test book elaborating the behaviourist thesis but even before that he had delivered some lectures on the subject at Columbia University. Hence, it is believed that behaviourism had its origin in his text book and the preceding lectures which he delivered in and about the year 1912. He also expressed his behaviourist learnings in a book on psychology which he published in 1919.

According to the behaviourists, psychology is a purely experimental branch of the natural sciences the object of which is to elaborate, control and predict behaviour. The behaviourists attempt at improving the psychological methodology then it become scientific. Hence they are opposed to the use of the introspection method. Watson refuted the existence of such a thing as consciousness from the domain of psychology. Other behaviourists object to the use of such concepts as mental states, mind, volition, image and others. They wish to analyse and understand all behaviour and conduct in terms of the stimulus and consequent response to the stimulus. Under the leadership of Watson the behaviourist school arose as a protest against functionalism and structuralism, and the younger generation of psychologists accepted the leadership of Watson because they believed that he was against psychological traditions. Watson placed much reliance on the element of environment in personality development. It was his confident belief that by making appropriate changes in the environment it is possible to make whatever one wishes of an individual. And because of this belief it became possible to visualise a society in which there were no ills because the frailty of the human element could be eliminated through psychology. One consequence of this was that Watson, in addition to being the leader of a new psychological group, also became a popular leader of his nation. In one other field, that of animal psychology, Watson has contributed as much by his concentration on research and experimentation. Much of his own research had been confined to the field of animal psychology for he had believed that by carrying on experiments upon the animals it was possible to learn many important facts concerning human beings. Hence, he stressed the need for increased research in animal psychology.

2.2 Tenets of Watsonion behaviourism

Taking the behviourist standpoint Watson offered novel explanations of the different mental and other processes, traditionally the subject matter of psychology. He also put forth numerous new ideas on the subject. A short account of them will clarify his contribution to psychology and the influence he had on its development. The ideas of the man are the following :

1. Explanation fo behaviour :

Watson attempted to explain all internal and external, acquired and instinctive, behavour of men and animals through stimulus–response or S. R. All behaviours (Stimulis-Response) have their beginning in some stimulus, In a visual sensation the stimulus is light wave where as in an activity sensation sound waves serve as stimuli. A stimulus eliits a response in the living

organis, responses that are either internal or external either acquired or instinctive. Many complex reactions or responses are developed in individuals on account of the leaning that takes place during some of his activities.

2. Sensation and perception :

In view of the fact that much of his research was confined to animal psychology it is not surprising to note that Watson did not put much faith in the verbal report method. Instead he used what he called verbal response. When a person sees yellow colour and says that he sees yellow this saying so constitutes his verbal response. But in actual fact Watson could not prove how verbal differs from verbal response. Watson did not believe in any sensation and perception apart from the response of the senses and the organism.

3. Memory Images :

According to Watson behaviour is the outcome of motion in the senses and muscles; he did not believe in the concept of memory images. He tried to illustrate or to establish that the so-called memory images are not other than the reaction of the senses and muscles. For example, reactions of the eye muscles and latent sound motions form part of any image formed by the eyes.

4. Feeling and Emotion :

According to Watson feelings are also sensory moter activities. The feeling of pressure, for example, is the outcome of various sensations received from the sense organs and the consequent motion in muscles. In explaining the phenomenon of emotion Watson resorts to purely psychological considerations and points out that it is the outcome of a definite and pronounced imbalance between the total organism and the visceral, along with the glandular organisation or system. It is possible to see varying patterns of visceral and glandular activity, during different emotional states. According to Watson, then, in an unusual state certain internal and external changes take place in the organism. Through his research on the basic emotions like, fear, anger and love, and their expression in children Watson tried to prove that the other emotions are all acquired, and that the principle of conditioned reflex work in the acquiring of these emotions.

5. Learning :

In his explanation of the phenomenon of learning Watson enunciated the law of use, replacing the law of effect suggested by Thorndike. According to Watson in learning, the principles of recency and frequency work, both of which are comprehended under the law of exercise. In this way Watson believed that to begin with, all learning is done by trial and error, and consequently this is the method to which he grants recognition. Later on, he tried to explain all learining on the basis of conditioned reflex or response, a theory propagated by Pavlov the Russian physiologist. The truth of the matter is that Watson's theory parallels the older notion of

associationism because he could not offer any satisfactory explanation of may elements, such as, reinforcement in Pavlov's theory.

6. Thinking :

Thinking was also given a behaviourist explanation in terms of latent motor activity by Watson. It was his belief that all behaviour is sensory motor activated. It is often observed that some children and quite a few grown ups think aloud, but on the other hand, the majority of adult people think without talking aloud. It was Watson's view that the reason behind the change was that external activity was replaced by some internal behaviour. According to this theory the vocal organs function during thinking out their movement is so subtle that it is not perceptible. One often sees movements of the tongue and face during thinking. One direct effect of this Watsonian explanation was the immediate increase in experiments on this subject and it was found in many of them that some activity of the vocal organs is almost inevitable in thinking. But there was no way of finding out how this activity would differ with differing kinds of thinking. Besides, all experiments did not prvide evidence of this activity.

7. Environmentalism :

Watson placed greater stress on environment than on heredity as factors in the development of personality although this does not have much of a connection with behaviourism. Watson declared that if he were given the authority to condition a normal child's environment completely he could turn that child into anything, doctor, engineer, artist, scientist, advocate, businessmen or any other kind of specialist. He could even turn him into a beggar or a thief, irrespective of the intelligence of its parents, their tendencies, abilities business, race, etc.

2.3 Criticisms of Watson's Behaviourism

Psychologists have criticized both primary system and secondary system of Watsonian behaviourism. We have seen that this primary system includes definition of psychology, methods of psychology, mind-body problems, etc. In other words, his primary system includes both methodological or empiricial behaviourism and metaphysical behaviourism. Some of the major criticisms of his primary system may be outlined as under :

1. William McDougall was one of the major critics of Watson's system. Watson had completely rejected theory of instinct by 1925 which was the base of McDougall's psychology. Attacking Watson, McDougall pointed out that denial of consciousness and mind as well as total rejection of method of introspection eliminated a great deal of valuable and legitimate data in psychology. For example, when consciousness is denied, the functional relations of conscious experiences, that is, their dependence upon external or bodily conditions could not be studied. Thus Watson was charged with narrowing the scope of psychology and limiting it to the study of overt behaviour.

R. S. Woodworth (who always showed a disliking for Watson from beginning) also

criticized watson's denial of consciousness and his overemphasis upon the study of objective behaviour. Woodworth (1948) pointed out that such emphasis upon objectivety, in fact, will block future researches in the area of sensation and perception. He also criticized Watson's effort to study afterimages. He also criticized Watson substitution of method of verbal report for method of introspection. He has rightly concluded, "We may conclude that verbal report is not a behaviouristic method and that Watson's use of it is practically a confession of defeat for methodological behaviourism." (Woodworth, 1948, p. 84). Boring (1950), giving a somewhat different level of argument, has also criticized method of verbal report.

This criticism has been replied by Watson and some other behaviourists. We have already dealt with Watson's reply.

2. Watson has also been criticized for his attempt to translate some mentalistic concepts like wishes, meaning, thoughts, etc. into behaviouristic language. Such mentalistic concepts, in fact, weakens the methodological behaviourism in its emphasis upon objectivity. Heidbreder (1961) has very rightly commented that verbal translations of mentalistic concepts such as wish which is an organic set, meaning of which is nothing but bodily attitude, and thoughts which are simply language mechanisms etc. create an impression of scientific and objective explanation where as the reality is that they have been simply defined in behaviouristic language and made workable.

Although this criticism is held to be more appropriate one, it has also been replied. This is true that Watson could not do much with these translations in scientific way, it could certainly be regarded as one of his basic efforts to objectify the psychological problems. In later years Watson allowed the mentalistic concepts disappear from psychological scene rather than translate them into behaviouristic language.

3. Another criticism of Watson has been that in his various explanations he used implicit behaviour tendencies that were not directly observable. Thus he was charged with providing a contradictory framework in the sense that on the one hand he himself emphasized upon studying only objectively observed behaviour while on the other hand, he included implicit behaviour tendencies not observable directly. For example, in studying implicit speech he has tried to concentrate on implicit responses like tongue, mouth and larynx movements, etc. not observable directly albeit they were observable in Watson's view. Thus Watson was, in fact, backtracking the restriction upon psychology put by himself.

This criticism has also been replied. In fact there is no inconsistency in assuming implicit behaviour tendencies while attempting to study something in objectively observable frame-work. When Watson based his data on the study of observable responses, the assumed implicit responses no longer remained unobserved. Moreover, Watson was not the psychologist to include assumed implicit behaviour tendencies. Freud's explanation of subconscious processes, Hull's and Tolman's use of various intervening varibles in explanation of learning are also examples of such assumed implicit entities.

