I.

The relationship between function, technology and form as shown in some typical products of the machine age.

The shapes of things we use in everyday life are determined by several factors:

- Improvement of established production methods
- Introduction of new principles of operation and raw materials
- Creative integration of function, technology and form

All these factors provide us with better tools for living.

What is the contribution of eclectic design that borrows unrelated forms to hide the purpose of objects in a "Package of Style"?

II.

In the pre-industrial era the craftsman was both designer and producer. His knowledge of material and technique and of the purpose of his product enabled him to integrate these factors into fitting designs.

In the transition from handwork to mechanical production, the responsibility for design shifted from craftsman to manufacturer who was often untrained and unable to see the importance of these basic relationships.

The divorce of form from technique and function produced articles of inappropriate shape and confused decoration. The ability of the machine to produce cheap imitations of intricate handwork and the desire for "sales appeal" made design frequently a means of deception and vulgar pretense.

**Visual Material**

- Windsor Chair (photograph)
- Group of Victorian Furniture (photograph)
The breach between function, technique and form at the turn of the century led to a shift of interest from structural to decorative shapes. "Art nouveau" degenerated into "art décoratif" which used indiscriminately neo-classic and modern art forms as a disguise for the purpose of things.

A conscious effort to close the breach led to the formulation of a new philosophy of design that seeks to meet the needs of modern society through shapes based on contemporary developments of technology. The affinity between this new organic design and modern art is no longer the result of borrowing but an expression of the basic human and scientific trends of our time that affect both the artist and the engineer.

Eclecticism still persists in spite of these efforts. Its latest form is the uncritical borrowing of mechanical shapes to make objects appear up-to-date.

Pablo Picasso "Woman with Pears" 1908, (Walter P. Chrysler Jr. Collection).

Bagge "Cubist Chair" 1926.

Henry van de Velde "Interior", art nouveau, 1908

Levard "Interior" art décoratif, 1925.


L. Mies van der Rohe "Interior" Berlin Exposition Building, 1931.

Marcel Breuer "First tubular chair", 1925.


Alvar and Aino Aalto "Municipal Library, Viipuri, Finland" 1932-35.

Alvar Aalto "Laminated plywood chair" 1932.

Protractor, Micrometer and Speed Indicator

Grumman F4F-3- U.S. Navy Fighter

Streamlined Pencil Sharpener.
### Technological Evolution

The shapes of scissors like those of many simple hand tools were developed without the designer's assistance. They are the result of practical experience that dictated modifications of shape to meet the demands of specialized function and took advantage of improved and more economical production methods.

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### Technological Evolution and Organic Design

The basic shapes of flat irons and kettles have remained unchanged. The modifications, however, seen in the latest products are the result of deliberate design rather than empiric evolution.

The designer's contribution to the development of the flat iron is based on improvement of manipulation and maintenance.

### Visual Design Analysis. Scissors.

**Design Analysis:** SCISSORS. Des. David Aldrich, Columbia University, School of Architecture; Evening Class.

<table>
<thead>
<tr>
<th>Design</th>
<th>Description</th>
<th>Manufacturer</th>
<th>Additional Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>44.931</td>
<td>Household and manicure scissors. Lent by Hoffritz Cutlery, New York.</td>
<td>7 items</td>
<td></td>
</tr>
<tr>
<td>44.1214</td>
<td>Surgical scissors and forceps. Lent by Harold Surgical and Hospital Supply Co., New York.</td>
<td>6 items</td>
<td></td>
</tr>
<tr>
<td>44.846</td>
<td>Electric iron, Universal #901 - 1915. Mfr'd. and lent by Landers, Frary &amp; Clark, New Britain, Conn.</td>
<td></td>
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</tr>
</tbody>
</table>
The application of Organic Design to the kettle resulted first in the increase of heating surface, improved handle shape and position for convenient pouring. The latest improvement is the elimination of the troublesome lid made unnecessary since modern non-corrosive materials require no hand cleaning.

TECHNOLOGICAL REVOLUTION IN OPERATION AND MATERIAL

New principles of operation are introduced in the labor-saving devices of the latest fruit juicers and in the waterless pressure cooker that replaces the traditional cooking pot.

