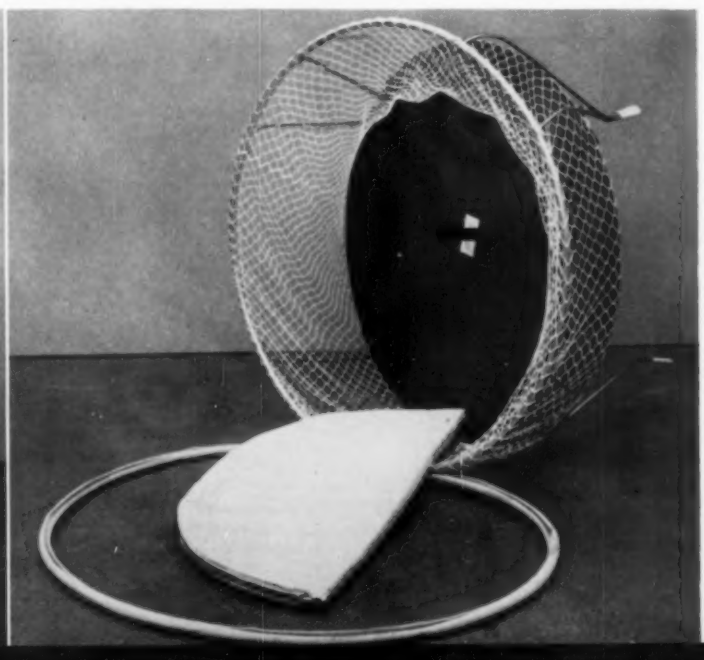
tion of Jackson for production and shipping, and Chicago for merchandising. "Though it's a high pressure business and highly competitive, we don't feel the pressure down here." He sums up: "We're down here because we're more free to think."

The Play-A-Round, whose story is outlined on the previous page, represents Tigrett's entry into the juvenile field—and it was not easy. It demonstrates how Tigrett had occasion to act as a designer himself, and it seems unlikely that anyone but Sundheim and Tigrett would have persisted with an idea that even in finished form struck infant buyers as much too unorthodox. Tigrett made sure of his ground, however, by testing the playpen on as many Jackson babies and toddlers as he could round up (an additional benefit from being a part of the community is that he always tests his products locally, especially toys). He discovered that as far as the round playpen design was concerned, the mesh was immune to abuse and useful to hang toys on and to stretch young fingers; he felt that the shape actually helped children develop confidence, to move around in it easily. But one problem emerged: a really big baby could tip it over, given a good push from a brother or sister. At that point, with Sears waiting for an order, they changed back to steel legs, bending them *outward*, and thus stabilized the pen securely. The first year, 1955, Tigrett sold only 10,000. But gradually, as mothers waxed enthusiastic, conservative bastions like F. A. O. Schwartz and Best's yielded, production mounted, and last year Tigrett sold 50,000.

Having won the battle of the round playpen, he turned over the problems of its vast distribution to Thayer, Inc. Tigrett has since been making ready his revolution in infant's cribs, which he introduced at last month's Toy Fair in New York. The result, he says, will be to get babies out of baskets, in which they have been stuck for over 3000 years, into a soft, cottony bed. And, in bright reds and yellow, the Cherub Crib too gets away from the pink and blue cliches of infant goods. Tigrett spotted Roberto Mango's original

PLAY-A-ROUND *is shown below completely collapsed and semi-collapsed. Tigrett's solution shows up in the photo to the right: the loop of tape in the middle of the bottom which can be easily reached to pull it up; and the legs are then folded over. The pad is removable, as is the vinyl rim; the nylon mesh is kept taut by a drawstring.*



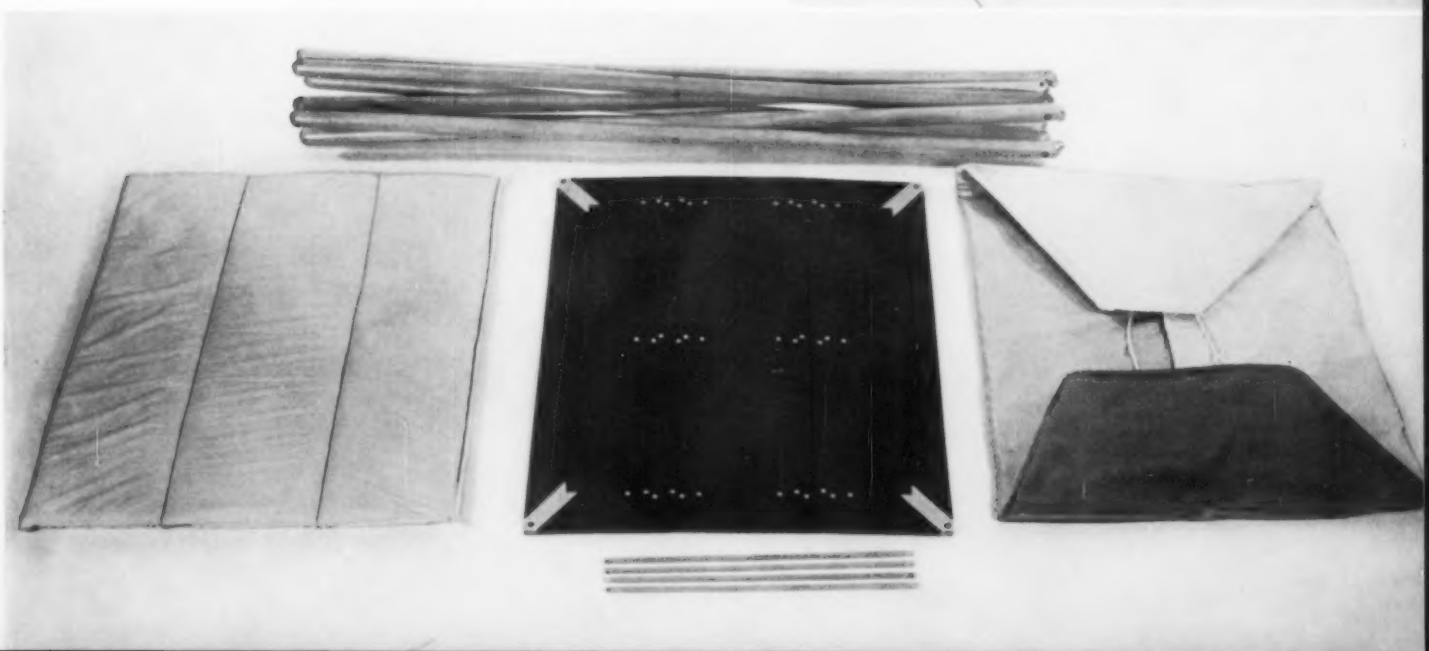


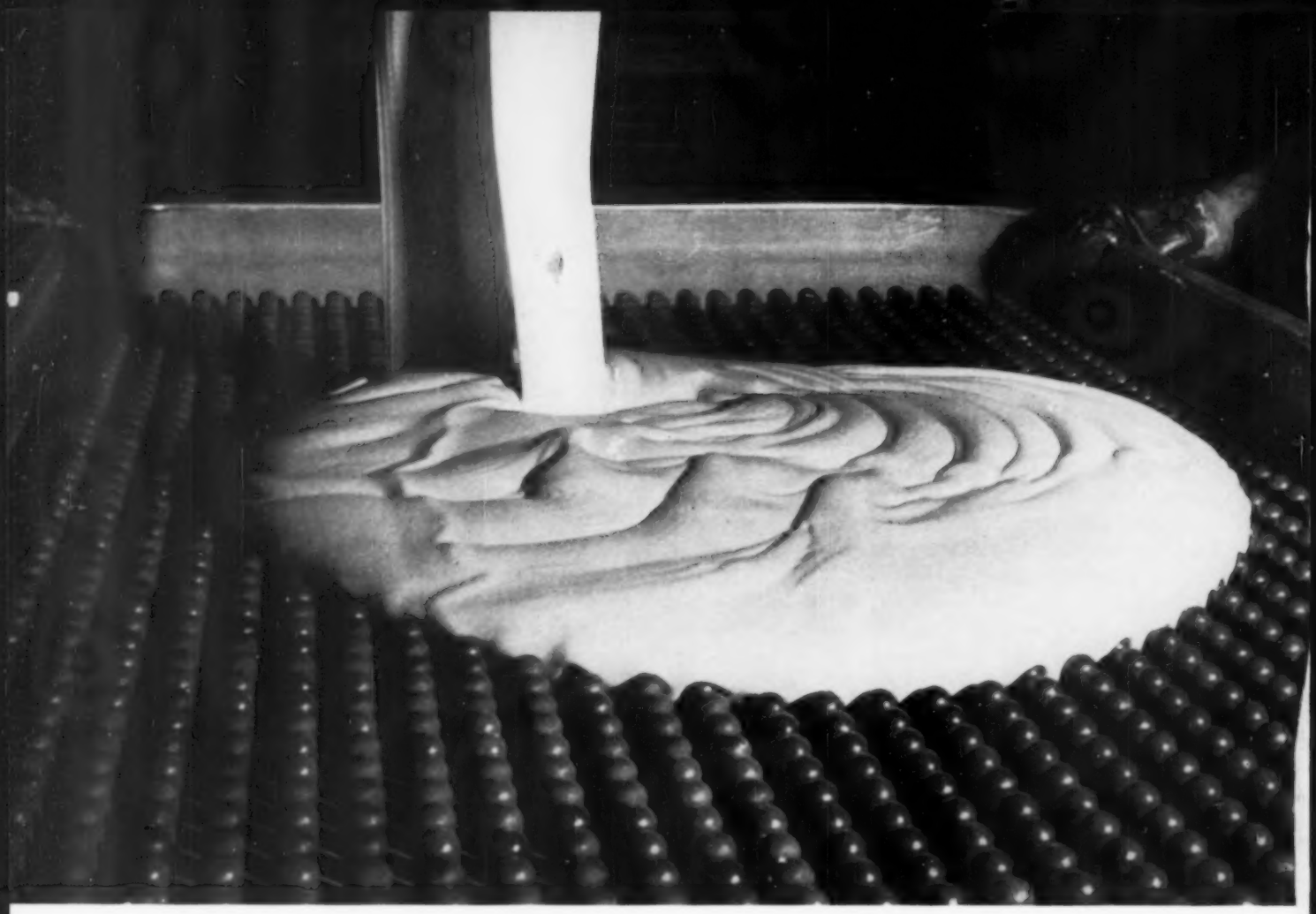
design, saw him in Naples, Italy and secured the patent. It was a long process adapting the design, which was intricately finished, to mass production. The big problem was to make a strong product that would also be washable and collapsible. Mango had made a bottom of twelve wooden slats between two pieces of board. Tigrett tried aluminum, magnesium, even steel for a bottom frame and found finally that three pieces of hinged Masonite did the job. They tried nylon mesh for the Cherub Crib as in the Play-A-Round, but decided that a mother would not care to see her baby hanging in space, however securely. So the crib is smooth and soft in cotton fabric and stretched nylon rope, including rubber sheets.

Starting with a paper toy, it would seem that in the making of nursery furniture, Tigrett has wandered far afield. In fact, since these products too are reduced to ingeniously simple elements, Tigrett's business reflects a clear and consistent design policy, its founder still following his natural bent.

Albert A. Stone

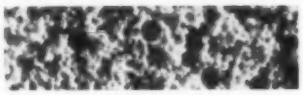
CHERUB CRIB *is easily packaged and assembled, folding into a flat parcel. Each panel is a different color, white, yellow, blue and red. The cotton fabric, supported by wooden dowels and reinforced by a bottom of Masonite, is suspended by means of nylon rope on a frame of wooden legs. Eliminating Mango's casters, Tigrett uses ball bearings in sockets on the bottom of the legs.*

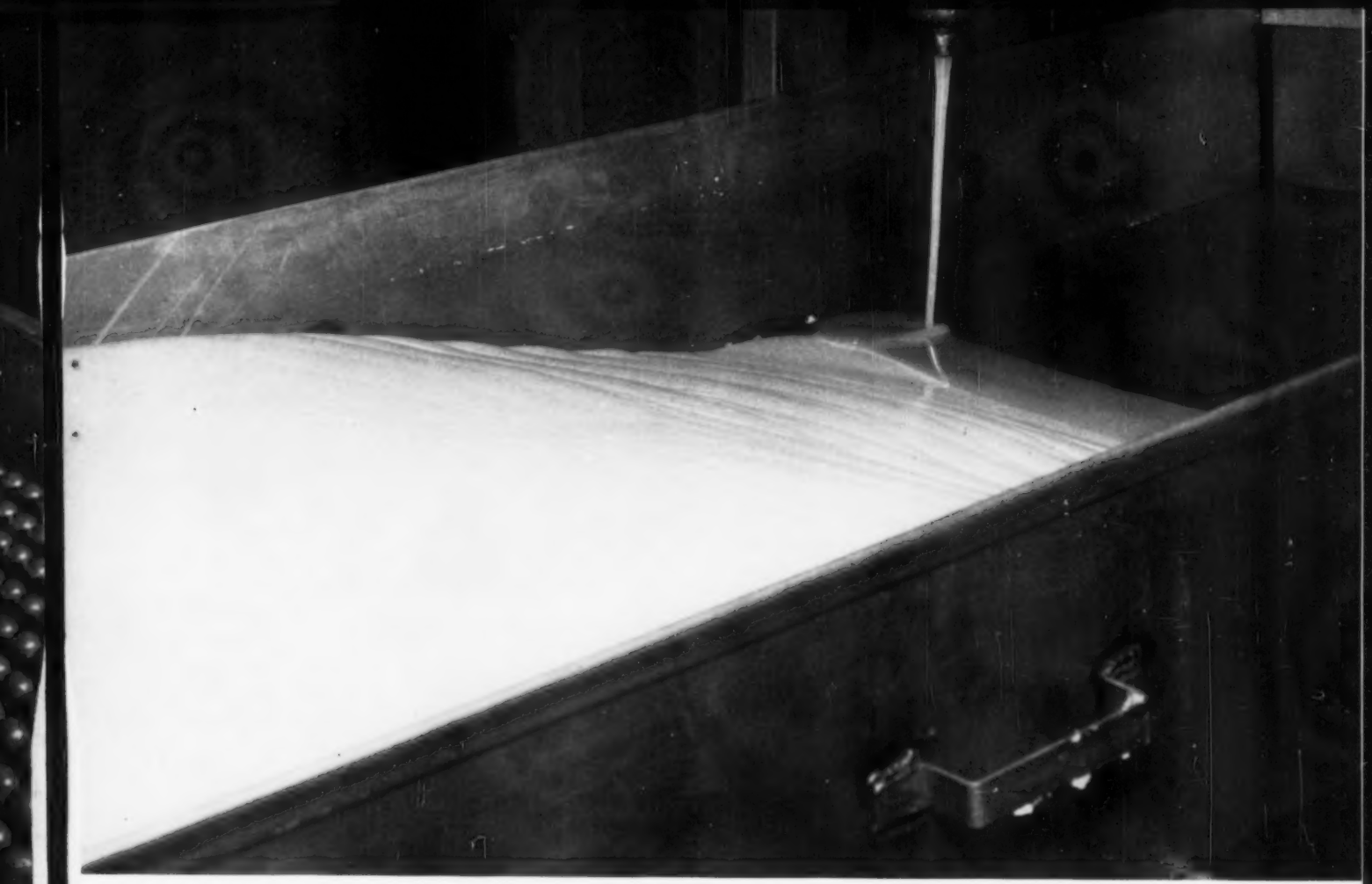




U. S. Rubber Co.

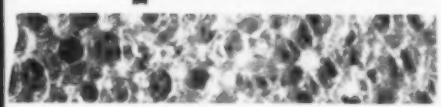
Foams: Rubber holds firm





Molay Chemical Co.

-plastics now expanding



To the consumer, foam means foam rubber, and there's good reason for this. In 1955 about 1/20th of all the foam produced was plastic; the remaining 19/20ths were rubber.

Yet plastic foams are big news right now. According to some figures, plastics may account for one-half the foam market in a few years.

The expanded market for plastic foam will be in new areas, where plastics put on performances that no other material has offered.

No one contends that rubber has a peer in the comfort market. Plastic foams sell for *fireproof* comfort, *high-production, custom-fitted* comfort. Other applications have nothing to do with comfort.

Plastic foams are finding new applications in cars, boats, refrigerators, packaging, ...

The whole story on plastic foams won't be ready for print until some production wrinkles are ironed out. But even today there are plenty ready for use and the designer should be on the lookout for those that are on their way.

It wasn't so very long ago that one automatically coupled the word *foam* with the word *rubber*. In tandem, or abbreviated, it tagged a new luxury material that quickly edged out the conventional ingredients of a good cushion: kapok, horsehair, feathers, innersprings. Then the chemists found that some of the plastics could be foamed successfully—and the results had certain advantages over foamed latex. There was much optimism for the new synthetics and the essential rivalry was rapidly established: plastic foam vs. rubber foam—with the vast cushioning market as the stake. The only trouble was that the plastics refused to stick to this competitive arena. It became increasingly clear, as development progressed, that the plastic foams, although they were to be primarily identified with the cushioning market and the factors involved in that competitive situation, were also a confusingly versatile group of materials capable of many applications having nothing whatever to do with something soft and rubberlike that makes sitting more comfortable.

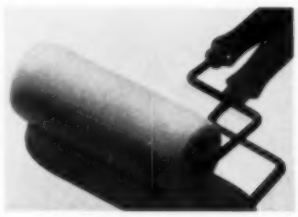
Plastic foams are, in fact, so versatile as to be downright ubiquitous: When not providing cushioning comfort, they may pop up in the form of a rigid material hard as a board—but lighter—that insulates walls, helps keep docks afloat, stiffens packages with a lightweight insulating filler. Plastic foams, in short, is a generic term covering a big territory. But the richest part of that territory is the cushioning field and, out of the welter of properties unique to the foams, several have emerged that are of particular value in this competition. At the risk of doing violence to their virtues and versatility, we might focus on these properties because they are things that group together when the question of good cushioning is discussed. Foremost among these is the fact that the plastic foams can be compounded so as to have varying degrees of fire-resistance—any degree in this quality lifts them a notch above foam rubber. Foam rubber burns; plastic foam doesn't. On this fact rests a powerful advantage. On the face of it, one might even expect that this liability alone would chase foam rubber from the market. Housewives have long noted, to their dismay, that foam rubber was liable to flaking and abrasion from even moderately rough handling. Sunlight turned it yellow. Cleaning fluid or strong soap play havoc. Alcohol destroyed it. Analysis of its properties pictured it as an almost unlikely material for the job it was supposed to do. No one has been more aware of this than the rubber industry.

But the virtues have not all been on the side of the new synthetics. Despite a handful of desirable properties, they have been plagued with difficulties in formulation, fabrication, and—in relation to cushioning—in

LATEX

Softest, springiest **but** *inflammable*

What are today's foams



URETHANE

Flexible **but** *difficult to control*

VINYL

Fire-resistant **but** *less springy*

STYRENE

Light, workable **but** *poor chemical resistance*

ECCOFOAM

High dielectric constant **but** *limited use*

obtaining plain old-fashioned comfort. The recipe of chemical ingredients that produces a plastic foam (essentially a resinous material and a gas to foam it) is subject to wide variation, and theoretically should give just what you want in the way of density (in vinyl foam, for example, firmness can be varied independent of density), springiness, strength, weight and the like. But there is one thing that chemistry has not been able to duplicate, and that is the soft springiness, the "feel" of natural foam rubber. Its cushion comfort (partly the result of its better "memory"—rate of original shape recovery—than urethane and, especially, vinyl) is the big competitive lead for traditional foam rubber. Privately, most of the plastic foam makers will admit this.

Perhaps the hardest part of evaluating synthetic foams for possible product applications is the difficulty in forming any fixed picture of them. Foams which seemed to mean something soft, like rubber, can also be made rigid; a rigid foam may have either open or closed cell structure. To understand the contrast of qualities, it is helpful to know what a foam is: Foam, paradoxically, is a hole that has strength. It is two strong skins separated by an incompressible something, often approaching nothing, that is a unique combination of strength and light weight. Cell structure is the key to many of the virtues—as well as the drawbacks—of the foams: (1) the closed cell, as in styrene, is a series of whole bubbles that transmit little heat or moisture, suggesting the reason for the many insulation and moisture-barrier applications it has found: house perimeter insulation, vapor barriers, cold storage trucks, rooms, and packaging. (2) Foams with connected or open cell structure most often give a soft foam, as in rubber and urethane, although urethane can be made rigid too. The open cell absorbs shock and sound, suiting it to cushioning (in soft flexible form) or acoustical installations (rigid form). (3) The newest cell structure in foams is the syntactic type—tiny hollow spheres in a resin binder—whose spherical cell shape provides the best strength-to-weight ratio of all the plastic foams. Development here is just beginning.

The basic process of molding which applies to all the cushioning foams—latex, urethane and vinyl—is easiest with latex and vinyl. (A gas is introduced into the resinous material in a mold, and the resulting foam cured.) Any scrap produced during the process can be reprocessed if it is vinyl foam, which is a thermoplastic, but is completely useless if it is urethane and latex, which are thermosets. Urethane is the only one of the three requiring little or no heat for curing, due to its exothermic reaction, which cures as it foams. Latex requires washing and drying of the completed foam, while vinyl and urethane do not. Formulation for foamed latex is rather inflexible—unlike the highly variable synthetics—and it is necessary to increase weight of foam rubber to get a harder material.

The plastic foams received a wave of publicity during 1955 and seemed unusually promising. The tempo soon slowed to a more realistic pace, based on the high cost of the foaming equipment and the uneven results. Some producers changed to a mood of extreme pessimism and began to doubt even the basic worth of the new synthetics. Today both pessimism and overoptimism have begun to balance out, and the pros and cons of plastic foams are receiving more objective appraisal. Urethane, for example, came into the world with a fatal tendency to "bottom"—the cushion resists pressure initially (boardiness) and then deflects too much and too rapidly (bottoming). Memory was undesirably slow. These drawbacks have now lessened immeasurably so that urethane, along with vinyl, is competing aggressively with foam rubber for a share of the cushioning market.

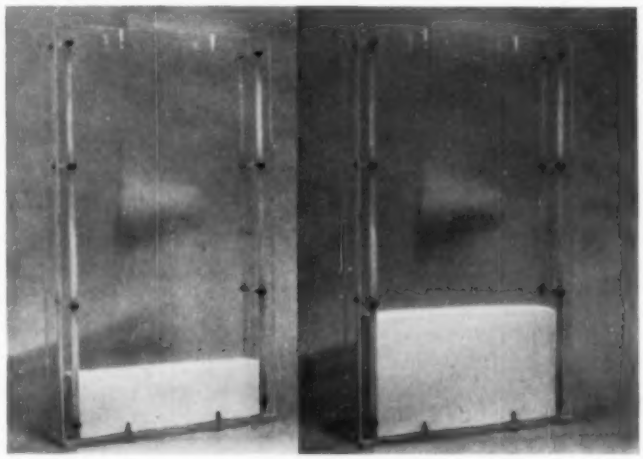
There are usually a clear group of payoff properties that send any material on its way. In cushioning foams they are comfort, cost, and flammability. The lines between synthetics and latex are now drawn like this: rubber still leads in comfort; there is nearly a draw on price; the synthetics lead where non-flammability can be made to count: cushioning for transportation equipment, schools, and other public places.

