A Study in the

SOCIOLOGY OF BUILDING

With Special Reference

to the Architect

A Thesis

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by

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PREFACE.

It is apparent from this research that we need to develop a sociology of building in the same way that we are assembling a sociology of medicine, education, religion and of knowledge itself and that in the task of creating a sociology of building we should pay particular attention to the relevance of sociological theory.

This dissertation does not claim to set out a sociology of building, but it can be regarded as a preliminary study perhaps useful to that end.

An aim in this research has been to concentrate on method, the collection of data, classification and categorisation, thereby attempting to shape an outline which later work may be able to fill in. Value judgments have therefore been used sparingly and only when they can serve some clear and specific purpose.

I gratefully acknowledge the patient help and guidance which I have received over a period of several years from Professor P. H. Connell of the School of Architecture, and from Professor Leo Kuper of the Department of Sociology and Social Work, both of the University of Natal.

Where assistance has been given by others in specific aspects of the research acknowledgments are made in the footnotes. Full references to all quotations are also made in the footnotes.

I wish to thank Mrs. H. T. McGroarty for typing the final document of this dissertation.

The writing of this dissertation was completed in Toronto, Canada, on the 12th. August, 1960.

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ILLUSTRATIONS.

CHAPTER 1

ORIGIN AND AIM OF THIS STUDY, METHOD AND EXAMPLE

This chapter describes how the need for a sociological study of this kind came to be realised; formulates the aim of the research; explains the methods adopted, and sets out the data of the building used for the purposes of general illustration.

1. Origin

A realisation of the need for research into the sociology of building first arose from the intractability of problems presenting themselves in the course of everyday planning and architectural work. Daily the practitioner is forced to deal with data impinging upon him from the world of action: he must heed the established usages of custom and law, the hard facts of economics; he must resist the pressures of political expediency; he must grapple with idealism unrelated to fact and with realism uninformed by ideal; he must negotiate rationalised explanation and arbitrary intention, and in the last analysis he must come to terms with the urgent necessity of arriving at a decision having some semblance of justification and some hope of acceptance.

The first impetus to initiating research was therefore born of the problems of action. Why is a decision difficult? Why do we find it hard to formulate the problem? Why do we not dare to take the rational decision? As a matter of common observation many decisions are seen to be difficult because of a lack of systematic background knowledge, and it is clear that in practice secondary and tertiary decisions are commonly made without benefit of the primary decisions on which they logically depend.

To be specific, the difficulties connected with building and planning appeared tentatively attributable to factors in the following broad categories:

(a) The difficulty of comprehending building as a product of the total culture (1).

(b) The lack of systematic background for any holistic study of the techniques of planning and building.

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(1) 'Culture' is used in its scientific sense to mean the whole on-going pattern of a society's behaviour. It is not used to indicate a high development in the arts, unless specifically stated.

(c) Lack of adequate scientific investigation into the exact origins of building forms and the sociological influences affecting them.

(d) The piecemeal nature of the administration of the techniques of building and planning.

These can be brought to focus by asking the single basic question: why precisely does the building take the form it does - in <u>all</u> its aspects?

Very briefly stated, this is the essential question that this research sets out to examine. Such an examination can only be undertaken by having as a general background, or terms of reference, the nature of our society and culture as a whole. It is therefore fundamental to this study that both methods and findings will tend to have a sociological rather than a technical emphasis. Building and planning are techniques but no technique can be understodd unless it is comprehended as both moulder of its culture and at the same time product of it.

2. Problem of the Total Cultural Configuration.

From this first tentative thinking emerged the idea of using as a research approach the concept of the total cultural configuration. This, it appeared, might form a framework to be filled in progressively with detail so that eventually building might be seen in all its aspects as a product of its cultural matrix (2). Preliminary investigations quickly showed, however, that in spite of its attractions this approach would be both over-ambitious as an aim and of poor precision as a tool.

Part of the difficulty may be attributed to the broadness of handling which such a treatment demands. Whilst breadth of treatment has the attraction of allowing an overall impression to be conveyed, it has several serious dangers which are virtually unavoidable in the course of protracted research. The most notorious of these is the descent into broad generalisation in which the restraining influence of fact progressively diminishes. A second difficulty is the danger of the treatment becoming so broad that there emerges only a statement of the obvious. Those whose chief preoccupation is with action often complain that the findings of the social scientists contribute little more than this. A third danger is to be found in arguing from a few arbitrarily selected and minor particulars to a major generalisation, which,

(2) Similar, but not identical, in method to that used by Ruth Benedict in 'Patterns of Culture'.

unverified by other checks, becomes incorporated as an important part of an overall picture.

Aspects of the difficulty may be very briefly illustrated by taking the conventional historical observation that the increased desire for privacy in the seventeenth and eighteenth centuries in Europe caused new domestic plan-types to appear. Such an 'explanation' juxtaposes the two facts of increased privacy and new plan-types so that they are presented as cause and effect (3). If examined, the evidence taken may be found to have been little more than a noting of a move from ensuite to corridor planning with the result that the 'explanation' is really little more than a generalisation based on the spurious reciprocity of an isolated observation (increase in corridors) and an attributed idea (desire for more privacy). All that could be said scientifically is: the configuration of the culture included, among a thousand other things, an increased use of corridors and increased domestic privacy. To attribute cause and effect, or desire, is an altogether more complicated matter, requiring serious scientific investigation of an order quite different from the conventional approaches to the history of building.

There is, therefore, great difficulty in finding an adequate research technique which could be used successfully within terms of reference implying such a wide scope, unless some basic framework of fact is first brought into existence. Only with the help of some such framework could building appear to be approached as a product of the total cultural configuration, with some hope of arriving at a factual and balanced assessment.

In spite of the difficulties of using the concept of the total configuration as a basic tool and in spite of the need at this stage to set it aside, it will nevertheless be necessary to bear it in mind constantly in the course of research, and to remember that any cultural configuration has certain major characteristics which will be of significance to any aspect of the society under review. Certain elements in our own culture must therefore be mentioned. The world-wide diffusion of basic democratic beliefs in political and intellectual life, an accelerating process of individualisation, the industrialisation and consequent urbanisation of world society, the rapid rate of social, cultural and technical change, and perhaps there should be included a trend in the direction of breaking down the formal barriers between individuals - these are relevant major influences in all our thinking and acting.

(3) It is in fact more likely that both are effects of some other factor such as an increase in wealth.

In considering the diffusion of basic democratic attitudes we should remember that we are in the process of passing from authoritarian to democratically motivated societies, and that, for the purposes of the sociology of building, there are certain important differences between cultures founded on these two basic premises. The first is that authoritarian (roughly identifiable with conservative) thinking tends to be in undifferentiated wholes, with an emphasis on morphology rather than on constituent parts and detail. This can clearly be seen in pre-industrial European architecture: the building is a product of a tightly prescribed traditional process. In a society with a democratic configuration, however, thinking has an analytical and rational emphasis and there is preference for justification by abstract proof. The present general approach to building by architects in the western world provides good evidence of this (4). Two relevant reasons for this difference between authoritarian and democratic cultures may be offered. One, that in the democratic society the individual has more freedom of choice to form his own attitudes and is less dependent on a special social elite; and two, the mass democratic society in spite of radio, television and the press has difficulties of communication in that the small elite group, which is a closed coterie of agreed attitudes and points of view, cannot be expanded to embrace the nation-wide group, since the intimate relationships of the small group simply cannot survive the mass-media of communication. In a mass democracy the face-to-face method of forming opinion and attitude is physically impossible and therefore formalisation and abstraction become essential for successful communication (5).

A second important difference is to be found in the attitude toward the hero and the genius. As generally understood these are products of the elite group in authoritarian society; they are, in fact, highly characteristic manifestations of the authoritarian system and they also cannot be carried over into an egalitarian democratic society demanding symbols of a different kind. Apart from his intrinsic ability or worth, the hero or genius is made by his elite group and he is useful as a justification for the authoritarian

(4) Witness the emphasis on function and abstraction. Perhaps abstraction of form in architecture, sculpture and painting is a predictable result of the shift to mass democracy. The confusion of thought which attaches to the architect's use of the word 'functionalism' should be noted.

(5) The mass-media allow communication in one direction only.

social structure in general and for the existence of the elite group in particular. With the dethroning of the elite group the hero will tend to disappear and the genius will tend to appear more 'human'. The mass of the nation-wide group will not so willingly 'distance' themselves from hero and genius as in the past, but will regard him more as one of themselves, accounting for his differences in terms of environment and opportunity.

The concept of the hero-genius affects vitally society's view of the architect. We still carry with us the artist-genius image of the architect handed down from a now decayed authoritarian society in which the architect in that image was the product of an elite group. As the authoritarian elites have disappeared so logically must the artist-genius concept of the architect.

We may, therefore, expect the authoritarian-democratic swing to minimise the power of the elite groups, to eliminate 'sacred' knowledge and special languages of communication, in favour of an emphasis on analysis, formalisation, abstraction and anonymity. We may also expect the decline and eventual elimination of the artist-genius image of the architect. These changes will be accompanied by the final collapse of the idea of revealed truth, whose place will come to be taken by ideas of process and relativity.

Industrialisation and its attendant urbanisation are psychologically linked with the process of democratisation. The links are many and complicated but the overall connection can perhaps be stated as the sequence: increase in the scale of industrial production due to general growth of horsepower; coming together of larger masses of people as a result; breaking up of old face-to-face groups in favour of a system in which the individual is anonymous, with human contacts limited and formalised; emergence of a mass society urban in outlook with atomised individuals who cannot feel themselves part of the greater society. Parallel with this and supporting it, is the growth of scientific method and the increasing application of the results of science to industry, business and indeed almost all aspects of life.

In building, this group of trends leads toward mass production and therefore anonymity and abstraction. Design tends to leave the control of the older architect-artist and to find its way on to the drawing board of the factory draughtsman, the architect being restricted to a selection, often very limited, of machine-made types whose design he cannot influence in their basic elements. This situation now applies to more building components than is worth enumerating. Curtain walling, however, is important enough to warrant special mention. The curtain wall is an outstanding example of democratised anonymity and very clearly highlights the enormity of the problem which presents itself to the individualistically trained and motivated architect. Buildings of curtain wall look anonymous and presumably this quality will be accepted by a mass public in the same way that motor-cars are acceptable as standardised products of the current socio-economic system. The real difficulty in this regard arises with the architects who see their role in the light of the self-expression of an individual personality within the framework of attitudes of a fast disappearing cultural configuration. This leads to the problem of the relationship between the individualism of the architect and the sharpened individuality of the citizen of the democratic society. The citizen feels his individuality as compensation for the loss of the general support of society. This is not in protest necessarily, but is a complementary process. The architect, in contrast, tends to encourage his own individualism as a reaction to the mass society. He resists, and is, to some extent in protest and opposition.

A notable characteristic of the democratic configuration to be mentioned is the lessening of the social distance between the various groups of society and between individuals. The leading groups whether political, social or intellectual, no longer inspire in the rank and file the awe that they once did. Institutions and associations do not command the respect and traditional assent that they did under an authoritarian configuration. Consequently buildings, which are one of the physical manifestations of these institutions, also lose their power of 'distancing' the observer. Here again we see the shedding of the hero and genius: they are dropping from the configuration.

With this process of reducing distance out go greatness, genius, romantic passions, the pompous, the grandiose and the ideal, taking with them monumental works in the arts. In their stead come anonymity, abstraction, teamwork, and emphasis on science, suspicion of the artist and the eccentric and a fear of the individual who will not conform to the agreed deviations. Whether the diminution of distance is brought about by the dissolution of the old cultural configuration or whether it is a special attribute of the democratic society is of minor importance. What is significant is that a major change in our system of values has taken place and this change is being reflected in building in all its aspects.

The trend toward the increasing spread of the cultural base of our society seems likely to continue for the foreseeable future particularly in view of events in many of the underdeveloped countries of the world. The French and American revolutions were clear indications of a social process which has produced mass democratic societies throughout the western world. In Britain the post-war period has seen a substantial, if unglamorous, spreading of the cultural base to include virtually the entire society. The Scandinavian countries show similar cultural changes. In some continents, notably Africa, these changes have yet to come. White Africa is still an elite denying to black Africa the broad benefits of western culture: a society authoritarian as far as the majority of human beings in it are concerned. Even this situation, however, is changing rapidly and the first beginnings of a democratised attitude to building are being seen in the research work now being done into the problems of building for Africans. As the cultural base is spread, by force or otherwise, it is likely to be in this field that many significant developments in building will emerge.

Authoritarian societies have a tendency toward the rigid and the regular. This applies to building. The new, the unusual, the experimental are discouraged: the irregular is excluded. In a period, however, in which distance is being diminished the opposites flourish. So we see a great deal of bold experiment in building in certain countries. The aim in building is not now to 'distance' the observer by inspiring awe. At best the aim may now be to give the observer aesthetic satisfaction. As the cultural base is spread this can only be done by basic simple forms of an abstract kind. The complicated geometry and dynamics of Gothic are not communicable and the rigidity of the Classical is unacceptable because its impact depends on creating distance - the very characteristic that democratic society is least able to tolerate. The building may, therefore, be predictably non-regular and in this sense informal. At the same time its forms will become abstract and in terms of the older culture, de-humanised. As distance is diminished and the building is released from the straightjacket of the older aesthetics a new creative opportunity is offered. This may well be an historic moment.

Over and above the characteristics of the configuration of our emerging society mentioned already, the significance of change must be emphasised. The rate of change in all aspects of our society is accelerating and we are becoming more used to it and more ready to accept it as inevitable and desirable. This is particularly true of the technologies as invention succeeds invention and the material standard of living is progressively lifted. The rate of change in our values system, our social behaviour, our legislation and governmental development is, however, also being increased because of a variety of factors present in the society as a whole.

Perhaps the most important aspect of change for this study is the fact of innovation. By this is meant the specific act of setting out to bring about purposeful change. It is therefore to be distinguished from both discovery and invention. The basic intention in innovating is the wish to shape something to a desired end. Innovation may therefore cover the whole field of human activity, and may range from making an atomic bomb to organising a national health service. Tradition-orientated societies are so structured that innovation is likely to be infrequent and difficult. Even in our own society it does not meet with equal favour in all sectors. In medicine it is selcomed and encouraged. in religion hardly at all. In the past resistance to innovation and slowness of change have acted as stabilisers and perpetuators of the culture.

The vital importance of innovation to our time becomes apparent when it is coupled with an accelerating rate of change and an increasing willingness to accept change. Given great powers of innovation and given willingness to change our environment, our social structure, our institutions and our ways of life, it becomes a question of deciding what it is we want to achieve: of writing the specification of the future. On the one hand we are better equipped intellectually than ever before: and on the other we are potentially freer from the incubus of traditional imperatives than any society has ever been. The configuration of the culture is no longer to be regarded as fixed: it is to be seen as capable of being altered by innovation: by purposefully acting to achieve desired goals (6).

For building this means immense possibilities. In terms of materials it could mean that we could specify what we want with the expectation that science will produce it. In terms of the form of the building in relation to use it means that we should examine conscious social aims and attempt to tailor the building to physical needs which would arise from the achievement of those aims.

The most interesting feature of this new possible orientation is the

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(6) This is a description of our situation: not a value judgment.

fact that it is characteristically qualitative and not quantitative. We are not concerned primarily with reducing costs in building or erecting more buildings faster. We are concerned with values and judgments: concerned to innovate in the direction of those things which seem desirable. Therefore, interesting as are cost analysis, economy of design and efficiency of management in building they are not of great concern to the sociology of building in the present context, except inasmuch as they are the tools of qualitative progress in terms of the common good of society. It is therefore essential to grasp that we cannot solve building problems solely on the basis of applying scientific method to the mechanical aspects of building since this can only be useful within the limits of the accepted value system of an existing given culture. To find ways and means of reducing the cost of the traditional house is only useful if the value system suggests that the traditional house is going to survive. If survival is not likely, or more significantly, is not desirable, the work involved in cost reduction is largely misapplied. Cost analysis in building is analogous to work study in industry. Work study can cut the cost of manufacturing a refrigerator. It cannot help us with the decision whether or not to make one, or show us how to make a better one.

The last analysis in the sociology of building is a matter of value judgments. Scientific method and analytical thinking are indispensible tools to help us define the limits within which the value judgments must be made, but they cannot unaided make the decisions. They can, however, provide us with data without which we cannot hope to predict the future development of the value system. This power of prediction is the fundamental need if adequate design of building and town is to be achieved.

3. Aim of the Study

The aim of the research may be stated: to indicate a methodological framework by means of which building may be investigated in its total sociological context as a product of the cultural configuration of our society, and to examine the relationship of the architect to this framework.

It should be noted that the word 'building' is used in its widest possible sense and includes such things as the law of building, the processes which go to make the building and the individuals who are the instruments of those prosesses.

It was originally hoped that the study would include special reference to the planner as well as to the architect. As the research proceeded, however, it became clear that to attempt both would be to make the research unwieldy, particularly in view of the special difficulties of the planner's relationship to his society. It was therefore necessary to restrict this part of the study to the architect only and to omit special reference to the planner. This, however, does not mean that the planner and planning matters have been ignored. Both are dealt with as is appropriate in the course of the research. The sociology of both planning and the planner offer scope for research on their own merits and should therefore be made the subject of a special study.

Although building and planning are for convenience often treated as independent subjects, it is obvious that they come together in the physical environment of towns. It is frequently impossible, therefore, to make a sharp distinction between what is strictly the material of the architect and what is proper to the planner. Nor is it perhaps desirable to be too precise in such distinctions (7).

The research has been titled as the sociology of building in the interests of brevity. In its totality the subject would be as vast and complex as the sociology of knowledge and probably a good deal larger than the sociology of, say, medicine. No claim is therefore made of offering a complete sociology of building, as such a study would of necessity be on a far larger scale and would be compelled to cover many areas as yet inaccessible because of lack of fundamental research. The most that can be claimed is that building will be looked at systematically with the help of certain tools of sociology and social anthropology so that the way society builds can be illuminated.

4. Method

The chief difficulty in dealing with the sociology of building is the complexity of the subject. This complexity arises first from the complexity of building itself - it requires the sustained work of many individuals over a relatively long time to produce even a small building - and secondly, from the fact that very many human activities are in some way involved with building. A third reason, if perhaps less important, is that human society has been making buildings over a period of several millennia, and therefore, views them somewhat differently from the way it regards more recent inventions like the

(7) Some material is proper to the planner only.

motorcar and the aeroplane. The absence, relatively speaking, of cultural lag in the design of these compared with the stylistic and even functional lag in building is a fair indication of this difference in attitude (8). These reasons for the complexity of building - many kinds of work required to produce the building, most human activities related to the building and the long tradition of building - give an indication of the field which a sociological study must take into account.

In terms of background knowledge and skill there appear to be two basic possible approaches to method. The first is to examine the building process with the background of sociology and as a sociologist. The second is for a member of the building team, say, the architect, to attempt to use the tools of sociology to approach the subject scientifically, being careful to avoid the traditional techniques of thinking which belong to the common practice of building.

The first method has the great advantage that the subject is treated by a mind trained in scientific method, coming to the material without the preconceived ideas which those working habitually inside a subject must inevitably harbour. The sociologist is also at great advantage in that he is not emotionally involved either from the point of view of professional activity or from the aspect of the personality problems which are part of the present cultural context of the architect's behaviour patterns.

The difficulties likely to beset the sociologist arise from this question of the complexity of the building process. The external observer, inexperienced in the problems of designing buildings and unversed in the skills required for decision-making runs the very serious risk of attributing wrong reasons and explanations. It is easy to find examples of building design which are patently defective from, say, a use point of view. To find the real reasons for the defects means going back to the decisions and the factors which conditioned them. The sociologist can question the designers, but this will rarely give a truthful reason or explanation: the reality of the decision-making process is likely to escape him. Without the facts and factors which lie behind the decision, the data for analysis can be so deceptive as to be

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(8) Motorcars and planes are never designed in architectural period styles, but buildings and ships still often are. There are, of course, in building many other lags besides stylistic lag.

dangerous. The precise conditions of all decisions must be known before any deduction can be made about any specific aspect of a building. This makes the collection of data extremely difficult for the sociologist, since in the nature of things he is most likely to appear on the scene after the building has been erected and when reasons for action have been forgotten, distorted and rationalised.(9).

The architect, on the other hand, has the advantage that he knows precisely what decisions are taken, how they are taken and the factors which determined the eventual choise. He is in the position of responsibility and can record the facts. In this way, provided that an adequate system of recording is used, the architect can provide the basic data of the all-important decision-making process. He can guarantee the authenticity of the data and by that means post facto explanations, assumptions, and falsely-based theories can be avoided.

The architect has, however, certain very severe handicaps. If practising, he has very little time for the careful recording that is required and still less time for reflection on the data when recorded. His training is relatively wide and touches many subjects, but is not highly concentrated in any particular field. He is taught to approach problems rationally and with scientific method, yet he is also taught aesthetic expression, and is generally inclined to regard the aesthetic as the more important. In practice his aim is to achieve buildings. For this end he quickly learns a professional expertise and becomes skilled in compromise and tends to think and act along lines laid down by the habits and outlook of the society which gives him his livelihood. These factors - whether they cause him to become a good architect or not is beside the point - certainly make it extremely difficult for him to see the building as anything more than the product of his professional abilities. His very success in playing his allotted role will further assist in confining his view of building to the conventional. He is not, therefore, particularly well suited either by training, or day to day work, to thinking analytically about the relationship of building to the total cultural configuration.

These thoughts suggest that the sociology of building needs to be tackled from the architect's side by way of the recording, assembly and

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(9) The appearance of the sociologist post facto is an unfortunate situation. He would be most useful at the stages of preparation when the major decisions are being taken. Even then, however, he would not be the individual responsible for actually deciding.

classification of the data of the decision making process and from the sociologist's side by way of using the concepts of the social sciences to relate the material to general theory, and thereby build up a body of systematic knowledge.

The research method will therefore need to satisfy the following requirements:-

(a) Concepts must be selected from the social sciences, particularly from sociology and social anthropology, to serve as tools to examine the building process.

(b) Data must be collected concerning actual buildings in such a way that its authenticity is above question.

Of the accepted major concepts of sociology the following appear to offer possibilities as tools:-

(1) Associations.
(2) Institutions.
(3) Community.
(4) Customs, folkways and mores.
(5) Social process: change.
(6) Status.
(7) Role.

On examination, associations, community, customs, folkways and mores present serious difficulties as major tools. Associations, that is the groups in which individuals act together, are rejected because of their instability and liability to change and because of their not being an adequately abstract concept. Community and customs are unsatisfactory for much the same reasons as the total cultural configuration concept. A further difficulty presents itself with these concepts in that the rapidity of change in our society is one of its chief characteristics, and that the concept of change must itself be used as a tool.

The research uses, therefore, three basic tools from sociology: institutions (in the strict sociological meaning), change, and status and role used together.

The first stage of the research consists of a theoretical examination of building using the concept of institutions. This allows a theoretical frame work to be created in which every aspect of building can be accounted for in sociological terms (10).

The second stage consists of the detailed recording of the design process of several buildings. This recording was carried out simultaneously with the actual designing and was done by means of chronological logs. This

(10) The description of these stages follows the precise chronological order in which it was found necessary to carry out the research.

technique was applied to seven projects of various types and sizes (11).

It is very important to record here that the problem of getting firm information about the precise reasons for a decision proved extremely difficult to solve. The fact that the difficulty was encountered is in itself highly significant and is a major finding of the study. If the architect for the building (or any other major actor) is asked after the completion of the building to give his reasons for any particular decision, it is already too late to ensure that the explanation given will be reliable. Authenticity of data is absolutely essential if research based on it is to have any value. In this study, therefore, only buildings for which the author has himself taken the decisions or for which the author has been continuously present in the decision stages have been used as data-sources. It was also discovered that the process of logging the data had to be done immediately after each decision and before other decisions coming after it could damage its recordigg. If time elapses between the decision and the logging of it, lapses of memory occur, rationalisation takes place, attempts are made to save face and post facto justifications are liable to obscure the real nature of the decision. When there is danger of these troubles the data immediately becomes suspect and unacceptable (12). The immediate, detailed and faithful recording of the decisions is to be regarded as the only way of safeguarding against the riskd of spurious data.

In the third stage the logs of the buildings are examined and submitted to analysis using the theoretical framework developed during the first stage when the institutions were examined. To complete this phase the findings are then fed back into the first stage material. In this way the theoretical framework is illuminated and corrected by data from the practical world.

The fourth stage examines the significance of change, social, cultural and technological. This part of the study is in contrast with the institutional part since institution and change may be regarded as antithetical elements in the social process, the first being the basis of a society's stability and permanence, and the second being the way in which a society allows for

(11) Factory and Offices (£83,000). Hospital Block (£53,000). Wing to Engineering School (£15,000). Warehouse and Offices (£11,000). Nurses Home (£39,000). Cricket Club (£3,000). Block of Shops. Only the Cricket Club is given in detail: Appendix 1.

(12) Rationalisation and justification are, of course, useful as data in themselves, provided they are recognised for what they are and are not mistaken for the basic information.

variations and development (13).

The fifth stage consists of an examination of the architect. This is carried out in the light of the research that has gone before but using status and role as the specific tools. After trial and error attempts to tackle the architect, these proved to be the most satisfactory because they permitted the subject to be held within definable limits. In dealing with the architect sociologically the main problem again turns out to be the need to limit the terms of reference. The architect was at first approached as seen against the background of his society. This proved to be imprecise as a method and too broad a treatment to bring out major characteristics except on the basis of arbitrarily selecting a series of aspects of the architect in his society. The danger lay in the possibility of making a serious omission unwittingly and therefore presenting a biased point of view. Status and role were, therefore, used because they offered a clearly defined reference frame capable of bringing out the characteristics of the architect with reasonable prospects of good balance and overall ooverage with generally accepted sociological concepts. The architect needs to be seen primarily as an actor in his society. For this purpose status and role taken together offer themselves as the most precise tool. They also feed back into the institutions.

The last phase covers conclusions to be drawn from the study. These concern methods of research, the theory of the subject and practical application of the findings. Although the conclusions have a special chapter devoted to them, the conclusions arising directly out of each chapter have also been recorded separately.

From the Table of Contents it will be seen that the example of the logging of a building and its analysis has been placed in the Appendix and not in the main body of the text. The reason for this is that both log and analysis make very tedious reading due to the degree of detail that is necessary. It is essential, however, to give the log and analysis in full as a matter of record and also because certain major findings have to do with the question of method of this part of the research.

It should also be explained that the full log and analysis are given for a building which is small in size and simple in design so that this part of the material can be kept down to a minimum and a bulky record avoided.

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(13) No value judgment is implied here: variations resulting from change may be in the direction of improvement or deterioration or may be neutral according to a selected value system.

The principles can be shown as effectively in a small as in a large building and a small building has the important advantage that its totality can be more readily grasped.

5. Selected Building Example.

The selected example, which is shown in Figures 1 to 4 serves the purpose of a reservoir from which illustrations of specific points can be drawn. Although examples are taken as appropriate from many situations in building, there is considerable advantage in having a single example to illustrate many points.

In theory it would have been possible to have analysed this example completely and to have used it as the sole example. The example, however, since it consists of three separate buildings, would have produced a far too builky and unreadable analysis and yet would not have provided all the illustrations that would be required. The total result would have been unweildy and would not have given adequate coverage. No attempt, therefore, is made, in recording the research, to log and analyse fully the buildings of the selected example. Instead, the example is used chiefly to illustrate principles.

This treatment allows the dissertation to be very simply presented in the following groups:-

Origin, Aim, Method and Example

Institutional Analysis

Change

The Architect

Conclusions

Appendices

A brief description of the example follows. The group of buildings was constructed in 1958 - 59 in England for the purpose of manufacturing, packing and distributing self-raising flour. The group comprises three blocks.

Factory Block:

This consists of a tower accommodating the processing machinery and the raw flour in builk. The process of converting raw flour into self-raising flour is vertical and is fully automated, there being no workers at all in this part of the plant. Attached to the base of the tower are a packing hall, storage area and loading bay, and a staff wing.

Office Building:

This has three parts: directors' suite, administrative offices, canteen and demonstration room.

Workshop:

This is for servicing the delivery vehicles and doing small maintenance jobs.

Cost:

Approximately £83,000 excluding equipment.

Construction:

Factory - R.C. frame, walls of brick infill and aluminium sheet backed with Thermalite, floors of R.C. beams infilled with sandwich timber construction, roofs hollow tile and precast prestressed R.C., driven pile foundations. Office: R.C. frame and brick weight-bearing walls, hollow tile and R.C. roofs, driven pile foundations. Workshop: Steel frame sheeted with asbestos. R.C. mat foundation.

Time for Construction:

Approximately 18 months.

Design Method:

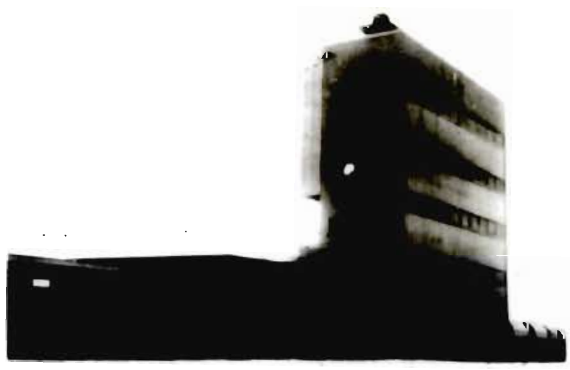
Architects, structural consulting engineers, quantity surveyors.

STAFF WING

1

FACTORY

2



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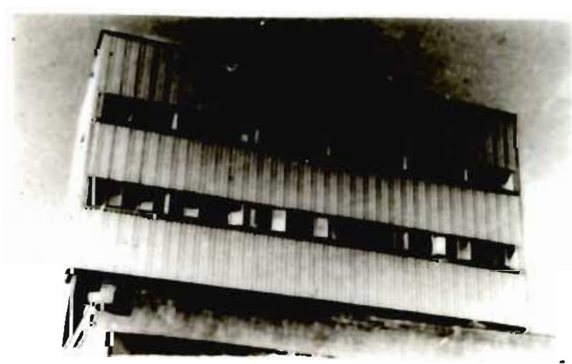

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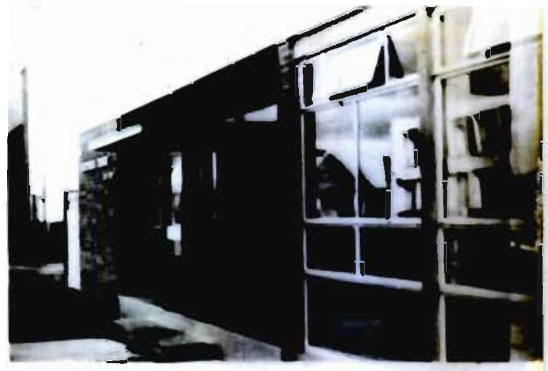
OFFICE BLOCK



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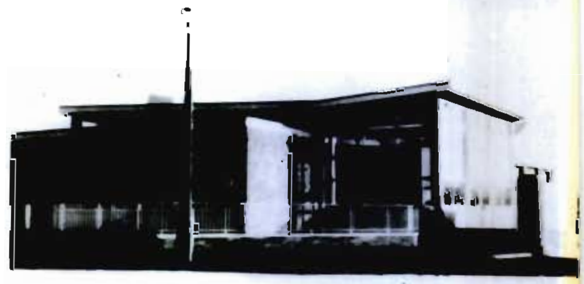

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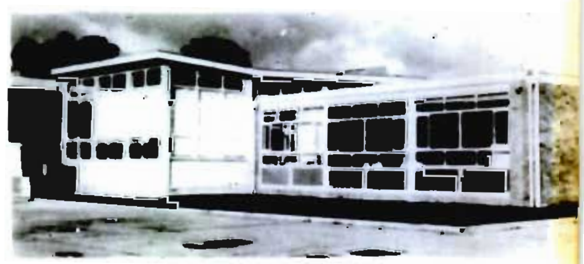

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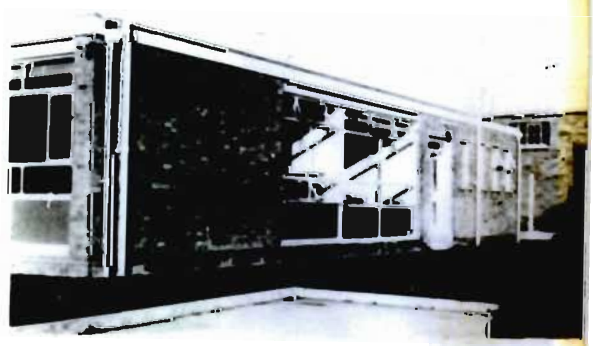
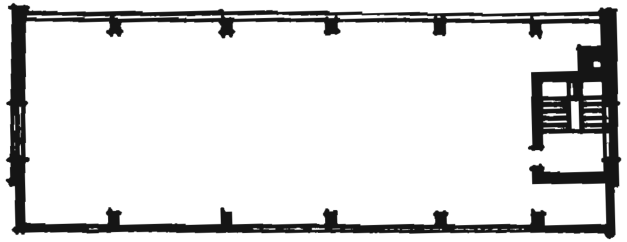


11

WORKSHOP

12

FIG 1



Typical Upper Floor Plan of Tower.

Fig. 2. Factory. Ground Floor Plan.

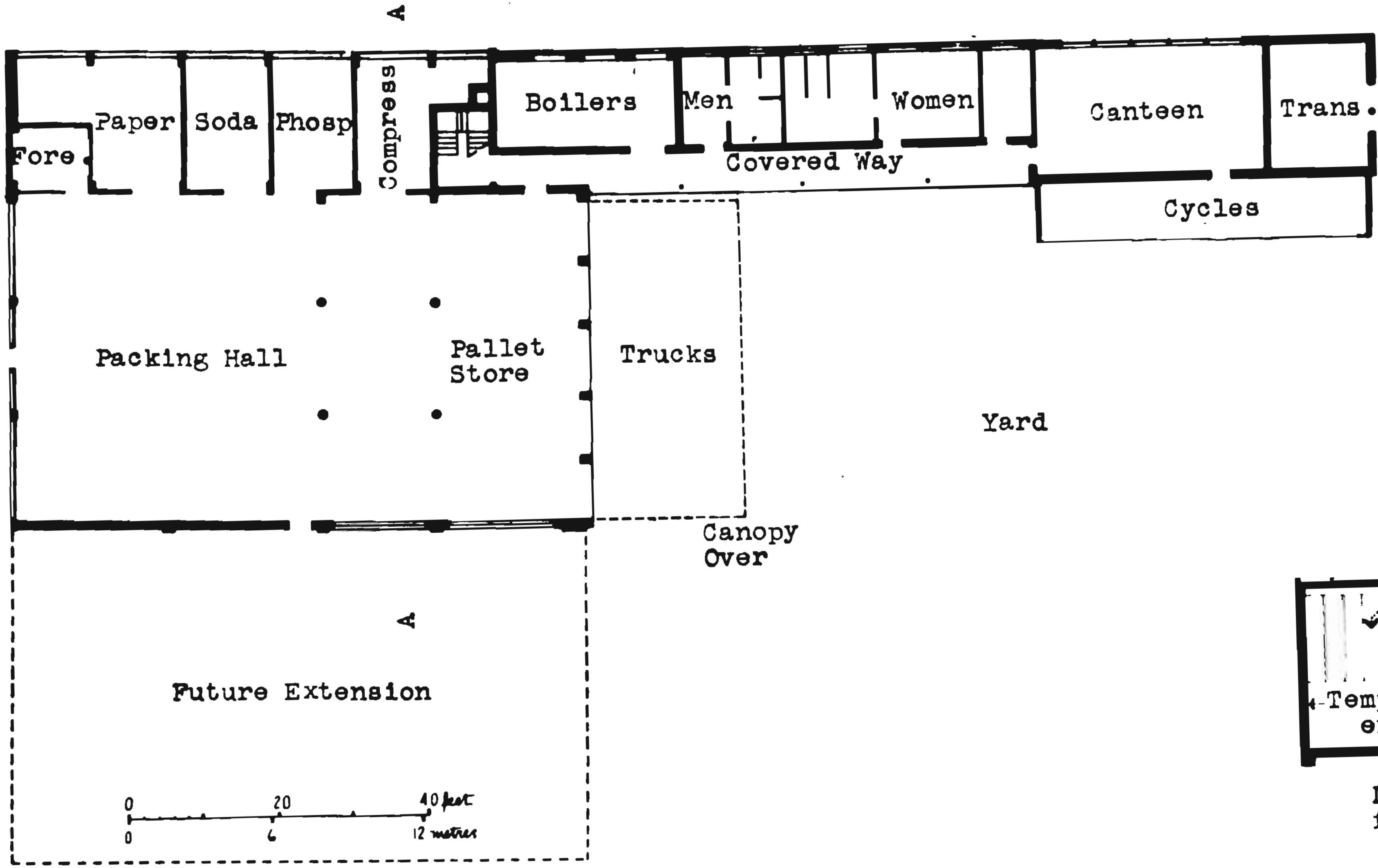


Fig. 3. Section A-A through factory.

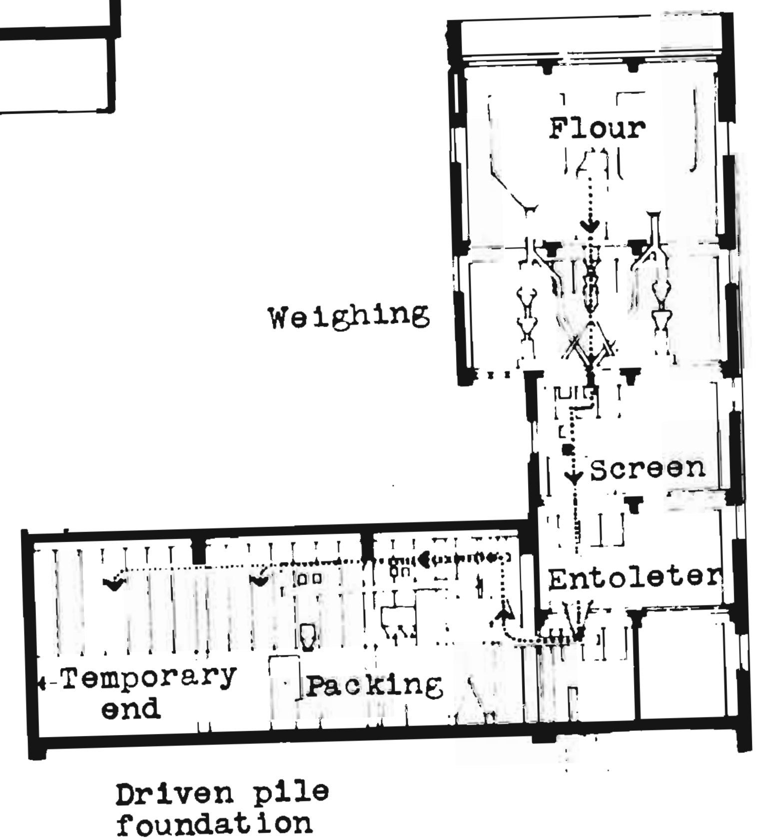
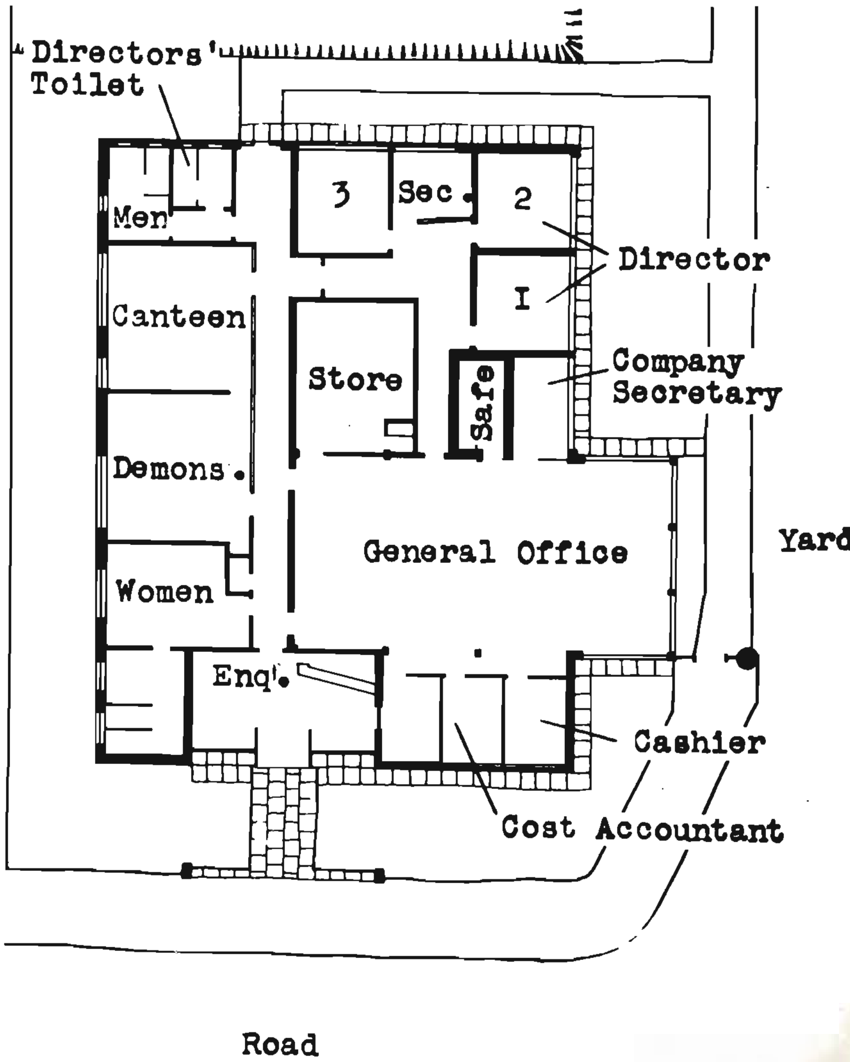
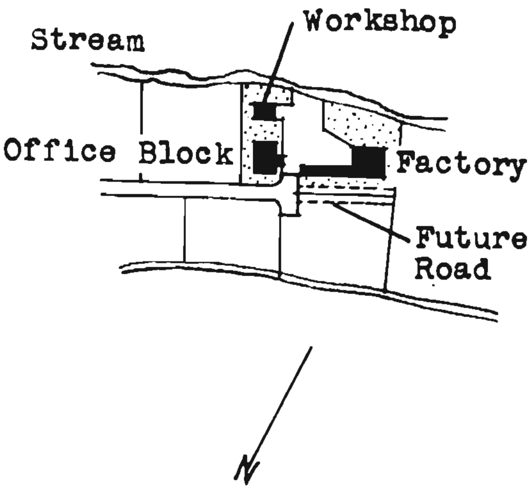


Fig. 4. Plan of the Office Block.





Site Plan.

Fig. 4a. Office Block. Street Elevation.

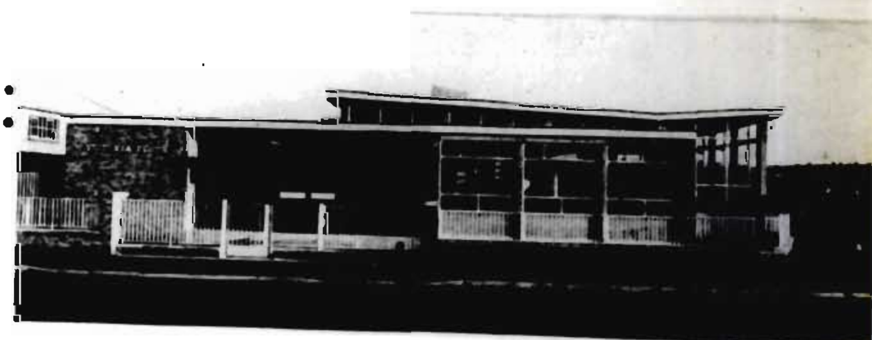
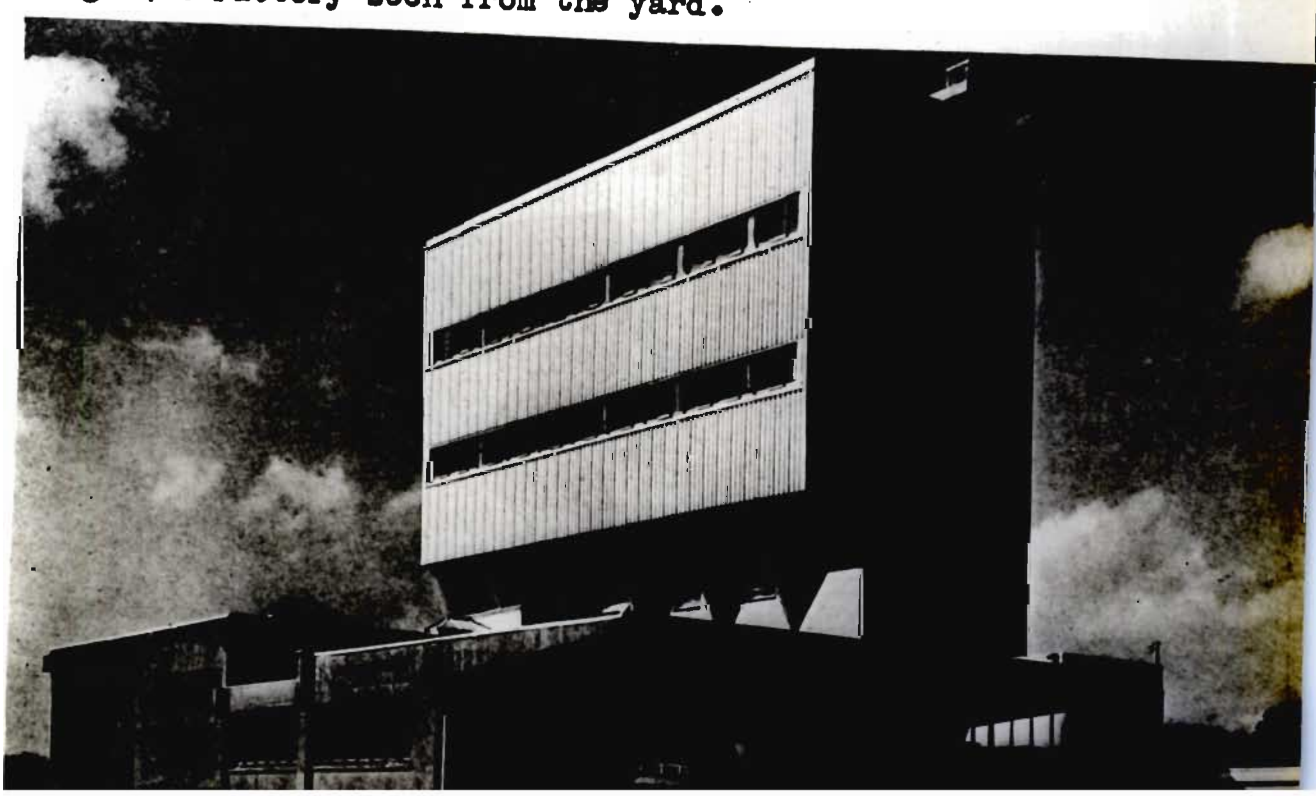


Fig. 4b. Factory seen from the yard.



CHAPTER 11

INSTITUTIONAL COMPLEXES AND BUILDING TYPES

1. General Approach

Before beginning this chapter, the reader will find it helpful to glance at the 'Log and Brief Comment' of the Case Study which is given in Appendix 1. Here he will see how the data has been collected, and he will appreciate how the degree of detail necessary in recording makes it too cumbersome for incorporation in the main body of the text. This material is, therefore, placed in the appendix only for reasons of convenience and not because it is of secondary importance. It is vital that the detailed practical approach to the sociology of building be continually borne in mind during the process of dealing with the theory.

In using the sociological concept of the institution to examine the building there are two main approaches: (a) analysis relating groups or complexes of institutions to buildings by way of building uses, and (b) analysis by relating certain complexes of institutions to all building types. This chapter deals with the first of these.

The area covered by this chapter therefore includes the adaptation of the building to the needs of the society. This is referred to by architects as the functional requirements of buildings. Vast as this subject is, it represents only a small part of the field to be covered by this study and therefore not more than one chapter can be allotted to it. The importance, however, of the need for sustained scientific work in this area of the sociology of building can scarcely be overestimated. It is interesting to see that some serious work along this line is now being done.

2. Social Institutions.

Definition: There is no short and comprehensive definition of the concept "institution". This is perhaps because the concept has many aspects which have to be viewed simultaneously: its place in the whole body of social phenomena, its nature, its purpose or function in the social process, and its make-up or constitution. In spite, however, of variations in the definitions given by sociologists it is possible to extract the salient features. Kingsley Davis gives this definition: "An institution can be defined as a set of interwoven folkways, mores, and laws built around one or more functions. It is a part of the social structure, set off by the closeness of its organisation and the distinctness of its functions. It is therefore inclusive rather than exclusive of the concepts previously defined; for without folkways and mores there could be no institutions."(1).

MacIver and Page give this short definition: "Institution (means) the established forms or conditions of procedure characteristic of group activity". (2).

Talcott Parsons gives this emphasis: "A pattern governing action in a social system will be called "institutionalised" insofar as it defines the main modes of the legitimately expected behaviour of the persons acting in the relevant social roles, and insofar as conformity with these expectations is of strategic structural significance to the social system. An institutional pattern is thus a cultural pattern to which a certain structural complex of motivations and social sanctions has become attached ..... An institution is a complex of such institutional patterns which it is convenient to treat as a structural unit in the social system". (3).

From these definitions it will be appreciated that institutions are to be found in all departments of the life of any culture, whether simple or complex. Examples of institutions are: momogamy, polygamy (polygyny and polyandry), payment of interest on borrowed money, the joint stock company, the tendering system in building, collective bargaining, the examination system, control by by-laws, monopolistic practices, kingship, Zulu lobola. It would be an impossible task to list them exhaustively.

Institutions are easily confused with corporate bodies or groups of individuals. Such groups are the physical embodiment of groups of institutions and they are essentially associations through which the institutions act. Thus, the R.I.B.A. is not a social institution in this sense, but is an association through which institutions such as the professional code of practice, having a president, entry by examination, expulsion for misbehaviour and grouped professional action, are able to operate. The R.I.B.A. is only an institution in the sense that the having of such an association has become institutionalised.

In building, the entering into a contract by builder and owner is an institution. It embraces certain legal sanctions such as enforcement of the

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(1) Kinglsey Davis. Human Society 1950 p.71.
(2) R. M. MacIver and C. H. Page. Society. p.15.
(3) Talcott Parsons. Essays in Sociological Theory Pure and Applied. p.14.

conditions, certain mores such as acting in accordance with the spirit of the contract and certain folkways such as the holding of signed documents by both parties.

Institutions Preferred to Associations: In this study it is the institutions rather than the associations that are used as a tool to examine buildings. It would be possible to use the associations for the same purpose, and buildings could be examined in relation to the groups of human beings who design, build, own and use them. The association, however, has the disadvantages that it is more liable to change than the institution, and that it is of derived origin since without institutions there could be no associations. Taking the house for example, it is not the association called the family which is useful for the present purpose, but the institutions which operate through the life of the family or, put in another way, it is the institutionalised roles (patterns of behaviour) of the members of the family which are significant. Associations may be ephemeral; institutions are the enduring structure of society. The local cricket club may pass out of existence, but that institution which is called the game of cricket continues, and in this sense it is a system of roles.

Institutions Classified: The number of institutions is legion. In order, therefore, that they can be conveniently handled it is usual to classify them. Classifications vary from writer to writer, but institutions are generally put into functional groups based on the various segments of human activity. There is a fair measure of agreement for the content or scope of these groups, since of eight classifications examined, the marital, familial, economic, educational, religious and governmental complexes are fairly generally accepted. Panunzio gives as major complexes: - the marital, familial, economic, educational, recreational, religious, scientific and governmental clusters (4). Hertzler gives: - the economic, marital and familial, governmental (including legal and military), religious and ethical, educational and scientific, expressional and aesthetic complexes. She adds as nascent systems: - recreational, health, and social work clusters (5).

For the purpose of examining buildings a group classification based on Hertzler's and Panunzio's lists appears satisfactory; the following complexes, listed alphabetically and not in order of importance will be used: -

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(4) C. Panunzio. Major Social Institutions. P.7.
(5) J. O. Hertzler. Social Institutions. 1946. P.94.

Ameliorative (corrective)	Governmental
Economic	Health
Educational	Recreational
Expressional	Religious
Familial	Scientific

There are other methods of forming categories or complexes. For example, the Webbs group institutions by their origins: animal instincts, religious emotions, humanistic ideals, and deliberate planning (6). Le Corbusier's four functions of town planning are in the nature of institutional clusters; habiter, travailler, cultiver le corps et l'esprit, and circuler (7). Classifications of this kind are however, rather too broad for the present purpose.

Institutions may also be classified in the broad groupings of (a) overt and covert, and (b) crescive and enacted.

Other definitions and classifications are given in Appendix 11 (1)&(2).

Functions and Functioning If a community is to have stability as a social group the behaviour of individuals must be clearly defined and generally agreed upon. The institutions are the defined and accepted major patterns of behaviour which have social approval and to which society legitimately expects the individual to conform. The institutions therefore serve as a sort of skeleton or structural armature of group behaviour on to which each person must hang the variations and deviations of his own individual behaviour. The institutions are, then, the structural element of the social system, operating to ensure the following:-

(1) Satisfaction of basic individual biological psychological and social needs in a cooperative way.

(2) Provision of operative bases for the social order.

(3) Act as the major instruments of social control.

(4) Formation of patterns of social behaviour in the individual and the group.

(5) Preservation and transmission of the culture (8).

Talcott Parsons emphasises that one of the fundamental functions of institutions is to define the situation so that the individual can act (9). This idea may be briefly stated as "actor-situation". The institution tells the actor what the situation is and determines for him the limits within which

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(6) S. & B. Webb. Methods of Social Study. P.22.
(7) LeCorbusier 1938-1946. P.149.
(8) Hertzler. Op. cit. P.40.
(9) Op. cit. P.38.

he will be expected to act. Put in this way the operations of institutions are readily seen to have a bearing on buildings, because whether we consider the designer, the owner, the contractor, the government official passing the plans, or the user of the building, it is clear that any action taken will be within the frame of reference of the appropriate institutionalised patterns of behaviour. The architect in designing will so arrange the parts of the building that the user will be able to live out his institutionalised roles. The owner in the course of financing the building will conform to such institutions as the rate of interest. And so on. It is perhaps this idea of actor-situation which is most rewarding for the architect as a way of thinking of institutions in their relationship with buildings.

The operation of institutions is very largely through the associations. In the South African building industry such institutions as collective bargaining and different wage levels for various racial groups are maintained by associations like the trade unions.

3. Building Types.

Different types, or sorts, of buildings exist in our society and in any society with a certain level of material culture. There are houses, temples or churches, shops, factories, schools and theatres to mention a few. These are clearly different from each other in that each has its own characteristics of arrangement and appearance by which it can be recognised. Although a church designed in a modern style may be derisively described as a factory, no one in reality acts on the impression that it is. The common use, therefore, of design elements for church and factory does not reduce them to a common building type.

The basic reason that there are different types of building is that they are created to suit different kinds of human behaviour. The church is an extensive covered area for seating a large number of people for devotion. The school is a system of cells in which instruction can be given to small groups. The building type is, therefore, accommodated to the pattern of behaviour of its occupants, and can be said to be institutionally defined. In designing the school the architect must understand the behaviour patterns of the children at all ages and in all aspects of their education - physical, social, and intellectual etc., and he must also understand the patterns of the teachers, distinguishing between the behaviours of headmaster and assistant master. In the same way, when designing an office block for a commercial firm, the designer must comprehend the behaviour patterns of everyone from office boy to the chairman of the organisation. To attribute the behaviour of the one to the other is to make serious mistakes in the design of the building.

These behaviour patterns, or roles, are institutionally defined. The institutional complexes and buildings are therefore intimately connected when considered from the point of view of the uses of buildings. The occupants of buildings behave in certain ways because institutions impose that behaviour on them. The buildings are designed, at least in some degree, to make the behaviour possible, or to put it in another way, to permit the playing of the culturally prescribed roles.

The above reasoning does not imply causation. The existence of a behaviour pattern may or may not be paralleled by a characteristic building type. Further, the building not only follows the behaviour pattern but also has some influence upon it. This is one of the problems of architectural functionalism. We may say at this stage that there are behaviour patterns characteristic of institutional complexes, that there are building types which can be clearly differentiated, and that the two can be correlated.

In our society the complexity of behaviour patterns, which might be described as the intensive differentiation of roles, is related to our high degree of division and specialisation of labour. In a primitive culture there may be little division of labour and practically no specialisation. Among the primitive Zulus every household was its own food production and consumption unit. But in our society division and specialisation have been carried so far that even farming families are not self-sufficient in food. This division and specialisation means new groupings of individuals, and these new groupings bring social change and new patterns of both individual and group behaviour. As specialisation is pushed further subgroups emerge with new variations in behaviour patterns. These highly specialised activities have individual behaviour patterns, and these new variations do eventually appear to some exten t reflected in the organisation and form of the building in which the roles are played. An airport building is a good example of a lay-out designed to meet a new specialisation - air travel.

Our culture is characterised on its material side by the multiplicity of its building types. Societies having a less complex material culture appear to have a lesser degree of differentiation in building types. The Zulus, for example, appear to have had only the hut and the cattle kraal. Pompeii, as a typical small Italian town of the early Roman Empire enjoyed a relatively high standard of living with the following building types: houses, barracks, shop, inn, service industrial buildings like bakery and granary, school, baths, theatre, brothel, temple, basilica, curiae, senate, customs house, prison (10).

Donn's 1773 map of Bristol marks: churches, chapels, poor house, infirmary, almshouses, schools, taylors' hall, Guild Hall, Council House, guard house, corn market, gaol, hospital, fish market, post office, exchange, market, merchants' hall, library, theatre, coopers' hall, assembley room (11). There would also be shops, warehouses, some industrial buildings and inns. There is, therefore, no easy correlation between the complexity of a culture and the number of building types, since both Zulu and Roman lived in anything but simple cultures. It may be concluded that a close examination of the relation between the degree of division and specialisation of labour (coupled with the level of the material culture) and the differentiation of building types would be a rewarding field for research, particularly in its practical application to the problems of use zoning in planning.

4. Correlation of Institutional Complexes and Building Types.

We shall now proceed to a detailed correlation of the institutional complexes with the building types. It is difficult to list the complexes according to any very clear system of evaluation and yet some order of ranking other than the alphabetical is necessary. The sequence used here is a very rough order of diminishing significance, and while it may be scarcely disputed that the economic is the most prominent aspect of our culture, the order in which the other complexes are given should be regarded as merely a matter of convenience.

(1) Economic: Commercial - shop, showroom, departmental store, kiosk, markets wholesale and retail, auction rooms, banks, offices, office block, post office, stock exchange, cafe, restaurant, filling station, warehouse, wholesale co-operative, service workshop, parking garage, trade exhibition building, professional or business organisation building, business club, hotel motel, hostel, public house, farm buildings other than domestic.

Industrial - factory, workshop, abattoir, brewery, destructor, mine buildings, power production buildings.

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(10) T. H. Dyer. Pompeii: Its Buildings and Antiquities. General Map.
(11) Anon. English City. P.37.

Service Buildings - buildings for production and distribution of water, gas, electricity; telephone buildings, sewage and garbage disposal plants, crematorium, cemetery chapel, transport buildings: air and sea terminals, railway stations and workshops, bus stations and garages; radio and television studio and transmission buildings, roads and bridges.

Any building may be regarded, of course, from the viewpoint of its economic role: a cinema may be classed as economic on the grounds that it sells entertainment. Although this emphasis has been avoided in these lists and the cinema will be found listed under the recreational complex, this possibility serves to underline the fact that classification is merely a tool to understanding the relationships of various concepts.

(2) Familial: House (detached, semi-detached and terrace), maisonette (S.A. meaning of a block of two flats, one above the), block of flats (or maisonette in U.K. meaning of apartment with two floors), old people's home, communal wash-house, group of lock-up garages, hotel (when used by families), palace.

(3) Governmental: Central government offices, house of assembly, local government offices, city hall, law courts, labour exchange, workhouse, military offices and barracks, specialised military buildings, archives, fire station, police station and barracks.

(4) Educational: Schools, nursery, primary, secondary and for defectives; colleges, university, technical and business; libraries, public, commercial, technical, professional and national; museum, art galleries.

(5) Scientific: Laboratory, special research building, observatory.

(6) Health: Hospitals, general and specialised; sanatorium, nursing home, clinic, health centre, consulting rooms, building for special treatment like physiotherapy.

(7) Recreational: Amusement hall, swimming bath, billiard saloon, club building, community centre, social centre, dance hall, exhibition hall, concert hall, cinema, theatre, stadium, race-track, ice-rink, fives and squash courts, gymnasium, boathouse, amusement park, night club.

(8) Religious: Church, chapel, church hall, temple, meeting house, monastry, convent, theological college, building of the type of the Voortrekker Monument at Pretoria, shrine.

(9) Ameliorative: Gaol, reformatory.

(10) Expressional and Aesthetic: Commemorative structure like Nelson's column, war memorial, tombstone, non-commemorative sculture or structure.

It will be seen that some building types could be placed under two institutional headings: museums could be allocated to both the educational and the scientific, theological colleges could be placed under the educational as well as the religious heading, and some service buildings, here listed under economic, could be placed under governmental. The reason for this difficulty appears to be that overlapping of the institutional groups occurs. The scientific and the educational, for example, are intermeshed, although the essential difference between the two is clear (12). This overlapping is reflected in the building so that the museum can be representative of both the educational and the scientific complex according to the use made of it by the particular individual. No difficulty is encountered in understanding the effects of overlapping if the building is tested against the behaviour patterns and their attendant attitudes of mind. The community centre is recreational if the dominant behaviour pattern of the individual is playing games there. If, however, it is a question of lectures on household management the building will, to that extent, be classified educational.

The question of overlapping emphasises both the complexity of institution as a concept and the need when using it to look for all possible classifications. Certain building types do not fit very comfortably into the classification given. Buildings connected with transport have been classified as economic. It would be equally possible to make a special class called "communicational". This has the difficulty that Hertzler has used this idea to cover essentially institutions like language and writing.(13).

Difficulties of classification of this kind do not invalidate the usefulness of the correlation between institutions and building types. The essential idea that behaviour patterns are substantially of the same order in all buildings of the same complex remains a valuable tool with which to examine buildings. The family patterns as laid down by the institutions are the same in both flat and house. The basic behaviour patterns of education are all of the same order whether stenographers are learning to type or engineers are being taught the three moment theorem.

Buildings are sometimes described by sociologists as "instruments of institutions" (14). The house or black of flats might therefore be called the instrument of the familial institutional complex. This idea of instrumentality is useful because it makes clear this first relationship between the institutional complexes and the building types, thereby separating this correlation from others which will be examined later. It is, however, necessary at this stage to decide upon a phase which will conveniently express the correlation that has just been made. For this purpose "own complex" appears satisfactory and will be used. This will mean that aspect of the relationship institution - building which signifies to which complex a building belongs by virtue of the

(12) The characteristic ideas of the institutional complexes are given in Appendix 11 (3).

(13) J. O. Hertzler. Social Institutions 1929. P.62.

(14) C. Pannunzio. Major Social Institutions. P.19.

behaviour patterns of its users. Thus, "own complex" for the house is the familial complex; for the shop it is the economic. The value of this phraseology will be appreciated when other relationships between the institutions and the building types come under review.

5. Illustrations of Building Types and Own Institutional Complexes.

The following illustrations are given to show the general principle of correlation between the institutional complexes and the building types. It must again be stressed that this correlation does not imply, far less prove, causation. The institutions grouped into complexes, have obviously some effect in determining the form the building takes. But, equally, the building when in existence and in use has some effect in determining the rate and direction of change in the institutions. Furthermore there is an inertia in building design, as in institutions (possibly the inertia in institutions makes it inevitable that there shall be inertia in design), and institutions and buildings must clearly exert reciprocal pressures on each other. At this stage of the analysis, however, these are side issues. The fundamental point now is to illustrate how the building types and the institutions can be related in a useful way.

The first illustration is the Zulu family village or umuzi. This has been chosen because it belongs to a society in which there is no great division and specialisation of labour and therefore no differentiation of building types. Basically the Zulu in his primitive days had only one building type - the circular hut. This was the unit element of all kraals, whether consisting of a handful of huts or of the 1400 huts of the royal kraal of Shaka at Bulawayo, Zululand (15).

Figure 5 (16) shows the plan of an umuzi. It consists essentially of huts grouped round a circular cattle-fold, or kraal. The huts are arranged in clusters in a way suitable to the workings of a polygamous household. Standing in the entrance of the outer fence and looking toward the cattle kraal one faces the hut of the chief wife, shown 1 on plan. This is called the indlunkulu and is both the most important hut of the whole village and the chief hut of the group of huts marked with this name. The chief wife (inkosikasi) is supported by subsidiary wives in the group of huts, which also accommodate her

(15) A. T. Bryant. The Zulu People. P.473.
(16) Based on E. J. Krige. Social System of the Zulus. P.43.

her married sons and their wives. The indlunkulu group thus forms the basic household in the polygamous family and is controlled by the patriarch's chief wife.

On the right of the indlunkulu group is the right-hand wife's group. This is called ingqadi. This wife is also supported by subsidiary wives and her married sons. This group ranks second to the indlunkulu and constitutes in a similar way a compact household based on patrilineal relatives.

On the left of the indlunkulu is the ikhohlwa, or Left-hand wife, together with her group. This group is in all respects similar to the other two but ranks last. The huts on the right and left of the entrance accommodate adult sons and retainers respectively.

Clearly such a lay-out is designed to suit the institution of polygyny (one husband, several wives) and to allow its resultant behaviour patterns to be followed. Each principal wife is responsible for her own household, having fields, cattle and grain of her own, and the household is made as self-contained as possible. This is expressed in the way the huts of each principal wife are grouped together. The institution of seniority of wives and their subsidiaries and dependents is expressed in the way in which the groups of huts are disposed about the axis of the entrance. A third institution which is expressed in the lay-out of the village is the cattle complex. In the life of the Zulu cattle have strong economic, familial and religious significance, and the ownership of cattle confers prestige. Cattle are handed over on marriage (lobola) and they are sacrificed. The importance of cattle in Zulu life is matched by the central siting of the cattle kraal in their villages; the human beings cluster round the animals.

The institution of the ikundla is also interesting for our purpose. This is the courtyard lying between the indlunkulu group and the cattle kraal. This is the family's place of assembly and seat of government. Women are forbidden to cross it.

In a general way it may be observed that the arrangement of the physical environment of the Zulu umuzi conveniently allows the inhabitants to follow those institutionalised patterns of behaviour required by the familial complex in Zulu culture.

In our own society the Natal European small house is a good example of the workings of the familial complex. A typical example is shown in Fig. 6. Such a house is suitable for a monogamous household. Only three (often two)

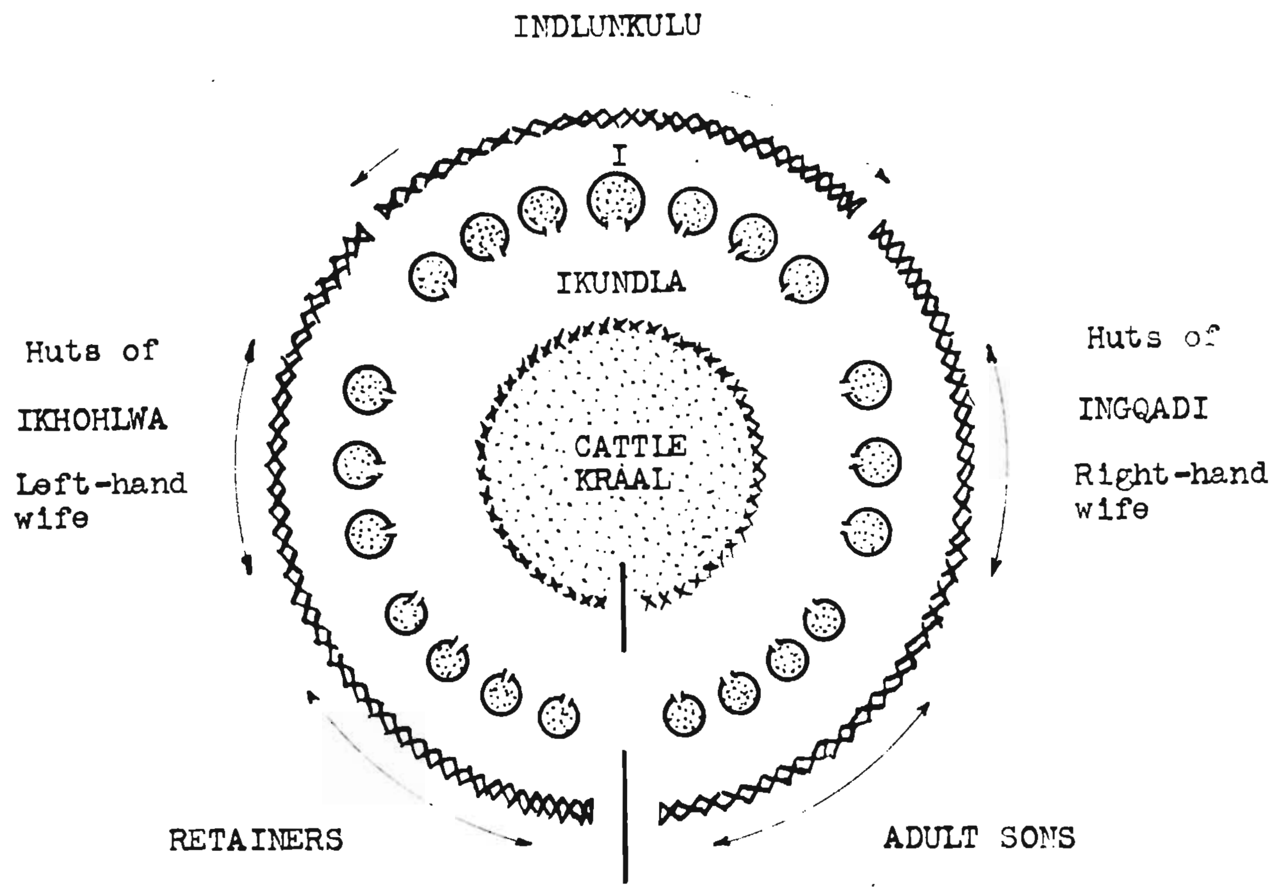


Fig. 5. Traditional Zulu Kraal.

FAMILIAL COMPLEX

Polygamy (polygyny).
Seniority of wives.
Focus on cattle kraal.
Patrilocal dwelling.
Ikundla barred to women.

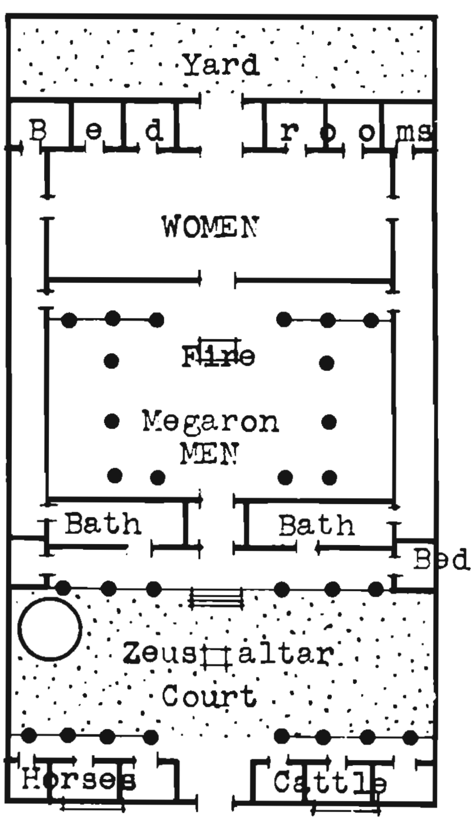
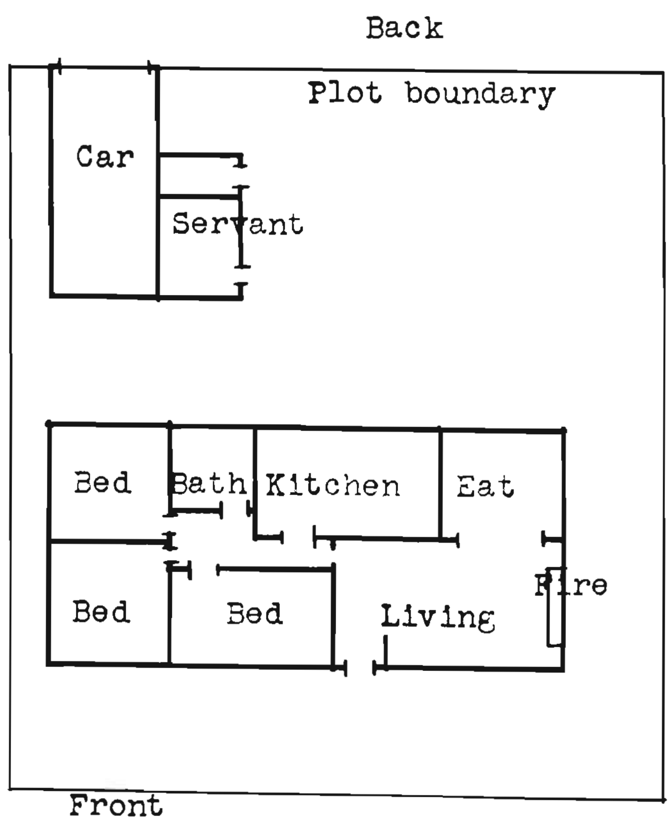


Fig. 5a. Homeric house.
A society in which the status of women was lower than that of the men. The women's quarters are at the back of the house and are less impressive than the men's.



FAMILIAL COMPLEX

Monogamy.
Privacy for bathing.
Non-European service.
Mechanical transport.
Fireplace focus.
Home-ownership.

Fig. 6. Modern European house, Natal.

bedrooms are provided and there is no provision for the various different groups of children which would be characteristic of a polygynous household. Another institution in evidence is bathroom privacy. There is bathing space for only one person at a time and there is a lock on the door because our society has institutionalised privacy for body-washing after a certain age. In contrast, the Finns have institutionalised communal steam bathing (17).

The institution of non-European domestic service is allowed for by regarding the kitchen strictly as a workshop and not as an eating place as well, which is common in Britain and the U.S.A. The servant's room, or kia, usually built in conjunction with the garage at the end of the garden, has been developed to allow for the operation of this institution.

In Natal home-ownership is a very vigorous institution. This is not only a familial but also a strongly economic institution. For our purpose its most important aspect is its repressive effect on change in the house. The home-owner is doubly under pressure to build a "normal" house. First, he must usually raise a loan and lending agencies have very strong leanings towards the "normal"; and secondly the owner must remember his possible need to sell. And so the "normal" is reinforced. Another aspect of home-ownership is a failure to produce houses of plan-type differentiated to the detailed needs of the family in its various age-phases.

The fireplace is an interesting institution in Natal. Life round the fireside in Britain and round the stove in various European countries is institutionalised and family life is focused round the source of heat. When this institution is translated to a hot climate its usefulness can be called into question. Many houses in Durvan are still being built with fireplaces as the focus of the living room, and yet this focus is used but rarely. This is an example of the persistence of an institution which has ceased to perform its primary function. This illustration serves to give a hint that we do not build "logically". In planning the house and arranging its parts we are aiming to make it convenient to carry out our institutionalised patterns of living. Such patterns are not necessarily logical, although our individual approval of them may be a striving toward the rational. The house, therefore, is not a logical design and efficiency can only be achieved within the limits set for us by the institutions.

(17) Attitude to the human body influences building design.

Le Corbusier's living units at Stuttgart (Weissenhof Siedlung, 1927) show how a new design for residential accommodation can be achieved if modifications in the institutional familial complex can be assumed. In this example, Fig. 7, the standard of privacy between living-room and bedrooms, and between bedroom and bedroom was so reduced as to make it virtually unacceptable to any class of western European at that date. As a living unit it failed because it could not provide the privacy institutionally expected (18).

The European house in Natal is a highly differentiated building type. It serves almost exclusively the familial complex only, meeting the marital, child-rearing and recreational needs of the family. Its degree of differentiation is readily observable if this type of modern house is compared with the mediaeval feudal house or castle which was designed to fit behaviour patterns in the familial, economic, governmental and religious complexes (Fig. 8).

The modern British secondary school is an example of how a school is designed to allow for certain institutions in education, and it is used here to correlate the building type and the educational complex. The particular example chosen is the Worthing Technical High School (19), shown diagrammatically on plan in Fig. 9. Reference to the plan will show special accommodation for the following institutionalised activities: science, wood and metal working, housecraft, arts and crafts, physical culture, drama, garden studies, communal meals, communal assembly (prayers, prize-givings etc), private study (library), and staff activities. Education at technical high school level has now to take account of all these interests, and new building mutations are being called into being. Some institutions involved here are: the class of a certain size, practical demonstrations and practical work by the scholars themselves, state-paid teachers, headmaster, the institutions of the various subjects and the institution of collecting all these activities into one building type. It is clear that these institutions, which form part of the educational complex, are borne in mind by the persons responsible for the creation of the building and are in the minds of those, both teachers and scholars, who use the building. The building is a technical high school just because the institutionalised behaviour connected with that type of education can be carried on conveniently in it.

(18) LeCorbusier and P. Jeanneret. Oeuvre Complete 1910-1929. P.154.
(19) Architects' Journal. 4-8-55 P.144-160.

