MECHANIZATION TAKES COMMAND

SIEGFRIED GIEDION

MECHANIZATION

TAKES COMMAND

a contribution to anonymous history

NEW YORK
OXFORD UNIVERSITY PRESS

Third Printing, 1970

Printed in the United States of America

FOREWORD

In *Space, Time and Architecture* (1941) I attempted to show the split that exists in our period between thought and feeling. I am trying now to go a step further: to show how this break came about, by investigating one important aspect of our life — mechanization.

At the origin of the inquiry stood the desire to understand the effects of mechanization upon the human being; to discern how far mechanization corresponds with and to what extent it contradicts the unalterable laws of human nature. The question of the limits of mechanization is bound to arise at any moment, as the human aspect, which is fundamental, cannot be disregarded.

The coming period has to reinstate basic human values. It must be a time of reorganization in the broadest sense, a time that must find its way to universalism. The coming period must bring order to our minds, our production, our feeling, our economic and social development. It has to bridge the gap that, since the onset of mechanization, has split our modes of thinking from our modes of feeling.

My first intention was to outline briefly the effects of mechanization, basing the study on specialized research in the particular fields with which we have to deal. I soon realized that this was impossible. Over vast stretches no research was available. I was unable to find any account of such revolutionary events as the development of the production line or the introduction of mechanical comfort and its tools in our intimate environment. I had, therefore, to go back to the sources, as I could not hope to understand the effects of mechanization without knowing, in outline at least, its evolution.

The process leading up to the present role of mechanization can nowhere be observed better than in the United States, where the new methods of production were first applied, and where mechanization is inextricably woven into the pattern of thought and customs.

But an amazing historical blindness has prevented the preservation of important historical documents, of models, manufacturer's records, catalogues, advertising leaflets, and so on. Public opinion in general judges inventions and production exclusively from the point of view of their commercial success. To

excuse this attitude the standard answer is: 'We never look hackward. We look forward.'

This means the discarding of time, hoth past and future. Only the present day matters. Later periods will not understand these acts of destruction, this murder of history.

One cannot blame the industrialist who dumped into the river apparently worthless documents. Nor, perhaps, can one blame tbe Patent Office for ridding itself (in 1926) of the original patent models. The historians who did not succeed in awakening a feeling for the continuity of history are to hlame. The precious remnants of hygone periods would never have heen collected or taken care of if several generations of historians bad not shown us their significance.

The attitude described above had some direct consequences for the research underlying this hook. Work for which a considerable staff should have been employed had to be done almost singlehanded. This led unavoidahly to incompleteness, yet it bad tbe advantage that, from the outset, the selection of the material was donc by one individual. *Mechanization Takes Command* will serve perbaps more to reveal existing gaps than to fill them.

The gaps will show, we bope, how badly research is needed into tbe *anonymous history* of our period, tracing our mode of life as affected by mechanization — its impact on our dwellings, our food, our furniture. Research is needed into the links existing hetween industrial methods and methods used outside industry — in art, in visualization.

This is an exacting task for which special training is needed. It is a matter of sifting the historically important from the less important. It demands a power of discrimination, even of vision — a hard task for which carefully prepared scholars are needed. Nothing of thc kind is earnestly provided for in the curricula of present-day universities. Chairs of anonymous history ought to be created, witb the task not only of showing how facts and figures are to be gathered, but of showing their impact on culture and their meaning for us.

The first condition, of course, and the most difficult one to fulfil, is that the people in general should understand how their work and their invention — whether they know it or not — are continually shaping and reshaping the patterns of life. Once historical consciousness is awakened, self-respect will awaken too, a self-respect that inspires every true culture. This renewed awareness will find means of preserving tbe key sourees to American history.

• • •

I mentioned the primitive conditions under which this book had to be done, as an apology for its apparent incompleteness. I wish, however, to express my deep gratitude for all the personal help I received from many sides, and I wish to mention particularly the historian Herbert C. Kellar, Director of the McCormick Historical Society, Chicago; of industrialists like C. F. Frantz, President of the Apex Electrical Mfg. Co., Cleveland; of Mr. A. W. Robertson, Chairman of the Board of the Westinghouse Electric Corporation, Pittsburgh; of Mr. William Eitner, of the General Electric Mfg. Co.; and of many others mentioned in the text.

I am deeply indebted to Mr. Martin James who, with never tiring care, prepared the English version in collaboration with the author, and to Miss Lotte Labus for her constant help and the editing of the index, which will prove a valuable help in interrelating facts and notions. Mr. Herbert Bayer and Mrs. Elisabeth Wolff assisted me with the layout.