The present state of confidence in the synthetics was indicated recently by a specification made by the design group of Wright-Patterson Air Force Base. In creating an experimental cabin for the air-borne vehicle of 1975, in which human comfort is a critical factor of the performance of a crew that is enclosed for as long as five days, the designers selected urethane foam for the cockpit seat in which men must sit for 15 hours at a stretch.

What the synthetics have today, if not a hold on the biggest market of all—cushioning—is a potential worth investigating. There are at least two techniques that designers can include more broadly in their fabrication thinking: heat sealing and foaming-in-place. Beyond these established processes, there are possibilities that require not only perfection but projection. Strong lightweight styrene foam that can be foamed-in-place between two skins to form large wall panels on the site, which Monsanto is now testing; a foam that grows its own skin; and a foam that can be turned out of the mold finished with a non-foaming surface material. In these embryonic developments shown on the following pages can be seen the outlines of the ultimate dream: the product you pour out of a faucet.—*r. c.*

Foaming-in-place: *A fabrication process that helps cut the*

How urethane expands without heat is shown in laboratory sequence (right) taken during 2 minute period. Result is a block of flexible foam with moderate memory like that produced in factory mixing vat (left) over a 4 minute cycle. Blocks are easily cored with band saws, then cemented to topper pads for cushions. Extremely light urethane cushions are popular for airplane upholstery.

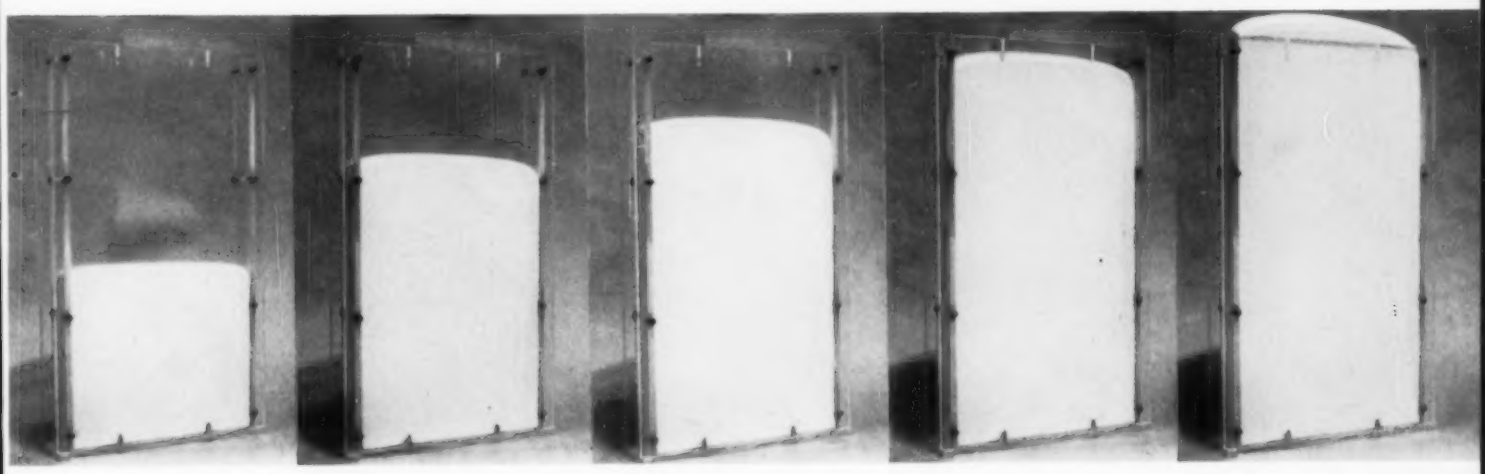


The synthetic foams have usually been more expensive than the traditional materials they aspire to replace, but some have overcome this basic disadvantage with the help of new fabrication processes that make possible an over-all saving in the completed products. Foaming-in-place is one of these processes (for another, see overleaf) by which the ingredients of a foam are reacted directly in the cavity to be filled. They foam-expand to fill every corner of the cavity with a foam of variable weight, strength, density and flexibility. The advantages of this process are particularly compelling when the cavity to be filled is irregularly shaped or has normally inaccessible reaches. The alternate method would be to mold or insert an element to fit the intricacy of the cavity.

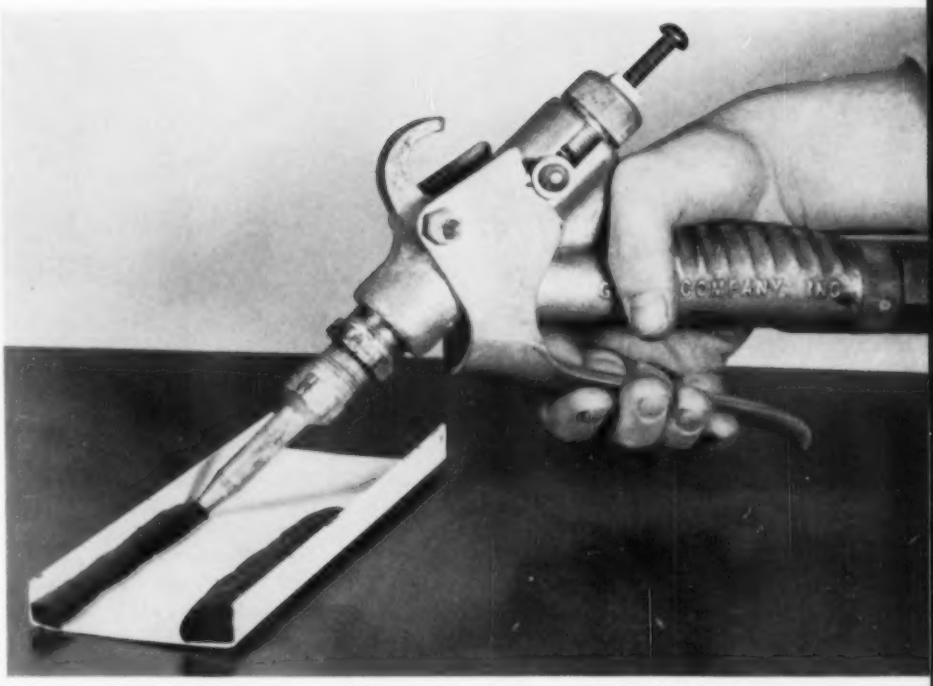
Foaming-in-place can be accomplished with several plastics but is most often associated with urethane foam because of the highly reactive nature of that foam's essential ingredient, isocyanate, and the fact that it can be cured at room temperature. (Sometimes heat is used to speed the process.) The peculiar virtues of urethane proceed partly from its open or sponge-type cell structure, which absorbs shock and sound. Other hallmarks of the foam are: good tensile strength, chemical and rot resistance, ability to withstand rather high temperatures (maximum service temperature is 250°F.) It can be formulated to produce varying degrees of softness of foam or even rigid foam of good strength. In its flexible form, it is a leading contender, along with vinyl foam, for the vast cushioning market. Its major handicap has been a tendency to resist pressure initially (boardiness) and then deflect too sharply and suddenly (bottoming).

All of the ingredients of urethane foam are liquid, and they react in a matter of seconds after combination. Because the mixing machines work best when stopped infrequently, large blocks several feet square and 8 to 12 inches thick are usually foamed at one time.

over-all cost of foam products even when material costs are high



The hand gun at the right is a vehicle for a foamed-in-place extrusion of another material: a vinyl plastisol (Interchemical's IC Vynafoam) is applied in the liquid state, as shown, then expanded and fused under heats of 300°-350°F. to form gaskets, insulation, sound and vibration barriers for industrial equipment, appliances, business machines or other products. The process takes from 3 to 30 minutes, depending on the size of the object, the temperature and thickness of the plastisol ribbon. The expanded foam is unicellular, of medium density and flexible, with low water absorption and very high tensile strength. It has good resistance to ultra-violet light, dimensional change, oxidation, oils, greases, many acids and solvents. Economies with vinyl come from labor saved by this technique rather than from the cost of the plastisol itself, which is often higher than the price of the gasketing materials it replaces. Other attributes of vinyl foam are shown overleaf.



Vinyl plastisol ribbon gasketing application is extruded and then heat-foamed.

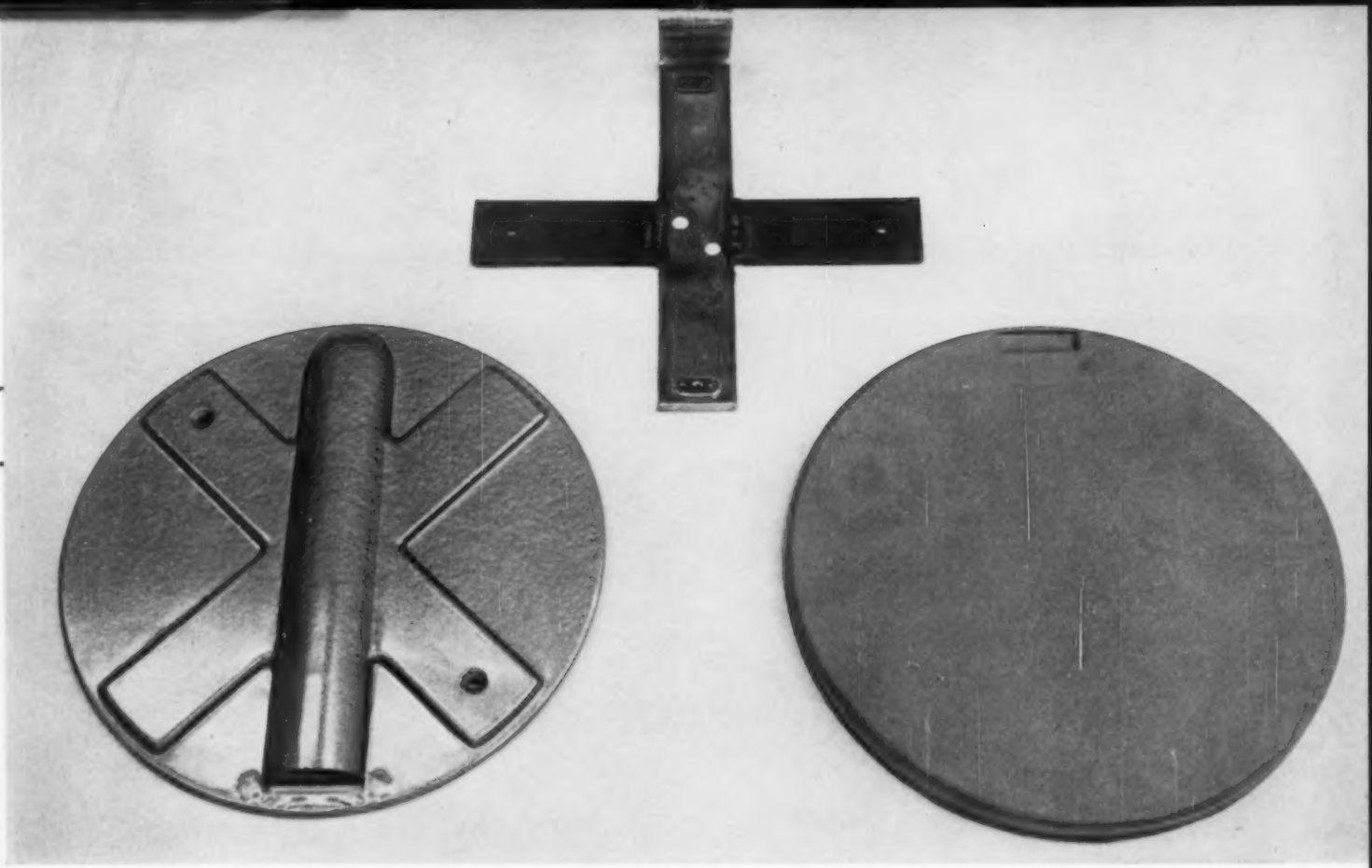
Heat seal: *one fabrication shortcut leading vinyl foam into mass production*

Hospital pillow speaker (Executone, Inc.) with vinyl foam (Elastomer Chemical Corp.) casing.

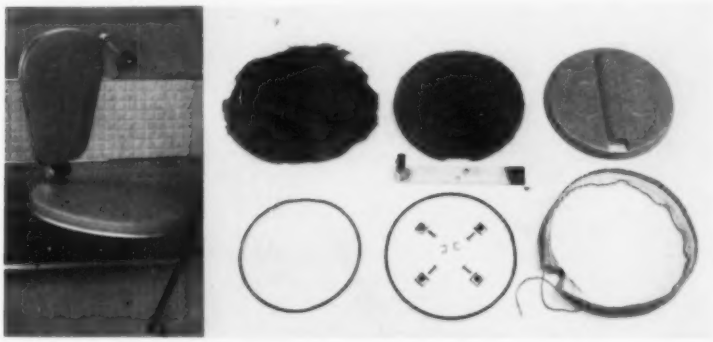
Because of the many unique properties of plastic foams — particularly their fire resistance—many major industries have been eager to find ways to reduce the cost of using them. Though the per pound price still sometimes exceeds that of latex foam, an approach to economy often emerges in fabrication advantages. Heat sealing is one such process that is special to the vinyl foams, one that could carry flexible vinyl into a strong position in several industries. The products of heat-sealed vinyl are, in fact, already well known in the transportation industry — car crash pads, padded sun visors, car seat panels, other seats—and in a welter of small-volume products now on the market—padded pocket books, padded belts, spongy toys.

Heat sealing is basically applicable to vinyl in any flexible form — whether sheet or foam—because of the material's tendency to melt and fuse with the surface it is in contact with. This becomes a special advantage in handling foams because it permits them to be fused by an electronic die press to many many sheet materials in a bond that is stronger than either of the materials. This makes possible a variety of combinations: laminated or sandwiched structures of vinyl foam sealed to films, fabrics, or sheet materials. Because heat-sealing makes the manufacture of finished cushions and upholstery virtually a two-step process, vinyl foam is joining urethane as a leading contender for the comfort market.

As a cushioning material, vinyl foam is utilized in its most familiar form: a flexible open-celled material that breathes. But it may also be produced



New 3-part construction of '57 cab jump seat (above), using vinyl foam with integral cover, contrasts sharply with old construction (below), which involved molded hair pad, wadding, and reinforced rib assembly with trim materials sewn together.



Heat-sealed bond between Vinylfoam (Elastomer Chemical Corp.) and vinyl fabric is stronger than either material. Hospital pillow speaker is enclosed in protective foam jacket whose outer vinyl cover (left) has heat-sealed edges.

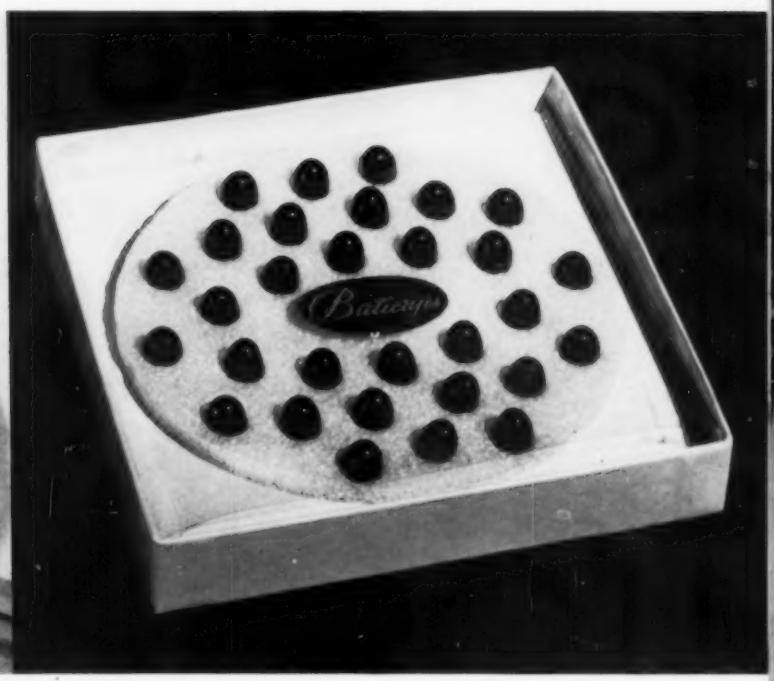
as a rigid closed-cell foam, and for flotation and insulation purposes this is gaining a market that may cut into, among others, the styrene foams. As it happens, both cell types can be made either hard or soft. The open-celled variety is usually manufactured mechanically, by whipping an inert gas into vinyl in a way that resembles the basic process of making rubber foam. But pressurized tanks and refrigeration are required for the process.

An alternate method, which obviates the need for heavy equipment, is to foam vinyl chemically by introducing a blowing agent; the problems of formulation control make the results less reliable at the moment.

There is another technique in molding vinyl worth watching: the interior of the mold or cavity is coated with a non-foaming plastisol; when the foam mixture is introduced and cured in the mold on top of the coating, it emerges with an integral skin. It could join with heat-sealing, to open a new realm of possibility in the production of the one-piece finished foam product.

Rigid foams: *Though most foams can be made in rigid form, styrene outshines them*

Vapor barrier
Styrofoam (Dow Chemical Co.) acts as both vapor barrier and plaster lath, cemented directly to exterior blocks.



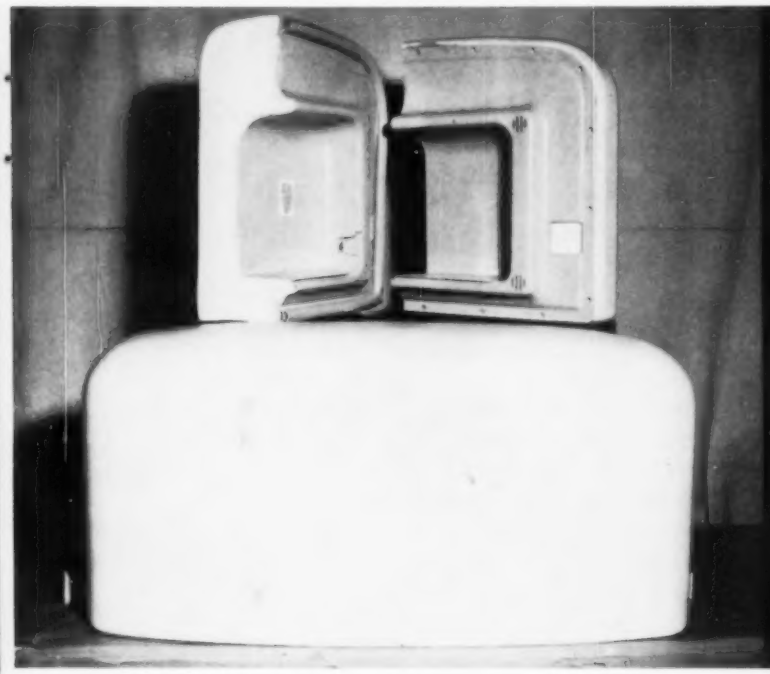
Filler
Capsule cavities are made in Dow Styrofoam shipping box filler with ordinary wood-working power tools.

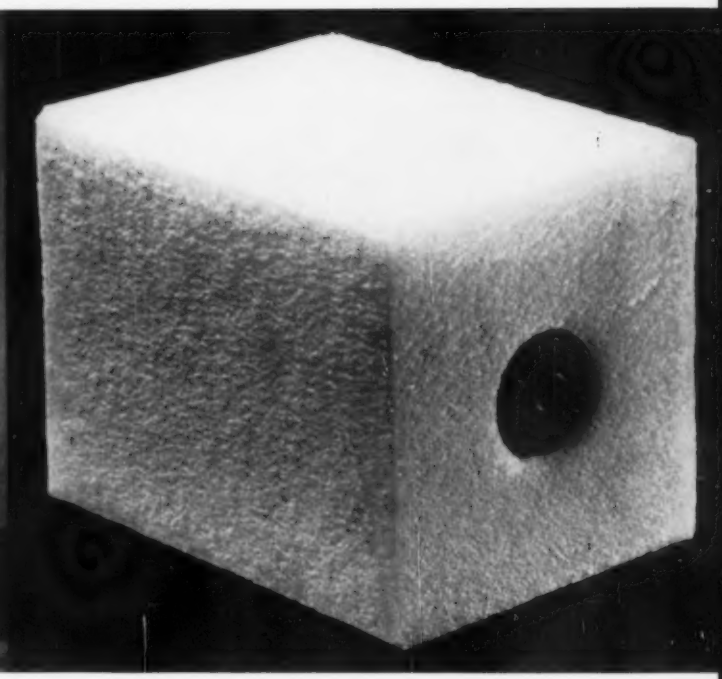
Styrene foam stands out from the other rigid foams as a well-established material, being produced in large quantities, at exceptionally low cost, coming from the production lines of several companies (Koppers, Dow, United Cork) with dependable properties. Their enviable success stems, in part, from their bubble-like, closed cell structure whose tightly sealed pockets are one of nature's strongest structures, resisting moisture and making it a poor conductor of heat. On the debit side, these glassy-surfaced cells also deflect sound, making them unsuitable for acoustical installations. (It is comparable to wood, somewhat better than plaster, but inferior to commercial sound-absorbing materials.) Despite other drawbacks—poor chemical resistance and a maximum service temperature of 175°F.—styrene foams enjoy a sturdy reputation in many fields and have already achieved complete acceptance in at least one: display and decoration. Their first success came as a decorative element in floral displays, proceeding from their good moisture resistance and easy workability with ordinary woodworking tools: they may be cut with a knife, sawed, notched and grooved with the ease of balsa wood. Room-high boards of styrene can be hoisted by one man without strain. (It is 4 times lighter than cork.) The properties of good strength with low weight, moisture resistance, and stability at low temperatures are leading them in ever greater volume into a variety of insulation applications, particularly low-temperature installations. In wall construction, they form a combination of vapor barrier and plaster lath. Concrete slabs in basementless houses can be poured directly on rigid styrene foam, which functions as a ground base and vapor barrier. Bouyancy uses include dock floats and an extra margin of safety for boats as unsinkable hull linings. A fast-growing use is as a sandwich filler in packaging to insulate and reinforce.

One of the characteristics of styrene foam is the form in which it is made. Foaming-in-place for large areas, like wall sections, is impractical at the moment because the intense heat reaction damages the thermoplastic foam. In limited areas, such as the interior of the refrigerator door above, powders or beads or liquid forms of styrene compounded with a foaming agent expand in a mold with the application of heat. But most styrene is expanded in a bulk mold, and marketed as boards or logs.