4. Some psychologists like Tolman (1932) has criticized Watson for either completely excluding purpose from his explanation of behaviour or treating it as a highly unimportant concept in such explanation. Tolman further said that Watson provided a molecular definition of behaviour in terms of its physological details. Tolman rejected this molecular definition and instead, provided a molar definition with emphasis upon purposiveness without nobody can do full justice to any psychological explanation.

Later Watson, in principle, agreed with Tolman that behaviour could be defined in molar behavioural terms because it is an 'emergent' in phenomenon having its own defining properties. Watson also accepted, in principle, that such molar behaviour could be analysed in terms of its physiological details.

5. Watson's stand on metaphysical behaviourism has also been criticized. We have seen (first point of criticism) that Watson rejected introspection but accepted verbal report – a point which in the eyes of many psychologists presented a contradictory stand and for which he was vehemently criticized.

The most severe attack upon Watson's metaphysical behaviourism was due to his argument against interactionism and outright rejection of mind. This stand on mind was criticized by both behaviourists like Hunter (1924) and non-behaviourists like Angell (1913), Bergmann (1956), Heidbreder (1961). Hunter opined that denial of consciousness or mind could never be a popular stand among psychologists. Heidbreder likewise, opined that if Watson outright reject the existence of mind or consciousness, his psychology will not be able to explain terms like thinking and emotion. Bergmann, even making a more bitter attack, pointed out that in order to establish no interacting minds, Watson asserted that there was no mind at all which was, of course, not only false but also silly.

Watson's stand on his secondary system that included environmentalism and determinism among others has also been criticized as under :

6. Critics pointed out that Watson "went overboard" in his position on extreme environmentalism. He altogether rejected hereditary and instinctive factors. He explained differences in behaviours of the persons as solely occurring due to environmental factors. Non–a-days with renewed interest in ethology and sociobilogy, most of the psychologists have also started the explanation of behavioural differences in hereditary and instinctual factors. Thus the pendulam has started swinging back.

Despite these criticisms, it can be said with reasonable confidence that Watson established psychology on a firm footing and shown the way for later experimental psychologists to expand their line of experimental researches. However, as structuralism is today no more, so also no great system like behaviourism does exist in its original form today.

2.4 Post Watsonian Behaviourism

A group of psychologsts emerged after Watson after he stopped writing and theorizing.

Such group of psychologists have been recognized as neo-behaviourist or post Watsonian behaviourists. Most historian agrees that there were six such important behaviourists – Edwin R. Gulthrie, Clark, L. Hull, B. F. Skinner, E. C. Tolman, J. R. Kantor and A. Bandura.

The readers must keep in mind that these behaviourists tried to develop their own theories keeping themselves basically within the general frame work of Watsonian behaviourism. Later Beheviorsts injected a new spirit to the dying body of Behaviourism as developed by Watson.

2.4.1 Edwin R. Guithrie (1886–1959) :

Guthrie was a behaviourist. He was an eminent psychologist. He obtained Ph. D. degree from the university of Pennsylvania in 1912. In 1958, he was awarded gold medal from American Psychological Association for his distinguished and outstanding contribution in Psychology.

Contributions of Guthrie :

Guthrie was the author of the following books :

(i) The Psychology of learning (1938)

(ii) Psychology : A First Couse in Human Behaviour, (1949, in collaboration with A. L. Edwards)

(iii) The Psychology of Human Conflict (1938)

The major contributions of Guthrie have been discussed below :

Learning by Continuity :

Guthrie also followed Watson, and he also studied only those behaviour which were observable and measurable. His theory is based on contiguous conditioning. He rejected Pavlov's conditioning, which was based on association by contiguity. He pointed out that "A combination of stimuli which accompanied a movement will on its recurrence tend to be followed by that movement." He also said that any stimulus pattern gains its full associative strength on the very first occasion of being paired with a response. This was called "single trial learning." As such, he rejected the importance of practice in learning. He also contradicted the view of S–R theories who had regarded practice as a fundamental ground or base for learning. Thus he made a distinction between act and movement. According to Guthrie movement is a pattern of muscular or glandular responses, while act is a series of movement that brings end result. He claimed that learning is a result of "single trial", he meant "learning of movement" and "not of act". Thus, his theory of learning is based on movement and not on act, and as such continuity alone explains association of stimulus and response movements. He also criticized Thorndike's 'law of effect' on the ground that it was based on 'acts' and 'not motivement'. To him, learning of simple acts does not require practice, only learning of complex and consists of several movements in learning through repetitions which in fact, becomes separate movements.

To be associated with exteroceptive, proprioceptive and introceptive elements of the stimulus situation the following is essential.

Motivation, Reward and Punishment :

Guthrie did not accept the importance of 'motivation' in learning as advocated by Thorndike Hull and Skinner. Guthrie replaced the role of reward and punishment by the principle of the last response. He pointed out that the last response is usually the lasting response. He supported his view-point by conducting several experiments on cats in puzzlie box, and found that the last response made by the bat in box is always repeated when it is placed in the box next. Vock (1954) also supported his experimental findings.

Regarding 'punishment' he said that it is much similar to motivation.

Extinction and Forgetting :

Guthrie also rejected the views of Pavlov regarding extinction and forgetting. To Pavlov extinction was the result of withdrawal of reinforcement or unconditioned stimulus. But Guthrie took a different view-point and said that, extinction and forgetting is the result of new response which weakens or destory the S. R. Connection, "thus in order to explain the concept of extinction he adopted the concept of associative inhibition. Associative inhibition means learning of some incompatible responses that obstructs the provious or original learning, as a result of which the previous learning is extinguished. He explained forgetting in a very similar way.

Breaking Habits :

According to Guthrie habit is formed due to the association of several stimuli. The geater the number of stimuli, the greater will be the habit.

Guthrie has pointed out three methods of breaking habits. They are :

(i) Threshold Method :

According to this method, the low threshold of stimulis can reduce the possibility of its future occurrence. This method is used for eliminating emotional response, like, fear and anger.

(ii) Method of Fatigue :

According to this method the stimulus which produces an undesirable response is associated unit stimuli that evoke a different but incompatible response. Gradually, the original stimuli becomes attached to the new response, thus eliminating the old undesirable response.

Prediction and Control :

Like other behaviourists, Guthrie belived that the aim of psychology should be prediction and control. His methodological position was one of the radical empiricist who was not ready to accept anything beyond our sensory perception.

However, the contributions of Guthrie has been subject to the following criticisms :

(i) Thorndike and Hull have criticized him on the ground that he has overlooked the impact of motivation (i.e. reward and punishment) on learning. He has completely ignored the role of motivation re-enforcement, which is a vital issue of learning process both in animals and human beings.

(ii) On the basis of few experiments he has calculated that animals show repetitious and stereotyped responses. He has also ignored the importance of individual difference in learning.

(iii) Some psychologists have also criticized Guthrie on the basis that he has tried to explain too much on the bases of few experimental evidences.

(iv) Guthrie has also failed to provide adequate experimental support in favour of his theory. In fact he depended much on anecdote, which cannot be regarded as substitute for experimental facts.

2.4.2 Clark L. Hull (1884–1952) :

Hull's system was influenced by many eminent psychologists and scientist. Specially, he was very much influenced by Darwin, who had emphasised individuals, biological adaptation to the environment. Not only that, we find reflection of Pavlov, Watson, Thorndike and Woodworth in his system, his contributions in the field of learning is worth appreciation. In his opinion, learning took place, when the needs were fulfilled and a biological equilibrium was established. He was very much influenced by Pavlov's work on conditioned reflex. He also adopted his concept of reinforcement, as a fundamental base or ground for learning. He was also influenced by Thorndike, who had considered reinforcement or role of motivation as a fundamental concept of learning. But Hull made distinction of the interpretation of the effects reward on learning. To Thorndike, reinforcement was effective as it produced satisfaction in the organism, where as Hull viewed that reinforcement reduces drive in organism.

As a behaviourist, Watson also influenced Hull's system. In brief Hull's system may be considered as S–R Psychology. Hull was also influenced by Woodworth's S–O–R formula.

Main Contributions of Hull :

Hull widely used hypothetic-deductive methods in formulating his theory. He defined his theory as systematic dedcution of secondary principles of observable events from some limited postulates. He believed that psychology is not only based on observation, but observation and theory go together.

Hull's system was based on several postulates and corollaries, which are summarized below :

(i) His first postulate deals with neural activities in brain following a sensory input. According to this postulate a gradual decay occurs in neural extination and in the process of interaction it leads to the occurrence of several sensory impulses at a time, one impulse tend to modify other.

