Bureaucratic organisation can work well when environment is highly static and predictable. However, the nature of environment for large organisations of today is highly dynamic and heterogeneous. In dynamic environment, more interaction between organisation and environment is required. There is high need for information monitoring and processing. Thus, an open-system perspective is more suitable for the management of modern-day organisations while bureaucratic organisation has closed-system perspective.

Hawthorne Experiments and Human Relations

Many of the findings of earlier writers, particularly of scientific management, which focused attention on the mechanical and physiological variables of organisational functioning were tested in the field to increase the efficiency of the organisations. Surprisingly, positive aspects of these variables could not evoke positive response in work behaviour, and researchers tried to investigate the reasons for human behaviour at work. They discovered that the real cause of human behaviour was something more than mere physiological variables. Such findings generated a new phenomenon about the human behaviour and focused attention on the human beings in the organisations. As such, this new approach has been called '*human relations approach of management*'.

Even in the writings of classical approach, notably, Taylor, Fayol, Henry Gantt, Follet, Urwick, and others, the human element in the organisation was recognised, but they emphasised it very little. The human relations approach was born out of a reaction to classical approach and during the last seven decades, a lot of literature on human relations has been developed. The essence of the human relations contributions is contained in two points: (*i*) organisational situation should be viewed in social terms as well as in economic and technical terms, and (*ii*) the social process of group behaviour can be understood in terms of clinical method analogous to the doctor's diagnosis of the human organism. Among human relations approach, there are many contributions and many more researches are being carried on. For the first time, an intensive and systematic analysis of human factor in organisations was made in the form of Hawthorne experiments.[8] There will be relatively lengthy discussion of the results and implications of the Hawthorne studies because of their historical importance to the behavioural approach to the analysis of management problems.

The Hawthorne plant of the General Electric Company, Chicago, was manufacturing telephone system bell. It employed about 30,000 employees at the time of experiments. Although in respect of material benefits to the workers, this was the most progressive company with pension and sickness benefits and many recreational facilities, there was great deal of dissatisfaction among the workers and productivity was not upto the mark. After the utter failure of an investigation conducted by efficiency experts, in 1924, the company asked for the assistance from the National Academy of Sciences to investigate the problems of low productivity.

In order to investigate the real causes behind this phenomenon, a team was constituted led by Elton Mayo (psychologist) Whitehead and Roethlisberger (sociologists), and company representative, William Dickson. The researchers originally set out to study the relationship between productivity and physical working conditions. They conducted various researches in four phases with each phase attempting to answer the question raised at the previous phase. The four phases were as follows:

1. experiments to determine the effects of changes in illumination on productivity, illumination experiments, 1924-27;

[8] A detailed account of these experiments is available in several books: Elton Mayo, *The Human Problems of an Industrial Civilisation*, New York: Macmillan Company, 1933. T.N. Whitehead, *The Industrial Worker*, Cambridge, Mass: Harvard University Press, 1938.

2. experiments to determine the effects of changes in hours and other working conditions on productivity, relay assembly test room experiments, 1927-28;
3. conducting plant-wide interviews to determine worker attitudes and sentiments, mass interviewing programme, 1928-30; and
4. determination and analysis of social organisation at work, bank wiring observation room experiments, 1931-32.

Illumination Experiments

Illumination experiments were undertaken to find out how varying levels of illumination (amount of light at the workplace, a physical factor) affected the productivity. The hypothesis was that with higher illumination, productivity would increase. In the first series of experiments, a group of workers was chosen and placed in two separate groups. One group was exposed to varying intensities of illumination. Since this group was subjected to experimental changes, it was termed as experimental group. Another group, called as control group, continued to work under constant intensities of illumination. The researchers found that as they increased the illumination in the experimental group, both groups increased production. When the intensity of illumination was decreased, the production continued to increase in both the groups. The production in the experimental group decreased only when the illumination was decreased to the level of moonlight. The decrease was due to light falling much below the normal level. Thus, it was concluded that illumination did not have any effect on productivity but something else was interfering with the productivity. At that time, it was concluded that human factor was important in determining productivity but which aspect was affecting, it was not sure. Therefore, another phase of experiments was undertaken.

