CHAPTER TWO

INTRODUCTION TO INDEPENDENT VARIABLES

2.1.0.

The previous chapter dealt with a description of the disruptive behaviour disorders investigated in the present study. This chapter discusses the different intervention strategies used in an attempt to reduce those disruptive disorders. The intervention strategies were three: Reinforcement, Time-out and Yoga. Reinforcement and Time-out are two separate but interrelated aspects of one therapy. They have, therefore, been discussed together under the general head of Behaviour Modification. The discussion on the third intervention strategy, Yoga, follows the discussion on Behaviour Modification.

2.1.1. INTRODUCTION

The word behaviour has become such a common coin that like all common coins it is shiny but faceless. Over the last 40 to 50 years, its use has increased 20 fold in titles of scientific articles alone, but the number of behavioural scientists has not. And all that is called behaviour today is not necessarily behaviour in the sense in which a behavioural scientist uses the term.

Behaviour is what an organism does, including actions that

take place inside the organism's body and, therefore, cannot be seen. But this definition is valid only if it is taken literally and not used to describe what an organism is. For example, the statement that a person is "depressed" says nothing about what the depressed person does, although one gets the idea that it is behaviour which is being labeled. When it is said that somebody is "lazy" no description of behaviour has been given. True, such terms as "lazy" and "depressed" can be, and are used to summarize detailed descriptions of behaviour under carefully enumerated circumstances. But without such descriptions and enumerations, the labels mean nothing to the behaviourist as a scientist.

Many so-called descriptions of behaviour are really value judgements. They do not fall under the definition of behaviour. Behaviour cannot be good or bad. Behaviour invariably has consequences labeled desirable (good) or undesirable (bad) but here the difficulty starts : desirable or undesirable for whom? For what? The organism emitting the behaviour? His or her health? It is well to remember that behaviour in itself is neither good nor bad; the circumstances and conditions under which it occurs give it its value.

Broadly speaking, therefore, behaviour is anything people do. This includes all activities human beings engage in - acting, feeling, emoting, and many subtle things that do not readily meet the eye. More ideally, behaviour is anything that people do that can be somehow investigated, that is, observed, counted, recorded, or measured. Looking at human behaviour in this broad perspective has led to a development called Behaviour Modification, also sometimes referred to as Behaviour Therapy or Behaviour Change.

2.1.2. BEHAVIOUR MODIFICATION CHARACTERISTICS

One of the reasons the behavioural movement has been so successful is that its viewpoint is quite versatile and flexible. Based on the central notion of reinforcement contingencies, there is a wide variety of tactics and strategies that can be used. All of these have one focus: changing behaviour (Kanfer and Phillips, 1970). The main characteristics of behavioural methods that make possible the operational versatility for purposes of counselling and psychotherapy maybe stated as follows:

1. SYSTEMATIC - The behavioural therapist approaches tasks in a systematic and methodological manner: taking data, using logs,

introducing controlled changes, observing results, setting agendas, and so on. This is done under the aegis of an overall behavioural position which identifies variables characterizing the person's behaviour in relation to his environment, and attempts systematic changes to bring about desired results.

2. EMPIRICAL -The variables underlying the systematic procedures are empirically based on reinforcement contingencies as the central consideration. Probably no other area of psychology, and certainly no approach to counselling and psychotherapy has the empirical backing that behavioural principles afford .

3. IDENTIFIES TARGETS OR BEHAVIOURS FOR CHANGE - The behavioural therapist does not attempt to "restructure personality or character", or "make the unconscious conscious", or do "major psychic surgery", but with the help of the patient and the process of presenting complaints, tries to identify reasonably modest goals and uses tactics and strategies as economically and effectively as possible to bring about the desired ends.

4. USES GRADUAL (SUCCESSIVE APPROXIMATION) STEPS - Most changes in behaviour come gradually; they are then better incorporated into the whole behavioural economy of the person. Gradual changes take advantage of and, are based on, reinforcement schedules that

solidify change.

5. IDENTIFIES AND PIVOTS CHANGE ON OBSERVABLES - The importance of identifying observables cannot be over-stressed. One does not deal with depression, but rather tries to deal with specific examples of unwanted behaviours (slowness in movement, feeling badly, lack of social interest, etc).

6. LOCATES VARIABLES IN THE ENVIRONMENT - As the patient reports on his distress, the therapist attempts to tentatively identify ways of changing or restructuring significant stimuli in the environment calculated to produce a change in behaviour. The therapist is an important part of this stimulus complex and tries to be useful in contingent ways.

7. BEHAVIOUR IS A FUNCTION OF ITS CONSEQUENCE - A close look at the consequences of the patient's behaviour in question tells the therapist much about what is controlling the patient and where and how these consequences may be altered. As consequences are changed in the patient's environment - by his or others' actions - new behaviours can be brought into play. The unwanted consequences must somehow be altered for changes to take place in the patient's behaviour (Bandura, 1974).

8. EMPHASIZES SELF-MANAGEMENT AND SELF-CONTROL - Contrary to what many think, behavioural therapy is not a one-way, manipulative street where the therapist imposes his "will" on the patient in some blind, authoritarian way. As the patient learns problem-solving skills, he takes over an increasing role in his self-management; the objective of therapy is to put the patient on his own feet as effectively as possible (Mahoney and Thorensen, 1974).

9. EMPHASIZES CHANGE -Change is an important factor; if we really understand behaviour, we can change it. The therapist does not seek abstract explanations for their own sake; "explanation" of problem behaviour and how to overcome it is of value only if it produces results.

2.1.3. BEHAVIOUR MODIFICATION METHODS

We now turn our attention to an array of behavioural techniques, procedures that offer an extensively wide and versatile approach to clinical problems. Since human difficulties are highly diverse, it is important to have flexibility and resourcefulness in approaching solutions to these difficulties. In treating problems from the behavioural vantage point, it is important to avoid sweeping claims or implied quick results, as is

sometimes the case with people who are overly enthusiastic about new techniques and applications.

These techniques maybe classified primarily as: (a) procedural (eg., placing a general emphasis on a technique or procedure that includes nearly all items in the list on one or other level), (b) data gathering procedures (a matter of collecting frequency-of-occurrence information, preliminary to and in conjunction with therapeutic effort), (c) conceptual (a way of looking at a problem or stating how intervention may be conceptualized) and (d) active-therapeutic (resulting in a specific therapeutic or behaviour change effort).

These classifications are not mutually exclusive: and all are intended to have a therapeutic impact, although at first this may not be evident as therapeutic results may be delayed or indirect. Undoubtedly, many more behavioural techniques will be brought into prominence in the future; as problems occur in new and different social settings, behavioural approaches will be challenged to meet demands.

1. ASSERTIVE TRAINING - This is a large-order type of behavioural intervention rather than a single technique, whereby the patient is helped to assert himself more effectively.

2. AVOIDANCE OF AVERSIVE CONSEQUENCES (OR AVERSIVE STIMULATION) - First, there is avoiding aversive (unwanted) consequences of action. Conversely, one may use direct aversive stimulation on oneself (snapping a rubber band placed on one's wrist) in order to stop unwanted thinking.

3. BEHAVIOUR COST - As the term seems to imply, this technique refers to what it "costs" the patient if he wishes to engage in given behaviours. It is first used as a general term, referring to a contingency involving money or privilege or effort that is necessary before a given behaviour is engaged in by the patient.

4. BEHAVIOURAL COUNTING OR LOG-KEEPING - This is simply a case of logging or tallying the instances in a given time-frame, when a person engages in a given act (smoking cigarettes, biting nails, etc.). Tallying forms or a baseline against later behaviour changes can be compared, and show the occasions and the frequency of the behaviour in question (people often do not know how frequently they engage in an unwanted behaviour).

5. CONTRACTING - As the term implies, this is an agreement between (say) teacher and student as to how much work will be done and the contingent terms of the contract. It is used in counselling and therapy in specifying agendas to be worked on,

times and places of therapy sessions, and the like (Krumboltz and Thorensen, 1969).

6. DESENSITIZATION OR RELAXATION - This term is associated primarily with Wolpe and his followers (Wolpe, 1958, 1969). It is used in connection with deep muscle relaxation procedures. The patient is led through successive desensitizing experiences based on a hierarchy of anxiety-provoking events in relation to a given experience.

7. EXTINCTION - Extinction is a technical term from learning theory; it refers to the gradual loss, through withholding reinforcement, of a given behaviour under a given set of circumstances. Applied to therapy or counselling, extinction will tend to occur when the reinforcing value of a given behaviour is stopped or greatly reduced.

8. FADING - Fading is the gradual removal of a formerly predominant means of reinforcement, allowing a new or different reinforcing circumstance (or stimulus) to take over. One fades out one method of control (reinforcer) in favor of another one.

9. FLOODING (OR EMOTIONAL FLOODING) - This procedure is not directly derived from learning procedures (in the sense that

fading and shaping are), but derives from the practice of some therapists to confront the patient very vigorously and persistently with his problems or some aspects of the problem the therapist deems important or relevant. Flooding may constitute a fast and powerful confrontation or it maybe executed gradually (Ayllon and Michael, 1959).

10. IMPLOSION - This is a term used by Stampfl and Levis (1967) to refer to a very intensive extinction effort to rid the patient of his or her distress and symptoms. The patient imagines scenes allegedly important in the generation of the complaint and often derived from hypothetical interpretations of symptoms. Possibly flooding tends to be used with overt situations putting the person directly into an actual anxiety-provoking situation, whereas implosion may be more commonly a vicarious (verbal) approach. Both tend to raise the anxiety level, however, and work from this vantage point in contrast to gradual anxiety-reducing approaches.