(ii) Hull's second postulate refers to the role of reinforcement in learning. According to him when a response (R) is closely in association with the stimulus trace (S) and when such S–R connections are closely related with a rapid decrease in drive produced stimuli (SD) it elicits and increment (—) in the tendency for that S to evoke that response (R). He also mentioned that the rapid decrease in goal stimulus (SG) is also reinforcing.

(iii) His third postulate contains two vital corollaries that directly influence learning. His first corollary is related to secondary drive, and second to secondary reinforcement. He also pointed out that when a neural stimulus is constantly associated with the primary drive, such stimulus may acquire the capacity to produce a state, just as it is occurred by primary drive. This is called secondary drive. He also pointed out that secondary reinforcement is a stimulus that acquires the property of reinforcing a response due to its association with the primary reinforcement.

(iv) The fourth postulate of Hull's system is related to learning and habit formation. He called it as habit strength. According to this postulate, habit strength depends upon the number of reinforcement trials.

(v) His fifth postulate is related to primary drive (D), which is kind of intervening variable, to which Hull has given due importance in his system. According to him, 'Drive is a temporary state of the orgainsm that depends upon our bodily requirement, i.e. what the body needs. It is also the result of painful stimulus.

(vi) His sixth and seventh postulates were also related to learning. The sixth postulate indicated stimulus intensity (V). This (V) refers that a probability of a response increases as the intensity of the stimulus increases.

(vii) His seventh postulate is related to incentive motivation (K). It is a type of 'pull' factor, which shows the effect of motivation.

(viii) His eighth postulate refers to reactional potential (SER). It is a tendency to evoke response towards given stimulus. Hull has pointed out that, when the conditions have been constant throughout learning situation, the (SER) becomes equal to the multiplicative product of habit strength (SHR) drive (D), stimulus intensity dynamism (V), and incentive motivation (K) minus inhibitory (I). The general equation of reaction potential (SER) is thus :

$$SER = SHR\ (D \times K \times V) - 1$$

(ix) The ninth postulate of Hull deals with inhibition (I) or inhibitor's potential. He has divided inhibition into two categories, i.e.

(i) reactive inhibition (g).

(ii) conditioned inhibition (SIR).

Reactive inhibition is tendency that restricts or inhibits response that has just been made. Thus it is also called a negative drive. The amount of efforts required to make the response is similar to fatigue, pain or tissue injury.

In brief, it can be said that Hull's system consists of a series of postulates and corollaries, that are concerned with drive and reinforcement and response strength. His theory of learning is based on the idea that, learning increase gradually as reinforced practice advance. As such, Hull's theory of learning is also known as incremental theory of learning."

But Hull's theory of learning was criticized on the following grounds :

1. His theory was mathematical and too complex to understand.
2. Hull was a behaviourist, but at the same time he banked upon inferred states and intervening variables. His idea about stimulus trace was purely subjective.
3. Koch has also pointed out that his system was very difficult and was mainly based on logical assumptions.
4. His experimental findings were also confined to white rats with a few exceptions to studies conducted on human beings.

2.4.3 B. F. Skinner (1904–1989)

Skinner was also interested in studying various principles of learning. He used rats as subjects in studying these principles of learning. He used as instrument which was called, 'Skinner Box'. He called it as an 'operant conditioning chamber'. This box became very popular in the study of conditioning. His conditioning theory was called instrumental or operant conditioning theory'.

Main contributions of Skinner :

Skinner's system is very close to Watson but opposed to Hull. The contributions of Skinner have been discussed as follows :

1. Conditioning :

Skinner on the basis of his experimental findings propounded the theory of "operant conditioning". He made a distinction between two types of conditioning. Type conditioning and Type–R conditioning. Virtually he divided responses under two categories– (i) Respondent response, and (ii) Operent response.

Respondent response is that which is evoked by a given stimulus. But in operant response it is not elicited by any specified stimulus. Such behaviour is operated on the environment. The conditioning of respondent behaviour is called Type–S conditioning. In Type S conditioning reinforcement is associated with stimuli. The S–type conditioning was very similar to Pavlovian classical conditioning.

Reinforcement was pivotal in his operant conditioning. According to Skinner, "if the occurrence of an operant is followed by the presentation of a reinforcing stimulus, the strength

is increased." The effect of reinforcement has been described by Skinner in different ways. According to him reinforcement is effective because it is presented in a situation as a consequence of certain response.

Skinner has also recognized the effect of negative reinforcement, or negative reinforcer.

The schedules of reinforcement was also an important aspects of Skinner's operant conditioning. This term refers to a pattern followed in presenting reinforcers after response have been emitted by the organism during experimentation. Skinner divided the schedule of reinforcement as continuous reinforcement and intermittent reinforcement.

In his operant conditioning he has also included secondary reinforcement, extinction, discrimination, differentiation and aversive conditioning.

2. Drive :

Skinner was a behaviourist. As such, he defined drive operationally, i.e. in terms of hours of deprivation of food, water etc.

3. Emotion :

Skinner, explained emotional behaviour in terms of situations or circumstances that affects the probability of a particular response to occur. Regarding anxiety he has said that, it is not something like inner state of the organism, but it is a set of some predisposition's to act in a certain way towards circumstances or situation.

4. Shaping of Behaviour :

According to Skinner animals can be trained to perform complex tasks through shaping. That is, the behaviour of the organism can be gradually shaped or moulded through a series of successive approximations by selecting reinforcement for some response and not for other responses. He has also used shaping for moulding the superstitious behaviour.

5. Verbal Behaviour :

Skinner also believed that speech like other forms of behaviour develops due to contingencies of reinforcement. In his book, 'Verbal Behaviour', he has recognized several forms of verbal behaviour, e.g., autoclitic behaviour, echoic behaviour, and textual behaviour.

6. Programmed Learning :

Skinner method of programmed learning involves the basic principles of shaping and continuous reinforcement. In this method an item is presented to the subject, who is required to write his own response in the space provided. The subject gets opportunity to correct his own response, which acts as a reinforcement. This is a type of programmed learning in modern days due to rapid increase in the use of computer, computer-aided instruction (CAI), is rapidly replacing Skinnerian programmed instruction on learning.

7. Behaviour Modification :

Behaviour modification is a type of behaviour therapy, in order to bring change and modification in an undesirable behaviour, through shaping, selective use of positive reinforment and extinction. Skinner's technique of behaviour modification has yielded fruitful results in the case of thumb sucking, autistic children, schizophrenic symptoms, and the behaviour of mental defective.

8. Beyond Freedom and Dignity :

In his book 'Beyond Freedom and Dignity', Skinner has discussed the solution of various social problems. According to him for effective solution of problems of human being a technology of behaviour can be applied. The main principle of technology of behaviour is found in the contingencies of reinforcement. He has considered man as autonomous, and self–composed. Man is affected by the force of the environment. Some of the forces are aversive. Thus freedom means to be free from these aversive forces. According to him 'dignity' is what a person attributes to oneself. He further points out if the aversive controls are eliminated, the idea of dignity becomes meaningless.

Criticisms of Skinner's System :

The best known criticism of Skinner's work is made by Chomsky (1959). In his thirty-two pages of review of verbal behaviour, he analyzed Skinner's formulation with great care and criticized it with great effectiveness. He devoted a great deal of attention to the term stimulus, response, reinforcement, since these are critical terms in Skinner's account of verbal behaviour.

Chomsky noted that in bar-pressing experiments reinforcer is an identifiable stimulus and that statement about reinforcement, therefore, have a meaningful, referent. He further said that the extension of the concept of reinforcement to the explanation of verbal behaviour is completely unjustified. In support of his criticism, he cited from Skinner a number of examples in which the term reinforcement did not refer to identifiable stimulus. Skinner often used 'automatic self reinforcement (not identified as stimulus) as an explanation of why varbal behaviour is maintained. Chomsky (1950) said of such usage, "In fact, the term is used in such a way that the assertion that reinforcement is necessary for learning and continued availability of behaviour is likewise empty."

2.4.4 Edward Chance Tolman (1886–1959) :

Tolman was a behaviourist, and his theory of learning was almost similar to stimulus response theory, He explained his theory on a set of non-observable intervening variables. He is regarded as behaviourist because he supported stimulus response interpretation by defining stimulus and response in his own way. For him stimulus is a kind of perception of evironmental events. Further, he did not accept that response is a combination of muscles or glandular secretions, but in behaviour, defined in terms of end results or goal. Tolman was a purposive

behaviourist.

System of Tolman :

Tolman has elucidated his system in his book 'Purposive Behaviour in Animal and Man'. For convenience the system of Tolman has been divided into four parts–

1. Independent varibale;
2. Dependent variable;
3. Intervenng variables,
4. Theory of learning.

A brief discusion of the above system are as follows :

1. Independent Variable :

To Tolman independent variable is a major causative factor of behaviour. These variables can be manipulated and measured by experimenter. In the beginning he recognized five such variables, and behaviour was explained on the basis of these variables. He presented these variables in terms of following equation :

B = f (S, D, H, T, A)

Here, S = environmental stimulus
D = Physiological drive
H = Heredity
T = Previous Training
A = Age
B = Behaviour

2. Dependent variable :

Tolman defined dependent variables as those behaviour which are overt or observable. He was not concerned with observable behaviour. He divided such behaviour into two types– simple reflex and docile behaviour. Docile behaviour has many characteristics, it is molar, purposive, cognitive and plastic.

