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Author Gilroy, John

Title Self Training for ...designers

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SELF TRAINING FOR INDUSTRIAL DESIGNERS

This book takes the student of design on from the point where he has completed his training in an art school or a technical college. It suggests courses of study which will familiarise him with industry and industrial processes; tells him how he can set about applying the technical training he has received, and extending it, and using it in the most practical way in his day-to-day contact with commerce and business. Above all, the thirteen chapters of this book are planned to help the young designer to get well started on the road to being a professional designer.

There are many illustrations in the text and sixteen half-tone plates.

John Gloag, the author, is one of the acknowledged authorities on industrial design, and is not a theorist, but has a considerable experience of arranging productive work between manufacturers and designers.

BOOKS BY THE SAME AUTHOR

Design, Architecture, Furniture and Interior Decoration:

INDUSTRIAL ART EXPLAINED

THE? MISSING TECHNICIAN IN INDUSTRIAL PRODUCTION

THE ENGLISH TRADITION IN DESIGN

(A King Penguin)

ARTIFEX, OR THE FUTURE OF CRAFTSMANSHIP

PLASTICS AND INDUSTRIAL DESIGN

(With a Section on the different types of Plastics, their properties and uses, by Grace Lovat Fraser)

MEN AND BUILDINGS

THE ENGLISHMAN'S CASTLE

HOUSE OUT OF FACTORY

(in collaboration with Grey Wornum, F.R.L.B.A.)

THE HOUSE WE OUGHT TO LIVE IN

(in collaboration with Leslie Mansfield)

TIME, TASTE AND FURNITURE

ENGLISH FURNITURE

(The Library of English Art)

MODERN HOME FURNISHING

SIMPLE FURNISHING AND ARRANGEMENT

SIMPLE SCHEMES FOR DECORATION

COLOUR AND COMFORT

BRITISH FURNITURE MAKERS

(Britain in Pictutes Series)

Social History, etc. :

THE AMERICAN NATION: A SHORT HISTORY OF THE UNITED STATES

HOME LIFE IN HISTORY

(in collaboration with C. Thompson Walker)

WORD WARFARE: SOME ASPECTS OF GERMAN PROPAGANDA AND ENGLISH LIBERTY

WHAT ABOUT BUSINESS?

(A Penguin Special)

Mr. Gloag has also edited the following books:

DESIGN IN MODERN LIFE

(with contributions by Robert Atkinson, Elizabeth Denby, Maxwell Fry, A. B. Read, Gordon Russell, James Lover and Frank Pick)

DESIGN IN EVERYDAY LIFE AND THINGS

(with contributions by W. H. Ansell, C. H. Collins Baker, B. J. Fletcher, Frank Pick, Gilbert Russell and H. P. Shapland)

THE PLAGUE OF GLASS IN BUILDING

(with contributions by Christian Barman, Lionel Budden, Kenneth Cheesman, G. A. Jellicoe, Richard Sheppard, E. M. S. Wood and Grey Wornum)

SELF TRAINING
FOR
INDUSTRIAL
DESIGNERS

by
JOHN GLOAG

London

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WOKING

*Dedicated to
Herbert Read*



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1855

"In Dearly stages of manufactures, it is mechanical fitness that is the object of competition. As society advances, it is necessary to combine elegance with fitness; and those who cannot see this must be content to send their wares to the ruder markets of the world, and resign the great marts of commerce to men of superior taste and sounder judgment, who *deserve* a higher reward."

Ralph N. Wornum, Keeper and Secretary of the National Gallery, in *The Analysis of Ornament*, first published 1855.

1915

"We have so far made an altogether inadequate use of our trained designers. Where they have been employed, it has often been too much in the use of paste and scissors, or as drawing clerks making timid variations. Their status is that of humble draughtsmen, not of *experts* who might confer great benefits and receive considerable rewards."

W. R. Lethaby, in a paper delivered to the Design and Industries Association in 1915: included in *Form in Civilisation*.

1937

"Nobody would object to the interference of engineers who tell a designer what is technically necessary and advisable. Nor would anybody object to sales managers communicating to designers which of the year's new patterns or new models were successful and which not. But when the sales expert tries to indicate what ought to be done in future, the result is as a rule aesthetically disastrous."

Nikolaus Pevsner, in Part Two of *An Enquiry into Industrial Art in England*, 1937.

1946

"It is all very well to talk about 'back room boys,' but no man or woman can give of their best if they feel that they are regarded as hacks, and that no recognition is given to the importance of the creative contribution they can make. I do not pretend that it is at all easy to achieve a proper relationship between production staffs, sales staffs and the designer. The production engineers and the salesmen are solidly established people, with a very good idea of their own importance and strength. Left to themselves most of them will be apt to think that they know the designer's job better than he does, or that he can quite properly be ordered about and made the servant of their own particular ideas of the job. It is one of the most important functions of management to bring about a relation of mutual respect and genuine co-operation between these partners in industry."

Sir Thomas Barlow, Chairman of the Council of Industrial Design, in the course of his inaugural address at the Conference on Industrial Design held in connection with the "Britain Can Make It" Exhibition, September, 1946.

REFERENCES IN THE TEXT

Footnotes have been avoided throughout the thirteen chapters of this book. References are indicated by figures in the text, numbered consecutively in each chapter; and the sources of these references are set out under their appropriate chapters at the end of the book, beginning on page 151.

To Clear Your Mind and Start Your Thinking

SO you are going to be an industrial designer? Or, shall we say, you *want* to become one. Presumably that is why you have picked up, borrowed or bought this book. It is only fair, then, to let you know in the first few paragraphs what you are up against; for unless you know, unless you can identify clearly the character of the subject of which you propose to become a master, you won't know what to study. That, you may think, is obvious; but it *is* necessary to say it here, because industrial design is a matter that has been little understood in this country until comparatively recently, and it is still ill-defined and subjected to much woolly teaching and preaching and writing.

Are you clear in your own mind about the meaning of industrial design?

Do you know what it embraces?

Do you know how it falls into sections and what those sections include?

Face those questions, and get them answered to your full satisfaction.

You must be absolutely clear and confident in your own mind about the subject and what it embraces; for only when your ideas are clarified is it possible for you to identify and appreciate what branch of industrial design offers the best opportunities for your particular talents. Here are some broad definitions to begin with.

Industrial design, or, as it is sometimes more loosely termed, industrial art, may be classified under these divisions:—

(i) Industrial design and (2) Commercial art. This book is not concerned with that branch of industrial design which may be described as industrial architecture.

(1) Industrial design includes the products of industry, not only those made in a factory, but large-scale things such as ships and vehicles, and such general utility articles as lamp standards, automatic machines, scales and weighing platforms. Industrial design may be sub-divided thus:

- (a) Design which affects the function, form and finish of a manufactured object such as a radio or television set, kitchen utensil, a toothbrush or a safety razor.
- (b) Design which affects the form and finish of a manufactured object with a mobile or static mechanical function, such as a motor car, a vacuum cleaner, a typewriter, a sewing machine, an adding machine or a perambulator.
- (c) Design which is concerned primarily with decoration, and which may be described as industrial decorative art, and which affects industries that still operate on a craft basis, such as those manufacturing domestic glass, pottery, textiles and wallpaper.

(2) Commercial art is chiefly concerned with the distribution of goods and with all those activities connected with marketing and selling which employ the graphic arts. Those activities include press advertising, posters, commercial literature, exhibition stands and packaging.

These two main divisions have been briefly described here: I shall enlarge on them presently, but it is im-

portant that you should become perfectly clear in your own mind about these classifications. Without that clear understanding of the relative functions of industrial design and commercial art, you will confuse yourself about your projected career, and will confuse other people when you are explaining to them what you are trying to do, or attempting to persuade them to employ your services. It is imperative that you should be able to describe these divisions simply, for you will constantly be meeting people—who may become your clients—who are vague and confused about the whole subject. Don't be put off by its apparent complexity or become intimidated by its ramifications. If you keep in mind the two main divisions into which it falls, you can not only place your own particular talents and potential activities under the appropriate heading or headings, so that you know what you are aiming at and why—always an advantage—but you can speak with greater authority as a technician.

Now how do you personally fit in with those two main divisions, industrial design and commercial art?

Here is a list of articles and activities set forth under those headings. It is only a short one—to start you thinking.

(i) INDUSTRIAL DESIGN

<i>General</i>	<i>Static or mobile mechanicalfunction</i>
Bathroom furniture	Adding machines
Cigarette lighters	Cash registers
Clothes hangers	Clocks
Cookers: gas, oil, electric and heat storage types	Coffee grinding machines
Cooking utensils	Garden rollers
Cutlery	Lawn mowers
Domestic furniture	Mincing machines
	Perambulators

<i>General</i>		<i>Static or mobile mechanical function</i>
Electric	fires	Sewing machines
Electric irons		Ticket issuing and punching machines
Fountain pens		Trucks and trolleys
Gas	fires	Typewriters
Insect sprays		Vacuum cleaners
Kitchen equipment		Washing machines
Lighting	fittings	Weighing machines
Luggage		Wheelbarrows
Office furniture		
Radiators		
Radio sets		
Safety razors		
Taps		
Television sets		
Toothbrushes		
Trouser presses		
Water heaters		

Decorative

Carpets
 Clothing accessories such as buckles, buttons, jewellery
 Domestic glass
 Fabrics—clothing and furnishing
 Linoleum
 Pottery
 Wallpaper

(2) COMMERCIAL ART

<i>Two Dimensional</i>	<i>Three Dimensional</i>
Book jackets	Bottles
Booklets	Cartons
Catalogues	Collapsible tubes
Fancy wrapping paper	Containers
Labels	Dioramas, "tatic or working models
Leaflets	

Two Dimensional

Notices
Posters
Press advertisements
Printed wrapping foil
Showcards
Streamers
Window bills

Three Dimensional

Display units
Exhibition stands
Packs, metal, cardboard, plastic or glass

Think these over; add to the list and fit your additions into the appropriate sections. You should then have made your first rough but practical survey of the problem: it will save you flapping around and thinking you might do this or you might do that if you only knew what to set about doing. You have reduced an incoherent array of ambitions to some kind of pattern; and you can now examine your own qualifications.

CHAPTER TWO

Tour Qualifications and Mine

NOW, what about your qualifications? Do they fit into any of the sections I've just described? Presumably you can draw and have some imaginative capacity for expressing ideas in terms of form and colour. If you can't draw, if you have no capacity whatever for wielding a pencil, put this book down at once. It is only in terms of drawing and making models that the designer can find expression, and can convey to other people the character of his ideas. Now, I presume that you *are* able to draw, and by that I mean that you can draw properly, that you aren't just a "copyist," that you can render objects in perspective, that you can draw mechanically and to scale, that you can use such instruments as a ruling pen, and that you know how to use a drawing board, tee square and set squares. And this brings me to the matter of your training up to date: I presume that you have been at an art school or a technical school where art classes have been available, where you have been taught freehand and mechanical drawing, and something about composition and colour values, and that your capacity for sketching has been developed and guided by your training.

I am taking you on from this point in your education, where you have acquired mechanical facility. If you lack that facility, put this book down and get it. Go

to evening classes if you are in a job, and become a good mechanical draughtsman, and sketch and draw everything you can in your spare time. If you are going to make a success of your career as a designer, then you must be prepared in the early years at least, to sacrifice 75 per cent of your leisure: if you aren't prepared to make that sacrifice don't read any further; you'll be wasting your time. The advantage of being a potential designer is that you can always be practising even while you are enjoying yourself in the country or anywhere else, if you carry a sketch book with you, and keep your eyes open and the critical side of your mind sharp.

So far I have mentioned only the elementary qualifications and training: but what sort of experience have you? Have you got the sort of mind that takes delight in mechanical things? Do you enjoy fiddling about with machinery, repairing bicycles, tinkering with the insides of cars, sewing machines, clocks, typewriters and so forth? Or are you much more interested in patterns and colours and decoration? Or do you feel that you could design really good posters? If you feel that, then it is a very common feeling: most people feel they could design good posters: very few people can. Do you by any chance feel, perhaps very secretly, that you are a genius? If you feel that, go and confide in your best friend: tell him that you think quite frankly that you are a genius, and if he is a real friend, that is the time for him to prove it by some plain speaking.

This book is not going to show you any easy road to success as an industrial designer, for one simple reason: there *is* no easy road. And now, having run over your qualifications, what about mine? It's your turn to shoot a few questions at me.

For a start, what qualifications have I for writing such a book as this?

Am I a designer? No.

Am I an artist of any kind? No.

What sort of training have I had, and what is my job?

Here are the facts: I studied architecture in 1911-12, went into business as a junior draughtsman in a studio in 1913, changed over to the selling side of the business which interested me more, and after service in the 1914-18 war, I went into advertising and technical journalism. I also taught myself how to write, because I wanted to write books, both technical books and novels; I was also interested in organization and in industry and educational propaganda. This sounds like the set up for a jack-of-all-trades: but I have become a writer: between 1921 and 1945, I published thirty-six books, fourteen of which are works of fiction, the rest dealing with such technical subjects as architecture and industrial design. I have also written books on social history, business organization and propaganda. I am a director of an advertising agency, a consultant on industrial design, and I am forty-nine at the time of writing. My work as an advertising agent and a consultant on design has given me considerable opportunities for starting off collaborations between manufacturers and designers, and I have initiated a good deal of design research work. I have written a book called *The Missing Technician in Industrial Production*, which is wholly concerned with the planning and operation of design research work; but that is a book for industrialists and professional designers. This book is written to help you to train yourself to become a professional designer, if you are really satisfied that you have the talent as well as the inclination. If you haven't the talent, inclination is not enough. Some pages of this book may read like an echo of *Self Help* by Samuel Smiles;

but don't let that put you off: a lot of common sense has to be restated in each generation, and applied to its special needs and circumstances.

When I began to teach myself how to write, I came across a book that was of immense value to me, namely Arnold Bennett's *How to Become an Author*. I reckon that book saved me years of time and wasted effort. Before I read it I hadn't the faintest clue how to set about acquiring the craft of writing. I couldn't string words together: in fact, because I had an exceedingly good memory, I had seriously considered the idea of memorizing phrases from all the books I had read, and re-hashing those phrases to convey what I wanted to express. Of course, that is laughably clumsy: but I didn't think so at the age of fifteen, when I was almost in despair about my inability to use the English language fluently. Arnold Bennett's book taught me to compose not in phrases, but in words; to understand words, to acquire words, to keep my mind freshly supplied with words by reading the dictionary daily, and to use simple words to express my meaning. By so doing I should be able to write creatively, if I had within me the necessary spark of creative ability. So if this book of mine can do for young industrial designers and students of industrial design what Arnold Bennett's book did for me as an author struggling to master his craft, then as a book it will have done its job.

There is a similarity between my struggles as a young author and those of designers. Many designers try to compose, if I may put it in this way, in phrases: they try to use up all the ready-made ideas, all the traditional notions they have seen, and they don't seek a direct and simple expression for the problems they are tackling: instead they attempt, as I had attempted in writing, to "cobble" up phrases and ideas, drawn from existing sources. In designing, as in

writing, you have to make a simple statement. In writing, it is a temptation, particularly for beginners, to use ready-made phrases; a cliché saves thought; lazy writing gives cumbersome disguises to ordinary terms such as "blue-clad guardian of the law" instead of "policeman." There are hosts of reach-me-down phrases and clichés, always tempting the tired or lazy writer, or sometimes appealing by their spurious glitter—for some of them do glitter—to the beginner. In the same way all kinds of conventions for ornamenting or embellishing await the unwary young designer. He has early to master the essential lesson of clarity in form; to realize, indeed fully to understand, that many ornamental conventions are only hangovers from a previous age, an age of handicrafts and personal production by craftsmen; an age whose conventions and ideas of embellishment are incompatible with machine production, and with the machine's ability to produce smooth untroubled surfaces. Very often you will see on a modern building or on some article that has been produced in a factory, the ornamental counterpart of some weary phrase like "the blue-clad guardian of the law."

Everything should be thought out afresh; and although this sort of initial and inventive thinking is severely hard work, it is a habit of mind which should be formed early in the career of the designer. Never adopt uncritically the accepted solution; don't take the established prototype for granted; be doubtful, but let your doubt lead to constructive criticism. Destructive criticism provides nothing but satisfaction for the congenital sour-puss; constructive criticism, from which new creative power may spring, is the hardest work in the world. Start practising now: take a look round.

CHAPTER THREE

Take a Preliminary Look Round

DIRECTLY you start thinking critically about design, you'll find yourself looking at things in a new way. In your own house, you'll discover that the things you've grown up with and have accepted without question as part of the background of your life begin to acquire a new significance—or insignificance. If you start asking yourself what is well designed and what isn't, how should you guide your judgment? You must have standards of criticism that can be recognized and easily explained, otherwise you will just be another of those people who say: "I know what I like, but I don't know why." The world, and particularly this country, is thronged with them, and you are certain to have a good many of them as your clients.

You should first be convinced—and you only can convince yourself—that a well-designed thing is one that does its job in the most direct, convenient, effective and pleasant way, with nothing in the shape of ornament or decoration to distract its function or to disguise its character. Don't read into that statement any condemnation of ornament: it satisfies one of the most ancient of human needs. "Fitness for purpose" is not enough, although for several years that much used and frequently misunderstood phrase together with the ugly word *functionalism* have been the salvation of the unimaginative designer. A primary and proper regard

for function in the design of anything should not imply a repellent austerity. Only when things are designed on a minimum standard of imagination are bleakly efficient results attained. The words "fitness for purpose" which form part of the slogan of the Design and Industries Association should always be accompanied by four others which complete it: "and pleasantness in use." It is advisable always to analyse such slogans; to be certain that they stand for something specific and are not just slick, superficial thought-saving devices, strong in exhortation but weak in argument. Slogans are potent soporifics for the critical faculties: they may appear to be wooing your reasoning powers while they are really blinding you with faith. But that slogan "fitness for purpose and pleasantness in use" survives critical analysis, because it brings the basic standard for design into a proper relationship with humanity. Pre-occupation with function should never exclude consideration for human foibles; but don't ever allow yourself to think in terms of *concessions* to human foibles. You're human yourself, aren't you? If, in the course of developing your critical faculties about design, you should detect a growing sense of superiority, a feeling that you are *above* ordinary people, go and see that candid friend whom you consulted when you thought that you might be a genius—even if you didn't consult him on that occasion or the need for such consultation never arose, go and tell him all about your incipient superiority: he'll know what to do.

Almost certainly there was a time when you were attracted by the fanciful form of things; when you were unconscious of bad design. Don't allow your new eyesight to obscure the emotions and tastes you had as a child; don't let your critical survey of familiar home surroundings become a sneering tour. When untrained imagination has got out of hand and as a result some

complex and distorted object has been made, don't condemn the sentimental attachment it may command. For example, there may have been a cruet that delighted you as a child because of its intricacy and mystery. The stand itself, of silver or some less precious metal, may have sported an opulent fauna and flora of its own, with a miniature palm rising in the centre, with tiny apes clinging to the fronds that formed the handle, while the framework consisted of kneeling elephants, the tall, thin cut-glass bottles for vinegar and sauces and the pepper pot emerging from the open howdahs on the backs of the crouching beasts. Thousands of such things were made during the Victorian period, and they were inconvenient in use, difficult to keep clean, but delightful to the eyes of the Victorian household, who had no valid standards for appraising the excellence or otherwise of design. The people who liked those things were as innocent of the critical faculty as you were yourself as a child, or even more recently; but don't attempt to suppress the affection you may still feel for that cruet: don't be tempted to use your new sharp faculties for severing a sentimental attachment.

We are still enduring a terrific hangover from the bad taste of the middle and late nineteenth century; perhaps two or three more generations must pass before blurred vision and confused ideas are cured; and you are one of the people who may become partly responsible for effecting that cure. You will achieve more by example than by condemnation; so be tolerant of sentimental attachments, and remember that, had you lived a hundred and fifty years ago, you would have formed many childish affections for things of such beauty and choice proportion that no subsequent development of your critical powers would have caused you in maturity to deride the taste of childhood. That happy condition of life, when people of every kind were

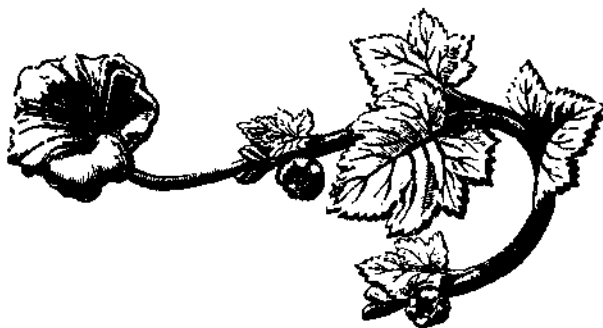
surrounded by well-made, well-proportioned things, pleasant to use and to live with, gay and fanciful but never complicated or attenuated by ornamental considerations, was common in England from the Restoration of Charles II to the reign of William IV. A golden age of design in architecture and its allied and subsidiary arts and crafts, furniture, interior decoration, pottery, domestic glass, textiles, silver, also in such things as vehicles and ships, snuff boxes and watches—one hundred and seventy years of an excellence universally achieved and acclaimed. During that golden age the operation of design was skilfully practised and widely appreciated, because a system of design, derived from the classic orders of architecture, was accepted and understood. There were rules governing the basic proportions of all manner of things which could be mastered by anybody with a modicum of talent—by the village cabinet-maker or the blacksmith or the builder, by the silversmith in the small country town, by the coachbuilder's apprentices, by the junior draughtsmen in the drawing office of some great fashionable architect, by the squire, instructing the local builder about additions and improvements to his country house, by the manufacturer of pottery—and those rules, those leading strings for design, trace back for more than twenty-five centuries of European history to Greek brains and hands. This period of illumination was disrupted by the first industrial revolution and the romantic movement in taste which accompanied and impinged upon that revolution, and it was followed by a widespread collapse of critical standards, so that skill, enormously amplified by mechanical facilities, was in a couple of generations devoted to producing such things as the cruet I have just described.

This decay of standards was not unremarked by

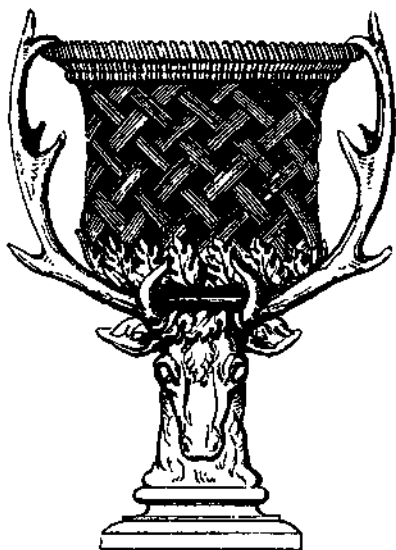
contemporary critics, and I shall quote one of the most trenchant and clear-minded of those mid-Victorian critics. He was Ralph N. Wornum, Keeper and Secretary of the National Gallery, and he wrote an *Analysis of Ornament*, which went into many editions, the first appearing in 1855. His wisdom is unassailable today; most of us have come across some example of the misuse of ornament that he illustrates and condemns. On the next page there are three illustrations taken from his book, showing a chaotic debasement of design, a gas jet, a cup and a bell, which he discusses, temperately enough, as follows:

"There is a class of ornament which has much increased of late years in England, and, by way of distinction, we may call it the *naturalist* school. The theory appears to be, that as nature is beautiful, ornamental details derived immediately from beautiful natural objects must insure a beautiful design. This, however, can only be true where the original uses of the details chosen have not been obviously violated; and one peculiar feature of this school is, that it often substitutes the *ornament itself* for the thing to be ornamented, as illustrated in the accompanying examples, in which the natural objects are so mismanaged as to *be principals*: flame proceeding from a flower, a basket on an animal's head to hold a liquid, a bell made of leaves! the elements chosen being so opposed to the proposed uses of the objects ornamented, as to make the designs simply aesthetic monstrosities, ornamental abominations.

"Ornament is essentially the accessory to, and not the substitute of, the useful; it is a decoration or adornment; it can have no independent existence practically. We cannot look upon any mere ornament without instantly associating it with something that it is fit, or is destined, to adorn; as a necklace or a bracelet. Even a statuette is not an ornament, unless you associate it with



A Gas Jet.



A Cup.



A Bell.

Mid-Nineteenth century legacy. Three examples of the *naturalist* school of ornamentation.

(From *Analysis of Ornament*, by Ralph N. Wornum. Sec pages 29 and 31.)

some shelf or other object or support that it may be fit to adorn. If we look upon it as a mere statue or portrait, it is purely a work of fine art, not an ornament; because it is then principal, instead of being accessory, an absolute condition of all ornament. Hence, every implement or article of practical utility, as, for instance, a candlestick, that is composed or built up of natural imitations exclusively or as principals, however poetical the idea may be supposed to be, is practically bad as a design.

"There is a very great difference between *ornamenting* a utensil with natural objects, and *substituting* these natural objects for the utensil itself. In the latter case, however true the details, the design is utterly false; in the former, you are in both respects true, and may be also highly suggestive and instructive. Of course, there are many natural objects which at once suggest certain uses; and we can never be wrong if we elaborate these into such implements or vessels as their own very forms or natures may have spontaneously presented to the mind.

"Every article of use has a certain size and character defined for it by the very use it is destined for, and this may never be disregarded by the designer; it is, in fact, the indispensable skeleton of his design, and has nothing to do with ornament."(i)

Chaos and bad taste prevailed in the Victorian period partly because of the debasement or absence of valid critical standards and the disrepute into which the old system of design, derived from the proportions of classic architecture, had fallen—for the bright young "moderns" of the day, who were ardent followers of Ruskin, would have none of it, and although there had been a tentative association in the early days of the first industrial revolution between some designers working in the established idiom and a few manu-

facturers, it dissolved as the revolution expanded and the system lost its universal appeal. (One product of this potential but unfulfilled partnership between designers and industrialists, was the first castiron bridge in Coalbrookdale, Shropshire, designed by Thomas Farnolls Pritchard, a Shrewsbury architect, constructed by John Wilkinson and Abraham Darby, the great ironmasters of that time, and completed in 1779-)

We are apt to think of the Victorian period as unique in its peculiar characteristics; but there have been other periods when ornament has got out of hand, distorting form, destroying common sense, and, in the France of Louis XV and Louis XVI, leading on to the dissolution of society itself. For example, in another book I have suggested that "It is not always apprehended that the Elizabethan period was one of those unfortunate phases of economic and social life in England when wealth outran education, when a new rich class, although its artistic appreciation for literature and music was profound, had not yet acquired the restraint which enabled it to appreciate good proportions and shapes and surfaces untroubled by ornamentation. The furniture that was made between 1570 and 1620 was for the most part as barbarous in form and repellently profuse in decoration as the furniture that was made between 1840 and 1910. The workmanship was not yet debauched. Bad though the designs were, the late Elizabethan and early Stuart furniture was well made. The copy books of ornament printed on the Continent did the mischief, such as *Les Cinq rangs de l'Architecture, a scavoit Tuscane, Dorique, Ionique, Corinthiaque, et Composte, avec l'instruction fondamntale*, with plates by Henricus Hondius, published at Amsterdam and frequently reprinted. This work was a popular architectural guide in the sixteenth and seventeenth centuries :

it gave to the classic orders of architecture a strong Dutch flavouring, and illustrated all manner of queer, monstrous additions to them in the shape of ornament. Pre-1914 Tottenham Court Road 'Jacobean' occasionally jumps out of those faded plates. To the England of James I and Charles I those plates were modish pattern-books: they enabled fashion to defeat design."(2)

The unbridled profusion of ornament and the drop-sical proportions that afflicted design in the late Elizabethan, Jacobean and Victorian periods, was as bad as the enervation of design, through an excessive pre-occupation with ornamental refinements, that occurred in France during the seventy-five years before the Revolution. "Seriousness in life and art goes out with Louis Quatorze," wrote Lisle March Phillipps; "frivolity comes into life and art with Louis Quinze. The old strength and stateliness gives place to an artificial and excessive refinement in workmanship, not of detail only but of form. What was ornament in the older style assumes control, eats form away, until form itself becomes ornament. It is the peculiarity of the studies of curves and scroll work of Louis Quinze furniture, and the slender, attenuated proportions of Louis Seize, that they no longer represent the beautifying and perfecting of the common things of life, which after all is the true function of art as applied to things like furniture, but minister and bear witness to a life cut off from such things." (3)

Thus ornament can become a crushing burden or a wasting disease; and the symptoms are easily recognized. It all seems plain sailing, if you take for your critical sailing directions: "fitness for purpose and pleasantness in use." But is it? No slogan is infallible, however much common sense it embodies, for it may be twisted to serve some modish or even ideological end. You must always be alert in judging critically the intrinsic merit of

any design, whether it originated in eighteenth-century France or England, or was shown on some stand at the Great Exhibition of 1851, or came off the production line of some American factory, smooth, sleek and up-to-the-minute in form, colour and finish, in 1946. There has been such a big reaction against excessive indulgence in ornament, such a protracted period of purification in design, so much adulation of "functionalism" that a thing may sometimes be dolled-up to look "functional" when it is really inefficient or wastefully designed, the *appearance* of fitness being used as a fashion note. But don't be taken in: beware of the manifestations of fashion; they may intrude under all kinds of sober guises, and all human beings are susceptible to the wiles of those accomplished specialists in temptation, the directors of fashion. Not that there is anything intrinsically wrong with fashion as such; it is the vehicle of a gay exuberance, lacking which civilization would be as grim as it was in dark Puritan England under the rule of Cromwells major-generals. But fashion is a great confuser of issues about industrial design and does not always find expression in frills and furbelows: it can inspire spurious "streamlining"; it can banish some happily imaginative shape and finish by insisting that the design must be "a functional statement" or "a statement of functional needs", thus allowing respect for jargon to displace inventiveness. Beware of technicalities; they may sound fine—they often carry such an air of authority particularly when they are drawn from the research laboratory—but analyse them as you analyse slogans. Somebody is bound to ask you what you mean, and then if you have been tempted to repeat something about "the integration of basic functional requirements with the economic norm of industrial operational needs and materials" you may find it difficult to explain. I should. So did the young designer I once heard using

that chunk of pretentious lumber with such blissful confidence. Of course, technical terms do occasionally explain something. You may sometimes (but not frequently) hear a typographer or a designer of press advertisements refer to "the visible span of apprehension" which means: "How much you can see at a glance." But why borrow the terminology of the psychologist, the economist or the physicist, unless they can provide some vivid, memorable and clear words which quickly illustrate a meaning?