11. IN-VIVO THERAPY - As the term implies, this is the practice of conducting therapy in the actual life situation in which the problem occurs.

12. MODELING - Modeling is social learning through imitation. The

child matches the piano teacher's movements and imitates them; likewise, on the playing field, the coach models the needed behaviour. Various verbal, sensory, symbolic and other processes are used to describe, for the person, the necessary cues which, in time and under correct conditions, are imitated (Bandura, 1965).

13. NEGATIVE REINFORCEMENT - refers to the removal of an aversive stimulus. Thus fastening one's seat belt in order to turn off a buzzer (which is annoying), is an example of negative reinforcement.

14. PARADOXICAL INTENTION - This term is not often used in behavioural counselling or therapy, but it refers to a behavioural process that should be made explicit. Literally it means that one behaves in a manner paradoxical (opposite) to the way one feels about something. A boy who is afraid of a dog might try to "scare" the dog in order to control his own anxiety.

15. PUNISHMENT - refers to the suppression (reduction in frequency) of a given behaviour through aversive measures that are applied to the person, contingent upon his acting in a given way. Punishment, to be effective, must reduce the frequency of an unwanted behaviour.

16. RECIPROCAL INHIBITION - This term was advanced by Wolpe as possibly the main characteristic of his therapeutic approach. It refers to inhibiting a given behavioural tendency by its reciprocal or opposite. Thus, if one is relaxed, he cannot be anxious; the way to combat anxiety is to learn and practice relaxation.

17. SHAPING - Shaping is a central concept in behaviour change. It refers to progressive approximations toward a goal or end result. Shaping is shown in the acquisition of elementary and motor skills such as dressing among children, retardates, and others with relatively meager behavioural repertoires. Shaping applies, as well, to more complex skills and with more resourceful learners, as in programmed instruction.

One should not gain the impression that all techniques lie at the same level of complexity, or that one is as easily employed as another. In counselling or therapy, the choice of technique or the versatile interplay among techniques must come from therapeutic planning and careful conceptualizing. Techniques, however, should never be regarded as the "end-all" or "be-all". They are primarily means to ends and the selection of means to behaviour change ends should be based on relevance to

the patient and his situations, economy, and the competence of the therapist in implementing the techniques used. The vast range of behavioural techniques are to be drawn on selectively as they increase the repertoire of skills and conceptualizations of the therapist; they are not to be imposed on the patient as a kind of "psychological patent medicine".

Two behavioural techniques were employed in the present study : reinforcement and time-out. These are discussed below in detail.

2.2.0. *R E I N F O R C E M E N T*

2.2.1. INTRODUCTION

In any listing of general laws or principles in the science of learning, the principle of reinforcement is a prime entry. Facts and conceptions of reinforcement have pervaded theory, experimentation and practical application. The general observation is that experimental or natural environmental consequences can increase the probability with which behaviour occurs and can also decrease this probability. The particular properties of the behaviour that is acquired often depend on the

details of these environmental consequences. The principle of reinforcement indicates how behaviour is shaped and learned through the use of reinforcers - a reinforcer being defined as an event, stimulus, or state of affairs that changes subsequent behaviour when it temporarily follows an instance of that behaviour. Throughout all the various theoretical interpretations of the mechanics of reinforcement, for example, drive reduction, sensory feedback, relative response probabilities, and incentive effects, the operational description of reinforcing situations has remained fairly stable. Behaviour is acquired and its occurrence regulated as a result of a contingent relationship between the response of an organism and a consequent event.

A large body of evidence had accumulated over the years demonstrating that behaviour is controlled by its consequences. Until recently, however, investigations of reinforcement procedures have been essentially confined to operations in which experimenters imposed particular contingencies upon subjects and administered reinforcing stimuli to them whenever the appropriate responses were made. As a result, reinforcement has generally been equaled with the performance-regulating functions of directly experienced consequences arising from external sources.

Under naturalistic conditions, reinforcement typically occurs within a social context. That is, people continuously observe the behaviour of others and the occasions on which it is rewarded, ignored, or punished. Observed rewards and punishments can play an influential role in regulating behaviour. Observed consequences also provide a reference standard that determines whether a particular reinforcer that is externally administered will serve as a reward or as a punishment. Thus, for example, the same compliment is likely to be punishing for persons who have seen similar performances by others highly acclaimed, but positively reinforcing when others have been less generously praised.

Although the theoretical formulations of the concept of reinforcement are fairly recent, the value of reinforcement has long been recognized. Mark Twain once said "I can live for two months on a good compliment". Shakespeare said, "Our praises are our wages".

Reinforcement appears to be a simple technique, but its apparent simplicity is deceptive. In simple animal studies, psychologists can easily identify that food and water constitute effective reinforcers when administered to animals deprived of

them for an interval of time. That is, a "hungry" animal given food after turning right in a maze will tend to turn right more frequently in future. Food is said to be a reinforcer in these circumstances because the presentation of it, following a response, increases the frequency of that type of response in future.

2.2.2. APPLICATIONS OF REINFORCEMENT

One complexity is in defining the response to be reinforced. A response is clearly more than a simple contraction of a single muscle. Extremely complex patterns of behaviour seem amenable to the influence of positive reinforcement. The complexity of patterns that may respond to reinforcement has no known limit. Whether a given pattern will respond to reinforcement for any particular student cannot be guaranteed in advance. It depends on whether the student has learned the sub-responses involved in the major response being reinforced. If reinforcing a complex pattern of behaviour does not seem to yield the desired results, one possible difficulty may be that the pattern needs to be analyzed into its constituent elements and the student reinforced for performing each sub-part.

The key to the successful use of reinforcement is proper timing. The reinforcer must be presented immediately following the desired behaviour, and it must not be presented immediately following the undesired behaviour. The basic idea is extremely simple, but many teachers and therapists find it difficult to apply in practice.

A concept of reinforcement has been developed by Premack which states that "for any pair of responses, the more probable one will reinforce the less probable one" (Premack, 1965). Taking Premack literally, any behaviour can be used as a reinforcer for any other lower probability behaviour at the instant that the behaviour is a higher probability one. It is not necessary when attempting to modify behaviour to depend wholly on candy or trinkets as reinforcers, as did early investigators. It is necessary only that the contingency manager be able to identify what students are doing most frequently in a given environment.

In an experiment, Homme (1965) was able to demonstrate that preschool Indian children make substantial improvements in learning English when taught by a contingency management system.

Before a client can be appropriately reinforced, he must manifest some behaviour that begins to move him toward his goal.

At the beginning of therapy, however, few clients know what their goals are. The therapist must begin by helping them to formulate their own goals. Some structuring is necessary before the goals become clearly articulated.

Three sources of reinforcement are available to the client: (1) therapist reinforcement of client behaviour, (2) client reinforcement of his own behaviour and (3) reinforcement by the environment outside of the counselling relationship.

The therapist reinforces any progress or effort by the client to attain his own goals. Reinforcement would be provided for any existing behaviour which may move the client toward his own goals; for the successful completion of any step in an action programme, for efforts to reinforce himself, and for taking the "risk" of committment.

Generally, the therapist reinforces verbally or visually by nodding his head, smiling, or saying "good", "that's great", or "I bet you feel better".

The client reinforces himself by following a reinforcement schedule created by the therapist and the client, which is integrated with the client's action programmes.

It has been found that a change in client behaviour often produces a modification of his feelings and attitudes. For example, when the probation student had unproductive study habits he reported dissatisfaction, depression, and discouragement, but as he realized he could fulfill his action programmes and saw himself progressing toward a goal he reported feeling "freer", "happier" and "more enthusiastic". It is felt that these changes of affect can become the basis for a well developed intrinsic self-reinforcement system appropriate not only to the present problem situation but adaptable to many problem areas.

The environment, too, reinforces the client. Family, friends, teachers, and employers can support the action programmes. The therapist teaches the client to be sensitive to reinforcing conditions in his environment.

A therapist may use reinforcement quite naturally and spontaneously in response to gradual improvements in a client's behaviour. A therapist may also deliberately plan the administration of reinforcers. It is clear from a number of studies that whether the reinforcement is spontaneous or planned, it can modify client behaviour.

Differential reinforcement has been widely employed for the

modification of deviant behaviour in both adults and children. In these treatment programmes, rewarding consequences for desired behaviour are typically combined with extinction, modeling, and in some cases, with punishment procedures.

Numerous projects have been reported in which reinforcement principles are systematically employed to alter deviant behaviour in children. These studies provide impressive testimony that children's behaviour can be powerfully controlled by the social consequences provided by adults. Each case involves intra-subject replication in which the incidence of particular response patterns is objectively recorded under naturally occurring contingencies and during subsequent periods when therapeutic contingencies are alternately applied and withdrawn. The findings demonstrate that persistent problem behaviours can be successfully eliminated, reinstated and extinguished a second time by altering the amount of adult interest and attention produced by the deviant behaviour. Among the disorders successfully treated through such selective reinforcement are extreme regressive crawling (Harris, Johnston, Kelley, Buell, Harris and Wolf, 1964) and extreme passivity (Johnston, Kelley, Harris and Wolf, 1966).

In a significant extension of reinforcement procedures. Patterson and his colleagues (Patterson, Ray, and Shaw, 1968) have achieved some success in modifying deviant behaviour by altering the reinforcement patterns of familial systems and peer groups.