3. Intervening Variable :

Tolman was the first psychologist who introduced the concept of intervening variable in psychology. According to him there are a set of inferred and non-observables that intervene between the observable independent variables and dependent variables. In 1938, he made a list of six intervening variables, such as demand (for food), appetite, differentiation, motor skill, hypothesis and biases.

4. Theory of Learning :

Tolman's theory of learning is called 'sign learning theory'. According to this theory what is learnt was not a series of muscular or glandular movement rather meanings, that is,

organism learns sign-significates relations, or sign gestalt. In other words it learns a behavioural route to goal or need.

Tolman (1949) added six types of new learning or connections in his theory. To explain these concepts he took the help of concepts proposed by Freud and Lewin. These are as follows :

(i) **Cathexis :** This concept owes from Freudian psycho-analysis, which is very similar to Lewin's concept of valence. According to Tolman, cathexis is a tendency to seek particular goal rather than some other goal. Thus a particular drive, a cathexis of that particular drive on that particular goal object is formed or learnt.

(ii) **Equivalence Beliefs :** It is a type of belief that not only reward or punishment will be given in a particular situation but also the belief that the situation itself is equivalent to that particular reward or punishment.

(iii) **Field Expectancies :** It is a type of cognition that, "what leads to what". In other words, it is sign gestalt what organism learns, is a route from one place to another. As such a cognitive map is formed as a field expectancies.

(iv) **Field Cognition Modes :** This is a higher order modes of expectancy. It reflects organism's inclination to learn certain things. To be more clear, we may say that it is our ability to use language in a variety of learning situation.

(v) **Drive Discrimination :** This indicates our ability to differentiate among different type of drive. This concept was derived from Hull (1933) and Leeper (1935).

(vi) **Motor Patterns :** The concept of motor pattern was never important for Tolman. As such he suggested that, analysis of such skills by Guthrie in terms of stimulus response connection was to some extent acceptable.

Tolman's Theory of Learning :

Tolman's theory of learning is based on experimental evidence. Three types of experimental evidences are frequently cited in support of his theory. These are briefly discussed below :

(a) Reward–Expectancy Experiments :

Expectancy has been one of the most important intervening variable in Tolman's theory of learning. According to him, the organism develops certain expectation, the confirmation of which form the base for development of cognitive map. This phenomena of expectancy has been confirmed through several experiments. In his experiment on monkeys Tinkle Paugh (1928), said that the monkey readily choose the container having banana.

(b) Place Vs Goal Learning :

In Tolman's theory expectation of the animal was more important than reinforcement. In

his theory Tolman made distinction between 'learning' and 'performances'. According to him no reward and reinforcement is required for 'learning'. Learning took place even in the absence of reinforcement. Such type of learning was called, 'latent-learning'. Tolman has defined, 'performance' as an overt expession of what has been learnt." This phenomen of latest learning was demonstrated by experiment of Tolman and Honzik (1930). In this experiment rats ran the maze in three different groups separately. First group was given no reward after reaching goal box. Second group was given food in the goal box after completion of each run. In this experiment it was observed that the delayed rewarded group did not show any marked impovement in performance in the first ten days. But in eleven days its performance abruptly improved and became equivalent to continuously rewarded group, when after eleven days they were given food in the goal box. From this experiment Tolman and Honzik concluded that in absence of reward or reinforcement delayed reward group had learnt the special relations but those were latent.

Thus we can conclude that Tolman was a behaviourist and his molar interpretation of behaviour and many interpretation of latent learning experiments and place learning experiment made him a popular and distinguished psychologist.

Tolman's purposive behaviourism has been criticised on the following grounds :

Tolman's emphasis on molar behaviour was not accepted by some behaviourists. Further, his modifications made behaviourism more undesirable and unacceptable to many behaviour psychologists. In the words of Marx and Hillix, The verdict of history has clearly favoured Tolman, particularly in case of "purpose"; the science of cybernetics has objectified and precisely defined what is for a machine to have purpose, so that there are few left in or out of psychology who would maintain that the concept is unacceptable."

Tolman has also been criticized on the ground that he has used too many variables and too many questions that remained unanswered.

Tolman has emphasized overt behaviour but at the same time he has introduced many covert varables.

Despite these criticisms Tolman's contribution in Psychology cannot be denied and ignored. He was the first psychologist who introduced the concept of intervening variable in psycholgoy. His concept of intervening variable was also accepted and upheld by other behaviourists.

2.5 Difference Between Early Behaviourism and Later Behaviourism

Behaviourism :

The champion of early behaviourism was Watson. Later behaviourists prefered to retain the general framework of Watson but at the same time tried to improve upon his system. As later behaviourists, the contributions of Hull, Guthrie, Skinner, Tolman, Bandura are worth

mentioning. A careful scrutiny of the contributions of these later behaviourists indicates that throughout their writings and research work they have tried to maintain the basic tenets of early behaviourism. However, later behaviourists differ from early behaviourists in their outlook as under :

1. Today we accept only some of the concepts of Watson's behaviourism but his system as a whole is no longer appreciated. But the concepts and ideas of later behaviourists are up to date and are widely appreciated by modern psychologists.

2. The early behaviourists have shown interests in the study of various psychological phenomena such as memory, emotion, thinking, learning, etc. Thus their approach was wider and scattered one. But later behaviourists tried to concentrate upon some basic fields such as learning and motivation only. Thus the approach of later behaviourists was more pin-pointed as compared to the approach of early behaviourists.

3. The concepts, viewpionts and theories of later behaviourists were based upon controlled evidences and experimental supports whereas this was not the case with early behaviourists. Their viewpoints, concepts and theories were mostly intuitively supported. They had little experimental support.

4. One subtle difference between early behaviourists and later behaviourists was that in considering the issue of how a person may improve himself Watson did not mention any technique of improving the behaviour of the person or any techniques of behaviour modifications as we know them today. He simply talked about education in a very general sense to be effective for bringing any improvement in behaviour. But later behaviourists paricularly Skinner gave special attention to behaviour modifications and also spelled out the various techniques of behaviour modifications.

Despite these difference, later behaviourists are said to rely mainly upon those principles which were enunciated earlier by Watsonian behaviourism.

2.6 Summary

Watson is taken as the father of behaviourism. Behaviourists believe that psychology is an experimental branch of natural science the object of which is to elaborate, control and predict behaviour. Watsonian behaviourism has several tenets. They are explanation at behaviours, sensation and perception, memory images, feeling and emotion, learning, thinking and evironmentalism.

J. B. Watson made a revolution in the field of psychology. He developed psychology. He developed psychology as an objective study of behaviour; animal and human being both. Important points are as below :

1. He brought psychology out from the controversy of mentalistic approach. He proposed completely objective psychology.

2. He was an extreme environmentalist. According to him environment was much more important than heredity in the determination of behaviour.

3. According to him, conditioning was the key to the understanding to behaviour. His famous passage which emphasizes the importance of environment : "Give me a dozen healthy infants, well-formed and my own specified world to bring them up in, and I will guarantee to take any one at random and train him to become any type of specialist. I might select-doctor, lawyer, artist, etc. and yes begger man and thief regardless of his talents, tendencies, abilities, vocations and the race of his ancestors."

4. The subject. matter of psychology is human and animal activity which can be observed and measured in an objective way.

5. The purpose of psychology is to predict the response and the control the behaviour of human beings and animals.

6. Consciousness, if at all exists, is not the subject for scientific study. The unit of behaviour is reflex or stimulus response (S–R) connection. Behaviour is composed of response elements and can be successfully analysed by objective scientific methods.

7. The chief method of psychology is conditioning. He rejected introspection as the method of studying behaviour. There is an immediate response of some sort to every effective stimulus; every response has some kind of stimulus. There is, thus, a strict cause and effect determinism in behaviour.

Watsonian behaviourism has been criticized on six different grounds. First, McDougall and Woodworth criticized Watson for his denial of consciousness, mind as well as total rejection of method of introspection.

Second, Watson's efforts to translate some mentalistic concepts like wishes, meaning, thoughts, etc., into behaviouristic language has also been criticized.

Third, Watson has also been criticized for using implicit behaviour tendencies that were not directly observable.

Fourth, Tolman (1932) has criticized Watson for either completely excluding purpose from his explanation of behaviour or treating it as a highly unimportant concept in such explanation.

Fifth, Watson rejected introspection but accepted verbal report which was obviously a contradictory stand and vehemently criticized by several psychologists.

