DESIGN FOR USE

MUSEUM OF MODERN ART
15TH ANNIVERSARY SHOW
ART IN PROGRESS
MAY - OCTOBER 1944

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

Technological Evolution

Introduction of new principles of operation and raw materials

Technological Revolution

Creative integration of function, technology and form

Organic Design

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)

TASTE CHART Photographic panel

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.

VISUAL MATERIAL

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 decoratif, 1925.

Piet Mondrian "Composition in Black, White and Red" 1936 Collection Museum of Modern Art.

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

Marcel Breuer "First tubular chair", 1925.

Joan Miro "Composition" 1933. Collection Museum of Modern Art.

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.

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 MATERIAL 44.1169 Design Analysis: SCISSORS. Des. David Aldrich, Columbia University, School of Architecture; Evening Class.

44.931.- *Household and manicure scissors.* Lent by Hoffritz Cutlery, New York. 7 items

Paper shears. Mfr. J.A. Henkels, Solingen, Germany. Coll. Museum of Modern Art. S-5310

Tailor's scissors. Mfr. J.A. Henkels, Solingen, Germany. Coll. Museum of Modern Art.

44.1213
44.1214 Grass shears and pruning shears. Mfr. Seymour Smith. Lent by Hammacher-Schlemmer, New York.

44.1231.1-6 Surgical scissors and forceps. Lent by Harold Surgical and Hospital Supply Co., New York. 6 items

44.866 Electric iron, Universal #901 - 1915. Mfr'd. and lent by Landers, Frary & Clark, New Britain, Conn.

44.808 Electric iron, LPC 4, - 1937. Des. D.L.Hadley. Mfr'd and lent by Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

44.1203 Electric iron, Never Lift - 1940. Des. Harris McKinney and John C. Fagan. Mfr'd and lent by Proctor Electric Co., Philadelphia, Pa.

44.831 H.M.V. controlled heat iron - 1938. Des. Christ. Barman. Mfr'd and lent by The Gramophone Co., Ltd. Hayes, Middlesex, England.

A century of sadirons, 1840-1942 (photograph). Lent by Westinghouse Electric & Mfg. Co. East Pittsburgh, Pa.

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

44.806 Wear Ever tea kettle.-1933. Des. Lurelle Guild. Mfr'd and lent by Aluminum Cooking Utensils Co. New Kensington, Pa.

44.790 Magnalite tea kettle - 1936. Des. John G. Rideout. Mfr. Wagner Mfg. Co., Sidney, Ohio. Lent by Edwin J. Mullens Jr., Clarksdale, Miss.

Roma 11/8/44

44.699 One-opening tea kettle-1939. Des. Trace and Warner. Produced and lent by Club Aluminum Products Co., Chicago, Ill.

Copper kitchenware (photograph). Lent by Revere Copper & Brass Inc., Rome Division, Rome, N.Y.

Glass juicer. Collection Museum of Modern Art.

44.1246 Aluminum Super-Juicer-1940. Des. Barnes & Reinecke. Mfr'd and lent by Dazey Corp., St.Louis, Mo.

44.841 Plastic Super-Juicer-1941. Des. Barnes & Reinecke. Mfr'd and lent by Dazey Corp., St.Louis, Mo.

Pressure Orange Juice Extractor. Mfr. Lorraine Metal Mfg. Co., Inc., N.Y. Collection Museum of Modern Art. 1934

44.1179 Juice King-1942. Mfr. National Die Casting Sales Corp. Lent by Celanese Celluloid Corp., New York.

Casserole - 1935. Mfr. Revere Copper & Brass Inc., Rome Division, Rome, N.Y. (Photograph).

Flex-Seal pressure canner - 1944. Des. Alfred Vischer Jr. Mfr. Vischer Products Co., Chicago, Ill. (photograph)

44.783 Flex-Seal pressure cooker - 1939. Des. Alfred Vischer Jr. Mfr. Vischer Products Co., Chicago, Ill. Lent by Anne Coolidge, New York.

Pyrex boiling flasks. Mfr. Corning Glass Works (photograph).

Pyrex double boiler and Pyrex tea kettle. Mfr. Corning Glass Works, Corning, N.Y., Collection Museum of Modern Art.