In contrast with a complex school like the Worthing example, the mid-nineteenth century nucleus of Bristol Grammar School may be cited. This consisted essentially of a huge hall round the walls of which masters' seats and desks were built in at intervals. Before each desk was an area of floor space large enough to accommodate perhaps 30 to 40 boys at their desks. A small gangway separated the flank of one class from the next. Masters shouted in competition and no doubt who shouted loudest was the best teacher simply because he could be heard. Underneath the hall were a few classrooms, as yet undifferentiated since science, woodwork, arts and crafts, physical training were still in the future. The interesting thing is that open school in the large hall was an institution, and the shape and form of the building was arranged to suit its workings (Fig. 10).

As with the familial and the educational complexes so with the economic, governmental, scientific, religious, recreational, health, ameliorative and expressional. Each complex has building types which in their characteristic form can be recognised as belonging to this or that complex, because their form is such that it conforms to the institutions of that complex and fits the institutionalised behaviour patterns. Building type and institutional complex may thus be regarded as two halves of a whole, and this should be thought of as the primary relationship: the building in relation to its own institutional complex.

6. Institutional Complexes and Planner's Use Zones.

In arranging the grouping of building types the planner uses categories which correspond to a large extent with the institutional complexes selected for this analysis. He will have special and general residential zones which are concerned exclusively with the familial complex. He will have business and industrial zones, both of which may be split up into sub-groups like light, general and special industry. These zones correspond to the economic institutional complex. There may be a governmental zone, a hospital zone and an educational zone. Recreation (including open space) may be separately zoned. The important point is that the institutional complex is not only related to the building, but is also in evidence in the way in which we are use-zoning our towns and cities.

In considering the use zoning of buildings there are two aspects which are relevant to the present study. The first is that in very general terms the

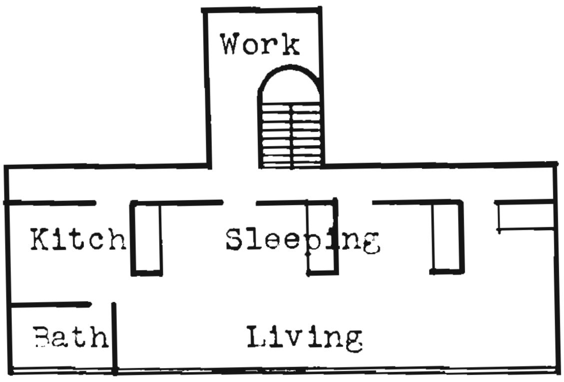


Fig. 7.

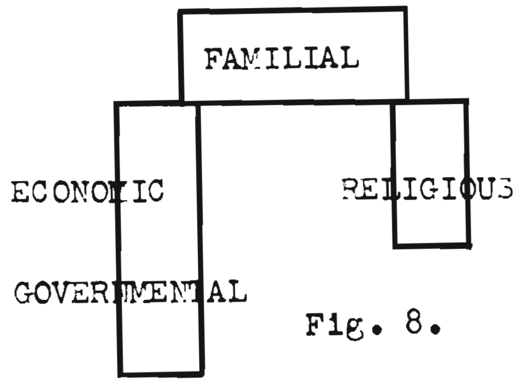


Fig. 8.

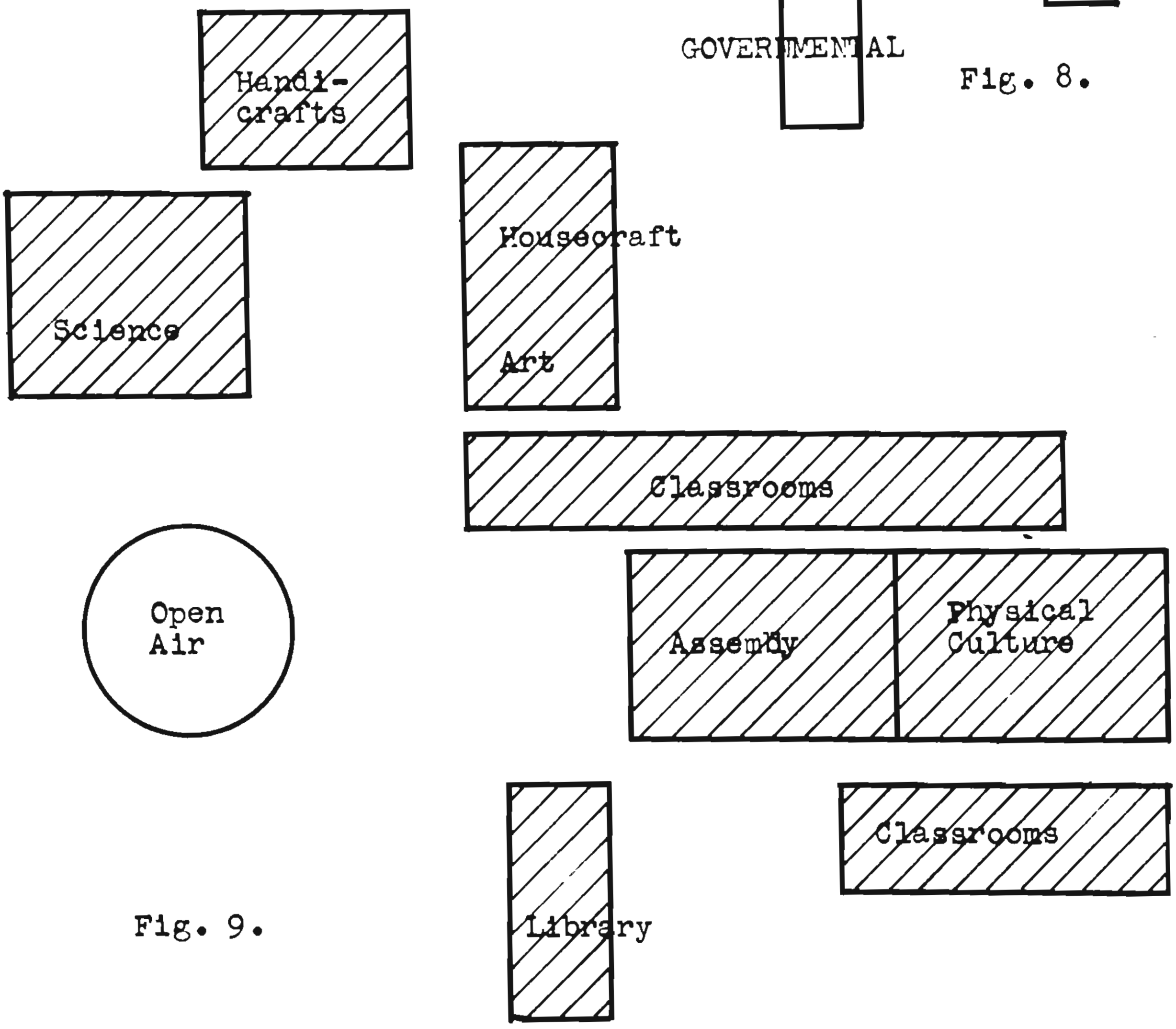


Fig. 9.

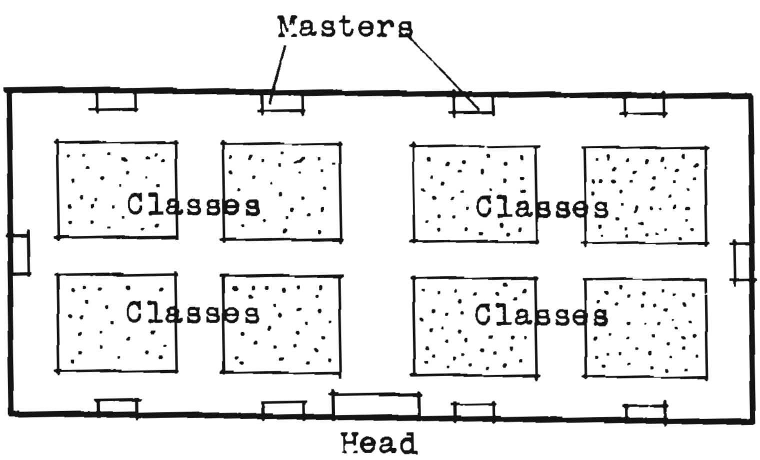


Fig. IO.

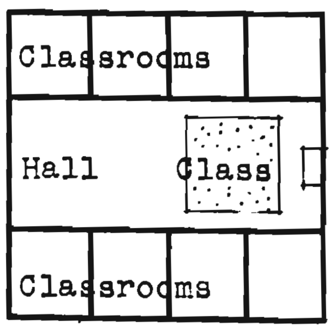


Fig. II.

Fig. II shows an intermediate stage of development: the open school not quite abandoned as an institution.

use zones can be correlated with the institutional complexes. This means that in effect the planner in defining his zones is defining areas in which specific patterns of behaviour may, or may not, be followed. Furthermore, he is saying in practice that we must all act out our various roles (familial, economic, etc.) in groups together: we must all work in the industrial or commercial zone and we must live our family lives in the residential zone. It should be noted that this is a statement of observed fact and not an explanation of why the planner zones in this way.

The second aspect is that use-zoning has itself become institutionalised: it is expected of the planner that he will use-zone his town in accordance with the accepted standards of the day. He must keep industry out of residential areas. Retail and wholesale commercial activity must be separated. And so on. This is a form of use segregation into institutional complexes which may now be itself so heavily institutionalised as to inhibit constructive thought on the desirable ecology of cities.

We must note, therefore, that not only is the building itself an institutional pattern in terms of its design for use, but also that its placing in the town or city in relation to other buildings is arranged in accordance with the requirements of an institutionalised pattern of town layout.

The use zoning schemes examined are given in Appendix 11(4).

From a planning-institutions point of view research into the walled clan villages of China would be useful (20).

7. Conclusions.

(1) The concept of institutions is useful in examining the building, and is superior to certain other concepts.

(2) Institutions can be arranged in sociologically functional groups. These groups and building types can be correlated so that every kind of building can be put into a category.

(3) All building types can be regarded as institutionally patterned: that is, the building is arranged to make possible the playing of the roles required by the institutional complexes.

(4) The details of the relationship between the building and its institutional complex is a matter for special study.

(5) The multiplicity of building types in our society is a reflection of our

(20) I am indebted to M. Hugo-Brunt for drawing my attention to these.

high degree of specialisation and division of labour. This will lead progressively to new building types.

(6) The first relationship between a building and its institutional complex must be clearly differentiated as signifying the complex to which it belongs by virtue of the behaviour patterns of its users. This is to be called the 'own complex' relationship.

(7) Correlation of building types and institutional complexes does not imply causation. But it is clear that a reciprocal relation exists.

(8) Specific institutional elements in building may continue after their utility value has disappeared. Persistence indicates that we do not build 'logically'.

(9) The planner's use-zones can be correlated in general terms with the institutional complexes.

(10) The employment of the use-zone as a tool of planning is itself an institution.

(11) When applying the principles of use-zoning the planner is defining territorially the areas wherein the roles fixed by the institutional complexes are to be played. This does not explain <u>why</u> the planner employs the use-zone tool: it merely describes the effects of the use of the tool.

CHAPTER 111

RELATIONSHIP OF CERTAIN INSTITUTIONAL COMPLEXES TO ALL BUILDING TYPES: (1) ECONOMIC COMPLEX

1. Distinction between this Analysis and the Own Complexes.

The first anaysis of institutional complexes and building types given in the previous chapter consisted of a simple correlation between the two on the basis of the purpose of the building-type. The shop, office and factory were seen to belong to the economic complex; the school and college to the educational; and the house and block of flats to the familial. Each building-type was thus shown to belong to its own institutional complex by virtue of the behaviour patterns of its occupants.

A review of the institutional complexes at once suggests that some of them may be related, by a different process of classification, to all building-types. This classification is dependent not on the behaviour patterns of those who use the building, but on the patterns of those who bring the building into being, and those who own it (as opposed to use it) or control it when it has been created. The complexes which have a relationship with all building-types concern the desinging, financing, erecting, controlling and owning of the buildings. This relationship, therefore, is in addition to, and quite independent of, the 'own' complex correlation.

2. Complexes Related to All Building-Types.

The institutional complexes with which a relationship to all building-types can be traced are:-

Economic	Governmental
Scientific	Expressional
Educational	

The way in which these complexes relate to all buildings will be very briefly sketched at this point in order to indicate the extent of the field. The relationships will be dealt with in detail in the chapters which follow.

The basic reason why all buildings are related to the economic complex of institutions is that this is the dominant group of institutions in our culture at the present time(1). This implies that all the institutions of the economic sector are liable to be involved in building, since without them a building could not be created in our society. The achievement of a building

(1) See Appendix 111 (1).

involves business firms to contract, to lend money, to design and supervise, to insure etc. Only those very few buildings which could be created by methods outside the normal processes of business could be excluded from this aspect of the economic complex, and to be truly outside no products of the normal business and manufacturing world could be used. All buildings are involved in the economic complex also by virtue of existing as property - as a commodity having value and a market price.

Similarly the scientific and educational complexes have a relationship with all building-types. The institutions of science, which make possible applied science, chiefly exert their influence in building by way of technical advance. It is the institutional complex of science which makes it possible for industry to produce new products, and for engineers to invent new methods of calculation for both old and new materials. Scientific research is a vital element in the development of building design and technique, and it is the institutions of science which make research and the application of its results possible.

Education is related to building through the individuals who are responsible for designing, erecting, financing, controlling and owning buildings. The education of the architect has a bearing on the way he designs his buildings. The education of the bricklayer has an influence on the cost of a building. The general standard of education of the public has a bearing: what sort of accommodation will they expect? What limitations will deficiencies in their education impose on the building?

The governmental institutions control many aspects of building. Again, most buildings are affected, although some controls may be evaded. A house built in the country, for instance, may not have to comply with by-laws. Few buildings, however, evade all legal control and most are in fact designed to meet the requirements of by-laws dealing with the sizes of rooms, structure, materials, siting on plot; laws dealing with health, finance, land subdivision, planning and labour; and government controls of various sorts. This institutional complex has a very strong influence on building-types, and it is unique in that its edicts are backed by force.

The expressional complex is related to all buildings except those which have no aesthetic or symbolic content. Most constructions above ground, however, have some content of aesthetic intention - some improvement not for utility but for appearance - which indicates the presence of the expressional complex. In some buildings the expressional complex may be very conspicuous in its influence, as in the Gothic cathedral, where there is high aesthetic and symbolic content. In creating a building, some thought is usually given to appearance, to make it more pleasing to the eye or to make it more satisfactory as a symbol. The town hall is given a visual content thought to accord with its civic importance so that it can act as a visible focus of civic pride; the house is designed to conform to the aesthetic standards of its culture.

The subsequent detailed analysis will therefore show how these institutional complexes are intimately connected with all building-types quite independently of the 'own' complex correlation.

3. Economic Complex Relates to All Building-Types.

Every building-type may be analysed in its relationship with the complex of economic institutions by regarding it from two separate points of view:-

(a) Considering the building as a consumer of material, labour, and capital during the process of erection. This heading includes the design stage during which professional services are used.

(b) Considering the building, when constructed, as an economic good which can be bought, sold, bequeathed, inherited, mortgaged and transferred. That is, as a material object in which individuals, or groups, have rights vested (2): essentially the institution of fixed property.

In order to illustrate these two points of view and the 'own' complex the shop will now be briefly examined under the three headings.

The Retail Shop.

Own Complex: (Economic) The shop differentiates itself from other building-types by having large windows for the display of goods, counters, racks for stock, a storeroom, a goods entrance, a name fascia. It has these things because it is to be used as a shop - that is, a place where the roles of retail shopkeeper and of customer buying goods in retail will be played.

(2) K. Davis: Human Society. P.452.

<u>(a) As Consumption: unit while being built.</u> (Economic).

From the moment its design is started on the drawing board the shop consumes economic value: the services of architect, estate agent, engineer, lawyer, financier, manufacturer, contractor, sub-contractor, workman, government official etc. In making the shop these all follow institutionalised patterns of behaviour and playing these roles they help to make the economic system work. Under this heading the economic process of "pump-priming", which frequently concerns buildings, should be included.

<u>(b) As an Economic good: Property</u> (Economic)

The shop is a property. It can be used according to the institutionalised ways in which such a building is permitted to be used as an economic asset. Money may be invested in it to produce rent. It may be bought and sold by individuals or groups in accordance with the institutions governing such transactions. It is also an economic good of the community at large: it is part of the community's apparatus for carrying on the economic side of the culture. The essential aspect here is the building seen as an object in which the rights of property are vested.

<u>4. (a) Building as Consumption Unit while being Built.</u>

This section deals with some of the economic institutional factors which may be observed during the process of creating the building, the lists being indicative, not exhaustive:-

<u>Professional Services</u> - Codes of professional behaviour, including scales of fees for architect, engineer, quantity surveyor, lawyer, estate agent etc. The set patterns of behaviour for carrying out the work: having offices with staff and equipment, preparation of sketches and working drawings, measurement of quantities, bills and final measurement. Methods of dealing with money: issuing of certificates with retention amounts and penalties. The use of consultants.

Sociologically perhaps the most significant factor of the professions in regard to the economic complex is the difference obtaining in our society between business and the professions. Fundamentally this difference is to be found in the fact that the avowed motivation of business is to make a profit and social approval is forthcoming when it does, whilst the professions may not overtly admit this motivation.

There are good historical reasons for this difference of ethos and no doubt society benefits from having a group of individuals whose opinions can be disinterested and whose standard of behaviour is not, in theory at least, dedicated to the proposition that the gaining of profit is adequate justification for action.

Evidence can be adduced, however, to show that the existing situation of the professions does not accord with the avowed intentions. The architect in private practice, for example, is in an institutionalised position in which working for a profit as an overt motive is not socially approved. In reality, however, the architect is in much the same situation as the businessman: he has set up an organisation to perform a service from the doing of which he must make a profit or at least not make a loss. Now it is very difficult to see how in the present cultural configuration with prominence given to the economic sector, a different set of conditions can be imposed on the professional man to those applying to the non-professional. The architect cannot advertise in order to attract work when he has surplus production capacity as can the businessman. He cannot openly compete with his rivals, although in the nature of the situation he must do so covertly.

As a result of the application of different standards in roughly the same situation the architect has developed behaviour patterns which, whilst appearing to accord with the existing institutions, in fact find ways of circumventing them and of allowing him to use similar techniques to those openly permitted to the businessman. Instead of advertising in the press and on hoardings the architect uses groups like golf clubs and business clubs; he serves on committees and in general uses the occasions of social contact to serve him as an advertising agency. It is here that he competes with his rivals.

The hollowness of the institutional position has two effects on the economics of the building in the process of its being created. First, it separates the architect completely from real knowledge of the business process of getting the building erected. There is a sharp dividing line between the professional who designs it and the builder who erects it. This line is also a status line, the architect being on the upper side and the contractor, theoretically, on the lower. The positions are apt to be reversed, however, if the contractor is wealthy. This division has an effect on building economics since the architect finds it very difficult to acquire expert knowledge in the economics of building. There is considerable evidence to show that economy of building can be successfully achieved by the close co-operation of the architect and the contractor from the earliest design stage. The present distinction between the professional and the businessman whilst not the only factor making this kind of collaboration difficult, is at least very important in its inhibiting effect.

The second matter concerns the efficiency of the architect. From the point of view of the society at large the question must be posed of whether the largely social method of selecting an architect for a given project is likely to ensure that the best architect available gets the commission. It must be obvious that in many cases the work is placed not on the basis of ability to design and erect buildings but on such fortuitous factors as personal contact and club membership.

It seems clear that there is an area here which would be rewarding for research; it seems inescapable that unless the architects take steps to understand their position in this matter that they will be overtaken by agencies, such as building contractors offering the packaged deal, who are not hamstrung by an institutional situation which no longer accords with the real conditions.

The stipulation of the architect's fees by professional associations has a bearing on the economics of building and this fixing of fees must be considered a relevant institution. In many countries the architect's general fee is 6% of the value of the contract (3). Under current conditions there is considerable doubt whether this is a satisfactory method of determining the architect's reward and this matter is under review by such bodies as the R.I.B.A. It may be that more buildings would be architect-designed if a degree of flexibility could be introduced, and this might well have repercussions on the cost of the building.

<u>Site Acquisition and Finance:</u> Institutions connected with financing the building project: valuation, land market, rate of interest, security, mortgage, loan return, leasehold, freehold.

(3) R.I.B.A. and S.A.I.A. have higher fees for small contracts.

The institutionalised relationships between land, money and credit are the essential element here. An important link between these is the valuation system, which includes such methods of arriving at a cash value as the years' purchase technique. Expectations of returns from land and building are institutionalised and the methods of valuation are designed to support those expectations. Methods of mortgaging, of arranging security and of land tenure work on an institutional basis and the individuals and groups operating those methods follow set patterns of behaviour whose continued existence is part of the stability of the general economic system. Economic stability depends, in part on the stability of the rate of interest, land values, the permanence of securities, buildings, and the way in which these are stabilised in relation to each other is of significance to the creation of the building. High land values make necessary a high return on the building. This in turn makes for an increased intensity of building use, which means increased height of building. The phenomenon of land value pyramiding in the centre of towns could, therefore, be regarded as an institutional element influencing the cost of building(4).

Production of Materials: Division and specialisation of labour. Mass production and machine methods. Dynamic economy. The market. Advertising. Patents. Monopoly. Invention. The manufacturing firm.

The most important characteristic of these institutions is that the building is geared to the industrial production processes of our society through the materials with which it is built. Although the building differs from products like the motor car in that it is part produced by our normal factory methods and part by individual work on the site, it is clear that the building depends, generally speaking, on the support of industrial production. For example, bricks, building clocks, cement, aggregate, fabricated steel, plaster, joinery, building boards, most roofing materials, sanitary ware, ironmongery, electrical equipment and paints are direct products of manufacturing industry and without these the modern building could not be created. As the conditions obtaining in all manufacture in our society apply also to the making of building materials, it is evident that these conditions must have their characteristic effect also on building. Such institutions as completition, mass production and manufacture for the market make themselves felt in the building by way of the increasing

(4) See Appendix 111 (2).

availability of new fabricated goods like plasterboard, softboard and asbestos manufactures, by way of the ubiquitousness of the manufactured article, for example corrugated iron, and by way of competitive price (5). On the restrictive side, patent and monopoly tend to have a retarding effect on the influence of production methods on buildings, and may prevent the application of improvements which are technically possible. On the one hand manufactured materials appear to increase in number and in influence, the local material giving place to the universal material - the world market; on the other hand certain institutions seem to inhibit this process or to impede technical change. The U.K. Commission on Monopolies and Restrictive Practices fround evidence of restriction in the supplying of at least thirty-two commodities (6). Monopoly is to be regarded as a form of protection for the supplier or manufacturer, and in many cases it is likely to be protection against the possible results of technological progress. There is, therefore, the possibility that the technological progress in the production of building materials and equipment may be less rapid than it might be without restrictive practices. This appears to be a most significant aspect of economic institutions in relation to building.

In general it is clear that progress in building is in a great measure dependent on the application of methods of production made possible by the advances of technology. Site work follows manufacture, not vice versa, and new site techniques are to a large extent dependent on new materials and new building equipment. The cost of a house built by European labour in South Africa is approximately equally divided between labour and materials (7). As most of the materials are products of manufacturing industry the influence of the building of those institutions which are concerned with production must be very considerable. Furthermore, it may safely be predicted that this influence

(5) The diffusion and cultural significance of such humble materials as corrugated iron and barbed wire would be a valuable study.

(6) Baths, bricks, cement, chain-link fencing, copper cylinders and boilers, curtain rails, certain electrical goods, fibre guilding board, flat glass, flushing cisterns, galvanised tanks, glazed and floor tiles, hand tools, heating boilers and radiators, lead sheets and pipes, lime, linoleum, memorials, paint, paper, plasterboard, refrigerators, sanitary earthenware, sanitary fireclay, steel mesh reinforcement, steel wire, wallpapers and wire rope. Monopolies and Restrictive Practices Commission Report. Various.

(7) If non-European labour is used the figures are approx. 25% labour and 75% materials. This increases still further the sway of production over the building.

will increase as the tempo of invention and technical skill advances. In this connection it may be noted that our society puts a premium on invention by means of the patent system thereby making technological advance both inevitable and progressively rapid. The United States has issued patents in the following numbers:-

	(in 000's)		
1860-9	77	1900-9	259
1870-9	138	1910-19	319
1880-9	182	1920-9	432
1890-9	216	1930-9	488

(8)

The influence of this institutional factor is now very much in evidence in the rapidly increasing number of manufactured articles that the architect has to choose from. This is presenting the architect with major difficulties of such magnitude that his traditional attitudes to materials must be regarded as no longer appropriate for the design process.

In recent years prefabrication has been heard of a great deal. At present it seems doubtful whether in any of its several meanings it can be regarded as an institutional element in the building industry, except in its basic meaning of the creation of building components by the normal processes of industrial production. In this sense prefabrication is not new. Nor is prefabrication new when used to mean that whole sections of the building are factory made, fixing only being done on the site. An early building of this type was the Tipton Green No. 1 Lock House - the first house made of iron panels and built before 1830 (9). Paxton's Crystal Palace (1851) was prefabricated in this sense. Yet such methods have never become standard practice and even in post-war Europe could not be regarded as institutionalised. Far less institutionalised is the totally factory-made and mounted building, as for example the AIROH house which is erected on the site in four sections only, each 22 ft. 6 in. X 7 ft. 6 in. (10). It is to be noted, however, that temporary buildings of small size have long been prefabricated in timber and metal. In this type of building prefabrication, meaning either the total building or its breakdown into a few elements, has been practised for some time and might reasonably be said to be institutionalised.

(8) W. F. Ogborn & M. F. Nimkoff. A Handbook of Sociology. P.538, quoting United States Patent Office Reports 1868-1939.

(9) J. Madge. Tomorrow's Houses. P.114.

(10) Idem. P.207.

If, therefore, by prefabrication is meant the factory production of standardised parts, such as wall and floor panels, plumbing units and roof elements, institutionalisation is recognisable and is covered by the basic institutions of factory production, like specialisation and division of labour and mass production. If, however, it is used to mean the factory production of whole sections or rooms of buildings, it can scarcely be said to be institutionalised yet. Progress in this direction is noticeable in houses and more recently particularly in schools, and it may be that this will become a major building institution in the future (11). If this happens, we shall have an interesting illustration of how a relatively unimportant institutionalised feature (the total prefabrication of small erections like garages and chicken houses) can develop into a major institution. Certain pressures - the increasing cost of labour, the decline of the crafts and the potential economies of all-factory production - appear to be already present and seem likely to induce this institutional shift.

A not unimportant aspect of the economic institutions connected with building is the use of building for 'pump-priming' in a time of depression. Building work is specifically set in motion by the government in order to vitalise the economy. This sets up a demand for building materials, which increases the tempo of all those industries which manufacture for the building (12).

Contracting:- System of tendering in competition, contract and subcontract. Competition. Operation in rings. Hiring of labour. Bonus system. Rate of profit. Building for speculation. Normal business institutions: joint stock company directorate and shareholders, absentee ownership, paid management, credit, audit, profit-making.

"Building has undergone a fundamental change in the half century between 1900 and 1955. In 1900, building was almost entirely a craft industry" (13). In spite of this change, however, the typical building firm is still small and commands only a small amount of capital. In Britain there are about 120,000 building firms, more than a third of which are one-man businesses. Forty per cent employ less than 5 operatives. There are about 150 firms employing each roughly 500,

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(11) See Appendix 111 (4).

(12) See Appendix 111 (3).

(13) T. Bennett. Paper at British Architects' Conference 1955. Architects' Journal 9.6.55. P.781.

totalling about 15% of the industry (14). A great deal of building, therefore, is outside the orbit of big business and is carried out by small contracting firms unlikely to be able to make the most of the benefits of large-scale operating. Nevertheless, Lea estimates that in Britain new construction accounts for nearly one half of the country's annual fixed capital investment (15). In view of the fact that big business is such an important element in our present economic pattern, it is remarkable that such a large percentage of building firms are of such small size. There is presumably a lag here and we may expect extensive amalgamation in the next few decades, since there is no reason to suppose that contracting can long resist the general trend of business toward larger and few units. Such amalgamation would have the effect of creating more large contracting organisations capable not only of benefitting from large scale production but also capable of providing the 'packaged service' which is a developing feature of the major contracting firms in many countries.

It seems likely that the relative backwardness manifest by contracting firms in Britain may be connected with the institutional nature of building as a whole, and that change in one area may be accompanied by change in another. It would be interesting to assess the degree to which building as a site operation has had a retarding effect on the development of the building firm. We might also enquire whether the independent professional status of the architect has had a bearing. There is a large field for research here - the relationship between the size and efficiency of the building firm and other institutions like factory production and professional services.

The contracting firm, as the instrument through which the building is realised, holds a strategic position in the whole process of building. A building is normally designed with regard to the way it is going to be constructed. It is financed on the assumption that the contractor will in fact build it according to the customs of building of the day. Labour is trained by the contracting firm and employed by it. Substitutes could be found for most of the professional services and building would continue, but without the contracting firm there would be no building. It is the effective instrument of construction.

Given this strategic position, it is obvious that the institutions which have to do with the contracting firm are of vital significance. Perhaps no other single group of institutions is quite as important, and cultural lag

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(14) F. M. Lea. Research on the Economics of Building Operations. Architect and Building News. 3.2.55. P. 160. (Paper at D.S.I.R. Conference on Research and Industrial Productivity).

(15) Idem. P.160. The building industry produces 6-7% of the gross national product (Britain).

in these institutions may have a depressive effect on the whole economy of a country. The potential danger of cultural lag in the U.S.A. may be exemplified by this quotation from a study by N. J. Demerath & G. W. Baker:- "House-building labour is predominantly craft-oriented, highly organised in powerful unions, and in a strategic role position to accept, reject or sabotage proposed changes in organisation and method"(16). The sociological emphasis here is inescapable: human relations and not technological improvement may be the factor which decides for or against a proposed change.

Some brief illustrations will now be given to suggest the extent to which institutionalised elements enter into the working of the contracting firm.

Competitive tendering, whether open or selected, is the institution commonly used to determine which firm shall carry out a given job. The theory behind this method is that it ensures that the client is getting the work done at the lowest price compatible with his requirements. To make certain that all tenderers are pricing for precisely the same work the architect prepares drawings and specification and the quantity surveyor draws up bills of quantities. The lowest tender price represents, in theory, the most efficient buying of bulk materials, shop fabrication, management of labour, etc. that can be obtained. This institution has grown up in order to serve the client's need and is, in its theoretical background, a bequest from the days when the western world believed in laissez-faire.

Today in Britain and elsewhere, the competitive tender is often no longer competitive at all. It may be totally non-effective as a protection to the client if the firms tendering work a ring system whereby they agree amongst themselves who is going to submit the lowest tender. This completely defeats the whole purpose of the institution. This is an example of succession in institutions: the facade of competition remains; behind it operates the new institution of the ring.

In Britain, the institution of subcontracting has now reached proportions which also threaten to nullify the benefits of the competitive tender. "We have now reached the point where sub-contractors' and suppliers' work often accounts for 60% or more of the contract sum, the majority of it being nominated and much of it not competitive. The general contractor, indeed, is

(16) Journal of Social Issues Vll 1 & 2 (1951)
The Social Organisation of Housebuilding. P.96.

rapidly becoming a job organiser with his organising ability being the competitive element in the contract" (17). This is an interesting example of institutional cannibalism.

Decay in the institution of competitive tendering is being matched by new emergent methods of procedure. In one of the case studies examined (food warehouse and offices) the sequence was as follows: the client asked the architect to prepare a sketch scheme with estimate of cost; the cost came out too high and the architect was asked to prepare a second scheme and estimate. The client then approached several contractors used to this kind and scale of work and eventually came to an agreement with one of them that the building should be done for an agreed amount. This amount had in it an element of bargaining. When this stage had been reached the client returned to the architect, informed him of the amount of the contract and instructed him to prepare the working drawings. When they were completed, together with a specification, a contract was drawn up and signed in the usual way. Advantages: costs were determined accurately before the working drawings were begun, the cost of a quantity surveyor's services were eliminated, the time taken to measure and bill (done by the builder) was much less than a quantity surveyor would have required, and a certain competitive element was retained. It is possible that here we have the emergence of a new procedure which in its turn may become duly institutionalised. What emerges clearly from this illustration and from other evidence taken is that the institution of competitive tendering in its traditional form is not meeting the requirements of the actual situation. As a result we see a new pattern being worked out.

The hiring (and firing) of labour is a characteristic institution of the building trade. The labour force floats from job to job with a degree of mobility unequalled in any other industry. This institutionalised shifting of labour holds back output in a variety of ways. The good team is broken up; the workman is conditioned to the easy relinquishing of a job; the foreman of to-day may be the bricklayer to-morrow, so he will not over-press the men under him for fear of later retaliation; general insecurity is not conducive to a stable personal and family life and this has repercussions on the quality of work and the ability of the individual to be integrated satisfactorily into the team.

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(17) T. Bennett. Paper at British Architects' Conference 1955. Architects' Journal 906055 P.783.

Speculative building by building contractors has long been institutionalised. Nowadays this is done almost exclusively by firms (18), but in earlier days craftsmen built speculatively. The arch-speculator of Charles 11's time, Nicholas Barbon, is recorded as having described the houses being built after the great fire in these words: "Some being set out with fine brickwork rubbed and gaged, were the Issue of a master bricklayer. If stone-coyned, jamb'd and fascia'd, of a stone mason. If full of windoe with much glass in compass, and reliev, a Glazier's; if full of balcone and balustrading, a carpenter, and so others..."(19).

This is very interesting in the way it shows the strength of the craft tradition and influence. This differentiation has now disappeared from the speculative housing scene because such houses are built to-day by a single firm having unified control of the craftsmen. The tradition, however, of building first and selling afterwards is still with us and carries certain characteristics of interest. One of these is the value judgment that mock Elizabethan or Georgian houses are satisfactory as status symbols. This is in the process of changing but the speculative tradition will doubtless continue although the appearance of its product may be different. The denial of the validity of the value judgment is summed up in the word 'Tudorbethan'.

From the institutional point of view speculative building is also of interest because of the institutions like home-ownership and building finance which interlock with it and because it is the only section of the building industry which puts a commodity on the market under competitive conditions. In all other building the contractor is assured of payment on completion of the work he has contracted to do. In speculative work he does the work first and hopes that the price he will receive will allow him adequate profit (the socially approved purpose of business organisations). Intimately bound up with speculative house production is the institution of financing the manufacture of the product by means of consumer's credit: a mortgage on the land and on successive stages of the building is the essential means of financing the speculative house, whether the builder is paid during or after the process of erection. The controller of the loan money is therefore an influential element in this type of building (20).

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(18) In Natal speculative building of houses and small blocks of flats is carried on by individuals who organise the labour themselves and even undertake some of the tenders themselves.

(19) J. Summerson. Georgian London. P.43, quoting R. North.

(20) Demerath & Baker. Op.Cit. P.91.

It has long been fashionable to sneer at the speculative builder. It would be more profitable to enquire why this form of building has become institutionalised and to try to define its function. It must be remembered that the speculative builder is an initiator: he starts an economic chain reaction which creates houses. Such initiators exist throughout our society and are of the very stuff of our dynamic economy. A fruitful way of regarding the speculative builder might be to ask in what respects would the industry be different if he did not exist? Holford has pointed out that one of our planning problems is to get the speculative element back into city centres. Although he does not mean the house-builder, but is thinking in terms of the function of the initiator (21), his comment is relevant to this analysis.

A charge brought against the speculator is that his motive is profit. This is not a very intelligent comment on his activities since profit is the socially approved motive of all business effort. From a sociological point of view the interest lies in the suspicion that although our avowed aim in business is profit, this ethos no longer fits the facts of our culture. In sociological terms, a very important purpose of the institution 'business' is to maintain our high standard of living. Business is a way of life, not primarily a system of monetary rewards. We cannot exist as a society without the activities of business, whether or not it makes a profit (some businesses do not make a profit, but continue). If the speculative builder still believes that profit is his sole motive we might usefully consider what other motivations can be found for him. Homo ecomomicus died some time ago (22).

Building, like all economic activity, "takes place within the institutional framework of society; economic behaviour is concretely a phase of institutional behaviour" (T. Parsons) (23). The normal business institutions, therefore, operate in the building industry, but because these are the typical

(21) W. Holford. T.P.I. Summer School 1953. Lecture: Central areas: Some Abstracts of Size, Function and Design. Report p.3.

(22) J. A. C. Brown. Social Psychology of Industry. P.186 et seq.

(23) Op. Cit. P.203.

institutions of business in our society they will not be mentioned in detail here. This, however, does not mean that such institutions as the joint stock company, absentee ownership, paid management and the audit may not have special and specific effects on building.

Very brief mention may also be made of the human relations side of the building firm. As in all other branches of production such matters as the institutionalised goals of the individual, the institutions for dealing with disputes and the institutions governing the contacts between individuals have a direct bearing on the quality and quantity of output. Institutions such as these affect, perhaps determine, the will to work and pride in workmanship. Presumably, it is possible that lack of pride in workmanship can become institutionalised, although it would seem probable that this danger is less likely in the building trade because it still retains its craft tradition more strongly than many other branch of production. Nevertheless the trade union is not the guild. The guild, a now extinct institution, concerned itself more with standard of work than standard of pay. The modern union reverses these, and new institutions like cash bonuses and incentives, and welfare services are developed to make tolerable the cash goal: stones instead of bread. J. A. C. Brown has pointed out how the law of diminishing returns applies to material incentives (24). The investigation of motives, attitudes, intentions, goals and values of all individuals concerned with building is of great importance if the output of the industry is to be raised. Recent work in industrial psychology has this emphasis, in contrast with the older pre-occupation with physical conditions, and Elton Mayo's Hawthorne experiment has implications of tremendous importance to the building industry. That this is being realised may be concluded from the interest being shown in improved techniques of management, site organisation and productivity research (25).

The human relations aspect of building has been placed under this heading and not under "Site Work" because of the following fact stressed by Brown: "It is management which has the power to set the situation and create a good or bad atmosphere, whereas the employees have no such power or only very limited power to do so" (26).

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(24) Op. Cit. P.202.
(25) Op. Cit. P.166.
(26) See Appendix 111 (5).

Site Work: Trades Unions with mechanisms for applying pressure such as the strike, collective bargaining, restriction of output, exclusion of non-union members, union dues. Institutions connected with wages. Institutions of group structure: foreman, craftsman, semi-skilled and unskilled. Clerk of works, apprenticeship system. Special holidays and the roof-wetting (in S.A.).

Tradeunionism is an institution which has been developed to protect the interests of the worker. It is the counter-institution to the professional and business patterns of behaviour of the employing groups. The union itself is an association applying social pressure against change on the part of the employer and deviation on the part of the employee. Thus efforts by an employer to increase the number of bricks laid per day would provoke collective opposition, possibly in the form of a strike, which is the most formidable weapon of unionism. The operative who decided independently to lay more than the 'normal' number of bricks would also have pressure brought to bear on him (27). Although group solidarity has been instrumental in increasing labour's share of the national income a price has been exacted. This price is a certain rigidity in the labour force. The rigidity serves to allay fears that hard-won gains may be lost. In Britain the idea that working too hard may mean working oneself out of a job still appears to survive, even into the days of full employment, and the hardships of the depression would appear to have had permanent effect on the institutions clustering round unionism.

The chief effect on building appears to be an emphasis on tradition or conservatism and an unwillingness to increase output. Such factors have to be steered round by the designer and the contractor and it may be expected that their best efforts are to some extent diminished by their having to allow for the tradition of the job. It is an important characteristic of building that the individual worker on the site has a good deal of freedom of action, usually more than his opposite number in a factory. This freedom of action - essentially freedom of decision - is likely to be jealously guarded and methods of speeding up the process will undoubtedly meet with institutional opposition.

Demerath and Baker have summed up the institutional situation of unionism in the building industry: "For their members the unions have constituted a security system, reassuring and functional to social-relational needs.

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(27) Research in the Bristol area showed that the union does not categorically lay down the number of bricks which shall not be exceeded. Restriction 'happens' informally.

By means of working rules and bogeys, craft gradation, autonomous unity of the local and the brotherhood, and identity with the Federation, the human needs of house-building craftsmen have been served. These devices have at the same time operated to perpetuate the unions as going concerns ... We see the conflict between the two "logics" - efficiency and costs versus human organisation" (28).

The wage system is an institution. This is so in any industry and is not peculiar to building. Two quotations from Maxwell Fry (29) on wages are illuminating having institutions in mind. First: "As wages rise the rougher materials, such as brick and stone, and with them bricklayers and masons, move into the luxury class, and are replaced wherever possible by machine-made products and factory conditions o. work." Second: "The most important (pressure on building) is the constant rise in wages unaccompanied by increase in output; it is this that leads America to mechanise building to the limit, in an attempt to keep output constant and drives us (Britain) in the same direction. This mechanism takes the form of careful site organisation, helped by machines wherever they pay their way, and where they do not by transferring as much as possible to the factory and bringing the ready-made parts on to the building site".

The hierarchy of labour: clerk of works, general foreman, trade foreman, skilled workman, semi-skilled workman, unskilled labourer, is institutionalised and all buildings have to be erected through the operation of the roles in this hierarchy. In South Africa it is also institutionalised that the lower roles belong to the non-European, and an industrial colour-bar operates to prevent his rising to the upper rungs of the ladder.

The position of each job in the hierarchy depends on an evaluation of skill. The position of bricklayer is rated higher than that of the labourer who brings him the bricks because of superior skill. This leads to a very pertinent question in modern building: how skillful does the skilled worker need to be? Bennett thinks that in future a very large amount of the craft work of a building will be done by workers of only moderate skill. He points out that much brickwork, for example, is very simple today, without quoins or reveals. The bricklayer does not, therefore, need the variety of skill that

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(28) Op. Cit. P.97.

(29) B. B. C. talk. Printed in Listener. 24.2.55. P.331.

he previously did. Similarly the joiner is largely superseded by the factory production of doors, cupboards, window frames etc., only fixing remaining to the craftsman. He points out in this respect that in Britain the industry needs 7,000 - 8,000 more men annually than it trains (30). This suggests that an investigation of craftsman training in relation to the job the craftsman actually does would bring out institutional factors which no longer have any useful purpose. This is no small matter when it is considered that "from 25 to 45 kinds of skilled work may be identified in the construction of detached houses, row houses, or small walk-up flats" (31). If status depends on skill, which in turn depends on training, it must be deduced that status depends on training basically. If so, training will be maintained in order to bolster status, irrespective of whether the training is suitable for the job. The training is functional, in the sociological sense, to the status: it reinforces it. Status, role and training in relation to the job actually performed would be rewarding subject of research.

6. (b) The Building as an Economic Good.

The following are some of the major institutions concerned when the building is considered as a possession or economic good: property, contract, inheritance, the money and credit system, home-ownership.

This aspect of the building is not concerned with the use to which the building is put, nor with the building in construction. It simply concerns the building as an economic asset: the building as an object in which society has agreed to concentrate rights of ownership, possession (use), transmission to another person, destruction, disposal by sale, reconstruction, expectation that the building will not be adversely affected by the action of other individuals or the community. Kingsley Davis describes property as "...essentially the distributive (economic) system in its static aspect. It consists of the rights and duties of one person or group - the owner - as against all other persons and groups with respect to some scarce good ... so ingrained in human thought is the fallacy of misplaced concreteness that property is often regarded as the thing owned rather than the rights which constitute the ownership" (32).

(30) Op. Cit. P.798.
(31) Demerath & Baker. Op. Cit. P.93.
(32) Human Society. P.452.

In our society production and property are closely allied, since most economic goods are man-made. Thus the product of the building industry becomes property - that is a physical focus of rights and obligations. This has its effect on buildings since the buildings must be made in such a way that the rights and obligations can be observed. If, for example, the right of transferability to another person is not to be squandered the building must be designed and built so that another person would be ready to buy it; that is, he would admit that it could be used according to our institutions. This expectation of transferability is naturally reflected in the market price, a part of which represents just this factor of capacity to meet the institutionalised uses of the building. The Goetheanum at Basle, the building of a cult started by Rudolph Steiner, shows how this element can be ignored. For ideological reasons the use of the right angle in this building has been avoided as much as possible. As a result, door and window heads are not level, but are tilted, giving an abnormal appearance to the building as a whole, and making it less fitted to the normal expectations for this building-type.

Davis points out that there is an ambivalence in our view of property. He says: "... all property is social in character, being a part of, and dependent upon the social system..... all property is exclusive - preventing others from enjoying the same rights in the same object. This dual character - its sociality and its exclusiveness - sets a fundamental conflict."(33) This conflict, and our differences of attitude to the duality, can be constantly observed in the building. The whole problem of town planning is this. The building is the result of the social process of production, but it is the individual, or group of individuals, who usually determines the form and appearance of the building. The community acts only negatively by restricting such factors as use, height, bulk and appearance. This aspect of building is perhaps only a reflection of the general question of our time: where shall the line between the individual and the community be drawn?

A building may be brought into existence chiefly because it is an opportunity for investment or profit. Its use may be incidental and accidental. It is clearly naive to imagine that a building comes into being only because a shopkeeper wants a shop or a company a suite of offices. Demand must, of course, exist but its mere existence does not guarantee the necessary supply,

(33) Op. Cit. P.456-7.

for if investment and profit are better in another direction it is there that development will go. This can be seen clearly in the Durban area, where in the post-war period there has been a high demand for living accommodation. The general opinion is that for the most part this demand should be met by houses. In fact it is being met to a very large extent by flats - presumably they are a more favourable avenue of property investment than houses to the promotors, although not necessarily to the eventual owners.

A very major factor in the property aspect of the economic complex is the influence of the amortisation periods of loans for buildings. This is a large subject and requires detailed research but it can be said here that the relationship between the degree of permanence of a structure and the length of time that is taken to pay for it is not technologically determined but is chiefly a matter of social values, although in a given context such things as a rise in land value may be considered as a technical reason why a building should be demolished and another, larger should be built.

We must also look briefly at the modern institution of home ownership. This has supplanted the institution of rented housing in most western countries. It is regarded generally by the public at large as a desirable thing: it makes for stability and so forth. Research, however, suggests that it is not quite the benevolent institution that it is thought to be.

There is ample evidence to suggest that one of the major brakes on progress in house-building is to be found in the conservatism and fears of the agencies which finance it. It is not unknown for the representative of the lending organisation to have a considerable say in the detailed design of the house. The organisation needs to feel that the security which it is going to hold is 'normal' and is an easily realisable asset. The new and the unusual are therefore discouraged.

J. P. Dean, dealing with the working of this institution in the U.S.A. says there is some evidence to "...suggest that two ghosts of the 18th. century haunt the home-ownership pattern: (1) the middle class Protestant ethic, and (2) classical economics" (34). And further: "...suggests that the persistent survival of these two 18th. century ghosts leads many working class families into home purchase under circumstances that may jeopardise their economic welfare."(35).

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(34) Journal of Social Issues. Vol. V11, 1&2. The Ghost of Home Ownership. P.59
(35) Idem. P.59.

A quotation from the Lynds may suggest why home-ownership is prevalent as a goal: "Middletown clearly operates on the assumption that the roots of its living lie in the acquisition of money ... the goodness of hard work in the acquisition of property".(36).

In considering home ownership we should also have regard to such failures as its inability to allow for the geographical mobility of families so essential to industrial life, to inelasticity of adaptation to the various age-phases of the family and to its excessive conservativism of design and construction.

The possibility that artificial obsolescence may appear as a feature of the house-building industry should not be ignored. It is already very prominent in the automobile and radio industries in both Britain and North America. There are indications that the house is again becoming the leading status symbol in the U.S.A., and if this trend increases we may expect sales pressure aimed at inducing the home-buyer to change his house with greater frequency. This might have some very interesting results in changing our attitudes to both land and the accepted and financed life of buildings.

The prestige aspect of property is very closely connected with the institution of home-ownership. The fact of being a property-owner confers standing and prestige in our society: the fact of possession is highly rated and aspiration is toward the acquisition of property. This should not be confused with the type or quality of building - that is the building's expressional value, but here is meant simply the property, or owning, aspect. Viewed in this way the building is akin to the coppers of the Kwakiutl (37), or pigs' tusks among the New Hebridians: they are simply material objects in which prestige-conferring rights are held to reside.

7. Building Example

The example of the flour factory (Figs. 1 to 4) as an industrial undertaking belongs to the economic complex of institutions. Its overt purpose is to prepare and sell a marketable commodity and the aim of the organisation which it accommodates is monetary profit.

As an industrial building it illustrates several major institutions

(36) R. S. Lynd & H. M. Lynd. Middletown. P.242.
(37) A strongly property-conscious Indian people of the Northwest Pacific coast.
A. Goldenweiser: Anthropology. P.153 et seq.

characteristic of the economic complex.

It is sited in an industrial trading estate along with other industrial buildings. This siting together of buildings of the economic complex is now a major institutional feature of our society. This manufacturing process, however, is in no way offensive and the question of what benefits arise from this grouping (or segregation from other uses) needs to be answered.

The offices are separated from the manufacturing part. This was done not merely as a matter of convenience of site access, but as a specific indication of status. What is institutionalised here is the ranking distinction between factory hands and office staff. Factory hands have no cause to visit the office block, with the exception of the foreman who has a special status. This distinction between the two buildings is a reflection of the class structure of the society. It is interesting to note that the social distance between factory hand and office staff is being rapidly diminished by the improving conditions in factories and by the mechanisation of offices. There is evidence suggesting that the two will move closer together and that the major separation between the classes will increasingly be seen to occur between management and those below them (38).

Ranking order of status among individuals is apparent within the organisation of the office block: large office for lower ranks, cubicles for junior management and a self-contained suite of offices for the directors. This kind of space differentiation to accommodate status is institutionalized in general in office layout and is again a reflection of the larger society. In this connection it is also interesting that privacy and quietness are institutionally used to indicate status, and confer prestige.

There are minor indicators of status also typical of the economic complex: position of parking car, separation of toilet accommodation, separation of canteen facilities, aspect of office, decorations and furniture, open corridor to workers' canteen etc., and the variations in appearance between the parts of the buildings.

The social association which the firm represents is the joint stock company. Typically, this group of buildings is of the kind that such associations develop for their operations. The share-holders, however, in practice have little say in the policy and running of the firm and the effective association is the directors and their salaried advisors. The building, therefore,

(38) Peter Drucker and Vance Packard hold this view.

in theory is evidence of one institution (the democratic joint stock company), but in practice represents an association which is oligarchical in form. A second factor of importance is that the firm is ostensibly local to its area (it was originally), but is in fact part of a large national undertaking. The building itself gives no hint of this, and this fact is also institutionalised in our society in connection with builaings in the economic complex: big business can be extremely reticent.

8. Summary.

The creation of the building can be regarded as a function of the economic complex both during the process of erection (or becoming) and in its use (or being). The building may not, therefore, be regarded simply as having the 'purpose' of providing a physical shelter for its occupants. It has, other, equally valid, 'purposes', and its multiple economic functions in the entire social nexus should be simultaneously held in mind: physical shelter, opportunity for investment, avenue for the employment of labour when being built, a store of economic value conferring prestige, a national asset. All these could be called the social 'needs' which the building must 'satisfy' in the economic sphere. All these 'needs' are very closely intermeshed, and reciprocal in action.

9. Conclusions.

(1) The economic, scientific, educational, governmental and expressional complexes of institutions have a deterministic effect on all types of building: institutional factors in those groups influence all building, helping to shape form, influencing plan, structure and materials.

(2) The economic complex of institutions is particularly significant for building because of the predominantly economic emphasis of our cultural configuration. Profit, however, is not an adequate explanation of motive.

(3) Considered from the viewpoint of the economic complex all buildings can be analysed as: (a) a consumer of labour, materials and capital during erection, and (b) an economic good when erected.. In the latter category the building must be regarded as the institution of fixed property. This institution should be looked at as an institutionalised structure of rights

and duties for which the building is the instrument. It is the rights and duties which are important to society; not the building. The architect is interested in the buildings.

(4) The fact that the rights in property run usually in favour of an individual or private group in our culture is a major problem of planning. Such institutional structuring of the 'ownership' of property is not universal and is only one of the many ways in which a society can deal with immovable physical equipment. Research is required into the institutional structuring to find ways in which it would be acceptably modified in the direction of making more of the institutional pattern a matter of public rights and duties: how can it be restructured bearing in mind that a large sector of society contributes to the making of the building.

(5) When a building proposal is initiated a social process is brought into action. Various agencies in the society go into operation following institutionalised patterns of behaviour. These patterns are related to each other and must interlock with reasonable efficiency if the building is to be achieved. It is the expectation of society that this will happen and that the product of this activity following institutional norms will be the creation of the building as predicted. Whilst the building is being produced architect, engineer, planner, financier, contractor, government official etc. will be playing their roles as required by the institutions of the economic complex. The 'result' is the building, but also whilst playing their roles the actors are contributing to the continuous creation of the society and culture in which they live. Society and culture are in this sense as much a product of the building as the building is of them.

(6) In (a) the institutional patterns are organised to produce a building. In (b) different patterns are organised for dealing with the physical object in ways which will accord with the societal structure.

(7) The economic motivation of building may also be divided into: (a) to initiate action in the patterns of institutional behaviour connected with creating the building, and (b) to obtain a physical object in which rights can be vested. In (a) we have government action in depression using

building operations as a 'pump-primer'; or the contracting firm developing speculative construction to keep going. Speculative building depends entirely on this set of patterns for existence. In (b) we have investment as the invitation for building.

(8) In the economic complex 'need' in the own complex is not adequate motivation. The fact that there is a shortage of houses will not necessarily produce houses. The idea of the equilibriating process of the market held by some economists is inadequate by itself to meet 'need' in this sense. The reason for this is that 'need' involves value judgments which cannot be taken into account in the equilibriating theory. A shortage of houses may well evoke a market response of increased production of apartment blocks, because they are financially a better investment than houses. Economic motivation and 'need' are not, therefore, to be dovetailed, far less regarded in the light of supply and demand.

(9) 'Need' may be seen as (a) building required in terms of a system of values held not by society at large but by individuals or groups thinking ahead of the society, or (b) building required for reasons emerging from the on-going process of society. We do not, therefore, build what we need in sense (a); instead we build what the structure and working of society make necessary to build for the continued existence of society in its present form. Many buildings have come into being and exist not primarily as objects of convenient use but as residual products of society's on-going process and repositories of rights. The next stage of thinking along this line concerns change, which is dealt with in the appropriate chapters.

(10) Buildings constitute a large part of the material culture. Equally, that part of the institutional structure of society which consists of the economic complex is concerned with building to a large extent: the culture is heavily dependent on building. The sociological background of building economics is therefore of great importance and perhaps would be more productive as a research field than further elaboration of research in derivative studies like cost analysis and organisational efficiency.

(11) The acquisition of property rights by the individual is a goal structured into our culture. It is a question of value judgment whether this goal

is given too great an importance. Home ownership in particular is an economic institution requiring revaluation in the light of the increased physical and social mobility of the individual. This is especially important in view of the power of the economic associations which have been developed on this institutional base and their consequent influence over the whole economy. A value judgment - the desirability of each family owning its own house - has become the foundation of major financial associations.

(12) In considering the relationship of the building to the economic complex of institutions, the following must be borne in mind simultaneously: - physical shelter, opportunity for investment, avenue for the employment of labour during the process of building, a store of economic value conferring prestige, a national asset, and a major contribution to the ongoing social process. Only in such wide terms can the building be observed sociologically in relation to the economic complex.

(13) Research into status, role and training in the building industry in relation to the job actually performed would be illuminating.

(14) Research is needed into the way in which the present institutional fixations in the economic side of building are acting against the trends of physical and social mobility of our society.

(15) Research is required to show the differential degree to which technical advance is inhibited by sociological difficulties in the economic institions.

(16) Because the building is not built to the requirements of the users only, but also to meet the needs of investment etc., research is necessary to establish the extent and nature of such 'distortion'.

(17) There is a serious difference in the efficiency of the professional and the business institutional situation. New patterns of behaviour are appearing as a result of strain in the architect's situation. This requires research, since the hollowness of the institutions has an adverse effect on the design of buildings.

(18) The relative backwardness of building in Britain is connected with the

heavy institutionalisation of building. This requires research in relation to the professional status of the architect. Since the contracting firm is pivotal to the building process this research would need to be approached from the angle of the contractor.

(19) Decay in the institution of competitive tendering is a matter for research. From such research might come a whole new approach to the procedure of getting a building designed, priced and erected.

(20) Artificial obsolescence may appear as a major feature of the house-building industry. This should be investigated in the light of the house as a status symbol.

CHAPTER IV

RELATIONSHIP OF CERTAIN INSTITUTIONAL COMPLEXES TO ALL BUILDING TYPES: (2) GOVERNMENTAL COMPLEX

1. Political Authority Institutionalised

As a method of social control political authority is a major institution of our society. Its form is government; its functional associations are legislatures, judiciaries and executive bodies; its essential substance is the "spontaneous systematisation of life produced by human interaction"(1). In our society political institutions are highly differentiated. This is so marked a characteristic that the governmental complex must be ranked a dominant institutional feature of our time.

The purposes of government are to classify the mores of society into standards, to enforce conformity to those standards, to arbitrate between conflicting interests, to plan for society's future, and to protect it against damage by internal and external conflict. The first three of these purposes embrace the majority of laws and regulations under which building must be carried out, since the control of the physical environment - and in an urban society that means largely buildings - is a major interest of all governments in the western world. The reason for this interest is clearly put by Parsons: "On the one hand it (government) is the primary focus ... of the integration of the national social system as a whole ... on the other hand, for the same reasons, it provides the most important single strategic vantage point for implementing any deliberate policy of control" (2). Government is thus the only institution with the function of formulating and promulgating law, by which in turn rights, restrictions and duties are made clear to the individual. It carries out its function by creating and enforcing fiats, decrees, laws and regulations, the operation of which may be seen as either restrictions or benefits according to the viewpoint taken. The building developer may see the planning control of a maximum number of three floors as a restriction on the investment potential of his site. But his neighbour, living in a detached house, may see the restriction as a benefit,

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(1) C. Panunzio. Major Social Institutions. P.351.
W. J. H. Sprott in Science & Social Action quotes B. Malinowski: "Law and order arise out of the very processes which they govern." P.79.

(2) Talcott Parsons. Essays in Sociological Theory Pure and Applied. P.299.

preventing depreciation caused by adjacent over-development. This dual aspect of legal control is of the very substance of town planning in the context of our existing towns. The Zulu arranged his real estate and building matters by custom: we do so by law. The difference is one of method, not of aim, for with both the aim is a 'right' solution within the social conditions. "Law is an institution. It is based on the concepts justice and equity" (3). Customs, on the other hand, need have no such rational foundation. The difference is a measure of the value of the governmental institution to building.

The state and the society should not be confused. Benedict says: "... in our civilisation the regulative activities of society are singled out, and we tend to identify society with the restrictions the law imposes upon us ... Society is only incidentally, and in certain situations, regulative, and law is not equivalent to the social order. In the simpler homogeneous cultures collective habit or custom may quite supersede the necessity for any development of formal legal authority"(4). In our society the power of the state has risen in relation to other institutions. This change has coincided with loss of influence by the family, private industry and the church, which have surrendered such functions as personal protection, unemployment protection and formal education. This type of change appears in building as (a) the falling away of established characteristic elements like moats and battlements in the later Middle Ages, and (b) emergence of new and highly differentiated building types like the bureaucratic office building in the nineteenth century (5).

2. Governmental Institutions Concerned with Building

The design, erection and use of buildings are controlled by laws under these headings:-

By-Laws Room sizes Lighting Ventilation Construction Materials Drainage	A system of law enforced at municipal level. It deals with the control of buildings by means of minimum standards to ensure health, structural stability, durability and appearance. The stipulated standards are enforced by the threat or use of force.

(3) P. V. Young. Scientific Social Surveys & Research. P.440.
W. G. Sumner. Folkways. P.53: "An institution is a concept plus a structure".

(4) R. Benedict. Patterns of Culture. P.252.

(5) See Appendix lV (1).

The building by-laws of the normal town are typical (6). In North America the use zoning of land and buildings is often done through the by-law system.

Planning Law.
Use of Buildings
Bulk
Height
Site Coverage
Siting
Building Lines
Parking
Appearance
Rehabilitation
Redevelopment

Law enacted at central government level, or in some countries like South Africa and Canada, at provincial or second tier level, delegating or making available planning powers to local authorities or larger administrative units. The chief difference between by-law and planning control is that planning control is thought to be more flexible and comprehensive. The British Town and Country Planning Act of 1947, which is a recent notable attempt at planning control was especially directed at achieving these two characteristics.

Public Health Law.
Sewerage
Dangerous Buildings
Delapidated Buildings
Slum Demolition
Nuisance Prevention
Water Supply
Disease Prevention

Law enacted at central government level to protect the public's health. Under this heading legislation dealing with slum clearance and minimum standards of floor space and cube space is of importance to building. Housing law is not included in this group for reasons explained later. The South African Slums Act No. 53 of 1934 and the British Health Act of 1936 are typical examples.

Land Law.
Survey
Registration
Transfer
Layout
Lot Size
Frontage Length
Use Restriction
Materials Restriction
Subdivision Permission
Racial Groups

Into this category of law fall such matters affecting building as the minimum sizes of lots, minimum frontages, permits to subdivide and develop, control of land use by means of restriction of title, and road access. In South Africa the control of occupation by the various races must be added since, owing to the wide differences of culture and economic status between the social groups (European, Coloured, Indian and African), the operation of the Group Areas Act will be a determining factor in how land is to be subdivided. The South African Survey Act No. 9 of 1927 and the Natal Ordinance No. 27 of 1949 are typical.

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(6) See Appendix lV (2).

Finance Law.
Mortgage Control
Loans
Valuation
Capital Assets
Credit
Liability

The most characteristic influence on building in terms of finance is parliamentary law controlling such things as the raising and lending of funds by such agencies as building societies and insurance interests and the raising and use of loans by local authorities. In South Africa the Building Societies Act, No. 62 of 1934 very rigidly controls how building societies may invest their funds. This in turn impinges on the design of the building affecting cost, size, selection of materials for durability, arrangement of plan (it must not be unorthodox), location and appearance. The legal obligation of annual budgetting affects the building programmes of both public and private bodies.

Labour Law.
Hiring
Firing
Wage Rates
Insurance
Apprenticeship
Unions

Usually enacted by central government with the aim of regulating the use of labour on the one hand and protecting it on the other. Under this heading comes law dealing with trade unions. The chief influence of such law on the building is its effect on the cost of labour (7). Under this heading the control of labour's environment, embodied in factories acts, should be included.

Mercantile Law.
Company Law.
Monopoly Control
Business Structure.
Tender
Contract

This may have a bearing on building through the effects it has on commerce. For example, the restriction of monopoly and the control of cartels may make easier the emergence of new materials and encourage alternatives. The law controlling joint stock companies affects contracting firms. The details of how investment allowances work have an influence on the scale and timing of building projects. Law enacted by central government to control members of the professions. The British Architects' Registration Acts of 1931-38 and The South African Architects and Quantity Surveyers (Private) Act No. 18 of 1927 are typical examples. Both these acts restrict the use of the word 'architect' to those who are on the legal register. Under regulations these bodies con-

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(7) Wage rates, maximum output, status of the worker in relation to other workers, compensation, insurance, paid holidays are typical institutionalised factors the rigidity of which has an important bearing on the cost of building, and particularly of innovation.

trol such things as professional conduct, scales of fees, and education. The architect thus operates within a fairly rigid framework. The complementary control compelling all buildings to be architect-designed is not very common, although examples can be found (8).

This list of laws is indicative only and is not intended to be exhausrive. Mention must also be made of laws which impose the duty of providing a service involving a building; for example the British Education Act of 1875 made the erection of schools a statutory duty, and the Housing Act of 1936 and the U.S.A. Housing Act of 1949 charged the local authorities with the duty of redeveloping slum areas. The differences between buildings so motivated and others requires examination. Some buildings, such as nineteenth century tenements in London, have perhaps suffered because of their statutory origin, but others like recent schools in Britain have probably benefitted.

In addition to the law-types listed there is also law restricting rent, maximum floor extent, maximum cost and the use of materials. Law of this type, used in many countries in the immediate post-war period and in Britain referred to a 'building control', appears generally regarded with disfavour and does not seem likely to win a permanent place in legislation. It does not, however, perhaps deserve to be dismissed solely as a stopgap if only because of the stimulus it gives to finding new materials and methods of construction, and new plan arrangements, and from a research point of view it merits careful attention in the direction of substitute materials (9).

3. Some Examples of Government Control

Building By-laws. In general the effect of by-law control on building seems to be the emergence of a degree of standardisation of construction and materials, and an emphasis on permanence. The aim is to prevent buildings falling below standards; the method is to prescribe materials, thickness of walls, sizes of timbers for given spans, minimum floor areas and cubic contents, minimum window sizes (and their opening portions), and air space. This results in many details of control to which the building designer must conform. The compulsion to conform constitutes one of the traditional elements in building:

(8) E.G. State of Washington. A local ordinance in Seattle requires the appointment of an architect for all work costing more than $500.00 (1956).

(9) The pejorative use of the word 'substitute' is almost an institution. It leads to misconceptions and mis-valuations.

what is prescribed becomes the normal, and departures outside the prescribed details are automatically difficult because the by-laws have been drawn up in terms of normal building practice. Consider external walls. The by-laws may stipulate: "the external and party walls ... to be constructed as a solid wall of .... good whole bricks or stone or solid blocks of concrete ... or other good hard and suitable incombustible material properly and solidly put together" (10). This is a by-law framed in terms of the traditional weight-bearing wall; it is quite unsuited to the point-support system and skin (e.g. glass) walls of modern design. Or, again, those who draw up by-laws may be so obsessed with the stability aspect of control, that they may insist on special precautions for stability if the openings in a wall exceed, for example, one half of the total wall area (11) - precautions quite unnecessary if the wall is not weight-bearing. Another control which has its effect on walls is that which prescribes a maximum distance from the ceiling to the soffit of the window lintel. Such a by-law prevents the use of windows with lower heads, thus ruling out the useful elevational possibility of a window with a substantial depth of wall above it.

In spite of the use of waivers, amendments and frequent rewriting of by-laws it seems likely they will always lag behind the practical possibilities of building, particularly in a period of technical change. What we urgently need to know is not just how much the by-laws put a brake on the individual building, although that would be extremely useful, but what is the total effect of by-law controls as a whole on all building. Is it one of the major causes of the late entry of building into industry? Almost all by-laws conceive the building as made on its site. To what extent does this continue to be the case simply <u>because</u> of by-law control? If it is thought that by-laws are unavoidable, the motorcar might be examined as an instructive comparison(12).

<u>Planning Law</u>. Building is influenced by land value, which is a major concern of planning. The building may therefore be materially affected by the use and density control of planning law. Given our economic system, the higher the cost of land the greater density of building it will tend to attract, particularly in central areas. This may seem self-evident, but it is quite easy to imagine a state of affairs where prestige might override payability, so that the return

(10) Bristol. By-laws: New Streets, Buildings & Drainage. By-law 18.
(11) Idem 31.
(12) See Appendix 1V (3).

on a central property might not be as great as that on, say, an outer ring property, although the land cost might be higher. Price need not be exclusively determined by earning capacity, and the situation we have now in residential areas where price and prestige value and not price and payability are fairly directly equated, might conceivably be made to operate in non-residential areas under a modified economic system (13).

The attempt has been made under some planning law to reduce the pyramiding of values in the central areas of towns (14). If successful, in some degree repercussions would be felt throughout the whole city structure. Other types of planning law may produce an enhancement of land value by restricting areas for uses for which there is competition. Use zoning unmodified by other controls may then create an artificial scarcity or even, by bringing certainty of future use, may both shift and increase value.

Stein makes this comment about planning legislation: "To fill in the form, the body, the reality of the town, city planning proceeds not by positive action but by negations. It restricts and regulates and limits use, height and bulk by zoning laws. These regulations are usually commonplace generalisations. They result in monotonous similarity of use, height, coverage and outline of neighbouring buildings" (15). The reconstructed central shopping centre, Bristol, illustrates well this point of how similarity of height imposed by a regulation has very little effect on improving the appearance of the street. It seems to sharpen the differences between the individual buildings rather than to weld them into a coherent design (Fig. 12).

Public Health Law. Housing policy, as expressed in housing acts, has an obvious effect on residential and even other buildings (16). The local authority housing estates which are conspicuous in all British towns are evidence of housing legislation. From the governmental aspect of such housing there have sprung local government departments to carry out the policy and from the mass housing developed by these agencies have emerged special visual characteristics: large areas with buildings of uniform height, plan, appearance and site arrangement, uniformity of variety, and a widespread bondage of Arlington Row (Fig. 16). On the other hand it seems likely that mass state housing has

(13) Slum residential property is noted for high payability.
(14) British Town and Country Planning Act 1947 by means of the development charge. Now abandoned.
(15) C. S. Stein. Towards New Towns for America. P.200.
(16) J. Rumney in "The Social Cost of Slums". Journal of Social Issues Vll 1 & 2 points out that the U.S.A. Housing Act "aims at stabilising and raising central property values ..." P.83.

produced houses of better structure and materials than would have been created by private enterprise and in many examples the quality of estate lay-out has been better than might otherwise have been achieved. In a similar way it is the situation in South Africa that housing development for non-Europeans frequently gets the benefit of more research and better technical skill than does that for the European, because it is a governmental responsibility (17).

Land Law. Traditional survey techniques giving rectangular plots and straight-line boundaries have had the effect in the past of making the grid-iron lay-out for towns and estates very common. This was a cheap method because additional blocks could be surveyed and the individual lots laid out as the demand arose. If there were no buyers the developer had not wasted survey fees. The defects of such development are that roads were designed irrespective of contours thus causing difficulties of gradient and later of sewerage; all roads were straight, and similar in appearance and of the same importance being of equal widths; and lots were frequently of the same size and frontage. These defects are characteristic of many towns in Natal, Eastern Canada and elsewhere and appear to be a result of the survey method in the context of the economics of the period. Survey in South Africa is more accurate than necessary (2 places of decimals in urban and 1 place in rural areas): an excessive accuracy which has to be paid for by the developer (18), and Biesheuval considers that high survey costs may actually prevent development of small pieces of land in urban areas (19).

The law controlling subdivision of land, as opposed to the law controlling the machinery of subdivision, may have a considerable influence on building. In Natal, for example, the occasion of subdivision is used to restrict lot size, frontage, use, coverage and floor area ratio. These are controls which might reasonably be expected to fall within the scope of town planning rather than land law. Such restrictions are imposed on subdivision although the lot may have been originally free of restriction. This method of control leads to some lots having restrictions and others not. Thus one owner may be able to erect a factory but another may not be permitted more than a block of flats. It seems clear that however administratively convenient it may be to

(17) Basic research for African Housing is in "Costs of Urban Bantu Housing" by the National Building Research Institute. (South African Council for Scientific & Industrial Research).

(18) Land Survey Act No. 9 of 1927, Sec. 43 of the Regulations.

(19) H. Biesheuvel. Maps & Land Use. P.12.

attempt to control building by imposing restrictions at the time the land is subdivided or re-subdivided, homogeneous development is not likely to result because building control is made contingent on the voluntary act of subdivision. The two matters are not in reality related (20).

In the U.S.A. and Ontario, Canada, an interesting aspect of land and building control is to be found in the way in which many towns have powers to control subdivision for 5 miles beyond their boundaries. This has the effect of bringing development outside the city limits into reasonable accord with that inside (21).

Labour Law. The labour laws of a country contribute to the process, described by Maxwell Fry and quoted in the last chapter, whereby in building we have a situation in which we find a continual rise in wages without a corresponding rise in output (22). We are therefore under continuous pressure to find ways of increasing the worker's output by means of mechanization. The legal point of significance is that the law permits collective bargaining. The labour laws in their financial aspects reflect how society has decided to distribute the national wealth. This decision affects building inasmuch as the building operative's value is thereby determined proportionately to the values of other members of society. If this value is relatively high that amount of the cost of the building which is labour will be high and there will be pressure to economize labour. Such pressure will have to be met by increasing the skill of the operative and by making greater horse-power available to him.

4. Examples of Problems Arising from Law.

The effects of legal control can be seen obliquely in a pungent way by looking at examples which cause difficulty. The following is a random selection:

(1) Durban's planning scheme defines a dwelling house:- "a building constructed or adapted to be used as a residence by one family, together with such outbuildings as are ordinarily used therewith." But whose family? The polygamous Indian family has many more members than the monogamous European. The regulation was framed with the background of planning

(20) Recent development in Isipingo Rail, Natal, illustrates this misconception.

(21) American City. April 1953, P.101. In State of Tennessee 25 municipalities had this power by 1953.

(22) The Architect's Dilemma 11. Listener 24-2-55. P.331.

terminology from Europe and the fact that there are two distinct types of family in Durban, each with its own requirements, was missed because the planners were planning with knowledge of their own culture only. The ambiguity lying in the word 'family' was brought out very forcibly when an Indian, having a house in an area zoned for single family dwellings, applied for permission to make major additions to his house on the grounds that he was now about to take his second wife. He was refused permission.

(2) What is the difference between a flat block and a tenement? A legal distinction is sometimes made by insisting on a common entrance for the flat block. It is at least curious to find conditions of title allowing flats but not tenements to be erected: a distinction made in Natal conditions of title whereby terrace houses are classed as tenements because they do not have a common entrance. Under these titles terrace houses are not permitted.

(3) The L.C.C. was prevented from building 15-16 storey flats at Ackroydon because Section 51 of the London Building Act allows appeal by adjoining owners if the proposed building is to exceed 100 ft. in height. This is a virtual devolution of power of control to the local group, who cannot be expected to appreciate the problems of height in terms of overall densities.

(4) Attempts to insist on a minimum cubage or cost of dwelling are efforts to create or maintain 'desirability' in a residential area. But a 'desirable' property can soon become very undesirable if it has occupants whose standard of behaviour is less reserved than that of its neighbours. Is there any relation between the cost of a house and its occupants' behaviour?

(5) All efforts at controlling appearance of buildings are likely to meet difficulties. The prohibition of flat or flattish roofs may be a bone of contention, and may prevent reasonable improvement in house design.

(6) The delightful case of the designer of a block of flats in Durban, who was forced to move the front entrance on to another side of the building in order that the building could comply with the rear space requirements of the by-law - since the rear of the building must by implication be opposite the front - must not go unrecorded.

These illustrations serve to highlight the fact that building is a social activity, and is intimately connected with the values to which society subscribes. Many planning controls are woolly because these values are not clearly defined by those who make the controls. The difficulties of planning are social difficulties; they can only be resolved by understanding the social context. The planner may naively try to solve social problems by a purely physical solution - the idea of intermingling social classes in housing estates in order to produce a varied community typifies this point of view - but such attempts can only be passed off as solutions in the sociological dark as Kuper's research at Coventry shows (23).

5. Interaction of Controls.

The question of the interconnection between the various governmental controls on building is important and will be briefly examined.

A very simple example is to be found in the effect of by-laws governing construction and materials on the planning controls affecting the height and appearance of buildings. The arrival and legalisation of the framed structure has made it possible to build to a very much greater height than was possible a few decades ago. This ability, and the fact that the techniques involved have received legal sanction through the by-laws of most towns and cities, has made it necessary to control heights very strictly, because increased height means increased density of population, greater concentration of vehicles, greater obstruction of light and air, and new problems of land values, fire-fighting and civic control in general. The control of height has, therefore, attracted increasing attention because of the legalisation of framed methods of building construction.

Turning to the appearance of buildings, it would be interesting to examine how many of our controls dealing with appearance are the result of previously enacted law controlling methods and materials of construction. In general, by-laws have tended to insist on permanence and durability of structure (24) and solid incombustible materials have usually been progressively insisted upon in the history of building control. Thus brick and stone have come to be accepted as the 'normal' materials of building and because that is so the appearance of buildings has traditionally come to be largely identified

(23) L. Kuper. Living in Towns. General P.176-180.
Specific P.179.

(24) The effect of improved fire-fighting methods on the need to have dense materials needs investigating.

with the appearance of those materials. So we expect a house to have brick walls. In the same way the tiled roof may become a normal expectation because of the prohibition of other materials (25). Now the significant thing here is not the effect of law on the appearance of buildings, but the effect of law on the law governing the appearance of buildings. Because a pitched roof is expected, a planning scheme may make it impossible to have any type of roof but the orthodox pitched tiled roof, and both by-law and the planning law controlling the appearance of buildings may conspire to maintain the status quo (26).

Some examples of the interaction of laws whilst appearing to be mutual relationships are not in fact so, and it is necessary to beware of attributing A to B, when they both stem from C. For example, the stipulation of minimum room sizes in houses might appear to have effect on the minimum plot size allowed by law. This is not a likely explanation; much more probably is the explanation that economic and other cultural forces have simultaneously caused minimum room (and therefore house) sizes and plot sizes to crystallise. This again underlines the extreme difficulty of making an accurate diagnosis of causation.

Some buildings may escape a large measure of control by being sited in areas where no local authority exists and where control by the next tier of government is weak. The peri-urban areas of some South African towns illustrate this point. In this instance the interaction of laws is still evident, although the operative factor is not the presence, but the absence, of by-laws. As urban control does not exist, attempts are made to prevent urban-type development by means of the law controlling the subdivision of land. The precise method is to restrict the lot size to a minimum of 10 or 20 acres, a safeguard not used in an urban area, and one which is not effective in controlling the emergence of incipient urbanisation.

