INDUSTRIAL DESIGN

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Appliance and housewares review

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IN SIX ISSUES...

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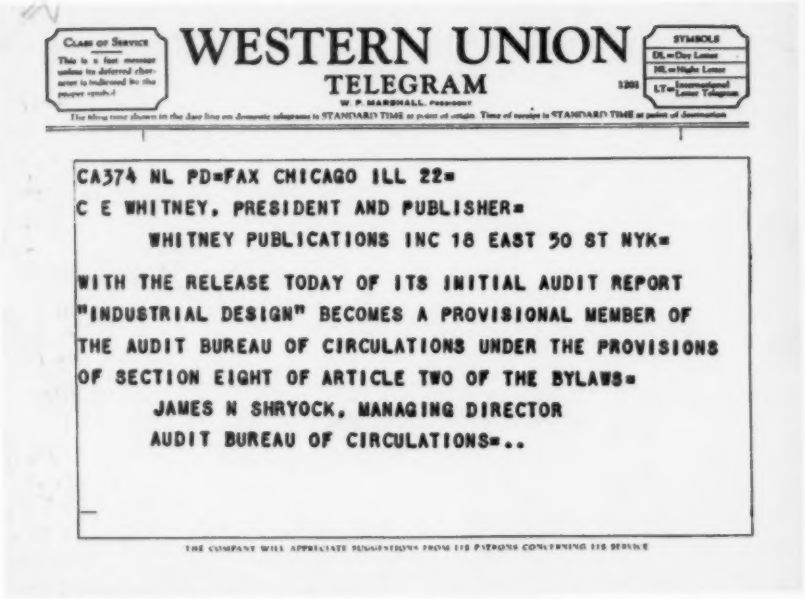

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JAMES N SHRYOCK, MANAGING DIRECTOR
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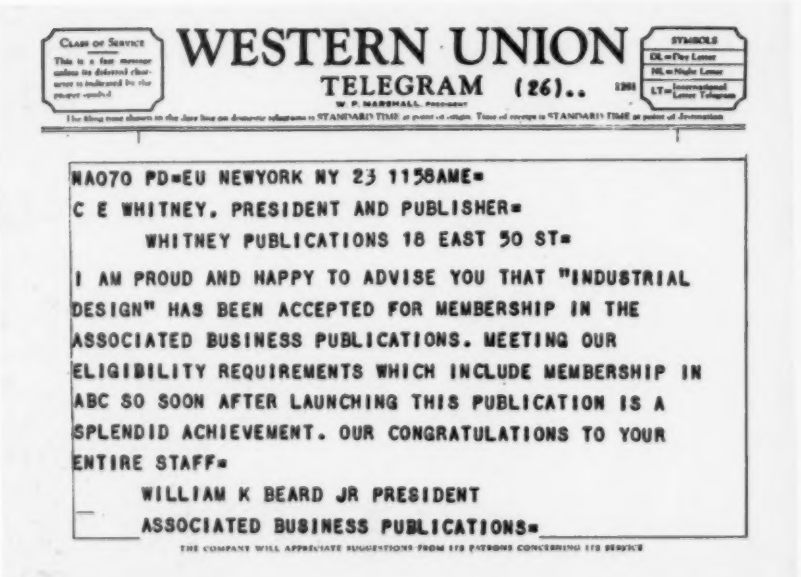

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WILLIAM K BEARD JR PRESIDENT
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INDUSTRIAL DESIGN

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

VOLUME 2 : NUMBER 2

INDUSTRIAL DESIGN

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

CONTENTS FOR APRIL, 1955

On the cover: *Geometric patterns of light filter through the structure of New York's Third Avenue El, photographed directly overhead by Harry Zelenko. Story on pages 24-31.*

Frontispiece: *In the finishing room of Aluminum Extrusions' Charlotte, Michigan plant, extruded lengths are stored on racks before being dipped in an anodizing bath. AE's facilities which range from product design to die-making, fabricating and finishing, also include anodizing equipment for extra-long lengths. Photo: Hedrich-Blessing.*

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in this issue...

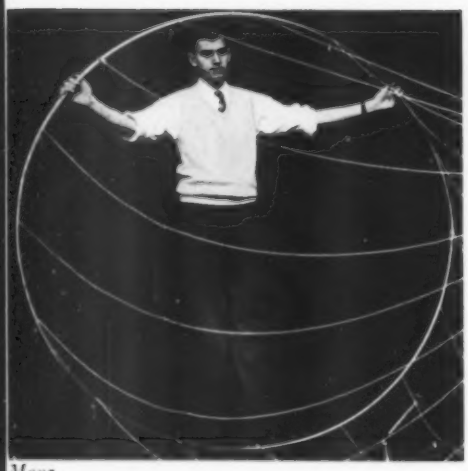
McDermott, Smith, Scherr

Loewy

Stevens

Lindsay

Pile



Merz

F. Eugene Smith and **Samuel S. Scherr** were consultant designers with Goodyear Aircraft on development of the Geda analogue computer (pp. 44-45) and designers of Rubermaid's dustpan of tomorrow (page 36). Before joining forces in 1947, in Akron, Ohio, Smith worked for George W. Walker and Scherr for GM as product and automotive designers respectively, but the idea of a partnership had started back when they were classmates at Cleveland Institute of Art. With the recent addition of another alumnus, **Bernard McDermott**, the firm of Smith and Scherr now becomes Smith, Scherr and McDermott. Their client roster includes Sunray Stove, Get Up Corp., and Cockshutt Farm Equipment. S. & S. are both members of the S.I.D.

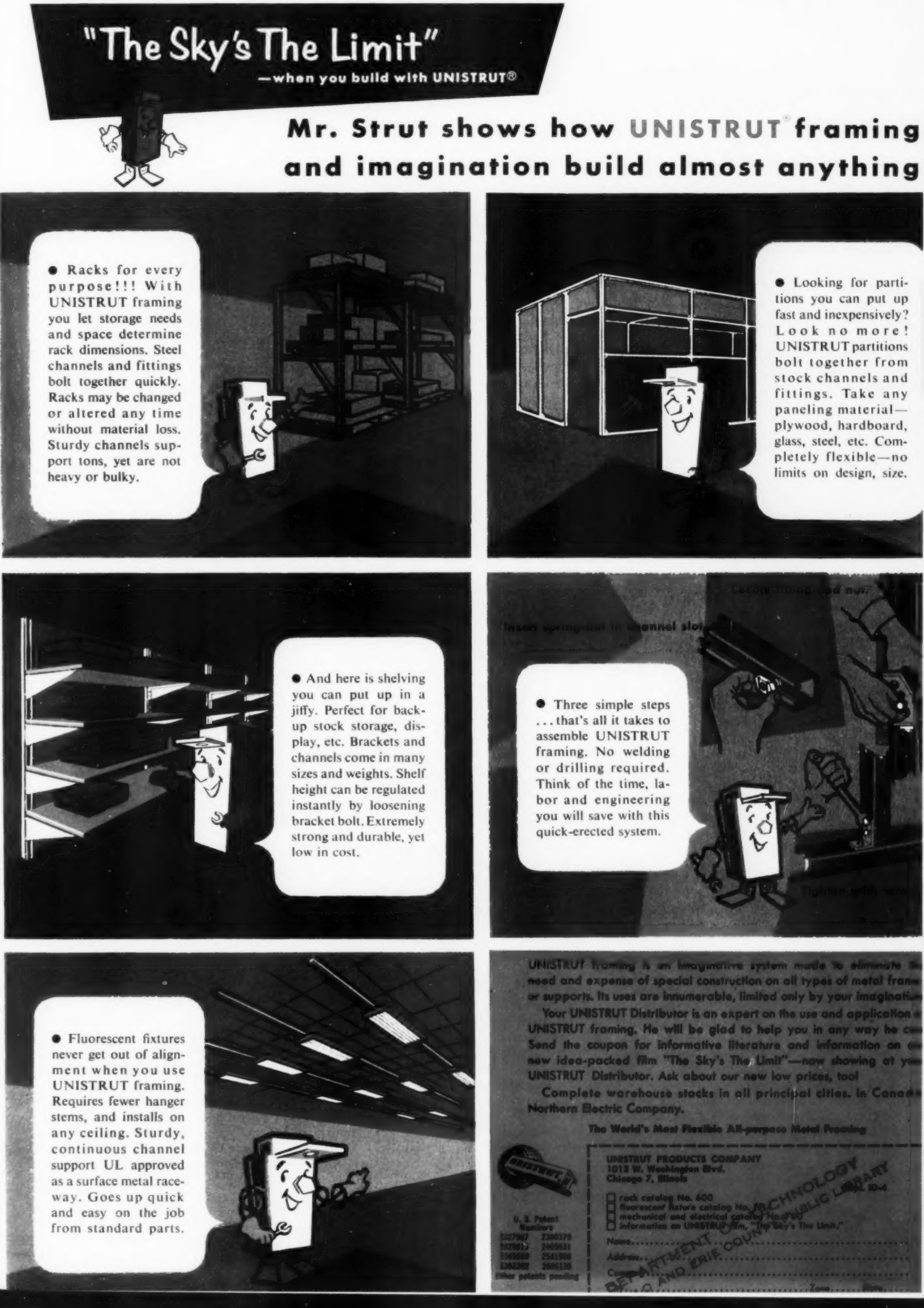
Robley D. Stevens, LL.B. LL.D., who contributes the advice on overtime (pp. 68-69), is a management consultant specializing in public-, labor-, and personnel relations in Washington, D. C. Formerly a law enforcement agent with the U. S. Department of Labor (whence these observations), he studied law at the University of Maryland and Blackstone School of Law, and is the co-author, with Dr. E. W. Mounce, of such publications as *Know Your Business Law*, *Legal Check Points for Home Buyers*, and *Collective Bargaining*.

Jeffrey Lindsay, Canadian-born designer of the plastic dairy barn on page 50, met R. Buckminster Fuller at Chicago's Institute of Design, then carried Fuller's ideas back to Montreal as head of the Canadian branch of Fuller Geodesics. Lindsay is now in California, where he plans to go into business full time constructing Geodesic shelters and, incidentally, become an American citizen.

Raymond Loewy, whose intrepid predictions on the future of car design appear on page 82, scarcely needs introduction to the world of design. French-born designer Loewy has redesigned practically everything except the egg since launching his own design organization in 1927. Raymond Loewy Associates now has a staff of 200 with offices in New York, London, Chicago, Los Angeles, South Bend and São Paulo. Car-critic Loewy's own forays into the field include the post-war Studebaker and the rakish hot-rod with which he is pictured here, which illustrated his "schmaltz and spinach" remarks on car design in 1953.

John Pile, whose nostalgic paean to the third Avenue El appears on pp. 24-33, is already known to Readers of ID as its former technical editor with a penchant for locomotives. A Philadelphian by birth and an architect by training, he divides his time between practicing design as one of George Nelson's associates (since 1952) and teaching it at Pratt, with a little photography in between.

Joseph G. Merz, here enmeshed in his own invention (pp. 32-33), is an architect in the New York office of Giurgola, Corbelletti, Merz, design associates. A graduate of Pratt, he worked in the offices of Raymond and Rado and Wiener and Sert before setting up on his own. Raniero Corbelletti, who appears on p. 33, studied architecture at the Polytechnic of Torino, Italy, then at Pratt and Columbia where he now teaches. Giurgola is architect, Aldo Giurgola, formerly of Rome and now of Philadelphia and where he teaches at the University of Pennsylvania and whence he commutes to New York as art director of *Interiors*.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LETTERS

Perspective

Sirs:
Your articles on Perspective by Jay Doblin have created a great deal of interest within my group of engineers and designers. The subject is being presented in a most enlightening manner, and I wish to be advised as to whether or not there will be reprints.
Carl Anderson
Manager, Product Design Section
Raytheon Manufacturing Co.
Newton, Mass.
We are considering the possibility of reprinting the series in book form, and would be happy to hear from other readers who would find such a volume useful—Ed.

Who's laughing now?

Sirs:
I would be interested to know what reaction you have had from the car crit in the February issue of Industrial Design. Your slant on the motivation behind automotive design is very strange to me, as a product designer, and I can't remember ever having heard any designer, automotive or otherwise, talk about design in such seemingly oblique terms. Since good designers don't talk about their work in the same terms as the critic, this difference may be entirely natural; but I suspect that you have rationalized the designs very much as a designer does when he finds impressive explanations for something which went out of the office over his dead body and then copped an award for design excellence.

To talk about the design of American cars in philosophical terms, it seems to me, is to credit one designer with the whole design as it stands. This is an insult to his ability except in a very few cases. Take, for example, the new Chrysler Corporation line designed, supposedly, by Virgil Exner who was also head of Raymond Loewy's South Bend office at the time the 1947 Studebaker was designed. This man could not possibly have personally created the line that has been credited to him this year. There must be other factors that have nothing to do with design as a good man does it. It is impossible to say what the factor is at this distance, but I have had enough experience with sales-department-designed products to suspect that the make-it-just-General-Motors-only-jazzier approach was the basis. Well, that is fine if you can do it, but it means that you have to think the way G.M. does, and Chrysler has gone to some lengths in the last few years to prove that they don't. I also suspect that, having made known that they were going to give the designer his head, they proceeded to turn conservative again, and set a policy that would mean no risks with the cost of body dies: keep the sheet metal conservative and get jazzy with the chrome. That would be one way of arriving at what you call "Chrysler's new version of a classic approach;" however, the designers I have discussed it with call it a sales department face-lift on a 1948 car.

Further evidence of the futility of trying to judge car design with a straight face is G.M.'s acknowledged policy of deliberately throwing a clinker into the design for the express purpose of disturbing the beholder. They call it the "cross-up." How can you have a serious discussion with someone who keeps laughing all the time?
William C. Renwick
Montclair, N. J.
Space did not permit us to discuss, in our February car review, the motivation of a couple of hundred interested parties, and according to one school of design criticism motivation is beside the point anyway. Nor do we feel that the fact that a couple of hundred interested parties, each with a different viewpoint, had a hand in these designs, means that they represent a chaotic lack of design. Nonetheless, we are grateful to reader Renwick for taking issue with our views, and would be glad if other readers' views were to keep the issue alive on these pages—Ed.

Follow-up

Sirs:
We have followed INDUSTRIAL DESIGN magazine since its first issue one year ago. The aims and policies described at the IDI meeting here at that time have been fully realized by the magazine you are now publishing. I would like to compliment you and the staff of INDUSTRIAL DESIGN for the fine way you are handling a most difficult subject.

The presentation of newsworthy designs and the various articles contained in each issue are a valuable contribution to design information, but I have been increasingly aware of your high standards and the intelligent understanding of the real problems in industrial design that is apparent in the editorial sections and news sections of your magazine. I would like you to know that we appreciate your work.
Richard Koontz, Chairman
Industrial Design Department
Syracuse University
Syracuse, N. Y.

Exploration

Sirs:
. . . Mr. Nelson's article ("Art X — The Georgia Experiment"), and the one by Deborah Allen on "Men and Machines," represent a broad and very stimulating approach which, if sustained in future issues, would establish your new periodical in the reading habits of all designers, industrial and otherwise. We believe there is an increasing need for this type of exploration of the basic motives and responses of our contemporary world.
Please give us more.
Paul H. Hunter
Bell Telephone Laboratories
Winston-Salem, N. C.
See page 44 of this issue—Ed.

Exclamation

Sirs:
We were delighted to see our Christmas Greeting reproduced on page 74 of your February issue. We sent out three different wooden forms, a cube, a square-based pyramid and the triangle. We were never sure who got which.

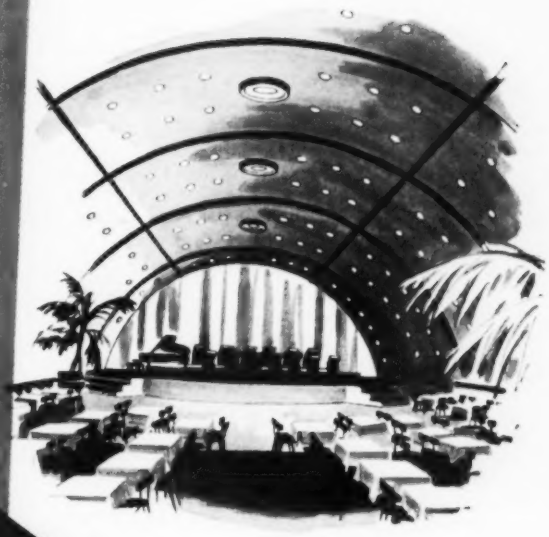
I was also pleased to see that Egmont Arens used one of my designs for his own Christmas card. These were produced and sold by Associated American Artists, with my name and patent number on the back of the card.

I want to put an exclamation point to my earlier comments about the fine quality of ID. We eagerly look forward to receiving each issue.
Seymour Robins
Robins Graphic & Industrial Design
New York, N. Y.
Apologies to card-designer Robins, and thanks to card-sender Arens for remembering us—Ed.

Envious

Sirs:
I am happy and glad to send you this letter. I obtained copies of INDUSTRIAL DESIGN through a friend in Iowa. They are very interesting and instructive.

We hardly can get magazines or reference books about industrial design in Japan, and there are few for specialists and students. When I see these nice magazines issued by you I feel very envious of your fortunate readers.
Satao Hori
Kobe, Japan



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Letters

Designer as Inventor

Sirs:
Your inclusion of "invention" in the ranks of the Design Review struck me as most interesting, and has provoked me to pen a few rambling comparisons.

The job of the designer is something like this: a caterpillar feeding on mulberry leaves has a whole bush allocated to him, but the bush has only three leaves and he can see only two centimeters ahead of himself. Locating the food seems impossible, but nature is kind to her groping children and in time any maze acquires an intelligible pattern. Trunk and branch, fork and sub-fork — these the designer must tread and retread, as he carries on his trade of cut-and-try. Error is as habitual as trial.

Technical knowledge is required of the designer, but the essential skill is akin to architecture: an arrangement of elements into a whole. No matter how critical the parts, functionally, success of the end product hinges on the way the parts are related, for the buyer rarely understands structure or operation. His judgment — if you could call it that — rests on a certain evident quality of wholeness-as-he-sees-it. That quality is what the designer contributes, and it is accepted almost universally as an index to the other qualities desired, and indeed, to the final utility of the product.

Design is a kind of invention, although invention is usually thought of as dealing more with elements than with the whole, and its product is of incidental interest to the consumer. Where the product designer seeks a simple, complete and self-evident presentation, inventors often indulge in complexities and obscurities. Inventors, confidentially, are a queer line of birds, dedicated to humanity, but hopelessly withdrawn and penurious. But a good invention may well affect many succeeding product generations, in a process of evolution, where a good design may blossom but to die with whatever object it attaches to.

Designers are, no doubt, penurious also, for like inventors they require terrific application, true passion for their work; yet they are not withdrawn. They have to get around, and study their prey, the consumer. Their objective is something which seems manifestly simple — the perfect consumer reaction: "Exactly what I always wanted."

This relationship of designer to the consumer, involving his employment by the seller, is fundamental. In economic terms, this becomes the job of conveying to the consumer an understanding that the seller takes the responsibility for the product in its entirety. This entirety involves style. It is not wholly something within the parts or the product. It is also within the mind — if you can call it that — of the consumer.

Design is also a kind of research, but research deals more with the profundities of nature. Design is, by comparison, inexact. The diameters of the corner posts of the Parthenon had to be bigger than those of the others, but not in a rational mathematic ratio. Researchers are a class apart, respectable. Inventors have to guarantee that things will actually work that way; designers have to make things fit-to-behold, while researchers are aloof from such responsibilities, taking nature quite as it comes.

The characteristics of the designer's actual job, if he is properly inventive about it, are something like this:
1. He has a hunch something can be done about a certain product, process, or human need.
2. He establishes an area in which the thing-sought might be found.
3. He examines, classifies, lists aspects or requirements of the thing-sought.
4. He examines, weighs various basic choices, in the light of experience, as to method of approach, area of technology, etc. (This might involve studies of various properties of woods versus metals, welding versus riveting, or what not. In all cases, the process is focused on some tentative model of the thing-sought, even though he knows the leaf may be on a wholly different bough.)
5. He establishes a pattern for the quick solution of recurring problems. (This amounts to the development of a special kind of science applicable only to this kind of particular problem.)
6. He tests by dry-run process, mostly in the shape of daydreams, the application of the thing-sought-by-the-means-presently-established. (This process merges with previous steps, as one is always studying ends as well as means.)
7. He reviews the whole job fundamentally, repeating step 4 and others in the light of improved experience. (This will happen many times, and each review will lead to starting up a new branch or twig.)

If this analysis appears to end no place, so may its application. The product will be subject to improvement long after you have exhausted your best talents. Yet the difference between arriving at any one leaf, as against finding none at all, is profound indeed.

But here is the curious thing: The pattern which evolves in our minds, (for those of us all who cannot see as clearly as we wish we could), has little or no relationship to the pattern of trunks, branches and twigs whereby we achieved it.

The process has a certain therapeutic value. A good designer can sit in a jury box looking wise and attentive, without hearing a thing either lawyer has to say — at the same time doing his very best work. I don't say it isn't exhausting, but next to being deaf and blind, nothing offers such assurance of the comforts of isolation.

David L. Fiske
Consulting Engineer
New York, N. Y.

Creativity and mass culture

Sirs:
You are to be congratulated for your conviction that creativity and mass culture are compatible. It is a shame that the kind of material you publish is limited to an elite audience. I am looking forward to the day when the photo journalists on *Life*, *Look*, and similar magazines will recognize the importance of your work to the total form of our urban environment. Then the common reader will learn of your imaginative integration into mass production and distribution.

Have you considered the possibility of doing for mass education what Nelson and his associates did (as reported in *Art X*) for college? The secondary school is the natural place to develop a sense of responsible patronage in tomorrow's consumer.

Patrick D. Hazard
E. Lansing High School
E. Lansing, Michigan

Art X in L. A.

Sirs:
Just a word to clear up the availability of *A Communications Primer*, the 16mm adaptation from *Art X* so admirably reviewed by George Nelson in the October ID. In addition to rental availability from the Museum of Modern Art Film Library in New York, the film may also be obtained on a rental basis from the University of California Film Library, Los Angeles 24.

Primer is also available on a life-lease purchase basis from this firm.

Sherman Rifkin
Cine Service
1350 Westwood Boulevard
Los Angeles 24, California

CORNING GLASS BULLETIN

FOR PEOPLE WHO MAKE THINGS

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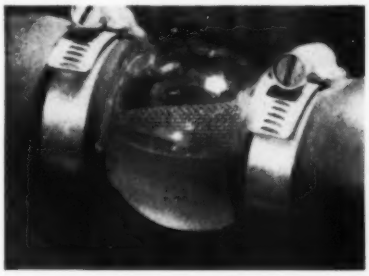

As you can see from the picture, this handy-dandy item consists of a metal cone filter, neatly ensconced in a glass bulb. This diminutive defender fits between the radiator and the block, spliced, as it were, between a couple of lengths of hose.

The basic purpose is to keep rust from clogging the radiator. Method—the cone sets up a swirling motion which breaks up the rust into fine particles.

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Thus, the glass bulb's unique combination of "see-through-ness" plus resistance to temperature changes plus ruggedness make for maximum utility.

A small item, this, but typical of the new products people develop. It's also typical of the design for inexpensive mass production you can expect when you work with Corning engineers.

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As the Leco engineers have discovered, PYREX tubing is both inexpensive and readily available. A long piece for the barrel of this sampling gun protects the person taking the sample and keeps the sample surface shiny and free of oxidation—a real timesaver compared with older methods of preparing samples for testing.

Actually, we don't ordinarily call attention to the *breakage* applications of PYREX tubing, or for that matter, of any of the other glass products we make.

Forsooth—our usual message speaks, with due modesty, of physical strength, resistance to thermal shock, and over-all ruggedness. And that perhaps points up one of the real virtues and attractions of glass: its ready versatility and adaptability to uses and purposes not even glimmered at first.

Take for another example (from our files of happy customers) the use of expendable glass in plastic molding. Manufacturers of such diverse items as billiard balls, insulators, and catheters have found glass an ideal (well, almost) material for molds. For one thing, glass being nonadhesive, the plastic doesn't stick to the mold. Glass molds cut processing costs, too, since like the metal samples in the Leco gun, plastic products molded in glass come out with a smooth finish.

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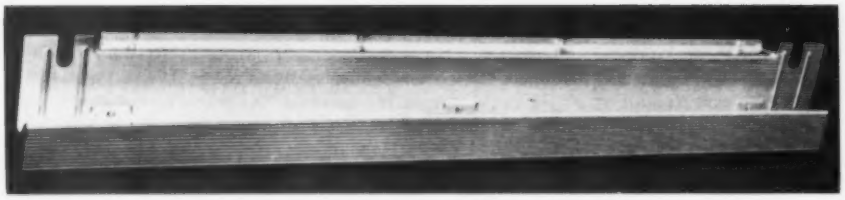
NEWS



Refrigerator drain trough, winner of Higgins Redesign Award.

Higgins winner: GE design engineer J. B. Horway (l.) receives award from Carter C. Higgins, head of Worcester Pressed Steel.

Laurels to design

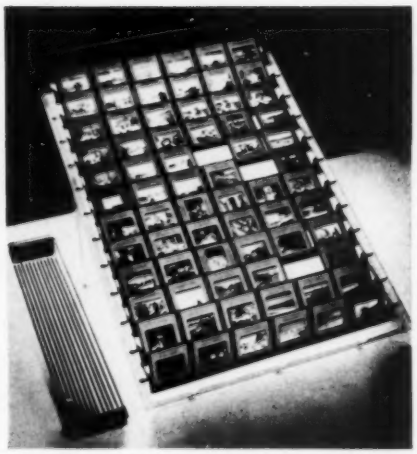
Significant awards by two basic suppliers
Canada picks its best
Golden Compass goes international

Awards are in the news this month, the most interesting sponsored by big companies. What is interesting about them is not so much the results but the fact that these companies, whatever their end products, are interested in better design. Two GE design engineers, J. B. Horvay and D. A. Solley, are winners of the first **John Woodman Higgins Redesign Award** sponsored by the Worcester Pressed Steel Company, with a redesigned drain trough for an automatic two-zone refrigerator. Their new design, in pressed aluminum, permits a heating tube to be run behind the trough to prevent freezing, impossible with the former plastic drain. Besides draining better, the new design reportedly saved GE $40,000 per year on production, a significant 23 per cent. The Higgins Award, to be sponsored by the company for at least four more years, is given for successful production in stamped metal of a part originally made by another process, involving originality of design and production saving.

If the Higgins award resulted in a boost for metal, the first **Koppers Award Design Competition** for polystyrene housewares was planned by its sponsor, plastic supplier Koppers, Inc., to promote "good design and the proper application" of plastics. This was the first competition of its kind in the plastics industry, and is indicative of the growing consciousness in the field (spearheaded by the Society of the Plastics Industry) of the need for regulating the quality of plastic goods; too many consumers have been put off plastics by slipshod finishing and incorrect applications. The present campaign, like those in other industries, should go a long way towards promoting the right material for the right use — which is, after all, half the battle in good design. The Koppers award is particularly significant because prizes, (apart from promotion for the winners), are one-year scholarships, awarded in the winning molder's name, to product-design students at the school of the winner's choice.

Canada's NIDC—National Industrial Design Council — has for the third year an-

Koppers winners: double-wall tumblers by Gits Molding were among polystyrene housewares picked by judges (l. to r.) C. E. Hodgman of Raymond Loewy; Jesse H. Day of Plastic Engineers Journal; Dr. H. G. Wales, American Marketing Association.



Canadian winner: picked for excellence, the Envisor slide file stores 7 folding racks of slides, each of which can be unfolded over translucent file top for display.

nounced winners of its design award, similar to our erstwhile Good Design. Eighty-one entries out of 500 submitted were given the "design award" label of merit by the NIDC, which is a council of manufacturers, retailers, designers and educators working in cooperation with the National Gallery of Canada to promote good design. One of the most ingenious and useful of the Canadian designs is a portable slide viewer which neatly stores 504 slides in a polystyrene case 18″ x 13¼″ x 2¼″. The translucent cover of the case can be propped on its handle, and with a light behind it becomes a viewer for 72 slides at once. Seven folding steel slide holders can be taken one at a time from the case, hooked to the top of the cover, and pulled open to display their contents. Designer of this visual file, called the Envisor, is John Ensor of Toronto.

The spread of the design idea is significantly summed up by the announcement that Italy's choosy **Golden Compass award** (see p. 84), established only this past year, will go international next year. The aim of this award is more exalted than some others: an International Great Gold Compass will honor the individual, industry, manufacturer or group who has made a "supreme" contribution to the field of design, to bring to the field of industrial design "that prestige which other arts and expressions of the spirit receive through famous prizes and illustrious academies," (presumably the Nobel, Goncourt, etc.). Rules will be announced shortly.

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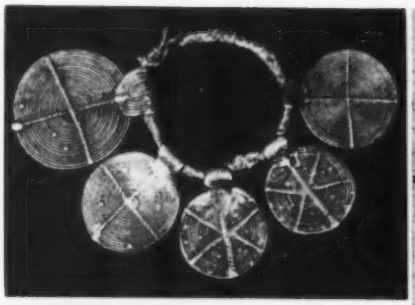


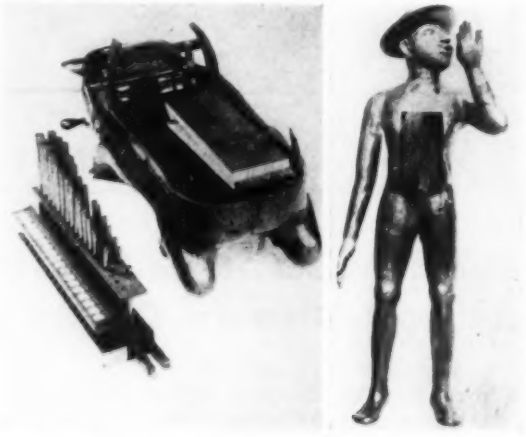
Carved soapstone jar, metal frontlet, silver-decorated black iron cat, and quilted, embroidered patchwork cotton cloth hint the vastly varied richness of Indian crafts.

India resplendent in New York

Nearly a thousand saris, shawls, precious jewels and jades, rugs and temple hangings—chosen from material selected here and abroad by Edgar Kaufmann, Jr., for an exhibition entitled Textiles and Ornamental Arts of India—have transformed the Museum of Modern Art's usually austere ground floor into a spectacle of almost blinding opulence. The keynote is struck at the entrance, where the visitor passes (if he is strong-willed enough) a huge low square bed covered in red, maroon, saffron, pink and orange pattern-woven silks, with bolsters of deep blue and red gold-flecked gauze. Above the bed, on a large black cotton antique hanging, milkmaids sport symbolically in a flowering forest, heavy with gold paint.

Inside, the main room has been transformed by architect Alexander Girard into a kind of Indian bazaar: twelve huge square gold columns pace off a 50-foot-long blue-lined pool of water over which lengths of every imaginable kind of sari material are hung on multi-colored horizontal rods: gold and silver brocades, handwoven tie-die-silks, gossamer-fine cottons and wools, and rich embroideries ranging from court stuffs of two hundred years ago to traditional folk-embroideries still made today. Bright pink and saffron gauze stretched at all the windows filters the light which glows through these saris as the visitor walks by, enabling him to examine each one in a general and splendid profusion of light, pattern and color. In another room, under a silver-columned pavilion of red, blue, green, black, white and yellow calico, are spread jewels and jades on a tiered silk platform; elsewhere are folk crafts of all kinds and floor-to-ceiling lengths of contemporary handwoven and mill-made fabrics for export.

The exhibition, which introduces the rich Indian esthetic to the American public on a grand scale, was conceived by the Museum's Exhibitions and Publications Director Monroe Wheeler. The show will continue to June 12.



Tippu's Tiger was carved around 1790: *the life-size wooden tiger represented India; the man, the British. The drama of their struggle was once heightened by mechanical effects: the man's hand flapped futilely, while a kind of organ inside (right) produced appropriate groans and growls (which emanated through slits in the tiger's mane). Silent now, the group is in London's Victoria and Albert Museum, like the jar and frontlet above.*

Middleton *Doner* *Bass* *Pinzke* *Roberts* *Cullen* *Moses* *Arenberg* *Baum* *Johnson*

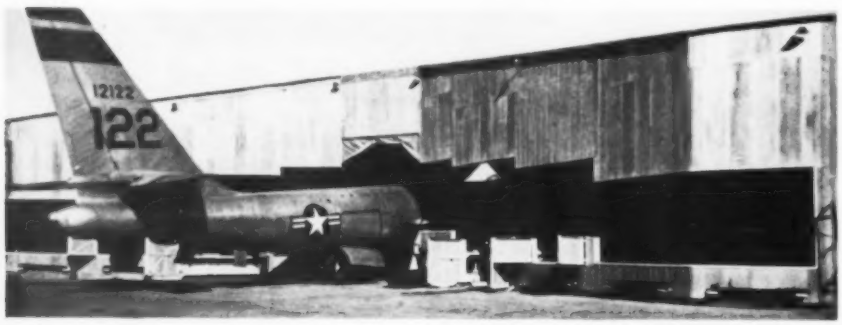
International Design Conference: Aspen

"Crossroads — What are the Directions of the Arts?" is the announced title of this year's International Design Conference, which will take place as usual at Aspen, Colorado, on June 13-18. One difference at Aspen this year is that for the first time, this fifth annual Conference will be operating as an independent and permanent organization. "It is the intention of IDC," states the program leaflet, "to explore Design at its *highest* level, and to bring to Aspen internationally distinguished thinkers in many fields. The Conference will not only present the ideas of specialized designers (industrial designers, architects, city planners, graphic designers, painters, sculptors, etc.), but also fresh ideas expressed by men working in other areas — philosophy, mathematics music, physics, economics, the humanities." Accordingly, a full roster of officers, some of whom are shown above, have been elected to shepherd the IDC through to a full and exciting week of ideas and discussion with more benefits to come. R. Hunter Middleton is Chairman of the Executive Committee, with Herbert Pinzke, Albert Arenberg, Saul Bass, Harry L. Baum, Jr., Will Burtin, George D. Culler, D. S. Defenbacher, and William M. Friedman. Standing committee chairmen are: Will Burtin, Conference Program; Saul Bass, Regional Organization; H. Creston Doner, Public Relations and Publicity; Harry L. Baum, Jr., Finance; Robert B. Johnson, Membership, and Mildred Constantine, Publications. Jack Roberts is associate chairman for Regional Organization, and Gerry Moses, for Membership.

Membership in IDC is offered to individuals, corporations, and students interested in design. Registration fee for the Conference, including membership, is $35.00 (paid-up members get $5.00 off). Those interested in membership information or in attending the 1955 Conference should write immediately to: International Design Conference in Aspen, 220 South Michigan Avenue, Chicago 4, Illinois.

Ceramic industry discusses design

A growing realization of the importance of design, especially to suppliers of basic materials, is underscored in the announcement by the American Ceramic Society that for the first time, at their annual convention in Cincinnati on April 25, 26 and 27, its Design Division is co-operating with its speakers to present an exhibition, "Design in Industry." Members of this society come from the architectural terra cotta, china, glass, pottery, porcelain and vitreous enamel, sanitary-ware and tile industries, and the Design Division, headed by F. J. Von Tury, is placing special emphasis on its program because the industry "has come to an era in which design in our industry is as important as production, technological developments and merchandising." Topics and speakers scheduled so far at the Netherland-Plaza hotel, include: Arthur N. BecVar of GE on "Design in the Company" (see ID February, 1954); James C. Plaut of Boston's Institute of Contemporary Art on "The Value of Design to the Company," and John B. Ward of Corning Glass on "What Industry Expects of the Designer," among others.



Movable maintenance dock *for Air Force B-47 Stratojet bombers fits around huge plane like a glove, enclosing all but the tail. Developed by Luria Engineering Co. of Bethlehem, Pa., the 100-ton galvanized steel dock comes in 5 bolted sections, rests on jacks, and can be moved on dollies. Inside, an attached system of platforms follows wing contours.*

Materials handling show

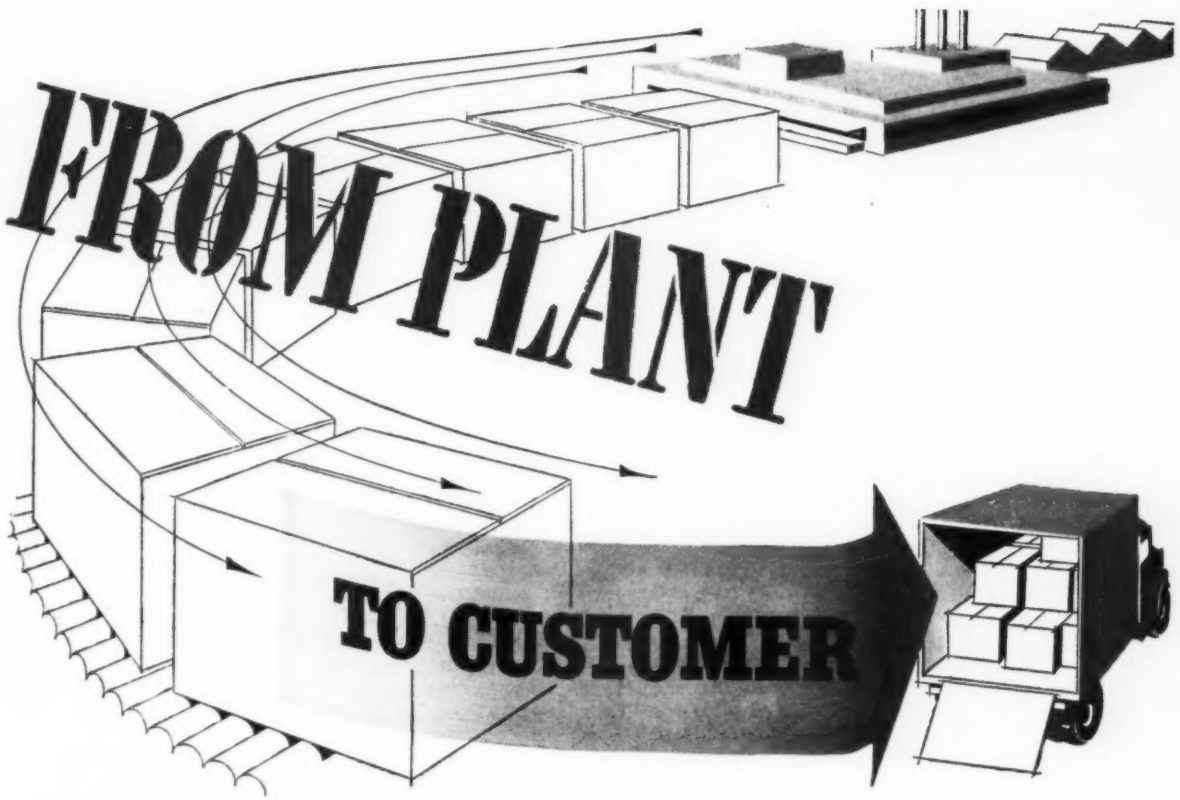
"The Concept of Obsolescence" will be the theme of the 6th National Materials Handling Exposition at Chicago's International Amphitheater, May 16-20. $10,000,000 worth of equipment from some 250 companies will be shown, with emphasis on systems of materials handling which are the basis for automation. At a conference concurrent with the show, 45 leading executives will discuss such pertinent topics as "Effect of Obsolescent Materials Handling Equipment in Today's Production Costs." Clapp & Poliak, Inc., 341 Madison Avenue, New York, is handling advance registration.

More shows to come

24th National Packaging Exposition and Annual A.M.A. Packaging Conference at Chicago's Palmer House and International Amphitheater April 18-20 will be reported in June ID. . . . **Third Annual Welding Show**, and National Spring Meeting of the American Welding Society at Kansas City's Municipal Auditorium, June 7-10 will feature all kinds of welding equipment from over 100 companies, and such discussion topics as "Applications of Welded Polyethylene and "Automation for Small Run Production." Hotel arrangements can be made through the American Welding Society, 33 W. 39th Street, New York 18, N. Y. . . . **World Plastics Fair and Trade Exposition**, originally scheduled for April (see ID February p. 20), has been postponed to October 5-9, in Los Angeles. Information is still available from the Show Management at 8762 Holloway Drive, Los Angeles 46, California. . . . **Design Engineering Show**, scheduled for May in Philadelphia, has been temporarily cancelled.

Competitions and awards

The Industrial Designer's Institute reminds all designers that submissions for its 1955 Award are due on May 14 at the office of the Program Chairman, Paul MacAlister, 1226 N. Dearborn Parkway, Chicago. The award will be made "for a fresh approach to design and function, combined with a practical use of appropriate materials" in a product marketed since 1954. Full details and an application blank may be found in ID, February, page 22, or obtained from the Chairman. *(Continued on p. 124)*



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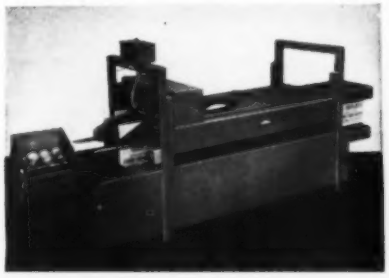

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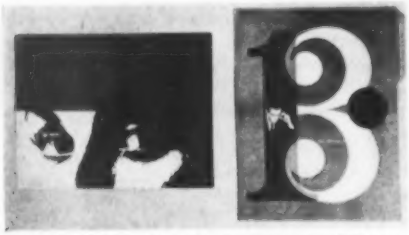
What's happening to our taste?

Three veteran designers, an editor, and a retailing consultant met at New York's Museum of Modern Art on April 22 to mull the question of America's taste. Led by Peter Muller-Munk, president of the Society of Industrial Designers (which sponsored the evening), the panelists were designers Henry Dreyfuss, Raymond Loewy and Walter Dorwin Teague; Harriet Morrison, Home Fashions Editor of the New York *Herald Tribune;* and Perry Meyers, retailing consultant and economist. Significant remarks by these molders of public taste will be reported in the June issue.

Chicago shows typographic arts

"Originality is not dressing and embellishing an idea, but rather going to the very roots and developing it only until the communication is the clearest. We must not superimpose our ideas on the subject matter and make it difficult to reach through a maze of colors and overdesign. . . . We should never underestimate the educational value of exhibitions. . . . Judges must get tougher." With this dictum, designer Will Burtin, with Taylor Poore and Suzanne Zurcher, art directors respectively of Tempo, Inc., and publications of the Art Institute of Chicago, got tough, and selected only 93 out of 910 entries for the Society of Typographic Arts' 28th Annual Exhibition of Design in Chicago Printing, to hang in the Institute through May 1.



In STA show: Charles Regehr, Don Walkoe

Marilyn Knudson

Packaging: Why do they buy?

Why does the housewife *really* buy a particular package of cake mix? Because she's hungry. Motivation studies, the latest weapon in the Battle of the Packages, came in for some debate at a recent meeting of the Package Designers' Council in New York. Special guests were Hugh Cullman, Market Research Manager of Philip Morris (pro), and Leonard Colson, advertising manager of The Mennen Company (con). After the meeting we solicited for quotes, recorded herewith:

Colson: "We at Mennen feel it is imperative to do motivation studies before going into production on any new product. . . . Based on the results, we formulate production plans and make sales forecasts."

Cullman: "Philip Morris tests actual packages in actual situations, after production, and adapts it to meet indicated needs. We retain Elmo Roper and the Color Research Institute for this purpose. We do not consider motivation research valuable."

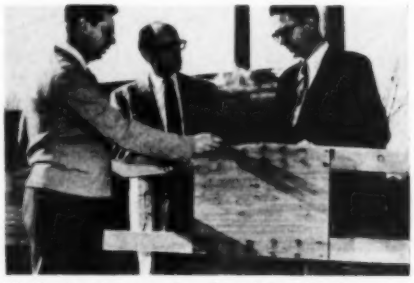
Egmont Arens (designer): "It isn't what people *think* about a package that counts; it's what they actually *do* under selling conditions. . . . Motivation research may be of use in predicting reactions to luxury items, but it has led both manufacturers and designers astray when it has made predictions about items that rely on impact for sales."

Gerald Stahl (designer): "I really don't believe motivation research has proven itself. I would never consider it the determining factor unless consistent with the judgment of the manufacturer and designer, whose combined knowledge and experience *have* proven themselves."

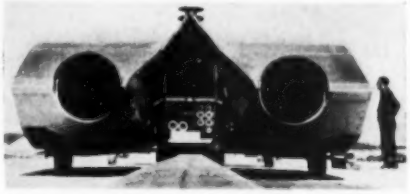
Karl Fink (designer): "I don't think that motivation research can possibly predict the success or failure of a supermarket item. . . . I would say however that it is possible to analyze the motivations guiding 'subjective' purchase . . . like perfume or cigars or wearing apparel or chewing gum."

In postscript, industrial designers **Lippincott & Margulies** announce that they not only encourage clients to use motivation research studies, but have now made an exclusive arrangement with Dr. Ernest Dichter, President and Founder of the Institute for Research in Mass Motivations, Inc., to use the Institute's studies in mass motivation as a guide in the design of everything from packages to hotels. As one spokesman put it: "What do people really want in a breakfast food? How does the consumer really see the product? What is the picture he has built up in his mind? We find out not what he *says* he wants, but what he *really* wants—then we hit him where it sells. Wheaties may be for champions, but if he wants All Bran to help his constipation, we'll give him a nice drug-like package; if he thinks it'll give him rosy cheeks, we'll give him cheesecake."

Display stands *for printed material in University of Illinois' current "Design for Communications" exhibit are specially cast, 125-lb. concrete double "Y"'s designed by Professor Jack W. Crist (right, above). Displays sandwiched between plates of glass are sloped toward the middle, forcing viewers to keep at proper distance across the stand.*



Nail-glued truss *developed by Purdue and Illinois Universities proved one of the strongest and most economical wood roof constructions at the Small Homes Council's recent 10th annual short course in residential construction. Co-designers Suddarth (l.) and Radcliffe (r.) of Purdue pose with Council president Leudrum.*



Jet test car *developed by Joseph C. Terry, engineer for the Navy Bureau of Aeronautics, is used by All-American Engineering Company to test aircraft arresting gear. Powered by two Allison J33-A8 engines, with a combined thrust of* 10,000 *lbs., the car rockets along a* 5,000*-foot I-Beam, pushing a dead weight. Near the end, the beam widens, braking the car, and allowing the weight to shoot, like a landing plane, into the gear.*

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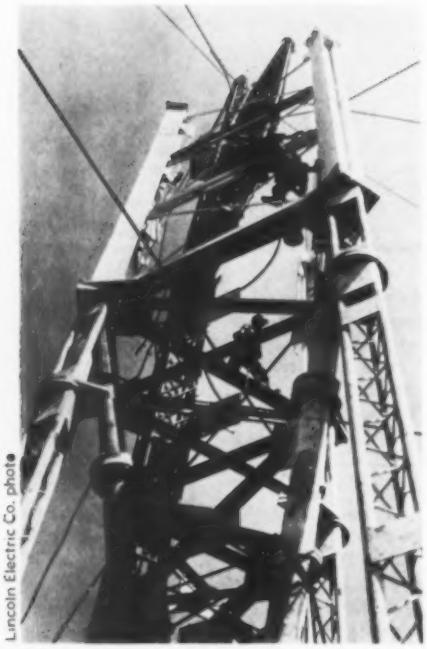

Lincoln Electric Co. photo

Taller than the Empire State building, *a triangular steel TV tower rises* 1572 *feet above Oklahoma City. Engineered by Ideco Division, Dresser-Stacy Company, Columbus, O., 54 sections were shipped ready welded, and bolted in place in 9 weeks.*

People

Jay Doblin, executive designer with Raymond Loewy Associates, New York, has been named Director of Illinois Institute of Technology's Institute of Design, and will resign to take office there in September. New Yorker Doblin was chairman of the evening school of Pratt Institute's industrial design division from 1947 to 1952, and recently has conducted a private experimental school for advanced students and professional designers. He is also the author of a new system of perspective drawing (see p. 103).

Donald Dailey has resigned as vice-president in charge of product planning for Servel, Inc., to return to private practice as a product planning consultant, in Evansville, Illinois.

Raymond Loewy Associates announce the incorporation of their 17-year-old Chicago branch as Raymond Loewy Associates, Inc. **Franz Wagner,** resident director, becomes executive vice-president.

Dick Latham, formerly Director of Design at Raymond Loewy Associates, Chicago, has formed his own firm, Latham, Tyler and Jensen, with **Bob Tyler** and **George Jensen,** of the same office.

Thomas Currie and **Kenneth Van Dyck,** both S.I.D., have formed a new design firm in Southport, Connecticut. For the past 10 years a consulting designer, Currie was previously with GE; Van Dyck has for the past two years been Executive Manager of Peter Muller-Munk Associates.

William A Lang has been named director of a new Design Research Department at Monsanto. Part of their Research and Engineering Division, the new department will function horizontally on all company interests.

Pete Thompson has joined Raymond Loewy Associates in New York after 6 years with Donald Deskey Associates.

Arthur L. Finn, industrial designer, and **William F. Jenter,** architect, have joined in New York to practice architecture, product design and packaging.

William Fleming, formerly of the Design Group of Whitaker Guernsey Studios, and a director of the Society of Typographic Arts, has joined Dekovic-Smith Design Organization in Chicago.

H. Edward Oliver, formerly with Lippincott & Margulies, now has his own industrial design studio in South Norwalk, Connecticut.

William A. Richards, formerly with Bell & Howell, has been appointed Executive Assistant to Peter Muller-Munk Associates in Pittsburgh.

John B. Coullard has been promoted to the newly-created position of product planner at GE's Electronic Components Department, in Syracuse, N. Y.

Harold J. Vanderhyde has joined the New York design firm of Nesbitt Associates.

Ernie Bevilacqua has left Caloric Stove Corporation, where he was Manager of Design, to join Henry Dreyfuss, New York.

Chester J. Abend, former Chief of Design and Development for the Braun-Crystal Mfg. Co., has formed his own design office in Whitestone (L. I.), New York.

Currie and Van Dyck

I. D. I. elections for 1955

National: **Robert Gruen,** president; **George Beck,** executive vice-president; **Elizabeth Dralle,** secretary; **Fred Boger,** treasurer.
Chicago: **James H. Hvale,** chairman; **Charles S. Anderson,** vice-chairman; **Walter C. Granville,** treasurer; **Herbert R. Carpenter,** Secretary.
Detroit: **Carl Sundberg,** chairman; **Walter B. Ford, II,** vice-chairman; **Peter Quay Yang,** secretary; **Mary Ellen Green,** treasurer; **H. Creston Doner,** public relations.
New York: **Jens Risom,** chairman; **Belle Kogan,** vice-chairman; **Reta Shacknove,** secretary; **Robert I. Goldberg,** treasurer.

Summer seminars

Creative Engineering and Product Design, Massachusetts Institute of Technology, June 20-July 1, 1955. "Considerable emphasis will be placed on the management of creative personnel; the results of a number of research programs in this area will be reported for the first time. In addition, case histories of interesting creative solutions will be presented by the men closely associated with their development." Registrants are urged to bring company problems for discussion. Topics will include: testing and measuring creative ability and potential; the psychology of creative thinking and imagination; techniques of organized problem solving. Director of the program is Professor John E. Arnold, director of M.I.T.'s Creative Engineering Laboratory.

Plastics in the Design of Building Products, Massachusetts Institute of Technology, June 14-24, 1955. The program will consist of two lecture series: a technical series dealing with the character and properties, structural possibilities, predicted design behavior and production and marketing aspects of plastics; and a design series dealing with form values, aesthetic problems, etc. Director of the program is Professor Burnham Kelly, chairman of the advisory committee for the M.I.T. research project on Plastics in Housing; visiting experts in the plastics engineering and design fields include Victor Canzani of Pratt Institute's Design Research Laboratory; Serge Chermayeff, Harvard Professor of Architecture; Charles Eames; and Ralph F. Hansen, Manager of Market Development, Monsanto Plastics. M.I.T. dormitories and recreational facilities will be open to registrants for both courses. Full details and application forms may be had from the Summer Session Office, Room 7-103, Massachusetts Institute of Technology, Cambridge 39, Mass.

Sixteenth Management Course, College of Engineering, State University of Iowa, June 13-25, 1955. An intensive course of instruction and talks by recognized authorities on new developments, applications and problems in management techniques will cover production planning, job evaluation, plant layout and public speaking, among other topics. For information, write J. Wayne Deegan, 118 Engineering Building, State University of Iowa, Iowa City, Iowa.

Survey Research Techniques, Survey Research Center, University of Michigan, July 18-August 12, 1955 (introductory session June 20-July 15). The eighth annual Summer Institute will offer special presentations of the Center's current research, and courses in survey research techniques, methods of sampling in survey research, and survey research methods. For further information, write the Survey Research Center, University of Michigan, Ann Arbor, Michigan.

CHARLES R. COX

Portrait by Fabian Bachrach

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"I know of no better method for each citizen to protect the American way of life than by building his own economic security and by helping his Government to keep financially sound. Both these results can be accomplished through the Payroll Savings Plan. I urge every executive in the nation to give this Plan his active and vigorous support."

CHARLES R. COX, ***President, Kennecott Copper Corporation***

With the active cooperation of Mr. Cox, Kennecott conducted a person-to-person canvass which put a Payroll Savings Application in the hands of *every* one of Kennecott's 20,000 employees. The men and women of Kennecott did the rest. Country-wide participation in Kennecott's Payroll Plan rose from 24% to 52%.

Your State Director, U. S. Treasury Department, is ready to help you install a Payroll Savings Plan, or show you how to build participation in an existing Plan through a simple person-to-person canvass. Write today to Savings Bonds Division, U. S. Treasury Department, Washington, D. C.

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INDUSTRIAL DESIGN

Omens over Madison Avenue

Things are happening in the world which makes a business of designing products, but it's no small trick to know your omens.

We first became aware of this state of affairs last fall, in a chat with a young man from a big New York design office. He was full of glum predictions for the future of the design profession: Things were not going at all well for Madison Avenue (by which he meant the large consultant designers of Madison or Michigan or Wilshire or Main) and he predicted that things might get even worse. The reason? The country's major industries, led by appliances,, were withdrawing their business from consultant designers; they had become so dependent on design—not only yearly model changes but continuing development of new products and new functions—that it was economic sense to spend their design budget to build up company design staffs. And that's what they had been doing, some gradually, some overnight, with departments of up to 50 and 60 men. The big consultant design offices, our prognosticator reminded us, had been built up on a steady volume of work on these large-volume products, and it would take innumerable small accounts (more than he cared to contemplate) to support these offices in their accustomed style.

Well, we're practically on Madison Avenue ourselves; and we were seriously concerned. A week or so later, a company designer from Detroit dropped around. He mentioned, with unnerving calm, that his firm might add some 20 or 30 designers (not draftsmen but full-fledged designers) to its styling section—did we know any? In the wake of this came rumors that a basic materials firm might swell *its* design department to 80 men—a 25% expansion. We beamed for industrial design—but shuddered for Madison Avenue.