Research and manuscript, with the exception of the conclusion, which my friend Mr. J. M. Richards of London kindly corrected, were finished during my second stay in the United States, from December 1941 to December 1945. Last but not least, I had the precious advice of my dear friend, the late L. Moholy-Nagy.

Special tribute is due to the Oxford University Press and its staff, who achieved the production of this book, which proved harder than we had foreseen.

To facilitate the reading, special care was taken in the choice and the layout of illustrations. Captions are provided in such a way as to convey the broad outline independently of and simultaneously with the text.

ZURICH, DOLDERTAL — S. GIEDION

November 1947

BLANK PAGE

CONTENTS

Part IV

MECHANIZATION ENCOUNTERS THE ORGANIC

Part VI

MECHANIZATION ENCOUNTERS THE HOUSEHOLD

PART I ANONYMOUS HISTORY

ANONYMOUS HISTORY

History is a magical mirror. Who peers into it sees his own image in the shape of events and developments. It is never stilled. It is ever in movement, like the generation observing it. Its totality cannot be embraced: History hares itself only in facets, which fluctuate with the vantage point of the observer.

Facts may occasionally be bridled within a date or a name, but not their more complex significance. The meaning of history arises in the uncovering of relationships. That is why the writing of history has less to do with facts as such than with their relations. These relations will vary with the shifting point of view, for, like constellations of stars, they are ceaselessly in change. Every true historical image is based on relationship, appearing in the historian's choice from among the fullness of events, a choice that varies with the century and often with the decade, just as paintings differ in subject, technique, and psychic content. Now great historical panoramas are painted, now fragments of everyday things suffice to carry the feeling of an epoch.

The historian deals with a perishable material, men. He cannot calculate the course of future events like the astronomer. But in common with the astronomer, he may see new constellations and hitherto invisible worlds appearing over the horizon. And like the astronomer, he must be an ever-watchful spectator.

His role is to put in order in its historical setting what we experience piecemeal from day to day, so that in place of sporadic experience, the continuity of events becomes visible. An age that has lost its consciousness of the things that shape its life will know neither where it stands nor, even less, at what it aims. A civilization that has lost its memory and stumbles from day to day, from happening to happening, lives more irresponsibly than the cattle, who at least have their instincts to fall back upon.

History, regarded as insight into the moving process of life, draws closer to biological phenomena. We shall speak little, here, of general lines and great events, and then only when necessary to connect occurrences with the bedrock in which they are rooted.

We shall inquire in the first line into the tools that have molded our present-day living. We would know how this mode of life came about, and something of the process of its growth.

We shall deal here with humhle things, things not usually granted earnest consideration, or at least not valued for their historical import. But no more in history than in painting is it the impressiveness of the subject that matters. The sun is mirrored even in a coffee spoon.

In their aggregate, the humhle ohjects of which we shall speak have shaken our mode of living to its very roots. Modest things of daily life, they accumulate into forces acting upon whoever moves within the orhit of our civilization.

The slow shaping of daily life is of equal importance to the explosions of history; for, in the anonymous life, the particles accumulate into an explosive force. Tools and objects are outgrowths of fundamental attitudes to the world. These attitudes set the course followed by thought and action. Every problem, every picture, every invention, is founded on a specific attitude, without which it would never have come into being. The performer is led hy outward impulses — moncy, fame, power — but behind him, unheknown, is the orientation of the period, is its bent toward this particular prohlem, that particular form.

For the historian there are no banal things. Like the scientist, the historian does not take anything for granted. He has to see objects not as they appear to the daily user, hut as the inventor saw them when they first took shape. He needs the unworn eyes of contemporaries, to whom they appeared marvelous or frightening. At the same time, he has to establish their constellations hefore and after, and thus estahlish their meaning.

History writing is ever tied to the fragment. The known facts are often scattered hroadcast, like stars across the firmament. It should not be assumed that they form a coherent body in the historical night. Consciously, then, we represent them as fragments, and do not hesitate, when necessary, to spring from one period to another. Pictures and words are hut auxiliaries; the decisive step must he taken hy the reader. In his mind the fragments of meaning here displayed should become alive in new and manifold relations.

Before we entered upon the present work we tried, at Yale University in the winter of 1941, to suggest in hroad outline what brought us to anonymous history. At that time we could not foresee how far the inquiry was to lead. For this very reason a few passages as then spoken may not be out of place:

Any inquiry today into the rise of our modern way of life must remain incomplete. There is no lack of works tracing the broad political, economic, or sociological trends of our time. Specialized researches into the various fields are also availahle. But few bridges have been thrown between them.