6. Causation.

The question of the causal relation between the institutional complexes and the forms of buildings and towns is of particular interest in the governmental complex. It would seem that where minima or maxima are exactly adhered

(25) E.G. Durban North where the by-laws state that the roof "shall be covered on the outer surface with tiles or other approved durable materials other than corrugated asbestos, corrugated iron, malthoid or similar materials..." Building By-laws of Durban No. 103 (1). 1946.

(26) E.G. Westville, Natal. Also see Appendix IV (4).

to causation is possibly attributable. For example, if a building reaches the maximum height, coverage and floor area ratio permitted under a planning scheme, the fact that the amount of building developed under all three controls is at the maximum would seem to argue that the designer has allowed them to determine these elements in the building's design. This may seem very simple, but the simplicity is perhaps apparent only, for causation must not be assumed. Consider the common by-law stipulation that the external walls of a dwelling house shall be not less than 9 inches thick. Examination of houses built under this by-law will show that the external walls are never less than 9 inches, and it might be deduced that the by-law has caused the walls to be that thickness. This is superficially true. At a deeper level however, it is true to say that the by-law has been framed to meet the structural and other characteristics of the commonest material in the area for building walls: the normal brick. Causation is, therefore, not attributable in any very straightforward sense: in the sense that fire causes smoke. Rather, it is better to say that the existence and use of the common brick has had a strong influence in determining the thickness required by the by-law and that once the by-law was promulgated all external walls of houses were under compulsion to conform. Now if the example of the height, coverage and bulk control given above is reconsidered in this light it will be seen that the control of, say, height is not a cause of the building reaching the maximum height permitted. If there is anything in the shape of a cause it is whatever (or whoever) determined the maximum. Is the maximum height prescribed simply the habitual maximum which methods of construction and economic opportunity etc. have made the accepted limit before it was made the legal limit? Or was it the guess of works committee, councillors or technicians? And on what was the guess (or calculation) based? These factors might be considered more realistically to be the cause of the particular building being limited in height. The presence of the regulation limiting height is itself not an adequate causal factor: it is merely evidence that causal factors are to be sought at deeper levels.

7. Principle of Reciprocity.

The foregoing sections bring out in several ways the idea of mutual interaction. The by-law 'determines' the wall thickness, but the material of the wall 'determines' the by-law. The planning scheme lays down that in the special residential zone only the house designed for the monogamous household shall be permitted, but it is the institution of monogamy which has 'caused' the planning scheme to lay down this restriction.

Throughout this study the principle of reciprocity will be found valuable as a tool to examine relationships between institutions and institutions, and between institutions and their instruments. If the principle of reciprocity is borne in mind, purely as a tool, the fatal error of the facile attribution of cause can be avoided, and such questions as: 'Do institutions cause buildings?' are seen to be wrongly framed and impossible to answer. The use of this tool consists first in asking whether the apparent effect can be considered as a factor conditioning the apparent cause. If so, this can be followed by an attempt to evaluate the degree of mutual influence of each of the symbiotic elements. Lastly the time sequence should be examined. When this stage is reached interest in simple cause and effect gives way to the more complex concept of a process of interaction. The application of the principle of reciprocity frequently brings out the significance of the time sequence. The example of the 9 inch external wall illustrates this neatly. Any new wall must be built to a minimum of 9 inches because the by-law stipulates it. This by-law was promulgated as a result of the building habits of a period whose conditions may be quite different from those under which the wall is actually built. The moment of promulgation is a moment of crystallisation, when habit becomes enforcible by law.

8. Coercion

The authority and power to coerce is a characteristic of the governmental institutional complex. No other complex has any comparable power and in no other complex is systematic and organised punishment to be found as a method of compelling conformity. Davis says that "political control includes not authority but ultimate authority, backed at some point by the use of force" (27).

This unique characteristic of the governmental complex is significant for building in many ways: standards of building construction must be adhered to, such minima as may be prescribed for ventilation and floor areas must be reached, maximum heights and floor area ratios must not be exceeded or serious consequences, such as the prohibition of the building, may result. In the use zoning of cities penalties are imposed for putting buildings to uses not

(27) K. Davis. Human Society. P.493.

permitted under the planning scheme. Clearly such strong sanctions as by-laws and town planning schemes tend to eliminate the element of risk-taking which may exist in operations concerned with the other institutional complexes. For example, the 'penalty' for starting a nursery school where there is no demand is simply financial failure. But the penalty for opening the school without adequate sanitary equipment may be a fine and the closing of the school. The significant point is that the first 'penalty' may legitimately be risked: the second may not.

9. Government Enforces Conformity to Other Institutions.

All the legal and coercive control of our society is performed by government, and it has a bearing to greater or less degree on all the institutional complexes. The law deals with correction and punishment, economic matters, education, family life, health, recreation, religion, science and even with art and symbol. It deals with all these on the basis of the ultimate threat of force, and the individual disobeys those dictates of all institutional complexes which are backed by law at his own risk. This risk may have a direct bearing on building. If, for example, a new method of financing building is found it may be itself illegal or lead to a situation which cannot be legalized. This may deter developers from using it and a useful invention may be lost simply because the current legal code forbids it. Something of this kind has happened in the Durban area in recent years. A new method has been 'discovered' for financing the building of blocks of flats; it consists in essence of 'selling' the flat to the tenant (28). In reality the tenant-owner cannot have title to the flat - that is not legally possible - but he holds a group of shares in the company having legal title to the block of flats. No doubt the law will be changed in due course to meet the new situation, making possible the transfer of the flat title.

The question of alteration of the law must be mentioned in order to give the other half of the picture. The law is altered by pressure arising from change. Such pressure is slow in operation, particularly when it is caused by mutual interaction between governmental and other institutions. Panunzio describes this interaction process: ".... government evinces a high degree of organisation and organisational interpenetration.

Not only does it control the other institutions, but in turn the other insti-

(28) New in terms of the Durban context, but used elsewhere.

tutions exercise a certain amount of control over government, now preserving, now changing its forms and functions" (29). The governmental institutions are therefore in a special position because it is through them that a good deal of the regulating of society is done, and because of the particular significance of the mutual interaction between them and other institutions (Fig.13).

10. The State May Control Architectural Style.

Merton points out that the extension of the state into matters with which it did not previously concern itself indicates that institutional norms are in conflict, and that a result may be the direction of aesthetic expression by the state. When this happens the aesthetic aspect of buildings is used as a propaganda medium for the state (30). Totalitarian forms of government are more given to this form of state control than are democratic, perhaps because they have one focus of authority (at least in aspiration) while in a democratic society authority is pluralistic. Whatever the causes, it is clear that the regimes of Soviet Russia, Nazi Germany and Fascist Italy have paid considerable attention to architectural style. The Weimar town hall, built under the Nazi regime in 1936 and the recent Smolenskaya Square building in Moscow give some measure of the effect of state emphasis on style (figs. 14 & 15). The effort to express the importance of the state can be seen in much Fascist architecture which is often notable for excessive height of internal cube-space and a bombastic use of form.

11. General Influence of the State.

The problem of the extent to which the state influences the general design of building in terms of both plan and elevation is less obvious, but its influence may be quite strong, if rather more subtle than the simple matter of propaganda. What, for example, is the relation between the governmental palace of the Versailles type and the English eighteenth century country house, taking into account the political aspect of the society which each served? Or, again, in a western democratic society does the form of governmental administration building differ from that in the totalitarian society? And does the form of government and its building influence the form of business and its building? Many questions of this sort require examination. It seems likely

(29) Op. Cit. P.363.
(30) R. K. Merton. Social Theory and Social Structure. Chap. XI.

that if they could be answered we should be able to understand our building requirements in much clearer terms, for building in the last analysis is a reflection of human values and attitudes.

A further aspect of governmental institutions emerges when the structure of government is considered, and penetrating more deeply, when the ideas which make and support that structure are considered. What, for example, is the significance to building of the three tier structure of local, provincial and central government in South Africa? What is the effect on building of the annual budget system and does the annual budgetting have a retarding effect on the rate of building development, particularly on the production of schools, hospitals and roads? Or again, is the bureaucratic system of pyramidal organisation of government departments an efficient form of organisation where original thought and the rapid grasping of new possibilities are necessary if government is to avoid acting below the threshold of accepted achievement? Such questions are closely bound up with the motivational ideas of our time. In terms of building no doubt one of the most important of these is the belief that the individual is very strongly influenced by his environment and that therefore the moulding of the physical environment into socially approved forms is a major social task (31). The question of the relative emphasis placed by society on the individual and on the community has significance here. Building might be expected to reflect various characteristics according to which is given the greater emphasis. A rewarding line of thought for building is that in a culture where liberty and freedom are prominent in the idealogy, restriction will be judged irksome, whereas if the ideological emphasis is on the communal good restriction will be readily embraced, although with possible inhibiting effects in some directions (32).

12. Limitations of Designer's Choice.

It is obvious that an important effect of law is to limit the choices open to the building designer. This limitation may cut across current economic, structural and expressional trends as in Westville, Natal, where a flat or

(31) Progress is an institution in the U.S.A. Improvement in schools, houses, hospitals, factories and offices is not due only to technical advance, but also to the will to find and use new methods and materials. The operative force is the will, not the results.

(32) K. Davis. Op. Cit. P.479.

mono-pitch roof is prohibited in certain areas thus preventing the designer from enjoying those benefits in the planning of the house which result from a flat roof and forcing upon him designs largely traditional in plan and elevation (33); or the limitation may go with the trend, as when Dance and Taylor in framing the 1774 Building Act (London) reduced the amount of external ornament possible on buildings by virtually banishing wood from the facade in conformity with the emergent taste for more severe elevations, and therefore the 1774 Act was not initially felt as a handicap to design, although later it came to be called "The Black Act of 1774" (34). Height limitation under a planning scheme is not responded to as a burden in the early days of the application of the scheme provided that there is a margin between the current maximum height achieved on a voluntary basis and the scheme's maximum. It becomes onerous only when the current maximum is tending to overpass the scheme height. At this point the scheme control becomes a limitation. It should be noted that this is a limitation different in kind from limitation resulting from changed conditions and cultural lag. The 1774 Act becomes onerous because building needs, habits and fashions have moved away from those it was framed to control or guide and a lag exists between what is legally required and what owners and designers would like to do. The height limitation is not, however, an example of lag. It is precisely at the point when it becomes onerous that it begins to do its intended work: restrict height.

In general, legal control over building seems to act for the most part as a restriction or limitation. Our society appears to be emphasising this aspect of government to an increasing extent, and building does not escape its share of controls. We are accustomed to this situation and as designers we are used to fitting our buildings into the control limits; we have come to think of such control as inevitable, although we may acknowledge that the detailed control of the moment is not incapable of being changed.

Our acceptance of legal forms of control of building would perhaps appear less foreordained if examined in the light of Benedict's observation: "Yet the dominant traits of our civilisation need special scrutiny. We need to realise that they are compulsive, <u>not in proportion as they are basic and</u>

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(33) Low pitches are not merely an aesthetic fad: they offer new plan possibilities.

(34) J. Summerson. Georgian London. P.110-111.

essential in human behaviour, but rather in the degree to which they are local and overgrown in our own culture.... the importance of an institution in a culture gives no direct indication of its usefulness or its inevitability" (35). It might be well before we reach for yet one more rigid by-law or cast-iron planning clause to look at building law in its cultural setting as an anthropologist would see it. Is it overgrown in our culture?

The essential practical question seems to be are we right in assuming that the increasing complexity of the material culture must inevitably bring in its train increasing differentiation, pervasiveness and power of governmental institutions? Are we doomed to an ever-increasing degree of legal control? Benedict's comment suggests that inevitability is by no means proved and that our emphasis on control by legal means might be regarded for purposes of analysis as one of our exaggerations.

If a diminution of the power of the governmental institutions over building is contemplated, other methods of control need to be found. Here we might perhaps find a hint in the stateless societies of the Nuer and Bantu Kavirondo (36). These people have virtually no governmental institutions: there are no laws and there is no government in the sense of leaders occupying offices and wielding power. Murder, for example, is not punished by courts. It is dealt with by ostracising the individual from his clan. That is to say those institutions which operate normally to protect the clan member are not permitted to operate for the murderer. The ultimate effect of ostracism is that he himself may be legitimately killed by any other member of the clan in the permitted circumstances. In other words control of punishment is not through the governmental complex, but through the familial and the economic. Essentially the control is social; the whole social system operates to redress the wrong. The question is whether we can find methods of social control for building that would overcome the rigidity and tendency to lag of the present governmental control. There have been, in the past, situations where the control of building has been largely social. For example, most of classical Bath was built with virtually no by-law control. The control was in the expressional complex; public taste demanded classical elevations and the fusion of individual buildings into a coherent whole (37).

(35) Op. Cit. P.250.
(36) M. Fortes & E. E. Evans-Pritchard. African Political Systems. P. 296 & 235.
(37) I am indebted to the Town Clerk of Bath, J. E. Nixon, for information on this point.

Part of our difficulty is perhaps that the increasing degree of the complexity of our society, with its increasing differentiation and interdependence, forces upon us an extension of state control in order to ensure that society may continue as a going concern. We should not, however, regard this as an inevitable development but rather as a 'solution' which our culture happens to have taken. If we can show that the present legal control of building is unduly rigid and is stultifying improvement that is technologically possible, we need to scrutinize both existing and proposed controls with a view to modifying them.

In our own time, the idea of adding the scientific to the expressional complex suggests itself. The scientific complex may eventually provide a non-legal social control through advisory standards on the lines of the work being done by the South African Bureau of Standards. Social pressure could conceivably go to the length of morally compelling compliance with a system of minimum standards, including a minimum standard of appearance. The difference between this and compliance with the law is that the ultimate threat of force is not present in advisory minimum standards and therefore not everybody will adopt them. There seems to be here a most rewarding line for research, particularly since emancipation from legalistic thinking might help to solve the very pressing problem of who is to undertake large-scale building development. This is now largely in the hands of either governmental agencies or isolated private interests. Myles Wright suggests that the building societies would be the most suitable groups for large-scale development and redevelopment, but if so, the problems of their institutional barnacles would need considerable attention as they are geared essentially to safe investment (38).

It may, therefore, be said when considering the governmental institutions that they are restrictive of building and that therefore policies, advisory standards and example may in the long run prove more valuable as building controls, because they operate through the general social system instead of by means of the exclusive channel of law; the paradox of law seems to be that, being brought into existence in the interests of improvement, it eventually ends by stultifying those rational solutions which are the next stage of development.

(38) Town Planning Review. XXVl No. 2. P.90.

13. Building Example

The flour factory has several points of interest in connection with the governmental complex of institutions:

(1) The planning technique of reserving land for a future road was applied to the site by the local planning authority. In effect this meant that a considerable area of the site was sterilized to the owners for building purposes. From the point of view of the local planning authority, however, this is a very satisfactory way of avoiding the costs of future compensation. Nevertheless the cost of this manoeuvre has to be paid for, and this is done, of course, by whoever owns the land.

(2) Since the western side of the site flanks on to countryside, the city's greenbelt and a dormitory village, and since the height of the top of the tower was to be some 70 feet above the existing land level, the planning authority made it a condition of the granting of planning permission (although the area is zoned for industry) that the clients would plant trees as a screen along the western side of the site. In spite of the obvious ineffectiveness of such a screen to conceal, or even break up, such a large mass as the tower, it was nevertheless insisted upon. This seems to be an example of the ritualistic application of a planning technique: it was possible to satisfy everybody by saying that something had been done.

(3) Although the local authority was in effect applying the provisions of model by-laws in the matter of construction, it was clear that in such things as prestressed concrete and the timber sandwich flooring of the tower it was out of its technical depth.

(4) The fact that the end walls and part of the front wall of the tower were clad in brick rather than being done in the same aluminium panelling as the front and back walls may be regarded as a residual effect of building by-laws. We have been conditioned to seeing buildings made of brick - this has entered into our aesthetic view. The brick walls are a concession to this fact (Fig. 1:3).

(5) The design of the ancillary wing of the factory block was strongly influenced by the need to meet the requirements of the various acts covering the safety and welfare of employees. The fact that the corridor was originally left open-sided was not because of legal reasons but because

Fig. I2.

Milsom St., Bath.
Elevational uniformity.

Broadmead, Bristol. Height uniformity: elevational disparity.

Fig. I3. Some parts of some institution-complexes are backed by law. Note special relation between law and governmental complex.

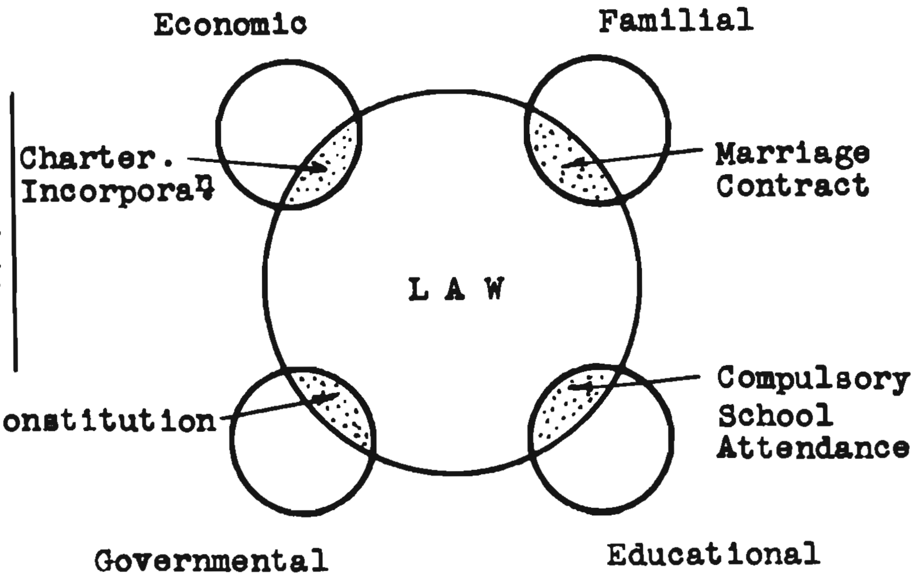

Fig. I4. Weimar. Weimarhalle.

Fig. I6. Arlington Row, Bibury.

Fig. I5. Moscow. Office Building in Smolenskaya Square of the desire to be able to see the movements of the workers from the office block. There was also the vestige of the idea that factory workers do not need to be protected from the weather.

(6) The power of an advisory board of architects to veto the elevation of a building submitted for planning consent was in evidence. The board complained that the buff-coloured bricks and the aluminium panelling of the tower were of too similar a tone. The architects countered this by replying that with the passage of time the aluminium would oxidize to a darker tone and when that had happened adequate tonal difference would be achieved. This was accepted and the desired result has occurred. The point of value here is that drawings only are not adequate data for committees even of experts: they should be amplified by written descriptions and statements of intention.

(7) The owners of the building were refused permission under the regulations controlling advertisement to mount an illuminated sigh reading "Feathery Flake Self-Raising Flour" on the panel of brickwork designed for the purpose at the top of the tower. Appeal was made to the Minister of Housing and Local Government, and he upheld the refusal. It appears, however, that a similar sigh merely stating the name of the firm would have been likely to have received permission. Reason: the first is advertisement; the second is merely identification!

14. Summary.

The governmental complex of institutions has a bearing on virtually all buildings, impinging upon them through by-laws, planning, health, labour, land, financial and mercantile laws and regulations. Laws governing the individuals who design buildings also have some effect, indirectly, on the building.

The outstanding characteristics of legal control are that it is unique in being backed by force, it is rigid and that it frequently lags behind present needs. Governmental control perhaps has an over-large place in our society and therefore the idea of encouraging social, as opposed to legal, control of building is worth examination.

This quotation from Tugwell sums up this institutional complex well: "At the heart of the nation is government. This centre is where accommodation is reached among conflicting social groups with their claims. It recognises rights so far as they are allowable; and it imposes duties. This accommodating process can be carried out as a chaotic conflict first one claimant, then another getting an advantage; or it can be made orderly ... by institutionalising the public interest, providing regular means for discovery and maintenance, and putting those who would infringe its integrity on the defensive"(39).

15. Conclusions.

(1) The outstanding conclusion in this group is that the strategic position of the governmental complex is extremely important. The reasons for its importance are (a) it can compel obedience by legal enforcement (b) it can initiate and compel implementation of deliberate policy in building and planning, and (c) it is in a dominant position in the pattern of our culture, so that governmental action appears to the individual to be the 'natural' means for achieving desired social ends.

(2) Precisely because it compels compliance the governmental complex may operate to inhibit improvement and tie development too closely to institutional norms thus reinforcing the tendency for building to rely on traditional approaches and techniques even when scientific knowledge is known to exist.

(3) What is prescribed by law becomes the normal practice. This leads to a uniformity of plan, structure, materials and appearance, in sharp contrast with the rich variety made theoretically available by contemporary technology. Where minimum standards are used they tend to become the normal because of their compulsory character. This is particularly so if trends in the culture are running against the direction of the minimum standards. Minimum and maximum standards are often complementary. The sociology of such standards urgently requires research.

(4) Bodies drawing up by-laws may give undue weight to certain aspects of control: e.g. fire matters (after a fire or war). This will unduly restrict the building operations of the succeeding period. Control by performance standards is an improvement.

(5) Compliance by legal enforcement appears to the private developer as a restriction or negation, which tends to draw out his latent resistance.

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(39) R. G. Tugwell. The Place of Planning in Society. P.85.

From the public's point of view the restriction may be positive and beneficial. The relationship between these two is more complicated than merely drawing the line between private and public good, since the entire situation is dominated by the fact of legal enforcement. This whole matter is closely bound up with the value system of the society, and the important question requiring investigation is the extent to which the governmental complex, in its operation, is inhibiting the development of the value system. The question to be asked is whether the controls we are currently using are likely to produce results in accord with the way we should like the value system to develop? There is much evidence to suggest that our by-law and planning controls do not necessarily produce on the environment those effects that we desire now or ought to be working toward in the future. Research is required into this whole area.

(6) As the governmental complex is able to enforce compliance with the requirements of both its own and other complexes (economic, educational, scientific) it is essential to be on the alert for occasions when inhibition of improvement becomes so heavily institutionalised that the opportunity is likely to be permanently lost. The trend toward multiplying building and planning controls needs, therefore, to be carefully watched on this score. Additional controls that appear to be improvements may very well be the opposite.

(7) Law limits the designer's choice and reduces the possibilities of experiment. This limitation may be quite contrary to other trends in the society. Cultural lag may therefore appear in building and planning techniques.

(8) Building work being done under the requirements of statutory enactments - flats, schools, hospitals and municipal housing - forms a special category. Because of the background of the legislation such buildings have in the past often been rated low in status. But as the state (an institution itself and not to be equated with society as a whole) has interested itself progressively with those matters, a rise in status rating may be found. With an increase in society's wealth, however, this trend may well be reversed and the statutory powers concerned may require major modification. This matter requires research: particularly interesting

would be research into municipal housing in Britain in the context of a society of rising affluence.

(9) Planning legislation is compulsory in many countries in the sense that statutory bodies are compelled to prepare and operate planning schemes. It, therefore, carries with it the characteristics of compulsion already described. Planning systems need constant surveillance to ensure that they are not preventing, by being heavily institutionalised, the good planning at which they aim.

(10) It can be shown that the requirements of land law have had a strong influence on the form of town layouts. In their turn the laws controlling land have been promulgated having regard to the nature of the land and the measurement techniques available. Law and technique can have such a strong influence on layout that planning in the sense of convenience of use, relationship of parts to whole and economy of services is rarely attempted, and town layout in the past has in many societies not been done rationally in the sense of planning for the total life of the town, but logically only within the narrow limits of law and technique. In this context law and technique, closely interlocked and well institutionalised, are highly resistant to change.

(11) In general, law is promulgated having regard to techniques of application. It is therefore very important that the law-giver should be well informed concerning the techniques available: particularly so in building techniques in a period of rapid advance in technology.

(12) A legal instrument can be wrongfully used for purposes other than those for which it was intended. It is unsatisfactory to use the occasion of the subdivision of land for the imposition of controls such as use of buildings, type size and cost of buildings, etc. The inefficiency of this method can be clearly seen when it is applied to a small number of lots. The principle is equally suspect when large areas are subdivided, but the unsatisfactory results are not easily seen. A reason for its use is that this kind of control has been more firmly institutionalised than has control by planning legislation. This situation can make the establishment of planning law very difficult, and in an institutional context of this kind special research is required to find ways of changing the

institutional situation.

(13) As a result of collective bargaining the labour laws of a society in some measure reflect how the society wishes to distribute the national income. This affects the cost of the labour content in building. If labour costs increase disproportionately to material costs changes will appear in building to counteract this new strain. If labour becomes rapidly more expensive the building industry will compensate by changing methods so as to reduce labour costs. The nature of building is therefore closely tied to society's assessment of the rewards building operatives should receive. In this respect building reflects the value system.

(14) Law interacts with law. This can have restrictive results by leading to a rigidity of ideas about the appropriateness of structure, materials and forms for specific purposes. A set formula of building may be perpetuated irrespective of its suitability to the cultural context.

(15) Some apparent interactions of laws are not in fact mutual relationships, but are collateral independent manifestations. Although the attribution of cause to institutions in the governmental complex is particularly illuminating, great care is required when attributing any building or planning effect to any particular institutional cause in this context.

(16) The principle of reciprocity is useful as a tool for examining the influence of one group of facts on another; particularly in the governmental complex the application of the idea of reciprocal effect can be valuable by enforcing examination of facts from different viewpoints. It should be noted that this principle is not the same as attributing mutual cause and effect and can be usefully employed as a tool without involving the attribution of cause. It should be thought of as a process of interaction. The principle of reciprocity can also be applied as between the governmental complex and other complexes of institutions.

(17) Law may be changed by pressure from other institutions. If it is desired to change a piece of building law the total institutional situation must first be understood.

(18) Direction of the expressional aspect of building by the state may be an indication that institutional norms are in conflict.

(19) The relationship between the form of government and the accepted form of building requires research.

(20) Governmental control is a motivational idea in our culture, and is a much-favoured way of dealing with strain in institutional situations.

(21) Although governmental control of building and planning (i.e. of environment) is a major characteristic of our culture, this is not the only form of control available. It is possible to control without legal compulsion. This can be done through other institutional complexes, notably the scientific, expressional and educational complexes. Controls of this kind may be more sensitive to change and can be a more subtle form of social action than governmental control. This matter is deserving of research specifically directed at the question of how such an alternative form of control of building and planning could be introduced into our culture.

(22) The legal control of building is of great importance for the architect. In many instances it decides for him the general form of the building and severely limits his creative scope. Quantitative research here is required to discover to what extent and with what frequency the general outline of the building in the urban context is defined outright for the architect either by the law or by the operation of advisory or discretionary powers by officials.

CHAPTER V

RELATIONSHIP OF CERTAIN INSTITUTIONAL COMPLEXES TO ALL BUILDING TYPES: (3) SCIENTIFIC COMPLEX

1. Science : Definition.

The word 'science', meaning radically 'knowledge', is no longer very satisfactory because it has at least two major connotations in our society. It is used to describe on the one hand a body of knowledge, and on the other an approach to the world, a method of thought and a point of view especially characteristic of our society. Further confusion is caused by the frequent failure to distinguish adequately between science and applied science or technology.

Panunzio defines science: "a search after bodies of knowledge sufficiently comprehensive to lead to the discovery of uniformities, sequential orders or so-called "laws"; it may be carried on by an individual but it gains relevance only as it produces data which can be added to and tested by the findings of others" (1). Bronowski puts it: "Science is a power of creating new concepts which verify our understanding of the world" (2).

Speculation is not science, although the scientific method may use speculation for the purpose of setting up a hypothesis whose validity it will be the task of the next phase of investigation to disprove. At present the social sciences are prone to confuse science and speculation, exactly as were the physical sciences in the seventeenth century.

2. Scientific Method.

The ascending order of man's methods of dealing with existence can be stated:

1. Appeal to the supernatural.
2. Intuition.
3. Appeal to authority.
4. Pure logic.
5. Common Sense.
6. The scientific method (3).

The scientific method is based on the hypothesis that the world is knowable and that this knowledge can be reduced to order by the human mind. An important step, therefore, in every science is the setting up of a basic order

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(1) C. Panunzio. Major Social Institutions. P.322.
(2) J. Bronowski. The Common Sense of Science. P.135.
(3) S. Chase. The Proper Study of Mankind. P.201.

system which will support the known facts. That system is enlarged, modified or rejected as further facts or results of experiment are fitted into it. Thus a dominant feature of the scientific method is its emphasis on fact-finding, grouping similar items together and experimental verification of hypotheses. There is, therefore, stress on the objective and the quantitative (4). The scientific method depends on induction from the observed, recorded and classified facts rather than on deduction from an accepted premise. It aims, therefore, to upset rather than to entrench a hypothesis.

Panunzio gives the scientist's method of working as follows: "the determination of the field of investigation; the setting forth of a hypothesis in clear and concise terms, or the stating of the problem involved and a tentative prediction of the possible solution; the painstaking assembling of data according to established categories; the classification of data; the verification of findings; and the setting forth of conclusions in clear and cautious terms" (5). Chapin gives this order for scientific research:

1. "Formulation of a working hypothesis of investigation.
2. Collection and recording of the facts of observation.
3. Classification of the facts of observation.
4. Generalisation from the facts of observation" (6).

The process of using the scientific method has been well described by Bronowski. He says: "In order to act in a scientific manner two things are necessary: fact and thought ... The processes of science are characteristic of human action in that they move by the union of empirical fact and rational thought in a way that cannot be disentangled. There is in science a continuous to and fro of factual discovery, then the thought about the implications of what we have discovered, and so back to the facts for testing and discovery in a step by step of experiment and theory" (7). This excellent description has smuggled into it one phase of great difficulty: rational thought. If the phrase is meant to include the operation of intuition there can be little argument. The word 'rational', however, is usually held to mean 'logical' and to exclude the intuitive process. It seems clear that in the application of the scientific method the operation of arriving at a hypothesis offers much

(4) The quantitative emphasis appears even in sciences not apparently fitted for this approach, for example the quantitative approach to sociology by Lundberg.

(5) C. Panunzio. Op. Cit. P.332 - 3.

(6) F. S. Chapin. Cultural Change. P.406.

(7) J. Bronowski. Op. Cit. P.30

scope for intuitive thinking and some scientists put very considerable stress on the need for imagination or intuition at this stage (8).

This is a highly important matter in building since it leads to the question of whether the faculty used by the scientist to reach a hypothesis is the same as, or similar to, the architect's intuitive process of design. Research along this line might shed light on the apparent dichotomy between art and science in building.

In the past, including the nineteenth century, science concentrated on establishing laws of cause. Contemporary science largely rejects causality, objecting that cause and effect are not rationally linked - they merely appear so by the habit of association. This idea is important in design because a design element often begins as a strictly rational response to outside stimuli but ends having no rational connection whatever to its 'cause'.

The great advantage and attraction of the scientific method is that it is the only one yet discovered which produces systems of knowledge which stand firm at least "until a closer fit with reality is found" (9) Such firmness is not, however, absolute but is a firmness institutionally supported because of the obvious material usefulness of science. Society could decide to reject it. If this happened the firmness of scientific knowledge would be impaired or disappear. Chase's affirmation is possibly correct only so long as it is made from inside our society, and it must, therefore, be regarded as adequate only within certain limits (10).

3. Nature of Science.

Fundamental to the viewpoint of modern science is the abandonment of the idea of inevitable effect and the adoption of the notion of the probable trend (11). This means a new fluidity and flexibility of concept, and a belief in, and a quest for, the understanding of processes rather than of absolutes.

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(8) I am indebted to E. C. Leisegang (chemist) for emphasis on the intuitive in the scientific method. He takes the view that too much fact may crowd out the intuitive, with disastrous results. This subject has been examined by W.I.B. Beveridge in The Art of Scientific Investigation. The possibility that we use 'intuition' to describe something not yet penetrated by science must be faced. Certain elements of 'intuitive' activity in architectural design can be analysed scientifically. The relationship between the intuitive and the fortuitous requires examination in the context of the architect's design procedure. See Appendix V (1).

(9) S. Chase. Op. Cit. P.21-22.

(10) R. K. Merton in Social Theory and Social Structure discusses this aspect of science. P.300.

(11) J. Bronowski. Op. Cit. P.82. See Appendix V (2).

Equally important is the refusal of science to tolerate taboos. There must be no area of life barred to scientific investigation: science may not halt at a social prohibition. There must be no social area into which it is illicit to penetrate.

It is inevitable that a critical and sceptical approach should be characteristic of the scientific method because false conclusions based on inaccurate or incomplete data must constantly be guarded against. It is perhaps this fact of scepticism which has led to the antithesis science - art. The popular idea of this antithesis is that science collects dry facts and eventually produces a cautious theory after much hard work, but that the artist by inspiration produces a masterpiece more or less effortlessly. This myth is not worth serious debate. Unfortunately, however, the antithesis is not confined to the popular mind, and evidence of an underlying misconception can be found in our educational system. In architecture this is appearing as a trend in the direction of emphasizing building <u>science</u> (12). This gives the appearance of institutionalising the antithesis science - art. The use of a phrase like 'building technology' would be less damaging and more specific, and would suggest simply the application of scientific knowledge to building. The danger of perpetuating the antithesis consists in the temptation offered to the artistic individual to avoid the rigours of the scientific method. Properly pursued art is as rigorous as science, but the arbitrary and the personal preference are much easier to pass off in art than they are in science. False science can be exposed easily: it will quickly disprove itself. But false art can always hide behind a shield of subjective preferences.

If the scientific is pressed too hard in building, there is perhaps the danger that designers will increasingly flee by the back door into their own esoteric artistic world, and we shall have an even sharper cleavage than now between architect and engineer. There is also the possibility that the perpetuation of the oscillation between the poles (art and science), which has in some measure characterized architectural attitudes for some time, will become institutionalised. The concept science-art does not, therefore, appear very useful as a tool or of any help as a former of attitude. Much more useful is the idea that there is no separation and that building depends on the use of both the scientific method and intuition, provided certain reser-

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(12) Liverpool University : School of Architecture, for example.
(13) C. Panunzio. Op. Cit. P.336.

vations mentioned already, are made.

4. Science as Institution.

Science is usually regarded as a nascent institution. This is somewhat curious as many modern trends are clearly rooted in science, and the scientific method is applied over a large area of life. It may even be said to constitute the core of modern western culture (13).

Included in science as an institution are the institutionalised ways of discovering new knowledge, and their appropriate attitudes of mind, such as organised scepticism, disinterestedness, free acdess to all knowledge and the view that findings must be of universal application (14). On the associational side there are research groups, foundations, scientific societies and scientific educational bodies. Also institutionalised are recognition of scientific discovery, honours and titles and prestige within the scientific group, and in the society at large.

Science in the above respects has similar characteristics to other institutional complexes. It has, however, one important feature which is not merely a-typical but is in flat contradiction to the usual situation with regard to institutions. Normally speaking an institutional complex depends for its continuance on society accepting, more or less implicitly, certain beliefs or views which are regarded as basic to the institution and to which individuals are expected to subscribe largely without question. It is loyalty and respect which ensure the continuance of the institution. This principle is most obviously seen in the religious complex: no church can continue as an institution without its members adhering to the faith. But it is equally true of all institutions. Education could not survive without underwriting the validity of systematic training as opposed to inspiration and revelation.

Science, however, makes no reservations. It works on the basis of certain beliefs which are not held to be absolute or unexaminable: even the central tenets of science itself are at any time liable to undergo critical re-appraisal, and it can be said that it is an obligation of science frequently to re-examine its own core (15).

The significance of this essential difference between the scientific

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(13) C. Panunzio. Op. Cit. P.336.
(14) R. K. Merton. Op. Cit. P.309.
(15) R. K. Merton. Op. Cit. P.303.

and other institutions is that science should never have a very serious lag at its centre as have other institutions. There is no sacred or taboo area maintained for the stability of the institution. These taboo areas are prominent in those institutions, like religion, which depend on affirmation. It is a mark of the degree to which science has penetrated all departments of life that we give, in general, more credence to scientific, or objective proof, than to subjective affirmation.

Science does not examine its own core only, but also that of all other departments of thought and action. The approach of science may, on occasion, seem almost like attack, and the body of institutions which is the subject of scientific examination will tend to defend itself against science by stressing such antitheses as science - religion or science - art. In every case the non-science part of the antithesis will contain institutions which those who defend them are afraid to have exposed to scientific examination.

In building we have a sacred area called 'art' or 'aesthetic'. In general, and with application to all the arts, a good deal of scientific thinking has been applied to the problem of aesthetic. Not a great deal of scientific work, however, has been done on the aesthetic of buildings. Just as the application of science has benefitted religion, its application to aesthetic in building could be illuminating. But in order to allow this to happen we must expose our sacred area, and science must be allowed to penetrate as far as it can into the 'art' of building.

5. Social Science.

The social sciences - sciences dealing with man himself - are relatively new as systematic disciplines. They are: social anthropology, sociology, economics and political science. They depend on the idea that the methods of science are as applicable to human behaviour as to any other natural phenomenon and that, therefore, the antithesis physical science - natural science is not useful, and is even positively false (16).

Chase defines social science "as the use of the scientific method to solve questions of human relations" (17). There is evidence to suggest that

(16) G. A. Lundberg. Foundations of Sociology. P 10.

(17) S. Chase. Op. Cit. P.22.

the social sciences are moving in the direction of a general science of man which may result in a new view of the humanities (18).

The significant new idea here is the aim to discover new knowledge. The attempt is to find new facts or to order known facts in a new way with a view to applying the knowledge to those spheres of human activity which have hitherto been largely unpenetrated by the scientific method. The older view was that social improvement is a matter of education: a question of paying closer attention to what the wise have already told us but to which we have not listened (19). The social sciences will attempt to objectify and quantify data in these areas and thus make them available for scientific use. This process is already happening: we will accept a 'fact' from a psychologist but reject the same fact from a priest.

The social sciences provide the theoretical basis for the social planning which now appears a necessity for all modern industrial societies, and it is to them that planners, architects and all those concerned with influencing the physical environment must look for the basic knowledge of how people behave, how cultures are created and how societies operate.

6. The Application of Scientific Method to Building.

As recently as twenty years ago science and building, and certainly science and architecture, could not be comfortably thought of together in the same bracket. Laboratory work on materials was, it is true, carried out and there was research into structures, but in the world of action both contractor and architect worked by rule of thumb, on the basis of precedent and experience. The architect was never thought of as having a scientific approach and in practice the limit of his science was reached when he had soaked a brick in a bucket of water, or prodded a piece of timber with his penknife (20). Costing was of the same primitive kind, the only accepted way of estimating being the cube method. Even for this the price per foot cube was on the basis of what the last job cost and not on any scientific assessment. The planning of buildings was also strongly traditional and without analytical reference to their

(18) The interdisciplinary research group at Harvard, and the Institute for Social Research, Natal University, are notable in this connection.

(19) S. Chase. Op. Cit. P.19.

(20) This is not an exaggeration. The middle-aged and older architects of twenty years ago rarely had a scientific approach to structure or materials They relied almost exclusively on experience.

actual uses.

In aesthetics during the same period, it is startling that the discrepancy between the prevalent neo-Georgian architectural expression and a quite different attitude in the designing of other things should have remained largely unnoticed. The renaissance principle of rehashing past styles was still the guiding thought in architectural aesthetics in spite of the social and technological revolutions of the previous fifty or so years. One has in mind inventions like reinforced concrete, the development of the motorcar and the aeroplane and the many changes in society's system of values. The cultural lag in architectural aesthetics was long, yet largely unnoticed, and society was able, without apparently having any feeling of incongruity, to live in bogus Tudor houses and ride about in motorcars of good contemporary industrial design.

In considering the highly interesting situation of the 1930's it is useless to allocate blame. Neither the architects nor society at large could reasonably be called to account. It is much more rewarding to view the phenomenon as the interaction of two reciprocal facts. The first is that science and applied science had only been admitted grudgingly to building during the preceding century and where it had been applied most successfully in new materials like iron and steel it was looked at askance by the 'cultured' element of the society. The second fact is that the architect and society together had tended to emphasise the artist role of the architect. This again cut off the potentially beneficial results of applying science to building. These two factors acted reciprocally together to produce the cultural lag in building which reached its maximum in the 1930's.

In sociological terms the architect of the period (21) was not so much preoccupied with the practical problems - economic, structural, planning and aesthetic - of building as with the problems presented by the need to make the building fit the traditional expectation of what a building should be. He was thus asked to make a ten storey city building look like a Regency residence. Appearing to be held up by its brickwork in fact it had to be supported by a steel frame discreetly hidden from view.

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(21) A few architects were practising with an altogether different attitude, which depended on eliminating the cultural lag: Le Corbusier, Gropius, Mies van der Rohe. There were few. In 1938 in London there were about six firms only using these new concepts. They had little work.

Into this situation the architects' sacred core of institutions dovetailed very neatly. The words 'art', 'intuition', 'design', and 'aesthetic' were all used to defend this core. The architect's job was essentially non-scientific and therefore his characteristic contribution - call it the aesthetic for the sake of a name - was able to be protected in its then accepted form for an abnormally long period of time. Always when attacked along the line of the scientific approach whether in planning, structure, or aesthetic, the architect could retreat behind the palisade of his art, there to remain unassailable. Thus architect and society had worked together to produce and maintain a self-closing system with fossil characteristics.

An interesting feature of this system was its extraordinary efficiency against the spate of new methods and materials which was beginning to form the flood of the 1950's and 60's. That efficiency can now be seen as a very considerable misfortune in that a whole generation of architects failed to make any serious adjustments in a rapidly changing world. The economic pressure of new methods and materials cannot be ignored for long in a society like ours having a cultural configuration in which business, science and change are such prominent elements.

There is perhaps a lesson for our own epoch in the design history of the nineteen thirties. To the architects of the time their aesthetic had become a special and rather precious possession which was their justification for existence as a defined group in the society. The aesthetic had become encapsulated and was a means of identification in the same way that engineers have become identifiable by the use of the formula. Architects of the present decade would, no doubt, be horrified if it was suggested that the same danger confronts them. But it may if they allow the image society is forming of them to be dominated by the idea of the aesthetic, or worse, by the idea of a single kind of aesthetic expression.

The post-war period has seen a steadily increasing emphasis on the use of the scientific method in building. It is now obvious that all aspects of building can benefit from this approach - even the expressional - and research is being carried on in the following areas with a view to improving the structure, performance, costs and appearance of the building:-

(1) The building's accommodation. That is, research into the way people use buildings and what they do in them. Examples are the

work of the Nuffield Foundation into the design and function of hospitals, and research into minimum standards of housing accommodation carried out by governmental agencies in various countries. Research into the performance of actual buildings in use is also coming into prominence.

(2) Constructional methods. Research for new methods and improvement of existing ones. Examples are the development of prestressed concrete and steel elements, advanced work in the structural use of timber and mathematical research of the type done by Buckminster Fuller.

(3) The nature and characteristics of known materials and the development of new ones. For example, the use of plastics, non-ferrous metals and fibres.

(4) Research into costing and financing of building. For example the work of the South African National Building Research Institute on Bantu housing costs and that of the British Ministry of Education on schools.

(5) The classification and systematization of trade and other information. For example the research sponsored by the Architects' Journal in Britain.

(6) The rationalisation of techniques in the factory and on the site. Work on modular co-ordination is an important aspect of building science.

(7) The application of scientific management to professional and contracting firms.

(8) Research into the relationship between the building and its environment. Much planning research is concerned with this aspect of building. For example the research being carried out by Natal University into the relationship of blocks of flats to their sites.

One is hesitant to add research into the expressional to this list. There is, as yet, very little application of scientific method to this aspect of building. A great deal of work is required on the origins and reasons for expressional forms before it can be said that any serious body of knowledge exists. Such forms may be random or arbitrary in their emergence. This, however, does not preclude their being scientifically approached. Scientific analysis of this area would do much to enlarge our understanding of the factors which determine symbol and aesthetic.

It will be seen from this list that in fact the scientific approach is being applied to the whole field of building although in varying degrees. Since a characteristic of our society is the increasing use of rational methods, it seems reasonable to assume that this trend will continue and increase rather than otherwise.

An important question at this point is the problem of just how far scientific method can penetrate into the areas of building listed above. Are there limiting factors? If so, what are they? Why cannot science take over building completely?

The most significant limiting factor is the problem of value judgment. Science can make clear for us the alternative lines of action but it cannot make a choice outside the objective facts: it cannot make a value judgment. For example, research may show that it is more economic of space, labour, and heating costs to combine living-room, dining-room and kitchen into one large area of use with differentiated zones. The values system of society, however, may make the acceptance of this idea impossible and may dictate the splitting off, as a separate room, of either the kitchen or the living-room. Similarly, research may prove that the most healthy, economical, time-saving sociable and aesthetically desirable way of urban living is to house people in very large blocks of flats, widely spaced with parks between them. The values system, however, may make this unacceptable and permit only houses or small blocks of flats (22), thereby blocking the effective application of knowledge.

Essentially, therefore, the factor which makes impossible the total absorption of building by science is that society is the client and the client's values system is always brought to bear on the building, in terms of accommodation, and financial and expressional preferences. Viable scientific solutions may be unacceptable to the values system because of cultural lag or flouting of the mores. The non-parlour type council house in Britain was (and still largely probably is) unacceptable because it did not provide a

(22) This 'conflict' between the logic of our scientific knowledge and the values system of the society exists today. Various scientific solutions to the city are known, but at present they cannot be related to the values system existing.

'front room' when that element was considered as an essential component of a house by the class of society for whom the non-parlour type house was intended.

Although, however, the scientific method cannot usurp the position of the values system in society it can perform the indispensable task of examining it, trying to understand how it works and establishing trends. Thus in the case of the non-parlour type council house a sociological analysis of the problem might have helped by showing that: -

(a) the class (working class) for whom the house was intended would object to having no 'front room'.

(b) middle and upper class opinion had long since got rid of the 'front room' idea.

(c) values concerning ways of living in relation to the physical environment have appeared in the past to descend from class to class, tending to originate nearer the top than the bottom of society.

(d) an assessment of how long it would take the parlour idea to become at least obsolescent in the class being provided for.

The adoption of scientific solutions does, of course, help to modify the value judgments of society in the direction of the rational. In building, the sky-scraper or high density block, has come to be accepted in spite of an opposing value judgment against it. The value system even went so far as to affirm that human fertility would disappear in individuals who lived so far removed from the soil! The evaluation of the flat block has improved in recent years due in part no doubt to improvement in design based on rational approach. It seems that the use of new methods and materials does produce eventually a new evaluation of expression, both in symbol and aesthetic (23). There is, therefore, in practice a reciprocal relationship between the science of building and the current value system of society, so that whilst science cannot become the value system, it most certainly does influence it. It is, no doubt, a very salutory thing that science in this way constantly challenges the values system compelling it to reassess the validity of its constituent parts.

If this thought at first appears to give the impression of inevitable

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(23) There is at present in Britain (1959) a resurgence of Tudorbethan, perhaps in reaction to the application of science to building in the postwar period.

progress by the simple means of increasing application of scientific method, the fruits of research very rapidly dispel any such idea. Research clearly shows that unilinear progress of this kind is deflected specifically and intentionally by the values system (24). The evidence examined for this was the situation in Britain from 1945 to 1960. Briefly, the sequence was as follows. The Ministry of Health and Ministry of Town and Country Planning had by 1945 produced a good body of advisory information on house design and estate layout for local authorities undertaking municipal housing. The period of house-building by local authorities which covers the next ten years put the recommendations, many of which were based on scientific analysis, into bricks and mortar. Partly because of the scientific approach and basic research which lay behind the recommendations, partly because of the need for strict economy and partly because the resultant severity of style was not unacceptable to the designing architects, these houses were plain and simple in appearance, depending generally only on good proportions and materials for their appearance. The standard of design was often high and it was excusable to imagine that a new level of performance and appearance had been reached and examples set for all future housing. But to indulge such hopes shows an ignorance of the way the value system works in England. As private developers were increasingly allowed to design and erect houses for private sale it became clear that the houses must on no account look like council houses - however good they might be from the angle of cost, layout, design and appearance. The people buying private houses were, in the opinion of the builders doing the developing, insistent that they did not want the new type of house, now associated with council estates, for themselves. Two ways generally were consequently followed by the builders: either they put up copies of semi-detached houses of the inter-war period or they commissioned someone, often an architect, to design houses specifically different in appearance from those built by local authorities.

The explanation of this sequence is that the good housing of the local authorities became in the value system a symbol of class distinction. The fact that it was perhaps the most rational house building ever carried out

(24) The evidence taken came from the author collaborating with a general contractor in Bristol (G.H.Pearce) in the design of 34 houses in an estate for the £3,500 range of house. This contractor has a wide experience of building for the speculative market and his evidence showed that there is a clear desire on the part of middle class, and perhaps aspirant middle class, to avoid anything even slightly resembling a council house. See also below.

in England did not count at all. What ought to have happened was that the benefits of research and scientific approach should have appeared in all future housing. In the event, because of the intervention of an adverse value judgment, they have not.

The response to such a situation should not be dispair or an abandonment of research and scientific approach, for what this sequence of events brings out clearly is that here lies open a field for scientific study. What determines our values and symbols? In making buildings, what may we anticipate the results to be in terms of values and symbols? For it is clear that whenever we build we have influence on these. Research can hope to show us just what this influence is, and can help us to predict with some measure of success.

It should be noted that had the fruits of research been applied to houses at the top of the social scale a quite different result would have emerged . In the present situation in Britain social groups tend to imitate those who appear to them to be higher up the social ladder. The results of a scientific approach to housing would therefore have most probably passed through the entire society from the top downwards by a process of imitation. The process of improvement in housing would then have been helped rather than hindered by the values system. This principle has great importance in countries with large populations of low income level. In South Africa, for example, excellent research has been done into the problems of African housing, both house design and estate layout (25). Almost none has been done for European housing. Consequently African residential areas have had the benefit of able and well-trained designers whilst the European areas have not. The differences are becoming visible and the danger is that European housing may not be able to benefit from the research because the values system will make solutions used in African housing unaccepted in European areas. This problem is not confined to the actual house but is applicable to the whole environment of residential areas: shopping groups, civic buildings, road systems and the ways in which houses are arranged in relation to each other (26).

(25) E. G. Research Studies on the Costs of Urban Bantu Housing C.S.I.R.

(26) Supposing the Radburn system were accepted as the best solution for layout in spite of its difficulties, if it were used extensively for African townships it would almost automatically be rejected for European use. But vice versa would cause no difficulty.

It is, therefore, clear that the level in the social scale at which research is applied must be regarded as extremely important if its beneficial results are not to be diminished because of considerations of prestige and status. It is not sufficient to carry out useful research and leave chance to decide its application. We need to find out at precisely what points in society the results should be applied without risk of their fruitfulness being reduced.

We must now look at the question of whether it is in fact possible in building to ignore the value system and to build purely on the basis of scientific research. This is probably not at all possible in a situation where the user of the building has any say, whether as public or private voice, at the design stage. But in certain circumstances there may be virtually no say by the user. For example, when the European builds houses for Africans in South Africa. Here the aim has been to build on the basis of research into the physical facts: costs, size of family, availability of land, transport problems etc. The value system of the African himself has scarcely impinged on the final result. Even the social research has been purely physical in its approach. There is here no expression of preference by the people being housed and no public opinion which has to be respected. The designers are theoretically free to design outside the values system of the people for whom the houses are intended.

In fact, the values system subconsciously accepted is a modified European one. For example, a degree of European privacy is considered essential. This may take the form of providing separate bedrooms with doorways but omitting the actual doors (27). Or providing a sink but no drain to take away the waste water (28). No doubt, the assumption is that the urban African in South Africa aspires to the European way of life. In general this may be true,

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(27) I do not wish to suggest here that Africans in their society attach a lower value to privacy than do Europeans in theirs. The important point is that in designing houses for Africans the Europeans assume that the Africans will require individual privacy in the matter of bedrooms just as Europeans do: the European values system is used. The minor point is that, although the European designer proceeds on the assumption of the desirability of privacy, he in fact provides a lower standard of privacy because it is a part of the European's value system that a lower standard in everything is all that an African needs, or ought, to have.

(28) At Umlazi, Durban. The reason was the cost, allegedly, of providing a disposal system. But the European values system clearly carries the attitude that kitchen and bathroom facilities of a standard much lower than that befitting a European household are quite good enough for Africans.

but in particular it is necessary to apply the scientific methods of anthropology and sociology to discovering the precise areas of overlap and divergence in the two cultural patterns. Research would illuminate two major aspects of the problem:

(a) What are the trends in urban African life that are significant for house design and urban layout in the present immediate economic and social context?

(b) What is the rate of change attaching to these trends? It is necessary that the house and estate layout should be such that the trends in the values system will not over-run them too quickly. A situation of over-run by the values system may already be emergent in many African residential areas (29).

These townships in South Africa constitute perhaps the most materialistically-determined examples of modern urban environments. A study of their effect on the development of the African town-dweller should prove rewarding.

A comparable situation can be shown to exist in Britain or North America with regard to municipal housing. Here the designers have no effective client. They will, therefore, only be able to design within the limits of their own knowledge of the values system. It is at this point that research can be extremely useful: it can act as a means of making clear the details of the values system in the absence of the future user at the design stage. In general, as the individual client disappears the designer-client relationship, which in the past has ensured that the building is roughly suitable to the values system of society, must be replaced by adequate research and designers must learn to use the results of such research in substitution of the old face-to-face relationship.

It is evident that in the past the values systems of the various societies, for which we have adequate evidence, had a great deal to say about the nature of the buildings erected. The conscious renaissance switch from Gothic to Classical expression is a good example. The Gothic quest for height in mediaeval France, the impersonal quality of 18th. century English building (30) and the romanticism of nineteenth century railway stations tell the same

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(29) The Minimum Standards for African housing assume that the living room is to be used also as a bedroom. In the upper urban classes of African this is already obsolescent as an acceptable standard.

(30) The value expressed here is belief in a mechanistic, mechanical and clock-like universe: the mathematical finality of Newtonian physics is surely present in Prior Park, Bath (1735-1743). The excessive emphasis on verticality which appeared in some German architecture in the 1930's is worthy of examination in this context. It might, or might not, be found to relate to a certain sentimentality in the German values system of the period.

story of a shift in the society's values system.

What appears new in our society is the heavier emphasis on science as a viable way of attacking all problems. We now see how to apply the scientific method to areas of building where previously rule of thumb has been the only approach. This is producing a new relationship between science and the values system as far as building is concerned, one of the most important results of which is to make change more acceptable more quickly.

The significance of this part of the analysis is, therefore, that science and the values system are in a reciprocal relationship, each affecting the other in building. This relationship is not new, but the larger part being played by science in this relationship does constitute an important new feature of our society. It should be noted that science is not concerned as 'causing' new development in building. The most it probably does is to assist in producing modification in the values system, which in turn allows the new knowledge to be put to work. There is no question of simple causation: the concept of reciprocity is again more useful than that of cause and effect.

7. Building Example.

In designing the buildings for the flour company a scientific approach was adopted for such aspects as the arrangement of the various blocks on the site, the determination of the form of the factory building, and the general disposition of the zones of use in the office block: office staff, directors' suite and canteen-demonstration-toilet area. The factory was rationally designed to meet the requirements of (a) automated manufacturing process - a tower since the process is vertical, (b) single story packing and dispatch area - substantially an undifferentiated cube space, and (c) service functions - boilers, first aid, toilets and staff rooms.

The factors to which this scientific approach was directed are clearly not all of the same kind. The problem of fitting a building round a production process can be solved in our society almost entirely along rationalistic lines: there need be very little influence from institutions, mores or folkways. When the machinery of a factory requires no constant attention from human beings, the design of factory building can be as scientific as we can make it. Machines do not need windows, minimum ceiling heights, fire escapes, or psychologist-designed colour schemes.

When, however, we come to consider the layout of office space, we find that we cannot apply our scientific method to the problems to any greater extent than the sociological situation will allow us. Thus, in the layout of these offices scientific method could only be used to satisfy the requirements of the institutional situation; the differentiation between office workers, directorate and demonstration to members of the public could not be questioned and had to be accepted as a given factor.

A comparison of the extent of the use of scientific approach in the various case studies leads to the observation that there is also another sense in which the method can be applied in two distinct ways. Following the order as before, the first of these is the application of science to the solution of a problem using only the rational techniques of science applied strictly to the physical problem under consideration. Thus we can investigate the problem of human shelter, we can review the technical resources available and we can arrive at Buckminster Fuller's answer: the Dymaxion house.

The second method open to us is to apply our scientific technique to using the existing institutional situation as successfully as possible. With this method we do not simply ask what is the strictly rational answer to a specific problem, but we examine the institutional context of the possible solution and accept it only when the optimum result can be achieved through the institutional situation. This may sound complicated, but in practice it resolves itself into this kind of decision: to build a wall of solid brick rather than of concrete framed construction with brick infill, although the latter would use less bulk of material. The operative institutional factor here, causing the decision for the non-rational method, is the fact that brick-work is still regarded as simpler and more straightforward by the building trade, and therefore is likely to be cheaper and quicker.

Scientific method can, then, be applied either totally, having little or no regard to the institutional situation, or it can be applied specifically to maximise the advantages of the institutional situation. In the case study of the wholesale food warehouse and offices this latter approach was used in order to obtain as economical a design as possible. The building was designed to use workers from a minimum number of trades, and the work of each trade was kept as simple as possible and was channeled into a single major effort. in terms of time so that trades did not have to return to the job a second time. This approach was consciously tried after the first kind of scientific approach had been proved too expensive. In this first attempt the steel frame, for example, had been examined as a prefabricated system having no purpose-made members in it. In theory this should have proved cheaper than any purpose-made frame, but because of our institutional system in which we have many small firms making structural steel, the benefits of large scale mass production are not obtainable in this particular field of construction. Because of the structure of the industry it is possible for a small firm with low overheads to fabricate in small quantity at a cheaper rate, in certain circumstances, than a large firm can mass-produce. Design, therefore, must have regard not only to the institutional situation in the building industry but also to that of the industries which feed it.

In making the distinction between these two ways of applying scientific method to building we are very near the heart of our subject. Here we see clearly that there are two 'logics'. The logic of the scientific approach which takes all knowledge and applies it as far as possible eliminating all considerations except those of science: and the logic of the institutional situation which is satisfied by thoroughly understanding the sociology of the society and meeting its demands. In highly developed societies in which there is great division and specialisation of labour these two approaches may eventually merge, although there is little sign of that happening in either the British or the North American context yet. In primitive cultures, however, where skills are low a wide gulf is inevitable. This means that in designing houses for erection by Africans, for example, it is essential not to disregard the institutional situation of the society if economy is to be achieved. The only alternative would appear to be the total prefabrication of the dwelling unit in the factory.

The preceeding analysis brings out a major characteristic of building which differentiates it from other processes of production. This is the involvement of building in so many ways with human beings and their groups. The process of making an individual building touches society at many more points than does the creation of any commodity which is entirely factory-made. If we take this in conjunction with the fact that buildings have such relatively long lives and immobilise relatively large blocks of capital, we reach the idea that building is very closely tied into its institutional situation, and we must conclude that this is a major field for research.

8. Conclusions.

(1) Intuitive thinking must be included as a valid component of scientific method.

(2) Research is needed to compare the methods used by the scientist to reach a hypothesis and those used by the architect in design. This would include a study of the attitudes of the scientist to his hypothesis and of the architect to his design. Does the architect seek to disprove the validity of his design? Is this a useful distinction between the scientific and the 'artistic' approach?

(3) Scientific truth is not absolute and society could reject it. Must aesthetic content be considered in the same way: relatively?

(4) Cause and effect are not particularly useful as a tool for this research. The notions of trend and process are more fruitful.

(5) No area of thought is barred to scientific investigation.

(6) The antithetical concept of science-art is not useful as a tool for research. The notion that the two are complementary in a single process is more useful.

(7) Science includes the institutionalised ways of discovering new knowledge.

(8) Science is unique as an institutional complex because it must always be prepared to question and reject, if necessary, itself. As a result of this, science should not have serious lag at its core.

(9) Science is the tool with which we examine the other institutional complexes.

(10) In building there is a sacred area called art of aesthetic. Penetration by science into the 'art' of building is required.

(11) The social sciences aim to provide the theoretical basis required for social planning. It is to these sciences that architects and planners must look for the basic data about the society with which they are dealing. Only scientifically processed data should be regarded as acceptable: homespun social science material is no longer adequate.

(12) A scientific approach to building and planning is recent. This is an explanation for the long lag in architectural and planning aesthetics.

(13) In diagnosing cultural lag allocation of blame is useless. The social facts preceeding the lag should be examined.

(14) It can be deduced that the scientific approach may be a measure of protection to architect and planner saving them from being locked in -

an institutional situation disfunctional to the society as a whole.

(15) All aspects of building, including the expressional, can benefit from the scientific approach. Research into how buildings are used, how they perform, their construction, materials and siting, the organisation of the industry and other techniques of design are all avenues for research which have received some attention. Some research is also being done on the relationship between the behaviour of the building's occupants and the building's performance, but this field has the limitation that no general sociology of building exists. The success of much building research ultimately depends on factors which can only properly be treated in a general sociology of the subject.

(16) Scientific research is required into the expressional aspects of building.

(17) Scientific research cannot settle matters of value judgment. It can, however, provide all the facts necessary for making value judgments. It can also find out how the values system works in the relevant areas of the culture.

(18) The values system of a culture may prevent the acceptance of possible solutions made available by science. This situation exists acutely in town planning in the culture of the West.

(19) An effect of the application of science to building is that innovations are made. These in turn act to modify the values system. There is a reciprocal relationship between innovation in building (and planning) and the values system.

(20) The values system may act specifically to inhibit improvement. This is of great importance to those planning innovation. It is naive to think that the self-evident rightness of an innovation is sufficient to ensure its acceptance.

(21) The establishment of trends in society is one of the most important contributions of science. Trends make possible prediction, which is the basis of planning.

(22) The application of the findings of research needs to be considered in relation to the way in which it is likely to spread to buildings in general. To have maximum effect the point of application chosen should be such that the benefits of high status and prestige can be obtained, so that diffusion will follow naturally. The application of new knowledge

at an inappropriate point in the societal structure may reduce the effectiveness of the knowledge applied.

(23) Research is required into how the findings of research can be applied. How is information to be disseminated effectively? There is much evidence that a great deal of published research is not applied because those concerned with building have no time to read. This problem of communication in its turn is clearly connected with the problem of storage of information and its accessibility. It is also connected, more subtly, with the work situations of the architect and others. The work situation of the architect is so structured that there is little inducement to systematic attention to published research, and this may in fact be a more fundamental cause of failure to apply the findings of research than the difficulties of solving the problems of information storage and accessibility.

(24) In a democratic society it may be assumed that it is impossible to build purely on the basis of scientific knowledge and to ignore the values system. In cases where the values system is ignored or unknown by the designers, they will tend subconsciously to work to the requirements of their own values system. In this context detailed knowledge of the culture for which the buildings or towns are being planned is the true beginning of the design process.

(25) In South Africa research is required specifically directed at the relationship between the values systems in regard to African living and urban environments designed by Europeans for Africans.

(26) An important purpose of research is to fill the gap produced by the partial disappearance of the individual client. We have a new situation in that much building and almost all planning is done by government agencies and there is no user-client. Research into the precise sociological conditions of a problem is essential to make good this deficiency if a reasonable degree of user-satisfaction is to be achieved in both building and town design.

(27) A result of the application of research is to increase the rate of change. It is the change in change itself which is most significant.

(28) The values system and science in building and planning are in reciprocal relationship. This is not new, but the increasing influence of science

on the values system is new. This influence will increase as the general influence of science makes us increasingly able to control our societal evolution.

(29) Scientific method can be applied with little reference outside the purely rational requirements of a solution to factory design, particularly having in mind the increasing trend to automation and the reduction in the number of workers.

(30) When designing buildings for people the institutional situation of their behaviour patterns has to be taken into account and the scientific method cannot go beyond understanding and providing for these: it cannot solve the human side of the problems on a purely rational basis.

(31) Scientific approach can be used in two distinct ways to deal with the fabric of the building: (1) pure scientific solution strictly in terms of the techniques available, but ignoring the institutional situation of the society, and (2) the application of science to understanding first the institutional situation and then using that knowledge to design strictly within the institutional framework. There are, therefore, two 'logics' available for approaching the design of the building fabric (as opposed to the planning of the building).

(32) It is an important characteristic of building, setting it apart from other production processes, that it touches society at very many points. Hence the need for a sociology of building.

CHAPTER VI

RELATIONSHIP OF CERTAIN INSTITUTIONAL COMPLEXES TO ALL BUILDING TYPES: (4) EDUCTIONAL COMPLEX

1. Science and Education.

Although these two complexes are dealt with in separate chapters, it is useful to bear in mind that their spheres of interest overlap and that the institutions of science and education have some features in common. The chief difference between them lies in the fact that science aims to extend existing knowledge and to discover new knowledge, whilst education is concerned with the transmission and handing on of knowledge from the older to the younger generation and is not primarily interested in the testing or improvement of existing knowledge (1). There are, of course, many refinements of difference between the two, as will readily be appreciated if these two chapters are read together.

2. Education: Definition.

Education is both non-formal and formal. Non-formal is given by the family, the play group, contact with the many sides of life, the press, radio, cinema, travel and adult work and play groups. It continues more or less throughout life. Formal education is given by the school, university, technical college, individual tutor and work group (apprenticeship), and usually occupies only the earlier years of life, although systematic formal adult education is increasing in importance in some countries.

Formal education may be defined as the systematic training which the individual receives from his society in order to condition him to fit into the cultural pattern of that society by the development of his individual potentialities.

Non-formal education could be defined similarly, except that "systematic training" would be omitted and some such phase as "informal guidance" would replace it.

3. Education: Purpose and Aims.

The basic purpose of education is the continuance of the culture. Without formal education no society can continue as a stable organism (2).

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(1) C. Panunzio. Major Social Institutions. P.242.
(2) Primitive societies often have highly complicated educational systems to ensure continuance: e.g. the Bantu peoples.

Function may be seen clearly in the definition of an educational system as "commonly shared adjustive patterns of social action organised round the group need for the initiation of every new generation into the group's way of life, and the group end of the preservation and perpetuation of the social heritage" (3). More simply, the function of education is to teach the new generation behaviour patterns necessary for ensuring the continuance of the society as an on-going process.

In relatively static societies this concept presents no difficulty. Change is very slow and substantially the educational requirements of the younger age groups can be satisfactorily met by the older generation. When, however, change in the society is so rapid that it becomes obvious that there are major differences between the culture to which the older generation was conditioned and that to which the younger generation must now be trained, this simple view of the function of education is clearly not adequate and is too restinctive as terms of reference for those on whom rests the responsibility of educating the rising generation.

It is perhaps a consciousness of this difficulty which has led to anotherview of education : the individual diversity view. This view puts emphasis on equipping the individual to use his resources to the maximum (4), rather than on the conditioning of him to meeting the requirements of his immediate cultural environment.

Some writers think that this attitude is too narrowly extreme even in a rapidly changing society like our own, and perhaps we are on safer ground to say that education's "greater task is that of looking through and beyond the individual to the development of the inter-relations of person with person, group with group, to a new synthesis in terms of human welfare" (5).

It is clear that the function of education may be placed between the two extremes of exclusive transmission of the existing social heritage and the exclusive equipping of the individual to develop his own resources. This observation leads immediately to the question of educational aims. These can be given as : fostering of contributive attitudes, preparation for adaptation to the group, acquisition of knowledge, development of vocational skills, and self-realisation. These can be generalised into : group solidarity, individual effectiveness, telic social change; the individualising process and the

(3). C. Kumalo. Education and Ideology in S.A. P.29-30.
(4). R. S. & H. M. Lynd. Middletown. P.231.
(5). F. J. Brown. Educational Sociology.

socialising process.

It is perhaps training for future change which is most important for our society. Change, technical and social, is a major characteristic of our cultural pattern and it is likely that the view of the function of education emphasising transmission of the cultural heritage only will run the risk of not being capable of sustaining individuals in middle and later life in a society in which change is so strongly dominant (6). It must, therefore, be an aim of education to serve as a telesis-promoting element in society, and to train the individual so that he can deal adequately with change.

In building this need is very obvious in the training of the architect. If the simple transmission view is taken for architectural education it means that the student is given a largely static attitude to planning, structure, materials, economics and aesthetic. Such a static view is contrary to the facts: structural methods, materials and aesthetic are constantly undergoing change as can easily be measured. It seems essential, therefore, that the architect should have formal training in how to deal with changes that are happening and indeed in methods of inducing desirable change. This does not imply that traditional cultural patterns must be ignored or repudiated : only that the architect must be equipped to deal with the changes that will happen whether or not he is conditioned to meet them. As an example, the team work view of Gropius may be quoted. He points out that architectural design is divorced in architectural training from first hand knowledge of industrial production methods (7). Since industrial production is of the essence of our society, an aim of architectural education must be to bring the architect into the production team. He must be trained to respond to change and conditioning to change must be regarded as a vital part of architectural education. "To provide for change is the <u>creative</u> function of education" (8).

In parenthesis it is useful to note that status assumption is increasingly becoming a function of the school and is being lost to the family. This is not an avowed aim of education but is in the nature of a by-product or latent function. It may be inferred from this trend that our society is placing a higher value on education of the formal kind than hitherto. We should also

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(6) This is apparent in the way in which architectural education of the period 1920 to 1945 (in general terms) has left many architects high and dry.

(7) W. Gropius. The Scope of Total Architecture. P.23 et seq.

(8) A.K.C. Ottaway. Education and Society. P.9.

note that the school and the university are important promoters of group-formation and group-continuation after the completion of the formal education. This also is not an avowed purpose of education but is a latent function.

4. Nature of Education.

The most significant characteristics of formal education in our society are that it is systematic and compulsory; that it is carried on in organised groups and is a communal or state responsibility. The individual is therefore unable to avoid it, and must inevitably be moulded within fairly closely defined limits into the personality patterns approved by society. In spite of educationalists affirming that education must teach the individual to think for himself it is clear that in fact the educational system trains the individual to think for the most part along channels approved by the community. This being so, it is not surprising that education is still largely unscientific in its general policy tendencies, which remain traditionally based however scientific may be the actual system of instruction (9).

The nature of the education received by any group in any society depends on the nature of that society's total culture. The Victorians, caught in the dichotomy industrialisation - art understandably gave an artistic emphasis to the architect's education - an emphasis which is still with us as an example of cultural lag. The contemporary culture of the United States having material success as a dominant goal inevitably puts emphasis on training for "getting ahead". Ottaway says that the education a society provides is determined by the dominant social forces in the society (10). Hertzler also observes that "Education ... being specifically charged with the task of transmitting the culture, is strongly reflective of the total configuration" (11).

Inherent in the present concept of education is the professionalisation of teaching and the rigid control of syllabuses by bodies external to the teacher. This leads to the question of just how much the state or other body can standardise education with safety to its own ends. If the state aims to

(9) C. Kumalo. Op. Cit. p.103 - 4 puts it: "many modern educational systems (are) based on tradition and the crude rationality of policy-makers and law-makers rather than on scientific normative ideas that the educational sociologists have madd available." Architectural education is no exception.

(10) A.K.C. Ottaway. Op. Cit. p.58.
'Social Force' is here to be precisely defined in terms of the activities of various groups, and not as a hypothecated force operating mystically in the on-going social process.

(11) J. O. Hertzler. Social Institutions. P.139.

to use the educational system to indoctrinate the rising generation with ideas conflicting with those of the individual teacher, he will find himself as a public servant in an anomalous position (12). This may produce a very dangerous situation for the state and can scarcely serve the best interests of education. In architecture an all-consuming state may attempt to control the teaching of architectural style in the interests of propaganda for itself (13).

It should be noted that the danger outlined above is more serious in a society like our own which has rapid means of communication and control at its disposal than was so in earlier civilisations in which education was not heavily centralised and in which the examination system was not dominant. It is obvious that in a centralised system of education which depends heavily on the examination no individual or school has very much scope for experiment in education.

In the West education is mainly in the universalistic liberal tradition; it puts heavy emphasis on the individual's right to self-development according to his own wishes; it allows freedom of opinion and expression of that opinion and holds that knowledge is open to all. At the back of this system of attitudes lie the ideals of the French and American revolutions. This is the soil in which western science has grown and it is a widely held opinion that this is the only soil in which it can continue to grow.

Traditionally western education has had, and still in large measure has, a literary emphasis. This is unfortunate because it tends to make literature more acceptable than the visual arts. There have been educators who have realised this defect but it does not yet appear that they have succeeded in materially modifying the popular view (14). The current English emphasis on the higher status of the grammar school in comparison with the secondary modern school is presumably evidence of this literary preference. The grammar school avoids a vocational flavour and thereby keeps a higher status.

This literary versus visual and vocational emphasis is particularly disastrous to architecture and planning which both require an educated public taste in visual matters. The importance of such an educated public taste is that it can receive the best efforts of the architects and planners. It also acts as a stimulus to them. The present lack of educated public taste in visual matters

(12) This situation has been examined by Kumalo for the African teacher in S.A.
(13) Nazi Germany. Is this also the case in modern China?
(14) J. E. Barton did pioneer work in introducing visual arts education into a school of strong literary tradition (Bristol Grammar School).

has exactly the reverse effects. It should also be mentioned that our age claims that it requires a large expansion of technical education. Much of this may well need a visual emphasis (15).

In this section we should note the traditional culture conflict between the literary and the scientific in our education. Those brought up in the literary and classical subjects have been conditioned to a contempt of the sciences. This is a damaging element in our culture and one which we should be able to eliminate if we fully accept that our society is heavily dependent on the technologies for its continued existence (16).

5. Education: Change.

In a period of rapid technological development the relationship between education and social and technical change is of much greater significance than in a period of relative stagnation. In a period of stagnation, technologically speaking, such as the later Roman Empire, education has little need to consider change: it concerns itself with the essential question of conservation (17). But when technical change, and therefore social change, are rapid as in our own time, education must aim to keep abreast of it, seek to mitigate the effects of too rapid change, or even to prevent certain kinds of change.

In technical education one of the most serious difficulties is the problem of lag in the educators and lack of up-to-date text books. This can be illustrated from architecture. Most of the theoretical and much of the practical work which constitutes the contribution of the Modern School of architects had been completed by about 1930. Yet only now are the principles then enunciated coming to be commonly applied, certain of them, for example the curtain wall, being very recent additions to the common vocabulary of the language of architectural design (18). Similarly the pilotis in both their legitimate and bastard use are only just emerging as common idiom (19). The effective lag is about twenty years.

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(15) There is, of course, a great deal of evidence that we need equally or more an expansion of education in the human sciences. This is not to say that we only need to boost the arts as against the sciences: the essential need is scientific knowledge about the workings of human society so that governmental and social development can match our technological advance.

(16) A. K. C. Ottaway. op. cit. P.88-9 deals with this conflict.

(17) At one stage in the history of the Roman Empire it was legally compulsory for a son to follow his father's calling.

(18) Le Corbusier in Precisions (1930) made this principle very clear. P.56.

(19) Bastard when the ground floor is filled up with rooms leaving the pilotis as pilasters.

This lag is particularly conspicuous in architecture because of the difficulty of experiment in building and its relation, through the client, to public taste. A new fact in physics can be disseminated and generally accepted through the written word only, and very quickly all interested individuals can assimmilate the new fact into the general body of their knowledge. But the architect, and to some extent the physician, have problems connected with practical application before a new idea can be accepted.

It is a task of education to recognise this difficulty and take measures to reduce the lag as much as possible. Bearing in mind the nature of education, it is obvious that this presents special difficulties to the educational system. Ottaway says: "Educational change tends to follow other social changes rather than initiate them ... (it) supports and develops the changes in social aims already decided by those in power ... "(20). In other words the educational system must have guidance: it cannot itself guide. It must wait and see which way the cultural wind is going to blow. Panunzio takes an even more depressing view: "the educational system still remains largely a backward-looking system, content in imparting knowledge regarding the past, which no one can control, rather than imparting a knowledge of the contemporary scene and encouraging intelligent participation in it" (21). He softens this to some extent by thinking "it not impossible that it may be becoming increasingly ... an agent of social improvement" (22).

Allied to the problem of lag in specific subjects is the problem of lag appearing in relation to new subjects. This type of lag is particularly noticeable in regard to the scientific approach to man himself: the social sciences. It is the job of architecture and planning to create, or control the creation of, the physical environment of human beings. Clearly in order to perform that task efficiently a knowledge of the kind of society that human beings at present find themselves in would appear not merely desirable, but of first importance. And yet architectural and planning bodies in general do not require the student to have any serious acquaintance with sociology. Instead of systematic knowledge of the structure and working of society both architect and planner are frequently content with a few vague generalisations and a nod in the direction of the community (23). This type of lag can only be

(20) A. K. C. Ottaway. Op. Cit. P. 12 and 56.
(21) Panunzio. Op. Cit. P.407.
(22) Panunzio. Op. Cit. P.263.
(23) Even distinguished architects are not impressive in their lack of precision when dealing with social aspects of building.

corrected from outside the educational systems concerned. Society itself, through its sociologists and by making its desires in particular buildings articulate, must be the chief agent of correction in this field.

Education, is not, then, a cause of change: rather it depends on change in the culture generally, and its role is secondary as far as change is concerned. It is of first importance that the lag between education and the rest of the culture should be kept as small as possible.