But omens are seldom one-sided. In midwinter we called on an important radio firm, and learned that its design department had been *closed down*—and all its work turned over to a designer in the midwest. One Design Director in major appliances, another rumor said, had just made a long-term contract with a consultant—for design projects which his own sizable staff would carry out, while another was farming out work which his staff was too busy to handle.

Last month our mail was sprinkled with announcements of openings of new design offices and new branch outposts, and our phone endlessly reiterated the classic cry, "Where can we find a well-trained designer, couple of years' experience, able to take responsibility? . . ."

We ran into our friend on Madison the other day, and asked somewhat gingerly after the state of *his* affairs. He had to admit that they had a new complexion. In fact, his office had never been so busy, turning down jobs every day. "A lot of it," he remarked, "is a new kind of work—consulting, experimentation, planning, development—what you might call policy-making design." Say, he added as we turned off at 50th Street, "know any good designers, couple of years' experience, able to take responsibility? . . ."

When the competition for employment in a profession is outdone by competition for employees, it's a fair sign that business is booming. For the manufacturers who have created this boom by their unprecedented demand for better design, the question of "consultant *versus* staff designer" remains to be answered. We suspect *versus* is a dying word in the design profession. This boom is also a shakedown, in which functions are becoming better defined; definitions suggest that the consultant's role may continue to change, so that he completely supplements, rather than supplants, the staff designer. Whichever way designers and manufacturers work it out, the omen for the business of industrial design can't be anything but good.

—the editors

william klein

The El, which has darkened New York's Third Avenue and depressed real estate values for seven decades, will soon be demolished. A last look at the El, a monument of ironwork construction, suggests that its removal may not be an unmixed blessing.

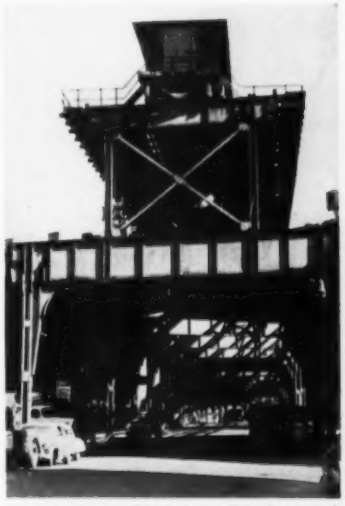
The El comes down

by John Pile

For 77 years the Third Avenue El has been part of the New York City landscape, but this month it is coming down—the last of its kind to be demolished. The Sixth Avenue El went in 1938; the Ninth in 1940; the Second, in 1941-42. Recently, with both ends amputated, the Third itself has been running a shortened schedule. This year, recognizing that the El has turned Third Avenue into the city's most dangerous thoroughfare, the Mayor requested permission to dismantle the remaining seven miles of track. It is going to close for good on May 12, and even if there are temporary reprieves, the El will eventually be demolished, and there will be sun again on Third Avenue.

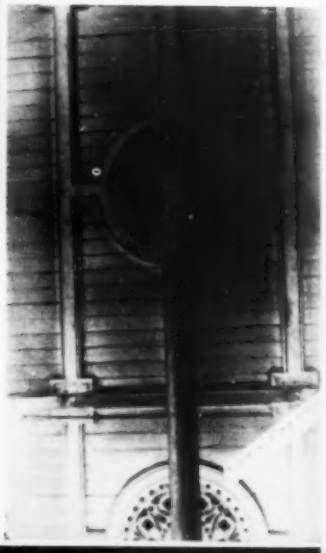
Such, undoubtedly, is the nature of progress. But by some, the El will be sorely missed. Some 200 mourners assembled on March 27th (a few from as far as Cincinnati) and paid $5.50 each to take the last Sunday run the El would ever make. Some came to show their little boys how things had been when *they* were little boys, or for unimpeded picture-taking of a sentimental journey. Others came to protest the destruction of what they considered an important civic structure. For not only did the El solve a problem in urban transport (in some ways better than its replacements can), by separating passengers from city traffic without burying them underground; not only was it a memorable example of 19th century design with standardized components, it was also a monument in the great tradition of ironwork construction. Like the Eiffel Tower and the Crystal Palace on a lesser scale, it was built of many small structural parts used visibly and ornamentally — a far different expression from today's skin-covered architecture, and one which is getting difficult to find.

From the start, the El offered a strange mixture of good and bad qualities. In 1867, traffic was so congested in New York that it took ten minutes to travel a block, and when an engineer named Charles T. Harvey proposed a cable-drawn overhead train, a mayor's commission eagerly granted him permission to build an experimental half-mile of track. The experiment was a success, but it depleted Harvey's funds; a corporation took over, built more track, and installed steam locomotives. Hot coals showered into the streets, El pillars had to be whitewashed so that horses could see them at night, and housewives stored up bricks to throw at passing trains. But official New York was delighted, and three new elevated lines were rapidly built. On August 26, 1878, the Third Avenue line opened for business, the last word in efficient modern transportation. Its stations, as a contemporary reporter aptly remarked, were "a modification of the Renaissance and Gothic styles of architecture, with somewhat the appearance of a Swiss Villa." Who designed them? Apparently no one at the time took the trouble to record this information — though the most likely claimant is the Cornell Iron Works, which supplied their characteristic metal pilasters, and panels for many of the stations.



photos by John Pile unless otherwise noted.

william klein



A trip on the El, for all its discomforts, was always an adventure and was once even fashionable.

A ride on the early steam-powered El was likely to be so messy that women wrapped themselves in dusters before taking a trip; engines often got stuck between stations, and there were near-disasters when the engineer took the curves too fast. But the interiors of the cars were luxurious: there were rugs on the floors and leather upholstery on the seats. Fare was 10c, but you didn't have to pay the collector if you couldn't find a seat. When people complained that the fare made the El a rich man's ride, the city responded with the somewhat puzzling maneuver of lowering it to 5c during rush hours.

From the beginning, the character of the El was chiefly determined by its height above the street, which implied (somewhat as air travel does today) both adventure and luxury.

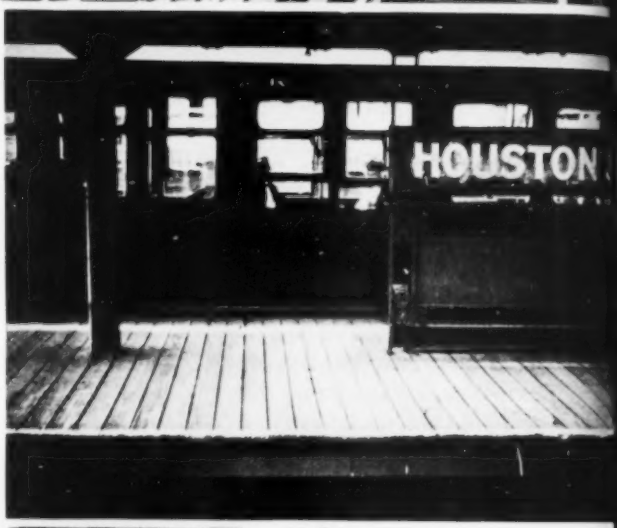
Its passengers were invited to leave the world of the streets and ascend to a higher one, from which the same old sidewalks and buildings took on a new perspective. The El was by nature indifferent to its effect on the long avenues which it darkened. Hence the bitter (though unsuccessful) newspaper campaigns which it first aroused; hence the cumulative civic frustration which eventually destroyed the El. Long after it had ceased to be a fashionable mode of transportation, it continued to reflect its own aristocratic temperament. But its minor virtues, both as a relatively fast means of transportation and as an enjoyable one, increasingly lost popular support, and were finally appreciated only by the sophisticated and the sentimental.

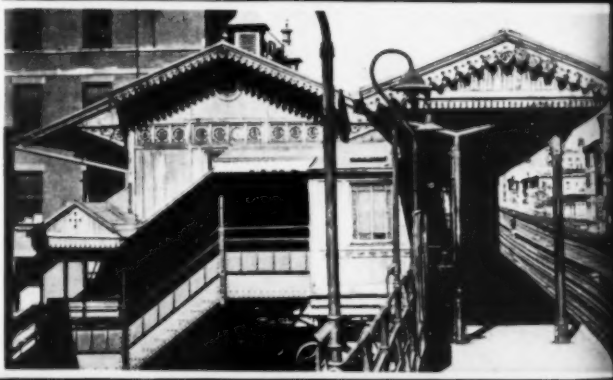
For the traveller who was prepared to see its virtues, however, the experience of riding the El was more than worth its minor discomforts. Up the makeshift, semi-enclosed stairway (a note of peril immediately introduced), he climbed to the stationhouse, with its ticket window and turnstiles (an innovation dating only from 1923). In many respects the El station was hardly different from any Victorian railroad station. But in the process of being hoisted into the air, a transformation took place. The designers, whoever they may have been, clearly saw no reason to devise a new structure merely because it was to be airborne. With the Victorian talent for adapting impossible shapes to useful ends, they merely shifted the masses of the building as practicality required, and in the process produced something of a new stationhouse architecture. In time the stations grew dingy, but the interiors continued to glow with a richness of ornament — potbellied stoves, roof brackets, transoms, and stained glass. In cold weather the traveller could pause inside to warm himself; otherwise, he passed on out to the platform, to a new orientation. Here, or from the street, the stations came into their own as architecture.

There was always a sideshow for the rider of the El

The Manhattan skyline is made visible only by height or distance; the El brought it into view from a new and rewarding vantage point — not terribly high, but with a sense of motion which made the view unique. Even the view down the track, a familiar sight on any railroad, became a unique vista on the El: the ribbon wound its way indifferently among the upper stories of earthbound buildings at a height which suddenly made them less domineering, made the city streets seem less cavernous. On the train itself, you had a choice of commanding the track front or back, from a semi-private cubicle, or of looking down on the everyday life of windows, washlines, backyard bucolics, and sidewalk saloons. The speed was slow enough for snooping — (a nude — a poker game) yet fast enough to embarrass neither *voyeur* nor viewed. This was another of the El's ambiguous benefits: having created a slum along its length, it had acquired a fascinating view — a permanent sideshow which was one of its big attractions. Park Avenue, by comparison, would have been a dreary ride.

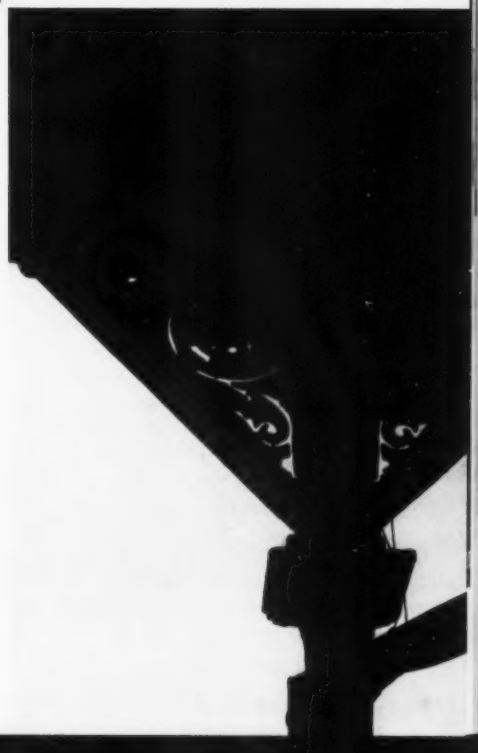
While the rider was aloft enjoying the view, the motorist and pedestrian had little choice but to suffer in the noise and the gloom below. Yet even this was not entirely bad. The street under the El was more like a roofed corridor than a street, and the sun which managed to filter through the complex structure arrived weakened but enriched. Because of the El, Third Avenue always had an intimacy, a neighborly mood which, in turn, made it the home of much that was derelict and disreputable — much that might not have survived in the glare of another unshaded street.





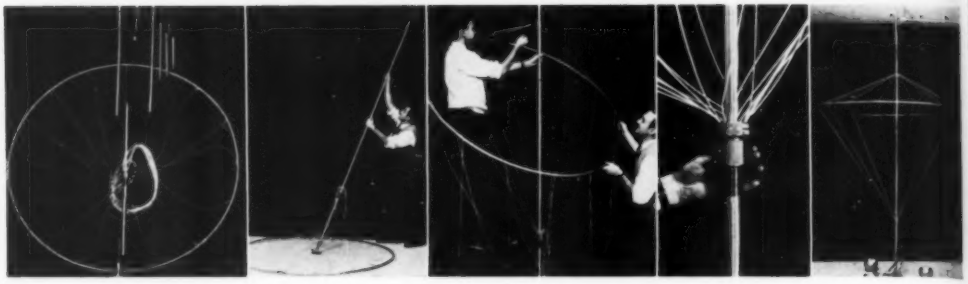
The El was an architectural event in the city scene

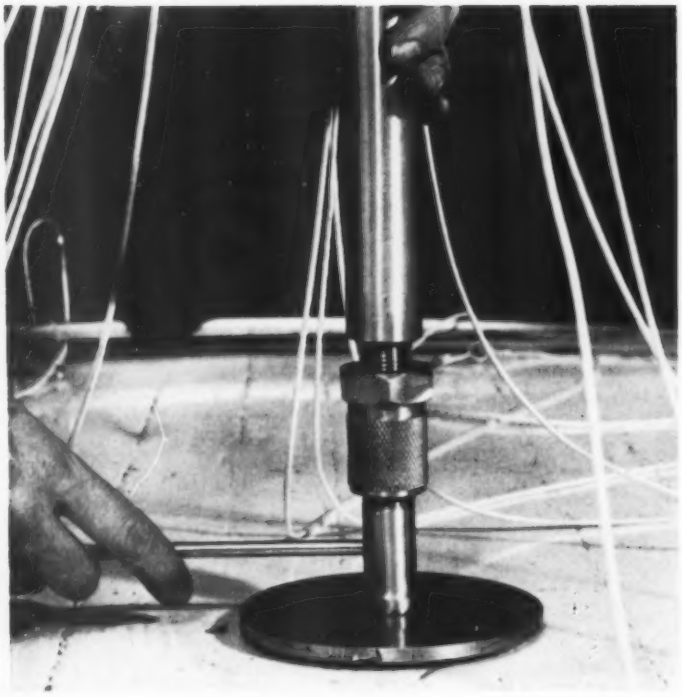
Now that transportation has been taken over by the invisible subway, and the formless and transient bus, it is striking to see how consistently the elevated railways accepted their responsibility a part of the cityscape. From the most fantastic of the early schemes, the Els were conceived as structures of great visual interest. When the El is gone, New York will lose what the El's builders contributed: a means of transportation that was something meant to be looked at, and to give pleasure in being seen. Not only Third Avenue but the cross-town streets benefitted, as the El interrupted their eventless line from river to river, and added a welcome variation to the normally standardized meetings of city streets.



Ironwork and sunlight created the El's rich scenery

As people spend more and more time in urban transit, the pleasures of travel seem to diminish proportionately. Is there any way, in future city construction, to match the El's extraordinary combination of shelter, motion, intimacy, enlarged perspective and rich textures? The departing El itself suggests how it might be done: Its structure and its embellishments use a repetition of identical elements to create delightful scenery; stained glass, cast iron brackets, railings and trims all filter and modulate the patterns of sunlight which are the chief decorations of any city. The El should remind designers, concerned with the human as well as the practical end of a product or structure, that it is possible, by very simple means, to make a ride to work a pleasure, instead of an ordeal to be borne in suffering silence.



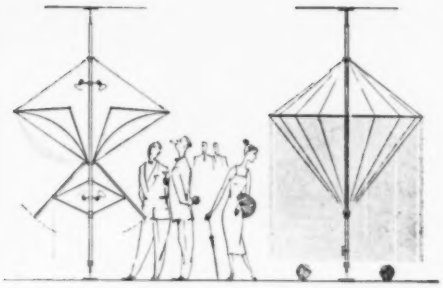


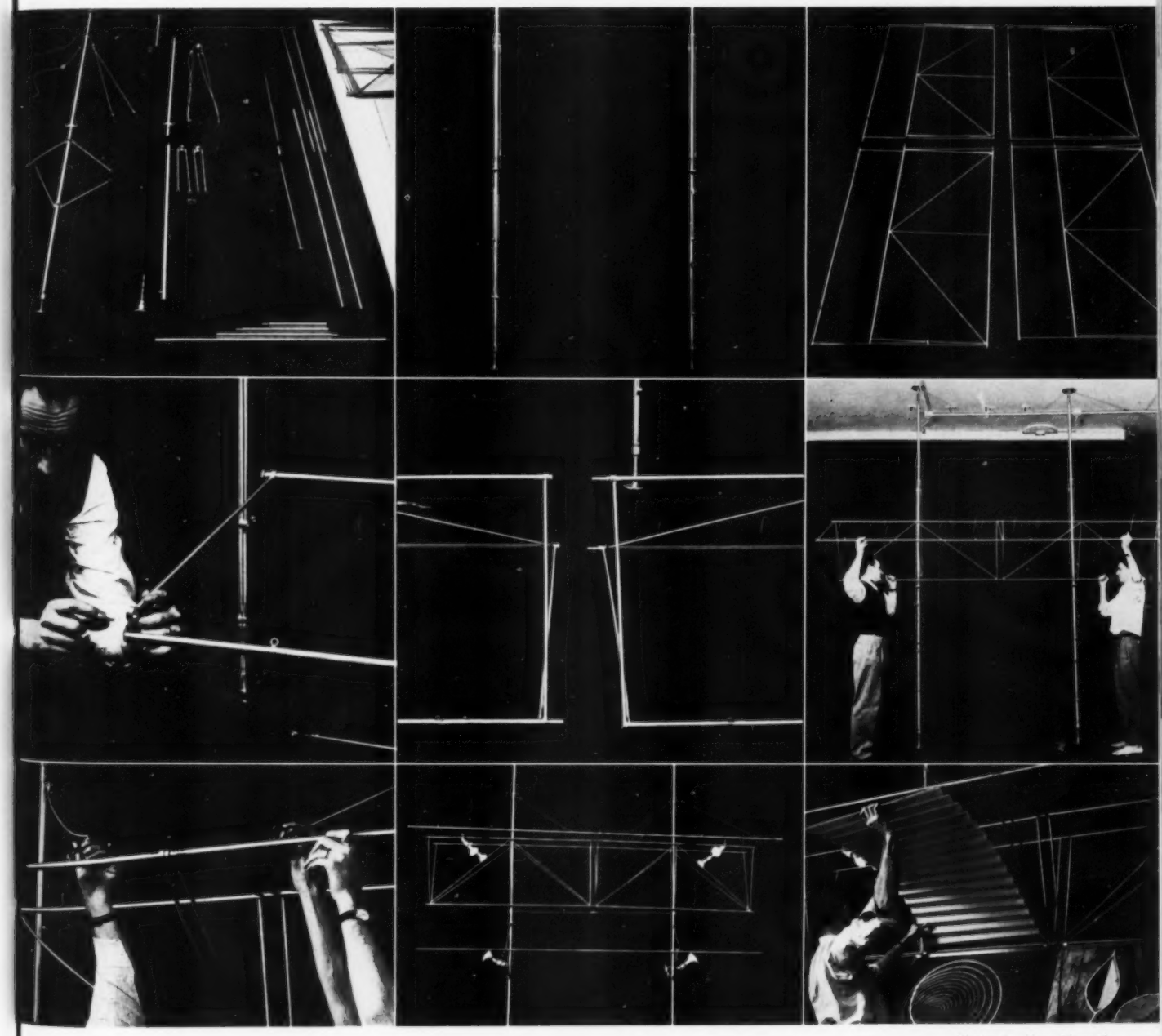
Clue to the frame's adaptibility is the felt-padded foot with its threaded shaft (l.): vertical supports on both units are formed of as many 4-foot lengths of tube as necessary to raise the felt-padded top to the ceiling. The threaded bottom section of tube can be cranked up on the foot shaft until pressure holds the unit firmly in place. The long unit comes knocked down into the parts shown in the first picture at right: foot, tube sections, and felt-padded top; adjustable ring with hook-ended white nylon cords, hinged supports for a horizontal bar, and two pairs of interlocking 5-foot trusses, folded flat. Once the verticals are up, trusses are swung open, locked into shape, and hung from the cords. The separate horizontal bar (center photo, bottom row) can be raised or lowered, on the umbrella-like spokes, to change the angle of the panels and fabrics. Electrical outlets attached to the poles allow the translucent fabrics to be lighted from within. Sheets of plastic are slipped into slats.

Neat new display shows off Owens-Corning's traveling fabrics on demountable

Frames for Fiberglas

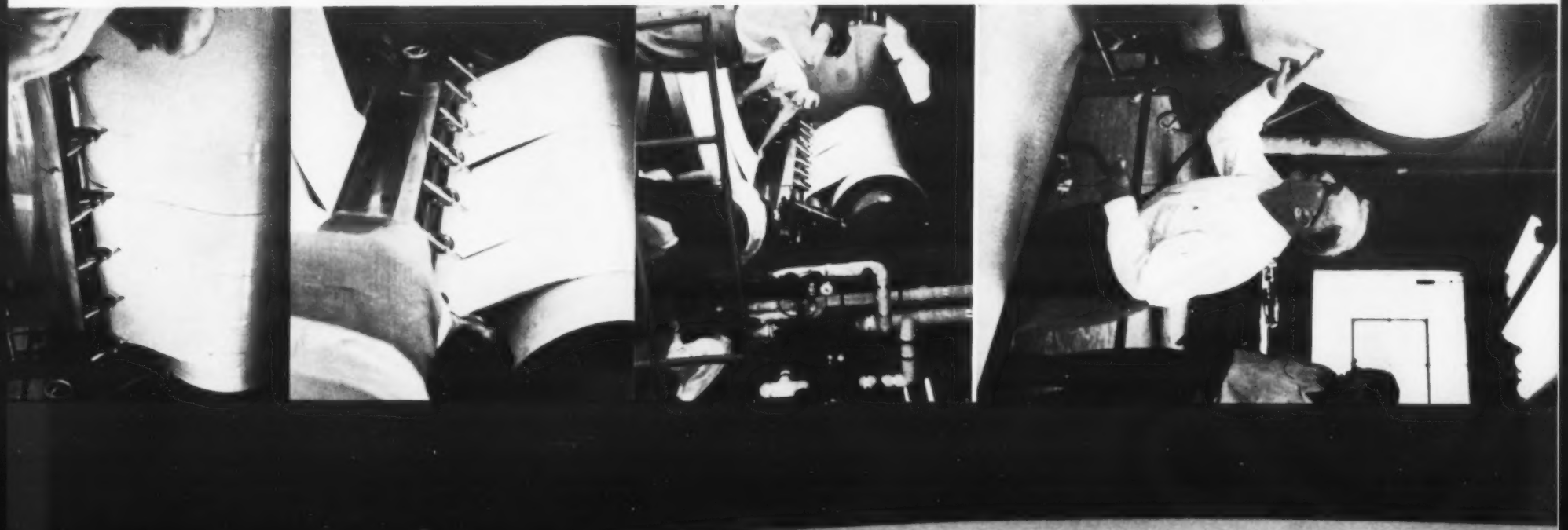
When Fiberglas representatives go on the road, they have the problem of showing off their wares in hotel rooms definitely not designed for the purpose. Joseph Merz, of architectural design associates Giurgola, Corbelletti, Merz, has designed for them a versatile traveling display frame, adaptable to capricious hotel ceiling heights, which can be quickly set up, demounted, and packed flat for shipping. The display consists of two types of units, made of standard bronze tubing (fitted by Beacon Artisans, Inc.) and white nylon cord. A circular frame displays fabrics, and a horizontal one can be variously arranged with fabrics, picture-text panels, and arched sheets of Fiberglas-reinforced plastic. The circular unit is 6′ in diameter; the horizontal unit is 10′ long. When two long units and two round ones are set up in a room, these proportions, the repetition of the two shapes, and the four 2′6″ square picture panels within each long unit, guarantee a certain rhythmic order to the exhibit no matter how the various parts are arranged. In bedroom, boudoir or ballroom, the display simply can't look anything but neat.

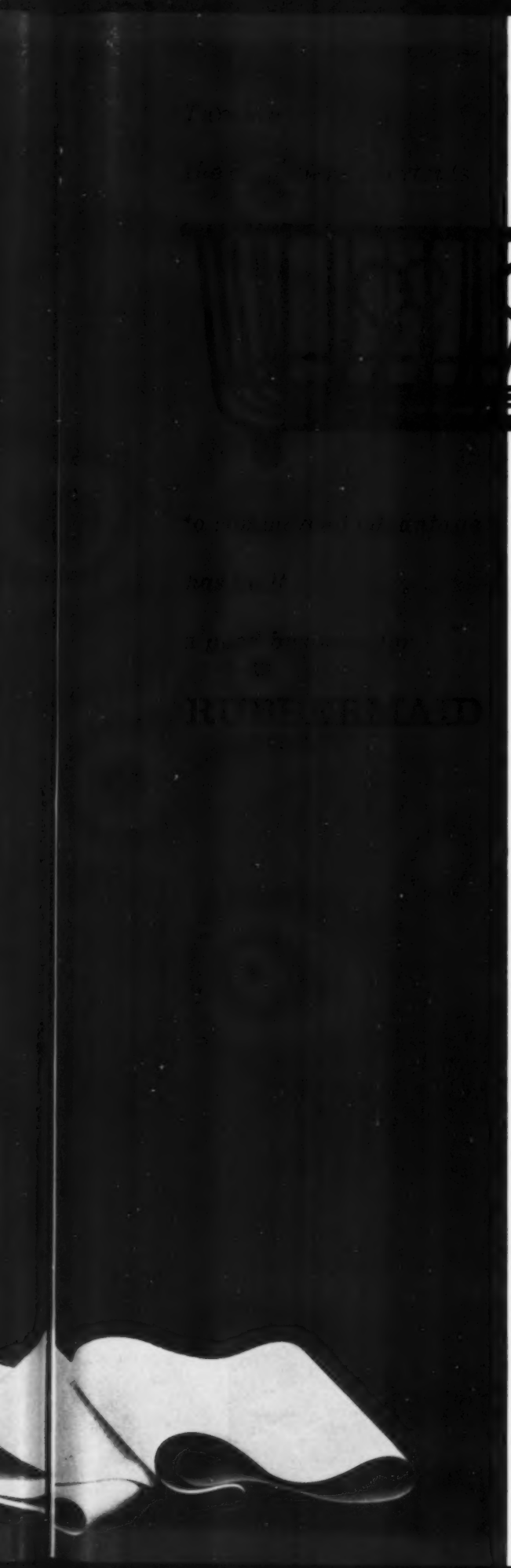


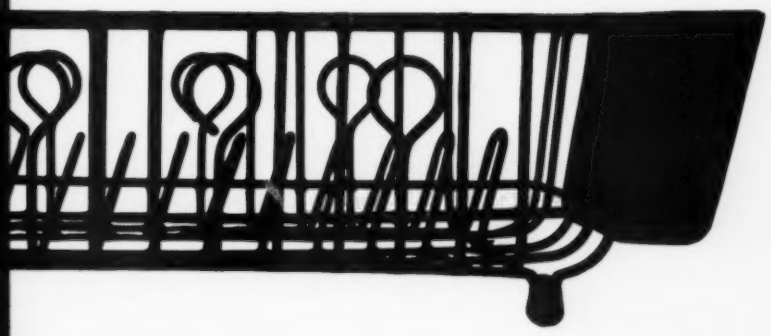


Photos by Hans Namuth

New Berstorff-Auma molds and cures in one continuous operation. Uncured, pre-heated rubber sheet is pressed around a hot, rotating patterned cylinder; cured sheet is slit before winding.



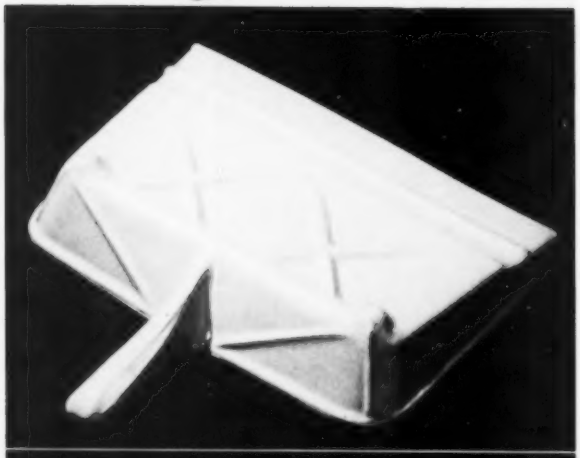


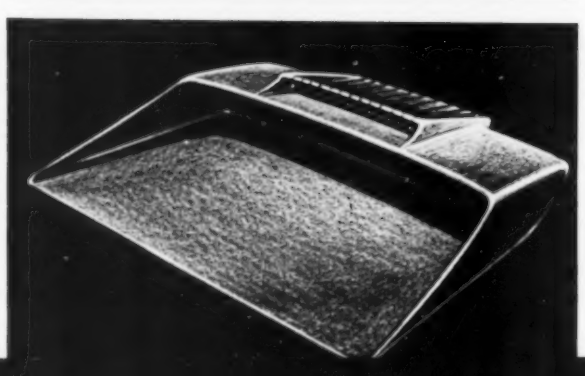


The limp ribbon at the left is a product of the Wooster Rubber Company called "Shelf Kushion." It is produced in endless rolls, 1,440 *yards a day, by a continuous processing machine which Wooster recently imported from Germany for* $80,000. *That's a lot of shelving to sell, and a heavy investment to be amortized by a sheet of ribbed rubber, but president Jim Caldwell, who built the* $14,000,000 *business on just such small rubber gadgets, decided that business actually demanded the machine. When Wooster introduced Shelf Kushion in* 1949, 36" *was the maximum length turned out by the standard press-molding process; yet by* 1953 *housewives had spent over* $2,000,000 *on the stuff. When a Texas customer bought* 320 *feet of shelving in* 17 *pieces, Calwell decided that continuous rolls would be more useful, and more salable, and bought the machine.*

Caldwell should know. Finding new ways to use and sell rubber has been his business for over 20 *years; he has built it by turning housewives' shortcuts to commercial advantage. His initial brainstorm is legend: During the '*20*s while a chemist for the Seamless Rubber Company, he was annoyed by a banged-up metal dustpan that missed the dust. He decided rubber would be better, designed an undentable footed pan, convinced U. S. Rubber to mold it, and sold it door-to-door. He had lots of time to observe his customers' kitchen habits: rags under glassware in the sink, towels under metal dish drainers to keep rust off porcelain. In* 1933 *he added a rubber drainboard and sink mat to his "Rubbermaid" line, and in* 1934 *took over an Ohio balloon factory with three employees. He immediately started experimenting with a coating for rubber, found a formula in* 1937, *then went on to develop rubbers for stove tops, cutting boards, flexible scrapers and racks. Today's Rubbermaid line totals* 68 *brightly colored molded and coated-wire products. With* 600 *employees, the firm's volume is* 10,000 *per cent larger than* 20 *years ago. Wooster has another* 45 *products under consideration—like most Rubbermaid items, they are new and sometimes fantastic ideas for making something useful out of a little slab or a little lump of rubber.*

Jim Caldwell, founder, president, and formerly research chemist, designer and sales manager of Wooster Rubber, designed the original rubber dustpan which still sells in only slightly modified form. To be on the safe side, Wooster's asked designers Smith and Scherr to visualize the dustpan of tomorrow (bottom.)





Two products which popularized the Rubbermaid name are still in kitchens after two decades.

The dustpan has sentimental as well as commercial value for Wooster: it was the item that put Caldwell in business in the 30's, and still a good seller. Caldwell holds that changing a product for change's sake is bad business and, as the photos show, the big change in the dustpan over the years has been color. When he designed it, green, if anything, was probably the most acceptable kitchen color; red was considered garish, and was hard to sell. Caldwell's marbleized green pan raised lots of interest in matching colored items. (Rubber, like linoleum, aped marble, which was supposed to be sanitary.) In 1938 he switched to solid colors, because he felt they were more sanitary-looking and more attractive. Today 50 per cent of all Rubbermaid products sold are red.

Probably the best-known Rubbermaid item is the spatula. Some 40,000,000 have been sold since 1934, 10 per cent of them last year alone. Caldwell designed it as a sink shovel (top right), later made the blade flexible—with no thought to its cooking uses. Housewives found it was good for stirring between the blades of electric mixers, and for scraping bowls, and it became a best-selling spatula. A new variation is a thin-blade bottle scraper which Caldwell invented while watching his daughter at work on a babyfood jar with a spoon.

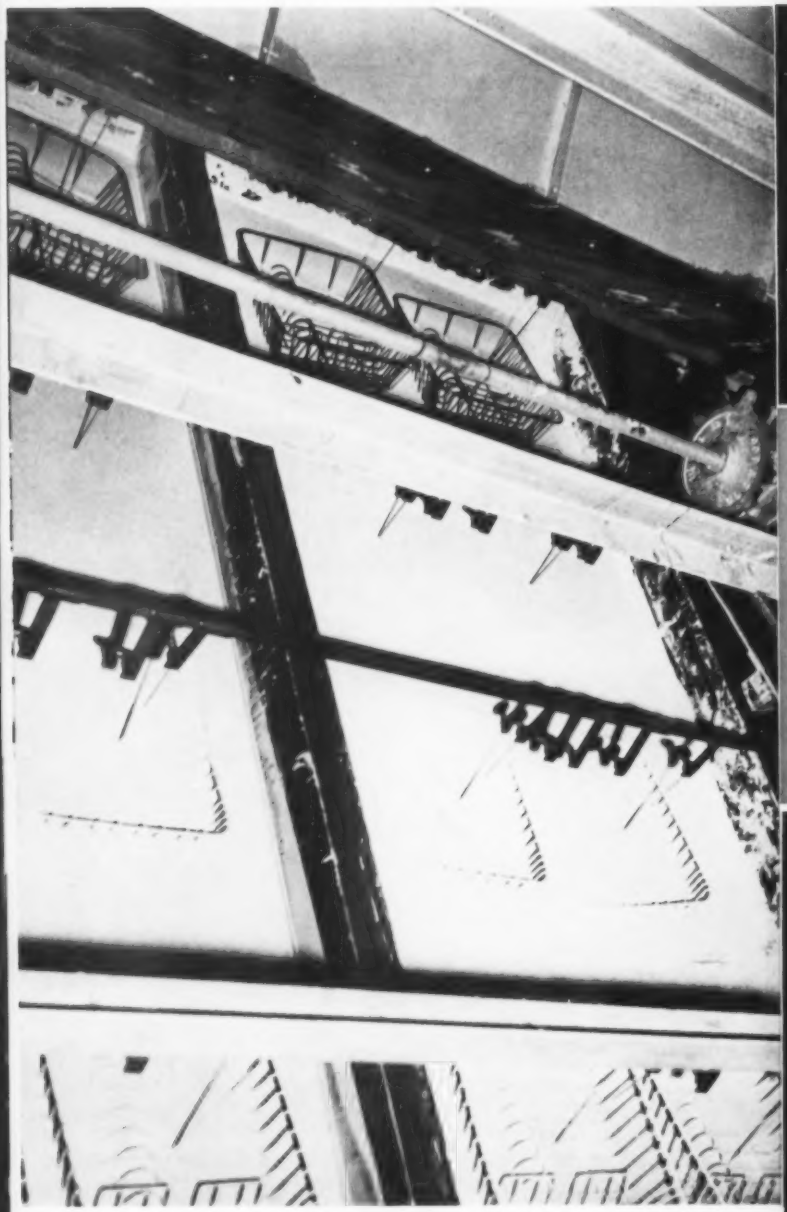
It is legend that Rubbermaid products design themselves. In practice this happens two ways: 1) The homemaker's needs are observed, or merely projected, and solved in some inventive way. Pads, liners, shelving, and coated baskets all came about to soothe minor kitchen irritations. 2) Suggestions from customers (hundreds of letters a week) yield some ideas, and 104 store representatives feed back valuable information about what people do with Rubbermaid products (seldom more imaginative than the lady who bought dog dishes for kneeling pads). One idea comes up at least once a week: a rubber sink. Caldwell thinks it would be too expensive, and holds that sink liners do the job.

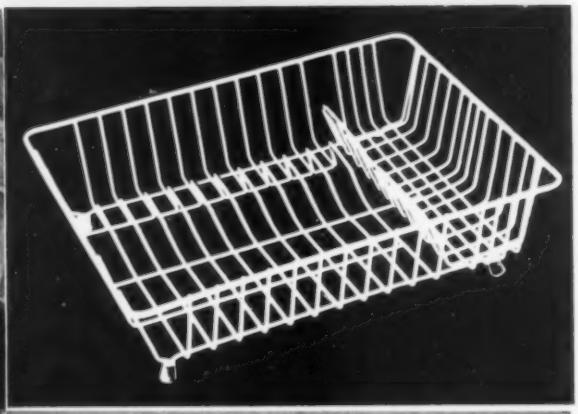
Even customer-designed ideas don't design themselves into products, and Wooster now has an executive Product Development and Merchandising Committee which evaluates new ideas before turning them over to designers.

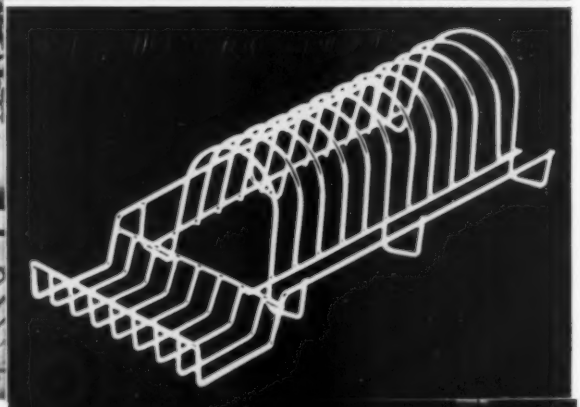
The original sink scrapers of 1934 *and* 1935 *(top) were parents of the spatulas in the picture directly above. Among the many funny little rubber gadgets in today's line is a clamp pad, to protect surfaces under food grinders, and coasters, which are small cuts of a pattern made for floors of automobiles.*

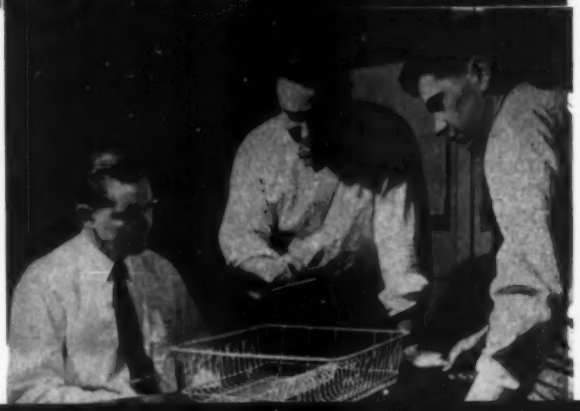
Rubbermaid

Coated wire, one of Wooster's staples, is sold in countless variations.



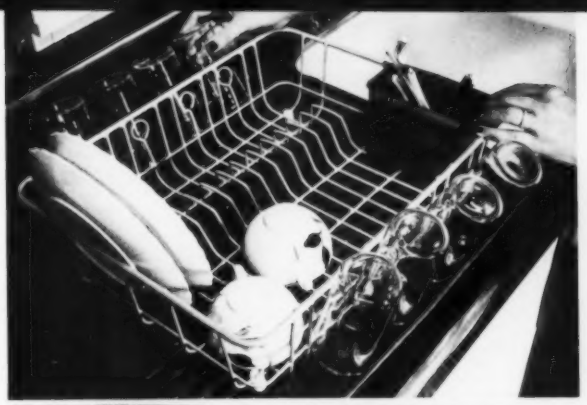






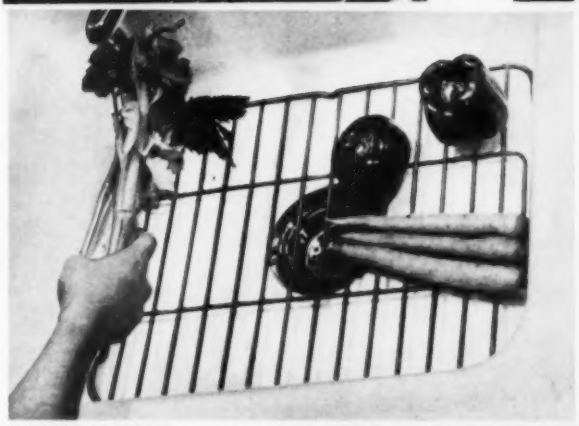
Wire items are now coated with two types of vinyl: Organosol for housewares, and Plastisol for commercial items. On Wooster's conveyorized dipping machine, baskets are pre-heated to clean wire and regulate amount of coating they will pick up, then dipped in plastic bath which moves at speed of conveyor to prevent feathering.

As soon as Caldwell acquired his own factory, he began experimenting with a colored rubber coating for wire dish drainers. He achieved the first non-rusting rack in 1937.



In* 1943, *Wooster began coating all its wire racks with a new vinyl chloride solution. The newest vinyl-clad rack has special hooks for glasses and cups; silver basket is now detachable.

In his early talks with housewives, Caldwell found that they were wary of putting colored rubber on white sinks. He added little white feet to show that rubber would not discolor sinks; they remained as identifying mark of Rubbermaid.

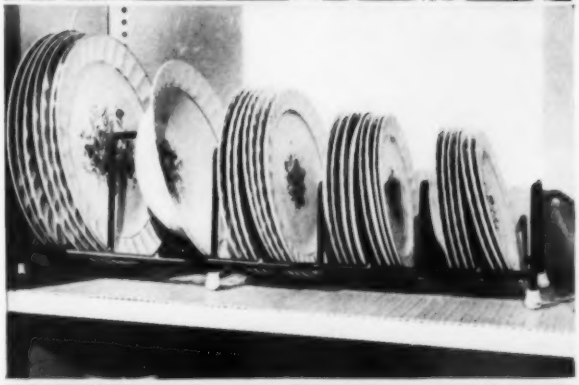


Sink strainer, recent addition to the line, replaces conventional strainer for washing vegetables without submerging them in rinse water.

New conveniences were added to the original dish drainer: a basket for silverware was first horizontal (above) and later evolved into a corner basket in which to stand silver upright for better drainage.

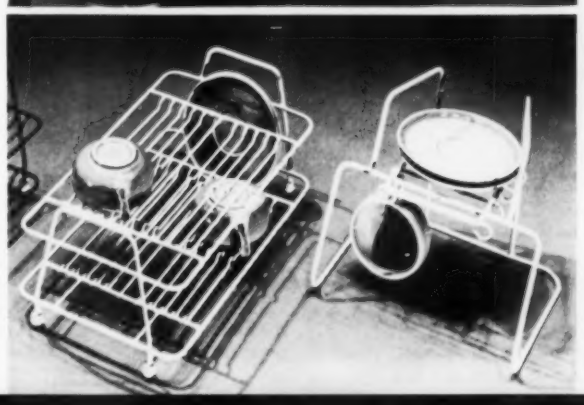
The resilient cushion of this simple basket makes it especially good for eggs, but like many Rubbermaid products, it turns out to be an all-purpose item; many customers buy it as an auxiliary dish drainer, especially for glasses.

An early dish drainer was designed with slots for plates and silver only; perhaps because it was so specialized, was never very popular. But it proved to be the parent of a later success (right).



When Caldwell noticed a neighbor using the old dish drainer to store dishes, he introduced this variation as a plate rack. It turned out to be very popular for everything from desk files to handbags.

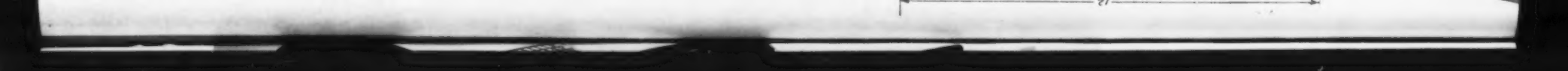
Product engineer Hensley Hobbs, chief designer J. C. Breneman and design engineer Richard Lawhead discuss one of the newest products. Since Wooster rarely changes a design from year to year, a large part of their work is refinement, improvement, and dreaming up new products.

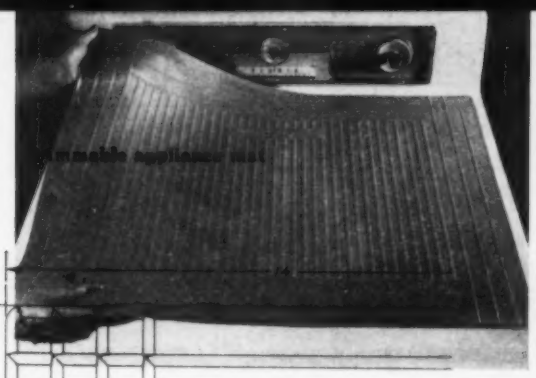


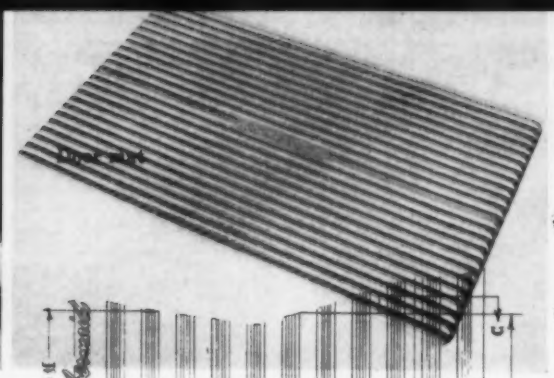
The little cup rack, introduced a few years ago, was not a success, but the dish rack designed especially for Corning Glass has been extremely popular with buyers of Pyrex dishes. It holds 6 place settings in 70 per cent of the normal space.

The majority of Wooster products are rubber mats, variously ridged, grooved, and formulated to fit a multitude of purposes. Some, like the auto mats (top left corner, above), are made for other manufacturers. Ideas for these mats come from all over — customers, representatives, designers; and in one case the company even held a contest (facing page). Working out the ideas attractively keeps three designers and two engineers busy. For instance, the apparently simple doormat (facing page, top) was designed with a flat surface and sloping grooves to permit drainage. The bathtub mat, with suction cups and drainage holes, required a surprisingly complicated mold. At the right, the waffle-iron-like press mold in which all mats were formed before Wooster purchased the Auma, shown on page 34.

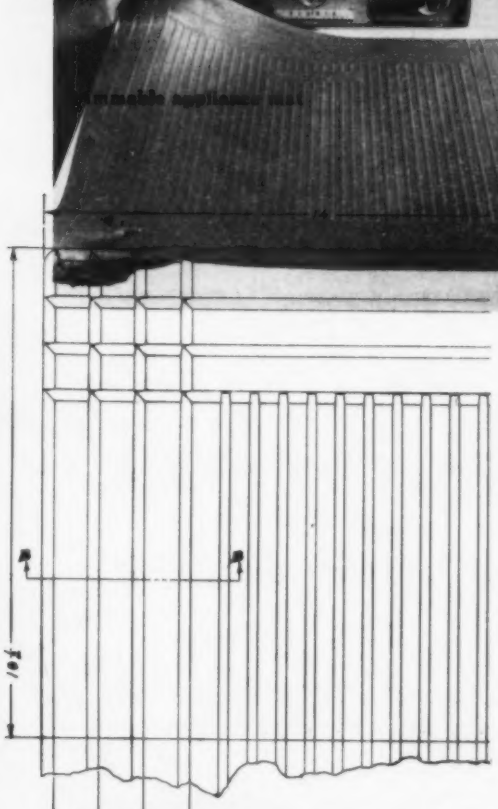
Mats of all descriptions dominate the Rubbermaid line

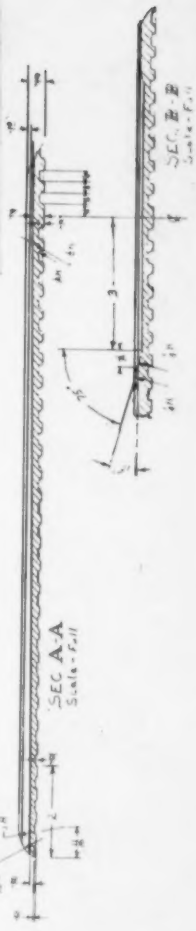




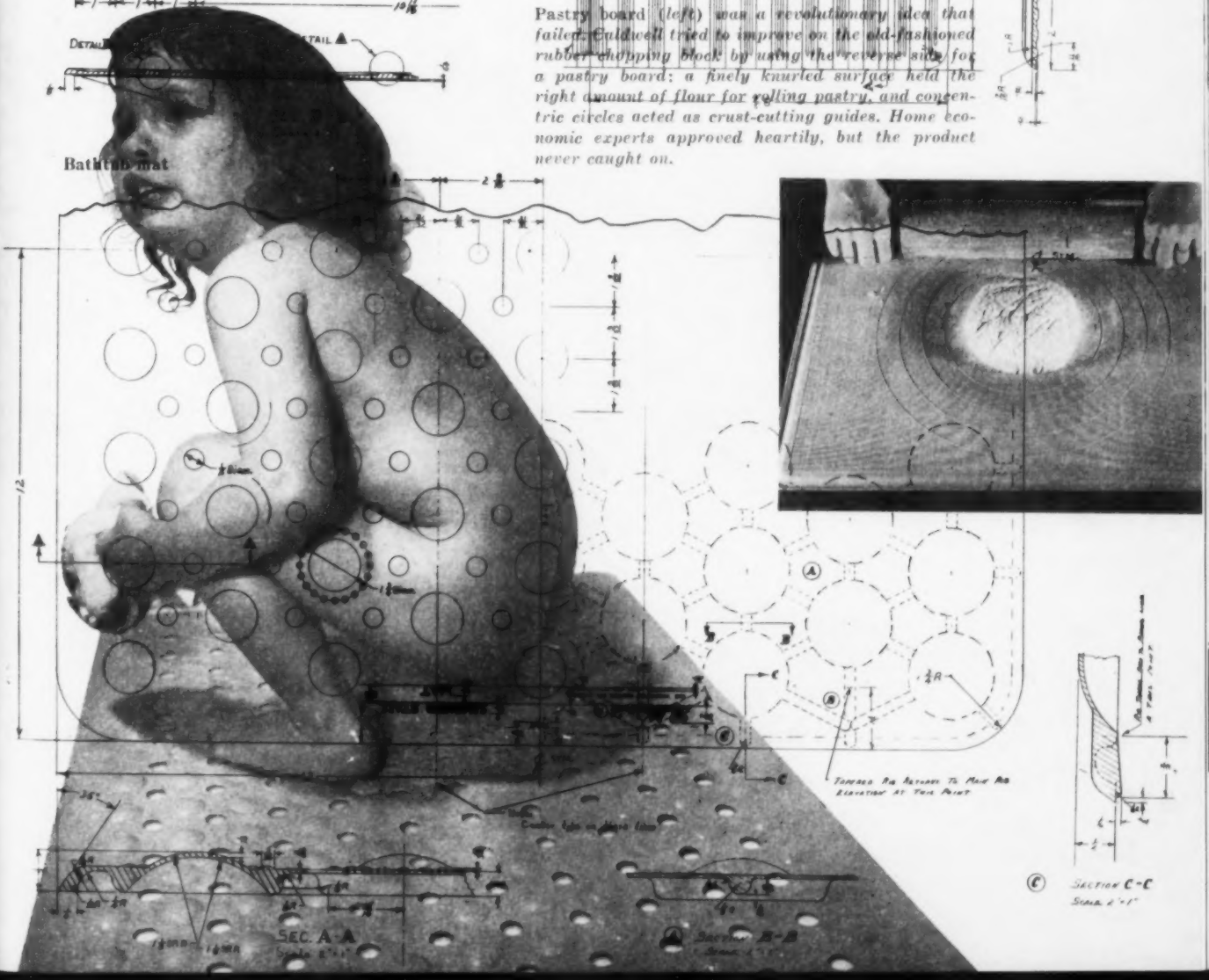


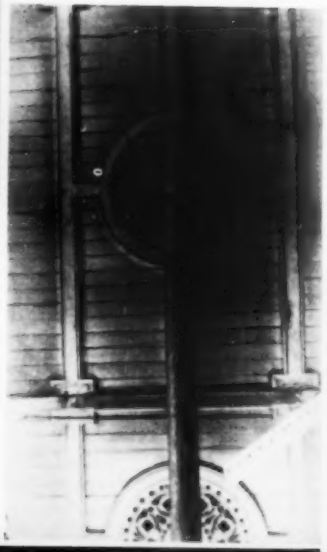
Trimmable mat was the result of a contest among store representatives for a mat to protect appliance tops. Winning design provided bordering ridges an inch apart as guides for cutting the mat to desired size. Doormat, right, has drainage grooves sloping away from center. Drawings are on overlay sheet.

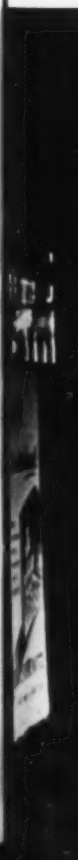




Pastry board (left) was a revolutionary idea that failed. Caldwell tried to improve on the old-fashioned rubber chopping block by using the reverse side for a pastry board: a finely knurled surface held the right amount of flour for rolling pastry, and concentric circles acted as crust-cutting guides. Home economic experts approved heartily, but the product never caught on.







A trip on the El, for all its discomforts, was always an adventure and was once even fashionable.

A ride on the early steam-powered El was likely to be so messy that women wrapped themselves in dusters before taking a trip; engines often got stuck between stations, and there were near-disasters when the engineer took the curves too fast. But the interiors of the cars were luxurious: there were rugs on the floors and leather upholstery on the seats. Fare was 10c, but you didn't have to pay the collector if you couldn't find a seat. When people complained that the fare made the El a rich man's ride, the city responded with the somewhat puzzling maneuver of lowering it to 5c during rush hours.

From the beginning, the character of the El was chiefly determined by its height above the street, which implied (somewhat as air travel does today) both adventure and luxury.

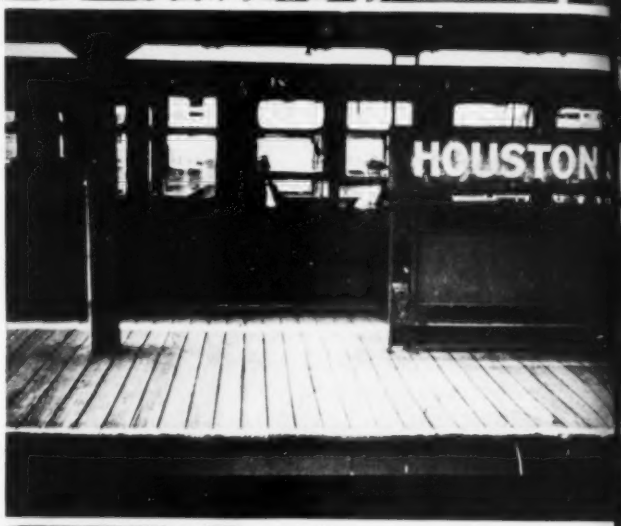
Its passengers were invited to leave the world of the streets and ascend to a higher one, from which the same old sidewalks and buildings took on a new perspective. The El was by nature indifferent to its effect on the long avenues which it darkened. Hence the bitter (though unsuccessful) newspaper campaigns which it first aroused; hence the cumulative civic frustration which eventually destroyed the El. Long after it had ceased to be a fashionable mode of transportation, it continued to reflect its own aristocratic temperament. But its minor virtues, both as a relatively fast means of transportation and as an enjoyable one, increasingly lost popular support, and were finally appreciated only by the sophisticated and the sentimental.