The rigid foams are a cross-group that overlap with flexible foams. Eight of the ten foams now in commercial production can be made in rigid form (polyethylene and foam rubber cannot) with styrene foam out-producing all the others by a wide margin. Each rigid foam has at least one notable property: silicone has the highest heat resistance of all foams, cellulose acetate has high shock resistance, phenolic is very low cost; among foams-in-place, urethane is the strongest foam, urea can be made in unusually low densities. For some of their important applications see the chart overleaf.

all in cost, buoyancy, versatility and established reputation

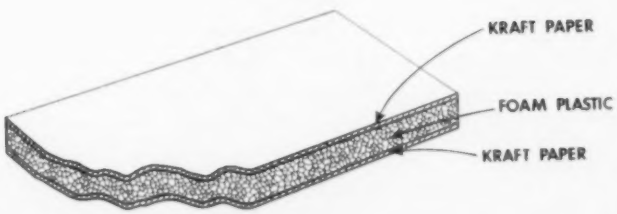




Insulation
The insulating element of Dylite (Koppers Co.) beads is expanded in a mold by heat to fit inside the refrigerator door.

Buoyancy
Simple cube of Styrofoam cut to fit metal insert (upper right) replaces conventional copper bulb as water closet float.

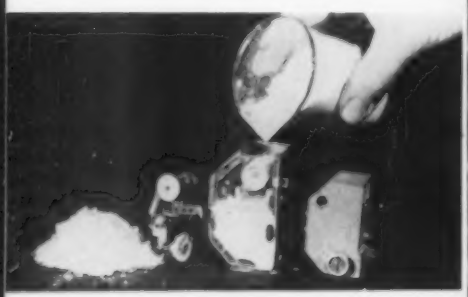
Packaging
Perishables — including live lobsters — can be shipped with little or no dry ice or refrigeration in the lightweight sandwich container developed by St. Regis Paper Co. in cooperation with Monsanto.

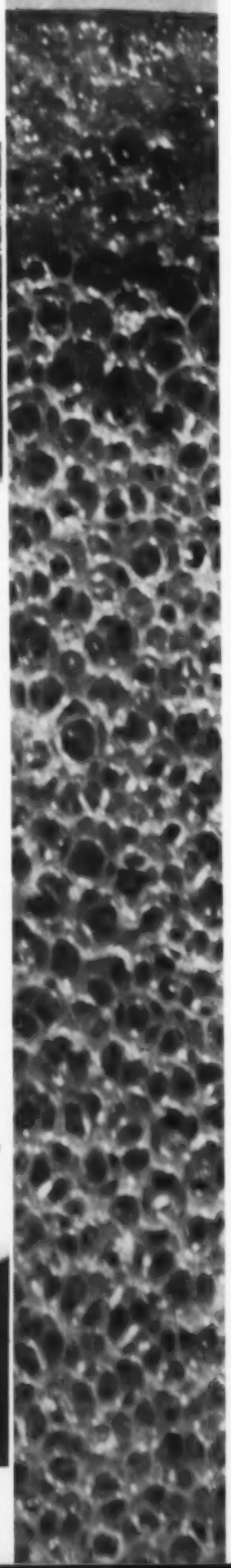


Phenolic foam
Large core of Marblette phenolic foam is lowered into a plaster mold to form the face of a die. Phenolic has density of 15 lbs., is flame, chemical, and water resistant, and is used in filtering and insulating applications. Manufactured by Marblette Corporation.

Polyester foam
Called Cush-N-Foam, the material's integrally-formed skin promises to eliminate eventually any applied covering. When method of skin-forming is improved to yield smoother finish, it will be possible to turn out upholstery in a range of colors literally in finished form. Manufactured by Hudson Foam Products Company.

Phenolic plus epoxide
Eccofoam GL, a combination of phenolic and epoxide foam, can be used to embed electronic equipment; a mold is filled with the powdered material surrounding the part. When heat is applied the powder expands to a foam which has excellent electrical properties. Manufactured by Emerson and Cuming, Inc.





Foam is obviously a very broad word: bread is a foam, wood is a foam, and any plastic, including glass, can be foamed. The chart on the opposite page shows the range of synthetic foams now in production, and indicates why some of the more obscure materials like urea and epoxy have not been used more extensively. However, the need for a material with a particular characteristic to do a specialized job sometimes justifies its application in spite of obvious disadvantages. Epoxy foams, for instance, are expensive and hard to process, but they can be foamed-in-place and have fine electrical properties that make them increasingly useful as embedments for electronic components. Similarly, silicone foams demand a long curing period, but the result of this time-consuming and expensive disadvantage is a material with truly outstanding resistance to thermal shock (some silicone foams can withstand temperatures up to 700° F. for long periods without undo damage). Polyethylene, known for years as a superior insulator, can retain its insulating properties in foamed form—but close temperature controls are necessary for satisfactory foaming.

It is too soon to tell how broad the application of these younger foams will become after problems are solved and shortcomings are minimized—as undoubtedly they will be, sooner or later. These materials are a part (and evidentally a potentially large part) of the constant drive for new materials to improve standard methods and create new concepts. On the basis of laboratory tests, much premature optimism has been generated: the second look has frequently been sobering. Polyester foam, which is akin to urethane, has a peculiar characteristic that shows the kind of possibilities that turn up accidentally when new materials are being created. In this case, the unpredicted characteristic seemed at first to be an attribute; it turned out to be a detriment. It was found that as a part of the molding process, polyester foam grows a thickened skin next to the mold (for a detailed discussion, see ID, June '55). This originally suggested the possibility of a major improvement in molding upholstery and cushions: an integral skin would theoretically eliminate the need for an applied fabric or finish. But because the skin is too rough to make a pleasant finished cushion, the manufacturer, Hudson Foam Products, has found to date no solution but to scrape off the skin.

Optimism, in the field as a whole, is called for. Flexible foams, it is reasonably certain, will show spectacular growth as upholstery materials, as clothing liners, and in blankets. Rigid foams may find their largest market in the construction field as foamed-in-place sandwich walls that strengthen and insulate. But optimism far in advance of the fact merely dampens what should be a growing confidence in what these remarkable new synthetics might do for the designer.

	COST	FLEXIBLE	RIGID	THERMOSETTING	THERMOPLASTIC	FLAME RESISTANCE	STRENGTH	CHEMICAL RESISTANCE	FORMULATION CONTROL	MOLDABLE	FOAMING-IN-PLACE	HEAT SEALING	APPLICATIONS
RUBBER	Fair	Yes	No	No	No	No	Low	Low	Good	Yes	No	No	Cushioning, Padding
POLYURETHANE	High	Yes	Yes	Yes	No	Yes	High	High	Poor	Yes	Yes	No	Cushioning, Padding
POLYVINYL	Fair	Yes	Yes	Yes	Yes	Yes	High	High	Fair	Yes	Yes	Yes	Cushioning, Padding
POLYSTYRENE	Low	No	Yes	No	Yes	Yes	High	Low	Good	Yes	No	No	Insulation, Packaging, Floatation, Decoration
PHENOLIC	High	No	Yes	No	Yes	Yes	Good	High	Good	Yes	Yes	No	Insulation, Structural, Packaging
SILICONE	High	Yes	Yes	Yes	No	Yes	Fair	High	Fair	Yes	Yes	No	High temperature insulation
CELLULOSE ACETATE	High	No	Yes	No	Yes	Yes	High	High	Good	Yes	No	No	Insulation, Floatation
EPOXY	High	No	Yes	Yes	No	Yes	High	Poor	Poor	Yes	Yes	No	Fillers, Electrical embedments
UREA	High	No	Yes	Yes	No	Yes	Low	High	Good	Yes	No	No	Insulation, Oil evaporation covers
POLYETHYLENE	High	Yes	No	No	Yes	Yes	High	Fair	Good	Yes	No	No	Electric wire insulation, Gasketing

MANUFACTURERS

RUBBER: Goodyear (Airfoam), General Tire (Fashion Foam), Great American Industries (Rubatex)

POLYURETHANE: Hudson Foam (Cush-N-Foam Polyester), Nopco Chemical (Nopcofoam), Dayton Rubber (Stafoam), Mobay (Mondur), Atlas (Urefoam)

POLYVINYL: Chemical Products (Chem-o-sol), Dennis Chemical (Dennis), Interchemical (Vynafoam), General Tire (Fashion Foam P.V.), U.S. Rubber (Ensolite), Elastomer Chemical (Vinylfoam)

POLYSTYRENE: Koppers (Dylite), Emerson and Cuming (Eccofoam), Dow (Styrofoam)

PHENOLIC: Rezolin (Corfoam), Poly Resins (Kaston), Marblette (Marblette)

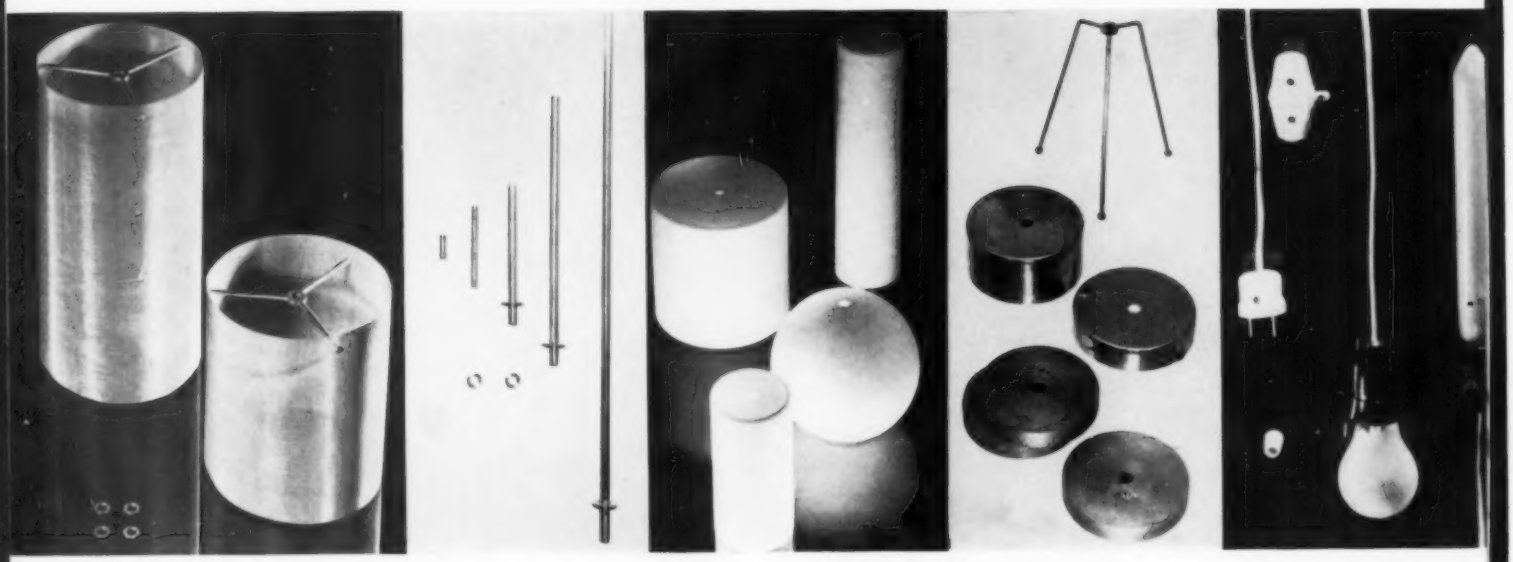
SILICONE: Dow Corning (Dow)

CELLULOSE ACETATE: Strux (Strux)

EPOXY: Emerson and Cuming (Eccofoam)

UREA: Colton Chemical (Colfoam)

POLYETHYLENE: Union Carbide

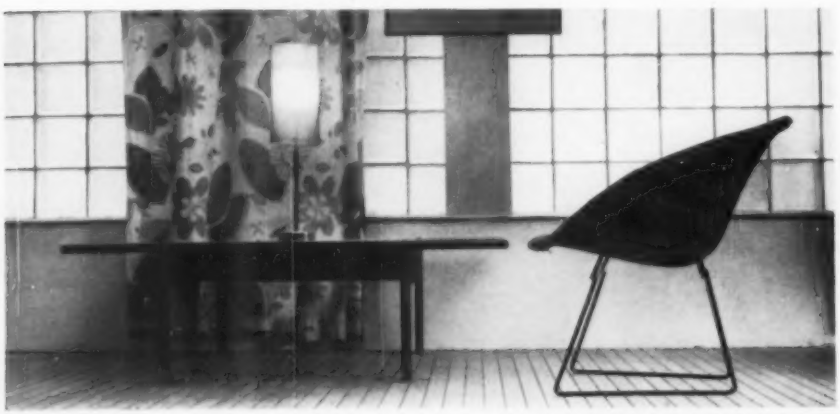


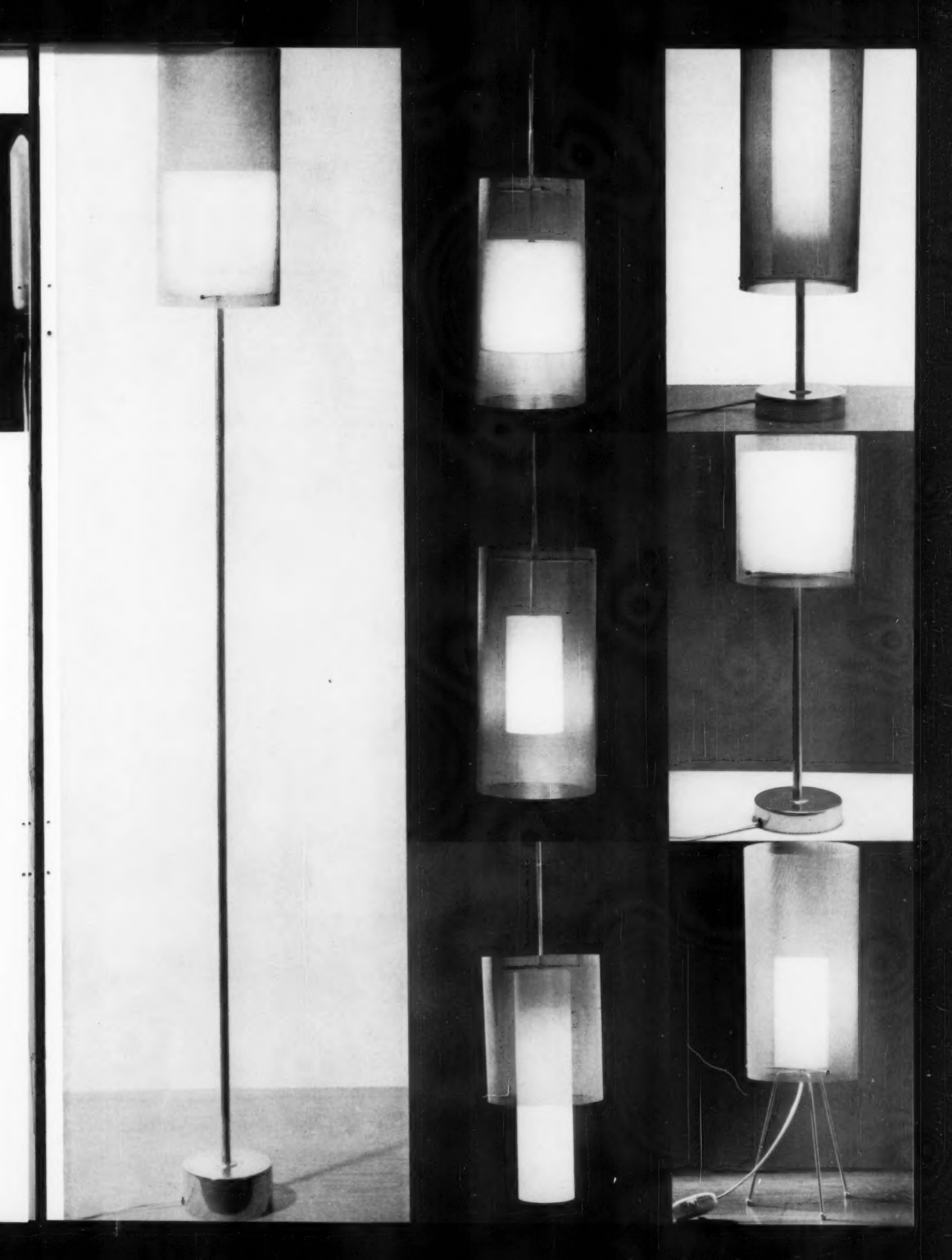
DESIGNS FROM ABROAD

From Finland: one idea for

a thousand and one lamps

In this new venture, Tapio Wirkkala sees lighting as a problem of combining a kaleidoscopic range of forms with the maximum utility both for user and manufacturer. Going beyond a conventional lamp modularization system, which might vary only one or two components, he has analyzed the potential of every element and created a vast family of relationships: brass bases, either several discs or a pair of legs, four different glass reflectors and two shade sizes or transparent metal mesh, with a choice, too, of bulb light or fluorescence. It is possible, the designer says, to put the parts together in 56 different ways, although "some of the combinations are not beautiful in proportions." Whatever the combination (we show only a few) this modular system shows remarkable esthetic consistency. Making the most of a subtle range of contrasts between a glowing globe and gauzy shade, the customer or manufacturer can design the lamp he likes, and might transform a hanging model into a standing one later, at not much extra cost. Prices, as yet, are not quoted.

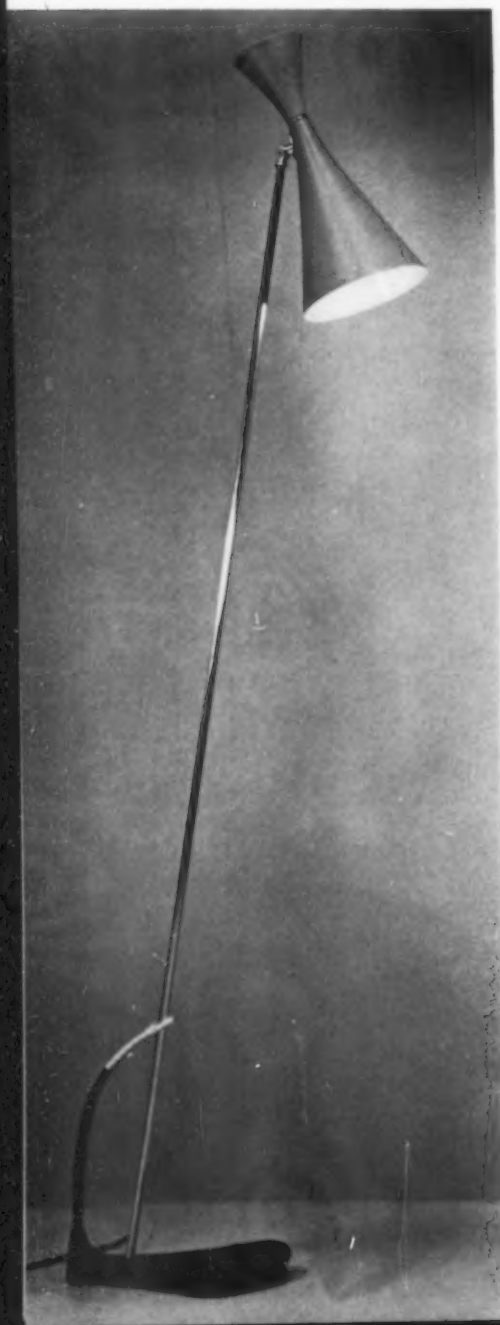




A Danish firm fashions a lamp's working elements and the Swiss expose

The Danish firm of Fog & Morup in Copenhagen has specialized in electric light fittings since 1915, and if their products look familiar, it is because they are often copied by manufacturers in the United States. Costing in Denmark about a fourth as much as a lamp of comparable size and materials in this country, the designs, done by a staff and by free-lance architects, display an exhuberance of forms. Some of the components in Fog & Morup's catalogue are reminiscent of Italy and Switzerland in their contours, but the combination as a rule is a new statement in terms of lighting as a decorative element. In standing lamps, shades and reflectors are tilted at extreme angles; and in hanging lamps, as though Denmark is unwilling to surrender the ornamental past of the chandelier, one finds a prolixity of pendants, row on row of standard reflector and shade shapes.

While Danish playfulness may toy with lighting as a simple matter of framing or decorating a spot reflector, the Swiss selections, from various companies, suggest a much more austere approach: here function is the prime interest and form is strictly a reflection of utility—as it is, for example, in the group (opposite page) taken from *Die Gute Form* exhibit of 1956 in Zurich.



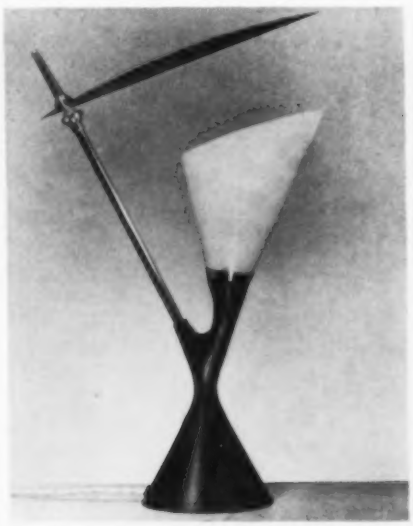
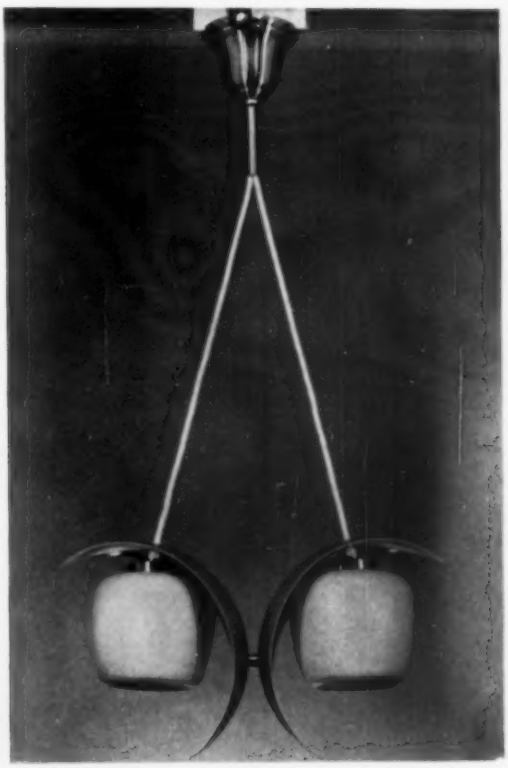
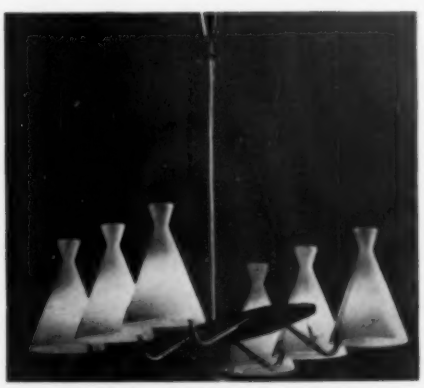


Table lamp, price $10.42. (top)

Table lamp, teakwood base.

Reading lamp, black base, red shade.





Ceiling fitting, outside red shade.

Ceiling fitting, price $22.50.