Sixth, Watson's extreme postion on environmentalism has also been criticized.

1. A group of psychologists who tried to develop their own theories remaining basically within the general framework of Watsonian behaviourism was called as neo-behaviourists or later behaviourists, E. R. Guthrie is one such behaviourist. Among other things, he is well known for his theory of learning by contiguity, Guthrie undermined the importance of motivation, reward and practice in learning. He postulated three methods of breaking habits, particularly

undesirable habits. Those methods were : threshold method, method of fatigue and method of incompatible stimuli. Although Guthrie's theory in general, lacks experimental support, it has also proved hard to be disproved.

2. C. L. Hull is another later-behaviourist who formulated his system that later became very dominant in psychology. In formulating his system he was influenced by Darwin, Pavlov, Watson, Thorndike and Woodworth. Hull's system consists of 17 postulates and several corollaries. He extensively used hypothetico-deductive method in formulating his theory. He postulated several intervening variables like SHR, D, KL, SER, IR, SIR etc. in explaining his theory of learning. Hull's system was also supported by several experimental evidences provided either by Hull himself or by his colleagues. Despite all these, Hull's system was criticized.

3. B. F. Skinner was another important later-behaviourist who carried the basic formulations of early behaviourism on a controlled and experimental footing. He is well known for his psychology of operant conditioning with several experimentations on rats in Skinner box and on pigeons in pigeons box. His viewpoints about shaping, superstitious behaviour, verbal behaviour, teaching machines and programmed learning were highly important. Despite these valuable contributions Skinner's behaviourism has been criticized.

4. E. C. Tolman well known for his purposive behaviourism, formulated a system that was based upon a set of intervening variables. In fact, he is credited with being the first psychologist who introduced intervening variables in psychology. He exaplained leanng in terms of cognitive map that is built up by strengthening the expectancy at each choice point in the maze. His theory of learning was divided into two parts–the "1932 version" and the "1949 version". Three popular and independent lines of experimental evidences were offered in support of Tolman's theory of learning. They were : reward expectancy experiments, place or goal earning experiments and latent learning experiments. in "1949 version" he added six types of new learning : Cathexis, equivalence belief, field expectancies, field cognition modes, drive discrimination and motor patterns.

2.7 Key Words Used

Behaviourist school,	behaviourism,	experimental,
Scientific,	image,	response
element,	personality	explanation
mental	traditionally,	internal
external	instictive	stimulus
living	organism,	sensationsense
organ	reaction,	phenomenon
emotion	recognition,	thinking

motor	activity	vocal organ
environmentalism	heredity	conditioning,
objectivity,	verbal	observation,
motor	structuralism	association,
motivation	forgetting,	habit,
threshold	fatigue,	extropection,
introspection	intervening varible	reinforcement
habit strength	stimulus increases,	dynamism
reaction potential	reaction inhibition	cathexis
independent variable	dependent variable,	cognition.

2.8 Questions for exercise

2.8.1 Short answer type questions :

1. Explain the main criticisms of Watsonian behaviourism.

   Ans : see 1.3

2. Point out the difference between Watsonian behaviourism and Post-Watsonian behaviourism.

   Ans : see 1.5

3. What do you understand by behaviourism ?

   Ans : see 1.1

2.8.2 Long answer type questions :

1. Evaluate the contribution of Watson to the Growth of behaviourism.

   Ans : see 1.1 and 1.2 and 1.3

2. Explain in short the contribution of Guthrie, Hull, Skinner, and Tolman to the growth of later behaviourism.

   Ans : see 1.4.1 to 1.4.4

2.9 Suggested Readings

1. Sharma, R. N. : History and School of Psychology
2. Wodworth, R. S. and Shuhan, M. R. : Contemporary Schools of Psychology
3. Singh, A. K. : Manovigyan ke sampradaya avam Itihas
4. Azimur Rahman & Ashraf Jawed. : Monovigyan Ka Sanxhipt Itihas

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Gestalt Psychology

Lesson Structure

3.0 Objective of the Lesson

The main objective of the lesson is to throw light on the concept and tenets of Gestalt Psychology. Anothor important objective of the lesson is to discuss about the contributions of Gestalt Psychologists in the area of perception, learning, thinking and memory. One important objective of this lesson is also to illustrate Gestalt school as a system. In this way the obectives of the lesson is multifaceted. Besides, a summary, key words used, questions for exercise and suggested readings will also be given for the convenience of the learners.

3.1 Introduction to Gestalt School of Psychology

Gestalt school of Psychology developed as a movement against the theory of behaviourism and conditioning. Gestalt school in its present form developed by the continuous contribution of psychologists from time to time. Though formally it developed in the last part of

first decade of the 20th century, but its beginning may be traced back to the initiative at Wurzburg school of imageless thought. Kulpe who studied higher mental process redefined psychology as "the science of facts of experience.... an inductive science whose peculiar property is the dependency of facts of experience upon experiencing individuals." Max Wartheimer who afterwards became the founder of Gestalt Psychology worked with Kulpe for his Ph. D. degree. The Wurzburg school from (1901–1909) conducted a number of experiments on thought process which had direct relevance to Gestalt school of psychology. The next important contribution was made by Edgar Rubin (1986–1951) who conducted experiment on visual perception of figure ground phenomena.

The Gestaltists opined that perception is not the mere aggregate of sensations and past experiences. It cannot be elaborately explained on the basis of past experiences. The real form of the object is to be taken as a whole. In German the word for form is Gestaltion, while in English it is gestalt. This gestalt approach to perception is very important. A face is beautiful because of the effect of its gestalt. This theory on the subject of perception was first introduced in psychology by the gestalt psychologists. In 1912, Wertheimer announced, on the basis of his experiments, that the perception by the various sense organs, eyes, nose, ear, tongue etc. takes place as a whole. The tune issuing from the harmonium is very pleasant, but if this tune is analysed into its notes, the tune vanishes.

According to the gestalt theory, perception is fixed or controlled by the psychological activities in the nevous system which result from the stimulation from physical objects. Whatever the person sees depends to a great extent upon the sensations from the perceived object.

3.2 Contribution of Gestalt Psychology in the Field of Perception

(i) Part-whole psychology :

Gestalt psychologists have made it clear that there is a distinction between whole and its parts (as we experience them) although prior to them a Chinese sage Lao-Tse in 700 B. C. had expressed the view that sum of parts was different from the wholes (Hartmann, 1935 : 9). Thus perceptual wholes are more than the sum of its parts. Such wholes emerge and have their characteristics which are different from the characteristics of the parts. The whole as given in experience has two major characteristics.

First, these perceptual wholes are unfilled wholes and not clusters of sensations. If we try to break whole, something new will emerge. It means the original characteristics of whole will be lost.

Second, Such perceptual wholes are separate and distinct from background.

Therefore, they are segregated whole and not simply wholes.

Thus by emphasizing upon the unanalyzable character of the perceptual wholes, the Gestalt psychologists were digging the base of elementalism of structural psychology.

(ii) Principles of organization :

Gestalt psychologists enunciated certain principles or laws that govern the organization of perceptual wholes. Wertheimer pointed out that these laws of organization were native and therefore, natural. Hence, they were also called as principles of primitive organization. Thus through these laws the Gestalt psychologists tried ot de-emphaize the role of learning in perception. There were several such principles of which the important ones are as under :

(a) **Principle of similarity :** Those objects which are similar in their structure tend to perceive as organized together into a whole.

(b) **Principle of Proximity :** These objects which are close together either in time or space would tend to be organized together.

(c) **Principle of continuity :** Also known as principle of good continuation or principle of direction, it states that objects that have continuity with each other tend to be perceived as flowing in the same direction and therefore, they are perceived as a figure.

(d) **Principle of objective set :** If we see a particular pattern of object and develop a mental set for it, it might be possible to continue to see that pattern even though the stimulus arrangements might be slightly changed.

(e) **Principle of pragnanz :** Also known as principle of good form or good gestalt or principle of pregnancy, it states that we tend to assume the best possible forms of the objects even though physical objects may be in developed and symmetrical form.

(f) **Principle of closure :** This is a special case of principle of good form. This principle states that when certain parts of the perceptual object is left out, we have a tendency to fill the gap and perceive accordingly by making the Gestalt complete.

(g) **Principle of figure and ground :** This principle states that any perception tends to organize itself into a figure that stands out upon a certain background. One major characteristic of 'figure' is that it is distinct and outstanding. Background is comparatively vague and indistinct. In reversible figure, the figure and the ground tend to shift back and forth as one fixes his eyes on it.

All these various principles of organization emerged partly from generalization from several Gestalt experiments and partly from the various theoretical models.

