

## CHAPTER FIVE

### THE CONQUEST OF CLIMATE: HOW MANKIND IS CLOTHED AND HOUSED

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## CHAPTER FIVE

### THE CONQUEST OF CLIMATE: HOW MANKIND IS CLOTHED AND HOUSED

#### § I. *The Wardrobes of Mankind*

SO soon as our 1,900,000,000 people are assured of food, the questions of clothing, shelter and ornament arise. The search for comfort begins. Man—and still more woman—arrays himself against the elements and to encounter his fellow creatures. He dresses, he arranges his personal background.

When first I planned that voluminous undertaking, the *Science of Work and Wealth*—that project which turned out at last to be only the necessary vast eggshell, the phantasmal embryonic wrappings from which this present work was born—I put down the title of two great books. One was to be *How Mankind is Clothed*, and the other *How Mankind is Housed*. As soon, however, as the attempts to assemble the material began, it became evident that these two systems of human activity were in fact inseparable. They are both in essence now, man's conflict with climate and the weather. And so far as the treatment of industry goes furniture is one indivisible link. Such substances as textiles and leather would have to come in twice over if the two subjects were separated, though little more than the lie of the seams separates a shirt from a pillow-case or a pair of boots from the cushion of a smoking-room armchair. The productive processes are the same. And hat, parasol, umbrella, tent, shelter, shed, hut, hovel, and house have, as the biologists say, a plain morphological as well as functional connection. They are all represented by the shell of the snail.

First we should have dealt with the general materials for clothing and furniture. There would have been an account, an immense account, like endless galleries, in a museum, of natural and artificial fibres, and of modern spinning, weaving, knitting and netting. After that would have come the colouring and printing of these fabrics. Leather, and skins generally, demand a chapter by them-

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selves. Then would have come the shoemaker, hosier, hatter, tailor and dressmaker. A discussion of fashions follows naturally on that. I think our encyclopædia would have omitted the soul of clothing unless it included an account of dress designers and their methods and profits and a survey of modern dressmaking and millinery as they have developed in such typical centres as Paris, London and New York. That could be made intensely interesting—for everyone with enough money to “dress.” How are fashions launched and sustained? And one could tell of the subtleties of “exclusive” fabrics made only for this or that dressmaker, and of the perpetual stealing of models and infringements of copyright. We could show the rich lady from the Argentine or the United States coming to Paris, and all the decorative traps and lures that are set for her money. We should have a wonderful and amusing chapter here—and I should like to have it written by some student with misogynic tendencies and a meticulous industry.

Such a discussion of dressmakers and decoration, even the suggestion of such a discussion, may seem frivolous to some readers and altogether beneath the dignity of “economic science”; but indeed it is not at all frivolous. The fashions are not merely a sort of decorative crest to the business of clothing mankind. All the world nowadays follows the fashions. There is no stable, staple costume left anywhere any longer. We may glance back at the past when for large sections of the community costume was as prescribed almost as military uniform. That fixity occurs now only in very out-of-the-way places, and every year it is more difficult to find any out-of-the-way places. There have been local reactions towards traditional costume in Spain and Italy, and in Brittany the priest and public opinion are effectively conservative of local modes. Apart from such exceptional cases the treatment of fashionable clothing is an essential part of the treatment of clothing in general. The mannequin parade in the Paris club or hotel links inseparably now with the shopping of the lodging-house “slavey” on her afternoon off, or the gala costume of the Kentish fruit-picker with money to spend. It is all one process of a continually varying demand and a continually stimulated production.

It might be interesting and profitable here to go into the question of what should be included in the modern man’s wardrobe. I am not thinking here of the wardrobe of a smart man-about-town.

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But what should a sailor, or an agricultural labourer, or an engine driver, or a clerk in a modern civilized community possess in the way of hats, shirts, boots, shoes, suits, and ties and collars? And what in fact does an exceptionally prosperous individual of these classes buy for himself nowadays? That ought to be ascertainable, but I know of no one who has attempted to ascertain it. I think we should find a considerable gap between the equipment that is reasonably desirable and the equipment actually possessed in most cases. I think we should find the world is shockingly underclothed to-day by the criteria of either efficiency or desire.

In the first place every worker in a soundly organized community should have proper working clothes, and by that I mean not simply overalls, but such underclothes as are best for him to toil and sweat in. I doubt if the expense and trouble of procuring this working costume should be left to him. They are the concern of the efficiency-seeking director as much as the space and lighting of his work-place. The modern agricultural worker, quite as much as the miner or factory hand, should have his working costume. And men and women are mere industrial slaves if there is not a considerable part of their waking life spent out of working clothes. That means suits and dresses and fresh underclothing into which they can change. The old-time peasant almost everywhere had his or her traditional "best," the go-to-meeting array, the provincial "costume." This was handed from one generation to another. It might be amusing to give a series of illustrations to show how alike those "old-world" costumes were and how distinctive they were felt to be. The modern worker has little need for such parade costumes for feasts and rare occasions, but more for varied personal clothing during his ever-increasing leisure. He wants first his sound and adequate "producer" costume as this or that sort of worker, and next his sufficient and satisfying individual "consumer" wardrobe as a free and independent citizen. The Lancashire operative usually has a "berryin' 'at," for funerals and state occasions, a last trace perhaps of the peasant's "best" regalia.

I believe myself that the present underclothing of the world is disgustingly dirty, ragged and defective. A contract to put that right and keep it right would set every woollen and cotton factory in the world enlarging itself and working overtime. And would keep it working overtime until fresh factories arose.



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It is not simply for the oily mechanic, the miner and the farm hand, that we have to consider this two-sided wardrobe. There is an old-established but increasing disposition in most of the organized work of the world to put the worker on duty into a uniform. In the past he was usually expected to share or bear all the expense of that. When I was a draper's apprentice the clothing expenditure of the shop assistant's wages was controlled by the fact that the men had to appear behind the counter in a white shirt and collar, black tie, black tail coat and dark grey trousers, or some such similar rig—it varied with the establishment—while the shop woman was under similar obligations. For shop assistants living in, this meant that from a quarter to a third of their wages was earmarked for uniform. In off time there was nothing for it but to go on wearing the same things. As a natural reaction against this obligation, it was the supreme ambition of every assistant to possess a coloured lounge suit. That was the symbol of one's (temporary) freedom, one's citizenship, one's manhood. One felt, when one wore it, no longer a shop hand but a man. One might be anyone in mufti. A select few treasured the equivalent of the peasant's gala costume in a cherished dress shirt or so, a white waistcoat, and a carefully folded evening-dress coat and trousers. They wore this gear at chapel dances and genteel occasions of that sort. Heads of departments got to tweeds and deerstalker caps. Nowadays there are thousands of young men in plus-fours who have never handled a golf club in their lives but who wear them as the outward and visible escape from some quasi-uniform imposing occupation.

I do not know how it is with the clothing of shop assistants to-day. Nor do I know on what terms the hall porters, hotel waiters, bus-drivers, railway conductors, postmen, delivery boys, lift attendants, and the like, that increasing band of uniformed men and women, are clothed. The social effect of the uniform, however, is very plain. The uniform limits both control and obligation. It is no longer an affair of lord and inferior; your personalities disappear in the formalized relationship. The first obligation of the man in uniform is to respect his uniform—as the scientific worker must respect his research or the doctor the public health.