The introduction of new material such as heat-resisting glass provides an improved substitute for pottery and metal and gives kitchenware a new appeal that makes it appropriate for serving as well as for the preparation of food.

Organic Design takes advantage of appropriate materials both old and new. It simplifies and perfects functional form as in the coffee maker, bottle cooler and drink mixer.

**VISUAL MATERIAL**

<table>
<thead>
<tr>
<th>Number</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>44.1246</td>
<td>Copper kitchenware (photograph). Lent by Revere Copper &amp; Brass Inc., Rome Division, Rome, N.Y.</td>
</tr>
<tr>
<td>44.841</td>
<td>Glass juicer. Collection Museum of Modern Art.</td>
</tr>
</tbody>
</table>


Chemex coffeemakers. Des. Dr. Peter Schlumbohm. Mfr'd. and lent by The Chemex Corp., New York. 2 items

Fahrenheit table refrigerators. Des'd, mfr'd and lent by Dr. Peter Schlumbohm, New York. 2 items

Swivelor, iced juice pitchers. Des'd, mfr'd and lent by Dr. Peter Schlumbohm, New York. 2 items

The shape of hand tools and instruments was changed with the introduction of small power units which made it possible to incorporate these in the tools themselves. Mechanization revolutionized form as well as method of operation. The electric hand drill has certain advantages over the brace. The electric rivet gun unites the separate actions of heating, handling and hammering in a single operation. The mechanical slicer makes cutting more precise and safer than the knife.

Shaving instruments change their shape when the method of operation is revolutionized by invention. The cut-throat razor, a refined knife requiring stropping, was generally superseded by the safety razor with its economic replaceable blade soon after its invention by Gillette in 1895. The invention of the electric shaver by Schick in 1933 employs the principle already used in agricultural machinery; cutting is replaced by shearing. The wet shave becomes dry; convenience and safety are increased.

In the later stages of this development, as in the case of the meat slicer from the knife, the vacuum cleaner from the sweeper and brush, the shaver from the razor, organic design has integrated the mechanical elements of these new instruments into esthetically satisfactory forms which are more than a mere assembly of mechanically efficient parts.
<table>
<thead>
<tr>
<th>Material</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Turbine runner</td>
<td>Mfg. Allis-Chalmers Mfg. Co. (photograph)</td>
</tr>
<tr>
<td>Motor of a Schick Dry Shaver</td>
<td>(photograph)</td>
</tr>
<tr>
<td>Hand drill, hand brace and set of bits</td>
<td>Lent by Hammacher-Schlemmer, New York. 6 items</td>
</tr>
<tr>
<td>Motor of a Schick Dry Shaver</td>
<td>(photograph)</td>
</tr>
<tr>
<td>Army mess knife</td>
<td>Lent by Bakelite Corp., New York</td>
</tr>
<tr>
<td>Cooks' knives and slicers</td>
<td>Lent by Hammacher-Schlemmer, New York. 4 items</td>
</tr>
<tr>
<td>19th Century straight razors</td>
<td>Lent by Charles de Zemler, New York. 5 items</td>
</tr>
<tr>
<td>Gillette safety razors</td>
<td>Mfr’d and lent by Gillette Safety Razor Co., Inc., Boston, Mass. (only 1 on gr. display)</td>
</tr>
<tr>
<td>Simplex military razor</td>
<td>Lent by Celanese Celluloid Corp., New York.</td>
</tr>
<tr>
<td>All-plastic safety razors</td>
<td>Mfr’d and lent by Dillon-Beck Mfg. Co., Irvington, N.J. 2 items</td>
</tr>
<tr>
<td>Magazine repeating and injection razors</td>
<td>Mfr’d and lent by Magazine Repeating Razor Co., Bridgeport, Conn. 3 items</td>
</tr>
<tr>
<td>Schick electric shavers</td>
<td>Mfr’d and lent by Schick Dry Shaver, Inc., Stamford, Conn. 5 items</td>
</tr>
<tr>
<td>Remington electric shavers</td>
<td>Mfr’d and lent by Remington Rand, Inc., Electric Shaver Division, Bridgeport, Conn. 3 items</td>
</tr>
<tr>
<td>Silver Streak carpet sweeper</td>
<td>Mfr. Bissell Carpet Sweeper Co. (photograph)</td>
</tr>
<tr>
<td>Vacuum cleaner, model 8</td>
<td>Mfr. Hamilton Beach Mfg. Co., Racine, Wis. (photograph)</td>
</tr>
</tbody>
</table>
The forms of organic design have already been generally accepted in our scientific and domestic tools and instruments. The recognition that all useful things are primarily tools for better living is now releasing organic design from the confinement of laboratory and kitchen.