It may be added in considering the relation between education and change that Mumford envisages a new kind of school which would be the cultural centre of its area for adults as well as children (24). This is a bold vision which would go far to solve the problems brought about by change during the life of the individual. The school years are no longer sufficient to equip the individual for living his whole life-span, particularly as the life-expectation is being steadily increased. There is need for a new kind of school which would give the adult education at every stage of his life to fit him to meet the new problems of each phase and to adjust to change. This would be a most useful stabilising institution in a culture having rapid change as a major characteristic. It is unfortunate that planners have used the existing type of school, misunderstanding Mumford, as a justification for the idea of a neighbourhood unit. The defining of the size of the unit by reference to the present educational system is largely mechanical and not social, since it virtually excludes the adults of the community.

6. Education Significant in Two Major Aspects.

There are two major connections between education and building. The first is the relationship created by the agencies of formal and non-formal education between the public and the building. This is the contribution made by education to the attitudes and values of the individuals in society, and these individuals will respond to buildings as their education - understood in the broadest sense - has taught them.

The second relationship is that made by the largely formal education given to those individuals who are to be actively concerned with the making of buildings : professional, business, financial, technical and manual agencies whose abilities are trained in the various specialities. In this regard it

(24) L. Mumford. Culture of Cities. P.476 et seq.

must always be remembered that the specialist is also an ordinary member of the public when regarded from certain points of view.

At any given time the state of these two relationships with building can be very roughly gauged by (a) public opinion and general responses, and (b) by the expert opinion of those actually involved in building. These two are indications of what effects educational institutions are having and have had in, say, the previous twenty years (25).

The two relationships interact so that whilst it may be said, as of many other things, that the public gets the buildings it deserves, it may also be hazarded that the building industry, including the architects, get the public they deserve. It is in this area that the great importance of institutional factors in education lies.

7. Education of the Public and Building.

Public opinion in the matter of building is formed by the agencies of non-formal and formal education : the home, the press, the radio, travel, the cinema; and the school, college and university. Quite obviously the demand made by the public as to the arrangement, cost and appearance of the building will always be within the limits defined by the formal and non-formal education. There is unlikely to be any sudden demand for something entirely new. The demand is fairly firm, does not change rapidly and is therefore predictable. It is, of course, precisely the function of education to produce these characteristics and we are here feeling the effects of institutionalisation. Family life is of a certain pattern. For living that kind of life we have come to use (26) a certain kind of house. The child, brought up in that kind of house is informally educated into expecting future houses to be along the same lines. This is not merely inertia : it is specific education into accepting and expecting a certain kind of living accommodation. The child is the future house-purchaser and in this role he will choose very largely what his education has taught him.

The same process can be traced in the expectation the public has about the other building types. School, church, office block and factory have their

(25) This implies that the middle-aged section of any community have a large say in the formation of public and specialist opinion.

(26) It is essential not to beg any questions by thinking in terms of our having 'developed' a certain kind of house to meet our specific 'needs'. We have not yet done this.

accepted forms, within rough limits, and their images are transmitted by the institutionalised methods of education, formal or informal. The little girl's dolls' house is a typical semi-detached suburban house. Once formed the image is difficult to change and may persist throughout the life of the individual. If change were negligible in our society the educational institutions would condition succeeding generations to virtually identical expectations for buildings.

Change, however, is in many aspects rapid, and this may appear as anachronisms in the agencies of formal education. Formal education is slow to move and unless constantly prodded by outside influences would remain extremely conservative. The child at school may have formal education from outmoded textbooks and simultaneously may be receiving up-to-date informal education about buildings by being in a school of good modern design. The reverse can be observed when we build a laboratory for research in atomic physics using a Gothic or neo-Georgian idiom.

Cultural lags of this kind are evidence of different rates of change in society's various sectors. In some ways the educational institutions have become too rigid and are failing to educate individuals into the actual conditions of the society at a given time (27). Such cultural lags, or ossification of the educational institutions, present great difficulties to the designers of buildings because of the fact that the public expectation is different from the structural, economic, planning and functional requirements of the actual world. The building consequently emerges as a hollow sham, designed with cynicism and built without enthusiasm.

In connection with the education of the public an interesting question is to what extent are individuals educated by the buildings they live in, work in and visit? Will the children now attending schools of modern design demand a new kind of house when adult? Research is needed here on an extensive scale.

As far as formal education is concerned a major difficulty is that it is ingrained in our educational institutions that inherited patterns of behaviour and attitudes must be handed on. Could not the idea of change be institutionalised in education so that the individual could be taught that in many matters, notably the man-made physical environment, change must be expected and welcomed? The fostering of such an attitude would greatly help the design development of many building types, but notably of houses which are

(27) The neo-Georgian of the 1930's in Britain is a typical case of almost an entire public having been conditioned by its educational institutions to attitudes no longer relevant.

slow to change except in superficial aspects.

Snobbery, fashion and the aspirations of social classes upwards are potent agencies of informal education. These are institutionalised in such things as the various residential areas of a city, the approval or dis-approval of certain kinds of house; for example the dis-approval of the semi-detached house in Natal, or Eastern Canada, past a certain point upwards in the social scale. The locality of residence is another example : to be the 'right side of the tracks', and to drive a certain kind of motorcar have a social significance (28).

These preferences or snobberies appear to spread downwards by imitation, an upper group starting a fashion and lower groups following as a by-product of social aspiration. Information as to what to imitate is conveyed by institutionalised vehicles like the cinema, magazines, radio, and of course by observing the latest buildings of the elite group. An important factor to remember about these institutions is that they have no specific aim or intention as far as education is concerned and that they can do no more than pass on. For example, the planning and appearance of houses are a favourite subject of women's magazines. Superficially, and to those unfamiliar with the ways in which ideas in this field originate, it might seem that the authors of articles are producing new ideas. This is very rarely so: many apparently new ideas are in fact taken from the writings of serious architectural writers of twenty years ago. This establishes a trend and the institutional vehicles simply act as diffusers through the society.

Architects are frequently heard to say that they must 'educate' public taste in order to improve the general standard of efficiency and appearance of buildings. The architects attempt this in several ways in practice: by the buildings they design, by writing, use of the radio, and contributing to non-technical periodicals. Exhibitions also have their place. These methods of propagating ideas take no account of the way in which the public taste proceeds by imitation. In order to obtain the maximum effect it is necessary to have regard to this tendency to imitate those above. Thus, if the architects wish to improve the design of industrial buildings they must direct their propaganda at those who make the decisions for such buildings: boards of

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(28) In Britain Jaguars for example. These are a success symbol, oddly suspect because often bought not by the individual but the firm.

directors and management, not to shareholders representing the public at large. The method most likely to succeed would be to persuade the most important industry to build well; to publicise this and allow diffusion to do the rest (29). Clients' attitudes often cannot be changed by logic or reason where an over-riding practical justification cannot be appealed to. In situations of this kind the only effective method of changing attitudes is by appeal to imitation. If the business client, who is resisting some proposed feature of his building, such as large plate glass windows, can be shown that the biggest firm in the business has recently incorporated this in a new building, he may modify his views. The important thing for the architect is to understand where these attitudes come from, otherwise he will feel himself baffled by something which he mistakenly categorises as his clients' ignorance or insensitivity. In this context persuasion and logic may be of little use: what he needs is knowledge of the sociology of the situation.

8. Some Aspects of Technical Education in Relation to the Building.

This section deals with some of the effects upon the building of the formal education of those who create the building. What effects on the building does the education of the architect, the engineer, the building manager or the bricklayer have?

First thoughts on this subject might suggest that as the architect is the building designer it is the effects of his technical education which are the most important. This, however, does not prove to be the case on closer examination. In practice the architect is so much in the hands of other experts - and in this sense even the bricklayer is an expert - that the decisions of the architect can often be shown to be overwhelmingly influenced by the education which individuals in other professions have received. The subject is, therefore, extensive and complicated and all that will be attempted here is a few examples to show the mechanisms operating.

Our first example concerns the quantity surveyor. In Britain, the new generation of surveyors is traditionally educated as articled pupils. That is to say they are trained in the current methods largely without the benefit of research or fruitful contact with students in other professions. The general

(29) In Britain one architectural periodical, 'Industrial Architecture', is directed specifically at boards of directors.

atmosphere of quantity surveying is therefore heavily traditional and conservative and the profession has not been enlivened by anything comparable with the changes occurring in architecture during the past twenty years. During that period methods of quantity surveying have become increasingly rigid and institutionalised. This process has gone so far and has so been accepted by the building industry as a whole that it is possible for contractors to tender on the bill of quantities alone without reference to the architect's drawings (30).

This might appear to be a step in the direction of efficiency and simplicity. In practice it is the opposite. It means that the tendering contractors are pricing labour without reference to the way the architect has designed his building. It takes no account of whether the building is simple and quick to erect or slow and complicated. Instead the cost of labour is estimated in vacuo according to a set formula. Thus the building as far as tendering is concerned may lose all the benefit of the simple and direct construction that the architect may have put into it.

This is not only a straightforward economic loss, it is also a very serious element of damage to the motivation of the architect. The architect is educated to accept good appearance, good planning, economy and originality of structure as acceptable motivations in designing his building. Many buildings are the better for having economy as a major motivation: out of a tight budget he must produce an efficient and presentable building. But what can he do if all his efforts at economy of design (31) come to naught because the method of tendering has become too highly formalised through cultural lag in the quantity surveying profession?

This situation has an unfavourable effect on the architect. Educated now to the idea of cost analysis in the design stage and cost control later he is apt to find his efforts wasted and he reverts to rule of thumb methods which have the advantage of simplicity and speed (32). The need for decision ever presses hard upon the architect: this is his greatest single problem, and he should be able to obtain the facts on which to base decision from the quantity surveyor.

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(30) Notable attempts are being made to break out of the institutional rigidities, but they are few and isolated as yet.

(31) This means simplicity of design: keeping subcontracts simple, shape and form straightforward and having in mind the trades and the union controls.

(32) Quantity surveyors are making themselves useful in cost analysis, but it is often so complicated and slow that the architect must take a decision without it.

In a more humble way the education of the bricklayer has its effect on building design. There was a time when all bricklayers were skilled craftsmen able to perform all labours connected with brickwork. This is no longer so. A building site will carry a few older men of good capacity. They will be used for the difficult parts such as the quoins and angles, brick arches. The rest, more or less infill work, will be done by men of less skill, sometimes hardly above the standard of the semi-skilled. Consequently the standard of brickwork is lower than it was 50 or even 20 years ago (33).

This fact is now taken into account by the architect who is trying to design within the present building situation. He must allow for the facts that the brick course will often be out of horizontal, walls will often be out of plumb and the mechanical strength of the wall when built will be less than its theoretical value. These inaccuracies are extremely serious since the architect is often designing brickwork and factory-made products, like curtain walling, to go together. The curtain walling is factory-made to low tolerances and it arrives on the site after the brickwork is completed. Consequently if there are irregularities in the brickwork they will be immediately revealed when the precision-made material of the wall cladding is put against it (34).

This decline in the standard of the bricklayer's work, reflecting a change in his formal education must, therefore, be taken into account by the architect at the design stage. He has several options:-

1. Eliminate all brickwork and similar imprecise craftsmanship.
2. Design so that irregularities are masked by such devices as rebates and cover strips.
3. Design the craft work so simply that small error will result.
4. Find ways by which the craft work will be forced to follow the factory product.
5. Produce the brickwork under factory conditions to factory standards of precision (35).

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(33) This is the decline of a craft. The instruments used are not as precise, the education is poorer, pride in the work is less. Evidence taken from the Bristol area: the reasonable craftsmen are middle-aged or older. Brickwork is frequently faulty.

(34) Many buildings have been examined for this type of defect. It is very common.

(35) It may be argued that some of these troubles can be avoided by the architect giving proper supervision. There are difficulties here: first, the architect under English law is only under obligation to give general supervision - he is not expected to act as a clerk of works; secondly, many faults are difficult to spot in their early stages and do not become apparent until it is too late. Another approach is to try to stimulate the craftsman to better work. This is a noble aim, but simply ignores the adverse sociological situation in which the crafts inevitably exist.

It is not within the power of the architect to command all these at present. Quite obviously, however, these options are having their influence on building design through the architects noting difficulties and failures in executed buildings. The operative factor is that the architect must now attempt to avoid the recurrence of a previous unforeseen failure due to deterioration in the crafts. These options cannot be examined in detail here, since the desired point has been made that change in the bricklayer's education leads to changes in the design of the building at architect level. Situations of similar interest, however, exist throughout the building industry, and it seems clear that society does not now give as good an education to its building craftsmen as it did, say 50 years ago (36).

The architect is of special interest because he is the decision-maker, and even if he does not in fact decide he must appear to do so. The attitudes which are formed by his formal and non-formal education are consequently of prime importance in determining the form, structure and appearance of the building.

By far the most important single educational change in architecture in the last decade or so has been the swing from traditional rule of thumb approach to building towards the use of scientific method. Before this change an architect faced with a problem would act for the most part only on the basis of precedent. Now he is free to approach any problem strictly logically and analytically, exploring all possibilities (37).

This analytical and rational approach should now be institutionalised in architectural education; its first effects can be traced in improved logic of structure, sensible use of new materials, cost analysis and detailed assessment of user's needs. There is, however, very little cause for complacency and we should not make the mistake of thinking that architectural education is in a satisfactory condition. P. H. Connell who recently visited the United States and examined some architectural schools there does not find it possible to be more optimistic than this: "...the systematic application of the scientific method in the training of the architect, the positive development and integration of building science into the architectural courses and the

(36) For the situation of the building craftsman see Appendix VI (1).

(37) This method has always been open for use, but in the past education has conditioned the individual against using it. This has been justified by such institution -protecting words as 'sound' to describe the architect's attitude to design.

systematic presentation of building research findings, do not yet seem to have found a secure place in the curriculum."(38).

This new approach has helped to destroy the older institutionalised styles of Classic, Gothic and neo-Georgian and in their place has fostered the growth of a new style having wide variations. This is in many aspects permissive, allowing the designer to use the conditions imposed upon him by client, site, materials, cost etc. to determine the form and appearance of the building. That this can be a valid way of approaching building design is now an educational concept with institutional characteristics.

Development in architectural education along this line is arduous and slow but it brings a measure of positive progress. There is, however, a difficulty: the present structure of our society is such that the architect is expected to play the multiple role of businessman-technical-expert-artist (39). The complexity of this role would not perhaps be very serious in its bearing on education if the concept of intuition did not play so large a part in society's image of the architect. The fact that it does allows the architectural student to withdraw from the rigours of reason into intuition, fantasy and the cult of personality. In trying to teach the student to be both artist and rationalist the educational system is faithfully carrying out its mandate from society. This antithesis, this dichotomy, is present as a value in society and that value education is committed to perpetuate (40). The question may be debated whether it is not the business of education to try to eliminate this antithesis. Perhaps that is rather a task for science, but the fact remains that here is a very practical difficulty in architectural education and consequently in the work of architects in later life.

Another educational problem which has an important bearing on the architect in his working life is the emphasis placed in education on the aim of assisting the individual to develop himself, for himself, to the maximum. This idea is fairly strong in architectural education because of the need to develop the student's imaginative capacity and no doubt there could be no effective education for building design without this stress on the individual

(38) P. H. Connell. Report on Architectural Education and Environmental Studies in the United States and Canada. Para. 82.

(39) This is dealt with in detail in Chapter XI in which the architect is examined using the concepts of status and role.

(40) There is no implication intended here that this antithesis is 'true' or 'real'. It is simply stated as an observed fact of our society.

diversity view. Nevertheless beneath talk of encouraging the student's artistic ability there lurks a difficulty. This is that the student will be trained to regard building design as chiefly an opportunity for his own self-expression. The student therefore, may become oriented not toward society but to his own emotional and intellectual preferences. This leads later to client dissatisfaction and the failure of the architect to achieve a satisfactory relationship with his society (41).

This side of architectural education most certainly has a great influence on the form and development of our buildings, as this is the architect's motivational reason to pay attention to the appearance of the building he designs. Society has three legitimate expectations from the architect: he shall construct it properly within the appropriate economic limits, and he shall ensure that its appearance is satisfactory (42). It is a reasonable expectation that none of these shall be sacrificed to the others. Unfortunately this value of balanced expectation is not generally institutionalised in architectural education and this defect is one of the possible causes of the present difficulties existing between architect and public.

In the last two decades there has occurred an important extension of this personal development idea in the form of attempts by architects to predict the forms of future buildings and even cities. This has often been a blend of research and intuition which has had a remarkable educational effect on younger architects. The work of Gropius and Le Corbusier together with that of many lesser known architects, clearly has had a tremendous educational impact on students in the last twenty years, and the habit of looking to masters for inspiration has tended to become institutionalised in architectural education, with results which are not all necessarily good. A service has, however, undoubtedly been performed by causing an increase in the rate of change in architectural design in the context of an activity showing many signs of cultural lag.

The education of the architect is the subject of considerable heart-searching in Britain and other countries at the present time. The rate of change in building practice is now so fast that it is becoming obvious even to members of the public that the architect is in some way not measuring up

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(41) Among other aspects professional delinquency. See Appendix V1 (2).

(42) The word 'satisfactory' can be understood simply as subjectively defined by the society concerned.

to the demands made upon him by a rapidly changing cultural pattern. Other disquieting indications are also appearing; for example, the low rate of remuneration of architects in Britain in comparison with other professions at a time of unprecedented prosperity in the building industry. As a result, architectural education is being carefully acrutinised by the architects themselves, some experiments are being tried and change is in the air.

All this is no doubt good from the point of view of its attempt to modify an institutional situation which is manifestly ossified. One wonders, however, whether much progress can be made unless a serious attempt is forthcoming to understand the sociology of the entire building process. To understand the sociology of the architect would be some advance on the current hit and miss methods, but even that is not really sufficient since the architect can scarcely be divorced from the work he himself does and the work of others which he materially influences. If we are serious in wanting to improve the architect's education so that it accords more with the emerging pattern of our culture we must thoroughly inform ourselves about the total sociological situation of building: all the approaches which are outlined in this study.

9. Building Example.

Perhaps the most interesting aspect of the example from the point of view of education is the aesthetic approach to the buildings. This will be dealt with in the following chapter rather than here in order to have the benefit of the expressional analysis given in Chapter Vll.

10. Summary.

It should be remembered that the scientific and the educational complexes go together. The strictly conservation view of education leads to difficulties in our society and training for change is important in the context of our present culture. We must always bear in mind the nature of education and not attribute to it characteristics which it does not possess, or expect from it results which it is incapable of producing. For building the two major areas of education are that of the public at large and that of the section of the public which is specifically concerned with building. The education of the architect is pivotal and is at present undergoing critical examination. For this to be successful a sociology of building is necessary.

11. Conclusions.

(1) In building and planning, scientific research and education need to be closely related. It is useful, to keep in mind that science aims to extend existing knowledge and discover new, whilst education must institutionally perform to ensure conformity with the requirements of all other institutions, so that the continuity of the culture can be maintained.

(2) The rate of change, which is accelerated by science, causes strain in the educational institutions. Science may help to reduce this strain by speeding adjustment in education, but a pulling in different directions is observable. This has to be borne in mind by both research workers and educators in building and planning.

(3) The individual diversity view of education is stressed by some educationalists, and is prominent in architectural education. There is some evidence that it has led to an over-emphasis on the individualising process at the expense of the socialising process as far as architects are concerned. As a result the architect is apt to be seriously deficient in his ability to act as a fully integrated member of his society. What personality pattern do we want for our architects?

(4) Specific training in ability to meet future change is required in all fields of training for building. Special techniques need to be taught and special attitudes inculcated if the training given is to have its maximum value as the individual grows older. This will involve instruction in techniques of unlearning. Unlearning is more difficult for knowledge acquired on the basis of experience, and less difficult for knowledge acquired by specific instruction. Training is also required in techniques for inducing change in society. This is particularly important to the planner.

(5) Architectural education must aim at bringing the architect into the production team. Without this the architect will remain aliented from his society.

(6) The individual's status in society at large is being increasingly determined by his formal education. This implies a shift in the values system.

(7) Educational policies tend to remain traditionally based although the system of instruction may be scientifically based. This requires research in architectural education: what are the items which are still traditionally

based and how great is their influence?

(8) The trend toward increasing centralisation of education has its dangers. In any western country having a system of architectural education organised by a central authority the rigidity of this system is in sharp contrast with the flexibility needed to accommodate rapid change.

(9) The literary emphasis in western formal education during the last few centuries is a handicap in both building and planning because in the values system the literary is valued higher than the visual and the vocational. The traditional humanities viewpoint must be very seriously examined with this in mind. It will be found deficient if our future society is to be based very largely on science.

(10) The defectiveness of public taste in matters visual is connected with this preference for the literary emphasis. This defect is of major significance to architecture and planning since both require an informed visual public taste.

(11) An educational system must have guidance from the society at large. It will follow social change, rather than initiate, and therefore in spite of protestations to the contrary, it will tend to be geared to the past and the present rather than to the shaping of the future.

(12) If architectural education is to play a significant role in shaping the future of society, it must be prepared to include the scientific study of society.

(13) The public will respond to buildings as their education, both formal and informal, has taught them. This is part of the social process.

(14) Those specifically trained in building will respond largely as their formal specific education has taught them within the range of their specificity. Outside that range their response may be general or specific.

(15) These two responses interact. Public reaction bears on technical training, and technical training influences the public reaction.

(16) Public opinion about building is fairly stable and changes relatively slowly. The public at large has reasonably clear expectations about what a building "ought" to be.

(17) There may be a cultural lag between informal and formal education, the latter inculcating attitudes at variance with those acquired through informal channels of education. Such lag is evidence of varying rates

of change in different parts of the culture.

(18) Research is required into the question of whether individuals (particularly children) are educated by the buildings of their environment. The hypothesis that better buildings will make better people is unproved, whatever is meant by the word 'better'.

(19) The inculcation of the idea that change, particularly in our physical environment, is to be expected should be institutionalised in formal education.

(20) Snobbery, fashion and social aspiration are important means of informal education. These spread their influence downwards in society by imitation, which can be a strategic method of inducing change.

(21) It is valuable for the architect to know how the attitudes of his client originate from informal and formal education. In this matter the architect must be knowledgeable <u>for</u> the client if the institutional relationship between the two is to remain unimpaired.

(22) The technical education of the architect is not necessarily the most important influence on building, since in designing he must have regard to the way in which all the other members of the building team have been trained to think and work.

(23) The architect is educated to accept certain motivations for his work; good planning, good appearance, economy of structure, service to the community are some of them. These motivations may have their effectiveness impaired by lag in the technical education of other members of the building team. Motivations require effective institutional support if satisfactory performance of the individual is to be maintained.

(24) Change in the education of a member of the building team, whether bricklayer or finance-promoter, will lead to change in the design of the building at architect level. Does the architect have to wait on these changes? If he does, is this an explanation of lag?

(25) The attitudes inculcated in the architect during his informal and formal education are of great importance to building because of the architect's role as chief decision-maker.

(26) In architectural practice the way is now clear for the scientific approach to problems to supersede rule of thumb. The public expectation of the architect as businessman-technical-expert-artist makes training with this

end in view difficult because of institutionalised factors which are in opposition to each other.

(27) In aiming to make the student both artist and scientist the architectural educational system is faithfully carrying out the institutional requirements of society. As long as society is ambivalent in its attitude to the architect, expecting him to combine two systems of attitudes which society itself regards as antithetical, just so long must there remain in architectural education this bi-polar orientation. Each operates to perpetuate the other.

(28) The emphasis in architectural education on the personal development of the individual's imaginative capacity frequently produces in the student an orientation toward his own self-expression to the detriment of his relationship to his society as a whole. This can lead to anomie and the failure of the individual to integrate with the group.

(29) It is the expectation of society that the architect shall give satisfaction along three lines: (a) efficient planning for use, (b) adequate construction within the financial limits set, and (c) satisfactory appearance. The expectation of balanced performance along these lines is not adequately institutionalised in architectural education.

(30) The now institutionalised habit of looking to well-known masters may produce a cultural lag when the supply of masters runs out.

(31) Progress in improving the education of the architect will only be made by carefully studying the complete sociology of the entire building process.

CHAPTER V11

RELATIONSHIP OF CERTAIN INSTITUTIONAL COMPLEXES TO ALL BUILDING TYPES: (5) EXPRESSIONAL COMPLEX

1. Term 'Expressional' Preferred.

This group embraces those institutions which concern the transmission of idea or emotion from mind to mind. In relation to the building such ideas or emotions might, on first consideration, appear to be adequately covered by the word 'aesthetics'. This however, is not a wide enough term for our purpose as the word describing this complex must also include ideas expressive of the spheres of action of other institutional complexes. For example, the form we call 'spire' is used to express or suggest religion, quite independently of whether the particular spire is aesthetically satisfactory or not.

The word 'expressional' covers the required range adequately, although care must be taken not to confuse it with 'expressionism' (1). 'Expressional' is therefore far wider in its connotation than is 'aesthetic' to the architect or 'beauty' to the art-critic, and is here held to include <u>any</u> aspect of the building which aims to transmit an idea, feeling or social value (2).

2. Two Major Subdivisions.

For this analysis the institutions of the expressional complex can be divided into two groups:-

(a) Symbolic.

This consists of the symbolic use of building form for propaganda purposes by other institutional complexes. Plan forms, such as the latin cross, elevational forms like the spire and dome for churches, the gable for domestic work, forms associated with aspiration such as the Skylon at the Festival of Britain Exhibition (1952) are examples (3). The siting of buildings so as to use dominant sites for important buildings of the institutional complexes is also a use of symbol. In short, the symbolic covers all those uses of building which are propagandist for religion, education, the family, business and government etc. It also includes the prestige aspects of building.

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(1) 'Expressionism' may be defined as the use of art forms to evoke the emotions of everyday life. Serious art is not concerned with this.

(2) By 'aesthetic' the architect means the beauty aspect of a building: the degree to which it measures up to the community's or his own notion of what is beautiful. 'Aesthetics' is the study, or philosophy, of aesthetic experience.

(3) The possibility of scientific play emerging requires investigation.

(b) Aesthetic.

This is the 'beauty' aspect of the building: the capacity of the building to move the observer emotionally when the building is looked at as an object in its own right and without reference to relation with other institutional complexes and without regard to symbol. The crudest form of spire would convey the idea of church and could be adequate as symbol, but aesthetically it would be of no value. The aesthetic is therefore the way in which building forms are handled - even the way in which symbol is manipulated. Under this heading come the institutionalisation of beauty as a value and ugliness as a disvalue; style - this is the vehicle of the aesthetic; accepted architectural values such as the canons of proportion; and the role of the architect regarded as at least part-artist.

3. The Symbolic.

Symbol means the use of building forms to express the physical presence of any of the institutional complexes. The religious complex may use the spire, nave and chancel to make its presence visually identifiable. Symbol is thus in one of its aspects the fixing of the institutional complex in space. Viewed in this way Hertzler regards the building as an instrument of the institution (4). Another fruitful way of looking at symbol is to see the building as something progressing from mere shelter to a culture-object carrying a non-material overburden. The Church begins its ceremonies in the simplest cave, but it quickly specialises the cave into a building type quite distinct from all others. This process of specialisation is the development of the symbol. Certain forms arranged in fixed ways come to 'stand' for church and from this point on those forms and their interrelationships have social meaning as an expression of the religious institutions of the society. The qualitative detail of the forms has no importance, for as Davis points out, "it is not the object itself but the super-empirical meaning attached to it that is sociologically significant" (5).

In our society the governmental complex is conspicuous for its use of buildings as symbols. The governmental buildings of New Delhi, the Union Buildings of Pretoria, the Federal Government Buildings in Washington, the

(4) J. O. Hertzler. Social Institutions. P. 65, 66, 167.
(5) K. Davis. Human Society. P.526.

State Capitols of the individual states of the U.S.A., local authority and judicial buildings everywhere, testify to the emphasis which our society puts upon government. Such buildings are characterised by formality, aloofness, durability and often by symmetry and a certain heavy dignity. They are witnesses to our will toward group solidity; they are the physical nuclei of the institutions of government. Hertzler points out that the "material possessions of an institution - public monuments and buildings, churches, cathedrals and shrines, libraries and museums ... form sentiment-laden awe-inspiring nuclei about which members of institutions rally in quiet times as well as in crises" (6) Obviously the treatment of buildings having such heavy social import cannot be informal or frivolous without making a mockery of the institutions themselves. Nor can there be any such thing as a purely functional parliament building, unless 'functional' is deemed to include symbol. The parliament building will fail if it is designed only on the basis of convenience of working, and aesthetic treatment. It must also be adequate as symbol. Government must not only be done: its being seen to be done must be expressed in a socially approved fashion.

Similarly, building-types have developed under the pressure of evolving familial, educational, scientific, recreational, health and economic institutions, to become symbols of those aspects of the social structure. The European house, for example, is very clear as a symbol. It suggests hearth, home, the basic cell of western society - the family of two parents and minor children. Sometimes it has failed as symbol. "Tis all very fine, but where do you sleep and where do you dine" is Pope's way not only of criticising utility but also of indicating a failure of symbol. Other familial symbols are shown in Figs. 26 and 27.

In South Africa, and in many new countries, the highest prestige expression of the family is the detached house. Its detachment expresses the individual nature of the family. The design of the house has social meaning for its occupants: in Natal a currugated iron roof carries a suggestion of inferiority despite the fact that the material is in many ways the most satisfactory of roof coverings. The front door is of social importance. In areas where the frame house is normal the brick or masonary house confers prestige. The evaluation of a symbol will vary according to country and culture - for

(6) Op. Cit. P.48.

example the semi-detached house has a reasonable standing in Britain but very poor standing in South Africa and the U.S.A. - but in general it may be said that the form of house and certain details like half-timber gables, porches, wall materials, and bay windows, are used as symbols to identify the domestic building and, by proxy, the social standing of its occupants.

The block of flats, on the other hand, is not as yet very clear as symbol. Its distinguishing characteristic in Southern Africa is the repetition of balconies (Fig. 17). This differentiates it from the office block, but still leaves it ambiguous as symbol because of similarity with hospital or hotel. An interesting comparison is to be found in the 18th. century multi-dwelling block: the terrace. The 18th. century reconciled utility and symbol by using the palace facade for its terrace blocks. This created the incongruity that what appeared to be a palace was in reality a collection of individual family units, thus confusing two distinct building-types. It must be noted that this solution is not being adversely criticised on aesthetic grounds, but only because of its uncertainty as symbol.

Criticism of the flat block at the symbolic level should not be confused by introducing the question of whether people should, or want to, live in flats. In our society the familial institutions operate in both individual homes and in flats, and therefore from the point of view of symbol the sole question is whether or not clear symbolic expression is achieved in both building-types. A criticism of Le Corbusier's 1937 Plan for Paris is that the only distinctions between the office blocks and the residential blocks were in height and layout(7). There seems enough evidence in history to suggest that human societies which achieve serious building eventually come to differentiate their building-types as symbols of their institutional complexes. Clear symbolic elements will, no doubt, in time appear for the flat block. Perhaps these may already be adumbrated in Le Corbusier's Unite d'Habitation at Marseilles where the balconies and the waist of the building (shops etc.) clearly differentiate it from symbolic confusion with the office block.

In South Africa the office block is acquiring certain symbols. Because of the need to give protection against sun the use of structural vertical fins at about three feet centres is becoming typical, and the whole body of the building is frequently treated in this way. The main body is often raised on

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(7) See Appendix Vll (1).

pilotis and the top floor is given an asymmetric treatment. These characteristics, now virtually agreed symbols of the commercial building in southern Africa, are becoming increasingly common. The building shown in Fig. 18 is typical. The building in Fig. 19 has taken over this symbol system only in part, retaining rather timidly a monumental symmetry round a central element and thereby indicating its essentially renaissance descent.

In North America the office block appears to be expressing itself characteristically through the all-glass facade. The block is conceived as a structural sequence of superimposed floors supported on columns and encased in glass on most or all of its sides - as it were wrapped in cellophane. Examples are Unilever House and the Corning Building, New York, (Fig. 20). The basic principles are essentially those expounded by Le Corbusier in 'Precisions', in which the 'pan de verre' theory is propounded (8). It is perhaps too early yet to say whether the all-glass facade is to become a symbol specifically of the office block, or whether it will become common to several building-types, or whether it will disappear altogether. The fact that in the U.S.A. the tall office block and the tall apartment block are tending toward the same expression is to be noted. As symbol the Corning Building and the Chicago Lake Shore Drive Apartments are indistinguishable (Fig. 21).

Recent developments in church architecture in South Africa and North America are important from the point of view of symbol. In many new churches we find a distinct tendency on the part of the architect to use the design opportunity to stress symbol, and the symbol is often not related to past symbols used for churches, such as tower or steeple. Often the symbol comes from the selection of the basic structural idea which is sometimes highly original and the fact that the ruling bodies of churches are prepared to accept these unusual designs is of sociological interest. The use of original symbol is illustrated by Frank Lloyd Wright's church as Madison, Wisconsin (Fig. 22).

The various institutional complexes have unequal amounts of building connected with them. In a town the familial symbol of house is stated many times but that of government perhaps only once or twice. Quantity, however, is modified by quality, physical size, siting and concentration of symbolic

(8) Le Corbusier. Precisions. P.53 et seq.

effort. The large quantity of houses is spread over a large area and as symbol is diluted. The economic symbols of office blocks, shops and factories tend to be concentrated densely and to become thereby more impressive as symbols. Furthermore the urban ecological pattern tends to enhance certain symbols, particularly governmental and office buildings which tend to be centrally located. It is of course obvious that physical size has a bearing on the impressiveness of the symbol. The house, in our present society, is almost always precluded from reaching the same size and bulk as the office block or the governmental building (9).

The 19th. century battle of the styles showed how style may be drawn into the symbolic side of expression. This argument was not essentially aesthetic. It was symbolic. Gothic was equated with Christian ideals and the very use (irrespective of the quality of the aesthetic) of Gothic was made to reinforce the institutions of Christian culture. Gothic forms once again came to be associated especially with religious building. The devil to be exorcised was the paganism of the renaissance. Thus Pugin and Ruskin fought for Gothic as against Classical for symbolic reasons (10). In our own period the Classical style is often appropriated by government, as in the building shown in Fig. 31 where the entrances are given Classical emphasis symbolising the importance of the institutional complex of government.

The various symbols can be distinguished even when all buildings use the same style. The Gothic period, for example, had no difficulty in differentiating church, school, townhall and house although all were built with the same structural methods and in the same architectural style. Fortunately, our period appears to have emerged from this particular symbolic confusion of the 19th. century and to have set its face towards the development of a style of its own which will be appropriate to all building types and which will make possible the clear differentiation of buildings on a symbol basis.

The site development of buildings is also an aspect in which symbol appears. In relation to the whole town the civic building, for example, is usually located near the centre. The building is now often sited with plenty

(9) In contrast, the 18th. century house had much greater scope as symbol. Prior Park, Bath is quite as impressive as symbol as Somerset House. Note the structural differences between their aristocratic and our democratic society.

(10) E.G. E. W. Pugin: The true Principles & Revival of Christian Architecture. No style can be more Christian than another: only its associations can. That is its symbolic value.

of space around it, and ideally this space is grassed and embellished with trees. This concept should be contrasted with the mediaeval siting of civic buildings straight on to the road or square. We seem to be setting the governmental building apart from the rest of our activities, whilst in the Middle Ages the townhall, the church and the shops were cheek by jowl. Our symbol here is perhaps aspirational. We are possibly aspiring to an ideal type environment - a kind of paradise removed from the actuality of life (11). A similar tendency to set factories in carefully tended space is also to be noted. This aspect of symbol should be investigated: it should not be dismissed lightly as a mere desire for pleasant surroundings. The word 'pleasant' simply begs the question. It may be that we are subconsciously trying to domesticate governmental and factory buildings and soften their austerity.

Kuper makes the observation that in the British context the "front of the house (i.e. the front garden) is simply not living space" (12). Whatever may be its physical purpose in terms of privacy, protection from noise and light and air space, it clearly has also a symbolic function. It is a measure of social status since normally any house with even the smallest garden is preferred to one built on the street (13). The building line has thus come to have symbol value. The sociology of space in front of and around buildings requires investigation.

An instructive example of the urge to create symbol can be seen in some of the mushroom boom towns of new countries. So pressing is the need to create the illusion of a busy and prosperous shopping centre that front facade walls are to be found at first floor level with nothing whatever behind them(14). This general idea can be seen in more modified form in the common practice of stressing the street elevation in a commercial shopping street. Such emphasis is frequent in South African towns where better quality materials are used for those portions which show to the street. Examples of this are the use of tiles for the front slope of a roof with sheet material behind (Fig. 23) and the use of superior wall finishes in foyers and entrances for that part which is

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(11) Is it possible that this is a working out of the ideal type cities of the renaissance?

(12) L. Kuper. Living in Cities. P.114.

(13) There are exceptions due to historic and other causes: e.g. town houses where land is expensive - a special ethos is developed to protect the status of the house. Similarly in villages the sense of the historic may overcome the disvalue of an otherwise poor status rating.

(14) It is noteworthy that in this sort of context the aim is actually to attract traffic: the very opposite of the situation in mature communities where the aim is to discourage it.

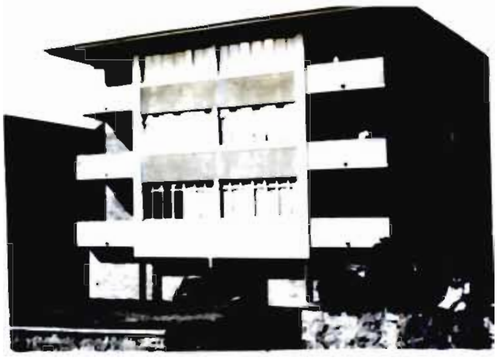


Fig.I7. Flats, Durban.

Fig.I9. Offices, Pietermaritzburg.

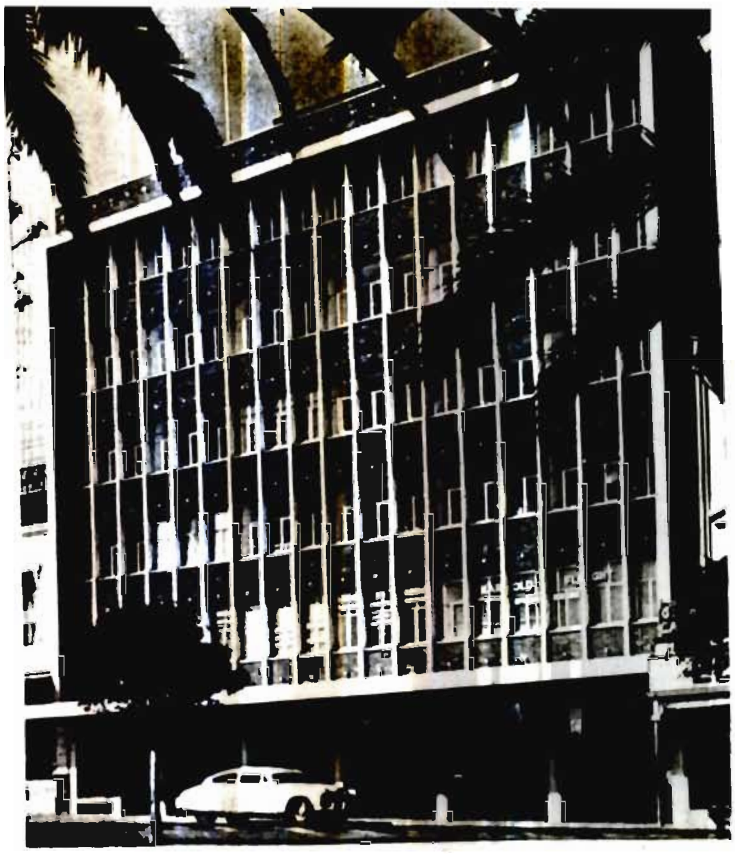


Fig.I8. Morco House, Benoni.

Fig.2I. Lake Shore Drive Apartments, Chicago.

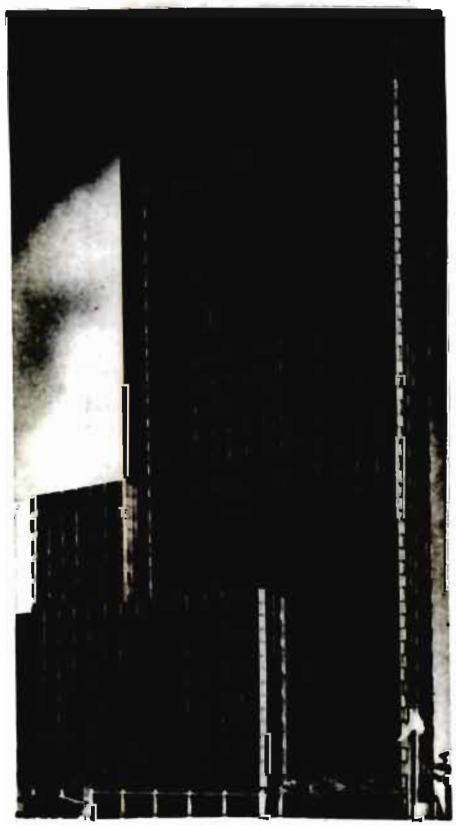
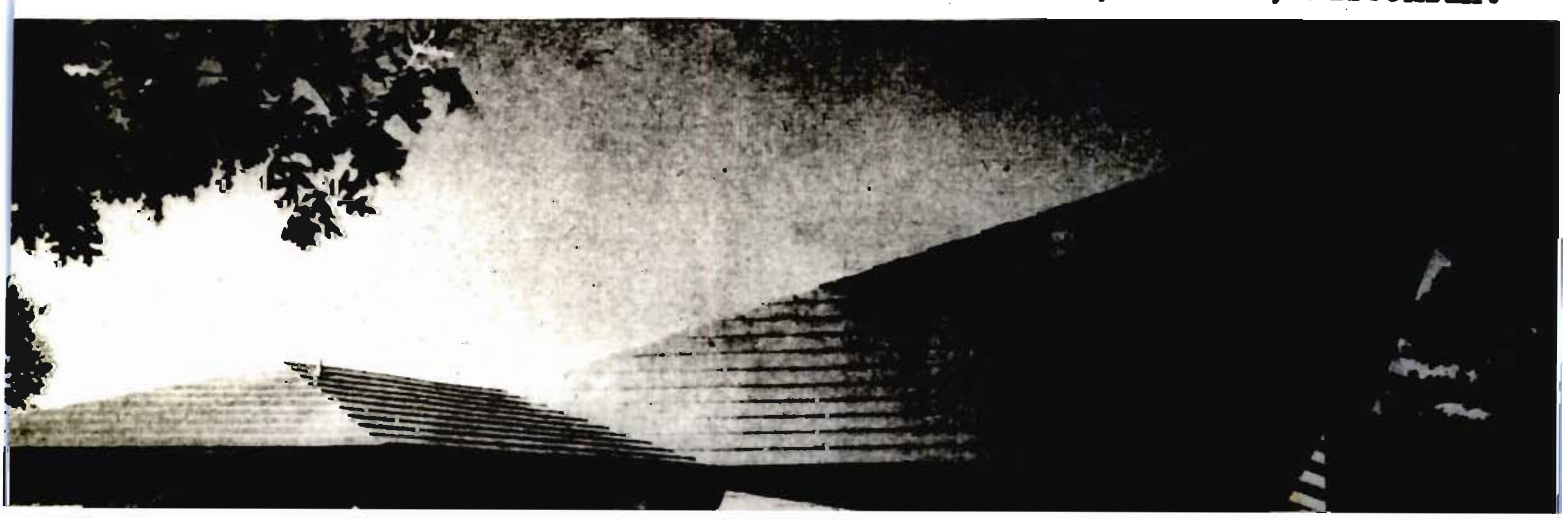


Fig.20. Corning Bldg, New York.

Fig.22. Unitarian Church, Madison, Wisconsin.



immediately visible from the street: in practice such things as a marble dado up to the first change of direction in the staircase. From then onward the dado may be plaster or tiles. The symbol consists in giving an opulent appearance and in specifically avoiding certain materials like corrugated iron and asbestos which are held to be inferior because cheaper. It seems reasonable to suspect that the impression of opulence can be regarded as a symbol of the economic complex.

Architectural style, materials and constructional methods may be used with symbolic import. The Daily Express building in Fleet Street (1932) with its very early glass walls is an excellent example of the use of an 'advanced' style for propaganda purposes (Fig. 24). The symbolic aim here was possibly to identify the paper with progress and a utopian future. In contrast to the Daily Express Building the Daily Telegraph Building (1930) uses as symbol of solidity and tradition the Classical order (Fig. 25). That new constructional elements are used specifically for symbol is exemplified by the "Here Sewentien Gebou" in Long Street, Capetown, in which the first extensive use of curtain wall was made in this area. The architect has stated that advertisement value was the major reason for selecting this type of wall (15). In other words the new constructional system was selected as symbol for the economic complex because of its newness.

Trystan Edwards has a good deal to say about symbol, particularly concerning the tendency of the economic complex to steal symbolic forms which have traditionally belonged to other complexes (16). He objects to the departmental store appropriating the dome and stresses the symbolic confusion which results. In our day, this problem seems to have resolved itself largely into one of height and mass, the problem appearing to be that commercial buildings are now more impressive by their physical mass than are for example, government buildings. Edwards' solution to this problem is to eliminate the sky-scraper: he calls it a cul-de-sac, which is interesting as theory: meantime the skyscraper is still with us. The interesting point about Edwards' view is that commerce was at that time (1925) looking for symbols. The best it could do was steal from the symbols of th rcomplexes (17). To-day it bids fair to appropriate the most advanced techniques and use them as symbols. If it is as successful in

(15) I am indebted to the architect, R. F. H. Chapman, for a statement of motive.
(16) A. T. Edwards. Good and Bad Manners in Architecture. P.9.
(17) The reasons for this require research.

capturing the modern style as the church was in capturing the Gothic we shall be faced with an urban environment which puts heaviest emphasis on the expression of the economic complex. If we consider this to be an unfortunate evaluation in which the economic (or production and distribution) elements of our culture are to be given dominant expression, while government, religion, education are to be allowed only subordinate expression, it will be necessary for us to search for new symbols for these other complexes. Edwards in an oblique way suggests a line of thought which may prove useful: that the purely utilitarian building should never be conceived as a monument (18). The word utilitarion is sociologically unacceptable as no building is purely utilitarian In the sense of implying a hierarch of symbolic values it is, however, comprehensible. He is saying that if we do not wish the economic symbol to dominate our towns one way of helping to prevent this is to forbid the economic complex using the monumental approach. This suggestion seems valid independently of style. Its application would lead to having commercial buildings somewhat neutral and uniform in style and would be in strong contrast to the current practice of each commercial or industrial developer seeking to attract notice to himself by being different from his neighbours. It would require the conscious control of symbol (19). The Technical College and the Land Bank Buildings in Church Street, Pietermaritzburg show how this neutrality of symbol can be achieved. The Technical College was built first. The bank building followed, using the same materials and the same scale. The Land Bank Building, unobrusive and making no attempt at self-advertisement, leaves the Technical College as the dominant symbol in the street (Fig. 28).

The foregoing leads to the question of the manipulation of the physical urban environment for purposes of symbol, that is, as a controlled purposive expression of the structure of society. A major piece of needed research is a study of the degree to which in the past and in our own society the urban environment faithfully reflects the social structure. In the absence of such research it seems only possible to consider isolated instances of the manipulated use of symbol. One such example is the use of the symbol 'village' transferred to the town as an expression of community life. The theory appears to be that community life flourishes in the village (or is thought ideally to

(18) Op. Cit. P.36 et seq.

(19) Elevational control committees should concern themselves as much with symbol as with aesthetic.

do so) and therefore if the form of the village is transferred to an urban population without a strong community life the growth of community will be fostered. This is the use of symbol for purposes of social betterment. (The symbol here should not be confused with the practical benefits). It is of course obvious that this is an entirely gratuitous assumption. First, it assumes physical determination of community spirit, which is quite unproved and secondly it confuses village with urban symbol. The small cul-de-sac in a village may be a symbol of group solidarity. But the reason for this solidarity may not be that it is a small cul-de-sac, but some other good social reason not in any way connected with physical environment. We must be very careful, therefore, of misinterpreting symbol and of using it for social betterment without fully understanding its causes and likely results. In this connection as a result of his Coventry studies Kuper recommends significantly that ".... in the immediate future in cities with a varied population and under the conditions of an acute housing shortage, we suggest the sparing use of very intimate clusters of houses" (20). Similarly, the symbolic implications of the Reilley Green require very careful examination before such a form is used extensively for urban development. It may not be the symbol we assume it to be, or have quite the results we expect.

There is also the question of whether it is necessary for building to express the elements of the social structure. Edwards raises this problem by asking whether the social fact of domesticity must be expressed. History suggests that whenever man has built he has used building as symbol to express his system of values. The hieratic emphasis of ancient Egyptian society emerges in the symbols of temple and pyramid. The 18th. century emphasis on the country mansion is an expression of the aristocratic form of that society. The problem before our society is perhaps the conscious manipulation of symbol on behalf of the social whole. Conscious manipulation on the part of a particular institutional complex has long been practiced: the church has chosen site and form of building to express its importance; government has raised its propaganda monuments. We are now at the point, however, where we are questioning the right of any complex to have free symbolic expression. Can we, with a holistic view of human life, now curb the expression of the economic institutions in favour of giving greater emphasis to, say, educational institutions?

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(20) Op. Cit. P.168.

Any such attempt assumes a hierarchy in the departments of life: have we any such clear hierarchy? The older planners held the view that the traditional hierarchy with religion near the top should be preserved (the mediaeval hierarchy), but today estate lay-outs are frequently done without any sites specifically designated for churches and the various deonominations merely buy normal house plots (21). Trading lots, on the other hand, are usually carefully considered.

The forms used by a society to serve as symbols are probably arbitrarily 'selected'. The Gothic spire, the Egyptian pylon, the classical pediment of course developed out of answers to structural problems. To trace such development, however, is not to answer the question implicitly just posed: how does the relatively insignificant pyramid roof to a tower come to aggrandise itself into the 13th. century spire becoming in the process a dominant symbol of the religous complex? It is as though an unnatural or exaggerated growth of one part has taken place. Indeed this notion of rather arbitrary exaggeration is worthy of examination. The French mediaeval cathedral exaggerated grandeur. Chinese builders over-emphasised the roof. The Baroque period was obsessed with the idea of interior space. This idea of non-rational exaggeration in the whole pattern of a culture has been explored by Benedict (22): its application to architectural form when used for symbol would be a rewarding field of study.

The exaggerations of a society are perhaps a key to the zeitgeist. If so, our own general problems would be illuminated by a study of our exaggerations in building, and in those sectors of life having an influence on building. The durability standards of most buildings are to be suspected of exaggeration: most houses for example are socially obsolete long before they are structurally worn out. Our exaggeration on the importance of business has helped to produce an exaggeration like the skyscraper complex of Manhattan.
Is our sometimes excessive use of transparent glass an exaggeration? Our stress on home ownership has a meaning in terms of our culture as a whole: in an era of geographical mobility we stress the virtues of owner-occupying immovable property!

In conclusion, it seems that the question of symbol can at present be

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(21) This must be regarded as poor planning. The significant point is that it can happen - proof that the old hierarchy is no longer believed in.
(22) R. Benedict. Patterns of Culture.

examined as three problems:-

(1) there is need for clear differentiation of the symbols appropriate to the various institutional complexes.

(2) a new hierarchy of symbol may be necessary. Are we to attempt to create this consciously or shall we allow the pull devil pull baker of the social process to determine it for us? The social sciences and cybernetics could combine to help us here.

(3) our exaggerations need to be examined and elucidated as a tool to our understanding of how symbol works.

4. The Aesthetic.

Having filtered symbol out from the expressional aspect of building, there is left the artistic or aesthetic side. This may briefly be described as the way in which building forms are selected, shaped, combined and generally manipulated. The criterion of aesthetic value is the extent to which the appearance of the building is held by the observer to have aesthetic significance.

Although this is a definition of aesthetic in terms of itself, it does serve to indicate that the aesthetic significance of building is of the same order as that of works of all the other arts: painting, sculpture, music, literature. Whatever beauty is, it must be conceded to be the same in its nature for all the arts including building. The essential characteristic is that the work of art is, when considered aesthetically, to be viewed as an end in itself: there is no aim but to give aesthetic satisfaction.

It should be stressed that representation does not enter into this discussion. A painting is not aesthetically significant because it represents a good act; nor is music because it suggests a charge by a troop of cavalry. Similarly a building is not aesthetically important because it 'represents' a house - that is symbol.

The essential aesthetic question in building, therefore, is the same as in any other art, namely: 'what is art?' Definitions range from Plato's imitation of reality to Croce's 'L'arte é intuizione' (23). Tolstoy has listed and analysed the various possibilities and gives this as a working definition:

> "Art is a human activity consisting in this, that one man consciously by means of certain external signs, hands on to others feelings he has lived through and that others are infected by these feelings and also

(23) B. Croce. Breviario di Estetica. P. 27-39.

experience them." (24).

As it stands this definition could be taken to mean the transference of any feelings: love, hate, anger for example. To read the definition in this way would, however, be to reduce Tolstoy's definition to Plato's imitation - a view which Tolstoy rejects. In fact Tolstoy elsewhere defines art as "that which pleases us without evolving in us desire" (25). His use of feeling must therefore refer to a special kind of feeling giving pleasure. This obviously rules out hate and anger; it also rules out art as the mere expression of the emotions of everyday life. That art does deal with these is, of course, undeniable, but their portrayal is not art.

Roger Fry and Clive Bell, among others, have tried to clarify matters by using the hypothesis of an aesthetic emotion:

> "In each (several given examples of art) lines and colours combined in a particular way, certain forms and relations of forms, stir our aesthetic emotions. These relations and combinations of lines and colours, these aesthetically moving forms, I call "Significant Form"; and "Significant Form" is the one quality common to all works of visual art" (26).

The theory then, is that there is an aesthetic emotion separate from the other emotions, and that this emotion is moved by forms in art having the power to evoke the emotions. On the question of why given forms move aesthetically he says:

> "It seems to me possible, though by no means certain, that created form moves us so profoundly because it expresses the emotion of its creator" (27).

It may be objected that Bell's significant form begs the question because if it is asked for what it is significant, the only answer possible must be framed in terms of the evocation of the aesthetic emotion, thus arguing in a circle. He sidesteps this difficulty by regarding all aesthetic as subjective.to the individual. This does not invalidate the general usefulness of the theory because the aesthetic is socially conditioned so that, although the individual's response is his own, as a member of society he has a large common area of response with other members of the society.

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(24) Leo Tolstoy. What is Art? P.123. On page 121 he gives the same idea: "The activity of art is based on the fact that a man receiving, through his sense of hearing or sight another man's expression of feeling is capable of experiencing the emotion which moved the man who expressed it".
(25) Idem. P.113.
(26) Clive Bell. Art. P.8.
(27) Idem. P.49.

A difficulty with this theory is that it hypothecates an aesthetic emotion. This in turn takes us back to the basic instincts favoured by some phsychologists but no longer held to be very useful as a theory. Our difficulty appears to be that the psychology of aesthetic is not yet able to tellus very much about the nature of the aesthetic response. It does not, however, appear essential that the sociology of aesthetic need wait on the psychologist. It seems clear that human beings in general have a typical response of this kind; our concern is with the way in which this response is related to the culture. That views of the nature of aesthetic can vary from the absolute to the completely subjective and individual need not prevent us considering the sociology of the response, since whatever view a given society may take, there will be a large, though varying, measure of agreement between the individuals of the society as to what is able to evoke the characteristic response and what is not. A system of values in this matter will develop and will be supported by the majority of the society. It is the way in which this is formed, continues and changes that is interesting sociologically.

In spite of its difficulties the great advantage of the Tolstoy-Bell theory of art for the present analysis is that it offers the possibility of limiting sociologically the field of action which art may be considered to cover. In building, it confines aesthetic to that part of the treatment of the building which concerns the aesthetic emotion only. This eliminates all symbols and expressionism, and leaves the building to be seen as an end in itself. Such a viewpoint prevents the destructive and cannibalistic ramifying of quasi-aesthetic notions through areas of the building process where they have no rightful place, and serves to provide a useful tool for the balanced criticism of buildings (28).

The word 'beauty' is a frequent cause of difficulty. It seems reasonable, or at any rate adequate for practical analysis, to regard beauty as subjective to the individual or to the society. In other words beauty is what the individual or his society takes it to be (29), and therefore resides in the observer and not in the object. We loosely attribute beauty to a work of art: what we mean is that the work is such that the observer has a characteristic emotional

(28) See Appendix V11 (2).

(29) A. F. Carritt in "Philosophies of Beauty" gives an exhaustive list of quotations from a wide variety of authors on the subject of beauty.

response.

Some societies have been very clear about what they considered to be aesthetically moving. Others, and this includes our own, have been vague, and have conflicting standards. In Britain the 1930's were notable for their aesthetic confusion, which in architecture manifested itself in two distinct expressions: the neo-Georgian and the Modern.

In building, style is the principal vehicle of the aesthetic. The agreed forms of a style are the words of the language. Some languages, like the Greek classical orders and the English Gothic are rich and have large and varied vocabularies: others, like the Saxon, are limited. It should be remembered that style need not necessarily be one of the historic styles, nor need it essentially have ornament or embellishments. An essential of style is that its forms are institutionalised. The architect expects to use them and society expects of him that he will use the agreed language of form. The 5th. century in Athens expected its architects to use the Greek Doric, Ionic or Corinthian orders: a Persian column would have been considered outside the agreed range of forms. The crucial idea of style is agreement on the forms themselves and their combinations. Greek columns illustrate agreed combinations very well: the Ionic had a base, the Doric did not. This underlying idea of agreement does not exclude change but it means that change is likely to be gradual since the main body of the formal language must remain valid at any one time, although over a length of time radical change will be seen to have taken place. A large enough core of agreed forms and their combinations (or basic aesthetic agreed approaches) must be in existence at any given time if the aesthetic is to be properly served.

The forms of style and their combinations are not necessarily rational. Attempts to find wholly rational bases for the elements of the Classical orders are notoriously unsatisfactory (30). It is of course obvious that some forms like the circular column and the pediment have a physical origin in the problem of structure and can be facilely 'explained'. But that does not explain why they should be picked on for emphasis. Why did Chinese architecture decide to make much of the roof, whilst western classical art did everything it could to suppress it? Classical architecture stresses the column, but Gothic reduced it to a secondary place. The salient idea, as suggested for symbol, seems to be that of fortuitous emphasis on arbitrarily selected elements as a characteristic

(30) For example the wooden prototype theory.

of style, as far as our present knowledge of origins goes. This idea of irrationally selected elements on which rational mind later works is in line with anthropological theories of the basic nature of the elements of society. Our own society puts heavy emphasis on the individual's success in acquiring money: the Kwakiutl do precisely the opposite, applauding success in getting rid of wealth in socially approved channels. In the same way elements of style might be explained as exaggerations, an over-emphasis of some elements and a suppression of others. The rib system of Gothic vaults received steadily increasing emphasis until the structural idea collapsed into the slab construction of the fan vault with the ribs merely carved on the surface: a nice example of a structural element becoming institutionalised as an element of style, receiving increasing attention and ending as an institutional shell constructed in a way totally different from the method from which it sprang.

The sequence of the development of elements of style can be set down:-

(a)	Rational response to a problem	(Emergent)
(b)	The form becomes elaborated, embroidered and obligatory.	(Dominant)
(c)	The form becomes ossified, other methods of achieving its appearance become normal.	
(d)	Form and structure lose all relationship.	(Recessive)

The use of rubble masonry walling in the last few decades shows a typical history. As an element of style it seems to have originated in Paris as a response to the legal-economic problem of finding a material suitable to comply with the by-law requirement of 30 cms. incombustible material between contiguous buildings. Left unplastered it produced, somewhat fortuitously, a pleasant effect. From this it progressed to being a specific design element freed from any legal requirements as in the Pavillon Suisse, where it possibly still had an economic justification. It then became popular and rubble wall, usually small in area, because now expensive, comes to be used as a specific design element in contrast with the smooth finishes of glass, metal and other manufactured materials. It next becomes obligatory and the problem is how to get the effect as cheaply as possible. A passable imitation emerges: slabbing up of crazy paving on to a brick backing: a 'solution' appearing simultaneously in many countries. As always the pressure of economics is most impprtant in assessing what is happening. The essential sequence is that an element becomes institutionalised - it comes to be expected, - is elaborated and attempts are made to cheapen it whilst retaining the element more or less in its accepted form.

The piloti also has an instructive institutional evelopment. Its origin was essentially to achieve a reclamation of the groundon which a building actually stands, for the general circulation purposes of the city. It was a contribution primarily to the solution of those problems which have been created by the motor vehicle in conjunction with the growth of large urban centres. Le Corbusier shows in La Ville Radieuse how the use of pilotis can give back virtually all the ground covered by buildings (31). Long before this idea can be put to useful work the piloti has become an accepted design element to be used without reference to its original purpose. When this point is reached the designer must inevitably ask whether he cannot use the 'empty' space under the building! The solution is easy: he simply encloses it, dressing the walls back behind the pilotis and so everyone is happy: the architect because he has achieved his institutional form and the client because he has not wasted the ground floor space. In no time at all this use of pilotis becomes institutionalised and we have a new, and virtually obligatory, design element. It is not logical and not really very useful, but it has emerged as an essential combination of forms in modern design, as can be seen in Fig. 29.

Canons of proportion are a very common institutional adjunct of style. The Egyptian canons for the human form (32), the Greek golden cut (21 : 34), Le Corbusier's traces regulateurs and modulor, are examples. The purpose of any proportional canon is to clarify the language of form and to provide a guide to its use. For example, in a column and beam style it is necessary to have some limit to the distance of the columns apart in relation to the height of the columns. If the limit, i.e. the canon, is stretched too much the language collapses. The language of classical architecture becomes dialect if the distance between columns becomes too great (Fig. 30). This happened in Jacobean architecture.

Various pressures are exerted to modify canons. Technical and economic changes are major factors here, since by modification of the canon a saving in costs can be made. The use of a cheaper tile means lifting the roof pitch slightly. This in turn means increasing the angle of the pediment beyond that which is normal. Classical columns can be made in cast iron, but they can be made more slender than in stone. Gradually the canon of proportion is stretched

(31) Le Corbusier. La Ville Radieuse. P.57 et seq.
(32) R. W. Church. An essay on Critical Appreciation. P. 172 et seq. Examination of reliefs for canons of proportion.

until a new agreed point is found, only to be itself superseded as technology advances.

An inevitable corollary of stylistic institutionalisation is survival(33). Just as survivals exist in society at large, so do they eke out a shadow life in architectural style. The best man at a wedding and the rite de passage of the 21st birthday celebration are marriage and puberty ceremonial survivals. All architectural styles have elements which are survivals. Florentine Gothic has the survival of the classical cornice (34). Glazing bars after the 18th. century pattern are a survival in modern metal sashes. Almost the entire neo-Georgian 'style' is made up of survivals. The use of the arch in a wall is now nearly always a survival as the most economical spanning method in walls is the reinforced concrete, reinforced brick or steel lintol, which are now thoroughly institutionalised.

Style and its subsidiary, canons, are not in themselves the essential of aesthetic. Of itself style is not capable of moving us aesthetically, although it may evoke the aesthetic emotion in reminiscence. The aesthetic emotion is only evoked by the <u>way</u> in which the language of form is used: by what it says: by being significant. The Temple of Ceres at Paestum is as Doric in style as the Parthenon, but for the contemporaries of Pericles and ourselves the aesthetic emotive power of the Parthenon is superior to that of the older temple because of the superior mastery of the idiom that its forms show. The development from Paestum to Parthenon is in ascending scale of subtlety, refinement of proportions, mastery of the language and fitness of institutional element to its place in the whole design.

It is clearthat the point of apogee of any period of art may be varied according to the subjective valuations of those making the judgment. Some would place the highest point of the English Gothic curve at Early English (say 1200 A.D.); others would place it later, in the perpendicular period. To make this objection is, however, merely to say that in the matter of aesthetic all valuations are in a measure subjective. This is agreed: it does not invalidate the view that the essence of aesthetic is the <u>way</u> the style is used.

(33) Not the same as persistence, which has no implication of obsolescence.

(34) E.G. The interior of S. Maria Novella, 1278.

We may judge the primitive or the flaccid and overripe to be the better; the significance of the way remains constant. The artist or architect who is able to move the observer aesthetically, or able in Bell's terminology to create significant form, uses the same style as the 'artist' who has no such power and merely uses a particular style because it is the convention. The whole discussion turns in the end on the artist's ability to make himself felt and on the spectator's ability to receive what the artist has said. For the spectator the way the artist uses style must be valid: understood and accepted.

5. Relation of Symbolic to Aesthetic.

From the foregoing we may conclude that it is helpful to separate the symbolic from the aesthetic, and within the general framework of the aesthetic to regard style as the grammer and syntax of the language of form.

Granted the validity of this point of view, the building may be appreciated as acting as a means of communication in two ways: through the symbolic and through the aesthetic use of form. The language of the second is substantially style; that of the first is plan form, mass, size, siting and the use of special forms like the spire. The symbolic calls into play the emotions of everyday life: emotions concerned with the family, religion, business etc. The symbols are in fact labels saying: house or school or railway station. The aesthetic differs essentially from this in that it stimulates emotion directly by requiring the observer to view the building as an object for itself and not as having reference to anything else. In appraising a building in its expressional aspects, therefore, we must cover two separate psychological areas:

(a) How adequately do the symbols used in the building convey their social meaning? This does not imply any criticism of the social meaning itself but it does involve an examination of the nature of the social meaning: straight statement such as 'this is a house' or a statement of prestige and status.

(b) To what extent does the building, viewed as an object in its own right and without reference to the social meaning of (a), move the observer aesthetically?

There appear to be occasions, however, when the two elements are so closely knit together that they become one. The Cenotaph in Whitehall and the Sainte Chapelle, Paris seem to be examples of this fusion. Is it not possible that the effectiveness of, say, Salisbury as symbol is more than partly due to its success as evoker of an aesthetic response? This is independent of the fact that here the religious complex has captured the Gothic style for its own symbolic purposes. Perhaps the guess could be hazarded that successful aesthetic enhances the effectiveness of the symbolic, but that poor aesthetic does not necessarily invalidate the success of the symbolic: the symbol may have no aesthetic significance and may yet be perfectly effective. It is also important to recognise that satisfactory evocation of an aesthetic response can be independent of symbol.

The use of symbols from other building-types of a previous epoch should also be mentioned in connection with the relations between symbol and aesthetic. We find terrace houses in the 18th. century English context, grouped within the confines of a palace facade. Banks in the 19th. century used the symbols of the classical temple. This transfer of symbol is extremely interesting sociologically and would appear to be related to situations of prestige and status, particularly where it is necessary to give adequate status relatively quickly to something which is either new or for some reason lacking in prestige. There is an important field of research here, important because of the rapidity of change in our society and therefore of relevance to our problems of symbol.

In current architectural thought there is a tendency to emphasise the aesthetic to the detriment of the symbolic. This manifests itself as a preoccupation with architectural style for itself, and as an anxiety to make the building 'beautiful'. Two untoward results flow from this misvaluation. First, the symbolic is undervalued and therefore the social meaning of the building is under-rated. Secondly, the aesthetic now released from any close attachment to social meaning, becomes over-rated and floats without anchor on a sea of whim and caprice, reducing the architecture to paper arabesques. The present vogue for meaninglessly curved and raked walls is an example (35).

As the world shrinks in space-time it is reasonable to anticipate increasing cultural diffusion (36). This will mean a universalising of institutions and their instruments and a diminution of local idiosyncrasies. By standardising symbolic forms and architectural style this process should make the sphere of the aesthetic stand out more clearly and make its contribution to the building less liable to confusion with the symbolic.

(35) The winning design for the Rome prize 1954 is a typical example. Most of the walls lying in one direction were pointlessly raked on plan. The ultimate sterile end of this approach to architecture is originality for originality's sake.

(36) J. O. Hertzler. Op. Cit. P.328.

6. Stability of Symbol and Style.

Symbol is the language with which the institutional complexes express themselves, and the function of symbol is to make manifest the importance of the various institutional complexes. Speaking of symbols Hertzler says:

> "They are visible and audible "cues" which mobilise and set off performed patterns of behaviour. They have been referred to as "trigger-phases" or "trigger-objects", ... They make institutions stand for something big and important, mysterious and ineffable. Finally, they simplify the complex institutional world and make its requirements appear beautiful, symmetrical, logical, eminently respectable, and therefore desirable" (37).

An important aspect of the mechanics of the process is the need for stability in the symbol: it must not vary rapidly or move far from the norms. If it does, it ceases to be an effective symbol. Le Corbusier's house at Garches (1927) is an example of a breaking away from the symbolic norm. Symbol can be changed slowly, as for example, the change from the early English broached spire to the perpendicular tower as a religious symbol, but too rapid change may overrun the society's capacity for adaptation and may lead to reaction. This may be an explanation of the strong tendency in the western world to resuscitate past styles during the last 200 years; rapid change produces a sense of loss which may be assuaged by a flight into the past. Neo-Georgian needs examination in this light.

Something of the significance of this aspect of symbol can be appreciated by examining Le Corbusier's town planning schemes, for example, the 1937 Plan of Paris. These schemes show what modern techniques could achieve in the direction of rational organisation of both the town and the building. Further, they show how the techniques could be imaginatively handled to produce an environment of high aesthetic emotive force. They do not, however, show symbol, because the rational use of the new techniques is such a radical departure from the usual expectation - consider financial scale alone - that utterly new symbols are necessary (38). This uncovers one of the major problems of our time: the over-running of accepted forms by the very rapidly advancing techniques of modern technology. This problem confronts us in both symbol and style, since both are institutionalised and change is essentially a departure from accepted institutions.

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(37) Op. Cit. P.167.

(38) The office block, however, has acquired some beasure of appropriate symbol: pilotis, rectangular carcass, free ground floor and roof shapes, and often a smooth all-glazed treatment of facade.

Style is institutionalised (i.e. it is an expected pattern of behaviour) for much the same reasons. It is a language and it may only change at a relatively slow rate. Like the meanings of words, the meanings of stylistic forms must both stand still and yet move. They must stand still to give precision of meaning: they must move, develop, fall into disuse because of the general flux of human life. Any accepted style is therefore difficult to change in its major elements, although detailed modification is always going on. Thus the crocket is recognisable sui generis for several centuries although its detail changed a great deal. The present style of architecture inspired by Gropius, Le Corbusier and Mies van der Rohe has become institutionalised into an ascetic and rational use of form based largely on structural requirements and, ostensibly, the physical requirements of the various complexes to which the buildings belong. No doubt this will 'evolve' into something quite different, and in fact the work of Niemeyer with its curvilinear forms not tightly related to structural necessity suggests the first major phase of change may be being entered. But this is growth. To attempt a new style now would be extremely difficult, and would be to jeopardise the institutional stability already won for the international or modern style.

7. Expressional Institutions Essentially a Means of Communication.

Symbol and aesthetic together form a language of communication. This language is a product of the social process and it has as characteristics a tendency to arbitrary selection and exaggeration of forms, and a tendency for the forms to lag behind the requirements of the working reality both in symbol and in style.

These discrepancies may perhaps be attributed to the fact that build- is so closely related to so many aspects of the institutional structure of society. Hertzler takes the view that there will be important architectural works only in relation to institutions, but omits to deal with the question of discrepancy between symbol and reality. Whatever the answer to that problem may be, it is clear that symbol and aesthetic are influenced by the institutions of family, economic life, government, education, recreation and religion. Symbol may come straight from another institutional complex: e.g. the latin cross plan. Or it may come from within building itself like the symbols of the modern office block already referred to. Aesthetic expression may be heavily influenced by governmental control: for example a statute of 1707 forbad the further use of wooden eaves-cornices in London (39). This compelled the use of brick or stone parapet, which from that moment onwards became an essential element in the stylistic expression of the 18th. century - an expression which continued more or less unchallenged until the middle of the 19th. century and finds its philosophic statement in the view of Trystan Edwards that parapets are urban whilst visible roofs are rustic (40)! Similarly the commercial development of very strong materials like structural steel and reinforced concrete has led to new stylistic possibilities: the elimination of weight-bearing walls, wide spans between supports, slender structural members. So great has been this impact that a new stylistic expression has emerged.

The significant point is that both symbol and aesthetic expression are to a large extent determined by other institutions. Detailed study is required to show just how much and in what precise ways the expressional institutions are influenced by the other institutional complexes. What is considered beautiful is sociologically determined and sociological determination means that the various institutional complexes have their influence on what is to be considered beautiful at any time or place. This is in addition to the fact that beauty is subjective and not in the object but in the mind of the beholder. These two ideas are not incompatible because the subjective response of the individual is in fact hedged in by the influence of the various institutional complexes and the general ethos of the society of which the individual is but one member. Were the one not limited by the other there would be no possible general agreement on beauty in any society - a contradiction of obvious fact. The individual's subjective response is, in the main, within the field defined by the influence of the institutions of building. For example the economic institutions of the U.S.A. have produced the skyscrapers of Manhattan. At a certain epoch (the 1920's) the combination of these institutions with the aesthetic institutions of the day produced the Gothic skyscraper with its excessive emphasis on verticality. In that context Gothic skyscrapers were held to be beautiful. Under the pressure of changing ideas in structures and materials they are no longer held to be so. But note that in the meantime the skyscraper has remained essentially unchanged in its general physical shape. What has happened is that society under the influence of new building techniques, that is changes in the institutionalised methods of building, has thrown out

(39) J. Summerson. Georgian London. P.52.
(40) Op. Cit. P. 111, 137, 143.

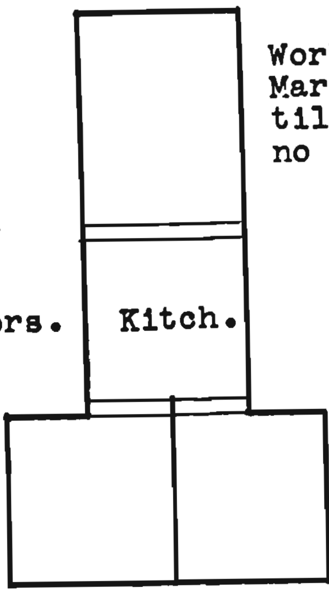
Fig. 40. Possible adaptation.

Fig. 24.

Fig. 25.

Fig. 32. M.A.C. Bristol.

Status Indicators.



Works canteen: Marley tile floor, tiled walls, no tablecloths.

Office staff canteen: wood block floor, wood panelled walls, no tablecloths.

Junior managers' canteen: wood block floor, wood panelled walls, tablecloths.

Directors' dining room in separate suite: carpet, no tablecloth but expensive hard-wood table.

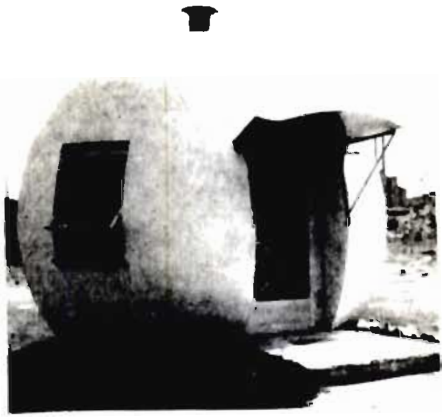


Fig. 26.

Fig. 28.

Fig. 29. Bastard pilotis.

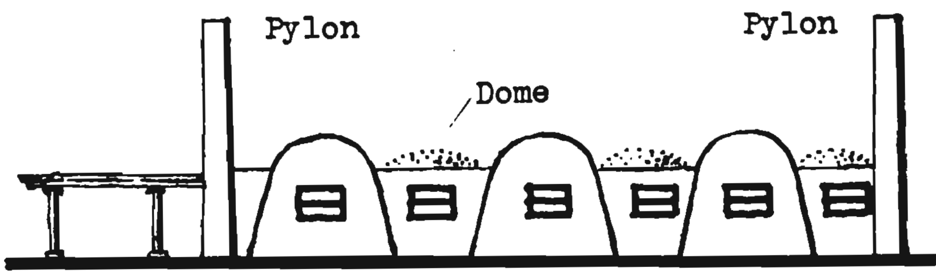
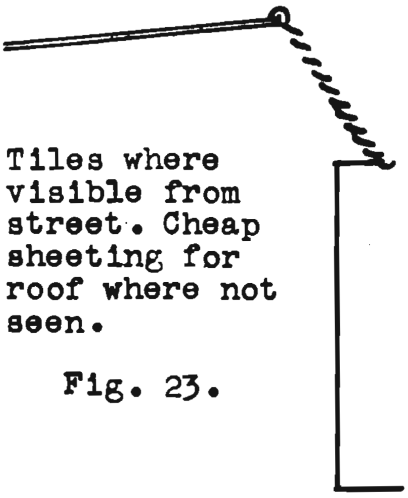


Fig. 27. Symbols of an ancient Egyptian house. From a drawing in a sarcophagus, Louvre.



Tiles where visible from street. Cheap sheeting for roof where not seen.

Fig. 23.

Fig. 30. Gable trying to be pediment.

Fig. 31.

a new aesthetic, an early manifestation of which in skyscrapers was Howe and Lescaze's Philadelphia Saving Fund Society Building in Philadelphia (1931)..

Although a study of the influence of the institutional complexes on aesthetic will not 'explain' the causation of any particular architectural style because of the fact that a style is often formed by the rational development of irrationally selected elements, it will prevent our being misguided into regarding beauty as an absolute and into thinking particular individual elements indispensable to beauty in building. One cannot hold the view that the parapet treatment of the roof is essential to the appearance of buildings if one understands that it was the result of fire-prevention regulations. The urgent need is a clear understanding of the practical how and why of accepted stylistic forms, if we are to assist in the emergence of a new and clear architectural expression. One has only to project techniques into the future to understand the institutional nature of our views on what is beautiful in building. Imagine for example, that the plastics industry were to put on the market a spherical house consisting of a bubble of transparent plastic. By what aesthetic or symbolic standard could it at present be judged?