Cheap, smart, stylish clothing, I am told, has revolutionized the factory life of women. The conditions under which girls are asked to work must have a certain compatibility with their clothing.

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Girls looking as they think like ladies, expect to be treated as they think ladies (working in a factory) should be treated, and the result is an extraordinary rise in the standard of cleanliness, language and manners.

Uniform expresses rôle, and as community-planning develops and the laying out of towns and architectural scheming become more extensive and influential in people's imaginations, the idea of a personal as well as a functional rôle may influence men and women in the direction of "dressing the part" even out of the employment hours. Their costumes will become indications of how they wish to be treated. They will express their conceptions of their own characters. We may be moving towards an age of much more varied costumes than the world has ever known before.

With all this an encyclopædic volume on clothing would deal copiously— in relation, no doubt, to museum displays—and then it would come to the making of the clothes in question. It would deal with the typical varieties of clothing factory, the mysteries of standard shapes and sizes, the processes of distribution and the eternal struggle between the economics of standardization and the incurable craving of every living individual for something distinctive. And so we should come back at last to those "exclusive" fabrics and designs to which we have already alluded. "Exclusive" designs—if we may be paradoxical—may become more general. As workers are released by improved productive methods from staple production, the proportion engaged in the design and making of distinctive clothing may increase.

### § 2. *Cosmetics*

Before we leave this matter of clothing, it may help to make our picture of social life complete if we say a little more about adornment. No human activities witness so directly to the almost universal resolve, at once heroic and pathetic, to make life gay and lovely as those which constitute the cosmetic industry.

In the last quarter of a century this has become an immense industrial interest. The Washington Bureau of the Census of Manufacturers tells us that for 1929, the factory value of perfumes, cosmetics and other toilet preparations manufactured in the United States alone was \$207,461,839. This sum would probably have to

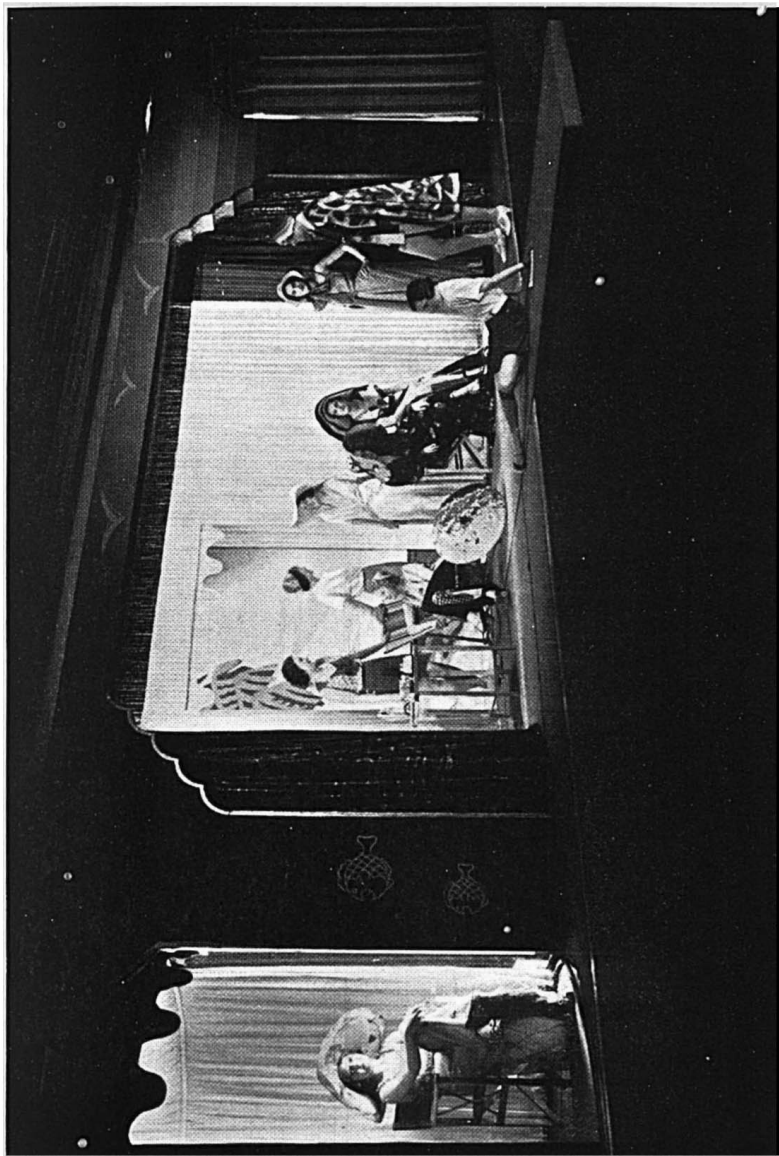
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be doubled for an estimate of the prices actually paid by the ultimate consumers, for profits in this trade run high, and to this would have to be added the upkeep of 803 beauty establishments, the wages of 13,000 more or less skilled employees, masseurs, rubbers and the like, electric current used in treatment and other expenditures. The gross total at the consumers' end cannot fall short of \$500,000,000. In all ages, far back into pre-history, we find human beings have painted and adorned themselves. The Cro-Magnon people painted themselves like Red Indians; all India seems to paint, if only caste marks upon its forehead; nearly all savages smear themselves abundantly. Museums are littered with the rouge cups, trays, manicure sets, mirrors and pots for greases and messes, of the pretty ladies of Sumeria, Egypt, Babylonia, and thence right down to our own times; but never can the organization of human adornment have reached the immensity and subtlety shown by these American figures.

To our fourth chapter we have given the title of the "Conquest of Hunger," and this present chapter goes on under the caption of the "Conquest of Climate." But, as we have noted already in our remarks about dressmaking, mankind is not for a moment content with mere nourishment and covering and shelter. In a world in which, as we have shown, there is a frightful deficiency of under-clothing, as many people as can are already striving for beauty, dignity and general effectiveness in their costume, and we have noted how clothing and conditions of employment can react upon each other. Here, under this heading of cosmetics, we face a still franker manifestation that man does not live by bread alone nor build his houses simply to keep warm and dry. This section goes beyond those necessities into another sphere of conquest altogether, the attempt to conquer happiness and beauty. And to keep something of youth still—something more desirable and far more evasive than bread or board.

Let us consider the effort to be pleasing that a modern woman in comfortable circumstances will make to-day. If our present hope that comfort and abundance are spreading down now steadily from class to class is to be justified, this is what most women will be doing in no very distant future.

It is an average well-to-do woman we are describing, intent, she says, upon her duty of pleasing mankind. She goes now to the



(By courtesy of Messrs. Selfridge)

**WOMAN'S CHIEF INTEREST IS STILL DRESS**

A mannequin display of beach wear



(By courtesy of Heiena Rubinstein)

THE SMART WOMAN GOES TO THE BEAUTY SHOP FOR MASSAGE AT LEAST ONCE A WEEK. And many supplement this weekly massage with treatments by diathermy and electrolysis for weight reduction, removal of congested veins, warts, moles, superfluous hair or other blemishes. Some of the apparatus for these treatments are seen in the background.