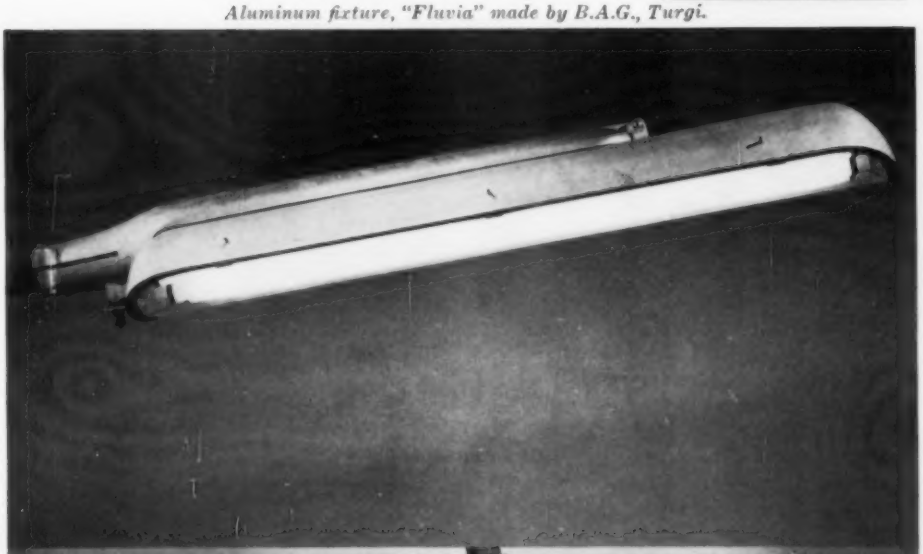
them in clean lines

The highlight here is the fluorescent wall bracket, which swivels into different positions, its working parts clearly exposed. The pendants employ the standard conical form of the shade, and among standing lamps (not shown) the Swiss show a decided preference for the gooseneck, suggesting the opposite approach from the Danish group: light as a *working* rather than a decorative element, even for the home.

Ceiling fitting, aluminum shade, made by B.A.G., Turgi, Switzerland.

Hanging lamp in glass and aluminum, made by B.A.G., Turgi, Switzerland.

Aluminum fixture, "Fluvia" made by B.A.G., Turgi.



Hanging lamp by Steiner AG, Basel.

Designer Charles Pollock builds his own plastic part for new chair.

The designer and modelmaking

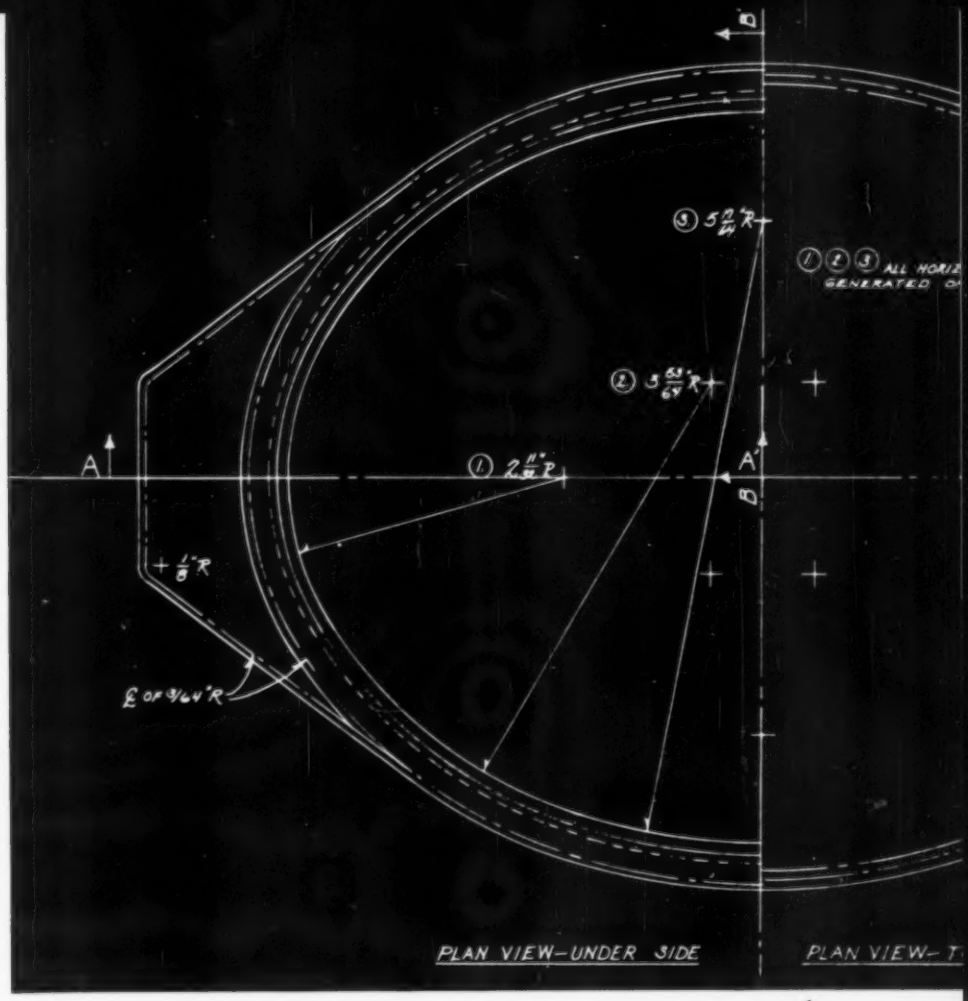
Designers' Aids and Sources, Part II, investigating the designer's procedure in expressing design ideas in three-dimensions, and the contribution of various special services in this vital phase of product development.

Designers disagree on a lot of things, but most of them do agree on this point: models are essential in working out design. In ID's first installment in this series we took up the general background of models; we turn now specifically to the designer's involvement with the model, what it means to him, and how he solves the often simple, sometimes complex, business of getting the model done.

The way a designer approaches modelmaking might seem a cut-and-dried procedure, but in practice it turns out to vary considerably according to the size of office, kind of industry, and product to be made. The extent of the designer's own modelmaking facilities differs. One large firm working on computers and large kitchen appliances has its own modelshop; other firms who work on smaller appliances are equipped to do some of the modelwork themselves, but for final appearance models rely on independent modelshops with which they work regularly. Designers agree on the importance of models, but in the method individual designers follow to get their models made, there is frequently wide and significant variation.

Some, working with models from the time a design is started, make drawings only after the model is finished and approved; others rely on models as a check of the accuracy of their drawings; some, like the designer shown above, build their own plastic components; others work out their own early models in clay or plaster; though almost all designers do some of the modelbuilding themselves, the extent to which they rely on outside help varies enormously. Questions then arise: at what point does the designer turn his model over to the professional modelmaker? What techniques of materials simulation are used to make the model look exactly like the manufactured product? (Appearance models must often approximate the final product closely enough to enable the client to display them as the *actual* product in a poll.) And what are the methods by which models are fabricated?

These are some of the points that will be taken up in the following examples, selected to show the relationship between designer and modelmaking in an in-company design procedure, in three independent offices, and in a collaborative modelmaking effort.—*a.a.*



1

MULTIPLE MODEL SYSTEM in complex design development —Corning's new line of casseroles comes alive

About two years ago, the research group that conducts periodic reviews of product lines recommended a redesign of Corning's line of covered, clear and opal glass casseroles. Although the line had been a good selling item for many years, the group felt that the casserole's round shape was beginning to be outdated—a more stylized expression with a more luxurious character was needed. Management agreed, and the assignment as it reached Corning's own design staff went like this: Design a new set of casseroles that can be merchandised either as an additional line or as an eventual replacement of the existing design of Pyrex casseroles.

In addition to a design department, headed by Lee Goldman, Corning has its own market research and home economics staff, test and modelmaking facilities. How the design staff was aided by these various in-company facilities to work out their models and conclude the design is discussed and illustrated on the following spread.

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Basic design direction

The first in-company service used by the Corning design staff was the market research department, which was asked to gather information concerning consumer desires in shape and decoration. The group studied the various design features of a casserole—the size, shape, height, type of handle, decoration and color that most pleased consumers—and found they preferred decorated to undecorated, oval to round ware. The design group in the meantime had worked out its own ideas of new designs and decorations in a series of highly experimental plaster models; six of these were made by the designers themselves in the department's modelshop—which is equipped for these preliminary operations—and decorated with strips of Bourges paper. Dubbed "dream designs," these early models (2,3) differed radically from the final line in size, shape and decorative pattern: the shapes were more extreme and the decorations more abstract. With them as a focal point, Corning's executives were able to make their own design recommendations.

Ware drawings and plaster models

Drawings are customarily the first formal design expression at Corning, and in this case, as the designers began to translate management's directives, they also included their own analysis of production problems on which they had conferred with Corning's production heads. From these drawings (1) the first models were made, a line of plaster shapes built in the department's modelshop. To mold them the designer poured plaster over a form whose dimensions were those of the inside of the proposed dish (4); a template mounted on a sled was rotated around the poured plaster to carve it into the desired shape (5). For decorations, some patterns were painted on strips of acetate wide enough to surround the outside of the dish (6). The models were then submitted to production heads for evaluation.

Inside and outside sources

Since design details had been pretty well defined beforehand, all that the production departments suggested were some technical refinements (a change in locating the separation of mold and plunger). Following the staff's review of the design status (7), the next step was to prepare the designs in presentation form for top management. The ware drawings, modified to incorporate the slight changes, became the basis for the presentation models, 13 in all, built by in-company as well as outside services.

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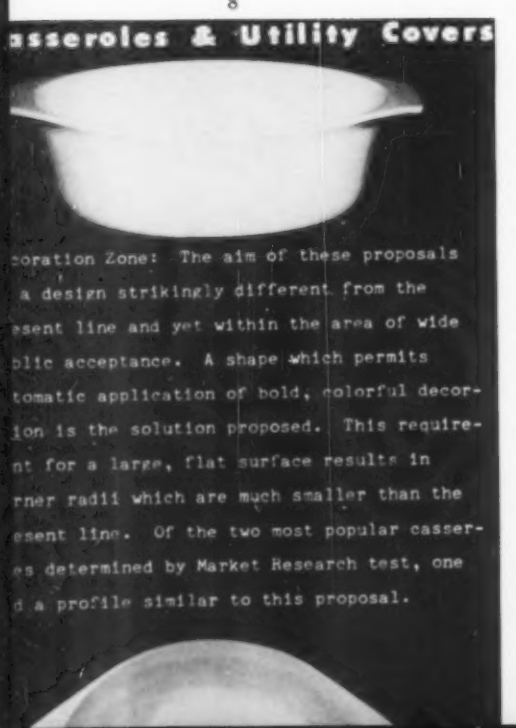

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Corning's service shop, where the company's production molds are made, is available as a source for wooden models. To simulate the opal element of the proposed new line, this service shop made ten wooden models. For the clear dishes, three lucite models were built; since time was a factor, three different outside modelshops with which the company works were used: A. S. Plastic Model Co., A. Cirkinian, and Y. Mogi, all of New York. To produce the plastic bodies, vacuum forming was used by the first two, milling from a solid lucite block by the third.

Production models

The finished models were photographed for presentation sheets (8) prepared by the design department for management's evaluation of the design proposals, and were also used by the market research group for opinion tests at Corning's Glass Center (9). Based on management's evaluation and the consumer polls, five design themes in four color combinations were selected.

The final models—production samples of the selected casserole line—were fabricated in the actual Pyrex in a pilot operation at the plant. These models served for sales tests in stores (10), general investigation of production problems, and the home economics staff's baking tests in the test kitchen (11).

The customer's choice, polled in sales tests, ended a complex development in which the model played many roles in the birth of a design. The new oval casserole line (12), which has been on the market since last fall, consists of 1½ and 2½ quart sizes, in four decorations.

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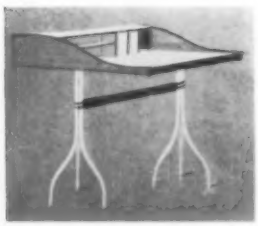
12

IDEA DIRECTLY TO FORM in experimental desk development at George Nelson & Company

A modelmaking approach that is personal and direct is demonstrated by a recent development of a new desk for the Herman Miller Co., a client of the New York design firm George Nelson & Company. The desk resulted from an original concept that one of Nelson's designers, Charles Pollock, had worked out in the firm's modelshop—equipped with workbenches, tools, saws, and sanders for miniature and full-size furniture models. (A highly skilled clay and plaster modeller, Frank Duci (4) comes in whenever needed to help the designers, who stay with their models from beginning to end—not just to visualize designs but to work them out.)

Interested in a leg construction that would lend itself to table, desk, or chair applications and would be inexpensive to produce, Pollock thought it might be possible to combine two simple machine operations into one — tapering down steel tubing by swaging, and bending the tubing into a leg with wide curves. Before investigating whether this method of fabrication was workable in production, he proceeded with his experiment by developing a desk that would use the new leg system as its base. He first visualized the desk in a rough sketch (1), and then built a 1½"-scale model (2), shown here in actual size. His intention was to achieve a general impression of the new concept, and he found that the materials he actually had in mind were as easy

1



2

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to work with as substitutes: white micarta for the desk top, oiled walnut for the strips around the top, lacquered colored panels for the desk compartments. Only for the legs did he use a substitute—white enameled steel rods instead of steel tubing. An order to Allied Tube Co. for full-scale samples of the legs, which came close to the designer's expectations, proved it was possible to combine the two machine operations, and Pollock went ahead to build his own full-scale desk mock-up (3). He now wanted to work out design details, and decided to use not the final materials but those substitutes easiest to work with: cardboard in place of white micarta, and rough lumber with walnut veneer glued on in place of solid walnut; only for the base was he able to use the actual product, the leg samples supplied by Allied Tube Co. The finished design, which was worked out entirely without detail drawings, was only at this stage translated into drawings for desk-parts fabrication and production assembly.

The desk design that resulted not from a client's request but a new construction concept is being added to the Herman Miller desk line; production models (5) made by the Herman Miller Co. will be displayed in the company's showrooms before the end of the year.

4

5

Sundberg-Ferar's Detroit shop

Designers' ELABORATE MODELSHOP produces mock-up in full scale

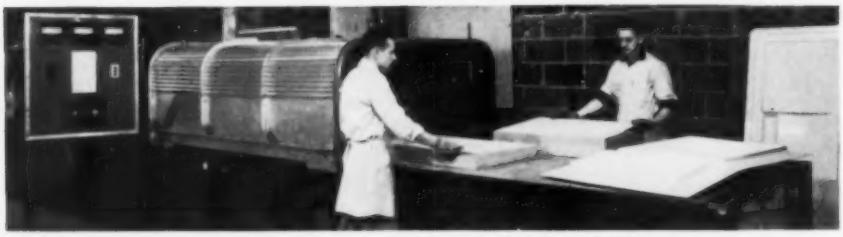
In Detroit, the firm of Sundberg-Ferar has met its need for extensive model-making facilities by setting up its own totally self-sufficient modelshop. S-F recently added a $15,000 vacuum forming machine, which can make plastic reproductions of such huge model components as refrigerator doors and range tops, to a $50,000 modelshop where 20 modelbuilding craftsmen produce full-scale, complete mock-ups of such complex projects as the RCA Whirlpool Miracle Kitchen shown below. Sundberg-Ferar believes in executing even preliminary models in full scale. The firm feels it is the only way to let the client see at a glance the product evolution the designer has in mind — just where the '58s will differ from the '57s. Located some distance from the firm's design office in Royal Oak, the shop operates as a separate unit, executing the designer's detailed, dimensioned drawings brought to the shop and interpreted by the coordinator, himself a designer, who works exclusively as a liaison between the designers and modelmakers.

Designer, shop foreman confer

Making a wood door

A wooden mold

Metal lettering



Vacuum forming plastic parts

RCA-Whirlpool "miracle kitchen" mock-up made in S-F shop

Coffee pot before redesign

OUTSIDE MODELMAKERS help Becker & Becker redesign a coffeemaker

Designers of the New York firm of Becker & Becker carry their designs through the early modelmaking stage, but prefer to rely on outside services for presentation models, as they did when they needed a very exact model of a redesigned coffee pot. Becker & Becker's major problem was to build a new model around the existing aluminum chassis, the tooling for which had to be retained. To give the item a new look the designers decided on three new parts — base, handle and spout — and employed three services to get them done. A drawing of the phenolic base to be made in wood went to Modelmasters, a New York shop, and Plasteline models of handle and spout which the designers had developed themselves went to Rochette & Parzini, sculptors, for plaster reproduction. The phenolic appearance of the base and handle was simulated with a spray of black enamel; making the spout look like the rest of the aluminum body involved the third outside service, Eastern Metallizing, where the spout was given first a copper, then an aluminum spray.

Along with the old product and a competitive item, two slightly different assembled models were used for a consumer poll in an Ohio department store, on the basis of which number one was chosen for production.

Three new parts gave old item new look.

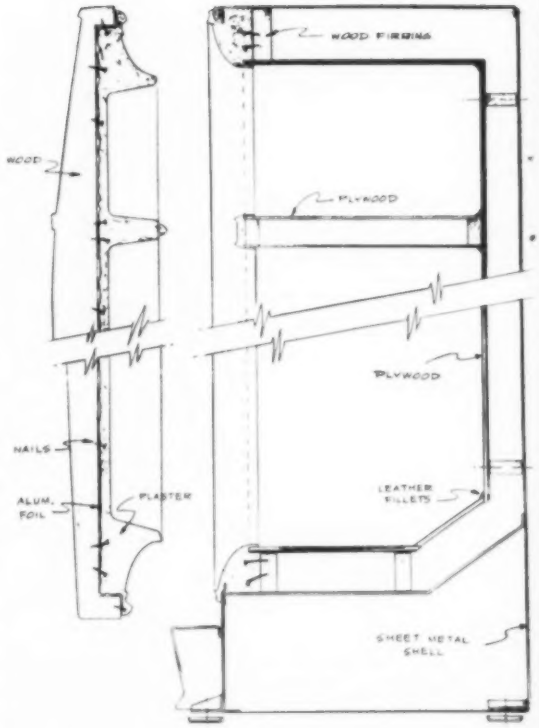
Rochette & Parzini, New York sculptors, supplied plaster handle and spout.

Two models of new coffee pot were used in consumer poll. Model at right won.

Designer's shop built inside box, outside handles

Designer-client COOPERATION expedites periodic redesign

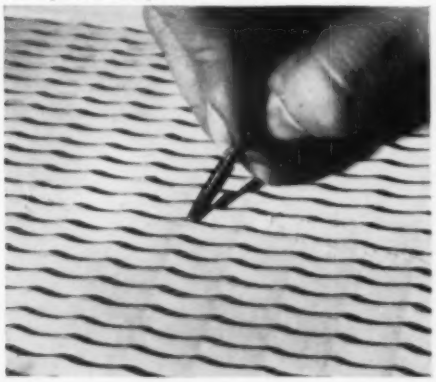
Philco collaborated with their designer, Harper Landell & Associates of Philadelphia, in the modelmaking of the '55 Philco refrigerator. Client and designer have their own modelshops, both with different facilities. The Harper Landell shop can handle all clay and plaster components, while the Philco shop is equipped to take care of glass, metal, and large wood parts. By each contributing their particular facilities, successful models are produced for periodic redesigns of Philco appliances without calling in outsiders. After the '55 refrigerator design was approved by the client, Philco supplied the body, did the exterior part of the door in wood, and fabricated freezer handles and shelves in glass and plated metal. Harper Landell lined the inside of the door with plaster, carved the door hardware in plaster, covered it with aluminum foil to simulate chrome plating, and built interior doors of plaster reinforced with brass. Some of these operations are shown on this spread.



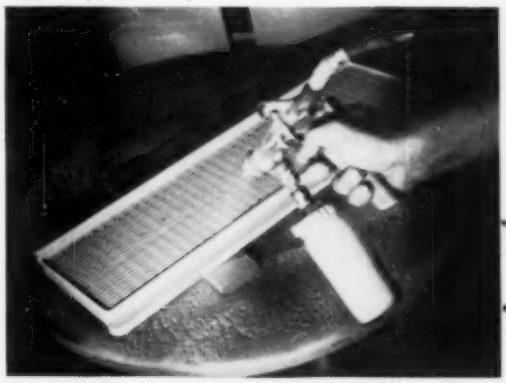
Designer's drawing for client's shop

Designer's shop lacquered plaster

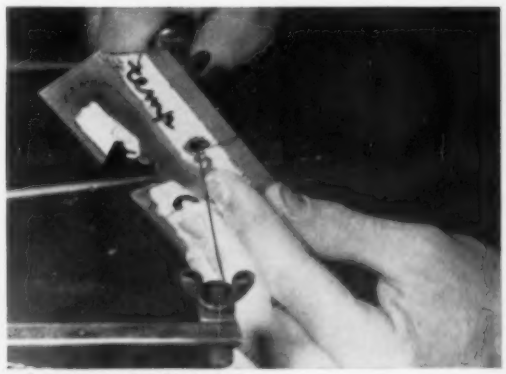
sharpened component detail



applied finishes to plaster doors



used plaster rings for grommets



sheet brass for lettering

PATTERNS OF PRACTICE

The examples in this section on designers' procedures have been appearance rather than mechanical models; the latter will be taken up in later articles.

The types of models that are constructed during product development are often similar. Regardless of the product, three models are usually built: early models — the first visual expression of design idea; presentation models — for the client's approval; production models — for a production check. Of these three, only the first two are usually the designer's responsibility, and by and large in these two there is a standard dividing line between the work done by the professional model-craftsman and the work carried out by the designer. As a rule, designers build their own early models — mostly in clay or plaster — but fewer construct their own presentation models, and very few delve into complex mechanical models. Whether presentation models must resemble the mass-produced product as closely as possible, or must operate perfectly, designers usually turn their finished designs over to craftsmen who can bring them to life with the skill that only the expert can offer.

The art of simulation

The man who builds the presentation model is constantly aware of the matter of materials *simulation*. The primary task in making models has always been to make them look or work exactly like the real thing, and the fact that today modelmakers are able to do just that was pointed out in every example taken up in this article. In Corning's proposed Pyrex casserole line, wood was used to simulate opal glass, Lucite to replace clear glass. Becker & Becker's model of a coffeemaker was a compound of the actual aluminum shell, aluminum-sprayed plaster to replace an aluminum spout, enameled wood and plaster to simulate the phenolic base and handle which they substituted. In each case these presentation models were used in a consumer poll, so they *had* to look exactly like the mass-produced item.

How important modelmaking is today, and how closely allied to design practice, may be summarized — in one of many examples — by the role of a modelshop at Harper Landell & Associates, Philadelphia (formerly Harold Van Doren). Ralph Knoblaugh, a designer of many years' experience who now heads the Harper Landell modelshop, feels the subject is so important that he has written a book on modelmaking for other designers; the material on this spread is based on one of the case studies in his forthcoming book, to be published by McGraw Hill this year. In June, Part III will take up professional modelmakers and their special fabrication techniques.