(iii) Object constancy :

From the various principles of organizations one basic generalization called phenomenon

of perceptual constancy has emerged. This phenomenon indicates that perceived objects tend to remain constant in size even when they are viewed from varying distances. As we know, due to variations in distance, the resulting retinal images do change. For greater distance the retinal image becomes small and for shorter distance the retinal image becomes large. Despite these variations in the ratinal images, the perceiver tends to perceive the object as remaining constant. This is called perceptual constancy and applies to every attribute of an object, namely, shape, brightness, size, colour etc. A boy observed from a distance of 5 or 15 feet distances perceived to be of the asme size. This illustrates size constancy. A piece of coal kept in shadow and when kept in sun, will be perceived as coal although the level of reflection of rightness in sun is greater than the level of reflection of brightness in shadow. This is called brightness constancy. Gestalt psychologists have also revealed that perceptual constancy is affected by the information regarding changing conditions. If such knowledge is not given to the perceiver, the perceptual constancy is reduced to a greater extent.

(iv) Field dynamics :

Since the Gestalt psychology is concerned with perceptual wholes, it naturally tends to explain field dynamics. For Gestaltists, a field is a dynamic whole or system in which changes in any one part affect the other parts (Boring, 1950). The dynamic field of psychological experience is person and his environment with which he makes interaction. This interaction forms the basis of behaviour. Such field contains various interaction forces or vectors on the analogy of the forces in electrical field. Gestaltists made it clear that not only our perception but also our thinking seems to be organized within a field of such forces. In the field of perception such forces maintain proper balance, symmetry and stability in the configuration. The law of pregnanz applies well to this field. Kurt Lewin went a step further and developed a new theory based on these field concepts. We shall discuss Kurt Lewin's field theory in chapter 15.

(iv) Phi-phenomenon and Isomorphism :

In Berlin in 1912 Max Wertheimer conducted a series of experiments on the perception of movement. In these experiments Kohler and Koffka had assisted him in several ways. In these experiments he observed that when the time interval between the two exposures of the same vertical line (second exposure a little right or left to the first exposure) was one fifteenth of a second, the subject reported the line to be moving the right or left. This illusion of movement was named as phi-phenomenon. If the time interval increased or decreased, the illusion of the movement stood abolished.

Since the perceptual field of movement was not identical to what happened actually, how could this be explained ? In order to explain this, the Gestalt psychologists formulated the principle of isomorphism. According to this principle there exists one to one relationship between what one actually perceived and what happened in brain although the correspondence between the two may not exist in exact form. Therefore, the relationship between the two is topological and not topographical. Explaining phi-phenomenon with the help of this principle,

Gestaltists assumed that there must be dynamic relation between two centres in brain stimulated by two flashes of light. This dynamic relations must be in such a manner that one area of brain influences the other area in a way similar to the flow of electricity across a poorly insulated gap.

In order to explain the principle of isomorphism in a still broader perspective, Woodworth (1948) used an analogy showing relationship between a map and the country it represents. Although the two are not the same but they bear the similarity in the sense that one can read the characteristics of the country from the map. The perceptual field and the physiological brain field demonstrate such direct relationship. To know what happens in the brain field, Gestalists assumed that there were two types of forces in braincohesive forces and restraining forces. The cohesive forces refer to the tendency of the excitations of nerve impulses in the brain that attracted each other provided there remains nothing to interfere with. Restraining forces refer to those excitations that prevented the cohesive forces.

In support of the principle of isomorphism the Gestalt psychologists have presented some meagre and indirect experimental support. Kohler and Held (1949) conducted one experiment in which EEG waves were recorded from the visual area of the brain when a test object was moved through subjecta' visual field. It was found that some changes did occur in the brain waves indicating the fact that there was some relationship between the perceptual field and the physiological brain field. They pointed out that if we fixate our eyes on a certain object for some time, say for example, thirty five secends or more, the cortical or brain areas so stimulated become satiated. When we shift our attention to new object, the new object may tend to be perceived distorted. In one of their experiments subject fixated eyes on black squares for thirty five seconds and thus the concerned brain areas were full satiisted. Later he shifted his fixation to white squares and this resulted in distortion of the white squares (probably smaller and also perceived as shifted from its original place). Likewise, in another experiment subject fixated at a covered line for some time and then shifted his fixation to straight line. It was found that the straight line appeared to be slightly curved. Such distrotions in perception were named as figural aftereffects.

In this way we find that Gestaltists made significant and very broad contribution in the field of perception.

3.3 Contribution of Gestalt Psychology in the field of Learning

Gestalt psychologists applied his principles of perception into the field of learning. They pointed out that learning was nothing but the perceptual reorganization of the field. After learning has occurred, there occurs perceptual reorganization and the person sees the situation in new perspective. They also made it clear that learning occurs by insight. In learning situation the person is faced with a particular problem. He thinks of many possible solutions and set up many tentative hypotheses. Once correct solution is reached, insight occurs and learning is

also said to have occurred. Insight is understood as sudden shift in perceptual field (Marx and Cronan–Hillix, 1987). Since insight is sudden, learning is also sudden and not a gradual improvement with practice. Once the solution is learnt, the organism proceeds immediately to the solution on further trials without making any random behaviour. Gestaltists have cited four behavioural indices of insightful learning. They are : sudden transition from helplessness to mastery, quickness and smoothness in performance after grasping of principle, sound retention, and readiness which the solution is transferred to similar problem involving the same principle.

In 1913 Kohler who was also director of the Anthropoid Station at Tenefife in Canary Island and was confined there due ot world war I, conducted several experiments on dogs and chimpanzees. However, his experiment on Sultan, one of the most intelligent chimpanzees could become very famous. In one experiment on Sultan, he presented a joint stick problem for its solution. There were two bamboo sticks, neither of which was long enough to reach the banana kept outside the cage. However, the structure of these two sticks were such that they could be joined end on end by fitting one into the other. It was found that in the beginning Sultan tried to reach banana with the help of either of the the two sticks but remained unsuccessful. Then Sultan started playing with these two sticks and during play both sticks happened to join them together by chance. Suddenly, he ran towards banana with the help of this longer stick and got the banana. The non-longer stick gave him insight suddenly and he solved the problem. On the following day, the animal solved the problem without any useless angling. Likewise, he conducted series of experiments and obtained more or less simlar conclusion.

His final conclusion was that learning occurs by insight and insight was a sudden mastery of the problem and not a gradual improvement with practice. Both Kohler and Koffka rejected Thorndike's idea of trial and error learning although in Kohler's experiments there appeared to be a good deal of what may be called as trial and error before insight occurred. Both Kohler and Koffka pointed out that the apparatus used by Thorndike and other animal psychologists forced the learning organism to use trial and error. In more appropriate situation where nothing is kept concealed from the subject, trial-and-error has no significant role to play. Learning here occurrs suddenly due to insight.

Gestalt psychologists also studied other aspects of insight such as transposition. It refers to learning a principle in one situation and applying the same to other situation. Hence it was a case of transfer. For Gestaltists what is transferred is a 'whole' or 'Gestalt' and not the identical element between the two situations as it had been propesed by Thorndike. To demonstrate this, Kohler conducted one experiment in which chickens were trained to peck at the darker of the two gray surfaces. Pecking at the darker of two gray surfaces was followed by food but pecking at lighter surface was not follwed by food. In about, hundred trials chickens learnt to make the discrimination between the two gray surfaces. In the next step Kohler presented this original dark gray surface along with a still darker gray surface. It was found

that animals acted according to the rules that had been learnt earlier. Now the animals pecked at the darkef of these two surfaces (that is, one new surface) and not at the original dark surface which they had learnt. This conclusion obviously show that chickens had learnt to react to the whole situation and thus, a Gestalt had been formed and transferred to the second learning situation. They had learnt the basis principle, that is, to peck at the darker of the two gray surfaces and not at a particular surface. In nutshell, the chickens had learnt a pattern and not a specific response. Kohler named such learning as transposition which was a case of insight.

3.4 Contribution of Gestalt Psychology in the Area of Thinking

The view of the Gestalt psychologists regarding learning were also applied to the fiedl of problem solving and thinking. Wertheimer's book Productive Thinking presents a detailed study of the principles of productive thinking derived from the experiments conducted with the help of simple geometrical problems on young children. In fact, he applied the Gestalt principles of learning to creative thinking done by human beings. The ground of studying thinking by Gestaltists had been provided by Wurzburg school. He emphasized that thinking should be done in terms of wholes. While solving a problem one should take the whole or broad view of the situation and he should not be lost in details. One should not take any step blindly and procedure adapted should be from the whole to its parts. While solving a problem if errors are committed, they should be good errors (that is, errors leading to the probability of success) and not blind errors as done by Thorndike's cat. Wertheimer explicitly denied any application of trial-and-error in thinking. For him, thinking was always goal directed as well as insightful and it created new gestalts. Experimental studies conducted by Dunker (1945) and Maier (1930–1931) have made it clear that thinking is insightful and changes the structure of the perceptual field.