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beauty shop for massage at least once a week, and there, according to her physical condition, she has electric treatment or rubbing with creams, the application of hot and cold lotions; she has her face put under a "mask," an affair of beaten-up eggs and other ingredients which tightens on the face, she has it covered and rubbed with ice. Then her eyebrows must be plucked to a fashionable form, and there must, especially if she is of a dark complexion, be treatment for any casual hair, for an incipient moustache or the like. Her neck must remain round and youthful; it must be treated for sagging, and her hair, even if it does not need to be dyed, must be washed, marcelled, or water-waved and rubbed with a tonic. Good hair tonics are specially expensive. Once a week at least the hands must be manicured, and generally the nails are coloured as well as polished. A little pedicure may come in here. Few people can be trusted to cut and arrange their own toe-nails well.

After this weekly or bi-weekly cleansing and refreshment our lady goes home. But she does not go empty-handed. She will need a selection of scents; and she will carry off bath salts, lotions, eau-de-Cologne (costly when well alcoholized), and perfumed soaps. We will say nothing of her dental care, because that is a part of normal hygiene. During the day she will want to clean her face, and this is done, not dairymaid fashion, with soap and water, but with cleansing cream which takes off powder, rouge and dust and prepares the facial ground for reconstruction. Then comes skin tonic or liquid astringent to tighten up the skin, reduce any puffiness under the eyes and remove what remains of the cleansing cream. Then all over face and neck is put a "foundation" or "vanishing cream," and on this goes the powder (there are various powders according to the part of the body), rouge (red, orange, or dark red, according to the type and fashion), lip salve, and "kohl," black powder or liquid, for the eyebrows, the upper eyelids, or just under the eye, or at the hair roots on the temples.

If her face feels tired and there is no time to go for massage, our lady puts on some very expensive "day cream" and lies down for one or two hours. It has quite a wonderful effect, and when it is taken off again with cleansing cream and astringent, the face feels back in its teens. A "muscle oil" also is very helpful in tightening up the muscles of the face, neck and shoulders and diminishing the wrinkles at the nostrils.

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After the triumphs of the evening the lady cleans her face before retiring with cleansing cream and liquid tonic. Then, if her face is thin, she puts on a thick, oily, very *nourishing* cream, or if it is fat, a *reducing* oil, and if she can bear it she goes to sleep thus anointed. But if she finds it unendurable she gets up again and wipes it off.

Also she must put cream on her hands to keep them white, and special cream on her nails. And also, perhaps, if she has been advised to that effect, she will put on a "wrinkle eradicator"—a band of rubber tied tightly round her forehead—and a "chin reducer," made by experts, of elastic and herbs, to brace up and keep her chin muscles within bounds.

But, you will say, this is a very exceptional woman, and indeed this is a very superfluous section to insert in a survey of world economics! By way of answer you are referred back to the figures from the United States Census of Production given in the opening paragraph of this section. There are a million women in the United States alone with an average annual expenditure of something like £100 on these things.

### § 3. *The Dissolution of the Home*

A comprehensive survey of housing would begin with the housing of the past. That was highly localized both as to design and material. We recur here to the motif of "delocalization" which runs through all this work. Housing is now more and more independent of local resources, though it is still dominated and will always be dominated by climatic conditions. You can bring any material now to a place, but you cannot take its weather away. The partial release from locality produces a certain discordance in many populated landscapes, because of the incoherent variety of forms and material now possible, but the weather is a steadying and harmonizing influence.

Here some very pretty pictures will come to mind. Compare the slant and structure of roofs in snow country with those in hot countries and windy lands, the characteristics of marsh, riverside and seaside building, the variations of window space, of the height and size of rooms, of the construction of verandas, loggias, sun traps and sleeping porches with variation in sunshine, windiness and rainfall. There is little need to tell here of the rapidly increasing

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comfort of the modern house, because we are all living through that improvement; consider, for example, the appearance of the bathroom and the enormous brightening of the evenings that has come with the electric light.

But the electric wires and the water tap take us on to another phase of the development of modern housing, the enormous development of collective services in the modern community. Water was laid on to the home in London in the seventeenth century, and domestic gas lighting came early in the nineteenth. The cholera epidemic of the middle nineteenth century stimulated the development of drainage and sanitary organization in Great Britain and made the English for a time the propagandists of domestic and public sanitation—until the Americans took the good work out of their hands. Our museum should show the rapid development of domestic interdependence in the modern town and give sections on water supply, drainage, sanitation, the destruction of refuse and the distribution of hot steam (as in New York), gas and electricity. And it will point us also to the household end of the telephone, with its new access to shop, doctor and mechanic. Here too a thoroughly exhaustive account of the decreasing autonomy of the modern home would have a few pictures from the *London Punch* of the eighteen-sixties to remind the happy present of the vanished horrors of "washing day." A description of the working of a modern laundry seems indicated here. All these collective services tend to replace the structurally separated house by collective buildings, mansions of flats and the like, and the high and rising value of land in urban agglomerations stimulates this tendency.

And there is another side to this increasing collectivism of modern life, and that is the increasing disposition towards collective housekeeping on the part of women. The modern household is not only invaded at every point by collective services, but it is also assailed and superseded by them. For all its improved facilities, the separate home irks people nowadays more than it did. Women, especially the abler ones, rebel against domestic preoccupations. Men object to a life with preoccupied women. Domestic service, especially in the small household, is more difficult to obtain than it was. It would be interesting to give an account of some country house or château of the eighteenth century for the purposes of



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comparison. The owner, like Trimalchio in that immortal banquet Petronius has preserved for us, could boast that everything he consumed was grown on his own land and prepared by his own dependents. Even his town house was served by his own mules and wagons from his own estates. Against this former autonomy of the rich we have to set the history of the modern hotel industry. Formerly "hotel" was the name of a great private town house; the seventeenth century knew nothing of what we call hotels. There were inns. You brought your lackey with you, if you had one, to secure proper service. The real dreadfulness of these inns glares through the fun of such a novel as *Humphrey Clinker*. In Russia, towards the end of the nineteenth century, you still brought your bedding, your tea, and even your provisions to the inn. You do that now over the greater part of India. Over all Asia, indeed, the caravanserai still rules. And these accommodations existed only for travellers. For those making a longer stay there were "lodgings." Fielding's account of his *Journey to Lisbon* describes an actual lodging in the Isle of Wight for the edification of posterity.

Athwart these memories we evoke the advance of the Hotel Industry, as the provision of a care-free comfort and abundance, at first for the very rich, now for the well-off, and presently for most people. We note the hotel branching out into the service flat and mark the progress of the residential club and country club.

With these advances there comes a considerable change in the status and quality of domestic service. From being a personal dependence with indefinite duties and a general obligation to obedience and obsequiousness, domestic service in a flat system becomes definite in its functions and with a certain personal detachment that marches better with modern conceptions of human dignity. In a London service flat or in a London club a modern bachelor is assisted in his domestic affairs by human beings he may neither rail against nor threaten nor burden with unexpected and uncovenanted tasks. But yet their assistance can make him extraordinarily comfortable. He can telephone that his rooms are to be ready before he comes to London, and he will find them in spick-and-span order. A maid will call him in the morning and bring him his morning tea, a valet carries off his disordered clothes to brush and puts out a fresh suit; a newspaper drops into his letter box. He finds his bath prepared. He telephones down to a central

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kitchen or restaurant for any meal he needs, and it is served him. Tea is served, and clothes are put out for him during the day. If an electric light or a lock goes wrong, a skilled mechanic comes up to set it right. The tenant's utmost trouble in the matter is to ring up the housekeeper or head steward.