Finished model, the result of combined shop efforts

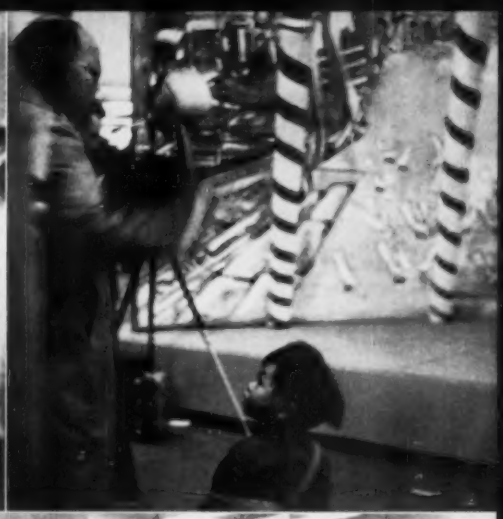
National Photo Show puts the focus on

Although all manner of colossal carnival trivia in the Coliseum in New York served to complicate any serious scrutiny, this year's National Photographic Show in February yielded up a number of significant developments—most notably, some Signal Corps advancements in specialized areas of photography, and, for the amateurs, the first Japanese movie camera to reach the American market. But it was hard to focus on the lions—so many infidels were there in the Coliseum. Many thousands of heavily equipped Romans attended ("Just bring your Camera. You can't miss.") to take readings on a white Eldorado Biarritz with gold trimmings, on "pert Judy Henning" and "black-eyed Robin Kessler," on Jerry Lewis, the girls of "Most Happy Fella" and Zossfender the Chimpanzee, King of the Show.

Amid the hubbub, the Signal Corps distinguished itself at one of the show's largest installations, demonstrating a novel type of photographic film. Made of vinyl, the new film is being used by the military in areas contaminated by atomic radiation; unlike ordinary films, it does not fog under such conditions. The new film also has provocative commercial possibilities because its processing requires no darkroom or fluid developers. A sun lamp and an oven develop the print, all in five minutes. An array of combat equipment was also given its first public showing. This included the 100-inch ground camera (photo above) and its aerial counterpart. Using infra-red film, these cameras can effectively penetrate enemy camouflage with a range up to 30 miles.

The "available light" frenzy is being fathered by faster lenses (Nikon has introduced an *f* 1.1) and by faster films. Ilford Ltd., specialists in the fast film, provided show-goers with the fanciest yet in "available light" feats—a movie exposed in part by matchlight.

There was little news in photographic equipment for the vast amateur market. Small improvements and new (but not improved) models were common enough, but only one product seemed significantly new—described on the next page, it is the latest Japanese camera designed for a world market.



photos left, above, top center, top right by Hugh B. Johnston

a growing Japanese industry

The National Photo Show marked the inaugural appearance of the Canon 8, first Japanese movie camera to be marketed internationally. High-priced ($159.50), it is a quality camera in its field, comparable to the Swiss Bolex 8, and features an especially versatile viewfinder. Its appearance signals another expansion in the Japanese camera industry, which in the last few years has been gearing itself for greater portions of an international market that has traditionally been fed by the long-established industries of Germany, Switzerland and America. Details on the design and merchandising history of the Canon, and on the development of the 35 mm Canon V, introduced last year, are given on the next six pages.

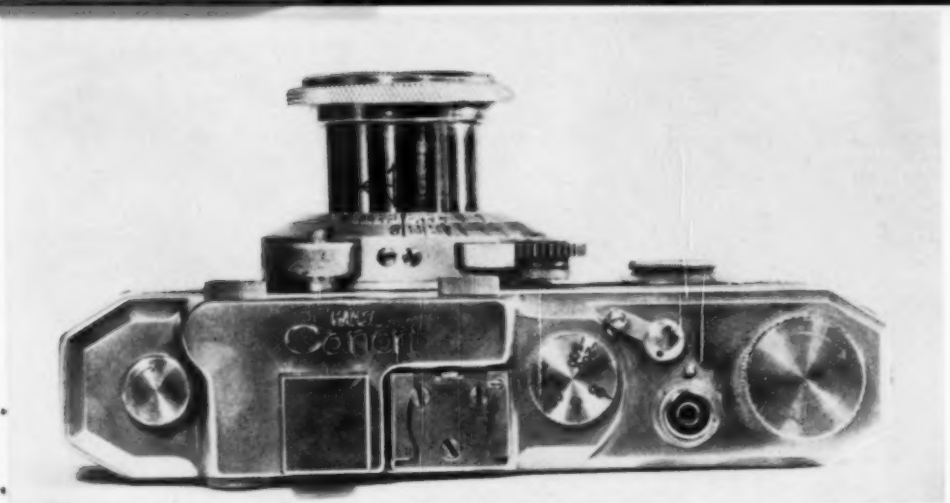
キヤノンカメラ株式会社

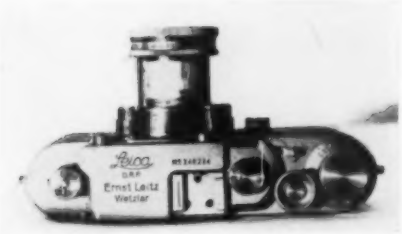
Canon designs a distinctive camera for world markets

Cameras have become one of the leading exports in postwar Japan. Today more than 50 manufacturers belong to the Japan Camera Industry Association, with products that range from reflex cameras bearing mysterious labels like Pigeonflex and Zenobiaflex to two of the master 35 mm's—Nikon and Canon. The Canon Camera Company is the largest manufacturer of cameras and camera equipment in Japan, and it was also the first to vie for a world market.

In 1935 Canon produced its first camera. Derived from the German Leica, it was called "Kwanon" after the Japanese Goddess of Mercy (the name was soon after reduced to its anglicized form, Canon), and at that time in Japan, it sold for one-third of the Leica's price. Through the next 20 years, that initial model was to undergo a series of some 16 revisions, but not once was the basic shape redesigned. By 1950 the company was ready to go after world-wide sales.

Reasoning that if they could sell the U. S., they could sell the world, the company tooled up still another revision of their basic camera and launched an advertising campaign in this country to announce that no more was Japanese export to be merely a matter of penny whistles. Then Canon crossed the Pacific, and with fortunate timing. As prosperity in this country and the popularity of 35mm photography increased, Canon rode the crest, followed by other Japanese companies such as Nippon Kogaku, makers of the Nikon. Last year, nearly 50 per cent of Canon's 45,000 camera output came to the U. S. Moreover, behind the company's most recent successes lies a new model, the Canon V.





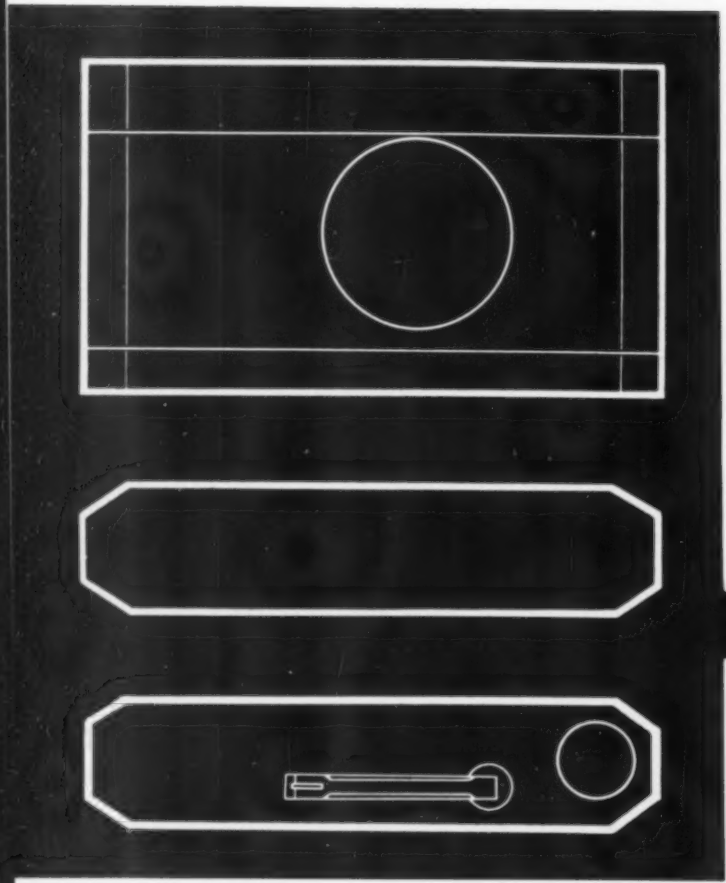
The first Canon camera, vintage 1935, owed much to the Leica, as the photographs above indicate, particularly in its overall dimensions and in the placement and detailing of knobs and dials on the top of the camera. The succession of revisions that followed the initial model culminated, in 1950, with the Canon IV-S2 (middle photo), the camera that was chosen for the first sally into the U. S. market. The IV-S2, though a sensitive and versatile instrument, was complicated both functionally and visually by a profusion of levers, dials and sockets that had been added to take care of functions introduced through the years. The old body was being asked to house a multiplicity of controls that were difficult to distinguish one from another, and the aggregation on top created a fussy and disoriented appearance. It was time for a new body concept, one that would make the complex camera more of a visual entity and easier to use, and that would identify the camera as a product more uniquely Canon's.

In 1953 the company started to develop a thoroughly new design, one that was ultimately to appear in 1956 as the Canon V (bottom photo). As development got under way, an Industrial Design Department was formed, with three members. This team went to work using a two-dimensional approach that has little similarity to the sculptural approach so familiar to American designers. As the drawings on the next spread suggest, the graphic method of the Canon V designers grows out of an Oriental aesthetic rooted in calligraphy and flat architectural relationships. Starting with a basic body rectangle, they approached the camera as a series of facades and developed details through a geometrical study of every relationship of circle, square, rectangle, straight line and curve.

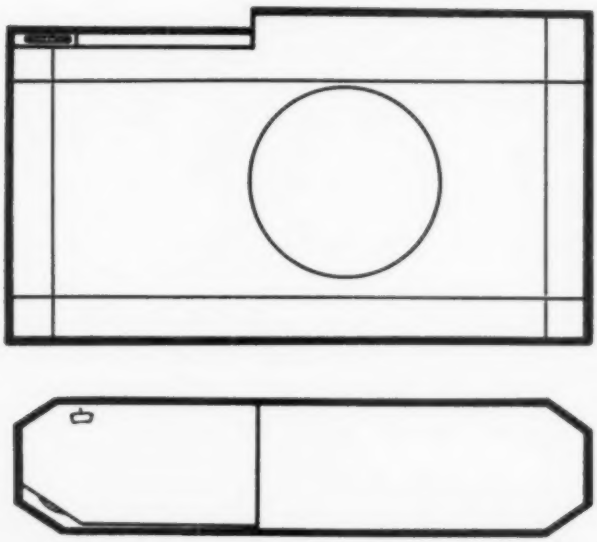
Thus emerged the first Canon camera to benefit from a coordinated approach to design — and from a conscious attempt to create an original, mass-produced, Japanese product for world markets.

キヤノンカメラ株式会社

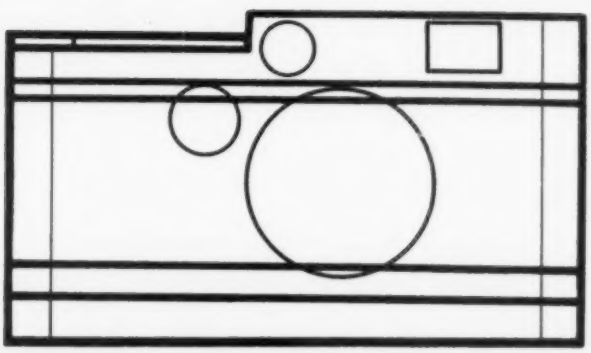
Drawings in Japanese tradition determine Canon details



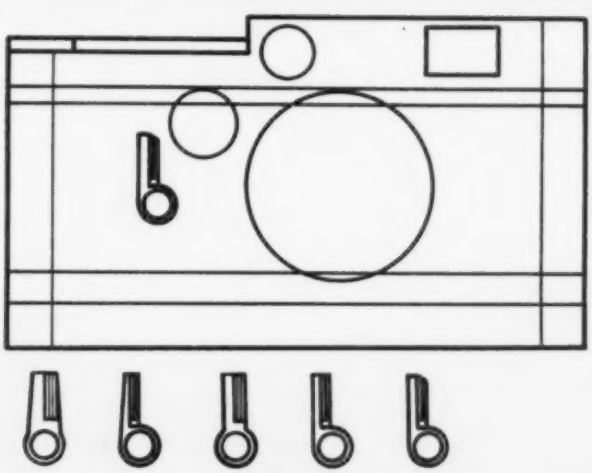
(↑) *Basic rectangle fixed;* (↓) *area for knobs determined.*

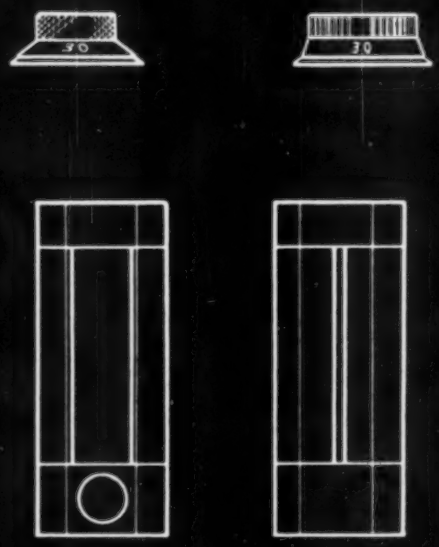


(↑) *Knob niche fixed;* (↓) *geometry of camera front studied.*

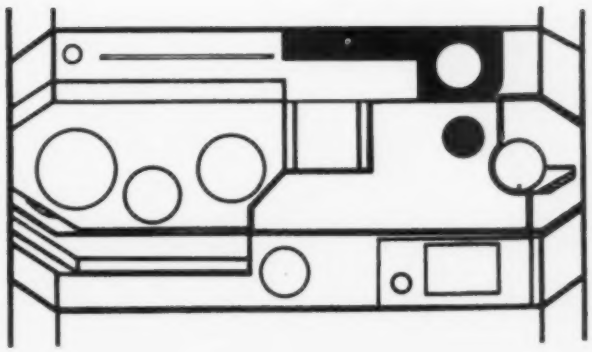


(↓) *Shape and placement of delayed-action lever established.*

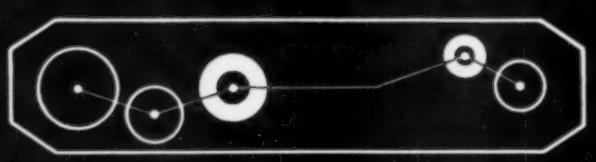




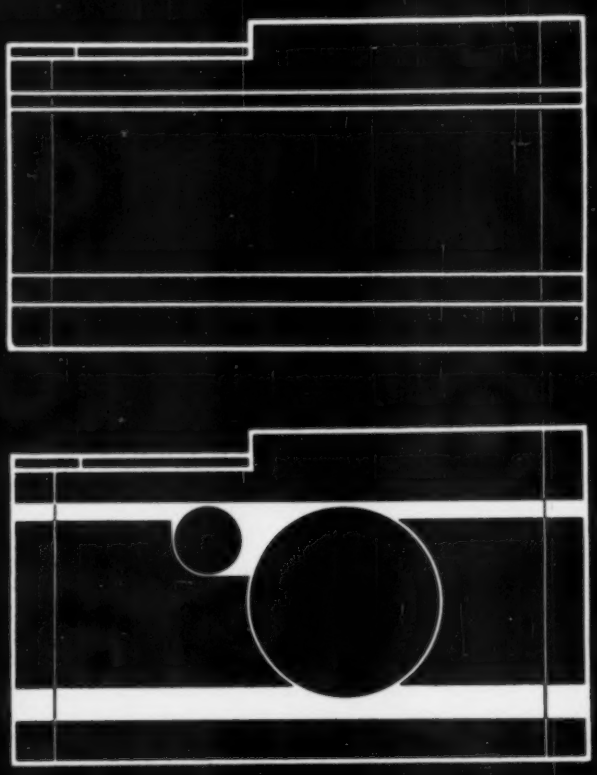
(↑) *Shape of slow-exposure knob and camera ends examined.*



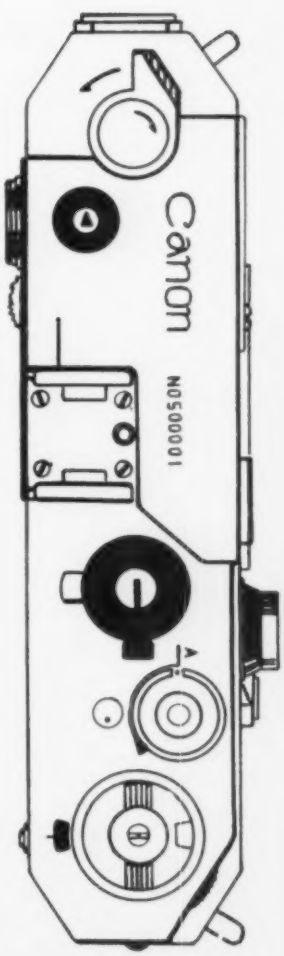
(↑) *Exploded study of top and upper sectors of front and back.*



(↑) *Circular shapes on top;* (↓) *horizontals tie back to front.*

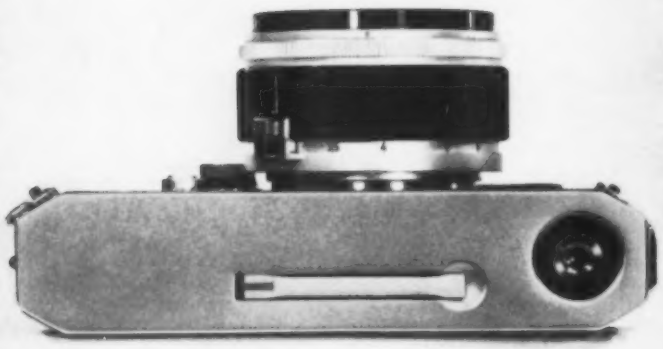


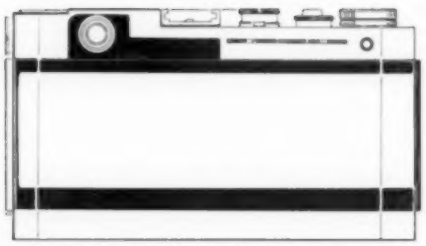
Since a 35 mm camera is, essentially, a flat slab enclosing a flat plane of film, the two-dimensional approach of the Canon V designers seems remarkably a propos. *The drawings on these two pages indicate how all of the important proportions and appearance details of the camera were established well before the designers left their drawing boards for a trip to the model-shop. After the designers had established the basic circle-within-a-rectangle scheme — the dominating circularity of the lens was carefully balanced off by other geometric elements from the very beginning of the design development — they determined the area that had to be mortised out of the top to accommodate controls. Then they proceeded with their asymmetrical plan. As the drawings left-center and top-right on this page show, and the one bottom-right on the opposite page, every circle, rectangle, stripe and line —even the small disc which comprises the base of the delayed-action lever—was proportioned to relate to an overall geometric effect. To the right is a final drawing of the top elevation, which, when compared with a similar view of the previous model* (p. 105), *shows the clarity of proportion and detail that can be achieved when a company, for the first time, calls industrial designers onto the scene.*



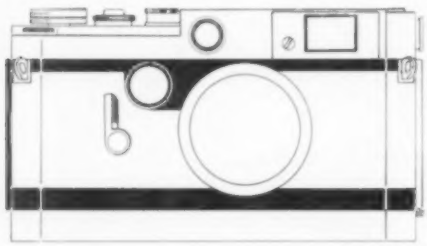
キヤノンカメラ株式会社

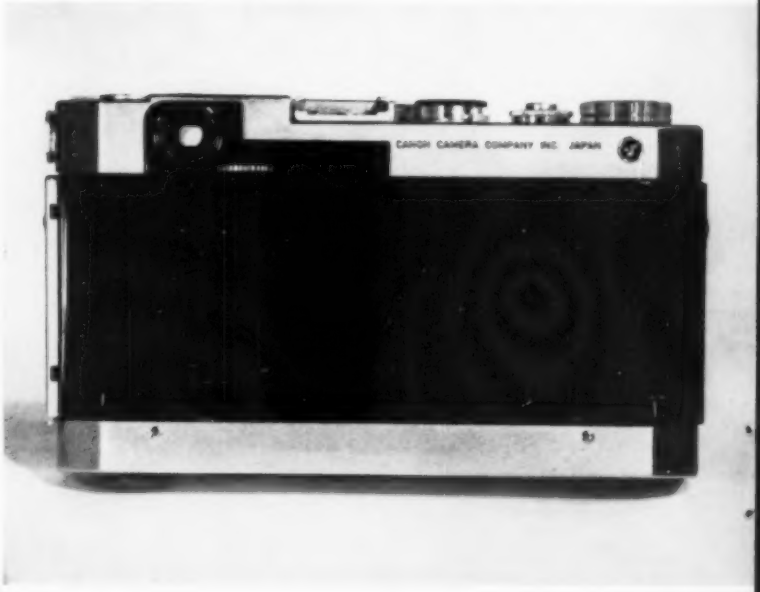
Canon V emerges as a product uniquely Japanese

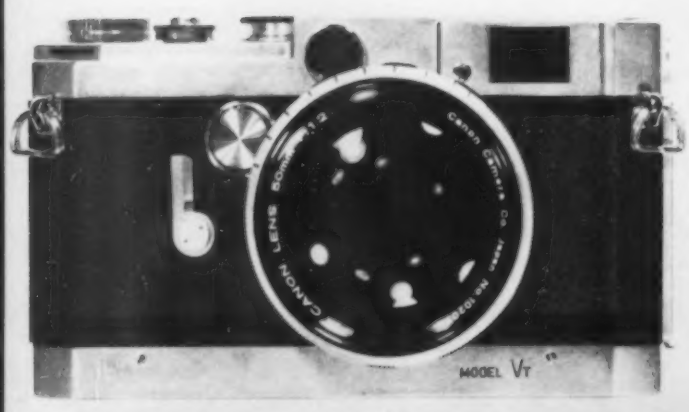




Bottom elevation (above) shows trigger rapid-wind lever, folded flush with the base. When in use, it is locked in place at right angles to the base. This and several other minor conveniences are the Canon V's only mechanical advances over the IV-S2. The main differences are redesigned controls and a new body slab.







Canon V, translated from flat elevations into the round, strikes one first of all as a larger camera than the IV-S2—and a better-proportioned one. On the earlier model, accumulated controls dominated and disoriented the slab; on the V, the monolithic slab prevails, with the controls coherently treated as distinguishing details across the camera's various facades. The two-dimensional method of designing three-dimensional detail has worked with surprising success — perhaps because the camera, by nature a series of intricately organized flat planes, is a happier subject for such a design approach than would be a toaster or typewriter or other product requiring subtler modulations of volume.

Although it is large, the V is bound together by black horizontal stripes that encircle the slab; beveled edges, a carry-over from the earlier models, also help to impart a three-dimensional unity to the flat planes. The top is held together by a strong horizontal; knobs level off with the adjacent top surface of the viewfinder housing—a dotted line across the top of the knobs would complete the purity of the rectangle with which the designers started. A controlled "blocked-in" feeling prevails, whereas the IV-S2, with each knob cropping off at its own level, evokes a feeling of rampant and random growth that suggests the absence of any coordinated design control.