If we seek a more general insight into the rise of our way of life — of our com-

fort, of our attitudes — we are stopped at every turn by gaps and unanswered questions.

We know furthermore that isolated studies are inadequate to embrace the complex structure of the nineteenth century. More than the bare history of an industry, an invention, an organization, we have to observe what was occurring in various other fields at the same time. Then we see that without conscious forethought phenomena simultaneously arise, bearing striking similarities to one another. They need only be displayed side by side to call into consciousness the tendencies and sometimes the meaning of their period.

Iron filings, these small insignificant particles, by the interference of a magnet become form and design, revealing existing lines of force. So, too, the details of anonymous history can be made to reveal the guiding trends of a period.

Our task is clearly outlined: to inquire how our contemporary life, with its mixture of constituent and chaotic elements, came about. The difficulty lies in sifting and separating those facts that may be called constituent and that are the true pointers of their age. Once this has been done the material does the rest.

Anonymous history is directly connected with the general, guiding ideas of an epoch. But at the same time it must be traced back to the particulars from which it arises.

Anonymous history is many sided, and its different departments flow into one another. Only with difficulty can they be separated. The ideal in anonymous history would be to show simultaneously the various facets as they exist side by side, together with the process of their interpenetration. Nature does this in the eye of the insect — a lens of multiple facets — fusing its distinct images of the outer world into an integrated picture. The individual does not have such power. We must be grateful if this objective is fulfilled only in the fragment.

PROCEDURE

In *Space, Time and Architecture* we attempted to show how our period came to consciousness of itself in a single field, architecture.

Now to broaden the scope, we shall observe the coming about of mechanization, that almost unescapable influence over our way of life, our attitudes, our instincts.

We shall deal with mechanization from the human standpoint. Its results and its implications cannot be simply stated. The prerequisite is that we should

understand its tools, even if our interest here is not a technical one. It is not enough for a physician to know that a body is attacked by a disease. Even if he is not a bacteriologist, he must push his research into usually invisible realms, he must have a modest knowledge of bacteriology, he must know when the organism was attacked and how the tuberculosis spread. Likewise, the historian cannot dispense with the microscope. He cannot relent in tracing the theme to its origins. He has to show when an idea first appears; how quickly or slowly it spreads or disappears. He cannot confine himself to mechanization alone any more than the doctor can to bacteria. He must take psychic factors into reckoning, for often they exert a decisive influence. In our case art represents the psychic factor. It will serve as the surest aid to an understanding of certain phenomena.

We begin with the concept of Movement, which underlies all mechanization. There follows the Hand, which is to be supplanted; and Mechanization as a Phenomenon.

Mechanization of the Complicated Craft

The elimination of the complicated handicraft marks the heginning of high mechanization. This transition takes place in America during the second half of the nineteenth century. We shall meet with it in the callings of the farmer, the baker, the hutcher, the joiner, and the housewife. But only in one instance shall we follow it closely: in the masterful transformation of the door lock from handicraft to mechanized production.

The Means of Mechanization

The symptom of full mechanization is the assembly line, wherein the entire factory is consolidated into a synchronous organism. From its first appearance in the eighteenth century down to its later and decisive elahoration between the two World Wars, the assemhly line is an American institution. What we shall have to say ahout it is but roughly carved out. So far as we know, no historic account yet covers this most significant factor in America's productive capacity. For this reason, but especially because they closely touch upon human problems, the assembly line and scientific management will be given somewhat closer treatment.

Mechanization Encounters the Organic

What happens when mechanization encounters organic substance? Here we face the great constants running through human development: soil, growth, bread, meat. The questions involved are but narrow sectors of a far broader complex: man's relation today to those organic forces that act upon and within him. The catastrophes that threaten to destroy civilization and existence are but outward signs that our organism has lost its balance. Their causes lie deeply buried in the great anonymous movements of the epoch. Our contact with the organic forces within us and outside of us has been interrupted — a paralyzed, torn, chaotic condition. This contact is increasingly menaced as the tie with basic human values becomes frayed. Here, if anywhere, overturn has become inevitable.

We shall therefore open with the question: What happens when mechanization meets an organic substance? And shall close by inquiring into the attitude of our culture toward our own organism.