In forming your own critical standards and explaining them, as you may have to in the future to your clients, use simple, current English. Words culled from a foreign tongue have a way of acquiring the wrong meanings, and a mistranslation may establish and maintain confusion about a subject. A familiar example of this is given by the Astronomer Royal in his book, *Life on Other Worlds*, where he relates how, in 1877, the Italian astronomer, Schiaparelli, when he made a highly detailed survey of the surface of Mars, discovered some dusky streaks crossing the land areas of the planet. "He termed these streaks *canali* which, interpreted literally, means channels. But the similarity of the Italian word to the English word canal has caused a narrower interpretation to be placed upon the term given by Schiaparelli than he intended, with the result that there has been a good deal of misrepresentation." (4)

This initial misconception promoted and for many years sustained a great body of theory about artificially constructed waterways on Mars, and sixty-three years after Schiaparelli used the word *canali* which the English-speaking peoples so enthusiastically misunderstood, the Astronomer Royal records that "the conclusion which it seems reasonable to accept is that the geometrical network of narrow straight canals does not exist." (5) I have deliberately drawn this example of the

way misrepresentation and confusion may arise from a branch of science that has nothing to do with industrial design instead of giving you an example from the subject you are starting to study: it will be better training for your critical faculties if you do your own delving into the tenability of plausible theories and your own doubting about the real meaning of foreign words and pseudo-scientific phrases.

So far you have only been taking a preliminary look round your own home, or your immediate surroundings. As in most homes, you have probably found a mixture of things: perhaps one or two pieces of old furniture, made at a time when ornament was Under proper control and things were almost always the personal work of a skilled craftsman; some nineteenth-century furniture that goes in for solid comfort and to hell with good proportions; perhaps some utility furniture—which, by the way, is *rationed* furniture and should be judged as such—any amount of odds and ends, useful, useless, decorative or cumbersome; and various household appliances, which may look far more efficient than they really are, or may really be well-designed. If, as I suggested at the beginning of this chapter, you have convinced yourself that a well-designed thing is one that does its job in the most direct, convenient, effective and pleasant way, with nothing in the shape of ornament or decoration to distract its function or to disguise its character, then you have established a basic and flexible standard for thinking critically about design. Continue the practice in your own home and in other homes, though if you want to keep the domestic peace and your friends you'll keep your conclusions to yourself.

You may now enlarge the scale and scope of your critical operations. Take a look round outside.

CHAPTER FOUR

Critical Tours

WHEREVER you happen to be living or staying, make a few critical tours of the neighbourhood. Look at the ordinary, everyday things that are accepted and unnoticed by nearly everybody. Use your critical yardstick in assessing the merit of the lamp posts in your own street, the shelter for tram or bus passengers, the bollards on refuge islands, the street name plates. The scrutiny of almost any street in almost any city or town in Britain is an exercise both stimulating and depressing. The late Frank Pick, one of the greatest patrons of design this century has known, once analysed the character of the street in great detail. His original analysis was in the form of a radio discussion with me, Pick speaking as the specialist in traffic, while I was pedestrians' advocate. This discussion, which was one of a series broadcast in 1933 under the title of *Design in Modern Life*, was subsequently re-written in the form of an essay, and included in a book of the same title, from which I quote the following passages from Pick's contribution:

"Signals are part of the equipment of the modern street. As they do not suffer from being tied to traditional prototypes, they are perhaps the most efficient part of a street equipment. Far in advance of lighting, for example. There is hardly a street in the country which is really well lit by street lamps alone. All

streets rely upon lighting from shops and from those additional lamps provided by traders for the sake of advertisement. Shops and stores take on the job of illuminating the street in front of them.

"Well-planned lighting should be fairly uniform for safety, not a succession of bright and gloomy spaces, as so often happens. There must be no place for lovers under the lamp itself, for example. No dark islands in the middle with the lamp high above them, which are traps for vehicles. It is necessary to think where the shadows will fall, for it is the shadows which are dangerous.

"Low lamps at the sides of the street cast moving shadows from the vehicles on the centre. This is bad. Low lamps in the centre of the street cast shadows of moving vehicles upon the pavements. That is worse.

"Lamps should be high up above the traffic, 20 feet or so, and over the roadway. They should illuminate downwards to give as uniform a distribution of light over the whole surface of the road as possible. The Embankment has just been relit to a fair standard. The Croydon by-pass near the Aerodrome is another instance.

"The idea of illuminated kerb stones, which is sometimes advanced as a solution to street-lighting problems, is not practical in its results. The kerb stones would be illuminated, not the street.

"The well-designed street must accommodate for lighting purposes posts and suspension wires. There is no need for such scaffolding to be untidy. Really well-designed suspension is beautiful as a spider's web is beautiful, because it is fit for its purpose. It shows the strain and how it is met. The overhead equipment of an electric railway or tramway deserves admiration, where it is well done. Untidiness mainly comes from adding and patching.

"But think what gets into a street.

"The Post Office comes along and drops in, pillar boxes and telephone call boxes.

"The Fire Brigade comes along and puts down fire alarms.

"The Local Surveyor discovers that a sandbin or two are desirable, or that there must be a dustbin to take street refuse.

"The Local Council is stimulated to think of litter baskets and hangs them on the lamp posts.

"The local transport undertakings want direction signs to their stations, or stopping posts for their omnibuses or tramways. These are all added.

"Then there is a cab rank or a parking place to be set out and marked, or there is to be a signed and marked crossing for the assistance of pedestrians. For all these notices are required. (How averse we seem to using bare symbols.)

"And so the notices take the form of regulations printed in full on a board and hung upon a lamp post so high that they are hard to read even with good eyes.

"Then the electricity supply undertaking may put down its switchboxes.

"There may be signal lights and posts required for the control of traffic.

"All sorts of things are dumped into the street without order and without planning by a whole lot of public-utility undertakings or departments of local authorities, until the street can become unbearably untidy. All this casual introduction of street equipment is just absence of design." (i)

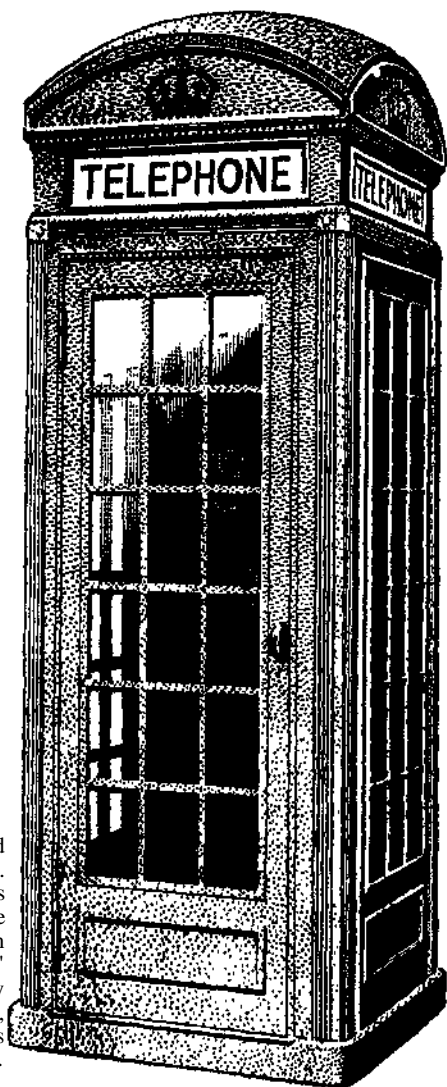
This "absence of design" in the siting of street equipment may occasionally impair the efficiency and mar the appearance of well-designed individual things, such as the **G.P.O.** telephone kiosks. It is

worth pausing for a paragraph or two on the subject of the telephone kiosk designed for the General Post Office by Sir Giles Gilbert Scott, O.M., R.A., P.P.R.I.B.A. It is an instructive piece of industrial design, and exemplifies a close and imaginative study of materials. In his book, *Cast Iron in Building*, Richard Sheppard has said:

"In point of mere numbers, the G.P.O. telephone kiosk must be the most successful piece of pre-fabrication ever designed. The latest pattern consists of four panels and a roof unit which are rebated and interlocking and fixed by bolting. The panels themselves vary as sides and door are made for glazing, while the rear unit is solid. To overcome the weakness of castings incorporating such a large opening, the door and window units are formed with curved projections which raise them in front of the panel. For the same reason vertical reeding is used in the corner sections. The design of small structures of this type calls for a very close study of their individual requirements. The G.P.O. kiosk is an example of the close approximation of means to ends. . . ." (2)

Sheppard's description is particularly valuable, for it shows how a practised designer scrutinizes materials, structure and every detail of finish. The vertical reeding on the corner sections might, at a casual glance, be taken for mere decoration, and dismissed as archaic and unnecessary by the fanatical functionalist; Sheppard, speaking as a designer and an authority on the technique of using cast iron, reveals the practical necessity for that decorative treatment.

Your critical excursions must be equally penetrating; you should never be superficial: you must observe and judge in a spirit of enquiry, remembering always that the capabilities and limitations of materials often determine details of design or finish which you



Richard Sheppard describes the G.P.O. telephone kiosk as "an example of the close approximation of means to ends_____"

It was designed by Sir Giles Gilbert Scott, P.P.R.I.B.A., and is made from cast iron.

(This drawing, made from a photograph, is reproduced by courtesy of the Postmaster General.)

may perhaps be tempted to condemn. For example, Hartland Thomas in a paper on *The Influence of New Developments in Construction on Architectural Design*, has warned critics about hastily ascribing to mere copyism devices that can claim technical justification. He mentions specifically "the grooving out of granolithic paving in small squares, which appears to imitate stone setts." and gives two reasons why this is done. "One is to release the surface tension to avoid cracks, the other to prevent slipping." (3)

So keep your rising confidence well in hand; but don't ever shirk the tough job of critically analysing an example of design. If you want to know more about some feature of it that may puzzle you, find out where it was made, and write to the manufacturer. If you type your letter, enclose a stamped, addressed envelope, refrain from expressing any adverse views about the object, whatever it is, and ask your questions in the fewest possible words, having previously made up your mind exactly what it is you want to know, the chances are that you'll receive an answer.

When you've walked down your own familiar streets and exercised your critical faculties, extend the field of your operations. In providing you with an example of how to go about this, I'll begin with Liverpool; and what I say about that maritime city may suggest all kinds of local applications to you. So assume that you've just arrived at Lime Street Station, and having found the way out by following the crowd (for there are no conspicuous direction signs at the time of writing nor any indication that you have reached one of the Liverpool termini), take a tram to the Pier Head. The trams at least are plainly labelled, and their destination is clear, though you may dislike their dingy colour scheme of olive green. (Across the Mersey, Birkenhead Corporation does

better with its cheerful, light blue buses: so does Wallasey, which paints its buses bright green.) When you reach the Pier Head, have a look at Princes Landing Stage. It is a famous landing stage—one of the largest in the world. About a third of it serves the Mersey ferry steamers; only that part adjacent to the Riverside Station—where the boat trains arrive and depart—is reserved for the great liners and the Belfast and Isle of Man steamers.

Begin by examining the gangways that allow passengers on and off the ferry boats. The Woodside, Seacombe and New Brighton ferries are served by three groups of gangways, two for the lower and one for the upper decks of the ferry boats. These gangways work on the same principle as the drawbridge of a mediaeval castle; and are mounted on bases that swivel round. Each base bears two hollow columns of cast iron, which take the chains and counter weights, and the gangway rests upright between them when it is not in use. The columns, the cross bars that join them at the top, and the gangways, are plain, rather clumsy examples of design; and perhaps as a protest against this, the Woodside group is adorned by an elaborate surrounding framework of cast iron, which performs no function at all, apart from supporting three lamps, one depending from the centre of the arch that sweeps above the gangway columns, and two lamp brackets branching out at each side. This complicated framework has hints, here and there, of borrowed mouldings from the classic orders of architecture: it is a congested and needlessly ugly assembly of unrelated ornamental odds and ends. The two Wallasey ferries have no such extraneous adornments, but all three groups of gangways suffer from "absence of design" in sign posting for the direction of traffic on and off the ferry boats.

The Seacombe gangways are each labelled "Seacombe" in gold lettering, a very ill-proportioned type of letter being used, and on the gangway that serves the upper deck, obviously as an afterthought, an additional signpost has been erected with the word "Seacombe" on it in white letters on black. You are left in no doubt about the destination of the ferry boats, but you are left in considerable doubt regarding where you should stand if you want to board the boat and also avoid the people who are coming off. There are some railings with boards and posters on them against which people stand, while making up their minds which gangway they are going to use, and as many fail to reach a decision, a lot of needless jostling occurs.

Let us assume that you embark on a ferry boat. You'll find that afloat there are far higher standards of design, because any kind of vessel *must* be efficient. There is a long and ancient tradition of efficiency in shipbuilding. The transition from sails to steam power was slow at first, but by the third and fourth decades of the nineteenth century it had been accomplished for small craft, and the needs of the motivating power had dictated the form and character of these new vessels. Many years before ocean-going steamers had even reached an experimental stage, there were steam ferry boats on the Mersey. The first one was the *Elizabeth*, built on the Clyde and put into service in June 1815. Her engines were about 8 horse power. A year later the *Princess Charlotte* was in operation between Eastham (where the Manchester Ship Canal now begins) and Liverpool. After 1817 steamboats were used on all the Mersey ferries—Woodside, Seacombe, Rock Ferry and New Ferry—and early in the eighteen thirties they began to serve Egremont and New Brighton. (The growth of this steamboat

traffic and its competition with the early railways, is described in Mr. Eric Hardwicke Rideout's book, *The Growth of the Wind*.) (i) The progressive development of design in the Seacombe ferry boats is illustrated by Plates 4 and 5, which are taken from photographs of the admirable scale models which are displayed in the ferry building at Seacombe. From the *Sir John Moore*, built in 1826, to the *Royal Daffodil* '11, built in 1934, you may see how the ferry boats have gradually become more commodious, tidy and convenient.

Begin your design quiz on the ferry boat you've boarded; you'll find that many small matters have been dealt with casually, and the operation of design omitted. For instance, at the stern, in the immediate proximity of the lifeboat, there is a notice, 1' 4" x 2' 8". On some of the boats this notice is of cast iron, and the raised block capital letters are painted red on a white background. These notices concern a matter that may well become one of life or death; but the wording is verbose and the type almost illegible, owing to excessive overcrowding. So with difficulty you learn that:

"Passengers are particularly requested to refrain from crowding the vicinity of the boat in the event of accident. Such action impedes the prompt launching of the boat by the crew, and may make rescue impossible. Volunteers will be called if required."

Once you have landed at Seacombe, you'll find that the ferry building is well planned. The toll houses and their turnstiles are arranged to draw off the greatest volume of passenger traffic in the shortest possible space of time, and a covered arcade sweeps round from the ferry house to the motor buses run by the Wallasey Corporation. Compared with the pay-

as-you-enter booking offices of the London Passenger Transport Board, turnstiles are complicated and slow down the pace of admission or egress. Also, most turnstiles seem to have been made on the assumption that nobody ever has anything to carry. Try to take even a small suit case through one of them as you pay your toll money, and see how you jam yourself and the people behind you; try two, one in each hand, and you stage a miniature traffic block. Are turnstiles, controlled from a pay box, still used because some toll-collecting traffic organizations fear that crowds will rush through without paying? The experience of the London Passenger Transport Board suggests that mass dishonesty of this sort simply doesn't exist. Maybe they're tough, mighty tough, in the North; but maybe they're just a bit old-fashioned too. But they're not unique: controllers of traffic are always inflicting hold-ups on the public, and those delays always arise from absence of design. I remember Frank Pick once expressing some views on the flow of traffic in railway stations: as far as I can recall his words he said :

"Most people who design railway stations seem to say to themselves: 'We must have a queue here.' They always think of people standing in queues to buy tickets or to give them up. Now when we design a station, we design it to avoid queues altogether."

The London Underground tube stations, nearly all of them designed and built long before the old traffic combine became the public utility company known as the London Passenger Transport Board, have two or more pay boxes, which are brought into service to prevent congestion during the rush hours, and are often supplemented by automatic ticket issuing machines, that take coppers, sixpences and shillings and give change—everything is planned

to speed up the flow of passengers and to avoid wasting the time of the travelling public. You may ask at this point, why the London Passenger Transport Board provides such excellent examples of the operation of design; and I shall answer that question as fully as I can in the next chapter when public vehicles are critically examined. To avoid anticipating the subject, we'll omit any commentary on the bus journey from Seacombe to New Brighton, because I want you to conclude this critical tour of Liverpool and its vicinity by inspecting that small but characteristic pleasure resort at the tip of the Wirral peninsula where the Mersey estuary opens out into Liverpool Bay.

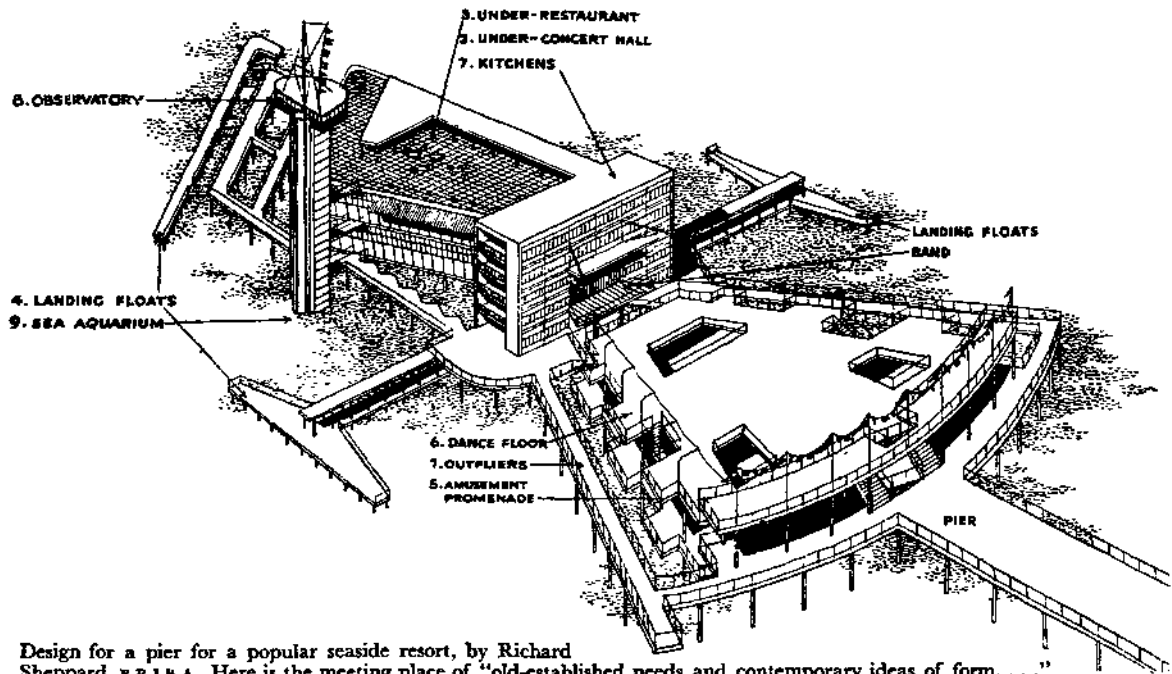
New Brighton once had an Eiffel Tower, like Blackpool, and in the 'nineties a roaring and exuberant array of shops and booths were packed along the sea front, and known locally as "the Ham-and-Egg Parade." It still has a pier, where the diver who once appeared as a regular feature in Tommy Handley's radio programme, really used to perform. This diver was a one-legged man, who would plunge off the end of the pier, while his assistant went round with the hat on the sands, shouting: "Don't forget the diver!" (Tommy Handley is a Liverpool man, and the ITMA programme is often rich in local allusions.) It is to this pier that I want you to give particular attention. It is typical of piers all round the coasts of England, though it is more compact than most and lighter materials than those normally employed are used on its superstructure, and I am just going to leave you alone on it, to work out your own improvements (if any), merely asking you first to consider well the extent to which obliging materials contribute to the ornamental nature of such light-hearted examples of architecture, and to ponder the following quotation from Richard Sheppard's book, *Cast Iron in Building*:

"The resistance of cast iron to corrosion, which has been further improved by some of the recent developments in alloying, has encouraged its use for seaside piers and pavilions since the eighteen sixties. Iron has a high degree of resistance to the sea atmosphere and to the direct action of sea water, and the columns and superstructure of many of our existing piers are of iron. Most of our piers are highly characteristic and have a genius of design all their own; they were the Victorian equivalent of the folk festival, and the quality of their decoration is expressive; it is bold, coarse and vigorous. The iron is used flamboyantly in panels and columns and crockets and gables, for windows and doors, for turnstiles and slot machines. Buried under the paint and obscured by later accretions the social investigator can discover a record of the habits, characteristics and amusements of mid-Victorian England." (5)

To show what could be done to give the public a pier that would meet old-established needs and contemporary ideas of form, a design by Richard Sheppard from *Cast Iron in Building* is reproduced opposite, and on pages 50 and 51. It is a spacious conception and includes a marine aquarium, a concert hall, an open-air dance hall, an observatory, and a planetarium. It belongs to the mid-twentieth century, the period in which we happen to be living, though vast numbers of people shrink from allowing that inescapable fact to be acknowledged in the form of the things they use or see or buy or desire.

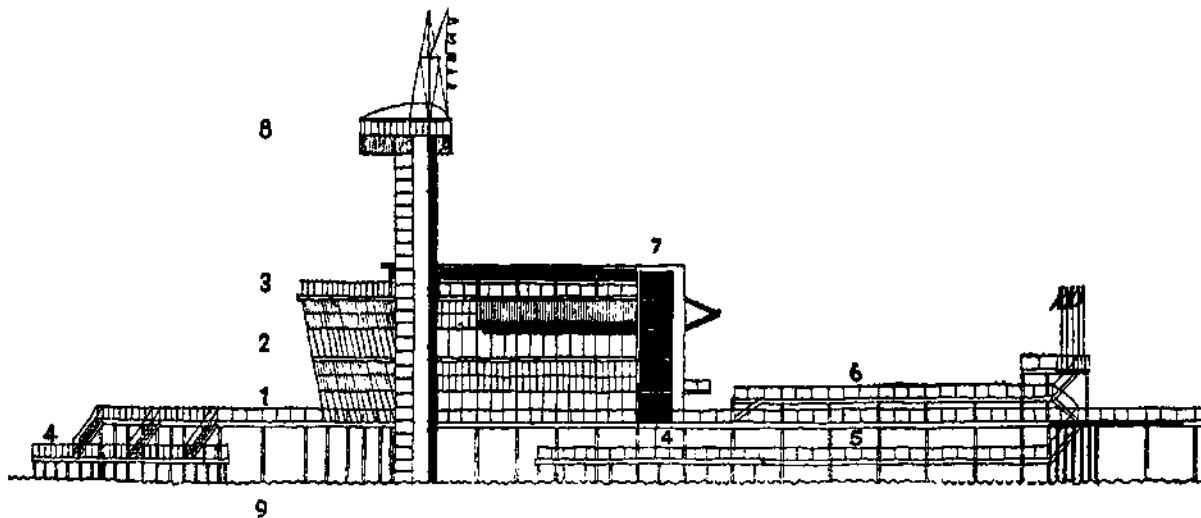
Why?

Until you know some of the answers to that you won't be able to explain convincingly what you mean when you have become a practising technician in design, and you give your clients something they haven't seen before.

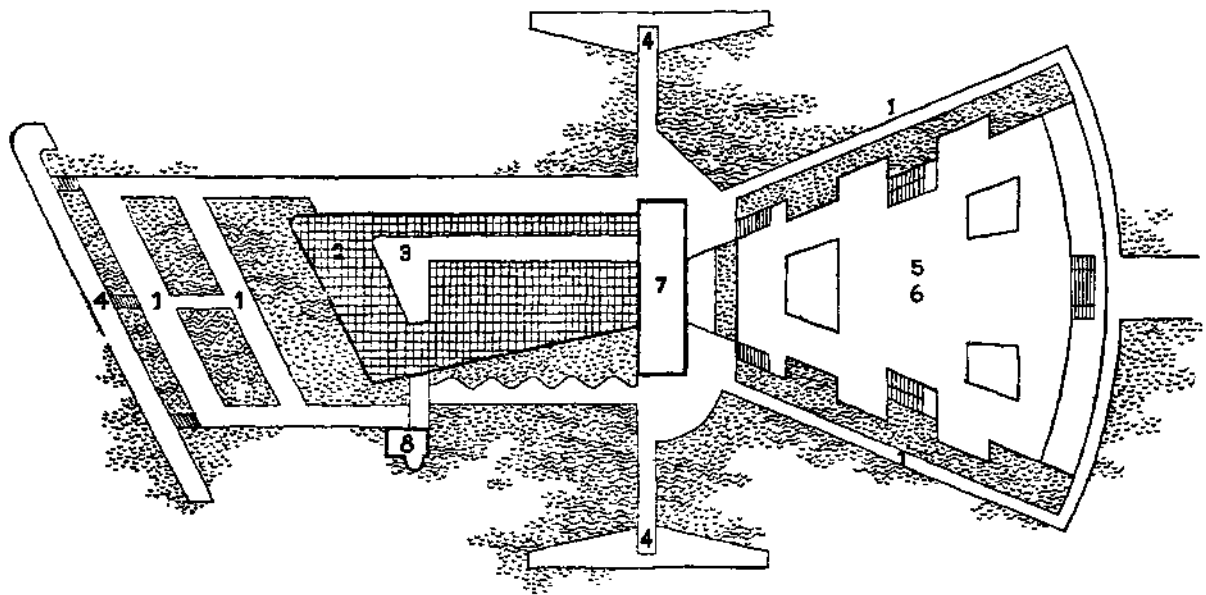


D

Design for a pier for a popular seaside resort, by Richard Sheppard, F.R.I.B.A. Here is the meeting place of "old-established needs and contemporary ideas of form. . . ." The elevation and plan are shown on the two pages that follow. (Reproduced, by permission of the author, from *Cast Iron in Building*.)



Elevation of the pier designed by Richard Sheppard, shown in perspective on the previous page. The key to the figures shown above and in the plan on the opposite page is as follows: 1. Outliers. 2. Under-Concert Hall. 3. Under-Restaurant. 4. Landing Floats. 5. Under-Amusement Promenade. 6. Dance Floor. 7. Kitchens. 8. Observatory. 9. Sea Aquarium. (From *Cast Iron in Building.*)



Plan of the pier designed by Richard Sheppard, and shown in elevation opposite and in perspective on page 49.
The key to the figures is given on the opposite page. (From *Cast Iron in Building*.)