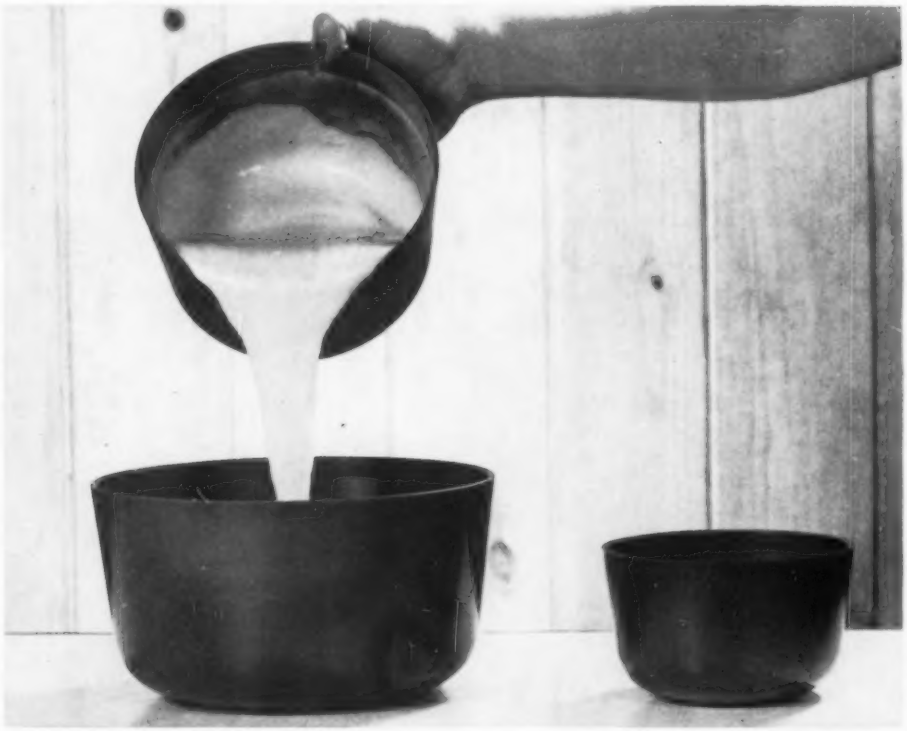
Not only in its planes does the Canon V show the good effects of a careful design approach; it also—and this is still exceptional among Japanese designs for mass production—gives the company an *original* product, developed as a piece and in terms of its own complexity. Its details, instead of aggregating (and aggravating) its function and appearance, combine with one another to make a consistent and distinctive whole. The Canon V, breaking away from the designs of other countries and other companies, emerges to prove that Japan can be successful *and* original, that she need not hesitate to rely on her own design resources. Although for years an incredible cheapness and willingness to imitate have injured the reputation and substance of Japanese products, a few like the Canon V are finally arriving to give evidence that Japan's rich design aesthetic can indeed be fruitfully applied to her mass production.—*h.b.j.*

Plastic Housewares Contest sponsored by Koppers Company makes a point that needs retelling: pliable materials, used with imagination, make useful, ingenious—and even quality—products.

With the objective of encouraging attractive, functional design and proper application of plastics in consumer products, the Koppers Company makes its third annual design awards this month. As a major raw material supplier to the molding industry, Koppers is an active supporter of better designs and applications that will break down the widespread distrust of plastics in the minds of many housewares-users. The company's design competition was initiated in 1955 to give recognition to molders whose housewares products excel in quality, design and imagination. Emphasizing the latter point, a third type of recognition was given to the entries for the first time this year: the judges voted for the "most original" products in each of the contest classifications.

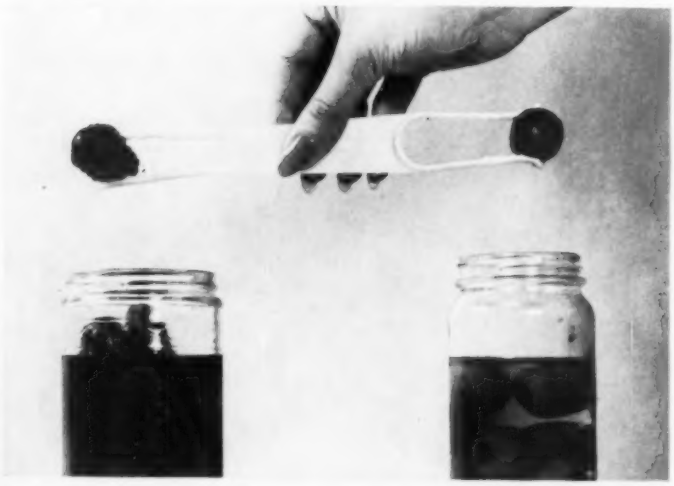
New aplications of the special properties of plastics are to be found in the baby-bottle insulator of rigid styrene foam, the pliable plastic double sink, and the bowl and collander set shown at far right. But the first-prize winner among home maintenance products, the 20-gallon trash can made by Loma Plastics, Inc., and designed by Paul C. Gunn—which also won the Best-of-Competition award—showed greatest inventiveness in its application of a special polyethylene for low temperatures and unsurpassed size.

POLYSTYRENE for use with food



First prize
Mixing Bowl Set (three-piece)
Flambeau Plastics Corp.
Baraboo, Wisconsin
High-impact polystyrene, $2.49 per set
Colors: red, yellow, natural, turquoise
Designer—Jack Collins

Honorable mention
Picnic knives
Federal Tool Corp.
Chicago, Illinois
Regular polystyrene, 10¢ per package of eight.
Colors: red, yellow, green
Staff designed



Most original
Olive and pickle fork: Little Oliver Picker
Brown & Bigelow
St. Paul, Minnesota
Heat-resistant polystyrene combined with high-impact polystyrene
Designed as premium item only
Designer—John J. Olson

POLYETHYLENE for use with food

First prize

Spatula set (three-piece)
Flambeau Plastics Corp.
Baraboo, Wisconsin
Regular polyethylene, 59¢ per set
Colors: red, yellow, natural, turquoise
Designers—Jack Collins and Harold Hulterstrum

Most original

Adjustable measuring cup
Milmour Products Co.
Chicago, Illinois
Polyethylene, 98¢
Colors: yellow, pink, turquoise
Designer—Seymour F. Fohrman

Honorable mention

Ice bucket
The Plas-Tex Corp.
Los Angeles, Cal.
Polyethylene, $9.95
Colors: red, yellow, white, pink, turquoise, black, green and straw
Designer—R. J. Willis

HOME MAINTENANCE products

First prize

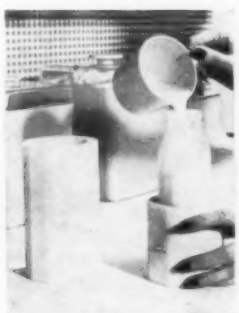
20-gallon trash can
Loma Plastics, Inc.
Fort Worth, Texas
Made of special low-temperature polyethylene
Colors: yellow, red, green, gray
Designer—Paul C. Gunn

Honorable mention

Rectangular pail
Republic Molding Corp.
Chicago 31, Illinois
Polyethylene, $3.49 eight.
Colors: red, yellow, turquoise, pink
Designer—B. W. Coltman, Sr.

Most original

Portable children's commode: Car John
Travel Aids Co.
Brooklyn, New York
Regular polystyrene, $1.98
Colors: red and white stripes
Designer—Robert H. Zoffer



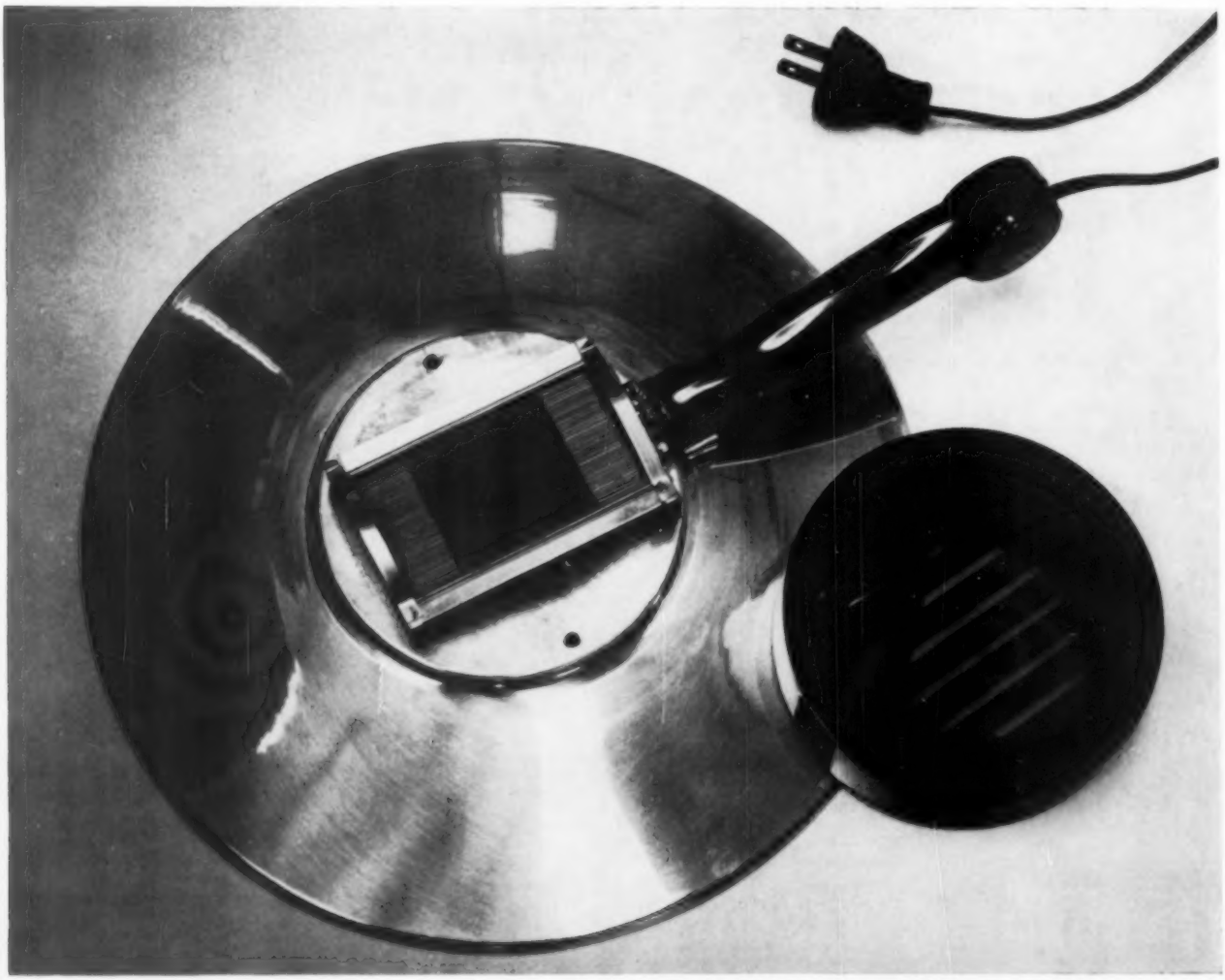
Others

Many new housewares ideas turned up in the material submitted to Koppers, among them these:

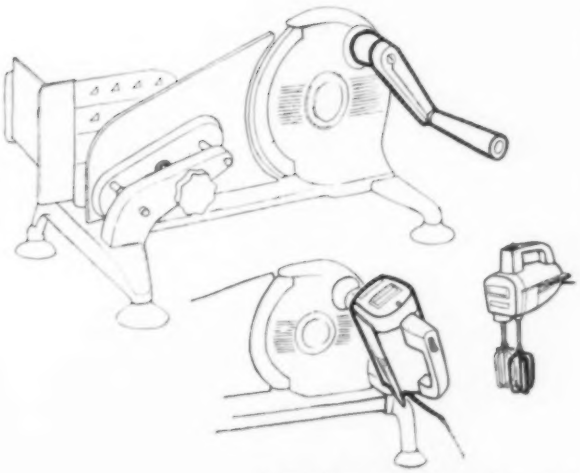
Baby-bottle insulator made of rigid styrene foam (above). Rinsemaster double sink (right) made by Federal Tool Corp., Chicago, Ill. Of pliable plastic, it retails at $3.49. Designed by Richard Neagle Associates.

Colander and Bowl Set (below) is made by Plastray Corp., Detroit, Michigan, of regular pliable plastic. It sells for $2.19, and comes in pink, turquoise and yellow. Staff designed.

In electrical housewares, now that there is an appliance for every cooking operation, and not just one but several in different sizes and shapes, the news lies in closer control of electric power and new uses for it. A really new use — one that may make a decided change in the kitchen environment — is a catalytic lid for the ordinary cooking pot that destroys smells, greases and smoke by chemical action. The catalytic agent was developed for electric ovens last year, and this is its premier as a portable appliance for on-the-range cooking. In other areas, appliances are getting together in some bizarre combinations to share one electric motor.



Oxycoil, a catalytic element developed by Oxy-Catalyst, Inc., oxidizes the by-products of cooking and clears the air of smoke, grease and smells. Cooking fumes pass through the catalyst-coated resistance wire in the Oxycoil, and carbon and other combustibles are consumed. Mounted in the center of an aluminum lid 12" in diameter, the catalytic element snaps out so lid can be washed. The unit plugs into an ordinary wall outlet and is ready in 30 seconds. Manufactured by Kankap, Inc. $14.95.



Dual-purpose motor housed in portable beater also provides power for the Silv-A-King meat slicer. Powered slicer is improvement on hand-operated model (top). Made of triple-plated chrome and nickel. International Appliance Corp. $49.95.

Electric can opener by John Oster cuts open all cans with a clean safe edge without burrs. Blades can be removed for cleaning. Made of hardened steel and die-cast zinc, it operates on the multi-purpose motor base of the meat grinder. $9.95.

Chemex Drinkwater Boiler is an entirely new solution to the problem of boiling large quantities of drinking water quickly and safely. It holds 2½ gallons of water which it can boil by electric current in about 45 minutes. Made of ¼" thick Pyrex, it has a lid with stainless steel outer rim, glass center, and molded nylon cup for attaching electric cord. Invented by Dr. Peter Schlumbohm. $125.

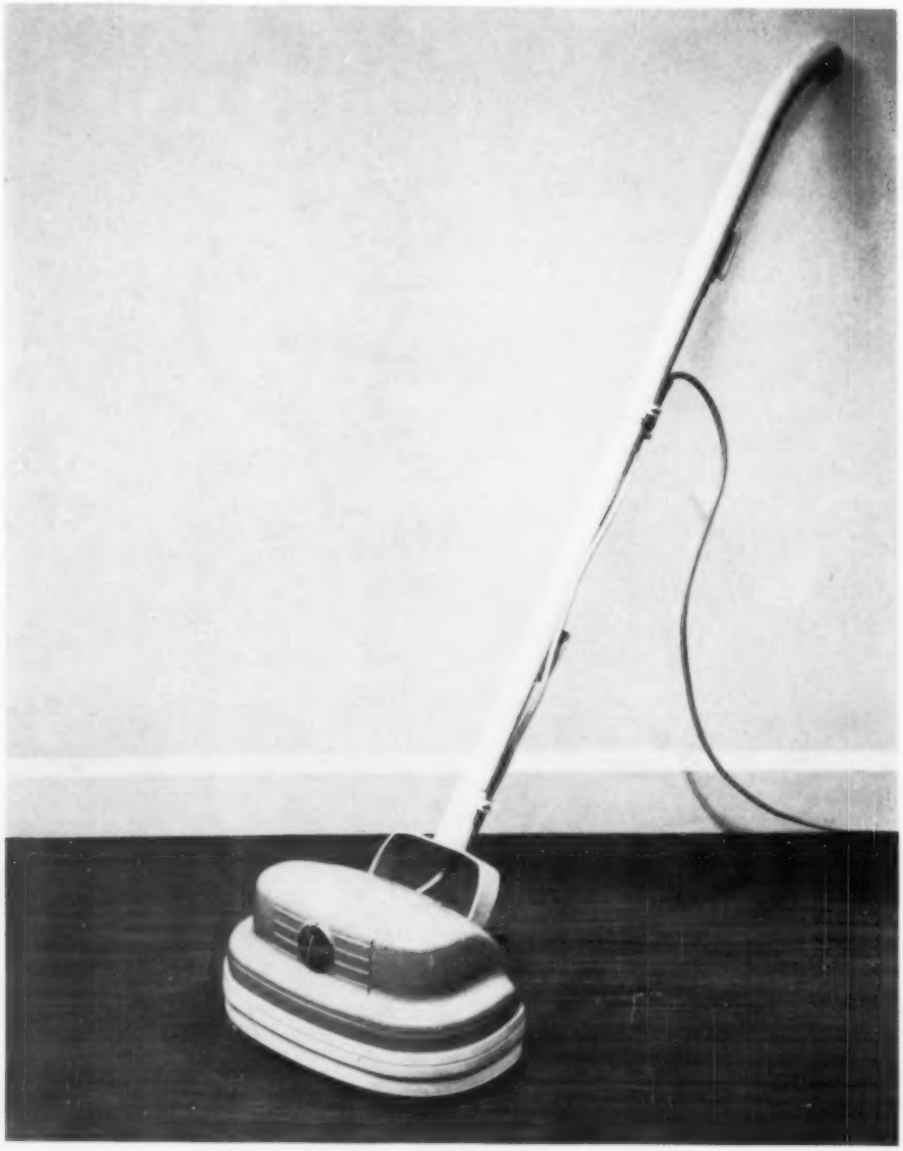
Mixer combination by Westinghouse is knife sharpener and juicer as well as mixer. In white and gray, mixer has baked-on enamel finish. For easy cleaning, center post has been left off beaters. Sharpener is spring-tensioned free-floating grinding wheel. $59.95.

Frozenfood Oven, with heating elements on top and bottom, cooks frozen foods in half the time, says its maker, Finders Manufacturing Co. It has an automatic timer and pilot light indicator, is finished in chrome and black. $29.95.

Jets of dry steam freshen stale baked goods and heat leftovers without drying them in the Fresh-O-Matic by Wear-Ever. Exterior is textured aluminum; Bakelite handle is Lamb-designed. Made for the food-serving industry, it is not yet available for home use.

Mix-R-Mates can be used three ways—for blending drinks, for portable or stationary mixing. Attachments include drink mixer blade, 12-oz. tumbler, chome-plated steel stand with turntable and 2½ qt. bowl. Three-speed mixer has white finish baked on aluminum die-cast body and black plastic handle. Westinghouse, $27.95.

Floor polishers are getting attention this year from manufacturers who traditionally make vacuum cleaners and also from firms who operate mainly in the electrical appliance market. Undoubtedly one reason is the spread of vinyl and tile floor coverings from the kitchen to other rooms in the home. In response to this need vacuum cleaners are also being equipped to clean floor surfaces.



▲ **One set of brushes** in this new lightweight (12 lbs.) floor polisher will wet scrub, wax, polish and buff floors, claims the Hoover Company. Outer bristles are cocoanut fiber for polishing, inner ones are mixture of tampico and bassine fiber for wet scrubbing. Two-piece handle shortens for polishing furniture. Position of handle turns polisher on. Colors: white and rose. $49.95.

▼ **Grand Rapids** is Bissell's new sweeper designed by Harley Earl Inc. and available in four colors — turquoise, yellow, metallic green and black. Handle comes in four parts for compact storage. Sweeper is all steel with chrome trim. $14.95.

▼ **Two-speed motor** on the new Eureka vacuum gives proper suction for heavy carpets or scatter rugs. Nylon bristle brush cleans by 3-way action, says manufacturer. For polishing floors, it is replaced by special brush. Colors: pastel green and cream. $89.95.

Dormeyer enters the floor polishing field with a polisher-scrubber equipped with two sets of brushes, one pair of felt buffing pads that snap on and off. Patented swivel handle allows operation at any angle. In pastel colors, about $65.

A mechanical "brain", says Electrolux, automatically stops their new cleaner when the dust bag is full. The brain can be adjusted for specific cleaning jobs; suction power, which is 20% greater this year, is also under control. $89.75.

Filtered exhaust air is circulated under canister of the Hoover "Constellation" to lessen effort needed to move it. Three-wheel nozzle will clean rugs and bare floor. For long-distance cleaning, hose extends to almost twice its length. In pearl white and heather rose. $89.95.

Flat, all-metal nozzle for Lewyt cleaner has built-in shag bar which is lowered by pushbutton for combing shaggy rugs. Floating brush rides easily over all depths of carpet. Canister is two tones of pink, the first time Lewyt has tried that color. $54.95.

Turb-o-tool, an attachment that converts air power of the Electrolux to rotating action, will drive drills, sanders, buffers, screw drivers. With the addition of cast-iron base for weight and the proper brushes, unit can be used to scrub and polish floors.

New nozzle of General Electric cleaner holds two brushes which clean on the backward pull as well as forward push and will work on both rugs and bare floors. New colors — sandalwood and russet — styled by Freda Diamond in conjunction with GE's appearance design department. $54.95.