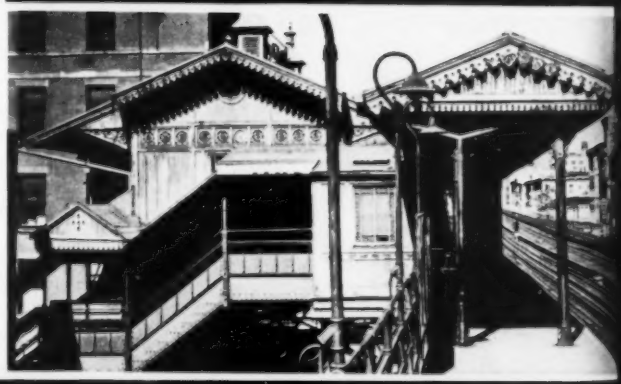
For the traveller who was prepared to see its virtues, however, the experience of riding the El was more than worth its minor discomforts. Up the makeshift, semi-enclosed stairway (a note of peril immediately introduced), he climbed to the stationhouse, with its ticket window and turnstiles (an innovation dating only from 1923). In many respects the El station was hardly different from any Victorian railroad station. But in the process of being hoisted into the air, a transformation took place. The designers, whoever they may have been, clearly saw no reason to devise a new structure merely because it was to be airborne. With the Victorian talent for adapting impossible shapes to useful ends, they merely shifted the masses of the building as practicality required, and in the process produced something of a new stationhouse architecture. In time the stations grew dingy, but the interiors continued to glow with a richness of ornament — potbellied stoves, roof brackets, transoms, and stained glass. In cold weather the traveller could pause inside to warm himself; otherwise, he passed on out to the platform, to a new orientation. Here, or from the street, the stations came into their own as architecture.

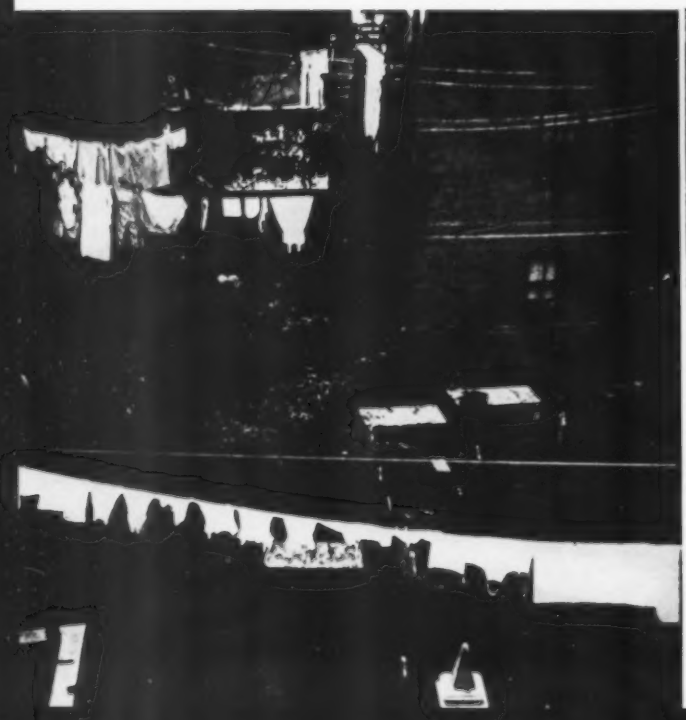
There was always a sideshow for the rider of the El

The Manhattan skyline is made visible only by height or distance; the El brought it into view from a new and rewarding vantage point — not terribly high, but with a sense of motion which made the view unique. Even the view down the track, a familiar sight on any railroad, became a unique vista on the El: the ribbon wound its way indifferently among the upper stories of earthbound buildings at a height which suddenly made them less domineering, made the city streets seem less cavernous. On the train itself, you had a choice of commanding the track front or back, from a semi-private cubicle, or of looking down on the everyday life of windows, washlines, backyard bucolics, and sidewalk saloons. The speed was slow enough for snooping — (a nude — a poker game) yet fast enough to embarrass neither *voyeur* nor viewed. This was another of the El's ambiguous benefits: having created a slum along its length, it had acquired a fascinating view — a permanent sideshow which was one of its big attractions. Park Avenue, by comparison, would have been a dreary ride.

While the rider was aloft enjoying the view, the motorist and pedestrian had little choice but to suffer in the noise and the gloom below. Yet even this was not entirely bad. The street under the El was more like a roofed corridor than a street, and the sun which managed to filter through the complex structure arrived weakened but enriched. Because of the El, Third Avenue always had an intimacy, a neighborly mood which, in turn, made it the home of much that was derelict and disreputable — much that might not have survived in the glare of another unshaded street.

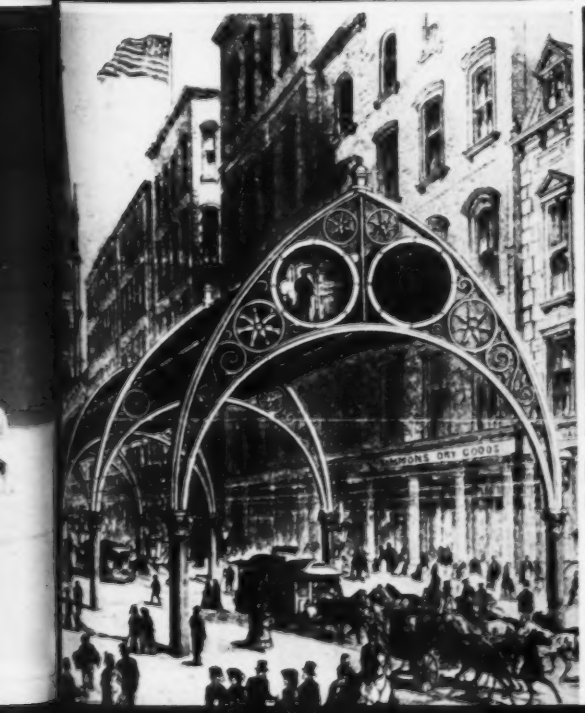






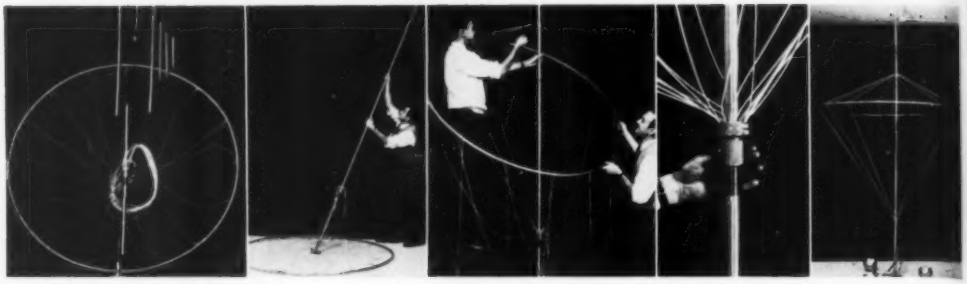
The El was an architectural event in the city scene

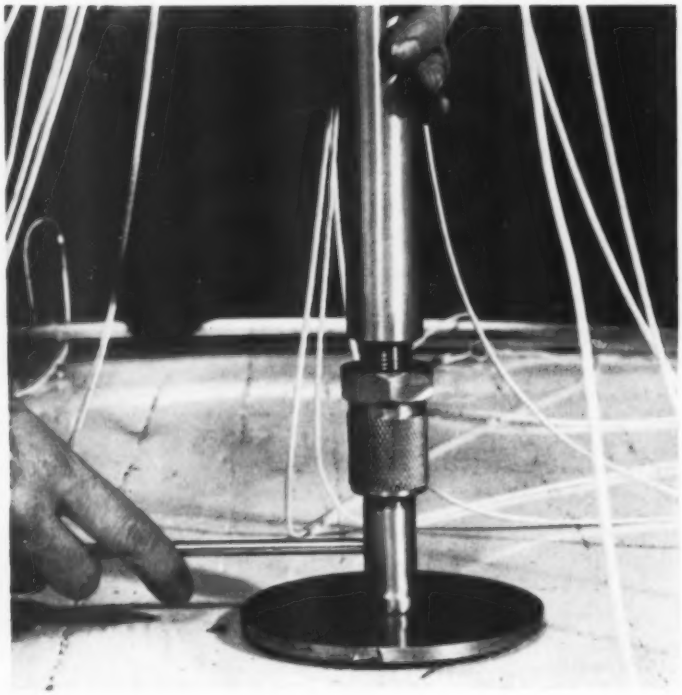
Now that transportation has been taken over by the invisible subway, and the formless and transient bus, it is striking to see how consistently the elevated railways accepted their responsibility a part of the cityscape. From the most fantastic of the early schemes, the Els were conceived as structures of great visual interest. When the El is gone, New York will lose what the El's builders contributed: a means of transportation that was something meant to be looked at, and to give pleasure in being seen. Not only Third Avenue but the cross-town streets benefitted, as the El interrupted their eventless line from river to river, and added a welcome variation to the normally standardized meetings of city streets.



Ironwork and sunlight created the El's rich scenery

As people spend more and more time in urban transit, the pleasures of travel seem to diminish proportionately. Is there any way, in future city construction, to match the El's extraordinary combination of shelter, motion, intimacy, enlarged perspective and rich textures? The departing El itself suggests how it might be done: Its structure and its embellishments use a repetition of identical elements to create delightful scenery; stained glass, cast iron brackets, railings and trims all filter and modulate the patterns of sunlight which are the chief decorations of any city. The El should remind designers, concerned with the human as well as the practical end of a product or structure, that it is possible, by very simple means, to make a ride to work a pleasure, instead of an ordeal to be borne in suffering silence.



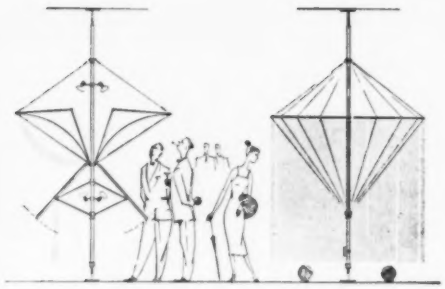


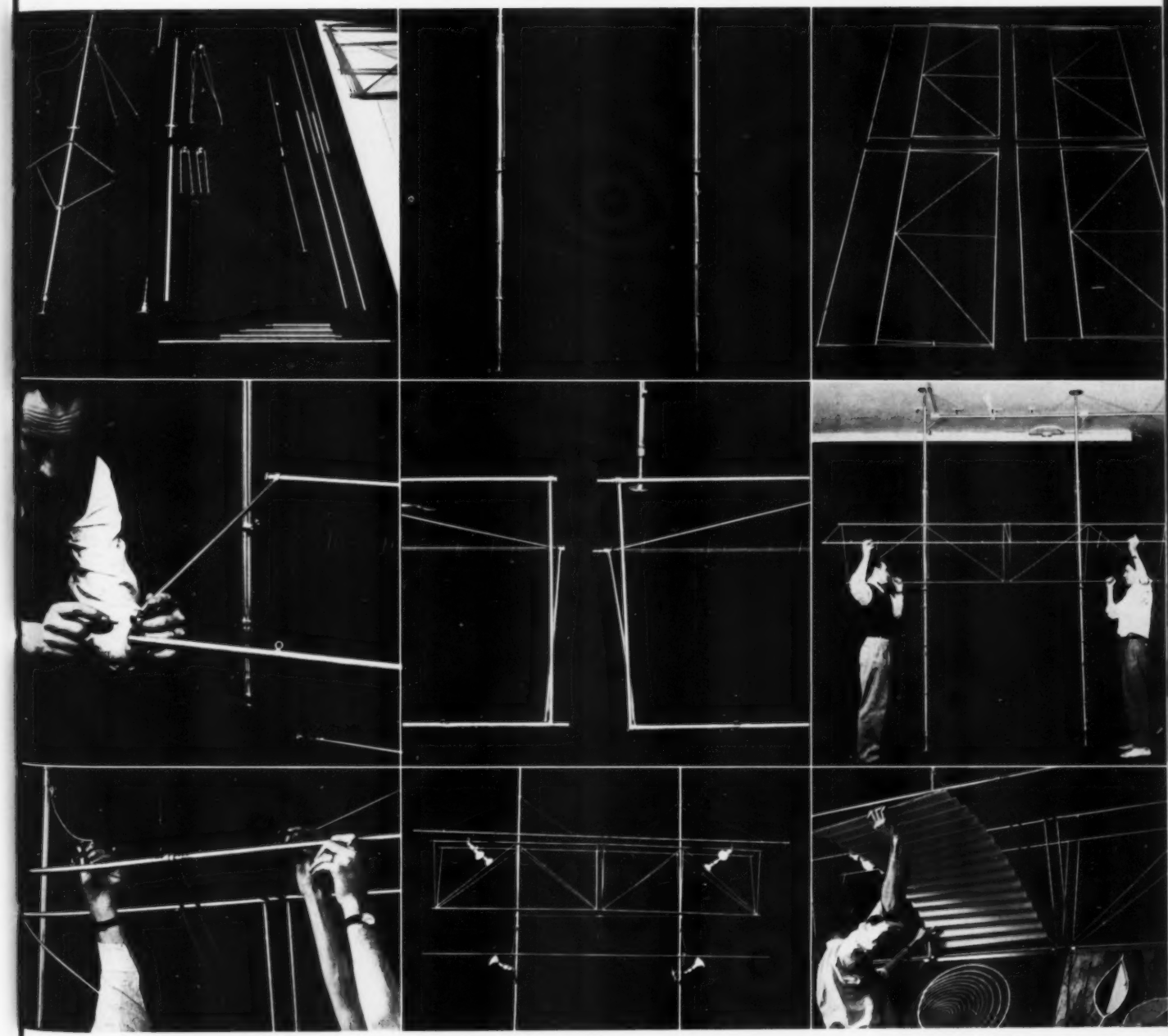
Clue to the frame's adaptibility is the felt-padded foot with its threaded shaft (l.): vertical supports on both units are formed of as many 4-foot lengths of tube as necessary to raise the felt-padded top to the ceiling. The threaded bottom section of tube can be cranked up on the foot shaft until pressure holds the unit firmly in place. The long unit comes knocked down into the parts shown in the first picture at right: foot, tube sections, and felt-padded top; adjustable ring with hook-ended white nylon cords, hinged supports for a horizontal bar, and two pairs of interlocking 5-foot trusses, folded flat. Once the verticals are up, trusses are swung open, locked into shape, and hung from the cords. The separate horizontal bar (center photo, bottom row) can be raised or lowered, on the umbrella-like spokes, to change the angle of the panels and fabrics. Electrical outlets attached to the poles allow the translucent fabrics to be lighted from within. Sheets of plastic are slipped into slats.

Neat new display shows off Owens-Corning's traveling fabrics on demountable

Frames for Fiberglas

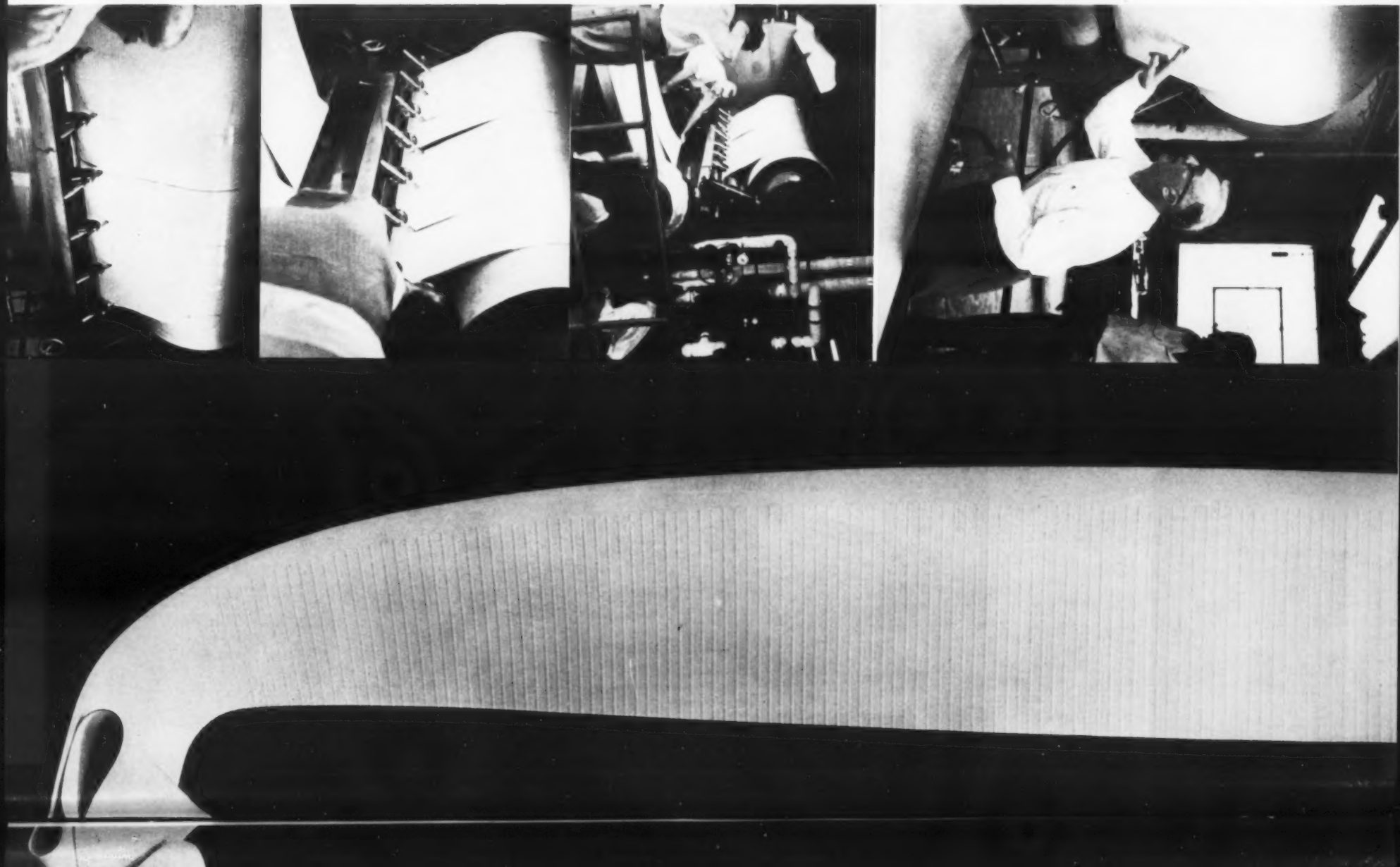
When Fiberglas representatives go on the road, they have the problem of showing off their wares in hotel rooms definitely not designed for the purpose. Joseph Merz, of architectural design associates Giurgola, Corbelletti, Merz, has designed for them a versatile traveling display frame, adaptable to capricious hotel ceiling heights, which can be quickly set up, demounted, and packed flat for shipping. The display consists of two types of units, made of standard bronze tubing (fitted by Beacon Artisans, Inc.) and white nylon cord. A circular frame displays fabrics, and a horizontal one can be variously arranged with fabrics, picture-text panels, and arched sheets of Fiberglas-reinforced plastic. The circular unit is 6′ in diameter; the horizontal unit is 10′ long. When two long units and two round ones are set up in a room, these proportions, the repetition of the two shapes, and the four 2′6″ square picture panels within each long unit, guarantee a certain rhythmic order to the exhibit no matter how the various parts are arranged. In bedroom, boudoir or ballroom, the display simply can't look anything but neat.

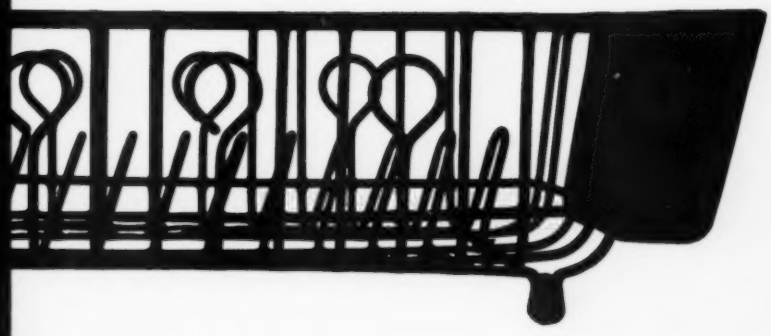




Photos by Hans Namuth

New Berstorff-Auma molds and cures in one continuous operation. Uncured, pre-heated rubber sheet is pressed around a hot, rotating patterned cylinder; cured sheet is slit before winding.



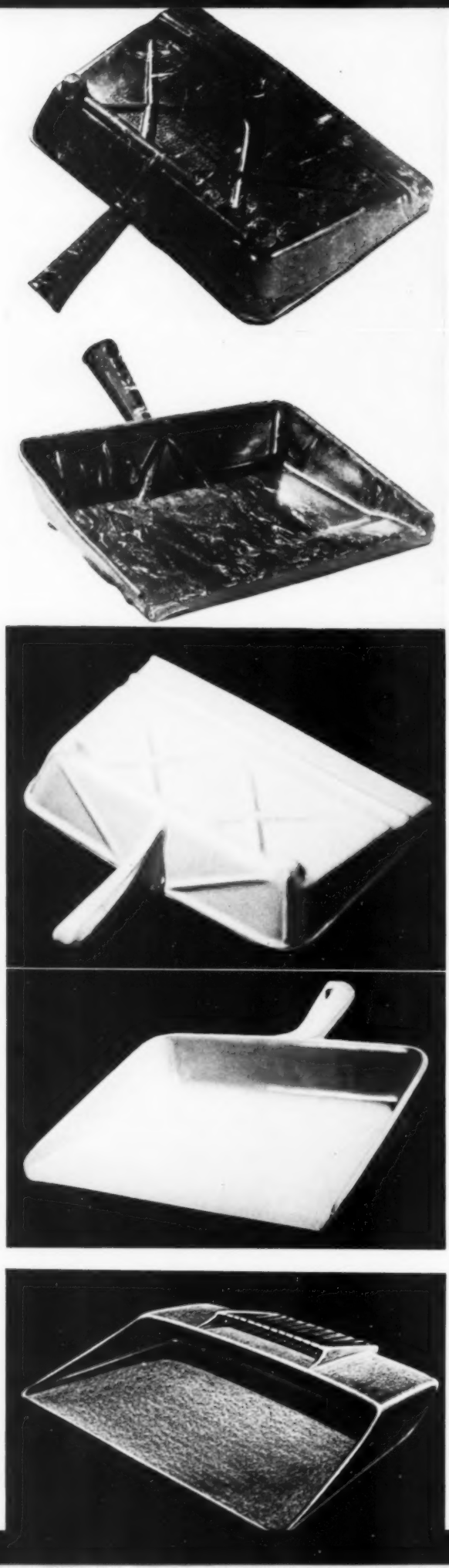


The limp ribbon at the left is a product of the Wooster Rubber Company called "Shelf Kushion." It is produced in endless rolls, 1,440 yards a day, by a continuous processing machine which Wooster recently imported from Germany for $80,000. That's a lot of shelving to sell, and a heavy investment to be amortized by a sheet of ribbed rubber, but president Jim Caldwell, who built the $14,000,000 business on just such small rubber gadgets, decided that business actually demanded the machine. When Wooster introduced Shelf Kushion in 1949, 36" was the maximum length turned out by the standard press-molding process; yet by 1953 housewives had spent over $2,000,000 on the stuff. When a Texas customer bought 320 feet of shelving in 17 pieces, Calwell decided that continuous rolls would be more useful, and more salable, and bought the machine.

Caldwell should know. Finding new ways to use and sell rubber has been his business for over 20 years; he has built it by turning housewives' shortcuts to commercial advantage. His initial brainstorm is legend: During the '20s while a chemist for the Seamless Rubber Company, he was annoyed by a banged-up metal dustpan that missed the dust. He decided rubber would be better, designed an undentable footed pan, convinced U. S. Rubber to mold it, and sold it door-to-door. He had lots of time to observe his customers' kitchen habits: rags under glassware in the sink, towels under metal dish drainers to keep rust off porcelain. In 1933 he added a rubber drainboard and sink mat to his "Rubbermaid" line, and in 1934 took over an Ohio balloon factory with three employees. He immediately started experimenting with a coating for rubber, found a formula in 1937, then went on to develop rubbers for stove tops, cutting boards, flexible scrapers and racks. Today's Rubbermaid line totals 68 brightly colored molded and coated-wire products. With 600 employees, the firm's volume is 10,000 per cent larger than 20 years ago. Wooster has another 45 products under consideration—like most Rubbermaid items, they are new and sometimes fantastic ideas for making something useful out of a little slab or a little lump of rubber.

Rubbermaid

Jim Caldwell, founder, president, and formerly research chemist, designer and sales manager of Wooster Rubber, designed the original rubber dustpan which still sells in only slightly modified form. To be on the safe side, Wooster's asked designers Smith and Scherr to visualize the dustpan of tomorrow (bottom.)



Two products which popularized the Rubbermaid name are still in kitchens after two decades.

The dustpan has sentimental as well as commercial value for Wooster: it was the item that put Caldwell in business in the 30's, and still a good seller. Caldwell holds that changing a product for change's sake is bad business and, as the photos show, the big change in the dustpan over the years has been color. When he designed it, green, if anything, was probably the most acceptable kitchen color; red was considered garish, and was hard to sell. Caldwell's marbleized green pan raised lots of interest in matching colored items. (Rubber, like linoleum, aped marble, which was supposed to be sanitary.) In 1938 he switched to solid colors, because he felt they were more sanitary-looking and more attractive. Today 50 per cent of all Rubbermaid products sold are red.

Probably the best-known Rubbermaid item is the spatula. Some 40,000,000 have been sold since 1934, 10 per cent of them last year alone. Caldwell designed it as a sink shovel (top right), later made the blade flexible—with no thought to its cooking uses. Housewives found it was good for stirring between the blades of electric mixers, and for scraping bowls, and it became a best-selling spatula. A new variation is a thin-blade bottle scraper which Caldwell invented while watching his daughter at work on a babyfood jar with a spoon.

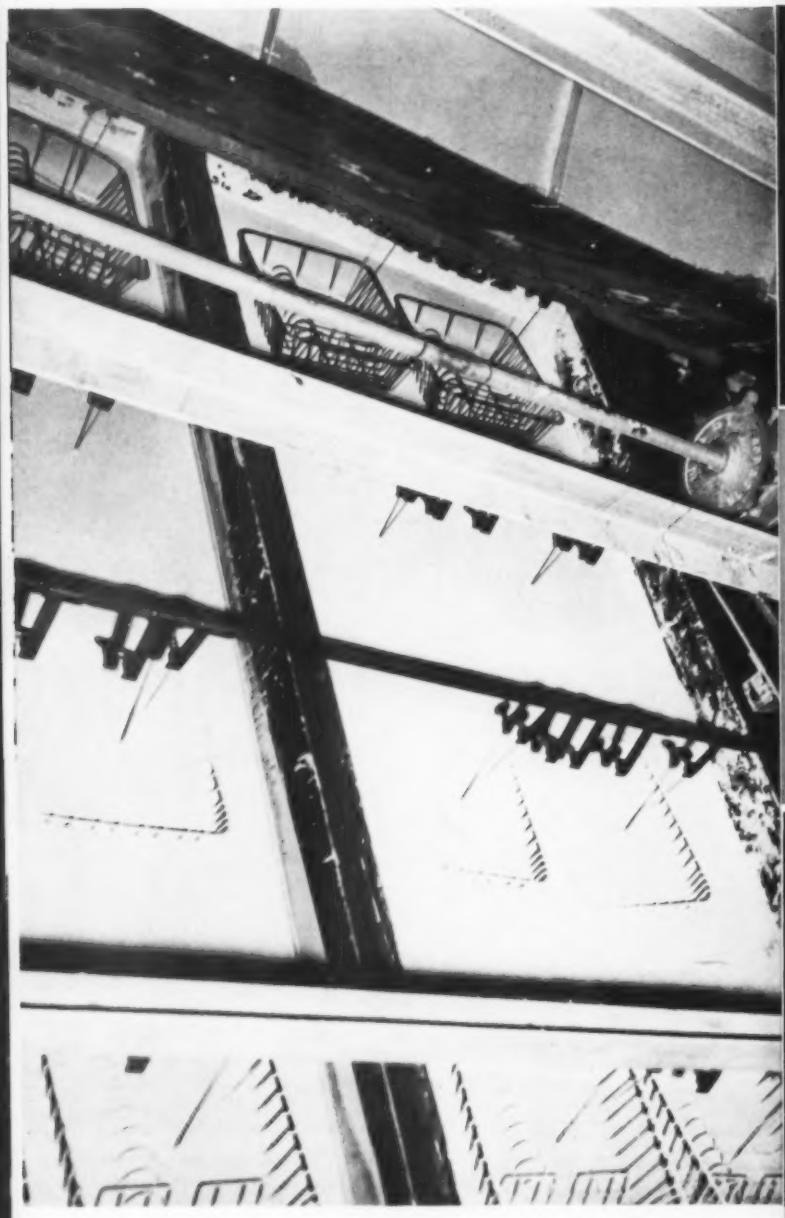
It is legend that Rubbermaid products design themselves. In practice this happens two ways: 1) The homemaker's needs are observed, or merely projected, and solved in some inventive way. Pads, liners, shelving, and coated baskets all came about to soothe minor kitchen irritations. 2) Suggestions from customers (hundreds of letters a week) yield some ideas, and 104 store representatives feed back valuable information about what people do with Rubbermaid products (seldom more imaginative than the lady who bought dog dishes for kneeling pads). One idea comes up at least once a week: a rubber sink. Caldwell thinks it would be too expensive, and holds that sink liners do the job.

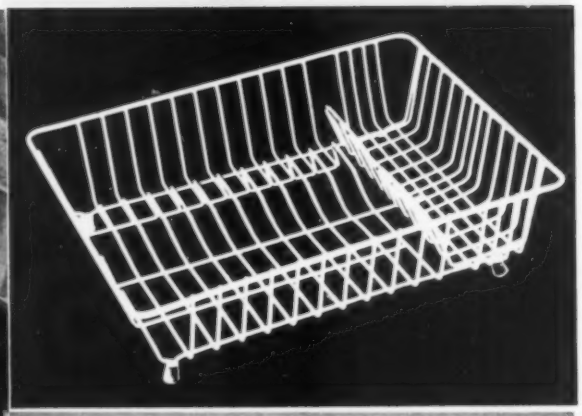
Even customer-designed ideas don't design themselves into products, and Wooster now has an executive Product Development and Merchandising Committee which evaluates new ideas before turning them over to designers.

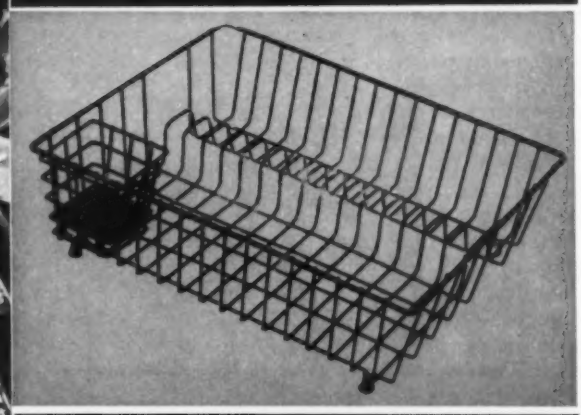
The original sink scrapers of 1934 *and* 1935 *(top) were parents of the spatulas in the picture directly above. Among the many funny little rubber gadgets in today's line is a clamp pad, to protect surfaces under food grinders, and coasters, which are small cuts of a pattern made for floors of automobiles.*

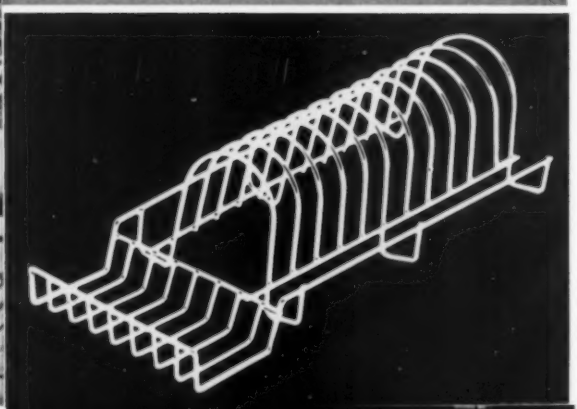
Rubbermaid

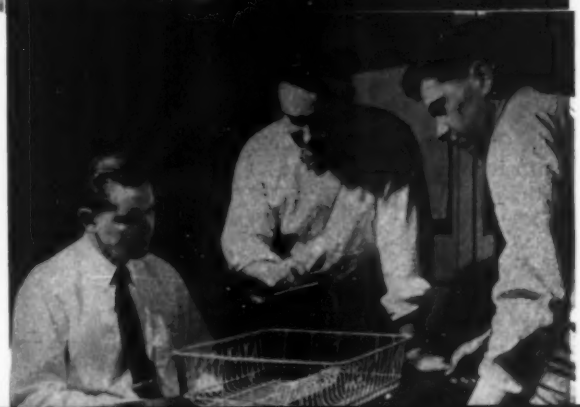
Coated wire, one of Wooster's staples, is sold in countless variations.







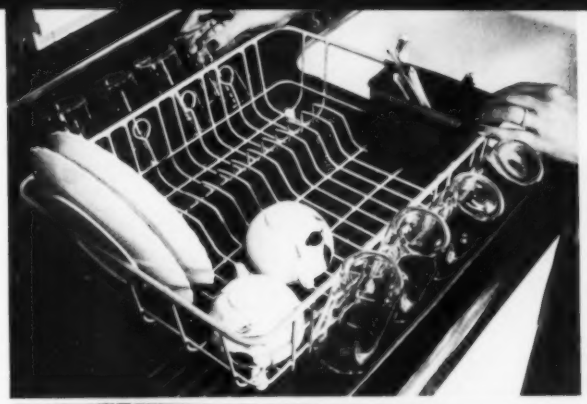




Wire items are now coated with two types of vinyl: Organosol for housewares, and Plastisol for commercial items. On Wooster's conveyorized dipping machine, baskets are pre-heated to clean wire and regulate amount of coating they will pick up, then dipped in plastic bath which moves at speed of conveyor to prevent feathering.

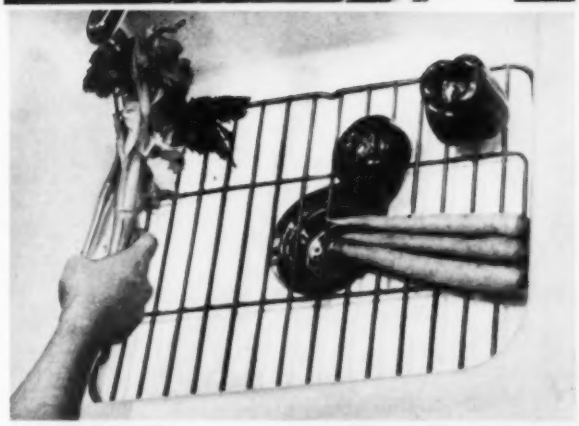
As soon as Caldwell acquired his own factory, he began experimenting with a colored rubber coating for wire dish drainers. He achieved the first non-rusting rack in 1937.

In 1943, Wooster began coating all its wire racks with a new vinyl chloride solution. The newest vinyl-clad rack has special hooks for glasses and cups; silver basket is now detachable.



In his early talks with housewives, Caldwell found that they were wary of putting colored rubber on white sinks. He added little white feet to show that rubber would not discolor sinks; they remained as identifying mark of Rubbermaid.

Sink strainer, recent addition to the line, replaces conventional strainer for washing vegetables without submerging them in rinse water.



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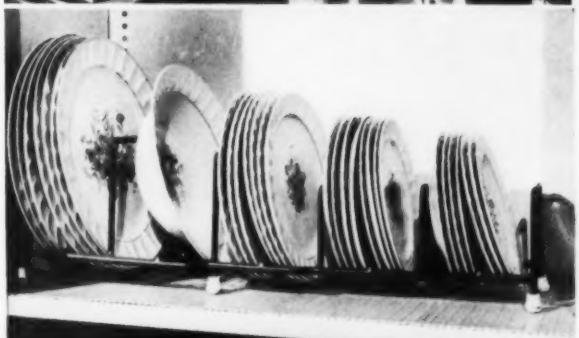
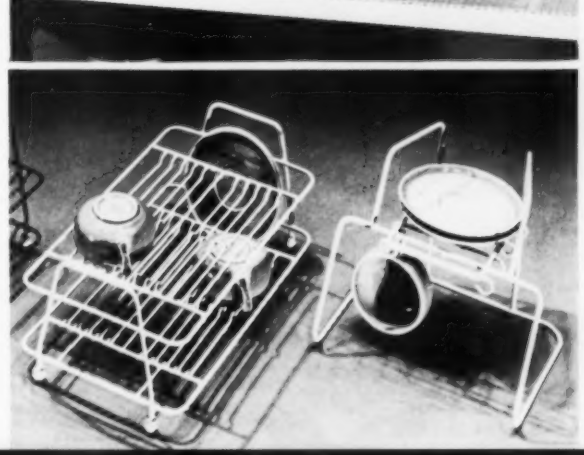
When Caldwell noticed a neighbor using the old dish drainer to store dishes, he introduced this variation as a plate rack. It turned out to be very popular for everything from desk files to handbags.



Product engineer Hensley Hobbs, chief designer J. C. Breneman and design engineer Richard Lawhead discuss one of the newest products. Since Wooster rarely changes a design from year to year, a large part of their work is refinement, improvement, and dreaming up new products.

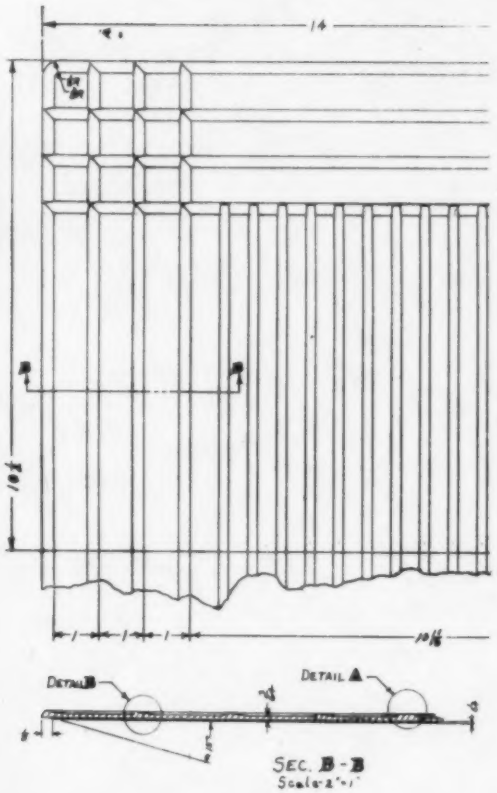
The little cup rack, introduced a few years ago, was not a success, but the dish rack designed especially for Corning Glass has been extremely popular with buyers of Pyrex dishes. It holds 6 place settings in 70 per cent of the normal space.



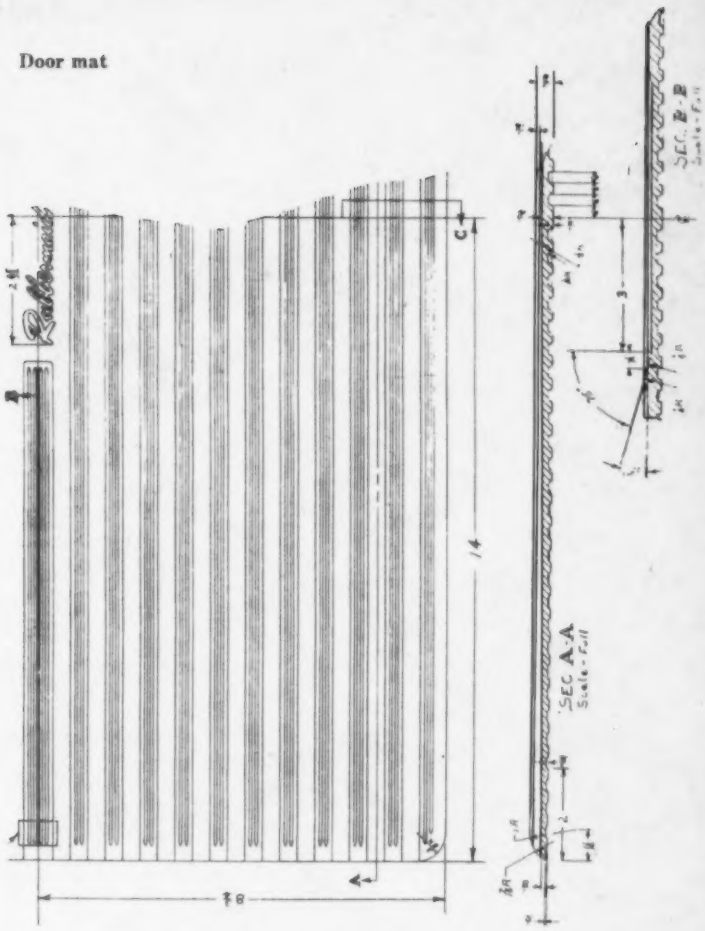
Mats of all descriptions dominate the Rubbermaid line

The majority of Wooster products are rubber mats, variously ridged, grooved, and formulated to fit a multitude of purposes. Some, like the auto mats (top left corner, above), are made for other manufacturers. Ideas for these mats come from all over — customers, representatives, designers; and in one case the company even held a contest (facing page). Working out the ideas attractively keeps three designers and two engineers busy. For instance, the apparently simple doormat (facing page, top) was designed with a flat surface and sloping grooves to permit drainage. The bathtub mat, with suction cups and drainage holes, required a surprisingly complicated mold. At the right, the waffle-iron-like press mold in which all mats were formed before Wooster purchased the Auma, shown on page 34.

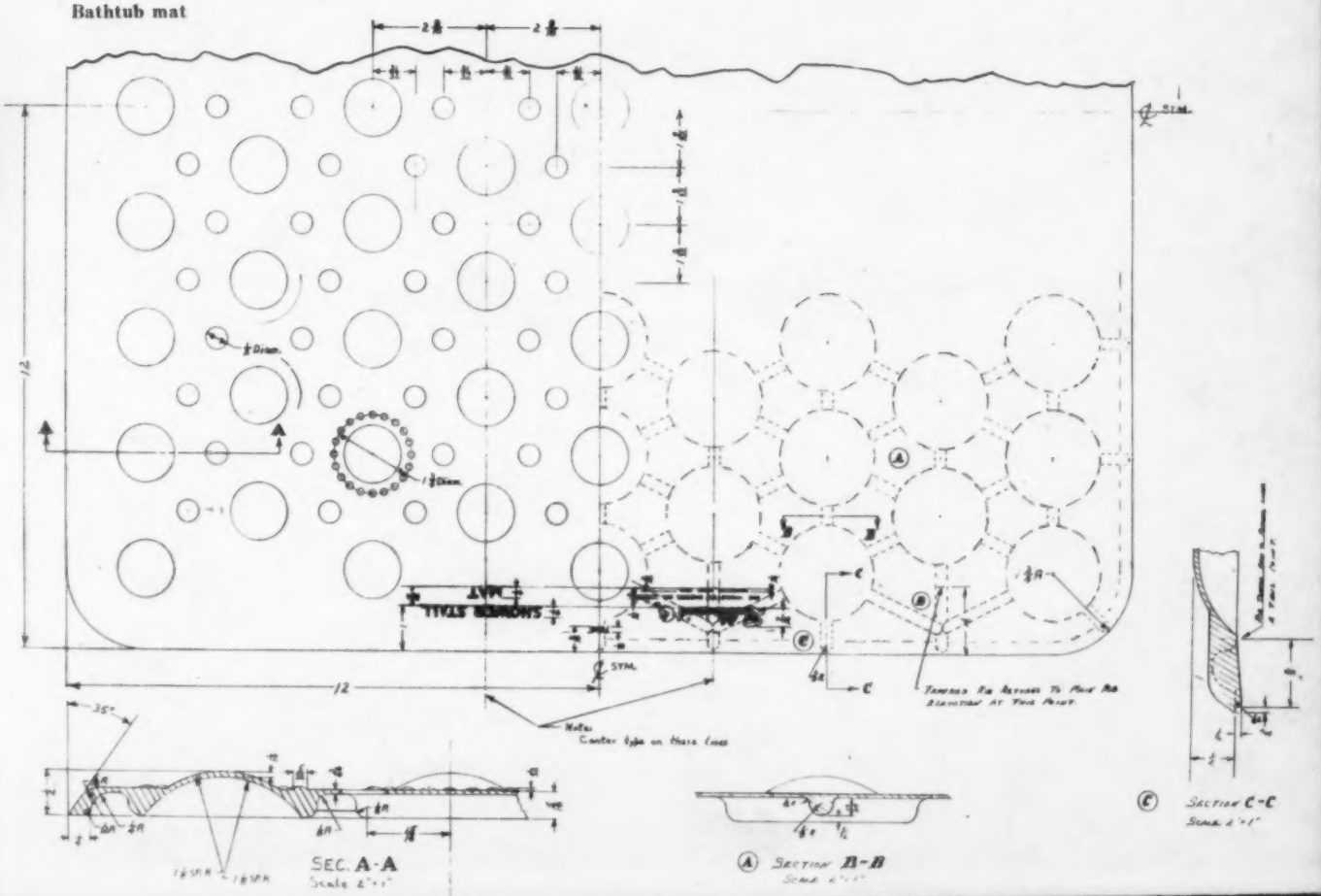
Trimmable appliance mat



Door mat

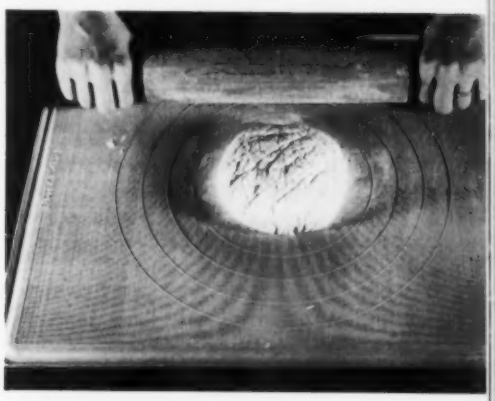


Bathtub mat



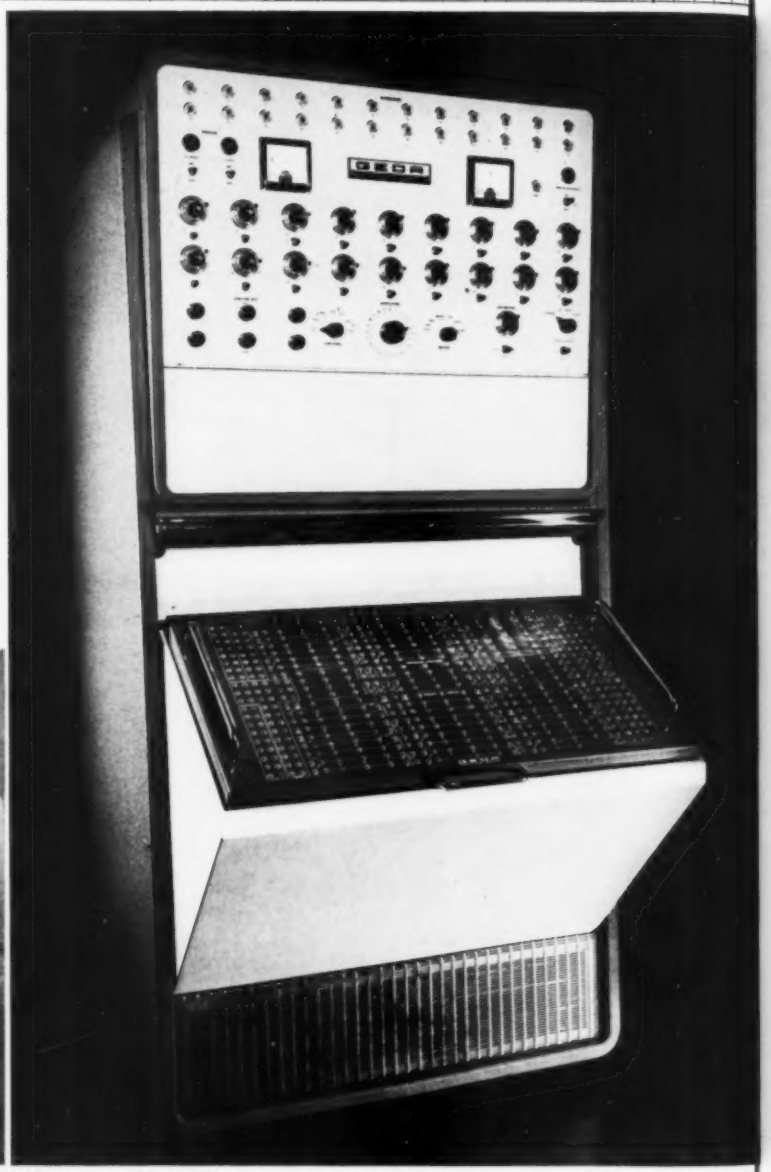
Trimmable mat *was the result of a contest among store representatives for a mat to protect appliance tops. Winning design provided bordering ridges an inch apart as guides for cutting the mat to desired size.* **Doormat,** *right, has drainage grooves sloping away from center. Drawings are on overlay sheet.*

Pastry board (*left*) *was a revolutionary idea that failed. Caldwell tried to improve on the old-fashioned rubber chopping block by using the reverse side for a pastry board: a finely knurled surface held the right amount of flour for rolling pastry, and concentric circles acted as crust-cutting guides. Home economic experts approved heartily, but the product never caught on.*



Part 2

Men and Machines:



On the Geda linear computer, the limits of a physical system to be studied are set up on a double row of potentiometers on the slanting panel above the problem board. Plastic cylinders representing other values are plugged into the problem board, and are interconnected with patch cords. Results are read off on a graph in the control console (right); curve follower (beneath) feeds actual curves into the computer.

Analogue computers were developed during the war so that scientists could simulate complex physical situations without actually creating them. An electrical resistance representing each characteristic of a physical system to be studied was set upon a potentiometer, then various variables were inserted electrically into the system. Contraptions used for setting up these situations were frequently Goldbergian, and when the computer was being re-designed for postwar use in industrial laboratories, and as control devices for production lines, there was a need to make machines that could be operated with simplicity, skill, and ease. A skilled scientist could use a computer as if it were a simple tool, but an operator who was merely executing a program set up by an expert required a less complex arrangement.

The Geda analogue computer on this page, developed by Goodyear Aircraft Corporation with Smith and Scherr as design consultants, is an interesting example of the way a machine was designed as a consumer product as well as a laboratory instrument. The machine can be operated from a desk-like master control console (above) and problem results are read off a graph mechanism set into the top of the console. Controls are grouped for right-hand operation, and instrument panels on all components are slanted so that they can be seen from a sitting or standing position. Special situations are set up on a slanting problem board, using plug-in plastic cylinders interconnected with patch cords. An actual graph can be fed into the computer with a separate curve follower, and a non-linear computer can be hooked into the system, when multiplication and other complex mathematical operations must be included.

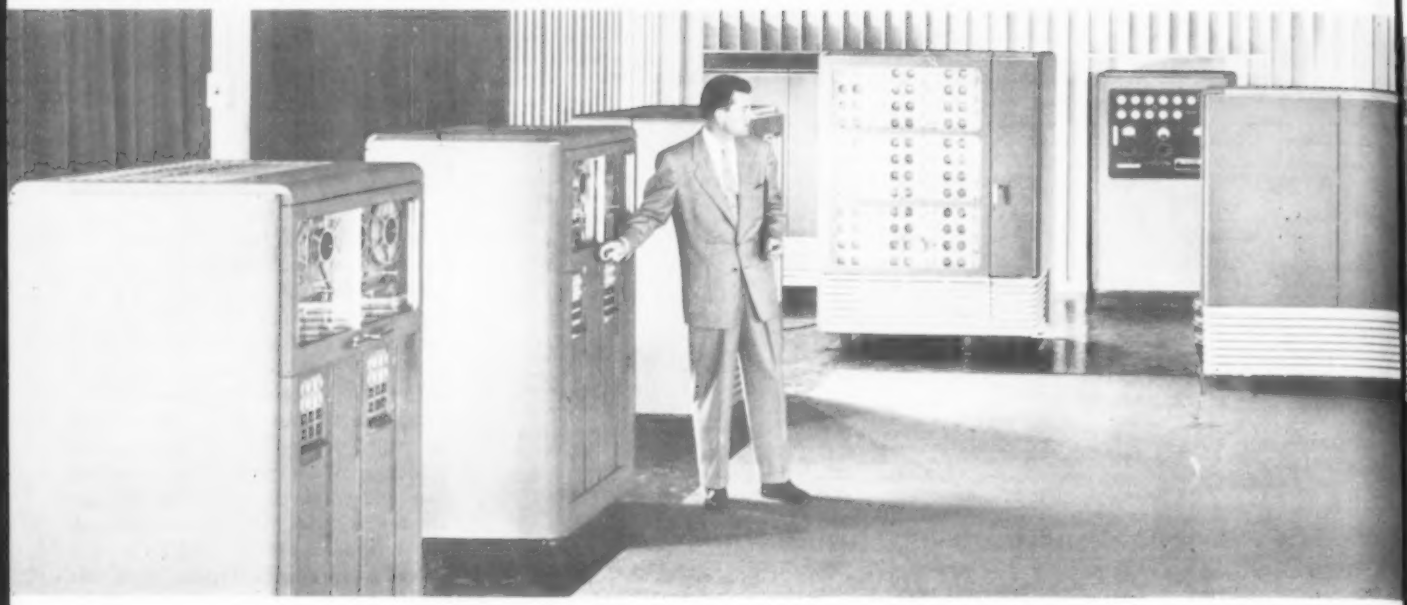
Large radii are used on wraparound cabinets to avoid bothersome highlights; finish is grey crinkle enamel and mat yellow, with black knobs and brushed aluminum hardware.

Most of the time, the operator's relation to the Geda is simply that of an observer: he watches the machine and the graph it makes, with signal lights to warn him when various elements are in operation. His job is organized as a simple step-by-step manual task, outlined on an instruction sheet, and the Geda makes it easier and probably more enjoyable to execute.