This treatment approach, which involves a 4 step programme, takes place in the home. After two weeks of baseline observation of familial interactions, parents are provided with a specially prepared booklet designed to familiarize them with the general principles of reinforcement, extinction, aversive control, inadvertent reinforcement of deviant behaviour, and the procedures for recording interpersonal behaviour. In the second phase, parents are asked to list the child's behaviours they wish to modify. They are then assigned a special hour each day to record the incidence of these behaviours, the various consequences they engender, and the family members who provide the consequences. After they have learned to observe interpersonal contingencies accurately, parents are helped, through ample demonstration and supervised practice, to alter the reinforcement contingencies that they provide for both deviant and desired response patterns. The family problems are thus modified one at a time.

When necessary, new reinforcement practices are also introduced in the classroom setting and in the peer group. Control over deviant behaviour in extra-familial situations is typically achieved by a peer-contingency procedure in which both the child and his peers initially earn desired rewards for his good behaviour. The material reinforcers are then gradually withdrawn until eventually the child's behaviour is entirely controlled/ manipulated on a diminishing schedule, and home observations are conducted periodically over a six month follow-up period.

Results based on 6 families that have participated in the above programme show that parents reduced the frequency with which they positively reinforced deviant behaviour from an average rate of 35% during the baseline period to 10% at the end of the intervention programme. Modification of familial contingencies not only decreased the family's output of deviant behaviour, but it increased the amount of positive social reinforcement in the entire social system, and it produced a more reciprocal quality to the interactions between the various family members. Moreover, these favourable changes tend to be effectively maintained over time.

2.2.3. ESSENTIAL COMPONENTS OF REINFORCEMENT PRACTICES

There are three essential features in the successful application of reinforcement procedures. First, one must select reinforcers that are sufficiently powerful and durable to maintain; that is, responsiveness over long periods while complex patterns of behaviour are being established and strengthened. Second, the reinforcing events must be made contingent upon the desired behaviour if they are to be optimally effective. And third, a reliable procedure for eliciting or inducing the desired response patterns is essential, otherwise, if they rarely or never occur, there will be few opportunities to influence them through contingent reinforcement.

For individuals who present gross deficiences in conditioned reinforcers, and who are, therefore, responsive only to primitive physical consequences, an important initial objective of treatment is to endow social and symbolic stimuli with reinforcing properties. The development of social reinforcers is particularly critical, since human behaviour is frequently strengthened, sustained, and modified by praise, approval, encouragement, positive attention and affection.

2.2.4. TYPES OF REINFORCERS

Behaviourists make a distinction between primary and secondary reinforcers. Primary or unconditioned reinforcers are such stimuli as food and drink, which are essential to the maintenance of life. The reinforcing power of such physiological stimuli is natural rather than learned. Most reinforcers, however, are of the secondary or conditioned variety. These acquire their reinforcing power by having been associated with or substituted for primary reinforcers. Thus, the smile of a mother as she feeds her child, for example, becomes a secondary reinforcer. Through the conditioning process, a spoken word can be substituted for a smile, a word for an object, etc., so that just about anything can be theoretically made a secondary reinforcer.

Certain stimuli, which have been paired with a number of primary and different secondary reinforcers, acquire a general reinforcing effect. Money is one example of such a so called generalized reinforcer. Attention, approval and affection, usually referred to as `social reinforcers', are other examples. Certain activities, such as playing a favourite game or watching television, are called `activity reinforcers.' Some stimuli, such

as trophies, certificates and report card marks, are referred to as `symbolic reinforcers'. A broad variety of reinforcers, or potential reinforcers, are thus available.

Also, reinforcement can be either intrinsic or extrinsic. Intrinsic reinforcement refers to activities that are automatically- or self-reinforcing. This, in a behaviouristic sense, explains interest. Therefore, in understanding the present behaviour of a person, behaviourists maintain it is necessary to take into account the kinds and amount of reinforcement a person has experienced. In attempting to modify his future behaviour, it is necessary to identify not only the particular reinforcers that will work with him, but also to ascertain how much and how often he should be reinforced.

Psychologists are seldom in a position to use primary reinforcers, though occasionally candy bars are used to reinforce a certain kind of behaviour. They more often use conditioned reinforcers, usually certain types of words, because for most human beings in our society, these words have been associated with primary reinforcers in the past. The conditioning history of most individuals in families and schools has involved the association of primary reinforcers with such words as "good",

"nice job", "fine work", "beautiful", etc.. However, a person who has grown up in a culture where these words were not associated with primary reinforcers would not be able to respond appropriately to them until he had learned to make the necessary translations.

It is necessary to arrange that these words of praise are accompanied by more substantial types of reinforcement. A therapist cannot rely upon words alone to reinforce approved behaviour. The verbally approved behaviour must also have positive consequences, that is, the individual being reinforced by the therapist with words must also experience more substantial rewards. Strictly speaking, we do not know whether any given stimulus actually serves as a reinforcer until we later observe whether it resulted in an increase in the response which it followed. From a practical point of view, however, we do know that certain classes of stimuli tend to serve a reinforcing function in a number of situations. The use of certain stimuli as reinforcers in counselling cannot be guaranteed to have any given result, but on the basis of past experience these stimuli seem highly likely to serve as reinforcers in any given practical situation. The therapist can only try and see.

Since the therapist is often not in a position to administer rewards herself, it is frequently advisable for her to arrange reinforcing circumstances in a client's natural environment. Thus, therapists are encouraged to work with teachers in structuring classroom environments where students will receive rewards, and to work with parents who are in a still better position to help their children. The therapist's words may provide the initial impetus to start a new course of action, but they will not be sufficient to maintain a new pattern of behaviours unless more substantial rewards are forthcoming to the individual.

2.2.5. SCHEDULES OF REINFORCEMENT

Behavioural engineers usually classify schedules of reinforcement somewhat as follows:

1. Continuous schedules
2. Intermittent schedules
    - A. Fixed schedules
        - 1) Fixed-ratio schedules
        - 2) Fixed-interval schedules
    - B. Variable schedules
        - 1) Variable-ratio schedules
        - 2) Variable-interval schedules.

Continuous schedules are operative in situations when the response is reinforced every time it is made. If the child is picked up every time he cries, if he is praised every time he eats his vegetables, if he is told he is right every time he gives a correct answer in class, he is receiving continuous reinforcement. Intermittent schedules are in effect when the response is sometimes reinforced and sometimes not reinforced. With fixed schedules, the response is reinforced in accordance with a kind of pre-determined plan based on either the number of responses or the time interval between reinforced responses. If the strategy calls for a child to be rewarded only after he has made the desired response a specified number of times, a fixed-ratio schedule is being used. Complimenting a child not every time he says "please" but every 5th or 10th or 20th time he does so, would be an example of fixed-ratio reinforcement schedule. If the plan calls for the child to be rewarded for desired responses only after a certain period of time has elapsed regardless of the number of times he makes them, a fixed-interval schedule is in effect. Taking the child to movies every Saturday (assuming, of course, that he has behaved all week), would be an example of fixed-interval reinforcement schedule.

Variable schedules of reinforcement are, in the literal

sense, really not schedules at all. Reinforcement is given neither continuously nor in accordance with any hard and fast plan. Rather, it varies in an irregular, uncertain pattern. With the variable-ratio schedule, the child might make the desired response 2 or 3 times before he is noticed, then he might have to make it 8 times before he is noticed again. He might be rewarded after the 9th or 10th response, but then not again till the 25th or 30th. With the variable-interval schedule, there is the same inconsistency, but with respect to the passage of time rather than the number of responses.

Behavioural psychologists have expended a great deal of time and effort attempting to discover which of these schedules is likely to be most effective with which type of learner for which type of learning. They have come up with a lot of findings that they regard as interesting if not important. They, however, insist that continued research in this field is vital for efficient behaviour modification.

2.2.6. QUALITIES OF A GOOD REINFORCER

An assessment effort aimed at identifying effective reinforcers may reveal a fairly large number of objects and activities that might be reinforcing for a particular child.

Therefore, it is sometimes necessary to select from among this list those reinforcers which lend themselves particularly well to the purpose of a treatment programme. A series of characteristics of a useful reinforcer is listed by Gelfand and Hartmann (1975).

To be useful, a reinforcer must maintain its reinforcing capacity over a long period of time; that is, it must resist satiation. For example, when food is used as a reinforcer, the child may become satiated within the first 15 minutes of an hour's training session. To combat this, one can either keep the individual reinforcer units small or the training session brief. Better still, one can use several different reinforcers or, ideally, rely on generalized conditioned reinforcers (tokens).

Since reinforcement is most effective when it is delivered immediately after the response has been emitted, a good reinforcer should be capable of being readily dispensed. A meal that must be first cooked, an outing that cannot be held until the following week-end, or a party that must be arranged weeks in advance are examples of cumbersome reinforcers.

Another desirable characteristic of a good reinforcer is that the child does not have access to it except in consequence of the behaviour the therapist, parent, or teacher wishes to

strengthen. This means that the delivery of the reinforcer must be under the exclusive control of the person seeking to use it. If the reinforcer is a favourite dessert or a small amount of money, the effectiveness of that reinforcer will be undercut if the child can get the dessert without working for it by going to a neighbour's house, or can obtain the money as a gift from granny. Providing a reinforcer when the child has not satisfied the agreed upon contingencies or conditions, giving a non-contingent reinforcer, destroys the effectiveness of that reinforcer. It stands to reason that the selected reinforcer should be compatible with the goals of the treatment programmes, that it should be readily available, and that it fit into the value system and economic reality of the child's family. One would not want to use food as a reinforcer for weight loss nor dispense caramel candy in the course of a session devoted to speech training. One should avoid using a reinforcer, even in the context of a programme using tokens that may not be available when it is needed, for example, a sled in the middle of summer. Lastly, where a family objects to the use of toy guns or the reading of comic books, a therapist would be ill-advised to place these objects among a child's back-up reinforcers, just as monetary reinforcers should not be introduced in amounts the

family cannot afford or seems excessive. A therapeutic programme should not be the cause of family conflict.