CHAPTER FIVE

Take Yourself for a Ride

DURING the blitz on London, there were a good many casualties among the buses, and various towns and cities lent spare buses to help the metropolis. Without being ungrateful for the assistance, Londoners could not fail to realize how lucky they were after they had sampled some of the cramped, ill-designed buses that people put up with in the provinces. "Jam 'em all in—never mind about comfort!" seems to be the direction given to those who build buses outside the operational area of the London Passenger Transport Board. There are of course exceptions, but not a great many of them. Take yourself for a ride, wherever you happen to be, and apply your critical tests to the local buses and trams. Use as your standard the RT-type of the London Passenger Transport Board, which was the latest in service in 1945, or the STL-type, which came into service in the late 'thirties, (i) You'll find that some public vehicles pass your tests, and I can give one example from the locality discussed in the last chapter, namely the buses operated by the Transport Department of Birkenhead Corporation. These are smooth-running, commodious vehicles, with plenty of room and comfortable seats: externally, they are painted bright blue, and from the driver's cabin to the conductor's platform, they give an impression of efficiency and spaciousness.

Birkenhead has a tradition of efficiency and enterprise in transport: it is the English home town of the tram, for on August 30, 1860, the first tramway or street railway was opened there. This tramway was introduced by an American from Boston, whose name was George Francis Train. He had sought permission all over England and Europe to make an experiment, but only Birkenhead mustered a sufficient number of enterprising men for the trial tramway to be sanctioned and built. Philip Sulley, in his *History of Ancient and Modern Birkenhead* commends the liberal and progressive outlook of the commissioners who allowed the tramway lines to be laid down on a route from Birkenhead Park to Woodside Ferry. Mr. Train gave security for the removal of the rails and the restoration of the roadway if after a six months' trial the scheme was unsuccessful. So on August 30, 1860, the tramway was opened, and was a huge success, 5,000 passengers being carried on the first day. Sulley relates how the promoter entertained the commissioners and other people interested in the experiment to a magnificent banquet, to which he had invited all the crowned heads of Europe, also the Pope and Garibaldi.

"Unfortunately none of them turned up nor even sent a letter of apology," Sulley tells us, adding that "Letters were received however from the Duke of Wellington, Lord Palmerston, Duke of Somerset, etc. In spite of the absence of all these magnates, the proceedings passed off successfully and enthusiastically, Mr. Train making a remarkable, not to say an extraordinary speech, narrating his difficulties, now overcome, and his pride at being the means of bringing in this great American invention. Thus, Birkenhead secured for itself the honour of being the first place in Europe to adopt street tramways, and its example was speedily followed by Birmingham and other cities." (2)

A report of this banquet was published, with the opinions of the Press and an engraving of the first tram. (3) On Plates 2 and 3, the evolution of tramcar design is illustrated, from the ancestral type represented by the first Birkenhead tram, to the latest type designed and built for the London traffic combine. Those early horse-drawn trams represented a new departure in vehicle design—a break with the tradition of coach-building that had persisted in the form of omnibuses and had determined and limited the character of railway carriages. In my book, *Industrial Art Explained*, I have traced the development of the English and American forms of railway carriage, and I am quoting the relevant passages here, because there was a parallel development in the design of trams and omnibuses.

"The design of railway coaches was hampered by the memory of the stage coach, and the habit of mounting private carriages on to flat trucks for transport by rail maintained the association with road vehicle forms. The early first-class coaches on English railways were two or three conjoined stage coaches, forming compartments which each accommodated four people. This compartment system for coaches has been generally retained on British railways." (4)

From America new ideas were introduced, although they too were inspired by a prototype.

"In the United States a new form of railway coach was invented by George Mortimer Pullman. Born in 1831, Pullman invented the sleeping car, and his work was devoted not so much to mitigating discomfort in railway travel as to making such travel as luxurious and comfortable as possible. That great American trading axiom, 'The customer is always right!' was honoured by Pullman's designs—passengers on the cars should have everything they asked for, and even

more. Sleeping cars, restaurant cars, club cars and observation cars, office compartments where the services of a stenographer could be hired, private parlours, shower baths, barbers' shops—all these amenities of travel were foreshadowed by the work of the Pullman Palace Car Company, which was founded at Pullman, Cook County, Illinois, in 1867.

"Although Pullman's work was original, and he was the inventor of the saloon car, it is probable that he was inspired by a prototype that was as obvious in America as the stage coach had been in England. The American prototype of the Pullman car was the river steamboat, with its spacious saloons divided by aisles which linked open platforms at bow and stern. The early Pullman car was a miniature of the river steamboat—a single-decked saloon on wheels, with open platforms at both ends, and generous windows. Long before railroads had been made, the inland waterways of the United States were developed; and the rapid settlement of the Ohio and Mississippi valleys, the whole vast river-threaded area of the Louisiana Purchase, was made possible by the steamboat." (5)

George Francis Train's trams in Birkenhead were not unlike the early Pullman cars with their open platforms at either end. Their small metal wheels, running on rails counter-sunk in the granite setts of the roadway, gave them a superior advantage over the omnibus, which was perched up high between wheels of large diameter, just like the old stage coach. They were comfortable, well-lit saloon cars; and they had far less rigidity of form than the early electric trams. Electric trams were first used in England at Blackpool in 1884 by the conduit system, and in Leeds by the overhead cable system in 1891. (6) One of the first electric trams put into service in Birkenhead is

shown on Plate 3: it ran on February 4, 1901. Birkenhead ultimately abandoned tramways, and took to motor buses; many other towns and cities have done likewise, or have converted their tramways to trolley-bus routes. Three progressive steps in the design of London trams are shown on Plate 3, and the trim and tidy final solution was designed for that most efficient forerunner of the London Passenger Transport Board, the London traffic combine.

The intelligent direction of that traffic combine, and the character of the man largely responsible for it, are the answers to all questions about the consistent excellence of design observable in the vehicles and stations of the London Passenger Transport Board. It is sometimes assumed that this excellence arises from some inherent virtue in a public utility company. Even a paper of the standing and authority of the *Architect's Journal* has committed itself in a leading article to the misleading statement that "We had to wait for the London Passenger Transport Board to show us that public ownership is not necessarily inconsistent with individual taste." (7) We didn't. The London Passenger Transport Board was not formed until 1933; before that the London traffic combine, which controlled the Underground Railways, most of the bus companies, and sixty-nine miles of tramways, had established standards of design that were unique in this country and acknowledged and admired throughout the world. In another book I have described how those standards came to be established, and the following paragraphs are quoted from *What About Business?*:

"The London Passenger Transport Board has inherited the spirit of enterprise, and that spirit was expressed in vastly different ways by two great men—Lord Ashfield and Frank Pick. The Board benefited

enormously by the example of its private predecessor; standards had been set, and in its early days the Board displayed all the innovating, eager energy of the Combine. Tramways were scrapped, and trolley buses replaced them, and their routes were extended. The L.C.C. trams were put into new, bright uniforms. Trains, buses, coaches, trams and trolley buses were co-ordinated; and the advantages of unified public control became apparent. The organizers, who had made a success of the buses and the Underground, now had extended responsibilities. But behind both the Combine and the Board was the influence of Lord Ashfield and Frank Pick. Lord Ashfield possessed the attribute that distinguishes most great organizers: he could identify potential great men, and was large-minded enough to give them responsibility and let them go their own way. Frank Pick was one of the great men to whom he entrusted vast responsibilities.

"Two or three hundred years hence some discerning historian, writing of the City of London, might say its greatest benefactors between the Great Fire of 1666 and the Great Blitz of 1940 were Sir Christopher Wren, the Brothers Adam, John Nash and Frank Pick. All these men contributed much to the visual pleasure of Londoners. Their work endured; and during their own lifetimes, the significance, the scope and example of their work were recognized and applauded, not only by a few discerning people, but by *the* people.

"Frank Pick was a great impresario of talent; he was one of the outstanding industrial patrons of our commercial machine age. His work for the London Underground, his sense of form and fitness, his understanding of London's aching need for colour, the excellence of his personal taste, his infinite patience

as a man, enabled him to give to the Capital a distinction possessed by no other living city. The trains, the trams and the buses controlled by the Underground Combine not only moved along rails and roads; they moved ahead into the future. It is no exaggeration to say that until a few years ago London's Underground railways were nearly a century ahead, in terms of vehicular and station design, of every other railway in this country. No continental or American railway system could equal either the efficiency or the trim beauty of design of London's Underground trains." (8)

Christian Barman has written discerningly of Pick's methods of work, and his recognition of the civic significance of traffic and those responsible for its planning and operation. "He knew that while towns are made by many different sorts and conditions of people," writes Barman, "among these people the urban transport manager has an important place. Pick was a transport manager who was conscious of his responsibilities as a town-maker in the widest sense. All that he did for art—and he did more than any man of his generation—he did not do to advance art in general, but to purify and elevate the practical business to which early in his life he had irrevocably set his hand.

"When, some four or five years ago, a *Times* leading article described London Transport as a 'civilizing agency,' it summed up Pick's achievement in two words. All over the world, from Shanghai to Montreal, from Moscow to Buenos Aires, London Transport has its friends and admirers; and in this context London Transport is synonymous with Pick. If anyone before the last War had been bold enough to suggest that a bankrupt tube railway and a company operating a fleet of omnibuses would one day be referred to as a 'civilizing agency,' his words would have met with

a stare of incomprehension. To Pick it seemed the most obvious thing in the world. Having the eye of an artist and craftsman, he saw clearly that London's Underground must choose between being an eyesore and being a work of art. Having also (paradoxically) the social conscience of an East Anglian puritan, he believed it was the duty of the management to give that work of art to London. With incredible energy and determination he set about to make the Underground a clean, orderly and harmonious environment for its travellers, to impart to all its physical aspects what, for want of a better term, has sometimes been called a 'soul.' And so, over a period of twenty years, the Underground at his hands became a possession that London regards with a good deal more pride than it does most of its recent acquisitions." (9)

Barman discloses the self-training this great patron of design worked out for himself and hints at the vast and continuous sacrifice of leisure that programme implied.

"He was 30 years old when he became a Traffic Development Officer of the Metropolitan District and London Electric Railways. His work in this department fell mainly under two heads. One part was to plan extensions and improvements to omnibus routes. The newspapers have told us of the long, solitary tramps to which at that time he gave all his week-ends, in winter as well as in summer. His other task was to develop poster advertising at Underground stations. Here he began by producing better posters and went on (for Pick never stood still) to produce a better arrangement of posters. From that point it was only a short step to 'station tidying,' to borrow Lethaby's phrase. The lettering and the signs must be perfected: Pick studied lettering and, together with Edward Johnston, gave the world sanserif type.

The stations must be improved: Pick studied architecture, and largely inspired by Dudok gave us a kind of station the world has never seen before. The buildings must be equipped and furnished, rolling stock redesigned: Pick joined the D.I.A. (Design and Industries Association) and became an expert on design for industry. It is fairly certain that by such easy and gradual stages did the final conception clarify and evolve." (10)

A study of- the results of Frank Pick's work for London's Underground railways and surface vehicles is a liberal education in the operation of industrial design. You will have to take lots of rides to do it thoroughly, but at the end of them you should have acquired unforgettable standards for comparison and an array of convincing examples for reinforcing your own ideas when you present them, at some future date, to your clients.

Old World Hangover

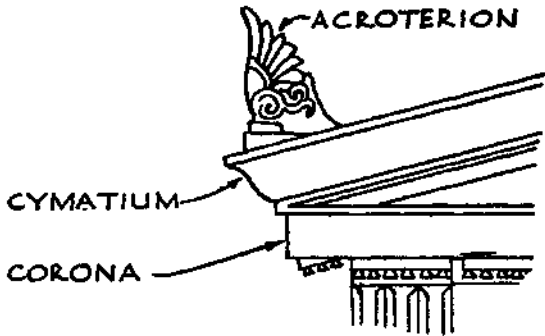
IN looking about you, making your critical tours, and establishing your standards, you have constantly come across memories of other days, impressed inappropriately and uncertainly upon an infinity of objects. Those complicated cast-iron surrounds to the gangways for the Woodside ferry boats mentioned in Chapter Four are typical; for they reproduce in a blurred way a medley of decorative features that were once regulated by a system of design, as though they had been sketched in ink on blotting paper by somebody with a defective memory. Indeed, we are living today with a perfect rag-bag collection of ideas that confuse and debase popular taste and help to prevent the formation of sound critical judgment—half-remembered ornamental conventions, romantic attachments to ancient prototypes, faded suggestions of the Gothic enthusiasms promulgated by John Ruskin in the last century: in short, a hangover in the form (though not in the colour) of many things from civilizations that have passed away.

For example, these words are written in a private sitting room in a large hotel in an industrial city. It is a miniature museum of ill-assorted objects and decoration. The walls are faked to imitate the sort of panelling that clothed the drawing rooms of fashionable town houses in England during the seventeen twenties and thirties. Mouldings have been *applied* to the walls; there is a

cornice with composition ornament impressed on it, reproducing the bead and reel enrichment, and a rather blunted form of acanthus leaf—both devices borrowed from Greek and Roman architecture. Above the doorways are heavy moulded cornices. The doors and their architraves are of polished walnut, with the architrave moulding broken and projecting outwards near the top, reproducing a fashion that was current some forty years earlier than the period the wall paneling is supposed to suggest. Each door has a small central panel, with a Greek patera surrounded by sprays of mistletoe, carved "freely" but unskilfully. On the door that leads to the corridor there is a lever handle in brass of undistinguished design with a lot of unnecessary moulding. On the door to the bedroom there is a handle based on a Louis XIV design, very badly reproduced. Those entirely modern appurtenances, switches for the electric light, are flat brass plates edged by mouldings which reproduce in miniature those used to fake the panelling in the room.

As usual in such rooms, the chimney piece is the principal feature. This is flanked by two thin panels filled by composition ornament, consisting of large daisy-like objects and complicated arrangements of oak leaves, resembling scrambled eggs, with ribbons wriggling in and out of the congested muddle, in an attempt to tie it up in some kind of order. At the centre of the chimney piece immediately below the cornice, there is a wreath of laurels and ribbons—at least, that is what it appears to be on close examination: at a first glance it might be taken for a pantomime string of sausages casually looped up, with a couple of loose ends hanging out.

The mantelpiece is of varnished wood, painted and grained to look like walnut, and follows no known style, although some of the ornament on it is of classical origin.



The Greek acroterion ornament is shown here in its proper architectural setting. Why put this sort of thing on a smoke guard for a fire-place?

(This drawing is reproduced, by permission of the authors, from *A Short Dictionary of Architecture*,¹ by Dora Ware and Betty Beatty.)

The two flanking pilasters have rectangular sunk panels bordered by a variation of the bead and reel ornament. These pilasters support two shallow brackets which bear a mid-Victorian rendering of the acanthus leaf, and at the sides each bracket is embellished by an acanthus scroll of a kind that used to embellish corbels, but are here placed upside down. If we think of ornament for a moment as we think of words, this mantelpiece and everything connected with it is just like a series of misquotations jammed into the middle of a most humdrum conversation about nothing in particular.

The varnished surround of the fireplace is shaped like the proscenium in a theatre, edged with the same blunted acanthus leaf ornament that appears on the cornice of the room; the grate is small and mean, and flanked by tiles the colour of old stewed rhubarb. Similar tiles appear on the hearth. There is a smoke guard of brightly polished brass at the top of the grate, with a design imposed on it that includes ribbons and festoons and an oval plaque surmounted by a Greek acroterion

Ornament, represented with the feeble air of something half remembered and never appreciated. The grate is filled in by a black steel plate with a square panel and a tiny electric fire inset, adequate enough for heating purposes, but managing to look like six sets of false teeth displayed in the window of a pawnbroker's shop.

The other adornments of the chimney piece and mantelpiece include a large overmantel mirror in a gilded frame—gold in colour only, for it is gold paint, not real gilding—made of pressed composition to reproduce in an ill-modified form a Louis XV design. There are two rather brightly coloured ornamental figures of the type and finish that one associates with display windows of dairies. One is a Balkan brigand with an extraordinarily prominent stomach. He wears a waistcoat, frogged with yellow braid, which ends halfway up his chest; a cloak which has slipped down to expose his right shoulder: hessian boots, and if their colour means anything, he has obviously been walking through clay; and the thighs of his trousers are embroidered with a device that might either be some abnormal kind of butterfly or else oak leaves, dead and shrivelled. His hair is long and badly bobbed, and is crowned by a sort of fur flower pot. In his left hand he clutches a fiddle. So much for the male ornament; and although I have for a good many years now been trying to learn the trade of words, I find it difficult to describe the lady, whose costume is an unhappy blend of a Roman toga and an old-fashioned Victorian nightgown, without visible means of support—indeed it is slipping from her shoulders, and is firmly grasped in her left hand to keep it in position. This hand is also performing another task, because it is holding, and is indeed entirely concealed by, a shaggy chunk of old pink blanket which might be a cloak, although that too is falling off. In her right hand she carries a guitar. It is impossible to discuss her figure

without becoming almost indelicate. Her style of hairdressing may be described as all over the place; she wears a cap of sorts, with a fringe of what appear to be four five-shilling pieces clattering upon her brow: her face wears the expression all too familiar upon a rough sea passage when the distressed voyager seeks the steward.

In the centre of the mantelshelf, there is an almost perfect reproduction in gilded bronze and tortoise-shell, of a Louis XV clock, in going order.

The window has a projecting architrave ornamented by oak leaves and enriched mouldings of classical ornament. This heavy architrave neatly frames the curtains. There is a big french window behind with fairly thick glazing bars and untidy bolts and handles. There is a lot of unnecessary metalwork on the window and the bolts are inconvenient, and the handles bruise the fingers when they are turned to open the window. The curtains are of a small, not unpleasing flower pattern in soft pink and green on a beige ground, reminiscent of a late eighteenth-century English design.

The walls of the room are of washed-out grey-green—"off green" and "*off* grey"—the result is a neutral tint with a great capacity for revealing dust.

The floor is carpeted in pale beige which shows every mark. There are two easy chairs and a chesterfield—large, clumsy and comfortable, covered in a dull grey material, enlivened, if such a gay word is permissible, with a feeble reproduction of a French design of the type popular during the Second Empire—the worst period of French taste. This pattern is used on the seats of the three single chairs. These chairs are of mahogany, and are "off Queen Anne." The backs are based on a Queen Anne design: the front legs are of the cabriole type, but ill-shaped; the bark legs, which are tied by a stretcher, are square in section and quite out of keeping

with the front legs. The seat is dropped, formed like the chair seats of the late Georgian period. As Queen Anne furniture was made almost exclusively in oak and walnut, mahogany was an inappropriate choice for these poor bastards.

There is a sideboard that is trying hard to be modern above its stunted little cabriole legs. Its modernity is conveyed by an exterior plainness which gives full prominence to the badly selected figured mahogany on the door and drawer fronts. The three drawers have clumsy, square-cut imitation ivory handles. There are three tables: a plain, straightforward but ill-proportioned mahogany side table; a writing table with one drawer, legs of octagonal section, which is uncomfortable to write at because of insufficient clearance for the legs of anybody but a dwarf; and a small low table which carries the telephone directory and the only thing of modern design in the room, which is the telephone instrument provided by the G.P.O.

There are four gilded two-branched wall brackets bearing electric lights, and a three-branched carved and gilded chandelier hanging by a chain from a brass rosette on the ceiling. The flex through which the current passes is wound untidily in and out of this chain, suggesting that the whole affair is tied together with bits of string. The chandelier itself is based on an early eighteenth-century French design, although the original certainly had far more than three branches, probably not less than eight. There is a mahogany lamp standard with a fringed shade of pale buff, and a waste-paper basket of woven cane work.

Such surroundings generally bear the label of "luxury furnishing." "Beachcomber" of the *Daily Express* once described "luxury eating" as "paying enormous prices for revolting food." I've not paid an enormous price for the privilege of a bedroom and a private

sitting-room in this hotel (which of course must be nameless), but the lack of taste, judgment and understanding of design, and even ordinary common sense which is everywhere apparent in my present surroundings does justify the use of the word "revolting."

All this arises from the confusion of ornament with design—a mistake made in the nineteenth century, and which is still being made in many industries, so today we are haunted by dead patterns and decoration. Go to the ruins of Viroconium in Shropshire; to the Silchester Collection in the Reading Museum; to the York Museum; to the Romano-British room in the British Museum—to all those places where the relics of our four centuries of inclusion in the Roman Empire are preserved, and you'll find the originals of nearly every scrap of the ornamentation that has been so casually distributed over the room I have just described. Those ornamental conventions have been handed down from the standardized Roman orders of architecture and their accompanying codes of decoration; and the Romans borrowed them from the Greeks, and edited them without much imagination.

It's worth examining briefly *why* all those dead patterns and rules for proportion have exercised such a powerful and continuous influence on designers.

CHAPTER SEVEN

The Pedigree of Classical Design

WHEN you start delving into the origin of familiar things you soon discover how much the Western world owes to the Greek and Roman civilizations. Even such everyday symbols as the £ and the \$ have a classical origin. The £ is really an L, standing for the Latin word *libra*, a pound weight of silver; while the \$ that denotes the North American dollar recalls the voyage of the Greek mariner Kolaios, the first of his nation to discover the Pillars of Hercules, the mountainous Rock of Gibraltar and its counterpart on the African shore. T. R. Glover, in that fine survey of classical civilization, *The Ancient World*, tells us that "wherever the American sign for a dollar is printed, you have a reminder of Kolaios and his voyage. On an old Spanish coin the two mountains were represented by pillars, and a garland was twined about them (\$). That coin was the ancestor of the American dollar." He adds: "It is worth while sometimes to remember the links that bind us to the past, and to remember that through all commerce runs a pedigree." (i) That also applies to design, and particularly to decorative patterns.

In Chapter Three, I mentioned the golden age of design which endured in England for one hundred and seventy years, and referred to the system based on the classic orders of architecture, which regulated the pro-

portions of nearly everything that was made in that period. There have been other references to the classic orders, and if you want to know something about the pedigree of design—if you want to be able to answer the question that is so often asked: "Why were things so well designed in the eighteenth century?"—you won't be wasting time if you study the system that was perfected by the Greeks, copied and standardized by the Romans, revived and given new life by the Italians of the fifteenth and sixteenth centuries, and in England employed and anglicized by such men of genius as Inigo Jones, Sir Christopher Wren, and that galaxy of great architects and designers which gave such distinction to the long Georgian period. I am not recommending that you should study the classic orders of architecture so you may "copy" or "adapt" anything from them, but only to help you to appreciate the significance of a once universal system of design. You may have studied a little architecture during your training at an art school, or you may have read some of those fashionable books that confidently present architecture as a branch of economics or sociology; but whatever knowledge you may have picked up, be sure that you understand why those who practised this system of design in the past achieved such indisputably excellent results. You may say, at this point: "But I believe in making a clean cut with the past; we live in an age of industry and revolution, of economic and social readjustment—what have the classic orders of architecture and the system of design they inspired got to do with the world today: *my* world, the world I'm living in and hoping to get a living from and possibly to improve?"

You can only make a clean cut with *some* of the past; even violent revolutions never make a complete and absolute break with the past. The first French Revolution destroyed the lingering tyranny of a mediaeval

society, where there was social privilege without corresponding responsibility, but it preserved the classical heritage of France: in design the men of the Revolution favoured classical precedents, and made no break with the past. Religious, social or economic revolutions, if conducted with violence, may destroy knowledge, and may thus cause some sound and worthy heritage to be suspected or rejected or misunderstood; but prosperity, unless accompanied by education, may be as destructive as violence. The classical system of design survived the upheaval of the French Revolution, but in England it was submerged partly by the emotional and artistic revolution that accompanied the Evangelical movement in religion, and found expression in the Gothic Revival, and partly by the industrial revolution and the new and ignorant rich classes whose prosperity was derived from mechanized industry. And the classic system of design lingers on, as an irritant to modern-minded people, but only because it seems a useless survival, getting in the way, confusing the issue about design; not because of its past achievements.

How did it work and why was it so persistently powerful?

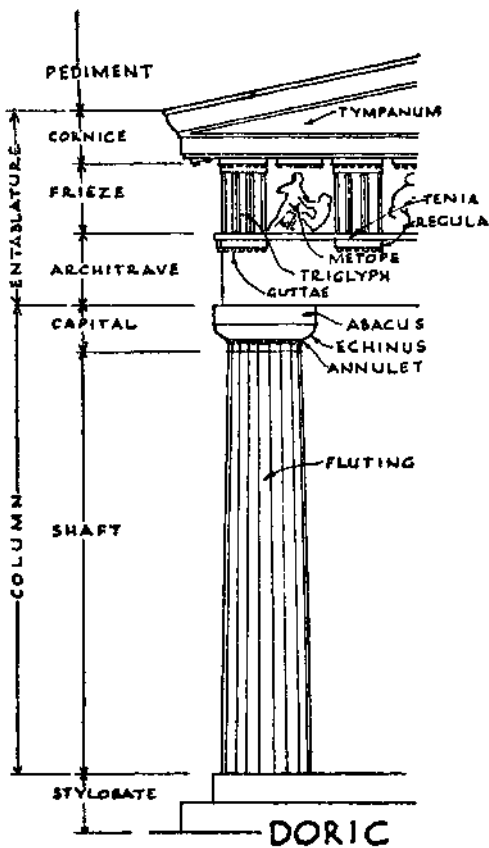
The answer is simple: it provided rules and directions which could be mastered easily by craftsmen and designers. These rules kept mediocre people from making ugly errors; they kept the bad taste of fools in check; they allowed men of genius to exercise their imagination in fresh and inventive interpretations—they were as fluid and flexible in the hands of men like Christopher Wren or William Kent, Thomas Chippendale, George Hepplewhite, Robert and James Adam or John Nash as words were in the hands of Shakespeare.

Of what, then, did these classic orders of architecture consist and how did they form the basis of a system of design? They were first perfected in Greece during the

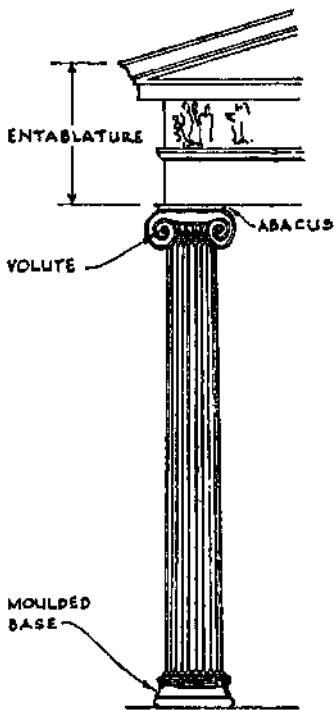
great period of civilization that flourished in the sixth, fifth and fourth centuries before the Christian Era. These orders took three forms: Doric, Ionic and Corinthian. They supplied a system of horizontal and vertical rhythms, and they accommodated a variety of ornamental patterns. In the third chapter of *Industrial Art Explained*, which discusses "The Influence of Architectural Tradition on Industrial Art," I have tried to condense the characteristics of those orders in the following sentences:

"Greek lucidity and love of moderation are illustrated by the temperate use of ornament in all three orders. In each, fluted columns terminated in capitals, which supported an entablature, divided horizontally into architrave, frieze and cornice. The Doric capital was plain, the Ionic was decorated with twin spirals, called volutes, and the Corinthian had smaller volutes rising above a band of formalized acanthus leaves. The variation of surfaces and the emphasizing of structural lines with mouldings, the occasional enrichment of mouldings with carved ornament, and the use of sculpture on the frieze of an entablature or the tympanum of a pediment all made some appropriate and reticent contribution to the composition of a building. Ornament was never allowed to disrupt or mask the harmonious relationship of structural elements which the orders represented."(2)

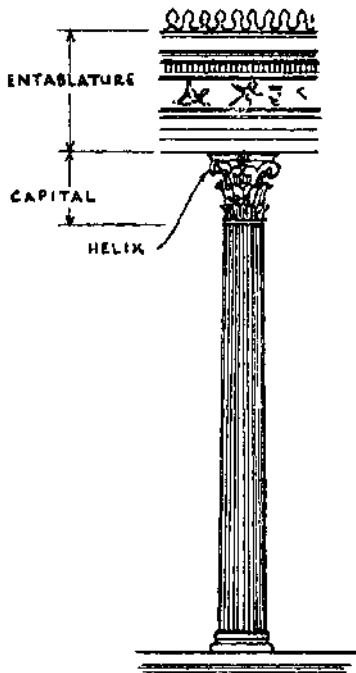
The three Greek orders are shown on pages 72 and 73, and those diagrammatic illustrations convey the sense of restraint, and the moderation with which ornament was employed. There was an orderly dignity about the type of ornament; most of it was originally designed for the enrichment of stone mouldings and capitals and surfaces, and consisted of geometric devices and formalized representations of flowers and leaves. But, as Wornum points out in his *Analysis of Ornament*, there is "no actual imitation whatever in Greek ornamental art."(3) On



The Greek Doric order. This was used for the Parthenon at Athens.
 (This illustration, and those on page 73, are reproduced by permission
 of the authors from *4 Short Dictionary of Architecture.*)



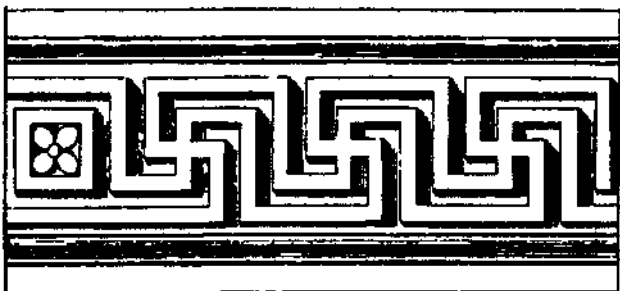
IONIC



CORINTHIAN

The Greek Ionic and Corinthian orders. Compare these with the Roman versions shown on page 79.