COMPUTERS, like the Geda, begin to look

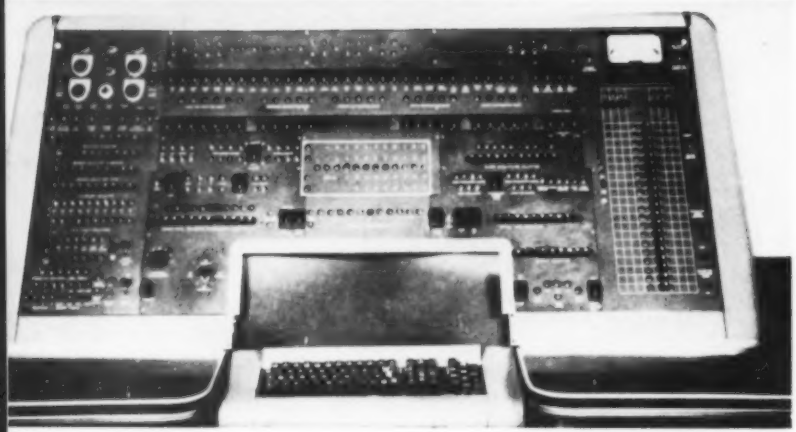
less like electronic monsters

and more like business machines they are.



New computers tend to be specialized, with simplified controls and

IBM's Naval Ordnance Research Calculator (left), counting at the rate of a million times a second, is the largest computer so far produced. It was designed to handle scientific problems, where input or output data are small and the work of computation is enormous. Input is made by magnetic tape loaded from punched cards. Any number or calculation can be shown on the faces of the cathode ray tube on the left, and selected portions of the program can be examined in slow motion on the same tube faces. Even the expert needs such visual aids on big computers.

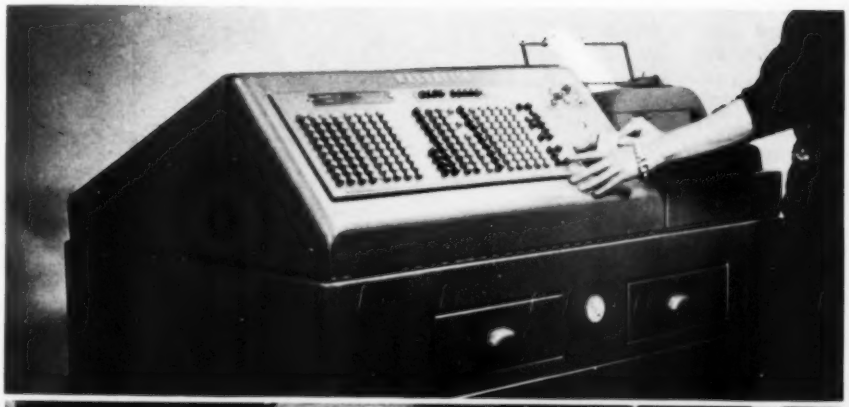


The control panel of Remington Rand's Univac (bottom left) looks even more complex at first glance. It was designed to handle business problems, where input and output data are enormous, even though the work of computation may be small. An expert programmer is needed to operate the machine, but it is possible that by simplifying the controls, and making visual the various steps in computation, a clerk-operator could direct the machine.

Big computers like IBM's 702, at the left, were developed to solve complex problems quickly. Any one of them can perform the record-keeping function for several dozen corporations, and do the computations for research problems as well. Manufacturers of the machines are working hard to bring this sort of rapid computation to every kind of business. Much of this effort is concerned with designing computers that perform less imposing tasks than the large machines, and with bringing their operation within the understanding of a clerk-operator. In order to accomplish the latter, the work of the machine can be outlined by an expert for a special program, or a program can actually be set up in the machine, so that the operator follows a simple set of instructions when inserting material into the machine, and in taking results from it.

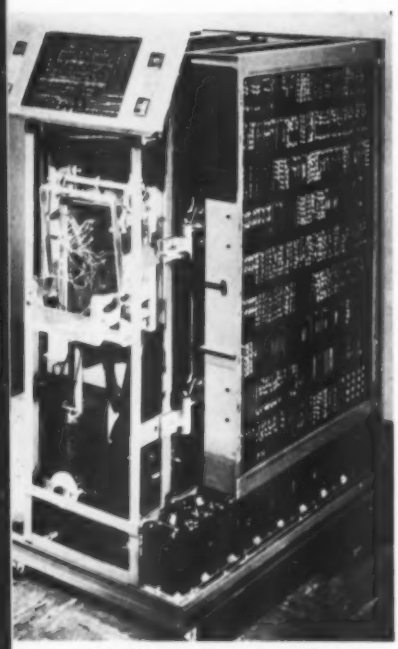
extended uses.

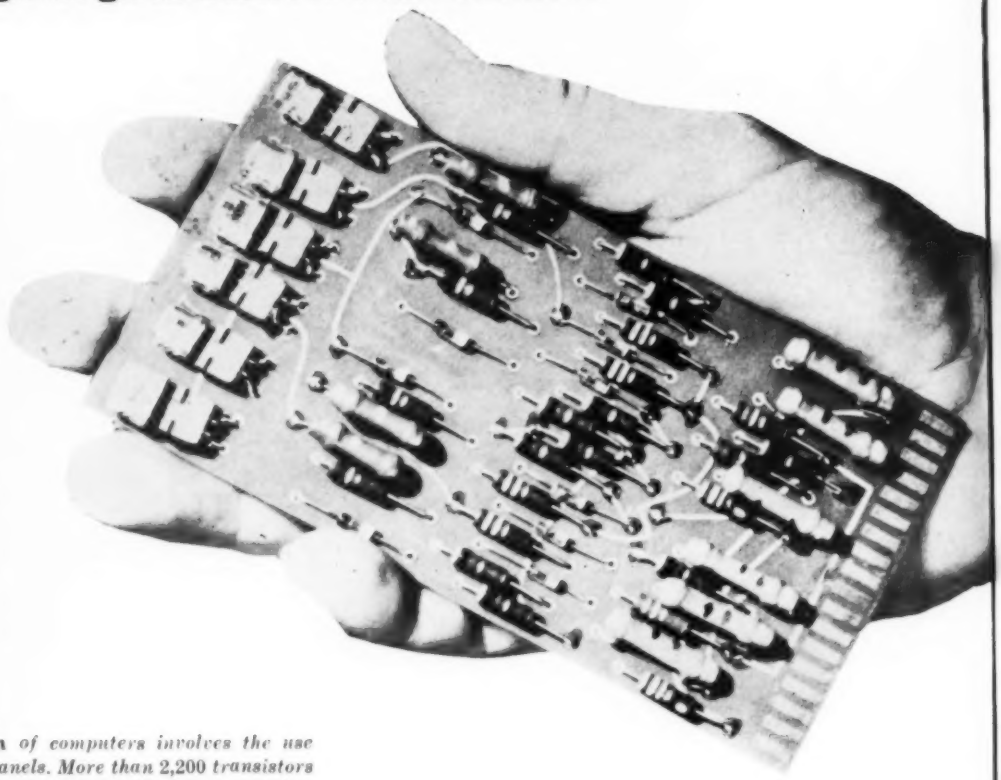
By limiting the work of its Magnefile to inventory systems, the Electronics Corporation of America developed a file and record keeping machine that can be used by a clerk in a store. (top, left) The clerk inserts information from a sales ticket, using the adding machine keyboard on the right. The machine makes out a sales receipt, then stores the information in a perpetual inventory system. A calculator operator, who can learn to use the Magnefile in a few minutes, uses the other keyboards to extract the various inventory information when it is needed. Though the inventory can contain as many as 10,000 items, the entire mechanism is contained in a single console.



With its Transceiver (below left), IBM makes available the services of a large computer to a firm which may be many miles away, and which has a lot of record keeping but not enough to keep a big computer busy all the time. Information is sent to a computer center by the Transceiver, and the same device sends back the answers after the computer has solved the problem. Data on punched cards is fed into the Transceiver by an operator seated at its console, who operates the machine with a small push-button control box. A second Transceiver automatically reproduces the cards at the computer center, and checks them for accuracy. Transmission is accomplished by telephone or telegraph.

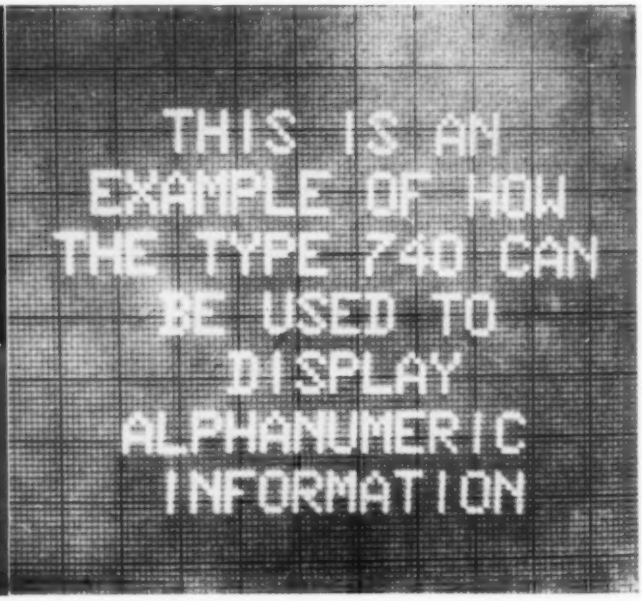
Small computers begin to go to work for small business



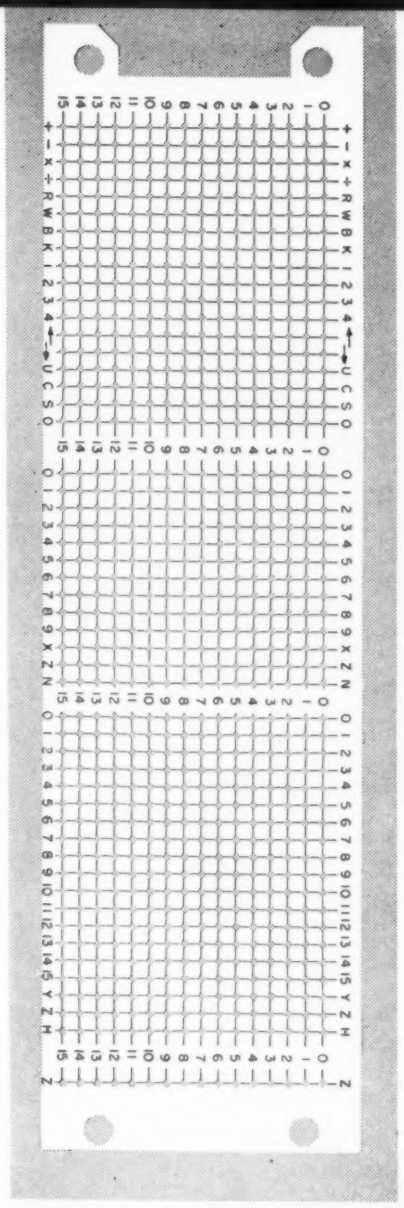


Simplification and miniaturization *of computers involves the use of transistors and printed wiring panels. More than 2,200 transistors are mounted on the panels above, replacing 1,250 vacuum tubes. The IBM computer of which this unit is a part is only half as large as the unit it replaces, and uses only 5 per cent as much power.*

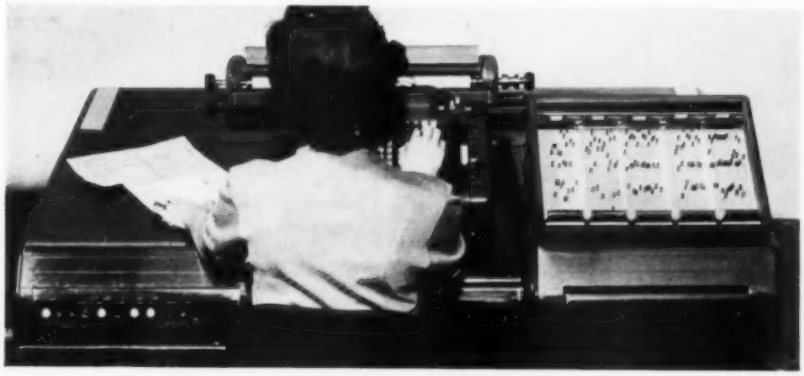
Graphic presentation *of answers obtained by computers can be made directly on cathode tubes in the form of geometrical figures, engineering symbols, graphs, or words and numbers. This direct visualization is particularly useful in observing the step-by-step developments of a problem as it is being solved. This IBM device,*



shown here set up beside a control console, can also inscribe graphs with an automatic pen attachment. Such visual aids are useful in studying problems where time is a factor, in much the way that slow-motion or speed-up photography can show the steps of a development or a sequence of action.



By limiting its functions, *the Burroughs E101 converts a digital computer into an office machine that a trained bookkeeper can learn to operate in an hour or so. She sets up her problem on cards placed on a peg board, inserting additional data by using a calculator keyboard when the machine signals her to do so.*



Computer manufacturers are finding all sorts of ways of making their machines available and useful to business. In addition to developing transmission devices like the Transceiver (previous spread) they are now designing computers that look and act like familiar office machines by simplifying their controls, hiding the complexity of equipment, and limiting their functions.

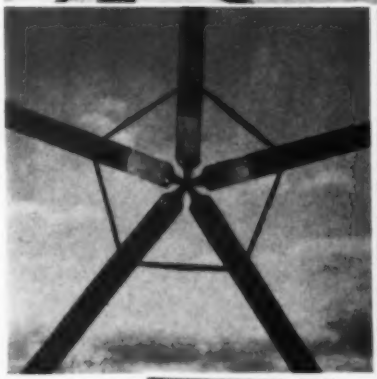
The newest and probably the simplest of all computers is the Underwood Elecom 50, whose keyboard is not much more complex than that of an adding machine. The operator uses it to add data to a problem that has been stored on a drum in a nearby cabinet. As many as 20 programs can be stored on metallic-coated plastic tapes, and the operator can switch from one to another by pushing a button. The machine handles an entire payroll, including the writing of the check, as well as most of the record keeping tasks required by a small business. Its price is about $15,000.

The Elecom 50, in short, makes computer operation a by-product of the working of an adding machine. The operator merely puts familiar business forms in a carriage, and codes the figures to be added to the problem so that they will appear in the proper columns; then the computer adds these to figures already stored, and prints the correct answer on the form. An operator, familiar with the form employed and the record-keeping system set up on a program tape, does not have to concern herself with the operation of the computer, which assumes responsibility for the accuracy of the results. The bookkeeper thus has an electronic tool that is as well designed for her needs as the large computer is for the scientist or economist.

REdesign

Domed barn for modernized dairy farm

photo Blanche Lemco



The men at the right are attaching one of 76 reinforced plastic panels to the framework of a dome-shaped barn. The barn is unconventional not only in its shape and structural technique, (based on Buckminster Fuller's patented geodesic system), but in its use of materials *and* in the way it suits new practices in the dairy business.

Several years ago Dr. John Hackney of Montreal went to designer Jeffrey Lindsay with a problem: a large, year-round shelter for 30 cows, silos and a poultry house on his 90-acre dairy farm; in other words, a kind of covered barnyard. Lindsay developed an 84′ space frame from 12′ and 14′ lengths of laminated timber (2½″ x 9½″), joined in equilateral triangles and mounted on 20 leveling concrete footings. The ends of butting members, each fitted with a steel shoe, are brought together around a bearing pin and secured with high-tension aircraft cable to form a rigid point.

As a covering, Lindsay and American Cynamid worked out a 1/16″ panel of Laminac resin reinforced with glass fiber mat, which is translucent, strong enough to carry snow loads, durable and easy to maintain. Because polyester has about the same coefficient of expansion as timber, it was possible to fit the panels rigidly into the members; this stressed skin surface provides lateral stability which saved considerable weight in the frame itself.

The barn is well suited to Dr. Hackney's redesigned farming: Cows wander loose-housed all year in a naturally light, easily ventilated pasture, feeding on nitrogenized fresh grass from the silo. They are insulated and warmed by a 4″ dry manure pack floor, kept healthy by bacteria innoculations.

This 84′ x 33′ pilot structure, enclosing 5,540 square feet and weighing 17,340 pounds, cost about $19,000. Lindsay plans to build more domes, and to lease them through distributors for all kinds of storage.

New deodorant applicator revolves around plastic marble

It was polyethylene that made it possible to package liquid deodorants, and countless other things, in squeeze-and-spray form, and now polyethylene has made possible a unique roll-on dispenser which may create just as big a splash in the field of toiletries.

Bristol-Myers recently introduced a bottle which dispenses its lotion deodorant "Ban" by means of a revolving ball held at the top of the container; as it turns in its holder, the ball gathers a film of deodorant from the bottle, which can then be rolled off onto the skin — very much as ink is rolled out of a ball point pen onto the writing surface.

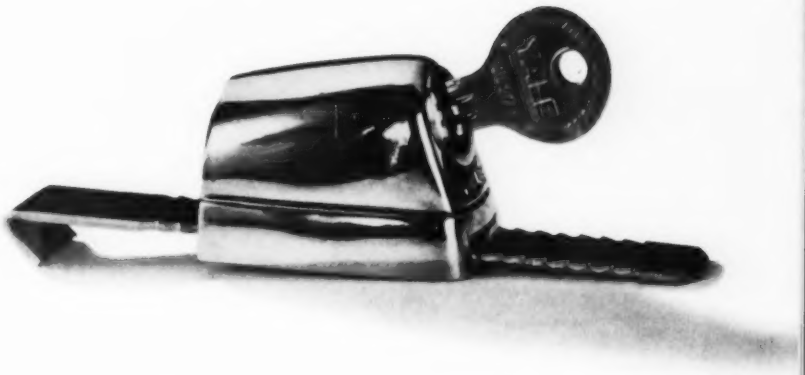
The dispenser, as the photo shows, is made up of four pieces: a one-ounce glass bottle; a precision-ground styrene marble, which is slipped into a polyethylene neck rim and held in place by three molded-in prongs; and a transparent styrene cap which is flanged to keep the marble from moving when the top is on. The neck ring is the key to the assembly of the dispenser, and in fact to its design: without polyethylene's flexibility, the marble could not be forced past the prongs into the ring, nor could the ring be friction-fitted over the glass cylinder. Precision fit between the marble and neck was another problem solved by the combination of plastics; without exactly the right tolerance between them (0.003-inch) the lotion would have dripped or failed to flow altogether.

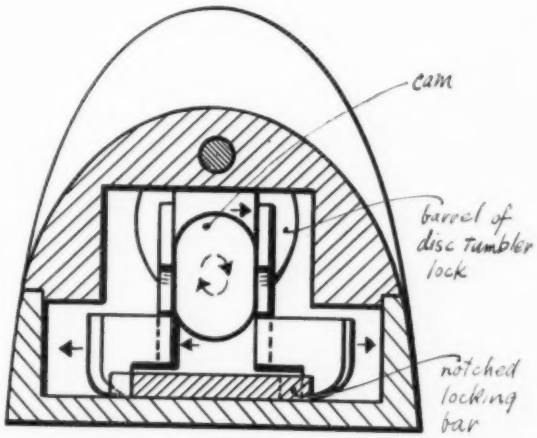
Redesigned lock is portable, personal and versatile

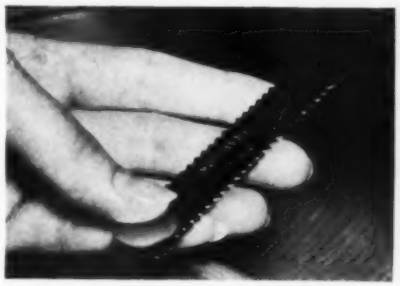
Although locking devices have been known for almost 4,000 years, there has never been a truly portable lock that could work without being permanently attached to an object.

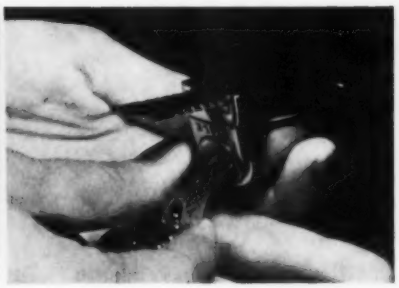
Yale and Towne Manufacturing Company's Research Center has solved this age-old problem with the new personal pocket-sized Travelok, which may be used to secure ordinary doors, drawers, luggages and the like, either for travel or everyday use. The Yale lock is attached to the unlocked object — a drawer is shown in the photo — with the help of a notched locking bar with one hooked end. The end is caught behind the ledge on the underside of the table top, and the drawer closed with the bar in the crack. The body of the lock, with a slit in its base, is then slipped over the bar, pushed up to the drawer, and locked. Turning the key engages the notches of the bar, so that tension between the hook and the lock makes it impossible to move the bar and open the drawer.

The Travelok is a distant cousin of the ordinary padlock, with the difference that the hooked bar makes it possible to get a grip on a simple, uneven surface. A standard disc tumbler lock mechanism is used in the Travelok, but the way it engages the bar had to be redesigned. As the key is turned to open the lock, an elliptical cam at the end of its barrel also revolves. In an ordinary door lock, this moves the latch bar sideways, but in the Travelok it separates two vertical bars, and each in turn pushes a pronged foot away from the notched bar. When the key closes the lock, the cam straightens itself, tension pulls the vertical bars together, and the prongs again engage the notches. The chrome-plated Travelok measures 1″ x 2″ x 2″, and the locking bar is 4″ long; the whole thing weighs 5 ounces, and sells for $2.89.







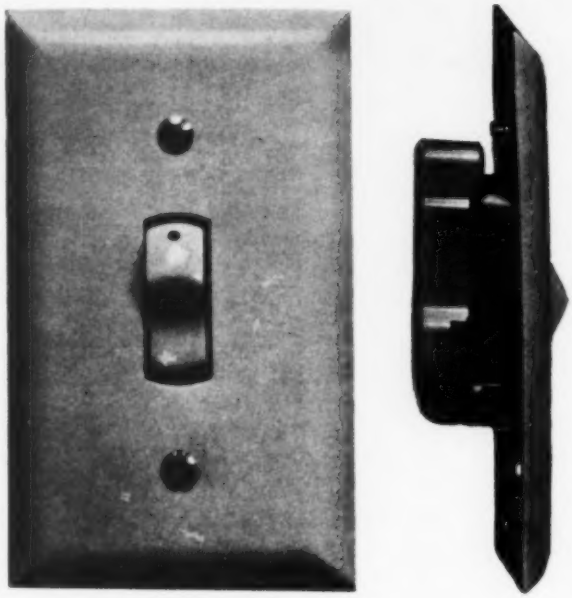


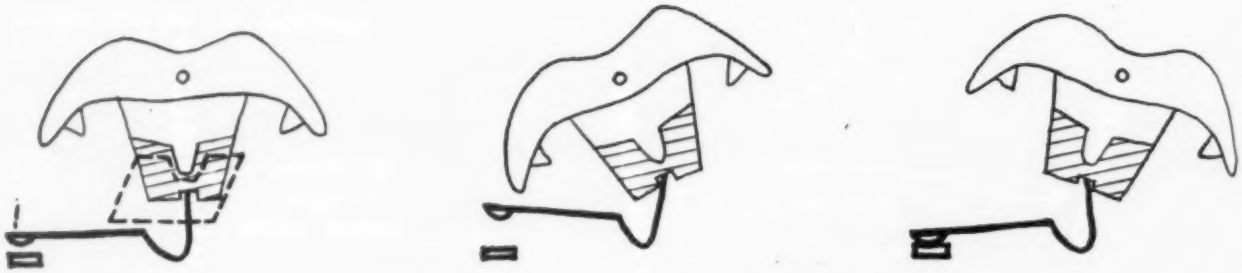
Wall switch with rocker arm action

The Feathertouch is a micro switch with unusually easy and pleasant action: you barely brush your finger against the smooth toggle, and it rolls on or off with a soft, agreeable click. This continuous, contour-molded styrene toggle, which has none of the sharp edges and stiff action of a conventional one, also makes the switch good to look at and exceptionally durable. It is the result of redesigning the mechanical action to employ an unusual patented balancing system and a coil spring instead of the usual leaf spring.

The base of the toggle rests in a metal cradle, connected to the porcelain back piece. The coil spring hooks into the center of the toggle and under the contact arm, holding them together by tension. (See diagram.) When the toggle is exactly horizontal, the spring is extended slightly more than when it is tipped to the side, but there is no force maintaining this horizontal balance. Thus, when a light touch pushes it from the side resting position to the center, the spring's tendency to contract pulls it quickly to the other side. As it falls, the base of the toggle trips the contact arm and opens the circuit, or trips it and brings the silver contacts together again.

The Feathertouch is T rated and approved by Underwriters Laboratories, but is designed for AC current only. Manufactured in Switzerland, it is distributed by H. J. Theiler of Whitinsville, Massachusetts, who points out that the high cost of the switch (about twice that of a conventional one) is balanced out by its unique design and guaranteed durability.



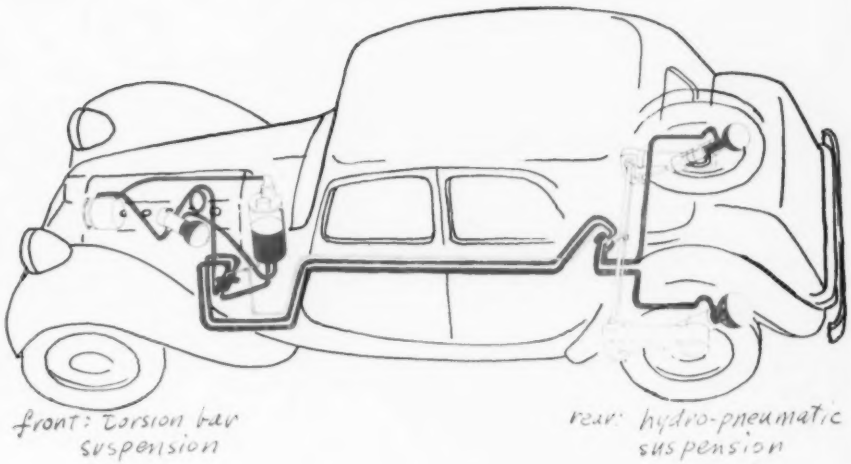


Now that cars are about as powerful as the industry dares make them, the next major area of competition will probably be comfort. Roadability and driving ease depends on suspension, and the ability of the car to recover from shock. Packard recently won an award for its torsion bar suspension, which uses an electric motor to adjust to loading. A simpler torsion bar suspension has been used in Europe for years — Citroen has used one since 1934 — and other systems are still being developed.

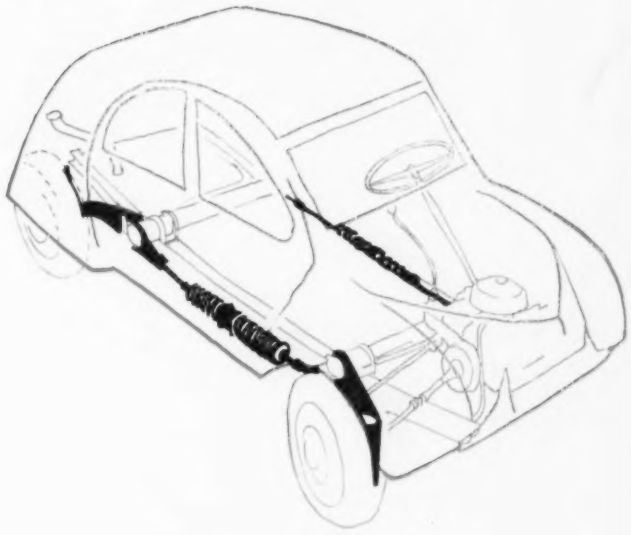
The 2CV Citroen just introduced on the American market employs three springing elements to absorb various degrees of shock, and the result is the world's smoothest-riding small car. An axle arm with an inertia damper supports the wheel. The damper is partially filled with oil, and contains a weight fastened to the bottom of the sealed piston, so that both pressure and tension absorb initial shock. The arm attaches to a crossbar, where friction discs absorb more shock. The third element is a front-to-back set of springs connected to the axle arms. Shocks that would cause the front corner of the frame to drop pull on these springs; the pull is transferred through the springs to the back wheel, where a similar tendency to drop is prevented by the tension of the springs. The far corners of the frame would have a tendency to rise, but an opposite action occurs in the springs on the far side.

The classic Citroen uses a more elaborate system, a piston in a cylinder and a sphere of oil and air under pressure, for its rear wheel springing. A shock is absorbed by an air-filled hemisphere, which is separated by a diaphragm from oil in the lower portion of the sphere; an increase in hydraulic pressure forces the piston to move an axle arm, which in turn raises the corner of the frame. Before loading, a latch, or faucet, in the hydraulic system is set to hold the car at a given height. When the car is loaded, the faucet opens, and the piston is extended by oil pressure from a hydraulic pump, raising the car to the established height. The faucet then closes off the main part of the hydraulic system, leaving open the line between the two pistons on the rear wheel. Since these pressures are equalized, when the frame has a tendency to drop at one corner the raising tendency of the far corner is counteracted by the increased pressure in the line. The pistons and spheres work rapidly to absorb sudden shocks and resist sway.

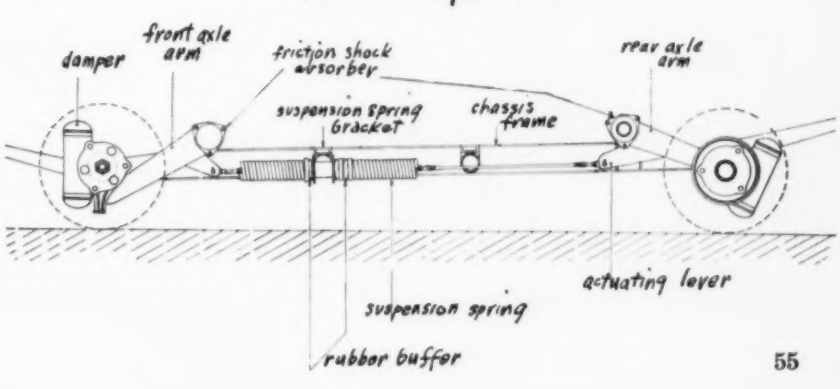
Hydro-pneumatic suspension for the classic Citroen



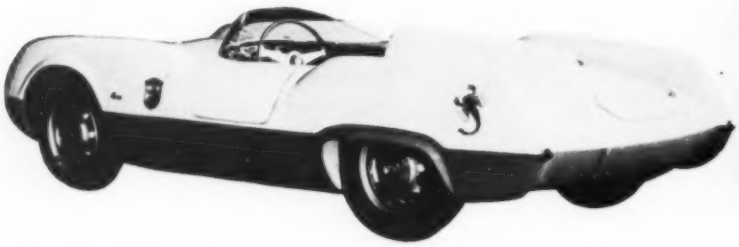
Spring suspension for a smooth-riding small Citroen

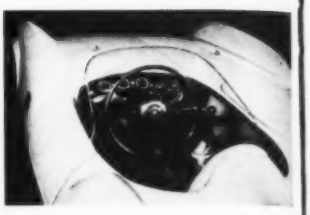


2 CV suspension



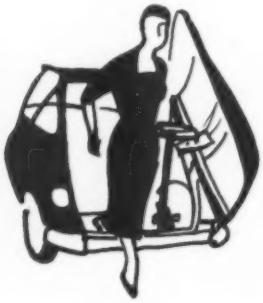
Show-stealing three-wheelers are going into production

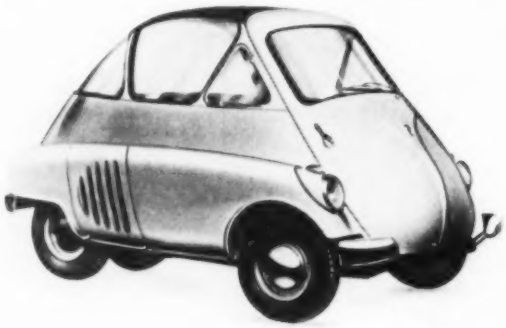




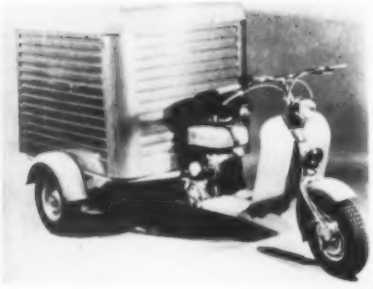
Motor sports show

Among the gaggle of cars in this Spring's Universal Travel and Auto Sports Show in Madison Square Garden, the most extreme of the European sports models in the grand tradition was the two-seater Abarth (above). Designed by Boano of Turin, it had sweeping crested fenders front and rear, and racing cowls jutting back behind the bucket seats. The efficient small cars like the Volkswagen, the English Fords, Vanguards, and Morgans were eyed by people planning to rent or buy a car for jaunting around Europe this summer. Prizes went to the Studebaker and the German Die Valkyrie for their styling, and Packard's torsion bar suspension won an engineering award. But the cars which grabbed the limelight were the three-wheelers and glorified scooters—cheap, miniature run-abouts for which most American manufacturers feel there is no demand; quite a few European firms have apparently recognized a sufficient market for low-cost transportation to warrant a serious effort to make a good small car.

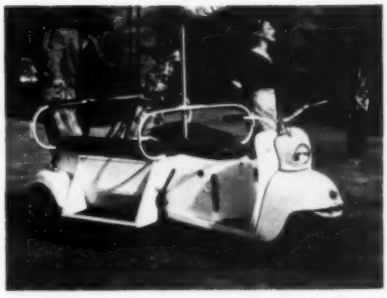




Italian Isetta *opens from front, leaving steering wheel behind; flexibly-encased wiring moves with door. Rear wheels only 20" apart, so 725 pound weight is distributed like a 3-wheeler's—towards main axle. 9.5 brake horsepower, Top speed 50 mph, gas consumption 60 mpg.* $995, *FOB New York.*

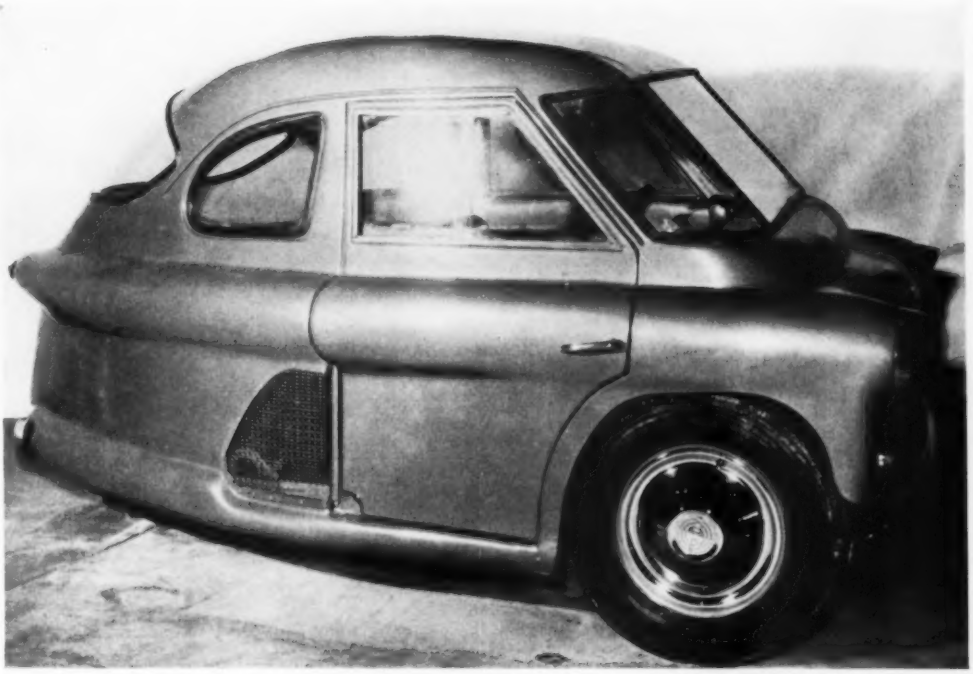


Italian Lambretta *has aluminum panel body, is glorified motorcycle on a tubular frame suspended on leaf springs over rear axle. Loads to 700 pounds. Top speed 34 mph, gas consumption 85 mpg. Imported by Innocenti.* $775, *FOB New York.*

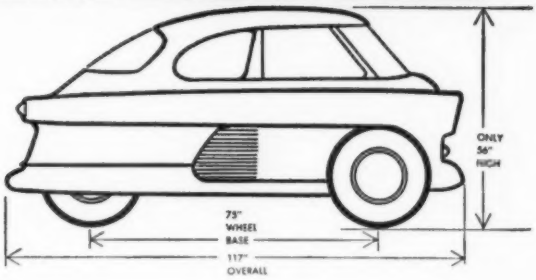


American Joe-Be Caddymobile *seats four, and practically replaces the clubhouse. It has umbrella stand, an electric outlet for a radio, shaver or coffeemaker, insulated compartment for hot or cold drinks. Produced by International Motorcycle Company.* $1040, *FOB New York.*

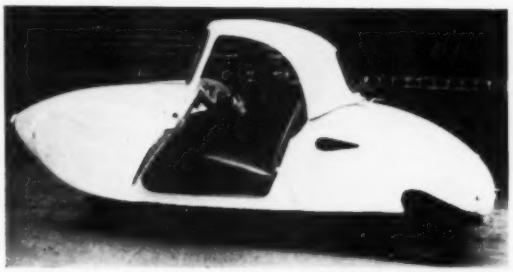
Buglike Messerschmitt *seats two in tandem, stands 47" high, has a seamless plexiglass top hinged on one side, sliding windows, and a safety glass windshield. The 9 bhp engine, rear-mounted, gives a top speed of 48 mph, consumption of 100 mpg. Imported by Gordon Motors.* $895, *FOB NY.*



The American Tri-Car's *stubby plastic body is the biggest and most carlike of all the 3-wheelers, and was designed by one of the originators of the Jeep, Charles H. Payne, assisted by H. A. Blenkle. Kohler air-cooled 2-cylinder engine is rated at 30 horsepower, and forms a single assembly with its torque converter and drive. Cruising speed, 50 mph; consumption, 40 mpg. Weight, 1120 pounds; wheelbase, 75". A model with an aluminum truck body has a carrying capacity of 45 cubic feet. $995, FOB Wheatland, Pennsylvania.*



Some of the most successful 3-wheeler designs were not in this year's show.



English Allard *has a fiber glass body with a front seat 4' wide, a rumble big enough for two children. Car weighs under 700 pounds; top speed about 40 mph. Not on the American market, price in England is under* $800.

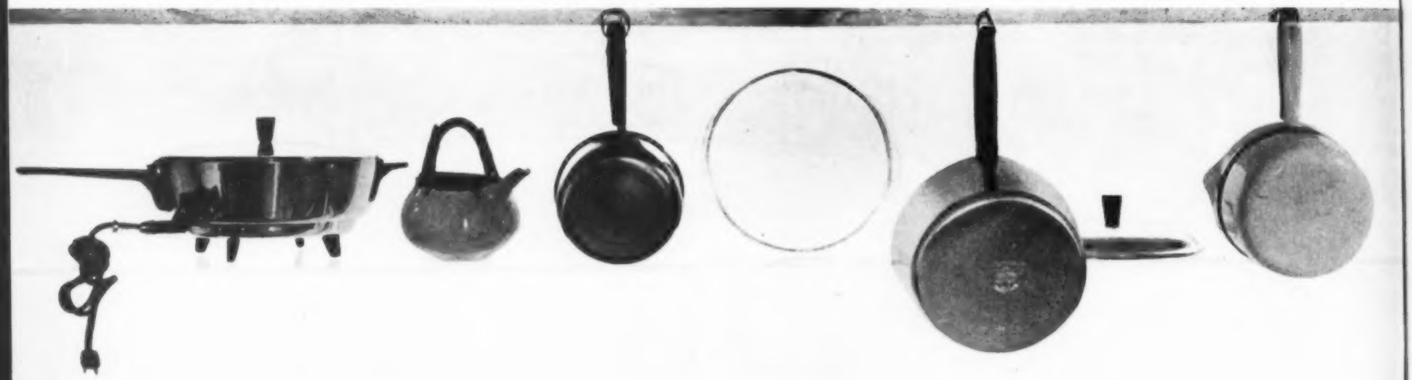
German Brutsch *has plastic body with recesses for headlights and front wheels. Like most 3-wheelers, a 2-cylinder engine is used, and cruising speed is just over 40 mph. Soon to be produced in France and Italy, prices not announced.*

German Penguin, *shown last year, has room for two adults and some luggage, gets about 50 mpg; when put into production, it might sell for about* $750 *in the United States.*

photos: Hank Parker

what materials are best for

Cooking Utensils?



In one area of household consumption, there is a vast new market for materials — practically any material you can name — and that area is cooking utensils.

There was a time when the housewife reached automatically for cast iron, enameled steel or copper, never doubting that they would serve all her needs. Then she learned the practical secrets of copper-clad stainless, and now suddenly she is confronted with countless varieties of utensils — each of which is said to be the newest or the oldest, the fastest or the slowest, and undoubtedly the best.

What has brought this about? To begin with, the restoration of cooking to its traditional place among the American social skills. This is not merely a matter of abundance; not only is the American woman buying more meat, more garlic and herbs, and more Vermont-made mozzarella, but the act of preparing them is again charged with personal interest. Of course, she may shortcut the old devotions by buying machines that stir and chop and shred, or by buying these processes in cans and packages. But the shortcuts themselves have given her the time, energy and raw materials for the fancier dishes which express a new pride in her work.

Cooking is essentially a matter of processing food by heat, and the cook who sets herself (or himself) up as a consumer-craftsman has available an unprecedented variety of heat sources, which have influenced present-day cooking materials as well as the taste of the food itself. There is the radiant cooker — charcoal grill, hibachi, or the ubiquitous infra-red broiler — each with its own demands on the utensil. Even the conventional conduction-convection stove has brought changes: the faster, less controllable heat of electricity has influenced the cook's renewed preference for heavier self-policing pots and pans.

The modern cook's selection of utensils looks less systematic than her choice of cooking machinery. She likes heat-resistant glass and porcelain because they suggest Scientific Management, and displays gleaming copper bottoms that say "French is cooked here"; but hidden away on the top shelf will be the less showy and somehow more satisfactory standbys — a cheap clay casserole, an enameled saucepan, a black

We wish to thank the following stores for allowing us to borrow utensils. **Bazar Francais**—chafing dish, top, left; polenta pot, top, right. **Bloomingdale's**—earthenware pot, top, left; triangular Danish and round Prizer enameled pans, and long-handled aluminum pan, bottom, right. **Hammacher-Schlemmer**—[illegible] bottom, right. **Lew's & Conger**—[illegible] and aluminum utensils on pages 54[illegible]. **Macy's**—[illegible] Club Aluminum saucepan, bottom, left.

Properties *of materials used in cooking*

	1 **thermal conductivity** calories per second per sq. cm. per degree centigrade per cm. thickness (rate of heat transfer)	2 **melting point** degrees Fahrenheit	3 **emissivity** (heat radiation of surface only)	4 **density** pounds per cu. ft. (weight, uniformity of heat)	5 **chemical activity** (effect on taste)	6 **surface hardness** (Brinell)	7 **Mob's scale hardness** (resistance to scratching)	8 **cleanability***
aluminum	.45	1220	.04	170	active	21 to 38*	2 to 2.9	66
stainless steel	.036	2550 to 2750	.05	494	nearly inert	135 to 185	6	97 to 99
cast iron	.112	2150 to 2300	.43	442	inactive	100 to 250	4.5	not tested
copper	.81	1982	.03	560	active	50 to 70*	2.5 to 3	not tested
brass	.29	1750	.03 to .06	520	inactive	50 to 150*	3 to 4	not tested
tin	.157	450	.043	460	nearly inert	—	1.5 to 1.8	not tested
clay (fired)	.0006	—	—	—	nearly inert	—	—	97 to 99
porcelain	.0025	—	.92 to .96	—	inactive	—	—	similar fire clay
enameled steel	—	—	.92 to .96	—	inactive	—	—	similar fire clay
glass (borosilicate)	.002	1300 to 1500	.92 to .96	140	nearly inert	—	5 to 6	97 to 99
soapstone	.0055	—	—	170	nearly inert	—	—	not tested
wood	.0003 to .00009	—	.89	30 to 50	inactive	—	—	not tested
silver	1.0	1761	.20	660	inactive	—	2.5	not tested
platinum	.165	3225	.05	1330	inert	—	4.3	not tested
paper	.0003	—	.92	60	inactive	—	—	not tested
asbestos	paper .0006 fibre .00019	—	.93	153	inert	—	5	not tested

Most of these basic poperties will be altered by finish, thickness and general design of a utensil. 1 Mechanical Engineers Handbook. 2 ASM Metals Handbook. 3 Handbook of Chemistry and Physics, and ASM Metals Handbook. Ratings are based on ratio of emissivity of these materials to performance of a perfect radiator, or black body. They represent surface characteristics only, and each material is changed in use by oxidation and surface roughness. High ratings indicate materials which absorb more radiated heat; low ratings reflect more heat than they absorb. 6 * indicate 500 kg load; others have 3000 kg load. 7 Handbook of Chemistry and Physics. 8 Percentage removal of radio-active bacteria; tests conducted by Ridenour and Armbruster, University of Michigan; reported in American Journal of Public Health, February, 1953. * All materials tested fell off when worn except stainless steel.

The market is suddenly flooded with pots and pans that use materials in countless combinations. Industry's interest in producing better utensils, by combining the virtues of traditional materials with the advantages of some newer ones, raises a question for everybody concerned: What does the consumer want in a cooking utensil?

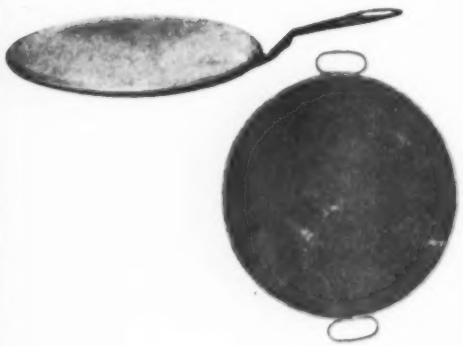
iron skillet, and whatever other secrets she has inherited or discovered on her own. This eclecticism makes sense. If speed of cooking is no more important than the quality of the results, the housewife wants utensils which will deliver everything from a 6-hour stew to a 2-minute steak; and variety is currently the way to versatility.

In addition to her culinary problems, the new cook has less space and less assistance than her forbears. She would like her pots to come handsomely to the table, to keep food hot without burning the server's hands, and afterwards to be a whiz to clean (or to look so unbearably pretty that she doesn't mind putting on rubber gloves to scour them). Thus, she must constantly weigh the dicta of the *grands chefs* against the demands of her table and the strength of her scrubbing arm. She no doubt waits for the day that a shopping trip will yield perfection — utility, versatility, beauty and cleanliness all in one object — but meanwhile must make frequent choices between good housekeeping and the joy of cooking.

This year in France a competition was held for the perfect saucepan; there were 400 entries, but the chefs, after trying them all, could not bring themselves to award a prize. But though perfection may be lacking in Paris as well as in American housewares departments, the consumer can console herself that industry is making an incredible effort to ease her dilemma, by finding new ways to combine the virtues of traditional materials with the advantages of some newer ones. This raises a question: To what extent, and in what ways, can the time-tested favorites really be improved on?

If designers and manufacturers are going to continue the quest for the perfect utensil, or the all-purpose material for a line of utensils, two points must be considered side by side: the properties of each material as a cooking surface, and the demands of each cooking operation. On the following pages we consider (as objectively as possible, considering that the *cuisinière*, professional or domestic, is as opinionated an artist as you will find) what makes various utensils good for their purposes — assuming, of course, that the proper pan is one of the big secrets of a great cook.

Traditional materials *the choice of cooks for centuries, offer many qualities*



Soapstone, long known to careful egg cooks and high-school chemists (as their lab table tops), is unharmed by acids and alkalis, thus will not affect the taste of food. It is naturally porous and slightly oily, so that foods are cooked without butter or grease, and will not stick. It is fine for top-of-stove baking because the ratio between conductivity and density is such that it absorbs unevenly applied heat and distributes it as even, low heat — hotcakes on the edges cook as well as those in the middle. But because it will not heat up, it is not suitable for griddling such things as bacon or fish (which are actually pan broiled.) Soapstone becomes translucent with use, age and love — a material for special uses and fussy cooks.

Stove-top baking *(griddling). This kind of cooking requires a low and even heat, distributed over the entire surface, so that the delicate browning of the bottom will be accompanied by an even baking of the interior — quite the opposite of pan broiling. Foods that are cooked this way, griddle cakes, crepes, french toast, etc., usually contain eggs — which would be toughened by fast, high heat.*

Stone is excellent because it insures a slow, low heat over an area large enough to cook many portions at one time.

Clay, in the form of earthenware, is perfect for long slow oven stewing, because it absorbs heat and passes it to the food slowly and evenly. Because it holds onto heat for long periods, it is very popular for stove-to-table use. Most ceramic pots can withstand the heat of a burner, if the flame is low, but will not survive quick temperature changes. Easily cleaned, the porous exterior seasons with use; but interior glaze may crack and become unsanitary.
(Beanpot picture courtesy Robert E. Coates)

Stewing *requires some liquid sauce or stock in the bottom of a pan to be heated slowly, over a low flame or by the hot air of an oven. The object is to vaporize the moisture so that the permeating vapor, rather than the liquid or utensil, cooks the food — releasing flavorful juices as it tenderizes. A tight-fitting lid is necessary to keep the vapor from escaping, and the material should be one which will transmit bottom heat to the walls and lid.*

Porcelain, an attractive standby of chefs for centuries, has made itself popular with both Escoffier and the scientists as a conductor which can withstand and transmit high heats. Inert and nonporous, it will not alter the flavor of the subtlest sauce, nor will it discolor unless cracked or crazed by quick temperature changes. It is extremely sanitary. Porcelain vessels can be shaped more elegantly, and the thickness of their walls controlled more accurately than their lesser ceramic cousins. With a good cover, it is useful for boiling and simmering.
(Double boiler picture courtesy Bazar Francais)

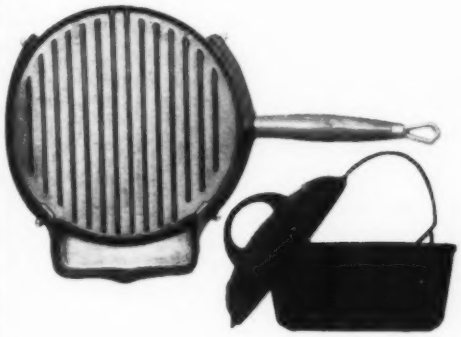
Simmering *requires a sauce or juice which covers the food and cooks at a very low, even boil; a cover will prevent the liquid from escaping as vapor, but is not always required. A slow, even conductor is best for prolonged simmering, particularly for creamed sauces in which milk protein has a tendency to overcook and harden. A porcelain double boiler offers a good combination of qualities for these. Boiling should also be mentioned: The aim is to get the heat to the water as fast as possible, and to keep it there; any good conductor will do the job.*

Copper has long been the all-around, cherished material for sautes, sauces and baked dishes. Dense, copper heats evenly and loses heat slowly. It is an excellent conductor at all heat ranges — but must be well polished, so that both conduction through to the food and radiation from the vessel walls (spreading the heat) can take place; the bother of polishing is usually justified by the quality of the results. Liquids in copper form a poisonous oxide, so an inert lining is required — traditionally tin. Though its docile conductivity is a virtue in cooking, soft tin can be melted by the extreme heat of modern ranges. Vessels must be re-tinned periodically, cleaned gently, and contents should be stirred with a wooden spoon.

Sautéing *should not be confused with frying (which is cooking with deep fat as the heat source); it means cooking lightly and rapidly at a moderate-to-high heat, in an open shallow pan with a small amount of fat, whose function is to keep food from sticking while the surface browns and the center becomes evenly tender but not overcooked. Sometimes the food is lightly floured, with the object of forming a crisp crust around a tender interior; if the food is sautéd directly in the fat, the liquid also creates a slight stewing action which releases juices as the base of a sauce. In either case, a smooth and unsticky surface makes it possible to keep fat to a minimum. Many cooks swear by tinned copper because it is smooth, inert and responsive.*

Brass, another good, though expensive conductor, also requires an inert lining, except for cooking sugar, which is best done in pure brass. Today its use is largely decorative.

which are frequently hard to surpass.



Cast iron is heavy, inexpensive and durable. It heats up slowly, but builds up a good medium-to-high surface temperature which is excellent for pan broiling and also for long, slow stewing; its tendency to cook foods after removal from the fire may be a drawback at the table. Because its surface heats faster over the flame than at the edges, it is second to soapstone for stove-top baking. Cast iron, though easily cleaned with soap or salt, must be thoroughly dried; continued use will gradually lubricate its pores, reducing stickiness and the tendency to rust. Cast iron utensils are again very popular because of their suitability to the high but not easily controlled heat of electric ranges, and many are given porcelain finishes.

Porcelain-enameled steel depends, for conductivity, on the gauge of its sheet-steel base; durability depends on the number of coats of liquid porcelain-enamel fired on. More expensive forms are dipped three times, absorb heat fairly rapidly and hold it well; thinner firms — the old "granite ware" — tend to form sticky hot spots. Sudden blows, direct heat, rapid cooling or stirring with metal spoons may craze or chip the glaze, and the rusted ferrous base may alter food flavors. Modern enameled ware, akin to glass and pure porcelain, and popular because it is so sanitary, appears in handsome cheerful colors; one of its classic uses is for roasting pans, where it is not called upon to act as a conductor.
(Picture courtesy "The American Home" Magazine)

Tin is far too costly, soft, and vulnerable to heat to be used as anything but a coating or lining for other materials; but as such it is inert, smooth, a good conductor, and when shined, an excellent radiator, which makes it good for certain kinds of baking. As a coating on sheet steel baking pans, it gradually darkens, absorbs more heat, and produces crisper cookies and darker crusts. The surface, which is extremely soft, should not be scoured or scratched.
(Reflector oven photo: courtesy Mary Earle Gould)

Silver, though a better conductor even than copper, produces tarnishing oxides which present practical problems; unless lined with waxed paper, tarnish would flavor most foods. Silver holds heat well, and has been fashioned into elegant serving utensils and teapots.

Wood cannot stand direct flame or extensive heat, but is useful for quick broiling, particularly for steaks. Because wood does not absorb much heat, a steak on a plank cooks only from the flame and not from heat absorbed by metal underneath it. Hickory was once used to impart flavor, but oak is now standard, and goes on to make a good carving board for the table.

Paper, indispensable adjunct of chops and fish *papillote*, is used to form in a low-conductive moisture-proof blanket around the food, inside which a slow vapor stewing takes place.