The analysis of function that is essential for scientific purposes produces implements of comparable elegance, precision and economy for use in the dining room.

The closer scrutiny of the function of tableware involving such problems as storage and maintenance leads in some cases to the use of new materials and techniques which permanently replace the traditional ones.

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**VISUAL MATERIAL**

- Boiling flasks. Mfr. Corning Glass Works, Corning, N.Y. 5-5380
- Collection Museum of Modern Art.
- Stainless steel pitcher, Carlton ware. Collection Museum of Modern Art. 5-5380
- Mint julep tumblers, Kensington ware. Collection Museum of Modern Art. 5-5380
- Army and Navy glass mess ware. Mfr'd and lent by Corning Glass Works, Corning, N.Y. (4) 5-5381
- Combination table-kitchenware. Des. Eva S. Zeisel at Pratt Institute, New York. Lent by the artist. (17) 5-5381
- Navy mess ware, plastic. Mfr'd and lent by The Watertown Mfg. Co., Watertown, Conn. and Hemco Plastics Division of The Bryant Electric Co., Bridgeport, Conn. (28) 5-5381
- Victorian silver tea set (photograph).

35 different items produced from 11 basic molds
by use of basic shapes with different attachments,
same molds with different templates,
same molds for pouring lips and side handles.

Four standard heights and four standard widths
allow for interchangeable use of covers and drainers;
the use of casserole as double boilers,
the use of drainers as steam pots,
the stacking of all items in four different stacks.

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VII.

The inventions of the industrial era have produced new tools that have no equivalent in history and are free from obsolete design traditions. How has this opportunity been used?

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In spite of its freedom from traditional associations, the radio suffered more than any other modern instrument from the misinterpretations and extravagances of style that are typical of the disintegration of design at the turn of the century.

Economic pressure for conspicuous sales appeal to overcome competition led to the creation of "drawing-room models" that borrowed their shapes from the most far-fetched sources such as Gothic chests, streamlined automobiles and string instruments. Even a radio man's radio, evidently made and sold on the merit of its performance, could not avoid a few decorative touches.

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The persistence of discord between function and form in radio cabinets is particularly surprising since the first portable radio, frankly designed as a service instrument, was commercially successful over ten years ago.

Since then various models were evolved that incorporate in their forms the consideration of such basic factors as economy of construction, visibility of dial and refinement of control. In the case of instruments where portability is not essential, efforts have been made to incorporate them organically and inconspicuously into home equipment.

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44.873
VISUAL MATERIAL

44.847


Table model radio set, 1939. Student designer Lawrence E. Roberts. Lent by the California Institute of Technology, Pasadena, Calif.


Example of a "Chippendale commode" radio cabinet (photograph)

Example of a "streamlined" radio cabinet (photograph)

Example of a "Juke Box" (photograph)


Built-in radio and phonograph equipment, 1941. Des. Raphael S. Soriano (photograph.)

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VIII.

Telephone instruments are not for sale. They are supplied to the customer as incidentals of the service and are therefore not subject to the pressure of competitive merchandizing promotion and to "styling for sales appeal".

The freedom from competition on the sales counter permitted the telephone, after a few experiments in bizarre decoration, to retain its structural form, but it also eliminated the economic need for constant scrutiny of function.

The examination of the technology and function of all devices essential for modern living that is now part of the systematic training of designers has recently developed new forms for the telephone such as this experimental model.

In this model technological considerations of production are combined with a study of hand-fitting form.
Because typewriters are generally accepted and therefore sold as service instruments and because no essential changes have been made in their mechanics during the last fifty years, their honest and structural form has remained basically the same.

The designer's contribution to their development can be seen in the latest models where dust-proofing, protection of delicate parts and economical production methods were used for the creation of a compact and pleasing shape.