(From *A Short Dictionary of Architecture.*)

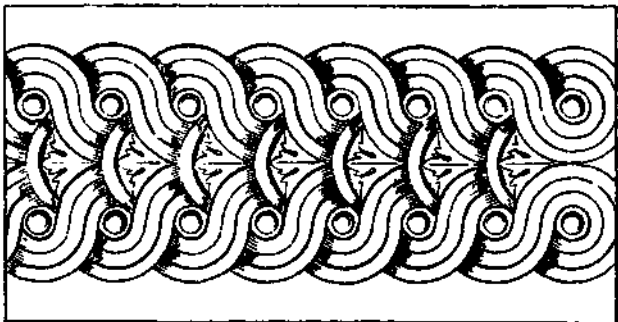


A Greek geometric enrichment, the fret or labyrinth.

(From *Analysis of Ornament*, by Ralph N. Wornum.)

this page there is an example of a geometric enrichment—the Greek fret or labyrinth. On page 75 are three other examples, taken from the *Analysis of Ornament*, the upper two are the anthemion, which is sometimes known as the honeysuckle or palmette, and the echinus or horse-chestnut, commonly known as the egg-and-tongue, or egg-and-dart, bordered by the astragal moulding which is enriched with the bead and reel. The guilloche ornament is shown below.

The most familiar of all the ornamental devices introduced or used by the Greeks is the acanthus leaf. The acanthus is found in southern Europe, and the common species, *acanthus mollis*, is called brank-ursine or bears' breech. It is used on the Corinthian capital, and you must turn to the pages of *A History of Architecture on the Comparative Method*, Sir Banister Fletcher's monumental work, if you want to trace its evolution. (4) The acanthus became ubiquitous; it is with us still. "In Greek hands it retained a feathery delicacy, and was employed with restraint; in Roman it became extravagant in form and was used with lavish vulgarity. The three orders were adopted by the Romans, who added two others, the Tuscan and the Composite. The former



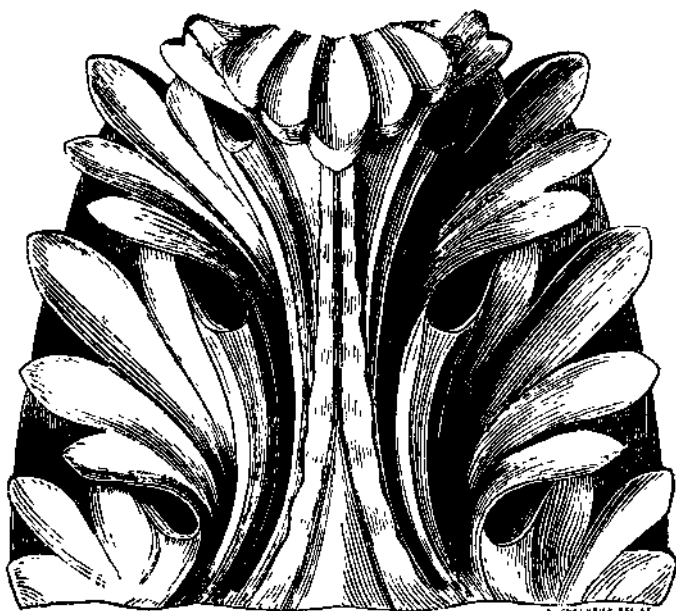
Three Greek enrichments.

Above: The anthemion, sometimes known as the honeysuckle or palmette.

Centre: The echinus or horse-chestnut, commonly called the egg-and-tongue and egg-and-dart.

Below: The guilloche ornament.

(From *Analysis of Ornament*, by Ralph N. Woraum.)



The acanthus leaf, which has probably been used in decoration more than any other floral device in Western civilization. This is the Olive acanthus, and is a Roman version.

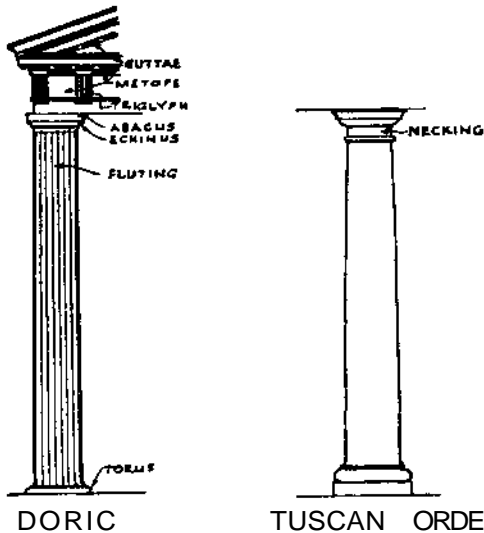
(From *Analysis of Ornament*, by Ralph N. Wornum.)

was a version of the Doric, with unfluted columns rising from a base to a simple capital and entablature. The Corinthian order, seldom used by the Greeks, was the favourite order of the Romans, and they produced an elaborate variation of it, with capitals which combined Ionic and Corinthian features. This was the Composite order: restlessly ornate, overcrowded with ornament and permanently vulgar."(5)

Those Roman orders are illustrated on pages 78 and 79. They were used to impose upon the Roman world—which represented the United States of Europe,



Part of the decoration of a Roman pilaster, showing the elaborate development of the acanthus leaf.
(From *Analysis of Ornament*, by Ralph N. Wornum.)



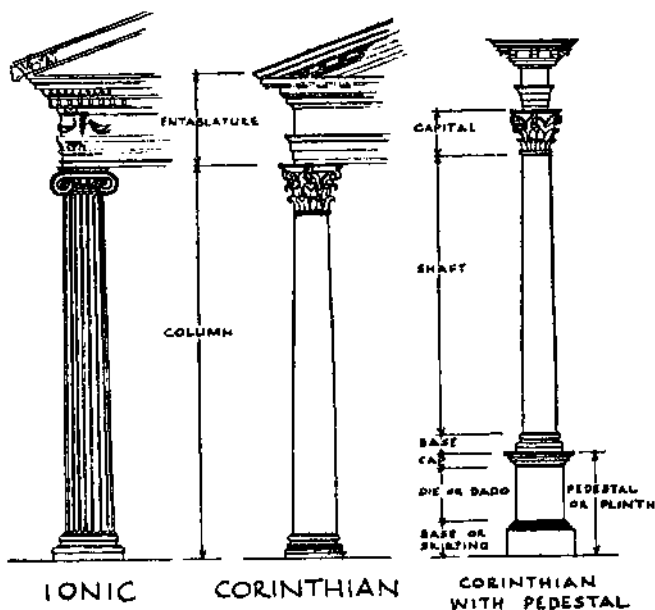
DORIC

TUSCAN ORDER.

The Roman Doric and the Tuscan orders. The Tuscan was invented by the Romans, and is a variation of the Doric order.

(From *A Short Dictionary of Architecture.*)

North Africa and much of Asia Minor—a standardized form of architecture and ornamentation. "The temples and tombs, the altars, triumphal arches and monuments, government buildings, palaces, bridges, aqueducts—even the private houses—are of a recognizable pattern. The rules for architecture were inflexible; they were used from Chester to Jerusalem, from the Danube to the Libyan Desert, to symbolize the magnificence and stability of Rome. Beyond the Roman roads were barren sands or barbarian darkness; within the Empire were law, order, a common language and currency, organized industry, standardized forms for nearly everything—for buildings, furniture, vehicles, armour,



The Roman Ionic, Corinthian and Composite orders. The last is an ornate variation of the Corinthian. Compare these with the Greek orders shown on page 73.

(From *A Short Dictionary of Architecture*.)

weapons—and those forms were unchanging."(6)

Wornum tells us that "the most simple Greek ornament becomes, under Roman treatment, if not a magnificent, at least an elaborate decoration. (7) Ornamental forms "under Roman treatment" had a way of degenerating into florid and overpowering conceptions, as the foliations of the acanthus that decorate the pilaster illustrated on page 77 demonstrate in detail. But the place and nature of ornament were regulated: the details might be excessively ornate, but they never overflowed to the detriment of good proportion.

Various strange and decorative elements were often

assembled with great skill, as exemplified on the opposite page by the portion of a frieze from Trajan's basilica at Rome, designed by Apollodorus of Damascus—a gifted architect who was banished and ultimately executed for criticizing the ideas of a client. The client was the Emperor Hadrian, who Gibbon described as "capable, by turns, of the meanest and most generous sentiments"; and the unfortunate disagreement occurred when Apollodorus was asked to express a view about the Emperor's plans for a temple. The architect was unwise enough to mention that if the goddesses and other statues seated in the temple area ever wanted to stand up, their heads would go through the ceiling. This reflection on the Imperial intelligence was unforgivable, and the fate of Apollodorus suggests that criticism even of the most elementary kind was a hazardous undertaking—it might directly or indirectly abrade the dignity of some powerful official in the huge, mindless, bureaucratic slave state that Rome had become by the second century.

It was easy enough to follow the rules for the orders and their embellishment. They had been set forth by a Roman architect named Marcus Vitruvius Pollio, whose twelve books on architecture were written, it is conjectured, in the time of Augustus. Those Roman orders were revived during the Italian Renaissance of the fifteenth and sixteenth centuries. "About 1486 an edition of Vitruvius had been printed in Rome; others were published in 1496 and 1497, while nine were issued during the sixteenth century. These were in Latin, but in the same period two French, two German and seven Italian versions were printed. Everywhere in Europe Roman architecture was re-establishing its regulations, but for the first time its orders were being interpreted by men whose minds were more active and innovating than Roman minds. The Renaissance was more than a revival



Part of a decorative frieze from Trajan's basilica at Rome. This is an example of controlled elaboration in which a number of decorative motifs are handled in an orderly fashion.

(From *Analysis of Ornament*, by Ralph N. Wornum.)

of ancient learning and art; it was the reawakening of the European intellect which had been in abeyance for centuries."(8)

I have made no reference to the national architecture and characteristic forms of design that had developed in England during the Middle Ages, for I am only tracing the pedigree of classical design; but the conflict between mediaeval traditions and the reintroduction of Roman rules has been suggested by a quotation in Chapter Three (pages 29 to 31). That conflict was not resolved until the middle years of the seventeenth century, and directly England was liberated from the Puritan dictatorship, a great period of good design was rapidly established. I have attempted to sum up the results in *Industrial Art Explained* in these two paragraphs:

"By the beginning of the eighteenth century, the system of design that was now so thoroughly understood, was being universally employed. The design of coaches, ships' lanterns, door knockers, iron railings and gates, clock cases, furniture of every description, chandeliers, candlesticks, silver cream jugs, sugar bowls, salt cellars—indeed, the form of everything reflected ideas which first found expression in Greek civilization and which now enjoyed a new injection of genius from English minds and English craftsmen. The Romans distorted and petrified the forms that had carried those ideas; in Georgian England they sprouted afresh.

"We have intentionally traced the growth and development of this system of design from its origins in Greece, for its persistence records the continuous identity of European life with Greek civilization. Although it was the interpreters of classic architecture, great Italians like Palladio, great Englishmen like Inigo Jones and Christopher Wren, great connoisseurs and educators like Richard Boyle, Earl of Burlington, who received the credit for educating taste; without the initial inspiration of Greek

architecture, the most remarkable period of English design would have lacked the completeness it attained in the course of a hundred and seventy years. During the eighteenth century, many books and collections of plates were published, which spread knowledge of the principles of design and the rules for attaining correct proportions throughout the whole country, so even the village carpenter and mason in some remote district would be fully acquainted with the orders of architecture, and able to execute not only the work of some fashionable architect, but the instructions of the local gentry. It had become part of a gentleman's education to understand design, and every new idea, every fresh foible of fashion was accommodated by the all-pervading system. Dutch taste, French taste, Chinese taste, fashions from all over Europe and the Far East, might acquire a fleeting modishness, but they were never permitted to disturb the established observances of good proportion. Even experiments with Gothic forms made by eccentric antiquaries like Horace Walpole, failed to disrupt the system of design or even to embarrass its practitioners. The principles of design, evolved from the study of the classic orders and their proportions, continued to provide consistent visual satisfaction and delight. Living as we do today in an age of confusion that is in many ways comparable to the late sixteenth century, we can scarcely imagine the completeness, the universality, of good design in the eighteenth century or the profound satisfaction it gave to the eye by its consistency, its inventiveness, its unfettered gaiety, and its complete identification with every branch of life. Into this well-ordered world, dominated by people whose education included a lively and informed appreciation of art and architecture, when men in every walk of life used common sense in judging the shape and performance of all the things they used, a world richly endowed with highly skilled craftsmen and mechanics, came the in-

dustrial revolution, which was not recognized as a revolution, and for which no preparations had been made." (9)

The continuity was broken; the significance of the system was lost; its ornamentation became a quarry for copyists, and its underlying principles either ignored or unsuspected. To revive its forms today would be absurd; but to learn its principles, to study their operation in directions other than classical design, is a form of discipline for the eye that quickens appreciation for good proportion and prevents a designer from becoming too intimidated by the materials and processes of modern industrial production.

It has been said that "the man who best knows 'the rules' is the man who best knows how to dispense with



The acanthus motif persisted long after the Western Roman Empire had disappeared, and it took on strange forms and was intermingled with various motifs. Here, for example, is a Byzantine frieze from a church at Bonn. The classical version of the acanthus did not reappear until the Renaissance. Compare this illustration with the marble panel by Tullio Lombardi show., opposite.

(From *Analysis of Ornament*, by Ralph N. Wornum.)



A marble panel at Santa Maria de'Miracoli, Venice, by Tullio Lombardi, *circa* 1500. The old classical forms re-emerged at the Renaissance, but they were used with greater freedom and with far more imaginative intelligence by the Italians of the fifteenth and sixteenth centuries.

(From *Analysis of Ornament*, by Ralph N. Wornum.)

them later on."(10) A new fluency is apparent today in decorative industrial design, where symbolic motifs are used instead of abstract shapes; and although such examples as those afforded by the work of Eric Ravilious and Marion Dorn, shown on Plates 15 and 16, owe nothing in form or colour to classical originals, their orderly disposition is as classical in spirit as, say, the arrangement of the decoration on the early sixteenth-century marble panel by Tullio Lombardi, shown on this page, though far freer, even when full allowance is made for the difference between carving on marble and screen-printing on chintz or printing from hand-engraved copper plates on pottery. The "Hermes" pattern on screen-printed satin designed by Louise Aldred and illustrated on Plate 16 has for its motif the wings that were affixed to the boots of the Greek god Hermes; but the conception is wholly contemporary though the arrangement again is classical in spirit.

Remember then that classical design has a significant pedigree, and is imbued by a spirit that may teach you something, and that those who acknowledge such facts are not necessarily reactionaries or copyists; as technicians in design they are prepared to use all relevant knowledge in the arduous and exacting task of training their imaginations.

CHAPTER EIGHT

Something About Yourself

SO far the chapters of this book have suggested how you may train yourself to become clear-minded about the character and scope of industrial design, and how to sharpen your powers of observation and critical analysis. An occasional historical flash-back has indicated the structure and ramifications of the old classical system of design which still marks superficially the form of many things, and from such short explorations of the past, you may have learned why the eighteenth-century designer could work with such confidence, certain of being understood by his clients, and you may possibly have envied his happy condition. You may have realized that in addition to being a technician in design, you have to be a tactful missionary for your own standards, because, unlike the eighteenth, the twentieth century has no universally accepted standards for appraising the merit of a design.

Now before taking you to the next stage of self-training, before suggesting a programme that may help you to get acquainted with industry, how do you think you are doing? Have you become at all sure of yourself in your critical deliberations about the way things work and the way things look? Do you feel competent to pronounce judgment upon the merits of this or that example of design which you come across? If you do, merely on the strength of reading a few chapters

of what can at best be only a superficial guide book, just think again, and realize that only by putting into operation some of the courses of action suggested in Chapters Three, Four and Five over a long period, only by constant practice in critical examination and analysis, can you begin to establish any certitude about your own standards. Don't imagine that you are beginning to approach a condition of infallibility: only a genius of the highest order ever approaches such a superior altitude, and even he has to climb there with toil, sweat and tears. If you suspect that perhaps your judgment *is* infallible, it means that you have either remained very young or else you are in your second childhood before your prime. Meanwhile, I hope that, in addition to looking about you and making critical tours and digging out facts which will reveal the why and wherefore of various practical matters, you are sketching and noting all kinds of examples of good design. And as you set about these activities, how are you thinking of yourself?

I have occasionally referred to you as a technician, and you may not like the word. To your mind the term "artist" may have a friendlier, perhaps a more exalted sound: certainly it is more picturesque. But if you regard yourself as a technician, you will have a better chance of being accepted seriously. An artist is a technician—some of the great artists have been the greatest technicians, like Leonardo da Vinci—and the man who can claim the authority of a technician, and prove his right to the claim by the practical nature of his work, is respected in the commercial machine age in which we are living. Also, an industrial designer often has to take his place as one of a team of technicians in tackling problems of industrial production. Unless you are recognized as a technician of equal standing with production engineers, research chemists,

marketing specialists, sales managers and development directors, you are just going to be pushed around and regarded as an unpractical visionary, because, regrettably enough, many people in this country still incline to think of an artist in that way. So you had better make up your mind about yourself, particularly about the way you are going to present yourself as a professional man to the people who may commission and use your work.

You would be well advised to insist from the beginning that you are a technician. All this may sound elementary: it is, but elementary matters have a way of being forgotten. The fact that we live in a world of misrepresentation and misconception is also forgotten. We all incline to build up idiotic mental caricatures of what various people look like if we don't know much about their professional or business activities.

It's just as silly to think that a designer must always look like this:



as it is to think that a business executive or an industrial organizer should always look like this:



Such misconceptions, which are invested with prejudice arising from ignorance of the function of design or from ignorance of or unconscious political bias against business, seldom occur in relation to other professions. For example, although a designer may think that an accountant is like this,



the business executive engaged in management and organizing work, inclines to think of the accountant like this:



There is no reason, particularly if the designer regards

himself as a technician, why the business execut should not think of the designer like this too,



even if the designer happens to look like this:



Still, an impression of youth is all to the good; it will be cured by time and experience; but nothing on earth can cure this sort of impression



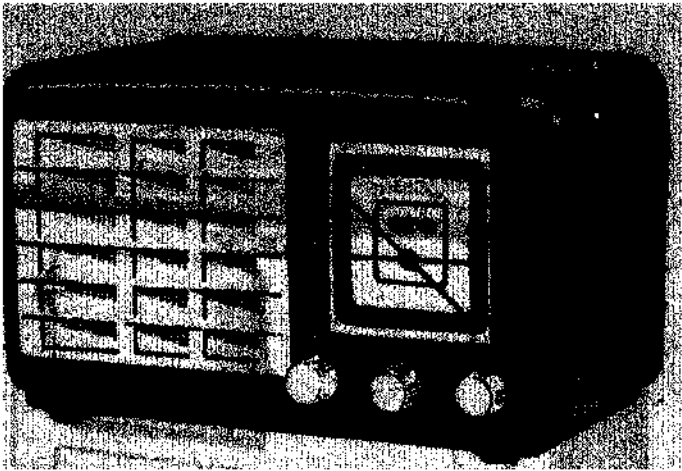
if you are ass enough to make it deliberately.

CHAPTER NINE

Materials and Processes

WE are now beginning to enjoy the advantages of the second industrial revolution, and you may live to see the beginning and even the establishment of a third, brought about by the release and *civilized* use of atomic energy. The abundant power that third industrial revolution could enjoy, might conceivably change the character of many branches of industrial design, and a good many other activities too. As long ago as 1914, a few months before the outbreak of the First World War, H. G. Wells, with that air of prophetic inevitability which used to carry such conviction in those days of unruffled security, described in a book called *The World Set Free* the possible results of releasing atomic energy. We may yet find ourselves living in the sort of world he imagined. But I am not discussing the future of civilization; it never turns out as people expect: in this book I'm only interested in your future, and what you are going to make of it—for you can shape much of it yourself, if you want to, but to do so you must be fully aware of the age you're living in, which I have called the commercial machine age. We are, I repeat, passing through the second industrial revolution of that age.

The first industrial revolution was based on steam power generated from coal, on the improvement and

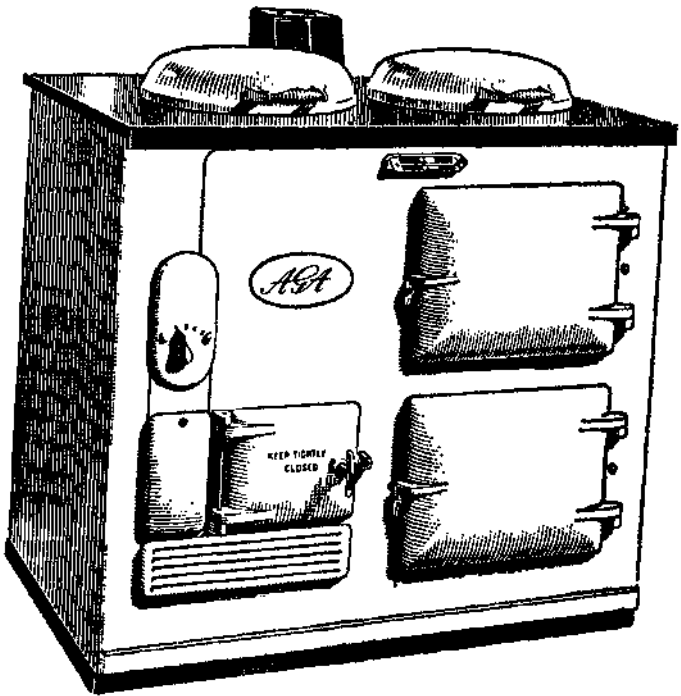


Here is an example of a contemporary use of plastic materials for a radio set.

(Reproduced by courtesy of Ultra Electric Limited.)

extension of iron founding, and ultimately on the large-scale production of steel. *Iron, coal* and *steam* are the three key words of that revolution, and although sociologists like Lewis Mumford may think up fancy terms such as "paleotechnic" and "neotechnic" (i) to denote phases in the evolution of the machine age, it is unnecessary to use high-sounding but clumsy words in order to convey the simple facts of industrial history. The second industrial revolution is based on the use of electric power, light alloys, and such chemically produced synthetic materials as plastics. But the ramifications of this subject are endless; for there is no clean cut between the use of the characteristic materials of the first and second industrial revolutions. I quote here the final paragraph from Chapter Ten of *Industrial Art Explained*, on "The Influence of Materials on Design."

"Plastics, light alloys, plywood, steel tubing, glass, rubber, composition boards, foil, all kinds and varieties



The "Aga" Heat Storage Cooker designed by Doctor Gustav Dal^n. This light-coloured, smoothly finished, well-designed appliance is made largely of cast iron, a material that today has many new finishes and properties. It emphasizes the point that "there is no clean cut between the use of the characteristic materials of the first and second industrial revolutions,"

(This drawing, made from a photograph, is reproduced by courtesy of AgaHeat Limited.)

of paper, were being used inventively and occasionally with great originality, before 1939; and industrial art may be enriched not only by an array of new materials, but by partnerships between materials. As a result of war production, some new partnerships have been made. For instance, it is now possible to weld aluminium directly to glass. Combinations of plastics and light alloys have been tried out and found practical in use; plastic sheets and plywood have been cemented together; and such partnerships between materials old and new, and the improvements made in the character of many traditional materials increase the designer's control over the form, colour, weight and character of the things he designs. His responsibility for hard thinking is also increased, so he may consciously reject the easy way of using new materials and techniques, and resist the temptation to imitate or adapt an old idea, when some new thing could be created, whose form reflected the scientific and industrial genius of the twentieth century." (2)

It is an essential part of your education to familiarize yourself with the character and properties of materials; and don't let plastics go to your head. Don't imagine that because you live and work in the second industrial revolution that all the methods and materials of the first have been outmoded or discarded; for methods of fabricating materials are constantly improved and amended and the materials themselves, as a result of research and experiment, are brought up to date, often acquiring new finishes and properties, so that they are scarcely recognizable as they are used today. Now it's easy enough to say you must familiarize yourself with materials, but how are you going to set about it?

As a first step, I suggest you read C. A. Ward's admirable introduction to the study of the subject,

entitled *Those Raw Materials*. (3) In the Appendix various books on different branches or related aspects of industrial design are recommended, but Ward's is a basic book on materials. It will give you, at the outset of your studies, a clear and logical approach to the whole subject, and should enable you to co-ordinate your information. It is divided into three parts which cover: i. *Raw Materials and their Uses*. 2. *Occurrence of Raw Materials*. 3. *Preparation of Raw Materials*. This book, which I regard as an essential and reliable work of reference, will save you any amount of time in acquiring preliminary knowledge of materials and their uses. There are other books which are specifically concerned with some material or group of materials in relation to industrial or architectural design, such as *Glass in Architecture and Decoration*, (4) by Raymond McGrath and A. C. Frost; *Cast Iron in Building*, (5) by Richard Sheppard, which I have quoted in earlier chapters; *Plastics in Industry*, (6) by "Plastes"; and my own book, *Plastics and Industrial Design*, (7) which are all mentioned in the Appendix. But use Ward's book as a guide to your programme of studies, and try to visit some industrial plants, if possible in this order:

- (i) Plants producing materials, from the raw mineral or chemical substances to the form in which they can be fabricated (such as pig iron).
- (2) Plants partially fabricating materials (such as aluminium sheets or extruded sections, plywood, or plastic sheets).
- (3) Factories making finished goods (which may be represented by a pottery producing domestic ware, a battery of looms producing carpets, or an assembly plant for radio sets, typewriters, sewing machines, cars or lorries).

These three headings may be amplified by specific examples, again to give you an indication of the sort of study you should pursue.

- (1) *Plants producing materials, from the raw mineral or chemical substances to the form in which they can be fabricated.*

A simple and straightforward example is provided by iron, the basic material of the first industrial revolution. The ironfounder uses what is known as pig iron, and this is produced by smelting iron ore in a blast furnace to separate the metal from the ore. The furnace is filled with iron ore, limestone and coke fuel, and temperatures as high as 1800°C. may be reached. The iron ore is melted, the molten metal descends to the bottom or the hearth of the furnace, and is then drawn off into the pig beds or moulds, where it cools and solidifies in the form of pig iron. In the manufacture of steel, the molten metal, instead of being halted at the pig-iron stage, goes through further refining processes.