(Pictures courtesy "The American Home" Magazine)

Pan broiling *The aim with pan broiling is similar to that of broiling: the heat should reach the interior of a steak, for example, as slowly as possible, while one surface at a time is made crisp and the juices sealed in. Pan broiling is preferred by some to oven broiling because there is no cooking action on the second surface to overcook the interior. Therefore, it requires a material which gets very hot and does not reflect heat back. It is desirable to cook without fat, which makes a less crisp surface that lets juices escape. Hence the pan should be self-lubricating, like aged cast iron.*

Roasting *In roasting meat by the modern method, heated air is the cooking medium. Dry air at moderate temperatures should surround and slowly penetrate the roast; whether or not there is basting there should be a minimum of contact with the utensils (ideally the roast should be lifted above it on a rack). Likewise, the utensil should not absorb too much heat at the point of contact or become so hot that juices burn. The main job of the roasting utensil is to catch these escaping juices subsequently to serve as a saucepan on the top of the stove when gravy is prepared.*

Baking *The object of baking is to cook the interior of the dough, batter or casserole evenly, by heated air, while the outside browns either lightly or crisply. The surface is in contact with both the pan and the air, so browning at both points must be controlled; a crust which browns too rapidly will keep the interior from rising completely. The role of the utensil is fend off or absorb heat rays. Shiny surfaces will reflect heat away from the object, preventing it from browning too fast; this results in a light, fluffy, evenly-browned cake. Glass and darkened tin will absorb heat rays, producing darker inside crusts, and crisp cakes and bread.*

Broiling *the oldest form of cooking, is cooking food largely by radiation from a one-sided heat source. In its original form, a spit turns the meat, keeping the interior cooking slowly while the surface becomes crisp and charred. Modern oven broiling sears the meat rapidly on one side at a time, but heat absorbed by the underside tends to cook the interior too fast. Infrared rotisseries, because of the high degree of heat reflected by all surfaces, approach a high-speed stove-top baking, during which the interior cooks fast without much charring of the surface.*

New materials *are now offered in endless combinations to help span the gap*

Stainless Steel, improved

Stainless steel is magnificent for serving (2) and for washing up afterwards, but for serious cuisine it absorbs heat too spottily and conducts it too unevenly, staining itself in the process. Texts classify it as a non-conductor.

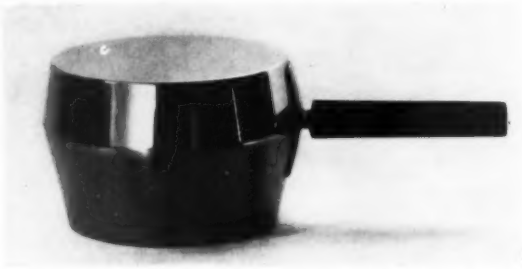
Fortunately, there are ways that its good qualities — its hard, inert, easily cleaned surface and its heat retention — can be paired up with other materials of greater conductivity. There are currently at least seven basic combinations in which mild steel, copper or aluminum are used to improve the cooking properties — and lower the cost — of a stainless utensil.

All-steel bonds: A carbon steel core (60 per cent of thickness) between two stainless steel layers is used by Nicro Steel Products, and a similar sandwich with a 50 per cent carbon steel core by Carrollton Manufacturing, for good even low-heat conductivity. Flint also offers a stainless sandwich with a thick radiant core of mild steel.

Stainless and copper: A copper bottom, clad or plated, was the original way to speed up the heat intake of a stainless pan, and versions, like Revere's, are still popular (3). Now copper interlinings are used by Bridgeport Brass (5) to raise the conductivity of stainless close to that of aluminum. (If copper's conductivity is arbitrarily taken as 100 per cent, according to Consumers Research, then the heat transmitted by the same amount of stainless is 4 per cent, and by aluminum, 55 per cent.) Stainless is being substituted by Olympic Metals for the easily fatigued tin linings of copper pans (4); and for restaurant duty, Legion Utensils bonds copper and stainless of equal thickness.

Aluminum offers lightness, economy and more uniform heat conduction, and gains convenience from stainless. Farber's new line has a thick aluminum slab bottom bonded to stainless walls (1). Probably the most complex bond of all is Reynolds Metals' four-ply utensil: light-gage stainless lining and exterior for cleanliness, a carbon steel core throughout for rigidity, and an aluminum slab bottom for conductivity.

1 *Stainless skillet, heavy aluminum bottom; Farber*



2 *Stainless steel serving casserole; Georg Jensen*

3 *Stainless steel restaurant pan, copper-clad bottom; Revere*

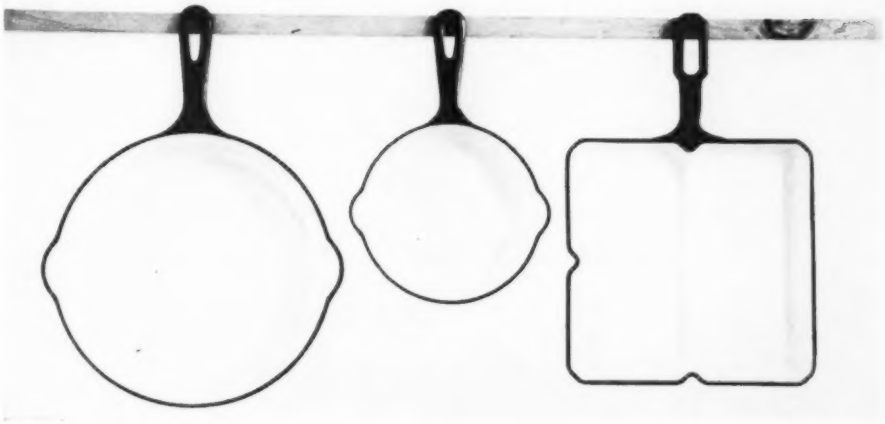
4 *Copper skillet (.032"), stainless lining (.008"); Olympic Metals*

5 *Stainless surfaces bonded to .06" copper core; Bridgeport Brass*

between sink, stove and table

6 *Opaque Pyrex baking dish; Corning*

7 *Pyrex immersion teamaker and drink mixer; Chemex*

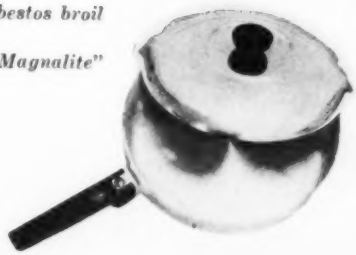


8 *Cast iron skillets, white enamel interiors; Griswold*

9 *Disposable foil and asbestos broil pan; Lewis & Conger*

11 *Aluminum foil wrap; Reynolds*

10 *Stainless aluminum "Magnalite" skillet; Wagner*



Heat-resistant glass

Transparency gives glass a unique and appealing quality. It will not absorb odors and is relatively unaffected by acids and alkalis. It can be cleaned quickly and easily, but cannot stand abrupt temperature changes; though it holds heat moderately well, it does not transmit it as evenly as some of the metals. Its inertness makes it especially popular for tea and coffee-making. The *caveat* against glass saucepans results from fact that light destroys many nutrients in vegetables, vitamin B2 in particular. A cook who cherishes her vitamins will lobby for tinted Pyrex and, in the meantime, use her glassware in a dark oven — where it cooks fast at lower temperatures and is excellent for crusty baking.

Enameled cast iron

The new utensils which are porcelain-coated combine the advantages of both cast iron and glass, and enameling makes the material handsome for the table as well as for the kitchen. It withstands both hard use and abrupt temperature changes; the inert, easily cleaned lining imparts no flavor to food, and utensils are good for sautéing and simmering as well as oven use. The latest innovation is Griswold's line of cast iron skillets enameled on the inside only (8); the black bottom, an important element in the absorptive qualities of cast iron, is retained, while the working surface is made sanitary and decorative.

Aluminum

This once-rare mineral is currently manufactured in three forms: 1) thin, stamped and inexpensive; 2) cast utensils, which give an evenly distributed low heat perfect for waterless cooking; and 3) foil, which has replaced vegetable parchment for sealing in juices during baking, and which now suggests a whole new concept of disposable utensils.

Aluminum is not as good a conductor as copper, but its relative cheapness and light weight allows it to be formed in heavier sections, so that its shape can augment its material characteristics. Durable and porous, it is easily kept clean, even though it is darkened by soap alkalis, and pitted by salty foods, if left standing. Unlike tin, it can be polished to a bright surface, which browns baked goods lightly. Reasonable care and choice of scouring materials will keep it in good condition indefinitely. According to the method of manufacture, its qualities can be varied almost to order.

a word about

handles

1

2

The existence of the potholder in modern technocracy is the tip-off that the handle problem has never really been solved. There are two basic ways of keeping heat from the hands: shape of the handle, and choice of materials. The shape school, which first used length and then aerated handles — hollow, perforated, or wound wire — seems to be in abeyance. But materials — woods and non-conductive phenolics — are taking their place (1, 2). While fine for the stove top, wood and plastics sometimes cannot stand the higher oven temperatures. One practical solution is the detachable handle (3, 4, 5). In laminated wood or metal, it can come to the pot after cooking is over, and can even turn it into a double-duty top-of-stove and oven utensil. The Disposa-pan (4) suggests that the handle may some day be the only permanent part of a cooking utensil.

1. *Laminated wood handle, Prizer enameled cast iron.* 2. *Phenolic handle, Club Aluminum.* 3. *Pyrex skillet, clamp-on metal handle, Corning Glass.* 4. *Aluminum Disposapan, metal frame, phenolic handle, Lewis & Conger.* 5. *Laminated wood detachable handle, 2-part enameled cast iron pan by Jens Quistgaard, at Bonniers.*

5

3

4

what the

experts *use*

One of the most authoritative sources on cooking materials is obviously the cook whose livelihood and reputation depend on using them, so we asked three experts, each with a different area of specialty, what they chose for cooking and why.

ERNEST INTILE, pastry chef of New York's famous Quo Vadis restaurant, learned his art in Canada and England. He is an advocate of flaky, dark pastry which uses a high proportion of butter, made on darkened tin-lined cooky sheets from France. He scrapes them lightly and wipes them with an oiled rag. "We never wash them," He explains, because contact with water produces a faint metallic tang in the pastry — even if the pans are thoroughly dried, and even though he uses a lining of parchment under the pastry.

HENRI GEIB, chef at New York's "21" for 14 years before becoming master of the kitchen at Quo Vadis, works amid an array of copper utensils of the old and new type: He has traditional tin-lined copper, but because of the hard wear imposed by restaurant cooking and cleaning, he prefers the newer kind made of copper and stainless in equal thicknesses. He finds that the latter keep heat better for more controlled cooking, and stand up under stirring and whisking; he even uses them in the oven. Geib's other favorite is black cast iron; he finds its self-lubricating surface excellent for quick sautéing of fish, potatoes and breaded foods.

MARIAN TRACY, author of eight cook-books, including best-selling "Casserole Cookery," has gathered an eclectic and very special wardrobe of utensils for one-dish meals from a tiny kitchen. She has three criteria: appearance ("My dishes must look well on the table,") size and shape for the particular recipe and party ("There must be a variety to choose from,") and appropriate material. Her favorites include the large, fire-red enameled Crouset "au gratin" pan, for uncovered spaghetti dishes; the covered Swedish enameled cast-iron casserole, for seafood, and a deeper mate for bulky stews and chicken fricassee; a straight-sided French copper casserole ("You must have straight sides for souffle, and copper is excellent,") and a spherical mica-flecked earthenware bean pot acquired from the Picuris Indians of New Mexico, which doubles for stews. The cream-colored enameled drip coffee pot is from Denmark; she uses nothing else because "It makes the best coffee."

photos: Hank Parker

photos Hank Parker

Who should get overtime in a design office and who should not? What does the law actually say and does it really cover the situation of the designer who puts in long hours after 5 PM? How have some design offices coped with this question? And do designers want overtime anyway?

That overtime question

Robley D. Stevens

What does the law provide?

The Fair Labor Standards Act states, in substance, that anyone covered by this law must be paid overtime for work beyond 40 hours per week. The question is, who in a design office is covered? It can only be settled by comparing the job functions of the individual to the official simplified "tests" of duties, responsibilities, salary and other requirements for eligibility. The language of these wage-hour "tests" is exclusionary—that is, anyone whose job measures up to all the requirements is *not* officially entitled to overtime, or is *exempt from the law*. Three classifications of industrial designer are exempted by Section 13(a)(1) of the Fair Labor Standards Amendments: *Executive, administrative*, and *professional*. It might be interesting to know just what each one is.

The exemption formula

1. An *executive* industrial designer is one (a) whose primary duty consists of the management of the enterprise in which he is employed, or of a customarily recognized department or subdivision thereof; and (b) who customarily and regularly directs the work of two or more other employees therein; and (c) who has the authority to hire or fire other employees, or whose suggestions and recommendations as to the hiring or firing or any other change of status of other employees will be given particular weight; and (d) who customarily and regularly exercises discretionary powers; and (e) who does not devote more than 20% of his hours worked in the work week to activities which are not closely and directly related to the performance of the work described in paragraphs (a) through (d) of this section; provided, that this paragraph (e) shall not apply in the case of an employee who is in sole charge of an independent establishment or a physically separated branch establishment; or who owns at least 20% interest in the firm in which he is employed; and (f) who is compensated for his services on a salary basis at a rate of not less than $55.00 per week, exclusive of board, lodging or other facilities.

2. An *administrative* industrial designer is one (a) whose primary duty consists of the performance of office or non-manual field work directly related to management policies or general business operations of his employer or his employer's customers; and (b) who customarily and regularly exercises discretion and independent judgment; and (c) who regularly and directly assists a proprietor, or an employee employed in a *bona fide* executive or administrative capacity; or who performs under only general supervision work along specialized or technical lines requiring special training, experience, or knowledge; or who executes under only general supervision special assignments and tasks; and (d) who does not devote more than 20% of his hours worked in the work week to activities which are not directly and closely relate to the performance of the work described in paragraphs (a) through (c) of this section; and (e) who is compensated for his services on a salary basis at a rate of not less than $75.00 per week, exclusive of board, lodging, or other facilities.

3. A *professional* industrial designer is one (a) whose primary duty consists of the performance of work requiring knowledge of an advanced type in a field of science or learning customarily acquired by a prolonged course of specialized intellectual instruction and study, as distinguished from a general academic education, and from an apprenticeship, and from training in the performance of routine, mental, manual or physical processes, *or*, original and creative in character in a recognized field of artistic endeavor, as opposed to work which can be produced by a person endowed with general manual or intellectual ability and training, and the result of which depends primarily on invention, imagination, or talent; and (b) whose work requires the consistent exercise of discretion and judgment in its performance; and (c) whose work is predominantly intellectual and varied in character, as opposed to routine, mental, manual, mechanical, or physical work; and is of such a character that the output or the result accomplished cannot be standardized in relation to a given period of time; and (d) who does not devote more than 20% of his hours worked in the work week to activities which are not essentially part of and necessarily incident to the work described in paragraphs (a) through (c) of this list; and (e) who is compensated for his services on a salary or fee basis at a rate of not less than $75.00 per week, exclusive of board, lodging or other facilities.

The "short tests" below can be applied for quick reference:

1. An *executive* industrial designer is one who is compensated on a salary basis or fee basis at a rate of not less than $100 per week, exclusive of board, lodging or other facilities; and whose *primary* duty consists of the *management* of the enterprise in which he is employed or of a customarily recognized department or subdivision thereof, and includes the customary and regular direction of two or more other employees.

2. An *administrative* industrial designer is one who is compensated on a salary basis or fee basis at a rate of not less than $100 per week, exclusive of board, lodging, or other facilities; and whose *primary* duty consists of the performance of office and non-manual field work directly related to management policies or general business operations of his employer's customers, which include work requiring the *exercise of discretion and independent judgment*.

3. A *professional* industrial designer is an employee who is compensated on a salary or fee basis at a rate of not less than $75 per week, exclusive of board, lodging or other facilities; and whose primary duty consists of the performance of work either requiring knowledge of an advanced type in a field of science or learning, which includes work requiring the consistent *exercise of discretion and judgment*, or requiring *invention, imagination or talent* in a recognized field of artistic endeavor.

It is natural for industrial designers to *prefer* to be classified as professional workers, similar to professional engineers and architects, and to be part of the management team—most of them are. On the other hand, some design-

ers may feel that they are simply part of the rank and file, and that excessive work loads should entitle them to extra compensation, particularly when the client is billed for their extra hours of work. In either case, official status can be determined by the exemption formula above. The form FO-74 of the Wage-Hour & Public Contracts Division, U. S. Department of Labor, is submitted as a questionnaire to design employees whose status is in doubt; the form and its resultant answers help the investigator to determine whether the individual is exempt or non-exempt. In my former capacity as a law-enforcement agent, I checked several firms who were concerned with product design, development and marketing. In some cases it was disclosed that some of the industrial designers had been ineligible for exemption. Consequently, their employers were given penalties and had to pay back wages. One of the main reasons why these designers were belatedly found entitled to overtime was misclassification.

Beyond the law

So much for the law. But what about the majority of designers, classified as professionals, who still put in long hours after 5 PM? Do they want overtime pay? Do they expect it? What compensation do they get? Here is the way four well-known design offices handle the problem.

Office A: This office works a 40-hour week. Everyone is paid overtime except the partners, who share in the profits. The design staff, all considered professionals, are paid straight time for overtime. *Billing:* Regular clients are charged an hourly rate for all work whether regular or overtime. Government contract jobs, however, permit only straight *cost* charge on overtime work (not a regular hourly rate), so such jobs tend to discourage overtime demands. This large and extremely businesslike firm does not like to ask overtime of its employees anyway, feeling that it lowers efficiency even when fairly compensated.

Office B: This office, also a large one, works a 37½-hour week. Overtime for work in excess of 40 hours is paid to all employees who earn less than $5,000. No distinction is made on any other basis. If a job is exceptionally rushed, however, adjustments are made for everyone concerned. *Billing:* Clients of this office are billed two ways—1) Straight time fee, on the basis of an hourly rate determined at the start of the job, or 2) retainer plus cost.

Office C: This office is smaller, with about 25 employees and the typical problem of the professional office: an uneven work load. Everyone in this office is a designer. All are paid a "professional" wage and no one gets paid for overtime. The reason is that overtime is infrequently required, and whatever there is usually evens out with "undertime." If overtime were a steady problem in this office, provision would be made, but the designer (and everyone in the office) feels that it would necessitate very strict "time clock" records which entail extra bookkeeping and are psychologically undesirable. *Billing:* Clients are usually billed on an hourly rate, sometimes a straight fee.

Office D: This is another small office whith around 12 employees, whose practice is similar to Office C. Designers, all on a salary of over $100 per week, are expected to work overtime when necessary, with time off given to compensate for exhorbitant hours. Employees who earn less than $100 per week (none of them designers) are paid overtime, and everyone gets supper money for working late. *Billing:* Clients are billed cost plus or a fixed fee.

As these examples show, overtime in design offices is pretty much a matter of individual policy, dependent on the kind of work each office does, the individual office structure, and the billing system. Overtime must be absorbed by someone—either it is the designer, the design office or the client. In a small office, run on a rather personal basis, the arrangement is likely to be most flexible; designers, as responsible professionals, are expected to get their work done on their own initiative; the "psychic" rewards of a free system compensate for the time put in. The situation seems much the same in several big companies with their own design departments, where a general disinclination to require overtime work is strengthened by the red tape necessary to get extra pay funds allocated. In big design offices, where heavy contracts and a hieratic payroll require more overtime work and warrant a more businesslike arrangement, simple criteria have been worked out, to distribute the burden of the overtime work fairly between client, designer and design office.

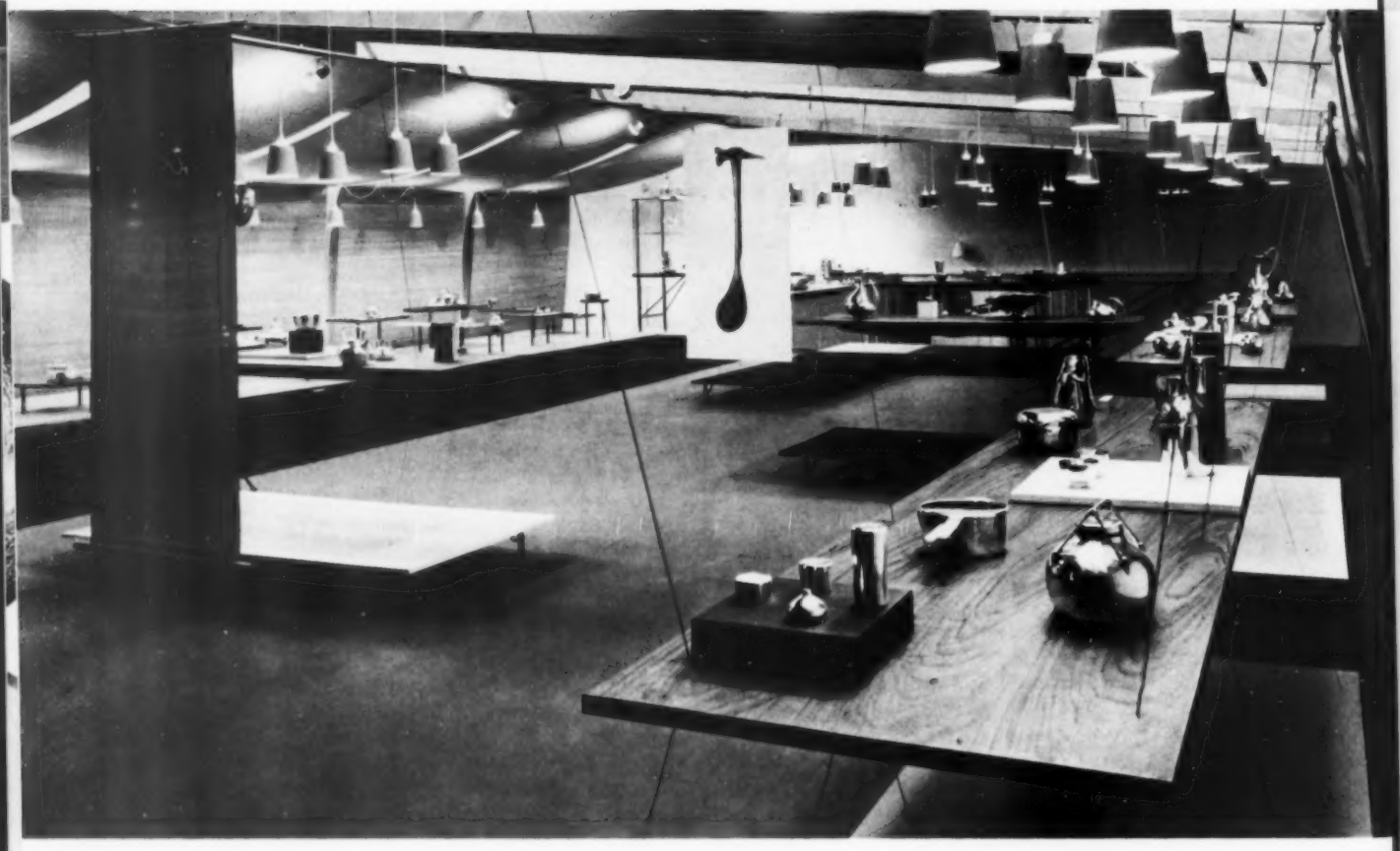
Conclusions

These solutions indicate that design offices have of necessity worked out their own systems of compensation, but a word of warning is due. The Wage-Hour & Public Contracts Division have indicated that some employers believe that anyone employed in the field of industrial designing will *automatically* be exempted from the compulsory overtime pay law as an executive, administrative or professional employee. A look at the "tests for exemption" again will show that this is not so. Although most designers probably do qualify as professionals, there are some whose actual duties, qualifications and salary level would entitle them under the wage-hour rules to overtime pay and the employer to a fine, wage suit, or even imprisonment for noncompliance. It is obvious from all this that both employer and employee owe it to themselves to have a working knowledge of the wage-hour rules, and for the employer to keep complete work records on all design personnel.

Danish silver in the U. S. A.

Georg Jensen's traveling exhibition of 20th-century silver celebrates 50 years of craftsmanship

Flexible installation by architect Finn Juhl displays silver on teak and fir slabs suspended from teak beams, or on low tables lacquered orange, blue, black and turquois. Awnings of natural matting, yellow linen and turquoise silk enrich reflections.



The gleaming objects on these pages are part of an exhibition entitled "Fifty Years of Danish Silver" (although it includes some stainless steel), organized by Georg Jensen Inc. to celebrate their golden anniversary. With its own flexible setting designed by Danish architect Finn Juhl, the show is currently at the Corcoran Gallery in Washington, D.C., and will embark May 1 on a two-year tour around the country.

From Georg Jensen's neo-classic grape clusters of 1910 to the luxurious austerity of a modern saucepan, the Jensen tradition holds that silver is a precious metal, to be drawn and shaped to bring out its own intrinsic beauty. Though these pieces represent the independent creation of several artists, and reflect the intellectual currents of five decades, a common feeling pervades them all: surfaces, whether hammered or shiny, are plain and shaped to give richness through reflection; edges are smoothly turned to suggest solidity. The resulting richness is evident in the precise, delicately poised classic shapes of Johan Rohde as well as in the mellifluous forms of Henning Koppel.

Georg Jensen
ca. 1910

Johan Rohde
1919

Henning Koppel
1952

Magnus Shephensen
1953-54

American design in Paris

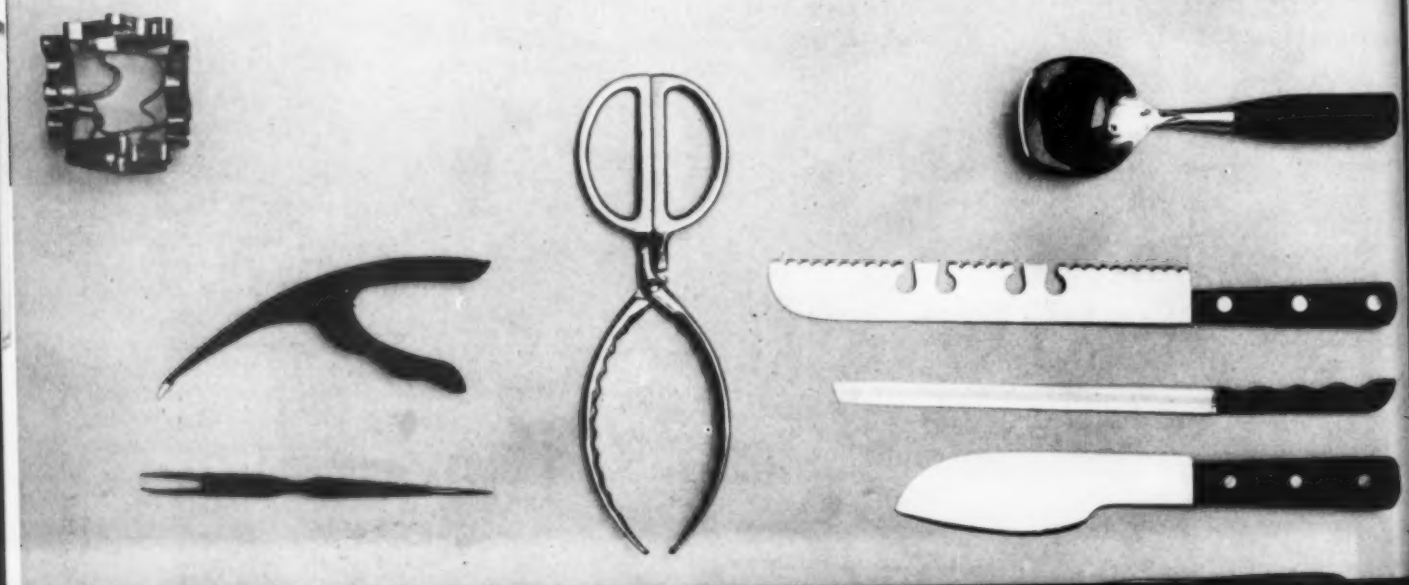
MMA selects 20th-century machine art for French exhibition

The choice and shiny objects on *these* pages are usually at home in the Museum of Modern Art's permanent design collection. Right now they're at the Musee d'Art Moderne in Paris, where they'll be representing American industrial design until May 15, part of the big "Salute to France" festival of cultural events being presented under the auspices of the American Embassy. Some of these objects look pretty familiar; some are now museum pieces; some are "designed" and some are anonymous. They have all been chosen as classic examples of American mass production.

Besides two major exhibitions — American art of the 20th Century and French works loaned by American museums — "Salute to France" will present dance, drama, and musical performances by American companies. The Museum's contribution, organized under its International Program directed by Porter McCray, is the largest collection of American 20th-Century art ever sent abroad. Besides 150 mass-produced articles, the Museum has sent some 200 paintings, sculpture and prints, a big architectural section, graphics, photography and films.

Starting left: pressure cooker, *chrome and plastic, Landers, Frary & Clark;* pitcher, *stainless steel, Carrollton Mfg. Co.;* bar shaker, *stainless steel, Lalance & Grosjean;* tea kettle, *copper-clad stainless steel, by W. Archibald Welden, Revere Copper & Brass;* water kettle, *Pyrex and cork, by Peter Schlumbohm, Chemex Corp.;* ice bucket, *hard black rubber, Chelsea Products.*

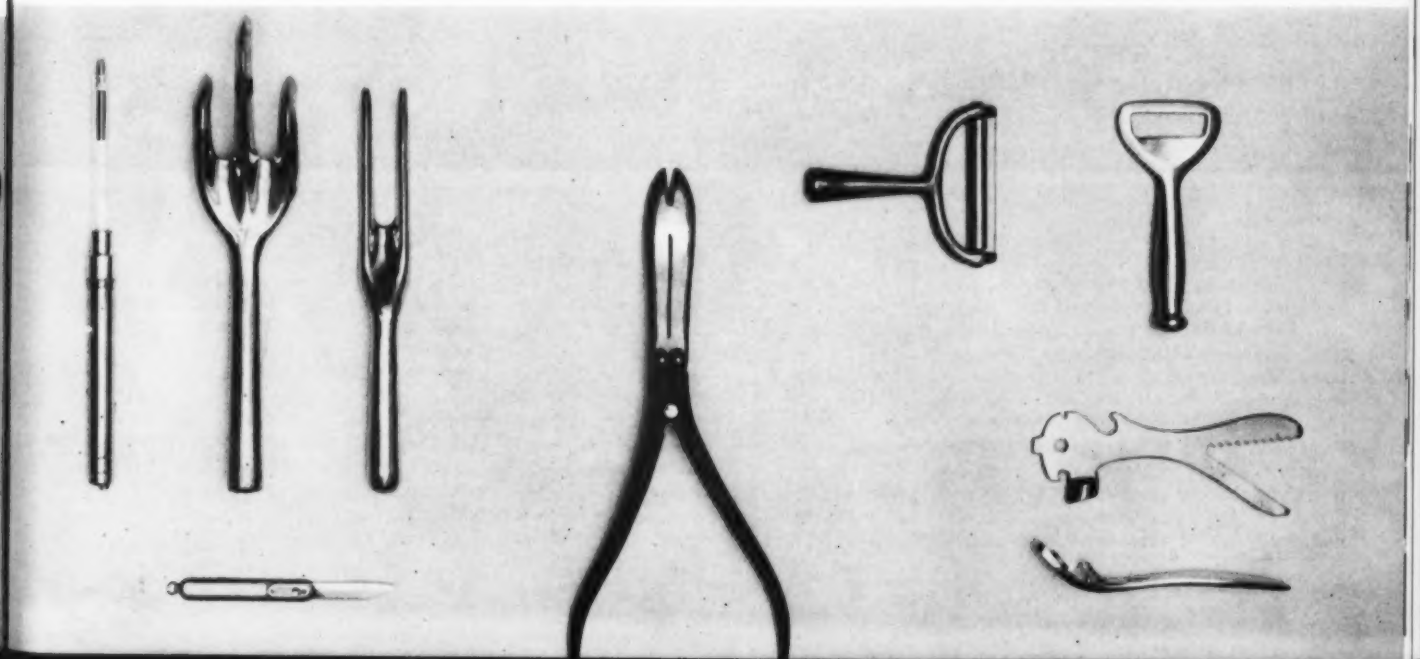
Starting left, reading down: cookie cutter, *tin;* shrimp cleaner, *red plastic, by Gershen-Newark, Plastic Dispensers, Inc.; lobster pick, stainless steel and red plastic, by Peter Sciascia, Holt Howard Assn.;* roast clamp, *chrome, Richter & Phillips Co.;* ice cream spade, *chrome and plastic, C. T. Williams Mfg.;* frozen food knife, *stainless steel and hard rubber,* poultry slicer, *steel, W. R. Case & Sons Cutlery Co.;* kitchen tool, *chrome and rosewood, Ontario Knife Co.;* clam knife, *stainless steel, R. Murphy.*



Outer circle, from front left: translucent round polyethylene ice tray, shampoo font, tumbler, juice shaker, *blue* bowl, *by Earl C. Tupper, Tupper Corp.; round* stacking containers. *Middle:* polyethylene laundry sprinkler *with red stopper, Beacon Plastic and Metal Products;* canister *with yellow cover, Tri-State Plastic Molding Co. Front row:* transparent cylindrical container; *inch-square* pillboxes; nail storage boxes *in two sizes.*

Saucepan *for hotel use, copper-clad stainless steel, by W. Archibald Welden, Rome Mfg., Div. Revere Copper & Brass;* electric iron, *chrome and plastic, Landers, Frary & Clark;* juice press, *cast aluminum;* salad washer, *metal wire, by M. Schimmel, Raymar Industries;* display stand *for oranges, metal wire;* mixing bowl, *aluminum, Lurelle Guild, Aluminum Cooking Utensils Co.*

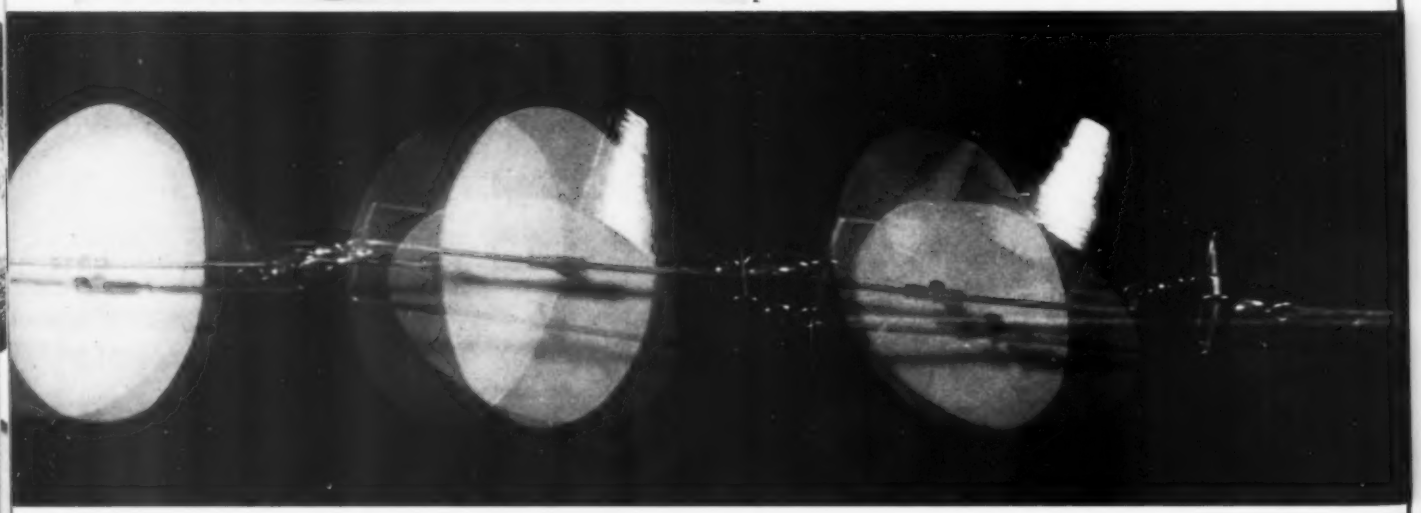
Mechanic's angle flashlight *with illuminated screwdriver attachment, metal and lucite, Alcorn & Co.;* claw cultivator *and* weeder, *cast aluminum, Westfield Mfg.;* pocket knife *with sliding blade, stainless steel, Christy Co.;* shoemaker's nippers, *Sargent & Co.;* cheese slicer, *cast aluminum, by John R. Carroll, R. A. Frederick Co.;* bottle opener, *steel;* multiple bar tool, *bronze, Barcalo Mfg. Co.;* magnetic bottle opener, *manganese bronze, by John H. Hammond, Jr., Hammond Research Corporation.*



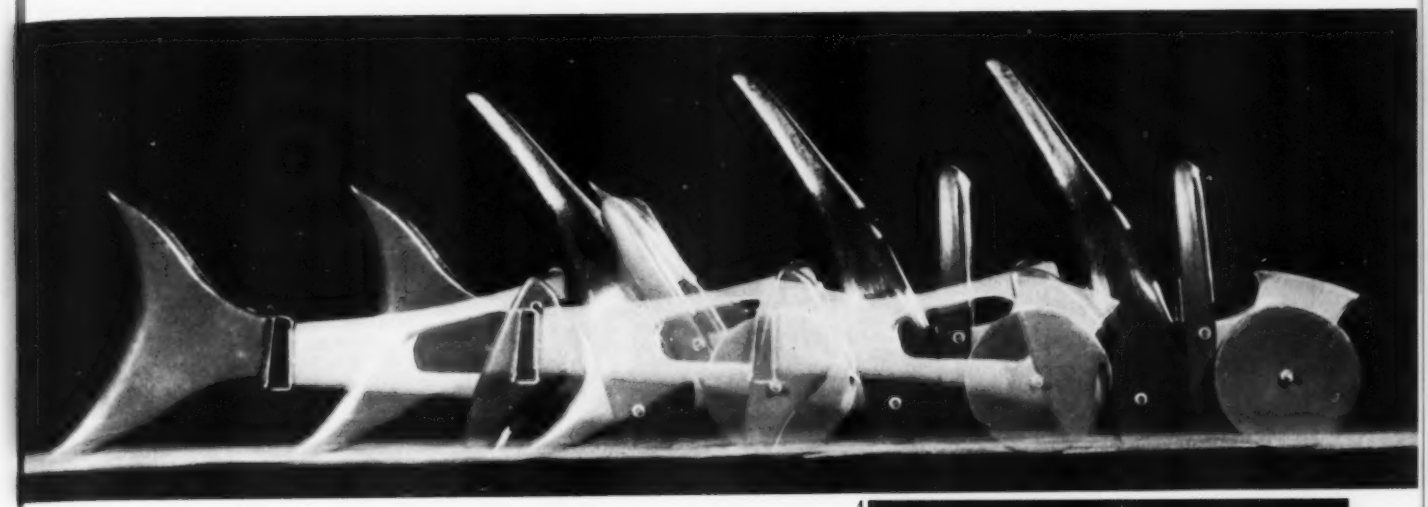
PROJECT TOYS *Students' ideas interest manufacturers*

By a timely coincidence, student classes at two design schools were given the same problem: toys. Reasons for the project were quite different. Associate Professor Ivan Rigby's second year design students at Pratt Institute were given a pure design problem: they were to create the simplest possible toys that could be stacked, pulled or nested. Production difficulties did not have to be considered; the purpose of the project was to let students develop new ideas in color and form by letting their imaginations loose within a simply defined area. Architecture students at the University of Pennsylvania, on the other hand, were given the project by Professor Stanislawa Nowicki as an exercise in prefabrication: they were to design toys based on one or at most two modular units, which could be repeated infinitely and combined in various ways. In neither project were the concepts of the toys to be investigated. As in many design problems, the themes were old and only the interpretations new. Both were simply "idea" projects. In neither was the student expected to turn out finished toys, ready for production. But both classes turned out such fresh and original ideas that manufacturers have snapped up some of the best in each. Monsanto is going to make up several of the suitable Pratt designs as part of a program to encourage better quality plastic toys. Several manufacturers are interested in the modular designs of the Penn group, shown on the next spread.

1



Pratt *students' toys fall for the most part into two groups—toys to pull and toys to build with. The idea of a pull toy is certainly old, but here it gets some new twists. One of them is color. A toy by Bartholomew Russo, for instance* (1)*, is striped in two shades of green like a cut-up cucumber. Another innovation is in* kinds *of movement. Russo's toy careens along with a crazy mixed-up roll because the irregular conoidal cylinders are pitched in alternate directions. A train by Carl Olsen* (2) *is not unlike toy trains that have been on the market for years. But this one combines its elementary cubes, trapezoids and lozenges in a particularly clean and pleasing way. On the other hand an almost rudely simple train-animal-dragon by Robert Matthews* (3) *makes an imaginative and unconventional toy by reducing the "body" to three nicely opposed triangular blocks and making the "wheels" of all things, cubes. The front two blocks* look *as though they're going forward; the rear drags as rears are apt to do, and the square wheels make a lovely child-pleasing racket. George Sereni's fish* (4) *attempts a complicated, controlled movement. Fierce, Buck Rogers-ish, and almost aggressively plastic, its sections knock against each other and against the floor as the toy moves to combine four ways: the tail and body wave from side to side and the fins from back to front. A rather elegant grasshopper by Marlan Polhemus* (5) *is the wittiest of the lot. Noise is not absent here either: a little bead, at the front end of the piston that joins the fixed rear wheels to the front, clacks as the string is pulled taut.*



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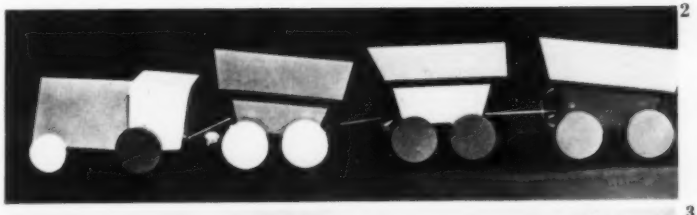

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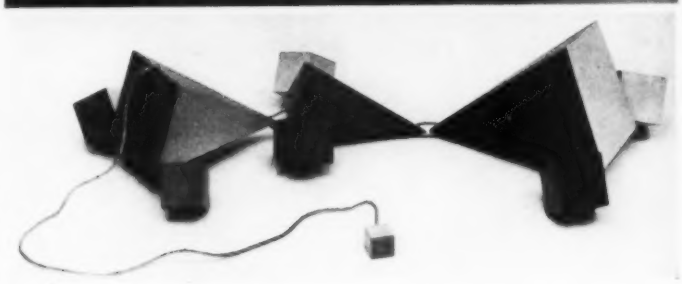

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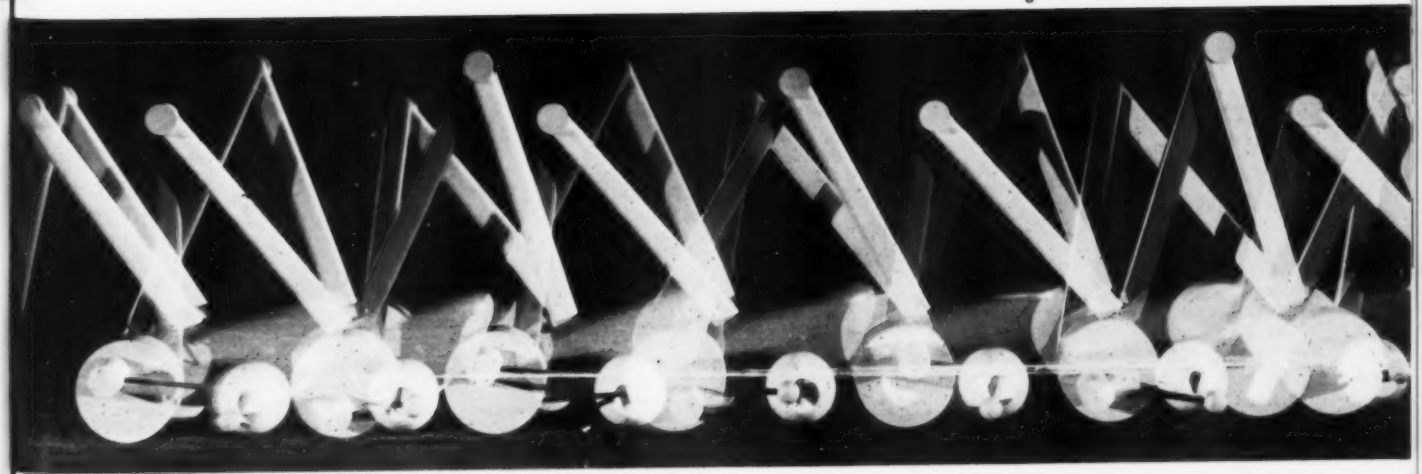


PRATT: *exercise in form and color*

6

Stacking and building *toys usually demand less imagination from the designer and more from the child because of the do-it-yourself aspect. But Alexander Cranstoun's whimsical totem pole looks like fun for both* (6). *The many-shaped and many-colored blocks (including shocking pink and olive green) can be strung on their pole in as many ways as there are beads, or they can be piled up without the pole to make colorful, if precarious, architecture. Building blocks get another new twist from Stephen Worthman* (9). *The single block shape, made in several bright colors, offers surfaces which can be interlocked, stacked, or built upon. David Smith's building toy* (10) *is both simple and sophisticated; it turns building into a game of arranging counterbalanced cantilevers. Animal toys by Manuel Jarrin* (7) *with interchangeable heads, legs and tails, let the child make his own fanciful menagerie. Their smoothly sculptured teak and maple surfaces invite touching and are pleasant to look at as shapes; the parts peg together. Finally, even old faithful alphabet blocks are remodelled by Ruth Launspach* (8). *Hers are three-dimensional. Only those letters which can not stand alone are left uncarved.*

7

8

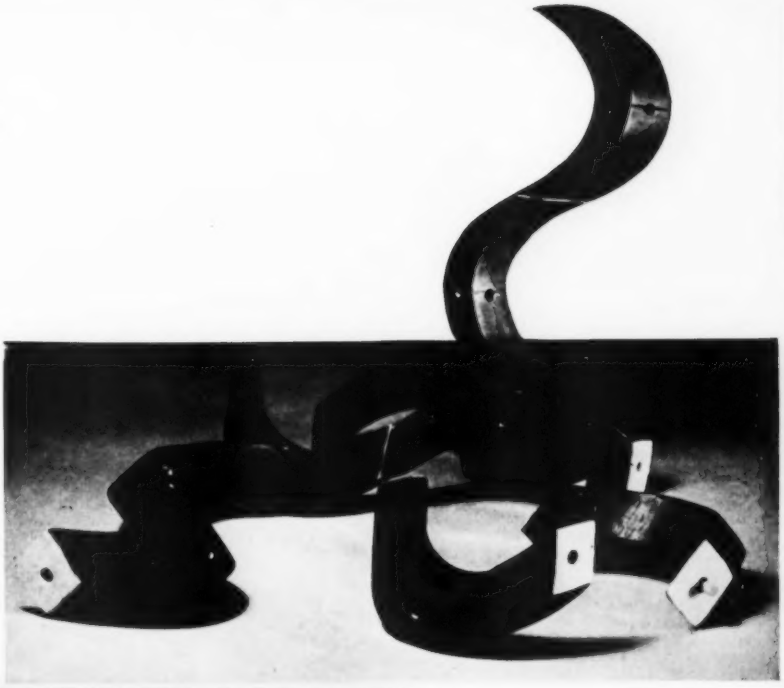
9

10

PENN: *exercise in prefabrication*

Penn *students' designs spring from quite another approach. Their concern is with structure more than with a pleasing surface, shape, texture or color—or, for that matter, with toys. The results are less explicit, more abstract. With one exception the components are regularly geometric, which is what might be expected from students concerned with the elements of architecture. The interesting thing here is the system which each of these students has conceived; the materials and joining methods in each case add up to an easy-to-prefabricate modular unit which is naturally fun to build with. The exception in the Penn group is David Riker's snake-like section, faceted and curved like a slightly twisted banana* (11). *A peg at one end, and strategically placed holes, permit all kinds of sinuous constructions. The peg-and-hole system is not unusual; what is unusual is the shape and the construction it leads to. An ingenious pair of triangular metal clips are the basis for Karyl Radzievich's modular Scottie* (12). *The large and small clips are identical, and can serve as body, tail, nose, or just plain joints. Robert Jackson turns a kind of glorified tongue-and-groove system into an unusual set of building blocks* (13). *The pyramidal tongue and the track-like groove are both constructed on the same* 1:2:4:6 *module so that they fit whichever way they're put together. The prettiest and simplest of all the Penn toys was built by Walton Stowell out of squares of ordinary wire mesh* (14). *Strands at each cut edge are bent to hook into the holes of the next square.*

11



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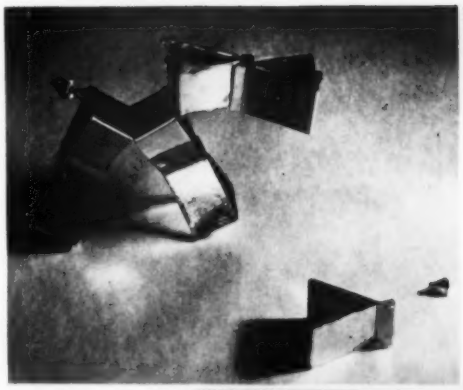

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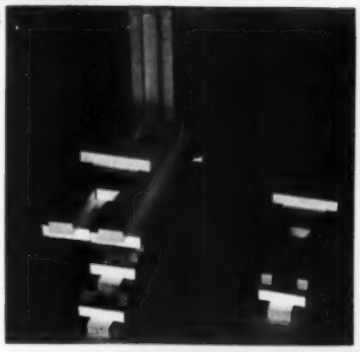

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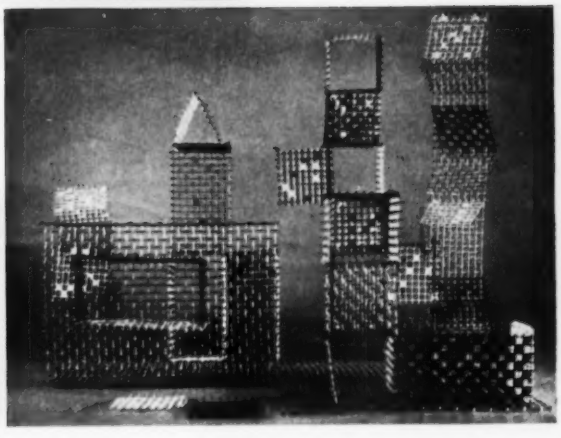
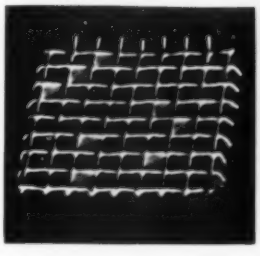




Manufacturing in microcosm

Sitterle ceramics

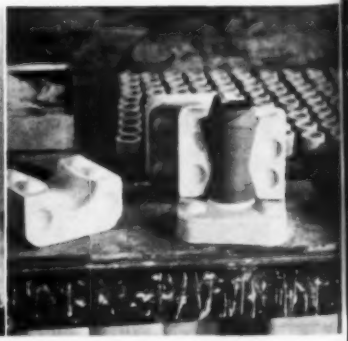
photos: william massee

Home, studio, factory for Harold Sitterle juts from hillside, was once part of an iron mine. Basement with a view is their workshop, into which they've built kilns, elephant-trunked spray booth, clay vats and revolving grinder.

Peppermill begins at tank where fins revolve solution

of fine-ground clay until it is strained and poured into porous molds. As water

evaporates, clay surfaces solidify. Liquid center is poured out, leaving



wet, hollow shape. Raw edge (bottom of mill) gets cut off.

Harold and Trude Sitterle live what is probably a designer's dream. They design what they like, they have no one to please but themselves, and their work provides them with a self-sustaining way of life which they thoroughly enjoy. Most designers produce designs for someone else to manufacture; the Sitterles have chosen to manufacture their own. They design and make a particularly refined kind of white porcelain ware, and they do it all themselves in the basement of the abandoned ironworks in Croton Falls, New York, which is their factory, studio, office and home.

Many people make pottery in their cellars; the Sitterles have turned it into an efficient, going business with an established, nation-wide market. On a line of 28 pieces retailing from $3 to $20 each, they gross about $10-$20,000 per year, which they make pay for the kind of life they want.

Five years ago the Sitterles knew nothing about making porcelain. Harold was a graphic designer, commuting 50 miles to a job as art director of McCall's magazine, Trude's hobby was ceramics, until Trude's sizable clay bill prompted the suggestion that they try a commercial item. The Sitterles collaborated, and the well-known peppermill (in earthenware) was the result. One of the first and most logical of the now-fashionable waisted shapes, it has become a classic of modern design. It was shown in the Museum of Modern Art's first Good Design show in 1950. After that, demand pushed up supply until the Sitterles were in business full time, and Harold's commuting days were over.

At first they decided to do no production themselves. All their time went to the unfamiliar tasks of bookkeeping, assembling and shipping. As this was now to be a professional job, they switched to a better material and contracted with a porcelain manufacturer; but after a year of growing dissatisfaction, they decided to take over the manufacturing themselves.

Porcelain is not easy to work with. Fine white porcelain is distinguished from other ceramics by its pure whiteness, its translucence, and its density. It is usually slip cast, which means that a suspension of finely-ground special clays is poured into molds, allowed to set partially, then removed, finished, and fired. Most ceramics are fired at temperatures up to 2000°F.; porcelain only starts to fuse at 2250°. Most ceramics are fired at least twice. In porcelain, however, the glaze is almost always fired *with* the body to the maximum temperature, producing an inseparable bond. One great difficulty with porcelain is shrinkage (18%). The slip is only 28% water, and as it is not very plastic the clay may easily crack as it is taken out of the mold. The Sitterles read all they could and experimented for a year before actual production. Their biggest problem was to get just the right mixture of clays which would burn white at the firing temperature of 2300° and still be plastic enough to work with.

Another problem was a high-temperature kiln, a stiff investment for the home. Luckily Harold had learned about electricity and machines in the Army. Using Swedish Kanthal heating elements and about 9" of brick insulation, he built a kiln for $1000 which operates on normal house current. By eliminating a transformer, he saved $1200.

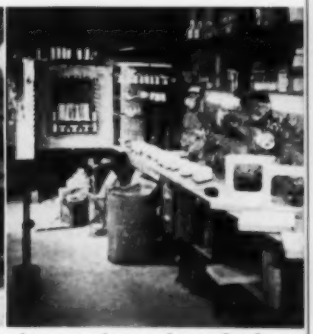
The Sitterles have become efficient by learning to do everything themselves, and experience in other fields has helped. Harold has electrified the shop as much as possible. He designs all the metal parts for the mill (except the grinders, which he says couldn't be improved), and the dies and tools to make them, so that the only cost is for the actual dies. Ceramic molds cost little, and they've found it's cheaper to have them made. Overall maintenance — machine parts and clay — runs about $3000 per year. Trude types and keeps the accounts, and Harold does all the publicity except the actual printing. A friend, Keith Hovis, who collaborated on the design of a serving spoon, makes the rosewood parts for some other items and takes all the photographs for brochures they send out to buyers.

After five years the Sitterles feel confident about their business. For the first two years they panicked when it was slow, but now they except a seasonal slump, and use the time to work out new models, improve molds, and build up their stock. The business, which the Sitterles do entirely by mail, is now firmly based on reorders from stores which carried first one item, now ask for more. The Sitterles count on their reputation for quality. Their scrupulous skill, the luxury materials they use, and the efficiency with which they now do everything from mold design to bookkeeping, result in a kind of product big producers probably compete with at the price.