44.820
44.702
44.705 Pyrex glass baking and pie dishes, mixing bowls and custard cups. Mfr. Corning Glass Works, Corning, N.Y. Lent by Hammacher-Schlemmer, New York. 12 items

44.823
44.824 Chemex coffeemakers. Des. Dr. Peter Schlumbohm. Mfr'd. and lent by The Chemex Corp., New York. 2 items

44.1163.1-2 Fahrenheitor table refrigerators. Des'd, mfr'd and lent by Dr.Peter Schlumbohm, New York. 2 items

44.1164
44.1221 Swivelor, iced juice pitchers. Des'd, mfr'd and lent by Dr. Peter Schlumbohm, New York. 2 items

S-5382

V.

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.

VISUAL MATERIAL

Turbine runner, Mfg. Allis-Chalmers Mfg. Co. (photograph)

Motor of a Schick Dry Shaver (photograph)

44.1263
44.1261 Hand drill, hand brace and set of bits. Lent by Hammacher-Schlemmer, New York. 6 items

44.953 1/4" Standard ball-bearing electric drill. Des. Glenn C. Wilhide. Mfr'd and lent by The Black & Decker Mfg.Co. Towson, Md.

44.1278 Riveting iron. Mfr'd and lent by E.I.Du Pont De Nemours & Co., Inc., Wilmington, Del. and tips - 6 items

44.792 Army mess knife. Lent by Bakelite Corp., New York

44.706 Cooks' knives and slicers. Lent by Hammacher-Schlemmer, New York. 4 items

44.706 Meat cleaver. Mfr. Lamson & Goodnow Mfg. Co. Lent by Hammacher-Schlemmer, New York.

Electric meat slicer. Des. Egmont Arens. Mfr. Hobart Mfg. Co., Troy, N.Y. (photograph).

44.1265.1-2 19th Century straight razors. Lent by Charles de Zemler, New York. 2 items

Straight razor. Mfr. Joseph Rodgers & Sons, Ltd., Sheffield, England. Collection Museum of Modern Art.

44.868 Gillette safety razors. Mfr'd and lent by Gillette Safety Razor Co., Inc., Boston, Mass. (only 1 on gr. slip) S-5261 + S-5262

44.1025.3 Simplex military razor. Lent by Celanese Celluloid Corp., New York.

44.985.1-2 All-plastic safety razors. Mfr'd and lent by Dillon-Beck Mfg. Co., Irvington, N.J. 2 items

44.1217 Magazine repeating and injection razors. Mfr'd and lent by Magazine Repeating Razor Co., Bridgeport, Conn. 3 items

44.1219.1-.5 Schick electric shavers. Mfr'd and lent by Schick Dry Shaver, Inc., Stamford, Conn. 5 items

44.1058 Remington electric shavers. Mfr'd and lent by Remington Rand, Inc., Electric Shaver Division, Bridgeport, Conn. 3 items

The Vanishing American - photograph of a soap covered man's face. Photograph lent by Pharmacal Products Co., New York.

Farmall mower, Mfr. International Harvester Company Chicago, Ill. (photograph)

Wire egg beater. Collection Museum of Modern Art.

44.929.6 Rotary egg beater. Lent by Lewis & Conger, New York.

44.1204 Kitchenaid, electric mixer. Des. Egmont Arens. Mfr. Hobart Mfg. Co., Troy, N.Y. Lent by Egmont Arens, New York.

"Silver Streak" carpet sweeper. Mfr. Bissell Carpet Sweeper Co. (photograph).

Vacuum cleaner, model 8. Mfr. Hamilton Beach Mfg. Co., Racine Wisc. (photograph).

Hand vacuum cleaner. Des. Walter Dorwin Teague. Mfr. Montgomery Ward, Chicago, Ill. (photograph).

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.