8. Building Example.

Examples of the manipulation of the expressional in these buildings are as follows (Figs. 1 to 4):-

(a) The office block is clearly recognisable as distinct from the factory block. This distinction, running parallel with the class distinction between factory worker and office worker is a frequent symbol seen in modern factory design. Sometimes the factory block is hidden from view from the road by the offices. There is detectable, however, a tendency to merge the two, particularly where the factory does not employ many workers.

(b) The front entrance to the office block is designed integrally with the entrance hall and the enquiries desk. This at once indicates that the building belongs to the economic complex.

(c) The exterior of the office block, and indeed of all the buildings, was designed to suggest up-to-dateness and modernity. In this sense the architectural style used is symbolic. This symbol has prestige value, of which the directors of the firm are well aware. The symbol becomes evidence of efficiency.

(d) The open space (grassed) in front of the office block has symbol value:

the grass is an indication of respectability much as is the grass in front of a house. The firm takes a pride in maintaining this symbol properly. The contrasting effect can be seen in front of the tower: this area is gravelled for economy of maintenance and gives no enhancement of prestige.

(e) In the design of the tower and staff wing care was taken to avoid creating a typical factory building and attention was paid to obtaining a satisfying shape to the tower - a problem of considerable difficulty considering the need to have an overhang at the back. The tower can be criticised on the grounds that it is not clear as symbol. It can be confused with other buildings of this size and shape, for instance a block of flats. A member of the public was overheard to say: 'what a curious place to put such a nice block of flats' - a reminder that people have ideas as to what a building ought to look like. This person saw his image of a flat block. The symbol intended did not, therefore, express itself successfully in this case as far as this part of the buildings was concerned. Perhaps a reason for this failure of symbol is to be found in the brick ends. In the Bristol area flat blocks are usually of brick and this has now become symbol. Had the whole tower been of aluminium panelling, as the sides, it would probably have been more successful as symbol of the economic complex.

(f) It is notable that the garage is regarded of no value as symbol. Tucked away at the back of the site, it is built of cheaper materials than the other buildings.

(g) The style chosen for the buildings closely relates design and structure, is severe and is rationalist in approach. It has, as yet, no official name, but there is in Britain a growing body of work in it. A modern style was used for prestige reasons and style here is also therefore symbol.

(h) The success or otherwise with which the style has been used to convey an aesthetic impact is a matter of value judgment which need not concern us.

The impact of the educational complex in building as far as the architect's side of the matter is concerned can be illustrated from these buildings. The style chosen was a direct result of the training of the architect largely responsible for the appearance of the buildings. In the nineteen thirties, as a student, he was much under the influence of the early modern architects who stressed a rational approach to solving physical problems and who believed that this, together with a scientific approach to structures, should be the major determinant of style. Out of this approach came the modern idiom which is now widely accepted. As far as possible all traces of previous vocabularies of form have been avoided and the requirements of use and structure have been allowed to 'make' the style.

An interesting feature about the style used is that there is no element in it which was not available to architects as long as thirty years ago. The only element which might not have been possible then was the use of wide span roof members used in the office block. But the unavailability of these would not have affected the style. Style in this case, therefore, seems to be a direct result of an increased rationality of approach on the part of both designers and clients. The conscious attempt to make a style out of the factors of the problem is new. The fact that clients can accept this and no longer necessarily insist on the use of a traditional style is also new. It should be noted that not all industrial or other clients have yet reached this stage: there is considerable lag, particularly in the attitudes of financial organisations.

9. Conclusions.

(1) The term 'expressional' includes the symbolic and the aesthetic and covers any aspect of building aiming to transmit an idea, an emotion or a social value. Both are structured into the culture in which they exist.

(2) The major divisions of the expressional are the symbolic and the aesthetic. The symbolic covers all aspects which are propagandist for the institutional complexes: religion, education, government, economic and includes the prestige element in building. The aesthetic covers those aspects which are concerned with evoking an aesthetic response. This is different from the response made to symbol. Aesthetic includes the institutionalisation of beauty as value and ugliness as disvalue. These are resistant to change and also includes style.

(3) Symbol means the use of building forms to express the physical presence of an institutional complex. Its use is a method of fixing or focusing the complex to a position in space. The complex can therefore be identified with the symbol and this identification greatly assists the survival of the complex.

(4) The functionaries responsible for maintaining the institutional complexes are usually well aware of the importance of symbol. For a building to fail in symbol is serious because this failure weakens the institutional complex concerned and therefore the stability of the society as it exists.

(5) Symbol may also be seen as the non-material over-burden which a culture-object (the building) acquires as it differentiates itself from similar culture-objects. This differentiation or specialisation comes to have social meaning separate from all other significances. It 'stands for'. This is quite separate from aesthetic.

(6) The characteristic forms of buildings become symbols for aspects of the social structure. Parts of the social structure are thereby mirrored in the physical world.

(7) Symbol is used for prestige purposes and may be related to manifestations of status. By proxy symbols are used to indicate the social ranking of building owners or occupants. This may become a very significant characteristic if our society is moving into a phase of increasingly rigid status definition.

(8) At the present stage of western culture the symbols for the various institutional complexes are not all equally developed. There is a varying degree of efficiency of symbol in the institutional complexes. Variations of this kind are significant as indicators of strain and lag. Research into the comparative development of symbol in our society is required.

(9) Historical reference suggests that all human societies which achieve serious building eventually come to differentiate their building-types as symbols of their institutional complexes. If this is true it may be assumed that our society will be no exception and that therefore in time it will settle down to accepted symbols expressing the structure of society. This assumption, however, may need modification in a situation of rapid technical and cultural change bringing change ultimately in the structure of society.

(10) In a town the amount of symbol is not the same for all institutional complexes. Symbol varies in quantity and quality. The familial complex, as represented by the symbol of the private house, is spread over proportionately large areas but is relatively weak in impact compared with governmental or economic symbols manifest in the city hall, and the shops and office blocks. The ecological pattern of cities also favours some

symbols as against others.

(11) Symbol is not constant but changes with other factors; some symbol forms like the tower and spire (in combination) are very old.

(12) Symbol is irrespective of style, although style itself may be used as symbol.

(13) The site development of buildings and groups of buildings may be used as symbol. In view of the trend towards setting a building in an area of landscape this use of open space requires research in relation to the aspirations of our society.

(14) Administrative techniques like the determination of a building line may generate symbolic value.

(15) Style, materials and construction methods may acquire symbol value. This value may fluctuate over the time scale.

(16) In any culture there is a hierarchy of symbolic value in building. This is not constant but subject to change as the society changes. This hierarchy reflects the values system of the society and will tend to follow its variations. Research is needed here, since concepts like 'town core' may not now be sociologically valid. This aspect of symbol is very important in the present crisis of town planning.

(17) Symbol may be consciously manipulated. This is dangerous if attempted without a thorough grasp of the societal and cultural situation. Research is needed to find areas where manipulation is possible.

(18) A problem of value judgment is presented by the fact that symbols of the economic complex are coming to dominate our cities. Can we prevent this?

(19) What kind of symbols can be used in a residential area?

(20) The forms selected for symbol are probably arbitrary in origin historically speaking. We may have to manufacture symbols consciously as we increasingly diredt the evolution of society.

(21) The forms of symbols show evidence of having sometimes arisen as exaggerations of utilitarian forms or at least as embroideries of them. This subject requires research particularly in relation to our present exaggerations and embroideries. This would help us to understand how symbol works.

(22) The essential characteristic of the aesthetic is that the building is viewed as an end in itself.

(23) The aesthetic emotion may be used as a tool provided it is understood that precisely what an emotion is must remain undefined.

(24) Aesthetic emotion may well be a conditioned reflex: the operation of a stimulus-response mechanism. We feel the emotion because we have been conditioned to do so under certain stimuli. The nature of the stimuli, under this hypothesis, would be determined by society in general terms.

(25) There is great benefit in closely defining the area concerned with aesthetic in building and planning because of the danger of undue prominence being given to the aesthetic if it is not seen in schematic relationship with other aspects.

(26) A culture is not necessarily consistent in its view of what is aesthetically valuable. Different systems of aesthetic evaluation may exist simultaneously in the same society.

(27) The vehicle of aesthetic is style. This usually consists of a vocabulary of agreed forms. The essential of style is that it is institutionalised and both designer and society have certain expectations about it. Aesthetic cannot be properly served unless there exists an institutionalised basis of style.

(28) The forms of style and their combinations are not necessarily rational. The salient notion appears to be fortuitous emphasis on arbitrarily selected elements. These are then developed rationally.

(29) Stylistic elements go through phases and can often be traced from 'rational' structural origins, through a phase of true symbiotic relationship between structure and style, to a final phase in which other structural methods are used to maintain the same appearance. Economic pressure is a very important influence in this sequence.

(30) The institutional analysis of stylistic elements is a vital tool for the critic if he is to avoid mistakes when attributing origins to forms in building.

(31) Canons of proportion are an institutionalised adjunct of style. Economic pressure is exerted on canons to cause change. Technical change is also an important source of change in canons.

(32) Survival of elements is a characteristic of style.

(33) Sometimes symbol and aesthetic can be so closely combined as to be virtually inseparable.

(34) A building may be aesthetically valuable but socially unsatisfactory as symbol.

(35) Symbol is more essential to the on-going social process than aesthetic, as the purpose of symbol is to make manifest the importance of the institutional complexes. This is particularly important in our situation, because our symbols are being over-run by rapidly advancing techniques.

(36) Symbol and aesthetic are largely determined by other institutions. This is not incompatible with the subjective view of beauty or ugliness since the field within which the subjective reaction of the individual takes place is institutionally defined.

(37) A specific form of stylistic expression may become a symbol. This is particularly likely when status is involved.

(38) The idea that there is a ritual element in the design of buildings on the aesthetic side requires investigation.

(39) Materials and forms may be used as symbols to indicate the status of individuals.

LINK 1.

AUTOMATION AND CYBERNETICS

As a bridge from the institutional analysis just completed to the next group of chapters which deal with social and technical change, the selection of a major factor characteristic of our present cultural configuration and significant for its next phase of evolution is more useful for our purpose than coupling the two groups together by sociological theory. This link, therefore, attempts to isolate and highlight cultural elements judged to be of extreme importance to the on-going process of society, so that these may be borne in mind during the reading of the next group of chapters.

Such a method implies value judgment. It is a matter of opinion and not of proof that the cultural elements selected are the most significant for our society's emergent form and for this reason no attempt will be made to bring forward detailed evidence in support.

War and catastrophe excepted, the most important single factor in our present situation is the direction and speed of scientific advance. Perhaps few would disagree with this. Agreement, however, is less easy when it is necessary to be specific. The peaceful application of atomic power, for example, might be put forward as the outstanding future major impact. Or, again, a case exists for the great importance of new man-made foods. In spite of a variety of specific single claimants, there is, however, a good deal of evidence to suggest that the most pervasive and most powerful factor of change is to be found in "... the implications of machine design for all aspects of our thought"(1).

The new science which covers this area is is cybernetics. This deals essentially with control and communication systems, and it makes possible the creation of highly developed machine-like organisms. Cybernetics cuts across the traditional boundaries of the various disciplines and draws from philosophy, biology, mathematics, sociology, economics and engineering to produce a new and fruitful integration of first importance in the present social-industrial revolution.

It has frequently been noted that a reduction in working hours and an increase in leisure is an observable trend in our present culture (2). The

(1) F. H. George. Automation, Cybernetics and Society. P.171. I am indebted to Dr. George for discussions on this subject.

(2) Research has been done in the U.S.A. into the effects of the 4- and 3- day working week.

effect of applying the contributions of cybernetics to our society will be to accelerate this trend. This will bring new problems in building and planning and we may expect innovation ranging in scope from the building-type to the layout of the whole town. Some thought is already being given to the likely effects of increased leisure, but a great deal of research is necessary if building and planning are to keep abreast of developments.

Important as will be the impact of increased leisure and the change that it will bring, it seems likely that another implication of the application of cybernetics will be even further reaching in its progressive effects. This is our increasing capacity to direct our societal evolution.

The more we develop machine-organisms the more efficiently we shall be able to predict. This means that we shall be able to try out solutions to problems without actually carrying out the experiments in the real world. We shall thus be able to choose a solution rather than have one thrust upon us. We should therefore be able to control change as never before.

The implications of this for planning are extremely important because the major problem of planning is one of prediction: how can planning be undertaken for a community without a fair measure of reliable prediction?

From this two significant thoughts stem. The first is that if we are going to control our evolution we must first comprehend our society. This means that the social sciences will be urgently required to make an indispensable contribution to our thinking in building and planning. The second is that society will need to formulate its goals consciously. What kind of society do we want to have? This will mean that there will be required an enhancement in the telesis-promotion capacity of suitable elements in the society. Among others we may include here the architect and the planner: they will be required to help society formulate its goals, at least in regard to the physical environment; it is debatable whether they should be expected to go further.

CHAPTER VIII

CHANGE: SOME SIGNIFICANT FACTORS.

Change is the inseparable travelling companion of the on-going process of all human societies. By the nature of things it is with us in varying degrees in all departments of life. The sources, forms, causes and direction of change are therefore of interest to us in studying the sociology of the building because, being a product of both the culture and the society, it is subject to change in all its aspects.

The scale of that part of sociology which deals with change is somewhat intimidating in its size and we cannot hope in this study to do justice even to an outline of the subject of change in relation to building. To achieve such an outline would require protracted research carried out in its own right, independently of the rest of the sociology of building.

The difficulty is somewhat alleviated by the fact that it is self-evident in our society that technical change is a very strong factor in building. This is because of the rapid pace of advance in invention and technology coupled with our dynamic type of economy which both forces the technical side and provides cause for it. Whatever, therefore may turn out to be the full story of change in building in the total sociological picture, it seems likely that we shall not go far astray if we examine the subject largely from the aspect of technical change. This chapter and the two which follow, therefore, will attempt the following approaches: this chapter will deal with certain essential basic concepts connected with change, particularly those which have to do with resistance to change because this is a major problem in building; Chapter IX will cover technical change as it relates to building and Chapter X will discuss social change. The approach to change must, then, be accepted as specifically cast in this special way in the belief that this has validity for the purposes of building research.

1. General Definition.

Change, whether cultural, social or technical can be described:-

"Change is the succession or substitute of one thing, state, condition or procedure for another"(1).

It is present in the structural - institutional - system of society,

(1) C. Panunzio. Major Social Institutions. P.411.

in the on-going process of society and in the cultural pattern. Its dominant factor is that it is omnipresent: we even find it appearing in natural building materials like stone and wood which undergo change by processes of reconstitution (2).

2. Change a Process Taking Place in Time.

The universality of change makes evident how indispensable is the study of the historic process; MacIver and Page speaking of the social structure say "its contemporaneous aspect holds and hides the secret of its past"(3). The reverse is also true, and for building more important: that its past aspect holds the secret of the contemporaneous. It seems clear that in building the nature of present change is dependent on what has gone immediately before. A single leap from the early 17th. century house at Coleshill to the Tugendhathaus would be impossible in terms of materials, structural methods and aesthetic. We change, in the main, by small movements rather than by large and all-enveloping innovation: from Burlington to Adams, rather than from Inigo Jones to Mies van der Rohe.

3. Difference Between Cultural and Social Change.

It is necessary to distinguish between social and cultural change. Social change means change in society, which is a structure and an on-going process. Social change is therefore a change in societal structure or process. Cultural change includes social change and also changes in the material and non-material culture (4). A change in architectural style is an example of cultural change. The cause of it may lie in social change - some shift, for example, in the social process. The political emancipation of women (a social change) is one of the causes of our change in attitude to the employment of women in industry (cultural change - the attitude) and hence of change in factory design. It is important to remember that the society at any time rests in the culture, not vice versa, and therefore cultural change is the more inclusive of the two concepts.

Although the building, as a physical object, must be included in cultural change, the importance of social change is ever present as a motivation to change in the building. Changes in family relationships, for example, have

(2) Reconstructed stones and reconstituted timbers have new physical characteristics and therefore new uses.
(3) R. M. MacIver and C.M.Page. Society. P.508.
(4) K. Davis. Human Society. P.622.

their responses in the design of the house, whilst changes in attitudes to health bring modification in office, factory, school and hospital design (5).

Social anthropologists sometimes distinguish the material from the non-material culture. Although this division is not universally accepted, it is useful in the analysis of building as a way of distinguishing change originating from technical sources from that having a social parentage. It is obvious that as a tangible thing the building is an object of material culture. Its form, however, is influenced by the non-material culture, as may be true in varying degree of all things that man makes (6).

4. Confusion of Change with Progress.

Change is neutral. The word has no implication for the better or the worse and does not carry any implied judgment. Social change does not therefore suggest that society is getting more moral, more complicated or more efficient in any direction. It merely means that there is a changing equilibrium of relationships. Change in the building does not necessarily mean that it is improving or getting more rational - an assumption we are often apt to make without realising it.

There are several words, however, which are used to describe change with a direction or qualitative judgment implied: growth, development, progress, evolution, repression, degeneration etc.(7). Of these evolution is perhaps the most abused concept. It means an unfolding process in which hidden or latent aspects become manifest. Its essential is a "sequential, uniform process of variation, selection, transmission and adaptation; a movement from simplicity to complexity, from homogeneity to heterogeneity; a process which operates genetically, affects all organisms in a given species and achieves relative permanency in the end product" (8). From this definition it is clear that evolution does not imply improvement in any sense, and to equate it with progress is to confuse an immanent process with a culturally-conditioned

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(5) A common method of dealing with the history of architectural style is to trace the 'development' of elements like plan, fenestration, roof system and decorative detail. This is a study in cultural change. The parallel social change is generally ignored.

(6) Physical determination of course arises from climate, availability of building materials, skill etc. In a society ever tending to greater universalism, however, these physical determinants are presumably declining in importance.

(7) See Appendix V111 (1).

(8) C. Panunzio. Op. Cit. P.399.

subjective valuation. From 1200 to 1500 A.D. the English Gothic style may be truly said to have evolved, strictly in accordance with the definition given from Panunzio. To say that it progressed in the same period is to imply a higher valuation of the Gothic of 1500 than that of 1200; a valuation, at any rate as far as the aesthetic is concerned, which many art-historians reject.

During the 19th. century it was the common assumption that evolution meant progress, particularly progress as understood by the period: Spencerian evolutionism. Roughly the idea was that as society continued, it improved in all directions, the late 19th. century civilisation being the highest reached by man. In order to make this pinnacle of progress difficult of attainment by other societies it was also held that all societies must pass through the same sequence of change as had Western Europe! The idea that human societies have all passed through the same sequence: food-gatherers, pastoralists, agriculturists; group marriage, polygamy, monogamy, and that all societies must pass through these stages has now been exploded (9), and we must be careful in building and planning for primitive societies not to harbour any residual thinking of this kind.

These ideas must be firmly grasped if the immanent nature of building in society is to be understood. Evolution is seen to be independent of progress, thus exposing the essential <u>subjectivity of aspirations</u>. The house, for example, may easily evolve into a glass or plastic box (10), since public taste has been conditioned during recent decades to an increasing proportion of glass in walls, and since the evolution of structural methods is making this possible. It may seem to the designer that this is progress, but a later assessment may be that it is a degeneration which goes beyond the reasonable limit of utility and acceptability. Thus in the development of a building-type the evolutionary curve may steadily mount but the utility or progress curve may reach an apogee and then fall. The Victorian development of the Regency town house is a salutary example of the lesson that evolution and progress are not to be equated. This group of ideas has particular significance for the problems which are met in westernising a primitive or non-western society. If it is <u>not</u> necessary for a society to pass through a fixed evolutionary series

(9) View held by Bachofen, McLennan, Morgan etc. The principle of cultural diffusion adequately disproves any theory of universal sequence.

(10) This might happen if (a) curtain walling becomes very cheap or (b) large castings in plastic, such as large plastic bubbles, become practicable.

in its institutions, we may hope that the jump may be made straight to a western-type urban environment, there being no need of any intermediate stage comparable to the housing development at Pretoria, where in the early 'lapa' system an experimental attempt was made to house primitive African urbanised workers in houses of an arrangement and construction based on their tribal kraals (Fig. 33). This attempt has proved a failure because the urbanised African aspires to the objects of European material culture. The housing of the urban African in South Africa does not therefore appear to be a question of developing something from his primitive hut dwellings: it is much more a matter of discovering how to provide a European style environment for very low cost.

Such concepts as evolution, progress and degeneration are therefore useful for the analysis of building provided their meanings are clearly defined and they are used in their scientific connotations. None of them should be used to denote the neutral word 'change' (11).

5. Technical Invention Our Major Source of Change.

The major source of change in our society appears to be technical innovation and invention, and their diffusion. The speed of increase of mechanical invention in the last century has been prodigious and this is a prime determinant of the present rate and direction of change. Innovation and invention have, however, also taken place in the non-material aspects of the culture during the same period. A useful way of classifying the relationships is:

	Relationship	Example
(1)	Technical change causes technical invention.	Reinforced concrete causes the invention of special types of shuttering.
(2)	Technical change causes social invention.	Invention of large sources of power-steam and electricity - make possible the large factory, and the large firm as a new social element. In building the invention of structural steel and concrete make possible the social invention of the large building accommodating many separate firms.
(3)	Social change causes social invention.	Invention of the large firm causes the inauguration of welfare organisations.

(11) See Appendix V111 (2).

(4) Social change causes technical invention.	Decline of domestic service causes the invention of labour-saving equipment for the house

We must note in this section the rising importance of predicting change and the implication to be drawn from prediction, namely, that we can direct change purposefully. Such thinkers as Buckminster Fuller and J. Bronowski are at present stressing this aspect of change (12).

6. Reciprocity of Cause and Effect.

If examples of change are examined in the light of the above table it will be quickly concluded that a specific item of change may frequently be classified as both cause and effect. For example the motorcar. As an invention (or group of inventions) it may be regarded as the cause of the recent social invention of the modern suburb. Looked at another way the car can be seen as a technological response to the social problems resulting from the rapid increase in the size of towns at the end of the 19th. century. We have here again very clearly the principle of reciprocity.

It is, therefore, necessary to exercise great circumspection in allocating cause to change. There are doubtless occasions when cause can be clearly allocated to the technical or the social area of a culture. For example, the change from Gothic to Classical which characterised the renaissance was social: a new system of subjective values appeared, capable of overcoming the value system which was still supporting the now enfeebled Gothic idiom. This was change in the cultural configuration, but it did not rest on any improvement in technique or on the discovery of any new principles. There is no evidence that the Classical style of the renaissance was attributable to any technical invention. On the other hand the invention of radio is a purely technical one. Generally speaking, however, it seems better when considering change to regard it as a circular or reciprocal process of which the elements for our purposes are technical and social change (13).

The decline of the use of natural dressed stone for building is a

(12) Cybernetics and the work being done on the human brain and nervous system by investigators like Gray Walter of the Burden Neurological Institute, Bristol are of great importance in relation to the development of electronic equipment for prediction.

(13) Hertzler gives as factors (not causes) of change: rapidly changing technology; large scale of our social relationships; increase in mental and cultural contacts because of fast communications; stimulation of urban life; extension of science; disturbance of the wars; totalitarianism. Social Institutions. P.238.

good example of the way in which a confused assignment of cause may be made. Stone is generally regarded as having gone out of common use because of cost. Its cost is high because of labour, which requires a 7 year apprenticeship. Because of the long apprenticeship few undertake the task and costs are again increased. It therefore appears that the 'cause' of the decline of stone is that it is uneconomic. But this is probably not so at all. The difficulty lies in the working technique which has to be learned: it is long and unsuited to the uses to which stone could be put economically in the context of modern design. The stage is set for a new invention. It comes in the form of methods of reconstructing stone. So the emergence of reconstructed stone seems a second reason why natural stone declines in popularity. Clearly these 'causes' are not causes at all. If there is any single cause it should be sought in the rigidity of the training of the mason which has priced natural stone out of the market - a rigidity not present in the training of the operative who makes reconstructed stone.

Having stressed the need to use the principle of reciprocity when examining the causes of change, it must be added that in general terms it seems reasonable to assume that although change may stem from physical nature, population, discovery, invention, intellectual concepts, societal catastrophe, technical invention, shifts in values and ideology, and man's deliberate efforts, the usual process is for the non-material to adapt to the material culture. That is to say the prime area of change is the material culture. Ogburn takes this view (14), and calls that part of the non-material culture which adjusts to material change the 'adaptive culture'. He does not think it common that non-material change precipitates change in the material culture (15). This is significant because it means that change in, say, religious buildings will be slower than in buildings of the economic complex which is deeply involved with technical invention.

7. Persistence.

We are now in the position to be able to examine resistance to change in its various forms: persistance, rigidity and lag. These are very important for building.

Once an institution or a pattern of behaviour has come into existence it develops a momentum which tends toward its continued existence and assures

(14) Op. Cit. P.271. Technical change is cultural.
(15) We must record the increasing emphasis on planned invention: e.g. nylon which was specified first and invented afterwards. This is culturally very important.

its projection into the future. This tendency is called persistence. It is not to be identified with cultural lag or inertia, or with rigidity. The word persistence implies no qualitative judgment and is only a neutral statement of an observable fact.

As an example, in the Bristol - Bath region the traditional use of ashlar in Bath stone for facing still persists as an economic material for good class work (e.g. multiple stores in Bristol - 1956) and sometimes even for working class houses built by the local authority (e.g. Bath). Another example is the persistence of tiles as a roofing material in the face of asphalt, sheet metals and bituminous felts. The tiled roof still boasts a prestige in certain places (e.g. Bristol and equally Pietermaritzburg) which can be explained very largely as persistence (16).

Persistence occurs not only in the use of materials but in all departments of building: constructional methods, the structure of the industry, craft habits, architectural style and the arrangement of the various parts of the building's plan. An outstanding example in constructional methods is perhaps the load-bearing wall. Although the merits (particularly in plan flexibility) of the point support system are known, load-bearing walls are still common practice for buildings of up to three stories in Britain, although in the U.S.A. they appear to persist mostly in domestic work only.

In craft training persistence is very strong and is reinforced by the special intervention of the trade unions. Lengthy apprenticeships persist during which the trainee has to become proficient at operations which he will only rarely be asked to perform in practice, and has to learn habits of work which will be difficult to modify later. Furthermore the worker may come to rely on the continuance of his working habits for psychological stability. The building industry is peculiar in the modern world in that it is probably the most heavily craft-oriented of all industries. This means that persistence is very marked. One has only to compare motorcar manufacture with house-building to notice at once that the house is the product of a group of crafts, whereas in the production of the car the craft element <u>has been replaced by pre-planning on the drawing board</u>, and assembly has been reduced to semi-skilled routine work. Generally speaking craft work is slow work. The craftsman is called upon to consume considerable time in making decisions, measuring, fitting

(16) Bristol Corporation, in common with many other local authorities, is now beginning to use roof felts for blocks of flats etc, where 10 years ago tiles or slates would have been automatically specified.

to individual needs. This is the typical approach to most of the operations of building, including building design. Very few of us would be able to afford a motorcar produced this way. The architect often deplores the decline of craftsmanship not fully realising that deficiency of skill and lack of interest in the work are the sociological indications of a declining craft situation. He therefore may blame poor craftsmanship for the defects in his building, when be in fact is the cause of failure since he designs beyond the capacity of the work force to carry out his intentions. If the architect wants successful realisation of his buildings he must understand precisely what is the state of the building industry in regard to labour and design accordingly.

The structure of the building industry as a whole may be said to have persistence of a type similar to that of the craft habits. The general contractor, the small house builder, the specialist contractor and the subcontractor are organisations fitted into the general nexus of our economic life. Once established they tend to persist at their given scale, continuing to be responsible for those sectors of the building process which have become customary to them. Their habits of estimating, accounting, measurement, allocation of responsibility, and organisation of man-power and work, are as persistent as the craft habits of their building operatives.

Persistence in architectural style is easy to appreciate. Once it is generally accepted, a style continues under the pressure of its merely being the accepted style. A peculiarity of style persistence, is, however, that it may be consciously attacked and brought to an end. The resurgence of the Classical in the renaissance put an end to the persistence of Gothic, first in Italy and later over all Western Europe. But in spite of this possibility always being present, style has in the past exhibited remarkable persistence particularly in its details. There is no reason to suppose that the modern style will be an exception.

Persistence in the planning of the building is commonly observed wherever change in living and working habits is in evidence. An example in the context of geographic-climatic change is observable in the continued construction of the domestic fireplace in Durban. This, in extreme form, consists of a fireplace apparently constructed for burning wood or coal but built in fact without a flue. The fireplace has persisted as a focus of family life. Persistence in the face of socio-economic change is seen in the fact that houses are still planned with separate living room, dining room and kitchen - a persistence from the days when domestic service was generally available and fuel was cheap.

An appreciation of the nature and characteristics of persistence is important to the architect because it is present in all aspects of the building process. It is also present in the educational methods applied to the training of all those who have to do with building. The most serious danger in dealing with persistence is confusion with rigidity and lag. Persistence is often a good thing and should be respected and the fact that a characteristic has persisted should give the architect pause to consider the reasons before he hastens to go counter to the existing trends.

Certain factors related to persistence will now be examined in the context of building:

(a) Utility. A building material , element or way of carrying out a building process persists because it is satisfactory (within reasonable limits) in use. It serves the purpose with adequacy. The same applies to the plan patterns of the building-types. Over time the plan of the house or church has been found to be capable of meeting the demands made on it. The advantage, and the weakness, of the utility aspect of the question is that it obviates the need for fresh thinking. We have this problem: we know from experience that a certain solution is adequate. There is often much to be said for leaving well alone - an ability which we have largely lost due to the pressure of our dynamic economy. Had the colonial type house with verandah all round been allowed to persist in Natal instead of being irrationally swept away by the typical modern house with large areas of glass and walls exposed to the sun, a house-type eminently well suited to the climate might by now have been evolved. The lesson seems to be that where there exists an already entrenched solution to a building problem it behoves the architect to examine it most carefully to see whether he cannot improve upon it whilst preserving its known benefits.

(b) Nature. Because climate and geographical conditions do not change over the time-span with which we are concerned, building can be said to take place under conditions of predictability. The traditional building materials that a region has developed will continue to be as effective as before, and because established in use, they will persist. Such materials

- bricks, slates, tiles, stone, lead, copper and iron - are frequently referred to as 'natural materials' because of their capacity to weather and improve with age (17). These are to be contrasted with the factory-made materials which rarely improve with age and which often change their nature, lose their colour or freshness as time goes on. The modern movement has tended to stress the opportunity offered by the new factory-produced materials: quite rightly in view of the general backwardness of building. It is necessary to remember, however, that the application of rational thought to building can be made equally to the traditional materials and it may be predicted that if the new materials are used too hastily without adequate knowledge of technique and performance, there may be a swing on the part of designers to an overcautious attitude to further advances on the industrial side. Such a swing is possible among architects because of their very poor integration with the industrial production system. Many architects could move in this direction without realising that they were moving further out of the real world into a world of illusion.

(c) Human Nature. There is a fair variety of opinion as to what this is. We may think we know, but reflection quickly shows that what may casually be referred to as human nature is in fact to a large extent a matter of cultural conditioning. For our purpose there are two ways in which this concept is useful: to indicate the drives that are common to all human beings, and to denote the psychological profile of the typical individual in a given culture. Persistence here shows itself in the tendency of expectation to continue as before. This is our conservativism (whether inborn or conditioned does not matter), and it is a factor for which the architect must have respect if he is to retain the support of society over the long run.

(d) Accumulation of Culture. Any culture is a complex web of interacting elements. The more complex this web the greater are the repercussions of change and the greater the encouragement to persistence. For the architect, this means that the more tightly are the various parts of the building process integrated with each other the more pronounced will be the tendency to persist. The elements of building exist symbiotically. The persistence

(17) Many of these are not in fact strictly 'natural' because processed.

of the brick or block wall, built wet, encourages the persistence of plaster for the internal finish. This in turn perpetuates the vested interests of the interior decorator trades. It should be noted that a strong factor which helps to perpetuate a nexus of this kind is its economic attraction. Not only do these methods and materials persist because they live on each other but also because, taken together, they are cheaper than other solutions. Persistence, therefore, has economic value which the architect cannot ignore. If he wishes to design cheaply he must have regard for the way in which groups of building materials and liaisons of methods persist in the cultural context for which he is designing. To step outside these is to run the risk of rapidly rising costs. This does not mean that the architect cannot innovate, invent or initiate change. He must do those things. What it means is that he must be aware of the social and cultural conditions he is dealing with and that he must adjust his methods to suit .

(e) Functional Continuity. This not very satisfactory phrase is used to cover largely the actions of individuals. The bricklayer has a sort of claim on society to continue laying bricks. His job persists. This applies to all workers in building from the architect down. They have been trained to a kind of work done in a certain way. This has persistence. In a rapidly changing situation persistence of this kind may appear in other forms than its obvious ones. When it is necessary, for example, to re-train building craftsmen, persistence of the original training may appear as an inhibiting factor on the surface - habits of hand, eye and mind from the old training appear in the man's attempts to apply the new. Below this level, however, there may be a whole system of attitudes having great persistence. These have to be discovered and the new training to be effective must be designed having regard to them, if the change is to be successful.

(f) Sentiment. It is easier to use an existing cultural form than to create a new one. This is how an architectural style persists. Both the public of a society and the building designers develop an affection for existing forms and depend on them for psychological security. The old forms therefore come to be applied to new uses and we have a persistence which may be undesirable, unintelligible or even comic. We must note in this field again the symbiosis of the various elements. In style, for example, all the parts hang very closely together and change often takes place only very slowly and not in all parts at one time. The sentiment felt for the style is therefore never outraged and can continue although over the long period very considerable change may be seen to have taken place.

In some ways the architect is at present tending to ignore and even flout this persistence of sentiment about building forms. Some architects are even under the misapprehension that originality is the supreme test of worth in a building. There are occasions when this is undoubtedly so but they are fairly rare, and if applied as the guiding rule of architectural design it is clear that originality eventually leads merely to the esoteric and the idiosyncratic - a contradiction of the nature of building which we are able now to show to be bedded very firmly in its social matrix.

It is likely that the extraordinary capacity of church building forms to persist is to be accounted for under this heading. This persistence is almost of the order of the timeless, particularly to semi-literate sections of the society and it is perhaps connected with the concept of the unchangeability of the deity. This is a subject which requires research in view of the present trend of some religious bodies in some countries to launch out into new building forms in their churches. This is noticeable in North America and in South Africa. Here, we can only ask the question: why is it that at this moment there appears a break-away in style in certain religious buildings at a time when the sentiment-tradition aspect of this kind of building might be thought to be its most important, in view of the rapidity of change in our society and the increase in individual insecurity.

8. Persistence Can Lead to Rigidity.

Persistence which goes on for too long so that change is inhibited becomes rigidity. Rigidity is, therefore, involved with criteria of judgment, for we have to judge within a system of values. For example, the typical semi-detached three-bedroom house in Britain may be considered evidence of rigidity or of the continuation of solid traditionalism according to the point of view. Rigidity herein differs from persistence which can be demonstrated objectively - e.g. the frame house has in fact persisted in the U.S.A. from pioneer days (18). Rigidity is imputed if we say that the frame house no longer meets the need and is impeding the development of a house of a construction better adapted to present requirements. Rigidity thus implies a degree of condemnation from the standpoint of desirable change or 'progress! It may be relative to other aspects of the culture; then it is termed 'lag'. In the Durban area the monopoly of the local brick company in the supplying of bricks and Marseilles tiles is a rigidity in the materials supply situation. If it is decided to use bricks and tiles for a house there is little or no choice available - a rigidity which is largely responsible for the appearance of the traditional type of house in the area.

Rigidity in many countries is particularly noteworthy in connection with the methods of financing housing development. This is done by specialist organisations who overemphasise their security requirements and so inhibit change which the society, in other respects, may be more than ready to accept. These organisations also have the effect of making the life of the building longer than is socially desirable because of their methods of financing. This in turn has repercussions in the direction of rigidity right through the building industry.

Another example of rigidity is to be found in the apparently arbitrary emphasis on steel or reinforced concrete for the frames of buildings. In the Bristol area the steel frame is preferred to reinforced concrete, whilst on the other side of the Channel the reverse obtains although building heights are similar. Steel can be erected a little faster, but reinforced concrete has the advantages of steel economy, flexibility of design and the easy use of the cantilever. In areas like Durban, where the use of reinforced concrete has been justified because of the high cost of imported rolled steel in the past, the industry has become used to the techniques involved and a change in the materials situation, like the advent of South African produced rolled steel appears to have had as yet very little impact on methods of framing. In these examples rigidity is in the approaches of designers, contractors and craftsmen. The designer, and the contractor tend to select what the craftsman has done before and to avoid the new, which tends to cost more because of unfamiliarity (i.e. rigidities in labour). Thus in the Britol area the dice is loaded for a

(18) An illustration is the San Fransisco area where S. J. Maisel in House Building in Transition, p. 27, states that still (1949) any house built is "almost always a frame house".

steel frame, in the Durban area for a concrete one (19).

The tendering system in South Africa and Britain is a good example of rigidity. The competitive tender was developed in conjunction with the quantities system (in Britain but not in the U.S.A.) as a method of discovering the most economical contractor. This implied all round efficiency on the part of the contractor: buying of materials, organisation of the stages of the job, control of labour etc. In Britain the competitive tender has persisted to rigidity since now anything up to 60% of the total contract amount may be represented by nominated subcontractors, thus virtually eliminating the competitive element except substantially in the area of the general contractor's managerial ability. An important and apparently successful attempt to break this particular rigidity has been made by the L.C.C. in the Picton Street flats development. In this contract the general contractor was selected in the early stages of design, thereby capturing economies that could not have been obtained without contractor consultation. If this process becomes common it will be a major change in the design process, the building process and probably in the whole structure of the building industry. It might do much to remove other rigidities.

9. Causes of Rigidity.

The cause of rigidity is largely to be found in the nature of institutions. Talcott Parsons thinks that vested interests are the most important cause since institutions both create and are supported by vested interests (20). It has been commented that persons holding places of honour "do not like to see the current of progress rush too rapidly out of their reach" (21). In addition to these causes there are such as: desire for security, preserving the status quo, fear of novelty, reverence for the past, lack of concerted effort to accomplish change, the difficulty of making inventions and getting them accepted, and the problems arising from the dislocations caused in other parts of the culture (22). All these appear in building and to them may be added a desire to play safe, a fear of new materials, methods and styles. This fear may be quite legitimate because a building must keep its efficiency and

(19) Accurate comparative costs of steel and reinforced concrete frames in various places are difficult to obtain because estimatrs always add something to cover unfamiliarity of working methods in the labour force.

(20) T. Parsons. Essays in Sociological Theory Pure & Applied. P. 313 f.f.

(21) W. I. B. Beveridge. The Art of Scientific Investigation. P. 111.

(22) W. F. Ogborn & M. F. Nimkoff. Op. Cit. P.553.

must remain a marketable commodity. Unwise innovation may in the end prove very expensive. The customary always appears the safe, although in a period of rapid change it may be extremely unsafe in fact.

10. Rate of Change.

Persistence and rigidity are closely involved with the rate of change. Some institutions are changing rapidly, and others very slowly. It is important for the architect and the planner to be aware of relative rates of change. An office building is so liable to change in the minor details of the behaviour patterns of the people who work in it that it is now generally agreed that partitions in this class of building should be easily movable (23). The rate of change in industrial buildings may be regarded as rapid and in fact they may be best considered as mere covered floor areas (24). The rate of change in schools has been rapid in recent years but may perhaps be expected to slow up as the more scientific approach to education becomes widespread.

In terms of the 'own' complexes perhaps the house presents the most difficult problem in the rate of change. Certain pressures, such as the high cost and difficulty of getting domestic service in Britain and elsewhere, the ideology of 'modern living', the increasing costs of building labour, will possibly increase the rate of change making the consumer ready for ideas that he would not have accepted a few years ago. On the other hand the vast existing stock of houses tends to slow the rate of change because many families have no choice in the kind of house they shall occupy. In the newer countries it does appear that the rate of change in the direction of a new style of domestic living is increasing.

The church remains in its plan type much as it was in the Middle Ages, and little change may be expected in the actual plan of the church itself. Certain denominations have recently added committee rooms, cloakrooms, etc. and have espoused modern expressional idioms but the rate of change is slow and war-destroyed churches of 19th. century Gothic are being cheerfully rebuilt in their original form without any apparent sense of incongruity (25). A house of the same date rebuilt as before with basement and attics would be

(23) In spite of this office buildings are still being erected on the fixed accommodation basis. The Natal Provincial Administrative building in Pietermaritzburg is an example. In this building (1953) the corridor walls which are non-structural are each of two $4\frac{1}{2}$" skins of solid brickwork.

(24) Evidence is available to suggest a trend in the direction of an increasing number of building-types requiring, at design level, indifferentiated floor space which the client uses as he wishes.

(25) E.G. Tyndale Baptist Church, and Redland Park Congregational Church, Bristol.

an immediately obvious stupidity.

In general, due to the copiousness of technical invention and innovation, we may expect the rate of change in all departments of life to accelerate. The extraordinarily rapid progress in electronics and atomic physics will force change in all technical departments, which in turn may be expected to cause an increasing rate of social change.

11. Concept of Lag.

From the observation of the differences in rates of change the concept of cultural lag or cultural inertia has been developed. The basic idea here is that parts of the culture show a slower rate of change than others and are therefore said to lag. We have a cultural lag in our attitude to road accidents. We have adjusted adequately to railway safety, but are not prepared to take equally drastic measures to make roads safe - by fencing, refusing indiscriminate access, and grade-separation. We have a lag in our inability to adapt town planning controls to the strangulating combination of the motorcar and our ability to erect high buildings. We thus impose on a town layout a vehicular and human density many times greater than was the original intention. The whole body of Le Corbusier's town planning thought is substantially directed at the recognition of this particular lag (26).

The most serious lag in building is our failure to integrate the operation of building into the industrial system. The building is still largely the product of individual craft work in spite of the application of industrial and scientific method to the manufacture of certain elements. Adaptation to industrial methods has taken place piecemeal and has concentrated on the various parts of the building: never on the whole, except where total prefabrication has been attempted. As this is a matter very closely involved with technical change it will be dealt with more fully under that heading.

Ogburn gives the following as causes of cultural lag:

(a) Scarcity of invention in the adaptive culture, for example lack of inventiveness in government. Such adaptive culture inventions are juvenile courts, pensions, playgrounds, town planning legislation.

(b) Mechanical obstacles to adaptive change, e.g. legislatures sit only at long intervals. Consider the length of time required to change a building

(26) This lag is accepted with such fatalism that the town planner rarely calculates his density controls for an existing town realistically on the basis of the traffic. The new regional shopping centres in the U.S.A. are an attempt to solve this problem.

by-law.

(c) Society is heterogeneous and has class problems.

(d) Adaptive culture is several stages removed from the material culture. This is the lag between what we know how to do technically and what we are allowed to do legally.

(e) Problems connected with relationship between adaptive culture and other parts of the culture.

(f) Group valuations, i.e. morals, mores, etc. (27). Public opinion may not be ready to accept new solutions.

Ogburn's concept of adaptive culture is useful. He uses it to describe that part of the culture which adjusts to the material culture. The motel is an adaptive cultural response to the motorcar, and has produced a new building-type. The essential idea is that a new pattern of behaviour emerges to fit a new material situation. Lag, therefore, is primarily with Ogburn a failure of the adaptive culture to keep pace with the change of material culture (28).

MacIver, on the other hand takes the view that lag between culture and technology is an unscientific idea because measurement cannot be made between two unlike elements. He prefers to talk only of lag between different aspects of the material culture. As for example the way standards of road design and construction lag behind car development in speed, comfort and mechanical efficiency (29). Ogburn's concept of lag in the adaptive culture is useful as a tool and if MacIver's objection is remembered, seems more useful than the narrow technological use of lag. Ogburn's view will be accepted for this analysis.

Adjustment is always taking place. It occurs in the face of rigidities. If first occurs in the material culture and then in the adaptive culture. The second lags behind the first and a strain toward consistency is present. This strain can always be seen in transitional architecture, where old forms persist side by side with new ones, until eventually pushed out. There is often a strain towards consistency in modern Italian architecture, where the symmetry of renaissance expression still lingers in disaccord with the asymmetric dynamic equilibrium approach of the modern style. Much present English work also has the echoes of a ghostly Classicism. Under transitional conditions it is difficult to predict what will survive, since there are psychological

(27) Op. Cit. P. The comments are the author's.
(28) See Appendix V111 (3).
(29) R. M. MacIver and C. H. Page. Op. Cit. P.574 f.f.

elements entering into the strain for consistency. The strain continues to exist because of rigidity, which may continue for a long time or may collapse relatively quickly like the rigidity which kept the body of the motorcar resembling the horse-drawn carriage. The increase in the size of the glazed area of houses is an indication of strain towards consistency, i.e. towards the actualisation of our professed belief in the benefits of sunshine, light and air. It is noteworthy that the use of all-glass facades to buildings is also a strain toward consistency in following out the logic of the frame building with point supports.

12. Reflex of Change.

It should be mentioned that change produces a kind of backlash, to which Bossard has given the name 'reflex of cultural change' (30). This occurs when a new element displaces an old element in a culture. A reflex of the introduction of the car is the extinction of the coach-builder of horse-drawn vehicles. In building the decline of thatch as a roofing materials is a reflex of the cheapening of other roofing materials and improvement in transport.

13. Summary.

In examining change, therefore, we have to take into account such matters as neutral change, change with special emphasis (e.g. progress) technical and social change, persistence, rigidity, rate of change, lag, and adjustment of the adaptive culture.

14. Conclusions.

(1) Change is by relatively small movements and its rate varies in different parts of the culture.

(2) Cultural change includes social change, since society is partly a process and does not include the things it produces.

(3) In building we are familiar with the study of cultural change (history), but we usually ignore the parallel social change which often is a major cause of cultural change.

(4) Although controversial, the distinction between material and non-material culture is useful as a tool to separate the technical from the non-technical content of building.

(30) J. H. S. Bossard. Social Change & Social Problems.

(5) Change does not of itself carry any overtone of value judgment. Nor does the concept imply homeostasis. The concept needs to be kept clear of the implied value judgment in words like 'growth' and 'progress'.

(6) All human societies do not have to pass through the same stages of development in a 'progressive' development. We can therefore conclude that the building and planning problems of primitive societies can be approached in the same way as those of any 'advanced' urban industrialised society. The requirements of the culture must be respected as always, but the fact of the society being at a primitive level requires no special consideration other than this. The important telic factor is that urban industrial society is showing itself increasingly universalistic.

(7) The significant areas of change for building are social and technical. These do not necessarily keep in step, since one may have to be initiated by the other. Technical change causes technical and social invention: social change causes social and technical invention. The principle of reciprocity applies.

(8) The precise attribution of the cause of change is often very difficult, but it is a useful tool as it can quickly expose unsuspected relationships between society and its techniques.

(9) In general the non-material culture will adapt in some degree to change in the material culture.

(10) Persistence occurs in all departments of building. This is particularly important in the labour component (including the professional) of building, where protection of outworn craft methods is continued for reasons of socio-psychological stability.

(11) Persistence may originate from utility, nature, human nature, accumulation of culture, functional continuity and sentiment.

(12) Persistence can move into rigidity, which involves value judgment, particularly with reference to desirable change. The cause of rigidity lies largely in the nature of institutions.

(13) In our present context some institutions are changing rapidly: others slowly. This makes special problems for building.

(14) An increase in the rate of change is to be expected. This will lead to cultural lag and inertia. There is already very serious lag in our failure to integrate building into the industrial production system.

(15) Lag produces a strain toward consistency, which should be coupled with the reflex effect of cultural change.

CHAPTER 1X

TECHNICAL CHANGE

1. Complexity of Change.

As the material culture of our society multiplies itself quantitatively so it becomes increasingly diversified and specialised, with the result that the whole culture tends toward a greater heterogeneity. This means that change becomes more complex than it was in a less well equipped but more homogeneous society. By contrast, the changes which occurred during the development of Gothic were uncomplicated, for new materials and structural methods, at least of a major order, simply did not appear, and change took place within the limits of known materials and principles.

A superficial review of changes in building in the last few decades might suggest that the observable complexity of change has been largely caused by the appearance of new materials and structural methods. But an examination of earlier, and particularly of neo-Georgian uses of these materials and methods, suggests that a great deal of the actual change that has taken place was not inevitable or predestined because of these new factors. Our society might have decided to continue the post-renaissance aesthetic of the pre-World War 1 period, merely using the new materials and methods to achieve a greater economy and efficiency within that given expressional framework. In the event, society has decided otherwise. Gropius, Le Corbusier and the whole modern movement have appeared and have mounted a successful revolution in architecture, causing the new materials and methods to be used for the creation of a new expressional language of architectural form. The recent changes in building cannot, therefore, be explained exclusively on the basis of new methods and materials, or even social needs. These methods and materials and the approaches of architects have made change possible but not inevitable. The significant factor in this complexity of change is that although the use to which inventions are put is a matter of social evaluation, this social evaluation is itself influenced by the emergence and potential application of inventions (1).

Ogburn in his 'Social Change' regards the making of inventions (mechanical and other) as the first cause of change in our society. The second cause he considers to be the diffusion of existing inventions. Others have

(1) W. F. Ogburn and M. F. Nimkoff in A Handbook of Sociology develop the theory of the grooving of the influences of many inventions, e.g. the car, telephone, radio etc. all making possible the suburb. P. 570 f.f.

put the emphasis elsewhere. For example, Simiand held that the discovery of new gold resources was responsible for the vital changes in our society. In building, however, it is evident that mechanical invention has played a most influential role in the immediate past as a constituent of change, and in considering change in building it is justifiable to place major emphasis on technical change in view of the increasing importance of technology in our society.

In parenthesis it is useful to note that when considering change in building an observation made by the Lynds is relevant. They remarked that in a period of social change the "one right way" of acting becomes less clear and several or many patterns for the same situation become acceptable (2). This is typical of transition in building, as can be seen by examining the Elizabethan or our own attitudes to it. At this moment no western society has a one right way of building a house: it can be anything from Tudorbethan to Niemeyer (3).

It is a very major problem for the architect to know how to deal with the complexity of change. In general his role must be to discover what changes seem likely and to help society decide its preferences. He cannot decide for society, but he can help bring concealed issues to the light of day and he may legitimately be expected to speak with authority on certain aspects of the physical environment. It is therefore relatively easy to define a role for the architect in this situation. The problem is to discover ways whereby the architect can equip himself to play such a role. Can the architect have much hope of understanding technical change when he is not integrated into the general production system of our society? Can he understand the processes going on in society without some scientific training in those subjects which deal with the on-going social process? These are difficulties arising from the architect's present situation and from his education. We may also ask whether the architect has opportunity to become reasonably well informed about the advances of science, particularly those branches of science - physics, chemistry, molecular biology and cybernetics - which are rapidly transforming our world. To obtain only an informed layman's knowledge of these requires time to read and ponder - activities for which the architect's work situation

(2) R. S. & H. M. Lynd. Middletown in Transition. P.175.

(3) The house is the extreme example. This situation is perhaps evidence of change in symbol, but this needs rather careful scrutiny, since there can be symbol anly where there is agreement: can Niemeyer's houses be yet accepted as symbol?

leaves him very little opportunity indeed. There is also the problem of whether he has adequate motivation to be interested in such things. By the nature of his work he tends toward a conservativism which is apt to be resistant to the present developments of science, and on which he is apt to rely for his psychological security. It seems clear that the architect is in a very difficult position as far as change is concerned and as the rate of change increases in more and more departments of life the architect must be increasingly responsive to these changes if he is to retain a significant place in society. If he has something valid to say he must understand the structure and processes of society, particularly in regard to change, sufficiently well to know how he can contribute in ways that are meaningful to his contemporaries.

2. The Technological Emphasis of our Society.

"Technology is the joining of both science and invention in the mechanical and organisational utilisation of new ways of doing things"(4). Technology is therefore concerned with empirical ends which are attainable and demonstrable in the world of actuality. Science on the other hand is concerned only with the search for truth. Davis defines science: "... that part of the cultural heritage which represents a systematic knowledge of nature"(5).

The essence of technology is invention. About 50,000 patents are granted annually in the U.S.A., approximately two million having been granted since the establishment of the Patent Commission in 1790 (6). It is reasonable to assume that the rate of technical change will increase if only because the more the inventions the more the possibilities for new combinations, and because the greater the scientific and technological skill the greater the chance of new discoveries (7). We must also note the pressure to further invention. Yates has listed 1,500 needed inventions (8).

Odum considers the technological emphasis in our society to be so strong that it causes the development of special modes of behaviour which he calls 'technicways' (9). These are the responses of society to changes in technology and new invention, for instance our social adjustment to the motorcar

(4) H. W. Odum. Understanding Society. P.350. He adds that "in the wide sense technology comprehends ... also organisation, management, controls and leadership in the social and economic worlds".
(5) K. Davis. Human Society. P.435.
(6) H. W. Odum. Op. Cit. P.351.
(7) Discovery is the finding of new truth or knowledge.
(8) R. F. Yates. Fifteen Hundred Needed Inventions.
(9) Op. Cit. P.38, 225 ff. This subject belongs to Chapter X.

Mumford bases his whole analysis of our society on the view that it is essentially a technological culture: "It remained for the peoples of Western Europe . .... to adapt the whole mode of life to the pace and the capacities of the machine"(10). MacIver and Page say: "The most novel and pervasive phenomenon of our age is not capitalism but mechanisation"(11). Quotations could be multiplied. It clearly emerges that our society is leaning increasingly heavily in the direction of mechanisation and industrialisation: technology is of its very life.

This is not to say that technology is our whole culture. That would be impossible because by definition technology can be only a part of any cultural configuration. Technology and the culture in which it is bedded are in a reciprocal relationship, the elements of the material and the non-material culture interacting to cause change. Because, however, a certain line of action is technically possible, there is no certainty that this action will in fact be taken. We are technically capable of taking measures to prevent pedestrians being killed on the roads (they are not killed on railways), but for certain historically conditioned reasons we decline to do so. In town design and in building, it has been clearly shown that we now have the technological ability to design and build the town so that problems of vehicular traffic could be completely solved. But this technological solution is not acceptable in our present cultural framework, which has persistence in such inhibiting factors as the holding of small parcels of land in private individual ownership and the financing of building in small driblets.

Whilst, therefore, the culture obviously cannot go beyond the limits of the technology there is no certainty that it will go up to those limits. Technology merely makes possible. It cannot choose what use shall be made of the possibilities. The choosing is done by society and in choosing, society produces a reciprocal effect on technology, encouraging further effort in this direction and inhibiting it in that. In general our society approves invention to do with industry and commerce, with the result that there has been recent rapid change in factories and office blocks. But over the same period change in the house has been comparatively slow and until the past ten years, insignificant.

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(10) L. Mumford. Technics and Civilisation. P.4.
(11) R. M. MacIver and C. H. Page. Society. P.553.

3. Importance of Money Economy to Technical Change.

The money economy of our society is a constant stimulus to technical change because of the ever present need to make profit. Change in technical methods is always being sought as a method of either increasing profits or lessening the risk of loss(12). Technology and business are therefore very closely interconnected. Drucker holds the view that business rather than technology is "the specific organ of growth, expansion and change" in our society (13).

Technology is not called upon simply to supply wants. If it were, technological advance would be much slower than it is. Technology is also, and simultaneously, called upon to create wants, and to satisfy existing wants in a new way. This very clearly illustrates how technology is dependent on the culture as a whole. Simple subsistence economies produce exclusively to supply wants, but our society has carried production far beyond that point to a stage where production is more than a purely economic activity of society and where profit, or money reward of production, confers prestige. In short, in our society production does not cease when demand is satisfied, nor does production necessarily begin because there is demand; it may appear purely from new invention (14).

Generally speaking our society demands that to be viable an organisation must be solvent. In a competitive world it must therefore do one of the following: increase its sales, lower production costs, introduce substitutes, find new markets. In order to achieve these technological improvement is called for and the help of science is enlisted to find new principles, materials and methods. The skeleton of the sequence is therefore: business is forced to change because of change elsewhere, technology is used to accomplish that change, and technology draws upon science for its knowledge. It is therefore the essentially dynamic nature of the economy which forces the pace of technical change. So much is this so that it seems true to say in building that change in technology cannot be strictly separated from the economic drive which pushes it along (15).

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(12) P. F. Drucker in The Practice of Management considers that the basic aim is the avoidance of loss, not the maximisation of profit. P.38.
(13) Idem. P.32.
(14) T. Veblen has commented that invention is the mother of necessity.
(15) Some discoveries and their associated inventions are free from economic stimulus: penicillin.

Although the extreme importance of the economic complex of institutions in our society is unquestioned, we must note that there is considerable variety in their relationship with the governmental complex throughout the western world. It would seem that government in the United States is a good deal more in awe of business than is the case in Britain, where one political party has expressed its view that all residential property should be owned by the community. This relationship between the two groups of institutions is of importance to building and in a context where government were clearly the dominant, it is possible that the money economy might not be so important to technical change as it is in our society.

4. Relevant Background Factors of Technical Change.

In considering technical change in its relation to building we should bear in mind the following characteristics:-

(a) Our society has a heavy technological bias.
(b) The rate of technical change may be expected to increase.
(c) Technology and the total culture are in reciprocal relationship: each is cause and effect of change in the other.
(d) Technology offers new possibilities: society accepts or rejects (16).
(e) Technology and business operate together.
(f) Economic pressure is a potent force for technical change.
(g) Technical invention is prime mover.

With these in mind we shall now proceed to examine some significant aspects of technical change in building: materials, structural methods, tools, the general production system, the equipment of the building, and new building types. This will be followed by sections on new technical possibilities, resistance to change and motivation for change.

5. Materials.

The increasing production of new manufactured building materials in the last 50 years is perhaps the most obvious technical change in building. In 1900 the normal building materials were: natural stone, brick, timber, slate, tile, lime, glass. Cast-Iron, steel and concrete were used a little, but not very readily and almost never in their own right: they were substitutes-unfortunate necessities to be hidden away behind materials of traditional appearance (17). Today, not only have these basic materials been greatly added to, but they have had highly specialised techniques applied to them, so that comprehensive knowledge of materials is one of the architect's most intractable problems. So serious is this problem that in practice it seems

(16) Some inventions are so useful that they are irresistible: pneumatic tyre.
(17) Cast iron did to some extent emancipate itself, but frequently it imitated wood or stone forms.

likely that most architects acquire a working knowledge of a limited number of materials, including proprietary manufactures like flush doors, ceiling boards and plasters, and design always within this self-imposed selection.

Technical change in materials appears as:

(a) outright new materials.
(b) substitutes for existing materials.
(c) improvement of existing materials.

Outright new materials are the result of new discovery and invention. The discovery that vermiculite could be exfoliated has provided a new light-weight insulation material. The discovery of how to make mild steel and the invention of mills to roll it into joist sections produced an entirely new structural material: the most influential technical innovation in building since the discovery of the uses of the pointed arch.

Of these types of change the most interesting are the substitute materials: felt, foil and PVC damp-proof courses replacing lead sheet or slate; reconstructed stone for natural dressed stone; concrete roof tiles; block-boards etc. used in place of natural wood. These substitutes are called into being either in order to achieve a similar result at less cost or because of scarcity of the original material. A substitute material may be dearer than the original but a saving of labour may be effected, producing an overall saving. Substitution of this kind appears in sequences, each new material succeeding the previous one as discovery and invention make possible. The sequence of phases for material used for cupboard doors is instructive:-

(a) Traditional. Framed, ledged and panelled. The panels were of normal planked timber, fielded in the 17th. and 18th. centuries.

(b) Traditional Substitute. Framed, ledged and panelled. The panels are made of plywood - a substitute for the built-up panels of the traditional specification. No fielding.

(c) Non-Traditional. A plywood sheet is applied over the whole frame - the flush door.

(d) Non-Traditional Substitute. Woodboard such as Masonite or other reconstituted wood supplants plywood.

(e) Total Substitute. Block or chip-board completely eliminates timber core or frame. The board is rigid enough to act as a door by itself. The only labours required in the manufacture of the door are cutting to size and letting in a hardwood edge fillet.

If this sequence is examined it will be noted that only at one point is there any sudden change in appearance: from panelled to flush door. It is often of importance in substitutes that the new shall be a passable copy of the original. It is the family likeness which helps win acceptance: in the door example (a) and (b) are of similar appearance; (c), (d) and (e) are identical. The normal conservatism of the human being is thus a factor of which substitution takes account. Because the new material in some respects, particularly in appearance, resembles the old, change is made first acceptable and eventually the substitute becomes the normal until the economic process causes it to be supplanted in turn. A very good example of the whole sequence is to be found in the metal window sash. The early steel sashes copied the sizes of pane, methods of opening and even the fastenings of the traditional side-hung timber sash. The aim was to give the appearance of timber sashes with the advantages of metal. Later the steel sash was developed according to its own potentialities. The circle has been completed by wooden sashes copying the forms of steel sashes (18).

In neo-Georgian work the structural steel frame became a substitute for the traditional load-bearing brick wall. By using this structural method it has been possible to use an essentially small scale style for large buildings. In these buildings the brick walls are not what they seem to be. Traditionally they are supporting the floors: now they are merely screens keeping out the weather. This illustrates very nicely how a material can come to be used as a concealed substitute (Fig. 34).

It should be remembered that the word substitute implies at least some measure of subjective valuation. It suggests a judgment implying that the substitute is in some way inferior to the original. In some examples no doubt the substitute is in fact from many points of view inferior, but often the idea of substitute arises because it is merely different from the hitherto accepted material. Corrugated asbestos is regarded as an inferior substitute for roof tiles. But why? It is as efficient as tiles and rather more economical of timber and labour. It seems that asbestos for domestic roofing purposes has come to be generally regarded as an inferior substitute material. Such a valuation is based not on the facts of the material, but on the social associations which society has somehow come to fasten upon it. Corrugated

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(18) E.G. In the houses being built by the Corby Development Corporation.

iron, a material most useful in countries subject to heavy hailstorms, suffers from the same adverse valuation (19). The difficulty appears to be that cheaper substitute materials sometimes come to be used in ways which allow deterioration and a decline in appearance, with the result that the material becomes declasse, and eventually forbidden under restrictions of title and by-laws. Thus a technological advance may be prevented from reaching its full potential. Are we for ever to reject sheet materials for domestic use because we have decided to brand asbestos and sheet steel as inferior substitutes? (20). A possible solution is good design, but patently our society has not yet reached the point where a reasonable minimum standard of building design can be guaranteed. That is a major problem of building sociology.

One of the factors militating against the acceptance of substitute materials is their tendency to cost less than the customary material. When this fact is realised prestige becomes involved. This can be seen working when in an area of houses with tiled roofs a newcomer builds a bungalow with an asbestos roof. There may be little difference in the colour between the tiles and the asbestos, yet the asbestos is oflower prestige value and the owners of the tiled roofs will feel that the area 'has been let down'. The owner of the asbestos roof is felt to be in some way delinquent. The sociological meaning of 'substitute' therefore carries the idea that something has been done in ways that are not quite acceptable: the social corners have been cut. When this feeling is aroused it requires more than the design skill of an architect to pacify it, and he must not be surprised if arbitration comes down not on the side of 'good design' but on the side of the status and prestige trends of the society.

Improvement in existing materials is continuously going on and in general is accepted because our society is ready to receive what it elects to include as improvement. Progress is part of our ethos, and any improvement in a <u>known</u> material will appear as progress. Such a valuation can be made because the fact of the material's existence provides an adequate anchor. The following are improvements which have been immediately accepted: drawn sheet glass, ready-mixed plasters, ready mixed paints, Marseilles tiles, precast concrete, vibrated concrete, fluorescent lighting, terrazzo. Others, asbestos, corrugated iron, plain concrete etc. have not been so fortunate and, to the general loss

(19) Some local authorities in Natal forbid the use of corrugated iron even for fences. Its prohibition for roofs is common.

(20) An interesting comparable loss to the house in South Africa is the low social valuation of linoleum.

of building, have acquired a stigma.

Although it has relevance to other aspects of technical change also this is a convenient point at which to mention the difficulties that flow from the wide range of materials and methods available to the architect. Superficially it might seem that this wealth of opportunity is an advantage: new possibilities of solving old and new problems. In theory this should no doubt be true. In practice it is not, perhaps largely because the architect is in an unfortunate position as far as the acquisition of new knowledge is concerned. His difficulty is that he cannot experiment to any appreciable extent without running the risk of jeopardising his client's building and indirectly his own reputation. In contrast, experiment of an extensive kind goes on in industry. A prototype motorcar is built and tested, modified and retested before it goes into final production. This solution is not generally open to the architect. Building materials are tested by the firms producing them and figures are made available which may prove conclusively that the material is satisfactory for what it is claimed to do. But the architect has many problems beyond that before he can feel safe: assembly, use in conjunction with other materials, natural ageing as opposed to the artificial ageing of tests, availability, transport etc.

In his approach to new materials and methods the architect shows two characteristic attitudes: conservatism and gullibility - sometimes in combination (21). The conservatism stems from training, previous unfortunate experiences and the desire to safeguard his clients' interests. The gullibility stems from lack of any trained way of dealing with this problem, coupled with a feeling that these new opportunities should be used, in fact ought to be used, in the clients' interest (Fig. 35).

Independent research laboratories, run by governments or other agencies not involved in the industrial or commercial side of building, are doing extremely valuable work in providing tests of new materials. They report on their findings and make their reports available and in theory again the architect is able to inform himself from a reliable source. There is evidence, however, to show that this research material is not as effective as it could be because of the architect's work situation. He is nearly always working under pressure and this precludes spending much time on looking for, reading and applying infor-

(21) Evidence taken from trade representatives.

mation which might help him to solve a problem in a new way. He thus tends to look for a comparable case and to modify a precedent rather than to find a new answer. Once again we find the architect in a work situation which is unsuited to allowing him to make as satisfactory a contribution to solving the problems of the day as he might.

6. Structural Methods.

Technical change in structural methods appears in new design techniques in these categories:

(a) new methods of design for existing materials.
(b) new methods of design for new materials.

The classic example of (a) is the discovery of the use of the pointed arch. 'Pointed arch' is really a misnomer since the essential discovery was that two segmental arches could be propped against each other to give complete flexibility of height in relation to span. Hitherto building, i.e. Romanesque building, had been limited by the fact that a semi-circular arch must rise half its span. The idea of using two segmental arches against each other broke the rigidity of the Romanesque style and produced the marvellously flexible Gothic. The change in technique from Romanesque to Gothic consisted simply in manipulating the height of the arch independently of its span.

In the modern world the plastic method of designing structural steelwork allows lighter sections to be used and more value to be obtained from a given weight of steel. Another example is the application of prestressing to both structural steel and reinforced concrete. The effect is to reduce the dimensions of structural members, thus giving larger spans and a lighter appearance to structure.

The development of reinforced concrete theory is an unusual example of new method being applied to two existing materials in combination. The essential discovery here is that the moduli of elasticity of the materials are similar in their characteristics and that therefore the steel and concrete can be successfully combined to remain satisfactory under load. This has produced . . entirely new kinds of building (Fig. 36).

New materials involve the application of new methods of calculation. New materials and new methods appear to go together, for example the use of light-weight alloys for geodetic roofs. This combination may be expected to increase in frequency as plastics come into commoner use and as non-ferreous metals become more popular. Stressed-skin construction, for example, may eventually be as common in building as in aircraft construction.

Changes in structural design techniques are often acceptable because their benefits are self-evident. These techniques do, however, tend to become more complex and difficult to apply and they will be likely to meet an increasing inertia on the part of individuals in the building industry. Change of this kind meets rigidity in those who are using the existing techniques from an entrenched position, and in by-laws which are framed to demand stipulated minima of structural size rather than minimum standards of performance (22).

Methods of design and materials interact in the matter of change. For example, a result of the application of design theory to steel structures has led in recent decades to the application of similar principles to timber structural members. What has happened here is that change has taken the form of a swing from traditional rule of thumb in timber to the use of formulae based on theory and test scientifically applied. An example is the experimental work carried out in the Civil Engineering Department of Durham University into methods of calculating the strength of plastic glue joints in timber members.

In dealing with new structural methods the architect is in a somewhat more favourable position than he is with materials because an increasing amount of structural decision is being taken by specialists. Thus in the situation where he must decide whether or not a solution in prestressed concrete will be satisfactory, the architect will take the advice of a structural engineer, who will not only design the reinforced concrete work but will also supervise on the site to ensure an adequate standard of workmanship. The architect can have confidence in this system and he can also feel that he is keeping up to date through the advances that specialist engineering is making: the responsibility for making progress he thus feels is shared, and that safely, with others.

Without benefit of independent structural engineer the architect is in much the same position with regard to new structural systems as he is with new materials: almost entirely in the hands of the commercial firms who market the new products. He can, however, take specialist independent advice

(22) There is a trend in by-laws to use performance standards in preference to detailed specification. E.G. The standard Regulations for Building by S.A.B.S.

on the adequacy of a new system. Nevertheless, in many contexts the architect in Britain and South Africa remains conservative over structure. He seems much less so in North America and the reasons for this difference require research.

In this connection we must mention the engineer-architects: such designers as Owen Williams, Maillart and Nervi. These men use refined techniques of structural calculation as a basis for their designs. Logically they are in a strong position because their structures are very closely related to the mathematical requirements of whatever system they may adopt. The expressional aspects of their buildings originate directly from their structures. They are therefore easily able to justify in logical terms the forms of their buildings. What is particularly remarkable about the work of designers of this kind is their success in symbol and aesthetic: a success that the architects would do well to ponder. In an age of technology this approach to design is bound to be attractive to the public. Moreover it is likely to produce buildings which are outstandingly economical. We might also remember that in our society the status of the engineer is higher than that of the architect (Figs. 39 and 40).

From the above outline we may conclude that there is here an area of great importance for the architect. In this direction lies economy of construction, expressional justification within terms of reference that our society can easily understand and last but by no means least, a head start to the engineers in the race for status during the next phase of development in building. In an age which puts such great trust in scientific method can a profession which has not thoroughly mastered the techniques of structure really expect to be regarded as the leaders of building? All the indications in our society are that greater proficiency will be required in bodies of knowledge which are becoming increasingly large and increasingly complicated. Structure in its requirements fits our technology - oriented thinking exactly, and the architects in ignoring this may be in danger of moving tangentially out of our society (23).

7. Tools.

Examples of new tools which are causing technical change in building

(23) The question of whether the architect can avoid this dilemma by claiming to be only the co-ordinator of the works of others is dealt with in Chapter Xl.

are: wood-working machinery for planing, drilling, rebating etc., hoists, belt-conveyors and tube distribution systems for concrete, power-driven hand tools, improved wheelbarrows, the tower crane, explosive charge methods of anchoring to concrete and brickwork, new methods of shuttering, compressors, welding equipment, pneumatic hammers, lacquer-spreading machines, spraying equipment, compacting equipment, pre-mixed and transit mixed concrete delivery, earth-moving machinery, vibrating equipment, mobile block-making machines, jacks, trench-cutters, tubular scaffolding (Fig. 37).

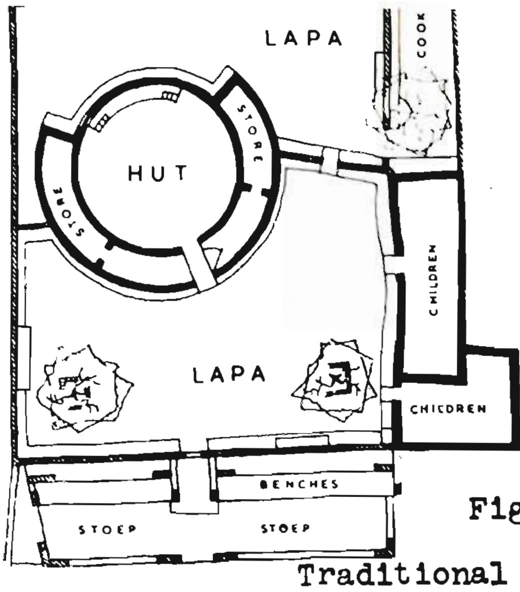
This list is not exhaustive. The chief significance of change caused by new tools is the increase in the application of power to the tool. In general this cheapens the work, particularly in a society in which labour costs are high, and has the effect of causing a decline in special (American 'custom' work) in favour of a standardised product or a standardised way of performing a labour. Thus a standard flush door will be cheaper than a framed, ledged, braced and battened door which will have to be purpose-made.

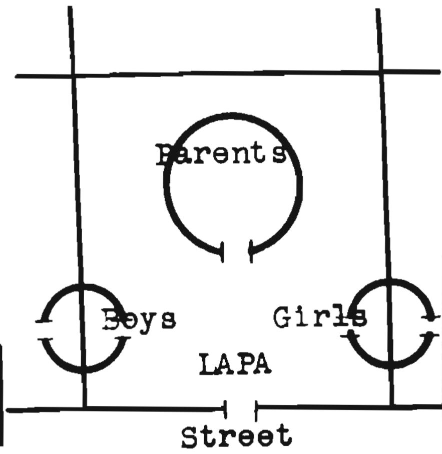
A second factor is the tendency to concentrate on the cheapening of known methods. Thus power-driven hand tools used on the job tend to perpetuate the craft, as opposed to the operative, tradition of building. The electric handsaw, for example, may cause on-site joinery work to be continued or even increased, when advantage would be gained in the long run by getting as much of it as possible into the factory, thereby reaping the reward of standardisation and economies of scale of production.

The tower crane is one of the most important innovations. It allows large weights to be lifted from the ground and placed accurately in the building many stories above. This means that parts of the building can be made on the ground and lifted later into place. This is now done with flights of stairs made of reinforced concrete: an obvious improvement on casting in situ and a step toward all-dry construction. Is it not possible, however, that improved efficiency of this kind may not inhibit the more fruitful development of, say, metal flights of stairs which are more economical to erect and to support because of their lower dead-weight?(24).

Improvement in tools used on the site, therefore, requires careful examination before being wholeheartedly accepted. In the immediate context a change in tools appears nearly always for the better. In total effect,

(24) Prefabricated steel staircases have long been in use in North America. Why not in Britain?





Pretoria

Fig. 33. Traditional and modern urban Lapa system.

Traditional Lapa (A.L.Meiring)

Fig. 34. Georgian and Neo-Georgian.

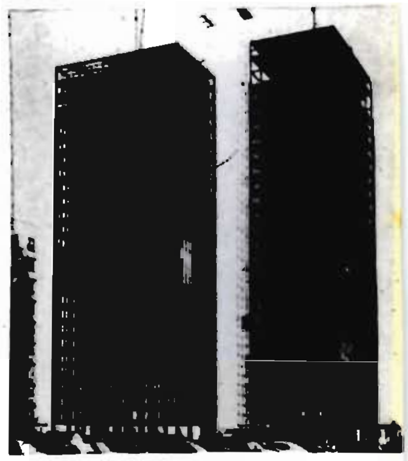


Fig. 37. Tool may consist of an idea. Movable weather enclosures as protection against bad weather.Chicago.

Fig. 36. Prefabricated structure and roof panels.

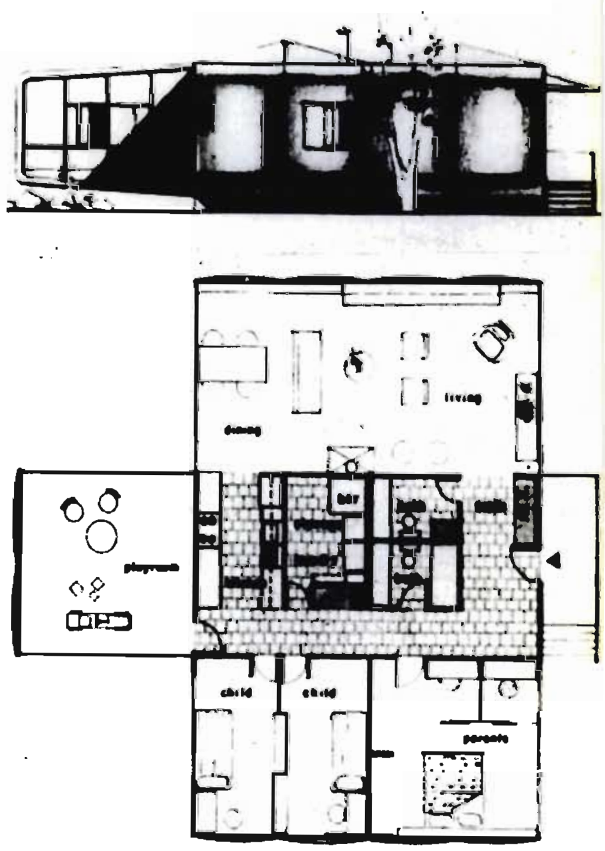


Fig. 38. Factory without windows.

Fig. 35. Moulded plastic house.

Fig. 39. Prestressed precast arch system.

however, the result may easily be to entrench techniques of building which require more drastic change, and therefore, tool-improvement which simply makes more efficient our craft methods should be regarded with suspicion. New tools which take the work into the factory, capture the benefits of standardisation and allow the economies of large-scale production to be realised offer more hope for the reduction of building costs through the essential integration of the whole building process into our industrial system, than does refinement of tool-work on the job.