The output of Sitterles Ceramics is about 400-500 pieces per month, produced on demand. As demand grows, they expect to grow, but they hope it won't come too fast. Expanding now would mean hiring and training a staff (instead of occasional local help); it would mean expanding their equipment (they've put about $30,000 in it); but most of all it would mean, as Harold says, "always having to be *forcing* our stuff on the market to pay for the equipment." Having achieved a balance between investment, output, and private life, the Sitterles prefer to stay off the treadmill and create a product that sells itself.—*m.s.*

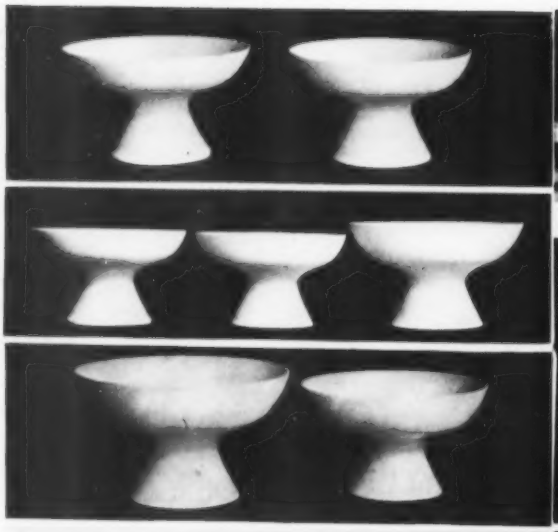
Trude scrapes mold marks from dry pieces, now white.

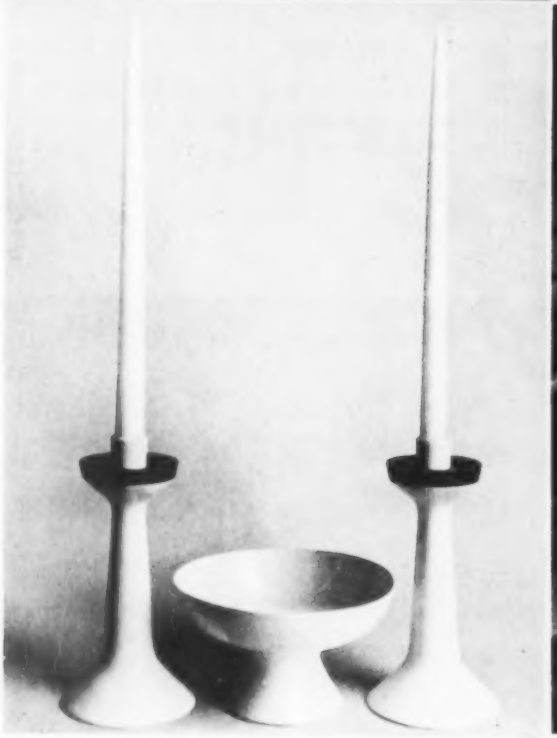
Harold dips each piece in glaze for final finish before putting it in kiln where heat fuses clay into hard white porcelain. Firing cycle takes one day to heat slowly, two more to cool off again.

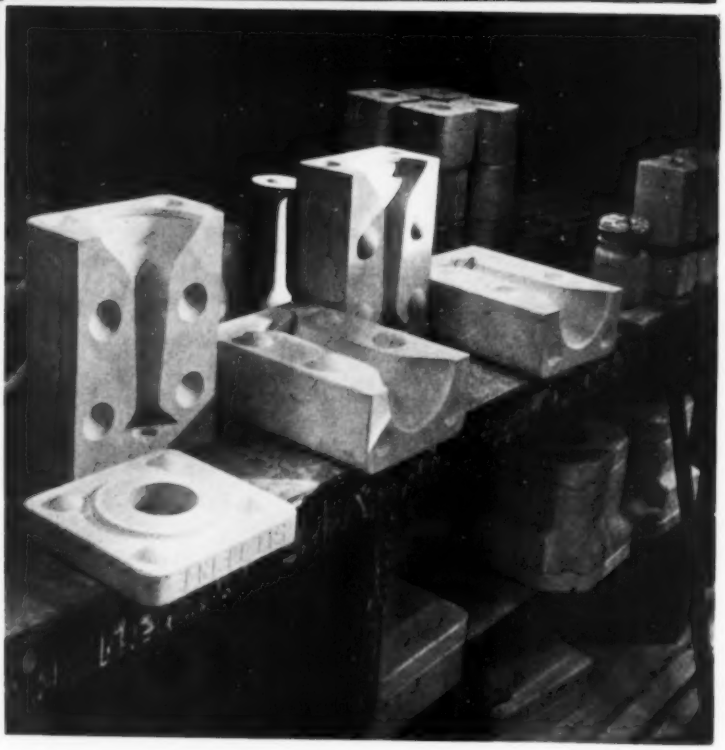


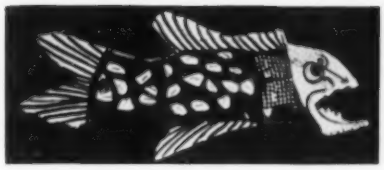
The original peppermill (*all white*) *and subsequent versions* (*left*), *are all still in production except the two with rosewood bottoms, which did not sell. Fluted versions was an attempt to please non-purist buyers, but Sitterles, not happy with it, have since decided that what they like themselves is most successful in the end. White salt dish and spoon were added in* 1951.

Development of difficult one-piece footed bowl (*photo bottom left*) *is shown in series of plaster models: Top two versions were studied for proportion. Then Sitterles decided they wanted it bigger, added third model. The final version is shown at right in bottom row; even bigger bowl at left is actual model from which mold was made, scaled up to compensate for shrinkage of clay in drying. Compound curves of the bowl required a* 22*-piece mold, whose parts almost hide Sitterles in the photo. The candlestick, on the other hand, takes only a* 3*-piece mold, plus another small one for cylindrical candle cup. A Phillipshead screw through cup and base holds rosewood disc in place.*

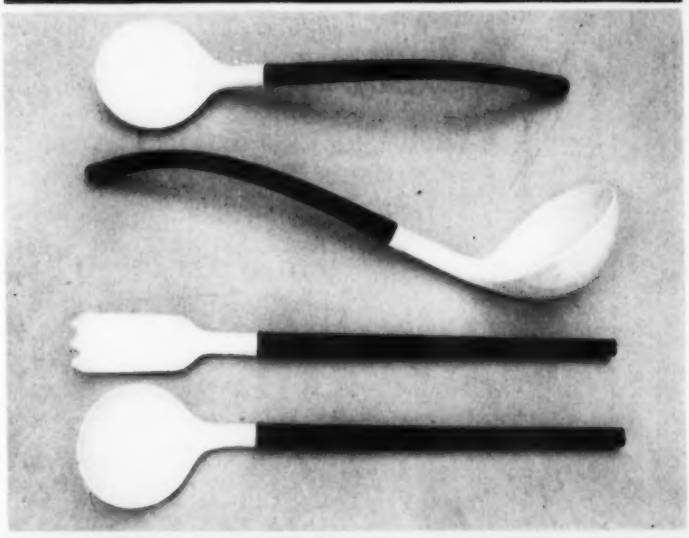


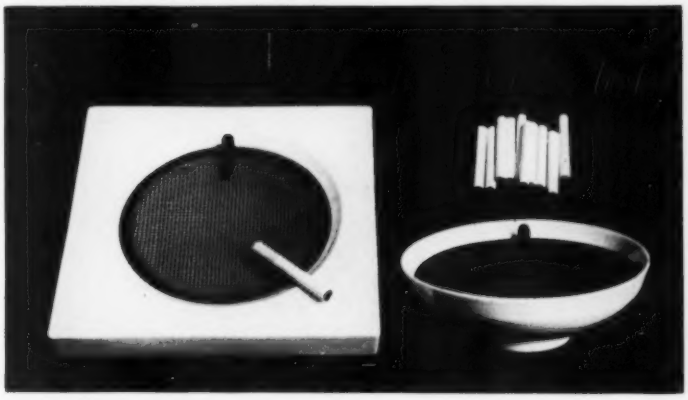


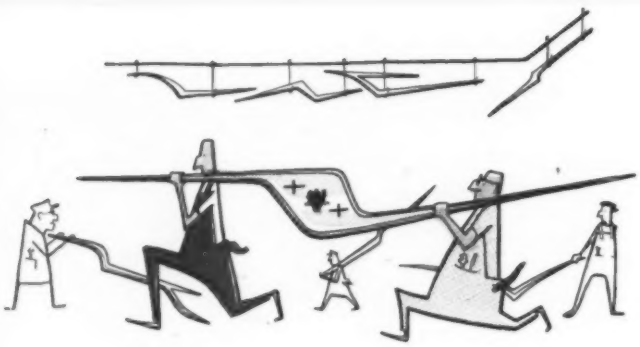




Sensitive shapes *like small bowl result from working directly with porcelain. Other fine materials suggest new combinations and designs: ladles and salad servers play smooth white porcelain against the polished warmth of rosewood, and ashtrays combine porcelain with black steel mesh. Design at the Sitterles does not stop with production. A big blob of plaster accidentally dropped on the floor seemed to suggest a fish, so Harold sprinkled on a few nuts, bolts and chips, painted it, cut it out, and hung it on the wall (above). He designed the fork-legged table in their office and is making another out of some beautiful old walnut planks they found. Faced with a seemingly irremovable object, the Sitterles have put their mark even on that: pasted-up drawings by the young Misses Sitterle are gradually obliterating the refrigerator's glacial white wall.*



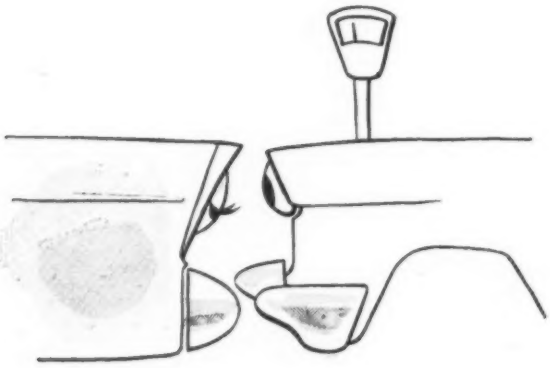


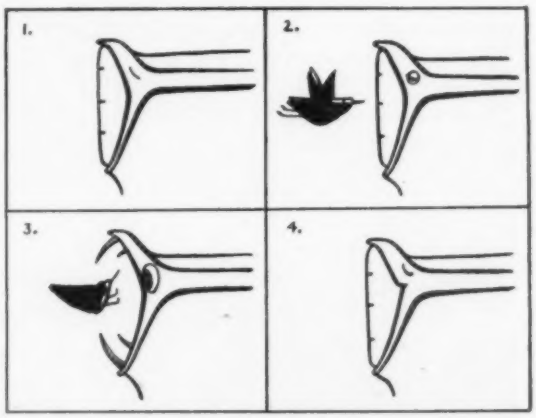


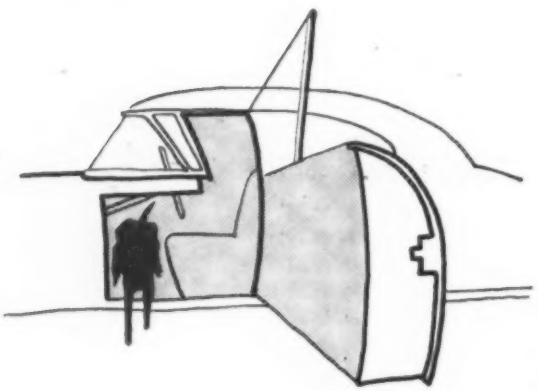
Lunge by Loewy *or, watch that dagmar!*

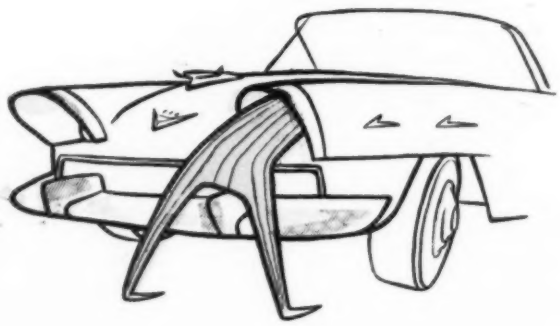
When Raymond Loewy was asked to Detroit last January to address the Society of Automotive Engineers on the subject of "The Next Fifty Years," he let them have it, right there in the lion's den. We figured if car-designer Loewy could stick his neck out (and the lions could take it without a roar), we ought to pass the word along, or rather the pictures; if this is what the next fifty years are going to be like, the public at large should be prepared.

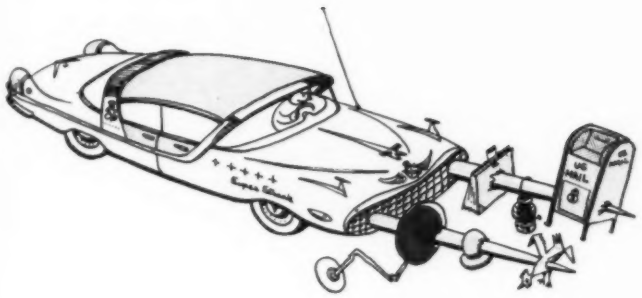
The action shot above, reportedly smuggled from a Detroit production line, ought to be worth a lot of money to a man with the right contacts. The character below, incidentally, is just changing a headlight.

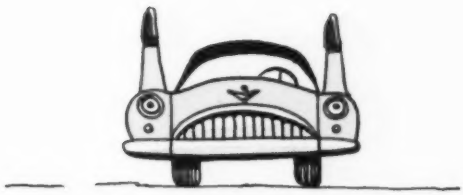


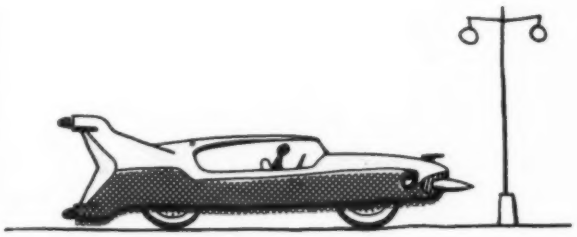


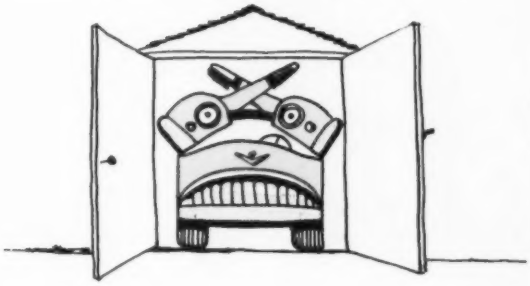


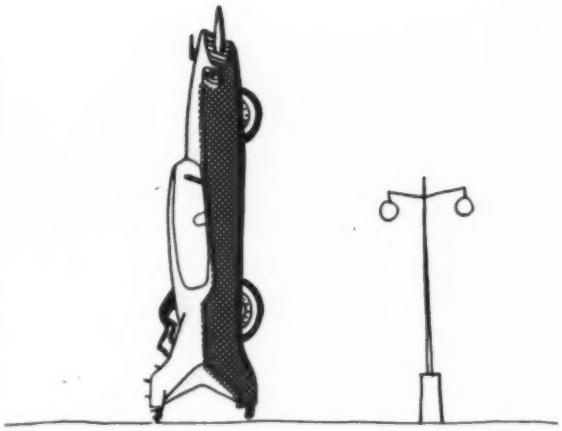


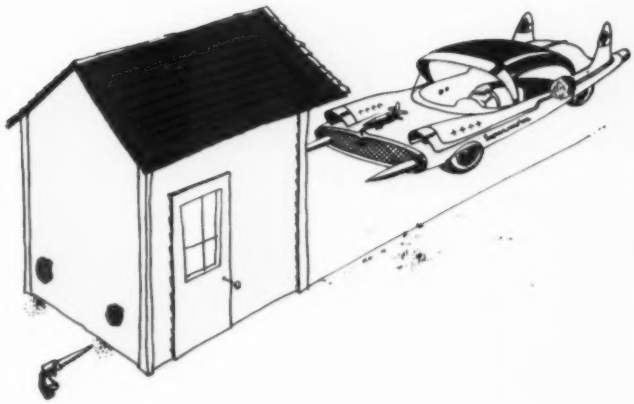


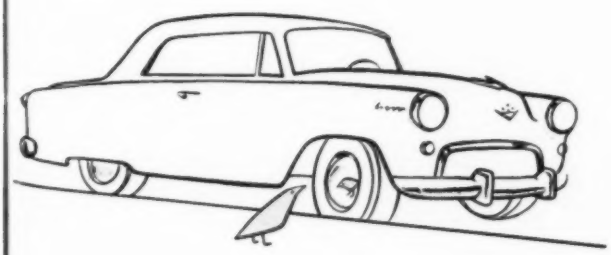


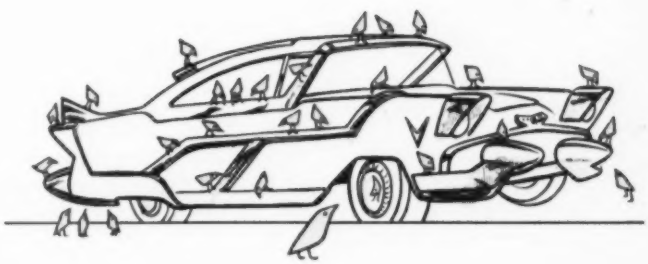












DESIGNS FROM ABROAD

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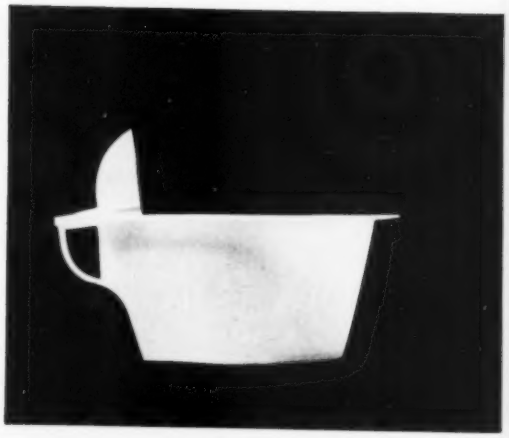

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Designs from Abroad this month are all designs from Italy, some of the winners in the first "Golden Compass" competition sponsored by La Rinascente, the Macy's of Rome and Milan. Commenting on the results of this first Italian equivalent of Good Design (with the difference that winners receive plaques and money), jury president Gio Ponti had this to say: "The designer or manufacturer who relies on the sometimes purely hypothetical demands of an uneducated public is off to a false start. The design innovations which caused industry-wide changes were all proposed to the public by architects and artists. They were accepted for qualities the public had not seen, thus *could* not demand: they have brought lethargic markets to life."

Industrial design in Italy, like architecture, clothes, and life itself, is characterized by great gusto and splash, a natural inventiveness, and an instinctive, unfailing elegance. It may err on the side of exuberance, but as these entries show, it is never dull and rarely ugly. A hinged clothesbrush (1) *opens into a hanger* (*Verbania*). *Steel mincer* (2) *is logically angled to spit food straight down; by Italo Strada* (*La Sorgente*). *A rubber hot water bottle for the feet* (3) *is round, and a child's chamber pot* (4) *is polyethylene* (*both Pigomma*). *Round traveling mirror* (5) *carries its own built-in light* (*Pollice*). *The rubber-finned table fan* (6), *ingeniously suspended from its airy cage, was one of* 15 *first-prize winners; by Enzo Priali for Zerowatt* (*Fabbriche Elettroniche Riunite*). *Hand vacuum-brush* (7) *works like a rotary shave, by Giuseppe de Gotzen* (*Chiminiello*).

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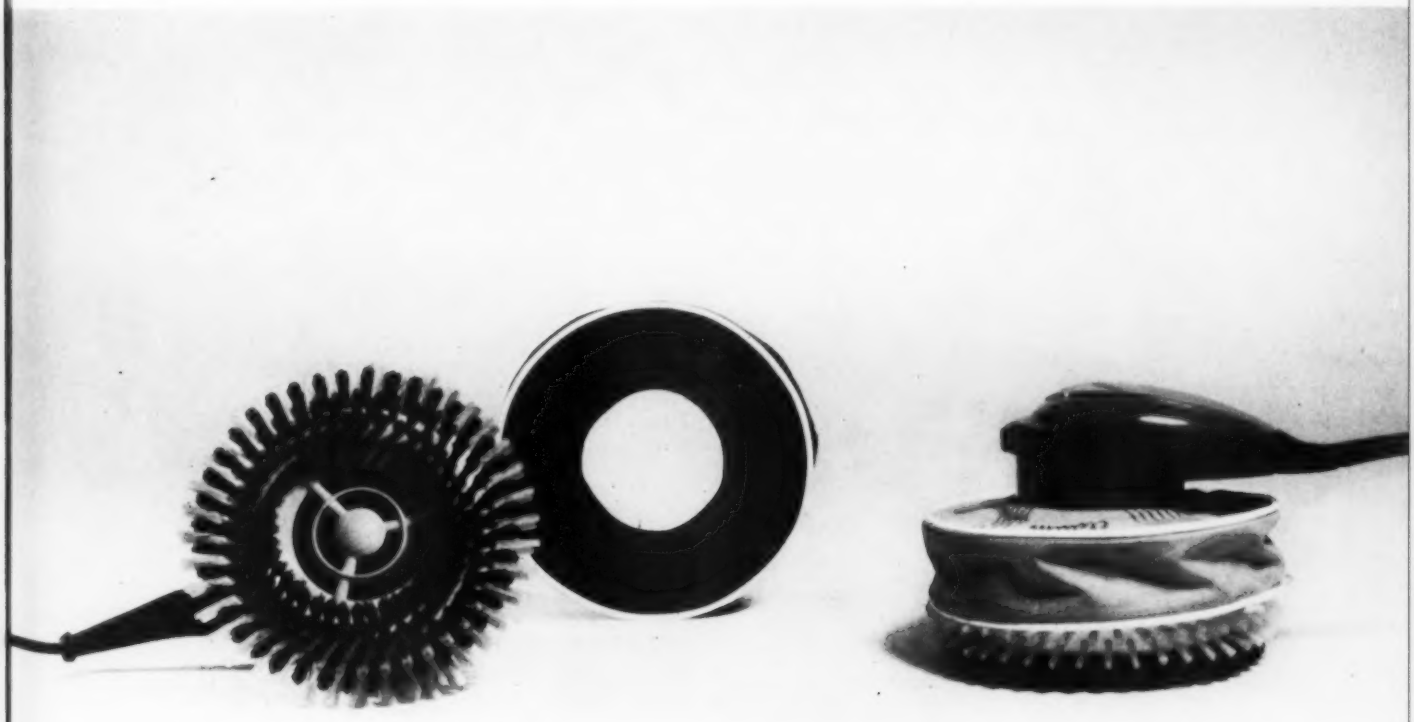

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Stainless steel nutcracker, steak knife and chicken shears (8) *have a baroque twist; by Silvio Rota* (*Co.Ri.Cama*). *Aluminum potato masher* (9) *works like a garlic press; by Italo Strada* (*La Sorgente*). *Another fan* (10) *joins more conventional elements in a sensuous series of curves; by Marco Signorile* (*Magneti Marelli*). *Voluptuous, creamy smooth sphere* (11) *is a water-heater, ubiquitous European sink attachment; by Serafino Radi* (*Radi*). *The foam rubber chair, poised on metal legs* (12), *was another of the first-prize winners, awarded a "Golden Compass" plaque; by Gastone Rinaldi* (*RIMA*).

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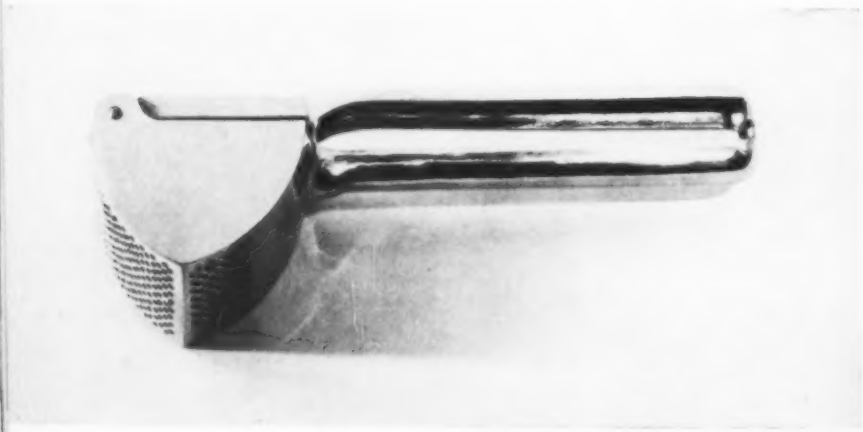

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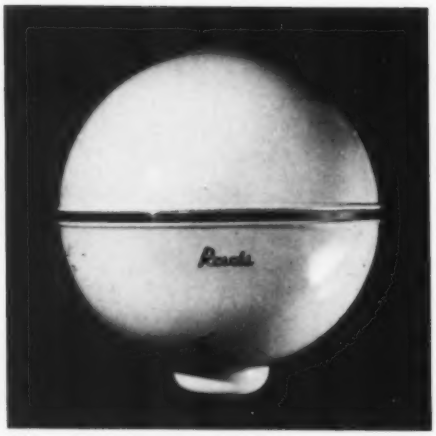


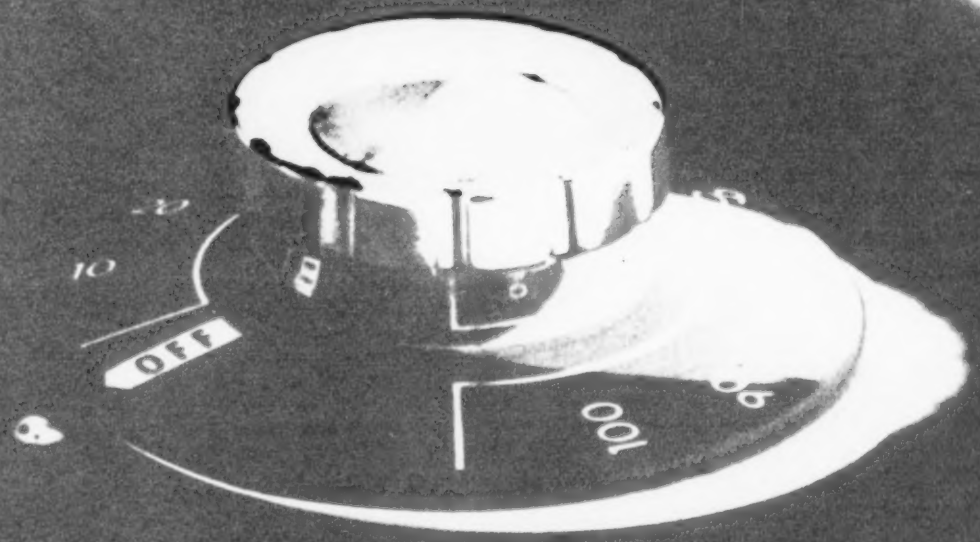
11

on the following 16 *pages: an appliance and housewares edition of*

DESIGN REVIEW

which will be a major section in each future issue covering product news

from markets and trade shows,



beginning this month with a study of the control devices

on 1955 *cooking and laundry equipment.*

We should probably call this Women and Machines, a mate to Men and Machines on page 44, because most of the products to be discussed are obviously designed for the housewife. Yet it would be unfair to the men who design appliances to assume that the approach known as "human engineering" is really required. There is hardly any danger to human life in the operation of an automatic washer or even an electric range, and the data which the operator receives from the knobs and dials and dashboard-like controls of an appliance is generally pretty simple. If her job looks as complex as a jet pilot's, it is because the controls are arbitrarily being designed for effect, rather than for use. Now, effect is a perfectly valid objective, both from a sales and from a functional point of view: there is no doubt that an appliance looks like a better buy if it looks versatile and powerful, and the customer may even feel her personal load lightened to the extent that the equipment in her kitchen resembles a genie. Certainly the top models this year, bristling with lights and dials and buttons, appear to do more than the economy models.

But the makers of these wizards, who have perceived that buttons and knobs add up to a certain effect, frequently overlook the fact that buttons and knobs were also invented for a specific purpose; combining the purpose of the dial with the effect of the dial would seem to require a higher order of design thinking than has been lavished on this year's customers. There are more substitute effects for mechanical prowess than expressions of the prowess which genuinely exists; there are more rules than reason. For example, the trend to symmetry often pairs up unlike knobs for the sake of balance, and confuses dials which should be distinguished, like temperature controls and timers; lettering fails to distinguish between instructions, information, and advertising copy; pointers, if they exist at all, often turn out to be fixed, or fake; automatic devices meant to help the user would take years to really master, and often include things which hardly need to be done automatically.

In reviewing some of this year's control devices, it is our premise that knobs and dials will look well only if they do the job they advertise, and that this could be accomplished fairly easily by some clear design logic. The customer who invests in an appliance will probably take the trouble to study it, learn to work it, and even be patient with it. Still, a dial which fails to show her when to add the bluing, or a knob which lights a burner under the wrong pot, will not, in the long run, increase her affection for the machine, or for the manufacturer.—j. f. m.

DESIGN REVIEW: *Controls*

WASHING MACHINES demand two things of the operator: doing and watching. These generally break down into three phases:

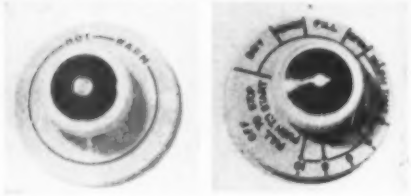
1) Do: Set water temperature, start, sometimes restart machine, select washing time.
2) Watch: Progress of cycle, with an eye to regulating the amount of water, size of wash, length and number of rinses.
3) Do: Break into cycle for special operations: repeat rinse, add bleach or blueing.

In other words, two kinds of information are conveyed by the controls: fixed information, to be observed; and instructions, to be acted upon. The best dial for the purpose would seem to be one which separates the two kinds of data, possibly with the instructions outside, for easier reading, and the clock-like cycle inside, nearest to the pointer. If the pointer moved, instead of the dial, all lettering would be in a normal horizontal line at all times.

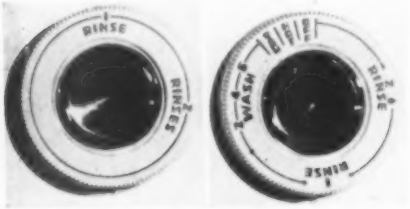
Watching a cycle is like reading a clock, in that it is most natural to observe progress from the changing position of one pointer, or hand. But if the system is reversed, the reader must be told where "off" is; unless she can subtract a point in the cycle from the terminal point, to find "time remaining," the chart is worse than useless.

↑ **Simplest system** is presumably one with everything on one dial: you turn it to start cycle, control water level by resetting the dial, control number of rinses with a third. The drawback is that, with dial used for cycle settings, there is limited presetting of the cycle, and dial easily gets crowded and confused with instruction. Here "warm-hot" selection has a single switch, logical for a 2-part choice.

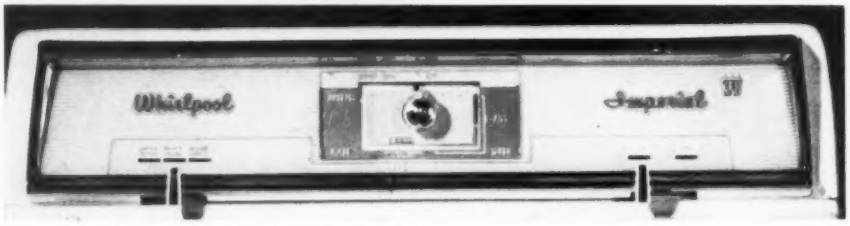
↓ **Two-part choices** can be removed from the dial and put on buttons, which permits pre-setting of such things as water level as well as water temperature. These coupled buttons light up when they are depressed, but they don't relieve the dial much; it still has three "offs." (Easy)



↑ **Two-part choices** are frequently put on a second dial, for the sake of symmetry. Here the effect is neat and decorative, but in the strict sense, the left dial hardly deserves the visual importance of the control dial. The general clarity of latter would be even better if typography for cycle and instructions were varied. (Frigidaire)



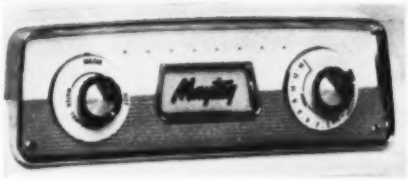
↑ **Pairs of dials** show up lettering problems: the vertical "chop suey" letter is a valid way of emphasizing the important dial, and its starting point, but letter-shaped numbers are hard to distinguish. (Bendix)



↑ **Side-to-side selector** is not really easier to operate than dials or buttons, but here it is logical for a 3-part choice(left), less so for a 2-part choice (right). The fixed diagram with moving pointer makes a good start at solving the dial problem, but the squared face offsets most advantages by making parts hard to relate. Moving colored guide lights help. (Whirlpool)

↓ **Visualization** by lighted color signals is a feature of washer at the left; the signals announce four phases of the cycle (fill, washer, spin, blue) by flashing four colors. The idea is good, and effect is attractive, but it has not simplified the dial itself, which repeats the cycle information, plus instructions. Dryer has colored buttons, lights, dial and reset button. (Apex)

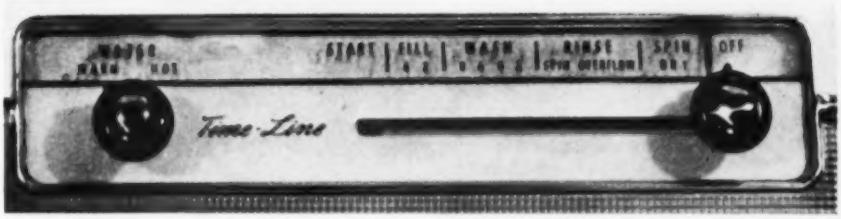
↑ **Instruction panel** has been added by one manufacturer, implying that the regular dials (which are nearly obscured by recessed mounting) are not up to the job of controlling the machine. The idea has sales value, though, because it suggests that the machine is very complex and competent. (Bendix)



metry, they can be kept compact and clear. The colored "off" segment here is particularly visible, and the round bracket highlights functioning part of the dial. (Maytag)

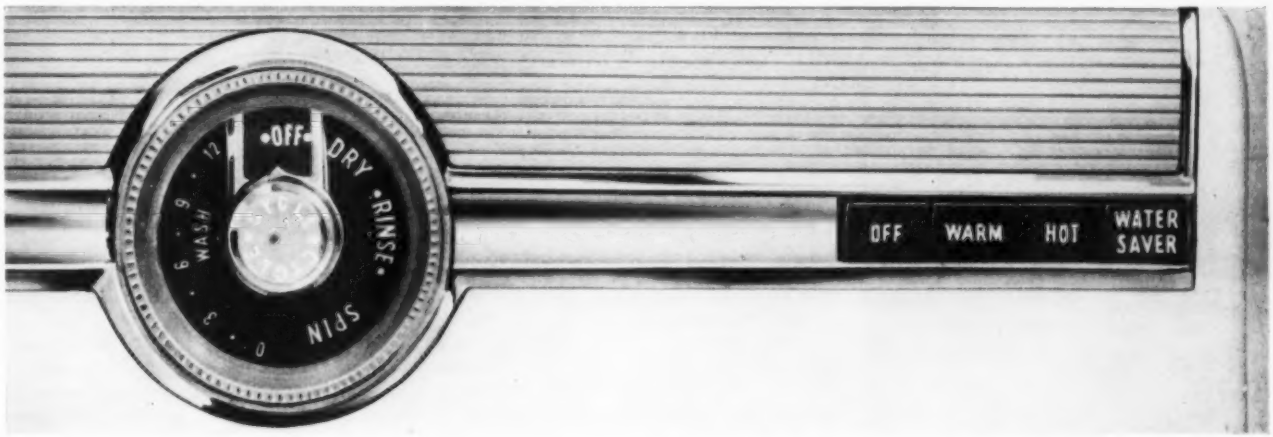
Out of all the variations on the dial and button theme, a few clear and perceptive solutions have emerged this year:

← If two knobs are to be used for sym-



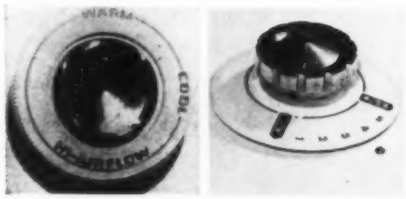
→ A horizontal time line and moving pointer is an even more graphic way to distinguish the beginning and end of the washing cycle. It makes for easy reading, and has the advantage of being very easy to judge from a distance. (Norge)

↓ The simplest and probably best solution of all has one good, clear dial which requires only one dial setting. The dial is only to watch; all "do" actions are relegated to single buttons, which can be easily pre-set. Though the dial moves, the window selector tells you precisely where to read it, and is underscored by a built-in pointer. Because an automatic second rinse is omitted, it is unnecessary to break into the cycle at all—a small sacrifice for a humanly-designed cycle which is really automatic. (GE)



DRYERS are a good deal simpler than washers, both to operate and to design. The operator has to do only a few things: select the drying temperature, from two or three markings within a warm-hot range; then set the drying time, either by the minutes required or the kind of fabric. She may watch the cycle progress, but no further action is required unless she wants to shorten the cycle. When the operation is over, she wants to be notified.

Except for a few shortcomings, most of this year's dryers do these jobs well, within a variety of systems.



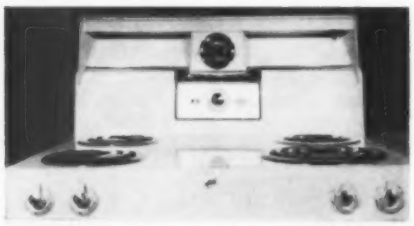
↑ **Dials** are commonly used for warm-hot selection, though they seem particularly superfluous when large unused areas cannot be utilized to mark off intermediary heats. (Bendix) Dial at right makes a feature of a virtue: the bold "high" and "low" markings orient the usable area of the dial and give it importance. (Maytag)

Washer-dryer combinations may be handled in several ways. One system (above) separates matching colored dials for washing and drying with a plain white one for drying temperatures. (Bendix) Another (below) treats the two-in-one machine with a two-in-one dial which adds drying to the washing operation; the matching dial is for drying temperature; all other selections are logically put on buttons. (GE)

↑ **Time line** for this dryer, matching the one on the washer (top right) has a knob to set a colored vertical indicator, which ticks off minutes; verbal gages tell operator *why* 5 minutes is correct drying time.

DESIGN REVIEW: *Range Controls*

If a housewife invests in a new and intricate appliance, she will undoubtedly make an effort to master it; so it is not imperative that the controls be legible enough for a beginner, as long as they are designed to help her learn and to help her avoid mistakes when the operation becomes more or less automatic. There are many ways this assistance can be built into the design. Placement of knobs: Are they directly or graphically related to burners and ovens, and well enough spaced to be recognizable? Size and shape of knobs and buttons: Are the controls for separate operations distinguished by size, shape and grouping? Can they be gripped or pulled easily? Lettering: Are important markings distinguished from labels and trademarks?



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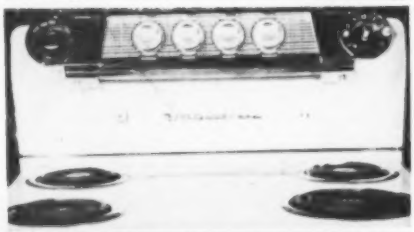

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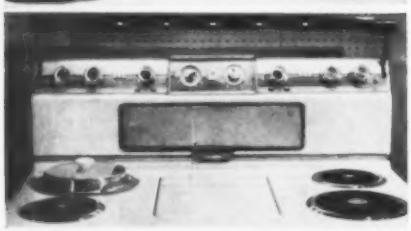
The conventional system (1) lines up all burner controls along the front, where they are easy to reach. The row is not diagrammatic, but by common agreement knobs are usually related to burners in front-back, beak-front order. (Frigidaire)



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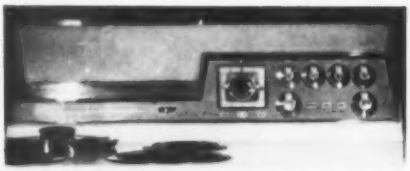
The new range system (2) places controls on the backsplash, out of harm's way. If the conventional row of knobs is maintained, it is perfectly easy to remember. But if the layout must be varied when new devices are added (3), good spacing is needed to make individual knobs easy to find. (Westinghouse, Norge)



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Some cooks dislike controls directly over the burners, and a compact cluster at one side seems like a logical answer; however, it may prove hard to coordinate knobs and burners if all the controls are identical in size and shape (4). A more reasonable solution is a cluster designed to echo the pattern of the burners, (5) and to take advantage of the easy-to-reach space between burners. (Frigidaire, Hotpoint)

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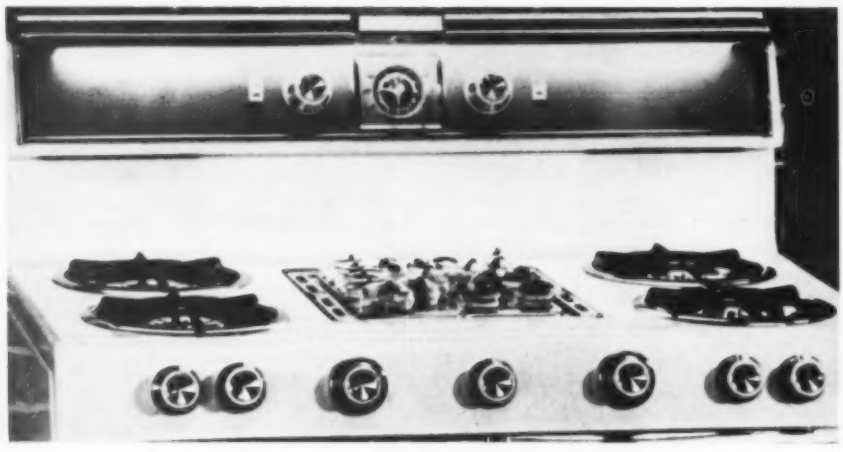
A solution for a more complex range or stove (6) is to arrange burner controls at the front, special controls on the backsplash, and to differentiate all of them by size and spacing. (RCA Estate)



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Variations turn up on the new countertop ranges, which are freed from some of the conventional requirements of burner and control placement. The hotplate above (7) distributes knobs in a clear, map-like pattern which duplicates the out-of-line pattern of the burners themselves. Though knobs in this particular spot may be a nuisance to the cook, there's no reason the same control pattern couldn't be located somewhere else. (Hotpoint)

Another idea for hotplate controls is a vertical chart, regulated by a small red disc which is moved up and down by a bar (8). Though it appears logical, its graphic value is disturbed by the fact that heat levels come out of order: "hi" is at the bottom, "medium hi" at the top, and "lo" in the middle, above "simmer." (Frigidaire)

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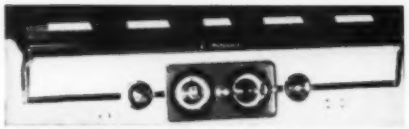

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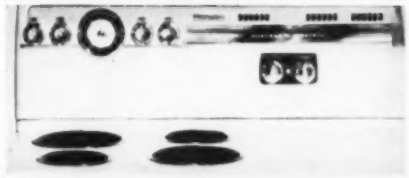

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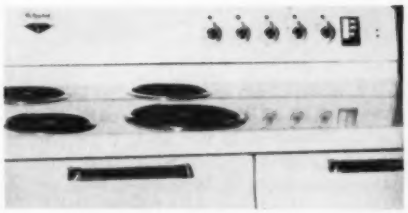
Pushbuttons, manufacturers have found, are a new way to make ranges bristle with automatic power. With a special button for each heat on each element, heat selection should become terribly quick and easy, but for the consumer it doesn't always work out this way.

Even when it is organized and decorative (9), a pushbutton panel demands a high degree of coordination, for the cook has first to find the right group of buttons for her burner, then count off the button for the right temperature — 24 buttons for one bit of heat. When the oven is pushbuttoned too, the result may be inscrutable. (Hotpoint)

Like knobs, buttons can be moved to the side (10), but if oven controls must then be placed where burner controls *should* be, the housewife isn't too far ahead. (GE)

Grouping sets of buttons helps to distinguish them, (11) and grouping them in a map-like, back-front relationship to burners is even better (12). (Hotpoint, GE)



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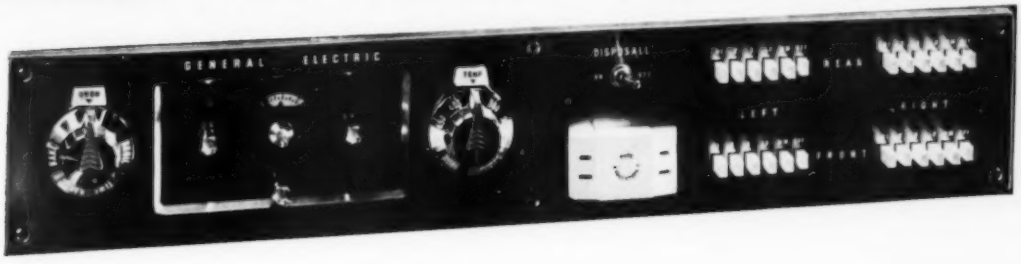
But in the final analysis, it's hardly possible to design quantities of pushbuttons for quick and easy selection. If that is what the designer is after, a more direct system will achieve it (13). A short row of simple knobs, with a minimum of fuss and complicated instructions, is one of the easiest systems to master. If the layout is not diagrammatic, neither is it intentionally confusing, and the woman who cooks may well find systems like this, and numbers 1 and 5, the best for her purpose. (Hotpoint)



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Knobs

Knobs which select heat by turning the proper marking to the top should have a fixed exterior selecting point even though stopping action is automatic (14). (The arrow which looks like a selector is really a grip, which only indicates "off.") (GE)

The knob which turns inside a fixed dial (15) needs a visible pointer which isn't so large it obscures the markings. It may be the easiest to read. (Westinghouse).

14

15

Automatic devices

From the cook's viewpoint, a minute timer must be watched more closely than a clock, and it might well be the bigger of the two; at least it should be equal in size (if not in visual importance) to the clock, and distinguished by its numerals and other markings (17). A new idea for separating the minute timer is a horizontal line with a moving indicator (16). (Norge, Caloric)

Automatic meal timers are too intricate to discuss here, but one point might be made in relation to clocks: a clock face spotted with tiny knobs and windows is both unreadable and unnecessarily difficult. The final example (18) shows an attempt to distangle the clock from other timers; it would be simpler still if "time off" (the white segment on the clock) were turned into a simple colored hand, and if the face of the minute timer (right) were fully visible rather than obscured behind a window. (GE)

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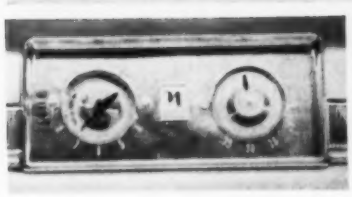

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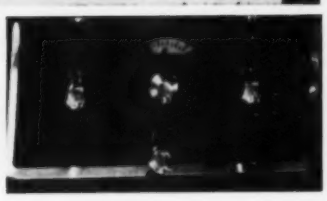

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DESIGN REVIEW: *Laundry Equipment*

It's interesting to see a sampling of the new clothes washers together. With so little variation in the basic lines and proportions of an anonymous box, each one manages to give a different impression through the handling of frequently small details: doors and openings, joining of surfaces, sharpness of radii, placement of controls and treatment of trim. In keeping with the increased complexity of the controls, most of this year's machines make a sales point of practical improvements in what the machines can do. There are more washer-dryer combinations, for those who can afford them, but the pairs persist, for the buyer who acquires a washer first, a dryer when she can afford it. And the pristine white which was preserved in the laundry is now giving way to the color riot in the kitchen.

A washer by **Laundry Queen** (1) has a front panel of Rigid-tex metal, and a patented balance that makes a high spinning speed possible for more thorough drying and greater washing efficiency. **Apex** (2), in addition to the colored guide light panel that follows the cycle (see previous section), has gold trim which gives it a festive appearance. It has a handy foot pedal to open the door and a removable and cleanable lint trap. Designed by Dave Chapman with Apex Engineering Dept. $327.50.

Caloric (3) automatic gas clothes dryer has a one-knob control; the left-hand circle is an air exhaust. A twist sets the drying cycle, lights the burner, starts the blower and cylinder, and lights an interior bulb and ozone lamp. A bell rings when clothes are dry; if the door opens at any time during the cycle it automatically shuts everything off. $286.50. **Westinghouse** (4) budget model washer, only 25" wide, can be permanently installed or equipped with wheels. $229.95. This machine has a vertical front, like most of those on the market this year. Other Westinghouse models retain a slanting front. This new Wash-N-Dry **Laundromat** (5) with an elaborate sloped front panel, features a three-way dry dial, and built-in instruction booklet. Besides white, it comes in yellow and aqua, like all Westinghouse appliances. $529.95. **General Electric's** (6) new washer-dryer is available in free standing model or in a version with front controls for under-counter installation. These appliances also come in white, yellow or aqua.

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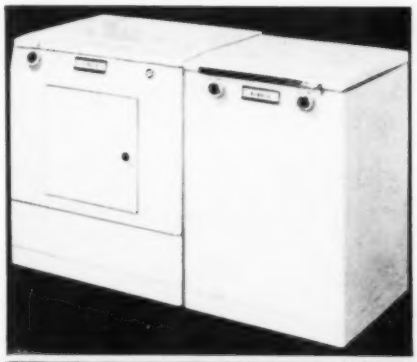

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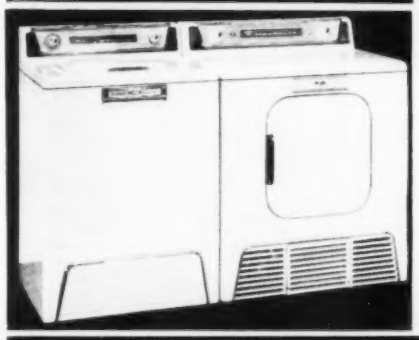

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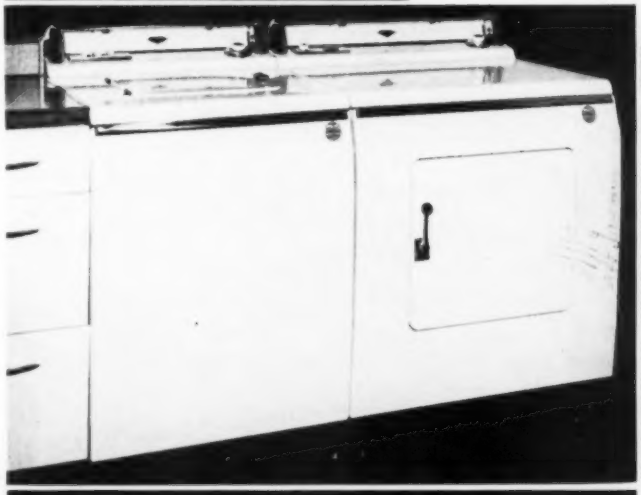
The new **Bendix** (7) economy twins differ from previous models by simplification. Some chrome trim has been eliminated, and a plain panel door replaces a jeweled porthole on the dryer. The washer top lifts up, making an uninterrupted work surface. Washer $199.95. Dryer $189.95. **Frigidaire** (8) washers and dryers are produced in white, yellow or green. The white units have green name plates and back panels, and yellow knobs. Dryer's front exhaust is echoed by washer kick-plate. Dryer heat is variable for different materials; other features are filter trap and interior light. Washer $299.95; Dryer $259.95. **Hotpoint** (9) deluxe pair has lighted push-button controls with or without metal-framed backguard, and automatic cycles. Both machines can be adjusted to handle man-made fabrics. Operating instructions are baked on underside of washer lid and dryer door. The dryer uses the revolutionary principle of drying clothes with a jet of cold water, which condenses heat, moisture, and lint from the air and flushes it down the drain. Trim is gold and chrome. Washer $399.95. Dryer $289.95. **Norge** (10) pair, designed by W. B. Ford, have changed very little since winning a Good Design tag in 1953. Back panel is now available in gold, or the original blue. Since these units are usually purchased separately, Norge feels an "open stock" line is a selling point. **Whirlpool** pair (11), designed by Sundberg-Ferar, have gold-trimmed panels, automatic washing which includes, again, settings for synthetic fabrics. Washer's special feature is "suds-miser," which automatically draws off soapy water at end of wash cycle, stores it, then returns clean sudsy water (soil reputedly settles and is not redrawn), for re-use on following wash loads. Washer $299.95. Dryer $229.95. **Easy** (12) matched pair of deluxe automatic appliances were designed, for the first time last year, with the boxy form of other new lines. Previously, all Easy washers were round-tub models with roll-wringers on top, or with attached spin-dry tubs. This year the panel and trim are refined and the machines offer the going specialties: synthetic fabric cycle, lint trap, and lighted pushbutton controls. Control panel is stainless with gold trim. Washer $229.95. Dryer $229.95.



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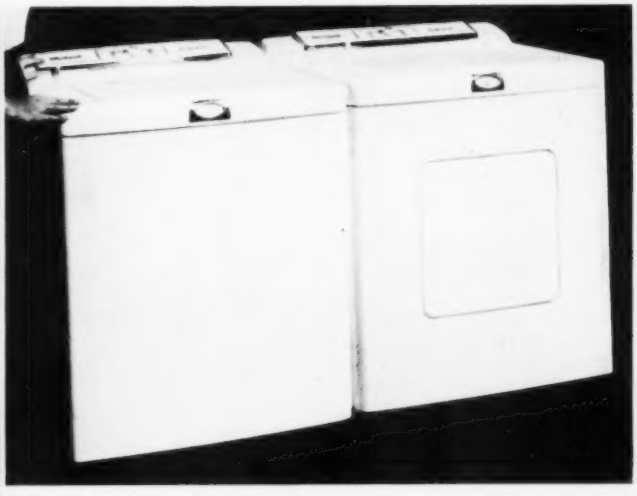

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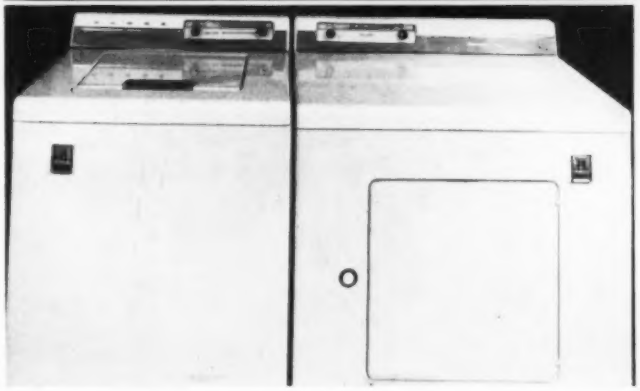

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The housewife who prefers to do her cooking and baking on and in a one-lump appliance — instead of all around the kitchen — still represents the greater portion of the appliance market, and products for her grow bigger, prettier and more efficient.