MECHANIZATION OF AGRICULTURE

After remaining stationary for a thousand years, the structure of the farmer is revolutionized. At first in literary and tentative ways, in the eighteenth century; experimentally in the first half of the nineteenth century; sweepingly in the second half. England forms the hub of the movement during the eighteenth century, the American Middle West during the latter half of the nineteenth. Here begins what is perhaps a new chapter in the history of man: a changed relation to the soil and the uprooting of the farmer.

Of the instruments of mechanization we shall touch only the reaper, which by its replacement of the hand holds the most important place among the tools of mechanized agriculture.

BREAD

What happens when mechanization comes up against an organic substance, bread, which, like the door lock or the farmer, belongs among the symbols of humanity? How did mechanization alter the structure of bread and the taste of the consumer? When did this mechanization set in? How are popular taste and production related to one another?

MEAT

What are mechanization's limits in dealing with so complex an organism as the animal? And how does the elimination of a complicated craft — such as the butcher's — proceed?

Still of unmeasured significance is mechanization's intervention in the procreation of plants and of animals.

Mechanization Encounters Human Surroundings

What happens to the human setting in the presence of mechanization?

Dangerous tendencies declare themselves before the advent of mechanization (on which the whole blame is thrown) and independently of it. There is no doubt that nineteenth-century mechanization facilitated these trends. But they appear distinctly in the interior before the impact of mechanization is felt.

The Changing Conception of Comfort: Medieval Comfort

We shall look to the late medieval period for a secure starting point. Here lie the roots of our existence and of our continuous development. Since typological researches in this field are unfortunately lacking, the Middle Ages will be included and dealt with from this point of view. What interests us in the first line here is the type of comfort developed in different periods. How did the Middle Ages understand comfort? How does the medieval conception differ from our contemporary view? Where do connecting links exist?

To take a short path, we shall follow the relation between man and space. How does man order his intimate setting in the fifteenth century, the eighteenth, the nineteenth, the twentieth? How, in other words, has his feeling for space changed?

A parallel question is that of *human posture* in the various periods, and of posture's projection into seating.

Comfort in the Eighteenth Century

The creation of modern sitting comfort is to he sought in the Rococo. The Rococo's great power of observation in shaping furniture organically so as to favor relaxation of the body forms a counterpart to that period's exploration of the plant and animal world.

Late eighteenth-century England is primarily concerned with the technical virtuosity of the cabinetmaker, and affords, within the most refined type of handicraft, a foretaste of the mechanized furniture of the nineteenth century.

The Nineteenth Century

The Beginnings of Ruling Taste

More than in the Rococo, in which Louis XV's role was not a very active one, a particular type of man becomes decisive in the Empire: Napoleon. Here phenomena appear, such as the devaluation of symbols, which have been laid at the door of mechanization alone.

The Mechanization of Adornment

The misuse of mechanization to imitate handicraft production and the use of substitute materials comes to the fore in England between 1820 and 1850. The blurring of the instincts is clearly recognized by English Reformers around 1850. Through criticism and encouragement, attempts are made to influence industry directly.

The Reign of the Upholsterer

From the upholsterer's hand comes that cushion furniture of the latter half of the century which seems to have lost all structure. These are transitory products of a surprising longevity. To avoid vague judgments, we have thought it useful to consider them typologically.

What types are found? In what way are they connected with mechanization? How is their form related to the introduction of spiral springs? When do they first come into use?

The Surrealists have given us keys to the psychic unrest that haunted mechanized adornment, cushion furniture, and the whole interior.

The Constituent Furniture of the Nineteenth Century

Over against the ruling taste stands the unexplored complex of 'patent-furniture.' In this case, mechanization is harnessed to the opening of new fields. Here, where unobserved, the creative instinct of the nineteenth century reveals itself, fulfilling needs formerly without solution. This furniture that answers to the posture of the nineteenth century is the work of the engineer. It is based on movability and adjustability to the body. In America, between 1850 and the late 'eighties there grew a facility never known in Europe for solving *motion problems* of this kind, which America lost back to the influence of ruling taste after 1893.

The Constituent Furniture of the Twentieth Century

The initiative now passes into European hands. The new furniture created in this period is bound up with the spatial conceptions of the new architecture.

It is a furniture of *types*, not of individual pieces. It is the work, with few exceptions, of the architects who at the same time became the leaders of contemporary building.

Mechanization of the Household

The mechanizing of the housewife's work is not unlike the mechanizing of the other complex handicrafts. The alleviation of domestic drudgery proceeds along like paths: first, through mechanization of the work process; and again by its organization. Both are best observed in America, in the early 'sixties, and — at their peak — in the period between the two World Wars.