- (2) *Plants partially fabricating materials*

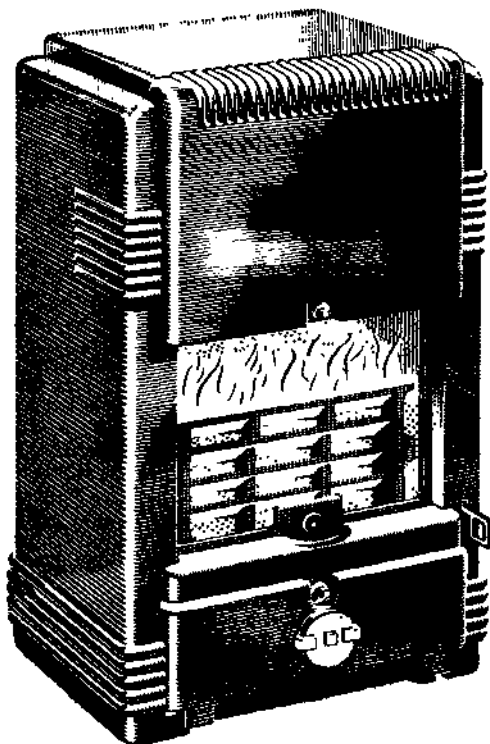
We'll follow iron through under this heading, and supplement it with another example later. The pig iron which was produced through the smelting of iron ore in the blast furnace is sent to an iron foundry where it is remelted and cast in a mould. A pattern of wood or metal is made, which exactly represents the form of the ultimate casting. This pattern is put into an iron box, and surrounded by sand which is the commonest form of moulding material; the sand is rammed tight around the pattern, which is then removed, and the sand remains in position. The pig iron, which has been remelted in a furnace, is then poured in its molten state into the mould, filling the

space made by the removal of the pattern. To prevent the casting from being solid and tremendously heavy, a core made of silica sand, bonded with clay or some organic material, is inserted in the gap left by the pattern, before the molten iron is poured in, so that the casting exactly follows the exterior of the pattern, but is hollow within, the extent and shape of the hollow being determined by the dimensions of the core. When the molten metal cools and the casting is firm, it is removed from the moulding box, and the sand shaken off. This is a simplified description of the casting process in a foundry; for an amplification of it read Section III of Richard Sheppard's *Cast Iron in Building*.

Another and totally different example of the partial fabrication of materials, is provided by a plywood factory. Here, very thin sheets of wood, which are known as veneers, are cemented together under pressure. These veneers are glued together with the grain of the wood running at right angles in adjacent sheets. Three-, four-, five-, or more plies may be built up, and the plywood may be faced with thin sheets of metal or plastic, thus becoming a composite material which can be used (to give a very short list) in the making of furniture and radio sets, for coach building, aircraft, and for many different purposes in building.

(3) *Factories making finished goods*

In a factory which is producing finished products, you may see a modernized version of some ancient process which has a craft basis, or some entirely modern example of the mass production of a commodity that passes along the assembly line and gradually acquires its form as part after part is added. All kinds of materials and processes may have gone to the



The "Otto" Stove designed by Raymond Loewy and Charles Scott. Like the "Aga" Cooker shown on page 94, this stove is largely made of cast iron in a modern finish. This design is compact, efficient and agreeable: nothing is wasted, there are no needless frills, there is no spurious "streamlining."

(This drawing, made from a photograph, is reproduced by courtesy of Allied Ironfounders Limited.)



Some of the advantages of contemporary materials are illustrated by this experimental design for a beer barrel. It is made of aluminium alloy, and is a quarter of the weight of a wooden barrel of similar capacity. The design represents a straightforward solution of a problem, and the designer has used to the best possible advantage the properties of the material.

(Reproduced by courtesy of the Northern Aluminium Company Limited.)

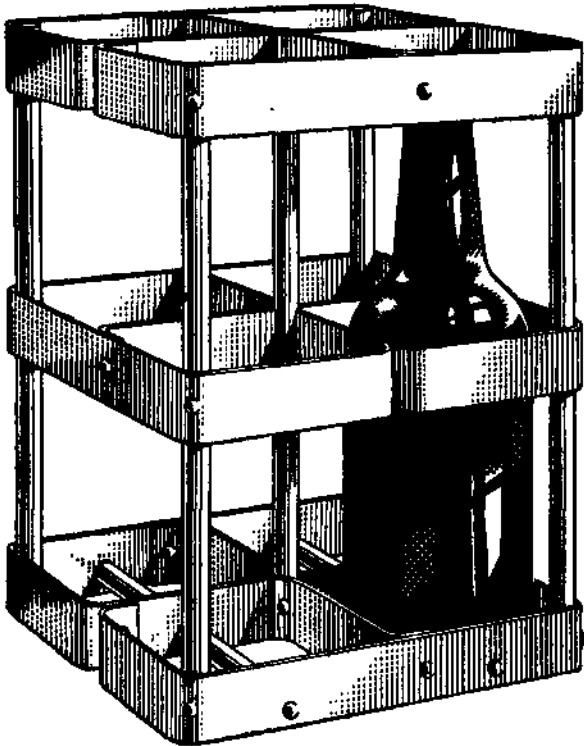
making of these individual parts, and if, for instance, the commodity is a piece of static machinery of the sort I happen to be using at the moment—a typewriter—you'll find small iron castings, aluminium castings, steel, rubber, plastics, and often a base made of plywood on which the machine stands. Partially fabricated materials, such as plywood and plastic sheets, or parts that have been finished elsewhere, such as iron or aluminium castings or steel pressings, are brought to the factory where they are all finally assembled.

There is a certain family likeness among industrial processes; and without risking one of those tempting over-simplifications, it may be said that most materials are fabricated through temperature changes, the

application of pressure, or the result of chemical action.

If you have a groundwork of knowledge about the processes and methods used for obtaining raw materials and giving them the form in which they can be transported to the place where they are to be fabricated, you have made a good start for studying the characteristics, properties and possibilities of any particular material or group of materials; and that study can be amplified directly you have a specific problem which demands the use of those materials. Suppose, for example, you have to produce a design for some light object that has to be fireproof, and you decide that the best material for the purpose is aluminium. If you are commissioned to produce such a design, you should either ask those who commission you to give you facilities for studying the properties and methods of fabricating this particular material, or, if you want your investigation to be independent, seek such facilities yourself. Even if you are not commissioned by anybody, and you want to make some experimental designs for your own information, then you would find no difficulty whatever in obtaining all the help you want for studying from firms specializing in the fabrication of aluminium and its alloys. Enterprising manufacturers are always ready to encourage people to know all about the practical applications, properties and possibilities of their materials. Try to see the inside of as many factories as possible: don't be shy about this: unless you ask you won't have a chance of seeing anything, and most manufacturers are proud of their works, and like people to see them. Some even organize conducted tours. It's up to you to see all you can.

Of all forms of training, that given to the architectural student provides the most practical and effective way



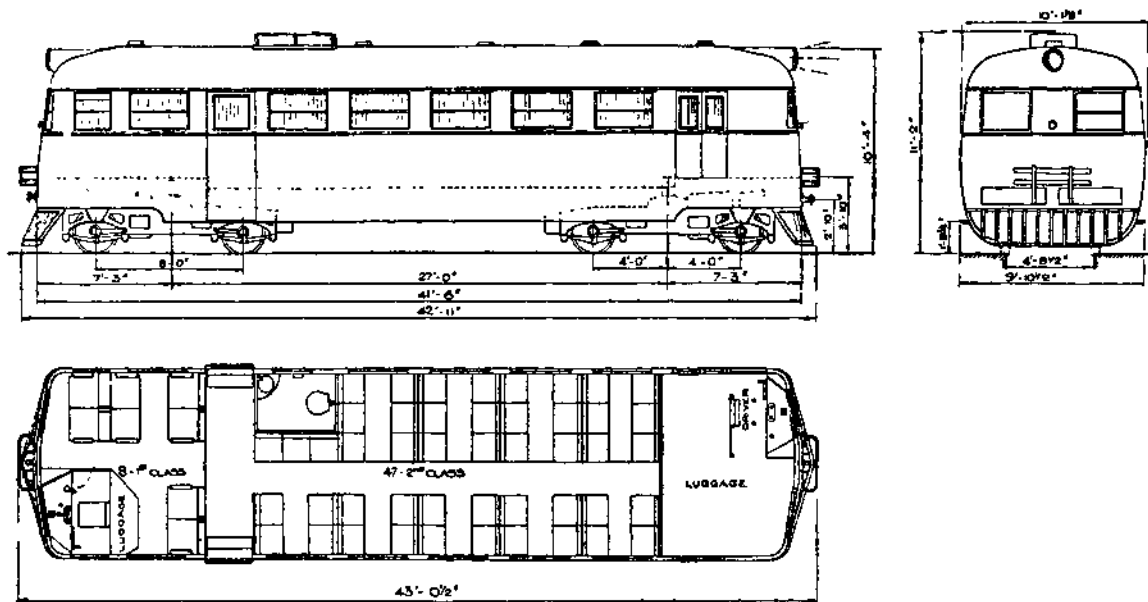
Here is another experimental design in aluminium alloy, a beer-bottle crate that is light but strong, and will resist corrosion. Observe the simplicity of this design: no scrap of material is wasted, and the maximum convenience for handling has been achieved by the simplest methods.

(Reproduced by courtesy of the Northern Aluminium Company Limited.)

of getting a comprehensive knowledge of a range of materials. The architect is trained to study materials, to know all about them, to understand their capacities for performing the most varied tasks, and at an early period of his technical education, a lively interest is aroused and an adventurous, experimental spirit encouraged, in new materials, improvements in old materials, and associations of materials. This characteristic of an architect's training may account for the fact that many of the leading industrial designers in this country happen to be qualified architects, or have been trained as architects. I am not suggesting that an architectural training is an essential preliminary to becoming an industrial designer, for many designers have had other forms of training; but such men have the same practical knowledge of the use of materials as architects, and are lit by the same experimental spirit. The next chapter suggests how that experimental spirit inspires the most practical results in tackling problems which require the study of materials and processes, and demand the seeking out of new materials and methods for handling them and shaping them.

Industrial Design in Operation

EVERY problem of industrial design should be clarified by a proper brief for the designer. Every manufacturer who tackles a problem of design has a proper brief from his customer; he knows exactly what he has to tackle, and what estimates he must prepare. In this chapter, I am giving three different examples of industrial design, and the first, which is primarily an engineering problem, is described by courtesy of D. Wickham & Co. Ltd., of Ware, Hertfordshire, and concerns the design and production of a lightweight rail car for the Jamaica Government Railway. The standard gauge railway owned by the Crown Colony of Jamaica has a section built a century ago—it was one of the earliest colonial railways. About forty per cent of its total mileage is in curves, with radii down to 300 feet, and the gradients vary from 1 in 60 to 1 in 30, including an almost continuous gradient of 1 in 30 for five miles. About eighty per cent of the pre-war traffic revenue on this railway came from freight; but it was decided to improve passenger services, and this improvement was achieved by replacing some trains on both main and branch lines by independent rail cars, which were designed for this purpose by D. Wickham & Co. One of these 55-seater first- and second-class lightweight rail cars is shown on the upper part of Plate i. The front



The front and side elevation and sectional plan of the 55-seater lightweight rail car, designed for the Jamaica Government Railway by D. Wickham & Co. Ltd., of Ware, Hertfordshire. (See Plate i.)



The H.M.V. electric iron designed by Christian Barman, F.R.I.B.A.
 This has a continuous and smooth surface having a flat soleplate, with no projections to interrupt it, the only visible parts being the control switch controls with a soleplate.

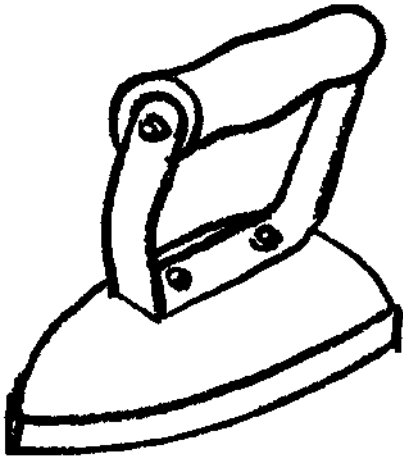
(This drawing, made from a photograph, is reproduced by H.M.V. Household Appliances.)

and side elevation, and a sectional plan, are shown on page 105. Each car accommodates eight first-class and forty-seven second-class passengers, with luggage compartments and lavatory, and is driven by two Perkins P,6 six-cylinder Diesel engines. Specially designed suspension reduces vibration, and makes for very smooth running. These cars are designed to suit the traffic needs and operational conditions of that particular railway, and are wholly contemporary in conception and design, owing nothing to traditional prototypes. This liberation from the leading strings of tradition is also apparent in the form of the train shown on the lower part of Plate i, which is typical of much of the motor-driven rolling stock now in operation on American railroads.

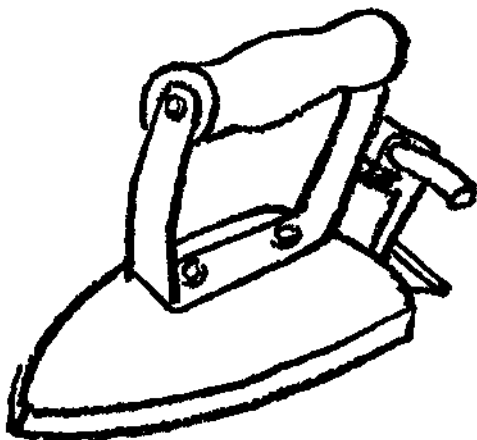
Two totally different examples of industrial design in operation may now be given. The first is provided by the work of Christian Barman, F.R.I.B.A., on the H.M.V. electric iron. Several years ago, H.M.V. Household Appliances decided to put on the market an improved form of electric iron, and presented the problem of designing this product to Mr. Christian Barman, who, after consulting with scientists and engineers, completely departed from the prototypes that had hitherto dominated the form of the electric iron. The six stages of exploratory research work in design, which are presently illustrated, were originally included, by courtesy of H.M.V. Household Appliances and Mr. Barman, in my book, *The Missing Technician in Industrial Production*, (i) The final product had no visible joints, but displayed a continuous and smooth surface of hard-glazed fireclay; there were no untidy projections to disrupt that surface, and the only other parts visible were the control switch and the metal sole-plate. I have elsewhere suggested that the H.M.V. electric iron, "the 'Aga' heat storage cooker, designed by Dr. Gustaf Dalen; the 'Otto' stove, designed by

Raymond Loewy and Charles Scott, all exemplify the essential qualities of machine art: the functional fitness of these products is uncomplicated by any inherited notions of form or finish: their designers have started clean." (2) This uncomplicated smoothness of surface is also a characteristic of the two clocks designed by Henry Dreyfuss for the Westclox division of the General Time Instruments Corporation, which are shown on Plate 14: it very often follows when designers have the courage to start clean, and to forget the ancestry of the product that provides their problem.

The evolution of the H.M.V. iron shows how the electric iron was to begin with merely an electrified version of the old flat iron which was heated up on a stove or a gas ring; just as the first "talkies" were merely photographic and sound records of stage plays, for when silent films were abandoned, there was an unimaginative gap during which films were tied to the technique of the theatre, and some years elapsed before an effective technique was evolved for the talking film. The six evolutionary stages of the H.M.V. iron are shown as follows:

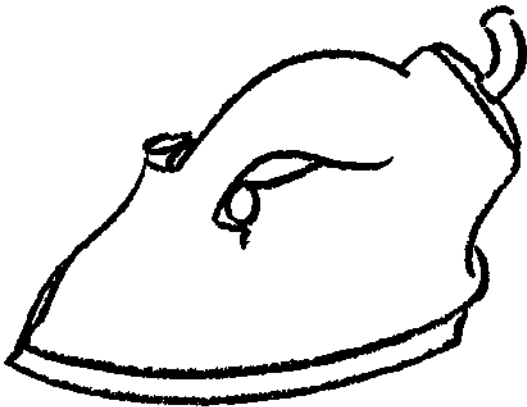


Stage I: Technically, the first electric iron represented a great advance on the charcoal and gas burning types which, in their turn, had taken the place of the old flat iron heated on a stove. But for years it did not seem to occur to any manufacturer that an electric iron might be *designed*. Its form was that of the old flat iron with an electric plug point added.



Stage II: As the plug point prevented the iron standing up on end, it had to be fitted with a projecting heel rest. When H.M.V. No. 1 controlled heat iron made its first appearance in 1935, the standard electric iron still looked like an old-fashioned flat iron with an elaborate contraption bolted on at the rear. It was a useful appliance, but there were some awkward drawbacks.

Stage III: In particular, this older type was liable to become overheated and, if carelessly left switched on, might get red hot. H.M.V. Household Appliances decided that in order effectively to discard the old



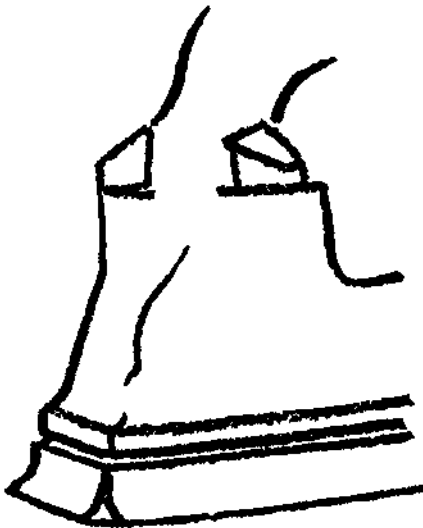
ideas and old standards, the clumsy and muddled forms of the past-must be scrapped.



Stage IV: The organization believed that their scientists were capable of producing an iron in which the temperature could be regulated by the user so that overheating would not occur. To give this revolutionary appliance an appropriate shape was a problem of industrial design. The top and handle were to be made in one piece, and the usual display of visible bolts and nuts would be dispensed with.



Stage V: A small number of wooden models, built from engineering drawings showing generally the desired shape, were handled and tested by a large number of people. The results of this research were incorporated in a pattern modelled in clay. Later, casts from this model were used to continue the study of poise, plans, and easy handling. From these trials the final shape began at last to emerge.



Stage VI: Simultaneously, many materials were
in

investigated, including glass and plastics. The greatest technical problem was behaviour under heat. Once porcelain had been chosen, colour and finish were studied. Last of all came refinements such as balance and weight, a stem correctly shaped as a heel rest, and a sole-plate with a sensitive nose, and an edge profiled to glide under buttons. Ambidexterous thumb rests concealed a necessary fixing.

For the next example of industrial design in operation, I am indebted to Mr. R. D. Russell, R.D.I., for some notes on his work for Murphy Radio Ltd. The history of this particular problem is related in Mr. Russell's own words, as follows:

"Murphy Radio's 1937 range of sets introduced a new problem for me as the designer of the cabinets. Until that year this Company had, for various reasons of its own, produced no set with station names on the scale; the scales had been very simple with two numerical wave bands moving behind a small window. Being quite unimportant in appearance they had more or less dictated a simple symmetrical layout of scale and controls with speaker above and, with one exception, this arrangement was standard practice in all pre-1937 Murphy popular sets. (See Figure A on page 113 and Plate 13, where the lower illustration shows A.4 set.) The one exception was a battery set, the lowest in price of the 1936 range, which for the sake of compactness and consequent reduction in material and cost of the cabinet was housed in a horizontal case with the loud speaker beside the group of scale and controls. But even here, in order to standardize the chassis layout with that of vertical sets in the same range, the symmetrical arrangement of scale and controls was Detained. (See Figure B on page 114 and Plate 12, which shows set 8.23.)

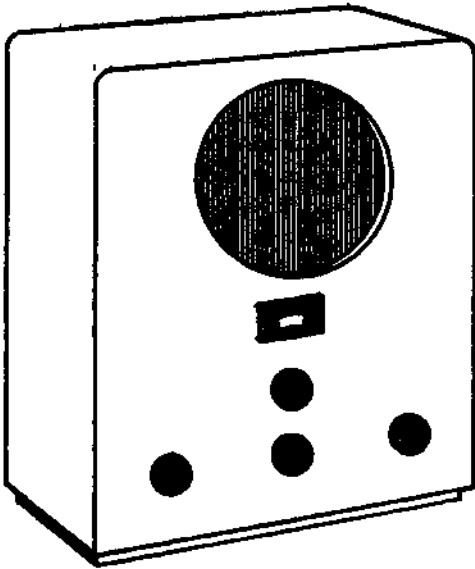


Figure A. Murphy radio set designed by R. D. Russell.
(See Plate 13.)

"This symmetrical grouping was not altogether satisfactory inside so asymmetrical a design but there was really no alternative as the scale in itself was too insignificant a feature to balance the loud-speaker opening.

"For 1937 a similar battery set, the 8.31, and also a correspondingly inexpensive mains set, the AD.32, which was the first at anything like its price to be made by Murphy Radio, were planned. (See top of Plate 13.) Also for 1937, station name scales were introduced and these were inevitably much larger and more important features in the design than any scale had been before.

"To keep down to the intended list-price a really inexpensive cabinet was essential for both these sets

and, on this account, a compact side-by-side housing was clearly indicated. In addition, the considerably increased height of the scale would have made a vertical cabinet too high. But the horizontal layout had now become a much better proposition, for the new scale was important enough to balance the loud-speaker opening and so a chassis was designed with scale and controls placed to suit my requirements for the particular arrangement I had in mind. Of course there were electrical and mechanical considerations which to some extent limited the exact spacing and pattern of these but, with a certain amount of compromise, I got what I wanted. For instance, I had the idea of emphasizing the functional connection between the tuning control which operates the scale, the scale itself and the loud speaker which produces the resulting sound by joining these three with an inlaid line. There was very little money to spare for

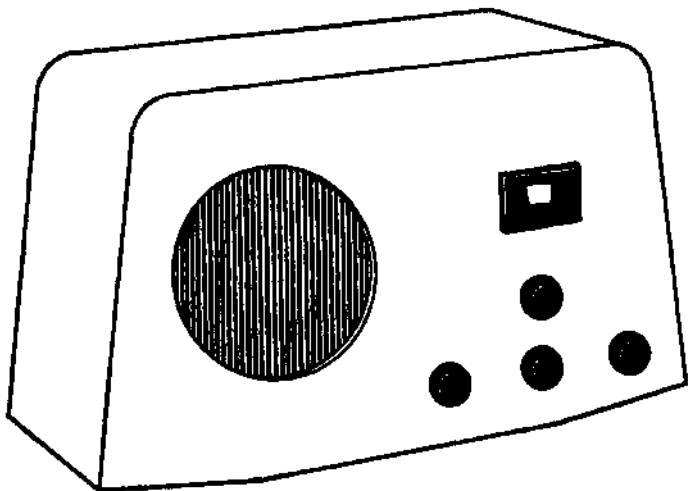


Figure B. Murphy radio set designed by R. D. Russell.
(See Plate 12.)

frills so that the line had to be absolutely straightforward and taken right across the front; therefore the units had to be exactly centred on it and this was organized. The other controls were arranged with careful reference to scale and tuning control so that the whole group led up to and balanced the loud-speaker opening and did not make its own vertical centre line as it did in the 1936 battery set.

"Details like the general arrangement and layout of the scale itself, its colour and the type used for the names, the design of the control knobs and speaker fabric were of course my responsibility and were all considered in close co-operation with the mechanical designers concerned.

"So much for the design of the cabinet in collaboration with the radio technicians. I have rather stressed the bearing on the problem of previous sets as I feel that a successful design is often very much one link in a chain of progression and cannot be considered on its own. These particular very simple cabinets do, I think, prove the value of the closest co-operation between the technical and industrial designers right from the beginning of a job for without the careful and exact arrangement of the various components they would be nothing.

"Now as to the cabinet proper and the relationship between design and production technique. Nearly all previous Murphy table cabinets had consisted of plywood top, bottom and sides joined by solid wood corner blocks, on to the face of which frame the plywood front was laid. The structure of this frame gave the effect of a continuous band but only if the grain of the veneer on the ply ran in the same direction as the grain of the solid corners so that the joints were barely visible. It was not a bad method but tended to look rather hard and without grace.

"In the cabinets for the B.31 and AD.32 (see top of Plate 13) receivers, price was so critical that only one part could be veneered even with an inexpensive wood. In the then normal construction the obvious part to veneer was the front, only leaving the sides and top in birch ply to be stained and polished. But this division was not satisfactory for a low horizontal cabinet where the top was much in evidence; the ideal seemed to be to veneer both front and top and to stain the sides. Then the front and top became very much of a piece and wanted to flow into each other by way of a rounded top corner. If solid wood were used for this corner the grain of the veneer on the ply should run from side to side to give the required continuity, and this would be tolerable only if very regular straight-grained veneer were selected for the job—if the horizontal grain was at all wild it would look unbalanced and might create the optical illusion of an out-of-true appearance. Certainly careful selection of veneers would be too costly.

"So a technique was developed by which both top and front were made from one sheet of walnut-veneered ply with the grain vertical, which was routed down from the back to a thin skin where the bend would occur, then bent under heat and reinforced on the inside with a glued corner block cut to the exact inside section of the finished bend. The walnut veneer was left light, the sides were stained a dark reddish brown and the whole thing was fairly highly polished.

"A plinth or base of some sort is necessary; it provides the thickness required to accommodate the heads of the chassis fixing bolts and also raises the cabinet from a table just high enough to be picked up easily. But if it shows it must be finished and polished and becomes an added small expense. In fact I thought that this simple direct design would

be better with no plinth showing; so two battens were fixed to the bottom to fulfil the functions of one and the front was carried right down to cover them. The bottom line of the front was splayed up at each end to express the finger grip.

"All of this sounds pretty simple and inevitable and I hope that the result looks fairly inevitable too, but the process of working it out was really quite complicated. It was worth the trouble for about 44,000 of the two sets were sold in that year, and the appearance may have had some effect on this."

Those three examples of industrial design in operation suggest the scope and range of the problems in which you may take part, and the last two emphasize the fact that as an industrial designer you become one of a team of technicians. But the *producing* of goods, whether they happen to be vehicles or domestic appliances, is by no means the complete picture. Your training as an industrial designer would be singularly incomplete unless you appreciated that, apart from production, there are activities concerned with distribution, and that the distributive trades may conceivably want some of your work. The task of distribution commands, not only industrial design, but commercial art, and sometimes the two activities become interchangeable. So before tackling any more examples of industrial design or examining its association with commercial art, we should consider the business of distribution.

CHAPTER ELEVEN

Distribution and What It Implies

WHEN goods are produced they have to be distributed and sold. In normal times, it is a buyer's market, and consumers can get from retail distributors more or less what they want; in times of shortage, or state control of supplies, it becomes a seller's market, when consumers have to want what they can get. In a country where free enterprise flourishes and competition keeps manufacturers and retailers alike on their toes, the consumer is well served, for "the customer is always right." Then the arts of persuasion reinforce the information that manufacturers and retailers publish and display about their goods.

"But why have a retailer at all, he's only a middleman?" is a question that you may have heard asked or have asked yourself. The retailer, the shopkeeper, gives the consumer freedom of choice: he provides a miniature market place, and gathers into his shop the goods produced by hundreds of different manufacturers. Some of these goods he gets direct from the manufacturer, others from wholesalers who act—to put it very simply—as distributors and warehousemen to shopkeepers, for they can carry far more stock than a shop, and as they buy in huge quantities, the manufacturer is assured of big orders which enable the price of goods to be reduced because the economic laws of mass production lower the individual cost of each item in a

long run. The wholesaler takes his profit, which is his *payment* for the convenient service he provides alike to manufacturers and shopkeepers: the retailer takes his profit, which is his *payment* for the hard and skilled task of shopkeeping, which provides a necessary service and often a major pleasure for the public, whose choice would otherwise be limited. The shopkeeper also takes risks as well as profits; for some goods he buys may never sell so he has to have a reasonable margin of profit to cover the risk of losses. Also, if he allows his customers credit, he may have bad debts to face occasionally. The shopkeeper works hard and consequently the consumer enjoys the pleasures of shopping.

The market is classified in accordance with purchasing power, so those who produce goods may become fully aware of the character and extent of their objectives. Information about these consumer objectives is secured through market research, and the results of such research influence the type, character and design of manufactured goods. The late Gilbert Russell, who was perhaps the most lucid writer on this subject who has ever put pen to paper or paper into typewriter, once said: "The purpose of market research, which simply means an inquiry into the possibilities and into the conditions existing within the market, is to discover facts at present unknown or not known with sufficient accuracy." (i)

In countries where the state controls production and distribution, the needs of consumers are often met on a minimum basis, the consumer's choice being either very small or non-existent, and instead of being "always right," the customer is almost a nuisance; but even so the consumer has to be kept reasonably contented, so the arts of persuasion are used to mollify the rigours of shortage or monotony. Distribution has to be accompanied by persuasion in almost any kind of modern

industrial state; and, as I told you in Chapter One, commercial art is chiefly concerned with the distribution of goods and with all those activities connected with marketing and selling which employ the graphic arts. Those activities include press advertising, posters, commercial literature, exhibition stands and packaging. I have mentioned the arts of persuasion, but here again I would quote Gilbert Russell, who has said: "Advertising is not an art, nor is it a science. It is a commercial operation. It has certain settled principles. It is as technical as banking. Yet it is frequently discussed and even employed as if it had no scientific basis whatever." (2)

The planning and designing of press advertising, posters, commercial literature—booklets, leaflets, catalogues—display material—showcards, counter stands, streamers and window bills—exhibition stands and all kinds of packaging, are, like the designing of goods for industrial production, normal business operations. The following extract from *Industrial Art Explained* suggests the extent and diversity of activities connected with distribution:

"A typical sequence of such operations may be described, which will show how advertising is part of the much larger business of marketing. The need for selling arises in the various stages of distribution after goods have been made. Manufacturers may deal either with a wholesale house or direct with retail distributors. If a manufacturer, say of toothbrushes, is dealing direct with the retail chemists, who would be the distributors for such a product, his travellers must call on individual chemists, and try to book orders for quantities of the toothbrush. If it is a branded toothbrush, an advertising campaign to the public will help to create a demand for it, thus bringing people into chemists' shops to ask for that particular brand. The Manufacturer must provide

the chemist with show cards and other display material for his window and counters, and must explain to him the extent and duration of the advertising campaign directed to the public, so that the retail chemist who is actually responsible for making the sale to the ultimate consumer, knows what steps the manufacturer is taking to simplify the task of selling. When an advertising campaign is going to be launched to the public for selling the toothbrush, the retailer must be informed several weeks before the campaign appears in the newspapers or in posters on the hoardings, and must be urged to order an adequate stock, so that he has plenty of toothbrushes to meet the demand stimulated by the advertising. A separate advertising campaign directed to the retailer, suggesting a stocking-up scheme, will appear in the trade papers he reads. Display material will be offered, and occasionally the manufacturers may sponsor the services of display specialists to put in a special window show in the retailer's shop, to coincide with the opening and duration of the advertising campaign to the public.