2.2.7. EVALUATION OF REINFORCEMENT PRACTICES

The deliberate use of positive reinforcement, particularly in the form of tangible rewards, often gives rise to ethical objections and concerns about harmful effects that may result from such practices. The attitude most commonly expressed is that desirable behaviour should be intrinsically satisfying. It is feared that if persons are frequently rewarded, they will be disinclined to behave properly unless continuously paid to do so, and when the customary rewards are discontinued, they will cease responding altogether. It is further established that rewarding practices not only establish weak and unenduring behaviour, but that contingent reinforcement is likely to interfere with the development of spontaneity, creativity, intrinsic motivational systems and other highly valued self-determining personality characteristics. Some of the more intemperate criticisms consider the deliberate use of reinforcement to be deceptive, manipulative, and an insult to the personal integrity of human beings.

Critics of the reinforcement method generally create the impression that change agents work with nature and intrinsically

motivated persons, but, rather than appealing to their higher symbolic motivations, insist upon imposing crass materialistic incentives upon them. Ordinarily, however, primary rewards are employed in initial stages with persons who are not reinforceable with other types of events and who would otherwise remain inaccessible to treatment. In the latter cases, it would be no more appropriate to rely upon developmentally advanced incentives than to teach young children how to count by commencing with the principles of advanced mathematics. After reinforcing functions have been imparted to social and symbollic stimulus events, more subtle and naturally occurring reinforcers are increasingly employed. Without initial concrete training, psychologically incapacitated persons are relegated to a sub-human existence in custodial institutions.

There are several ways in which reinforcement systems can be devised and altered during the course of treatment to ensure that existing behaviour does not readily extinguish.

After reinforcement patterns have been firmly established through continuous reinforcement, the schedule is gradually thinned out, by providing rewards on increasingly variable ratios and intervals so that the rewarding consequences occur only

periodically. Intermittently reinforced behaviour is extremely resistant to extinction. The durability of behaviour under less favourable reinforcement conditions can also be increased by gradually reducing the amount of reward after the behaviour has been sufficiently strengthened or by increasing the amount of work per reinforcement.

2.3.0. *T I M E - O U T*

2.3.1. INTRODUCTION

There has been an increased emphasis in recent years on identifying and implementing less intrusive interventions in behaviour therapy for children with developmental disabilities. Ethical considerations regarding deleterious side-effects of some punishment procedures and preferences of care providers for less intrusive and less restrictive forms of intervention have contributed significantly to this trend.

There are various types of contingencies: presentation of a positive or negative reinforcer and removal of a negative reinforcer. Another possible contingency, removal of a positive reinforcer, has been termed time-out by Ferster, who has investigated it at some length (Ferster, 1957, 1958). The removal of

reinforcers includes the removal of attention, loss of privileges, or the implementation of time-out. Time-out is an abbreviation of the phrase `time-out from positive reinforcement'. It signifies a cessation of all available reinforcers, usually for a short duration. When applied to the child, this usually involves his removal to a corner or to his bedroom where all available reinforcers (such as adult attention, toys, television, and peer attention) are unavailable.

Since presentation of a reinforcer is very brief in temporal duration, removal of positive reinforcement mainly involves removal of stimuli associated with its presence. Usually a time-out period, when the organism can no longer obtain positive reinforcement contingent on his responding, is signaled by a time-out discriminative stimulus. In daily life, the "cooling-off" period for children overly excited in a game, the interruption in a mother's story-telling for a misbehaving child, the refusal to serve a boisterous drunk at a bar, etc., are among the many examples of time-out. In these situations, the contingent withholding of positive reinforcement often preceded by threats is used to put the behaviour under control of the rewarding agent.

Ferster (1958) demonstrated that time-out has many of the properties of conventional aversive events for the on-going response. A number of other studies employing time-out procedures support the general conclusion that it acts as an aversive event. Lietenberg (1965), in reviewing this research points out that "the most convincing evidence that time-out is aversive comes from those studies demonstrating escape from stimuli which previously set the occasion for non-reinforcement" (p. 439). Leitenberg notes also that time-out, at times, produces different effects like electric shock in a punishment paradigm and that shock is a more effective suppressor.

The time-out procedure in humans permits the occurrence of avoidance or escape responses when used in a punishment paradigm. For example, a child who is sent to his room for misbehaviour during a party can indulge in fantasy or other substitute behaviour that reduces the aversive consequences of the procedure. Similar to the case of punishment, the effects of the control procedure are weakened when other positive reinforcement is available. The similarity to punishment also holds with regard to the relationship of the magnitude of "lost" reward and the effectiveness of the technique. That is, the overall frequency or magnitude of positive reinforcement under a particular schedule

for correct responding will influence the effectiveness of time-out in suppressing incorrect responses.

2.3.2. TYPES OF TIME-OUT

Time-out is among the most widely used interventions for reducing maladaptive behaviour. Several variations of time-out, which differ in degree of intrusiveness, have been reported in literature. The most restrictive and intrusive form of time-out reported is isolation time-out. In this time-out variation, the subject is removed from an area of reinforcement and placed in another location with relatively sparse reinforcement, typically a time-out room void of materials and other persons. Exclusion time-out is a less intrusive variant of time-out that also involves removal of the subject from the immediate reinforcement area. However, instead, of complete isolation from others, the subject remains in the same room but is seated facing the corner or behind a screen in order to restrict access to reinforcement. Still less intrusive are two procedures reported in the literature as Nonexclusive time-out. Foxx and Shapiro (1978) had children wear a time-out ribbon when engaged in appropriate behaviour. Contingent on disruptive resp- onses, the ribbon was removed briefly indicating that the child-ren could not

participate in reinforcing activities, although they were allowed to observe the classroom activities.

Although all of the above time-out variations have been shown to reduce children's maladaptive behaviours, there is no information available regarding the comparative effectiveness of different time-out procedures. If the effectiveness of time-out increases with the intrusiveness of the procedure, practitioners may be inclined to use the more intrusive forms of time-out for difficult cases. However, if time-out variants do not differ appreciably in their effects, the use of less intrusive procedures would seem to be warranted.

The success of time-out depends upon careful selection of the appropriate location, upon the correct implementation of the procedure, and upon ensuring that it is not abused by the parents.

Time-out is an effective form of punishment and also a safe one. It allows the opportunity for highly charged emotions to diffuse and may, in some instances, decrease the risk of battering. However, it is important to ensure that parents do not abuse the system and conveniently `forget' about the child who has been sent to time-out.

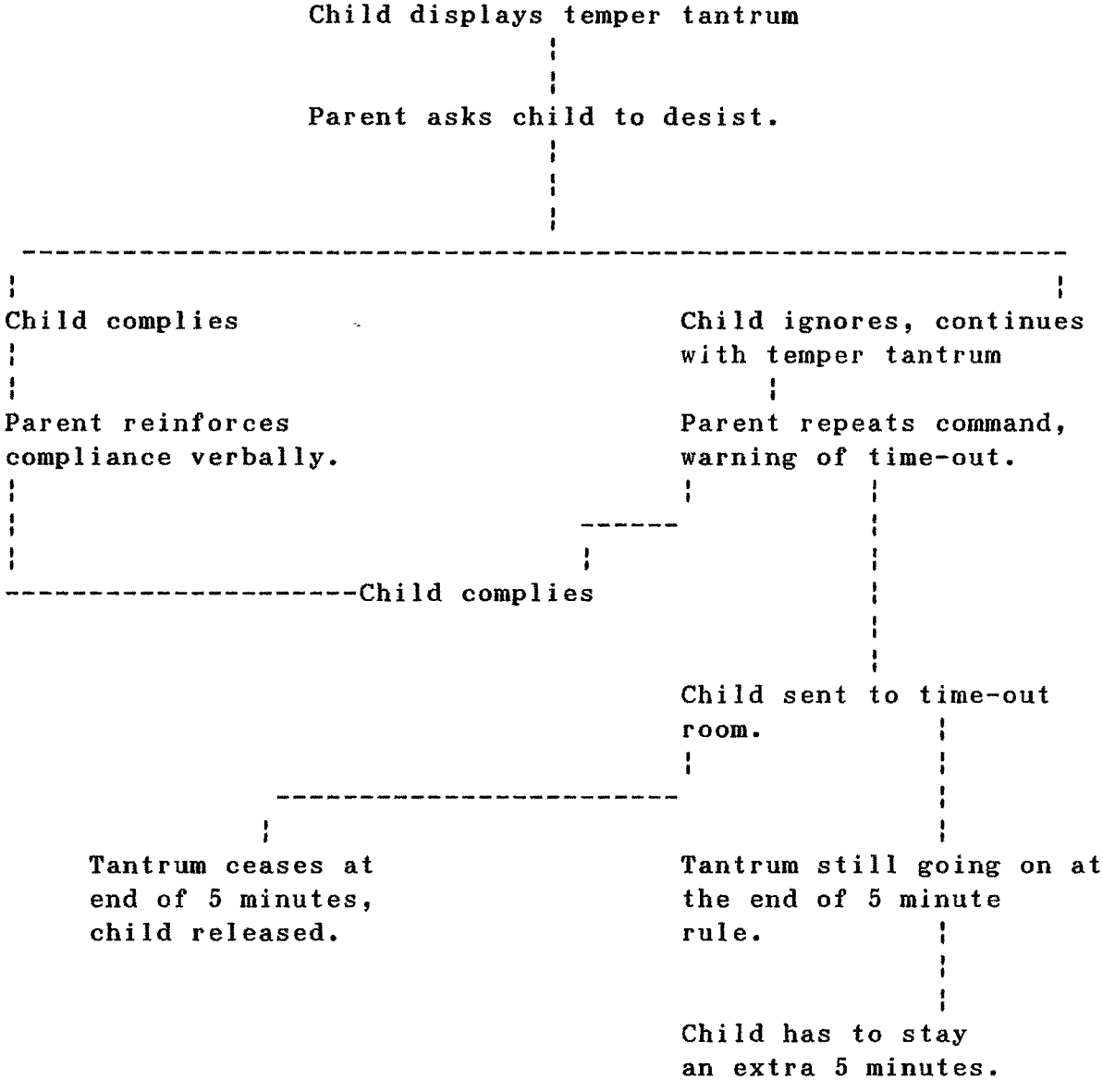
2.3.3. IMPLEMENTATION OF TIME-OUT

The best way to ensure that time-out is implemented is by means of a 3-stage procedure - the three step contingency. The stages are as follows (see flow chart). Stage 1: the child is commanded to do something or to stop doing something; Stage 2: the child is rewarded if he complies, if he has not complied within a reasonable length of time (which is judged according to the content of the command) then a second command is given with a punishment warning; Stage 3: the child is rewarded if he complies, if he has not complied within a further reasonable time he is sent to time-out.