VISUAL MATERIAL

Boiling flasks. Mfr. Corning Glass Works, Corning, N.Y. Collection Museum of Modern Art. S-5380

Petri dishes. Mfr. Kimble Glass Co., Vineland, N.J. Collection Museum of Modern Art. S-5380

Evaporators. Mfr. Corning Glass Works, Corning, N.Y. Collection Museum of Modern Art. S-5380

44.1276 / 44.1030 Water pitcher, tumblers, highball and old-fashioned cocktail glasses. Mfr. Fostoria Glass Co., Moundsville, W.Va. Lent by S. Chermayeff, New York. (13) S-5380

44.1168 Tomato juice set. Des. George Sakier. Mfr'd and lent by Fostoria Glass Co., Moundsville, W.Va.

Stainless steel pitcher, Carlton ware. Collection Museum of Modern Art. S-5380

Mint julep tumblers, Kensington ware. Collection Museum of Modern Art. S-5380

44.1248 Army and Navy glass mess ware. Mfr'd and lent by Corning Glass Works, Corning, N.Y. (4) S-5381

Crucibles, evaporators and beakers. Mfr. Coors Porcelain Co., Golden, Col. Collection Museum of Modern Art. S-5381

44.1272 Combination table-kitchenware. Des. Eva S. Zeisel at Pratt Institute, New York. Lent by the artist. Also: 2 tea pots (17) S-5381

44.799 Ceramic dinnerware. Des. Russel Wright. Mfr'd and lent by Steubenville Pottery Co., Steubenville, Ohio (8)

44.952 / 44.971 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)

Victorian silver tea set (photograph).

Graduated measures, Staybrite nonoxyd metalware. Mfr. L. D. Cahn Co., New York (photograph).

Aluminum mint julep set with cork insulation. Des. Russel Wright (photograph).

Demonstration of stacking principle of combination table-kitchenware (photograph). Des. Eva S. Zeisel, New York.

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 casseroles as double boilers,
the use of drainers as steam pots,
the stacking of all items in four different stacks.

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?

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.

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.

44.813
VISUAL MATERIAL "Sky Champion" portable radio, 1942. Mfr'd and lent by The Hallicrafters Co., Chicago, Ill.

44.847 Gothic style radio cabinet, 1932. Des. Barnes & Reinecke. Mfr. Kadette Radio Co. Lent by Barnes & Reinecke, Chicago, Ill.

44.1062 "Stradivari" portable radio, 1939. Mfr'd and lent by the Emerson Radio & Phonograph Corp., New York.

44.845 "Kadette" radio cabinet, 1939. Des. Barnes & Reinecke. Mfr. Kadette Radio Co., Lent by Barnes & Reinecke, Chicago, Ill.

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

44.838 Portable radio, model 432, 1941. Mfr'd and lent by the Emerson Radio & Phonograph Corp., New York.

44.979 "Lyric" portable radio, 1933. Des. Russel Wright. Mfr. The Rudolph Wurlitzer Co., North Tonawanda, N.Y. Lent by Russel Wright, New York.

44.1161 Shoulder strap portable radio, 1940. Des. George Patterson Jr. Mfr'd and lent by Philco Radio & Television Corp., Philadelphia, Pa.

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

Example of a "streamlined" radio cabinet (photograph)

Example of a "Juke Box" (photograph)

"Ekco" 8-stage superhet, 1932. Des. Serge Chermayeff. Mfr. E. K. Cole, Ltd., England (photograph).

"Ekco" 4-valve wireless set, 1933. Des. Wells Coates. Mfr. E.K. Cole, Ltd., England (photograph).

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

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.

VISUAL MATERIAL

"New Years Greetings by Telephone" 1882 (photograph).

Decorated telephone, 1901 (photograph).

44.984.2 Desk stand telephone, 1902-04. Des. Bell Telephone System. Mfr. Western Electric Co. Lent by the New York Telephone Co., New York.

44.984.1 Desk stand telephone with dial, 1920. Des. Bell Telephone System. Mfr. Western Electric Co. Lent by the New York Telephone Co., New York.

44.954 Hand telephone with elliptical base, 1930. Des. Bell Telephone System. Mfr. Western Electric Co. Lent by the New York Telephone Co., New York.

44.959 Hang-up type hand telephone, 1936. Des. Bell Telephone System. Mfr. Western Electric Co. Lent by the New York Telephone Co., New York.

44.955 Hand telephone with bell in base, 1937. Des. Bell Telephone System. Mfr. Western Electric Co. Lent by the New York Telephone Co., New York.

44.921 Telephone model. Des. Nolan Rhoades. Lent by Institute of Design, Chicago, Ill.

44.1023 Hand sculptures, student work. Lent by Institute of Design, Chicago, Ill. 3 items

---

IX.

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.

VISUAL MATERIAL

Remington office typewriter model #1, 1873 - first commercial typewriter. Mfr. E. Remington & Sons (photograph).