The application of the typewriter principle to specialized instruments, such as the shorthand typewriter, stimulated re-examination of its functions and resulted in new advances like the re-arrangement of symbols on the keyboard and the reshaping of the keys which contribute to the relief of the operator from physical and nervous strain.

The same stimulation of form by a new scrutiny of purpose is shown in the dictaphone.


Smith office typewriter model #1, 1905. Mfr'd and lent by L.C. Smith & Corona Typewriters, Inc., Syracuse, N.Y.


The traditional and the re-arranged typewriter keyboard (photographs).

Most of the electric light fixtures sold to the consumer today are imitations of candle and gas fittings. They are conceived as decorative objects rather than as efficient instruments of illumination. By contrast the purely functional fixtures, produced for commercial, industrial and professional purposes, have developed into organic design of the highest order.
The first attempts to use plywood and bentwood as materials for furniture making goes back to the early days of quantity production. The clamor for conspicuous decoration relegated them to use in offices and service quarters.

It is only recently that organic design has demonstrated that good form can be derived from the lightness and structural economy of these materials.

This also holds true of metal that was previously used mainly for rain-resistant park and garden furniture.

The re-evaluation of a chair as an instrument of effective body support led not only to the development of highly specialized forms of occupational furniture but influenced the shapes of chairs in the home.

Analysis of body position in relation to various activities resulted in new forms designed to increase efficiency of performance, to protect health, and to give a maximum of relaxation.

The traditional method of obtaining comfort through "stuffing" that, at its worst, filled our drawing-rooms with unwieldy monstrosities, gave way to body-fitting form of the chair structure itself and made possible to combine comfort with light and elegance.
Present day need for cheap and light furniture for military and temporary housing purposes has produced designs which are based on maximum economy of material and minimum space in transportation.

VISUAL MATERIAL


"Perforated Veneer" chairs, 1884. Sales catalog of Gardner & Co. (photograph)


Close-up of Prodomo chair with cushion removed (photograph).


Flaneuse garnie en canne, 1905 (photograph)


Plywood chair, 1941. Des. A. and S. Wasson-Tucker (photograph)


Collapsible plywood chair and table. Des'd and lent by Peter Blake, New York

Chair construction, Des. Saarinen-Fames (1941) (photograph)

Chart of chair functions, Des. Antonin Heythum, 1943 (photograph)

Wrought iron chairs, French ink drawing, 1875 (photograph).

Wrought iron garden chairs, French, 1929 (photograph).


"The seats of the Mighty" - aluminum chairs (photograph).

Tubular steel chair, Des. Marcel Breuer (photograph). 1929

Chair, Des. Van der Vohe, 1927. Collection MoMA.


Metal chair, 1931. Des. L. Mies van der Rohe (photograph).


Tubular steel reclining chair. Des. Lauterbach, 1932 (photo)

Aluminum reclining chair, 1933. Des. Marcel Breuer (photo)


Tubular steel stacking chairs, 1929. Des. Serge Chermayeff (photograph).


Upholstery (photograph).

Victorian arm chair, 189X (photograph)

Upholstered club chair, 1930 (photograph).

Molded plywood chair showing section of airfoam cover. Des. Saarinen-Eames, 1940 (photograph).

Until recently the use of many of our traditional raw materials was limited by their inherent characteristics. Wood, for example, could only be shaped by hewing and cutting before modern technology gave it entirely new properties.

Today the solid plank has become a laminated sheet that can be bent and finally molded into curved forms of great strength and elasticity. It can be disintegrated and reintegrated into new homogeneous materials.

This revolutionary step which reduces waste and increases usefulness is the direct result of the new technology of synthetics.

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**VISUAL MATERIAL**

- Washington forest land with Mt. Rainier (photograph courtesy Life Magazine)
- Lumberman oiling saw blade (photograph by Bernice Abbott A.F.P.I.)
- Lumberman making undercut with ax (photograph by Bernice Abbott, courtesy of Red River Lumber Co.)
- Grading lumber in mill (photograph by Berenice Abbott, courtesy of Red River Lumber Co.)
- Working lumber in mill (photograph by Berenice Abbott, courtesy of Red River Lumber Co.)
- "Extravagant Use of Wood" (photograph courtesy Life Magazine)
- Solid wooden structure, drying shed (photograph by Berenice Abbott; courtesy of Red River Lumber Co.)