As always, considerable emphasis is laid on the verbal and non-verbal style of the parents. The commands should be given in an authoritative manner and should clearly specify what is expected of the child. In the early stages of intervention, parents are asked to overact the commanding style. It is hoped that in doing so they are helping the child in discriminating a change in parental consequating. If stage 3 is reached, then the child is asked to go to time-out. At this time the parents should not allow any argument to develop about the time-out but simply ensure that it is carried through.

FLOW CHART-

An example of the stages in the use of time-out.



The only verbal exchanges now allowed should be restricted to the parents informing the child that he must remain in time-out until he has been quiet for 5 minutes (or whatever time has been decided upon). At the end of this duration, the child is informed that he may come out. If the original command was one which required the child to complete a specified task then the whole procedure is repeated. The ultimate goal is compliance and child reward. Following the eventual reward the parents are asked to re-explain to the child the new house-rules and the reasons for his punishment. This explanation is important because it actively engages the parent in teaching the child appropriate behaviour and it also helps the child to discriminate the new situation and thus avoid high frequencies of time-out.

2.3.4. PROBLEMS IN IMPLEMENTING TIME-OUT

Initially, time-out rarely runs as smoothly as in the above outline. The frequently encountered problems are (a) refusal to go to time-out, (b) refusal to remain in time-out, (c) refusal to leave time-out.

In the majority of cases, initial refusal is almost inevitable. Younger children should be physically removed to

time-out. This must be done quickly and without arguement or overt anger. If the child is older, or if the parents are unable to physically implement the punishment, then a response-costing method should be used. This would involve the parent stating that 1 minute extra will be added to the time-out duration for every 15 seconds that the child refuses to comply with the punishment. Again, this should be stated without overt anger or arguement. Once 15 minutes has been added to the time-out duration and the child has still not complied, the parents could, if necessary, remove time from privileges. Parents should ensure that any time penalties lost in this way are recorded and put into effect later. Once maximum time penalties are reached (these are always set prior to intervention) the parent then simply ignores the child until he complies. However, this has rarely been the case, where the appropriate procedure was followed (McAuley and McAuley, 1977). The changes in parent consistency and verbal style contribute significantly to an increase in child compliance. However, these parental changes alone (that is, without the use of punishment) are insufficient to effect large and sustained improvements in the child's behaviour.

Refusal to remain in time-out maybe encountered initially. If the child was physically removed to time-out, then the parents

continue this physical restriction until he sits quietly on his own. At this time, they should begin timing the duration. Above all, parents should be prepared for the initial trauma of this procedure. They must not show anger, or even anxiety when the child screams and shouts. If necessary, these initial time- out sessions should be supervised by the therapist until the parents feel more confident or the child has learned to sit quietly. In some cases, the initial time-out session may last up to an hour or more. In one case, where time-out sessions were of long durations due to the child's refusal to sit quietly, an older sibling was employed as a confederate to model the time-out situation (McAuley and McAuley, 1977). This was to demonstrate to the deviant child that he was only required to sit quietly for a few minutes. This procedure contributed to the reduced duration of subsequent time-outs. With older children when a response-costing method has been employed for the initial refusal, the parents continue to use it for each episode. If the child remains in time-out but is not quiet, then the duration does not begin until he is quiet.

When the duration of time-out has run out, the parents inform the child that he may leave, but they should not persuade him to do so. Parents often find it upsetting when their children

remain in time-out after the required time has elapsed. They infer from this that time-out is having little effect on their behaviour. Often associated with this is a blase child attitude to time-out. The child may leave, saying, "I don't care, it doesn't matter to me". Parents should ignore this attitude and concentrate only on ensuring that the procedure is fulfilled. After a few days it will be possible, by reviewing observational data, to assess whether time-out is having the desired effect.

Time-out has a number of counter-productive effects for the child. He is in the limelight, possibly acting the buffoon and, therefore, still the center of attention. Or he is getting out of doing some unwelcome scholastic task. Another disadvantage of time-out is that it may prove to be more attractive to the pupil than the classroom, and thus act as a reinforcer of the behaviour it is intending to punish.

2.3.5. APPLICATIONS OF TIME-OUT

In practical settings, time-out also has the advantage of interrupting an interaction that has explosive potentials for escalation. The dispenser as well as the recipient of reinforcers can use the time-out interval to consider his own behaviour, to

review alternate strategy, and to calm down. Since a child's aversive behaviour has its effects on the teacher, for example, imposition of a time-out interval can prevent her from overreacting emotionally to the child. In many instances of clinical application, punishment is also impractical or inadvisable. Extinction may not be possible because a child's disruptive behaviour is often dependent on reinforcers that are hard to identify or impossible to control. The time-out procedure offers a convenient alternative technique.

Time-out procedures are frequently used as mild punishment to eliminate disruptive behaviours. Their use presupposes that the person is under relatively high reward conditions, since the termination of positive reinforcement must have some aversive impact and must be readily discriminable. The husband who threatens to leave home unless his wife stops nagging him will have little effect on these behaviours if she is eagerly looking forward to being rid of him. Nor will a child stop yelling under threat of time-out if class attendance is aversive to him and time-out promises to bring some relief. In fact, under conditions of low positive or high aversive reinforcement, the contingent time-out procedure for the disturbing response serves as a

relief-stimulus, strengthening the noxious response according to the escape paradigm. Thus the reluctant child learns that destructive behaviour in an unpleasant situation can lead to escape into time-out; the apparent ineffectiveness of this procedure is often due to its inept utilization.

A frequent suggestion to parents for handling behaviour problems of a child in the home is that physical isolation, equivalent to time-out, be contingent upon undesirable behaviours. This procedure, however, is likely to involve more features of behaviour control than just time-out. Isolation, for example, being confined alone in a room for a specified period, may in itself be aversive aside from its properties as time-out (This assumes, as a time-out procedure must, of course, that the room is not full of alternative attractive reinforcement opportunities, such as a television set or a phone). Time-out removes positive reinforcement for the undesired behaviour (for example, attention from parents and siblings) and reduces the total amount of positive reinforcement for all responding. And finally, since release from time-out (from the room) is usually made contingent upon both lapse of time and cessation of the target response, release may positively reinforce behaviours competitive with the target behaviour. In application of time-

out, as with other techniques, it is difficult to distinguish the sole effective variable that maybe producing therapeutic changes.

2.3.6. EVALUATION OF TIME-OUT

In a survey of reports on experiments and clinical reports of time-out, Patterson and White (1969) believe that the following conclusions about the use of this technique are warranted:

1. In a variety of situations, especially the classroom, time-out has been more efficient and effective than what might be termed "passive ignoring".
2. Although time-out of long duration has been used ... short periods have added the advantage of allowing for an increase in time available for positive reinforcement of acts representative of social skills.
3. The size of time-out rooms need not be restricted to cramped quarters. Studies reporting effective use of time-out have used rooms about the size of a small bedroom .
4. Maintaining supervision of time-out while in use is desirable.It is necessary in studies where the child is to be returned to class immediately following cessation of tantrum behaviour. In addition, several investigators subscribe to the

notion that high amplitude destructive or verbal behaviour in time-out should be mildly punished by telling the child "That cost you two more minutes. Every time you kick the door,it's two more minutes".

5. Time-out procedures avoid some of the procedures associated with the use of direct physically painful punishment. For example, use of time-out, contrasted with physically aggressive punishment methods do not provide the child with an aggressive model for imitation. That is, no models using methods of counteraggression which would be used against parents, teachers, or peers.

(Patterson and White, 1969, p.3).

Behaviour modification techniques such as time-out, which are designed to eliminate inappropriate or undesirable behaviour, are unlikely to succeed unless supplemented by the reinforcement of an alternative and more appropriate behaviour pattern. Time-out, used in conjunction with extinction and positive reinforcement, is effective in reducing a variety of deviant patterns of behaviour.

Besides the above-mentioned intervention strategies, the third strategy used was the science of Yoga.