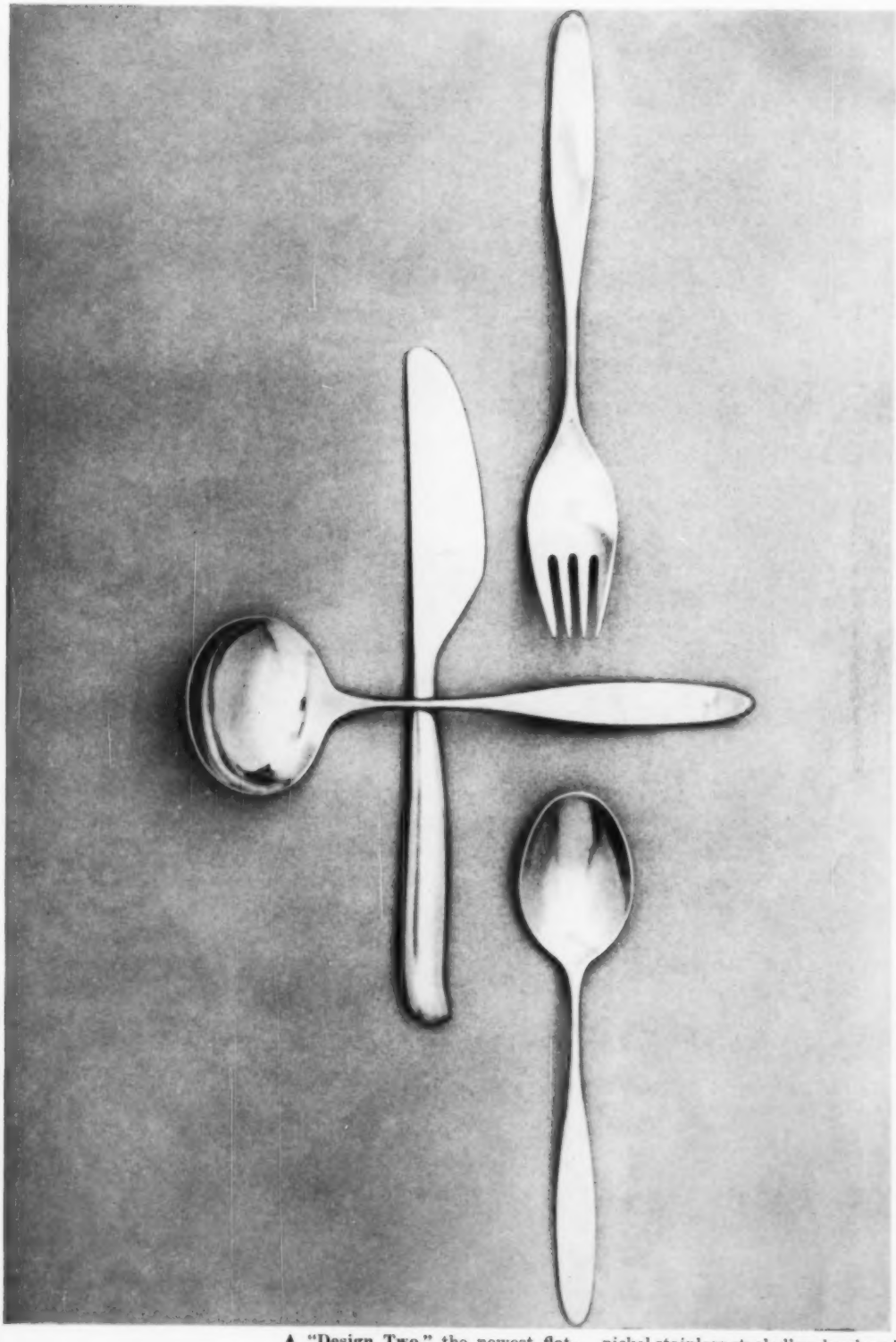
In cookware the story is no longer color, but the rediscovery of the beauty of metal finishes. Metal cooking utensils are going to the table bare of enamels and tints, adorned only with handsome handles, new lines. To protect table surfaces, some covers can be inverted to serve as trivets. One long-time maker of cooking utensils has added a line of buffet servers made of aluminum. Chrome finishes and aluminum are most popular, with stainless steel an up-and-coming third.

New 8-cup percolator by Wear-Ever has copper-colored anodized aluminum cover, inverted Bakelite handle attached only at one end. Designed by Lurelle Guild. $8.95.

Handles designed by Thomas Lamb are made of hard rubber for this Cutco barbecue set to protect the hands from heat. Shafts are heavy-gauge stainless steel. $15.95.

Hallite dutch oven by Wear-Ever is intended for both cooking and serving. Twisted wire handles and cover are made of copper-colored aluminum, which is characteristic of the line. 5½ quarts. $9.95.

Large fryer represents a completely new line of Presto-Pride cooking utensils. Developed in conjunction with Norris-Thermador Development Laboratory, the six basic items are made of three-ply armor-clad stainless steel with copper bottom heat cradles. Covers invert to make trivets for table serving. Handles are heat resistant.



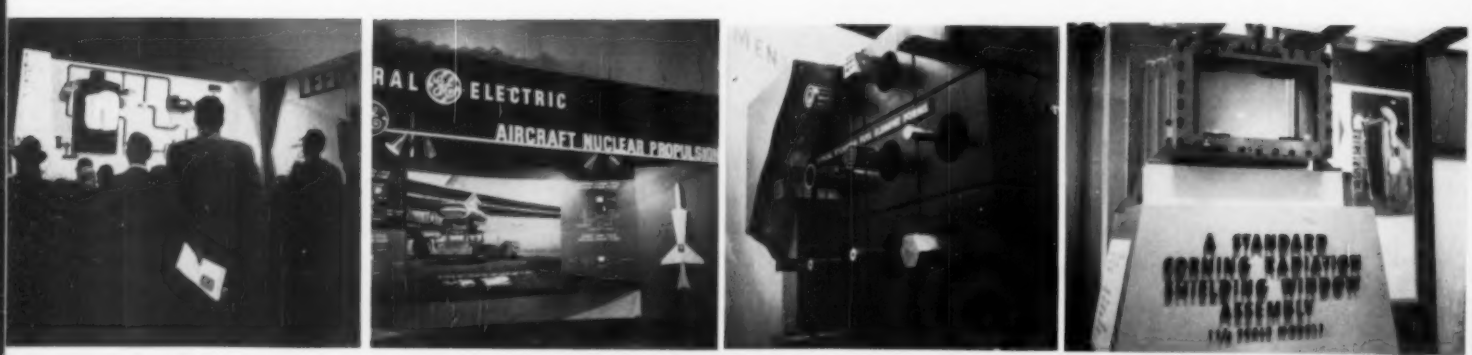
"Design Two," the newest flatware designed by Don Wallance for H. E. Lauffer Company, is more weighty and sculptural than his "Design One." Made of a chromium-nickel stainless steel alloy developed for greater stain resistance, each piece is forged to make possible greater depth in cross-section. $14.25 for 6 pieces.

Two-way carafe by Silex, in which you can brew the tea or percolate the coffee you will serve in it, is made of Pyrex glass with copper or brass finish trim. Designer: Raymond Yama. Price, $7.95.

In colors that match this year's GE appliances — yellow, turquoise, pink and brown — porcelain enamel cast-iron cookware by Sun Glo can also be used for serving. Trivet base on all pieces protects enamel surface from direct heat of electric ranges. Sixteen pieces for $101.80.

Mass-produced nuclear reactor produced by Aerojet-General Nucleonics. Control panel is in foreground.

TECHNICS: 1957 Nuclear Congress



Display areas of Leeds & Northrup, General Electric, Sylvania Electric, and Corning at 1957 Nuclear Congress.

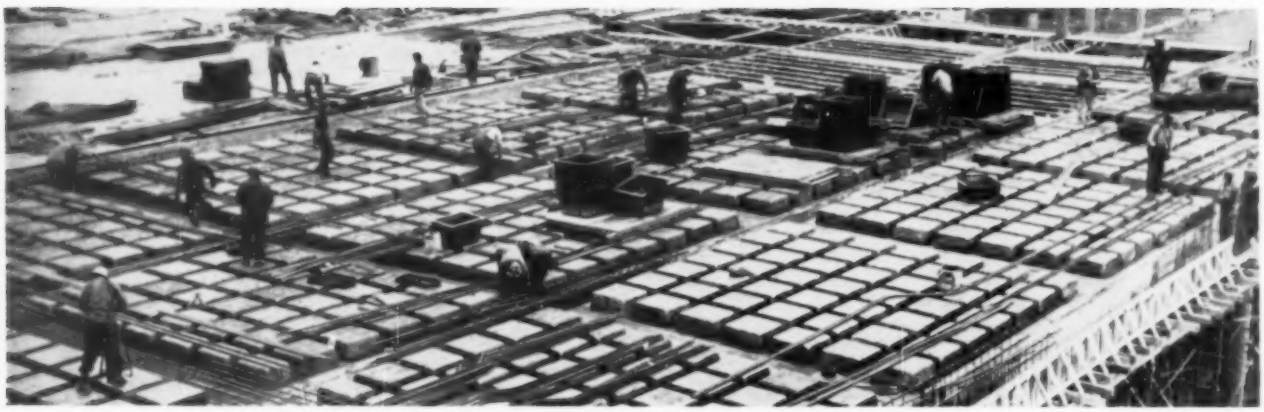
Nuclear energy, to most people, is an awesome mystery with silent and invisible dangers: many feel that the equipment that generates and controls atomic power is best installed as far from civilization as possible. Visitors to the 1957 Nuclear Congress, held at Philadelphia's Convention Hall, March 11-15, probably came away with a different impression. For the first time in this country, a "critical" reactor was operated publicly—strong evidence of the confidence the Atomic Energy Commission has in the safety that has been designed into recent reactors. The operating reactor, made by Aerojet-General Nucleonics, is a mass-produced model for use in medical centers, educational institutions and industry for the production of radioactive isotopes. It is 9½ feet high, weighs 20,000 pounds, and uses enriched U-235 uranium dispersed in solid polyethylene as its fuel. The fuel will have a life of about 300 years.

The Congress, devoted entirely to peacetime uses of nuclear energy, was sponsored by more than 20 engineering and technical societies. New concepts of how nuclear energy is being or will be applied to agriculture, industry and science were discussed and demonstrated. General Electric, for instance, devoted part of its exhibit area to the possible use of nuclear propulsion for aircraft. This development is far from a pipe dream because GE's Nuclear Propulsion Department has already powered a turbojet engine on the ground with a nuclear reactor.

Safety and the disposal of radioactive wastes comprised a large portion of the sessions, and many new instruments for the control of reactors and the handling of radioactive materials were on display. Atomics International, a Division of North American Aviation, Inc., emphasized the peaceful uses of the atom and its rapid international expansion. They showed models of an experimental sodium reactor designed as part of the AEC program to develop economic power from nuclear energy; a new type of reactor, for installation in a Latin-American country; and the first nuclear reactor for the Far East.

These few examples of the proceedings at the 1957 Nuclear Congress give, perhaps, some insight into the atmosphere at the exposition: It was one of confidence—with no undercurrents of fear—that our greatest potential commodity, nuclear energy, is well on its way to very full and useful service.

With a sensitivity that is human, Central Research Laboratories remote manipulators are designed to perform delicate operations with radioactive materials, keeping the operator out of the danger area.



Metal forms for concrete floors

New metal forms for building waffle-type concrete floors and roofs have been devised by Ceco Steel Products. The forms, called Steeldomes, are constructed to permit their quick removal from the hardened concrete; one man presses an air gun against a fitting set into the form, while another man stands by to grasp the form as it is blasted free. This method avoids chipping and scratching of the concrete surface. The Steeldome is designed especially for exposed ceiling construction; a rigid, one-piece unit, it makes possible construction of floor areas without the use of projecting beams. The standard units have a void of 30″ x 30″, an overall plan size of 36″ x 36″, and depths of 8″, 10″, 12″ and 14″. Application of the new Steeldomes is shown above in the construction of one floor of a new Bergen Mall Shopping Center, Paramus, N. J.
Manufacturer: Ceco Steel Products Corporation, 5601 West 26th St., Chicago 50, Ill.

Four operations with one machine

A machine that automatically winds, cuts, labels and packs pull-out stranded cotton skeins of up to 25 feet, at a rate of about one skein a second, has been marketed in England. In addition to cotton, the machine also handles wool yarns, silk and rayon in the same four-operation process: continuous winding of the yarn, cutting the yarn, joining consecutive skeins, positioning of tubular labels over the skeins, and packing the skeins in boxes. The machines are driven by 1 b.h.p. motor, controlled by an electrically operated clutch. The low voltage controlling circuit of this clutch is connected to start or stop push buttons and also to a number of yarn guide trips, which automatically stop the machine in case of breakage or stoppage of thread.
Manufacturer: Stowe and Partners, Ltd., Purley Way, Croydon, Surrey, England.

Guiding guided missiles

A number of guided missiles have recently gone astray, and the question of how to control the course of missiles or rockets to any pinpoint on earth has kept electronic scientists busy for some time. Engineers at Minneapolis-Honeywell have come up with a solution to the problem of guiding the guided missile. Using powerful lenses, advanced remote control circuits and the fixity of the North Star, they have developed their "sidereal equatorial mount"—a new system for guiding missiles and rockets to targets.
Manufacturer: Minneapolis - Honeywell, Aeronautical Division, 2600 Ridgeway Road, Minneapolis 13, Minn.

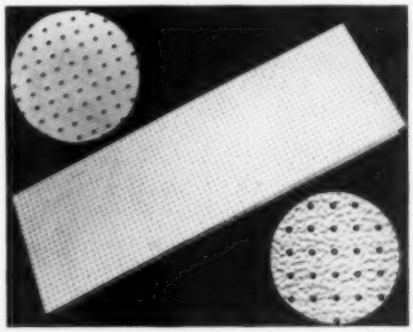
Extra large acrylic sheets

Large acrylic sheets, called Plexiglas RL, are now available in sizes up to 8½ x 10 feet in both colorless transparent and translucent colors for a variety of architectural applications. Manufacturer: Rohm & Haas Company, Washington Square, Philadelphia 5.

North Star helps guide missiles

Textured acoustical panels

Simplex Ceiling Corporation is offering a new line of textured aluminum acoustical panels, called Ceilect. The new acoustical ceiling panels are square edged to make joints. Made of embossed aluminum sheet, they are available in permanent aluminum finishes, in natural color, or anodized. Ceilect panels come in length up to 36″ by 12″ wide.
Manufacturer: Simplex Ceiling Corporation, 552 West 52 St., New York 19, N. Y.



New polystyrene compound

Bakelite has developed a new compound for molding thin-walled plastic articles with improved resistance to breakage. The new polystyrene molding compound, designated SMD-3700 Crystal 11, provides greater strength for thin-walled sections of containers. During extensive test shipments to and from Cuba of these thin-walled containers, their percentage of breakage was considerably less than that of containers molded of general-purpose polystyrenes. The new compound is less permeable to air, oxygen, nitrogen and moisture vapor than the polystyrene used before. Its resistance to permeation is a significant factor in increasing the shelf life of a packaged product.
Manufacturer: Bakelite Company, a Divi-

sion of Union Carbide and Carbon Corporation, 260 Madison Ave., New York 16, N. Y.

"Machine-gun" assembly method

In anticipation of their prediction that the semiconductor industry will expand even more than the estimated 500 per cent by 1960, Hughes Aircraft Company is developing new and faster methods of assembly—a "machine-gun" assembly method—for attaching semiconductors in electronic circuits. Inserting semiconductors—some of them are no bigger than a grain of rice—slowed down assembly of mass-produced circuitry using the vacuum tube replacements. Each germanium diode, transistor or rectifier had to be handled separately. The new method uses long, flexible belts of precisely-spaced semiconductors that feed into stapling machines on the assembly line. The machines tack the tiny components in place. Hughes Aircraft supplies belted semiconductors at no increase in price. The stapling machine that tacks the components in place is manufactured by United Shoe Machinery Corporation of Boston. Patent is pending on the machine that fabricates the belts used in assembly which was invented by Hughes engineers.
Manufacturer: Hughes Aircraft Company, Culver City, California.

Die-cast cargo buckles

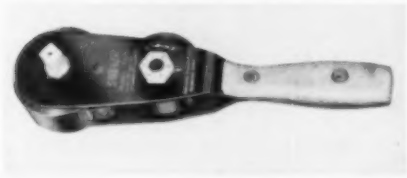
A subsidiary of General Logistics, the Aeroquip Corporation, is using zinc die castings in a new application—as buckles in the company's line of load control and tie-down equipment. The zinc die cast products are the 1-inch and ⅝-inch Weblock and the new Ropelock buckles. The Weblock buckles are used with strap assemblies for all kinds of tie-down purposes in aviation, industrial and marine fields. The buckle's cinching and locking mechanism requires no threading; it tension locks automatically at whatever maximum pull is exerted on the strap. The Ropelock performs the same tie-down function with rope that the Weblock buckle does with straps. With both types, the load can be instantly released by pressing down on the cam. The Weblock is used with nylon webbing at tensile strengths up to 725 lbs.; the Ropelock with ⅜ nylon or manila rope, at tensile strengths up to 1000 lbs.
Manufacturer: Aeroquip Corporation, Pasadena, California.

Air traffic system

Federal Telecommunication Laboratories have concluded six years of research in air traffic control systems with their announcement of the TACAN Automatic Reporting and Data Link System. The Tacan Data Link, as the electronic system is called, is equipped to handle complex air traffic situations by a pilot-ground control exchange of full data on identification, speed, course, altitude, and position for 120 aircraft in only six seconds. The instrument panel on Tacan Data Link equipped aircraft contains a number of dual-purpose instruments which simultaneously advise pilots of existing conditions and dispatch orders from the ground station. Pilot and ground controller exchange messages through a push-button arrangement. Should the ground controller want the pilot to let "wheels down" he pushes the appropriate button and the order appears in word form on the pilot's instrument. A novel feature of the Tacan is the way it deals with foreign languages. The language in which a message is received need not be same in which it is given. This eliminates a hazard for pilots flying international routes; "hold," "proceed," or any one of the 31 available messages can be given in Japanese, for example, but will appear in English in the plane, or in whatever language the pilot may speak.
Manufacturer: Federal Telecommunications Laboratories, a division of International Telephone & Telegraph Corporation, 67 Broad Street, New York 4, N. Y.

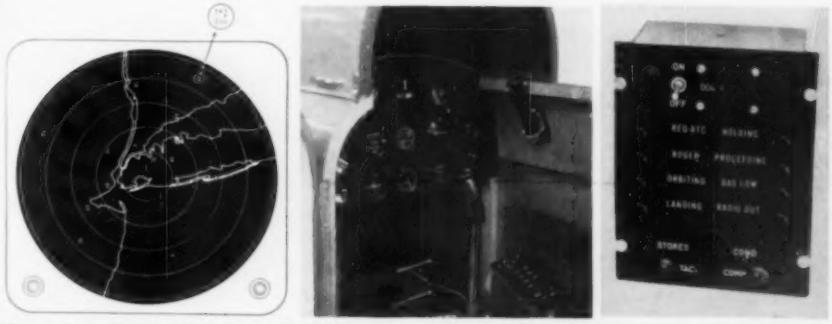
Torque magnifying wrench

A new manually operated impact wrench, called Swench, has been put on the market by the Swenson Engineering Company. The new wrench has the ability to deliver torque values up to 20 times that applied to the handle by the operator, which means a single operator can manually tighten bolts up to 1¾" in diameter. Any desired bolt tension can be produced by the operator through control of the impact force and



the number of impacts applied to the fastening. Control of the force is achieved by the indicator setting on the head of the spring arbor.

The Swench is available in three models ranging from ½" to 1" socket fit, and ¾" to 1¾" bolt size capacity. The first two, Models 500 and 750, weigh 4½ lbs. and 10½ lbs., and sell for $95.00 and $135.00 respectively. Further information on the third type, Model 1000, is available from the company on request.
Manufacturer: Swenson Engineering Company, P.O. Box 43, Branford, Connecticut.



Ground-station component and pilot's parts of Tacan Data Link

Metal-plastic panels

"Security Junior Panels," a new line of glass fiber-reinforced plastic panels, feature aluminum or steel diamond pattern mesh embedded in a translucent sheet. The mesh gives high impact resistance, making them particularly useful as factory protection against flying particles and liquid spray. They may also be used for protective skylights, windows, and other fenestration. In aluminum, the panels consist of .081 gauge embedded in flat Resolite sheets using 1½-ounce Fiberglas mat. In steel, the panels are 16-18 gauge expanded steel embedded in similar sheets of flat Resolite. Available in standard or fire-resistant Resolite, in five colors or plain, their light

transmission values ranging from 71% to 15%.
Manufacturer: Resolite Corp., Zelienople, Pennsylvania

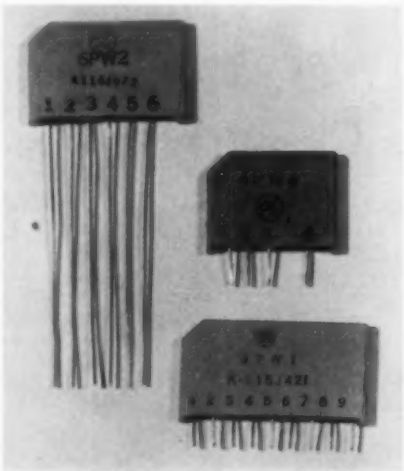
No installation for lift platform

Autoquip Corporation has developed an industrial lift platform that needs no concrete breaking, excavating, or underground piping usual for the installation of conventional lift platforms. The new product, called Porta-Contact Lift, is powered by a specially designed pumping unit that operates without air: (the pumping unit consists of a 1 HP, electric-hydraulic, 220-440 v, 60 c, 3 phase motor). The lift platform is equipped with a 6' x 9' platform and supports 5,000 lbs. of load at 2,500 lbs. per axle. Other platform sizes and lifting capacities are available for loads up to 100,000 lbs. Raised height of the basic unit is 64½"; in its lowest position the distance from the floor to the platform is 4½".

The new type of lift platform is well adapted to loading and materials handling applications for warehouses, plants, depots, and for truck, rail and aircraft loading.
Manufacturer: Autoquip Corporation, Chicago 12, Ill.

Resistor-capacitor networks

A line of resistor-capacitor networks designed for high resistance to heat-humidity cycling, and applicable in radios and TV receivers, has been introduced by General Electric. The networks eliminate much of the effort that goes into circuit assembly, enable automatic placement of circuit sections, and are available in three case sizes all 5/32" thick and 59/64" high, but in varying case lengths—1-5/32", 1-13/32", and 1-21/32". Resistor values of the networks range from 1000 ohms to 10 megohms, and capacitor values from 100 to 10,000 micro-microfarads. The plate of each network is encapsulated in an epoxy resin inside a molded, non-porous phenolic case, which gives the networks an operating temperature range from 10 to 85°C.



Resistor and capacitor patterns and lead arrangements are provided to user specification.
Manufacturer: General Electric, Electronic Components Department, Auburn, N. Y.

Radiation detector

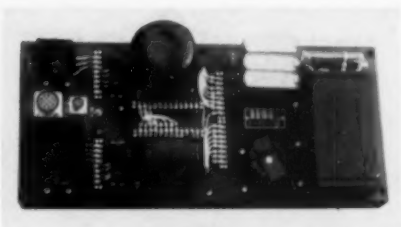
An instrument that scans the hands and shoes of workers, seeks out tiny bits of radioactive contamination accidentally brought out of adjacent radiation work areas, and detects any amount of alpha,

beta and gamma radiation, has been developed by GE engineers for GE's Hanford, Wash., atomic plant. The new electronic computing device measures and records nuclear radiation and answers twelve important questions on radioactive contamination in fifteen seconds. The questions the new instrument answers regard types of radiation from specific areas of hands and shoes. If any radioactive material is discovered, the machine flashes a red warning light marked "alpha, left palm" or "beta-gamma, left sole," depending on the type of radiation and area of contamination. Green lights flashing on at the end of the counting period indicate no radioactivity has been discerned.

The new machine performs the survey in half the time of the old instruments and will cost less to manufacture than two of the old machines.
Manufacturer: General Electric Company, Hanford, Wash.

High gain magnetic amplifiers

Power amplifiers for electronic circuits—magnetic amplifiers—are now being built without tubes or any moving parts. Tubes are replaced by two stable components



(saturable reactor and rectifier) in the new magnetic amplifiers whose ratings range from microwatts to hundreds of watts. The

new line offers amplifiers with instant warm-up, long life, and a power gain up to a million per stage. Applications of the redesigned amplifiers lie in voltage and frequency regulation for ac or dc motors, in areas where dc power supplies are used for computers, planes and missiles, and general production tests, for servo controls, power amplifiers, lighting controls, safety devices and voltage regulators. The tubeless amplifiers are shock and vibration resistant.

Manufacturer: Electric Machinery and Equipment Division of American Electronics, Inc., 655 W. Washington Blvd., Los Angeles 15, Calif.