Remington office typewriter model #1 - specially designed for Philadelphia Centennial in 1876. Mfr. E. Remington & Sons (photograph).

44.755 Remington office typewriter model 2, 1878. Mfr. E. Remington & Sons. Lent by Remington Rand Inc., New York.

44.1076 Smith office typewriter model #1, 1905. Mfr'd and lent by L.C. Smith & Corona Typewriters, Inc., Syracuse, N.Y.

44.1256 Smith office typewriter, Super-Speed, 1939. Mfr'd and lent by L.C. Smith & Corona Typewriters, Inc., Syracuse, N.Y.

44.1174 Underwood office typewriter, Master, 1939. Des. W.A. Dobson and UEF General Research Laboratory. Lent by Underwood Elliot Fisher Co., New York.

Remington office typewriter model #17. Mfr. Remington Rand Inc., Syracuse, N.Y. (photograph). 1939

44.1175 Blickensderfer portable typewriter, 1893. Mfr. Blickensderfer Type Co. Lent by Underwood Elliot Fisher Co. New York.

44.1020 Corona portable typewriter model #1, 1905. Mfr. Corona Typewriter Co. Lent by L.C. Smith & Corona Typewriters, Inc. Syracuse, N.Y.

44.1170 Underwood portable typewriter, 1918. Des. W.A. Dobson and UEF General Research Laboratory. Lent by Underwood Elliot Fisher Co., New York.

44.752 Hermes Baby, portable typewriter in case, 1935. Mfr. E. Paillard & Co., Ltd., Yverdon, Switzerland. Lent by R.H. Macy & Co., Inc., New York also: cover with case.

44.1177 Stenotype machine, 1940. Des. A.B. Ireland. Mfr'd and lent by Stenotype Co., New York.

44.1212 Dictaphone Cameo dictating machine, 1939. Des. William O'Neil. Mfr'd and lent by Dictaphone Corp., New York.

44.935 Telescriber, 1944. Des. Vahan Hagopian. Mfr'd and lent by TelAutograph Corp. New York.

Vari-Typer composing machine, 1943. Mfr. Ralph C. Coxhead Corp., New York (photograph).

Typewriter design, 1939. Des. George Switzer (photograph).

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

X.

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.

VISUAL MATERIAL

Victorian chandelier, 189X woodcut (photograph).

Electric chandelier, 1910 (photograph).

Electric chandelier, 1910-44 (photograph).

Electric globe, 1930. Des. Kurt Versen. Mfr. Kurt Versen Co., Union City, N.J. (photograph).

Lucette, electric light fixture, 1932. Des. Kurt Versen, Mfr. Kurt Versen Co., Union City, N.J. (photograph).

Louverlux, electric light fixture, 1937. Mfr. Troughton & Young Ltd., London, England (photograph).

44.1178 Art Nouveau electric table lamp, 1905 - lent by Dan Cooper

Adjustable fixture, 1930. Des. Christian Dell, Bauhaus, Dessau, Germany. Collection Museum of Modern Art.

Wall bracket, 1939. Des. Kurt Versen. Mfr. Kurt Versen Co., Union City, N.J. Collection Museum of Modern Art.

Photo reflectors, 1938. Collection Museum of Modern Art.

Drafting table lamp, 1942. Des. Barnes & Reinecke. Mfr. Dazor Mfg. Co., St.Louis, Mo. (photograph).

Art Director's Office. Architects Morris Ketchum and Francis X. Gina (photo Ezra Stoller).

Kodaflector, 1942. Des. H. J. Hood. Mfr. Eastman Kodak Co. Rochester, N.Y. (photograph).

44.1250 Mazda lamp - lent by E. Mayer, Dec.

XI.

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.

Modern technology is misapplied when chairs designed to be constructed of wood are reproduced in metal.

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

Patent model of the first "Veneer Chair", 1874. Des. Isaac J. Cole. Collection Museum of Modern Art.

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

Rocking chair, 1878. Mfr. Thonet Bros. (photograph).

Bentwood and cane chair, 1929. Mfr. Thonet Bros. Collection Museum of Modern Art.

44.1258 Prodomo chair with removable cushion, 1929. Mfr'd and lent by H.G. Knoll, New York.

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

Laminated plywood chair, 1932. Des. Alvar Aalto. Mfr. Artek-Pascoe, Inc., New York. Collection Museum of Modern Art.