2.4.0. Y O G A

2.4.1. INTRODUCTION

Yoga is the science of an individual's well-being. Like any other science, yoga is also based on certain basic principles. Its investigations, findings and applications are based on logical and rational considerations. The inventors of this science discovered that a man possesses two distinct faculties - body and mind - and unless both are given due attention, the desired goodness cannot be achieved. Faced with these problems, they developed systems of enriching both body and mind. But since these two faculties of the individual are not isolated entities, and as they are interdependent, a system was also developed to coordinate and harmonize them. And what we have in yoga is plainly this: there is one distinct system of physical well-being, another for mental well-being, and still another for harmonizing the two. What makes this science unique is its all encompassing nature of individuals' problems. What makes it universally acceptable is that there is no other science in any corner of the earth which can match the quality, content, methodological process and contributions of yoga.

2.4.2. MEANING OF YOGA

There are a good many ably written works on yoga, both in vernaculars and in english, and each has tried to define yoga in its own particular way. Some have defined yoga as "self concentration with a view to seeing the soul as it looks when it is abstracted from mind and matter". Patanjali describes yoga as "suppression of thought". Here the word `thought' must not be understood in the usual narrower sense of reflection, but should be taken to mean consciousness which includes sensibility, imagination, and dreams.

A simple definition of yoga is found in the Bhagvad-Gita, where it is described as "equanimity of mind in thought and deed, resulting in efficiency of action, done as service dedicated to God". But the following is a more or less comprehensive definition of the term yoga. "Yoga is the science which raises the capacity of the human mind to respond to higher vibrations, and to perceive, catch and assimilate the infinite conscious movements going on around us in the universe" (Sri Ananda, 1981).

In ordinary parlance, the word `yoga' is said to be derived from the Sanskrit root `yuj' which means `to yoke'. Yoga means union. It could be a union of two or more opposite gunas, forces

or powers. But what is implied in this union is the causation of equilibrium and harmony. Yoga, therefore, also means a science of equilibrium and harmony. According to yogic interpretations, these opposite forces or powers are ever-present in all matters and living beings of the universe. In a human, these opposites are in his bodily realm as well as in his mental realm. In the bodily realm, the identification of these opposites are the Ida, Pingala, and Sushumna nerve channels. The first represents the negative, the second the positive and the third is the channel of harmony between the two. In the mental realm, likewise, there is the presence of these forces - positive, negative and righteousness.

The yogas which deal directly with the aforementioned forces are Hatha yoga - concerned primarily with the physical, Raja yoga - concerned primarily with the mental and Karma yoga - concerned with both the physical and the mental aspects of the individual. Besides these three yogas, a fourth yoga is Jnana yoga, the science of acquiring proper knowledge. The emphasis, in the present study will be on Hatha yoga.

2.4.3. HATHA-YOGA

The word *Hatha* has the literal meaning of `force, power,

exertion'. According to the `*Yogashikha-Upanishad* it is also attributed with an esoteric significance, in that it is connected with the two syllables *ha* meaning `sun' and *sa* (=*tha*) symbolizing `moon'. Hatha yoga would thus signify the union of these two principles which are symbolic expressions of the left and right current of life-force (*prana*) circulating in the subtle body' (*Sukshma-Sharira*).

Hatha yoga is a system of finely elaborated psychosomatic techniques which serve as a means to the transformation of the human body into a `divine body' (*Divya-Sharira*) or `diamond body (*Vajra-Deha*) which alone bequeaths immortality. There are 4 outstanding features which characterize Hatha yoga:

1. It replaces the antecedent Upanishadic notion of the body as an abode of unending suffering and pain by a more positive attitude towards physical life, in that it regards the body as an invaluable instrument for effecting emancipation.
2. It stresses the psycho-physical aspect of yoga practice without, however, neglecting its spiritual aims.
3. It teaches a well-balanced polarity dualism (Shiva-Shakti doctrine) which is philosophically more satisfactory than the absolute dualism of Raja yoga or the unqualified monism of some

schools of Advait-Vedanta.

4. The accentuation of the psycho-physical aspect of the yogic path led to a profound knowledge and understanding of those phenomena which belong to the `inner' dimension of nature and to the `subtle body', such as *Prana* (the life-force), the *Chakras* (the various focal points of the life force in the subtle body) and the mysterious *Kundalini-Shakti* (serpent power).

Though it concerns itself more than any other system of yoga with the human body, Hathayoga must not be interpreted as an equivalent of physical culture or gymnastics. Its declared goal is that of every other form of genuine yoga, namely the emancipation of man, understood as his realization of the self.

The techniques of Hathayoga are designed to enable the adept to gain full control over the autonomic nervous system. The extraordinary powers of Hatha yoga are repeatedly emphasized in Sanskrit text. According to the *Goraksha-Samhita*, perhaps the oldest text on Hatha yoga, there are 6 `members' to this forceful yoga.

1. *Asana* - posture
2. *Prana-Samrodha* - control of life-force.
3. *Pratyahara* - sense withdrawal

4. *Dharana* - concentration

5. *Dhyana* - absorption

6. *Samadhi* - (ecstasy) deep meditation

The exclusion of the ethical precepts - *Yama* and *Niyama* -in this enumeration does not mean that they are ignored in the actual practice.

The *Gheranda-Samhita* offers a slightly different series:

1. *Shat-Karma* - 6 acts, a set of preliminary cleansing practices
2. *Asana* - posture
3. *Mudra* - gesture, symbolic bodily postures.
4. *Pranayama* - control of life-force
5. *Pratyahara* - sense-withdrawal
6. *Dhyana* - absorption
7. *Samadhi* - (ecstasy) deep meditation

The fact that concentration is not mentioned in this 7-fold yoga points to the intimate relation that exists between the process of sense withdrawal, concentration, and absorption.

Hatha yoga is an off-shoot of Tantrism and as such a comparatively recent development in yoga. It probably originated

during the latter half of the first millennium A.D. Tradition celebrates Gorakshanath (also Goraknath) as the founder of this type of yoga. Goraksha is ascribed with the authorship of two Sanskrit works, *Hatha Yoga* and *Goraksha-Samhita*. His teacher is the legendary Matsyendranatha (also Minanath), one of the 84 perfected ones *(Siddha)*. Numerous legends have been woven around these two masters, and it is difficult to extract the historical realities from them.

Hatha yoga is the immediate successor of the *Siddha* cult of Tantrism which promoted the `cultivation of the body' or `realization through the body' *(Kaya-Sadhana)*. The central idea of this path is that a body is not a hinderance to supreme enlightenment as generally held in pre-tantric times, but the temple of the divine. The primary intention of Hatha yoga is to prepare the body for higher spiritual practices, to `bake' it hard in the fire of physical yoga *(Gatastha-Yoga)*. It purports to be a ladder to Raja yoga which emphasizes the virtue of meditative discipline. Hatha yoga revives the ancient and popular ideal of `immortality' in the body by striving after emancipation in a perfected physical vehicle *(Siddha-Deha)*.

As mentioned earlier, asanas form the third item of the

yogic curriculum. Asana is considered as a physical aid to concentration. Hatha yoga deals with innumerable postures of the body, aiing at perfecting the physical mechanism of the body, bringing about longevity and resistance to disease.

These asanas can be divided into 2 groups, namely meditative and cultural postures. The aim of the cultural poses is to produce physiological balance in the different systems working in the body, so that it can possess the best organic vigour. They are specially intended to take particular care of the spinal column and also other parts of the body to train the spinal cord and the brain, so that both of these can sustain the interaction of the spiritual force of kundalini when the same is awakened with advanced yogic practises. These cultural asanas involve different physical movements before the final pose is assumed, and the final arrangement of the various parts of the body, being essentially an out-of-way fashion, renders meditation difficult, if not impossible.

The aim of the meditative poses therefore, is to offer a comfortable posture for Pranayama, etc. and, in co-ordination with other yogic exercises, help the student of yoga in the awakeming of the kundalini. These meditative poses are such as

can be maintained for hours without much discomfort. They do not involve, in their technique, any out-of-the-way movement of the body, and are, in their final stage, some variety of ordinary sitting, with a few changes introduced to make the pose more useful for the purpose of meditation.

The sample of children in the intervention group of yoga in the present study were made to perform the following asanas.

PADMASAN OR THE LOTUS POSE - This is one of the most important poses. Amongst the 4 poses described for meditation, Padmasan comes foremost. It is the best asana for contemplation. It is suitable for householders, men, women and children.

The pose is called Padmasan because it is in imitation of the lotus that the hands and feet are arranged in this asana. `Padma', in Sanskrit, means a lotus. Possibly, the two feet placed on the opposite thighs represent the lotus leaves, and the two hands arranged one above the other stand for the blooming lotus.

Technique The student first takes his seat with his legs fully stretched out. He then bends his right-leg at the knee-joint, and folding it upon itself, sets the same on the opposite hip-joint,

so as to make the foot lie stretching at the root of the thigh with its sole upturned. The other leg is similarly folded and placed on the opposite hip-joint. Both the heels are adjusted in such a way that they almost meet in front of the pubic bones and each of them presses into the abdominal portion adjacent to it. Then, on the heels thus brought together, the left hand is spread out with its back touching the heels and its palm upturned. The right hand is placed upon the left in the same manner. The eyes are directed to the nose-lip. Except for the neck, the spine is to be maintained erect.

Cultural Advantages All over the lower extremities, the flexors are greatly contracted and pressed. This circumstance, coupled with the passsive condition of all the remaining muscles of the lower extremities maintained for a considerably long time, interferes with the free current of blood circulation. That being the case, the pelvic region gets a larger supply of blood from the bifurcations of the abdominal aorta. (Swami Kuvalayanada, 1977).

This meditative pose is a highly suitable pose for *japa* and contemplative purposes. It increases the digestive fire and gives good apetite, health, and happiness. It removes rheumatism. It

keeps the wind, bile and phlegm in proper proportions. It purifies and strengthens the nerves of the leg and thighs.