He has never "engaged" any of these helpers. He never gives them "notice." Often he does not know their names. He goes away for a month and may find one replaced. He may ask a friendly question about that, but it is not his business. He knows nothing of the religion, politics, private life of these competent professionals. Such a system of relationship would have been inconceivable in A.D. 1850. Then these people would have been part of our bachelor's private household; he would have been their patriarchal tyrant, and they (and he) would have suffered all the limitations and inconveniences of their being fixed upon his back.

### § 4. *The Landscape of Homes and Cultivations*

This secular disappearance of the autonomous household through these double and alternative processes, the collectivization of its services on one hand and collective substitutions on the other, open up the prospect of an entirely new series of patterns in the layout of town and country. The life of the ordinary fairly prosperous citizen tends to divide itself between a town apartment with a stereotyped fashion in its fundamentals and either a country club or an individualized cottage or bungalow, and the large-scale map of our populated regions alters in accordance with these tendencies. The regrouping of urban centres and dispersed out-of-town homes and resorts is going on now with extraordinary rapidity and demands a new planning of roads, open woods and other common lands. The idea of "Town-Planning" is a new one in the Anglo-Saxon world. Before that idea became prevalent, towns grew unchecked. They grew higgledy-piggledy, but their growth never came to any crisis that challenged control until the present era of continually advancing and varying transport facilities. And "Town-Planning" still remains very uncertain because of the endless devices and methods of transport that have still to be tried out and judged.

But though Town-Planning came as an afterthought to the great

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urban aggregations of modern Europe and America, the idea itself is an obvious and ancient one. The cities of the old civilizations were planned, as often as not, as wholes. The idea came as a novelty to Renaissance Europe and has never since been lost sight of in Germany. Such eighteenth-century cities as Karlsruhe were carefully planned. Sir Christopher Wren tried to plan a new London after the great fire, but he was defeated by haste, greed and vested interests.

Before the modern housing map can be made out in detail it will be necessary to work out the proportion of urban and diffused urban population to the country worker and to the delocalized elements—free to live anywhere—in the grand total of people whose needs have to be provided for. There will necessarily be great local variations in these proportions and in the nature of the local activities. They will presently become calculable, but thus far estimate and guess-work have had to be used. It will become more and more possible, as surveys become more exact and statistical methods are perfected, to determine the proper sites for factories and industrial fields and to scheme out systems of intercommunication between them and the residential districts, to plot out the great schools, colleges, directive and research stations, the clinics, the hospitals, rest houses and playgrounds, the theatres, dancing-places and museums, of an advancing social order. Such a planned distribution of populations is called "zoning." There are already planning schemes which regulate the number of individuals in a locality; the Welwyn Garden City plan, for example. Such regulation is necessary, if adequate breathing and recreation space is to be maintained. The Ministry of Health fixes an upward limit to the number of persons per acre in urban regions in Great Britain.

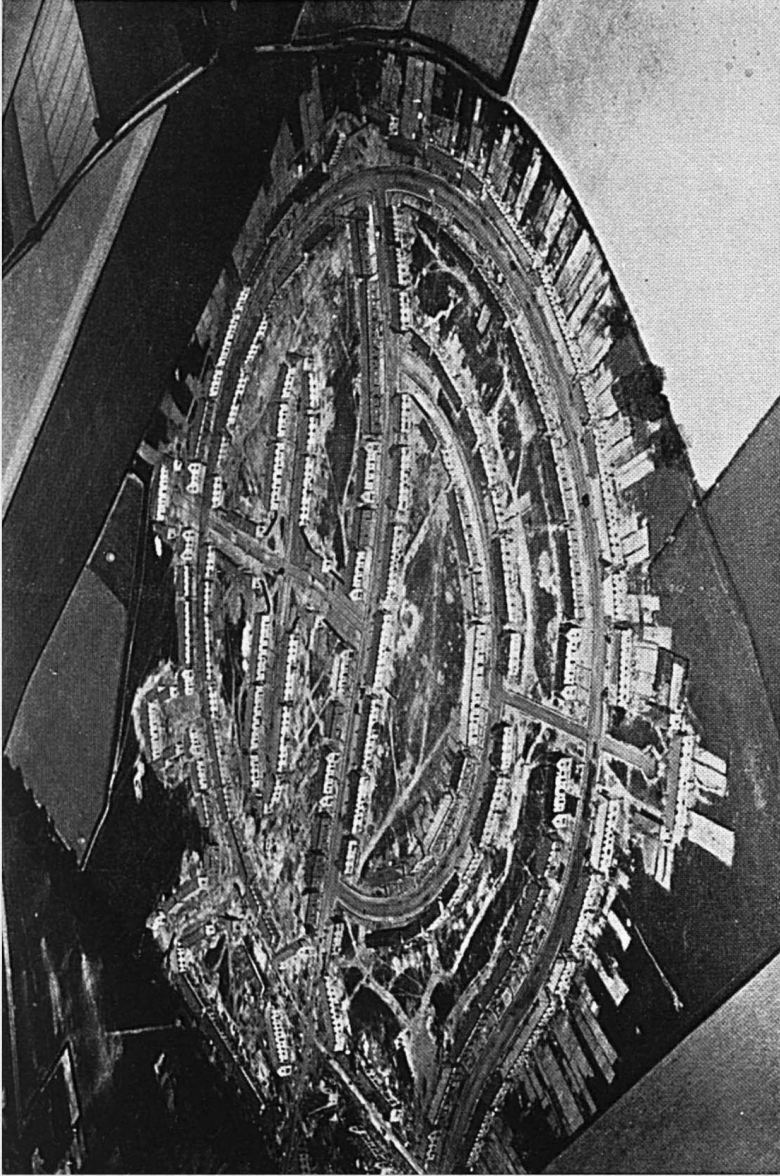
But all this planning has to be given substance and reality in a world already covered with fields, hovels, farms, châteaux, villages, towns and cities, whose forms and distribution have been determined by an interplay of forces and feelings that have now passed away or changed beyond recognition. We can look about us and see the old towns of yesterday with their citadels and fortifications, their casernes and iron-barred palaces, their cathedrals and town halls and market houses, giving place incoherently to the thrusts and pressures of our new occasions. All this dissolving and changing human landscape must be brought at last to the measure of a



*(By courtesy of Aeroflins, Ltd.)*

**AN INDUSTRIAL TOWN BUILT WITHOUT IMAGINATION OR FORESIGHT**

Mill workers' houses at Burnley, Lancashire; erected with a view to convenience rather than attractiveness



(By courtesy of Aerofilms, Ltd.)

**THE BEGINNINGS OF A MODERN INDUSTRIAL DISTRICT: ROSSINGTON, YORKSHIRE**

This new mining village has a spaciousness and interest entirely lacking in the older towns of planless unimagined development

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quantitative survey. And that survey must comprehend the rapid advance in building and engineering methods that is going on, and the attempts of power supply and water supply and every extending collective service to keep pace with the changing, experimenting and developing contours of façades of the rehousing of mankind.