Laminated wood arm chair, 1932. Des. Alvar Aalto. Mfr. Artek-Pascoe, Inc. New York, Collection Museum of Modern Art.

Bentwood stacking chairs, 1935. Des. Alvar Aalto (photograph)

Plywood stacking chairs, 1937. Des. Marcel Breuer (photo).

Laminated wood reclining chair, 1932-35. Des. Marcel Breuer. Mfr. Isokon Furniture Co. Collection Museum of Modern Art.

Flaneuse garnie en canne, 1905 (photograph)

44.1211 Webbed occasional chair, 1934. Des. Bruno Mathsson. Mfr'd. and lent by Artek-Pascoe, Inc. New York.

44.918 Plywood chair with airfoam cover. Des. Charles Niedringhaus. Lent by the Institute of Design, Chicago, Ill. 1941

44.920 Demountable plywood chair. Des. Charles Niedringhaus, 1941. Lent by the Institute of Design, Chicago, Ill.

Group of experimental plywood chairs. Des. Jack Waldheim, 1943, Institute of Design, Chicago, Ill. (photograph).

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

Demountable easy chair. Des. Ferdinand Kramer and Fred Gerstel, 1944 (photograph).

44.1257 Cypress arm chair with webbing, 1943. Des. Jens Risom. Mfr'd and lent by H.G. Knoll Associates, New York.

44.1220 Collapsible plywood chair. Des'd and lent by C. Coggeshall, New York.

44.1180 Collapsible plywood chair and table. Des'd and lent by Peter Blake, New York 2 items

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

Chart of sitting positions, Des. Alvar Aalto, 1935 (photo).

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

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

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

First tubular steel chair, 1925. Des. Marcel Breuer. Collection Museum of Modern Art.

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

Tubular steel chair, Des. Marcel Breuer (photograph). 1929
Chair. Des. Van der Rohe, 1927. Collection MoMA.
Tubular steel arm chair, 1929. Des. Le Corbusier. Collection Museum of Modern Art.

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

Tubular steel reclining chair. Des. Le Corbusier. Mfr. Thones Bros. Collection Museum of Modern Art. 1932

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

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

Metal and plywood stacking chairs, 1932. Des. Alvar Aalto (photograph).

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

44.919 Metal chair with plywood seat. Des. David Pratt. Lent by Institute of Design, Chicago, Ill.

Molded plywood chair with airfoam cover. Des. Eero Saarinen and Charles Eames. Mfr. Haskelite Corp. and Heywood-Wakefield Co. Collection Museum of Modern Art. 1940

Metal chair with removable seat, 1940. Des. Ferrari Hardoy. Mfr. Artek-Pascoe, Inc., New York. Collection Museum of Modern Art.

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).

44.1227 Inflated Vinylite chair, 1944 (patent applied for). Des. Wm. H. Miller Jr., Mfr'd and lent by Gallowhur Chemical Corp. New York. S-5263

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.

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.)

The old way

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.)

The new 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.)

44.1210 Laminated Bentwood chair arms. Des. Alvar Aalto. Mfr'd and lent by Artek-Pascoe Inc., New York. 2 items

Samples of Celotex fibre board. Mfr'd and lent by The Celotex Corp. New York. Unrecorded 2 items

44.1353 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.

VISUAL MATERIAL 153.34 BIRD IN SPACE, bronze, 1919, by Constantin Brancusi. Collection Museum of Modern Art.

44.1228 Panelyte propeller blade. Mfr'd and lent by St.Regis Paper Co., Panelyte Division, New York.

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

S-5385 + S-5384

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.

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, Cal.

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.

44.1155 Molded wood splint made by the Eames process. Des. Ray and Charles Eames. Mfr'd and lent by Evans Products Co., Molded Plywood Division, Los Angeles, Calif.

Soldier with leg in splint (photograph)

Splints stacked for shipment (photograph)

44.1184 Stabilizer skins made by the Eames process. Mfr'd and lent 2 items
44.1185 by Evans Products Co., Molded Plywood Division, Los Angeles.

PBM Patrol Boat (photograph lent by Life Magazine)

V-45 Army 25-ton Ponton Bridge Equipment Power Boat (photograph, lent by U.S.Plywood Corp., New York).