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**The old way**

- Stripping veneer sheet off log (photograph by Berenice Abbott A.F.P.I.)
- Grading veneer sheets (photograph by Berenice Abbott; courtesy of Red River Lumber Co.)
- Bentwood chair seats and backs (photograph Architectural Review, February 1936)
- Bending of resin-treated wood (photograph courtesy of Life Magazine)
- Inserting CVA tank shell layup in metal die preparatory to bagging (photograph courtesy of Duramold Division of Fairchild Engine and Airplane Corp.)
- Bagging CVA tank shell (photograph courtesy of Duramold Division of Fairchild Engine and Airplane Corp.)
- Samples of Celotex fibre board. Mfr'd and lent by The Celotex Corp. New York. Unrecorded. 2 items
- Samples of Masonite hard board. Mfr'd and lent by Masonite Corp., Chicago, Ill. 1 item
The technology of modern plastics and the mold are the greatest single influence on the shape of useful objects in the modern world.

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**VISUAL MATERIAL**

53.34 BIRD IN SPACE, bronze, 1919, by Constantin Brancusi.
Collection Museum of Modern Art.


44.1202 Compreg wood propeller blade. Mfr'd and lent by St. Regis Paper Co., Panelyte Division, New York.

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**STRENGTH AND LIGHTNESS**

Sheets of wood bonded by plastic material can be bent with ease and molded into complex curved shells that derive increased strength from their shape.

The production of large elements of this nature, required for airplane and boat building, was made possible in the last few years by the development of low pressure molding which substitutes an economic pneumatic mold combined with heat for the expensive and cumbersome metal dies of earlier processes. One-piece molding of large complex units also eliminates the need for laborious assembling of separate parts.

The same technic enables us to combine with plastics, and to process in one single operation, many different materials of different properties.

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**VISUAL MATERIAL**

44.1209 Molded plywood sculpture by Ray Eames, Los Angeles, Calif. Lent by the artist.

44.1182 Extruded shapes made by the Eames process. Mfr'd and lent by Evans Products Co., Molded Plywood Division, Los Angeles, Calif.

44.1181 Rudder skins made by the Eames process. Mfr'd and lent by Evans Products Co., Molded Plywood Division, Los Angeles, Calif.

44.1190 Outboard panel leading edge section made by the Duramold process. Mfr'd and lent by Fairchild Aircraft, Burlington N.C. Division of Fairchild Engine and Airplane Corp.

44.1189 Nacelle-center section fairing made by the Duramold process. Mfr'd and lent by Fairchild Aircraft, Burlington N.C. Division of Fairchild Engine and Airplane Corp.

44.1191 Fuselage-stabilizer fairing made by the Duramold process. Mfr'd and lent by Fairchild Aircraft, Burlington N.C. Division of Fairchild Engine and Airplane Corp.

44.1192 Gun turret fairing made by the Duramold process. Mfr'd and lent by Fairchild Aircraft, Burlington N.C. Division of Fairchild Engine and Airplane Corp.

44.1188 Tail cone made by the Duramold process. Mfr'd and lent by Fairchild Aircraft, Burlington N.C. Division of Fairchild Engine and Airplane Corp.
The impregnation of various traditional materials with plastics increases the range of their application. Thin and light wooden tubes replace metal ones. Soft wood can be made into hard wood. The most delicate cane rod becomes nearly unbreakable. Paper becomes resistant to heat and humidity, adequate to protect ammunition and strong enough to serve as a fuselage door, a gunner’s seat and an engine cowling.

Materials of varying properties may be bonded together and pressed into the same shape in a single mold by using the new low pressure process.
Soft sisal fiber impregnated with plastics becomes the base of structural material of great economy and considerable strength and lightness.

The sisal mat is roughly shaped and sprinkled with powdered plastic before it is laid into the mold where the final form and the new material are produced in one operation.

The simplicity of the process and the homogeneousness of the material demand a form expressive of these qualities. There is no attempt to imitate wooden ribs and planks in the boat models. Why should the seams and the hatband of the traditional topee be reproduced in the helmet?