Tappan (1) presents a chrome-lined, clock-controlled oven with two broilers, one serious, one for snacks. Crisping drawer fills space at bottom, left. Burners are placed 4-in-line at back of the range for accessibility and maximum use of surface. A fluorescent light fits into the backsplash. **Florence** (2) features a new invention: a thermostatically controlled fifth burner in the center of the stove-top, which measures temperature of food inside the cooking vessel and keeps it constant. It operates like an oven thermostat with heat markings on a dial. Triangular pan at left is a swing-out broiler. Trim is brass, chrome and black. **Caloric** (3) backsplash is glass —a colored bulb is used behind it to produce variously tinted panels. Controls at front are on an angled strip; knobs are recessed and out of the way, yet easy to turn.

Buyer chooses oven set-up from available cooking ovens, pastry ovens, infra-red or plain broilers — with or without a rotisserie. This was designed by Peter Muller-Munk, with Caloric design department. **Westinghouse** (4) has a full-width oven instead of a compartmented interior. Broiling unit is in several independently controlled sections. It can be used in part to save fuel, or parts may be set at different temperatures to cook a party's worth of steaks to order. Colored backsplash has gold and chrome trim.

Kelvinator (5) has a removable broiler element that can be plugged in and used separately in its storage compartment. Oven is equipped with disposable aluminum foil sides. Backguard is aluminum trimmed with gold and black. **Raytheon** (6) RadaRange offers electronic cooking in a neat package. Unit is stainless steel trimmed with red. This oven roasts a chicken in 9 minutes, is currently priced for commercial use.

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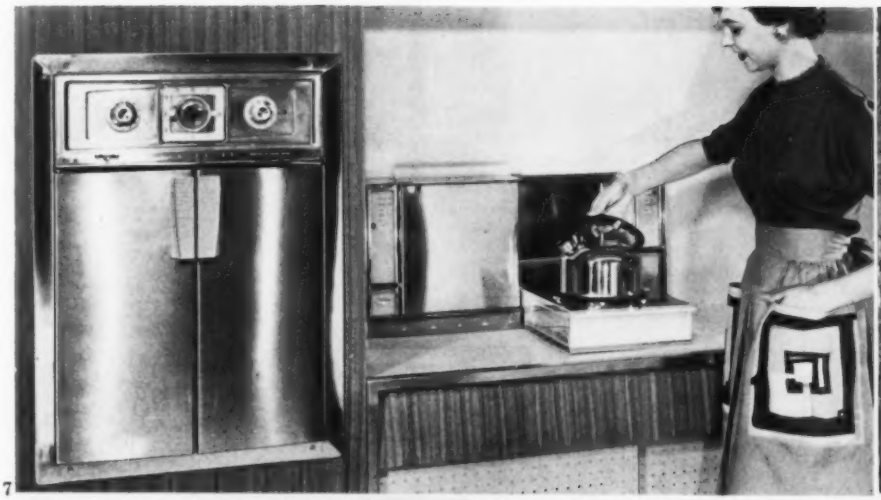

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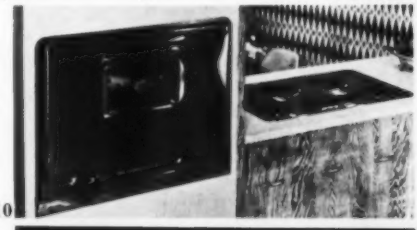

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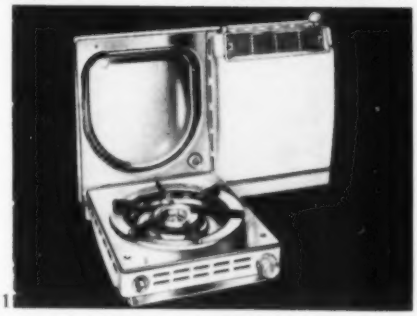

11

Big appliance manufacturers are continuing to enter the built-in market pioneered by smaller firms. Here, (with the exception of 11), is what they offer.

Frigidaire (7) has two vertical "French" doors on their new built-in oven to allow installation in tight corners. The oven is finished in stainless steel to match the electric burner units, shown beside the oven. (Frigidaire's regular ranges, incidentally, come in green or yellow.) Surface units come in two-burner sections; each folds back against the wall, leaving counter free when cooking is not going on. Sliding vertical control panel is illuminated when burner is down; unit and light go off when burner block is raised. **Tappan** (8) enters the market with an electric oven that comes in chrome or copper, with or without the see-through window. Cooking units in background are one of the firm's combinations. They also offer four burners in a handy inverted V placement. Tappan's gas unit (9) has four-in-line burners, and the wall oven has a separate broiler. **Westinghouse** (10), also new in built-ins, offers an oven with greater width and larger capacity than others on the market — their selling point with standard ranges, too. Oven has a look-in panel and an interior light. For surface cooking, Westinghouse unit provides a conveniently spaced 4-unit panel, one of which is a super element that gets red hot in 30 seconds. Counter surface and oven are stainless steel. **Dixie Products** (11) also makes gas built-ins. These foldaway burners are, like Frigidaire's electric units, available in groups of two. They also turn off automatically if accidentally closed. **Hotpoint** (12) oven is finished in satin chrome. Pictured oven is economy model; it is also available with specialties such as an oven timing clock. Other Hotpoint separates include two-unit surface sections, deep well cookers and a large griddle. **General Electric** (13) makes its built-ins in color. Oven and four-burner units are available in yellow, blue, brown, green or pink. Surface units also come in stainless steel.

Refrigerators, like the other appliances this year, are much-decorated, bigger, and produced in stainless or chrome or color and more color. Several big companies now offer built-ins and built-inables. Interiors are more specialized — with ice and egg dispensers and even one rack for bananas — and there is increasing use of the door for front-row storage. Freezer above refrigerator space, or freezer below, is the still undecided question, and one being worked out in a variety of ways.

Westinghouse (1) is the first large producer to market square refrigerator-freezer built-ins, with separate mechanisms so they can be installed side by side, vertically, or in different parts of the kitchen. Satin-chrome finish with polished chrome trim matches their built-in cooking units. $759 for the pair; also available in less expensive white enamel. **Frigidaire's** new models (2) have special picture-window fruit and vegetable hydrator that swings down to present a flat tray of greens, which are also in view when the hydrator is folded into the door. Colors are white, yellow or green. $469.95. **Crosley** (3, 4) Super-Shelvador refrigerator has beverage server that provides cold drinks through a door dispenser which is worked into the handle design. This unit and matching freezer (right) were designed by Mel Boldt. Freezer $449.95. Refrigerator $499.95. **Hotpoint** (5) chrome-finished refrigerator-freezer has an aluminum strip around the face providing an exhaust above the refrigerator for built-in installation. It can be used free-standing, but the sides are white beyond the facade. $599.95.

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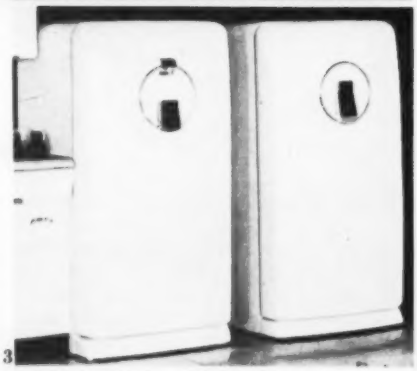

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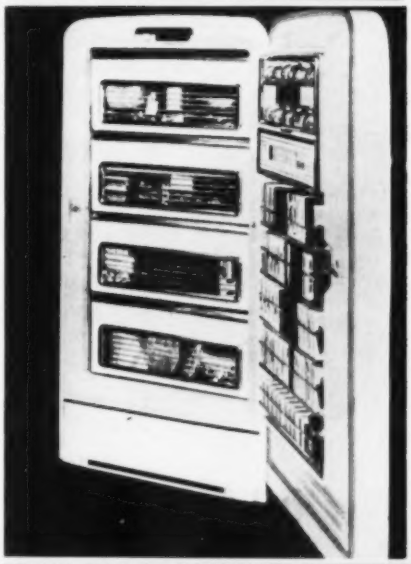

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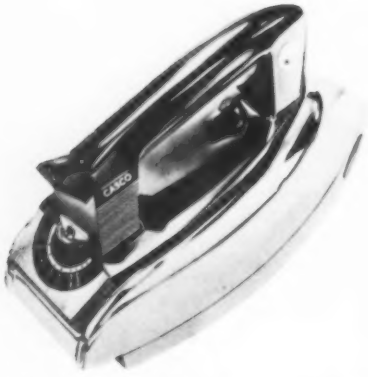
General Electric (6, 7) combination has 10 cu. ft. refrigerator section on top, well-packed 3.7 cu. ft. freezer low down. Freezer door, which is covered with grey Textolite, opens with foot pedal — has two large roll-out baskets. $579.95. **Deepfreeze** (8) refrigerator has double-doored freezer compartment in bottom. White appliance has copper trim outside and within, and a cream interior trimmed with coral. $519.95. Deepfreeze freezer chest (12), boasts the same colors. The chest has almost 14 cu. ft. of space — all brightly lit when the top is raised. A large pull-up basket may be locked into lid after it is open. $519.95. **Westinghouse** (9) upright freezer features a large-capacity door storage for handy access to small items. Four sections in the interior have drop-down railed fronts, roll-out baskets or trays. The Westinghouse freezer feature, the Freez-File for recording contents, is at top in this model. $499.95. **Kelvinator** (10) "Foodorama" is like Siamese twins: refrigerator and freezer joined vertically: there is a door on left for freezer section, right for full refrigerator, which has three large roll-out shelves. There is even a bit of banana-climate in this enormous unit — which offers approximately 16 cu. ft. of space. It is available in white or eight colors — most interesting of which are pink, grey and beige. Interiors are all white and gold to simplify production. Kelvinator reminds us that it had colored appliances as far back as 1928 — when the taste was for Chinese red with a parrot's picture on the door. Foodorama is $629.95. **Frigidaire** (11) Imperial refrigerator-freezer has 15 cu. ft. capacity. Both vertical "French" doors must be open to pull out shelves, which are full-width roll outs. Freezer is on top. This comes in white, yellow or green — trimmed inside and out with white and gold. $649.95.

Color, chrome, copper and more color is the report from the midwinter National Housewares Show. Instead of the usual red or yellow kitchen equipment many manufacturers have turned to pinks and pastels —and have replaced white enamel with shiny chrome or brass. Copper trims metals, plastics and wood, on ladders, utensils and toasters—particularly if they happen to be pink ones. The plastic dinnerware lines have patterns now, or new soft colors. Electrical appliances still do many kinds of cooking at the table, and charcoal grills (which will be reviewed in June), do everything else. The latest indispensable gimmick is the electric knife sharpener, or possibly a one-slice toaster, for families where children fight for toasting privileges.

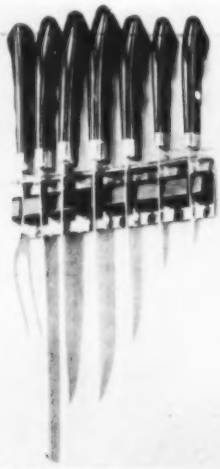


↑ **Casco,** like several other companies, has introduced irons with colored handles. The Steam and Dry Iron is stainless steel with red, green or grey Bakelite lift-up handle that permits filling directly from the tap. Donald Deskey design. $19.95.

↑ **GE's** new Roll-Around vacuum cleaner rotates freely and patters after its housewife on a detachable wheel base. Colors sound bizarre (pink, coral and cocoa — and all together), but they combine well. Styling by Freda Diamond. $69.95.

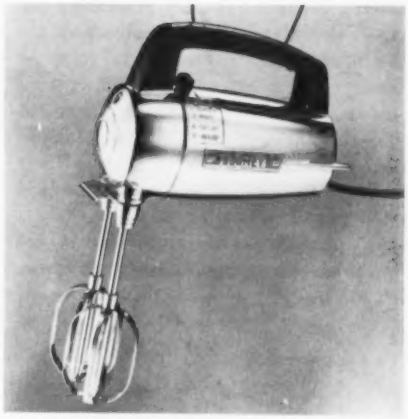
↓ **Abco's** kitchen ladder is black steel with copper-plated top and sides, black rubber treads. $10.95. (In general this new kitchen chic made the show very cheerful, though perhaps it went too far when it got to pastel-colored trash and garbage cans.)

↑ **Rival's** new ice crusher comes with a handy detachable bucket that catches the output of either fine or coarsely-crushed ice. Top is chrome, bucket is red, yellow or black Bakelite. $12.95.

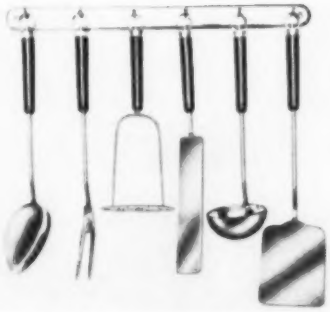


↑ **Chas. D. Briddell** introduced this Homemaker line with copper-trimmed black wood handles, matching rack. Metal trim is common in kitchen cutlery, to achieve color where colored plastics are impractical.

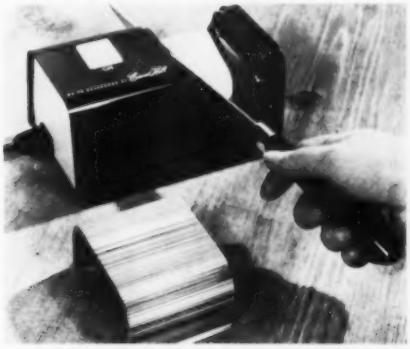
↑ **Peerless** Broil-Quik Super Chef Eldorado has all the rotisserie, corn popping and cake baking potential we now expect in an expensive infra-red broiler — and has them packaged by Raymond Loewy in black and gold anodized aluminum. Unit measures 24" x 14" x 12" deep. $89.95.



↑ **Dormeyer's** new portable mixer follows trend away from white. It is dressed up with chrome, a black handle and red dial. The beater stands on end; weighs less than four pounds. $21.50.

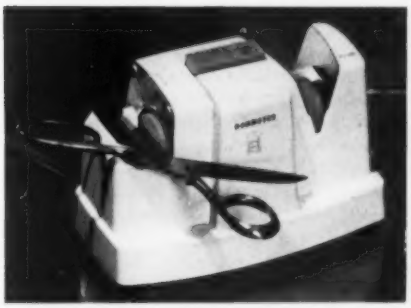


↑ **Parker-Gaines** successfully rides the color wave with stainless kitchen tools that have pretty pink plastic handles, brass tops and stainless hang-up rings. Designed by E. K. Parker. This set, $14.00.



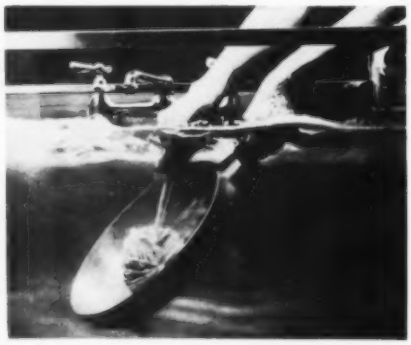
↑ **Chas. D. Briddell,** whose knives are on opposite page, has also chosen black and copper for their new compact electric knife sharpener. The black Hercocel plastic unit can be used on its non-skid base or wall mounted. Striated extruded copper cover protects grinding wheel from dust. By George Nelson and Associates. $14.95.

↑ **Aluminum Goods Mfg. Co.** has a new luxury line of Mirro cooking utensils designed with Vapor-Seal covers, a heat indicating valve and convenient drain holes; all are trimmed with a gold band of Alumilite around base of cover knob.

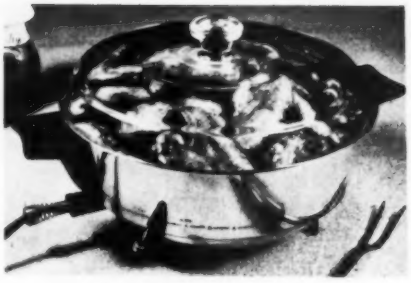


↑ **Dormeyer** sharpener, unlike the mixer, above, still wears white enamel, has tasteful trim of grey. This appliance sharpens scissors as well as knives, sells for $14.95. A control stops sharpening wheels when heat develops, to protect tempered edge.

Tabletop cookers are now practically old hat, so except for minor innovations the news lies in electric utensils that can be dunked in dishwater—and the fact that there are now many electric knife sharpeners in the world. If some appliance manufacturers sometimes stretch a bit in their search for the new, others try just as hard to find good grounds for change.
Some especially valid improvements are shown on this spread—things not only new, but new for a reason.

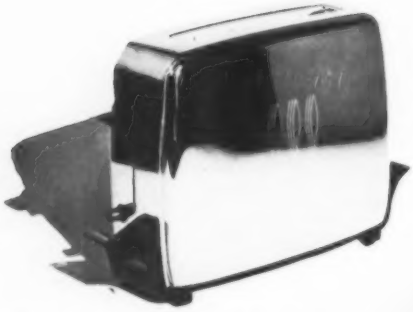


↑ **General Electric's** new automatic skillet has a three quart capacity, many square inches of cooking surface for browning. Cast aluminum body with sealed-in Calrod heating element can be immersed up to tip of handle. Indicator light goes off when skillet reaches dialed temperature. $19.95, cover, $3.00.



↑ **Presto's** new table cooker is called Fry-Pan-Casserole, has casserole handles instead of long single arm, which seems sensible for table use. Glass cover, which permits cook to watch the pot, can be repurchased separately. Designed by Mel Boldt, sells for $21.95.

↑ **Mirro's** new line includes this versatile electric pressure pan that also performs as table top cooker. Heat control dial is set for pressure or for cooking temperature. Thermostat permits a very low dial setting for keeping foods warm. Aluminum, 4 qt. capacity. $29.95.

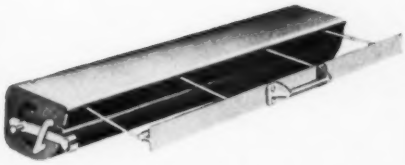


↑ **Toastmaster's** new one-slice toaster is a scaled-down version of larger toasters in their line. Firm's folder says it's for small families and those who appreciate the new and unusual. The pleasantly slim body is chrome-plated steel, handles are brown phenolic (Philip E. Willman, designer). $17.50.

↑ **Dormeyer's** electric skillet comes equipped with an aluminum basket for French frying, and blanching vegetables. The cast aluminum pan is chrome finished, has heat-resistant plastic handles and feet. Because it has 4-quart capacity, double-grip handle is practical design feature. $24.50.

↑ **Sunbeam** has a new blender attachment for the Mixmaster, to whip, liquify, grate grind, chop, etc. A large glass blending jar 8" tall encloses steel cutting blades. $12.75.

↑ **Westinghouse's** new Rotisserie, an attractive polished aluminum half cylinder, is capable of broiling a 12 lb. turkey. Other foods can cook in the inset pan while meat is being rotary broiled. Picture above is Westinghouse Roaster-Rotisserie-Party Cart combination. Rotisserie alone is $29.95.



↑ **Ekco's** weather-proof aluminum disappearing clothes dryer has five 30-foot long plastic coated wire clotheslines which spring back when not in use. The case measures 88" x 6", hangs on inside or outside wall. $29.95.

↑ **Bellaire Enamel Company,** pioneers in pink, have produced a new design, too. The foot pedal on this step can raises a cover which is attached to the base by a separate post. The container is completely independent. Enameled steel in many colors. $12.00.

↑ **Renuzit** offers something brand new—a home dry cleaning unit of aluminum that swishes clothes in cleaning fluid, drains them; then filters dirt out of fluid and returns it to storage can. $7.95.

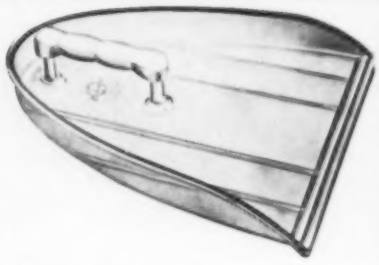
↑ **Cory's** latest is this 12-cup coffee decanter that sits in a wrought iron candle-warmer trunnion. Decanter can be removed or locked into unit. Glass is brass collared, has black plastic handle. $6.95.

↑ **Continental Scale Corp.'s** new Health-O-Meter has an obviously practical new kind of scale handle—right down its center, where it would only interfere with a centipede's legs. $8.95 in enamel with a rubber mat, in all colors, including pink. $11.95 in chrome.

↑ **Kordite Inc.** has a new broom-brush that locks into three different sweeping positions; for dusting walls, sweeping, and push-broom use. $2.89.

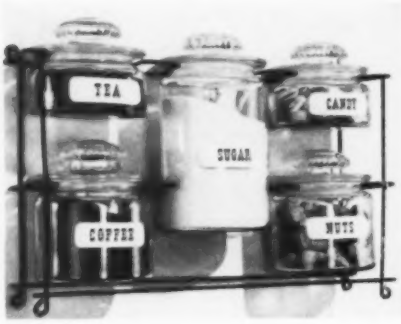
↑ **Plastics Mfg. Co.** offers one of the first decorated sets of melamine dinnerware; also have a new woodgrain pattern and difficult-to-produce white. Many firms have introduced interestingly designed plastic serving dishes.

↑ **Gits Molding Corp.** sells this set of tall plastic tumblers of Styron in charcoal and three new soft colors. An air space between two walls of plastic keeps beverage cold or hot. These were a Good Design selection and Koppers' Award winner. $5.00 set of 6 glasses.



↑ Transparent dustpan of Transolene plastic, by **Pretty Ware** was designed by W. D. Timmons. Second pan, by **Republic Molding** is also nice looking, hangable and transparent. Neither handle shields the hand from dust being swept aboard.

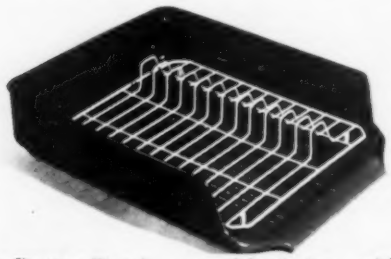
↓ Apothecary jars and penny candy canisters have recently become favorites for storage. Now **Silex** presents a set of jars with a wrought iron wall rack and a selection of labels. This set is $6.95; set of four jars $4.95.



↑ **Rival Manufacturing's** meat grinder and food chopper has rubber suction-cup feet instead of the usual clamp. Comes complete with interchangeable fine or coarse cutters in usual colors, or the new coral. $7.95 in non-tarnishing alloy; $10.95 for all-chrome.

↑ **Schlueter Manufacturing's** Patio Cooler is fine for keeping things hot or cold — foods as well as liquids. Aluminum bucket has galvanized inset, fiber glass insulation, black painted cover. Four gallon capacity, $7.95.

↑ The **Westinghouse** Design Dept. under Raoul Lambert has come up with a handsome new portable mixer. Stop-go switch is in the handle, speed dial is equally handy. Mixer rests on heel, or can be wall hung. White enameled aluminum body, grey handle, red switches. Mixer weighs 3 lbs., costs $49.95.



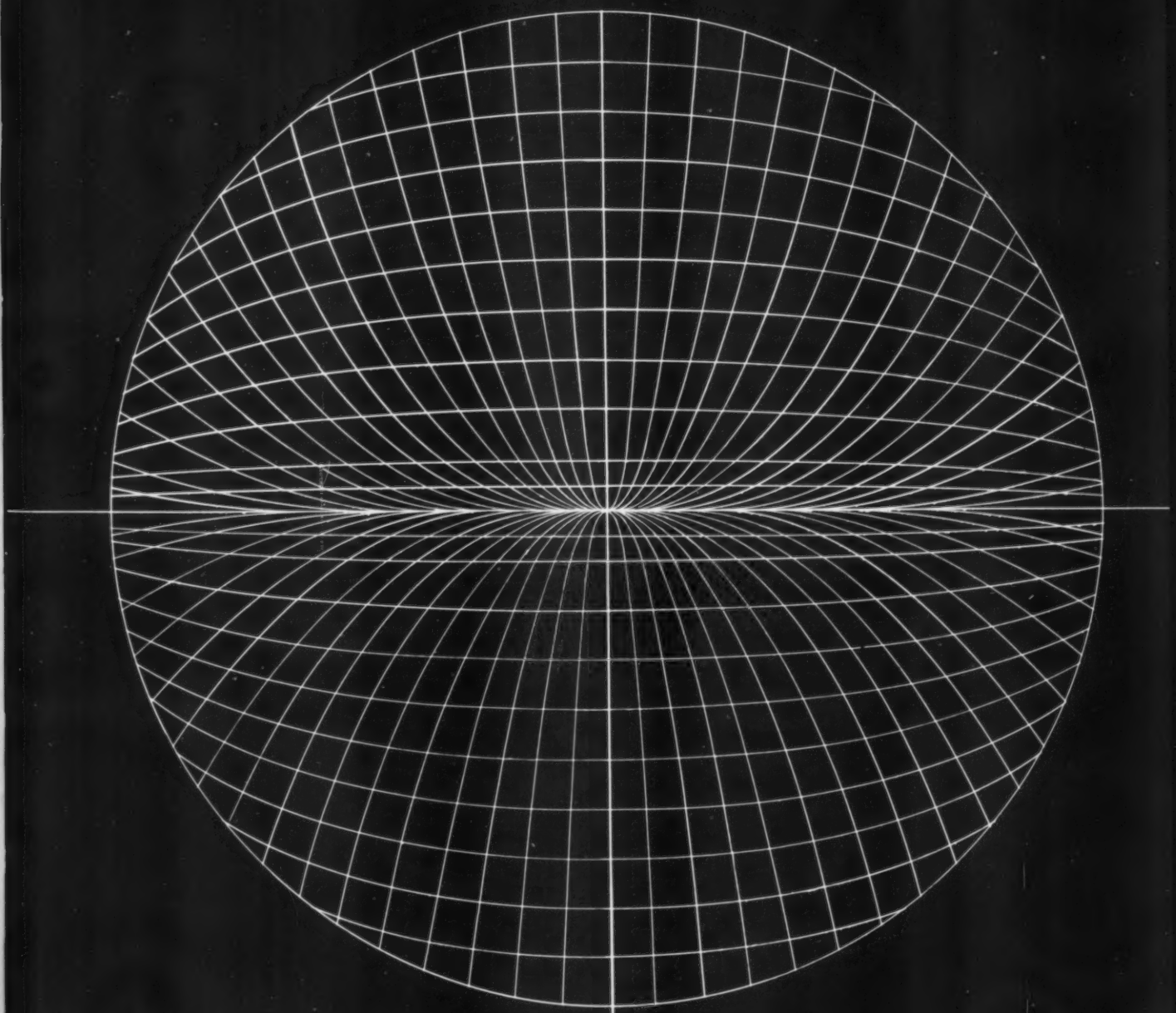
↑ **Pretty Ware's** new dish drainer with high sides, keeps dishes from falling out of rack and permits drainboard rinsing. Drainer is rubber, new colors are coral and chartreuse. Coated wire racks are accessories; drainer alone is $3.98.

↑ **Hoover's** first canister-type vacuum stays in one place, but swivel top and double-stretch vinyl hose permits cleaning an area of 750 sq. ft. without moving the sphere. Designer Henry Dreyfuss chose blue and grey enamel. $97.50.

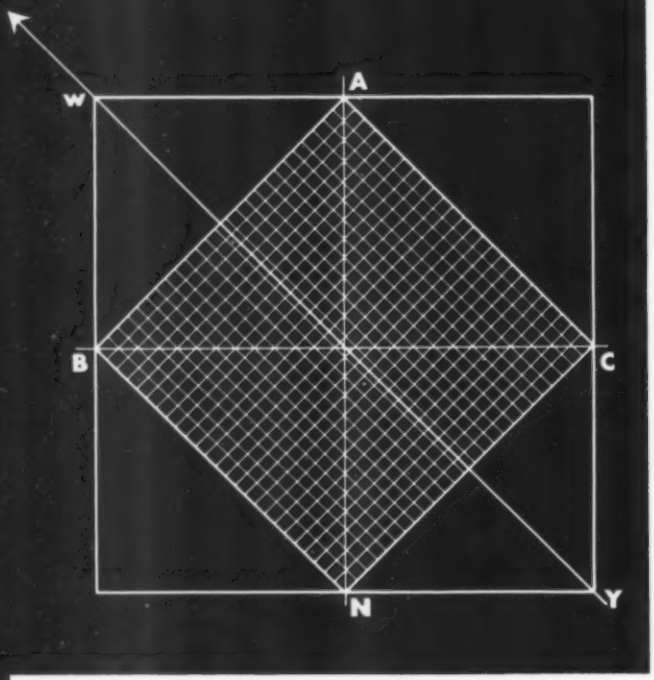
Part 3

PERSPECTIVE

a new system for designers



by Jay Doblin



Parallel Perspective

In the first two chapters we learned simple methods for drawing two specific views of the cube — the 45° view and the 30-60° view. We discovered that the methods we had developed to draw these particular views could be used to draw any oblique perspective view of the cube. We must learn to draw one more view, however, because an oblique perspective view can never include a vanishing point. In some drawings, particularly street scenes and interiors, the inclusion of a vanishing point is desirable because it permits us to show three side planes of the cube from within. A view which includes one vanishing point (or which has one vanishing point above or below the picture rather than off to one side) is called one-point or parallel perspective. Although it is the oldest and simplest form of perspective, parallel perspective is still poorly understood. It can be regarded as a case of 45° perspective, for the two forms are interlocked. We can see this by re-examining the tile floor that was used to illustrate 45° perspective. If we study the diagonals of the tiles, we find that they form squares in parallel perspective. They fulfill two conditions: the vanishing point of the front-to-rear diagonals appears in the center of the drawing, and the side-to-side diagonals are truly parallel to the horizon. Since the 45° square is easily drawn directly from the vanishing points, we can use it as a quick guide for drawing a square in parallel perspective.

Construction of a square in parallel perspective

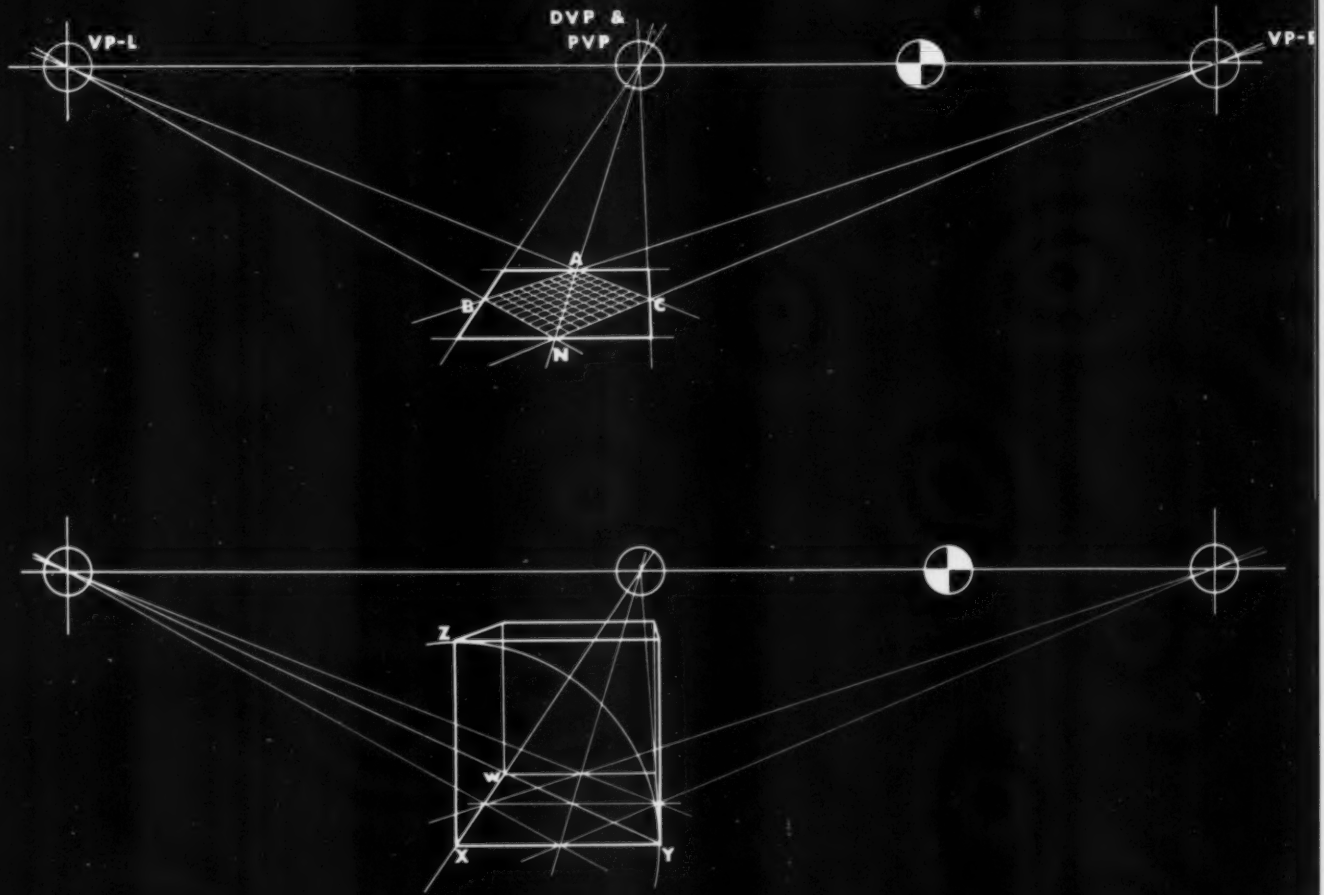
1. Draw a horizontal and place two vanishing points *VP-L* and *VP-R* on it.
2. Bisect the distance between the vanishing points to locate the diagonal vanishing point *DVP*. This is also the parallel perspective vanishing point.
3. Draw perspective lines from *VP-L* and *VP-R* to create a horizontal square *BNCA*, making certain that the nearest angle *N* does not approach 90°.
4. Draw diagonals through *A* and *N* parallel to the horizon.
5. Draw diagonals through *C* and *B* to *DVP*. These diagonals form a square in parallel perspective.

If we examine our tile drawing again we see that it is not necessary to complete the 45° square in order to draw a square in parallel perspective. A line drawn from one vanishing point through the middle of the 45° square will be the diagonal of the square in parallel perspective and serve to establish its depth.

Construction of a cube in parallel perspective

1. Draw the front edge *X-Y* of the cube parallel to the horizon and rotate it upward 90° to *Z* to find the height of the cube.
2. Draw a perspective line from *VP-L* to *Y*.
3. Draw a perspective line from *DVP* to *X* intersecting the line from *VP-L* at *W*.
4. Draw a horizontal through *W*. This is the rear edge of the cube.
5. Draw the remaining verticals and perspective lines to complete the cube.

Less side-to-side shift can be tolerated in parallel perspective than in 30-60° or 45° perspective. Care must be taken to prevent distortion at extremes of the drawing.


VP-L
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PVP
VP-R
A
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X
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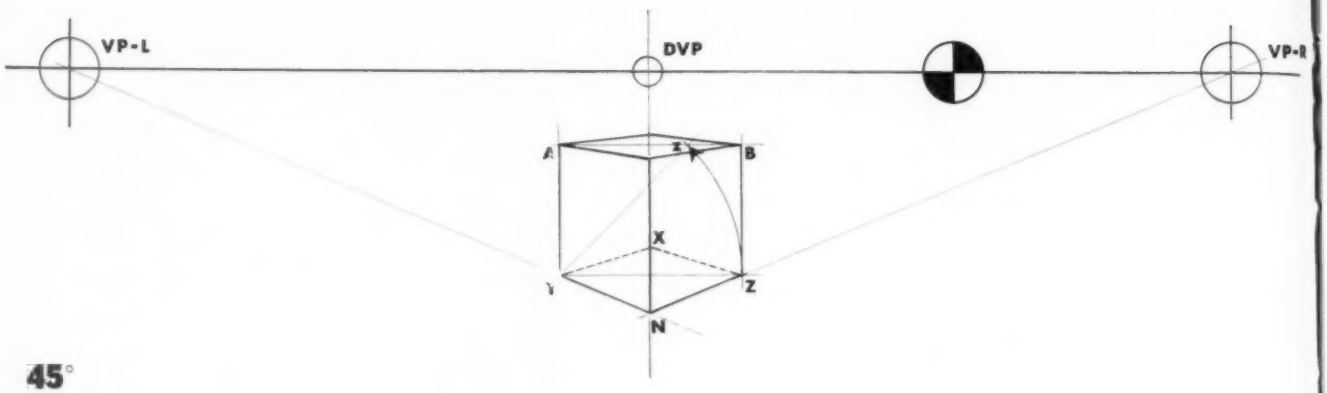
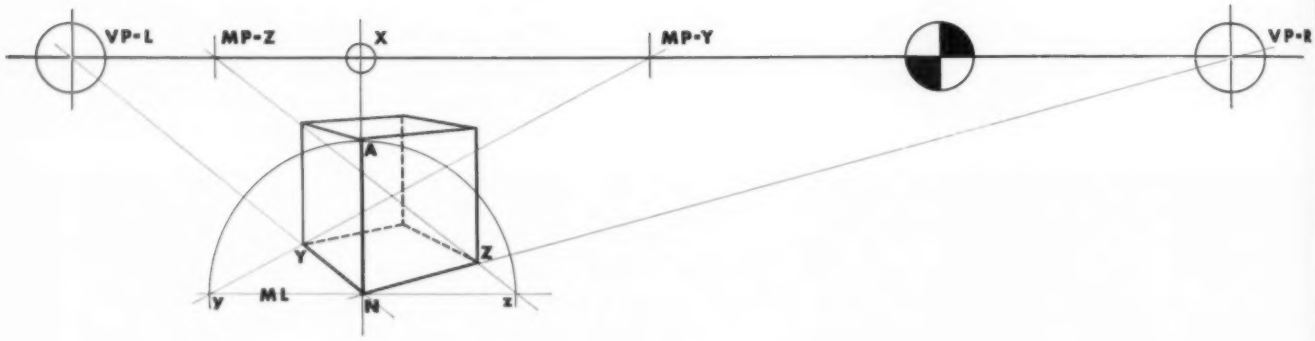
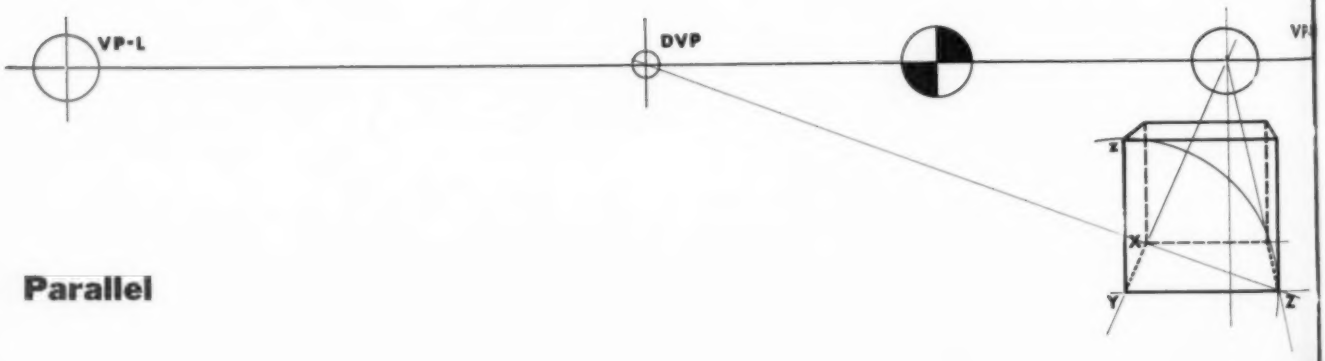


45°



30°-60°



Parallel

Selecting view

The construction of a perspective drawing involves three decisions: view, scale, and the size of the drawing. View, or the angle of rotation of the object to observer, has been our major subject so far. Any object can be rotated 90° between one set of vanishing points by using the parallel, 30-60°, 45°, 30-60°, and parallel cases in order. In choosing the one view that will show an object to best advantage we can be guided by several considerations. 45° perspective serves well if the object is wider than it is deep; it gives a good view of both sides without being monotonous. 30-60° perspective helps avoid monotony if depth and width are almost equal, and is useful where one side contains most of the interest. Parallel perspective is used mainly for interiors and street scenes, but may be used for objects if they are very long and must fit a narrow frame.

Summary

We now have simple methods for drawing three perspective views of the cube. Each method can be used to produce a range of views, so that by choosing the proper method we can draw an accurate cube at any angle to the observer. The preliminary construction in each case is simply a horizon and two vanishing points.

1. 45° oblique perspective

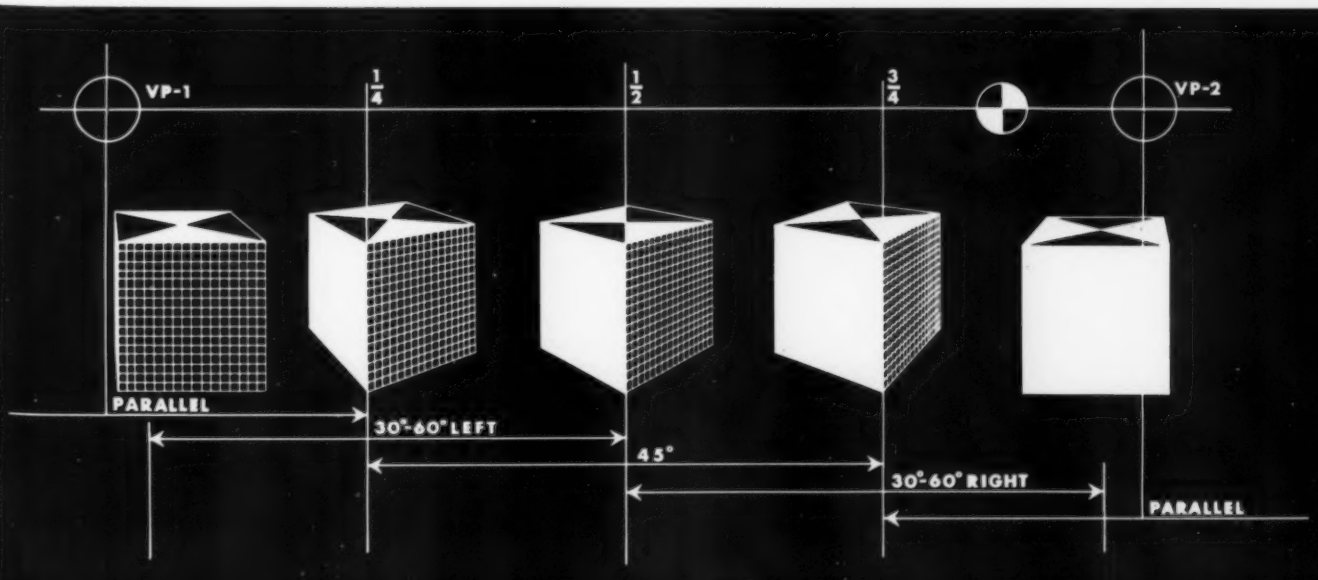
Place the diagonal vanishing point *DVP* half way between the vanishing points.
Construct horizontal square *YNZX* with lines drawn from the vanishing points to intersect on a line from *DVP*. Raise verticals at corners.
Rotate the diagonal of the square upward 90° to *z* and draw a horizontal. This gives us the diagonal plane *YZBA* of the cube.
Draw perspective lines to complete cube.

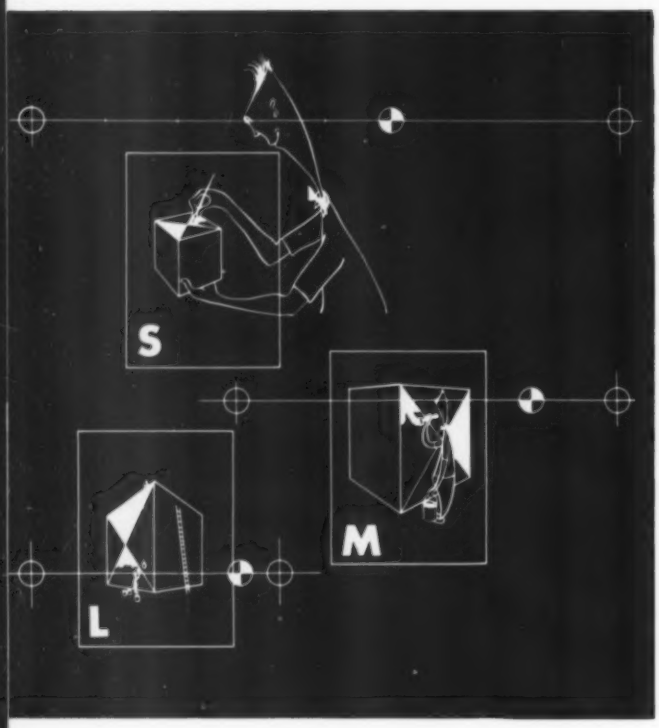
2. 30-60° perspective

Bisect the distance between the vanishing points to locate one measuring point *MP-Y;* bisect the distance from *MP-Y* to locate the perpendicular *X;* and bisect the distance from *X* to locate second measuring point *MP-Z*.
Draw perspective lines to construct the nearest angle *N* on *X*.
Lay off the height of the cube *NA* and rotate it to a measuring line drawn through *N*, locating *y* and *z*.
Draw lines from *y* to *MP-Y* and *z* to *MP-Z*, locating the side angles *Y* and *Z*.
Complete the cube with the necessary perspective lines and verticals.

3. Parallel perspective

Bisect the distance between the vanishing points to locate diagonal vanishing point *DVP*.
Draw the front edge of the cube *YZ* (parallel) to the horizon and rotate it up 90° to *z* to find the height of the cube.
Draw perspective lines from *VP-R* to *Y* and *Z*.
Find the diagonal *XZ* of the cube by drawing a perspective line from *DVP*.
Add the necessary horizontals and verticals to complete the cube.

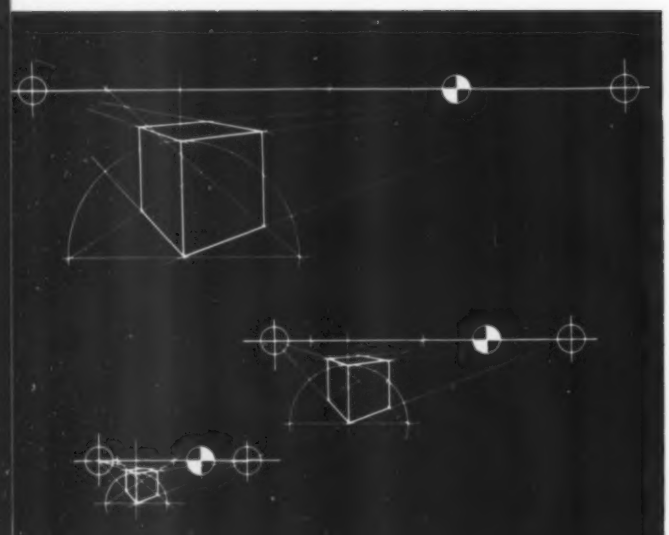




Scale

One advantage of perspective drawings is the impression they give of the scale of objects. The draftsman should know how to control his drawing so that this impression is an accurate one. Scale, in perspective, is a factor of eye level and convergence. It can be assumed that all objects fall into three categories—small (clocks, jewelry, etc.), medium (automobiles, furniture, etc.), and large (buildings, ships, bridges). Convergence will be slight in small objects because they intercept so little of our cone of vision. It will be greater in medium-sized objects and considerable in large objects. Since the eye level of the observer is normally about five feet, it will usually be well above small objects, near the top of medium-sized objects, and near the base of large objects.

Thus a small object will ordinarily have the horizon high on the board and the vanishing point far apart in relation to the drawing. For medium-scale objects, the vanishing points will be closer together, and since they usually straddle the horizon, it will be slightly above the center of the drawing. Large objects are most impressive with eye level near the base of the drawing and the vanishing points close together to give a good deal of convergence. Sometimes, of course, the scale is intentionally upset to achieve dramatic effects.



Size

The size of the drawing depends directly on the distance between the vanishing points. Since the distance between the vanishing points is also a function of scale, a large drawing of a small object means a very large distance between the vanishing points. With a little practice, the draftsman will be able to judge how far the vanishing points should be spread and how high the horizon should be to achieve the proper scale and size for any object.

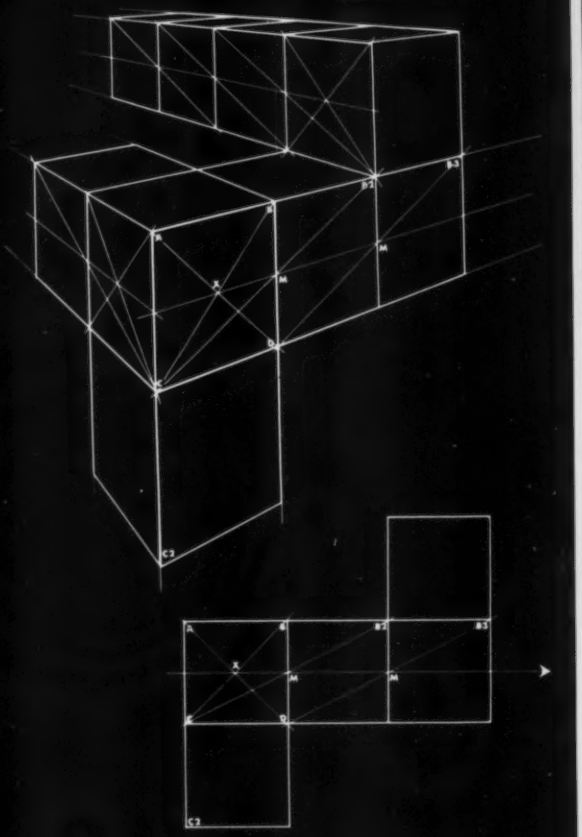
If he is skilled at freehand drawing he may lay out the cube by eye and derive the vanishing points from this sketch before proceeding with the mechanical drawing. Drawings can be enlarged by spreading the vanishing points, or by photostating a finished perspective if this is inconvenient.

In setting up a drawing, it is best to decide the view first and set up the cube in proper scale, then check to see if it is the proper size. If the cube is deficient in view, scale, or size it should be corrected at the outset. It is easier to redraw a faulty cube than to salvage a finished drawing.

After the basic perspective cube has been drawn it can be used as a measuring device to obtain a figure of any depth, width, and height. This is accomplished by multiplying and dividing the original cube.

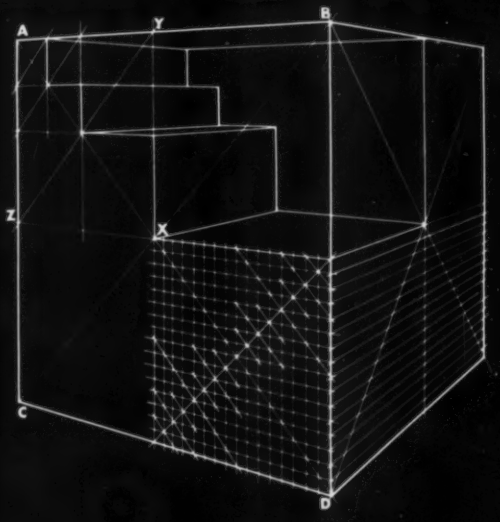
Multiplication of the cube

1. Extend the sides in the direction of the new cube or cubes.
2. Choose any square of the original cube that is in line with the proposed cube and bisect the common side by drawing the diagonals of the square to locate its perspective center and drawing a perspective line through the center to the common side.
3. From an opposite corner of the existing cube draw a line through the center of the common side to the extended side. The intersection with the extended side is the depth of the next cube.
4. Complete the new cube with the necessary perspective lines and verticals.

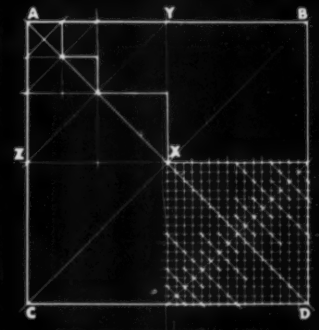


Division of the cube

1. Find the perspective midpoint of any square of the cube by drawing the diagonals.
2. Draw perspective lines through the perspective center to divide the square into four equal squares.
3. Add whatever perspective lines and verticals are necessary to complete the division.

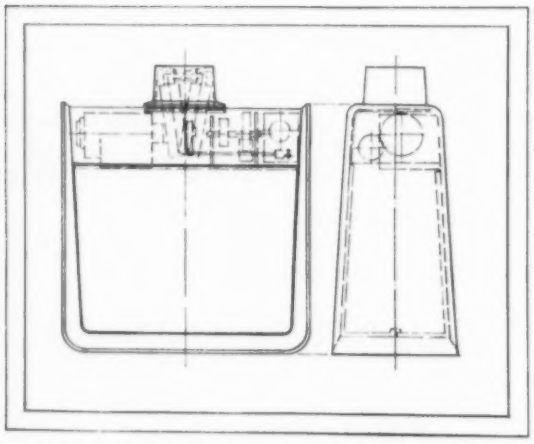


Multiplication and division may be repeated as often as desired to create any combination of dimensions. In every case, the artist must determine which method is best from the proportions of the object he is drawing. Multiplication would be best if the object were 10 x 1 x 1, for example, while division would be quickest if it were 10 x 10 x 1. If the object is almost a cube, it is easier to draw the largest mass first and divide to find whatever irregularities may occur. In general, division is safer and may prevent exceeding the limits of accurate drawing.