Happily, in this field, it is only when we come to political frontiers that we impinge upon the traditions of patriotism and war. The local struggles of expanding municipality with urban and rural district councils, the conflicts of new avenues with ancient slums, may be severe and intricate, but, at any rate, we do not teach in our schools the inviolable sovereignty of Paradise Alley and Muck Lane, we do not stir up in them a more than religious fervour to remain for ever what they are, nor invoke all the forces of romance and sentiment towards bloodshed in the cause of old insanitary suburbs inconveniently situated upon our outlets, but "rightly struggling to be free." The most formidable obstacle is the individualistic landowner whose obstinacy, greed and defensive energy have necessitated and probably will in many cases still necessitate a long political and legislative struggle.

### § 5. *Modern Architecture and the Possible Rebuilding of the World*

At a later stage in the development of this survey we shall point out the probability of community-buying taking the place of individual-buying in respect to many commodities and services. In no field is this more practicable and probable than in the plan and rearrangement of town and countryside. It will be convenient to anticipate the conclusions of that discussion here and to review the tendencies of contemporary rebuilding. A steady enlargement of the enterprises, an increasing boldness and comprehensiveness are to be noted. The time may not be very remote when whole districts and townships and cities may be systematically reconstructed upon one single plan.

Most people have still to realize the vast extensions of available material, the changes in method and outlook that have come to the modern architect. The most fundamental change is the replacement of natural materials by reconstituted and artificial ones, and particularly the development of the steel framework. In our story of the steels we have noted the development of structural steel.

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Most steels will corrode unless specially protected, but the metallurgist may be trusted to deal with that difficulty. So far, steel frameworks have been made in large forgings and riveted together, but now welding is coming into use, particularly in America. New alloys, lighter to handle and fix, may be counted upon with confidence. Even now buildings can be made upon a scale and of a complexity beyond the utmost imagination of the builders of a hundred years ago. Before our age the technical problems of architecture were concerned chiefly with the piling up of weights. Great buildings were really "stately piles." Now they can have a new openness, grace and variety, and they can soar up to heights unthought of before. They can also be built with what a hundred years ago would have been an incredible speediness.

Up to the present the original mud hut has been clearly traceable in modern building. Cement, mortar, the dried brick are all mud at one remove. All building has hitherto been a wet process. Now it becomes the "dry" putting together of fully fabricated parts. And as R. A. Duncan has pointed out in his essay in *Science and the Art of Architecture*,\* building is ceasing to be a skilled handicraft and is becoming an affair of mass production, far more rapid and capable of rearing much more massive edifices.

In the place of massive walls of brick and stone, hollow walls of metal-sustained composition are not merely possible, but most practicable and economical, so that a room can be like a vacuum flask and maintained at a steady temperature impervious to heat or cold; it can be lined with soundproof materials; or it can be built of tinted or clear toughened glass and saturated with sunlight. And while the house of earlier times was a mere accumulation of masonry boxes with clumsy fireplaces for ventilation and staircases from floor to floor, the modern building becomes more and more like an engine, with tubes for air, hot and iced water, sanitary apparatus of all sorts, wires for heating and lighting, telephones, speaking tubes and the like. The house of a hundred years ago compared with the modern house is half-way back to the cave.

Steel frameworks are already a great stimulus to rebuildings, especially the rebuilding of big blocks of offices, warehouses and retail stores. Because steel-frame construction is quicker than any other method, the capital invested becomes remunerative in a

\* Journal of the Royal Institute of British Architects, June 7, 1930.

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shorter time, or a business is not interrupted for so long a period. It is also cheaper than any other form, and that also encourages rebuilding and expansion. The rigid framework permits of lighter walls, less weight, a taller building with a greater capacity on a given area. A steel-frame building has a greater range of upward extension than one of stone or brick. The spaces between the framework may be of very light material—hollow porous blocks—especially in the upper storeys. The steel framework permits a much larger area of window space and therefore larger rooms. This window space means better day lighting, especially in the murky atmosphere of northern manufacturing towns. The side and back elevation of the newer warehouses in Manchester, for example, appears to be "all window."

Many steel-frame buildings have masonry fronts; but the masonry is only a veneer. The "bricks" or "blocks" used to fill the spaces between the steelwork have often no structural qualities—they are merely "fillers."

For dwellings man still builds with little bricks, like the men of old. It seems difficult to replace the small rectangular "block" by the "slab" which is suggested by the vertical walls. But "wooden" bungalows are frequently covered wholly or partially and lined and ceiled with asbestos cement sheets, or covered with roughcast sheets which consist of a thin cement sheet mounted on expanded metal, like a coarse wire net. For interiors three-ply board is being used, and cheap panelling employing this material is now available. Slates are rapidly disappearing as roofing material, and the slate quarries languish. But tiles are more varied in pattern and colour, and may do much to produce beauty even in a small dwelling.

When there are museums to do justice to the march of structural knowledge, the ordinary man will realize what a large amount of vigorous experiment and innovation is in progress. I spoke the other day to an architect of the problem of noise in flats, and he rattled off a list of devices and compositions to meet that one trouble; Cabot's quilt, acousticon plaster and a score of others. But so far, where there is glass, it is difficult to bar out noise from the exterior.

It is small wonder that not only young men and women with an artistic and constructive drive in them, but also business men, financiers and publicists concerned with the problems of human



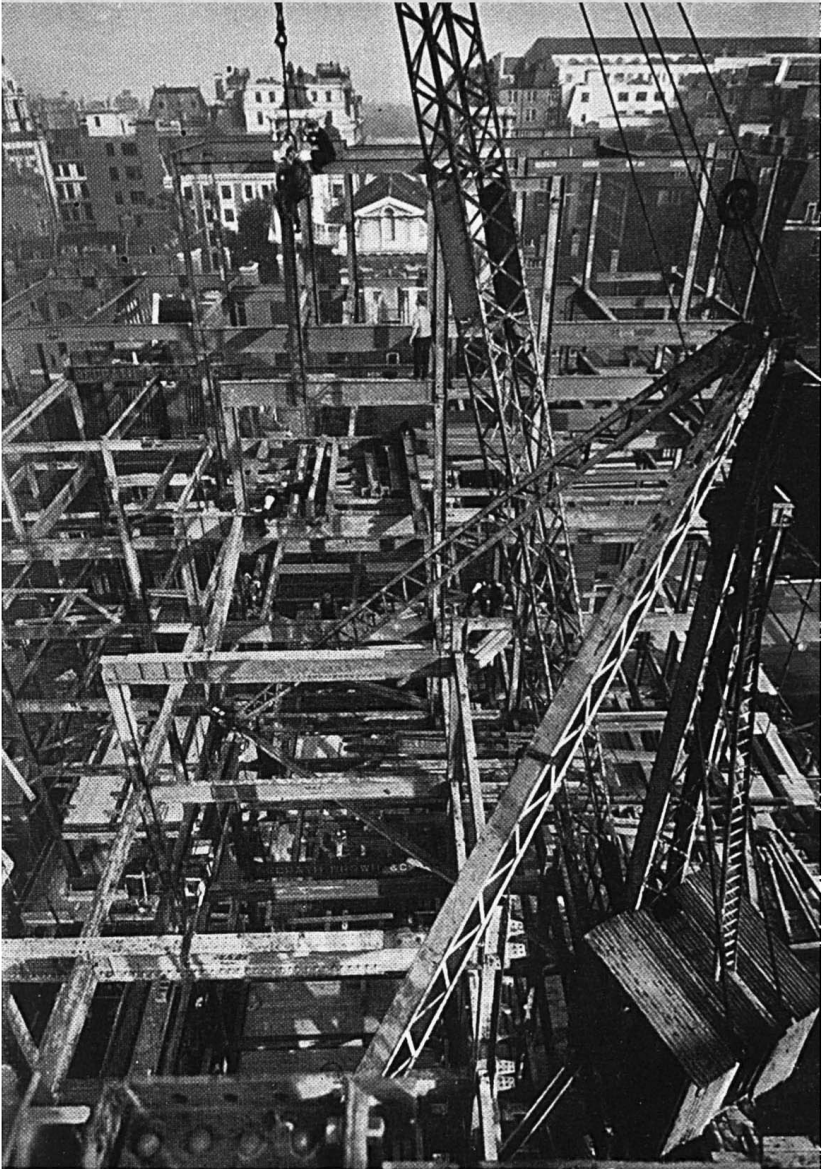
## THE WORK, WEALTH & HAPPINESS OF MANKIND