Relay Assembly Test Room Experiments

Relay assembly test room experiments were designed to determine the effect of changes in various job conditions on group productivity as the illumination experiments could not establish relationship between intensity of illumination and production. For this purpose, the researchers set up a relay assembly test room and two girls were chosen. These girls were asked to choose four more girls as coworkers. The work related to the assembly of telephone relays. Each relay consisted of a number of parts which girls assembled into finished products. Output depended on the speed and continuity with which girls worked. The experiments started with introducing numerous changes in sequence with duration of each change ranging from four to twelve weeks. An observer was associated with girls to supervise their work. Before each change was introduced, the girls were consulted. They were given opportunity to express their viewpoints and concerns to the supervisor. In some cases, they were allowed to take decisions on matters concerning them. Following were the changes and resultant outcomes:

1. The incentive system was changed so that each girl's extra pay was based on the other five rather than output of larger group, say, 100 workers or so. The productivity increased as compared to before.
2. Two five-minute rests—one in morning session and other in evening session—were introduced which were increased to ten minutes. The productivity increased.
3. The rest period was reduced to five minutes but frequency was increased. The productivity decreased slightly and the girls complained that frequent rest intervals affected the rhythm of the work.
4. The number of rest was reduced to two of ten minutes each, but in the morning, coffee or soup was served along with sandwich and in the evening, snack was provided. The productivity increased.

5. Changes in working hours and workday were introduced, such as cutting an hour off at the end of the day and eliminating Saturday work. The girls were allowed to leave at 4.30 p.m. instead of usual 5.00 p.m. and later at 4.00 p.m. Productivity increased.

As each change was introduced, absenteeism decreased, morale increased and less supervision was required. It was assumed that these positive factors were there because of the various factors being adjusted and making them more positive. At this time, the researchers decided to revert back to original position, that is, no rest and other benefits. Surprisingly, productivity increased further instead of going down. This development caused a considerable amount of redirection in thinking and the result implied that productivity increased not because of positive changes in physical factors but because of a change in the girls' attitudes towards work and their work group. They developed a feeling of stability and sense of belongingness. Since there was more freedom of work, they developed a sense of responsibility and self-discipline. The relationship between supervisor and workers became close and friendly.

Mass Interviewing Programme

During the course of experiments, about 20,000 interviews were conducted between 1928 and 1930 to determine employees' attitudes towards company, supervision, insurance plans, promotion, and wages. The interview programme gave valuable insights about the human behaviour in the company. Some of the major findings of the programme were as follows:

1. A complaint is not necessarily an objective recital of facts; it is a symptom of personal disturbance the cause of which may be deep seated.
2. Objects, persons, and events are carriers of social meanings. They become related to employee satisfaction or disatisfaction only as the employee comes to view them from his personal situation.
3. The personal situation of the worker is a configuration, composed of a personal preference involving sentiments, desires, and interests of the person and the social reference constituting the person's social past and his present interpersonal relations.
4. The position or status of a worker in the company is a reference from which the worker assigns meaning and value to the events, objects, and features of his environment such as hours of work, wages, etc.
5. The social organisation of the company represents a system of values from which the worker derives satisfaction or dissatisfaction according to the perception of his social status and the expected social rewards.
6. The social demands of the worker are influenced by social experience in groups both inside and outside the work plant.[9]

During the course of interviews, it was discovered that workers' behaviour was being influenced by group behaviour. However, this conclusion was not very satisfactory and, therefore, researchers decided to conduct another series of experiments. As such, the detailed study of a shop situation was started to find out the behaviour of workers in small groups.

Bank Wiring Observation Room Experiments

These experiments were carried on between November 1931 and May 1932 with a view to analyse the functioning of small group and its impact on individual behaviour. A group of fourteen male workers was employed in the bank wiring room: nine wiremen, three soldermen, and two inspectors. The work involved attaching wire to switches for certain equipment used in telephone exchange. Hourly wage rate for the personnel was based on average output of

[9]Delbert C. Mill and William H. Form, *Industrial Psychology*, New York: Harper & Row, 1951, p. 58.

each worker while bonus was to be determined on the basis of average group output. The hypothesis was that in order to earn more, workers would produce more and in order to take the advantages of group bonus, they would help each other to produce more. However, this hypothesis did not hold valid. Workers decided the target for themselves which was lower than the company's target, for example, group's target for a day was connecting 6600 terminals against 7300 terminals set by the company. The workers gave following reasons for the restricted output:

1. *Fear of Unemployment.* The basic reasoning of workers was that if there would be more production per head, some of the workers would be put out of employment.
2. *Fear of Raising the Standards.* Most workers were convinced that once they had reached the standard rate of production, management would raise the standard of production reasoning that it must be easy to attain.
3. *Protection of Slower Workers.* The workers were friendly on the job as well as off the job. They appreciated the fact that they had family responsibility that required them to remain in the job. Since slower workers were likely to be retrenched, the faster workers protected them by not overproducing.
4. *Satisfaction on the Part of Management.* According to workers, management seemed to accept the lower production rate as no one was being fired or even reprimanded for restricted output.