The extent, however, to which mechanical tools are used in building should not be exaggerated. The U.S.A. building industry appears to be the most highly tooled, yet the small house builder (1-24 houses per annum) in the San Francisco Bay area owns $4,000. of tools and equipment, whilst the medium-sized firm (29-99 houses p.a.) owns only $8,500. Equipment may, of course, be hired but the equipment charges of $100. and $50. per house of the small and medium-sized builders respectively do not suggest any extensive hiring of equipment (25).

The British Productivity Team Report on Building investigating the American building industry quotes as one of the causes of the great speed of American construction the "general availability and use of mechanical aids"(26) as part of the explanation of why the "output per man-hour on similar site operations is approximately 50% higher in America than it is in Britain"(27). It is interesting to note that this team, which did not include either a sociologist or an economist, in considering how to increase productivity in Britain came to this non-technical conclusion: "The necessary changes will not be made until large numbers of individuals decide that it is their personal duty to make a move toward the good of increased output"(28). In this respect we should bear in mind the rigidity of attitude to work and tools found in the trade unions.

8. General Production System.

The main technical change in building under this heading in recent decades has been the application of large-scale production to the various component parts of the building. Standard doors, for example, have replaced

(25) S. J. Maisel. Housebuilding in Transition. Pp. 37, 39, 72
(26) Anglo-American Council on Productivity. Productivity Team Report on Building. P.63.
(27) Idem. P.15.
(28) Idem. P.3.

purpose-made. Machine methods also make possible the production of new combinations of material and process. Plywood is the result of being able to apply machine methods of cutting a log spirally to produce a thin continuous layer of wood and of heavy compression to produce a good bond between the various layers. It would be impossible to manufacture it without machine methods. The same is true of the manufacture of glass, steel joist, sheet metal materials and all materials, like plastic and cement, which basically depend on grinding up large quantities of raw material (29).

Change of this kind is constantly going on and new manufactured building materials are being put on the market. It is in this sense and in this sense only that the building may be said to be integrated into the modern industrial system. Increased integration of this kind may safely be predicted with a decline of the craft approach to building, and an increase in site labours on an operative basis.

The most significant aspect of the industrialisation of building production lies in precisely this question of craft versus operative work. Whilst the motorcar has been taken entirely into the factory, the building has been taken in only as components. This trend toward greater factory production may lead to work on the site amounting merely to assembly. Attempts at the total prefabrication of buildings have so far not proved economic for the class of building - particularly house - produced. Drucker comments that the reason why the prefabricated house did not compete successfully after World War 11 was because it was built in the factory on craft lines (30). To build a complete house in the factory on a craft basis would be to miss the main point of factory production, namely that factory work must achieve economy by doing the thinking for each operation once only. The craftsman is called upon to make decisions, measure and execute in a variety of behaviour patterns. The operative has all that done for him in the pre-planning stages. The car-assembly operative does not measure a piece of steel for a bumper, bend it and fix it. He merely grabs it and fixes it, the time-consuming operations having been done earlier and done only once.

The benefits of pre-planning plus factory production on a large scale are, however, being obtained in certain directions, for instance, complete

(29) I am ignoring the primary industries (extractive and genetic) which produce the raw materials like iron ore, coal, timber, gypsum etc. Change in these, however, may reduce costs and thereby be reflected in building.

(30) P. F. Drucker. The Practice of Management. P.88. See Appendix lX (1).

plumbing units are now available and there are many types of standard partition unit, floor construction element and kitchen unit on the market. The general tendency in building appears to be in the direction of designing so that such units and stock sizes of other materials can be used with a minimum of special work. This means that design is becoming largely a question of organising assembly. This is healthy since it tends toward the elimination of the craft and favours the rise of a class of mechanics who will specialise only in mounting the various building elements. This trend is the explanation of the present stress on modular systems which aim to ensure that all factory-produced parts can be used together, even going so far as to attempt transcending the standard measures of feet and metres (31). There seems little doubt that these tendencies will crystallise into a new approach to both the individual production of component parts and a design emphasis on assembly. The fact that the building industry uses at present about 50,000 component parts is a measure of the magnitude of the task and an indication of how fruitful success would be (32). Eleven countries of the European Productivity Agency are at present undertaking the construction of experimental modular houses and blocks of flats. In Britain this is being done by the D.S.I.R. and the B.S.I. (33). We may expect results to accelerate the present trend toward site assembly rather than site construction (34).

There can be little doubt that the building crafts exhibit many situations in which lag can be found. In general, the production methods of building are technically inferior to the production methods of factory industry: more expensive use of labour, less rationalisation of processes, less precision in the finished product, rigidity in desigh, financing and organisational structure.

What attitude is the architect to take to this? He may run against the trends of the cultural pattern by trying to resuscitate the dying crafts. Before he embarks on a policy of this sort he had perhaps better examine what has become of the views of William Morris and Ruskin. The history of the last hundred years appears to show that there is very little hope of success along

(31) Le Corbusier. Modulor. And others.
(32) Of these about 18,000 conform to B.S.I. standards, but that does not mean that they comply with modular requirements.
(33) The Building Research Station of the D.S.I.R. has reconciled the various possible sets of modular dimensions.
(34) See Appendix 1X (2).

this line for reasons that can be easily exposed by having regard to the sociology of the subject. If the architect wishes to make building more efficient he must understand the nature of the situation in which the crafts now exist. He must then design within that situation. He may further try to make the situation better in some respects, but in trying to do this he must expect success only in those directions in which the trends are already moving. Anything to simplify site work will meet with success. Anything which reduces the individual fitting of parts will be readily accepted. The building worker, whether we care to admit it or not, is very interested in the money he earns. That money is largely determined by the amount he produces: it is not nowadays determined by the quality of his work. This is regrettable but it is a fact of our culture that architects ignore at their peril.

9. Equipment of the Building.

In the last 50 years the equipment of the building has undergone great change in both quantity and quality. In 1900 the building had crude heating, lighting and water services. It may also have had a rather primitive lift. The tendency has been to add to the equipment: telephones, intercommunication, air-conditioning, specialised ventilation, vacuum cleaning, radio; and to refine and elaborate the equipment. Lifts have become automatic, buildings are fully wired for telephone in every part; full air-conditioning with automatic control of temperature and humidity, and automatic sun baffles are commercially available.

From being mere additions to the building, more or less afterthoughts in the design, these items of equipment have become integral, and are taken thought for at the very earliest stages of the design process. For example, the well-designed office block is not thought of first as structure, with the heating etc. added afterwards, but rather at the stage of structural design the type of heating etc. is thought about and services and structure are dealt with so that they can be reconciled in the best way. This is a serious change in the design approach to building, and a change which may be expected to become even more marked as the equipment increases in quantity and becomes more refined.

Equipment has its special effect on building design and construction. For example, air-conditioning means that windows need perform only the one function of letting in light and can be independent of ventilation. This means that windows need not open and larger sheets of glass can be used. Daylight type artificial lighting means that windows can be eliminated for lighting purposes (Fig. 38). This implies that the building plan need no longer be arranged to utilise natural lighting: offices can be much deeper and factories can be built without roof lighting. Already in America factories, multiple stores and even educational buildings are being built without windows, wholly lighted and ventilated by artificial means. Town planning regulations limiting building mass in order to safeguard neighbours' light and air may require nodification in the not very distant future (35). The ways in which artificial climate is going to affect buildings in tropical countries is not yet at all clear, but most probably it will do so in the general direction of total departure from the traditional wall-window idea.

The development of kitchen equipment is a good example of technical change. The coal or wood burning range, the stoneware sink with one tap, the dresser, the kitchen table and the larder have all been supplanted by electric cooker, steel sink and draining board, fitted working tops and cupboards, and refrigerator. Hot water is piped to several points and is in constant supply. All the factors which make the kitchen hot, smelly, noisy and uncomfortable are being reduced in their unpleasantness to such an extent that the kitchen is now sometimes brought into the dining room: a change due entirely to the improvements of technical change. In some American houses the living room, dining room and kitchen are combined into a single room (36) (Figs. 41 & 42). We are back to the open planning of the Zulu hut!

It is possible that the use of electronic methods for controlling machines may effect a similar change in the design of the factory. The worker will no longer be on the factory floor. He will instead require a control office much after the style of a power station. In the building example of the flour company it was possible to design the tower without reference to workers' requirements: nobody works in this part of the factory.

The likely trend, therefore, is toward more and better equipment, which will probably impinge more and more on the general design of the building as a whole.

10. New Building-Types.

One of the most obvious aspects of technical change is its effect in

(35) In this connection many existing regulations are quite obsolete. New standards are required.

(36) No value judgment is implied: the fact is merely recorded and attributed to technical change.

producing new building types and causing modification in existing ones.

In the past, new building-types have emerged as the result of technical inventions like railways, ocean-going liners, motor transport, air transport, radio communication and large-scale production, in the form of railway stations ocean terminals, garages and bus stations, air terminals and hangers, broadcasting stations, large factories and power-stations. All these owe their existence as building-types purely to technical change. New building-types of similar origin are at present emerging: atomic power stations, research buildings, diagnostic centres, filling stations, drive-in cinemas, television studios (Fig. 43). These will crystallise in time into agreed forms. Other building-types will appear as special adaptations to further specialisations in our society. It should be noted that only those building-types growing out of technical change are included here. Those resulting from social change are dealt with in the next chapter.

Further technical change is continually causing change in existing types of building. Not only does this occur by way of the equipment which the building carries but also by virtue of additions to life in general e.g. the motorcar. It has brought with it the garage which means a fundamental change in the planning of house, block of flats, block of offices, factory etc, and cities; for all of these garages or parking space must be found and plan-types modified accordingly.

It is less obvious that technical change of this kind involves preferences which are set in motion by the very fact that technology offers many possibilities. A family must decide whether to have a car, television set, refrigerator, washing machine etc. and a small house, or none of these and a larger house. The general tendency seems to be to prefer the former. Whatever choice may crystallise into a trend, clearly the offerings of technology affect preferences for houses. It is very necessary for research to be done on this matter if future preferences are to be met with precision. This is particularly important for low income group housing because of the already minimal floor areas usually adopted, and it is likely that new minimum standards will be required to cope with this situation.

For the architect this means that he will be called upon to make living acceptable in an increasingly small space. In order to meet other pressures he will have to provide more and more mechanical equipment in his buildings. In terms of his working approach it is difficult to escape the conclusion that mistakes of organisation on the part of the architect are going to become increasingly serious. Further, his technical knowledge must be able to stand up to increasing demands to be made upon it. If, for example, the architect is going to succeed in making the flat block an adequate environment for living he will need all the technical resources he can muster to counteract the adverse effects of confined living space, too many people moving about in corridors, noise of radio etc., the problem of car noise, the problem of noise between adjacent blocks of flats, outdoor living and playing space and the problem of the decline of a property in terms of the behaviour standards of its occupants. This all means that the architect will have to study in detail how people live, what they can tolerate and what they will not. At present the architect is ill-equipped either for dealing with these matters himself or for getting effective help from others.

11. New Technical Possibilities.

The last thirty years have seen the splitting of the atom and, latterly, the beginnings of the controlled application of the energy released. The magnitude of change that this new energy source is likely to cause can hardly yet be appreciated, but a measure of it may be gained from the fact that by "1975 nuclear power stations (in Britain) might be doing the work of 40 m. tons of coal a year .... this would require only 400 tons of uranium a year" (37). A second indication of possible change is that some economists think that the saving in transportation, handling and storage will be so great that the cost of nuclear fuel may be ignored (38). Dean, however, thinks that economically available power from the atom will "not come suddenly but rather will follow the gradual advance of technology" (39). The stimuli to the development of commercial atomic energy will be such facts as the increasing costs of winning increasingly inaccessible coal, oil and natural gas, the increasing demand for energy (40), and a mounting repugnance on the part of workers to continue the dirty and dangerous work of mining. The original source of atomic power, uranium 235, has been matched by thorium and uranium 238 which can be converted into nuclear fuels (plutonium and U.233 respectively), and

(37) J. Cockroft. Atoms for Peace in Britain in Commentary from Britain 1.8.55
(38) G. Dean. Report on the Atom. P.159.
(39) Idem. P.153.
(40) See Appendix lX (3).

hydrogen. These fuels are very much more plentiful in nature than is U.235 and the process of breeding appears to presage an almost inexhaustible supply of fuel. There appears already to be a surplus of plutonium in the U.S.A.(41).

The future picture is not yet clear but perhaps it is possible to make the following points:-

(a) We have new power sources which will alter our whole technology.

(b) Technology will probably become an even more important segment of our culture than at present.

(c) The new power source will mean new possibilities for the development of hitherto undeveloped regions of the world: deserts, areas lacking in water and natural power resources. New towns, even new types of town may emerge.

(d) The building and the town may be affected in the direction of each building becoming more independent of central servicing systems like water, electricity, sewerage (42).

(e) New systems of water-heating, water-pumping, distilling of water from the sea, of cooking, of storing food over long peridds, of automatic internal climate control, of visual and aural communication must be expected to affect the building.

(f) New materials for building may possibly emerge from atomic physics and chemistry. It may be possible to frame the requirements of a perfect building material and have science produce the answer, as was done with nylon. If this were to happen the whole approach to, and process of, building might be radically changed.

Another major factor which will alter the technology of building is automation. "Automation is the self-regulation of a process by its own product" (43). It thus concentrates on neither craft nor product but upon process. "The aim is to arrive at the best process - the process that will produce the greatest variety of goods with the greatest stability at the lowest cost and with the least effort" (44).

There are in building two major processes: manufacture and assembly.

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(41) Economist 23.7.55. Atomic Energy in Harness.

(42) It is understood that strontium 90 can be used to generate electricity directly without using a normal generator. It could, therefore, be used as a small scale reactor perhaps adequate for a house. The saving in distribution would no doubt be large. It is now also possible to generate elecgricity by the interpenetration of two gases.

(43) P. F. Drucker. The Practice of Management. P.38.

(44) Idem. P.15.

Automation may be expected to be applied to the first of these initially and to the second later. It is reasonable to suppose that the relatively large size of building parts will make anything other than hand assembly difficult for a long time. It seems, therefore, that automated production may be expected to turn out an increasing variety of predetermined standardised parts. The building problem is to assemble them economically.

These two characteristics, standardised process production with diversified assembly, are the true characteristics of mass-production. Mass-production is not the making of an infinite quantity of exactly similar products (45). It is the manufacture of standardised parts capable of assembly into a smaller or greater variety of finished products. We are apt to quote the motorcar as a product of mass-production. It is, but only because a large percentage of the cost of the car represents items bought from other producers who specialise in ignition, carburettors etc. and not because a large number of identical cars are produced (46). The manufacture of computing machinery is in fact a much better example of mass-production. Drucker says the essence of it is that "the burden of diversity ... is taken out of manufacturing and shifted to assembly" (47). So what mass-production does most significantly is to combine uniformity in manufacture with diversity in assembly. It could then, in theory, be used to produce unique products. The parts of these products however, could be of common size, shape, material etc. This fits building exactly. Few buildings are exactly the same. Only houses perhaps fall into this category. The other building types fall under the heading of diversity in assembly. Neither automation nor mass-production means uniformity of building except in terms of modular principles.

It seems likely that automation will give a further impetus to the manufacture of standardised parts for the building. This would fit in with the present tendency toward an increasing emphasis on designing from the point of view of organising the economical assembly on the site of standardised factory-made parts. Automation will reduce the cost of these standardised parts, thus forcing their increasing use. A trend in this direction is already with us.

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(45) This appears to have been Henry Ford's emphasis for mass-production. His dictum that the buyers of his cars could have any colour provided it was black is typical of this concept of mass-production.

(46) Some car-manufacturers have been almost entirely assemblers. e.g. Chrysler.

(47) Op. Cit. P.86.

The new atomic source of power and new materials together with automation may be expected to have a revolutionary effect on the technique of building, and these two seem likely to constitute a cluster of inventions capable of producing profound modification in all the institutions connected with building (48).

The helicopter may also prove to be a major cause of future change. If it becomes common, offices, factories, stations, shopping groups and domestic buildings will have to provide landing and parking space. In congested areas this will mean compulsory flat roofs and the possibility of bridges from building to building: the tendency being to reclaim the ground occupied by building almost in its entirety. The entrance to the building in a city area would now be on the roof, and the lower floors might become the most desirable because furthest from the noise. The upper floor might become hangar space, the whole system working like an aircraft carrier with flight deck, lifts and storage for machines below. Certain pressure - motor vehicle congestion, the spread of cities causing long journeys for commuters, the very high costs of hacking high-speed roads through built-up areas will tend to make the helicopter appear an attractive solution to the problems of urban circulation despite its present high costs. It has the great advantages from a municipal point of view that the main capital expense can be unloaded on to the individual traveller (he buys his own machine) and the building promoter who provides the deck and the parking; the capital and maintenance cost of roads would be reduced. Already in several countries aeroplane kits can be bought for home assembly. It must be assumed that the problem of getting the small plane up and down without a horizontal run will be economically solved in the near future. As soon as it is, the helicopter is a reality in our towns. From that moment major change in the design of building-types must be expected, and the present congestion caused by the motor vehicle may prove to have been a relatively short-lived phase.

In this connection we should also mention the hovercraft. This machine, depending on a cushion of air for its contact with the ground, shows signs of being very economical to run and capable of ultimately reaching very large dimensions. It is early yet to suggest any ways in which it may influence building. Perhaps its influence will be felt more on the road system

(48) W. F. Ogburn and M. F. Nimkoff. Op. Cit. P.581.

outside towns than anywhere else. It requires no hard surface for running on and may therefore revolutionise inter-city transport.

There is another aspect of science which may rapidly cause technical change: the work being done in molecular biology (49). It seems that research in this field stands about where atomic physics stood fifty years ago. It must be presumed that the effects of discovering the principles of life itself will scarcely be less impressive than the recent atomic discoveries or less significant for society's future development.

12. Resistance to Change.

A great deal of the resistance to technical change is non-technical and will therefore be considered in the next chapter. At present the question of resistance or lag must be confined to the technical resistance to change. So great is the importance of non-technical factors (particularly the institutional order) that at first sight it may appear that there is little or no technical resistance to technical change (50). This is not, however, true.

Resistance to change may be caused by difficulties of diffusion. A new technique may be declined for purely sociological reasons such as the fear of causing unemployment (51). Or, it may be left unused, although its existence may be known, because opportunities for transmitting it may be lacking. This happens in building in the architect's sphere of activity. In the nature of things the architect learns the feel of materials as design elements by habit and use, but he must be cautious because experiment, if unsuccessful, must be paid for by the client's money and his own reputation. Now as soon as technology produces a new method of dealing with structural concrete, like prestressing, the architect quickly becomes aware of it, may acquire a good theoretical knowledge. What is lacking in the initial stages is a practical working knowledge. This comes by diffusion. Contractors try the new thing out in small examples and little by little confidence is gained and a working knowledge is diffused. A comparison of the knowhow possessed for reinforced concrete framed buildings by South African architects and British architects illustrates the point well. In South Africa practical knowledge arising from

(49) For example at the Cavendish Laboratory, Cambridge, England.

(50) R. K. Merton in 'Social Theory and Social Structure', P.322, goes so far as to say that the central sociological problem of our time is to spot the elements of our social system which inhibit technological progress.

(51) The automation strike at the Standard Motor Works, Coventry in May 1956 is an example.

experience superimposed on theoretical training produces a reasonable common body of knowledge on the subject. In Britain not so. The theoretical knowledge is there but its practical application is not generally diffused. This is not due to any sociological cause, other than habit and tradition(52), but to the technical problem of diffusion. This difficulty is not limited to architects and engineers, but is common in our society, and is particularly serious for building contractors.

Another problem is that inventions are never totally independent in their functioning. The tower crane will make the benefits of precasting more easy to apply. The advantages of concrete were long known - it can be mixed as wanted, poured to any shape, is homogeneous, jointless, requires little craft work etc. But its full application required the addition of steel reinforcement to counteract its fatal weakness in tension. The full development of wood has had to wait upon the techniques of breaking raw wood down and reconstituting it to achieve new characteristics. Thus change, that is departure from a present use, has been dependent on a new technique. This, one may suppose, is the normal thing. A technique, and in building that means the material and the way it is handled, has persistence because it has utility. It cannot be changed until technology makes available a reasonable alternative. Techniques, therefore, do not just die. They disappear as the result of change due to pressure from alternative techniques. The persistence of techniques lies always in their present utility: it can never wholly be eliminated.

Technical change may be inhibited by lack of invention. If innovation and invention ceased in our world there would be a continuance of technical change for a while until the lag between techniques had been adjusted. But after that, change would cease for lack of essential nourishment. The later centuries of the Roman Empire were a time of stagnation of this kind. In such a period resistance is obviously strong because tedhnical change has no impetus. With us it has great impetus and this impetus has very important implications for the whole social system. Lack of impetus in invention is, therefore, another cause of technical resistance to change because of the essentially cumulative nature of the material culture.

(52) The British architect will think quite confidently in terms of a steel frame.

Again, a culture may simply fail to develop an obviously necessary technique, though lack of materials or opportunity or because its supporting technology is not adequately advanced. This failure, of course, appears as technical resistance to change. The Chuckchee Indians changed their life from a static to a nomadic habit, but continued to use, and carry about a complicated and cumbersome house, instead of developing a lightweight collapsible tent (53). Invention is, after all, difficult and comparatively rare. Resistance to technical change therefore serves the purpose of preserving well-tried materials and methods. We ourselves have so far failed to develop houses capable of expansion and contraction according to the needs of the family (54), and of easy removal to another site. This is in face of minimum standards in housing and a high degree of geographical mobility due to the breadwinner being often forcibly moved.

In spite of these brakes on technical change, it is in fact rapid and we expect it to be so. There are certain technical pressures encouraging change. The more inventions the more their progeny from cross-fertilisation: the shear increasing weight of the material culture is a pressure forcing acceptance of change.

Another pressure is to be found in lag. If an area of technology lags behind the rest the tendency will be for increased attention to be paid to it eventually, so that it is brought into line. There is here a sort of technological strain toward consistency. A good example is the development of the curtain wall. From the moment framed structures become accepted the logical walling method was some kind of lightweight, thin material which need merely act as a weatherproofing membrane. In spite of the known need nothing emerged as a specific answer to this lag. Only in the last decade or so have various curtain wall systems been put on the market. Their increasing use appears certain on the principle of strain to consistency, because the achievement of consistency gives positive results, in this case: economy, saving of floor space, and speed of erection (55).

Resistance to technical change from technology itself is, then, always

(53) F. Boas. The Mind of Primitive Man. P.162.

(54) Curiously, we have gone some way to achieving this in office blocks, where a firm can take on or shed floor space at will.

(55) Curtain wall is still plagued by anachronisms of by-law on the excuse of adequate fire-proofing.

to be expected. But the rate of change is increasing and likely to continue to increase. At this point technical resistance merges into the problems of social change in general.

13. Motivation of Technical Change

The stimulus to technical change may come in any of the following ways:

(a) Through the urge to reduce costs without materially lowering existing standards or failing to fulfil existing expectations. This may operate at various stages in the design of a building. First, technical skill can be used to simplify the plan of the building without materially reducing the standard of accommodation. Secondly, at the stage of determining the detailed structural methods: new methods may be applied. Thirdly new materials may be specified either as substitutes for accepted materials, or by outright new materials of kinds hitherto unknown.

(b) Through the need to solve new structural problems and to solve old ones in better ways. New structural problems appear generally in new building types. Thus in the 19th. century the railway station emerged as a new type requiring the unencumbered roofing of large areas. Aeroplane hangers are another example. New techniques like total pre-fabrication of houses may compel the development of new structural approaches.

(c) Through the results of research. As new methods of testing materials lead to more accurate knowledge of the nature of materials new methods of calculation are made possible, which allow materials to be used in new ways. The prestressing of reinforced concrete is a recent out-standing example.

(d) Through the general advance of science and technology which are constantly making new contributions to knowledge and knowhow, so that change in the building is a manifestation of technical change in the general body of the culture.

It should be noted that these motivations are not suggested as the causes of technical change. The causes of technical change are clearly very complicated and are not of immediate concern to this study. The motivations are rather channels along which change can come. For example, the drive for economy is not a cause of change, because other things as well as economy are

Fig. 39. Nervi. Hangar.

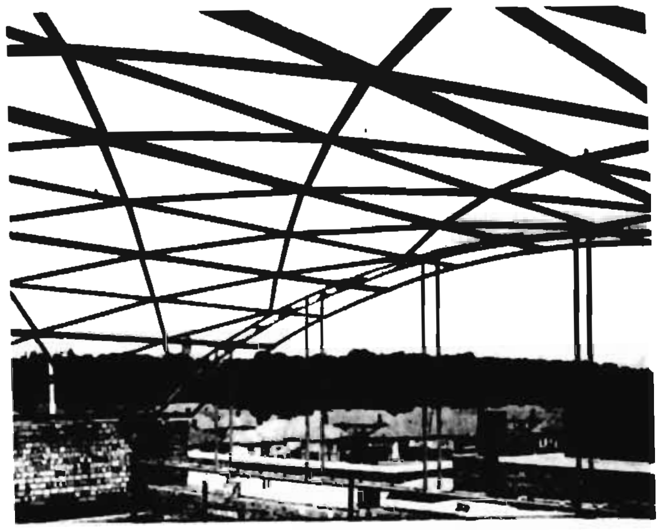

Fig. 40. Ove Arup. Steel space frame roof.

Fig. 45. Persistence.

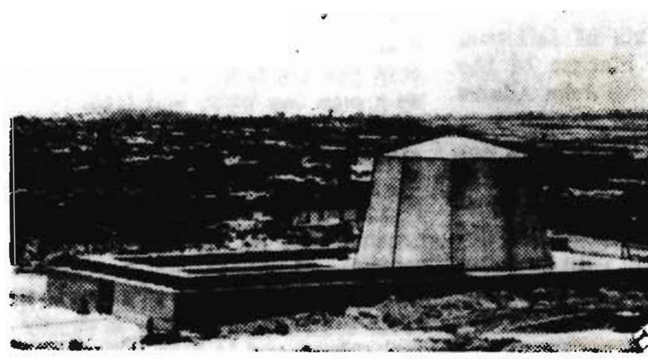

Fig. 43. Research Reactor, Israel New symbol.

Comparison between the modern house and the primitive hut shows how advancing techniques can make abandoned living patterns acceptable again.

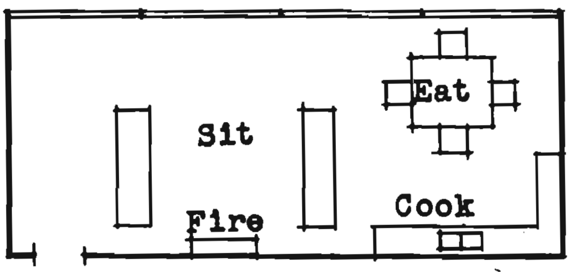

Fig. 41. Modern House.

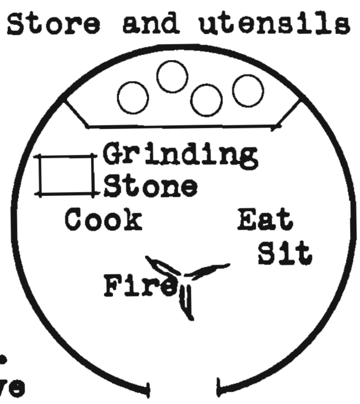

Fig. 42. Primitive Hut.

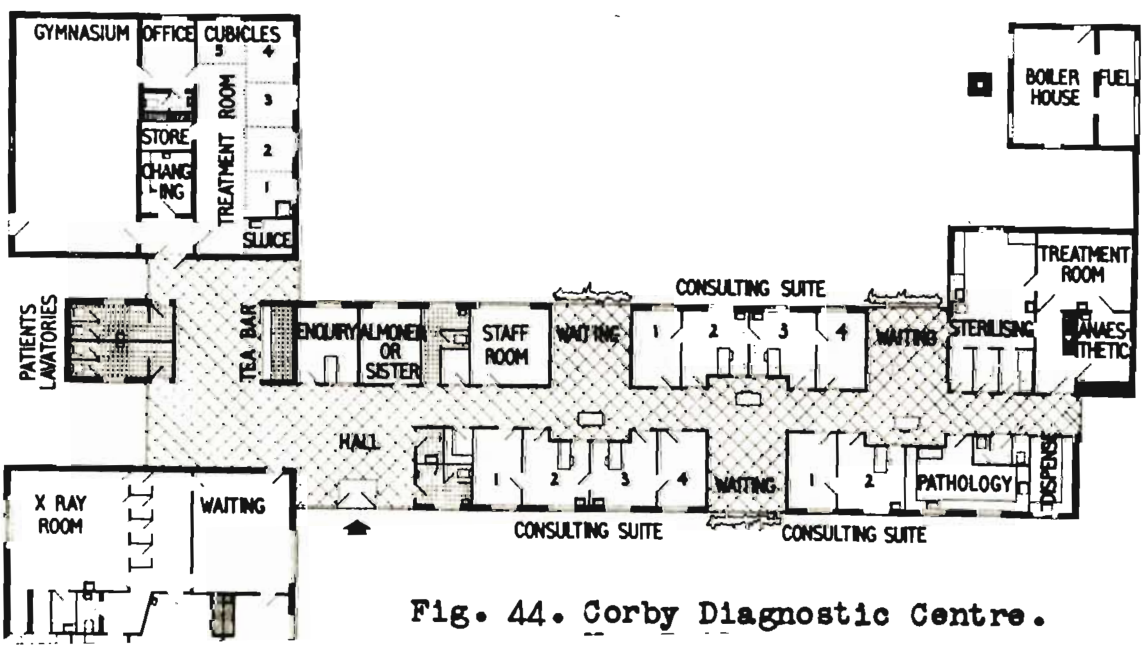

Fig. 44. Corby Diagnostic Centre.

required to bring the change about: discovery, invention and alteration in the general climate of the culture as a whole.

14. Significance for the Architect.

The fundamental question which technical change poses for the architect is the very simple one of how to respond to it so that he can make a valuable and valid contribution to the development of society in this, the new industrial revolution.

There are several possible attitudes. He can pretend it does not concern him. This point of view appears in the form of: 'the present state of affairs will last my time' or 'all this is beyond me. I had better stick to what I know'. If the architect takes this point of view he bids fair to eliminate himself from the world of action within ten years.

On the other hand the architect cannot hope to acquire an intimate knowledge of the new sciences and techniques which are the cause of such rapid change. He already has more to learn during the period of his formal education than is either possibly pleasant or economic, and he obviously cannot be taught atomic physics, cybernetics and the techniques involved in using computers.

There is, however, one thing the architect can do, or have done for him, during his formal training. He can put himself in the necessary receptive attitude of mind toward the new developments. He can set out to make himself responsive to the trends of our society and he can make the effort to feel himself a part of it. If he does not do this almost inevitably the opposite course will be taken in default: he will tend to feel himself outside the society - a view of the architect already held by many laymen.

It seems of outstanding importance, therefore, that during the formal training of the architect he should be adequately motivated to be outward looking towards the whole pattern of the emerging culture, so that he will feel impelled to keep himself generally informed about the progress and significance of scientific developments. Ways and means of doing this for the student need to be found.

In terms of the working methods of the architect we should mention the increasing use that is being made in the business world of computers. These machines are not merely a matter of convenience. They are vital to certain kinds of work, and by means of them we are able to undertake operations that would have been previously of too uncertain an outcome to embark upon. An example is the St. Lawrence Seaway, the computer work for which made the whole project a practical possibility. Both planners and architects will find that increasingly they will be drawn into the use of the new electronic equipment and they will find themselves faced with problems which can be solved only by the use of such machines. The architect must also orient himself to this aspect of science if his techniques are to catch up with techniques in other fields. One cannot but feel stimulated by the new techniques used by aircraft designers using computing equipment. Nor does their enthusiasm for the new possibilities escape notice. By comparison the archaic methods and irrational swings of aesthetic preference of the architect are depressing, and as portends for the future, un-nerving.

Conclusions.

(1) Increasing diversification and specialisation of the material culture will bring greater heterogeneity of the culture as a whole. Change will therefore become more complex, and its prediction more difficult.

(2) Technical change and the social evaluation of it are in reciprocal relationship. It is a matter for social evaluation to decide how technical change is to be used, yet the technical change influences the social evaluation.

(3) In a period of social change several different response patterns to a given situation may be equally acceptable for satisfying the institutions. This explains the wide limits of current architectural approaches.

(4) Technology is perhaps the most characteristic component of our culture. It depends on invention.

(5) The possibilities of technical change are not applied equally through the various parts of the culture. Lag is apparent in the application of new possibilities.

(6) The money economy of our social structure is constant stimulus to technical change, and therefore technology and business are closely connected. Therefore technology creates as well as satisfies wants. It is the dynamic nature of the economy which forces change.

(7) In building change in technology cannot be separated from the economic drive which is the motivation of industry. This is very important when the lag which exists in the building industry is considered in relation

to the improvement of techniques in building. Techniques improve in relation to economic pressure.

(8) The recent rapid progress of the technology of building materials has presented the architect with one of his most difficult problems: how to select materials. This is connected with the problems of communication and knowledge storage. The situation is likely to get worse rather than better and this may lead to an increasing self-limitation of choice by the architect.

(9) The production of substitute materials by technology is important and requires detailed research. Substitutes succeed one another. Frequently the substitute is made to copy the appearance of its predecessor: this facilitates change and copyism must be viewed in this light. Gradually the substitute becomes the normal.

(10) The word 'substitute' carries with it a measure of subjective evaluation. This should be eliminated in favour of a neutral word so that the products of technology can be freed as far as possible from adverse value judgments. A substitute is often superior rather than inferior to the material it supplants.

(11) Evaluations are frequently not related to the nature or qualities of the material but are fastened on it by the values system of society. In this way a technological advance may fail to reach its full potential.

(12) New methods and new materials go together, and methods of design and new materials interact to cause technical change.

(13) Tools are an important cause of technical change in building. The development of tools is reciprocally related to economic pressure by way of wage levels and productivity.

(14) Increase in power tool work means increase in standardisation, but may also mean the perpetuation of site work when the work could be done in the factory with advantages of economy of scale of production and higher standard or working conditions. The improvement of existing tools may lead to an increase in lag in building. The basic theoretic need is for the full integration of building into the industrial system.

(16) The trend will be to eliminate craft work in favour of operative work. The key factor is that the thinking for a repetitive operation is done once only. It is in this direction that economies in building lie. Design becomes a matter of organising assembly. This is a new major

factor of great importance to the architect's training and work.

(17) The equipment in the building is increasing in proportionate cost and complexity. Technical change is significant here in its close relationship to social change.

(18) Technical change calls new building types into being. The ways in which the products of technology cause modifications to existing building types is a subject for research.

(19) New technical possibilities are of very great significance for building and planning. These will increase the rate of change and thereby cause lag and rigidity of a degree hitherto unprecedented. The two most significant factors are the imminent application of atomic energy and the development in cybernetics.

(20) Viewing automation in the narrow perspective of the building industry it is clear that it may cause rapid technical change in that part of the industry which is carried on in the factory. The change will be in the direction of cost reduction, standardisation, increase in quality and quantity. This will leave the main problem in building to be assembly on site. The contrast between standardised production process and diversified assembly is the essential characteristic of mass-production and is not new. In applying the principle to building it is site assembly which causes the difficulty. The precise reasons for this difficulty need urgent research. Are they chiefly technical or sociological?

(21) An economic solution for the small helicopter would revolutionise cities.

(22) Technical change may meet resistance from other than sociological factors. Diffusion may be slow for technical reasons. Also one invention may have to wait upon another for its effectiveness. Technical change may lack impetus because of the cumulative nature of material culture. There is, however, a strain toward consistency in technology.

(23) The motivations (not causes) of technical change are multiple: all require research.

(24) How to deal with the complexity of technical change is a major problem for the architect. How will he fare in a society into which he is not integrated on the production side and which he is not scientifically trained to understand? He must put himself in a receptive frame of mind for understanding these new trends in society. It will be an important task of education to motivate the architect in this direction.

(25) Special difficulties beset the architect because of the wide variety of materials and constructional methods now available to him. In regard to these he shows himself typically conservative or gullible.

(26) The architect's work situation does not favour his using available research material to good advantage.

(27) In the coming changes in building techniques the architect may well find himself in a less advantageous position than the engineer-architect. This area of the architect's work which deals with the structural side of buildings is of great importance for him in terms of future change.

(28) The architect must define his attitude to the problem of the now rapidly changing crafts. He must understand the sociology of the situation and design strictly within the limits which this situation allows. Attempts to resuscitate the craft system are doomed to failure in our present cultural context.

(29) Greater precision of work will be demanded of the architect as he has to design to increasingly stringent and complicated standards.

(30) In relation to technical change the architect is in danger of moving out of the main stream of the cultural development of society. He may opt to do so realising what this will mean, but if he does this he cannot expect support from society. This is a major dilemma for him.

CHAPTER X.

SOCIAL CHANGE.

In our society technical invention and innovation are the most conspicuous source of social change. There is a constant flow of invention requiring the adaptation of our behaviour patterns as these inventions become assimilated into the material equipment of our society. Change is thus born of other change. The change from horse to motor vehicle forces us to adjust the lay-out of cities, the design of buildings, the planning of inter-town roads, family life and leisure, and the protection of rural areas. As a quantitative indication of this kind of adjustment it is interesting that Ogburn and Nimkoff list 150 aspects of life affected by the emergence of domestic radio (1).

1. Social Adjustment to Technical Change.

The scale, extensiveness and implications of technical change in terms of the on-going social process are so important in their effects on the behaviour of individuals that we may regard it as having produced, and as producing with increasing intensity, special responses of adjustment. These responses have been given the name of 'technicways' by Odum. This is an ungainly word, but it has the merit of stressing the essentially technological nature of our emerging society. Odum defines these behaviour patterns:

> "Technicways are not the ways of technology: they are not techniques. Technicways are the ways of adjustment to technology and the resultant behaviour"(2). Or again: "......habits of the individual and customs of the groups for meeting needs and survival values in the modern technological world"(3).

Our present attempts to adjust to domestic television are an example of an emerging technicway. As a piece of mechanical equipment it compels change in our living habits: it must be placed in such a position that several people can get a good view of it; the lights must be dimmed, and other activities may be rendered impossible. We must change our eating habits so that we can eat whilst viewing. It presents problems connected with children's homework. We shall adjust to the requirements of this technical development

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(1) W. F. Ogburn & M. F. Nimkoff. A Handbook of Sociology. P.564.
(2) H. W. Odum. Understanding Society. P.230.
(3) Idem. P.371.

in a variety of ways: some good and some not so good. Our patterns of behaviour connected with the motorcar are another example of technicways. The sequence is: a new machine appears; it has obvious use; we decide to adopt it; we then develop behaviour patterns which fit the use of the machine into our whole system of behaviour more or less efficiently. Traffic control, the social habits connected with cars, our development of suburban living and commuting, our use of the car as a status symbol, our road safety organisations and our acceptance of the motorcar as an essential aid to business activity - all these are basically technicways.

The compulsory nature of the response should be noted in situations arising from technical change we have no alternative but to modify our old behaviour. If we wish to have the benefits of the new machine or piece of equipment we must adjust our behaviour patterns at least that minimum amount which will make the use of the machine possible. We no doubt have some degree of choice in the response as is proved by the fact that not all our responses are equally rational. We cannot, however, refuse to make a modifying response if we wish to have the benefits. Our problem is to know how to make a rational response which will be satisfactory now and will allow adequate opportunity for further change at a later stage. The determination of what is a rational response and what is not is a matter of value judgments and in the case of technicways these are notoriously difficult because of the newness of the problems presented.

Perhaps the most significant single change produced by technology, and therefore requiring the development of technicways to meet the change, is the recent rapid and enormous increase in the size of towns. Instantaneous communication and fast transport for people and goods have made possible larger concentrations of population and the development of outlying suburbs. This in turn makes possible larger houses and gardens than would otherwise have been possible, allowing a new pattern of suburban living to emerge for the mass of town-dwellers. In South Africa and America a social result of this development has been the decline in status of the semi-detached house (American half-house) and the rise of the ranch-type house. This type of suburban, or outer suburban,living is utterly dependent on certain basic technical advances: instantaneous communication by telephone and radio, rapid transport particularly by motor vehicles, and the development of high speed roads. These make possible: adequate distribution of goods to subcentres, efficient police control, rapid movement of factory-produced building materials, shopping by telephone, home amusement, rapid mobility for the individual.

The significant role of the motor vehicle in this context is to be noted. With it have originated production line assembly, new working groupings, and new business formations concerned with selling and servicing the vehicle. It very materially affects the transportation of people and things, giving a form of mobility quite different from that of the railway, and opening the countryside to the town-dweller. It has stimulated road development and subsidiary activities like teashops and motels. It has made possible a new ecology of cities and the relocation of industry and workers' residential areas. It has affected leisure, amusement and even church-going habits. The resultant social changes appear as new buildings: factories of a new kind, new showrooms, offices, petrol stations, bus-stations, freight stations, roadhouses, motels, suburban centres, suburban houses, drive-in cinemas etc. Each of these new building-types represents a social response to a need produced by change in our technical equipment. They are adaptations to technical change and are themselves evidence of change in the adaptive culture.

Odum emphasises the non-transitional aspect of the technicways and thinks they "transcend the folkways and supplant the mores" (4). He also stresses that they are quickly adopted. These differences may prove significant for building by speeding up the tempo of non-technical change. For example it suggests the question: is the modern ranch-type American house a technicways response? The traditional house, often Regency in its general approach, was a slowly developed folkways response. May the contemporary house with its interpenetrating volumes rather than rooms, its flowing into the landscape, its stress on informal living and its rigorous eschewing of the heavy and solid, represent an abrupt switch from the folkways to the technicways? Certainly the development of the house over the last thirty years would appear to bear an interpretation of this kind. The house has adjusted, to a considerable extent, to the technicways which have developed in response to the motorcar, to the general employment of women, to family limitation, to mechanical household equipment, to the increasing technological emphasis of life. The 'machine a habiter' does in fact suit a mechanised society with a logic that matches the social revolution caused by the universal spread of technicways. If our

(4) H. W. Odum. Op. Cit. P.368.

society's most dominant characteristic is its technological emphasis, it is only to be expected that its buildings will be heavily involved not only in construction and materials but also most significantly in their expressional aspects. Seen this way, the appearance of a modern building is symbolic of our technological emphasis. This will continue to be so in spite of minor truant excursions into the folkway architecture of previous stages in our social evolution.

The idea is not confined to Odum. Mumford sums our situation up: ".... the machine is serving independently, in its neotechnic phase as a point for a fresh integration in thought and social life" (5). The development in cybernetics since Mumford wrote these words bear out this assessment of our society's major trends.

2. Technicways and Folkways.

Odum contrasts the characteristics of the folkways and the technicways as follows. The folkways are, on the whole, difficult to change. They originate in acts to meet specific needs, developing into recurrent habit and are not "creations of human purpose or wit" (6). They are permanent by the iron bond of custom. Technicways on the other hand are the result of being forced to change habit rapidly because of the demands of technology. Thus the individual may, by the pressure of technology, be forced to change his habits without reference to the group. There is, therefore, argues Odum, a greater hope of change of habit in response to technological change than can occur in the folkways. He concludes: "..... if change can be brought about, it can best be done by understanding the folkways and substituting the technicways for them (7).

This may prove to be a very important line of thought in view of our need to encourage change in certain directions in the building industry. For example, if it proves to be the situation that building can only advance by eliminating a great deal of craft work, a major problem will be how to get such an idea accepted by a trades union system which is based on the principle of craft distinction. The emphasis here, of course, is not on the technical change aspect but on the non-technical aspect: the fact that the unions are associations dedicated to the preservation of vested interests. The rational

(5) L. Mumford. Technics and Civilisation. P. 368. See Appendix X (1).
(6) W. G. Sumner. Folkways. P.4.
(7) H. W. Odum. Op. Cit. P.226.

solution is that the building team should consist of a group of fitters each able to do basic work in carpentry, bricklaying, plumbing etc. - mechanics rather than craftsmen in the traditional sense. This is at present quite impossible because lines of demarcation follow the crafts and they have the fixity of folkways. Odum's idea of technicways being able to accommodate change more quickly suggests that possibly through the common use of new tools the craft divisions could be broken down and new groupings might emerge based on technicways (8). This suggestion requires first research and, later, practical testing.

3. Social Change Arising from Non-Technical Invention.

Social change may appear as social invention. Social invention means in practice "any invention that is not material and that is not a discovery in natural science" (9). Some significant social inventions are: chain store, civil service, day nursery, building society, juvenile court, town planning machinery, health clinics, research institute, social settlement, United Nations. Whilst it is true to say that all these are in the last analysis brought into being because we have a society with a highly developed technology, it is reasonable to regard them as evidence of social rather than technical change, since they depend for their emergence not on specific technical inventions but on the general cultural pattern (10). The planning machinery now commonly used is an example of social invention more or less pure. The stimulus to town planning is, no doubt, manifold: urge to improve housing conditions, desire to allow for proper traffic circulation, light, air and amenities. The need for these things is often the result of technical change. But the response is non-technical, and stems from the realisation that the environment needs further control. Thus the idea of town planning is largely social, although the means used to this end are, of course, technical: the control of buildings in use, size, height and appearance, the control of layout and new development etc. The essentially social nature of town planning can be appreciated by examining historical examples. The new controls imposed by Charles 11 on London were simply the result of learning the lessons of the immediate past: loss by fire, congestion caused by narrow streets, and lack

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(8) The breaking down of the bricklayer's craft at Springs in the erection of houses for Africans, is a technicway. See D.M.Calderwood. Native Housing in South Africa. P,164-170.

(9) Ogburn & Nimkoff. Op. Cit. P.573.

(10) T. Veblen held that technology determined the social development, but this view is not generally accepted. A more satisfactory viewpoint is: - "Any instance of social change is ... the resultant of a specific and probably unique conjuncture of a considerable diversity of conditions." R.M.MacIver & C.H.Page. Society. P.626.

of through communications (11). They did not arise from technical change.

New building-types may emerge fairly directly from social invention. These need to be contrasted with new building-types generated by technical invention. Example of both are:-

From Technical Invention.	From Non-Technical Invention.
Automated Factory	Business Club
Broadcasting Buildings	Community Centre
Power Station (Atomic)	Government Office
Railway Station	Health Clinic
Research Laboratory	Multi-firm Wholesale Warehouse
Telephone Exchange	Regional Shopping Centre

A third, or mixed, category may also be classified. This consists of those building types which depend first on technical invention without which they could not exist, and secondly on social invention which makes the technical invention of social value. For example, the cinema (contrast with the theatre which is a purely social invention), ice-rink, library, technical school, diagnostic centre.

The rate of change in buildings will probably be fastest in the technical group, and slowest in the non-technical. It has to be remembered that invention whether technical or not is difficult; to achieve a social invention and have it accepted may be exceptionally difficult. Can we, therefore, predict that once the present period of rapid change in, say, the house has been completed there will be a period of relative rigidity? Shall we find that our family living will once more crystallise into generally agreed patterns to which the modern house will provide a generally acceptable environment? Or, is the tempo of change to increase and society to become more and more rapid in its adjustments? A possible equilibrium may be fluidity in certain aspects of life, like technology and business, compensated by relative rigidity in the patterns of home life.

Social change has a modifying influence on the building-types. The reduction in the size of the family has made the three-bedroomed house the generally accepted standard. This must be contrasted with the 19th. century house in which five or six bedrooms were common. The house has become more compact and easier to run as domestic service has become more scarce. The

(11) There is confusion with the word 'planning'. The use above is that of controlling future development in an already existing town, although the social invention of new towns is equally valid as an example.

social invention of welfare in industry has led to the introduction of special rooms equipped for this purpose. The canteen has appeared and has become an indispensable part of the factory plan. Playing fields and sports amenities are also an indication of the fact that the place of work is becoming an increasingly important social node. Some, for example Drucker, seem to think that this is a very major social trend. If it is, we may expect increasing elaboration in the design of the place of work in response to its rising social significance. In contrast to this view we should note the possible effects of automation, reduction in the hours of work and the trend of increased stress on leisure activities.

4. Two Channels of Social Change in Building.

The channels along which non-technical change operates in building are rather more restricted than those along which technical change may be traced. They are two: the utility and the expressional aspects of the building.

(1) Utility Aspect.

Broadly speaking, any building is designed to fit a particular behaviour pattern or set of patterns. As these patterns change in response to technical and social change there takes place some modification of the building-types to follow the social change which has occurred. This may be called the utility aspect of social change. It must not be confused with response to technical change. The addition of the individual garage (12) or car park is a utility response to the technical invention of the motor car. The regional shopping centres is a utility response to the social needs of the new suburbs. Building-types are constantly undergoing modification in their utility aspects. This is very roughly what the architect normally means by function: that the building must be such that the expected behaviour patterns can conveniently be lived out in it (13).

The following are examples of relatively recent change arising from social sources in the utility aspects of building:

(a) In schools the classroom (form room) has become clearly differentiated, and special rooms for woodwork, science, music, and art have come to be expected in the layout of schools. The utility response here has

(12) As opposed to the grouped system of lock-up garages.
(13) The architects' use of 'function' is inadequate. A building has many more 'functions' than that of merely satisfying the utility demands as has already been shown.

been to an increasing specialisation in the teaching of the various primary and secondary school subjects. This response is now probably complete to all intents and purposes, although other subjects requiring a new response may at any time be added to the curricula.

(b) In hospitals, new departments have been added to the basic ward-operating theatre idea: ear, nose and throat, physiotherapy, outpatients, diabetic clinic, work-therapy, polyclinic, diagnostic unit, radiology etc. Responses of the kind required here will probably continue to be needed because of increasing knowledge and specialisation.

(c) A most interesting utility response to change has occurred in the office block. Here, future change is so taken for granted that the design of the office block has been reduced to having fixed only stairs, lifts and lavatories, the remainder being undifferentiated space left for the tenant to subdivide in his own way. This is clearly an ultimate response and cannot in principle be improved upon. The hospital by contrast, is very far from this level of development (14).

(d) In the departmental store the most recent utility adaptations are in the rearrangement of the store for self-service, which eliminates the shop assistants' space and the counter, but requires the addition of exit control (for payment) and parking space for the customers' trolleys. A further utility adaptation is the siting of the shopping centre away from the city centre and sometimes out beyond the suburban fringe of the town (15).

(e) The house has not generally responded to utility pressure as much as might be supposed. Superficially, the modern house might seem to be different from its immediate predecessors. It has responded to the social fact of the departure of domestic servants to some extent: houses are made more compact, steps are avoided between kitchen and dining-living area, basements and attics are no longer required. But the house is still usually a fixed and static arrangement of space, capable of neither expansion nor contraction. The basic concept is still that of a system of cells, rigidly controlled as to light, ven-

(14) Some hospital administrators are beginning to think about approaching hospital buildings in the same way that we design office buildings.
(15) Highly characteristic of trends in North America. See Appendix X (2).

tilation, height and floor area by inflexible by-laws. With the exception of those mentioned above most of the recent changes in the house have been on the expressional and not the utility side.

It is along the line of utility response that so many mistakes are made in building. A building frequently does not meet the utility requirements of the client's behaviour patterns because the architect does not understand what those patterns are, and particularly does not appreciate that they may be very different from what he imagines them to be. He is also generally without any organised knowledge of behaviour trends (16). The result is that the architect tends to work on precedent - a poor teacher in a time of transition when the rate of social change is rapid. As an indication of the importance of research work in this area the comments of Kuper on municiple housing at Coventry are significant. He points out the importance of privacy between families and produces evidence that in the houses studied the standard of privacy was not adequate, observing: "They (the occupants) adjusted more readily to the inadequacies of the neighbourhood services than to the dis-satisfaction with the immediate area of living" (17). This is a distinction that an architect could not have arrived at merely by taking thought for it. The observation suggests that first satisfaction must be with the house itself, and that architects must enquire into satisfactions and dis-satisfactions very closely.

The troubles suffered by the contemporary English architect over the terrace house are an instructive example of the problems of utility response. The basic difficulty in the present context with the terrace house is that the architect favours it over the semi-detached house for aesthetic reasons and therefore wishes to induce change in its favour. The public, however, has no enthusiasm for it. Their preference is for a semi-detached, or a detached house (18). The architect in England expresses horror at the ugly acres of semi-detacheds and points out how much better the urban landscape would be if the semi-detached house could be banished in favour of the terrace. In order to 'sell' the terrace house the problem with which the architect <u>thinks</u> he is faced is the achieving of the same degree of utility and efficiency in the terrace house as is achievable in the semi-detached. This is hard. There are

(16) No systematic sociology is normally included in the architect's training.
(17) L. Kuper. Living in Towns. P.165-7.
(18) English context. In South Africa not even the architects are enthusiastic for the terrace or row house.

problems of dustbins, garden material, the loss of daylight on one side, and garage. The architect tries hard to show that he can solve these problems as well for the terrace as for the semi-detached house. To some degree he succeeds but the public order of preference will continue to be: detached, semi-detached, end house of a terrace, middle house of a terrace (19). Why?

The attempt to solve the problem by way of utility response is most probably doomed to failure because the problem does not lie wholly in utility. It lies partly in status and prestige. In the values system of populations with a British background the terrace house is largely declasse and its occupants, generally speaking, suffer a loss of prestige in comparison with those who can occupy a semi-detached (20). The real problem is to give the terrace house an improved social standing. If given that, defects of rear access and restrictions of planning will be cheerfully endured by tenants, or owners, who would no longer have feelings of injured status. The architect must, therefore, look much deeper than utility response if he is to succeed in the status rehabilitation of the terrace. The often mistaken direction of the architect's efforts in this matter is an example of his blinkered view of function. The general question which he must ask and answer is: what determines the status rating of a building-type? This is as important an aspect of function as is utility satisfaction.

(2) Expressional aspect.

This is the second channel along which non-technical change operates in building.

Neither the symbolic nor the aesthetic content of the expressional complex can be wholly determined by technical factors. It is obvious that technical matters do influence the appearance of buildings: the nature of materials, the principles of structure and legal prohibitions are clearly traceable in their effects on building, but when that has been said, there remains a great deal of the expressional element in building quite unaccounted for. It is change in this remainder that is our present concern.

There has, in recent years, been considerable change in symbol. Fifty years ago the symbol for an English elementary school was a multi-story, com-

(19) At Umlazi, Durban, Africans have the same order of preference.

(20) There is also status cleavage between local authority rented housing and privately owned. Would the privately owned terrace house rate above the local authority semi-detached?

pact building of a single mass, sited more often than not close to the road and having a fairly high site coverage. Today the symbol for the same building-type has come to be a group of clearly differentiated parts rather loosely connected and often having a horizontal rather than a vertical or massive emphasis.

A change has also taken place in the symbol expressing church. In the last third of the 19th. century the spire was very common. This has given place to the tower in England, a spire almost never now being used (21). Certain styles, notably Norman and Gothic, were used during the latter half of the 19th. century as symbol for the religious complex. This also has now virtually disappeared and its place has been taken - style as symbol and not as aesthetic - by a very severe use of design elements and an originality of structure and form which is notable.

For many centuries a major symbol of the house has been the front door, which has therefore received special attention as an element in the design. In certain styles the chimney has also been a domestic symbol of great importance. Both these symbols appear now to be in decline. The domestic fireplace may also possibly be about to lose value as symbol.

The common factor in all these changes is that none of them is due to technical improvement. The changes are not, therefore, movements towards more rational building within the economic and utility context, and they are quite different in nature from rational changes in structure or in the employment of materials. They are social in origin and their presence is a reminder that however much we may rationalise our shifts of emphasis there is no proof that what follows is necessarily an improvement on what has been superseded. The non-rational element of symbol is ever present, living its own independent life. In what sense is it an improvement that banks suddenly cease to need as symbol of financial stability their massive stone plinths and walls, great entrance doors and barred windows, abandoning them for glass and aluminium (22)?

In this connection we must note an essential difference between the nature of change in the technical and the expressional aspects of the building. In technical matters change may be self-evidently progress: the new may be stronger, cheaper, more durable than the system or material that it replaces.

(21) The Dutch Reformed Church in South Africa still adheres to the spire, usually of very slender proportions, for its chief symbol.

(22) The traditional bank, particularly in the American Beaux Arts style, simply stole the security and aristocratic symbols of the renaissance palazzo.

It is probably reasonable to conclude that the long term trend in technology is in the direction of progress - improvement. We may also at least hope that our approach to the utility aspect of buildings may move in the direction of improvement, bearing in mind our stress on research and our desire to find out how needs can be met with increasing efficiency. Change in symbol and aesthetic, however, is of a strictly neutral kind. To say that the change from Gothic symbol of spire to the renaissance symbol of dome constituted progress is to make a value judgment scientifically worthless. We must be careful always to be on our guard against confusing the two. Mere change of symbol cannot be passed off as progress with honesty. In an age which is making so much obvious progress in science and technology, the architect must beware of claiming to match such progress with mere value judgments concerning symbol and aesthetic. Science is self-proving in its validity. Symbol and aesthetic are not.

In aesthetic there has been a great deal of recent change. The historical styles have been abandoned almost completely, and a style based to some extent on physical function, the characteristics of new materials and new ideological tenets is the only style in which vigorous building is now carried out in the western world.

The chief characteristic of the change that has taken place here is not the alleged closer proximation to function, as is often claimed, but the rejection of the languages of the historical styles as a vehicle of aesthetic expression. Parallel with this rejection there has emerged a preference for certain stylistic elements. Some of these are: pilotis, all-glass facades, large areas of glass in living rooms, an emphasis on the horizontal, the use of random rubble masonry in contrast with smooth finishes, bright colour, and certain plan shapes like the fan for auditoria. There is often emphasis on the staircase, great effort being expended to give it an air of lightness, and there is a tendency to play down the entrance to a building.

If any of these characteristic elements is examined for its contribution to the function (i.e. the use) of the building, it will be seen that it is not very great. Pilotis serve the purpose of lifting the whole building off the ground, which is sometimes useful, but that purpose is defeated if the ground floor space is afterwards filled in and used for accommodation. All-glass facades are of doubtful practical value. The increase in the amount of glass in living rooms is not really intended to increase the amount of light, which now has to be kept out with blinds, but is necessary to achieve a certain preconceived appearance. The fan as a plan shape for auditoria is useful for large areas, but where the area is small or the sound is mechanically produced and capable of being easily adjusted in volume the practical acoustic advantages of the fan are small.

Preferences for these elements, and for others, are rationalised by 'functional' explanations. Plate glass windows in the house are 'explained' as better for letting in the sun and bringing the garden into the house. It would be more in accordance with the actual mental processes to say that preferences are generated first in the minds of a few and later in the minds of the many; that these preferences may or may not be in the direction of making the building more logical; that the mind, disliking to admit the arbitrary and the wilful seeks to find reason and order; that order is apparently achieved by rationalising the preference so that it appears to approximate more nearly to the demands of function than did the thing it supplanted.

The intellectual and emotional demand for reason and order is, however, met. This is done by the imposition of order in the way in which the various preferred elements of the building are combined. Any preference is made acceptable by the way in which it is combined with other equally arbitrary preferences into a logical whole. The whole group of preferences must therefore hang together as a unit if any individual preference is to survive. The truth of this can be seen at once if preferences from one style are mixed with those of another. The once classic architectural problem of how to combine the large plate glass areas of a shop window with the Georgian facade of an existing building is a good example. Basically the problem is not soluble because the shop window destroys the acceptibility of the Georgian elevation and reduces it to the arbitrary. Or imagine the use of the Classical orders to define the two decks of a motorbus (23).

The principle then, seems to be that the individual element of design is apt to be arbitrarily selected, but that these elements are given permanence and made acceptable by the logic of the way in which they are handled. Thus from often fortuitously determined elements the logic of a style is developed and institutionalised.

(23) The renaissance would have adopted this solution for the bus; of necessity because their agreed language of form was a modified version of the Classical. There are three obvious Classical solutions to a renaissance motorbus: Alberti, Raphael, Palladio.

Change in aesthetics must be seen with this background in mind. Clearly technical and non-technical invention give opportunity for a change in aesthetic, and indeed the aesthetic of any period must respond to change in these two if it is to survive, since beyond a certain point no aesthetic can be stretched. Technical and non-technical change probably do not, however, determine aesthetic change. Rather they must be seen as offering possibilities of aesthetic change only, which may or may not be taken up.

The aesthetic possibilities of large areas of plate glass, flat roofs, isolated point supports have been taken up, have been welded into an aesthetically consistent whole and have become a now characteristic modern style. It is interesting to speculate what would have happened had the emphasis been put on lightness and portability in the last fifty years. A product much like the motorcar or aeroplane might have emerged: compact, of minimum standards in terms of floor space and built of very small structural sections like an aeroplane fusilage, in which small windows would have been necessary because of the need to stress the outer skin (24).

The future of the modern style will be conditioned by its past. We must expect the continuance of non-rational preferences appearing within the general framework of the style. Aesthetic change will, therefore, be most likely to occur as relatively minor change in existing elements. The sheets of plate glass may get larger, the structural supports more slender and the use of colour more bold. But the aesthetic change will be a continuum, since the likelihood of a clean break occurring again seems remote and because our present aesthetic is well fitted to meet the demands of new building-types, structural systems and materials. In general the new aesthetic has a vast reservoir of potential adaptations within itself, a fact which makes it reasonable to predict its continuance with anticipated gradual change in individual elements only. Aesthetically the style is extremely flexible: it depends not on symmetry but on balance, giving great variety of adaptation to physical needs; there is no rigid canon of proportion; there is no fixed way of giving scale; it is able to use almost any material and, most important, it fits the ethos of change. Yet, on the other hand, this very flexibility is to some extent dangerous because the elements may not have sufficient persistence to

(24) In historical fact it was the ship and not the motorcar which provided much of the inspiration of the early moderns. See Le Corbusier: Vers une Architecture.

preserve the style. Continuance of style demands stability in the general expectation of what a building should look like. The acceptance of architecture depends on public opinion and that opinion must have time to form and must not be shattered by too rapid a rate of change, if building is to remain a serious art. Too rapid a rate of aesthetic change may reduce architecture to the level of fashion, which in essence is nothing more than a sequence of change in aesthetic so rapid that it can be supported by only a small section of the community, and that only very superficially. From the point of view, therefore, that architecture should be regarded as a serious art, rapid aesthetic change has dangers. The Festival of Britain architecture, admittedly exhibition work, is a salutary reminder of how, when the aesthetic fails to bind the arbitrary elements into a firm stylistic bundle, design topples over into the merely wilful and does not achieve that institutionalisation without which there can be no hope of permanence.

5. Socio-psychological Currents.

Non-technical change to a large extent stems from the opinions, attitudes and aspirations of the time. If the general attitude is to conserve, little change may be expected: the very slow rate of change in Egyptian society was parallelled in their millennial approach to building. But if society has an urge toward improvement in material things change may be expected as a normal characteristic in building, and it may not merely be tolerated but may be actively pursued. The new may be specially favoured just because it is new.

In our society, particularly in America, the ethos of 'progress' has been present now for about two centuries. So enamoured of the idea of technological progress did 19th. century society become that it assumed a parallel improvement in the non-material culture. Two world wars have dimmed that conviction, but as far as the material culture is concerned progress is still a very important assumption in our thinking. It predisposes us to accept change on the assumption that it is improvement. If a change is in the direction of current thoughts and feelings it will probably be accepted irrespective of its utility value. If it is against the general trend there will be difficulties. The social failure of the post-war British prefabricated portable house is an instructive example. The socio-psychological climate of opinion about houses is roughly that they should be solidly built, owned by the occupier (the house-ownership ethos) and perform adequately as status symbols. The prefab gets very low marks on these counts and its basic utilities: ease of movement, adaptability to site, freedom from structural cracking, ability to be cleared away quickly for redevelopment, go for nought because they go against not only the institutional structure but also against the prevailing currents of thought and feeling.

A socio-psychological current of the opposite trend to the idea of progress is to be found in the nostalgias and historicism of our time. Thirty years ago everything of the 19th. century was anathema. Today, the period is far enough away to take on a rosy hue and Victorian wallpapers, lettering and furniture are rising in popularity. This backward looking is not new in our society but has been present from the breakdown of the Gothic onwards. It is perhaps a reaction against change in general and it is too early yet to predict that this tendency will be submerged under the rising flood of the technicways.

Each institutional complex has in it socio-psychological currents which encourage change in the direction of their flow and make it difficult in other directions. Some of the more important for building are briefly summarised below.

Economic.

"Innovation is a necessary function of business enterprise; it is one of its major social responsibilities" (25). This is as good a statement of creed as of economics, for it is not impossible to have a society in which a given level of economic expansion is accepted as the agreed ultimate level. Drucker's statement is a typical example of the way in which a preference for a certain attitude is camouflaged as scientific explanation. Innovation is only an essential of business enterprise in an economically competitive society.

Nevertheless, Drucker's statement is very important as expressing the climate of opinion about the economic side of our society. The drive for innovation will make society more inclined to change in building as far as buildings in the economic group are concerned. Change in factories and offices may well become easier to accomplish and its rate may increase. This may spread to other, non-economic, building-types or it may not (26).

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(25) P. F. Drucker. The Practice of Management. P.236.

(26) Compare the modern factory building in which the industrialist works with the nostalgic baronial mansion in which he is in popular opinion stereotyped to live.

In physical matters the trend is toward improvement of working conditions by the application of the research findings into such things as lighting, decoration, ventilation, etc. of the physical environment. Pari passu with this physical trend goes an urge to improve working conditions by tackling problems of human personality such as group, committee and team working : a rejection of the older mechanistic welfare in favour of a welfare related to the welfare of the whole personality.

These two trends, physical and psychological, are connected and both will be increasingly reflected in the building because both can be demonstrated to show results (27).

If the economic complex gains in importance we may expect its buildings to acquire an enhanced prestige with the distinct possibility that an entirely new heirarchy of building may emerge nucleated round buildings of the economic complex. This would be a new departure historically; the old current which favoured the church or civic building as the nucleus is now running very sluggishly, and a realignment round our economic interests may be inevitable.

A significant fact of modern production methods is the increasing length of time required for the proving of an innovation: production tends to become increasingly roundabout and the building and its equipment tend to become larger and more expensive and require more time for setting up. This will mean for the building:-

(a) an increasing emphasis on speed of design and erection.

(b) an increasing demand for flexibility of use.

(c) an emphasis on economy.

(d) resulting from (a) and (b) the increasing use of standardised building parts which may be assembled in different ways.

Other aspects of economic thought which may have a future bearing on the building are: the idea of economic planning, the increasing employment of women, aspiration toward the automation of production and the desire for increased welfare for the worker (28).

Familial.

Several currents and trends of opinion are being expressed in house and flat design. There is today a tendency toward the egalitarian family as

(27) It is also a cultural characteristic that we tend to attempt to win over to any viewpoint not by subjective conviction, but by objective demonstration.

(28) See Appendix X (3).

opposed to the patriarchal concept of earlier times in the western world and very frequently the whole life of the family is structured round the requirements of its young children.

Another trend is a movement in the direction of less formal living: rooms and furniture are becoming more informal in design allowing greater freedom and variety of behaviour. Balance is preferred to symmetry and formal reception rooms disappear as casual living becomes increasingly popular.

In this atmosphere the wife is both more and less than the traditional housewife. She is expected to be on a level with her husband in interests outside the home and she does not expect to devote herself narrowly and exclusively to the home interests of the family. This means an emphasis on domestic efficiency, and an intensified demand for labour-saving equipment.

At the same time the family is losing certain functions; for example that of formal education and physical protection both of which have been taken over by the state.

The home, therefore, appears to be moving in the direction of an informal place where the members of the family can retreat from the world for rest and recuperation in an environment of equality. New plan types and layouts are emergent to meet these needs. These are tending to be less and less urban in the 18th. century sense and more and more suburban (29), and what was the country house is becoming the typical town house (in America the ranch type) just as country and informal clothes are penetrating into the town.

The increasing physical and social mobility of the family should also be remembered. At present the house shows no tendency to respond to this problem. Instead it is being partly solved by a different kind of living accommodation altogether: the caravan. In time, however, mobility of the house may become important, perhaps in conjunction with, or as a result of, lighter constructional methods and a psycho-sociological swing in favour of structures of less permanence may be generated (30).

Governmental.

The most outstanding trend in the governmental complex of institutions is for the state to take to itself increasing power. This trend shows itself by government invading an increasingly large sector of the individual's life,

(29) See in general L. Mumford. Culture of Cities. P.430-433.
The Conduct of Life. P.288-292.

(30) In U.S.A. in 1949 the caravan output was 4.5% of house starts. In 1958 it was 11.1%. There is considerable increase in mobile house living on a permanent basis.

and by the individual being a more or less voluntary victim.

An aspect of state control is the protection it is called upon to afford to production because of the increasing period of gestation required in modern industry. Broadly speaking industry is requiring larger blocks of capital and a longer period of preparation before production than it did.

In building, the new towns in Britain are a manifestation of the appreciation of the new problems arising when action on a larger scale than usual is attempted. If these prove successful in the long run, it is possible that the state may embark on new works of a scale hitherto unknown, but matching the social need and using our full technical potential. There is at present very little indication of this except perhaps in the provision of housing in Britain.

The building is now very closely controlled by the state and local government enactments and there seems little hope that these complicated and in many ways unsatisfactory methods, which cause rigidity in many aspects of building, will diminish in influence. The most that can be expected is probably that they will become more efficient and more in line with social and technicological needs. The present trend to seek to control by performance standards rather than by specification is a move in the direction of freeing building from the legal straight-jacket and it is one which will probably be applied increasingly. The initiative of the building industry would be stimulated thereby (31).

In the legal system of property which we have inherited largely from Roman jurists and which is an exaggeration in our society, there seems no indication of significant change, although the recent development of government ownership of land in Britain may ultimately make possible a new concept of immovable property, more satisfactory to the community at large than that which generations of lawyers have fastened upon it.

<u>Educational</u>.

The trends here are toward the state taking over all formal education, which now becomes lost to the church and the family. The aspiration here is toward giving a better education and making it open to every child having the ability to benefit from it. The change that these trends are producing in Britain as far as school buildings are concerned is now well-known. It seems

(31) See Appendix X (4).

very possible that the future pattern has been set for some time to come in school design and that no great change impends.

Greater differentiation of class-room types or the development of composite types may emerge and the drive for a greater output of technological students may mean a series of developments in the technical schools (32). There will, however, be considerable effort directed toward the more economical design of schools. The aim will be to provide the same high standard of design at lower cost, the aluminium and other prefabricated systems being already an indication of trend.

Recreational.

If automation means an increase in productivity, an increase in leisure may be inferred. Leisure has in fact been increasing for some time and the idea that the use of leisure will constitute a major problem at some stage of our social development is not new, but the possibility of extensive automation gives the problem a new urgency.

The elaboration of existing buildings catering for leisure and the emergence of new building-types may reasonably be expected. Both passive and active forms of recreation appear to be developing.

Expressional.

The influence of recent outstanding personalities appears very forcefully in the expressional complex. The general situation we have at the moment results largely from the impress of hands perhaps more heroic than usual: a trend toward a universal architectural style, an aim toward lightness of appearance, an aloofness, an absence of applied decoration, the theory that a building must first adequately satisfy function (which is treated as an ascertainable absolute), an aspiration toward sun, space, fresh air which modern man is alleged to crave, and a tendency toward a deceptively expressive simplicity. It will be noted that all these are theoretical, or supposed requirements, which the architect attributes to the client, but which are in fact, in their being achieved, the architect's own self-justification.

Historically, there does appear much evidence to suggest that change in aesthetic is apt to be the work of outstanding individuals. They, no doubt, need the stimulus of new social requirements and new methods and materials. But when those are present, and sometimes when they are not, the direction of

(32) J. Diebold. Automation. P.131. Points out the need to adjust education to the work which will have to be performed and the need for a greater understanding by engineers and technicians of the economic and business context.

change seems often to depend on a single individual or perhaps a small group. If the work of Le Corbusier or Frank Lloyd Wright is examined with this idea in mind the very great extent to which these two have changed our aesthetic in recent decades becomes immediately obvious (33).

6. Value Judgments.

In dealing with social change in this kind of study there is a strong temptation to get sidetracted into making value judgments of questionable validity and applicability. For example, when examining the social effects that have emerged from the recent development of new suburbs we must not confuse what technology has in fact made possible, such as rapid transport and instantaneous communication, with the effects of these things on human beings. No doubt many of the effects of living in the new suburbs are not desirable. We may think that people living in these suburbs suffer from boredom, lack of social contact and frustration. This may be so, but we cannot say this as a scientific statement without first undertaking a great deal of research. Still less may we imply that the boredom etc. is caused by inadequacies of the physical environment. The same individuals might well be bored living in other places of quite different kinds. It is necessary to be constantly alert against passing off a personal subjective value judgment, which may be little more than a stock response to a stimulus, as though it were ascertained scientific fact.

The habit of doing this is a characteristic of the architect. He is trained to form certain kinds of opinion and indeed must form such opinions as the basis of action. Opinions, however, are dangerous if they are not adequately related to facts, or if they fail to change with increasing knowledge or as the situation changes. It is therefore very important for the architect particularly in dealing with social change to stick as closely to the facts as he can and to be very much on his guard against value judgments which are mere expressions of personal preference. For this reason the attempt has been made throughout this study to set down a fact wherever possible and to eschew the value judgment except where it serves a specific purpose and can be easily recognised for what it is (34).

(33) The indirect influence of outstanding personalities in other spheres should be noted: Picasso, Ford, Howard etc.

(34) The fact that the architect is prone to make value judgments is, of course, sociologically interesting and needs research.

Fig. 46. Concept and acceptance indicate social change. Church at Auxerre, France.

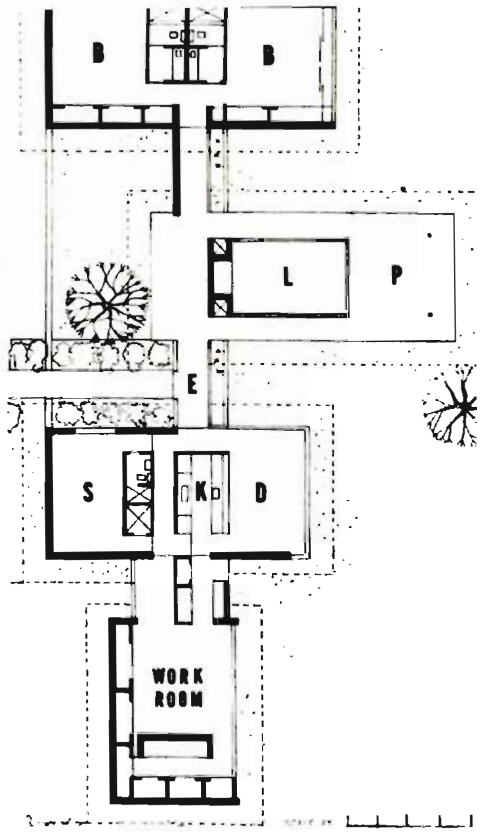


Fig. 47. House pattern adjusting to social change.

Fig. 48. Tudorbethan. A recent building in Swansea.

Fig. 49. Inflated plastic house. Source of future social change.

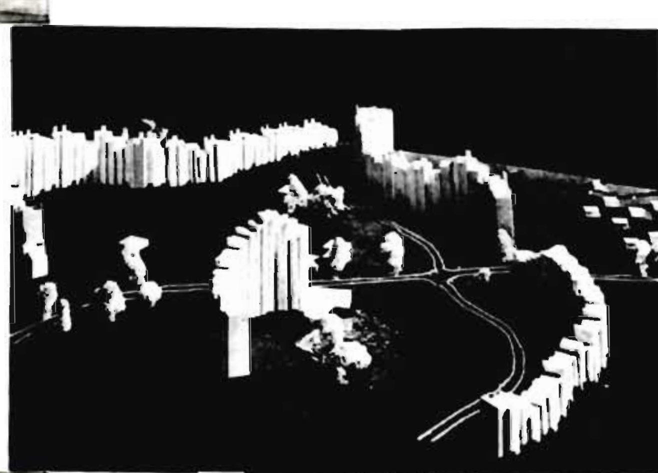
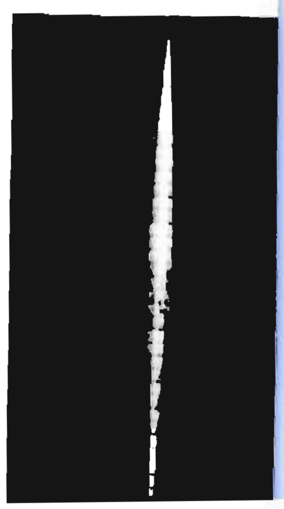


Fig. 50. New high density housing concept. Students' project.

Fig. 51. Social change in symbols used by banks.

Fig. 52. Regional shopping centre, Detroit.

Fig. 53. Skylon. Possible emergence of scientific play.



7. Summary

Social change may come as a result of either technical or non-technical invention. Our response to the increasing intrusion of technology into our lives may be described as technicways.

The two channels of social change in the building are along the lines of utility, the building to some extent being adapted to fit the technicways, and through the expressional institutions. Change in the symbolic and aesthetic side of building is in a considerable measure a non-technical response: non-rational and sometimes contrary to the rational utility response.

In dealing with non-technical or social change in building the significant roles of the socio-psychological currents and of outstanding personalities must be stressed, for it is because of the impetus supplied by these that social change arising from non-technical sources becomes effective. It is in the outstanding personalities that the aspirations of society are brought to an effective realisation.

Conclusions.

(1) It is likely that social change is following technical change rather than vice versa in our culture.