employment, turn their minds more and more definitely to the immense possibilities in comfort, creative work and beauty and happiness of this ever renascent art. Before them a by no means insurmountable barrier of social and business usage and political stupidity stands in the way of a complete reconstruction of human habitations, in which only a few lovely, memorable or typical buildings now in existence will be spared. At this stage in our work this may seem a very bold prophecy, but when the reader has got through our twelfth chapter he will probably be quite ready to accept our very confident prophecy that, *if our present civilization does not crash*, it can hardly avoid this stupendous rebuilding. It is not only that man *can* do it. It is not only that it stirs the imagination as if with trumpets to think of its being done, but, as we shall show, it will *have* to be done to sustain the economic working of our world. We shall have to rebuild to keep the economic machine running.

As it is, England is being rebuilt at the rate of a complete new world in a hundred years, and the economic life of a New York skyscraper is estimated at thirty years. A friend reading this passage foretells a licensing of buildings which will require the clearing of the site when the licence expires.

The layout of that rebuilt world is also amenable to imaginative reconstruction. In the first place considerations of economy point to a continuation of the present processes of agglomeration. Plumbing, sanitary convenience, power distribution, and so on, all necessitate close grouping. Transport facilities release even the horticulturist, the flower and vegetable grower from the necessity of sleeping and living in his spare time close to his work. To resort in fine weather to the sea, the forest and wild, the open country, is a very powerful desire in most human beings, but that can be gratified by the use of tents and light pavilions and need not prevent the concentration of permanent habitations in handsome soundproof, sweet and clean compound buildings. A village, a town, a great city need no longer be an accumulation of huts, hovels and discordant, inconvenient old houses. Now it can be planned and made as one complete architectural undertaking.

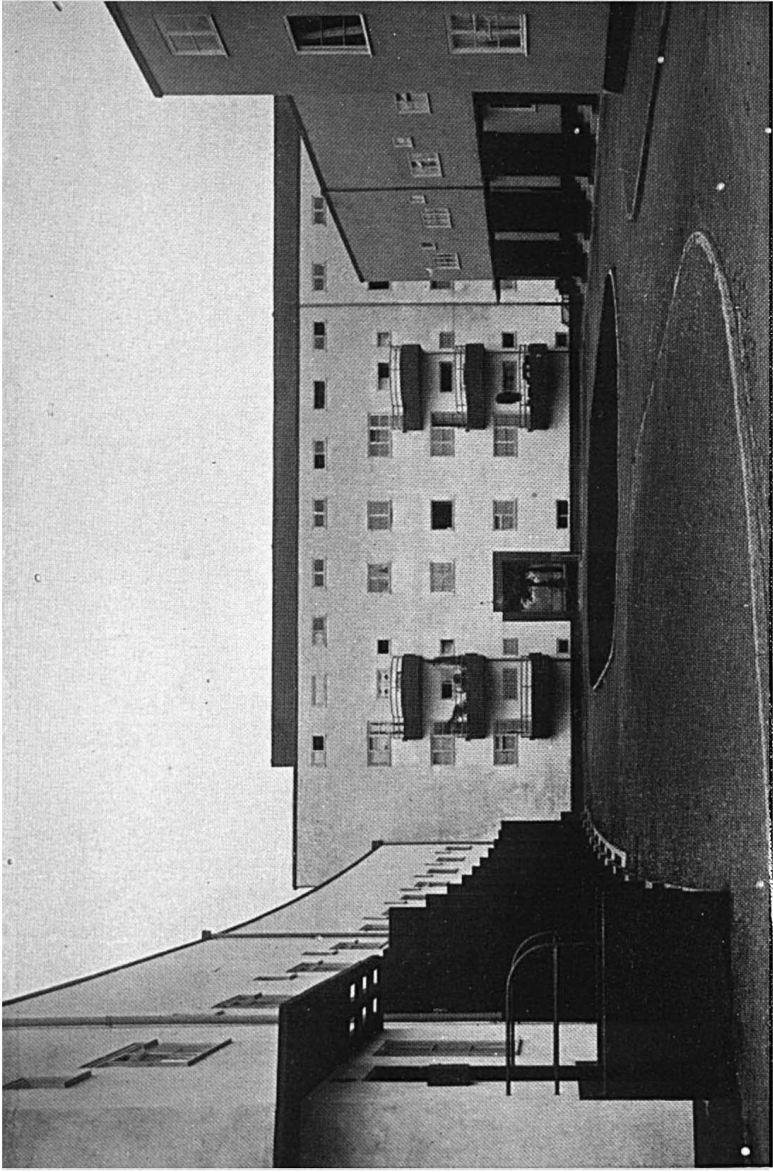
This is not any sort of Utopian dreaming. It is going on now. Everywhere in the world building schemes are becoming bolder and more comprehensive. The ever more deliberate organization of



*(By courtesy of Messrs. Keupath, Brown)*

“ENGLAND IS BEING REBUILT AT THE RATE OF A COMPLETE  
NEW WORLD IN A HUNDRED YEARS” (p. 208)

A stage in the construction of warehouses and shops, Oxford Street, London



*(By courtesy of Mr. F. R. Yerbury)*

MODERN HOUSING: FRANKFORT, GERMANY

## THE CONQUEST OF CLIMATE

industry, the scientific reconstruction of factories, with which we shall deal in Chapter VII, advance step by step with the progress of habitation. We can foretell with as much assurance—subject to the one proviso we have already made—that the twentieth century will be the Era of Rebuilding as we can call the nineteenth century the Era of Railways and Steamships. Let the thoughtful reader of English to whom a great public library is accessible compare the article upon Architecture in the Eighth Edition of the Encyclopædia Britannica with the current edition. It is a different subject; it is an account of a different world.\*

### § 6. *The Lighting of Town and Countryside*

One of the least obtrusive and yet one of the greatest, biologically speaking, of all the great changes in human life that have occurred since A.D. 1800, has been the immense development of artificial lighting. Quietly, steadily, a little more every year, the evening lights have been turned up. To anyone from Stuart or Georgian times who might return to contemporary life, nothing would seem more remarkable than the night-time brightness not only of interiors but of streets and roads. And it is a change still in progress. What we have is only an earnest of the lighting still to come.