"The existence of this machinery of selling is seldom suspected by the public, and the operation and economic significance of marketing, sales organization and advertising, are occasionally misunderstood by academic economists, who are inclined to dismiss all selling effort as wasteful, degrading and unnecessary." (3)

The waste that occurs in competitive industry irritates and alarms economists and other tidy-minded people though they tend to ignore or minimize the waste that occurs in state enterprise. This subject has been embittered and obscured by political controversy, and you must form your own opinion about the matter. Work it out for yourself, and don't accept some reach-me-down political or economic faith or popular set of prejudices about it; and begin the task of standing on

your own feet and using your own mind in this matter by reading *The Voice of Civilisation*, (4) Denys Thompson's attack of advertising, and a much better book written ten years earlier by the same author in collaboration with F. R. Leavis, entitled *Culture and Environment* (5); then turn to *The Economics of Advertising* (6) by F. P. Bishop, and study Gilbert Russell's three published works: *Nuntius: Advertising and its Future*(7); *Advertisement Writing* (8) i and *Planning Advertisements* (9). Twenty years ago, Russell, writing in *Nuntius*, described advertising as a social service in its broad aspects, and said: "Unfortunately people blind themselves to the broad aspects of advertising and judge all of it by the small proportion of catch-penny advertising of worthless patent medicines, electric belts and the like. No one denies the existence of this rubbish and no one condemns it more heartily than advertising men themselves. It does immense harm by discrediting the immeasurably larger volume of honest advertising. But do let us realize that these dirty slums of advertising are insignificant in comparison with the wide domain of clean advertising, and their effect in deceiving fools who can alone be victims is negligible in comparison with the social benefits derived from serious commercial advertising." (i i)

You'll find that the popular writer or the intellectual or semi-intellectual critic still pick on the lowest kinds of patent medicine advertising, and appear to regard such anti-social balderdash as typical of the whole operation of advertising. This is about as silly as saying that the worst type of jerry-built house represents modern architecture or that the street-corner quack who sells bottles of coloured water flavoured with cinnamon as a universal specific against every conceivable kind of complaint represents the medical profession. Destructive critics ignore the "immeasurably larger volume of

honest advertising" of which Gilbert Russell speaks, and very many people are ignorant of the immense amount of technical information, and educational work that is planned and carried out by firms who are anxious that their goods and services should be used to the best advantage of the consumer. Enterprising firms are constantly searching for better methods of presenting goods, displaying them and packing them; and this progressive activity is stimulated partly by pride in the product, partly by competition, and partly by a sense of obligation to the consumer, lacking which no business can ever flourish for long. Obviously you, as a technician in design, come into the picture, and it is in the activities connected with distribution that industrial design and commercial art are occasionally united as one problem for the designer.

Industrial Design and Commercial Art

EXAMPLES of the way industrial design and commercial art overlap are shown on Plates 6, 7, 8, 9, 10 and 11; and they have been selected to illustrate the diversity of the problems that you as a designer may be called upon to solve and the range of technical knowledge you should acquire. Apart from the materials and processes used for the industrial production of commodities, you should become familiar with those used for publishing and packaging; you should have a working knowledge of printing processes, and know the difference between a half-tone block and a line block, between lithography, photo-litho and photogravure; you should know a lot about lettering and typography, and about paper, its qualities and standard sheet sizes.

How much do you know about all this?

Are you aware of the difference between one type and another? Are you aware, for instance, that this book is printed in 12-point Baskerville type, and that the text is printed on what is called an antique wove paper and the sixteen half-tone plates at the end are printed on art paper, and that if I'd asked for the whole book, text and reproductions of photographs to be printed on antique paper, the publishers couldn't have printed from half-tone blocks except with a very coarse screen and that they would probably have used lithography, which would have done the job' though without the same

So you are going to be an industrial designer? Or, shall we say, you want to become one. Presumably that is why you have picked up, borrowed or bought this book. It is only fair, then, to let you know in the first few paragraphs what you are up against; for unless you know, unless you can identify clearly the character of the subject of which you propose to become a master, you won't know what to study. That, you may think, is obvious; but it *is* necessary to say it here, because industrial design is a matter that has been little understood in this country until comparatively recently, and it is still ill-defined and subjected to much woolly teaching and preaching and writing.

Are you clear in your own mind about the meaning of industrial design?

Do you know what it embraces?

Do you know how it falls into sections and what those sections include?

Face those questions, and get them answered to your full satisfaction.

You must be absolutely clear and confident in your own mind about the subject and what it embraces; for only when your ideas are clarified is it possible for you to identify and appreciate what branch of industrial design offers opportunities for your particular talents. Here are some broad definitions to begin with.

Too long a line is a pain in the eye, even when a legible type face like Baskerville is used.

(See page 126)

sharpness of definition that is given by printing from half-tone blocks? Do you know that the first duty of displayed type is to be rapidly visible and that the whole duty of type for text is to be legible? Are you aware that there is a relationship between the size of type and the length of line in which it is set? The 11-point Baskerville that you are reading now is easy on the eye when set in a line that doesn't exceed three and thirteen-sixteenths or three and seven-eighths of an inch in length; but suppose it is set in a much longer line? You could run up to four or four and a half inches, but beyond that it becomes a strain to read and the size of the type should go up to 12 point. Look at page 125 : the opening paragraphs of Chapter One have been set there, in the same size of type that is used on this page, but in lines six inches long.

And what, you may well ask, is all this technical stuff about 11-point and 12-point Baskerville? There are hundreds of different type faces, and they are made in sizes which are numbered according to the division of the inch into 72 parts, which are called points: 11-point type is eleven sevenths of an inch, measured from the top of a letter like l or b to the bottom of a letter like p or q. Baskerville is named after its inventor, an English printer, John Baskerville, born in 1706, who became a writing master at Birmingham at the age of twenty, and after making a fortune by improvements in the process of jappanning, began to make experiments in type-founding about 1750, which led to the production of the clear and agreeable typeface you are now reading. But on page 125 you see how its misuse in long lines could detract from its clarity and legibility, and here I repeat the warning I gave you in Chapter Three about the *appearance* of fitness being used as a fashion note. Because long horizontal lines are fashionable in some forms of contemporary architecture, because sleek,

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The opening paragraphs of Chapter One are here set in long lines of 10-pt. Gill Sans.
(See page 128)

elongated "streamlined" surfaces and shapes suggest modernity, don't think that modern sans serif types, stark; mechanistic and clear, slimmed down to the bare bones of legibility, can be used in long lines for masses of text to reflect this modish taste for horizontality. Observe the example afforded by page 127: there the opening paragraphs of Chapter One have again been set in lines, six inches long, but this time in x0-point Gill Sans. It's an excellent type face, designed by that master-craftsman, the late Eric Gill, but the way it is set on page 127 is no way to treat it, though many young designers have sinned against legibility in just this way because they believe it looks "modern." Sans serif types are suitable for captions and short paragraphs and displayed lines of type; but for masses of text they tend to tire the eyes.

I have made this digression about type and printing deliberately, to emphasize how your study of industrial design is incomplete without a corresponding study of the trades and skills which serve distribution. For example, the bottles and labels designed for Dettol by Charles W. Hobson Ltd. which are illustrated on Plate 6 demanded not only a study of the technique of bottle manufacture, but a knowledge of lettering and typography. Bottle, cap and label were not separate conceptions, subsequently associated—they were designed as a whole. Another instance of the way an inventive designer may change the character of a container, by using his knowledge of materials to simplify a difficult problem of packing and labelling, may be quoted from *Plastics and Industrial Design*.

"The problem is presented by very small tablets of a drug, usually contained in a bottle which can be slipped into the waistcoat pocket; but the minuteness of the bottle causes a difficulty, for it only allows two restricted surfaces for accommodating a label, and on that label

it is essential to set forth explicit directions for taking the tablets, their ingredients, and the name of the makers. This information has to appear in four languages and even the use of a label that encircles the bottle cannot solve the typographical problem satisfactorily; so perforce it is solved unsatisfactorily, and the smallest type that can be set by a compositor is reduced still further by photography, until the essential material is crammed, illegibly, into the space available. The use of a transparent plastic would allow a packaging designer to produce a disc pack, smaller in diameter than a watch case and not much thicker than, say, three half-crown pieces. This disc pack would have a simple, screw-thread closure; the two sides of the disc would offer a much larger area than the bottle for printing the directions and so forth, and possibly the material could be printed direct upon the plastic surface." (i)

Seek out comparable examples, dissect them, find out all you can about the limitations imposed by the nature of the product that had to be packed or displayed. When I was in the United States in 1934,¹ I came across an ingenious form of pack for toothbrushes, which consisted of a rigid transparent covering that fitted tightly over the bristles. There was no other covering, no cardboard case, and the brushes were displayed loose on the drug store counter, their bristles protected from dust, and their brand name stamped on the handles in gold lettering. This device enables customers to see the bristles and the shape of the head without the retailer having to take the brush out of a pack. There was just one snag: that plastic covering was not entirely dust-proof, so the bristles got soiled if the brushes were kept in stock too long. It was a good idea, though it hadn't been worked out properly; but it became the starting point of some experimental design research work, which resulted, a few years later, in a

pack designed for an English toothbrush manufacturer, which was an improvement on the American notion. It consisted of a limp transparent plastic envelope which contained the whole brush, head and handle, and allowed the customer to test the relative hardness of the bristles by feeling them through the thin, flexible plastic that covered them: the envelope was dust-tight, and terminated in a thin metal plate, printed with details of name and price and pierced so that the brush in its transparent pack could be hung up in a window or on a counter display.

Packaging is a life study, you may sometimes be told, particularly by people who devote so much time to it that they have got into a groove; but don't be discouraged by the specialist; he always knows the technical limitations by heart, and if his own inventive faculties have withered, he's inclined to crab new ideas merely because they are new and are ideas. You always have to be tactful about presenting innovations, but you'll find that sales managers and advertising managers are far more receptive than the technical specialist who knows what can and can't be done. When you start thinking of what can't be done when you first tackle a problem, shake up your mind: only a tired or lazy or worn-out mind considers the obstacles first: to do so is to deny the validity and strength of your own creative powers. Leave all that cautious doubting to uncreative minds, to unenterprising "safety first" men; there are plenty of them, and your job includes having the right answers to dissipate their doubts. But don't allow yourself to be intimidated into accepting the usual, conventional way of solving a problem; it may, of course, be the best, indeed almost the only way, of solving it economically and effectively, but don't assume that: think it out afresh, and even if you ultimately decide that the usual solution is the right one, you'll have

exercised your mind and perhaps invented some minor improvements.

A practical example of thinking out new methods for the solution of a problem, is provided by the catalogue designed for Pilkington Brothers Limited to show their range of Cathedral and Figured Rolled glasses. (Cathedral glass is a generic name for a rolled glass with a texture on one surface which partly or completely obscures vision: Figured Rolled glass has a definite pattern on one surface which performs a similar function.) There were nine types of Cathedral glass which were available in thirty-nine different shades of colour; there were fourteen patterns of Figured Rolled which were available in thirteen different shades. It was essential to show these patterns in their actual size and desirable to show their effect in colour: the catalogue really had to perform in a compact way the function of a comprehensive sample box. To have shown each of the nine Cathedral patterns in thirty-nine different colours and each of the fourteen Figured Rolled glasses in thirteen colours would have meant an enormously costly and unwieldy job of colour printing, apart from the almost inevitable falsity of the ultimate representation, for printing inks could not convey the same quality of colour possessed by a sheet of translucent coloured glass; light passes *through* glass whereas it falls *on* a printed surface. The first step was to have photographs taken of all the patterns to be included, so that a page area, 11 inches deep by 8¼ inches wide could be filled with an accurate representation of the pattern. A photographer was employed, who really knew how to use the camera to show all the varied play of light and shade on the patterned surface of the glass so that no subsequent retouching was necessary: a retouched photograph destroys the realism that is one of the principal virtues of photography. These photographs

were reproduced in black and white by fine screen half-tone blocks, and were bound with "Spirex" binding in a book that showed a pattern bleeding off on each right-hand page, while technical data occupied the left-hand page opposite. To suggest the effect of the different shades, a hinged colour chart composed of actual pieces of coloured glass framed in a sheet of $\frac{1}{8}$ inch cardboard, was bound in with the cover, so that it opened out on the right-hand side of each pattern and could be folded back over it. Turn to Plate 7, and you'll see what the book looked like outside; Plates 8 and 9 show the colour chart in use. The thirteen shades in general use were given sight areas of 2 inches by 1 inch on the chart, and the number of these areas was made up to fourteen by including one with ordinary untinted glass, to provide a key for judging the relative intensity of the coloured areas. When the chart was laid flat on any pattern in the book, an excellent idea of its appearance in different colours was obtained. The fourteen Figured Rolled glasses which were not available in all thirty-nine shades were only printed below the areas showing the thirteen shades in general use: the remaining twenty-six shades were grouped in small strips on the right of the chart.

That catalogue not only illustrated an original and practical way of solving a problem, but one which made actual use of the material that was being advertised: it also showed the immense amount of care and thought given by manufacturers of materials to the provision of accurate technical information about them, so that they would be used properly. It was designed in the studio of an advertising agency, in the closest collaboration with the manufacturer's technicians, and the objective throughout was to provide a work of reference that was a real tool for people who were specifying glass for different purposes in building.

A final example of industrial design and commercial art in alliance is furnished by the "Travel Aid" unit, designed for the London Passenger Transport Board by Misha Black, O.B.E., F.S.L.A., M.INST.R.A. I am indebted to Mr. Black for his descriptive notes about this unit, and for the drawings and photographs accompanying them, which I reproduce on pages 134, 135, 136, and 137, and on Plates 10 and 11, by courtesy of the London Passenger Transport Board. I am quoting in full Mr. Black's own description of the initial work on this unit. He has set forth the various steps as follows:

"(i) *The Problem*

"(a) To design a unit to accommodate traffic maps for Underground, buses, trolley buses and Green Line coaches; time tables, details of first and last trains; a map of the immediate vicinity of the station where the unit is displayed and details of quickest routes.

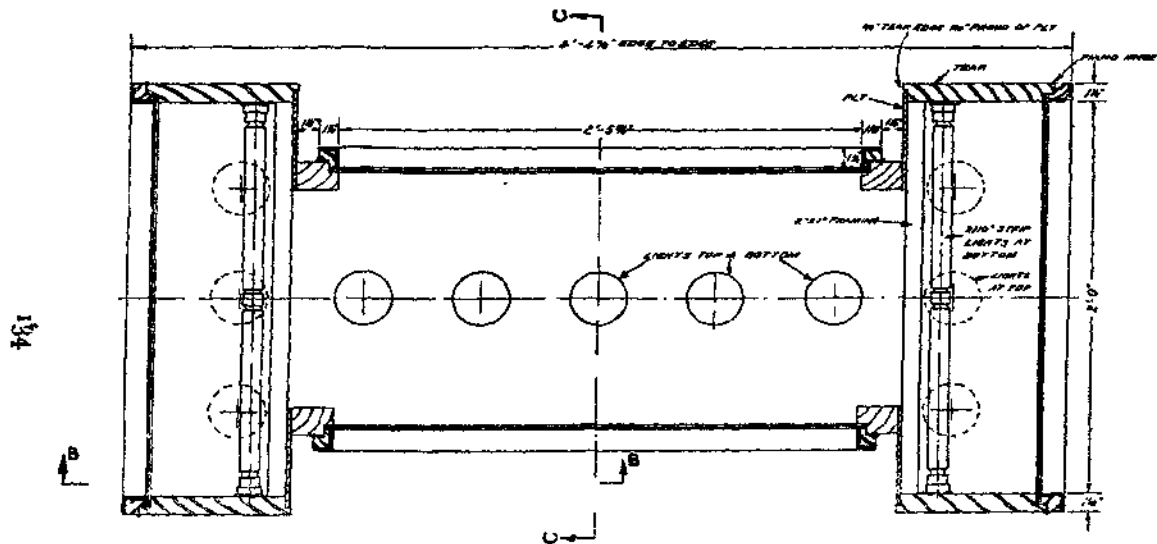
"(b) Intended for all London Passenger Transport Board stations, the unit must be adaptable for different sites, some with ample space and some already very congested. At the same time the unit must be suitable for economic production in large quantities.

"(c) The design must be such as to harmonize with the admirable general architectural design of the more contemporary stations and yet be sufficiently distinctive to attract the attention of the traveller looking for information.

"(d) The materials used in its construction must be those which can be easily cleaned and not deteriorate or require frequent reconditioning.

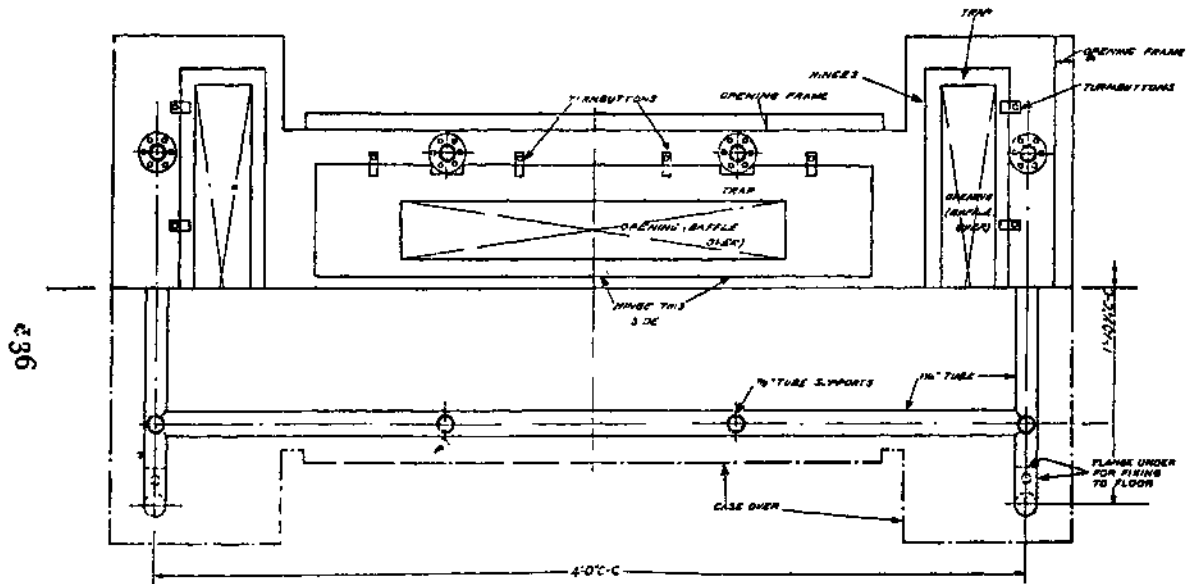
"(2) *The Solutions*

"(0) The number of posters, maps, etc. to be accommodated made it impossible to display them all on eye



GENERAL CONVENTIONALIZED PLAN

General conventionalized plan of London Passenger Transport Board "Travel Aid" Unit, designed by Misha Black.
 (See pages 135, 136 and 137; also Plates 10 and 11.)



Half plan looking up and half plan looking down of London Passenger Transport Board "Travel Aid" Unit.
 (See pages 134, 135 and opposite; also Plates 10 and 11.)

level. By tilting the panels it was possible to arrange the smaller units in pairs while, if anything, improving legibility. (See Plate 11 and page 135.)

"(b) The angle of the glass panel, combined with the use of specially designed reflectors, makes it possible to illuminate the whole surface evenly, while using only one light source at the top or bottom of each panel.

"(c) All units are of the same overall dimensions and capable of various arrangements; in a square, as shown on Plate 11; detached from the legs and fixed straight to a suitable wall; in a straight line, with the units back to back—and so on. The panels, remaining standard in every case, are suitable for mass production, a small variety of different leg units only being required.

"(d) The use of polished wood, inset with brightly coloured plastic panels, toned bronze, enamelled bronze, and glass ensures the unit remaining in a 'new' condition for many years without reconditioning.

"(e) Special fixing clips were devised to enable the posters to be easily removable from, the sandwich of clear and flashed opal glass, while remaining absolutely flat when in position.

"(3) *The Preliminary Design*

"It soon became evident that it would be difficult to prepare drawings which would easily be understood by the client, so very preliminary working drawings were prepared and 1/2 inch to 1 foot models prepared, showing different methods of assembling the standard unit. (One of these models is shown on Plate 10.)

"(4) *The Prototype*

"Various modifications were agreed after consideration of these models and instructions were received to prepare drawings so that a full-size prototype could be produced. The working drawings for the construction of the prototype were related to this specific require-

ment and were, therefore, substantially different from drawings which would be required for the mass-produced job.

"The specification for the prototype had to be suitable for fabrication by hand and with materials easily obtainable under existing conditions. Instead of extruded bronze sections for frames, for example, a simple steel angle was specified; the short-length fluorescent tubular lighting was replaced by ordinary tungsten lamps; the literature racks were replaced by poster panels (no maps being issued for mass distribution); standard piano hinges were used instead of the special 'secret' hinge intended for the final job. Since maps were not yet available, they had to be replaced by other printed matter; the special translucent paper was not available and the sign was designed for cut-out wood instead of the finally intended cast and enamelled bronze. The legs, eventually to be of bronze tube, were of painted steel.

" (5) *The Next Stage*

"The prototype unit has been erected at a selected station. It has been inspected by the various London Passenger Transport Board officers concerned. The designer visits it from time to time to test whether it is easily visible during rush hours as well as when the station is more empty; whether travellers looking for information go straight to it or wander aimlessly round the booking hall looking for maps; whether dust collects too easily on the sloping surfaces. Reports are being prepared on ease of servicing, map and poster replacement and fitting new lamps. All this and similar information will later be collated and carefully considered and any necessary adjustments made before production drawings are commenced."

The sequence of tasks in that "case history" as described by Mr. Misha Black is particularly instructive; *it* shows not only how a difficult and unusual problem was approached and solved, but how a professional designer presents his work and goes about his business. Presenting your work and running your business are discussed in the next chapter, which is also the last.

*Presenting Tour Work and Running
Tour Business*

YOU may soon begin to think that you will never cease to train and learn all your life. When you've accepted that conclusion, you've got somewhere. A creative mind is a restless possession, for it's always driving you on to explore new ways of doing things, always flirting with new ideas, never rusting in easy complacency. But it may be a long time before you become an established designer. At first, as a free-lance, you may pick up a commission here and there, or perhaps you may become attached to a firm in some junior capacity, and you may be wondering why you have not yet established yourself, and thinking that it all looks pretty hopeless. Sometimes you may feel that even when you do get a look in on a job people don't take you seriously, that you don't "go over" with practical, rather hard-boiled business folk.

Is it, by any chance, your own fault?

How do you present your work?

How do you handle your correspondence?

How do you present yourself?

Let's take those questions in turn. Remember that very few people know how to read drawings: they can understand perspectives, if they aren't too mannered, but if it is possible to show things in three dimensions in the form of scale models, you've secured your client's

interest at the outset, for few human beings can resist models. I don't know how psychologists would explain the almost universal fascination exerted by models, but it is a fact: if you doubt it, watch the crowds queueing up at any exhibition where models are displayed.

Always present your work neatly: never send in sketches on any old scraps of paper, and always protect drawings so they survive the journey through the post uncrumpled. Put drawings in folders or portfolios; don't waste hours of your time lettering descriptions: have any descriptive matter neatly typewritten and pasted in, for typescript is easy to read and is familiar to the eye. Learn how to use a typewriter—anybody can, but it's an advantage to learn touch typing, rather than wearing out two or three fingers only, which I'm doing at the moment, because I taught myself to type thirty-seven years ago and didn't learn properly. Buy or borrow a typewriter if you can: it's an indispensable tool. It enables you easily to keep copies of everything you write. Always keep copies of material you send to clients, whether it's drawn or typed.

Keep your work simple: make it possible, if you can, for the client to see everything at a glance. Avoid complicated cross-referencing. Set out the steps you have taken in an orderly sequence. Turn back to pages 133 to 139 and re-read Misha Black's compactly sectionalized survey of the operations connected with the "Travel Aid" unit. It is advisable when presenting your work, to recapitulate your "brief," to repeat the basic points of your instructions, so subsequent changes of mind on the client's part are clearly identified as such and cannot be fobbed off as shortcomings of yours. This happens sometimes, and it's essential to have your instructions clearly confirmed in writing, or

if they aren't, to write yourself to the client confirming your interpretation of his instructions.

Be sure that you fully understand what your client wants you to do, what he is expecting you to produce, how soon and for how much. Get all this clear at the outset, and see that it is committed to writing; not through any motive of distrust, but because the mere act of reducing a matter to writing clarifies it and resolves any woolly, indecisive chatter that may have preceded the final instructions on which you are acting.

Always type your letters and keep a copy: always date them: always type your name under the place where your signature goes, for you may, like me, have an illegible signature. Never address a letter to — Smith, Esq. If you can't take the trouble to find out a man's initials, he won't think much of you, and you should remember to ask his secretary for his initials and how he likes to be addressed, and spell his name right. Don't begin a letter "Dear Sir" and sign yourself "Yours sincerely." Use "Yours truly," or "Yours faithfully" until the other party starts the "Yours sincerely" stuff. Always answer letters by return of post: acknowledge them even if you can't answer them fully. File your clients' letters and the carbon copies of your replies in order of date, with the latest letters on top, under the client's initial, in a box file with alphabetical divisions. All this is simple, elementary business common sense, and good manners: if you start conducting your routine work like this it will never intrude upon your creative work and waste your time, and if you keep records and always know where everything is, you won't waste your clients' time either.

So much for your contact through the post with the client; but how do you behave at a conference? It is a

testing occasion, and you, as a technician in design, are on trial, for remember other people may be thinking of you like this:



I know it's absurd, because you aren't like that at all—at least externally: you may be smouldering with revolutionary and unconventional urges inside—but those people at the conference have to be reassured. Well, reassure them.

Let me repeat that you are a technician. Let me remind you of your specific technical ability, which immediately distinguishes you from all the other people in the room. The Accountant, if such a person is present, or the type of man who likes statistics (generally for their own sake) can produce a slide-rule and can juggle with percentages, costs, and what-have-you, so that other people at the meeting are properly impressed or even intimidated. The Production Engineer can discuss his own particular subject with absolute authority, so can the Metallurgist, the Research Chemist, the Sales Manager, the Advertising Manager and the Market Research Expert. But you are a technician too: you are a specialist. You deserve to be taken at least as seriously as all these other people. And you can do something that most of them can't do, indeed that very few people can *do—you can express your ideas*

graphically. At any moment during the discussion you can quickly sketch what you mean or what you want to say. You can produce your little battery of coloured pencils, and by demonstrating then and there on a pad some of the ideas that you would like to discuss in a preliminary way, you can explain, as you could seldom explain in words, exactly what you mean, and you will be understood and respected.