The Lotus Pose is the most difficult of all, but it has cultural and therapeutic points in its favour which make it the most scientific posture for yogic discipline. It may cause considerable discomfort at first, but the results are worth the effort. Ability to perform this asana varies with individuals. Some are able to take the position easily, others find it very difficult. It is a splendid position for breathing exercises and for meditation.

YOGA-MUDRA OF THE SYMBOL OF YOGA - The compound Yoga-Mudra is formed of two members: Yoga and Mudra. In all probability, the word Mudra is used here to mean a symbol; and the exercise is called Yoga-Mudra because it is useful in awakening the Kundalini.

Technique The first step in this pratise is to prepare the foot-lock, that is, as in Padmasan. The two heels must press against portions of the abdomen so that they touch. The hands are then brought behind the back, the right hand grasping the left wrist. Next, the student bends himself forward so as to touch the ground with his forehead.

Care must be taken not to give jerks to the spinal column. Many people find it difficult to secure the necessary bent. They should try and bend as far as they can do so smoothly and comfortably. What little bent may become possible should be maintained for a time. That will enable the student to bend himself further, and after practise of some days, he will find even the last position quite easy. The breath is allowed to flow as usual. Exhalation, as one bends, is likely to be helpful.

When practised as a pelvic exercise, Yoga-Mudra should last only for a few seconds, from 5-10 seconds at the most. It maybe profitably repeated from 3-5 times at a sitting. For the purpose of the short or easy course, 5 turns of Yoga-Mudra maybe sufficient. When practised as an exercise in nerve cutlure on the physical side, Yoga-Mudra maybe maintained for 3 minutes.

Cultural Advantages Yoga-Mudra builds a powerful abdominal wall, helps the abdominal organs to be kept in their proper places and tones up the nervous system in general.

Therapeutic Advanatages - Yoga-Mudra relieves constipation by replacing the displaced abdominal visceral. It improves circulation of blood in the face and head regiones and eliminates toxic wastes. The intra-abdominal compression gives a gentle

massage to the internal organs. And it leads to a relaxed passive state of consciousness.

ARDHA-MATSYENDRASAN OR THE HALF-MATSYENDRA POSE OR THE TWIST - The pose is called Ardha-Matsyendrasan because it does not require the entire technique of the full Matsyendra pose. The full posture was invented by Bhagwan Matsyendra, one of the pioneers of yogic culture, and is the only yogic pose to be named after anything other than a plant or an animal. Although of high spiritual value, the original pose is somewhat difficult to practise. The Half-Mastsyendra Pose is easy to practise and has many physiological advantages.

Technique - To start with, the student sits on his seat with his legs fully stretched out and placed close to each other. He then bends in the knee of one of his legs, say the right, and, folding it, sets its heel tight at the hip-joint of the other leg. (Sometimes an attempt is made to sit on the heel, but this is a wrong procedure and should be studiously avoided.) Then the student withdraws his left leg and, bending it at the knee, arranges it in such a way that the left foot rests on the right side of the right thigh.

The main feature of the pose consists in twisting the spinal

column. The steps taken upto now are only a preparation for securing this twist with mechanical advantages derived from particular arrangements of the extremities. The erect knee, here the left, is now to be used as a fulcrum upon which the right shoulder-joint is to rest its back. This is done by passing the right hand around the left knee and rotating the whole trunk to the left till the right shoulder and left knee stand pressing against each other. With a view to obtain full rotation of the trunk and to prevent the knee slipping off the shoulder, the right hand is fully stretched out and made to grasp the left foot or its toe which is now availble on the wrong side. Care should be taken not to strain the elbow-joint, as such a strain might result in a fracture. The danger is completely avoided by firmly setting the shoulder against the knee.

In order to obtain additioned mechanical advantage for securing the spinal twist, the student now employs the left hand. He swings it back and tries to have a hold upon the back on the right side. Thus there are two forces operating upon the two upper corners of the trunk twisting it to the left and these two together are competent to effect the fullest possible twist. The contrivance, however, does not affect the cervical vertabrae. In order that these might cooperate with the remaining, the head is

swung to the left till the chin find itself almost in line with the left shoulder.

Throughout the practice, the student must take care to see that his chest stands erect and does not droop drown.

The same pose is to be tried using the left extremities instead of the right and vice versa, so that the two opposite twists would move between them the different vertebrae through all the rotating space available.

Cultural Advantages. If the spinal coloum is to be maintained in the best of health, it must be trained to execute all the movements through which it is capable of going. The natural movement of the spine maybe of 6 varieties: forward and backward bends, side bends to the right and left, the left twist and the right twist. Ardha-Matsyendrasan is one pose which gives the two side twists the greatest efficacy and as such has a very great cultural value. This pose also secures the side bents for the spine,although not on a very large scale. Hence, every scheme for the culture of the spine must find a prominent place for Ardha-Matsyendrasan and must coordinate it with the backward and forward movements of the spinal coloum.

Therapeutic Advantages. As a curative measure, Ardha-Matsyendrasan can be effectively prescribed against constipation and dyspepsia. Against enlarged and congested liver and spleen and inactive kidneys, it could be practised with advantage. (In order to reap the highest therapeutic advantage, this pose should be combined with other excerses that may be indicated by the patient).

PASCHIMATANASAN or the POSTERIOR-STRETCHING POSE- The posture is called Paschimatanasan because it streches the posterior muscles of almost the whole body. In Sanskrit, *Paschima* means to stretch; thus, Paschimatanasan means stretching the posterior. Text-books of yoga also give a spiritual interpretation of the name. The pose is capable of rousing spiritual forces that are felt travelling upwards through the spine. It is to connot this capacity of the asana that it is called Paschimatanasan.

Technique - The student begins by fully stretching his legs out on the seat and keeping them close to each other. He then bends forward a little, makes hooks of his forefingers, and catches hold of his big toes, the right toe with the right finger and the left toe with the left finger. A pull on the toes with the fingers secures not only a full relaxation but a complete

stretching of the posterior muscles of the legs. The student then further bends forward in the lumbosacral region, and stretching his trunk along his thighs, rests his face on his knees. This entirely doubles up his body through the hip-joints. The distance between his shoulders and his toes is much shorter than the hands, in this pose. Hence, the upper extremities are bent at the elbows and, if possible, are made to rest on the ground. Care is taken not to allow the knees to bend, straight knees being essential for maintaining a full stretch of the region.

In the case of nearly every beginner, the hamstring muscles -muscles which enable us to bend our knees and which are situated at the back of it - do not possess the elasticity necessary for this asana. The result is that the knees are raised when one tries to bend over one's thighs. With a little practise, however, young and well-built persons can soon make the hamstring muscles sufficiently supple, so that there is little trouble in securing the desirable bent even without raising the knees.

But people who are avanced in age, prematurely old, or have stiffened their muscles by over-exercise stand on a different footing. They experience some amount of difficulty in bending their thrunk effectively while maintaining a straight knee.

However, there is no reason for these people to become impatient. They should proceed into the practice of this asana slowly and steadily. Instead of trying to catch hold of their toes, they should seize their legs either at the ankles, or even higher up, at the knees. Without experiencing much discomfort, the trunk should be bent forward as far as possible, but the knee should always be kept stiff. This little bent, maintained for a time, will invariably make further flexing possible. Jerks, either mild or violent, should be studiously avoided. In a few days, the spine will begin to show signs of improved elasticity and the hamstring muscles will be better able to bear the necessary strain. When the toes are reached, they should be hooked by the fingers and the whole system of posterior muscles stretches by degrees. Suppleness will develop day by day, ulteimately making the full pose not only possible, but even comfortable. Regularity is essential.

For the purpose of physical culture, not more than 3 minutes should be the maximum time devoted to this pose. As regards a minimum time, just in the beginning, to secure the complete bent required for the full asana, the student may maintain the pose only for 15 seconds to start with, and slowly develop it to one minute only. But if, on account of stiffness of muscles, only a

partial bend is possible at the outset, the student should repeat the pose 2 or 3 times over and make a total of 1 minute. As the spine becomes more and more elastic, the 3 attempts maybe fused into 1, converting a period of 1 continuous minute. 3 turns of 1 minute each would make up the maximum of 3 minutes.

Those who practise the short course should maintain the pose for 5 seconds at a time and should repeat it according to their own measure.

Cultural Advantages Paschimatanasan is a fine stretching exercise. Nearly all the posterior muscles of the body, and partly the hamstring muscles at the back of the knees, are relaxed and fully stretched. The pose is also of great importance in the culture of the abdomen. The front abdominal musdes are vigorously contracted, which ensures better health and functioning for them.

Therapeutic Advantages Paschimatanasan builds a powerful abdomen and is found to be a good remedy against constipation and dyspepsia. The measure of this asana has to be judiciously adjusted. When maintained for a long time, it promotes constipation instead of relieving it. Habitually constipated people should avoid practising this asana for anything more than

3 minutes a day.

BHADRASAN OR THE THRONE POSE- The one asana that exercises the unused or less-used muscles of the thigh favourably is Bhadrasana or the throne pose. Technically, the throne pose is of two kinds: (i) the simple and (ii) the complicated. In the present study, however, the simple type was performed. Hence, only simple bhadrasana will be discussed here.

Technique- Sit on the floor with legs fully stretched out. Then draw both the legs nearer to the body while still keeping the legs in contact with the floor, with the knees bent outward and the soles of the feet together. With the abdomen controlled, inhale, and bring the feet with the toes pointing outward close to the generative organ, the heels touching the thighs. Retain the breath, place the hands on the respective knees pressing them down, palms outward, and hold the pose for 10 seconds. Exhale and return to the starting position - the legs stretched outward. Repeat without pause, remembering always to keep the upper part of the body and the neck erect.