Molded plywood tubings. Mfr'd and lent by Wm. L. Marshall, Ltd., New York. 3 items
Molded Weldwood tubings. Mfr'd and lent by United States Plywood Corp., New York. 3 items
Phenolic paper tube. Mfr'd and lent by Vidal Research Corp., Camden, N.J.
Bamboo rod segments before cementing and impregnating.
Samples of natural and Bakelite treated bamboo.
Sample cross sections of ski poles and fishing rods.
Samples of maple ply, glued and impregnated with Bakelite and molded under various degrees of pressure. Lent by Bakelite Corp., New York.
Compound curve pressings made by the Vidal process.
Material: plywood, sisal phenol, paper and plywood, ply-wood and paper caning, aluminum faced plywood.
Phenolic paper channel, phenolic paper angle, paper vane.
Sample of Co-Ro-Lite laminated to metal. Mfr'd and lent by Columbian Rope Co., Auburn, N.Y.
Impregnated paper food and milk containers. Mfr'd and lent by Sutherland Paper Co., Kalamazoo, Mich.
Impregnated paper ammunition containers. Mfr'd and lent by Selfon Fibre Can Co., St. Louis, Mo.
Plastic materials, invented shortly before the outbreak of the war, have so far found practical application only for military purposes. The sunburn hood, bag and the boat for which this model was designed, are made of waterproof material that combines strength, lightness and great elasticity and is impervious to climatic conditions. When deflated or emptied, these objects require only a minimum of storage space. The pneumatic seat of the experimental chair is made of the same material.

Visual 44.810  

44.973  


44.682  

44.1252  
In addition to serving as a medium for binding and impregnating, plastics, if used by themselves, actually supersede traditional materials such as glass, metal, pottery, rubber, and textiles.

Plastics can now be given the properties most desirable for specific purposes and constitute an ideal medium for industrial production based on scientific analysis of function.

Examples of opaque, semi-translucent and translucent plastic sheet material in white, ivory and black. Mfr'd and lent by:

- Celanese Celluloid Corp., New York
- Marsh Wall Products, Inc., Dover, Ohio
- Mica Insulator Co., New York
- St. Regis Paper Co., Panelyte Division, New York

The physical and esthetic properties of the new materials have given the modern artist new and appropriate media to formulate contemporary concepts.


The constant reduction of the price of synthetic materials and the manufacturing cost of articles made from them multiplies the purposes for which they can be used.

The unique combination of strength, flexibility, lightness and translucency of some plastics made possible the development of a type of container the transparency of which is of particular advantage. This also pertains to a vast variety of objects from food canisters to gun-turrets.

Objects composed of several parts, such as the Army bugle, may be produced quickly and economically by the new injection process. All parts are manufactured simultaneously in a single die containing several molds connected by channels. These are filled under pressure with liquid plastics. When set the pieces are broken apart and finished.
The demands of war for speed and volume of production and for utmost efficiency of fighting tools has given us new and better materials and techniques. The machine capacity of America has been greatly increased and at the end of the war we will be left with vast resources of knowledge and industrial power.

We have used technology on the highest level of which we are capable for purposes of war. If industrial design is willing and permitted to assume its responsibility toward society as a profession as well as a trade we shall use it equally well for purposes of peace.

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**VITALS**


44.976.8 Piano type hinges. Mfr'd and lent by Tennessee Eastman Corp. Kingsport, Tenn. (2)


44.976.4 First plastic washing machine agitator. Molded and lent by Bakelite Corp., New York.


44.820 Nylon bristled Lucite brushes. Mfr'd and lent by Hughes-Autograph Brush Co., Inc., New York. (2)

44.822 Neoceta paint brushes with Cellulose Acetate bristles. Mfr'd and lent by Pittsburgh Plate Glass Co., Brush Division, Baltimore, Md.