44.1223 Army ponton boat hull of molded Weldwood. Made in one-piece construction of 7-ply, resin impregnated birch. Mfr'd and lent by United States Plywood Corp., New York (suspended from ceiling).

44.1157 Molded plastic plywood wingtip made by the Vidal process for the Grumman Aircraft and Engineering Co. Lent by Vidal Research Corp., Camden, N.J.

44.1631.2 Wing tip fairing (AT-6), made by the Duramold process. Mfr'd and lent by Duramold Division of Fairchild Engine and Airplane Corp., New York.

44.1193 Molded Weldwood wing tip. Mfr'd and lent by United States Plywood Corp., New York.

44.1027 Corrugated wing section, test sample. Mfr'd and lent by Marine-Air Research Corp., Essex, Conn.

(above four objects mounted on column)

44.1273 PT-19 Stabilizer(with one skin removed) made by the Duramold process. Mfr'd and lent by Duramold Division of Fairchild Engine and Airplane Corp., New York.

44.1187 Molded plastic plywood Ercoupe fuselage made by the Vidal process for Engineering and Research Corp., Riverdale, Md. Lent by Vidal Research Corp., Camden, N.J.

Ercoupe (photograph).

(above two objects mounted in main stair case)

XIV.

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?

VISUAL MATERIAL

44.1559 Molded plywood tubings. Mfr'd and lent by Wm. L. Marshall, Ltd., New York 3 items

44.1195 Molded Weldwood tubings. Mfr'd and lent by United States Plywood Corp., New York. 3 items

44.1158 Phenolic paper tube. Mfr'd and lent by Vidal Research Corp. Camden, N.J.

44.956 Bakelite impregnated split bamboo fishing rod. Mfr'd and lent by Charles F. Orvis Co., Inc., Manchester, Vt.

44.932 Ski poles made of Bakelite treated bamboo. Mfr'd and lent by Charles F. Orvis Co., Inc., Manchester, Vt.

44.974 Bamboo rod segments before cementing and impregnating; Samples of natural and Bakelite treated bamboo; Sample cross sections of ski poles and fishing rods. Mfr'd and lent by Charles F. Orvis Co., Inc., Manchester, Vt. 4 items

44.956 Rod case of synthane tubing impregnated with Bakelite. Mfr'd and lent by Charles F. Orvis Co., Inc., Manchester, Vt.

44.821 Samples of maple ply, glued and impregnated with Bakelite and molded under various degrees of pressure. Lent by Bakelite Corp., New York. 4 items

44.1031.1 Molded wing cutout section. Mfr'd and lent by Duramold Division of Fairchild Engine and Airplane Corp., New York.

44.1159 Compound curve pressings made by the Vidal process. Material: plywood - sisal phenol - papreg and plywood - plywood and paper caning - aluminum faced plywood. Mfr'd and lent by Vidal Research Corp., Camden, N.J. 4 items

44.1158 Phenolic paper channel, phenolic paper angle, papreg vane. Mfr'd and lent by Vidal Research Corp., Camden, N.J.

44.1205 Sample of Co-Ro-Lite laminated to metal. Mfr'd and lent by Columbian Rope Co., Auburn, N.Y.

44.934
44.1162
44.1219 Impregnated paper food and milk containers. Mfr'd and lent by Sutherland Paper Co., Kalamazoo, Mich. 20 items

44.869 Impregnated paper ammunition containers. Mfr'd and lent by Sefton Fibre Can Co., St.Louis, Mo. 12 items

44.802 Martin 187 antenna mast and base made of laminated fabric base phenolic. Mfr'd and lent by The Glenn L. Martin Co., Baltimore, Md.

44.975.11 Laminated Lockheed airscoop. Mfr. Swedlow Aeroplastics Corp., Glendale, Calif. Lent by Modern Plastics, Inc. New York.

44.1200 Panelyte baffle. Mfr'd and lent by St. Regis Paper Co. Panelyte Division, New York.

44.1199 Panelyte fuselage door. Mfr'd. and lent by St. Regis Paper Co., Panelyte Division, New York, N.Y.

Panelyte fuselage door installed in airplane (photograph).

44.1022 Gun turred seat made of Structomold phenolic paper laminate. Mfr'd and lent by McDonnell Aircraft Corp., St.Louis, Mo.