Cultural and Therapeutic Advantages - In simple bhadrasana, the outward bend of the knees aids extreme stretching of both the superficial and deep muscles of the inner side of the thigh and

more specially of the interior of the pelvis. The latter, in turn, also reacts favourably on the muscles and ligaments of the urogenital region, besides exercising the joints of the lower extremities.

SAVASAN OR THE DEAD POSE - The pose is called Savasan because it requires complete relaxation of the muscles, as in the case of a dead person, whose position the student is made to imitate in the practise of this posture. *Sava* means `dead body' in Sanskrit.

Technique The technique of Savasan is simple to understand, but somewhat difficult to practise. It is as follows. The student is to lie on his back and fully relax his muscles. It is to be noted here that our muscles remain slightly contracted even while we lie down for a rest in a waking condition. Even this slight contraction is to be avoided in this pose. This requires an effort of will and concertration. The student should take a particular part of the body and thoroughly relax its muscles. Then he should concentrate upon that part and imagine that every muscle tissue in that part is further relaxing and is, as it were, collapsing. Constant practise of this procedure will enable the student to bring about full relaxation of different muscles. When the student succeeds in simultaneously relaxing every tissue

of his body, he should continue concentrating upon the relaxed tissues for some time. This completes the first part of the technique of Savasan.

In the second part, while maintaining the todily reaction already secured, exclusive attention is to be paid to the regulation of breath. Savasan aims at introducing rhythm in the flow of breath. The practise of rhythmical breathing is not as easy as it looks at first sight. The most difficult part of it is concentration. Patient work, however, will enable a student to achieve success.

A physical culturist can satisfy himself with the first part of Savasan, that is, with the relaxation of his muscles. He need not necessarily go in for the rhythmical breathing although, even to him, the second part of this pose will be of great value in improving his nerves.

Savasan, if rightly done, is so soothing to the nerves that there is always a tendency to fall asleep during its practise. This tendency should be checked studiously.

Cultural Advantages Muscles work more efficiently because of their relaxation. Venous blood circulation is promoted throughout

the body and thus fatigue is relieved. The whole nervous system is toned up and mental energy is considerably increased.

Therapeutic Advantages Savasan is helpful in reducing high blood-pressure and pulse rate. It can also effectively overcome neurasthenia. It establishes muscular equilibrium and complete relaxation and it helps in psychosomatic disorders.

Savasan should be the concluding pose for any group of yogic exercises.

PRANAYAMA- Pranayama means a `pause in the movement of breath'. In Sanskrit, *Prana* means `breath' and *Ayama* means a `pause'. In modern literature on yoga, Pranayama has often been interpreted to mean a subtle psychic force or a subtle cosmic element. However, the original Sanskrit text of Patanjali - Yoga Sutra - does not warrant this interpretation. In these Sutras, the Prana cannot be taken to refer to anything but `breath'. The author, Patanjali, positively refers to respiratory movements when he talks of Prana and Ayama.

Patanjali notices 4 types of Prana, the distinctions being based upon the nature of the pause. For instance, when a pause is made after a thorough exhalation, that would constitute the first

type of Pranayama, called *Bahya Kumbhak*. The second type would be available when the pause comes after a deep inhalation, called *Abhayantara Kumbhak*. In both these cases the yogic student is required to make a special effort for holding his breath, either in or out. But in the third and fourth types of Pranayama, called *Kevala Kumbhaks*, the student is not required to make any special effort to hold his breath. The respiratory movement may stop all at once when the student wants it to stop, the pause being continued over a considerable period of time without any physical effort on the part of the student. This constitutes the third type of Pranayama. The fourth type is similar to the third. The only difference is that in the fourth type there are many inhalations and exhalations preceeding it. The absence of effort in maintaining the pause is common to both, the third and fourth types of Pranayama.

Cultural and Therapeutic Advantages Pranayama, though it concerns the breath only, gives good exercise also to the various internal organs and the whole body. Pranayama removes all sorts of diseases, improves health, energizes digestion and invigorates the nerves. It bestows good health and a steady mind. A Pranayama pracitioner will have a light body free of diseases, a very fair complexion, a sweet, melodious voice and a pleasant smell of his

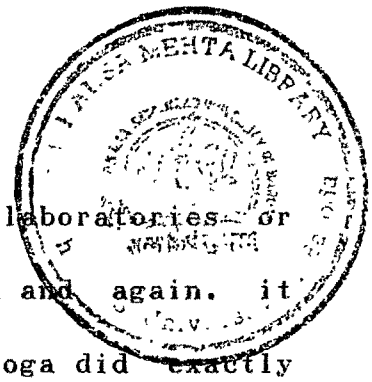
body. It helps aid circulation of blood, provide efficient control over respiratory movements and is useful for emotional control. Longer and deeper breathing provides a sedative effect on the nerves. It helps in steadiness of the mind and in concentration. More bioenergy is absorbed and stored in the body.

He who practises Pranayama will have good apetite, cheerfulness, great strength, courage, enthusiasm, a high standard of health, vigour, vitality, and a good concentration.

2.4.4. SCIENTIFIC PRINCIPLES OF YOGA

We will now consider the scientific principles on which yoga is based. Every science has its own distinct principle of operation and functioning, and the same is also true of yoga. In Hatha yoga, where physical exercises are performed by means of various asanas, the governing principle is to create a phase of standstillness while being in the process of motion. This principle of motion and motionlessness is present in all the asanas. If this principle is not maintained in the performance, then it will not be yoga.

What is the significance of this principle ? Any method or system, before it is called a science, is first experimented,



tested, observed, and rationalized either in laboratories or outside and when the known result is seen again and again, it qualifies as a science. The inventors of Hatha yoga did exactly the same. Their laboratories were their open surroundings. They observed and rationalized the life pattern of humans, animals, birds, plants, objects, and all other living things in the environment. When they found something good and desirable in them, it also made them find out the causation of that goodness. And they adopted that into their oven lives by following the same method of causation. As a result, all the 84 asanas of Hatha yoga (except one) are named after birds, animals, plants, some creatures, or certain objects of their surrounding.

In their investigation and research they found that though motion generates energy and power, a short phase of motionlessness in it generates manifold energy and power. They found the validity of this principle while watching a running lion, a dog, a cat, and other animals. As we know, a running dog, before it takes a leap, creates a phase of motionlessness. The animals do this because they need more energy for taking a jump than what is needed while running. And if this practice of motionlessness in motion can enhance the energy of an animal, it holds equally good for humans. Based on these findings, they

developed a system wherein while a practitioner of yoga creates motion by an asana, he also maintains motionlessness in the same asana. By doing so, while he is spending energy, he is also gaining energy. And this is exactly what we have in Hathayoga. It is the incorporation of this principle which makes Hatha yoga a unique science of physical excellence. There is no other system of physical science in the east or the west where this principle is incorporated. The superiority of this system over others is for various good reasons. In all the rest of the physical cultures, there is only mention which causes physical exhaustion, strain, and imbalanced conditioning of the body. Though not all of them have the same effect, many are such that they distort and disfigure the physical appearance of the practitioner. Yoga, on the other hand, does not bring any undesirable result either on the inner or on the outer parts of the body. The effect of yoga asanas is such that while it builds a proportionate body, it also adds beauty to it. While it strengthens, it does not distort; while it builds, it does not weaken. Hatha yoga thus becomes a most desirable science of well -being for modern men and women.

2.4.5. EVALUATION OF YOGA

Objective evaluation of yoga would imply interpretations,

criticisms, objections, and value-judgments held or expressed by all others except the true yogins. There are also such objective evaluations by the yogins themselves, whose evaluations are contained in a few selected works.

Many traditions and schools of yoga in the ancient past, and even today, have given cause for conflicting ideologies and techniques, which pass as one or other type of yoga. These are not wedded to one system of philosophy but to many, sometimes quite contrary to one another. Many are still trying to probe the numberless divergences inherent in multipurpose yoga but almost all of them failed to arrive at any definite solution which could give integral yoga its true and uniform perspective both with respect to its ideology and technology. Philosophers, academicians, scientists, sociologists, economists and others, for that matter all non-yoga appraisers, who indulge in splitting of ideas and words so as to give them such interpretations as suit their profession, thinking and evaluation, often detract and even misjudge more vital aspects of yoga philosophy and facts.

In consequence, various shades of misunderstanding seem to have prevailed and still continue to prevail regarding yoga. These misconceptions have, therefore, frightened many. The

layman, therefore, remained indifferent to all its virtues and some people actually abhor it as something antisocial.

However, in ancient India, every school of thought accepted yoga as an absolute sine quo non of the ultimate achievement in life. The yoga technique thus flourished under its own intrinsic vitality.

Yoga, interpreted in rational synthesis,represents the way of life which endows perfect health so that what is ignoble in man is sublimated to what is most noble in him. This can be achieved only by good health, both physical and mental. Good health, according to yoga, is not only an important requisite, but is looked upon as a sacred duty. The methodical study of yoga thus rightly begins with postural training and rhythmic breathing.

Regarded from the yoga point of view, it may be emphasized in conclusion, that the interdependence and correlationship between the body and the mind should at no stage be overlooked. Further, it hardly needs to be pointed out that this system of yoga has not been formulated without considerable thought and investigation, and that every detail has been worked out with great care and founded upon the clinical experieance of nearly

four decades. The physiotherapeutic results thus far obtained, whilst not exceeding expectations, have been, in the main, quite satisfactory.