Example 1: a large object

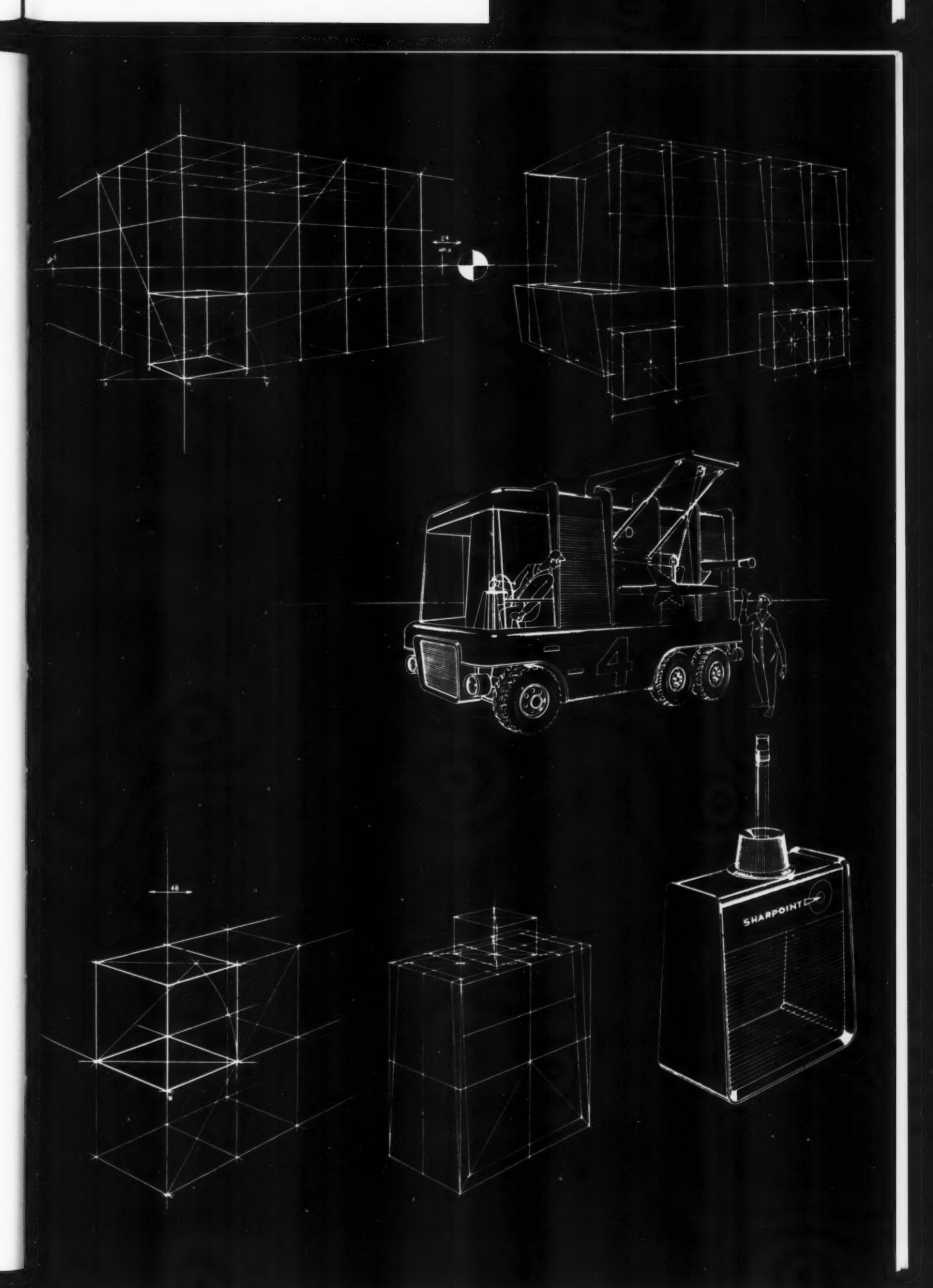
The design of a truck has been settled to some extent in a rough. We want to convert this into a tight and accurate perspective drawing. First, we must choose our view. We want to show something of the front of the truck but are most interested in the side, and a 30-60° view seems the logical choice, Next, we consider the scale of the truck. Our drawing is intended to describe it accurately rather than dramatize its size. Presuming that the truck is about 12 feet high, we decide to place its midpoint slightly above eye level. It will fill as much of the cone of vision as possible. Finally, we decide on the best size for the finished drawing. We do not want the drawing to be cumbersome, but it must be of workable size for the amount of detail that will be included. In this case, we plan a drawing of medium size, about 18 inches across. Having made these preliminary decisions, we start by drawing a horizon fairly low on the table and placing two vanishing points on it 24 inches apart. Now we draw our basic 30-60° cube. The basic cube should be the largest unit that can be multiplied conveniently. We must watch out particularly for three errors: the final form must not cross the midpoint between the vanishing points; it must not come too close to the left-hand vanishing point; and the nearest angles at top and bottom must not approach 90°. We know that the ratio of the truck's width to its length is 3:5; therefore the largest convenient cube will be a third of the width and a fifth of the length. This cube is multiplied to form a grid the over-all size of the truck, and details are added by further multiplication and division. (rounded forms will be discussed in the next chapter.)



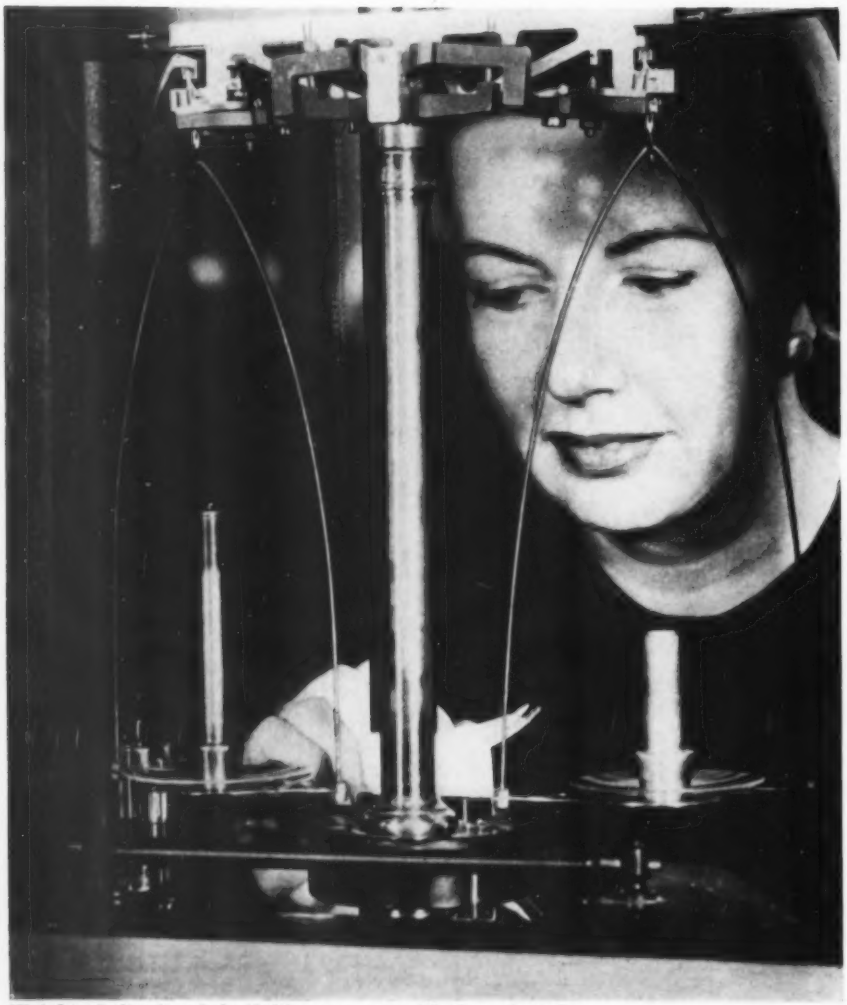
Example 2: a small object

We start with two orthographic views of a pencil sharpener. Although the subject is smaller than the previous one and requires less detail, the drawing is for presentation and we wish it to be approximately the same size. In order to achieve the proper sense of scale, we must place the object well below eye level and spread the vanishing points far apart. To begin with, we set up a horizon near the top of the board and place the vanishing points about 48 inches apart. We decide on a 45° view because it will show both sides well, yet will not be monotonous since the object is about twice as long as it is wide. A cube equal to the desired width of the sharpener is constructed from the horizon, and from it a figure of the proper proportions is developed.
This demonstration, like the one above, could be carried much further. In order to show the mechanisms inside the upper half, for instance, the original perspective grid could be broken down to extremely fine dimensions.

Neither of these drawings was based on a predetermined scale situation: that is, a given size of drawing, a given scale of observer, or a given distance from eye level. This is easily accomplished, however, and will be explained in the next chapter.


SHARPOINT

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



Weight of titanium bolt (left) compared with that of steel.

Titanium tension bolt

Because of its light weight, corrosion resistance, and high melting point (3020° F), engineers have been anxious to use titanium, particularly in jet aircraft production. It has only 57 per cent the weight of steel, but it loses much of its strength at high temperatures and under stress. By using a titanium alloy containing 4 per cent aluminum and 4 per cent manganese, and hot forging within a narrow temperature range by special methods, the Standard Pressed Steel Company produced a bolt whose tensile strength almost equals that of steel. Microscopic surface flaws caused the bolts to fail at first, and to overcome this, finishes finer than 8 micro-inches were produced. This is probably due to its ductility, which is twice that of steel. The basic problem was solved by working within closer tolerances than were necessary with steel. Bolts are now being produced with tensile strengths near the desired 150,000 psi and with fatigue performance better than that of steel. Substituting a pound of titanium bolts for steel bolts in aircraft saves ¾ of a pound of weight. This saving is estimated to be worth as much as $200 a pound, considering the increased payload made possible. Savings can range as high as 1,000 pounds in a single plane.

Hi-Ti tension bolt, *Standard Pressed Steel Company, Jenkintown, Pennsylvania.*

Electronic synthesizer

A machine that can produce any kind of sound by electrical means, even sounds that cannot be produced mechanically, has been developed by Dr. H. S. Olson, director of acoustical research for RCA. The machine can be used to make records, the sounds being fed into it from a punched paper tape. It can handle only two sounds at once, but any kind of sound can be built up by re-recording. Tones of pure musical quality can be produced, because such noises as the rattling of keys or scratching of bows can be eliminated. It is easy to reproduce sounds of existing instruments by the synthesizer, and their range can be extended. New tones, and combinations of them can also be produced. Old recordings, for instance, can be reproduced so that noise and distortions are eliminated.

Radio Corporation of America, Camden, New Jersey.

Gyro

The technique of substituting electrical components for mechanical ones has been useful in the development of a new directional gyroscope by Gyromechanisms, Inc.

When a wheel is made to spin in a housing mounted in rings, or gimbals, the wheel will resist any tendency to change it from its plane of rotation. It can therefore work as a stabilizer, and it is used to keep aircraft and guided missiles on course.

Some method of restraining the gimbal freedom — until the proper orientation of the spin axis has been attained — is a necessary part of most gyroscopes. This is called a caging mechanism. It has in the past been accomplished by a series of cams and cam followers. The Gyromechanisms' Directional and Vertical Gyros are caged by small solenoid-operated pins which move into detents after the gimbals have been brought into orthogonality by the same electric torque motors used otherwise for erection and leveling.

By thus obviating the need for a complex mechanical system, some 20 stamped and machined parts were eliminated. The electrical units are easier to assemble, and more reliable. The entire unit is housed in a hermetically sealed case that weighs 5½ lbs., is 5″ in diameter, and 5½″ long.
Model 45,000 Gyroscope
Gyromechanisms, Inc., Halesite, New York.

Air-locking rim

A new rim design permits the use of tubeless tires on trucks and giant earthmovers, with savings in weight, increased durability, and retention of the full flange height and support that has always been desirable for truck tires. The problem was to design a rim that would fit in the space formerly occupied by the tire itself. A three piece rim was developed, with a rubber air-sealing ring held in place by a lock ring. Tire mounting is simplified, for the valve is fastened in the rim, and tubes and flaps are eliminated. Standard dimensions of conventional truck tires are retained.
Tru-Seal rim, *Goodyear Tire & Rubber Co., Akron* 16, *Ohio.*

New rim for trucks is sealed with a small rubber ring that is clamped into position as a lock ring to grip tubeless tires.

Compact foot switch

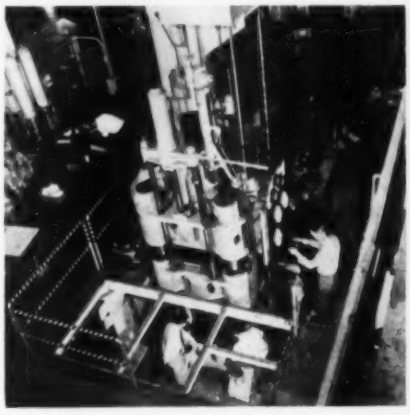
Slight pressure from any angle on the unbreakable plastic cap of a new foot switch puts it into operation. 3⅝″ in diameter and 1⅛″ high, it is housed in a steel case with a non-skid sponge rubber base. The rubber cord has a series plug and a molded strain relief grommet. $4.50.
Cadet, *Linemaster Switch Corporation,* 432 *Woodstock Terrace, Woodstock, Conn.*

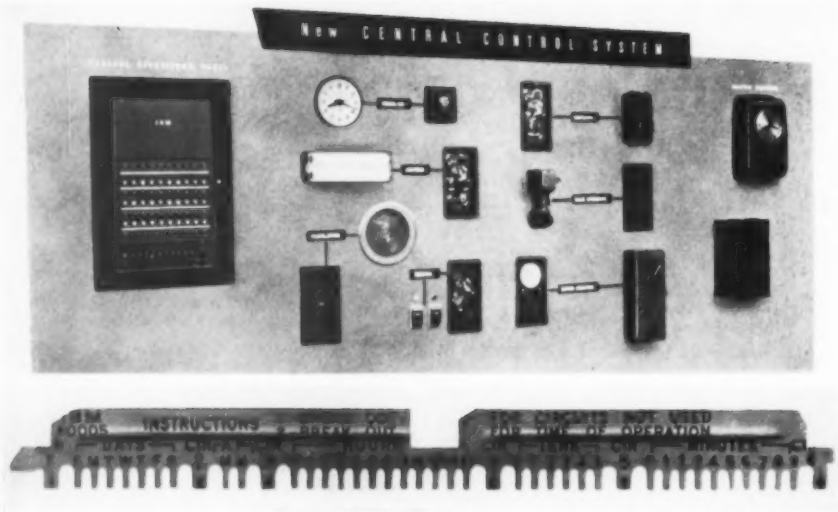
Thermal battery

Heat from radioactivity has been used to develop a small battery with electrical energy comparable to that of a dry cell. Scientists J. H. Birden and K. C. Jordan of Mound Laboratory used 150 curies of polonium sealed in a capsule, the surface of which is in contact with the hot junctions of 40 thermocouples. The capsule is insulated with a silica aerogel. Cold thermocouples are located in the surface of a surrounding container. A temperature difference of about 450° F is maintained between the capsule and the container. The battery can be small and light, and its output is not affected by extreme temperature changes, as is a flashlight battery. The voltage-current rating can be varied by changing the wire size and the number of thermocouples. Operating life depends on the rate of decay of the radioactive material used. The advantage of the battery is that it can be used as a power source the properties of which can be predicted regardless of variations in the total power delivered, and which will be reliable under adverse environmental conditions. The test battery has a power output of 9.4 milliwatts, which is a .2 per cent efficiency, and no-load voltage of .75 volts. When alpha-emitting radio isotopes are available in larger quantities and at less cost, such thermal batteries will be desirable for use in instruments and apparatus where known output, dependability, light weight, and long life are primary requirements.
Mound Laboratory of the Monsanto Chemical Company, St. Louis 4, *Missouri.*

Giant press, tiny chips

By devising a pressure vessel that could withstand 750 tons per square inch at 5000° F, GE scientists have been able to produce a variety of diamond chips from a carbon compound containing graphite. The chamber is about the size of the eraser on a lead pencil, and force is exerted on it from a 1,000 ton hydraulic press that is 35 feet high. The biggest diamond the scientists admit to having produced is a sixteenth of an inch on its longest dimension; GE's president, Ralph Cordiner, remarked that it was probably the most costly diamond ever seen. Greater pressures and higher temperatures may produce a bigger diamonds, and it may be possible to produce low-quality industrial diamonds within a few years. But perhaps the most important aspect of the research will be new knowledge of what happens to matter under extreme heat and temperature. Pressures and temperatures attained by GE's press are similar to those at a depth of 240 miles below the earth's crust. Estimates are that there is a temperature rise of 150° F per mile as you descend into the earth, with pressure increasing at the rate of 3 tons per mile. With its present press, GE can go down another 80 miles. The technique is a development from twenty years of work by Harvard's Dr. P. W. Bridgeman. Supervised by Anthony J. Nerad, manager of the Mechanical Investigations Section, the project has been carried out by Drs. F. P. Bundy, H. T. Hall, H. M. Strong, and Robert Wentorf.
General Electric Research Laboratory, Schenectady, New York.

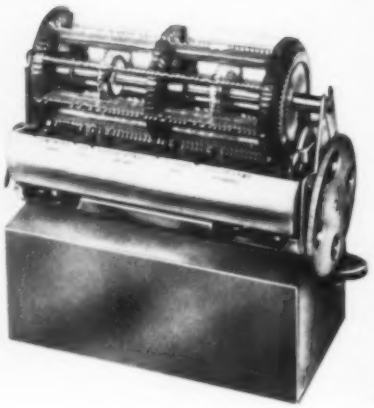




In IBM's central control system, coded switches at remote locations are switched on and off according to schedules set up in a master control panel that contains slowly revolving drums (right). A comb-like reading bar (above) is slipped into notches in the drum. Teeth in the bar are snapped out, and those remaining activate a carrier signal that is picked up by the distant switches.

Central control

A central control system for offices and factories that employs a carrier wave transmitted over conventional wiring systems so that no special wiring is needed, has been developed by IBM. As many as 40 groups of remote units can be controlled. Motors can be started and stopped, valves can be opened or closed, and lights, air conditioner, or signal systems can be switched on or off. A programming device in the form of a small drum is incorporated in the control panel. Schedules for each group of units to be controlled are set up on a comb-like reading bar which is inserted in the drum. These schedules are transmitted to an electronic receiver located near the equipment to be controlled. These dual coded relays can distinguish between ten "on" and ten "off" signals. A master clock is incorporated into the system to aid in proper timing. A remote unit can still be operated independently by its own switching mechanism, for instance, when lights are needed for after-hours work. The control system employs four carrier frequencies. The program drums and circuit relays are plugged into the central control panel, and a plugboard is provided, so that changes can be made in circuit arrangement or capacity.
International Business Machines, 590 Madison Avenue, New York 22, New York.



Knobless latch

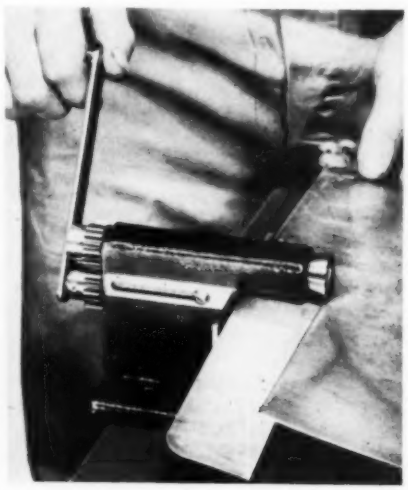
A door latch without a knob, that can be opened with a flick of the finger under the edge of a lever-like plate, is available with or without a locking mechanism. The faces of the latch, which are fastened with a pair of screws, are made of heavy gauge, rustproof zinc alloy, with plated finishes.
The latch face measures 3 1/3" high and 4" long, including the bevelled edges.
Lev-R-Latch, *Soss Manufacturing Company, 21777 Hoover Road, Detroit 13, Mich.*

Hole cutting dial saw

Holes with diameters from 1⅛" to 3½" can be cut in wood, metal, or plastic with a new dial saw. It employs three high-speed steel cutting blades that have been heat-treated electronically, and which are set simultaneously. The saw's dial is calibrated in pipe and conduit sizes, as well as in ⅛" divisions. A high alloy shaft, ⅜" round, is milled with three flats for chuck mounting. The saw also can be used as a rotary planer, or as an inlaying or grooving tool. It can be used with electric or manual hand drills, and with a drill press, lathe or milling machine. One set of cutters is used for iron and steel, another set is used for non-ferrous metals and plastics, and a third set is used for wood. Rustproof black finish with calibrations in white. $14.95.
Model 400 Dial Saw, *Robinson & Ruth, Box 534, Elmhurst, Illinois.*

Small rotary shear

A hand operated bench shear with sufficient mechanical advantage to trim 16 gauge steel and even heavier gauges of aluminum or brass, has a maximum 2" cut and can be adjusted to trim as fine as .005". Cutting wheels are said to outlast several pairs of hand shears and can be replaced for about one-fifth the cost of a pair of snips. Throat guides are set with slot-head screws. The body is cast iron, with steel crank, throat guides, and gears. Cutting wheels are high-carbon tool steel.
Fidelity Tool Supply, Inc., Camden, N. J.

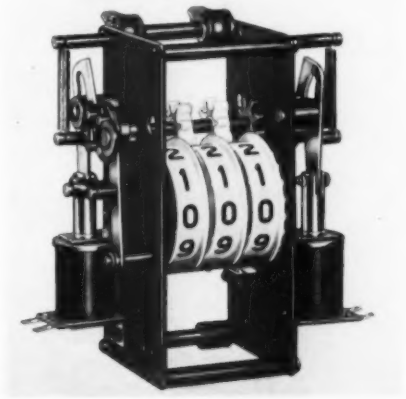


Agitating beverage pump

A beverage pump for soda fountains has a finned agitator that is revolved by an electric motor that keeps suspended solids stirred up, and also pumps out the liquids at a light touch on the knob. It can be disassembled in a few seconds. The pump is made of heavy stainless steel throughout. **Agimatic,** *Kenco Products Corporation,* 153 *South Dean Street, Englewood, N. J.*

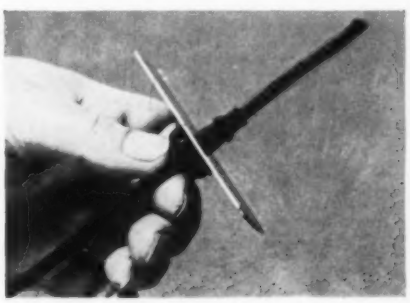
Roll-lock Grommet

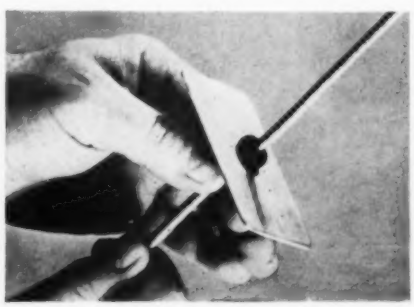
A new grommet with soft rubber sleeve that turns back on itself to lock a wire, rod, or tube in place, can serve as a seal against water, air, dust, or chemicals. It has been used to seal hydrostatic pressures of 225 psi; heavier grommets can be designed, but these need to be installed with special tools. The grommet can be used as a shock mount or foot where it is necessary to damp vibrations or avoid abrasions. 26 designs have already been made for specific applications; these range from a .09" bore for television wiring to a 2¼" bore for an air conditioning system.
Moorhead Roll-lock Grommet, *Spencer Rubber Products Company, Manchester, Connecticut.*



Counter that can subtract

An electrical counter with an extra unit that can subtract, operates at 400 counts per minute, registering a single count per impulse. It can be used for checking the flow of materials from or to a production line or a stock supply. It can be set at a predetermined figure so that it will shut off automatically at zero, and can be actuated by a photo electric cell, tube, relay, or contact switch. The counter is 6½" square and 3½" deep, weighs 2 lbs. 5 ounces. Numerals are black on opaque white nylon rolls; the case has a black oxide finish. The counter is usually mounted vertically for best results. Its electrical coils are intermittent duty for alternating currents of 6 volts to 110 volts. The counter has a maximum of 999. The company will furnish special counters to requirements.
Spencer Manufacturing Co., 3253 *N. Cicero Avenue, Chicago* 41, *Illinois.*



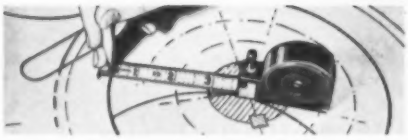


Ribbed die-cast aluminum riser

Escalator risers and treads are being die cast of type 308 aluminum to reduce the weight of moving stairs, to permit close tolerances of the moving parts, and to simplify machining and assembly. Tolerances are held to .003" on decimal dimensions, .015" on fractional dimensions.
Precision Castings Company, Incorporated, Fayetteville, New York.

Wireless microphone

An improved version of the first successful wireless microphone is now available; it is useful for relaying instructions in large spaces where loud speakers are needed, and for addressing gatherings large and small, indoors or out. The light weight radio transmitter and battery case for the microphone can be carried in a pocket, and provides 5 hours of power on a single loading of batteries that weigh 10 ounces. With a lapel microphone, the user can cover an area of 30,000 square feet. The receiver picks up a voice with good clarity and quality of sound. Printed circuits and standard parts are used. The 18 tube receiver operates through normal amplifiers.
Port-O-Vox, *Port-O-Vox Corporation,* 521 *West* 43*rd Street, New York* 34, *N. Y.*



Cartridge-fed ruling pen (above), and a beam compass rule imported from Sweden.

For easy reproducing

Some new items to make life easier in the draughting room include:

A beam compass rule imported from Sweden lets you draw arcs with 12-foot diameters, just by locking a steel tape at the desired radius and pressing in a center point that consists of an ordinary thumb tack. It can also be used for cutting leather, fabrics, and other thin sheet materials.
The Walpole Company, Department 138, 419 *Boylston Street, Boston* 16, *Mass.*

A vertical art projector that casts a sharp image directly on a drawing board, four times larger or smaller than the original, allows quick scaling of flat copy, color transparencies, or 3-dimensional objects.
Art-O-Graph 44, *J. A. Engel, Incorporated, Phoenix Building, Minneapolis* 1, *Minn.*

New xerographic copying equipment that can reduce drawings up to 24" x 36" on a 12" x 18" paper master, will produce 100 copies in about five minutes. This dry, electrical process requires no negatives, and the small original masters are easy to file.
Xerox Model 1218, *The Haloid Company,* 2-20 *Haloid Street, Rochester* 3, *N. Y.*

Spooled rolls of photocopy papers, that are coated with high-speed projection-type emulsions, are being offered in a variety of stocks to fit standard photocopy cameras.
Peerless Photo Products, Shoreham, N. Y.

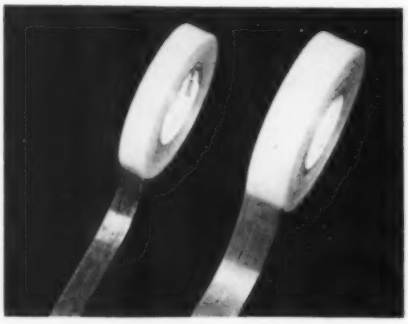
A new panchromatic film that sells at the price of chrome-type films, offers good color sensitivity and a wide exposure latitude that has a tendency to correct for over and under exposure. Packaging was designed by Raymond Loewy.
All-Weather Pan Film, *Ansco, Binghamton, N. Y.*

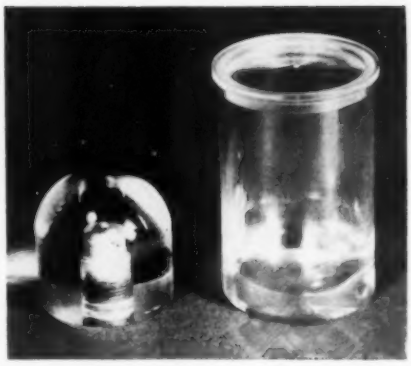
A long-life developer for photo copy machines that will last a week, produces extremely high-contrast prints.
Hecco-kwik, *Hunter Photo Copyist, Inc., 586 Spencer Street, Syracuse, New York.*

A cartridge-fed ruling pen with push-button feed that has rustproof stainless steel nibs and uses throw-away cartridges filled with India Ink, can be filled in a couple of seconds. No ink gets on the outside of the nib.
Rule-O-Matic, *Rule-O-Matic Corporation, 38 East 57th Street, New York* 22, *N. Y.*

Reinforced polyethylene tapes

Clear polyethylene tape reinforced with glass filaments has been developed by Minnesota Mining and Manufacturing Company, in two forms: a pressure-sensitive type, with the filaments sandwiched between the backing and the adhesive, and a tape not pressure-sensitive, with the filament between two layers of polyethylene. The first is 9-mils thick, with a tensile strength of 150 pounds per square inch of tape width; the second is 11½-mils thick, with 100 pounds strength. The tapes remain flexible at —60° F, and are resistant to most chemicals. They were originally developed to reinforce the plastic panels of weather balloons; The pressure-sensitive version is available in 72-yard rolls in widths up to 21"; the other is available in widths up to 34". Except for the balloon application, only two others have been found; they can be used as edge reinforcement for woven wire and silk screen makers, and for reinforcing plastic tarpaulins. The company expects to find other useful applications.
Minnesota Mining and Manufacturing Company, 900 Fauquier Street, St. Paul 6, *Minnesota.*



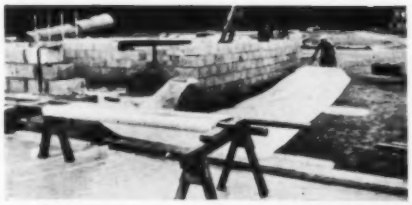


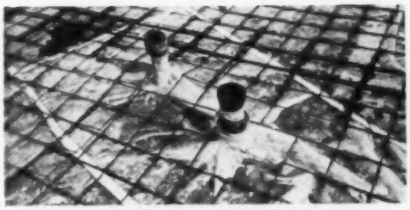
Acrylic Pycnometer

The weight of corrosive liquids and viscous pastes can be measured quickly with this clear pycnometer machined from solid Plexiglas. A close fitting tare weight, also machined from acrylic, nests in the bottom of the cup when not in use; the fitted cover squeezes out excess liquid through a center hole, and when the excess is removed, the cup is placed on a balance, and counterbalanced with the tare. Contents can be weighed to the nearest .1 gram; when the weight in grams is divided by ten, the answer is the weight per gallon in pounds. Multiplying the weight in pounds per gallon by .012, gives the specific gravity. The optical clarity of the Plexiglas allows a visual check for bubbles. The cup is 3" high, 1¾" in diameter; Rohm & Haas Plexiglas.
Gardner Laboratory, Inc., Bethesda, Md.

Polyethylene vapor barrier

A thin film (.004") of Bakelite's polyethylene has been developed for use as a vapor barrier under concrete slabs, over subflooring, on the warm side of exterior walls, and on the ground in crawl spaces. It is called Visqueen film, and transmits moisture at one tenth the rate specified in government standards for good moisture-vapor barriers. The film is chemically inert and does not deteriorate, which means it becomes a permanent part of the building. Its strength and tear resistance permits it to be stapled to studding. It remains flexible at low temperatures, and can be cut easily. For use under a concrete slab, the film is laid on a layer of sand, which protects it from projections and sharp objects. Strips are overlapped about six inches. Base overlaps are secured first to the wall with asphalt, and are further secured by the concrete slab itself. Holes are cut in the strips for pipes and conduits, and these are tightly wrapped with sheets of the film sealed with tape before steel mesh is laid to reinforce the concrete slab. Condensation is already noticeable at this time.
When the film is used over subflooring or on the inside of a wall, it blocks the passage of air and dust, in addition to serving





as a vapor barrier. When the film is used in a crawl space, it is laid over the ground and covered with a layer of sand to keep it in place, which prevents condensation on joints and subflooring. Contractors are finding the film useful for covering machinery and materials on job sites. Rolls are available in widths up to 16", and in thicknesses from .002" to .02" thicknesses.

Visqueen film, *The Visking Corporation, Terre Haute, Indiana.*

Light cold storage doors

Expanded polystyrene, Dow's Styrofoam, is being used for its light weight, high insulating values, and resistance to water penetration in fabricating freezer and cooler doors. The Styrofoam weighs two ounces a board foot; four- or six-inch thicknesses are bonded between plywood panels with a resin emulsion. The sandwich is strong, and the resulting door can be made extremely close fitting. Sheet metals can also be used for the sandwich. Standard size doors range from 1'6" square to 5' by 6'6", and special sizes are available on order.

Streator Products Corp., Fairfield, Iowa.

Aluminum coat

A protective garment that reflects heat, rather than insulating against it, is made by applying an aluminum coating on an asbestos fabric base. The coat allows more freedom for those who work in intense heat, for it is half the weight of conventional protective garments. An added advantage is that molten splatter rolls off the fabric instead of collecting on it. The garments have been tested in steel mills for two years, on such jobs as changing the doors of a furnace operating at 2100° F. Workers do not like to wear the conventional bulky protective garments, but one company that used these lightweights reported complete elimination of burns and no resistance to wearing them on the part of the men.

Department G5-24, Minnesota Mining and Manufacturing Co., 900 Fauquier Street, St. Paul, Minnesota.

Scratchless silicone surfaces

Silicones seem to be busting out all over and one of the areas in which their use is being extended is in coating glass, porcelain, and china. A new solution from Dow, called F-4141, can be diluted in water and applied by spraying, flooding, or dipping to form an invisible film that is not oily, yet imparts a high degree of lubricity and scratch resistance. Treated surfaces are water repellant, but may be labeled with many resin-type inks and certain adhesives. Conventional equipment can be used to apply the coating, which is instantly effective in concentrations as low as .01 to .1 percent. Optimum properties are developed by air drying at room temperatures for 24 hours, or by curing for 10 minutes at 100°. The cured film is not affected by 2 hours' exposure to live steam, perchlorethyleyne, or a 3 per cent sodium hydroxide. The film is insoluble, so it will not contaminate foods. It is supplied from a 20% solution in tertiary butanol, and has a long shelf life. Solutions diluted with hard or soft water remain stable for as long as 72 hours. Available in commercial quantities at $1.50 per pound.

F-4141, *Dow Corning Corporation, Midland, Michigan.*

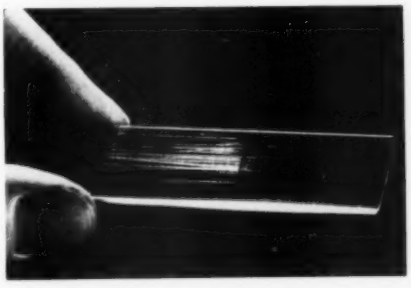
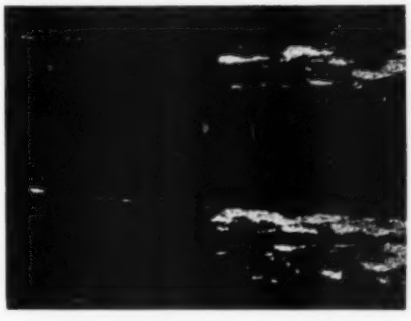


Photo and microphoto of Dow silicone film.



Tenite butyrate bushings

Insulating bushings for standard rigid conduits are being produced of shatterproof Tenite butyrate supplied by Eastman Chemical Products. The bushings will withstand dropping or accidental knocks, and will not rust or corrode. They are molded with scalloped edges to provide an easy grip, and rounded throats that will not abrade cable, sheath or wire insulation. They are provided with locking threads, and can be installed easily by hand, but a wrench is usually required to remove them. Vibration will not loosen them. They are available for conduit sizes from ½" to 6", in a chipproof blue that is easily identified by electrical inspectors.

The Thomas & Betts Company, Incorporated, 36 Butler Street, Elizabeth 1, New Jersey.

Manufacturers' Literature

Alloy Steels. Climax Molybdenum Company, 500 Fifth Ave., New York, N. Y. 200 pp. ill. A handbook for engineers, purchasing, and management personnel on uses of alloy steel, including case histories.

Aluminum. Reynolds Metals Co., Louisville 1, Ky. 16 pp., ill. A new brochure describing in condensed form Reynolds' mill products. A complete wrought aluminum alloy selection guide and a casting alloy guide are included; methods of fabricating and finishing aluminum are briefly explained.

Aluminus Casting Alloys. Federated Metals Division, American Smelting and Refining Co., New York 5, N. Y. 60 pp., ill. This "Aluminus Casting Alloys Handbook" contains descriptive material on metallurgy and casting practices, and consolidates, for reference use, all specifications pertaining to aluminum casting alloys.

Architectural Metal Items. Wooster Products Inc., Wooster, Ohio. 12 pp., ill. Window sills, thresholds, stair treads, floor plates, and other items for installation in public buildings, are described in Wooster's new bulletin.

Automatic Sewing. Automatic Thread Control Co., 39 Newman Court, Hempstead, N. Y. 2 pp., ill. This firm's facilities for automatic cutting and sewing are described, with illustrations of several examples.

Ceramic Parts. Centralab, A Division of Globe-Union, Inc., 900 East Keefe Ave., Milwaukee, Wis. 16 pp., ill. The advantages of engineered ceramics over other materials, and the types of ceramic for specific uses, are cited in this new Centralab Ceramic Buyers Guide.

Concrete Testing. Department of Scientific & Industrial Research, Westminster, London S.W.1, England. 50 pp., 65c. A technical pamphlet describing recently-developed ultrasonic equiment for testing concrete and road surfaces.

Custom-Printed Fabrics. Eric Hand Prints, 1914 6th Ave., Los Angeles 18, Cal. 28 pp. ill. Hand printing of fabrics to client's color and design specifications for hotels, industrial buildings, and other special uses.

Draw press. Clearing Machine Corporation Div., U. S. Industries, Inc., 6499 W. 65th St., Chicago 38, Ill. 16 pp., ill. Operation and specifications of the Clearomatic draw press are outlined, with tables for determining the number of strokes for a given draw.

Electrical Conductors. Aluminum Company of America, Alcoa Bldg., Pittsburgh, Pa. 20 pp., ill., charts. Alcoa offers a report on the Electrical Conductor laboratory, describing such developments as all-aluminum cable, steel reinforced cable, and aluminum for bus conductors.

Electrical and Mechanical Controls. Curtis Development & Mfg. Co., 3266 N. 33rd St., Milwaukee 16, Wisc. 4 pp., ill. Battery chargers, feeder mechanisms and various control units and components.

Electric Conductor Accessories. Reynolds Metals Co., Louisville 1, Ky. 12 pp., ill. A new manual providing information useful in selecting and installing accessories needed with aluminum wires and cables in the construction of overhead electrical transmission and distribution lines.

Electronic Products. Superior Tube Co., Norristown, Pa. 20 pp., ill. A catalog of cathodes and other vacuum tube components manufactured by Superior, assembled into a single catalog for the first time.

Expansion Joints and Bellows. Flexonics Corporation (formerly Chicago Metal Hose Corporation), Maywood, Illinois. 24 pp. and 16 pp. respectively, ill. Features and specifications of expansion joints and bellows, arranged as a design guide for application and selection.

Manufacturers' Literature *(Continued)*

Fiberglas-Polyester Electrical Laminates. Owens- Corning Fiberglas Corp., Toledo 1, Ohio. 4 pp., ill. Comparative properties of Fiberglas-polyester general purpose electrical flat sheets, now available at low cost. A second folder of the same size gives performance characteristics of various grades of Fiberglas-base sleeving and tubing.

Fir Plywood. Douglas Fir Plywood Association, Tacoma 2, Wash. 4 pp. Revisions in the new Commercial Standard are contained in a condensed reference table, as well as engineering data for sheathing and concrete forms, FHA requirements, and other details, to help in the writing of specifications.

Hardwood Plywood. Hardwood Plywood Institute, 600 S. Michigan Ave., Chicago 5, Ill. 20 pp., ill. Various types of hardwood plywood, including specifications and properties, plus sections on installation, manufacture, and application.

Heating. Westinghouse Electric Corp., Pittsburgh 30, Pa. 32 pp. A revised edition of Westinghouse's handbook on electric heating gives full information on designing, cost estimating, and installing electric heating systems.

Industrial Hose and Fittings. The Weatherhead Co., Cleveland, Ohio. 132 pp., ill. For designers of hydraulic and pneumatic control systems, with tabbed reference sections for the types of fittings, and a section of technical data that includes pressure tables, bending instructions, servicing, and other details.

Insulated Piping Systems. Ric-wiL, Incorporated, Barberton, Ohio. 90 pp., ill. Catalogue includes specifications for both underground and overhead insulated piping systems, with separate sections on the types of piping, the engineering problems, drawings, and installation.

Laboratory Equipment. Peck & Harvey Mfg. Corp., 5650 North Western Ave., Chicago 45, Ill. 16 pp., ill. Stainless Steel sinks, tanks, trays and accessories for photographic and laboratory use and chemical processing are illustrated and described in P & H's new catalog.

Lighting Fixtures. Smithcraft, Lighting Division, Chelsea 50, Mass. 4 pp., ill. Smithcraft's new line of industrial lighting fixtures—featuring 10% uplighting through apertures in the tops of reflectors.

Liquid Level Gauges. The Bristol Company, Waterbury 20, Conn. 26 pp., ill. This new bulletin describes the complete line of liquid level gauges for indicating, recording, controlling and telemetering offered by the Bristol Co.

Manlift Elevators. Humphrey Elevator Co., Inc., Faribault, Minn. A small folder describes the four standard models of Humphrey Manlift Elevators, which are power driven, continuous belt lifts, with hand holds and steps at intervals—providing simultaneous up and down employee transportation.

Mercury Lamps. Jefferson Electric Co., Bellwood, Ill. 16 pp., ill. Jefferson presents detailed information about mercury lamp street lighting in connection with its transformers for mercury lamps.

Metal Tubing. Superior Tube Co., Norristown, Pa. 8 pp., ill. A general tubing catalog, with information needed for the selection and application of almost fifty principal analyses of tubing.

Package Merchandising. Hinde & Dauch, Sandusky, Ohio. 28 pp., ill. "How to Merchandise with Corrugated Boxes" is Hinde & Dauch's new booklet, which discusses the considerations that should decide box design and color.

Plastic Parts. The Richardson Co., 2739 Melrose Park, Ill. 12 pp., ill. A catalog discussing Richardson's facilities for production of intricate molded plastic parts; and "Insurok," their laminated plastics.

For Your Calendar

April 10-May 1. For your Home—an exhibition of furniture and articles for the home selected for their good design by the Dept. of Architecture, University of Illinois, Urbana.

April 13-June 5. Textiles and Jewelry from India. Museum of Modern Art, New York City.

April 14-May 31. Product Design Exhibit. The Institute of Design, Chicago.

April 16-17. Packaging Machinery Manufacturers Institute Semi-Annual Meeting. Palmer House, Chicago.

April 17-May 7. Chicagoland Better Rooms Pageant. New trends in home decorating featured in simultaneous displays by retail stores in Chicago. Sponsored each spring by the Chicago Tribune and the Home and Home Furnishings Council.

April 18-20. 24th National Packing Exposition of the American Management Association. International Amphitheatre, Chicago. Packing Conference will be held in conjunction with Exposition, at Palmer House, Chicago.

April 18-21. Society of Automotive Engineers' Aeronautic Meeting. Aeronautic production forum and aircraft engineering display. Hotel Statler, New York. (April 21 at Hotel McAlpin.)

April 21-June 17. Nineteenth Century Jewelry. Cooper Union Museum, New York.

April 25-27. American Ceramic Society, Annual Convention. Netherland Plaza Hotel, Cincinnati. (For Design Division activities, see page 18.)

April 27-29. Society for Experimental Stress Analysis, Hotel Statler, Los Angeles.

April 28. Ohio Valley Industrial Advertising Conference. Netherland Plaza Hotel, Cincinnati.

April 30. 10th Annual Northern New York Science Congress. Clarkson College of Technology, Potsdam, N. Y.

May 1. American Institute of Chemical Engineers Meeting. Shamrock Hotel. Houston, Texas.

May 2-5. Electrochemical Society Inc. Spring Meeting. Cincinnati.

May 2-13. The British Industries Fair. Olympia Hall, London and Castle Bromwich, Birmingham.

May 5-31. Open House Exhibit. The Institute of Design, Chicago.

May 7-15. Society of the Plastics Industry, Annual Meeting and Conference—cruise on the "Queen of Bermuda."

May 8-22. Annual exhibition of work by graduate students, Department of Art, University of Illinois, Urbana.

May 16-20. National Materials Handling Exposition. International Ampitheatre, Chicago.

May 18-19. The Chemical Market Research Association. Annual Meeting. Hotel Plaza, New York.

May 20-21. State Science Congress. Cornell University, Ithaca, New York.

For Your Calendar *(Continued)*

May 23-25. American Society for Quality Control. Annual Convention, New York.

May 25-June 5. Philadelphia Chapter Annual Exhibition American Institute of Architects. Philadelphia Art Alliance Building.

June 1-11. British Plastics Convention and Exhibition. National Hall, Olympia, London, England.

June 7-10. American Welding Society Spring Meeting and Exhibition. Hotel Muehlebach & Kansas City Auditorium, Kansas City, Mo.

June 12-17. Society of Automotive Engineers' Summer Meeting. Atlantic City.

June 13-18. Fifth International Design Conference, Aspen, Colorado. (For program, see page 18.)

June 19-23. American Society of Mechanical Engineers' Semi-Annual Meeting. Boston.

June 20-23. American Electroplaters' Society Industrial Finishing Exposition. Cleveland.

June 20-July 1. International Home Furnishings Market, Merchandise Mart, Chicago.

June 20-July 1. Summer Market. American Furniture Mart, Chicago.

June 20-July 1. Summer Market. Waters and Exhibitors Buildings, Grand Rapids, Michigan.

June 22-September 25. Built in Latin America. Museum of Modern Art, New York.

June 26-July 1. American Society for Testing Materials Annual Meeting. Atlantic City.

July 11-15. Los Angeles Summer Furniture Market. Los Angeles Furniture Mart.

July 11-15. Los Angeles Auxiliary Market. Shrine Exposition Building.

July 11-15. National Housewares & Home Appliances Exhibit. Auditorium, Atlantic City. Independent Housewares Exhibit, Chelsea Hotel, Atlantic City.

July 17-22. National China, Glass, and Pottery Show. Hotel New Yorker, New York.

July 24-27. Washington Gift Show. Hotel Willard.

September 6-17. Machine Tool Show, International Amphitheatre, Chicago; Production Engineering Show, Navy Pier, Chicago (closes Sept. 16).

September 12-16. 10th Annual Instrument Automation Conference and Exhibit, sponsored by Instrument Society of America. Shrine Exposition Hall and Auditorium, Los Angeles.

October 13-16. The Audio Fair. Hotel New Yorker, New York.

October 24-28. National Business Show. 71st Regiment Armory and 69th Regiment Armory, New York.

Index to Advertisers In This Issue

Classified Advertisements

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

Positions Wanted

INDUSTRIAL DESIGNER *with varied production and material experience in all creative phases of product design, development, engineering and model making desires permanent position with progressive manufacturer. Willing to relocate. Box ID-38,* INDUSTRIAL DESIGN, *18 E. 50th St., N. Y. 22.*

CONSULTANT STYLIST-DESIGNER—*Attractive young lady with 12 years performance in man-made and natural fiber* TEXTILE *industries selling to automotive, apparel, home furnishings and television markets, and with executive* RETAIL *merchandising and public relations background, seeks challenging appearance design and merchandising assignments. Box ID-39,* INDUSTRIAL DESIGN, *18 E. 50th St., N. Y. 22.*

INDUSTRIAL DESIGNER DESIRES POSITION IN CHICAGO AREA. *Fourteen years experience. Degree in Industrial Design from Carnegie Tech. Received five patents for clients while free lancing. Strong engineering and architectural diversified background. Age 36, Married. Room 501, Park Building, Pittsburgh 22, Penna.*

Help Wanted

WANTED *Furniture Designer experienced in case goods. Must have knowledge of cost. Good opportunity for man for steady position in large Middle West plant. State experience and personal data. Box ID-40,* INDUSTRIAL DESIGN, *18 E. 50th St., N. Y. 22.*

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

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

PACKAGE DESIGNER *with experience in creative package design, printing processes and lettering knowledge. Some package machinery, paper and board knowledge desirable. Opportunity for right person with fresh graphic approach to develop and head packaging department of leading Midwest Industrial Design firm. Age 25-35. Salary open. State education, experience, and salary expected. Box ID-41,* INDUSTRIAL DESIGN, *18 E. 50th St., N. Y. 22.*

NEW ENGLAND MANUFACTURER *of metal furniture desires product designer on permanent basis. Please state complete details, background, and previous experience. Box ID-42,* INDUSTRIAL DESIGN, *18 E. 50th St., N. Y. 22.*

Miscellaneous

HUMAN ENGINEERING—*Research assistance in determination of product requirements. Human limitations and capabilities data. Assistance in achieving product efficiency, safety, comfort and maximum appeal. Human Factors Laboratory, 550 Fifth Avenue, New York 36, N. Y.*

MODELS—INDUSTRIAL—*Complete facilities for modelmaking in all materials. Executed to your specifications. Prompt delivery at reasonable prices. Arnkurt Associate Engineers, 31 East 27th St., New York. LExington 2-4286.*

IDEA MAN—FREELANCE—PHENOMENAL ORIGINALITY—*Intellectual catalyst, science liaisons. Ultimate pen, wet ink, spherical/conical point, leak proof. $25,000. Ultimate razor, guardless 36" slashing edge, self honing, $100,000. Torch, burning solid carbon, 16,322° F. (Vaporizes creation), $200,000. Tugboats eliminated, $100,000. Atmospheric separation, $250,000. Triflers abhorred. Want revolution, your line? Laboratory, Box 2, Brooklyn 17.*

Competitions & awards (*Continued from p. 16*)

First Exhibition of Award Furniture and International Furniture Competition sponsored by the town of Cantù, Italy, offers, with substantial cash prizes, the following eight competitions: planning of furniture for four rooms; planning of furniture for a living room; planning of six pieces of furniture in wood incorporating small size and demountability suitable for export; planning of six pieces of furniture in metal, similarly small and suitable for shipping; a bookcase, close-top desk or vitrine incorporating inlay techniques; a suite of upholstered furniture; three groups of office furniture (typist's, file, and waiting-room groups); and three groups of service furniture (kitchen, laundry, and pantry). The distinguished international jury is composed of architects Gio Ponti, chairman; Alvar Aalto, Finn Juhl, Carlo de Carli, and Prof. Romano Barocchi. Winners and exhibits of international entries will be shown at Cantù, September 17-October 5, 1955. Plans must be airmailed, postmarked not later than May 25, 1955, to the Competition (as described above), Cantù, Italy. In the interest of speed, this office still has several entry blanks with complete instructions available.

Products for Tomorrow, sponsored by All-Luminum Products, Inc., of Philadelphia, is offering prizes of $500, $300, and $200, and possible royalties, to "an original idea for a new product or a new and important improvement on an item now on the market in the housewares, hardware, toy or juvenile fields." The entries must be made of aluminum or steel sheet, rod or tube, or a metal-and-fabric combination, to retail at more than $3, preferably over $5.00. Entry blanks are available from Products Development Division, All-Luminum Products, Inc., 36th & Reed Streets, Philadelphia 46, Pennsylvania. Closing date is June 30, 1955.

Industrial Designers Institute Student Member Competition will award $25 for the best paper written by an undergraduate student on the subject, "Design and Living Standards Raise Each other;" post-graduate members may compete separately with the topic, "Design Integrity and Merchandising." Candidates should send their papers before May 1, 1955 to the head of the local I.D.I. student chapter, who will then forward the best three to Henry Glass, chairman of the student awards committee, at 666 Lakeshore Drive, Chicago.

Manufacturers' Literature (*Continued*)

Royalite. United States Rubber Co., 2638 N. Pulaski Rd., Chicago, Ill. 12 pp., ill. Complete information about U. S. Royalite, a tough industrial plastic made from a plastic copolymer and synthetic rubber. Its properties and applications are covered, with data about types and sizes, working and finishing, and suggested uses.

Screening. Aluminum Co. of America, Pittsburgh 19, Pa. Alcoa announces four information booklets on aluminum screening. "Aluminum Combination Storm & Screen Windows," "Things You Should Know About Screen Cloth, Tension Screens, Combination Windows," "17 Years' Research Brings You Aluminum Screening," and "How to Rescreen with Aluminum."

Storage and Maintenance Equipment. Precision Equipment Co., 3636 N. Milwaukee Ave., Chicago 41, Ill. 24 pp., ill. Shelving, lockers, and other equipment for industrial and institutional use.

Television. Radio Corp. of America, Camden, New Jersey. 7 pp., ill. Discusses typical installation of industrial television equipment for remote observation in power plants, etc., now offered by RCA.

Woodworking Equipment. De Walt Inc., Lancaster, Pa. 16 pp., ill. Specifications and features of the various models comprising De Walt's line of woodworking equipment, with emphasis on ways the machinery can reduce costs.

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Have you ever had the exhilarating experience of having a new material in your hands and contemplating the many new and different things that can be done with it? Of course, you have! And if you'd like "that old feeling" to return, just send for samples of the latest colors and textures in Terson and Terek!

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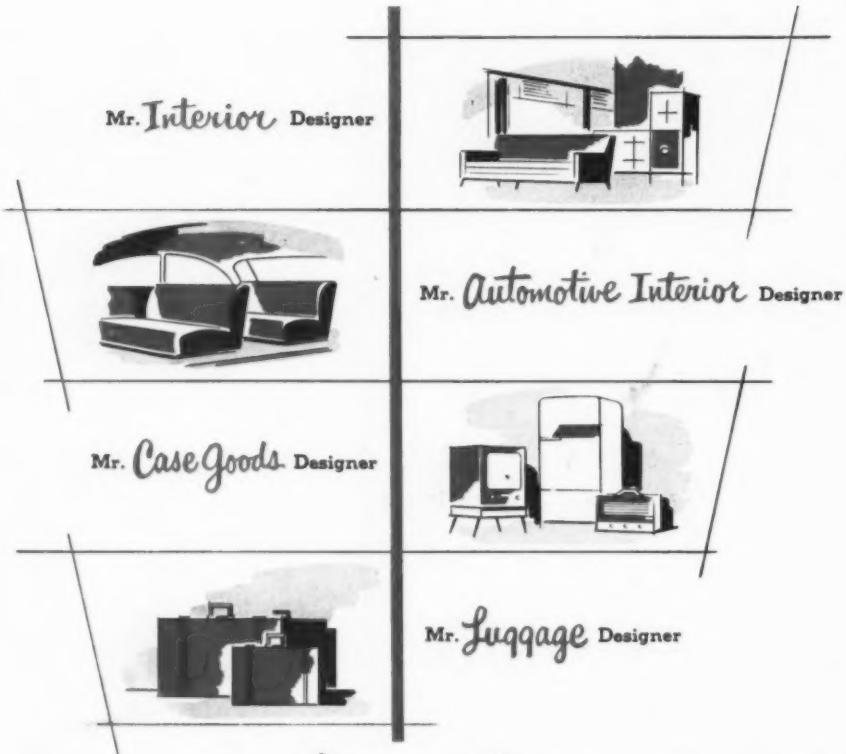

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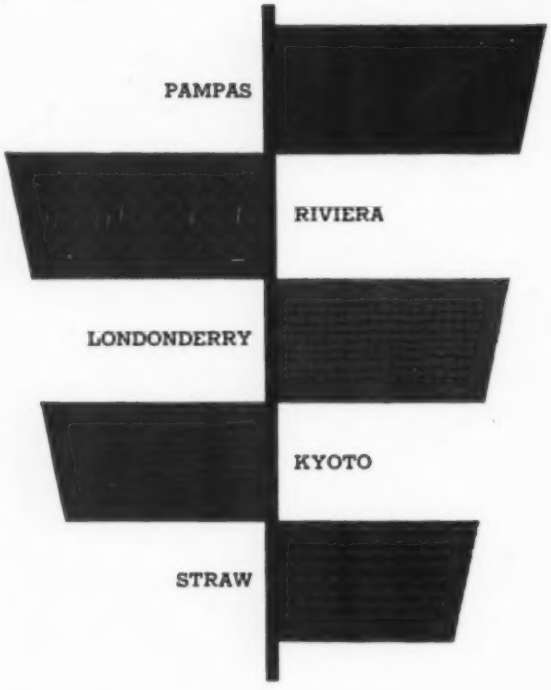

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*Reg. Trade Mark—The General Tire & Rubber Company. NYGEN Tolex is also *stocked for immediate shipment* in the rich, new *Pampas* leather effect.

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