Questions that require an answer are, among others:

Is household rationalization connected with the status of woman in America? Is it rooted in the Quaker or the Puritan outlook?

The organization of the kitchen had its starting point in the new architectural movement in Europe around 1927. It came about in the general reshaping of the house.

We have placed the mechanization of the hearth at the head of the various mechanisms. An ever-growing concentration and automatization of the heat source is observed — from the coal range to electric cooking. This trend seems to be still in progress.

We shall survey the various aids to mechanical comfort in the household, their individual appearance and general acceptance. Central among them are the mechanized cleaning appliances: for washing, for ironing, for dishwashing, for removing dust, etc. The influence of feeling upon the aspect of the appliances cannot be overlooked: streamline style.

Only when the mechanical appliances had already been worked out and were becoming popularized did the interest of American industry turn to the integration of the appliances within the work process. Thus emerging in the mid-'thirties, the streamline kitchen was raised, with its devices, into the idol of the house.

It was in the time of full mechanization that the domestic servant question, recognized around 1860 as irreconcilable with democracy, became an immediate problem: the servantless household. Connected with the servant problem was the attempt to reduce the ever-rising cost of mechanical utilities by a rationally planned mechanical core of the house.

Mechanization of the Bath

The history of its technical equipment affords no standard hy which to evaluate the modern hath. Closer insight is immediately gained in registering the uncertainty and wavering throughout the century from the moment a choice hetween types became necessary.

Just as it left no style untouched, the nineteenth century left none of the historical types untried. But scant progress was made, outside of reformistic propaganda or the development of luxury hathrooms. For the masses of the population, only the cheapest mode of hathing was seriously dehated.

The chaos around 1900 appears in the failure of the expert to recommend a single satisfactory hathtuh. But even this would have offered no historically acceptahle standard, and the question remains: is hathing a simple ahlution, or is it part of a broader concept, regeneration of the human organism? Looking hackward, we find that in past cultures the hath was emhodied in types affording total regeneration. Though shortened to the utmost, a typology of Western regeneration will have to be drawn up. Ancient, Islamic, Late Gothic, Russian regeneration seem to reflect a common archetype, its path traceable to the interior of Asia.

All these types aim not merely at outward ahlution, hut at a total vivification of the hody hy differentiated means, which vary with the culture. Our civilization from the waning Middle Ages on has helieved that it can do without a systematic type of regeneration to help the organism recoup the damage which each civilization in its own way entails.

Mechanization did no more than give a glittering façade to the most primitive type of hath.

Toward a Typological Approach

A treatment of prohlems suited to our day will constantly hear interrelations in mind. This leads to a typological approach. The history of styles follows its theme along a horizontal direction; the history of types along a vertical one. Both are necessary if things are to he seen in historical space.

The specialistic approach that grew in strength through the nineteenth century hrought stylistic history to the fore. Typological thinking rarely finds a place there, and mainly when unavoidahle, as is the case in the encyclopedias of furniture. The French contributions around 1880, in which a vein of nniversality still runs, are the more satisfactory in this respect. The large *Oxford English Dictionary* too is sometimes a friend in need.

We are interested in following the growth of phenomena, or if one will, in

reading their line of fate, over wide spans of time. Vertical sections make it possihle to trace the organic changes of a type.

How far a type need he followed hack into its history varies with the case. There are no rules or recipes. It is not the historian who guides, hut the material. Some of the developments will call for far-reaching retrospect, others only for rapid backward glances. What is essential is the panoramic and simultaneous view. This may lead to discontinuous treatment. For only through simultaneous perception of various periods and of various fields within a period can there he insight into the inner growth.

Conceiving of history as constellations, the historian can claim one more freedom. He assumes the right to observe at close range certain phenomena, certain fragments of meaning, while omitting others from his field of attention. This may lead to unwonted proportions, as in contemporary painting when a hand is made to spread over the picture while the body remains a hint or a fragment. This freedom in handling proportion is no less necessary when one seeks to represent the meaning of historical complexes.

Dates

The historian's ohjectivity may he voiced in a treatment faithful to the nature of the material as well as to its constellations in time.

Dates are the historian's yardstick. They enahle him to measure off historical space. In themselves or when pinned to isolated facts, they are as meaningless as the numbers on a ticket. But conceived in interrelation, that is vertically and horizontally connected within the network of historical objects, they delimit constellations. In such cases dates take on meaning.

Dates marking when and where phenomena first appear or have hecome commonplace in various spheres form complexes that give ohjective insight into growth.