44.1207 Miner's helmet and preform made of Co-Ro-Lite. Mfr'd and lent by Columbian Rope Co., Auburn, N.Y.

44.1224 Dinghy model made of Co-Ro-Lite. Mfr'd and lent by Columbian Rope Co., Auburn, N.Y.

44.1216 Model of outboard motor boat made of Co-Ro-Lite. Mfr'd and lent by Columbian Rope Co., Auburn, N.Y.

Production stages of Co-Ro-Lite Jettison tank (photograph).

44.1251 58 gallon Jettison tank made of Co-Ro-Lite. Mfr'd and lent by Columbian Rope Co., Auburn, N.Y.

44.1028 Chance Vought 160 gallon tank half shell made by the Duramold process. Mfr'd and lent by Duramold Division of Fairchild Engine and Airplane Corp., New York.

(last two objects suspended from ceiling).

XV.

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 Material 44.810 Plaster model and drawing of a Vinylite folding boat (patent applied for). Des. Wm. H. Miller Jr. Lent by Gallowhur Chemical Corp., New York.

44.973 Inflated Vinylite Army sun hat (patent applied for). Inventor Richard Delano. Des. Wm.H.Miller Jr. Mfr'd and lent by Gallowhur Chemical Corp., New York.

Vinylite emergency water bag. Mfr. National Carbon Co. Inc., New York. Lent by Materiel Command, Wright Field, Dayton, Ohio

Unnumbered

44.682 Sample of Saran screen material. Mfr'd and lent by Dow Chemical Corp., Midland, Mich.

44.1252 Sample of Velon fabric. Mfr'd and lent by Firestone Industrial Products Co., Inc. Akron, Ohio

---

PLASTICS SUPERSEDE TRADITIONAL MATERIALS

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.

VISUAL MATERIAL — Examples of opaque, semi-translucent and translucent plastic sheet material in white, ivory and black. Mfr'd and lent by
44.1225 Celanese Celluloid Corp., New York,
44.1183 Marsh Wall Products, Inc., Dover, Ohio, (19)
44.1275 Mica Insulator Co., New York,
44.1206 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.

396.38 Bust, 1926. Construction in metal and celluloid by Antoine Pevsner. Collection Museum of Modern Art.

THE RANGE OF PLASTICS

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.

VISUAL MATERIAL

44.975.5 Army foot tub. Molder Eclipse Molded Products, Milwaukee. Lent by Modern Plastics, Inc., New York.

44.976.4 Electric fixture plate. Mfr. Auburn Button Works, Auburn, N.Y. Lent by Modern Plastics, Inc., New York.

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

44.976.2 Round box with cover. Mfr. Amos Molded Plastics, Edinburgh Ind. Lent by Modern Plastics, Inc., New York.

44.976.5 Plastic knobs of various shapes. Mfrs. Kurz Kasch, Inc. Dayton, Ohio; Grigoleit Co., Decatur, Ill.; Dayton Insulating Molding Co., Dayton, Ohio. Lent by Modern Plastics, Inc., New York. (9)

44.976.3 Type case. Mfr. Superior Type Co., Chicago, Ill. Lent by Modern Plastics, Inc., New York.

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

44.975.3 Binocular case. Mfr. Hood Rubber Co., Watertown, Mass. Lent by Modern Plastics, Inc., New York.

44.843 Scotch tape dispensers. Des. Barnes & Reinecke. Mfr'd and lent by Minnesota Mining & Mfg. Co., St.Paul, Minn.

44.753 Machinery safety guard. Mfr'd and lent by General Electric Co., Plastics Division, Pittsfield, Mass.

44.915 Mono goggle. Mfr. Willson Products, Inc., Reading, Penna. Lent by Celanese Celluloid 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.

44.975.1 Plastic Army bugle. Molder Elmer E. Mills Corp., Chicago, Ill Lent by Modern Plastics, Inc., New York.

44.568 Plastic canisters with metal tops. Mfr'd and lent by Henry A. Enrich & Co., New York. (4)

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

44.751
44.867 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 utility boxes. Mfr. Duranol Products Co. Brooklyn N.Y., Collection Museum of Modern Art.