Stainproof rubber for wheels

A non-marking, non-staining rubber compound has been developed for the molded wheels of vacuum cleaners and other appliances. They can be dragged across the floor without discoloring carpet or floor.
Manufacturer: Rubber Prods. Div., Parker Appliance Co., Cleveland 12, Ohio

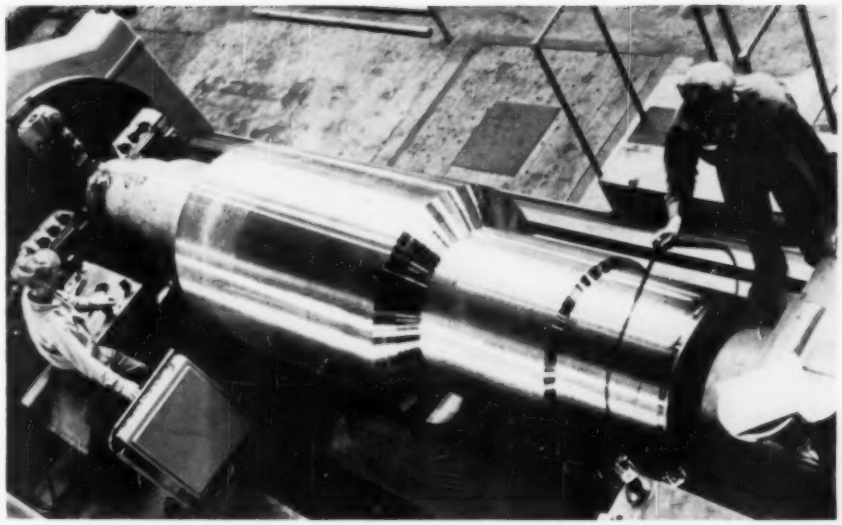
Fireproof roofing material

Corrugated Cellactite, an asbestos-bitumen-fireproof material, is suitable for any climate from tropics to arctic for fireproof roofing. It is supplied in a range of colors, in standard building sizes, and its makers claim it is suitable to any type and size of structure from henhouse to aircraft hangar.

Manufacturer: Cellactite and British Uralite Co., Ltd., Gravesend, Kent, England

Adhesive for foam rubber

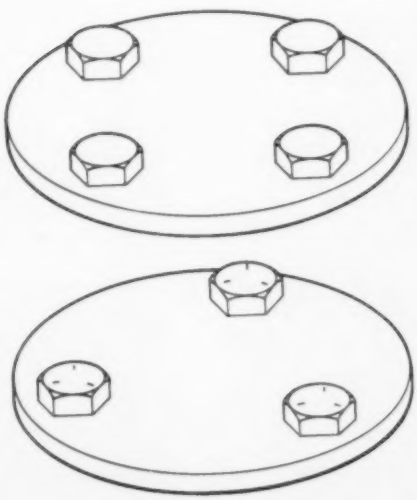
A new adhesive, No. 452 Tuftbond, permits the manufacture of tufted and channeled backs for sofas and chairs without the use of stitching. The new product cements the fabric directly to the foam rubber.
Manufacturer: Anchor Adhesive Corp. 36-23 164th St., Flushing, New York



Giant German-made lathe cuts down labor at Ohio Steel Foundry Co.

High tensile bolts

Three new bolts with increased tensile strength, positioned 120 degrees apart around a common center, can provide as stable a joint as the conventional pattern of four bolts arranged symmetrically. The manufacturer of the new bolts has made up for the holding capacity lost in using fewer bolts by using stronger ones. For example, to carry an 80,000 lb. load safely, four ¾-inch standard bolts—bright cap screws—or three ¾-inch high tensile bolts can be used. The new high tensile bolts are identified by the radial dashes on the bolt head, have a high carbon content, are heat treated to increase strength, and are rated at 120,000 psi tensile strength. Bright cap screws are identified by a bright finish, and are rated at 68,000 psi. The three-bolt system results in a reduced assembly as well as fastener cost; although the cost per bolt is higher for high tensile bolts than for bright cap screws, three of the new bolts amount to less in total cost than four of the conventional ones.
Manufacturer: Russell, Burdsall & Ward Bolt and Nut Co., Port Chester, N. Y.



Giant lathe a double saving

Fifty-two hours of labor and a reduced cost in obtaining steel scrap were the results of the installation of a new German-made lathe at the Ohio Steel Foundry Company, Lima, Ohio. In using Carboloy grade 370 carbide tools, machining time was reduced from 70 to 18 hours when a 60-ton steel roll was shaped on the new lathe; the tools removed 12 tons of steel, and produced 100 per cent furnace chargeable chips—a saving since the company need no longer purchase steel scrap but can produce their own. Old hand-lathes used by the company previously produced chips that were too thin to remelt properly.
User: Ohio Steel Foundry Co., Lima, Ohio

Transistors for car radio

A transistor that replaces two tubes, vibrator, and power transformer, is in production at Bendix Aviation Corp. Installed in an automobile radio, the transistor results in lower battery drain and elimination of the vibrator hum. Heart of the transistor is a slice of germanium a few thousandths of an inch thick and a quarter inch in diameter. The germanium is coated on each side by an equally thin amount of indium. Bendix expects to develop other types of power transistors with industrial applications in servo-mechanisms, power supply circuits and electronic controls and switching equipment.
Manufacturer: Bendix Aviation Corporation, Long Branch, New Jersey

Product and Manufacturer

Threaded inserts by Nylok are now available in a wider range of sizes. They feature a self-locking principle which uses a nylon pellet that projects beyond the external threads of the insert and is compressed into the internal threads when engaged. Nylok Corp., Paramus, N. J.

Contact screw with a precious metal core of silver or silver alloy reduces pitting and wear. The core is silver-braze bonded to a high strength alloy shell which is threaded. As no oxides can develop between the precious metal and the outer shell, positive and permanent electrical conductivity between the core and the outer shell is assured. George Ulanet Co., 413 Market St., Newark, N. J.

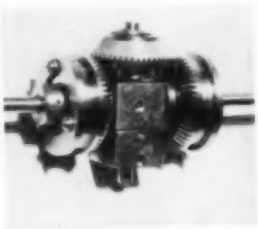
Hex nut that is self-aligning and self-locking provides for misalignment of up to 8 degrees in any direction between bolt holes and mounting surfaces. Kaylock H19000 reduces weight and construction costs by eliminating the need for spotfacing or tapered shims in many applications, such as tapered spar caps, tapered skins, forgings and castings with draft angles. Available in two sizes: 10-32 and ¼-28. Kaylock Division, Kaynar Co., Los Angeles, California

Adjustable hole gage permits rapid and highly accurate measurement of small hole diameters. It is accurate and readable to 0.0005", and the direct reading scale is marked in increments of 0.001". Hamilton Watch Co., Lancaster, Pa.

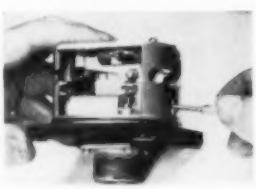
Clamp lining made of an asbestos wire-reinforced strip impregnated with du Pont Teflon combines the characteristics of both materials to give high temperature resistance and good electrical properties. The clamps are designed for the aircraft industry. Joclin Manufacturing Co., North Haven, Conn.

Product and Manufacturer

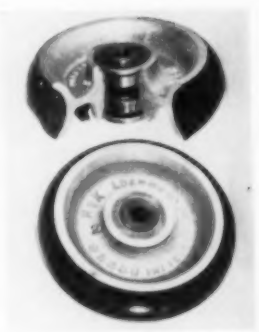
Dual purpose socket, known as "Ten Point," will fit square and hex nuts interchangeably. The socket is particularly useful for farm and factory equipment where both square and hex nuts are used on the same machine. By eliminating special sockets for square nuts, the new tool saves space and reduces the weight of a set of tools. It is currently being produced in one size (½"), but a wider range is anticipated. Wright Tool & Forge Co., Barberton, Ohio.



Oil-less bearing differentials with ⅛, 3/16, and ¼ inch shafts are being produced by Pic Design Corp. All parts are stainless steel except the spider gear, which is aluminum. Lost motion between any two end gears is not more than 30 min. of arc. Pic Design Corp., 477 Atlantic Ave., East Rockaway, L. I., N. Y.



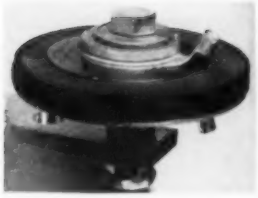
Accelerometer with a caging mechanism that prevents potentiometer wear when not in use. The instrument has no pivots, bearings or loose springs in its pressure-sealed case. Humphrey Inc., 2805 Canon St., San Diego 6, Cal.



Aluminum wheel with a du Pont Neoprene tire designed for industrial use where high load capacity and rollability are important. The Neoprene tire resists deterioration from animal fats, oils, greases, acids, etc., as well as abrasion, cutting and chipping. The wheel is recommended for power-pulled systems in continuous operation where friction heat is a problem. R & K Industrial Products Co., 1945 N. 17th St., Richmond, Cal.

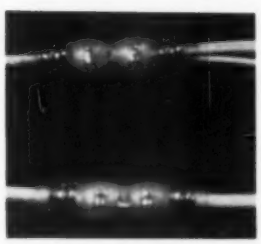
Plug holder designed to cut down time required to make connections to electrical and electronic plugs is adjustable and can hold any size Cannon or Amphenol connector or plug. Macdonald & Co., 1324 Ethel St., Glendale 7, Cal.

Product and Manufacturer



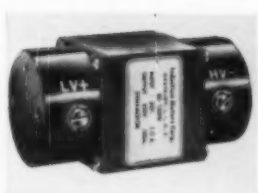
Discharge varistor, developed for direct installation in electrical circuits, is suitable for applications where space is at a premium. It protects motors, generators, etc. from high inductive surges. Metallurgical Products Dept., General Electric Co., Detroit 32, Mich.

Gasketing materials made of asbestos fiber have unusual flexibility. "Accopac" can withstand sharp bending without piping or cracking, is easily die cut, and since there are no loose fibers to become detached, will not contaminate fluids or clog orifices. Armstrong Cork Co., Lancaster, Pa.



Insulated splice called "Sealink" is water sealed and will accommodate either two- or multi-wire splices. Color-coded for circuit identification, they are composed of a highly conductive, electro-tinned copper link, a nylon insulation sleeve, and anodized aluminum sealing rings. Burndy Corp., Norwalk, Conn.

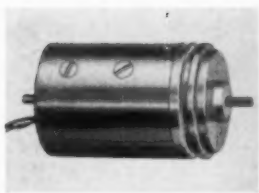
Gasketing material composed of cork granules and wood fibers bound together is soft and compressive, making it suitable for delicate seals. The softness of the material makes it effective for sealing rough surfaces and sharp edges.
F. D. Farnum Co., Chicago, Ill.



Dynamotor for use in guided missiles and telemetering installations features a power output of 10 w continuous, ranging up to 25 w. The unit can withstand more than 3 g's, along three axes. Industrion Motors Corp., 570 Main St., Westbury, L. I., N. Y.

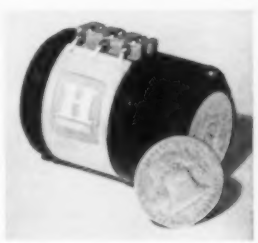
Graphite brushes for use in a-c and d-c heavy duty traction, locomotive, mill, mine, crane, elevator and electric shovel motors have high commutation factor for severe conditions.
Ohio Carbon Co., 12508 Berea Rd., Cleveland 11, Ohio.

Product and Manufacturer



Bi-directional digital motor that is completely balanced has an output shaft that is positively locked into position after each actuation. Angular accuracy is within plus or minus ½ degree. Nemeth, Inc., 2223 So. Carmelina Ave., Los Angeles 64, Cal.

Miniature voltmeter for d-c vacuum tubes can be mounted in operating or test equipment without exceeding the area required by a standard panel meter. Model F has an accuracy of 2%, a range of from 0.5 volt zero center to 300 volts full scale, zero adjustment while connected to the circuit. Trio Labs, Inc., Seaford, N. Y.



"Floated" gyro that weighs eight ounces is designed for the stabilization of instrument platforms in "short-time" or "aided" automatic guidance systems of some missiles. The new gyro joins a family of half-dozen hermetic integrating gyroscopes. Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.

Sub-miniature potentiometer for applications requiring minimum starting and running torque has precision jewel bearings that provide low torque.
Ace Electronics Associates, Inc., 103 Dover St., Somerville 44, Mass.

Photosensitized sheets that can be produced on the user's premises to make etched-circuit panels. The sheets are copper-clad and available in rectangular sizes up to 18" by 21".
Keil Engineering Products, Dept. EL. 4356 Duncan Ave., St. Louis 10, Mo.

Miniature battery which has a projected shelf life of over 20 years consists of a cylindrical Pyrex case enclosing 127 stacked cell units. The battery is 31/32 inch long, .335 inch in diameter, and weighs .15 ounce. It maintains a charge on a capacitor.
General Electric Co., Auburn, N. Y.

Manufacturers' Literature

Air Compressors. Kellogg Division, American Brake Shoe Company, 230 Park Avenue, New York 17, New York. 20 pp., ill. Catalog covering line of one-third to 20 hp air compressors for automotive and industrial use. It gives specifications on single and two-stage models, portable models, tanks, pumps, and accessories.

Air Control Valves. Ross Operating Valve Company, 120 East Golden Gate Avenue, Detroit 3, Michigan. 71 pp. Data file on Starline series of air control valves, including dimensional data, list of parts, floor diagrams, and price list.

Aluminum Military Specifications. Harvey Aluminum, 19200 S. Western Avenue, Torrance, California. Military specifications for alloy 6066, covering aluminum alloy bars, rods, and shapes produced by extruding.

Building Cost Manual. John Wiley & Sons, Inc., 440 Fourth Avenue, New York 16, New York. 367 pp., $15.00. Details construction costs of 150 different building types and gives a guide to those engaged in appraising, planning, estimating, financing, construction, and insurance underwriting. Prepared under the direction of The Joint Committee on Building Costs of the Chicago Chapter of The American Institute of Architects and The Appraisers Division of The Chicago Real Estate Board.

Casting Metals Specifications. Dodge Steel Company, 6501 Tacony Street, Philadelphia 35, Pa. 20 pp., ill. New specification folder giving physical, chemical and general properties for 12 Dodge metals for castings. Includes tips on how to buy castings and a glossary of foundry terms for the buyer and user of castings.

Chemicals for Polyurethane Foam. Chase Chemical Corp., 3527 Smallman St., Pittsburgh 1, Pa. 6 pp., ill. Composition, characteristics and applications of a new chemical—Nafil Resin—used in the manufacture of polyurethane foam are discussed in this recently released folder, which takes up in detail the properties of the new resin and those areas best served by Nafil Foam.

Cold Flowing Metals. Claude C. Slate Company, Glendale 1, California. 4 pp., ill. A bulletin describing typical parts which can be produced by "Flotrusion" process for cold flowing various metals into tubular forms of a variety of sizes and shapes.

Electrical Contacts. Gibson Electric Company, Frankstown Avenue, Pittsburgh 21, Pa. 4 pp., ill. Catalog listing materials, properties, forms and uses of Gibson's line of electrical contacts.

Epoxy Resin Laminations. Smooth-On Manufacturing Company, 572 Communipaw Avenue, Jersey City 4, New Jersey. 4 pp. Technical bulletin explaining the system for making glass laminated epoxy-resin impressions for use in metal working, model and pattern producing.

Flareless Tube Fittings. The Parker Appliance Company, 17325 Euclid Ave., Cleveland 12. 28 pp., ill. The new company catalog, No. 4320, covers the firm's list of Ferulok Tube Fittings, and includes a section on fittings for mounting in new S.A.E. straight thread boss utilizing o-ring for sealing.

Floodlighting Catalog. Stonco Electric Products Company, 333 Monroe Avenue, Kenilworth, New Jersey. 48 pp., ill. Describes Stonco's line of cast aluminum floodlighting equipment, including portable spike lights, wall lights, and clamp lights.

Gears. New Process Gear Corporation, 500 Plum Street, Syracuse, New York. 24 pp., ill. Describes engineering and design facilities of New Process Gear Corp., to solve production problems for the automotive, aviation, appliance and other industries.

Glass-Protected Steel. A. O. Smith Corporation, Milwaukee 1, Wisconsin. 4 pp., ill. Brochure describing glass-protected steel, with details on its chemical and physical properties and how it can be used.

Industrial Television. Philco Corporation, Government and Industrial Division, 4700 Wissahickon Avenue, Philadelphia, Pa. 8 pp., ill. Brochure covering Philco's newly designed line of industrial television equipment. It contains information and illustrations of cameras, monitors, controls, lenses, and other accessories required to create any kind of camera chain.

Insulating Materials. Perlite Institute, 45 W. 45th St., New York 36. 80 pp. A new manual, published in loose-leaf form, to aid architects and engineers with design specifications when using perlite insulating concrete and/or perlite-gypsum plaster in the construction of roof and floor systems, curtain wall back-up, and other building sections.

Laminate for Printed Circuits. Formica Corporation, 4411 Spring Grove Avenue, Cincinnati 32, Ohio. 4 pp., ill. Brochure describing characteristics of Cirprint, new copper-clad laminate developed for printed circuits used in radio and television industries.

Materials Handling. Nutting Truck and Caster Company, 1201 West Division Street, Faribault, Minnesota. 28 pp., ill. Specifications on trailers, drag-line trucks, dollies, jacks and skids.

Manufacturers' Literature, continued

Microfilm Applications. Dexter Folder Company, Filmsort Division, Pearl River, New York, 36 pp., ill. "New Horizons With Microfilm," a booklet concerned with the conception and growth of the Filmsort system for activating microfilm by mounting it in aperture cards or jackets. It gives details of new equipment, supplies and techniques for handling engineering drawings, personnel and other office records, traffic control material, etc.

Office and Factory Equipment. General Industrial Company, 5736 Elston Avenue, Chicago 30, Illinois, 24 pp., ill. Handbook containing specifications and descriptive data on line of office and factory equipment, including shelf trucks, lockers, small parts cabinets, hand dryers, fireproof blueprint cabinets, glass door display cases.

Overhead Doors. Barber-Colman Company, Dept. 5A, Rockford, Illinois. 16 pp., ill. Catalog presenting Barcol OVERdoors, a line of residential, commercial, and industrial overhead doors. Specifications and instruction are given for preparing building openings for various models.

Panel Wiring Techniques. Stahlin Brothers, Inc., 8 pp., ill. Bulletin S-301 outlines methods for simplifying wiring operations from the drafting room to the assembly floor by the use of raceways and pre-cut wires.

Plastic Laminates. Taylor Fibre Company, Norristown, Pa. 4 pp., ill. Literature on copper-clad laminated plastics used for printed circuits.

Plastic Molding Facilities. Penn-Plastics Corporation, Glenside, Pa. This illustrated brochure includes a list of the firm's facilities for compression, injection and transfer molding, and pictures products custom-molded by the company.

Plastic Sealers. General Gasket, Inc., Industrial Road, Clifton, New Jersey. Booklet and color-coded "size selector" describing washers, gaskets, shims, seals, and spacers, produced in 12 gauges ranging from .001 to .030, each identified by color.

Punch Presses. Wiedmann Machine Company, Dept. 477, 4272 Wissahickon Avenue, P. O. Box 6794, Philadelphia 32, Pa. 6 pp., ill. Bulletin No. 500 DM includes specifications and detailed information on features and operating principles of 40 to 150 ton capacity heavy-duty turret punch presses which are equipped with a direct measuring gauge and table to locate and pierce holes in large metal sheets and plates in one handling.

Purchasing Used Machine Tools. S&S Machinery Company, 140 - 53rd St., Brooklyn 32, N. Y. Written in question and answer form, the booklet "How To Buy A Used Machine Tool" covers many aspects of used machinery purchase.

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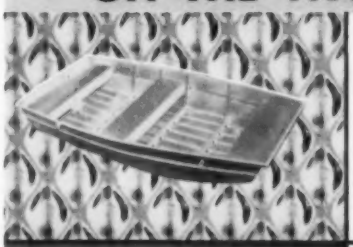

The low weight-high strength ratio of aluminum RIGID-tex Metal (Pattern 6-WL) makes possible a weight of only 45 pounds for this 8 ft. pram.

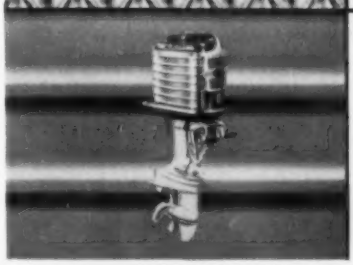

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Photo by Fabian Bachrach

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

For Your Calendar

March 27-April 24. The Art Institute of Chicago, in cooperation with the Midwest Designer-Craftsmen Society, will hold an exhibition in six galleries of their East Wing.

April 14-27. United States World Trade Fair. Exhibitors from 41 countries will display products and services. Coliseum, New York.

April 15-17. The Building Research Institute's Annual Meeting, The Drake Hotel, Chicago, Illinois.

April 22-May 4. An international exhibition, "The Work of Architectural Students," sponsored by the NIAE, with 30 students from 15 nations represented, will be held at the Carnegie Endowment for International Peace, New York City.

April 27. The Design Management Forum co-sponsored by INDUSTRIAL DESIGN and The Philadelphia Museum School of Art, Broad and Pine Streets, Philadelphia 2, Pennsylvania. By invitation only.

April 29-May 3. National Materials Handling Exposition, Convention Hall, Philadelphia, Pennsylvania.

May 6-10. The American Foundrymen's Society will hold a national conference in Cincinnati, Ohio.

May 7-10. The second in a series of three conferences on "Creativity As A Process" will be held at Arden House, Harriman, New York. The sponsor is The Institute of Contemporary Art of Boston.

May 15-June 15. Design and Printing for Commerce Show sponsored by the AIGA, Freedom House, New York City.

May 20-23. The Design Engineering Show will be held at the New York Coliseum.

May 22. The first research and testing conference for the packaging industry will be held at the Hotel Plaza, New York City. Lippincott and Margulies are the sponsor.

June 1-30. The Chicagoland Commerce and Industry Exhibition will be held at the International Amphitheatre, Chicago, Illinois.

June 11-13. The Western Plant Maintenance and Engineering Show will be held at The Civic Auditorium, San Francisco, California.

June 12-14. The First Annual Conference of American Craftsmen will be held under the auspices of The American Craftsmen's Council, Asilomar, Monterey Peninsula, California.

June 14. The S.P.E. will sponsor a regional technical conference, "Plastics for Electronics," at the Lowell Institute of Technology, Lowell, Mass. Contact: R. Mondano, Raytheon Mfg. Co., Waltham, Mass.

June 23-29. The International Design Conference in Aspen. Subject: "Design And Human Values." (Address inquiries to: Mr. George Culler, Chairman, International Design Conference, Art Institute, Chicago, Illinois.)

June 24-26. The Semi-Annual Meeting of the American Society of Heating and Air Conditioning Engineers will be held at the Manoir Richelieu, Quebec, Canada.

July 8-August 16. Processes for design problem-solving. Six-week summer program, Institute of Contemporary Art, Boston, Massachusetts.

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