(2) Technical change has had major influence on the form of the town in recent decades and a new form of 'urban' living has emerged in suburban and outer areas. This depends on instantaneous communication and rapid travel.

(3) This change has significantly affected living and working habits and will continue to do so. It is not clear whether a new pattern with long term stability will emerge.

(4) The question of stability of living patterns is important to architect and planner, since they must understand the pattern and its trends if they are to respond adequately.

(5) Social change produces new building-types, as responses in the adaptive culture.

(6) The concept of technicways is useful for examining social adaptation to technical change. The supplanting of the folkways causes an increase in the rate of societal evolution. The architect and planner must keep abreast of the technicways as change in them is the precursor of societal change.

(7) When it is desired to induce social change, for example to reduce cultural lag, success is more likely along the line of change in the technicways than in the folkways. This fact may prove highly significant in promoting change in the craft organisations of building. The application of more mechanical equipment to site work is perhaps the fastest way to induce desirable change in the structure and activities of trades unions.

(8) Some new expressions of building-types may be manifestations of a switch from folkways to technicways. This requires research.

(9) The appearance of a modern building tends to be symbolic of our technological emphasis. This is because the machine is serving as a new node of societal integration.

(10) Social change may come from social invention. Where appropriate, invention of this kind gives birth to new building-types. The need for social invention sometimes arises from technological change, but essentially the response is non-technical.

(11) Future development might be stability in the pattern of family life and fluidity in business and technology. Trends need to be searched for here. The importance of knowledge along this line is that it could indicate to architect and planner where flexibility will be essential and where it will be relatively unimportant.

(12) Social change affects the acceptability of the solutions offered by the architect for the various building-types.

(13) Social change operates in building along two channels: (a) the utility aspect and (b) the expressional aspect.

(14) A great deal of research is required into the utility aspect since there is much evidence of lag here and because it is in this area that architects are making many mistakes. These are often due to inability to predict adequately. Inadequacy of physical performance is common in modern buildings and much research is urgently needed into how newly erected buildings meet the utility requirements of their occupants.

(15) Utility response of occupant may be modified by considerations of status and prestige, and must be regarded as only one factor contributing to the final design decision.

(16) We need to discover the mechanism by which the status rating of a building or building-type is determined in our society.

(17) Change in symbol is basically social change. It is often (not always) induced by technical change. This kind of change need not be toward the more rational, and cannot be classed as progress.

(18) Change in aesthetic is often basically social in origin. Change of this kind may often be rationalised as improved utility: the rationalisation of an arbitrary preference.

(19) The elements of a style may be arbitrarily determined, but logically developed, used, and finally institutionalised.

(20) For the continuance of a style stability in the expectation of what a building should look like is required.

(21) Style which does not win institutionalisation, becomes the merely personal and the wilful. Ultimately the culture controls the style.

(22) Non-technical change can originate from opinions, attitudes and aspirations. The ethos of progress is important, but this may be rejected in favour of historicism, which may arise as part of the resistance to change.

(23) Each institutional complex has its own socio-psychological currents. These are indicators of trends and must be studied by architects and planners.

(24) Social change may be induced by outstanding personalities. This is particularly important in the expressional complex.

(25) The fact that the architect is prone to make value judgments is of sociological importance and requires research.

LINK 2: FUNCTION

Up to this point in the study we have attempted to show how building can be examined in relation to the institutional complexes, and how technical and social change are significant for building. The purpose of this link is to indicate a theoretical connection between what has gone before and the next part of the analysis which deals with the architect.

For this purpose, the concept of functionalism would at first sight seem a likely tool. The word is in the vocabulary of both architecture and sociology and might, superficially, seem to be a ready-made bridge between the two. Unfortunately, however, function turns out to have many meanings and to be a source of confusion to both subjects. When the architect thinks of the function of a building he is likely to mean his view of its use by the occupants, and functionalism has come to stand for a stress on this aspect of building particularly with reference to special structural, symbolic and aesthetic connotations (1).

The mathematician may use function to refer to one variable considered in relation to one or more other variables. The biologist uses function to describe vital processes regarded from the point of view of their contribution to the life of the organism as a whole. The sociologist or social anthropologist may use function with a meaning analogous to that of the biologist, explaining a sociological fact in terms of the part it plays toward maintaining the continued existence of a society or a culture. This method of approach has led to the development of functional analysis and certain postulates: that of the functional unity of society, that of universal functionalism and that of indispensability have been put forward, attacked and defended by social scientists.

Even the briefest comparison between the architect's use of the concept of functionalism and that of the sociologist shows that the architect's is little more than a way of describing a certain aspect of building requirements and of stating a point of view. As such it can scarcely claim to be a scientific tool, however useful it may be for other purposes. The 'doctrine' of functionalism may have changed our attitudes to the physical requirements

(1) The functionalist approach to structure is included here. In general architectural functionalism is in essence a value judgment giving emphasis to a certain approach. It is not a tool or working concept like the functionalism of biology.

of buildings and to aesthetic, but it has not unlocked any doors of knowledge.

If the architects wish to make function into a useful concept for building they could do so by adopting the social scientist's concept. Seen in this way, the function of a building is not merely to provide shelter and accommodation for carrying out the activities of living. <u>It is in general to contribute to the on-going process of society through all the institutional complexes</u>.

These sociological meanings of function and functionalism open up a large field of possible research in both building and planning and it is probable that the functional approach would provide an alternative basic way of developing a sociology of building.

Status and role are functional in this sense to the institutional complexes. The continuance of the institutions that make up every complex is dependent on individuals behaving in the patterns which are required by the institutions. These patterns are the roles which must be played by all those concerned with building. By playing the appropriate roles the individuals are ensuring the continuance of the institutions and therefore of the society. Status defines the role and constrains the individual to play it. In the matter of building, therefore, the architect along with all the others, financier, contractor, engineer, operative and municipal employee, is functionally related to the institutional complexes. By means of status and role the institutions define the architect's pattern of behaviour: by following these patterns the architect helps to ensure the continuance of the institutions.

CHAPTER XI.

THE ARCHITECT.

1. Reasons for Selecting the Architect.

In dealing with the sociology of building it is necessary at some point to examine the subject in relation to the lives of the human beings who are participants in the building process. For this purpose it would serve to analyse the role of the general contractor or his foreman or operative, or that of any of the professional individuals concerned: structural or services engineer, or quantity surveyor. The analysis of the actions, roles and functions of any of these would throw into relief various aspects of the general thesis that building is a product of society as a whole and that therefore its sociological examination is essential if techniques are to be improved.

If, however, one trade or profession only is to be selected there are good reasons for selecting the architect. First, he claims to be traditionally the chief builder: the expert responsible for the building in its entirety, and indeed his very name means this. Secondly, he has now played this part in western culture for a good many centuries with the result that his activities have become institutionalised to a greater extent than those of the heatin or lighting engineer, or even the quantity surveyor (1). The third, and perhaps most significant reason is that as a matter of common observation the effects of social and technical change are at present showing up strongly in the education, behaviour, aspirations and general responses of the architectural professions in most countries of the western world (2). Some observers go so far as to suggest that the very position of the architect as leader of the building team may collapse under the impact of such emergent techniques as the "all-in service", which aim to reshuffle the traditional institutional alignments of the building process, with advantage to the commercial and financial associations of society.

2. Method of Treating the Architect.

The main difficulty in dealing with the architect is the danger of

(1) The rapidity of the growth of institutions connected with the quantity surveyor in recent decades is remarkable. This is probably due in part to the closeness with which they have attached themselves to the architects.

(2) The editorials and articles of British, South African and American periodicals have provided very clear evidence of this in recent years.

the treatment becoming too general and discursive and, in view of the present uncertainties, too speculative. A possible method of approach would appear to be by way of the architect's education: for what role is he trained? How successful is he in bringing his training to bear on the situations of the actual world? Questions of this kind, however, on further examination are found to be secondary: they beg other more fundamental questions.

Another approach which would seem hopeful is the attempt to examine the general place of the architect in his society (3). This method, however, leads very quickly to tackling society as a whole and immediately becomes unmanageable, the architect being seen as merely one among many. This approach, therefore, promising as it may appear superficially, has to be abandoned in favour of some method which will keep the architect central to the subject, and keep the analysis within fairly narrow limits. These requirements can be met by using the sociological concepts of status and role and it is with the help of these that the sociology of certain aspects of the architect will now be examined. As status is the more basic concept this will be explored first.

3. Status in General.

In common parlance status means the standing of the individual in the group: his position in relation to an agreed system of ranking. Every society at every stage has a ranking order of status by which individuals are placed and recognised according to ranks dependent on such factors as class, birth, wealth, age, ability, job, education, character or other criteria built into the given society. The outstanding characteristic of this ranking system is the principle of deference, each lower rank being obliged to be deferential in its behaviour to each higher rank (4). It is this characteristic which identifies the status of the individual in any social context.

In the traditional society of Western Europe status was largely determined by birth on the basis of a society hierarchically arranged in classes having very little mobility between them. This method of determining status has been in decline for several centuries and it is true to say the political and social developments of the period since the renaissance have proved increasingly inimical to this kind of status structure (5).

(3) This would mean the architect's existing situation - a purely factual approach, not to be confused with what we may think the architect's position ought to be.

(4) H. H. Gerth and C. W. Mills. Character and Social Structure. P.307.

(5) The major 'revolutions', French, American and Russian were occasions when status ideas changed drammatically.

In its place there has emerged a complex system whereby the individual occupies several statuses at the same time. This is a collateral system in which the ranking of the various statuses need not necessarily be related in any agreed order. Thus the individual may still enjoy high status by reason of birth, but low status in terms of wealth. Or he may enjoy very high status as chairman of a company, but low status as an acolyte member of his lodge. The individual therefore occupies several status positions simultaneously and each status is determined to some extent independently of the others. High status in one sphere no longer means high status in every sphere as once it did.

It must be noted, however, that as a matter of convenience in every-day life the group of statuses which belong to every individual are bundled together to give a sort of total status. This is often vague and uncertain, but has the advantage of giving a rough and ready ranking as between individuals. Thus, in the common view, general status is often held to depend on the degree of wealth the individual is thought to be able to command (6).

It is clear from these very brief comments on status that in the present condition of western society this is a difficult subject. Status has been changing over a period of many centuries and perhaps the main difficulty is to relate it to other factors in the society in order to make useful handling possible. At present it can benficially be related to the tendencies toward democratisation which typify urban life almost everywhere in our world. Examined with this background the multiplication of status can be appreciated as an inevitable result of the ideal of the face-to-face relationship between individuals. It is the individual, the person, who counts, not the rank or position held as, for example, in feudal societies. This can be stated in juristic terms as the shift from status to contract, provided it is remembered that in our present society it may be the contractual relationship which in fact considerably helps to define the status, as for example, a town clerk's status. His contractual relationship with his corporation is the chief determining factor of his status.

We should note that in scientific use the meaning of the word status is twofold. First it maybe applied to denote the institutionalised position of the individual in the total status range of the society. In this sense

(6) Not on what he has: that is usually unknown; but on what he is <u>thought</u> to have. This may depend on conspicuous expenditure.

status is entirely neutral and merely indicates a position on a horizontal scale. Secondly, it is used to indicate prestige.

4. Role in General.

The concept of role is common to everyday language: we are used to the idea that the individual must play his role in any given situation. We are also familiar with the idea that the individual in his lifetime plays many roles, some simultaneously, others in succession.

Scientifically speaking role is "the dynamic aspect of status" (7). The role is the predictable body of actions which the individual will be expected to perform as a result of occupying a specific status. If he holds a relatively high status he will be expected to behave as a leader. If low in status his role will be subservient. The parent must take charge of the young child's affairs; the child must accept the submissive role.

The basic idea in role is that of anticipation or expectation, and predictability of behaviour is essential to an understanding of role both from the side of the individual playing it and of those amongst whom it is played. The behaviour, agreed by the group, which belongs to a given role must be stable and unambiguous otherwise the role can neither be played nor be seen to be played, adequately. Most individuals have at some time or other felt the social pressure on them to play a role demanded by the situation in which they find themselves. The situation will not only force the role upon the individual but will also indicate for him the necessary behaviour. This is the effect of the operation of the expectation of the group.

The more adequately the individual can play his role in terms of the way in which the group conceivesthe role, the more acceptable he will be. The closer he approximates to the image in their minds the more successful he is in playing the role and the greater will be the social approval accorded to him. The importance of this factor to understanding the relationship of the architect to society can be immediately recognized since it poses the question: approximation to the image of role in <u>whose</u> mind?

Change has a significant bearing on both status and role. In a period of very slow social change status tends to be modified only to a small extent in the lifetime of the individual. It is, therefore, clearly defined and to the

(7) W. F. Ogburn and M. F. Nimkoff. A Handbook of Sociology. P.208.

individual appears fixed and enduring, so much so that it may seem inseparable from existence itself. He cannot conceive the conditions of life as other than the status arrangements of his own society. For many centuries Christendom could not think of the infidel except in terms of lower status, and the word 'heathen' still carries a status connotation. Without clarity of status there can be no clear definition of role. Lack of clarity works in two ways to cause confusion: the player of the role is not sure how to act and the group is not unanimous about the image of the role. Therefore precision of expectation is lost and behaviour is uncertain. It can happen under these conditions that the image and the behaviour fail to coincide at all (8).

In a period of rapid technological and social change such as our own, status tends to lose definition and roles tend to become uncertain. When we come to deal with the architect we shall see that at bottom the present problems of the architect, which appear so baffling to the profession, can be illuminated by examining status and role in the light of change.

Status and role can be thought of as the cement holding society together. Change can be regarded as disintegrating that cement. Status and role hold the individuals in position and ensure the continuance of society by controlling behaviour. The individual, having a known and recognized status, plays a role consisting of predictable action, which can be anticipated by his fellows, who in turn will know how to respond. If change, however, has made the status uncertain the role will not be adequately defined for the individual and his guide for action will be defective. He may, as a result, act in a way unacceptable to his fellows, who may reduce him in status if this unacceptable behaviour is repeated. Any society must enforce a minimum requirement of predictability in the behaviour of its members. Without this there is no stability and no real society in the accepted sense of the word. On the other hand there can be no advance without change. We are faced, therefore, with the need for stability requiring slowness of change on the one side, and advance requiring rapid change on the other. The present position of the architect is simply an individual example of this general condition of our society.

5. The Architect's General Status.

Although the idea of the general status of the individual in his society

(8) The Hoare - Laval - Mussolini episode is an example from politics. In architecture when the businessman selects an architect whose emphasis is aesthetic this situation may exist.

has not a great deal to recommend it scientifically, it is useful at the outset in dealing with the architect because of the wide limits of status ranking which the profession shows. The famous architect, Wren or Wright, enjoys very high status, but the junior architect in a local authority office in a small English town has a status hardly higher than a clerk. This wide range is not characteristic of other professions. The famous surgeon will have a very high status, but the unknown junior surgeon will enjoy a status well above that of the junior architect. Roughly the same can be shown for the status of dentist or lawyer. After having made allowances for status variation due to differences in age, knowledge, skill, experience and perhaps family background, there does seem to be an unexplained variation in the status ranking of architects. This is not new, since it was expressed decades ago in the query whether the architect should come to the front door or the back door, along with the plumber? In the days when most major building was commissioned by an aristocratic class the architect's status was his caste status. If he also was a member of the aristocracy he could enter by the front door. If he was not, but was middle or professional class, he was automatically of lower status than his client and therefore tended to be lumped with the rest of those concerned with building (9). The architect's status in the past has, therefore, contained an element of considerable ambiguity. This, however, is not a totally satisfactory explanation for this problem of excessive status variations and other possible factors will emerge later. At this stage it is adequate to record that there has been and is today an ambiguity or variation in the architect's status.

6. Dominant Factors of the Architect's Status.

In the past the architect has seen himself as supplying an essentially personal service to the client in the designing and supervising of the building. On its side society has supported this image of the architect, and has viewed the relationship between itself and the architect as analogous to that which obtains between physician and patient or solicitor and client.

The service provided within the older professional framework was dis-

(9) When judging of status below oneself there is a tendency to minimize status distinction of those in lower statuses. The status ranking of others always seems less important than one's own. A bricklayer working on large public buildings will insist that his status is higher than that of a bricklayer working on speculative housing. To the architect, enjoying a much higher status than any bricklayer this is apt to appear as an excessive touchiness about position.

interested and essentially personal, the kernel of the idea being advice given by a free agent whose services were rewarded by a fee paid by the beneficiary of the service. This arrangement was partly the result of, and partly the product of, a system of institutions and associations which regulated the behaviour of the professional person very largely by the machinery of status and role. His conduct was predictable and reliable; his role relatively well defined and his status clear at any rate within the view of any given stratum of society. By the end of the nineteenth century the architect was a professional individual and occupied the typical status position accorded to such a person.

This status was heavily dependent on knowledge and skill of an expert kind (10). This knowledge and skill, in whatever profession one examines, was to a major extent the cause of the high status achieved and was essential to its maintenance. The surgeons lifted their status from the lowly barber by the steady acquisition of knowledge and skill. The architect has moved from amateur to expert during the last three centuries: both knowledge and skill have been increased.

These two factors, personal service and expert ability, must be taken together when considering the status and role of the architect. In engaging an architect the client is conditioned by the image that he has of the architect - the expectation that his project will be dealt with by the architect in a personal and individual way. This is so whatever the type of building contemplated. The individual requirement is very obvious in the case of a house, but it is no less present when factory, office or even church is to be built. It is partly on this expectation of personal service that the architect's status is based and reciprocally the status, by virtue of being what it is, in its turn makes the client play the role of one for whom a personal service is to be performed. This aspect of status and role is also important from an analytical point of view.

This role of performer of the personal service is a factor of great importance in understanding the architect. It cannot be divorced from the role of expert technician, since technical competence is essential, but above that level the personal service role is perhaps more important than, say, an

(10) Professional associations like the B.M.A. and the R.I.B.A. have become increasingly aware of this with the passage of time. An outward manifestation is the rising standard of examinations.

increase in technical ability. This distinction helps to illuminate the very obscure field of success or non-success in architectural practice. It has long been noted that the best architects from the aspect of knowledge-skill are not necessarily the ones with the largest practices, and the ingredients of this kind of success have largely defied analysis. The success is attributed to "knowing the right people" or "business ability" (11). The suggestion that it is a matter of understanding this special personal service role is likely to prove a more fruitful line of research.

In this relationship the architect plays the role of adviser to the client and chef d'orchestre as far as the design and actual building operation are concerned. The proof of the personal service relationship becomes apparent as soon as contact is established between client and architect. From now on the precise detail of the role of the architect will be defined by the degree of mutual confidence existing between the two. The architect may advise but the client need not follow the advice. This mutual confidence is a face-to-face matter and clearly personal.

Confidence having been established the architect begins to interpret his client's brief. There are two extremes of client attitude here: those who tell the architect exactly what they want and expect him to do it, and those who expect the architect to find out what they really need and design accordingly as he thinks fit. There are various gradings of attitude between these extremes. Even the first attitude, unenlightened as it often is in practice because it does not use the architect's capacity to a maximum, nevertheless involves and calls forth a personal response. Clearly the status and role of the architect vary in relation to these two extremes. And again, the process is reciprocal. The restricted attitude confines the role of the architect and reduces his status in his own eyes, whilst confirming the client in his view that the architect is just somebody he must tell what to do.

It is an essential quality of this personal service that it is independent. On the basis of independence, advice can be given by the architect, that is knowledge and skill can be brought to bear. It can be rejected or accepted by the client, that is a firm decision can be reached on a face-to-face basis. If he thinks the client is making a wrong decision the architect can say so, and since he is independent and fundamentally disinterested, he can go

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(11) Compare C. W. Mills. White Collar , P.256-6, where he describes the American 'law factory' system. Mutatis mutandis this description would cover the structure of private architectural practice.

to the length of resigning the commission if, in his opinion, the seriousness of the mistake warrants it. This independence is an important support of the architect's status and therefore one of the factors shaping his role, and because of this independence the architect is free to withdraw from a given situation. This means that his judgment has a good chance of being disinterested and it is this factor which in detail reacts favourably on his status. It may be that if status is to be maintained, or even improved, it is just this factor of independence of judgment and resultant action which has to be preserved in a period in which social and technological change is rapid.

7. Status and the Salaried Architect.

There are many minor ways in which the independence of judgment of the architect may be impaired. These can mostly be covered by listing irregularities of professional conduct: fee-cutting, touting for work, and alliances with other agencies concerned with building such as estate agents, package dealers etc. Such irregularities go on everywhere and are not particularly significant as they are individual incidents only and would only become significant if they became widespread. One major denial of the architect's independence has, however, appeared in the last two decades: the emergence of the official or salaried architect in large numbers. It is precisely during this period that the architect's status and role have changed rapidly. This statement does not imply assignment of cause or effect, but it should not escape our notice that these changes have appeared together.

In the salaried situation the architect is employed permanently and exclusively by a company, city corporation, county council, central government department or other body on the basis of an agreed annual salary and on the same conditions as its other employees: clerks, medical officers, solicitors and technicians.

In contrast with the older independent system of architectural practice the new salaried method has two features which are highly significant in relation to the personal service side of the architect's function. These can be posed as two questions, a form in which the problems present themselves in practical life. How can a personal service be rendered to an impersonal client consisting in the last resort of a group of shareholders or councillors with whom the architect can have only the most superficial relationship? And, how can the architect, dependent for his livelihood on his one employer maintain that independence of thought and its expression which is so essential to the older concept of the architect's role?

The problem of the personal service aspect is much more complicated than at first appears. In practice the salaried architect finds himself without a client to whom he can go for effective advice (12). There may be access to other officials and the future users of the proposed building, but these will be involved in the administrative machine in a way which to lesser or greater extent will diminish their usefulness to the architect as persons capable of making right and firm decisions. It should be noted that in these situations such 'client' as there is, is hydra-headed. The treasury will want a say since the building must not be too expensive. The users of the building will naturally consider themselves the 'real' client. In the case of a company project the managers may want something different from the board of directors.

All this affects adversely the decision-making process at architect-client level. The architect may find it difficult to get any kind of decision out of anybody and may be forced to make architect-client decisions entirely by himself. This in the end tends to make the architect an autocrat operating in a world of his own and produces buildings unsuitable for their purposes (13). As we have seen before the cardinal element in building is the decision-making: it is the determining factors of the decision which must always be sought and brought to light. If the architect-client decision process is defective for any reason such as doubt as to who the client is, or failure of communication, there is little hope of the building turning out staisfactorily.

The architect-client situation is further obscured for the salaried architect by the fact of his inability to give advice which is completely independent. He cannot express independent opinion since disagreement may cost him his job. In actual fact he may not be in danger of this happening, but the knowledge that it might happen is sufficient to influence judgment. Under

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(12) This situation also obtains for a private architect serving a government department, e.g. an architect in private practice building a school for a local authority. In the case of school buildings it appears common for the headmaster not to be consulted at all about the proposed building. Who then is the client?

(13) The architect is frequently criticised as an autocrat and the charge is frequently brought that he does not give the client what he wants but instead what the architect thinks he ought to want. Often, however, the architect is in a situation where he has no alternative but his own guesses.

pressure he must defer, often to inexpert opinion, and he can be reduced by his dependence to the status of a mere tool of other interests. The degree to which the architect's status is often reduced by the large corporation or government department which employs him, may be illustrated by the practice common in the Public Works Department of the South African Government, whereby the architect responsible for designing and preparing the documents for a building does not have the opportunity of supervising the contract, this part of the architect's work being delegated to someone else - often an engineer.

Both these factors, the difficulty of rendering the personal service and the weakening of the ability to give an independent opinion, have serious repercussions both on the architect's status and on his self-evaluation (14). In terms of the older system of private practice it means that the architect is ceasing to be professional and is tending to become more exclusively technical. This, it is fair to say, is a lowering of status, even allowing for the fact that the term professional is becoming increasingly difficult to define. The key difference between professional and technical lies in this matter of independence. The pivotal question, therefore, is : can a professional person be permanently salaried without loss of status?

In parenthesis it is useful to note how the habit of employing architects in a salaried position has arisen. It is undoubtedly connected with the rise of the municipalities in England. They have become very important initiators of building in the last few decades, as certain spheres of building, like housing and schools and the redevelopment of substandard areas of towns, have become increasingly the statutory responsibility of local authorities. At first, and still to some minor extent, these authorities depended on private architects. Later they set up their own architectural departments in order to save money (therefore the architects were earning less for the same work) and in order to be able to control their architects. It can easily be shown that the salaried architect earns less for the work he does than he would by doing the same work independently. We can clearly see,

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(14) First Interim Report of the Committee appointed to examine the Representation of Salaried Employment (R.I.B.A.) states "This greater demand for the architect's services has not .. been followed by a corresponding enhancement and strengthening of his standing". The problem is why? The status situation of the architect must be viewed on the background of the status instability of the professional classes. Chapter 11 of White Collar by C. W. Mills has relevance in this connection.

therefore, two factors which are tending to lower status: reduced earning power and direct control by the client.

8. Hierarchical Status of Salaried Architect.

The architect in a municipality or government department or large business organisation enjoys a hierarchical status conferred by office much in the way that in some societies status is conferred by birth. The hierarchy of salaried professional staff might be taken as:-

Town Clerk
Medical Officer of Health
City Engineer
City Architect
City Planner
City Valuer

In some cases City Engineer might rank higher than Medical Officer. In these offices status and salary are reciprocally related: the status is reflected in the salary and the salary reflects the status.

As the use of salaried architects appears to be on the increase, at any rate in Britain, this principle of the determination of status by virtue of the office held is an important aspect of the status of all architects, raising many questions difficult to answer. Will the trend produce an image in the public mind of the architect as a salaried official in a large organisation, whether government or business? Is this, if it happens, to be regarded as a lowering of status? Or to be welcomed as simplifying a complicated problem? And most important, how, if all is rigid, is status ranking to be modified when the need arises?

Although this last question is not in the strictest sense in the line of our present argument it is so important a matter for the future of our cities that the exact nature of the problem must be brought out. The ranking status for officials given above has an historical explanation. The predecessor of the town clerk was responsible for the administration of the government of the community, whilst the predecessor of the engineer was responsible for the physical condition of the village or town. The engineer had to deal with crude physical requirements like prevention of flood, maintenance of communications, disposal of waste material etc. (15). Historically, the architect comes on the scene at a later stage, and his work appears less fundamental. The ranking status of the various officials seems to have crystallised from some such historical necessity, and this is a partial explanation

(15) This primitive condition of the emerging new community can be seen clearly in the Health Committee areas of Natal.

of why nearly always the engineer is superior in status to the architect, and he to the planner.

This situation is now no longer satisfactory in a modern city. We are thus in the position that a rigid status ranking applicable to an earlier condition of towns still operates after its usefulness has been outlived. In the redevelopment of city areas, to mention only one example, the skills of both planner and architect are more vital than those of the engineer with the possible exception of the traffic engineer (16).

The recent growth of attempts to raise the status of salaried architects by group action are in effect efforts to achieve hierarchical status ranking. The status of the fully qualified and experienced architect is felt to be inadequate and these are attempts to achieve status by means of collective bargaining about salaries and gradings in relation to job ratings. Such status would not depend on either personal service to client or knowledge-skill, but on the designation of the rank held: status follows the rank and rank may be expressed by size of desk, size of carpet, position of room or by other marks manufactured by the organisation to express rank (17). This kind of detailed display of rank is quite different from the private architect's marks of status. His are success marks: kind of car, house, yacht, the schools his children go to - in short roughly the same evidence displayed by the successful in any business or professional group in our society.

The hierarchical status of city or town architect is further enhanced by the implication of superiority which resides in the fact of his having to recommend approval or disapproval of the building plans submitted to the local authority. Many of these plans are by other architects and we therefore have the extraordinary situation of one architect sitting in judgment on the work of another. In the eyes of the public, as well as of local authority committees, this appears as a status judgment, although in fact it is a fortuitous result of social change.

The rise of this hierarchical status has been rapid in Britain. In 1939 it is fair to say that appointments as city architects were only accepted

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(16) At present the engineer often stultifies the best efforts of planner and architect. In housing development in Britain for example the engineer may actually design the roads and put them in <u>before</u> reference is made to planner or architect.

(17) The furniture and furnishing of a civil servant's office reflect his rank and are therefore the marks of his status.

by architects who had not done well in private practice and the private architects (then the majority of the profession) were contemptuous of those who took salaried appointments with governmental or business organisations. Twenty years later official architects enjoy high status and constitute a large section of the profession (18).

These hierarchical structures have about them an air of great permanence and rigidity. Together these characteristics in fact represent a danger threatening society as a whole. The trend might appear to be in the direction of an increase in the number of official and salaried architects at the expense of private practitioners. Such an assessment would, however, ignore certain factors. First, the rate of change in our society is accelerating; this militates against any kind of rigidity. Secondly, the reason for having an architect's department rests not on proved fact but largely on opinion. This invariably holds that it is a good thing because it allows direct control of the architect and gets the work done more economically. Both of these opinions are capable of being challenged. Control may in fact be less effective than that wielded over a private architect since the latter works under the implied threat that if he is not efficient further work will not come his way; and as for the economic aspect it is always extremely difficult to prove whether a department is efficient in the long term (19). After a period of running an architect's department an organisation may therefore change its evaluation. Thirdly, in the present climate of architectural opinion young architects in salaried employment are eager to go out into private practice when the opportunity comes. Many of the best leave salaried employment in official organisations, thereby causing a constant erosion of the status of the salaried architect.

Bearing these factors in mind he would indeed be rash who predicted a further rise in status for the official architect.

9. Status Supported by Knowledge-Skill.

It is obvious that our society, increasingly dependent on technology, must give increasing weight and value to knowledge and skill, since it is on

(18) In South Africa this change has not been so marked, but there are indications that it has begun.

(19) Short term is easier to show in a favourable light because it can take no account of the quality of work done - costs of future maintenance etc.

these that it depends for its continuance and it is to these that it looks for further advances (20). Already society is responding to this pressure by a shift in the status of many technical jobs. This trend is present in the building industry where the individual is coming to be evaluated increasingly on the basis of performance. The architect is not exempt. The question 'what is his performance?' will be asked with increasing urgency simply because of the increasing technological complexity of building. The architect's status will, therefore, tend to rely less and less on traditional professional standing and more and more on knowledge-skill as exhibited in proved performance: efficiency becomes a test of status, and his role becomes that of the expert.

This leads us immediately to ask what precisely are the knowledge and skill of the architect? In broad outline he must know how to design a building and how to get it erected. This requires knowledge of the purposes of buildings, knowledge of materials and techniques for using them, and administrative and executive ability. Defectiveness in any of these will inevitably be apparent in the end product of his activities: the building, which will stand as permanent evidence of his knowledge-skill. It is the role of the architect to be knowledgeable in these things and to be able to exercise these skills. The role must be seen to be played adequately during the preparation of the building on paper and during erection, and when complete the role must manifestly appear to have been adequately played. On his capacity to play the role properly the continuance of his status depends.

This aspect of status resolves itself largely into an assessment of efficiency. How efficient is the architect at his job? Difficult as this question is to answer it is nevertheless necessary to attempt an evaluation without falling into inverifiable generalisations or tendentious value judgments.

The first approach is through education. Clearly if the architect is to fulfil his role he must be trained, among other things in: knowledge of the workings of society in order to plan for building use (basic sociology), knowledge of the economics of building in order to keep within the financial limits set by the client, management training and business efficiency. He must also be trained in scientific method if he is to understand and apply

(20) It is implied here that western society will continue to regard technological advance as a desirable goal.

science to building. In general none of these subjects are taught seriously to architects. Some are beginning to appear in the curricula of a few advanced schools, but it is true to say that the profession has no tradition of using any of these skills. During the course of practice architects do pick up some working knowledge of these subjects, but the knowledge is scrappy and unsystematized and such is the pressure of practice that it can never become otherwise.

If the above criticism of the architect's past, and to a large extent present, education is valid, it will be in these fields that we should expect to find adverse criticism in the world of action. It is precisely in these sectors that in recent decades the strongest attacks have been made against him. The physical planning of his buildings is said to be ineffective and on completion clients claim that they have not been given what they needed. He is accused of being unable to control cost: the building always (says the critic) costs much more than the architect estimated or the client expected. Control of the building operation is defective, administrative mistakes are normal, dates are not kept and management of the project is poor.

These criticisms are frequently justifiable in the English and South African context and they clearly seem to be linked with an impression of falling status. Whatever the impression, however, the relationship between status and knowledge-skill seems clearly to be of rising importance in the present situation in the western world. On the one hand society is being served by increasing specialisation and on the other there is a mounting pressure toward greater efficiency. Both these imply an increasingly analytical approach to building in all its aspects. This demands greater precision and exactness which in their turn depend on knowledge-skill. The omissions in the architect's education, which appear later as deficiencies in performance, are therefore aggravated, and made more difficult to correct, by the current trends of the society. The architect is thus doubly caught in the mesh of events: he is both technologically backward and inescapably geared to a drive for greater economy and greater speed. And in all this his traditional training and approach help him not at all. Training together with social and technological change have conspired together to put the architect in an unfavourable position as far as trained capacity to play his role is concerned. It may be predicted that the consequent lowering of status will continue until arrested by proved performance. Conscious efforts made by propaganda or other means to enhance status will not in the long run avail unless the improvement is earned, and attempts made by various organisations in Britain to raise the status of salaried architects in local government offices must be viewed in this light. Very largely these are attempts to increase status on the basis of pressure-grouping: collective bargaining, threat of strike and so on, none of which has any relevance at all to performance. Status can be enhanced this way as it can by protection through legislation, but in time the real nature of the status becomes apparent and the discrepancy between performance and status stands out as an anachronism(21).

. The second approach to the question of how efficient is the architect at his job, is through his trained capacity to design the building, excluding for the moment ability in actually getting the building erected. He is called upon to plan (arrange the parts in a way suitable for the use intended), construct and style the building. He must know how people live and work, he must know materials (their strengths and natures), how to use materials (calculations), costs, standards and laws. He must be able to give the building both inside and out a satisfactory appearance in terms of the aesthetic preferences of the day. He must be able to analyse and synthesise: use reason and intuition.

If any aspect of the demand made on the architect is examined it is quickly seen that in order to be effective specialist knowledge and highly developed skill are necessary. A simple example may be taken from steel structure design. In theory the architect should be an expert in structural engineering if he is really going to determine and be responsible for the steel frames of his buildings. Anything less implies the surrender of some part of his design responsibility (22). In practice, at the best, the architect arrives at a general conclusion about the kind of structure necessary and leaves it to the engineer to work out. Proportions, shape and detail are usually determined by the engineer and accepted by the architect as fixed items which he must incorporate in his design. In doing this the architect has abdicated his design function in very large measure.

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(21) In S.A. the protected profession of land surveyor shows indications of this difficulty. It is sometimes advocated that all buildings should be architect-designed. This would result in much the same over-protection of status. Few societies compel the use of an architect. The State of Washington and West Germany are exceptions.

(22) J. Bronowski has expressed the obligation to design very clearly. In his view, for the architect to be dependent on someone else is a limitation of a serious kind.

The same situation holds for heating, ventilating, electrical engineering, soil mechanics, painting, timber selection, concrete design, curtain walling and in fact almost everything that goes into building. In none of these is the architect really expert and in many he has little more than a smattering of knowledge and often little skill. To this we must add the problem of the spate of new factory-made materials, prefabricated parts, structural systems and new techniques which the very rapid technical progress of the last twenty, but particularly the last five years, has produced; a flood which is almost incapable now of being controlled and put to use intelligently.

In self-defence the architect pleads - must plead - that he cannot know everything in detail and that his job is to co-ordinate the expert effort of others. This, from the architect's side is a dangerous explanation because he has little specific training in co-ordination and because he thereby largely hands over his design function to others.

In terms of status-determination we again have an obscure situation. If, in the long run, the architect's status is largely dependent on the architect's trained capacity to design then all is a sham: in fact the various specialists design for him and he is reduced very largely to harmonising the work of others. He offers himself as knowledgeable and skilful but in fact it is the knowledge-skill of others which he is forced to produce in the guise of his own.

Again we see that the times have run against the architect. Specialisation is increasing, making it more and more impossible for him to reach the goal of mastering the knowledge-skill he professes to have. The evidence suggests that this trend will accelerate since invention and production proceed on the exponential principle more or less. The architect has no hope of catching up and the goal of properly understanding all the techniques in building is now unrealistic for him (23).

If status is dependent in a large measure on knowledge-skill in the actual design of buildings it appears that expert ability cannot be claimed for the architect in those specialities which are now required to make a building, and therefore status must suffer. In this regard the architect is in a dilemma. The times give enhanced status to those who have devoted their

(23) Only twenty years ago the student could achieve a very good coverage of the field. Will the new situation tend to alienate the architect from his work, as now appears to have happened with many white collar workers? Or can the architect be regarded as fortunate in terms of job satisfaction?

time to intensive specialisation: a development very difficult for the architect in the present social context. This, in a highly technological society is the very core of status. Yet if he tries to specialise in the only department in which success seems achievable - co-ordination - he must forego his master-position as designer.

The role of co-ordinator might be a possible line of escape from the dilemma even abandoning his pre-eminent place in design, if it could be shown that the architect were expertly trained and well practised in the complicated job of co-ordination. This is not so and it is precisely lack of this kind of skill that is frequently a major part of the charge of inefficiency against the architect (24).

The conclusion to be drawn is that if the architect's status is determined largely by knowledge-skill, we are again faced with a genuine deficiency. If, as the facts suggest, the architect's proffered knowledge-skill is not adequate for the tasks addressed to it - that is adequate in terms of performance - we must expect a decline in the architect's status. If the architect offers himself as expert or responsible in the techniques of building he must expect to be judged, and therefore ranked, in the long run on the basis of performance.

Although the ideas of knowledge-skill and co-ordinating skill have been separated for purposes of analysis, in practical life this separation is not required since society must judge on what it sees as the finished product: explanations of difficulties cannot be taken into account because they cannot be recorded. In the last analysis the architect must either manifestly exhibit adequate knowledge-skill in building techniques, or he must appear so to do so whilst in fact depending on the expert ability of others. If he can do neither adequately his status will be deprived of its essential support of knowledge-skill as exhibited in performance, and society will cast another for the leading role in the drama of building. There are already signs that this may be happening: the all-in service provided by some contracting firms deposes the architect reducing him to an employee; development and investment trusts who often build on a large scale frequently use anonymous architects. In these

(24) This, notwithstanding a certain amount of publicity concerning the need for training of this kind. As yet there is no measureable effect in the profession in Britain.

organisations the leading role is that of the financial expert.

A subsidiary but very important side-effect of the present dilemma of the architect's diminishing status is that the increasing pressure of speed and economy forces him further away from the creative and intellectual areas of his job and deeper and deeper into the administrative and executive jungle from which there is no exit. This cuts more deeply than might superficially be supposed. For example, the choice between two constructional systems might at first sight appear to be a matter of intellect and imagination directed toward the structional problem. In practice it is likely to turn out to be a balancing of considerations like delivery dates, speed of erection, which firm is slack, tender prices etc. The examples studied have shown many decisions of this kind: in principle creative, in fact administrative. Professional expertise, therefore, often overshadows technical ability.

This difficulty produces a further weakness in the support knowledge-skill should give to status. How are the knowledge and the skill to be maintained and improved without constant effort being directed at the problems themselves rather than at facile techniques of getting things done (25)?

10. The Architect's View of His Role.

Role is the expected body of behaviour which the individual will show in a defined situation, and its essential characteristic is predictability. Role may be examined from two angles: that of the player of the role and that of the group in which the role is played. The architect's role can be examined as seen by himself, which is our present concern, and as seen by members of his society. Very roughly the first is a subjective view, the second is objective. The standards of measurement and judgment used are not, therefore, the same, although that architect whose performance most narrows the gap between the two will appear the most successful.

The architect's role as seen by himself can be a combination of any or all of the following roles:-

Creative Artist.	Genius. Born with a flair. Intuition.
Master Builder.	Really knows the technical answers, and how to make a building look decent.

(25) It is difficult to judge whether building techniques are on balance, in decline in Britain. The crafts clearly are, but this is compensated for to some extent by the emergence of the factory product. If weather-tightness and durability are the criteria, however, then decline is what we have.

Businessman.	Not much sold on this art stuff. Believes in business propositions and efficiency.
Developer's Agent.	Knows how to sieze an opportunity for development. Art has good sales value; here aesthetic not to be ignored.
Engineer - Scientist.	Believes in doing adequate research to get the right answers. Functional emphasis in structure and planning.
Arranger of Space Accommodation.	Good plan is the thing. Must be right for intended use: sociological functionalist.

These are a general indication only and vary enormously as between individuals. They do correspond, however, to identifiable attitudes to be found among architects and expressed by them. We might, without unduly stretching things, also include in the list roles as town planner and interior decorator (26).

This multiplicity and variety of roles presents a problem. It would appear, perhaps, that in this respect the architect is not dissimilar from the medical practitioner who may see himself as physician, personal counsellor, or guardian of the public health. Or the lawyer whose roles may be legal adviser, arbitrator, lawgiver. In both these, however, the roles are easily compatible and are very firmly grounded in the basic knowledge-skills: medicine and law. The architect is different. The roles of creative artist and business executive would appear to be diametically opposed. The society in which the architect operates expects art and business together. This in the social context prevailing is impossible because society already regards art and artists as the opposites of business and efficiency. In this sense, therefore, the group is making contradictory demands. It has an image of artists being dreamy and impractical but from time to time coming up with 'great' works of art. By very definition this is the opposite of the image of the businessman: sound finance, speed, efficiency, grasping opportunity for more business, drive and energy. Society has here made rival and antithetical images. Yet in the architect society asks for both these images to be combined. The same contradiction is to some extent visible in the antithesis usually expressed as art-science. In this case the contradiction is reflected in the architect's variation in role between creative artist and engineer-scientist. The roles of the architect carried by society as a whole (27).

(26) Students' manifestoes are interesting as evidence of the architect's view of his own role.

(27) Only in part since the image carried is formed to some extent by the actual behaviour and propaganda of architects.

The diversity of his own view of his role causes difficulty in daily practice. It is common for the architect to be called upon to switch his mind from making a creative decision, the criteria of which are aesthetic, for example the detailed working out of a complex elevational problem, to the scientific consideration of how much weight can be put on a particular member. In this process he switches role. The fact that these roles require different training and capacity to play is frequently forgotten by the architect and is rarely appreciated by his clients.

This particular difficulty of role is sometimes attacked by having one architect for the planning, structure and business side of the building and another for the aesthetic. The second architect will be responsible for elevational styling. This conforms to the current tendency to have things 'styled', and this attempted solution may increase in popularity as the creative artist or genius concept of the architect's role declines in importance.

Is any one of these roles more important than the others? It is obvious that the role of efficient businessman is important. Administration must be efficient and management adequate since building is an operation involving many individuals and long periods of time. The control of cost, for example, will become more important as society aims increasingly to use its resources more efficiently. In the eyes of the client, the creative-artist side of the architect may, often does, seem of little importance: the building is justified on the grounds of being a business proposition. It pays, therefore it is adequate. This, however, is a utilitarian assessment of the building within terms of reference that are physical, financial, structural. If that is all that is to be expected of a building the architect's place could be, and indeed had better be, taken by an administrator. The complex problems of building design could be fed into a computor and the 'right' answers would be provided(28). The rest would be administration.

This solution would leave the appearance of buildings to the interaction of legal controls, economics, utilitarian requirements and technical know-how, and would be to abandon the attempt to mould our physical environment into something having more than mere convenience value. This is regarded

(28) The question of whether computers will eventually be able to deal with the aesthetics of building is highly interesting. Machines can already compose crude music. If as some, like F. H. George and G. Boulanger (Universite Libre, Brussels), think all human activity can be reduced to mechanical processes, we must regard aesthetics (basically intuition) simply as an area not yet opened up by science.

as a negation and is contrary to history. In Western Europe there is a long history to the idea that a building should be beautiful or should be classed as a work of art (29). Methods of expression have changed over the centuries, but this value of attempting to create beauty (express this idea how you will, subscribe to what theory of aesthetics you prefer) has been a constant characteristic of our society for a good deal longer than we have written records.

It is this value which both makes and justifies the architect's role of creative-artist. It is he, above all, of whom the ability to give meaning beyond the utilitarian or efficient in building is expected by society. Others may show this ability also, although a Maillart or a Nervi are comparatively rare and society in the main does not ask its structural engineers to play this role.

If we regard the architect as coming at the end of a long development of building with this value in mind as a characteristic of our society we must concede that of all the roles, engineer-scientist, businessman, manipulator of space and materials, this is the one which,in historical context, anyway cannot be subtracted from the architect without loss of identity. Administrators can organise teams of experts, businessman can apply initiative and method, but it is the architect who must create the aesthetic value of the building.

It is commonly said that the architect must be both creative-artist and efficient businessman. This is in practical life the way the problem of reconciling roles presents itself. Analytically, however, it is that the creative product must be dependent on the practical product. Now this practical product is far more difficult to bring into being than is the physical existence of the painting, the symphony, the statue or the play. For one thing it costs a great deal more money. Here, therefore, the architect is at a very great disadvantage compared with other creative-artists. He is first of all accountable to agencies in the practical world which have no power over painter, poet and musician. By that amount his role as creative artist is more difficult.

In combining the two principal roles of creative-artist and efficient

(29) Non-architects have frequently remarked on this, e.g. Sir John Wolfenden addressing the R.I.B.A., 4.3.58: "... it is ...unavoidably true that you do construct objects which come within the range of qualifying to be called works of art". R.I.B.A. Journal, April 1958. P.187.

businessman the individual architect may pitch his combined role at any point along the line stretching between the two. If he places it nearer the creative-artist end he will play down the businessman and will tend to sacrifice practical utility to artistic integrity. If he places it nearer the businessman end he will emphasise businesslike approach and will tend to ignore artistic requirements in favour of the 'real' advantages of utility. In either case he will be apt to feel guilty about the role he has played down and will be defensive or aggressive about it.

Historically the position of the compromise along the line has varied. The eighteenth century sacrificed comfort and convenience to an aesthetic which put great emphasis on symmetry. This favoured the creative-artist role. The extreme functionalist of the 1930's reduced the creative-element to a kind of super-efficiency in satisfying physical requirements and in calculating the most efficient structure in terms of applied science (30). In terms of our society it must be noted that the general trend toward efficiency, speed and rationalisation may encourage an increasing number of architects to make their choice toward the businessman end of the scale. These same trends will make the playing of the creative-artist role increasingly difficult. This danger is very serious since the architect, of whatever choice in the matter of roles, is going to be increasingly under pressure from the trends in the society. When this difficulty is remembered on the background of the basic contradiction of roles that the architect faces all the time it may be expected that knowledge-skill will hardly be increased without some major change involving the sacrifice or modification of some roles. The total danger remains decline of knowledge-skill because of the complexity of roles, all resulting in decline of status and the reformulation of roles at a lower level in the ranking system of status.

11. The Architect's Role Seen by Society.

Here we are to examine the image of the architect carried by the group in which he operates. This is their expectation of his behaviour. As with the architect himself, we find again wide variation, and lack of uniformity in the image of the architect held by the individual and the group.

It is useful to recall for a moment how we view the role of the

(30) This does not apply generally to the most advanced architecture of the 1930's, which has a highly characteristic ideal aesthetic.

physician (31). We expect him to play the role of leader in sickness, to diagnose, prescribe, organise and supervise treatment; we also put ourselves in a relationship to him which indicates that we assume he will act as personal adviser in general health matters. Broadly speaking, the mere application of his knowledge-skill in an adequate way will ensure that he plays the role to coincide with the image. This is greatly helped by the fact that he must play the role face to face with the patient (32).

The public may hold the view that the architect will behave in rough conformity with any of the following patterns:-

(1) He will produce an artistic masterpiece of distinctive value, but he will be inadequate in a business way, having no sense of the importance of urgency, efficiency or cost control. We go to him because the building will be splendid and we put up with the attendant difficulties.

(2) He will regard the commission chiefly as an opportunity for the exercising of his private aesthetic interests. We shall get what the architect wants and not what we want. We had better keep away from him if we can.

(3) He will produce an efficient building, get it up on time, control costs adequately and he will do as we tell him. There is just the little difficulty that his buildings lack individuality and quality and our building will look just like all his others.

(4) He will produce an efficient building, get it up on time, control cost, will not be expensive and will do exactly what we tell him. That's just what we want, as we think an architect should simply serve our financial and business interests.

(5) We do not need an architect at all: he would be a luxury for such a straightforward building.

(6) We do not really need an architect. Our engineer is very good, but perhaps an architect could give us a little help over one or two difficulties, but he need not take the whole job over.

(7) We had better engage an architect to get the paper work done - get local authority permission etc. And then we will get it put up by a sensible builder: no need to have an architect supervise it.

(31) The sociology of the medical profession has been examined by T. Parsons in Essays in Sociological Theory Pure and Applied.

(32) Successful bedside manner is close identification of behaviour with image.

On being first called upon to carry out a commission the architect may meet any of the above role expectations in his new client. The role expectation will lie between the extremes of the client who wants the architect to do everything including writing the programme for him and the clients who know just what they want and expect him to carry out merely the mechanics of their wishes.

The first role expectation means that the client entertains a notion of high status for the architect. The second means that the client will rate his status lower. The higher status will mean that the architect will tend to play his role with more enthusiasm and closer identification with his clients' image. The lower status will impoverish the architect's playing of the role and the motivation to make the identification close will be weakened.

It is evident that there is some relationship between this wide range of client expectation of role and the extremes and variations of the architect's view of his own role. The same may be said about status. Obvious difficulty is caused in practical affairs if the role expectations and status ratings of client and architect are badly out of gear. If the client with an emphatic business emphasis engages an architect chiefly concerned with appearances of building the result is not merely a sequence of misunderstandings. It is likely to be a case of each playing a role quite different from the expectation of the other. This can lead to a baffled anger in which neither can understand at all the behaviour of the other. In this we have an example of how variance between expectation and role as played highlights lack of cohesion in a society.

There is no indication that the two items of variation, client's view and architect's view of the role, can be correlated. It would be convenient to find that they are reciprocal in a straightforward way and that the image of the creative artist carried by the public was at least partly the good effect of the architect who favours that role putting himself over successfully. This is clearly not so as the image of the creative artist has something of the pejorative about it and is in some degree an image carrying a flavour of disapproval. The idea is that the architect is rather too much the creative artist and is not down enough to earth. Similarly the business efficiency concept of the role of architect is by no means free of an undertone of criticism. And the other concepts of role, if examined, are also found to be complicated by contradictory elements. What illumination can be found of this highly interesting fact?

In the latter half of the eighteenth century the architect was an amateur. He was a gentleman of education and taste who interested himself in arranging the appearances of buildings to suit the classical taste of the time. This taste was sometimes imposed wilfully, as by Burlington, and sometimes it developed in less obvious ways. But essentially the expression vehicle, the style, was agreed by the society as a whole. The emphasis was symbolic and aesthetic and the architect's justification was his ability to handle the current variation of the Classical or to change it in a way acceptable to those in the society who were the leaders of taste and fashion. By the time we reach Soane the emphasis is professional, no longer aesthetic. The architect is no longer amateur. It is a much more serious business, in fact it is now a means of earning a living. Now the architect is an agent and we have the businessman role emergent and ultimately dominant. By the end of the nineteenth century a renewed emphasis on the aesthetic had emerged, largely under the influence of the aestheticism of the day and its reactionary course away from industrialism and the machine. We find the image of the artist-architect rising whilst his practical skill in terms of the materials and techniques of his time declines. This kind of architect still lingers on. He was overtaken by the 1930's concepts of the architect - engineer and the practical businessman approach. The first of these has widened his scope, very beneficially, into a science of building (33). At the same time, however, there is now appearing among students an arbitrary artistic emphasis which appears in opposition to the rationalism of the 1930's and the eclecticism of the 1945 - 55 period. It may also prove to be anti-scientific.

The first observation concerning these shifts of role is that there is clear evidence of reaction. These swings of reaction no doubt bear a relation to changes in the climate of the times. Business became more important as the nineteenth century wore on. Too much business emphasis brought a revulsion (34). All this is understandable, but why is it the architect's image which we see in the mirror? The physician, lawyer, banker, schoolmaster and many others have changed their roles little and that slowly. Nor have they been subject to reaction and counteraction. Ought we to investigate

(33) The science of building is now rising in status and it is taken seriously in architectural schools.

(34) Partly manifesting itself as local authority action motivated by ideals of social betterment, with an emphasis on human values. This body of thought and action has had its characteristic impact on the architects.

whether the architect's role has, in its changes, some close relationship to certain incompatibles in the system of values of our society? Research along these lines would be very difficult, but if it could be shown that such a relationship exists, then we should be able to gain a much clearer understanding of the problems which beset the architect and the building industry, and which at present appear intractable.

The second observation is that these reactions appear to come often directly from the work and writings of architects themselves (35). What happens is that in a given situation some architects try to do something different. A Sullivan, a Wright, Le Corbusier in the 1920's. They appear - no assumption of cause or effect here - as individuals dissatisfied with the role. The aim is now by actual works, writing and propaganda to put over a new idea of the role of the architect. He is artist, engineer, sociologist, businessman, utopianist. The architects create a new image or revive an old one with modifications. After a due lapse of time the public takes up the new image and perhaps adopts it. As the architects in forming the new image intentionally cause the superseded image to become declasse the public is always apt to be carrying past images sullied by the architects' own disapproval. In this may we have a possible explanation for the disagreeable undertone of dissatisfaction which seems to haunt all the roles of the architect as imaged by society today.

Whilst this shift of role, constantly causing a change of emphasis, may be regarded as a sign of liveliness, it is nevertheless legitimate to enquire whether society's needs in building, which are now highly complex, can be properly met by a leading group which is continually changing its role concepts for no very clear reasons.

The idea that shifts in role are connected with the spirit of the times also suggests itself. The present emphasis on teaching science in schools is clearly reflected in the growing interest in science throughout the building industry. It is not difficult to see that change, particularly technical change, in society will tend to redefine the architect's role. He must move from tradition and rule of thumb to science and research. He must move from craft to anonymous mass-production. From approximation to precision.

(35) It can be claimed that the rebel makes the new form, but that the society makes the rebel first. This line of discussion is not fruitful.

These are not difficult to understand and correlations could be found in the general trends of the society at large. What is hard to explain is the polarity or ambivalence of attitude which the variations of the architect's view of the role and the various images of the public prove to exist. To say, as sometimes is said, that this may be explained by the great complexity of the building process as a whole is to beg the question. It is true that architecture is at one and the same time scientific and non-scientific, rational and imaginative, physical and aesthetic, private and public, traditional and entirely new. But by what mechanism is it decided which of these elements are to dominate and which be played down or even ignored? And by what mechanism does an old dominant become deposed?

It would be interesting to go on to suggest by what means the architect may hope to extricate himself from the somewhat adverse societal situation in which he now is. Should he become specialist-expert in some relatively narrow aspect of building? Should he project himself as the efficient businessman? Justify himself as the creative artist? Or, like the architects of Byzantium, should he be fixed hierarchically in his place in society? Fascinating as are these lines of thought, they are speculations which are outside the terms of reference of this study.

12. Conclusions.

(1) In the present cultural configuration of the West status is often not well defined.

(2) Role is the predictable body of behaviour expected of the individual: it is the dynamic counterpart of status.

(3) The closer the role played corresponds to the society's image of the role the greater the approval accorded by society to the role-player.

(4) In a period of rapid change status and role lose definition, and expectation and behaviour may fail to coincide. This means a loss of stability in the social structure.

(5) There can be no advance without change, but change brings a detachment of role-performance from role-image. We require rapid advance on the one hand and slowness of change on the other. The architect's present position is a particular case of this general societal dilemma.

(6) The total status of the architect is notable for being between widely spaced upper and lower limits. This is not new.

(7) Traditionally, the architect's status has been based on his ability to provide a personal and disinterested service to society. This service depended on a command of expert knowledge and high-grade skill.

(8) The sociology of the architect-client relationship is that the client expects a personal service based on knowledge-skill. This means that the architect must play this role and that the client will play the role of one for whom such a service is to be performed. The reciprocal relationship of the roles is essential as a social factor: this is the very process of society holding itself together.

(9) Failure to play the role adequately by architect or client will be followed by a fall in the performance standard of the building.

(10) To be continuously effective the personal service must be independent. This is an important component of the structure supporting the architect's status. This is particularly to be remembered in a period of rapid change when status may easily be damaged through lack of understanding of its nature.

(11) The salaried architect's independence, and therefore his status, is impaired. The fall in status of the architect in Britain has coincided with an increase in the proportion of salaried to independent architects. Research is required to establish the extent to which the two facts may be connected.

(12) The salaried architect is in a special difficulty in rendering a personal service, since he usually has no client with whom he can enter into a personal relationship.

(13) This difficulty has an adverse influence on the decision-making process at architect-client level. The architect may be forced to make client decisions himself. This is one of the causes of performance failure of so much state and municipal building.

(14) Failure of communication between client and architect is a cause of performance failure.

(15) Independence of judgment is impaired in the salaried architect because his economic security is in his employer's hands.

(16) The adverse effects of these factors on the salaried architect's status tend to lower the status of independent architects also. The trend would appear to be in the direction of reducing the architect to a more exclusively technical level.

(17) In Britain the salaried architect earns less for the same work than the private architect. This, together with direct control by the employer, constitutes a factor tending to lower the status of the architect.

(18) To some degree the loss of status by salaried architects is compensated for by status conferred on an hierarchical basis. This may have relation to other trends in the society: e.g. the change in the position of general medical practitioners in Britain since 1947. Research is required.

(19) In hierarchical status there are traditional reasons why the lawyer and engineer rank higher than the architect, but the reasons why a medical officer of health ranks higher than the architect in a municipal hierarchy would bear examination. Is this a result of conscious status elevation by physicians as a corporate body?

(20) The marks of status of the private architect are different from those of the salaried architect.

(21) The position of the salaried architect who vets the designs of other architects (private) on behalf of a local authority requires research. In the eyes of laymen this implies a judgment based on status. In fact it is not, but merely a fortuitous result of social change.

(22) The reasons for the establishment of an architects' department by a municipality can be shown to rest largely on opinion and not on fact. These organisations are perhaps not as permanent as they appear.

(23) Rapid technical change must give increasing social value to knowledge-skill. Steadily improving performance in this direction is essential to the architect if status is to be maintained, let alone enhanced. Efficiency will become increasingly the test of status. His role must, therefore, become increasingly that of expert.

(24) It is the role of the architect to be knowledgeable in the purpose of buildings, in materials, techniques, and administration. His status depends on his capacity to play the role of being knowledgeable in these things. From this angle status becomes a question of efficiency.

(25) The architect is failing in efficiency through not being educated appropriately to the social situation. The adverse criticism which is voiced by the world of action is evidence for this.

(26) The trends in the present culture indicate that the architect must adopt an increasingly analytical approach to building.

(27) The architect's present position is that whilst being technologically backward he is in a situation where progressively greater efficiency in knowledge-skill will be demanded of him. The architect is in an unsatisfactory position as far as trained capacity to play his role is concerned.

(28) A lowering of status will continue until arrested by proved performance.

(29) Because of the difficulty of being an expert in all aspects of building the architect may fall back on the idea that his role is essentially that of co-ordinator. He will tend to claim this increasingly as not only mastery but even comprehension of all the techniques of building becomes more and more unattainable.

(30) The architect's dilemma is that knowledge-skill is increasingly the main support of status. This the architect cannot have in specialist degree. If, however, he professes to be an expert in co-ordination he foregoes the reason for his existence: his position as master-designer.

(31) There are signs that architects may be supplanted by others as the leaders of building.

(32) Present pressures of speed and economy force the architect progressively further away from the creative and intellectual areas of his work and deeper into administration. Professional expertise becomes more important than creative ability. This becomes a substitute for genuine knowledge-skill.

(33) The architect's view of his own role is variable in its emphasis on several different images. Of these, the roles of artist and businessman are diametrically opposed and society expects this opposition. Society has an image of the architect containing contradictions. This is extremely important because it is the likely cause of the ambivalences of the architect's own attitudes.

(34) The value of beauty in buildings is structured into our cultural pattern. This justifies the architect's role as creative artist. This is the essential role of the architect.

(35) The trends in our society may cause an increasing number of architects to lean toward the businessman role.

(36) The public has a variety of images of the architect, with various status-ratings. The precise relation between these images and the concepts of role held by the architect requires research.

(37) The swings of emphasis in the concept the architect's role possibly bear close relation to some irreconcilable characteristics in the values system of society. Research might illuminate both the architect's and the public's attitudes.

(38) Constant shifts in the role of the architect weaken his status. This, however, must be seen on the background of the status instability general in our society.

(39) The status and role of the architect are somewhat uncertain and ambiguous This affects adversely his performance, frequently requiring him to act in a situation which is not adequately defined. The resultant doubtful performance is matched by an ambivalence of attitude to the architect on the part of the public, and this ambivalence tends further to obscure the architect's status rating in his own eyes.

(40) The degree to which the architect is alienated from his work requires research. The myth is that he finds satisfaction in his work and therefore he should be regarded as in a different category from many white collar workers who have clearly suffered job alienation. The facts of the architect's day-to-day life may not support the myth.

(41) A full sociological study of the architect is required.

CHAPTER X11.

CONCLUSIONS.

The chapter-by-chapter conclusions have already been set down and these will not in general be repeated here. This chapter attempts to isolate conclusions which cut across the entire field of research, and therefore looks at the whole subject from a somewhat higher viewpoint than that adopted for the conclusions incorporated in the various chapters.

In some aspects this chapter enters the sphere of value judgment. Some of these judgments are explicit but some are implicit. To some extent the chapter is geared to the world of action, an implicit value judgment being that the sociology of building is useful in its application to the problems daily presented to those involved in building. But only to some extent. The underlying basic intention of the research remains constant: to find out how the scientific methods developed by the social sciences can expose the nature of the building-process. <u>Whilst the result of this may be useful in the practical world, the motivation is disinterested. This disinterestedness is vital to a development of the subject along sound lines</u>.

The conclusions in this chapter do not in general go into detail for the very good reason that the subject is not adequately advanced for detail. It aims rather at this stage to record major ideas, leaving detail to later research.

There is also a speculative element in this chapter. Speculation is not science, but it can provide points of departure for scientific exploration, and it can supply the imaginative impetus essential for any sustained research.

It may be added that the questions of value judgment and speculation are matters which belong properly to this stage of the study, and to a stage which may follow, rather than to the earlier stages of data collection and classification.

In carrying out the research for this study the order of work was first to set up a rough framework of theory and secondly to collect the data from actual buildings, organisations and individuals. This method was necessary because the framework was an essential analysis required to show where the data should be sought. The fortunate situation wherein the evidence can first be collected and classified, and then a theory formulated, proved unsatisfactory in building analysis because of the difficulty of determining precisely what kind of data is to be recorded. A structure of theory, of however crude a kind, is therefore required before data-collecting can begin. The theory serves the purpose of priming the process. Once that has been done, however, there is no reason to maintain this order of procedure in the conclusions which follow.

ONE

As a preliminary observation, it is necessary to record that throughout this study, in contact with all sorts of individuals in the building industry, it has been repeatedly observed that there is an urgent need for greater precision of thought and expression. Many sections of the industry have no channels of communication with other sections, or if they have the channels, they are not articulate in the ways that are appropriate to their use. It is very difficult for an architect to communicate intelligently with a bricklayer, and it is no easier for the bricklayer to be sure that he can make his meaning clear to the architect (1). Failure of communication is not confined to building but is present in many aspects of our culture, and there is evidence that it is increasing. This is mentioned not in adverse criticism, but as a warning that we shall meet difficulties in communication when we try to collect data about building. It is therefore desirable to state data in mathematical or other unequivocal terms whenever possible.

TWO

In order to understand the sociology of building we must use the building itself as evidence. This evidence we must be careful to look at objectively, factually and scientifically, taking precautions against the danger of accepting as data explanations which we may read into the situation from our own experience. This danger is ever present because of the extreme difficulty of getting accurate information about vital decisions. It is a danger which has beset the study of building for a very long time, often in concealed ways. Of these concealed ways a very common one is the misreading of a simple institutional causation for an aesthetic intention. A safeguard against this is never to look for, much less accept, a psychological explanation until all efforts have failed to uncover a cultural explanation. This means we must not attribute a feature of a building to aesthetic intention

(1) Mere talking to a bricklayer on the site cannot be regarded as an adequate channel of communication. But even this is not as satisfactory as it might be because of differences of thought-habit, vocabulary and behaviour patterns.

until we are quite certain that it cannot be have been caused by the effects of legal controls, economics, convenience of erection etc., or a combination of these. By this technique the masking of objective fact by subjective response can largely be prevented. This does not imply the whittling away of the aesthetic content of a building: it merely means the accurate circumscribing of its legitimate field. <u>It is essential for the scientific analysis of building that aesthetic should be prevented from ramifying into areas of thinking where it has no place and where it can do positive harm by vitiating the thought-processes which are proper to these areas.</u>

<u>THREE</u>

In formulating a sociology of building a crucial difficulty is encountered in the problems connected with collecting the basic data. <u>The building itself is</u> the visible evidence: our difficulty lies in reading this evidence. The question which we must ask continually is: why is this aspect of the building like this? Our problem is to answer this question without ambiguity or guess, but with precision and certainty. This search for firmness leads us directly to the examination of the decision-making process, and it is a major conclusion that the essential data which we require will be found in this area. <u>The decision-making process is cardinal in examining building sociologically</u>.

<u>FOUR.</u>

In the decision-making process it is the conditioning factors of the decision which are significant. It is precisely these which it is difficult to isolate and record accurately, because of the nature of building which requires the efforts of many different individuals, the passage of considerable lengths of time and which has multiple connections with society at large. In terms of sociological method the primary difficulty is to discover how to obtain accurate information about the conditioning factors of any given decision. The technique of questionnaire, for example, is of little use because of difficulties such as the tendency to rationalise, desire to save face and the lapse of time between decision and questioning. At this present stage there appears <u>no other solution to this problem other than the collection of decision data by the individuals who make the decisions, at the time they make them</u>. This method, although presenting difficulties of training, availability of time and capacity for discriminating between the significant and the unimportant, alone seems capable of providing data whose authenticity can be relied upon. As a practical matter, we need individuals, architects, financiers, contractors, who will set about systematically collecting records of decisions just as botanists collect plant specimens.

FIVE.

In recording a decision the decision-maker, or the observer, should use a technique to include the following. All known factors influencing the decision should be recorded in the order in which they occurred to the decision-makers. This is important because of the light it may later shed on the reasons for the decision. These factors should be recorded as they appear and not later in the meeting or discussion when there may be a temptation to edit them or put them in 'logical' sequence. All preliminary decisions must be recorded, although they may have been later abandoned. The final decision in which action will be taken should be recorded together with a comment as to which factors have been the major influences on the decision and which have had no influence. Any attempts at rationalisation after the decision has been taken should be recorded. Where a conditioning factor is latent only and not manifest, such as a factor lying in the education of the architect, this should be recorded and supported with whatever evidence may be available.

SIX.

The sociological study of building requires a framework of sociological theory in order to give assurance that the total picture, and not just a part, is brought into, and held in view. It is essential that the subject should be safeguarded against narrow interpretations which can easily occur if sociological method is applied intensively to a part of the subject such as the users' requirements of buildings without an adequate background of theory. Sections of the subject must be seen in their relation to the whole and it may be suspected that many sections cannot be adequately dealt with except in this way. The architect's 'functional requirements of buildings' cannot in fact be taken very far without some concept of the total sociology of building for the very good reason that the building is in reciprocal relation with the culture as a whole.

SEVEN.

Any such framework is not to be regarded as absolute but only as a tool to be changed in the light of further knowledge. There are, no doubt, several ways of making a framework of this kind using the available concepts of the social sciences. The one used in this study, based on the idea of groups of institutions, although having certain limitations which are dealt with later, does successfully ensure that all aspects of the building and the building process can be categorised. This allows building to be examined systematically without the danger of major aspects being overlooked, and permits a paradigm of building to be formulated as a guide to decision-making on a rational basis, as a tool for seeing building in a balanced way as a whole, and as a method of applying scientific criticism to existing buildings.

EIGHT.

The framework used, consisting of institutions, change, status and role, needs in the next stage of research to be amplified by:

(1) A study of the interactions between the various institutional complexes.

(2) An attempt to describe the configuration of our culture in its relevance to building.

(3) A functional analysis of building in sociological terms.

These are major pieces of research required to refine the instrument. Their absence, however, at this stage does not in any way invalidate the effectiveness of the framework that has been developed, but these additions would allow the subject to be penetrated further in depth.

NINE.

The methodological purpose of the theoretical framework is to allow the data to be classified so that the true nature of the items of data can be recognised in whatever form they may appear. This allows the participants in building to realise the institutional group to which any aspect of the building or the process belongs and therefore to know how to act. Accurate classification along these lines should make it possible to rationalise the decision-making process and to construct logical procedures which will render some decisions virtually automatic. This is in line with the trend in other subjects, business, military studies and even politics, in which it seems likely that the advances in cybernetics, communication theory, neurology and psychology will make formalised decision techniques common practice in the next twenty or so years.

TEN.

Many decision-processes in building are at present too expensive and too often repetition of decision occurs because of the absence of systematisation and lack of the equipment necessary for economical decision-making. Many decisions are not intrinsically as difficult to take as they appear because of defective methods. Simplification of decision-making techniques for certain kinds of decision will be increasingly forced upon all participants in the building process by the rising cost of labour, whether that labour is high or low on the salary scale. What is operative as an economic pressure in the relationship between a routinised decision which can be arrived at very quickly and a decision which is a 'one off' and takes much longer.

ELEVEN.

That part of the research which dealt with the collection of data from the decision-making process brings out very forcibly the fact that not only is this process the key to obtaining the basic material evidence for the sociology of building, but also that it is the decision-making which is the most expensive, complex, non-rational and obscure part of the entire building process. Specialised techniques have been applied for some time to the problems connected with getting decisions carried out: improved office routines, improved communications, the standardisation of workshop practice, attention to managerial methods, work study and even techniques for psychological welfare. But no comparable advance has been made in the area of decision-making, which is now becoming disproportionate in cost. The question of the cost of decision-making is related closely to the time factor in building. As the building process takes longer in the preparatory effort necessary before site work can start and as building projects get larger in scale there will be increasing pressure on all concerned to speed up the process. This pressure will work together with the high cost of decision-making and will be a further inducement to the routinisation of as many decisions as possible.

TWELVE.

If decisions are to be increasingly taken over by formalised routines and electronic equipment such as computers, the question arises of how far these techniques can penetrate into the design process in building. We can already syphon off the 'fixed' decisions. In the long run we must be prepared to face the question of whether those decisions - often aesthetic - which are alleged to be taken intuitively can also be dealt with by some kind of machine. In support of this idea we have the views of some workers in cybernetics and other related fields that all processes of which the mind is capable can be reproduced by a machine. We do not readily accept this idea because it is contrary to certain elements in the cultural configuration of our society. We have institutionalised a dichotomy between the rational and the intuitive; between the scientific and the artistic; between the physical and the spiritual. But these dichotomies are cultural and can be explained by reference to the nature of our culture. There is no proof that they are psychological antitheses arising from the basic nature of man unconditioned by cultural factors. If this is true, there is no reason to suppose that in theory a 'machine' cannot be made which would be capable of taking decisions in the aesthetic field of building.

THIRTEEN.

The use of computers is now common in scientific, military, business, engineering, accountancy and actuarial fields. An advantage of the computer is not only that it is faster and therefore allows calculations to be made which would have otherwise taken too long to be useful, but also that it allows new refinements of relationships to be stated mathematically. This will have an important bearing on the financial aspects of building, since it will make possible a much closer analysis of the comparative costs of alternative methods of design. This is very difficult to do for a major building project at present because of the multiplicity of relationships between the various possibilities of materials and methods etc. The computer is well suited to this kind of refined calculation and can provide the answers quickly enough for them to be used. A trend in this direction appears inevitable.

FOURTEEN.

Decisions can be divided into two classes: those that depend on fixed items and which are made outside the individuals and groups concerned with building, and those which allow options to these individuals and groups concerned with building, and those which allow options to these individuals and groups. The fixed decisions are those 'given' by laws, by-laws and other statutory enactments which permit of no variation. Decisions of this kind can be modified only through the institutionalised machinery set up for change by the society. In practical life the time taken for such a procedure [illegible] to operate is so lengthy that such decisions are are effectively regarded as fixed. Decisions which are 'open' concern such things as structural methods, materials, clients' requirements, choice of contractor or of method of selecting him, symbol, aesthetic. Both kinds of decision are important sociologically, the first kind because of their relation to the structure of society and the second because of their particular significance in regard to the behaviour of individuals when presented with alternative possibilities of decision.

FIFTEEN

Those decisions for which there are options may be graded according to the breadth of option presenting itself. The architect, faced with the problem of choosing a wall-cladding material for a block of flats, may appear to have many possibilities open to him. In fact, however, the economics of the situation, the availability of the various alternative materials, speed of erection and many other factors may limit his effective choice very severely. It is very important, therefore, when trying to understand how a building comes to be built as it is, to find the degrees of restriction on the optional decisions of the designer. These restrictions, taken with those decisions which are outside the designer's power to change, may indicate that the designer has had very little scope indeed for choice. This may well be the case for such building-types as multi-story flats and offices built in high density city locations, and such a diagnosis would lead us to suspect that we cannot look for an improvement in building through any single specific approach, such as a change in the education of the architect, but must have regard to the total sociological situation of the whole building process.

SIXTEEN

The areas in which decisions have to be made in building are not constant. The Gothic architect had no problem of selecting a style for his building. The Roman architect had only two major structural systems from which to choose. In many periods and places such things as style, materials, decoration, scale, finishes and colours have been largely fixed for architect, builder and craftsman. We may therefore conclude that, after allowing due latitude for the availability of materials and variations in physical conditions like climate, the areas of decision in building are culturally determined. If the culture is not highly developed technologically we may expect decisions to be required only within narrow limits. If the culture is very highly developed in its technologies we may expect a corresponding widening of the field of decision. Because of the rapidly accelerating pace of our technology it is predictable that the field within which any building decision is to be taken will become progressively larger and the decision therefore more difficult and possibly slower. This may lead to the designer imposing self-limitation of choice upon himself. Such a solution cannot in the long run be satisfactory because of the many points of contact between building and the culture as a whole. It could lead, if generally practised by designers, to an ossification of building, and to the institutions and mores connected with it being converted into a sub-culture within the larger configuration.

SEVENTEEN

In collecting the data for the decision-making process it has been observable that confusion of thought and lack of understanding of the real nature of the conditioning factors of decision are often present. It is also observable that these characteristics are not necessarily due to a lack of intelligence on the part of the decision-makers. It rather appears that confusion in the process is to be laid at the door of a total social situation which, particularly in a time of rapid change, has in it many contradictory and even irreconcilable elements. Thus in a period of heavy emphasis on the legal control of the individual's actions we must inevitably find laws and by-laws which are incompatible in letter and intention; under conditions of rapid technical change we must encounter at the decision stage a situation of lag in some of the conditioning factors; we must expect to find different emphases in the interpretation of the individual's role in a culture in which status is achieved and not ascribed and therefore is in some of its aspects ambiguous. These difficulties, appearing as problems to the decision-maker, are integral parts of the decision situation, and they cannot be avoided. The decision-maker cannot put them aside as having no bearing on his subject without running the risk of making a decision which will be inadequate to meet the cultural situation. Nor can the decision-maker 'put society right' so that these difficulties do not constitute a part of his decision. The decision-maker can, however, take steps to comprehend the nature of these difficulties and to understand the cultural and sociological reasons for their presence. Such knowledge would safeguard him against irrational responses to stimuli he does not understand, and would allow him to direct his energies intelligently to specific goals. The conclusion seems inescapable that decisions taken on the basis of the hunch will give increasingly poor results in decision-making, and that, if it is therefore admitted that the decision-maker must approach the decision rationally, he must be equipped with an adequate knowledge of the sociology of the situation within which he must perform. This does not eliminate the need for good judgment; its purpose is to ensure that the material on which the good judgment must work is sound and complete.

EIGHTEEN.

Conscious comprehension of the nature and working of the institutional order is particularly significant for education in building. Architectural education has graduated from the simple inculcation of behaviour patterns to the so-called rational approach whereby the student is taught to review the facts available, to consider the options which present themselves and to select from the various possibilities a solution which can be defended by rational argument. This is an advance on the older approach, but we must still remember that this method is itself an institutional structure and that therefore the student is not consciously being informed about the institutional order as a whole. The educational approach remains largely locked 'blind' in the institutional situation and in this respect it is just as 'advanced' or 'retarded' as the society itself. It is not therefore to be expected that meaningful progress will be made in building by way of architectural education until this is realised and corrected. It must also be said that if this *is* corrected a major change in the very nature of education will be involved, since education, thus far, in our societal development, has served the essential purpose of conserving.

NINETEEN.

If we wish to break through this educational ceiling it is possible we might do so by basing architectural training on the sociology of building.

If this were done, it would mean that the student would have to be thoroughly exposed to the subject, particularly to the institutional side of it, and he would have to be trained to approach all action analytically. This means in educational matters a rigorous intellectual and scientific approach of a kind which would not fit into the present irrational mixture of science, tradition and professional expertise. The approach also has the difficulty that it would not produce the type of professional individual that has come to be expected and therefore resistance from the profession would be inevitable, since reality and image would not coincide. On the other hand the method might well open doors to new knowledge. As the idea that architectural education could be based on a sociology of building is only a by-product of this study, this is not the place to pursue the question of how it could be done in detail. But the guess may be hazarded that it would revolutionise the general approach and would perhaps put some armour on the Achilles' heel of architectural education: the theory of design.