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

44.1025 Pyra-utility and bait boxes. Mfr. Bill de Witt Baits,
44.1274 Auburn, N.Y. Lent by Celanese Celluloid Corp., New York and Charles F. Orvis Co., Inc. Manchester, Vt.

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

44.1260 Plastic arm and finger splints. Mfr. Curvlite Products, Inc. Portchester, N.Y. Lent by Harold Surgical and Hospital Supply Co., New York. (2)

44.975.6 Biological specimens imbedded in methacrylate resin, pro-
44.1264 duced by Rohm & Haas Co., Philadelphia, Pa. Exhibition blocks designed, cast, machined and polished by Dr. Charles E. Sando, Bureau of Chemistry and Soils, U.S.Department of Agriculture, Washington, D.C. Lent by Modern Plastics, Inc., New York. (2)

44.1001 Lucite navigation and wing light covers. Mfr'd and lent
44.784 by E.I. DuPont De Nemours & Co., Arlington, N.J. (6)

44.1186 Plexiglas bomber nose. Mfr. Rohm & Haas Co., Philadelphia, Pa. Lent by Modern Plastics, Inc., New York.

44.1277 Lucite tail cone. Mfr'd and lent by North American Aviation, Inglewood, Calif. Not now in exhibition

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)

XVII.

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 shape-making in three dimensions.

Visual Material 44.1557 Paper construction, 1944, by Irene Schawinsky, New York. Lent by the artist. (object suspended from ceiling).

44.923 Hour glass, study in wire mesh. Des. Georgianna Greene. Lent by Institute of Design, Chicago Ill.

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

44.572 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.

(on window pane)

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 whold 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

The individual piece; the wardrobe. Des. F.E.Baldauf, 1939 Mfr. Herman Miller Furniture Co., Zeeland, Mich.

The individual piece; the refrigerator. Mfr. Sears Roebuck, Ill.

The individual piece; the radio. Mfr. Zenith Radio Corp. Chicago, Ill.

The built-in element; the prefabricated clothes storage unit British Ministry of Works post-war prefabricated houses,1944.

The built-in element; the refrigerator in the prefabricated food preparation unit. British Ministry of Works post-war prefabricated houses, 1944.

The built-in element; radio and phonograph and record storage. Architect Serge Chermayeff, 1938.

The built-in elements; food preparation units. Architect George Nelson. From "Homes for Human Beings", Fortune Magazine, April 1943.

The built-in elements; model oven unit from "The Kitchen Of Tomorrow". Mfr. Libbey-Owens-Ford Glass Co., Toledo, Ohio.

The built-in elements; food preparation units in stainless steel. Architect Harwell H. Harris, 1941. Mfr. Thermidor Electrical Mfg. Co., Los Angeles, Calif.

The mechanical core; prefabricated electric food preparation unit. Designer T.W. Kennedy, England, 1943.

Mechanical assembly of modern plumbing of plastic and glass;
44.679 Saran pipes and pipe fittings. Mfr'd and lent by Dow Chemical Co., Midland, Mich.
44.914 Plastic float. Mfr. Kirkhill, Inc., Los Angeles, Calif. Lent by Celanese Celluloid Corp., New York.
44.1167 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 individual piece; "styled" sanitary fittings. Designer Henry Dreyfuss. Mfr. Crane Co., New York.

The mechanical core; prefabricated bathroom unit, built experimentally in 1937 for the Phelps Dodge Research Laboratories. Des. R.Buckminster Fuller.

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. Rummells,1942

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

The mechanical core; Architect Theodore Luderowski, 1944.

The mechanical core; prefabricated combination kitchen and bath unit. Des. W. Brooks Cavin Jr., 1942.

INSTALLATION XIX.

Semi-circular screen built of Tekwood and Tempered Tekwood. Supplied by United States Plywood Corp., New York.

Vinylite curtain. Supplied by Carbide & Carbon Chemicals Corp., New York, heat sealed by Gallowhur Chemical Corp. New York.

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).

DESIGN FOR USE

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.
New York Public Library
Pharmacal Products Co.
John D. Schiff
Institute of Design, Chicago
St.Regis Paper Co.
Ezra Stoller
Roger Sturtevant
U.S. Camera Publishing Co.
Kurt Versen Co.
Vidal Research Corp.
Westinghouse Electric & Mfg. Co.
Shigeta Wright
British Information Service