Your capacity to wield a pencil in order to explain ideas, which would otherwise remain mystical and nebulous, so far as the meeting is concerned, is unquestioned directly you start doing it; but your appearance also has an influence on the meeting. A much higher degree of respect is likely to be paid to your abilities if you go into the meeting wearing the sort of clothes which are normal and accepted in everyday life, than if you seem a bit eccentric. So many people with high-powered imaginations, or even with imaginations which are not so very powerful, seek a spurious form of self-expression through their clothes; but the man who dresses normally is far less likely to be accused unconsciously of strange, unpractical antics, than the man who asserts his capacity for creative work with a sartorial vividness which leaves beholders breathless and even a little alarmed. Generally speaking, a man who wears a black coat and waistcoat, a white collar, a quiet tie, and, of course, trousers, preferably of dark grey, or anyway a dark suit, is listened to with more serious attention than the man who may talk and act just as intelligently, but who wears mustard-coloured checks or flannel bags, a fierce sports jacket, and a shirt that is almost bursting into flames. It is probably a heritage from our Victorian past, that the man in the dark suit is listened to with serious attention, and the man who goes in for excessive gaiety is not; but because such prejudices are traditional, there is no point in

denying their existence. If you feel that you must act the part of a pioneer and break down such prejudices, maybe you'll succeed if you have an exceptional personality, but you are giving yourself an enormous amount of totally unnecessary trouble, and may never realize that you are arousing a lot of subconscious opposition to your work. Many a good design has died young because of a tactless pullover.

So far my remarks on this subject of appearance have applied to men only. It is equally important for women designers to look business-like and well turned out; but very often they don't. Madam, do not, I beg of you, allow your appearance to suggest that everything you wear is hand-woven. There is only one thing worse than that: a complete indifference to clothes. That is quite unforgivable in any woman, no matter what her job is; and as a man, this is where I hand over a section of my chapter to somebody else. Woman should speak to woman: men don't know enough. So the paragraphs that follow have been written by a woman who holds a responsible executive job in a business that uses the work of designers of both sexes.

"It is not given to all women to possess a good sense of dress, but if you are one of those who just haven't got it (and if you are completely uninterested you haven't got it) play for safety and wear quiet, ordinary clothes. It is a pity if you haven't got it, but it's just a gift lacking and nothing can be done about it—you will have to work a bit harder in other directions.

"Overdressing, of course, is just as devastating and much more difficult to cope with, but if you always feel you *must* wear masses of bits and pieces, *grand* clothes, high-heeled shoes, and so on, it generally means you are inclined to overdress, and in this case—eliminate as much as possible in the way of extra ornamentation.

"But if you do know how to dress, then take full advantage of it, and never NEVER (however gloomy you may feel) go to a meeting where other people will be present, wearing 'any old thing,' however unimportant the meeting may seem. To most women, clothes are a psychological factor, and quite unconsciously, they do better work, are more alive mentally, and enter into the thing more if they are suitably dressed. There is no need to spend a lot of money, provided the basic things are well cut and of good quality. It is more economical in the long run to have a suit tailored to fit you, in good material, which will last some years and always look good, than to buy a poor quality ready-made suit every year.

"Generally speaking, most Englishwomen look their best in a suit, and it is certainly the most suitable dress for a business meeting. If you can wear black, then that is the obvious choice; but if you go in for black, then be sure to invest in a good hard clothes brush.

"Personal cleanliness is also important, though this may seem a surprising statement. As for make-up, this should be an aid to nature, not an alternative, and should on no account be despised; it may save you from being 'hearty,' which is just as bad as being over made-up."

All this, you may object, sounds a bit snobbish: but is it? Doesn't it all boil down to the practical suggestion that in your contact with clients you should be neat but not gaudy? You want to be an industrial designer, and if you want to be one badly enough you'll take any trouble and make any sacrifice in order to get a hearing and to get your work accepted and produced; for until your work is accepted and produced you cannot become established any more than a writer can until somebody accepts and publishes his work.

It may, I repeat, be a long time before you are an established designer. I can't tell you how' to get your urst job or your next job; nobody can: I have only attempted to tell you how to set about training yourself to tackle jobs. You must rely on your own wits and your own spirit of enterprise for breaking into the great and growing market that exists for the work of industrial designers. But you must be patient.

You may have to work at your chosen task for years, devoting all your leisure to it, financing yourself meanwhile by work that is less congenial and appropriate to your temperament and gifts. You may have disappointment after disappointment; but if you want to be a designer, and you have the capacity to be one, don't let anybody or anything discourage you. People, even the best-intentioned people, are always inclined to discourage unusual ambitions in others, particularly if those ambitions are related to creative work; for the creative mind, whatever outlet it may seek and find for full expression, is different from though not necessarily superior to the ordinary, uncreative mind.

Having brought you to the last chapter, I can venture, after repeated warnings about its dangers, to discuss this matter of superiority and ordinariness. The industrial designer, whatever branch of design he is practising, must by the very nature of his work look at things differently from his fellows, for he is constantly scrutinizing his environment; ideas for improving this or that pour into his mind; his alert observation makes him see many things that ordinary untrained eyes and imaginations never apprehend, though in a civilization where good education was universal, the designer's critical and appreciative faculties would not be exceptional. Good education would train people to use their eyes: education that

omits such training is incomplete. It is because education today is almost always incomplete that the designer, because he has been taught or has taught himself to see clearly, enjoys his superficial superiority.

Although you are a technician, people will persist in thinking of you as an artist. "Art!" the more old-fashioned of your friends and relatives will exclaim in pained surprise; "There's no *money in art!*" To which, I think the only reply is: "Who cares?" Who wants on their tombstone the epitaph:

HE MADE MONEY?

When such a statement is true, it often means that a man has made nothing else.

But don't be put off by the fact that few people will understand what your job is, though the number of people who do is likely to increase during the next few decades. Don't be deterred by the fact that job after job is turned down, or you can't get your work in anywhere, perhaps for years. I'll refer here to my own experience as a writer—comparable, as I've said before, in many ways to the experience you're trying to acquire—if I may do so without suggesting that I'm putting over one of those nauseating success stories which are such hot favourites with the elderly. I am not a conspicuously successful writer; but I was determined to write. I had a good many things I wanted to say—I still have—and I wanted to tell stories, for I knew I had a lot bottled up inside me—I still have. So I just wrote. Between the age of fifteen and twenty-nine I wrote five unpublished novels. That was part of the price I had to pay for learning how to write at all, and, rising fifty, I'm still learning. My first published short story appeared in *Truth* in 1919: it was 1927 before I had another short story published. But I

wrote scores in the interval. I had also started on the writing of popular technical books about furniture and furnishing and interior decoration and architecture—subjects that I had studied since 1911—and in 1932 my first novel was published, and although it has since been reprinted, it was then a failure commercially.

Are *you* prepared to persist?

SOURCES OF REFERENCE IN THE TEXT

CHAPTER THREE

- (1) *Analysis of Ornament: The Characteristics of Styles*, by Ralph N. Wornum. (London: Chapman & Hall, sixth edition, 1879.) Chapter II, pages 8-10.
- (2) *English Furniture*, by John Gloag. (The Library of English Art: A. & C. Black Ltd., second edition, 1944.) Chapter I, pages 7-8.
- (3) *The Works of Man*, by Lisle March Phillipps. (London: Duckworth & Co., revised edition 1914.) Chapter XI, pages 293-4.
- (4) *Life on Other Worlds*, by H. Spencer Jones, M.A., SC.D., F.R.S., Astronomer Royal. (The English Universities Press, 1940.) Chapter VIII, page 177.
- (5) *Ibid.*, page 195.

CHAPTER FOUR

- (1) *Design in Modern Life*, edited by John Gloag. (George Allen & Unwin Ltd., 1934.) Chapter VIII, pages 100-2.
- (2) *Cast Iron in Building*, by Richard Sheppard, F.R.I.B.A. (George Allen & Unwin Ltd., 1945.) Section V, page 77.
- (3) "The Influence of New Developments in Construction on Architectural Design," by M. Hartland Thomas, M.A., F.R.I.B.A. *Journal of the Royal Institute of British Architects*, Vol. 51, Third Series, No. 5.
- (4) *The Growth of the Wind*, by Eric Hardwicke Rideout, B.SC. (Liverpool: E. A. Bryant, 1927.) Chapter III: "Communications," pages 31 and 32.
- (5) *Cast Iron in Building*, by Richard Sheppard. Section V, page 63.

CHAPTER FIVE

- (1) *Industrial Art Explained*, by John Gloag. (George Allen & Unwin Ltd., revised and enlarged edition, 1946.) Plate 28: "Evolution of the Motor 'Bus.'"
- (2) *History of Ancient and Modern Birkenhead*, by Philip Sulley, F.R.H.S. (Liverpool: W. M. Murphy, 1907.) Page 263.
- (3) *Report of the Banquet given by George Francis Train, Esq., of Boston, U.S., to Inaugurate the Opening of the First Street Railway in Europe at Birkenhead, August 30, 1860.* (Liverpool: Lee, Nightingale & Co., 1860.)
- (4) *Industrial Art Explained*, by John Gloag. Chapter VI, page 109.
- (5) *Ibid.*, page 112.
- (6) "A Notable Tramway Jubilee," by H. G. Archer, *The Graphic*, August 28, 1920.
- (7) "Public Relations." Leading article in *The Architect's Journal*, March 7, 1946, page 191.
- (8) *What About Business?* by John Gloag. (A Penguin Special, 1942.) Chapter VIII, pages 69-70.
- (9) "Frank Pick," by Christian Barman. *The Architectural Review*, January 1942, page i.
- (10) *Ibid.*, pages 2-3.

CHAPTER SEVEN

- (1) *The Ancient World*, by T. R. Glover. (Cambridge University Press, 1935: Pelican Books, 1944. The Pelican edition is quoted.) Chapter III, page 44.
- (2) *Industrial Art Explained*, by John Gloag. (George Allen & Unwin Ltd., revised and enlarged edition, 1946.) Chapter III, page 43.
- (3) *The Analysis of Ornament: The Characteristics of Styles*, by Ralph N. Wornum. (London: Chapman & Hall, sixth edition, 1879.) Chapter VII, page 60.

- (4) *A History of Architecture on the Comparative Method*, by Sir Banister Fletcher, P.P.R.I.B.A., F.R.I.B.A., F.S.A., F.S.I. (London: Batsford, eighth edition, 1929.) Page 105.
- (5) *Industrial Art Explained*, by John Gloag, Chapter III, page 46.
- (6) *Ibid.*, page 46.
- (7) *Analysis of Ornament*, Chapter VIII, page 73.
- (8) *Industrial Art Explained*, Chapter III, page 47.
- (9) *Ibid.*, Chapter III, pages 50-1.
- (10) *Theory and Elements of Architecture*, by Robert Atkinson and Hope Bagenal. (London: Ernest Benn Ltd., 1926.) Vol. I, Chapter I, page 6.

CHAPTER NINE

- (1) *Technics and Civilization*, by Lewis Mumford. (London: George Routledge & Sons Ltd. First published in 1934-)
- (2) *Industrial Art Explained*, by John Gloag. (George Allen & Unwin Ltd., revised edition, 1946.) Chapter X, pages 184-5.
- (3) *Those Raw Materials*, by C. A. Ward, A.M.I.E.E. (George Allen & Unwin Ltd., 1941.)
- (4) *Glass in Architecture and Decoration*, by Raymond McGrath and A. C. Frost. (Architectural Press, 1937.)
- (5) *Cast Iron in Building*, by Richard Sheppard, F.R.I.B.A. (George Allen & Unwin Ltd., 1945.)
- (6) *Plastics in Industry*, by "Plastes." (Chapman & Hall, 1940.)
- (7) *Plastics and Industrial Design*, by John Gloag. (George Allen & Unwin Ltd., 1945.)

CHAPTER TEN

- (1) *The Missing Technician in Industrial Production*, by John Gloag. (George Allen & Unwin Ltd., second edition, 1945-)
- (2) *Plastics and Industrial Design*, by John Gloag. (George Allen & Unwin Ltd., 1945.) Chapter IV, page 38.

CHAPTER ELEVEN

- (1) *Planning Advertisements*, by Gilbert Russell. (George Allen & Unwin Ltd., 1935.) Chapter II, page 37.
- (2) *Advertisement Writing*, by Gilbert Russell. (Ernest Benn Ltd., 1927.) Introduction, page 15.
- (3) *Industrial Art Explained*, by John Gloag. (George Allen & Unwin Ltd., revised edition, 1946.) Chapter XI, pages 194-5.
- (4) *The Voice of Civilization*, by Denys Thompson. (London: Frederick Muller Ltd., 1943.)
- (5) *Culture and Environment*, by F. R. Leavis and Denys Thompson. (Chatto & Windus, 1933.)
- (6) *The Economics of Advertising*, by F. P. Bishop. (Robert Hale Ltd., 1944.)
- (7) *Nuntius: Advertising and its Future*, by Gilbert Russell. (Kegan Paul, 1926.)
- (8) *Advertisement Writing*, by Gilbert Russell. (Ernest Benn Ltd., 1927.)
- (9) *Planning Advertisements*, by Gilbert Russell. (George Allen & Unwin Ltd., 1935.)
- (10) *Nuntius: Advertising and its Future*, by Gilbert Russell. Section III, pages 59-60.

CHAPTER TWELVE

- (i) *Plastics and Industrial Design*, by John Gloag. (George Allen & Unwin Ltd., 1945.) Section I, Chapter V, pages 52-3.

APPENDIX I: BOOKS FOR STUDY

THE books recommended in the lists that follow have been chosen because they have either a direct bearing on the subject of industrial design and that closely related activity, architectural design, or because they cover some aspect of industrial design or commercial art in operation. A few concerned with materials and distribution have been included; others have been deliberately selected to keep your mind supple about various branches of the subject, because it is all too easy to acquire set ways and habits of thought, and one of the best cures for such complacency is to study books written from different points of view. Don't get carried away by any author: the written word may appear convincing, but keep your own critical faculties sharp, even when you are in full agreement with a book you are reading. Beware of the pontifical approach to a subject adopted by some writers: don't be overwhelmed by the masses of facts they deploy with apparently irresistible force to convince you: make a habit of investigating references and checking quotations: you may sometimes uncover some illuminating misrepresentation, either intentional or just arising from carelessness; and it is always possible that what is presented to you as factual information may be thinly disguised ideological propaganda. If you retain your independent judgment when reading, you can make allowances for an author's faiths and prejudices, and even enjoy them: they may flavour his writing very agreeably, just as G. K. Chesterton's boisterous enthusiasm for a largely imaginary conception of mediaeval civilization flavoured many of his books and poems.

Sometimes you may be faced with huge and intimidating masses of erudition, that have accumulated and congealed in thousands of pages, and you may feel that it is your duty to read through them to the very end. For instance, I recommend you to read Lewis Mumford's trilogy: I. *Technics and Civilisation*. II. *The Culture of Cities*. III. *The Condition of Man*. Those three books are Worth reading through to the

very end, even though you may feel, as I do, that Mr. Mumford's approach to history is misleadingly systematic. He examines the past in relation to the present with a ponderous deliberation, draws various conclusions, but leaves critical readers with the uneasy suspicion that he may be fitting facts to a theory. Now that is precisely what happens in Wells's *Outline of History*; but H. G. Wells is a literary artist of a high order: Lewis Mumford is not. Wells writes history frankly as a Socialist. All history, in his view, supports his socialistic idealism. History written from the point of view of a particular political ideal is interesting and, if the reader is aware of the ideal, is not misleading. Wells, with his flashing phrases, his creative imagination, "his grasp and understanding of the past, is easy and stimulating to read; but to read Mr. Mumford is a task, though you feel that the effort, even if uninspiring, may possibly be beneficial. You feel, too, that he is trying to prove something. You feel also that his sincerity is indisputable. Only it is a little difficult to know what he is trying to prove, and what he is being sincere about. Perhaps there is a vast pattern somewhere, but although some individual parts of it are fleetingly apparent, you may finally conclude that in his three books, so carefully planned and conscientiously documented, this American sociologist has merely amassed a colossal amount of varied information.

You may wonder why I have included Christian Mawson's Penguin anthology, *Portrait of England*, in my list of recommendations. The reason is because it gives a good cross section of English thought and life and characteristics. After all, your own countrymen are likely to be your chief ultimate customers—they will buy, or not buy, what you design. Remember that they like diversity, that there is a poetic streak of idealism in them but they are also extremely practical, and although at times they may be surprisingly and even bewilderingly progressive, at others they are obtusely conservative. To look beneath the surface of those conflicting characteristics, you should read Doris Langley Moore's enquiry into the sentimental tendencies of public opinion, entitled *The Vulgar Heart*.

And to that last suggestion, I would add the Conway Memorial Lecture given in 1938 by Lord Horder, on *Obscurantism*) which is available in book form. A designer must know, not only the far-ranging technical implications of his subject, but something about the public too, and the influences to which they are subjected.

DESIGN IN INDUSTRY AND COMMERCE

ANTHONY BERTRAM

Design (Penguin Books).

Design in Daily Life (Methuen).

NOEL CARRINGTON

Design and a Changing Civilisation (John Lane).

DESIGN AND INDUSTRIES ASSOCIATION

Four Lectures on Design, delivered by Henry Strauss, M.P., Sir Francis Meynell, Tom Harrisson and Herbert Read, before the D.I.A. (Hutchinson).

JOHN GLOAG

Industrial Art Explained (Allen & Unwin, revised and enlarged edition, 1946).

The Missing Technician in Industrial Production (Allen & Unwin).

Plastics and Industrial Design, with a Section on the properties and uses of the various types of Plastics by Grace Lovat Fraser (Allen & Unwin).

JOHN GLOAG (edited by)

Design in Modern Life, with contributions by Robert Atkinson, F.R.I.B.A., Elizabeth Denby, HON. A.R.I.B.A., E. Maxwell Fry, B.A.R.G.H., F.R.I.B.A., James Laver, Frank Pick, HON. A.R.I.B.A., A. B. Read, R.D.I., and Gordon Russell, R.D.I. (Allen & Unwin).

Design in Everyday Life and Things: the Tear Book of the Design and Industries Association, 1926-7, with contributions by B. J. Fletcher, Frank Pick, W. H. Ansell, C. H. Collins Baker, H. P. Shapland and Gilbert Russell (Ernest Benn).

GEOFFREY HOLME

Industrial Design and the Future (Studio Publications).

ALAN JARVIS

The Things We See—Indoors and Out (Penguin Books).

PHILIP JOHNSON

Machine Art (Allen & Unwin).

RAYMOND McGRATH AND A. C. FROST

Glass in Architecture and Decoration: with a Section on the nature and properties of Glass, by H. E. Beckett (Architectural Press).

"PLASTES"

Plastics in Industry (Chapman & Hall).

NIKOLAUS PEVSNER

Industrial Art in England (Cambridge University Press).

Pioneers of the Modern Movement, from William Morris to Walter Gropius (Faber & Faber).

HERBERT READ

Art and Industry (Faber & Faber, second edition, 1944).

JOSEPH THORP

Design in Modern Printing (Benn).

Printing for Business (W. H. Smith).

JOHN DE LA VALETTE

The Conquest of Ugliness (Methuen).

C. A. WARD

Those Raw Materials (Allen & Unwin).

V. E. YARSLEY AND E. G. COUZENS

Plastics (Penguin Books, third edition, 1944).

ARCHITECTURE AND THE ALLIED ARTS

SIR PATRICK ABERCROMBIE (edited by)

The Book of the Modern House (Hodder & Stoughton).

CHRISTIAN BARMAN

Architecture (Benn's Sixpenny Library).

Balbus, or the Future of Architecture (Kegan Paul).

ANTHONY BERTRAM

The House: a Machine for Living In (A. & C. Black).

- JOHN BETJEMAN
Ghastly Good Taste (Chapman & Hall).
- SIR REGINALD BLOMFIELD
The Mistress Art (Arnold).
The Touchstone of Architecture (The Clarendon Press).
- GEOFFREY BOUMPHREY
The House—Inside and Out (Allen & Unwin).
Tour House and Mine (Allen & Unwin).
- ROBERT BYRON
The Appreciation of Architecture (Wishart & Co.).
- NOEL CARRINGTON
Design in the Home (Country Life Ltd.).
- W. A. EDEN
The Process of Architectural Tradition (Macmillan).
- A. TRYSTAN EDWARDS
Good and Bad Manners in Architecture (John Tiranti).
Style and Composition in Architecture (John Tiranti).
The Things Which are Seen (John Tiranti).
- MAXWELL FRY
Fine Building (Faber & Faber).
- FREDERICK GIBBERD
The Architecture of England (Architectural Press).
- SIEGFRIED GIEDION
Space, Time and Architecture (Harvard University Press,
U.S.A.; Oxford University Press, England).
- JOHN GLOAG
English Furniture (A. & C. Black, Library of English Art).
The Englishman's Castle (Eyre & Spottiswoode).
Men and Buildings (Country Life Ltd.).
- JOHN GLOAG AND GREY WORNUM
House Out of Factory (Allen & Unwin).
- WALTER GROPIUS
The Mew Architecture and the Bauhaus (Faber & Faber).
- HENRYRUSSELLHITCHCOCK
*In the Nature of Materials: 1887-1941, The Buildings of
Frank Lloyd Wright* (Duell, Sloan & Pearce, New York).

LE CORBUSIER

Towards a New Architecture (John Rodker).

JULIAN LEATHART

Style in Architecture (Nelson).

W. R. LETHABY

Architecture (Home University Library).

RAYMOND McGRATH

Twentieth-century Houses (Faber & Faber).

NIKOLAUS PEVSNER

An Outline of European Architecture (Penguin Books).

SIR CHARLES REILLY

Some Architectural Problems of Today (University Press of Liverpool).

Some Manchester Streets and their Buildings (University Press of Liverpool).

J. M. RICHARDS

An Introduction to Modern Architecture (Penguin Books).

HOWARD ROBERTSON

Architecture Arising (Faber & Faber).

Architecture Explained (Benn).

The Principles of Architectural Composition (Architectural Press).

JOHN C. ROGERS

Furniture and Furnishing (Oxford University Press).

RICHARD SHEPPARD

Cast Iron in Building (Allen & Unwin).

Prefabrication in Building (Architectural Press).

DORA WARE AND BETTY BEATTY

A Short Dictionary of Architecture (Allen & Unwin, second revised edition, 1947).

C. & A. WILLIAMS ELLIS

The Pleasures of Architecture (Cape: Life and Letters Series).

FRANK LLOYD WRIGHT

Modern Architecture (Princeton University Press, U.S.A.).

When Democracy Builds (University of Chicago Press).

F. R. S. YORKE AND COLIN PENN

A Key to Modern Architecture (Blackie).

HISTORICAL BACKGROUND OF DESIGN

V. GORDON CHILDE

Progress and Archaeology (Watts & Co.).

LEWIS MUMFORD

Technics and Civilization (Routledge).

The Culture of Cities (Seeker & Warburg).

The Condition of Man (Seeker & Warburg).

LISLE MARCH PHILLIPPS

Form and Colour (Duckworth).

The Works of Man (Duckworth).

M. & C. H. B. QUENNELL

A History of Everyday Things in England (Batsford).

STEEN EILER RASMUSSEN

London: the Unique City (Cape).

JOHN SUMMERSON

Georgian London (Pleiades Books).

DISTRIBUTION

F. P. BISHOP

The Economics of Advertising (Robert Hale).

LAWRENCE E. NEAL

Retailing and the Public (Allen & Unwin).

F. R. LEAVIS AND DENYS THOMPSON

Culture and Environment (Chatto & Windus).

GILBERT RUSSELL

Nuntius: Advertising and its Future (Kegan Paul).

Advertisement Writing (Ernest Benn).

Planning Advertisements (Allen & Unwin).

DENYS THOMPSON

Voice of Civilisation (Frederick Muller).

GENERAL

CLIVE BELL

Civilisation (Chatto & Windus).

Since Cfeanne (Chatto & Windus).

SIR REGINALD BLOMFIELD

Modernismus (Macmillan).

MARGARET BULLEY

Art and Counterfeit (Methuen).

DONALD COWIE

The British Contribution (Allen & Unwin).

W. MACNEILE DIXON

The Englishman (Arnold).

ROGER FRY

Vision and Design (Chatto & Windus).

ERIC GILL

Art and a Changing Civilisation (John Lane).

Beauty Looks after Herself (Sheed & Ward).

JOHN GLOAG

What about Business? (Penguin Books).

LORD HORDER

Obscurantism: Con way Memorial Lecture (Watts & Co.)

W. R. LETHABY

Form in Civilisation (Oxford University Press).

CHRISTIAN MAWSON (edited by)

Portrait of England (Penguin Books).

DORIS LANGLEY MOORE

The Vulgar Heart (Cassell).

SIR WILLIAM FLINDERS PETRIE

The Revolutions of Civilisation (Harper).

HERBERT READ

The Politics of the Unpolitical (Routledge).

SIR HUBERT LLEWELLYN SMITH

The Economic Laws of Art Production (Oxford University Press).

CLOUGH WILLIAMS-ELLIS (edited by)

Britain and the Beast (Dent).

APPENDIX II: SOCIETIES AND INSTITUTIONS

THE following organizations are concerned directly or indirectly with industrial design:

THE CENTRAL INSTITUTE OF ART AND DESIGN
THE COUNCIL OF INDUSTRIAL DESIGN
THE DESIGN AND INDUSTRIES ASSOCIATION
THE ROYAL INSTITUTE OF BRITISH ARCHITECTS
THE ROYAL SOCIETY OF ARTS
THE SCOTTISH COMMITTEE OF THE COUNCIL OF
INDUSTRIAL DESIGN
THE SOCIETY OF INDUSTRIAL ARTIST3

In the United States:

THE SOCIETY OF INDUSTRIAL DESIGNERS

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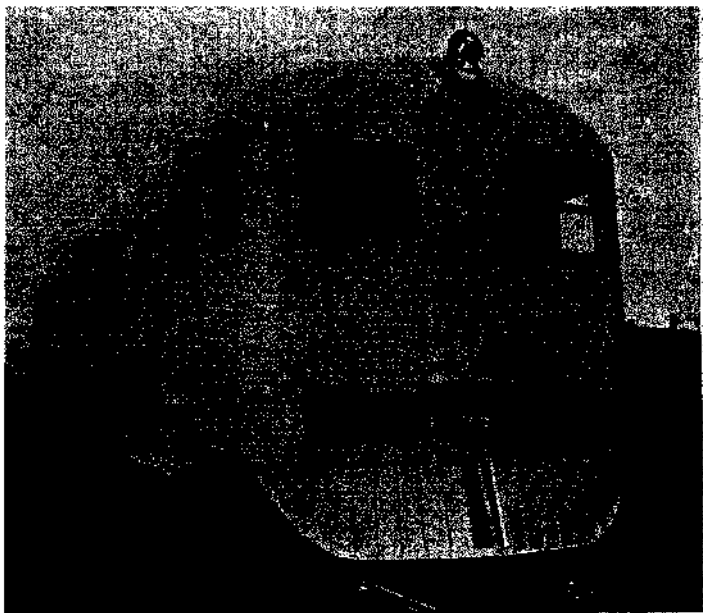
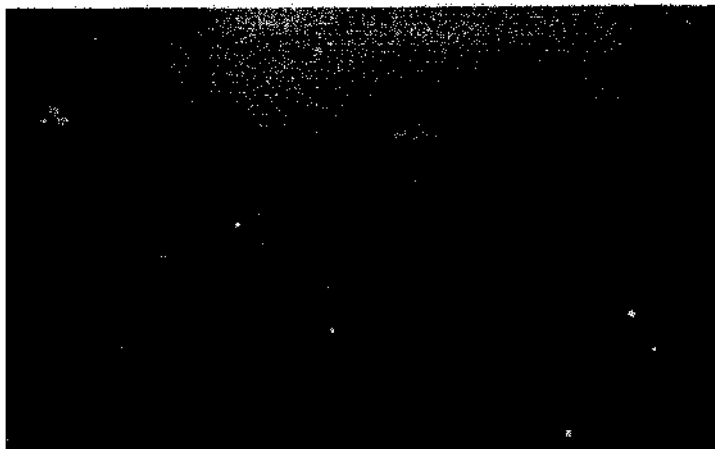


PLATE I.—Examples showing the clean untroubled lines and surfaces of railway rolling stock. *Above:* A fifty-five seater first- and second-class lightweight rail car, designed and made for the Jamaica Government Railway by D. Wickham & Co. Ltd., of Ware, England (see page 105 for detailed drawings).

Below: the Santa Fe speeding across the United States: typical motor-driven rolling stock on American railroads.