Wertheimer distinguished among three types of thinking– a, b and y. Type a thinking refers to the productive thinking which the individual is concerned with decisive issues relating to the structural problems and includes processes like grouping, reorganization and discovery of the important features. In such thinking the person tries to relate mens with the ends or goals. Productive thinking is the best example of this type of thinking. Type Y thinking refers to blind and trial and error type of thinking. Such thinking tends to eliminate type a thinking. Here if solution occurs, it occurs by chance. Such thinking should be avoided. Type b thinking was partly productive and partly mechanized and unproductive. One of the most important features of Wertheimer type a thinking or productive thinking is that it involves the process of centering and recentering. In the process of centering there is transition from a personal or subjective view to a detached view of the situation, viewing it objectively and as a whole. Recentering refers to taking a new and penetrating perspective. In fact, it provides a new angle or outlook from which the creative solution is reached.

Wertheimer has also undermined the importance of repetition in solving a problem. He was warned that continuous use of mechanical repetition may produce harmful effect by creating a habit of blindness and mechanical actions.

3.5 Contribution of Gestalt Psychology in the Area of Memory

Gestalt psychologists have also applied the principles of perception to memory. At that time one common theory of memory was that when we perceive something and subsequently try ot recall it, we get success in that because a trace of the same is left in the brain. when we don't get a success, we forget it. This happens because the 'trace' gradually wipes out. The Gestalt psychologists have tended to reject such theory although they have retained the concept of trace. They have emphasized that memory is a dynamic process in which traces undergo several types of progressive changes with lapse of time. Such progressive changes occur in accordance with the principles of perceptual organization. As an example, we can take the principle of pragnanz. Wulff (1922) conducted one study that nicely demonstrated that changes in memory traces took place in accordance with this principle of organization. In this experiment subjects were presented with simple ifregular geometriacal figures for five seconds only. Subsequently, they were asked to draw the figures that they had seen after a time interval of thirty seconds, twenty-four hours and one week. It was found that the subjects tended to sharpen the figure and made it appear in good Gestalt where they were vague. Likewise, there were some other experimental supports to such theory of memory. Gibson (1929), Bartlett (1932) and allport & postman (1947) have reported that subjects tend to sharpen the original materials and thus produce distortion in reproduction no doubt but these distortion occurs in the direction of good form. These experimental evidences clearly show that memory can be easily explaned with the help of principle of perceptual organization.

Thus we see that Gestalt psychologists have made valuable contribution in the fields of perception, learning, thinking and memory. In fact, theri contributions in the field of perception were the mot important ones and in the remaining three areas there have been simply application and extension of the principle of perception.

3.6 Gestalt Psychology as a System

After examining the contributions of the Gestalt psychology in different areas, it is also essential to examine this as a system. Like other system in psychology, Gestalt psychology was also no less important and has made important methathoratical and methodological contributions. As a system Gestalt psychology may be examined as under :

3.6.1 Definition and methods of psychology :

Some earlier Gestaltists like Kohler, Koffka and Werthiemer pointed out that psychology was the study of immediate phenomenal experience which covered psychological functions like

memory, thinking, perception, learning, etc. However, they began with studying perception and later extended to other areas of psychology. Later Gestaltists among whom Kurt Lewin is an important figure, pointed out that behaviour should also be included in purview of the subject matter of psychology. These later Gestaltists tried to relate perception and behaviour by conducting several studies. The present position is that for Gestaltists, psychology is the study of both immediate phenomenal experience as well as behaviour of the organism. Their methods were experimentation and introspection. However, his method of introspection was different from that used by the trained introspectionists of the structural psychology.

3.6.2 Postulates :

Like behaviourists, Gestalt psychologyists had some basic postulates for explaining its viewpont. Those postulates may be divided into primary and secondary. The primary postulate which is only one in number, is concerned with whole part of psychology. we have already considered this in detail. As stated earlier, they have pointed out that the whole is not the sum of its parts. Whole has characteristics distinct and different from the characteristics of the parts. The whole dominates its part and provides basic data for study. The secondary postulates are several in number. The principle of isomorphism, the principle of perceptual organization, the non-continuty view about learning and the principles of contemporanetiy (that is related to the principle of isomorphism) are some of the basic secondary postulates. The noncontinuity viewpont as emphasized by Gestalt psychology is contrasting with the continuity viewpoint emphasized by Thorndike or reinforcement theorist. According to Thorndike, each trial or reinforcement contributes to learning. But Gestalt psychologist have said that in learning sudden discontinuous in gradients which are associated with insight do occur. The principle of isomorphism states that the present perceptual experience is solely explicable on the basis of the present brain physiology because there is one-to-one relationship between the two. The part is past and there is no sense in looking at back. The only importance of past in that it may affect the present condition. Brain injury of the past may affect the present physiology of brain but our perceptual experience will always be guided and controlled by his present physiology. Thus the principle of isomorphism in a way incorporates the principle of contemporaneity.

3.6.3 Mind-body problem :

For Gestaltists, isomorphism was the real solution to the mind-body problem. It was definitely a parallelism but not a psycholphysical parallelism of Wundt and Titchener who had assumed a one-to-one relationship between mental events and physical events. It may be said that for Gestaltists it was a psycho-physiological parallelism because it assumed one-to-one relationship between perceived or mental field and the brain field. Besides these two fields, there is another field called physical field or geographical field which may not correspond to perceived or mental field as it happens in a case of various types of illusion.

3.6.4 Nature of data :

Facts obtained from immediate, unanalyzed experience form the major data for gestalt

psychology. Gestalt psychologists called data based upon these experience as given. The given was used most frequntly in the study of perception. In accepting data based upon immediate unanalyzed experience Gestalitists were very much like the structuralists. But they were at the same time different from the structuralists in the sense that they rejected the type of analysis provided by them (the structuralists).

Gestaltists also accepted behavioural data particularly in the field of learning and problem solving. That way Gestaltists also accepted the psychology of behaviourism. On this point, it can be said that Gestaltists were more tolerant than the structurlists who were not ready to accepted the basic tenets of behaviourism. Gestaltists differed from behaviourists in the sense that they wanted to study and relate behaviour with psychological fields and not simply with environmental factors.

3.6.5 Priciples of selection:

Gestaltists enunciated various principles of perceptual organization that obviously tried to explain how a particular form of the figure was organized or selected for perception. They pointed out that almost all parts of the field played some role in perception. Therefore, for them how were they organized was more important than how were they selected. Why some parts of the field were perceived as figure and why some other part as background. Rubin, one of the major supporters of Gestaltistic principles, pointed out certain principles through which some parts of the perceptual whole were selected as figure and others were treated as a background. One such major principle was that those parts which were most distinct and clear, were selected to be perceived as figures and relatively vague and indistinct parts were selected to be perceived as background. Later, Gibson (1966) tended to specify some properties of the stimuli that made such selection more smooth.

3.6.6 Principles of connection :

For Gestaltists, the problems of connection are not the same as we find for associationists and structuralists. We have seen that for structuralists, the elements of consciousness are connected through various laws of association. This was termed by Gestaltists as bundle hypothesis and they have rejected this hypothesis because for them the whole is not the sum of parts and therefore, it is meaningless to reconstruct the wholes by connecting the parts. Gestaltists have argued that if bundle hypothesis is taken to be true one, perception is nothing but simply the sum of simple and elementary perceptions. But really our perception can't explained by connecting the various simple perceptions. They also made it clear that principles of perceptual organization were not principles of connection because they (principles) stated that a particular structure would merge and not what elements would be connected to produce the structure, Needless to say, Gestalt psychologists, like other systems, emphasized upon the connection or relationship between antecedents and consequents of immediate experience and behaviour.

On the whole, we can say that the Gestalt psychology as system was no less important than any other system. Its various postulates are still the primary source of inspiration of modern research and experimentations.

3.7 Criticisms of Gestalt Psychology

Some psychologists have criticized Gestalt Psychology for its various omissions and commissions. Some of its major criticisms are as under :

3.7.1 According to Marx and Cronan-Hillix (1987), Gestalt psychology was too dependent upon theory and lacked sufficient evidences to support the theory. They further pointed out that the entire system of Gestalt psychology had a nobulous character about it. For example, the concept of insight was only theoretically inferred not empirically defined.

3.7.2 Harrower (1932), one of Koffka's students, has agreed with critics in saying that Gestalt psychologists have failed to define their key term, that is, organisation. Critics state that this term has, nowhere, been defined empirically. Moreover, they also claim that the term should be distinguished from non-organization so that experimental studies must be pinpointedly be carried out on organization only. They further claim that if the term organization is left to be interpreted differently by different psychologists, how can perception be studied in a scientific way ?