The workers in the group set certain norms of behaviour including personal conduct. The workers whose behaviour was in conformity with both output norm and social norm were most preferred. This study suggested that informal relationships are an important factor in determining the human behaviour. During the course of experiments, workers were counselled for good human relations in the company's plant. The counselling was in regard to personal adjustment, supervision, employee relations, and management-employee relations. The supervisors tended to understand and accept the problems of workers, and management tried to sense their feelings which were helpful in formulating the action for resolving management-employee conflicts.

Implications of Hawthorne Experiments

Hawthorne experiments have opened a new chapter in management by suggesting management through good human relations. Human relations involves motivating people in organisation in order to develop teamwork which effectively fulfills their needs and achieves organisational goals. Hawthorne experiments have tried to unearth those factors which are important for motivating people at workplace. The major findings of the experiments are presented below:

1. Social Factors in Output. An organisation is basically influenced by social factors. In fact, Elton Mayo, one of the researchers engaged in Hawthorne experiments, has described an organisation as "a social system, a system of cliques, informal status system, rituals, and a mixture of logical, non-logical behaviour."[10] Thus, an organisation is not merely a formal structure of functions in which production is determined by the official prescription but the production norm is set by social norms. Since people are social beings, their social characteristics determine the output and efficiency in the organisation. Economic rewards and productivity do not necessarily go together. Many non-economic rewards and sanctions affect the behaviour of workers and modify the impact of economic rewards. While motivating workers, these factors should be taken into account.

[10] Mayo, *op. cit.*

2. Group Influence. Workers being social beings, they create groups which may be different from their official group. In fact, groups are formed to overcome the shortcomings of formal relationships. The group determines the norm of behaviour of members. If a person resists a particular norm of group behaviour, he tries to change the group norm because any deviation from the group norm will make him unacceptable to the group. Thus, management cannot deal with workers as individuals but as members of work group subject to the influence of the group.

3. Conflict. The informal relations of workers create groups, and there may be conflict between organisation and groups so created. The conflict may be because of incompatible objectives of the two. However, groups may help to achieve organisational objectives by overcoming the restraining aspect of the formal relations which produce hindrance in productivity. Conflict may also arise because of maladjustment of workers and organisation. As the individual moves through the time and space within the organisation, there constantly arises the need for adjustment of the individual to the total structure. In the absence of such adjustment, either individual progresses upward at a rapid pace or the organisation structure itself may change over the time while the individual remains standstill. In either event, the change takes place in the position of the individual with respect to organisation structure, hence adjustment is required.

4. Leadership. Leadership is important for directing group behaviour, and this is one of the most important aspects of managerial functions. However, leadership cannot come only from a formally-appointed superior as held by earlier thinkers. There may be informal leader as shown by bank wiring experiments. In some areas, informal leader is more important in directing group behaviour because of his identity with group objective. However, a superior is more acceptable as a leader if his style is in accordance with human relations approach, that is, the superior should identify himself with the workers.

5. Supervision. Supervisory climate is an important aspect in determining efficiency and output. Friendly to the workers, attentive, genuinely concerned supervision affects the productivity favourably. For example, in the bank wiring room experiments, an entirely different supervisory climate—more friendly to the workers and less use of authority in issuing orders—existed which helped in productivity, while in regular departments, supervisors were concerned with maintaining order and control which produced inhibiting atmosphere and resulted into lower productivity.

6. Communication. The experiments show that communication is an important aspect of organisation. Through communication, workers can be explained the rationality of a particular action, participation of workers can be sought in decision making concerning the matter of their importance, problems faced by them can be identified, and attempts can be made to remove these. A better understanding between management and workers can be developed by identifying their attitudes, opinions, and methods of working and taking suitable actions on these.

Evaluation of Hawthorne Experiments

Though Hawthorne experiments have opened a new chapter in management by emphasising the importance of social factors in output, it is not without fault. The experiments have been widely criticised by some behavioural scientists because of lack of scientific objectivity used in arriving at various conclusions. Some critics feel that there was bias and preconception on the part of the Harvard researchers. One writer developed a detailed comparison between the conclusions drawn by the researchers and the evidence presented, and found that their