TWENTY.

There is much to be said for the view that the scientific institutional complex is more important to building in the present context of rapid technical and social change than is the educational complex. Rapid adjustment to change seems more likely to take place in the scientific institutions than in the educational, because the latter are very closely tied to the status quo by way of controlling associations such as professional, political and business groups whose interests are entrenched and whose resistance may be the cause of serious lag in the institutional order. It therefore seems desirable that much more scientific work should be done in building and for this purpose we should greatly increase the amount of research work and, most important, should encourage a climate of opinion in which research has increasingly good standing. We should also consider whether post-graduate education for members of the building team should not be carried out in scientific rather than educational organisations, in order to obtain the benefits of a more favourable institutional situation.

TWENTY-ONE

The fact that we have been able to show that the building has a separate and independent relationship with six different groups of institutions (own complex, economic, governmental, scientific, educational and expressional) leads to the conclusion that building is more widely and deeply involved with the institutional structure of society than are some other activities, such as for example, the manufacture of motorcars or the distribution of food. It is not possible to measure the degree of involvement mathematically, but it seems reasonable to say that building is one of the most deeply involved of all human activities with the institutional order, and to conclude from this than an appreciation of the nature and working of the institutions is of particular importance both to an understanding of building and to action in this context. In a homogeneous society with a slow rate of change such an understanding can be largely subconscious without loss of effectiveness. The institutional pattern is learned, as it were by rote, by the individual and he follows it implicitly. In a society in which change is rapid the pattern becomes blurred and definition must be given by specific, conscious comprehension. The more complex the institutional situation the more important this is. In building it means that the individual must not be taught a beahviour pattern 'blind' - even the pattern of rational approach to his problems since this is also an institutional structure - but he must be helped to understand how and why the pattern comes to be what it is and to learn how it intersects with other patterns.

TWENTY-TWO.

The building is institutionally defined in its plan-form. The plan may be regarded as an institutional pattern. We must note, however, that the patterns which the institutions give us do not exist for new building-types. These new plan patterns are developed either on largely rational lines or by the process of modifying an existing and already known pattern.

TWENTY-THREE.

The building is institutionally defined in its appearance. This means that we have expectations of what a building's appearance should be. Even the expectation that it should be novel or original may be institutionally determined. The uses of materials are controlled largely by the institutional order both in respect of the purposes and methods of use and the combination of materials. Appearance covers both the symbol and the aesthetic aspect of building. Symbol must be generally accepted by the society, and therefore institutionalised in its form, if it is to be recognisable. The aesthetic content is perhaps the most highly institutionalised of all the elements in building. Failure in this direction means that the aesthetic becomes esoteric and moves out of the orbit of the generally acceptable. There can be aesthetic meaning only provided there is firm societal agreement about the words of the language used and about what is to be expressed.

TWENTY-FOUR.

Building procedures are institutionalised in the same way that are procedures in other departments of life. By this means the expectations of behaviour are met and permanence and stability are given to the behaviour patterns. One of our major problems is that in a period of rapid change these behaviour patterns have to be modified too hastily, with the result that the precise details of the new behaviour are not adequately diffused. This means that expectation is blurred and therefore performance is less certain. This difficulty militates against our constant need for ever more accurate and longer term prediction. For adequate prediction we need very precise behaviour patterns. Because of change this is difficult. We have here a serious dilemma of our age.

TWENTY-FIVE.

In the context of our society with its trend toward larger and larger economic, political and military blocks, its increasing scale of production and use of large units of capital, prediction of trends will become increasingly important. This prediction must become more and more accurate and fast, and it must be effective over longer and longer periods into the future. This may tend to make building more predictably successful, but may also tend to eliminate the speculative element in building. The aim, from a business point of view in our culture, is to find an area of profit whilst diminishing the risk to a minimum. If accurate prediction becomes possible the tendency will be for risk to be reduced or virtually eliminated. This may sound attractive, but it is risk which often makes profit possible. If the hope of profit is reduced, then so is the inducement to initiate and we are faced with a situation in which playing safe may lead to stagnation. And stagnation appears to be the death of our high-production, high-consumption kind of economy.

TWENTY-SIX.

From the institutional analysis it emerges clearly that building is involved with so many aspects of the total culture that it must be regarded as a product of the whole society and not only of restricted parts of it. Building is not, like the atom bomb, overwhelmingly a product of our technology. It is possible, however, that building will move increasingly into the technological area of our culture, and we may already be able to isolate factors indicating a trend away from building resting in the total culture to its being more narrowly based in technology. There are various pressures in our society which would accelerate such a trend if it became firmly enough established. Of these pressures not the least important is our high and rising standard of living which is progressively pricing individual craft work out of the market. This must force an increasing amount of all aspects of labour in the building process, from that of designer downward, first into the hands of the less skilled worker, and as he is progressively eliminated, into the automated factory. When this stage is reached we shall be producing new kinds of building and shall be developing new attitudes toward buildings. Perhaps we shall come to regard buildings in very much the same way that we view motorcars: expendable, quickly dated, an important staple of the economy, of aesthetic interest but not major works of art.

TWENTY-SEVEN.

This leads to the question of whether the building, considered by itself, may be of declining importance as a work of art. The question of whether the building is to be viewed as an opportunity for the major artist is a matter of social decision. There is some evidence that with the increase in mobility the building is diminishing in potential aesthetic appeal. Its place may be being taken by the aesthetic of motion (by whatever kind of vehicle) through the landscape or townscape. If this is a trend, and this idea is only tentative, it will be necessary for us to attach the aesthetic of building to the larger prospect: to the sweep of the vehicle moving at high speed across the landscape. Cultures place their aesthetic emphases in different areas: we still have to find the area preferred by our culture. It is probably not in building, but it may prove to be an area in which building can be of significance.

TWENTY-EIGHT.

Any culture in any age has certain nodal points around which its psychological energies are nucleated. In our time and culture these are perhaps: space flight; atomic investigation and the application of the findings; the research in genetics; the research into the nature of the brain, nervous system and thought itself by neurology, psychology, semantics and cybernetics; and the developments in electronics - automation, computing equipment and thinking machines. These things will increasingly stir the imaginations of the generations to come: these are the nodes of future psychological nucleation. The days in which the society at large can feel any thrill about buildings are most likely gone. The emphasis of the culture is in other directions. This means, among other things, that the best brains will tend to be attracted into subjects other than those connected with building. This trend is already with us in the shape of tremendous competition by students to favour these subjects which are the darlings of the age. <u>The only way of bringing building into the psychologically dominant sphere of our culture would appear to lie in the direction of a totally new approach to building, using all the potential of our culture to this end</u>.

<u>TWENTY-NINE</u>.

In addition to the nodal points mentioned in the last section we must note the rising interest in the social sciences. As science and applied science advance with increasing rapidity, the lag which exists in the non-scientific sectors of the culture must become progressively obvious and increasingly embarrassing. The idea is already common that our political ability falls far short of our technical skill in armament production. It is clear that we know a great deal more about the world of physical phenomena than we do about the nature and structure of human society. <u>The development of applied science in the technologies must increasingly force the attention of our society into the areas of knowledge in which lag exists - the sciences dealing with man himself - because it will be in these areas that our failures will multiply</u>.

<u>THIRTY</u>.

<u>Institutions do not 'progress' as does science.</u> That is to say change in an institution is not of the same order as the change in scientific theory brought about by the discovery of a new fact. The new fact can be verified; it can be shown that it does not fit into the present theory, and the theory

can be modified, in a self-proving way, to accommodate the new fact. There does not seem any indication whatever that there is in the nature of the institutional structure of society any similar self-proving system of advance. An institutional situation may be modified but there is nothing to compel improvement of a self-evident kind. For this reason it is very important for building that scientific tools should be applied to the whole institutional structure of society. Only by the acquisition of scientific knowledge about our institutional order can we hope to provide the essential data on which the value judgments necessary for meaningful societal improvement can be based.

THIRTY-ONE.

Equally with institutions, aesthetic standards do not 'progress'. It may be questioned whether in aesthetic content our painting has advanced at all since palaeolithic man. This factor is very important when we remember the heavy scientific emphasis of our culture. We are ready to accept a scientifically authenticated fact, but we find difficulty in understanding the aesthetic and can find no common ground in the culture for universal agreement. As a result, aesthetic expression is retreating into increasingly fragmented sectors which have meaning only for small groups and not for society as a whole. This very much weakens all those who are in any way involved with aesthetic, particularly vis-a-vis the self-proving progress of the scientists. In terms of building, the significance of this situation lies in the sphere of the architect. He seems only able to match the discoveries of science with the arbitrary swings of largely private aesthetic preference. In such a contest there is no doubt who will win. The sociology of the aesthetic in our time is a major subject for research.

THIRTY-TWO.

In a similar way it is doubtful whether there is very much progress in our general attitude toward design as a whole. We like to think that there is development in a direction vaguely hoped to be good. We must bear in mind in this connection the tendency toward illogical exaggeration which is a characteristic of human cultures. We sometimes develop an idea reasonably up to a certain point and then encourage it to ramify into areas where it has no logical use. Glass facades to domestic buildings are perhaps of this kind. The light-weight all-glass facade is a very intelligent answer to the problem of cladding the skyscraper, but when it appears in house design by a sort of process of infection we must look for explanations other than reason. There are those who think that in general our culture moves in the direction of increasing rationality. It would be difficult to show this in terms of the building activity of, say, the last fifty years. The conclusion is forced on the observer that many elements of the building are the result not of rational analysis but of arbitrary preference based on little more than swings of fashion.

THIRTY-THREE.

The dichotomy between art and science is of diminishing meaning in a cultural configuration which is changing rapidly in the direction of accepting the scientific world-theory. If, as the evidence strongly suggests, we are in the process of abandoning the cultural pattern which has been the shape of European culture since Graeco-Roman times and the world view which is the characteristic of that pattern, and in exchange are putting in its place a humanist world view based on the validity of science, the dichotomy science-art will disappear and art will become both a product and an expression of the new world-theory. In cultural terms, the history of the last few centuries certainly shows trends involving the capture by the new world view of an increasing number of areas of the old cultural pattern. Increasingly sections of the culture once dominated by intuition, hunch, precedent and custom have surrendered, and it seems likely that our culture is in the process of evolving a unitary world order based on science. It goes without saying that we shall not like this change and that we shall resist it. In building this resistance may take the form of increasingly hectic plunges into esoteric aesthetic attempts to deny the validity of the new cultural pattern. Such attempts will be mere reactions, each a contra-oscillation to the last. In the end there must emerge an aesthetic based in the new cultural pattern and of validity to the society as a whole. Reformulation may well take place on a very much lowered level, when regarded from certain viewpoints in our present culture.

The need for a systematic aetiology of building form is brought out by the institutional analysis. Only if we understand exactly how a building form has come to be, can we comprehend building in a balanced way. The recording of change as a method of approach to the history of building is not therefore adequate by itself. We must seek out all the factors that bring a change about if we are to achieve a real understanding of how building forms come into being, change and finally disappear. We must recognise the symptoms and understand the causes.

THIRTY-FOUR.

Change, whether in the technical or the social sphere, raises the question of desirability. Are we to regard a given change as good and therefore assist it, or if we regard it as bad, are we to resist it? This is a very major question, having many aspects. One aspect concerns our ability to arrive at an adequate evaluation. It is easy to have an opinion; but there is no proof that the opinion held is relevant to the change considered. For example, we might compare cities of today with towns of yesterday and, bearing mind the change to rapid transport, suburban living, commuting, civic consciousness, noise, boredom and juvenile delinquency/ might conclude that the changes that have taken place in the urban environment in, say, the last hundred should have been resisted. But such a point of view would be ridiculous. On the counts of health, longevity, education, conditions of work, opportunities for leisure, housing accommodation, wealth, reduction of destitution the city is an incomparably better place for far larger populations than it was. Yet many changes connected with these improvements were resisted for often what appeared to be good reasons. A major conclusion, therefore, in this matter of value judgments is to question our capacity, particularly in a time of rapid and widespread change, to arrive at value judgments that are sound. Obvious conclusions are especially likely to be suspect. A second aspect concerns the goals of society. What are these? How can we understand them? How can we modify them? And in what direction? It is a task of the social sciences to expose the goals and to bring to light trends, contradictions and anomalies.

THIRTY-FIVE.

The tacit assumption in architecture that we are moving toward something better needs examination. It is part of the ethos of the time. The rapidity of change in other parts of the culture will tend to increase the speed of change in building and we may already be in a situation where we are ready to encourage change for no better reason than that everything else is in flux. An important piece of needed research in this regard is an examination of the attitudes toward the various building-types in different cultures, particularly in respect of the influences that these attitudes have on building design.

THIRTY-SIX.

There is a good deal of evidence of lag and resistance to change throughout the building industry. As lags increase areas of potentially greater profit than normal will appear and will attract attention. As such areas are increasingly worked in the lags will be diminished. The span in which this situation exists extends from the formation of the architect by his formal and informal education, through the organisation of the construction industry, to the operative on the site. The area which building occupies in the culture as a whole is so large that any elements in building which show lag for too long will run the risk of loosing their place and will find that their previously enjoyed monopoly of an institutionally held position is not merely challenged but has actually disappeared. The craft union which is too rigid in its attitudes may lose completely by indirectly forcing the emergence of alternative methods which bypass the union altogether. The architect is also in this position. Excessive rigidity may loose the design of building to him and put it in the hands of others who are better related to the actual institutional situation. Change may be resisted, but history is littered with lost causes.

THIRTY-SEVEN.

The effect of persistence, rigidity and lag in the present cultural context is to protect the existing anachronistic system of building. The whole system is such a complex web of institutional relationships that the perpetuation of situations which in other departments of life have long since suffered change is made possible. It may be predicted, perhaps, that this situation will alter with increasing rapidity as change takes place in more and more aspects of building. There will come a point in this process where the balance of rigidity and lag is so diminished that the remaining areas due for change succumb with even greater speed. This will mean even greater strain will be placed on individuals subjected to the increasing pressures. The sooner, therefore we can build into our educational system a specific method of inculcating the idea that change is normal and must be adjusted to the sooner we shall have a building industry with a coherent institutional and attitudinal structure capable of matching the levels reached by other sections of the culture. We need not worry too much about the problem of resisting what we may regard as undesirable change. We find resistance to change relatively easy; this presents little difficulty. Adjustment to change, however, we find difficult and it is in this direction that we have to bend our efforts. Many of our troubles clearly stem not from failing to resist change but from an incapacity to adjust to change that has already happened and which we are powerless to modify.

THIRTY-EIGHT.

As far as the architect is concerned there emerges from the research as a whole the conclusion that it is no longer adequate for the architect to respond in a routine and stereotyped way to any institutional situation. Responses that have been learned by rote are likely to be increasingly unrelated to the behaviour demanded by the institutional situation and therefore to prove non-effective. The alternative open to the architect is the conscious comprehension of the institutional situation. This means that he must be able to understand in specific terms what is happening, must be able to classify it and relate it logically to other similar situations. In order to do this the architect needs knowledge of the social sciences. He requires some acquaintance with the methods of sociology, social anthropology and social psychology if he is to replace 'intuitive' and learned responses which may be no longer appropriate, by responses based on specific, conscious, analytical thinking.

THIRTY-NINE.

The idea that the architect needs sociology in order to understand how people act and how they may be expected to behave in his buildings is sound provided it is understood that this aspect is only a very small and limited part of the total sociology of building. Without the rest of the subject, this part has some but not very great, value and it has the difficulty that those problems which unavoidably arise in this limited field cannot be fully comprehended without knowledge of the larger configuration to which they belong. We must not, therefore, think that we can advance very far simply on the basis of examining human behaviour in the narrow context of what the architect sometimes terms the 'functional requirements of buildings'. The present trend of research in this direction is wholly good as a limited objective and provided that it does not engender disillusionment at a later stage when it is found that human behaviour cannot be confined to the way people act but is deeply involved in goals, value judgments, attitudes - in short to the whole on-going process of society. Nothing less that a total sociology of building is adequate as a background for such research, and it is highly doubtful in the long run whether such research can make a very significant contribution unless it is so based.

FORTY.

Building is the only major industry in which design and production are completely separated. In a society so heavily dependent on industry for its life, this is a very curious fact. It is still more remarkable when it is remembered that our industrial activity is based on economic competition - that is to say the units of production must be financially viable to continue their existence. This is in contrast with an economy in which financial viability is not the determining factor of continued activity. In reciprocal relation to this fact of separation of design and production is the fact that the architect stands almost entirely outside the production system of manufacturing industry, does not understand it and in the main does not feel very much sympathy with it. It is fair to say, therefore, that he is alienated from one of the great structural features of his society. Yet in spite of this he is dealing with products of the system and is therefore directing the disposal of a considerable part of the national wealth. The question to be answered is whether the architect can long survive in a situation of this kind without very drastic changes in his education, his attitude to industry and even in his aloof professional independence which, whilst having certain moral advantages, perpetuates dichotomies in the industry which the trend of events may well render impossible to maintain.

FORTY-ONE.

The manager is one of the power nodes of our society. His are the day-to-day decisions which the vast mass of people have to carry out in their daily work. This is a highly characteristic fact of our cultural configuration. The managers have prestige, power and reasonable wealth. The role is well defined as a major channel along which economic and social power can be manifestly seen to flow. Inasmuch as the architect conforms to the same pattern of behaviour and can be seen to perform the same function - the managerial function - he will be comprehensible to his fellows and will be accorded a similar status and prestige. In our culture here lies an avenue of success for the architect. As administrator and executive he can be understood, fitted in a niche and accepted as a reliable player of the institutionally defined role.

FORTY-TWO.

The architect himself, however, is rarely able to accept this role whole-heartedly and with singleness of mind. He is educated not only to this role (not very well), but also to the role of creative artist. This is a role toward which society at large has an ambivalent attitude. On the one hand the culture approves the artist because of his aspirations and his ability to move aesthetically. On the other hand it stereotypes him as erratic, unreliable, dreamy, unknowledgeable about the affairs of the world. In brief it categorises him as the opposite of the dominant stereotype of our culture: the successful, the efficient, reliable, the energetic and the businesslike. One feels, rather than defines, in the opposition of these two stereotypes a major structural characteristic of our society - an attribution to cultural rather than psychological factors. Whatever this rift, or contradiction may be, it is clear that the architect is caught across it. Society casts him in the role of manager and in the role of creative artist. Society also puts these two at opposite poles, with strong approval for the one and ambiguous approval-disapproval for the other. The individual architect is thus caught in an institutional situation which must inevitably dissipate his energies rather than focus them effectively on the attainment of a clearly defined position of acquirable status and prestige.

FORTY-THREE.

The broad, overall question, therefore, that the architect must ask himself is where does he fit in society? Creative artist, manager, engineer, industrial designer, co-ordinator of the work of others? Into what part of our cultural pattern can the architect's interest in bringing order and beauty to the physical environment be fitted so that he can be effective as an individual in the institutional framework and so that society can ensure for itself that the most is made of the potential benefits that the architect could bring if the structural difficulties of his situation were corrected? That situation is now unquestionably deteriorating because of the pressure of technological and social change. Nor is there any indication that the mere passing of time will improve matters. The architect is in very serious danger of progressive alienation from his society, and this in an economically competitive culture means extinction. Others will be seen to perform his roles more effectively; others will try to capture his roles from him.

FORTY-FOUR.

Clarification of the architect's role could come from the architects themselves. But for this to happen the architects would first have to agree amongst themselves on the role to be aimed for and secondly they would have to stick to that role in practice. This would need enforcement by some kind of authority along lines altogether more narrow probably than those at present followed by professional bodies in the western world. In spite of the pessimistic view that must be taken of the likelihood of anything of this sort actually happening, it is probable that a great deal could be done by the architects agreeing on a clearly and precisely defined role for themselves and attempting consistently for a number of years to project themselves in the image of that role.

FORTY-FIVE

In the definition of his role the architect faces in the present cultural situation the difficulty that his work situation is deteriorating. The rapid developments of technology present him with an increasingly large array of new materials, and methods. With these he is ill-suited to deal either by education, or experience and his lack of contact with the realities of manufacture complicate matters further. The increasing speed of operations in our society is another factor causing difficulty. Whilst the design of buildings gets more complicated and therefore takes longer we find an increasingly insistent demand for speed of preparation and erection. This trend will force the architect toward greater emphasis on management and techniques of action, with possible detriment of the quality of the design of his buildings.

FORTY-SIX.

The body of knowledge being developed by sociologists could be of assistance to the architect in general by alerting him to situations where he is in danger of making decisions which may prove socially disastrous. In particular it can provide him with tools for dealing with specific problems: systematic knowledge of how people behave and why they act in the ways they do; techniques for examining situations methodically; ways of identifying the general principles of a situation from the particular evidence. The use of such tools would allow the architect to recognise the real nature of a given situation and enable him to assess its value with a great deal more accuracy than rule of thumb or hunch.

FORTY-SEVEN.

For this to be effective the architect must first of all acquire some knowledge of the body of thought which he is going to use. In his formal education the architect receives no systematic training in the social sciences, but does have some contact with particular aspects of them. If, however, he wishes to benefit seriously from them he must first learn. Secondly the architect cannot hope to fill both his own role and that of the sociologist - especially as there is evidence to suggest that the architect is trying to be too many things already. For the potentialities of sociology to building to be fully developed requires the services of the sociologist himself inside the building team. He must be present from the beginning of the project and he must continue his research on it long after the architect has handed the building over and its occupants have well settled down to its use. It is doubtful whether the sociologist can make his weight adequately felt if he is solely used in an advisory capacity. The sociologist is not trained to action in the way that the architect is and is not accustomed to the same day-to-day pressure of action. This pressure is an undoubted major cause of hasty and wrong decision by the architect and it might therefore be argued that what is wanted is a sociologist who is not subject to these pressures to redress the balance. The problem, however, lies in the fact that pressures and the unavoidability of responsibility have a constantly moulding effect on the judgment, without which the judgment may be unable to operate in terms of the actual situation. A solution seems to be team work (not committee work) in which the sociologist might be given a clearly defined sector of responsibility in the form of actual decision-making. Collective decision-making, as in the committee, is no use for this purpose because the benefits of the decision-making pressure playing upon the individual are lost. It would seem that the individual must be kept steadily under the pressure of decision-making, if his judgment is to remain in reasonable accord with the institutional situations in which he has to act. In practice this means that the architect would have to give up some of his authority to the sociologist. But is this any more difficult than his yielding to the structural or heating engineer? In basic logic it is not. In the existing institutional situation, however, there is an important difference: if the structure of a building is seriously defective our values system looks for someone to blame and punish: if the failure, however, is of a sociological order such as inadequate planning for the use of the building, we tend not to take it so seriously and have no organised method of dealing with the offender. This misvalue clearly needs correction and the sociologists can render an important service to society by continuing to point out, on the basis of scientific research, failures in building and lay-out which may be categorised as sociological. To be fully effective, however, in bringing their weight to bear on this lag in our values system they must ultimately also enter the fray of direct participation in the decision-making process of building and planning.

FORTY-NINE.

In addition to his contribution to the building the sociologist could greatly assist the architect to an understanding of his own situation. It is perhaps not too soon to suggest that if the architect is serious in wishing to discover what role he can perform and how he can serve society effectively he should take advice from the sociologist. He could analyse the architect's position in society with an unbiased view. On the basis of such a view a realisable role and status might be formulated for the architect and some of the contradictions and ambivalences of his position eliminated. The benefits of a dispassionate investigation into architectural education by sociologists would appear to be enormous. What is urgently needed is a study of the sociology of architectural education as a preliminary to measures for improving it. If the sociology of the architect's education is not understood it is impossible to achieve very much in improvement except fortuitously. Such a study would also bring to the surface items of specific interest, such as, for example, the reasons why the architect's intellectual contribution to his time is so poor, or why it is that the profession has developed no refined techniques for the selection of individuals for either private commissions or public appointments.

FIFTY.

The problems of the architect brought out by the research lead to the question of how should the architect reorient himself? On the evidence presented, different views might be put forward. The following remarks are therefore of the order of a personal value judgment. The most important points for reorientation are perhaps towards greater integrity and a much greater emphasis on the intellectual content of the subject. These two are very closely connected since the intellectual interest is not in the long run to be improved unless it is disinterested. Intellectual interest directed to professional ends - increased practice or greater expertise - will be self-defeating both for the individual and the profession as a whole. Thirdly, the architect must take steps to prevent his further alienation from his society and to reduce the present gap. Fourthly he must use what the social sciences have to offer. Fifthly, he must find his role in the new cultural configuration. This may mean an abandonment of his previous views on aesthetic and its purpose.

FIFTY-ONE.

The original terms of reference of this research were somewhat different from those which have in fact been used. The study started with the intention of 'examining the sociological determinants of building and city planning'. After a certain amount of work had been done it was discovered that the aim could not be intelligently framed in those words or with that basic concept, and there was the problem of reformulation in terms which would continue to be meaningful as the study unfolded (2). At the completion of the study it is possible to say that the original intention is covered very simply by 'the sociology of building'. The need is to see in detail how the building is immanent in the culture: how it serves society and is at the same time an indispensable product of it; how the nature of the on-going social process influences the building and also how the building helps to make that very process viable; how we build not necessarily what the society

(2) I am indebted to R. Glass and J. Madge for assistance in helping to formulate the aim of the research in more satisfactory terms.

needs for utility, but what the cultural configuration permits or demands; how we build not necessarily rationally in reference to what is convenient or useful, but logically in terms of the institutional apparatus of our society. There are no sociological determinants of building: the idea cannot be expressed in this way. There is society and there is building. The question may therefore be rephrased: how are society and building related? This is the sociology of building and nothing less than this is required if we are to build effectively. The most important conclusion of this study is therefore that OUR URGENT NEED IS FOR A COMPREHENSIVE SOCIOLOGY OF BUILDING.

APPENDIX 1.

CASE STUDY : PRELIMINARY DATA

Building Type.	Recreational. A bar for public use on a county cricket ground in Britain.
Stated Purposes.	To replace dilapidated existing bar, which was a temporary wooden building. To provide an attraction which would enlarge attendances at fixtures and thereby increase the club's revenue. To provide alcoholic and non-alcoholic refreshment to members of the public watching the cricket matches.
Client Type.	A small committee, but effectively the chairman of the club and the chairman of the supporters' club. Communication was by informal contact.
Brief.	To provide the largest covered space for the money available (initially £3,500, later increased to £4,500). The money to be provided from the profits of a football club run by the supporters' club. Very rapid completion for the opening of the season was stipulated.
Control by Client.	The size of the building, its form and materials were left entirely to the architect.
Cost Control.	This was not asked for by the client but was used by the architect to keep reasonably within the budget and in order to obtain the best appearance for the building that the money would allow.
Comment.	It will be noted that the example chosen is a small and very simple building. The reason for this is the desire to achieve as brief a case study as possible. The case study for a major building would be very large and would not, because of mere size, be any more instructive as an illustration of the thesis, than that of a small building. The reader will probably find the case study tedious to read because of its detail. Unfortunately there is no escape from the fact that the collecting of such data is a tedious process, and the pages which follow should be viewed in much the same light as a collection of specimens in the natural sciences.

CASE STUDY : LOG OF JOB AND BRIEF COMMENT.

(Each event was recorded immediately after taking place. The events are logged in chronological order.)

1. Architect instructed to prepare plans for a building on a site separated from the cricket pitch by a service track. Architect decides to put the building up on stilts because he considers good vision essential. He thinks in terms of a prefabricated building to keep costs low, and prepares the first sketch scheme: Fig. A.

   Architect's choice of a certain kind of prefabricated concrete building determined by previous success that he had had with this type of building when used for a golf club house. This previous success, backed up by considerations of low cost and quick erection, was the essential point of departure in beginning the design of the cricket club bar.

2. The client changes the site and the need for stilts falls away. Architect further considers prefabricated buildings. He rules out timber buildings because 'we don't want it said that we have given them another hut: it must be a permanent-looking building.'

   Here there was an implied judgment that in the public's view timber prefabricated buildings are only huts. No doubt 'timber building' does mean 'inferior substitute' to many people in Britain.

3. Architect designs building using only the prefabricated units manufactured by the concrete firm previously used. This is planned on a 9'-0' module and has a pitched asbestos roof: Fig. B. The drawing is sent to the concrete firm for detailed design and costing. The firm replies by sending only their stock drawing for a sports pavilion. This is quite unsuitable, largely on grounds of appearance.

   This highlights the problem of prefabrication of whole buildings. Any departure from the rigid standard is discouraged, presumably because to depart is to put up costs without necessarily earning commensurate profits. In this case, however, serious departure was not intended since the proposal was to reassemble the standard parts into a non-standard whole. The failure of the firm to respond with some effort at costing the proposed design may perhaps, therefore, be attributable to business inertia.

4. Architect again attempts to design to the standard units using a bay dimension of 6'-0' as this is stated by the concrete firm to be their economic limit. This module gives unsatisfactory elevational proportions and the cill height has to be 3'-3" which is too high to see out when

sitting in a chair. These difficulties are pointed out to the concrete firm, who make only the feeblest attempt to modify their standard parts. The architect now abandons this system of prefabrication. Fig. C.

> Poor salesmanship was a major factor here in the ultimate rejection of the prefabricated system. Had a reasonably helpful response been forthcoming the building would probably have gone up in this system as the architect was familiar with it and well disposed towards it. Possibly an institutional rigidity is detectable in the firm. It is clear that serial production of building parts imposes limitation on the number and variety of parts which can be offered, but failure to combine the available parts into new wholes is not prevented by the nature of serial production. This can only be interpreted as a rigidity of approach and lack of competition.

5. Now freed from the shackles of a prefabricated building system the architect develops a building section with monopitch roof and purpose-made elements. The monopitch is selected on the grounds of aesthetic suitability and the desire to put up an "interesting building": Fig. D. Bitumetal (aluminium sheeting and bitumen roofing felt) selected as safe against cricket balls. The following roof support systems were examined for cost, speed of erection and appearance: Trofdek, Secodek, wire-weld beams and conventional steel sections. All left problems unsolved.

> Once having shaken off the idea of using a prefabricated building system, the architect's training allows him to see the possibilities of the building and its site, and to approach the problem on an altogether higher level. The advertisement value to the architect is also not missed. He does, however, miss the fact that the plan form could now be released from the straightjacket of the simple rectangle. This idea remains as a hangover from the prefabricated project. What has happened is that the architect has approached structure and materials afresh, but he has not been able to be so sweeping with the plan form.

6. Quantity Surveyor asked to estimate approximate cost of new scheme. The builder (already selected on the basis of his capacity to do a good job rapidly) also asked to estimate roughly. As a result the architect is satisfied that the cost will not be seriously greater than for the prefabricated building. Prefabrication is now finally abandoned because of poor salesmanship, low aesthetic value and no apparent advantages.

> The architect thinks he has now solved his three main problems: (1) good appearance (2) low cost and (3) speed of erection. In fact the last of these was not adequately solved.

7. Architect now tackles the problem of how to support the roof sheeting. Timber ruled out because of cost, expensive maintenance and 'temporary' appearance. Final decision is for precast, post-tensioned reinforced

concrete columns and raked beams. These to be purpose-made by a firm well known to the architect. Detailed design and costs discussed with this supplier. Architect profiles the beam and the supplier proceeds to design typical beam and column. Simultaneously architect works out the basic design of the building using precast reinforced concrete frames.

> The research for a structural system is not pushed as far as it might have been. Other factors, such as the need to make a decision and get the job moving enter in, preventing a really exhaustive analysis. It is noteworthy that even in the design of a small building the need for urgency is apt to rule out a thoroughly rational study of both materials and structure.

8. Architect discusses rough sketch scheme with the local authority officials. The official responsible for by-law control rules that the building should be classed as a "warehouse" and consequently the brick ends walls have to be increased from 11" to 14" in thickness.

> This occurred because of the category into which the official arbitrarily thrust the building. Had the building been classed "domestic" the 11" thickness would have been regarded as adequate for stability.

9. Architect now searches for the precise dimensions of a typical bay. The ruling factor proves to be economy and the cheapest form of window is shown to be standard steel sashes grouped with steel mullions and transomes. In order to get the most favourable price it is assumed that all the sash components must be stock size. Architect carries out research to get (1) good visibility of the cricket pitch for both sitting and standing, (2) good proportions and (3) adequate ventilation. Many combinations tried before a satisfactory and economical solution reached. Architect also seeks for a way to avoid using the standard windows units, but fails. Architect modifies the standard french door by putting a solid steel panel in the lock panel, instead of glass. This has to be done not by the window supplier but by the general contractor because this is the more economical way. From this research comes the height and width of a typical bay and the total length of the building. The total length is decided on as having an uneven number of bays because the architect prefers to have a bay rather than a column on the central axis. The building form is now crystallised.

> The detailed proportioning of the main elevation is here being determined by the limitations of standard parts. It is not

certain that the assumption that standard windows would prove the cheapest is correct. What is important is that the architect acted on that assumption. It is also interesting that the architect wished to escape from the standard window type. This because the standard window has shape and proportions immediately recognisable, and therefore having no element of the novel about them. The architect's traditional training comes out in his desire to avoid a central column in the main elevation. A younger architect might well have been glad to have it, as showing a break with tradition. During this period of preparation there was no comment from the client on the appearance of the building.

10. The local authority department of health is given access to the plans and demands: staff lavatories for both sexes, staff rest room, food preparation room with refrigerator, and lavatories for the public. A special deputation to the health inspector points out that the license will be on a daily basis only, for not more than 27 days in the year; that no food is prepared on the premises; that lavatories exist round the perimeter of the field and very near the bar; that the proposed building merely replaces an existing bar in which none of these features exist.

The health inspector was clearly using the occasion of rebuilding to improve the general standard. The legal position is that so long as a building is not touched the provisions of the present law cannot usually be applied. Only on rebuilding or building anew can the full requirements of the law be insisted upon. This also applies to by-law provisions.

11. On the strength of a rather vague letter from the health inspector the architect decides to ignore all the demands except that for male staff lavatory accommodation on the grounds that this is probably the maximum which could be demanded. He adds a small annex to the back of the building, leaving the main rectangle of the plan intact. Subsequent events proved the architect's view to be correct and the health department in fact made no further demands.

To some extent the architect took a risk. It is to be noted that the health department were trying to obtain a better standard than they were legally entitled to require. The health inspector admitted that he had not visited the cricket ground before making his demands. It is obviously important that standards of hygiene, structural stability and fire resistence shall be adequate, but it is equally important that the already high cost of building shall not be loaded with standards which are higher than strictly necessary. If each local government department - by-laws, planning, health etc. - increase their demands above the minimum the cumulative effect on total building costs would be so high as to prevent some building altogether. When the demands of central government departments are added to those of local government a very serious increase in cost may result. This danger appears inherent in our bureaucratic system of building control.

12. The cost of a building designed with precast pre-stressed concrete frame and aluminium-felt roof turns out about £300 more than expected. Architect calculates that the reduction of the length of the building by one bay would save about this amount. He refers this to the client who does not agree to this reduction.

> The architect was not in favour of reduction because of his preference for a central bay. Later events showed that the cost was to come higher than estimated and it is therefore possible to say that at this stage the architect should have insisted on saving the bay cost of £300. But the architect was not at any time given an absolute ceiling for cost.

13. A commercial firm offers to provide a flagstaff provided the gift is acknowledged with a small plaque. The gift is accepted.

> The familiar exchange of publicity opportunity for the provision of some service or amentity.

14. Architect decides on bare facing brick for the inside surfaces of the end walls and exposed aggregate concrete slabs for the long back wall. All materials are now decided and the appearance of the building is determined: Fig. E.

> This is partly to reduce capital costs and partly to keep maintenance expenditure to a minimum. The facing brick and the exposed aggregate also give a satisfactory aesthetic effect. It may be noted that this is a relatively new possibility used first by the pioneers of the modern movement. Used by Le Corbusier and others in the 1930's, it is now, twenty years later, acceptable to ordinary architects and clients. This 'lag of descent' is a common phenomenon particularly in aesthetic ideas.

15. The contractor is finally decided upon by the architect and approved by the client, on the basis of speed of working and immediate starting. The price is arranged on agreed rates for the materials and labours. No written contract was asked for by either side.

> The architect's personal knowledge of firms, their capacities and personnel counted heavily here. No quantities were required and in fact the job could not have carried the cost of a quantity surveyor's fees because the possible savings from competitive tendering could not have equalled the amount of the fees. This is particularly true of this job because of the high percentage of subcontractors' work. The method adopted was a quick way to a good job without undue fear of having unreasonable extras. A major benefit of the method was prior discussion between architect and contractor at the design stage.

16. Work is begun. Before very long a hold up occurs because the precast concrete structural units are not ready. The foreman tells the client that he could have "built the columns quicker and cheaper in brick".

This pronouncement causes alarm in the client and the architect has to dispel it by explaining that the statement is not correct.

> The problem here is the passing of inaccurate information and uninformed opinion by lower levels in the building team. Some clients are ready to listen to such opinion in the same way that sometimes more weight is given to the nurse's opinion than to the doctor's statement. The impression often given to the client is that the 'practical' builder really knows better than the 'theoretical' architect. And in a great many matters he undoubtedly does - particularly in the field of the performance of materials. In matters of planning, appearance, choice of structural system and overall conception of the building he has no systematic training and no organised body of knowledge and his opinion can therefore be very misleading to a layman. This matter is an important one for the future of the building industry as a whole. It appears at present to be resolving itself substantially into the question of how to get all members of the team responsible for building to contribute their specialist skills in as economical a manner as possible.

17. The steel windows, when brought on the site, do not fit in spite of meticulous dimensioning and adequate tolerances.

> The reasons: the steel frames varied as much as 1/2" in 4'-0". Inaccuracies of this sort in a standard product make nonsense of refined methods of job planning. This question of tolerances is of vital importance to the whole problem of the factory production of building parts. The old craft methods may be cheaper if factory-made parts lead to major adjustments on site.

18. The foreman bricklayer acts as general foreman. He is good at bricklaying but not interested in joinery.

> This is one of the defects of the craft system now being superseded. The general foreman of the future may turn out to be a general mechanic rather than a tradesman having a smattering of a few other trades.

19. The building is completed. The foreman offers the opinion that he "didn't think much of it as a building from the drawings but now it's up, it isn't half bad".

20. The client holds a meeting with the future holder of the liquor license and the tea contractor. It quickly becomes clear that it is impossible for the two contractors to use the building simultaneously: neither will trust his stocks to the other. At this stage such ideas as making another door, dividing the bar into two parts, and making a separate counter for the tea contractor are discussed. Eventually the matter is settled by giving the tea contractor permission to bring up a trailer and place it next to the bar on a concrete platform to be constructed for the purpose.

I" equals I6'-0"

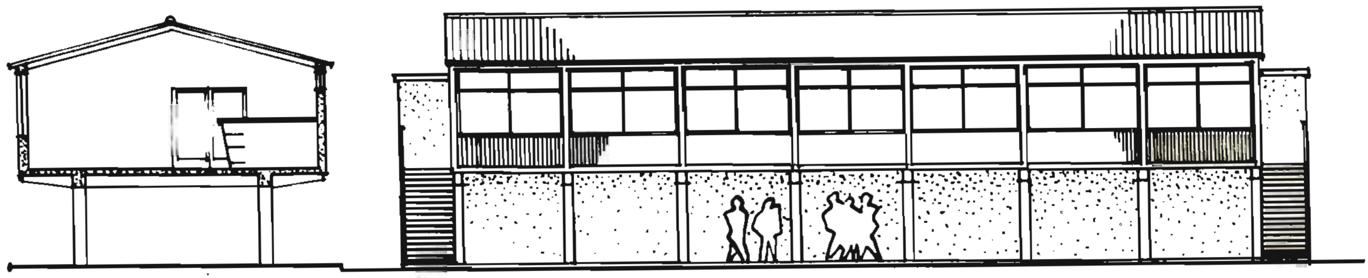


Fig. A. First Scheme: raised on pilotis.

Pitched asbestos roof, precast concrete trusses and columns, standard windows. All on R.C. raised platform. All concrete parts standard

Fig. B. New Scheme: on the ground.

Pitched asbestos roof, precast concrete trusses, columns and wall panels. All concrete parts standard.

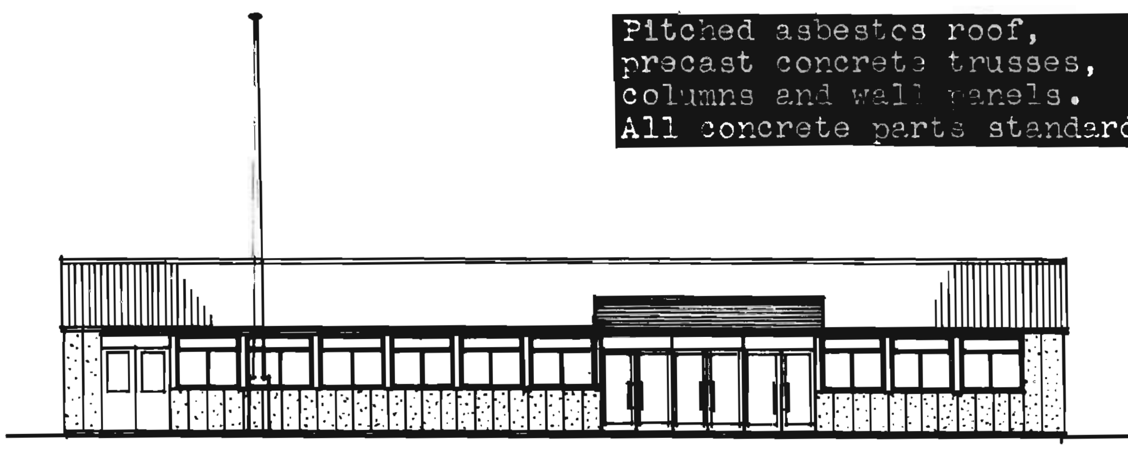
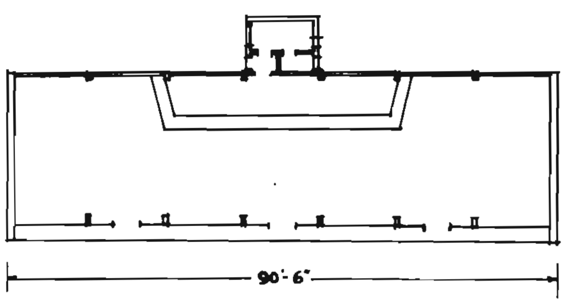
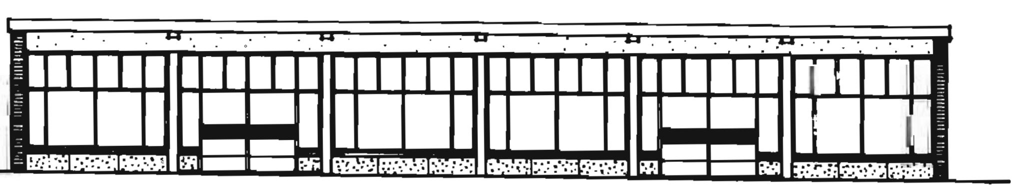


Fig. C. Third Scheme.



Final Plan.

Fig. D. Penultimate Elevation.



Final Section.

Aluminium monopitch roof, purpose-made concrete trusses and columns, brick ends and purpose-made concrete panels. Only windows standard.

The building as completed with seven bays.

Throughout the negotiations no mention had been made of this problem of the two contractors and the architect was quite unaware of the situation. Had the facts come to light earlier it is certain that they would have had an important influence on the design of the building. Two separate rooms would have been required and design difficulties would have emerged. The client clearly failed to make his full requirements known and the architect failed to draw out the information.

21. The client is surprised that the total cost is more than anticipated. It is forgotten that additions have been required by the local authority and additions have been requested by the clients themselves. The client also expresses the thought that he had hoped for a reduction in architect's fees. In fact he had not mentioned this matter. The architect charged the minimum fee permitted by the R.I.B.A.: 6%.

CASE STUDY : ANALYSIS BY INSTITUTIONAL COMPLEXES.

(Numbers refer to paragraphs in the log).

Category of Building-Type.

The building belongs to two institutional groups: the recreational and the economic. It belongs to the institutional group collectively known as cricket. It is also a commercial building inasmuch as it is involved in the institutions concerned with retail trade.

It is interesting to note that when instructing the architect to design a 'bar and tearoom' the club committee had as background many years of having two separate rooms - one used as a bar, the other used as a tearoom. It appears that either nobody drew the inference that there was more than mere chance involved in this separation, or if they did see difficulty in combining the two, the fact did not reach the architect. Presumably it did not occur to anybody that institutional difficulties would be met in combining the two. Nor did it occur to anybody to ask either the licensee or the tea contractor whether it would be acceptable.

This appears to be an example of an institutional difficulty being missed by both the client and the architect, in spite of the evidence lying reaily to hand during the design period. It is difficult to allot blame. It might be laid at the door of the club committee on the grounds that they should understand the difficulties of running the ancillary activities connected with cricket. Or it might be argued that the architect should have brought it to light by his questioning. There was no failure of client - architect relationship, but perhaps more detailed discussion in the early stages of the job would have been helpful. The problem here, and this seems to apply to all building projects, is that of getting adequate sustained attention given by both client and architect at the right moment. Both are busy, interruptions are frequent and there is the problem of getting concentration from individuals who may be little used to long sustained effort of this kind. The whole of this question is bound up with the difficulty of a client understanding what the drawings mean. He is untrained in reading drawings and may in fact understand a good deal less than the architect thinks. This may lead to the architect thinking he has client's approval when in fact the client imagines he has given his consent to something quite different.

Did this failure to understand the institutional situation influence the design of the building? Most probably it did. Had the situation been clearly grasped at the beginning the architect would have been required to produce a building having two separate cells, each lockable against the other. He might have solved this by planning a long rectangular building divided across the middle. More probably he would have abandoned this clear prismatic form in favour of a plan shape of 'L' or 'T'. Had this point been reached a quite different building in plan and elevation would have emerged. <u>It is, therefore, reasonable to deduce that the failure to diagnose the real institutional position involved in the future uses of the building was most probably a major determinant of the plan-form and therefore of the structural and expressional characteristics of the building</u>.

It seems clear from the foregoing that a close understanding of the institutions connected with the uses of a building must be reached by both client and architect early in the design stage.

This is not the same as saying that both must understand the use of the building. To do that is not enough: it is also necessary to relate those uses to the appropriate institutions in the society of which those uses are but an expression. In the world of reason, untrammelled by institutions, there is no difficulty in serving alcohol and tea together. The rational and the reasonable are not, however, adequate guides in themselves to building use. They must be applied within the framework of the institutional structure.

Economic. The building drew on the following direct producers of building materials: cement manufacture, sand and gravel winning, stone quarrying and crushing, steel rod manufacture, brick making, quarry tile manufacture, precast concrete making, making of steel window frames, glass manufacture, putty and mastic making timber factoring, joinery making, adhesives, steel cable making (for post-tensioning concrete), making of aluminium sheeting, soft board and roofing felt manufacture, refining of bitumen, making of screws and nails, making of asbestos rainwater goods, of earthenware pipes, gasketting material, making of polythene pipes, plastic and porcelain sanitary goods, making of taps, metal pipes, manufacture of electrical material such as conduiting, switches, junction boxes, cable and holders, manufacture of chain to support light fittings, manufacture of wire-netting for reinforced glass, making of aluminium bar, of hinges, door furniture and locks, manufacture of sheet lead, making of doors, manufacture of paints, stain, varnish and polish.

There are, therefore, even in a small and simple building like this about forty different contacts with manufacturing industry. If secondary and tertiary contacts were listed for manufacturing and extractive industry a much higher total would be reached. The observation may be made that if the building were much larger and more complex it would not involve many more sources of manufactured goods. Perhaps these would be added: manufacture of basic steel, ornamental metalwork, the preparation of special stones such as freestone, marble or slate, winning and refining of asphalt, winning and manufacture of other metals such as zinc, brass, bronze, manufacture of floor materials like plastic sheet, thermo-plastic tiles, linoleum, manufacture of plaster, making of heating equipment such as boilers and piping and radiators. This makes about a further fifteen or so manufacturers giving a total of perhaps fifty-five very approximately serving the building industry.

A conclusion which may be drawn is that as far as the supply of materials is concerned even the simplest building in our society requires a complex production organisation. For comparison the construction of the traditional Zulu hut required: branches of trees, vine-cords, thatch, stones, earth, water and cow dung (for the floor). All these materials were supplied by nature, not industry, on or near the site. It is a neat demonstration to reverse backgrounds. The Zulu could not call on our materials because his technology was very primitive: we cannot call on the Zulu's materials because our highly organised society does not allow the collecting of stones or trees and grass as a preliminary to building. Furthermore the Zulu's ways of using these basic materials would be forbidden in our context of rigid legal control over building.

The contracting firm must also be considered under the heading of the economic complex. The firm was small and the team actually doing the building operation consisted of a manager who visited the site daily and at the end actually helped with urgent work, a foreman bricklayer who acted as general foreman, a foreman joiner present for the joinery only, a plumber and at most four labourers. At the end a foreman painter and a small gang of painters appeared. All other work, including roof construction and finish, floor tiling, post-tensioning of concrete beams, electrical work, making the bar counter, glazing and making the precast concrete wall slabs was done by subcontractors. Thus the skilled crafts exercised by the general contractor were only four in number, whilst the specialists' or subcontractors' numbered seven. Other investigations show these relative proportions to be not unusual. We are faced with the general contractor being in theory the organiser of skilled labour, but in practice actually manipulating directly only basic tradesmen and allowing subcontractors to be responsible for nearly double the number of trades.

This tendency to subcontract any but the basic trades is a common trend. There is, however, the exactly opposite trend appearing: that of supplying the "complete service". Firms which supply this "all-in" service provide all their own specialist tradesmen. Why are there these two opposite trends simultaneously in the same industry? This question cannot be examined here, but the suggestion may be offered that the scale of the firm may have an important bearing. As far as the small contractor is concerned, the use of subcontractors avoids the locking up of capital in equipment and stock. If these two trends cannot be explained satisfactorily they must be taken together as evidence of a significant non-rational element in the structure of firms in the building industry. A possible explanation is that the increasing use of subcontracting is an excessive development of the historical fact of some contracting. If rationalisation were applied to such an excessive growth would not the "all-in" service be one of the likely results?

Governmental. The following governmental institutions had their influence on the creation of the building: by-laws and the health acts and food and drugs acts. The law controlling the sale of alcoholic liquor should have had a bearing but in fact did not. It is to be noted that the building form was influenced remarkably little by legal institutions. There was no influence by planning law, land or financial law, labour or mercantile law, of any material significance.

Educational & Scientific. The following institutionalised educational factors had an influence on the design of the building. First, the approach to the problem by way of precedent. This was the design approach favoured by the older system of architectural education. It is in sharp distinction to the more recent rational and analytical approach. The architect's developing desire to put up an 'interesting' building is a second educational factor. This is helped to realisation by the rational approach institutionalised in the analytical examination of the various methods of structural support.

Thirdly, the architect's educational background is visible in his desire to achieve 'good' proportions. 'Good' can only mean those proportions which have been institutionalised as 'good' - particularly in the educational system to which the architect was exposed when a student. This is because 'good' proportions are not absolutes, but variables dependent on other factors in the particular society. There have been various attempts to establish universal good proportions, from the greek golden section to Le Corbusier's modulor, but the claim to universality can never be substantiated.

Fourthly, the desire to avoid a central column in the main elevation must be attributed to an institutionalised origin. This point is interesting, as opinion has shifted in the last twenty years or so. Then, it was quite unthinkable to have an even number of bays in an elevation of this kind. Now, many architects would have no difficulty in accepting an even number with the consequent central pier or column, and some architects would actually prefer the central solid. The two attitudes may with benefit be related to the preferences of the renaissance and mediaeval designers.

Fifthly, institutionalised patterns of education are detectable in the architect's unwillingness to accept at face value the health inspector's demands. The architect resisted the requirements and took a risk in building without fully complying. This leads to the important question of what should the architect's attitude be toward authority?

In general the emphasis in the approach to design was traditional rather than scientific. The possibilities of bay structure were investigated scientifically up to the point where it was decided to adopt a certain kind of construction made by a firm in whose work the architects had had previous experience. We have here brought out the fact that the results of scientific analysis may not necessarily be used. Reason, logic and efficiency are not the only criteria of judgment; we must also allow for the desire on the part of the designer to decide on the basis of his previous experience. This method can, however, lead to excessive conservatism.

Expressional. This aspect has been largely covered by the comments made under the 'Educational and Scientific'. Good appearance was regarded by the architect as essential both from the point of view of the club and the architects. The avowed aim was to achieve a building which was up-to-date in appearance and which would symbolise the vitality of the club.

General Comment. The most important factor perhaps emerging from this case study is the large number, and difficulty, of the decisions. Frequently decisions are made obscurely and often it is not certain whose responsibility it is to decide. From this evidence and from similar evidence from other case studies it may be concluded:-

(1) That the decision-making process is very important as an area from which data must be obtained for studying the sociology of building.

(2) That decision-making is often a very complicated and obscure process involving ambiguity of responsibility.

(3) That it is in the area of decision-making that we urgently need scientific analysis to assist us in improving our building techniques.

APPENDIX 11

(1) Definitions of Institution.

"... institutions consist of concepts, usages, associations and instruments; arise out of man's basic needs and interaction with his environment; have long-time and wide reach, time and place variations; operate among all classes and in all stages of culture and function automatically, interpenetratively and on three planes."

C. Panunzio. Major Social Institutions. P.22.

"... major institutions .. those complexes of thought and activity which are more or less timeless, universal and which are directed to the satisfaction of basic human needs."

P.3..

"... an institution is a configuration of cultural patterns which, as a whole, has certain functions."

R. Linton. Cultural Background of Personality. P.36.

(2) Classification of Institutions.

(a) Situation Institutions.

(Kinship roles ..)

(b) Instrumental Institutions.

(Technology like medicine is thin framework of institutionalised systems of roles).

(c) Integrative Institutions.

(Social Stratification.)

Talcott Parsons. Essays in Sociological Theory pure and applied. P.46.

(a) Primary: Family, church, mutual aid organisations.

(b) Secondary: Education, health, penal and correctional.

P. V. Young. Scientific Social Surveys and Research. P.452.

(a) Basic Cultural Institutions (family, church, school).

(b) Economic.

(c) Recreational.

(d) Institutions of formal social control (governmental and social service agencies.

E. W. Burgess in T.V. Smith & L. D. White Chicago: An Experiment in Social Science Research. P.140.

Middletown was studied under the headings:-

(a) Earning a living.
(b) Family.

Appendix 11 Cont'd.

(c) Training the young.
(d) Leisure.
(e) Religious life.
(f) Processes of community life - government, health, dependents.
(g) Making and unmaking of group solidarity.

R. S. Lynd and H. M. Lynd. Middletown. P.4.

Hertzler gives the following viewpoints for classification:-

(a) Functions or objectives.
(b) Organisation.
(c) Scope.
(d) Degree of importance or basic nature.
(e) Development or formulation.

J. O. Hertzler. Social Institutions. P.5.

(3) The essential ideas characteristic of the institutional complexes are:-

Economic	- Production and consumption, providing and service, earning a living.
Familial	- Married life, rearing of children.
Governmental	- Control of the individual by the state.
Educational	- Inculcation of knowledge to equip the child for life in the existing society.
Scientific	- Discovery and application of new knowledge. Invention.
Health	- Curative and preventive medicine.
Recreational	- Play.
Religions	- Relationship with the supernatural, moral and ethic education.
Ameliorative	- Reclamation of the individual with deviational behaviour patterns.
Expressional	- Symbol, commemoration and aesthetic.

(4) Use Zones and Institutional Complexes.

The following zoning schemes have been examined:

Johannesburg. No. 1	1946
Pietermaritzburg, Ntl.	1954
Scottburgh, Ntl.	1954
Pretoria, Tvl.	1949
Bonnyville, Alberta	1953
Grande Prairie, Alberta	1953
Piet Retief, Ntl.	1954
Bristol, U.K.	1951

Differentiation is most marked in all schemes in the economic complex. Piet Retief has 10 different zones in this class, Bristol 4, Grande Prairie, Pretoria, Pietermaritzburg and Johannesburg 5.

Nearly all schemes tend to use one zone to cover education, recreation, religion and government, as does the "The Development of Central Areas", HMSO 1947 (paras. 76 - 83). The TCP Regulations 1948, circular 59 stipulating

Appendix 11 Cont'd.

requirements to be shown on Comprehensive Development Plans in Britain puts all these into one zone except education which it zones separately.

APPENDIX 111

(1) Economic System:

Panunzio (Major Social Institutions, p.501) points out that in our society it is the economic, and not governmental and religious institutions as in previous ages, which is the dominant of our time and which creates interdependence. He estimates the average person's time as 90% economic activity.

Talcott Parsons (Essays in Sociological Theory Pure and Applied) puts forward the idea that the acquisitiveness of modern business is not so much motivational as institutional. Our attitude might be contrasted with that of the Northwest Pacific coast Indians at whose potlatches the aim is to get blankets at the highest rate of interest, and among whom honour consists in publicly distributing, not hoarding, wealth (Goldenweiser Anthropology p.154). This is akin to Veblen's conspicuous waste. It is quoted here to underline the institutional nature of our economic system.

(2) Financing of Speculative Building in Durban.

The method is roughly this: Buy the land. Design a scheme for development and cost at full price including full fees for architect etc. This is done by a tendering system, which is sometimes rigged so that the lowest tender is a little higher than it would normally be. The proposal is then put up to the financing company for a loan. They agree to an advance of, say, 75% of the tender price on the security of the land and the building as it goes up. The developer, therefore, erects the building by disbursing only the price of the land. The money may be borrowed at 6½% and the building may bring in a very good profit on borrowed money. Alternatively, a quick return on a small capital outlay may be achieved by selling immediately - sometimes as individual flats. A building society expects a building to return 9 - 10%. The immediate cause of such building seems to be the profits obtainable, not the demands for accommodation, although the two are in reciprocal operation.

(3) Building and the Economic System.

See from the point of view of economics there are two important aspects of building to be stressed:-

(a) It constitutes, in the multiplicity of buildings, part of the physical equipment of the society. In this sense all buildings are productive - even houses because workers cannot work if not housed adequately. This is the property aspect of building viewed from the standpoint of the community at large.

(b) The production of a building touches many branches of economic life. It, therefore, has a particular claim for attention if governmental action is required to get the economic machine running better in a time of depression. Various economists have stressed the 'pump-priming' value of building:

J. M. Keynes (The General Theory of Employment, Interest and Money),

and

R. G. Hawtry (Capital and Employment).

A notable example of this action is the Tennessee Valley project carried out under the New Deal.

(4) Standardisation.

There is considerable activity in the direction of standardisation of dimensions, parts and standards. The simplest expression of this is the standard specifications for steel etc. (in Britain the British Standard Specifications and in South Africa the work of the South African Bureau of Standards). Another expression is in the work being done towards the perfection of modular systems. This ranges between the group efforts of the Modular Society to the individual work of LeCorbusier in creating the Modulor.

The O.E.E.C. research "Cost Savings through Standardisation, Simplification and Specialisation in the Building Industry" is notable.

These things are not yet institutionalised. They may well be, but even if they are not they cannot avoid modifying existing institutions. Their influence may easily change the face of building completely.

Historically, the Japanese tradition of planning the house on the basis of standardised mat sizes (tatami):

7 ft. X 3.5 ft., 6.6 ft. X 3.3 ft., 6.3 ft. X 3.15 ft., 5.8 ft. X 2.9 ft., (See J. Harada: The Lesson of Japanese Architectur, p.48) is of comparative interest. The mats are an institution.

(5) Social Organisation of Buildings.

(a) Demerath and Baker (J.S.I.V11 1&2 p.89) list the following roles in house-building:-

1. Initiator
2. Architect
3. Land Developer
4. Financier
5. Government Official
6. Contractor
7. Sub-contractor
8. Foreman
9. Union Business Agent
10. Craftsman
11. Materials Manufacturer
12. Materials Distributor

(b) The following observations by J. A. C. Brown in Social Psychology of Industry are relevent:- "Peter Drucker points out (that) mass production is to be regarded not only as a mechanical but also as a social principle, a principle of human organisation, according to which human beings are organised for a common task... It is the organisation rather than the individual worker which is productive under the new system." p.38-39.

"What has happened to change an important, necessary and potentially pleasurable social activity (work), which is capable of satisfying both material and psychological human needs into a source of strife, resentment and boredom?" p.190.

APPENDIX 1V

(1) Bureaucratic Office Building.

The increasing importance of this building type is interesting evidence of the dominance of governmental institutions. The first modern example of the type is Somerset House, London (1776). Its design was essentially that of a country mansion of the period.

Panunzio says of the state that it "has come to be regarded as the agent that must guide society in all aspects". (Op. Cit. P.349). The implications of this idea for building are as yet only adumbrated.

(2) By-laws.

Attempts to produce 'model' and 'standard' by-laws are a feature of modern by-law practice. The standard by-law work of the South African Bureau of Standards is a good example. This standardisation of control is largely dependent on the fact that building materials and methods are in the process of being universalised. Standardisation has the great advantage of centralised amendment based on research and experience gathered from many different areas.

(3) Example of By-law Influence.

The English 'by-law street', so characteristic of many square miles of English towns, provides an outstanding field for enquiry. These streets appeared as a result of the Public Health Act of 1875 and no doubt as a result of the tremendous improvement they embodied were a pride to the promoters of the act. We deplore the visual effects and unfairly compare these rows of dreary houses with the palace facades of the Georgian and Regency terraces. The comparison is sterile. It would be more fruitful to examine the significance of governmental (or legal) control as compared with social control.

(4) Appearance of Buildings.

Conservatism about the appearance of buildings and cities is pilloried in characteristic style by Le Corbusier: La Ville Radieuse (p.102) where he gives a series of sketches of Paris at various epochs. All different: all Paris.

APPENDIX V

(1) Intuition.

F. S. Chapin in "Experimental Designs in Sociological Research", pages 26 and 27, makes some observations which are appropriate. He points out that intuition has fallen into disrepute amongst scientists because it has been used without discrimination. He emphasises that it is not a form of scientific description. If it is used in this way it leads to clairvoyance and mystic insight etc. If, however, it is used as a process of thinking in which the purpose is explanation of dim memory it can be useful scientifically. "The intuitive process consists of a convergence of as yet unverbalised experience (because only organically recorded) into a patternof response below the threshold of critical attention; this pattern may then emerge in part, and when verbalised, serves as a partial explanation of the problem which acted as the original stimulus. Intuition is then a judgment based on the convergence and integration of former impressions of memory into a pattern of explanation in which the perceptual details are not at the threshold of critical attention."

This process is clearly proper material in itself for scientific research.

(2) The following quotations from Bronowski's "The Common Sense of Science" are of interest:

"They (19th. century scientists) believed that in the end there is only one scientific method: to set up a system of causes and effects. This belief can no longer be sustained." P.80.

"Science is a process of creating new concepts which unify our understanding of the world, and the process is today bolder and more far-reaching, more triumphant even than at the great threshold of the Scientific Revolution." P.135.

"There is no gravitation; there is no force at all; the whole model was wrong. When Newton brought in force as a cause, he was giving to matter the human property of effort, as much as Aristotle once gave it human will. The true causes are now embedded in the nature of space and the way in which matter distorts space; and they have no resemblance to the causes in which we believed for nearly three hundred years." P.65.

APPENDIX VI

(1) Building Craftsman.

He is educated during his training not only to manipulate the tools and materials of his craft but also to play the role of trade union member. This keeps the various trades in watertight compartments and conditions members very effectively to this idea.

In the medieval period this demarcation of spheres of craftsman action was probably not harmful or at any rate did not seriously impede the slow rate of building development. In the present situation, however, when the craftsman's work is being increasingly machine-performed in the factory this conditioning of the operative to a narrow range of work and tool-use is against the trend. A new type of craftsman and therefore a new educational method is required. It is also a question whether something of the same sort is not to be found amongst professional groups; individuals, whilst trained and job - designated as doctors, architects, engineers, planners etc. are in fact doing administrative work, for which they have had no adequate training.

(2) Professional Delinquency.

A serious result of having a wide gap between the standards inculcated by the educational system and those actually worked to in society, is to be found in the appearance of delinquency. This may occur because the avowed goals are too high to be reached in the real world. In architectural practice delinquency takes the form of such unprofessional conduct as fee-cutting, job-filching, forbidden forms of publicity and doing architectural work under some other name. The actual state of professional ethics at any time is the product of the ethics taught by the educational system and the general ethical standard of the society at large.

In Capetown (Sea Point) I saw a noticeboard outside a building under construction carrying these words:-

A. B. So-and-So, B. Arch. (U.C.T.)
For Building Plans.

U.C.T. stands for University of Capetown. Notice that this individual was actually qualified in architecture and, therefore, had not the inducement, or necessity, to go outside the established professional code of behaviour.

Professional codes are adopted by professional bodies to protect themselves against those not qualified for admittance. But here is a case against which no protection is possible.

It is to be noted that the standard of behaviour demanded by an institution is not normally higher than individuals can reach without undue strain. What happens in delinquency situations is that the standard is felt by some individuals to be unattainable. If many individuals come to feel this way, the institutions will come under severe strain to adjust to a standard that the majority can hope to meet.

APPENDIX V11

(1) Symbol in Le Corbusier's Town Plans.

The following references show how little symbol is developed in his schemes:-

Le Corbusier 1910 - 1929. P.36, 37.

La Ville Radieuse. P. 131,141 (layout) 204, 236.

It is this absence which has led to the change of inhumanity. The difficulty is that his schemes are a leap forward technically and therefore sociologically. The symbols cannot materialise, until the actual effort to build a Corbusier city is attempted, although theoretical attempts at symbol might be made. Society at large will decide the symbols. The critic who thinks these future towns inhuman is perhaps only registering the absence of accepted symbols. We should beware of using the word 'inhuman' in such a context, since what we regard as inhuman is largely conditioned by our culture. Seen in this light the criticism becomes the same as saying that the new environment is differently conditioned from the present urban environment. Le Corbusier seems specifically to ignore the question of how we arrive culturally at the point where we can find his solutions acceptable and actually attempt them. Perhaps that problem is one for the social engineer rather than the planner and architect.

That Le Corbusier has given attention to the question of symbol for dwelling units can be seen from Le Corbusier 1910 - 1929 p.76,92.

(2) Quasi-Aesthetic Notions.

Examples are:-

(a) The theory that some materails are 'inferior' in appearance: concrete corrugated iron, corrugated and sheet asbestos. Such theories lead to the making of blocks of concrete so that they imitate the texture of rough-hewn stone. The question of appearance of materials is very largely a matter of the overall design of the building.

(b) The idea that a building must 'look solid' - banks used to favour this idea - or should 'grow out of the ground'.

(c) The notion that glazing bars after the 18th. century style 'give scale'. They only give scale under certain conditions. They cost money for material and labour in cutting up a large sheet of glass only to fix the pieces together again with the bars.

(d) Stylistic treatment may be forced on a building without reference to the actual process of building and therefore without strict relation to costs. Neo-Georgian office blocks with their massive walls hung on a steel frame are an example. Such attempts are not merely stupid in themselves: they also retard the general progress of building. The measure of our progress, however, from such ideas, can be seen in the readiness with which we now accept brickwork as a cladding material freed from notions of support.

(e) The habit of mind common to architects that only those buildings which are aesthetically 'interesting' are worthy of attention. From the point of view of the sociology of building all buildings, even the worst aesthetically, are worth examination.

APPENDIX V11

(1) Words Used to Describe Change.

On page 523 of 'Society' MacIver and Page give the following chart:-

1. Determinate continuous change	Process
11. Determinate continuous change in a specific direction:-	Growth
(a) Quantitatively defined with respect to size.	Accumulation etc.
(b) Qualitatively defined with respect to structural or functional differentiation.	Evolution Development Regression Retrogression
(c) Qualitatively defined with respect to its conformity to a standard of value.	Progress Decline Decay Decadence Degeneration
(d) Defined by reference to some other object or system with respect to their compatibility within a common process.	Adaptation Adjustment Accommodation Assimilation Harmony and their contradictories.

The word 'change' therefore carries no implied judgment: it means merely 'alteration' and is neutral. It is essential for clear analysis to use the word in this basic sense, and to avoid implied judgment which may inadvertantly creep in, particularly when dealing with the expressional complex.

(2) Evolution.

M.Ginsberg in 'Sociology' (p.234) says:-

"We can point to no order of ideas or social institutions whose growth can be traced through a regular sequence of stages repeated in the same order among different peoples. The most we can hope to do is to indicate a movement in humanity as a whole, which despite actions and reactions, reveals some persistent direction."

This means that no society is forced inevitably to pass through a given sequence. The Zulu, when urbanised, has jumped without difficulty from the tribal hut to the Western style minimum house.

Similarly, the fact that one society has made a certain jump or achieved a certain stage is not evidence that others will. Change is very much dependent on diffusion and diffusion meets difficulties like geographical isolation, climate, lack of material resources, and different cultural emphases or equilibria.

The diffusion of the pneumatic drill into South Africa is very slow because road gangs have been trained to work bringing their picks down in unison: a stage probably never reached in Western Europe. There is no inevitability in the general adoption of the drill.

(3) Lag.

Ogburn and Nimkoff in "A Handbook of Sociology', p. 598, quote the following developments and inventions as responsible for cultural lags in our society: "Telephone, motorcar, wireless, cinema, power-driven agricultural machines, printing, photography, alloys, electric transmission lines, electrical goods, welding, chemical uses of cellulose, coal-tar products, chemistry of foods, aeroplane, air-conditioning, artificial lighting, contraceptives, slot machines and television. The result is an enormous accumulation of cultural lags." The authors here refer to the adaptive culture: The Lynds in 'Middletown' (p.XVl) have commented that tolerance of disparities is a characteristic of such lags because of man's tendency to make only minimum adaptations.

Lags in techniques especially require study. It seems reasonable to conclude that the long apprenticeship of the bricklayer is a failure to respond to the changed status of brickwork in building. It is very much simpler than it was and for many uses (load-bearing, partitions, paving, arches etc.) it has declined.

An interesting successful response to the need for adaptation in brickwork is to be found in the task system developed at Springs in the Transvaal for the erection of houses for Africans. Because of the extreme simplicity of much of the brickwork (the hardest task is the quoin) it was discovered that fully trained bricklayers were largely unnecessary, and that unskilled men could be taught in a few days to do the simpler tasks. This is an excellent example of rational adaptation to a new situation; the essential adjustment made was from a craft to an operative basis. See C.S.I.R. 'Research Studies on the Costs of Urban Bantu Housing', p.133 - 147.

APPENDIX IX

(1) Factory Production of Building.

The full quotation from Drucker is:

"Management must demand that those responsible for production know what system of production is appropriate, and apply the principles of that system consistently and to the limit. These are the first and decisive steps in pushing back the limitations of production on business performance.

Only when those steps have been taken can the next one be made: the organisation of parts of production on the basis of a more advanced system.

The result of doing this without first analysing the production process and organising it properly is shown by the failure of the prefabricated house. It would seem the most obvious thing in the world to build a house from prefabricated, standardised parts. Yet the attempt, made after World War 11, proved abortive.

The reason was that uniform, standardised parts - mass production in other words - were superimposed on a badly organised unique product system. Instead of homogeneous stages, the organising principle was craft organisation. The use of prefabricated parts in a craft system proved more expensive and slower than the old methods. When, however, the Levitts in Long Island organised home building by homogeneous stages, they could immediately use uniform standardised prefabricated parts with conspicuous savings in time and money".

P. F. Drucker. The Practice of Management. P.88.

(2) Emphasis on Site Assembly.

The Anglo-American Council on Productivity reported in their Report on Building, p.38:

"It has been claimed that a saving in cost of 25% could be obtained if all materials used were designed according to the principle of modular coordination and if plans were designed on the same basis".

Bodies dealing with standards do not necessarily concern themselves with modular problems, although this would appear to be a natural development of work on minimum standards. The American Standard Association, for example, works under these headings:

(i) Coordination of dimensions of building materials and equipment.

(ii) Performance standards of building materials.

(iii) Building code requirments.

(3) World Demand for Energy.

P. C. Putman, using a unit of energy called Q (= one billion billion B.T.U.), calculates we are now using energy of 20 Q per century. This will reach 100 Q by 2000 A.D. By that time world reserves will last about 80 years only. All the economically recoverable uranium and thorium in the world would provide about 1,700 Q of energy.

G. Dean. Report on the Atom. P.160.

APPENDIX X.

(1) Significance of the Machine.

The following quotation shows how Mumford views the philosophical background of the machine:

> "Order had been sought before, again and again in other civilisations, in drill, regimentation, inflexible social regulations, the dicipline of caste and custom: after the 17th. century it was sought in a series of external instruments and engines. The Western European conceived of the machine because he wanted regularity, order, certainty, because he wished to reduce the movement of his fellows as well as the behaviour of the environment to a more definite, calculable basis."
>
> L. Mumford. Technics and Civilisation. P.364.

If this view is correct, it must be inferred that the machine is one of man's less harmful forms of tyranny: a hope, not a doom. Mumford's view has the great merit that it uses the machine creatively and does not set art and instition over against it.

(2) Self-Service Departmental Stores.

The Keduzal store, Memphis, Tennessee was the first fully automated supermarket. It was a financial failure partly because the selection of goods was too limited. Diebold thinks that full automation of merchandising is unlikely, but that partial automation may be applied successfully. (J. Diebold. Automation. P.146-7). It certainly seems that automatic handling of retail goods together with proper provision for the motorcar customer will bring considerable change to the retail shop. Nor should the mail order business, like Sears, Roebuck in the U.S.A., be forgotten when considering change.

(3) Automation.

The extent and speed of change likely to be caused by automation has been exaggerated by the popular press, which has unfortunately made automation into a highly emotive word. Diebold (p.149) quotes R. L. Meier as saying that only the following industries are safe for automation: bakery products, beverages, confectionary, rayon, knit goods, paperboard containers, printing chemicals, petroleum refining, glass products, cement, agricultural machinery, miscellaneous machinery, communications and limited-price retailing. These industries use only about 8% of the total U.S.A. labour force. Diebold comments: "Although they will use automatic machines, agriculture, trade, service, construction (i.e. building), mining and the self-employed and professional fields will certainly not be automatized. In 1949 these fields accounted for over 56% of the total labor force, excluding the armed forces." (p.148). Where, however, automation can be applied in effective form, for example in insurance for recording policy information, its effect on the building may be startling. Diebold calculates that whereas at present a company may use "ten or fifteen stories of its skyscraper headquarters merely to keep records .... by the use of magnetic tapes the storage space .... can be reduced .... to 350 or 400 spools ..... which with control gear would occupy one medium-sized room. This magnetic tape could be kept in a low rental area far from central headquarters."

J. Diebold. Automation. P.94.

An almost certain change - reduction - in office space for certain kinds of firm appears inevitable.

In terms of industry a reduction in the number of workers per acre would seem likely. Diebold quotes the Rockford Ordinance Plant. This factory of about one million square feet floor area will employ only about 140 persons all told, p.74. Allowing 60% site coverage this gives 3.7 persons per acre.

(4) Performance Standards.

In the South African Bureau of Standards Model Building Regulations the following performance standards are laid down:-

2.8.2. New Methods of Design and Construction.

(a) Where a person submits plans for a building based on a method of agricultural design, or incorporating a method of construction, not permitting or prescribed by these By-laws, then the Local Authority shall approve such method of structural design or construction provided that it complies with the following requirements to the satisfaction of the Engineer:-

(i) a structural frame shall not, under the designed working loads show in any portion a crack or cracks visible to the naked eye, nor shall any portion of such a frame deflect from its unloaded position in such a manner as to suggest that the material of the frame had yielded in-elastically at any point, nor to an extent that in the opinion of the Engineer, endangers the stability of the frame, nor shall the frame when it is subsequently unloaded, fail to return to its unloaded position to an extent that is readily visible to the naked eye when viewed in elevation;

(ii) Portions of a building, such as applied finishes,or fixings for the same, shall not show any cracks or visible signs of yielding under working loads;

(iii) the ratio of the predicted collapse load of the building or any portion thereof to the load for which the building or portion is designed shall provide a margin of structural safety adequate, for the material and type of construction adopted, to provide against possible and likely eventualities such as:-

(1) accidental overloading.
(2) variations in quality of materials and workmanship

(3) possible errors in the assumptions and calculations on which the design is based.
(4) possible deterioration of the structure as a result of wear and tear, corrosion, or any other cause.

(iv) the construction shall be not less durable than the least durable construction which is permitted to be erected by these by-laws, for that purpose, for permanent buildings.

(v) the construction shall have a resistance to moisture penetration not less than the lowest moisture resistance permitted by these by-laws for a construction used for the same purpose;

(vi) the construction shall comply with the requirements of these by-laws for Fire Protection, Lighting, Ventilation and general health requirements.

(b) Where in the opinion of the Local Authority doubt exists as to the acceptability of the method of construction or design proposed, suitable tests, if necessary on a full scale building or on a portion of such a building, shall be carried out at the expense of the owner, to demonstrate whether or not the proposed method of construction or design complies with the requirements set out in Paragraph (a) of this by-law.

(c) Where the Local Authority decides that the proposed method of design or of construction does not meet the requirements set out in Para. (a) of this by-law, it may require that a building or a portion of a building which has been erected in accordance with the proposed method of design or construction for the purpose of testing the same, shall be entirely demolished and reconstructed in accordance with these by-laws, or shall be so altered as to make it comply with the requirements of these by-laws.

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