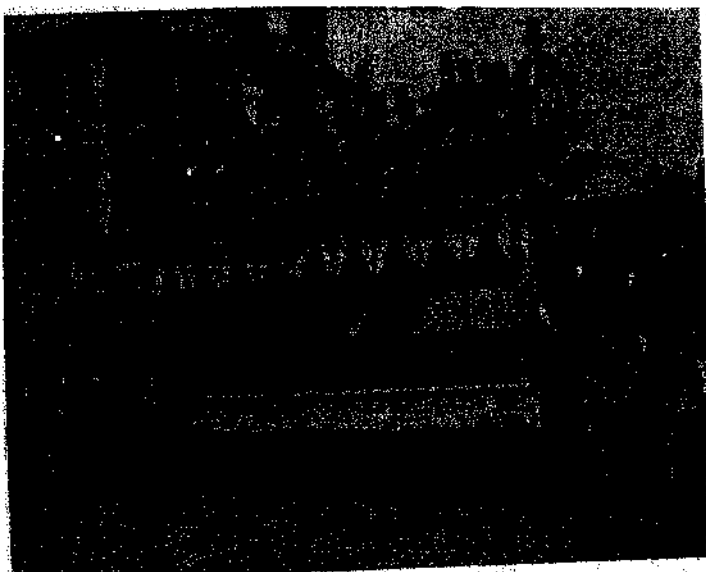
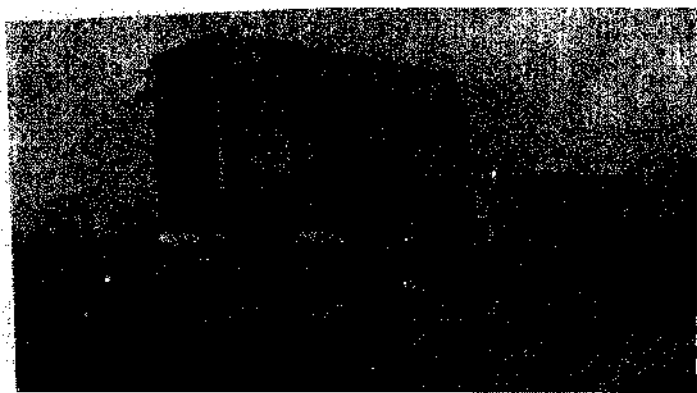
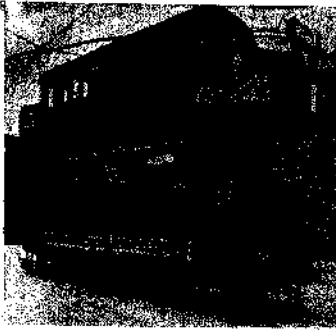


PLATE 2.—Evolution in Design: Tramcars.

Above: The first passenger tramcar to be operated in Europe. It was introduced by an American named George Francis Train. This first street railway, as it was called, was opened at Birkenhead on August 30, 1860.

Below: London soon Mowed the lead of Birkenhead. Here are two examples of early London horse-drawn tramcars plying between Marble Arch and Notting Hill Gate in 1861. (Rischgitz collection)





One of the first electric trams put into operation at Birkenhead is shown above. It ran on February 4, 1901.

(Reproduced by courtesy of the Transport Department, Birkenhead Corporation.)

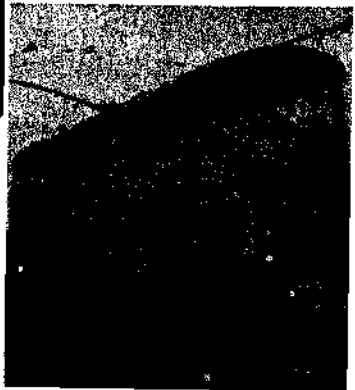


Above: The tram became two glazed boxes one on top of the other.



An electric tramcar on the London United Tramways in service in the early years of the century. No protection was furnished for the driver.

(The tram shown above and the two on the right are reproduced by courtesy of the London Passenger Transport Board.)



Below: The lines have been tidied up and the general comfort and efficiency of the design improved.

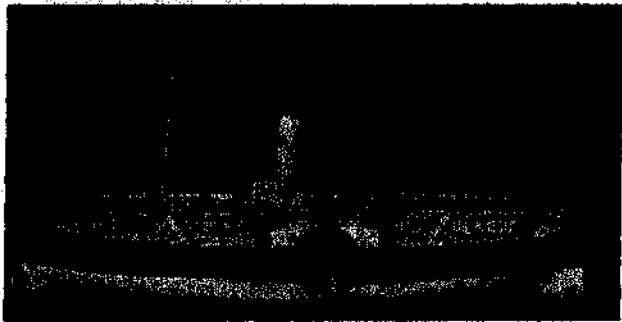
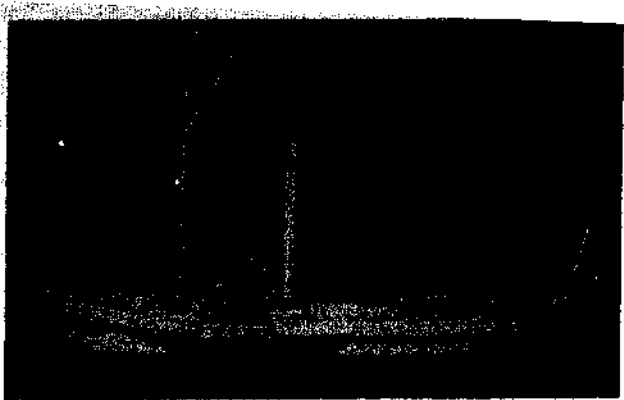


PLATE 4.—Evolution in Design: Ferry Boats. These two plates show how the Wallasey ferry boats on the Mersey have developed between 1826 and 1934,

Above: The ferry boat *Sir John Moore*, built 1826 by Land and Denny. 50 tons. Length: 104 ft. Breadth: 16.5 ft. There is no record of passenger capacity. This ferry boat was in operation between 1826 and the early 1850's.

Below: *The Pansy*, built 1896 by J. Scott & Co., Kinghorn. 332 tons. Length: 160 ft. Breadth: 27 ft. Passenger capacity: 1,243. In operation from 1896-1917.

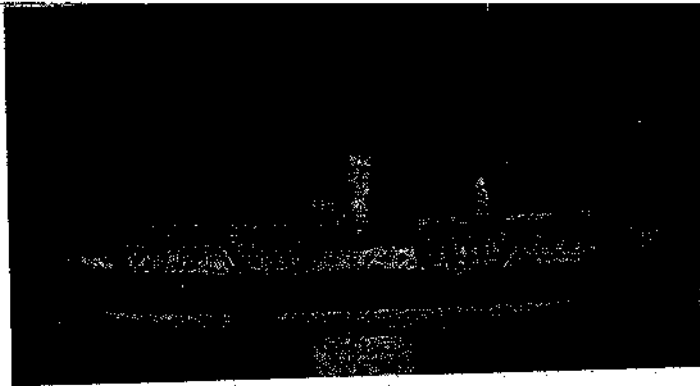
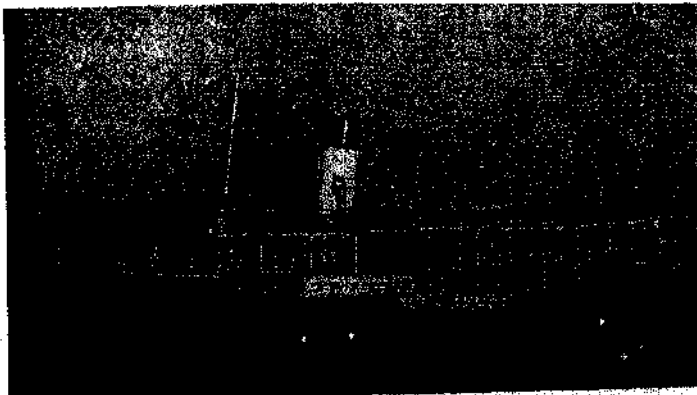


PLATE 5.—The Paddle Wheel Disappears.

Above: The Rose, built 1900 by J. Jones & Son, Liverpool. 514 tons. Length: 155 ft. Breadth: 42 ft. Passenger capacity: 1,831.
Period of operation 1900-27.

Below: The Royal Daffodil II, built 1934 by Cammell Laird & Co., Birkenhead. 591 tons. Length: 151 ft. Breadth: 46 ft.
Passenger capacity: 1,995. In operation since 1934.

(The four illustrations of these two plates are photographs of models which are exhibited at Seacombe Ferry, Wallasey, Cheshire, and are reproduced by courtesy of the Wallasey Corporation Ferries.)



EXAMPLES OF COMMERCIAL ART IN THREE DIMENSIONS

This plate and the five that follow show how problems of industrial design and commercial art overlap. The design of the Dettol bottle below, the Pilkington Cathedral Glass catalogue that performed some of the functions of a sample case (Plates 7, 8 and 9) and the Travel Aid Units for the London Passenger Transport Board (Plates 10 and 11) all demanded the trained imagination of a commercial artist and an industrial designer.

PLATE 6.—The bottle and label designed for Dettol by Charles W. Hobson Ltd. The bottle to the left has a wartime labelling device, for the label is printed on both sides, and the name shows through the liquid in the bottle, the other side being devoted to necessary directions for use and so forth.



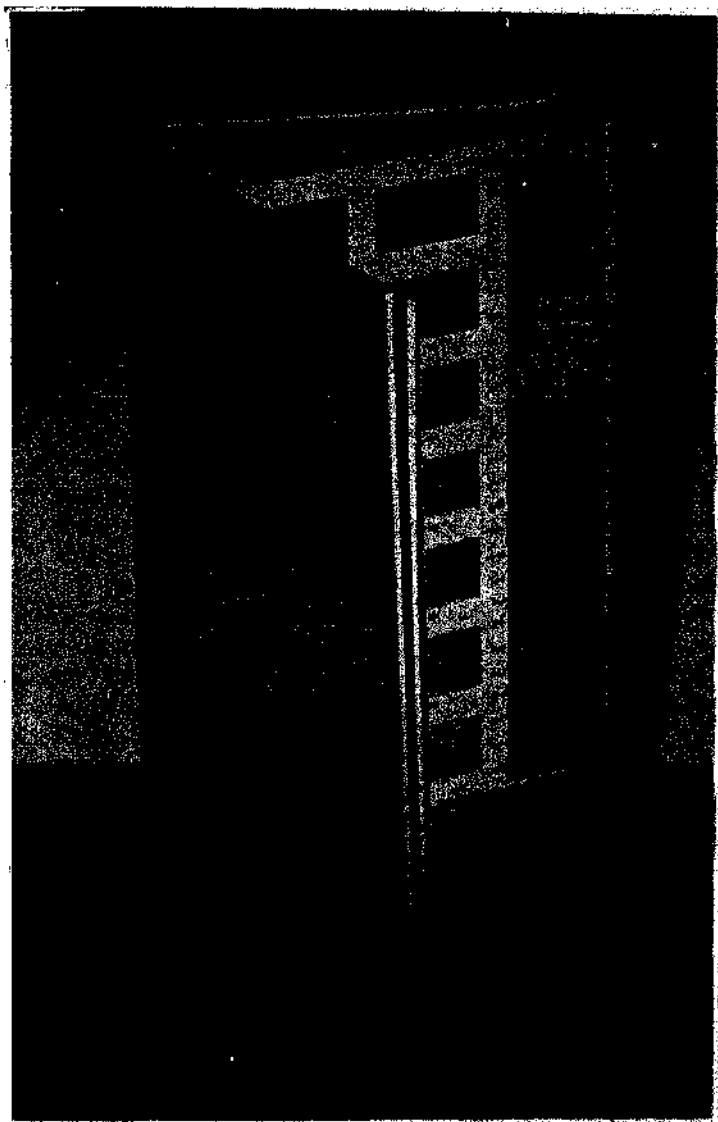
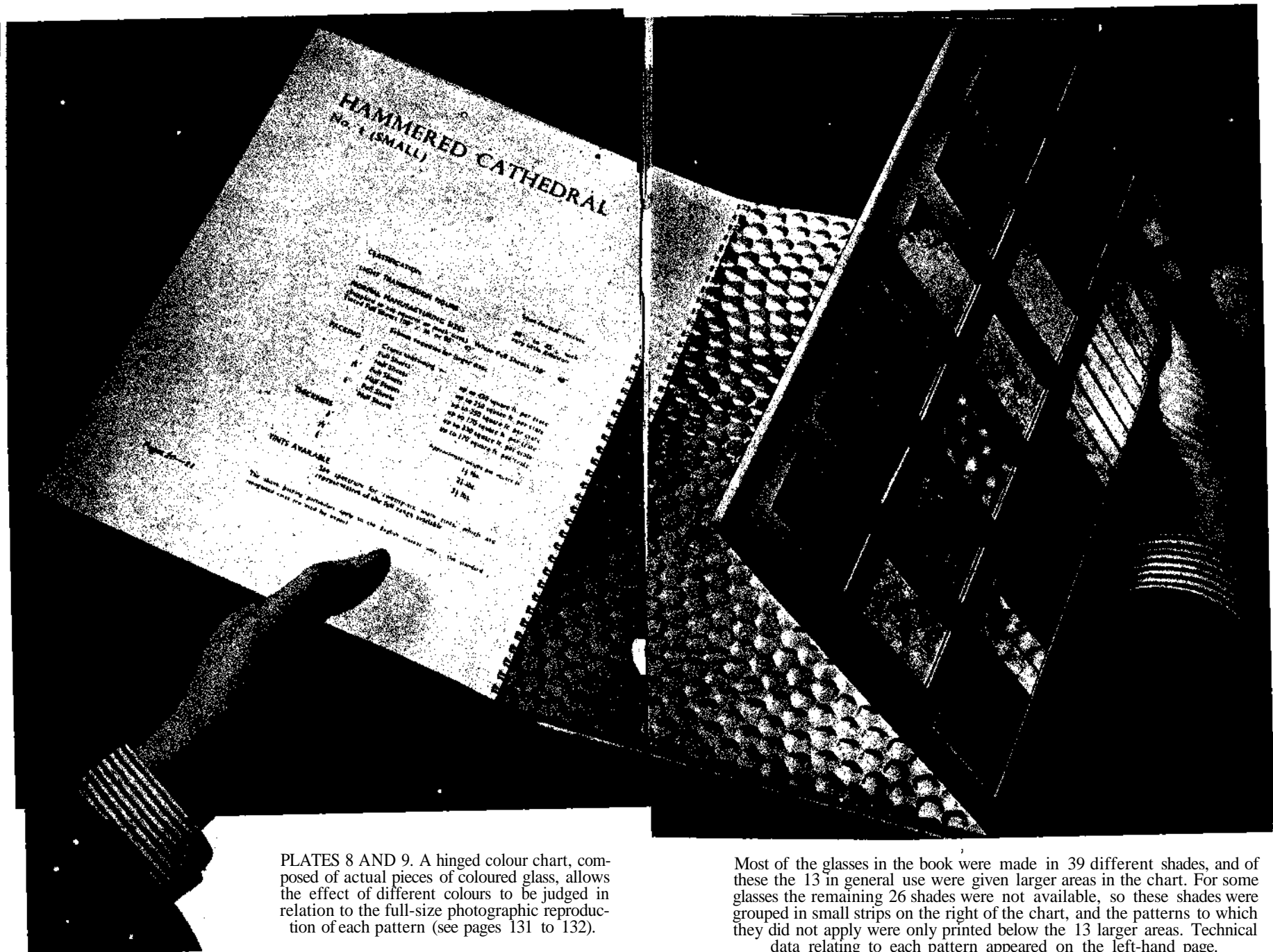
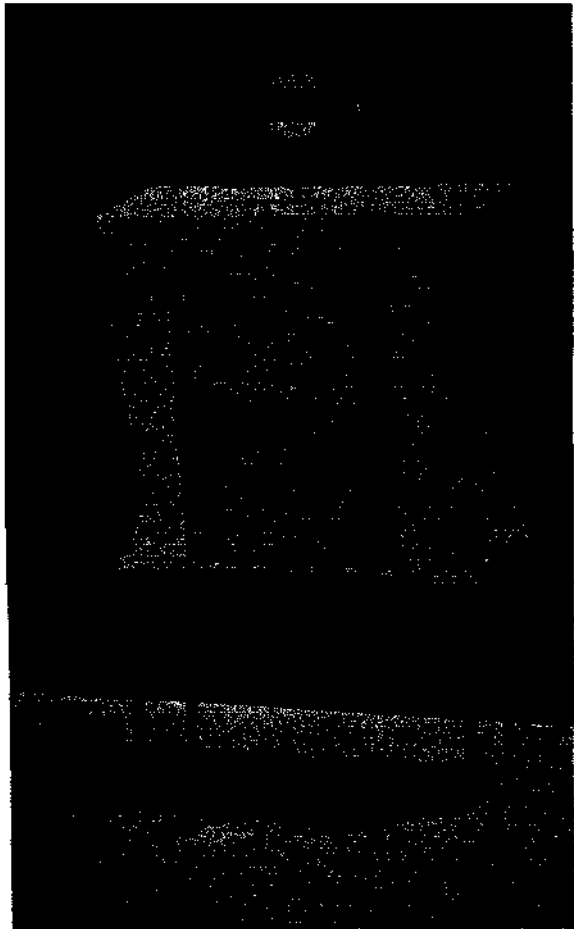


PLATE 7.—A catalogue for showing the colours and surface patterns of the Cathedral glasses manufactured by Pilkington Brothers Limited. Externally, it is a compact, well-bound book. Plates 8 and 9 show it in use.



PLATES 8 AND 9. A hinged colour chart, composed of actual pieces of coloured glass, allows the effect of different colours to be judged in relation to the full-size photographic reproduction of each pattern (see pages 131 to 132).

Most of the glasses in the book were made in 39 different shades, and of these the 13 in general use were given larger areas in the chart. For some glasses the remaining 26 shades were not available, so these shades were grouped in small strips on the right of the chart, and the patterns to which they did not apply were only printed below the 13 larger areas. Technical data relating to each pattern appeared on the left-hand page.



PLATES
10 AND 11

A "Travel Aid" unit, designed by Misha Black, O.B.E., F.S.I.A., M.INST.R.A., to accommodate traffic maps for the Underground Railways, bus, trolley bus, and Green Line coach routes operated by the London Passenger Transport Board. The case history of this design is given in detail on pages 133 to 139. The preliminary model, made to the scale of 1 in. = 1 ft., is shown above. The prototype unit is shown on the opposite plate.

(Reproduced by courtesy of the London Passenger Transport Board.)

Figure 1

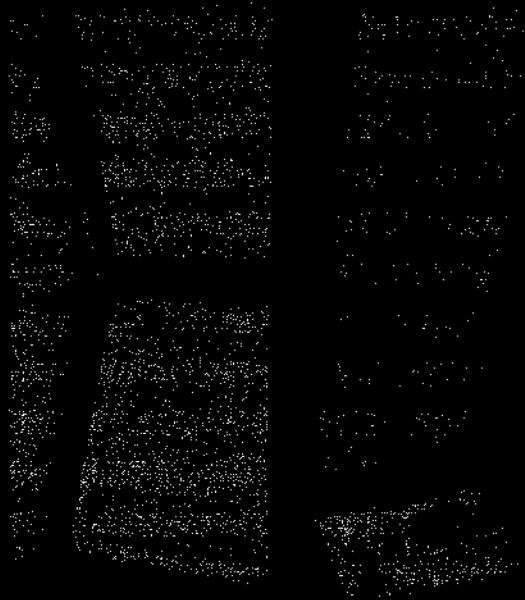


Figure 1. Relationship between number of children and number of children in school.

Figure 1 shows the relationship between the number of children and the number of children in school. The x-axis represents the number of children, and the y-axis represents the number of children in school. The four plots show a positive correlation between the two variables.

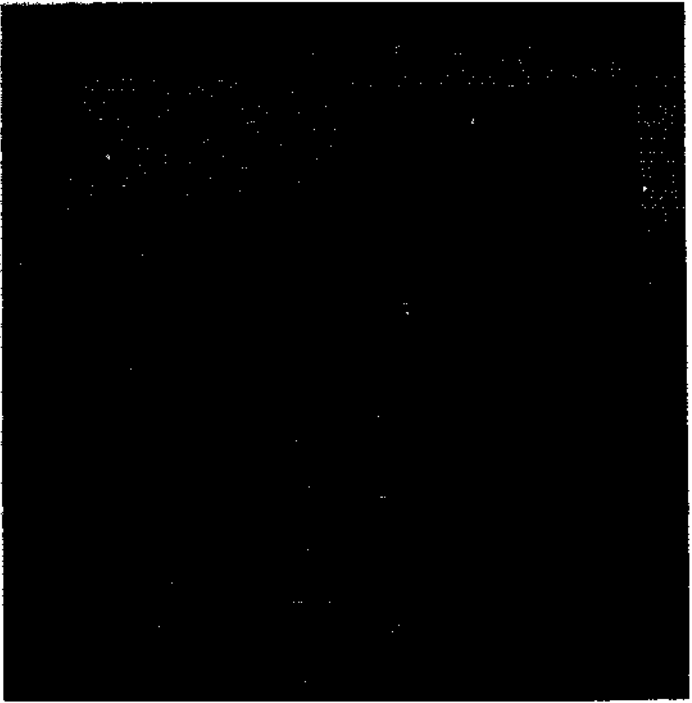
The top-left plot, labeled 'All children', shows a positive correlation between the number of children and the number of children in school. The top-right plot, labeled 'Children in school', shows a positive correlation between the number of children and the number of children in school. The bottom-left plot, labeled 'Children not in school', shows a positive correlation between the number of children and the number of children in school. The bottom-right plot, labeled 'Children in school', shows a positive correlation between the number of children and the number of children in school.

The relationship between the number of children and the number of children in school is positive. This is shown in all four plots in Figure 1. The number of children in school increases as the number of children increases.

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SMALL-SCALE EXAMPLES OF INDUSTRIAL DESIGN

PLATE 12

Above and opposite are three radio sets, designed for Murphy Radio Ltd. by R. D. Russell, R.D.I., M.S.I.A. The evolution of these designs is described in detail on pages 112 to 117. Set No. B.23 is shown above, and on Plate 13, set No. AD-32 is shown at the top, and set No. A.4 is shown below,

(Reproduced by courtesy of Murphy Radio Ltd.)

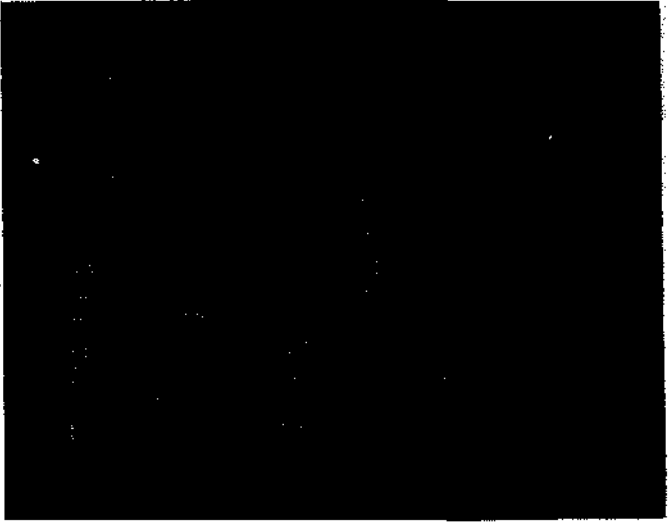
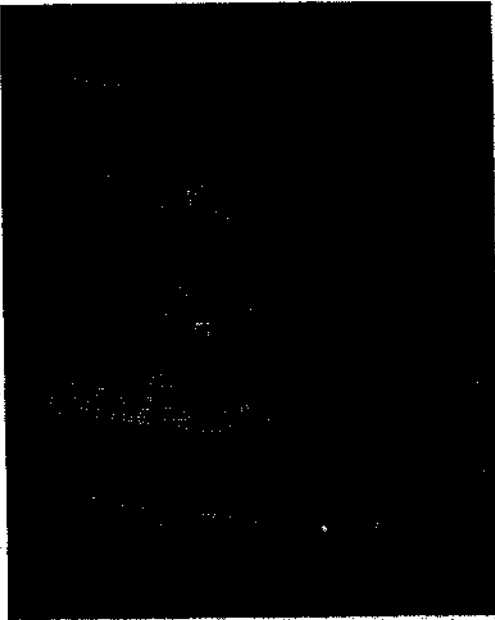


PLATE 13
See description
on Plate 12.



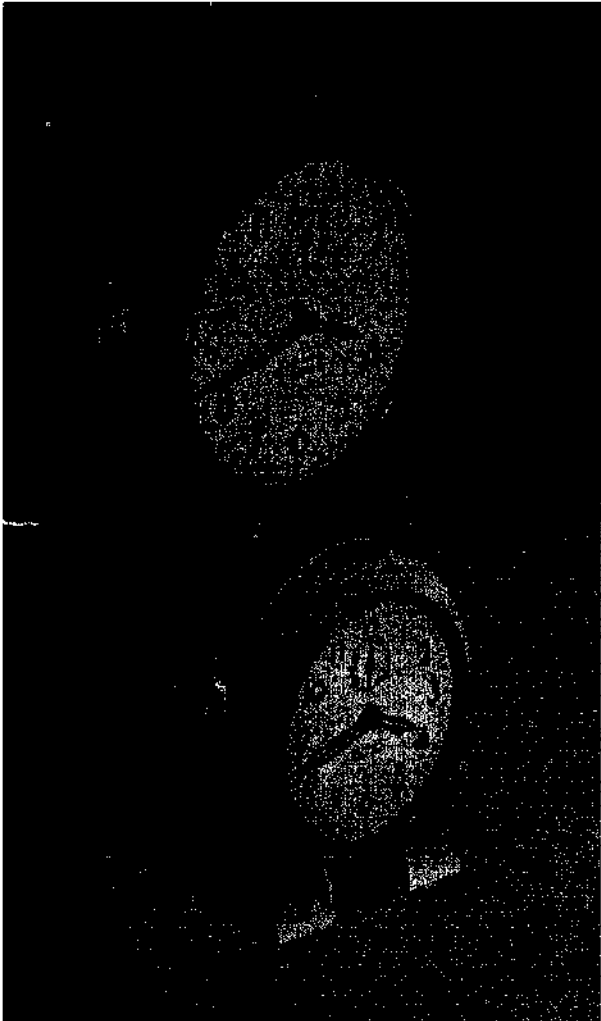


PLATE 14

Two clocks designed by Henry Dreyfuss for the Westclox division of General Time Instruments Corporation, La Salle, Illinois, U.S.A. These clocks, marketed under the name of Big Ben and Baby Ben, have brass cases with lacquer finishes: alternatives being ivory finish with gold colour trim and black finish with nickel trim. Height of the large model $5\frac{1}{2}$ in.; small model $3\frac{1}{2}$ in.

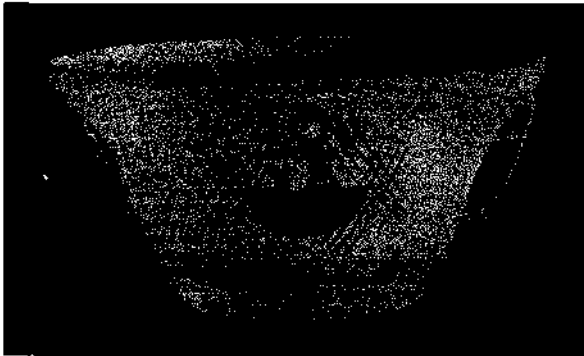
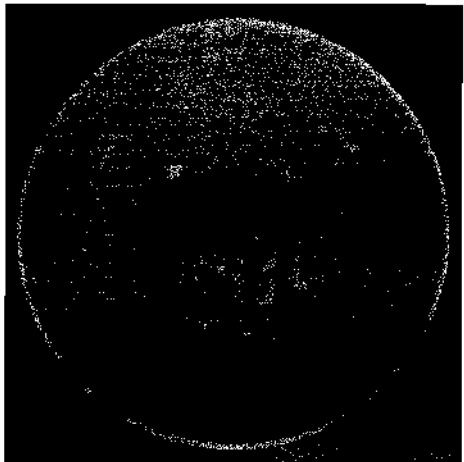


PLATE 15



Above and centre: The Boat Race bowl designed by Eric Ravilious for Josiah Wedgwood & Sons Ltd. This is printed from hand-engraved copper plates, in black, with splashes of vivid colour.

To the left: The Coronation mug, designed by Eric Ravilious for the same firm.



PLATE 16

Three examples of contemporary fabrics designed for Warner & Sons Ltd.

Above: The "Tally Ho" screen-printed chintz designed by Marion Dorn.

To the right: "Hermes" screen-printed satin designed by Louise Aldred.

Below: "Cloudscape" screen-printed chintz designed by Marion Dorn.