Man is a daylight animal. So were his ancestors, and so are all the primates. We are creatures that see with an unparalleled and exquisite precision in a good light. But we are in darkness and groping at a stage of illumination when most other mammals can still see effectively. So while the carnivores prowl and the herbivores creep to their drinking places, the gorilla squats with his back to the tree in which his family nests, and man goes into his cave or camp or clearing with a fire to keep off inimical beasts. From twilight to dawn, except when the full moon comes with its magic and excitement, or when he talks and wrangles or indulges in some mystical singsong or dance, savage man is out of action. Dawn rouses him, and sunset dismisses him.

This daylight phase of human life lasted almost to our own times. Man was busy from dawn to sunset—"for the night cometh when no

\* The reader who finds this section attractive will probably like to read Le Corbusier's *Urbanism* (translated into English by F. Etchell as *The City of To-morrow*).

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man can work." The torch, the fire, and the dim oil lamp remained the chief illuminants until the coming of the candle. When one thinks of the crabbed uncertain lettering of the manuscripts, and the chill small flame of the lamp, one begins to realize the heroism of the student burning "the midnight oil." (How many men like Pepys laid down their pens and put their books aside in early middle age because of blindness?) "Wax candles," says the *Encyclopædia Britannica*, "are probably of Phœnician origin," and candles massed on a candelabrum were the typical illuminant of temples and palaces (the golden candlesticks of Solomon's Temple, e.g.). The eighteenth century saw the candle at the zenith of its career. Massed candles could give churches, palaces, and public gatherings a soft brilliance that seemed at times dazzling against the background of the circumambient night. But even the roads and lanes about the palace itself were black or had their blackness made visible by swinging oil lamps or transitory linkmen.

A new phase arrived at the very beginning of the nineteenth century with the use of coal gas. The lighting of streets and houses became brighter. There was a simultaneous advance in gas and lamp lighting. Lamp wicks were improved, and better burners devised. At first the gaslight was a naked flame owing all its illuminating power to the incandescence of its own constituents, but later the burning of the gas was used to heat lime to incandescence. The "limelight" has survived as a proverb for the conspicuous, long after its theatrical use has disappeared. Presently petroleum, paraffin, and the mineral oils and fats came to the help of the lamp and candle in their struggle against gas. The gas was enriched by various admixtures. All through the nineteenth century the standard of nocturnal brightness was rising. Lighthouses also were spreading and multiplying about the world and calling continually for brighter lamps. Nineteenth-century London and Paris had already developed a night glare beyond the utmost dreams of Babylon or Rome.

Then came the electric light. Its first form was the spitting arc light fluctuating with its violent flushings, and then the incandescent filament lamp. Jablokoff's arc light (1876) was the first practical arc light. Edison's inventiveness made incandescent lamps a business possibility four or five years later than this, and thirty thousand of them were alight in 1882. At first the filaments were of carbon, and

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then came the far more efficient tungsten filament. Steadily electric light rivalled and then surpassed all the combustion lights.

Gas made a gallant struggle as an illuminant against its newer rival. Auer von Welsbach, while trying to improve the electric lamp filament, hit upon the modern "gas mantle." This is a mantle of cotton or pumice dipped in nitrate of thorium and cerium and burnt. The thorium and cerium salts are reduced to their oxides, thoria and ceria, which become brightly incandescent in the gas flame.

Man has now at his disposal a great and increasing variety of electric light sources, which continually become cheaper, more powerful and more manageable. He has gaseous vapour lamps in which the current passes through a glass tube of attenuated gas; this tube can be bent to form designs and letterings, it can be as long as twenty feet; its decorative possibilities are immense; such are the Neon tubes whose ruddy orange brightness is a familiar note now at night in every city in the world. This Neon light has great penetrating power in a fog. And there are little incandescent lamps, scarcely larger than pin heads, with which man can explore a hollow tooth, and powerful ones for searchlights that sweep the sky. He can tint and temper these lights in the most various ways. He can make them stimulating, or he can make them restful and tranquillizing. And he has now the utmost freedom in grouping them. Before the electric light came, every light on earth was burning upward; it had to stand on a base; it had to be fed regularly and jealously guarded from other inflammable material. From all these limitations the designer is now released. Now man can put lights under the bedclothes or in his mouth, upside down and where he will.

At the present time, *white* light of the Neon type, extraordinarily cheap, since it consumes practically no current, is becoming available. Neither lamp manufacturers nor power companies hail its advent with delight, and its application therefore is being delayed, but sooner or later it must come into use.

Upon all this "conquest of darkness" there follows a vast revolution and extension of the possibilities of architecture, housing, and living generally. A room at night can be lit more delightfully than was possible even with sunshine in the days before electricity. Colour can be thrown upon walls and buildings and changed and varied. There need be no permanent patternings on walls or

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scenery; everything can become a screen for projected lights, form and colour. Great advances have been made in the science and use of reflectors, and light can be concentrated upon this or that special point or poured out (in flood lighting) over wide surfaces. Already a number of fine buildings have come into existence, built as much for flood lighting from beneath at night as for the slow creeping of the downward daylight across their façades. The time is upon us when city life at least will have all the assured freedom of vision and movement that daylight alone permitted in the past.

And nocturnal light spreads out upon the highroads—and upon the air routes—from the city to the once black and silent countryside. We have now upon the highroad a sort of symbolization of the conflict between individualism and collectivism. When the automobile first came, it was rare, it had to travel at night upon roads whereon it never encountered another light except a distant house window, the lantern of a carter, or the glare from the eyes of a startled sheep or cat. All the driver wanted to do was to see ahead of him. There was a steady competition to produce continually more brilliant and far-reaching lamps, until head-lamps became veritable searchlights. That was all very well until the automobiles multiplied. Then headlight dazzled headlight, and automobiles had to feel their way past each other, dipping their lights, turning them down, going slow. The night highroads became confusing and distressing and dangerous to drivers. The local authorities and automobile associations accepted and still largely accept the powerful individual headlight to-day and put up reflector signals and warnings on the country road. But in the towns the headlights must be turned down, and now the disposition is to spread out the lighting and light the highroad. Great lamps can be hung high above it, but the more convenient form of road illumination now (involving a more exact levelling of the roads) is cheap white flood lighting at a level below the car body. It seems highly probable that the time is near when the automobilist will save his headlights for the lane and by-way, and that the great roads of the future will run lit and silent, luminous white bands across the night landscape. Instead of the continual conflict of individual glares there will be a steadfast light along the track. There will be collective lighting instead of personal lighting. Amidst the dark landscape flood-lit houses will shine like glow-worms, and indolently wandering





*(By courtesy of Allied Newspapers)*

#### MUNICIPAL PROBLEMS

Six hundred yards of traffic held up in Holborn  
"I incline to think the traffic policeman is most symbolical of social organization"  
(p. 213)





*(By courtesy of Allied Newspapers)*

**"ENGLAND'S GREEN AND PLEASANT LAND"**  
Plenty of work to be found in cleaning up this sort of thing

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searchlights pick out trees and shining waters. One will have to go far from the artificial brightness of the roadways to recall the clear softness of moonlight or the bright stir and glitter of the stars.