44.930 Cleartite plastic capsules and containers. Mfr'd and lent by Cellulastic Corp., Newark, N.J. (16)

44.751 Plastic pill boxes for the Armed Forces. Mfr'd and lent by Monsanto Chemical Co., Plastics Division, Springfield, Mass. (4) and St. Louis Plastics Molding Co., St. Louis, Mo. (3)

Plastic lunch boxes. Mfr. Landers, Frary & Clark, New Britain, Conn. Lent by Bloomingdale's, New York. (2)


Pyra-shell fly boxes and Orvis Flies. Lent by Charles F. Orvis Co., Inc., Manchester, Vt. Unrecorded (2)


Combination mold for parts of plastic Army bugle mounted in press (photograph lent by Modern Plastics, Inc.).

Chart depicting the numerical development of plastic molding plants 1910-1940 (Map prepared by Institute of Plastics Research, lent by Modern Plastics, Inc.)

Bomber Noses (photograph by Palmer, Office of War Information)

TRAINING DEVICES OF THE DESIGNER

In the world of modern technology, when techniques and related problems become rapidly obsolete, imaginative thinking is as essential as technical knowledge and discipline.

Using easily obtainable flexible materials such as paper, wire mesh and plastic sheets, the student develops a faculty for imaginative shapemaking in three dimensions.

Visual Material

Paper construction, 1944, by Irene Schawinsky, New York. Lent by the artist. (Object suspended from ceiling).


Corrugated mat, study in wire mesh. Lent by Institute of Design, Chicago, Ill. Unrecorded.

Study model of orthographic projection of a chair on vertical horizontal and oblique planes from a single view point. Student Barbara Winchester, Industrial Design Section, California Institute of Technology, Pasadena, Calif.
The growing recognition that a house is a problem of interrelated functions makes us now think of home equipment as components of a unit of living space rather than as separate esthetic and technical problems.

Modern industrial technology applied to this field will give Industrial Design its greatest opportunity.

Considerations of functions applied to the house as a single problem shifts interest from individual object to basic purpose. This shift of interest is expressed in the subordination of the individual problems of lighting fixtures, heaters, refrigerators, stoves, and pieces of furniture to the principles of illumination, climate control, food preservation and preparation, body support and storage as applied to the whole house.

The acceptance of the closet as a replacement for the wardrobe is the most widely accepted example of this trend of thought, and the growing tendency to unite closely related devices in formal as well as functional units has led to experiments with the replacement of separate bathroom fixtures by prefabricated and pre-installed sanitation units.

Haphazard assembling is gradually making way for purposeful design of basic house equipment, which is realized either through integration of separate parts or through installation of industrially produced mechanical cores around which other elements may be arranged.

Organic Design applied to housing calls for mechanical core in the modern plans.

**VISUAL MATERIAL**

**PHOTOGRAPHIC PANEL**


Mechanical assembly of modern plumbing of plastic and glass; Saran pipes and pipe fittings. Mfr'd and lent by Dow Chemical Co., Midland, Mich.


Glass syphon trap for War Production Board. Developed by George Sakier, New York. (actual objects)

The traditional craft of the plumber; attempts to meet modern sanitary requirements.


The mechanical core: Architects J.M. Pei and E. H. Duhart, 1943.

The mechanical core: PAC Design. Architects Eero Saarinen and Oliver Lundquist winning design, California Arts and Architecture competition for post war housing, 1943.

The mechanical core: prefabricated combination kitchen and bath unit. Designers Ralph Rapson and David B. Rummele, 1942.

The mechanical core: prefabricated bathroom unit. Designer Maynard Lyndon, 1942.


3000 lin. ft. of Ponderosa Pine were supplied for exhibition stands by Red River Lumber Co., Westwood, Calif.

The Munsell System of color organization and notations has been employed in determining primary and secondary colors and values of grey which have been used in this exhibition (Lent by Allcolor Co., Inc., New York).
PHOTOGRAPHS COURTESY OF:

Berenice Abbott
David Aldrich
Allis-Chalmers Mfg. Co.
Architectural Forum
Avery Library
California Arts & Architecture
Walter P. Chrysler, Jr.
Columbian Rope Co.
Duramold Division of Fairchild Aircraft
Charles Eames
Eastman Kodak Corp.
Hedrich-Blessing Studio
Antonin Heythum
International Harvester Co.
A. Lawrence Kocher
Life Magazine
Modern Plastics, Inc.
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St. Regis Paper Co.
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Vidal Research Corp.
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British Information Service