3.7.3 Gestalt psychology has been charged to be mystical or metaphysical. Perhaps this criticism has been done due to the complexities of the gentalt position. But this ciriticism is not cent-per-cent true. In fact, Gestalt psychology, like behaviourism, is a natural science and not a metaphysical science.

3.7.4 Gestalt psychology has also been criticized on the basis of physiological assumptions relating to isomorphism. Critics said that the isomorphic principle of man in the brain relating to what one perceived was a unique speculative explanation and any proof of it was only indirect. Such speculation decidedly cast doubt on the validity and acceptability of the experimental results.

3.7.5 Critics have also pointed out that Gestalt psychologists have conducted poorly controlled, ill-designed, non-quantitative, and non-statistical experiments. They have depended mostly upon introspection, a method that was hard to replicate. Not only this, critics have also charged them to provide subjects unnecessary clues in experimental situation that have affected their problem solving ability in some unknown was making the results biased one.

3.7.6 Sometimes it is said that Gestalt psychology was not new and its basic

principles were in use since long. But this does not appear to be a valid criticism because every system was born not suddenly and it had its own antecedent forces. If this criticism is held to be valid one, it can be said that no system in psychology was new one.

Despite these criticisms, it can be said that Gestalt psychology has made several postive contributions. Its researches and experimentations in the field of perception gave certainly a 'new look' to the theory of perception. The renewed interest of the psychologists of today in cognitive psychology is nothing but reflection of strong Gestalitists influences. They were, in fact, intellectual forefathers of what is today known as cognitive psychology.

3.8 Summary

3.8.1 Tenets of Gestalt psychology

The Gestalt is German word which means form, shape or configuration and Gestalt psychologists have added the meanings orgainc whole and organization to it.

1. The first principle of Gestalt psychology is that it is the whole which determines the behaviour of its parts. We perceive whole not parts. It was revolutionary finding against the elementalistic psychology that emphasized the importance of parts. For elementalists parts make the whole. It was automistic concept of behavour which was challenged by Gestaltists. Werthiemer said : "There are contexts in which, what is happening in the whole, can not be deduced from the characteristics of the separate pieces, but conversely; what happens to a part of the whole is, in clear cut cases, determined by the laws of inner structure of its whole."
2. The Gestalt approach is phenomenologically oriented and is antiposivistic. It is a molar approach to behaviour.
3. Opposition to quantification, Gestalt school of psychology is against the quantification of human behaviour. They emphasize the importance of qualitative assessment of behaviour.
4. They have no faith in the reliability and validity of measuring tools. They were against the behaviouristic approach to human behaviour on the basis of stimulus response (S–R) connections. They introduced the concept of organization in between stimulus response (S–R) connections.
5. Laws of perception : Gestalt psychology emerged out of experimental findings on perception. The following principles of perceptions have been developed by Gestalt psychologists :

   (i) **Pragnanz :** The principle of pragnanz means that our perception orgainzation will always be as good as the prevailing conditions allow. The principles plays an important role in motivation.

(ii) **Closure, proximity and similarity :** Gestalt laws also follow these three principles. Closure means that mind has a tendency to complete imperfect wholes into perfect and closed forms. A dynamic variation of the laws of pragnanz is the principle of closer which operates in perception, thought, action and memories.

According to the principle of proximity, objects are perceived as a unity when they are observed in close proximity. The principle of similarity states that objects observed in like forms or colour will be perceived as assuming a grouped formation.

6. Psycho-physical isomorphism : The concept of psychophysical isomorphism was borrowed by Kohler from his professor Max Plank who developed quantum theory. Psycho-physical isomorphism means that Gestalt is both physical and mental. The brain functions tend to take the form of specific molar events corresponding to those structures that are found in experience. Kohler defined isomorphism "as the thesis that our experiences and the processes which underline these experiences have the same structure."

7. Gestalt psychologists developed theory of learning based on insight, theory of productive thinking which emphasize the importance of perceiving meaningful wholes, grasping relations and finally acquisiton of insight.

3.8.2 Gestalt psychology was founded by Max Wertheimer. Wolfgang Kohler and Kurt Koffka were the co-founders. all three persons were German. This school was fully established by 1930s. Like any other system this system had also some antecedent forces. The viewpoints of Immanuel Kant, Wilhelm Wundt, John Stuart Mill, Franz Brentano, Carl Stumpf, Ernst Mach and Christian Von Ehrenfels were most instrumental in laying the foundation of Gestalt psychology. Apart from all these persons, laboratory works done at Gottingen University were also very important antecedent forces for its birth.

3.8.3 Max Wertheimer conducted a series of experiments on apparent movement. In those experiments Kohler, Koffka and Klein had participated as subjects. He concluded that when an appropriate interval of time (one fifteenth of a second) was given between the two flashes of stimuli, subjects perceived that one stimulus was moving across the screen form one point to another. This was called phi-phenomenon. Time interval shorter or longer than one-fifteenth of a second led to reduction and finally abolition of illusion of movement. The discovery of phi-phenomenon was the base for the foundation of Gestalt psychology because when subjects perceived the apparent movement in the visual stimuli, they were perceiving whole or gestalt rather than succession of isolated stimuli. Kohler, a co-founder of Gestalt psychologists, is famous for his studies on chimpanzees at the island of Tenerife. He concluded that animals learnt by insight rather than by trial and error. Sudden perception of the correct relations among stimuli was called insight. Since this insight was sudden, learning was also sudden and not

gradual. His book," The Mentality of Apes" presented a good, account of experiments conducted on chimpanzees by him. Koffka, another co-founder of Gestalt psychology, became instrumental in popularizing this basic tenets of psychology in America by writing about this new movement in psychological Bulletin. His article published in this journal presented the results of many experiments conducted by Kohler, Koffka and Wertheimer. The title of this article was : Perception : An introduction to Gestalt Theories.

3.8.4 It is said that Gestalt psychology established itself by lodging a strong protests against the dominant system like structuralism associationism, behaviourism, etc., of the time. Gestaltists objective against structuralism by rejecting constancy hypothesis, elementalism and bundle hypothesis. They also objected against associationism for showing its sympathy towards bundle hypothesis. Behaviourism was objected on the ground that it had outright rejected consciousness as the subject matter of psychology.

3.8.5 Initially, Gestalt Psychology contributed only in the field of perception. But later on, it expanded its programme to learning, thinking and memory. In the field of perception Gestalt psychologists emphasised upon perceptual wholes, principles of perceptual organization and isomorphism was the most important ones. In the field of learning they, on the basis of their experimentations, made it clear that the organism learnt by insight and not by trial and error. Hence, learning was sudden rather than gradual. Wertheimer's work on productive thinking has been very crucial. He emphasized that in solving a problem or in thinking, one should take the whole or broad view of the situation and one should not be lost in details. Gestaltists have emphasized that memory is a dynamic process in which traces undergo several types of progressive changes with lapse of time. Such progressive changes occur in accordance with the principles of perceptual organization.

3.8.6 Gestalt psychology as a system was no less important. Its viewpoint regarding subject matter of psychology, methods, postulates, mind-body problem, nature of data, principles of relation and principles of connection have proved much valuable to modern psychologists.

3.8.7 Gestalt psychology has also been criticized. Among several criticisms, three points of criticisms are worth summarizing. First, it has been said that Gestalt psychology was too dependent upon theory and lacked sufficient evidences to support the theory. Second, it has also been said that they had conducted poorly controlled, ill-designed, non-quantitative and non-statistical experments. Third, its physiological speculations about the principles of isomorphism were unique explanation that lacked dirct experimental support for its confirmation.

3.8.8 Despite the fact that Gestalt psychology has passed its premier days, its impact on modern psychology is widely felt. The renewed interest in cognitive psychology widely confirms such impact. In this sense, they have been rightly called as intellectual forerunners of cognitive psychology.

3.9 Key Words Used

Contribution
individuals
elaborate
structural
perceptual
proximity
symmetrical
phenomenon
analogy
exposure
stimulated
distinguished
thinking
experimental
immediate
structure
opposition
stimulus
Continuous
founder
pleasant
increased
orgainization
pregnancy
perceive
dynamics
Isomorphism
identical
situation
probability
mechanized
distortion
environmental
consequents
validity
Behaviourism
Perception,
sensation
elementalism
similarity
distorted
emerged
stability
illusion
evidence
solution
discrimination
memory
system
enunciated
omissions
reliability

3.10 Questions for Exercise

3.10.1 Short answer type questions :

1. What do you mean by Gestalt Psychology ?

   Ans : see 3.1

2. Explain the contribution of Gestalt psychology in perception.

   Ans : see 3.2

3. What are contributions of Gestalt Psychology in the field of learning ?

   Ans : see 3.3

4. Explain the contribution of Gestalt psychology in the area of thinking ?

   Ans : see 3.4

5. Explain the contributions of Gestalt school in the field of memory.

   Ans : see 3.5