Among other consequences of the present revolution in lighting will be the probable disappearance of those lonely workers, the lightship men and the lighthouse keepers. For now anything that can be moored or fixed off a coast can have its lighting controlled from the shore; there is no need for the imprisonment of men to tend those lights.

### *§ 7. Protective and Regulative Services of the Modern Town and Countryside*

A survey of the layout of population in town and country would be incomplete unless something was said of the marshalling and protective services of the modern community. The older civilizations fought fire, imposed sanitary controls over epidemic disease and filthiness generally, and kept order in the streets only in the most rudimentary fashion.

One might write a history of civilization in terms of police and public order, in which attention would be concentrated throughout upon the growth of organized controls and protections in the developing body politic. I cannot decide in my own mind which is most symbolical of social organization, a lighthouse, a cadastral map, a ship's wireless apparatus or a traffic policeman. But I incline to think it is the traffic policeman. The stage is not so very remote — indeed, it is still theoretically in existence in most countries — in which every man was expected to do his share in keeping order, suppressing fires and performing similar public duties whenever he was called upon. Sheriffs, constables and so forth, came into existence primarily as directors and marshals of the common effort and became the nuclei of special forces only by degrees. In the small, highly localized, toilsome but uneventful countryside community of the past, there were few real strangers, crimes were almost family events, and the necessity for an organized control of such things as traffic, public cleanliness, and personal safety did not appear. The great towns of mediævalism in Europe, India and China were dark, insanitary, dangerous tangles, and it did not seem they could ever be anything else. But the change in human methods

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of communication which has made all the world neighbours has conversely made the man in the street a stranger, and the organization of his protection and direction struggles to overtake the sweeping reconstruction of our homes and ways and roads that is now in progress.

The city, to begin with, we may note, was a planned and unified affair. It centred on the *arx*, it was walled and well organized, the brain and heart of a small countryside. The typical Greek city was this; even Rome was this in its beginnings. The sanitary planning of kingly Rome or Cnossos was sound and adequate. But so soon as political organizations enlarged to the scale of kingdoms and empires, cities began to lose their figures and spread. It is only now that the modern architect and the modern policeman are setting out to get these vast, loose, flabby monsters into shape again.

The story of the modern police, after the historical retrospects usual in such studies, would begin in good earnest in the seventeenth and eighteenth centuries. Crime and the mob were getting out of hand during that period with the growth of a larger economic framework that admitted of quicker escapes, ampler hiding places and less controllable gatherings. A large part of police duty was, to begin with, repressive. Mobs out of hand, rioting, was a marked and distinctive feature of eighteenth- and early nineteenth-century history. The first French Revolution became a riot on a large scale until a whiff of grape-shot cleared the streets. The nineteenth century saw the steady development of a police not simply of repression but of order. Any history of police would have to note continually the steady increase of directive duties and the relative diminution of the more primitive repressive functions. Less and less does a modern police constrain us to do this or that, and more and more does it become a service of specialists associated with the layout of roads and habitations, dissolving congestions, arresting annoyances, averting dangers, assisting people to do what their education has presumably disposed them to do.

I think in an encyclopædic expansion of this present survey there might be a long and interesting chapter on fire-fighting, tracing its organization from primitive neighbourly helpfulness to the splendid disciplines and equipments of to-day. In the uneventful life of the newspaper-less past a fire was not without its consolation of

## THE CONQUEST OF CLIMATE

excitement. It must have stirred up everybody and been a nine-days' wonder. People must have talked of all they did and thought and felt. And who set the place alight? The cloth hall of the town of Thaxted in Essex still preserves the iron hooks on long poles that were once used to drag the thatch from burning houses, and some of the water buckets that were passed from hand to hand along the street. From that sort of thing we have ascended stage by stage to the watchtowers and ever-ready engines and fire escapes of a modern great city.

And the ordinary man in the street is no longer a helper but a nuisance at a fire. Precautions against fire were admitted very reluctantly to the list of public functions. The earlier fire brigades were paid or kept up to the mark by insurance companies. Great fires sweeping away whole quarters of the congested cities of the time, are normal incidents in the history of the Middle Ages. They are much less important relatively under contemporary conditions. It is lamentable to note how much of the records of the art, literature and science of the past has been destroyed by fire. The Great Fire of London swept out of existence all the apparatus of Gilbert, that most interesting of all our scientific pioneers. Fires at Dantzic, Copenhagen and Petersburg did much to diminish the tale of early telescopes, and all Volta's original apparatus was destroyed by a fire at Como. Priestley's library and apparatus were destroyed by mobs in 1791, another aspect of inadequate protection.

The agglomeration of the modern community in cities, residential districts and organized areas of production, not only created a new need for systematic regulation and protection but raised also another set of problems through the wearing out of its fabric and its accumulation of waste material. In addition to the activities of constructors, engineers, builders, furnishers and the like, in addition to the activities of police and firemen, there are the perpetual repairing and replacement of material that go on, the wrecking and removal of outworn buildings and other structures, the removal of debris, the dust-bin and the dust destructor. There is a vast industry of salvage in the modern social organism. I am told by a competent adviser that the Waste Trade, considered altogether, is the fifth greatest industry in England. It salvages everything from old iron, rusted girders, scrapped machinery and brick rubble, to bottles, bones, rags, worn-out tyres. It is a filthy and at present

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ill-organized service in which much sweating, insanitariness and dishonesty prevail.

The defilement of scenery is one of the minor evils that arise from the ill-regulated extrusion of waste materials. I would like to give a picture of that once beautiful corner, the Pont de Nice at Grasse, to illustrate that point. The picture would not reek and smell, however, and so it would give only a very imperfect idea of how a backward municipality may still defile the world. This dump engenders a plague of flies and forms a sort of club and prowling place for a miscellany of mongrel dogs. In the Middle Ages excrement, waste and debris lay where they fell; filth and rubbish were everywhere, but they were diffused. The effort to banish these offences precedes the effort to destroy them and leads to hideous concentrations. While I cry aloud at the Pont de Nice, my friend Bernard Shaw bewails with equal bitterness the dumping of London rubbish at Welwyn. But in this field too the type that prefers service to profit is at work, the community is not content, and steadily things improve. An encyclopædic *Science of Work and Wealth* would have a huge illustrated section on scrapping, house-breaking, salvage and the manner in which the struggle against foul offensive accumulations is being waged to-day.

So we add to our growing catalogue of human activities the increased multitude of people engaged in building and building regulation, in planning layout and in rebuilding and rearranging habitations, in keeping roads and drains open and working, in maintaining every sort of security and order, in preventive hygiene and in the suppression of fire. Here too we must glance at the hospitals, with the ambulance organization and at the medical profession. These are the scavengers of damaged and scrapped humanity.

We have surveyed now—superficially enough but sufficiently for our present ends—all production, all transport and all the services of order; we must next note, as compactly as possible, a third main mass of occupations, *distribution*.